E&I ENGINEERING LTD

IE LICENCE APPLICATION

Baseline Report

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IE Licence Application – Baseline Report
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19 August 2019

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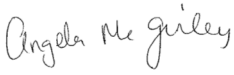
Angela McGinley		19 August 2019

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1 INTRODUCTION

This document presents the baseline report which has been prepared in accordance with the "European Commission Guidance concerning baseline reports under Article 22(2) of Directive 2010/75/EU on industrial emissions" (reference 2014/C 136/03). This guidance sets out a standard eight stage process that includes highly prescriptive requirements to complete the report and this report is set out on a stage by stage process as per the guidance below:

- Stage 1: Identifying the hazardous substances that are currently used, produced or released at the installation
- Stage 2: Identifying the relevant hazardous substances
- Stage 3: Assessment of the site-specific pollution possibility
- Stage 4: Site history
- Stage 5: Environmental setting
- Stage 6: Site characterisation
- Stage 7: Site investigation
- Stage 8: Production of the baseline report

2 STAGE 1: IDENTIFYING THE HAZARDOUS SUBSTANCES

2.1 Guidance Requirement

The draft guidelines from the Commission require the following details for Stage 1:

Identify which hazardous substances are used, produced or released at the installation and produce a list of these hazardous substances.

"Hazardous substance" is defined in the Guidance as substances or mixtures as defined in Article 3 of Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures.

Article 3 of Regulation (EC) No 1272/2008 defines hazardous substances and mixtures and specification of hazard classes as follows:

A substance or a mixture fulfilling the criteria relating to physical hazards, health hazards or environmental hazards, laid down in Parts 2 to 5 of Annex I is hazardous and shall be classified in relation to the respective hazard classes provided for in that Annex.

Where, in Annex I, hazard classes are differentiated on the basis of the route of exposure or the nature of the effects, the substance or mixture shall be classified in accordance with such differentiation.

A full list of the relevant hazard classes applicable are presented in Appendix B for reference.

2.2 Applicant Details

A full list of all substances and mixtures to be used produced or released during the process has been compiled and are presented in the following sections along with details of the nature of the hazardous substances identified. The Commission Guidance states that substances must include raw materials, products, intermediaries, by-products, emissions or wastes at the facility. While fuels are not a requirement these are included for completeness.

2.2.1 Substances Used

The main substances to be used at the facility include active raw material, process solutions and waste process solution and rinse waters. Attachment-4-6-2-Raw-Material-Interm-Product of the IE application lists details of process related raw materials used on the site. All of the above have been compiled to identify the "hazardous substances" at the facility which are listed in Table 2.1.

Table 2.1 List of "Hazardous Substances" to be used at the facility

Process Bath	Substance	Hazardous Category [1]	Hazardous Category [2]
Degrease (Stage 28)	SLOTOCLEAN AK90	H302,H315,H318 H360FD, H412	H412
Pickling (Stage 25)	Aluminium Pickle SLOTOCLEAN AK60	H319, H317, H351,H302, H290,H314	
Desmut (Stage 22)	SLOTOCLEAN DS10	H290, H302, H314 H318, H412 H301 H311 H332,H300 H310 H330 H314 H318	H412

[1] Article 3 of Regulation (EC) No 1272/2008

[2] Article 3 of Regulation (EC) No 1272/2008, Part 4 Environmental Hazards

Process Bath	Substance	Hazardous Category [1]	Hazardous Category [2]
Zincate Strip (Stage 21)	SLOTOSTRIP ZN 10	H314 H318	
Zincate (Stage 16)	Zincate CNF 10	H314,H318,H411,H290, H400, H410	H400,H410, H411
Nickel Strike (Stage 12/13)	Nickel Plate Solution NORMA (Nickel Watts + BFL)	H360FD,H301, H331,H315 H319,H334,H317,H341, H350i,H360D H372,H410,H302,H332, H315 H334,H317,H341 H350i,H360,H372 H400,H410	H400,H410
Oxidizer Copper Etch (Stage 9)	SLOTETCH 584	H272 H314 H318 H302 H335	
Acid Tin Plate (Stage 6/7)	Bright Tin CULMO 1	H332, H315, H318, H317, H335, H373, H412,H373, H318, H332, H315, H317, H335, H412,H302 H312 H314 H317 H341 H412,H226 H319,H411H290,H301 H311,H400	H400, H411
Antitarnish (Stage 4)	Antitarnish ALS 30		
Nitric Rework (Stage 20)			

2.2.2 Substances Produced

The process involves the surface treatment of busbars (aluminium and copper conductors) using an electrolytic and chemical process. The surface treatment of the aluminium and copper conductors will involve the dipping of the conductors in a number of different tanks with a different combination of chemicals and rinse water in order to provide a tin plate on the conductors to prevent corrosion. Therefore no substances are produced.

2.2.3 Substances Releases

The only releases from the facility are as follows:

- Discharges to air - There will be no main emission points at the facility (existing or proposed).
- Discharges to surface water – There shall be no emissions to surface water of environmental significance.
- Discharges to groundwater - There shall be no emissions to groundwater of environmental significance.

Given the expected nature of the above discharges, there will be no substances released from the facility that may be considered as hazardous substances and substances released are not considered further in this assessment.

3 STAGE 2: IDENTIFYING THE RELEVANT HAZARDOUS SUBSTANCES

3.1 Guidance Requirement

The draft guidelines from the Commission require the following details for Stage 2:

Identify which of the hazardous substances from Stage 1 are 'relevant hazardous substances' (see Section 4.2).

Discard those hazardous substances that are incapable of contaminating soil or groundwater. Justify and record the decisions taken to exclude certain hazardous substances.

'Relevant hazardous substances' (are defined in the guidance as those substances or mixtures defined within Article 3 of Regulation (EC) No 1272/2008 (Identified in Stage 1) which, as a result of their hazardousness, mobility, persistence and biodegradability (as well as other characteristics), are capable of contaminating soil or groundwater and are used, produced and/or released by the installation.

3.2 Applicant Details

Table 2.1 of Stage 1 presents the hazardous substances broken down into the following categories:

- Bath Solutions Make Up.
- Waste Bath Solutions and Rinse Waters

There will be a number of materials used at the facility which will contain hazardous substances. All of these substances (liquid and solid) are used in very low volumes and annual usage equates to approximately m^3 /per annum liquids and kg/per annum solids[3].

Each of these materials will be heavily regulated and controlled in terms of transport, storage and usage at the facility for both health and safety and environmental purposes.

All materials will be stored by enclosed storage. All storage facilities will conform to Best Available techniques (BAT). As such, there is no potential pathway to ground from a spill or incident involving these substances as any incident would be contained within the storage area which will be bunded. Similarly, transport and use of the substances is in very small volumes and all of which is carried out in the internal areas of the production building.

As such, there is no potential pathway to ground from a spill or incident involving these substances as any incident would be contained on the facility floors.

Furthermore, some of the materials listed in Table 2.1 do not pose a designated environmental hazard (hazardous to the aquatic environment as defined by Article 3 of Regulation (EC) No 1272/2008) and as such, in the unlikely event of a spill/incident involving these substances, the environmental consequence would not be significant. Given the very low probability of an incident occurrence coupled with the absence of any environmental consequence, there is no pollution risk associated with these substances. As these hazardous substances are incapable of contaminating soil or groundwater, they are discarded as "relevant hazardous substances" and are not considered further in this assessment.

For each of the materials identified in Stage 1, a review of the following parameters derived from the MSDS has been completed to determine which, if any, of the substances are considered "relevant hazardous substances":

- Physical state

[3] Table 3.1 of Operation Report

- Solubility
- Toxicity
- Mobility
- Persistence
- Biodegradability
- Environmental Hazard (Part 4 of Regulation (EC) No 1272/2008)

Each of the above is identified and used to determine what substances are included as “relevant hazardous substances” along with a rationale for the decision making. This element of the assessment is presented in Table 3.1. Details of the chemical characteristics and environmental fate of these substances has been derived from the following website European Chemicals Agency (ECHA http://echa.europa.eu/information-on-chemicals) as prescribed by the Commission Guidance and MSDS sheets.

Based on the analysis the following are listed as “relevant hazardous substances” at the facility:

Table 3.2 List of 'Relevant Hazardous Substances' to be used at the facility

Process Bath	Substance
Degrease (Stage 28)	SLOTOCLEAN AK90
Desmut (Stage 22)	SLOTOCLEAN DS10
Zincate (Stage 16)	Zincate CNF 10
Nickel Strike (Stage 12/13)	Nickel Plate Solution NORMA (Nickel Watts + BFL)
Acid Tin Plate (Stage 6/7)	Bright Tin CULMO 1
Antitarnish (Stage 4)	Antitarnish ALS 30
Nitric Rework (Stage 20)	

This “relevant hazardous substances” is further assessed for risk of soil and groundwater contamination in Stage 3 (Section 4) of this report.

Table 3.2 Assessment of 'Hazardous Substances' at the facility

Substance	Physical State	Soluble in Water	Toxicity	Mobility	Persistence	Biodegradability	Environmental Hazard	Relevant Hazardous Substance	Rationale
Degreaser AK90 (Stage 28)	Liquid	Yes	H412 Harmful to aquatic life with long lasting effects.	No further relevant information available.	No further relevant information available.	Biodegradation in water: ready biodegradability	slightly hazardous for water	Yes	High toxicity
Desmut (Stage 22)	Solid	Yes	H412 Harmful to aquatic life with long lasting effects	The product is soluble in water. Mobile. The product is non-volatile.	The degradability of the product is not known.	The degradability of the product is not known.	Environmentally hazardous substance/marine pollutant No.	Yes	High toxicity
Zincate (Stage 16)	Liquid	Yes	H411 Toxic to aquatic life with long lasting effects.	No further relevant information available.	No further relevant information available.	No further relevant information available.	slightly hazardous for water Toxic for fish	Yes	High toxicity
Nickel Strike (Stage 12/13) Nickel Chloride	Solid	Yes	H400: Very toxic to aquatic life. H41		N.A	N.A	Marine pollutant Toxicity to fish	Yes	High toxicity
Nickel Sulfate			0 Very toxic to aquatic life with long lasting effects.		No data available	No data available	An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.		
Acid Tin Plate (Stage 6/7)	Liquid		H412 Harmful to aquatic life with long lasting effects	No further relevant information available.	No further relevant information available.	No further relevant information available.	Product contains environmentally hazardous substances: acrylic acid Marine Pollutant - No	Yes	High toxicity

As can be seen a number of the substances listed in Table 3.2 pose a designated environmental hazard (hazardous to the aquatic environment as defined by Article 3 of Regulation (EC) No 1272/2008).

Attachment 4-6-2-Raw-Material-Interm-Product of the IE application lists details of process related raw materials used on the site and it identifies those substances that are hazardous to groundwater as determined by the EPA4 in accordance with the European Community Environmental Objectives Groundwater Regulations 2010 (S.I. No. 9 of 2010) as amended and European Communities (Classification, Packaging and Labelling of Dangerous Preparations) Regulations 2004 (S.I. No. 62 of 2004 as amended (Risk phrase, R56 denotes 'Toxic to soil organisms.'). There are no substances on the list that are toxic to soil organisms.

[4] Classification of Hazardous and Non-Hazardous Substances in Groundwater, EPA 2010

4 STAGE 3: ASSESSMENT OF SITE SPECIFIC POLLUTION POSSIBILITY

4.1 Guidance Requirement

The draft guidelines from the Commission require the following details for Stage 3:

For each relevant hazardous substance brought forward from Stage 2, identify the actual possibility for soil or groundwater contamination at the site of the installation, including the probability of releases and their consequences, and taking particular account of:

- the quantities of each hazardous substance or groups of similar hazardous substances concerned;
- how and where hazardous substances are stored, used and to be transported around the installation;
- where they pose a risk to be released;
- In case of existing installations also the measures that have been adopted to ensure that it is impossible in practice that contamination of soil or groundwater takes place.

4.2 Applicant Details

For each of the relevant hazardous substances identified in Stage 3, a risk assessment of the potential for ground contamination is provided in the following sections. The assessment includes a review of potential breaches caused by:

- Accidents/Incidents
- Routine Operations

Table 4 1 Assessment of 'Hazardous Substances' at the facility

Criteria	Description
Substance	Degrease (Stage 28) SLOTOCLEAN AK90 Desmut (Stage 22) SLOTOCLEAN DS10 Zincate (Stage 16) Zincate CNF 10 Nickel Strike (Stage 12/13) Nickel Plate Solution NORMA (Nickel Watts + BFL) Acid Tin Plate (Stage 6/7) Bright Tin CULMO 1
Annual Usage	As per Table 3.1 of the Operational Report
Storage Location	The storage and containment of hazardous materials on site will be in accordance with IE licence requirements. All chemical will be stored in a bunded area or self bunded double-skinned storage tank. Spill kits will be available. An EMS will be in place for the process. Drip trays will be installed at coupling points to ensure any drips/spills from loading/unloading are fully contained.
Description of Use	The process involves the surface treatment of busbars (aluminium and copper conductors) using an electrolytic and chemical process. The surface treatment of the aluminium and copper conductors will involve the dipping of the conductors in a number of different tanks with a different combination of chemicals and rinse water in order to provide a tin plate on the conductors to prevent corrosion. There are 23 single tanks and 2 double tanks, making a total of 27 tanks used across the 29 different stages of the process.
Mode of Transport	The bath solutions are a mixture of chemicals that will be made up on site. Chemicals as described in Section 4 will be supplied by Schlötter Ireland and delivered to the site by a hazardous chemical licensed contractor. Chemicals are to be stored in original packaging as supplied by Schlötter Ireland and in

Criteria	Description
	accordance with Schlötter Material Safety Data Sheets (MSDS) provided in Appendix C. Packaging will range from 2.5-200L.
Potential Pathways to Ground	Potential pathways include the following: 1. Uncontrolled release during the tank loading operation. Substances would spill onto the concrete hard standing area and flow across the area until controlled by spill kits/booms. 2. Uncontrolled release from the combined failure of the primary and secondary containment. Substances could spill onto the concrete hard standing area and flow across the area until controlled by spill kits/booms. All breaches would be contained by the bund or the concrete hard standing area around the site prohibiting any direct pathway to ground in the event of loss of primary/secondary containment. None of these losses has the potential to occur near gravel, grass or other porous surfaces which would provide a path to ground or surface water.
Mitigation	All deliveries will be controlled and fully supervised. All personnel will receive relevant spill management training. Spill kits and booms will be available at the site to ensure any spill is quickly contained. Primary and secondary containment for all storage areas. Integrity checks will be undertaken as per the terms of the licence. The EPA Guidance Note on Storage and Transfer of Materials for Scheduled Activities, 2003 will be referred to.
Probability of Release to Ground	Given the expected low volumes of Process Solutions to be used at the facility, the proposed containment measures, the probability of a breach of Process Solutions containment and an uncontrolled discharge to ground/surface water is considered very low.
Consequence of Incident	Substances listed in Table 2.1 pose a designated environmental hazard (hazardous to the aquatic environment as defined by Article 3 of Regulation (EC) No 1272/2008). H400: Very toxic to aquatic life H410: Very toxic to aquatic life with long lasting effects H411: Toxic to aquatic life with long lasting effects H412: Harmful to aquatic life with long lasting effects
Risk of Soil or Groundwater Contamination	Despite the significant consequences of a spill at the facility, the probability of such an incident is considered very low given the proposed mitigation measures and low volumes. As such, the risk of soil or groundwater contamination at the facility from a spill is considered very low.

4.3 Stage 3 Summary

There are no historical baseline soil or groundwater monitoring results available for the facility. There has been no pollution causing incidents at the existing facility which would have resulted in the contamination of soil or groundwater.

A number of “relevant hazardous substances” were identified in Stage 3 for the facility.

The risk assessment for each substance presented in this stage of the report indicates that the volumes of the substance employed, the nature of the containment system and the consequences of the events are varied but in all cases the risk assessment indicates that the risk of ground or groundwater contamination by a relevant hazardous substance is very low.

As such, RPS contends that a baseline report is not required for the facility as per Section 5.3 of the Commission Guidance.

Appendix A

Attachment 4.6-2 Raw-Material-Interm-Product

EPA Application Form

4. Activity and Capacity

4.6.2 - Raw Materials, Intermediates and Products - Attachment

Organisation Name: * E&I Engineering Ltd

Application I.D.: * LA001741

4. Activity and Capacity

4.6. Raw Materials, Intermediates and Products

Raw Materials, Intermediates and Products cont…

Details of Process related Raw Materials, Intermediates, Products, etc., used or generated on the site *

Complete the table below for all process related raw materials, intermediates, products, etc., used or generated on the site Note 1 - See notes below table for further information

Note: Add additional rows in to this table if required. (Please copy the existing formatting into added rows).

Ref. No. or Code	Material/ Substance[2]	CAS Number	Danger Category[3]	Amount Stored (tonnes)	Annual Usage (tonnes)	Nature of Use	Hazard Statement [4]	Odour			Ref. No. or Code (repeated)	Pollutants (Tick and specify Group/Family Number)				Controlled Substances REACH SVHC[6]	Relevant hazardous substance?[7] Yes/No
								Odourous Yes/No	Description	Threshold µg/m3		EC EO (Surface Waters) Regulations 2009		EC EO (Groundwater) Regulations 2010			
												Specific pollutants	Priority (hazardous) substances	Hazardous[5]	Non-hazardous[5]		
28 Degreaser AK90	Disodium tetraborate, pentahydrate	12179-04-3	GHS08 Repr. 1B	Ordered as needed	15 m3/year	Bath solution make-up	H360FD	No	N/A	Not determined.	*28 Degreaser AK90*	N	N	-	-	N	Yes
	Sodium hydrogensulphate	7681-38-1	GHS05 Eye Dam. 1				H318	No	N/A	Not determined.		N	N	-	-	N	
	Tetrasodium pyrophosphate	7722-88-5	GHS05 Eye Dam. 1				H318 H302	No	N/A	Not determined.		N	N	-	-	N	
	Reaction product of benzenesulfonic acid, 4-C10-13-sec-alkyl derivs and Benzenesulfonic acid, 4-	932-051-8	GHS05 Eye Dam. 1				H318 H315 H412	No	N/A	Not determined.		N	N	-	-	N	
25 Pickling (Acid Etch) Slotoclean DS10	Sodium 3-nitrobenzenesulphonate	127-68-4	GHS07 Eye Irrit. 2, Skin Sens.1	Ordered as needed	6 m3/year	Bath solution make-up	H319 H317	No	N/A	Not determined.	*25 Pickling (Acid Etch) Slotoclean DS10*	N	N	-	-	N	Yes
	Trisodium nitrilotriacetate	5064-31-3	GHS08 Carc.2, GHS07 Acute Tox. 4, Eye Irrit. 2				H351 H302 H319	No	N/A	Not determined.		N	N	Undetermined	Undetermined	N	
	Sodium Hydroxide Pellets	1310-73-2	GHS05 Corrosive				H290 H314	No	N/A	Not determined.		N	N	Undetermined	Undetermined	N	
22 Desmut Slotoclean DS10	Pentapotassium bis(peroxymonosulphate) bis(sulphate)	70693-62-8	Acute Tox.4 (H302), Skin Corr. 1B (H314), Eye Dam. 1 (H318), Aquatic Chronic 3. (H412). Xn;R22. C;R34. R52	Ordered as needed	6 m3/year	Bath solution make-up	H302 H314 H318 H412	No	N/A	Not determined.	*22 Desmut Slotoclean DS10*	N	N	Hazardous	-	N	Yes
	Sulphuric acid	7664-93-9	Skin Corr. 1A (H314), Eye Dam. 1 (H318). C;R35				H314 H318	No	N/A	Not determined.		N	N	Undetermined	Undetermined	N	
	Hydrofluoric acid	7664-39-3	Acute Tox. 2 (H300), Acute Tox. 1 (H310), Acute Tox.2 (H330), Skin Corr. 1A (H314), Eye Dam. 1 (H318). T+;R26/27/28 C;R35				H300 H310 H330 H314 H318	No	N/A	Not determined.		N	N	-	-	N	

4.6. Raw Materials, Intermediates and Products

Raw Materials, Intermediates and Products cont…

Details of Process related Raw Materials, Intermediates, Products, etc., used or generated on the site *

Complete the table below for all process related raw materials, intermediates, products, etc., used or generated on the site Note 1 - See notes below table for further information

Note: Add additional rows in to this table if required. (Please copy the existing formatting into added rows).

Ref. No. or Code	Material/ Substance[2]	CAS Number	Danger Category[3]	Amount Stored (tonnes)	Annual Usage (tonnes)	Nature of Use	Hazard Statement [4]	Odour			Ref. No. or Code (repeated)	Pollutants (Tick and specify Group/Family Number)				Controlled Substances REACH SVHC[6]	Relevant hazardous substance?[7] Yes/No
								Odourous Yes/No	Description	Threshold µg/m3		EC EO (Surface Waters) Regulations 2009		EC EO (Groundwater) Regulations 2010			
												Specific pollutants	Priority (hazardous) substances	Hazardous[5]	Non-hazardous[5]		
21 Zincate Strip Slotostrip ZN10	Pentapotassium bis(peroxymonosulphate) bis(sulphate)	70693-62-8	Acute Tox.4 (H302), Skin Corr. 1B (H314), Eye Dam. 1 (H318), Aquatic Chronic 3. (H412). Xn;R22. C;R34. R52	Ordered as needed	3 m3/year	Bath solution make-up	H302 H314 H318 H412	No	N/A	Not determined.	*21 Zincate Strip Slotostrip ZN10*	N	N	Hazardous	-	N	Yes
	Sulphuric Acid 96%	7664-93-9	GHS05 Corrosive, Skin Corr. 1A, Eye Dam. 1				H314 H318	Yes	Acrid	Not determined.		N	N	Undetermined	Undetermined	N	
16 Zincate CNF 10 Zincate	Sodium hydroxide	1310-73-2	GHS05 Met Corr.1, Skin Corr. 1A	Ordered as needed	4 m3/year	Bath solution make-up	H290 H314	No	N/A	Not determined.	*16 Zincate CNF 10 Zincate*	N	N	Undetermined	Undetermined	N	Yes
	Zinc oxide	1314-13-2	GHS09 Dangerous to the environment, Aquatic Acute 1, Aquatic Chronic 1				H400 H410	No	N/A	Not determined.		N	N	-	-	N	
12-13 Ni Strike Watts Nickel + BFL	Boric acid	10043-35-3	GHS08 Health hazard	Ordered as needed	3m3/year	Bath solution make-up	H360FD	Yes	Characteristic	Not determined.	*12-13 Ni Strike Watts Nickel + BFL*	N	N	-	-	N	Yes
	Nickel Chloride	7791-20-0	GHS06 Toxic, GHS08 Health Hazard, GHS07 Irritant, GHS09 Dangerous for the environment	220ltr drum			H301+H331 H315 H319 H334 H317 H341 H350i H360D H372 H410	No	N/A	Not determined.		N	N	-	-	N	
	Nickel Sulfate	10101-97-0	GHS08 Health hazard, GHS07 Irritant, GHS09 Dangerous for the environment	220ltr drum			H302 H332 H315 H334 H317 H341 H350i H360 H372 H400 H410	No	N/A	Not determined.		N	N	-	-	N	

4.6. Raw Materials, Intermediates and Products

Raw Materials, Intermediates and Products cont…

Details of Process related Raw Materials, Intermediates, Products, etc., used or generated on the site *

Complete the table below for all process related raw materials, intermediates, products, etc., used or generated on the site Note 1 - See notes below table for further information

Note: Add additional rows in to this table if required. (Please copy the existing formatting into added rows).

Ref. No. or Code	Material/ Substance[2]	CAS Number	Danger Category[3]	Amount Stored (tonnes)	Annual Usage (tonnes)	Nature of Use	Hazard Statement [4]	Odour		Ref. No. or Code (repeated)	Pollutants (Tick and specify Group/Family Number)				Controlled Substances REACH SVHC[6]	Relevant hazardous substance?[7] Yes/No
								Odourous Yes/No	Description / Threshold µg/m3		EC EO (Surface Waters) Regulations 2009: Specific pollutants	EC EO (Surface Waters) Regulations 2009: Priority (hazardous) substances	EC EO (Groundwater) Regulations 2010: Hazardous[5]	EC EO (Groundwater) Regulations 2010: Non-hazardous[5]		
									Description: N/A; Threshold: Not determined.							
6-7 Acid Tin Plating Culmo 1	Tin sulphate	7488-55-3	GHS08 STOT RE 2, GHS05 Eye Dam. 1, GHS07 Acute Tox. 4, Skin Irrit. 2, Skin Sens. 1, STOT SE 3, Aquatic Chronic 3	220ltr drum	4m3 /year	Bath solution make-up	H373, H318, H332, H315, H317, H335, H412	No	N/A; Not determined.	*6-7 Acid Tin Plating Culmo 1*	N	N	-	-	N	Yes
	Polyethylenglycol-decylether	166736-08-9	GHS05 Eye Dam. 1 GHS07 Acute Tox. 4	Ordered as needed	4m3 /year		H318 H302	No	N/A; Not determined.		N	N	-	-	N	
	2-(propyloxy)ethanol	2807-30-9	GHS02 Flam. Liq. 3, GHS07 Acute Tox. 4, Eye Irrit. 2				H226 H312 H319	No	N/A; Not determined.		N	N	-	-	N	
	Cocoamphodipropionic acid	68919-40-4	GHS05 Eye Dam. 1, GHS09 Aquatic Chronic 2.				H318 H411	No	N/A; Not determined.		N	N	-	-	N	
	Sulphuric acid	7664-93-9	GHS05 Met. Corr. 1, Skin Corr. 1A.				H290 H314	No	N/A; Not determined.		N	N	Undetermined	Undetermined	N	
	Pyrocatechol	120-80-9	GHS06 Acute Tox. 3, Acute Tox. 3, GHS08 Muta. 2, GHS05 Eye Dam. 1, GHS07 Acute Tox. 4, Skin Irrit. 2, Skin Sens. 1.				H301 H311 H341 H318 H332 H315 H317	No	N/A; Not determined.		N	N	-	-	N	
	Acrylic acid	79-10-7	GHS02, Flam. Liq. 3, GHS05 Skin Corr. 1A, GHS09 Aquatic Acute 1, GHS07 Acute Tox. 4, Acute Tox. 4, Acute Tox. 4				H226 H314 H400 H302 H312 H332	No	N/A; Not determined.		N	N	Undetermined	Undetermined	N	

4.6. Raw Materials, Intermediates and Products

Details of Process related Raw Materials, Intermediates, Products, etc., used or generated on the site *

Complete the table below for all process related raw materials, intermediates, products, etc., used or generated on the site Note 1 - See notes below table for further information

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Ref. No. or Code	Material/ Substance[2]	CAS Number	Danger Category[3]	Amount Stored (tonnes)	Annual Usage (tonnes)	Nature of Use	Hazard Statement [4]	Odour			Ref. No. or Code (repeated)	Pollutants (Tick and specify Group/Family Number)				Controlled Substances REACH SVHC[6]	Relevant hazardous substance?[7] Yes/No
								Odourous Yes/No	Description	Threshold µg/m3		EC EO (Surface Waters) Regulations 2009		EC EO (Groundwater) Regulations 2010			
												Specific pollutants	Priority (hazardous) substances	Hazardous[5]	Non-hazardous[5]		
	Sulphuric Acid 96%	7664-93-9	GHS05 Corrosive, Skin Corr. 1A, Eye Dam. 1				H314 H318	Yes	Acrid	Not determined.		N	N	Undetermined	Undetermined	N	
9 Oxidiser Copper Etch	Pentapotassium bis(peroxymonosulphate) bis(sulphate)	70693-62-8	GHS03 Ox. Liq. 2., GHS05 Skin Corr. 1B, GHS07 Acute Tox. 4	Ordered as needed	3 m3/year	Bath solution make-up	H272 H314 H302	No	N/A	Not determined.	*9 Oxidiser Copper Etch*	N	N	Hazardous	-	N	Yes
	Potassium hydrogensulphate	7646-93-7	GHS05 Skin Corr. 1B, GHS07 STOT SE 3				H314 H335	No	N/A	Not determined.		N	N	-	-	N	
	Sulphuric Acid 96%	7664-93-9	GHS05 Corrosive				H314 H318	Yes	Acrid	Not determined.		N	N	Undetermined	Undetermined	N	
4 Antitarnish	phosphoric acid	7664-38-2	GHS05 Corrosive	Ordered as needed	3m3 /year	bath solution make-up	H314 H318	No	N/A	Not determined.	*4 Antitarnish*	N	N	-	Non-hazardous	No	Yes

4.6. Raw Materials, Intermediates and Products

Raw Materials, Intermediates and Products cont…

Details of Process related Raw Materials, Intermediates, Products, etc., used or generated on the site *

Complete the table below for all process related raw materials, intermediates, products, etc., used or generated on the site Note 1 - See notes below table for further information

Note: Add additional rows in to this table if required. (Please copy the existing formatting into added rows).

Ref. No. or Code	Material/ Substance[2]	CAS Number	Danger Category[3]	Amount Stored (tonnes)	Annual Usage (tonnes)	Nature of Use	Hazard Statement [4]	Odour			Ref. No. or Code (repeated)	Pollutants (Tick and specify Group/Family Number)				Controlled Substances REACH SVHC[6]	Relevant hazardous substance?[7] Yes/No
								Odourous Yes/No	Description	Threshold µg/m3		EC EO (Surface Waters) Regulations 2009		EC EO (Groundwater) Regulations 2010			
												Specific pollutants	Priority (hazardous) substances	Hazardous[5]	Non-hazardous[5]		

Notes:

1 The details provided should be very comprehensive, all materials used, fuels, intermediates, laboratory chemicals and product should be included. Particular attention should be paid to materials and product consisting of, or containing, dangerous substances as described in the EU (Classification, Packaging, Labelling and Notification of Dangerous Substances) Regulations 2003 [SI 116/2003] as amended and Regulation (EC) No. 1272/2008. The list must classify these materials in accordance with both of these Regulations, and must specify the designated Hazard Statements. Hazard statements for each substance should be in accordance with Article 21 of the EC Regulation 1272/2008.
The list must identify any Substances of Very High Concern (SVHC) listed in Annex XIV of the REACH Regulations (Regulation (EC) No 1907/2006) as amended and indicate whether the use has been authorised or is exempted in accordance with the Regulation. In the case(s) of exempted use(s) the list must state the basis for each intended exempted use concerned.

2 In cases where a material comprises a number of distinct and available dangerous substances, please give details for each component substance.

3 Article 2(2) of S.I. No. 116/2003.

4 EC Regulation 1272/2008 (Chemicals Act 2008 (13 of 2008) and 2010)

5 The EPA Classification of Hazardous and Non-Hazardous Substances in Groundwater, December 2010.

6 Where relevant, specify whether the substance is on the Authorisation List (Annex XIV Regulation (EC) No 1907/2006 as amended) or Restriction List (Annex XVII Regulation (EC) No 1907/2006 as amended). Also, indicate whether the use has been authorised or exempted in accordance with Regulation (EC) No 1907/2006 as amended.

7 Relevant hazardous substances are those substances or mixtures defined within Article 3 of Regulation (EC) No 1272/2008 on the classification, labelling and packaging of substances and mixtures which, as a result of their hazardousness, mobility, persistence and biodegradability (as well as other characteristics), are capable of contaminating soil or groundwater.

Appendix B

Hazard Classes for Hazardous Substances

Article 3 of Regulation (EC) No 1272/2008 (Parts 2 to 5 of Annex I)

Part 2: Physical Hazards	
2.1 Explosives	H200: Unstable Explosive H201: Explosive; mass explosion hazard H202: Explosive; severe projection hazard H203: Explosive; fire, blast or projection hazard H204: Fire or projection hazard H205: May mass explode in fire
2.2. Flammable gases	H220: Extremely flammable gas H221: Flammable gas
2.3. Flammable aerosols	H222: Extremely flammable aerosol H223: Flammable aerosol
2.4. Oxidising gases	H270: May cause or intensify fire; oxidiser
2.5. Gases under pressure	H280: Contains gas under pressure; may explode if heated H280: Contains gas under pressure; may explode if heated H281: Contains refrigerated gas; may cause cryogenic burns or injury H280: Contains gas under pressure; may explode if heated
2.6. Flammable liquids	H224: Extremely flammable liquid and vapour H225: Highly flammable liquid and vapour H226: Flammable liquid and vapour
2.7. Flammable solids	H228: Flammable Solid
2.8. Self-reactive substances and mixtures	H240: Heating may cause an explosion H241: Heating may cause a fire or explosion H242: Heating may cause a fire
2.9. Pyrophoric liquids	H250: Catches fire spontaneously if exposed to air
2.10. Pyrophoric solids	H250: Catches fire spontaneously if exposed to air
2.11. Self-heating substances and mixtures	H251: Self-heating; may catch fire H252: Self-heating in large quantities; may catch fire
2.12. Substances and mixtures which in contact with water emit flammable gases	H260: In contact with water releases flammable gases which may ignite spontaneously H261: In contact with water releases flammable gases
2.13. Oxidising liquids	H271:May cause fire or explosion; strong oxidiser H272: May intensify fire; oxidiser
2.14. Oxidising solids	H271: May cause fire or explosion; strong oxidiser H272: May intensify fire; oxidiser
2.15. Organic peroxides	H240: Heating may cause an explosion H241: Heating may cause a fire or explosion H242: Heating may cause a fire
2.16. Corrosive to metals	H290: May be corrosive to metals
Part 3: Health Hazards	
3.1. Acute toxicity	H300: Fatal if swallowed H301: Toxic if swallowed H302: Harmful if swallowed H310:Fatal in contact with skin H311: Toxic in contact with skin H312: Harmful in contact with skin H330: Fatal if inhaled H331: Toxic if inhaled H332: Harmful if inhaled
3.2. Skin corrosion/irritation	H314: Causes severe skin burns and eye damage

	H315: Causes skin irritation
3.3. Serious eye damage/eye irritation	H318: Causes serious eye damage H319: Causes serious eye irritation
3.4. Respiratory or skin sensitisation	H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled H317: May cause an allergic skin reaction
3.5. Germ cell mutagenicity	H340: May cause genetic defects (state route of exposure if it is conclusively proven that No other routes of exposure cause the hazard) H341: Suspected of causing genetic defects (state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard)
3.6. Carcinogenicity	H350: May cause cancer (state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard) H351: Suspected of causing cancer (state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard)
3.7. Reproductive toxicity	H360: May damage fertility or the unborn child (state specific effect if known)(state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard) H361: Suspected of damaging fertility or the unborn child (state specific effect if known) (state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard) H362: May cause harm to breast-fed children.
3.8. Specific target organ toxicity — single exposure	H370: Causes damage to organs (or state all organs affected, if known) (state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard) H371: May cause damage to organs (or state all organs affected, if known) (state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard) H335: May cause respiratory irritation; H336: May cause drowsiness or dizziness
3.9. Specific target organ toxicity — repeated exposure	H372: Causes damage to organs (state all organs affected, if known) through prolonged or repeated exposure (state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard) H373: May cause damage to organs (state all organs affected, if known) through prolonged or repeated exposure (state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard)
3.10. Aspiration hazard	H304: May be fatal if swallowed and enters airways
Part 4: Environmental Hazards	
4.1. Hazardous to the aquatic environment	H400: Very toxic to aquatic life H410: Very toxic to aquatic life with long lasting effects H411: Toxic to aquatic life with long lasting effects H412: Harmful to aquatic life with long lasting effects H413: May cause long lasting harmful effects to aquatic life
Part 5: Additional EU Hazard Class	
5.1. Hazardous to the ozone layer	EUH059: Hazardous to the Ozone Layer

Appendix C

Material Safety Data Sheets (MSDS)

MSDS Aluminium

Schlötter Galvanotechnik

Safety data sheet
according to 1907/2006/EC, Article 31

Printing date 13.07.2017 Version number 37 Revision: 28.06.2017

SECTION 1: Identification of the substance/mixture and of the company/undertaking

· **1.1 Product identifier**

· **Trade name:** **Degreaser Salt SLOTOCLEAN AK 91**

· **Article number:** 020091

· **1.2 Relevant identified uses of the substance or mixture and uses advised against**
No further relevant information available.

· **Application of the substance / the mixture** Electroplating auxiliary

· **1.3 Details of the supplier of the safety data sheet**

· **Manufacturer/Supplier:**
Dr.-Ing. Max Schlötter GmbH & Co. KG
Galvanotechnik
Talgraben 30
73312 Geislingen/Steige
Germany

· **Further information obtainable from:** E-Mail: sds@schloetter.de

· **1.4 Emergency telephone number:**
University of Freiburg
Poisoning-Information-Center
+49(0)761-19240 (24h, 365 days/year)
Information in German and English
http://www.giftberatung.de/

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SECTION 2: Hazards identification

· **2.1 Classification of the substance or mixture**

· **Classification according to Regulation (EC) No 1272/2008**

Acute Tox. 4	H302	Harmful if swallowed.
Skin Irrit. 2	H315	Causes skin irritation.
Eye Dam. 1	H318	Causes serious eye damage.
Repr. 1B	H360FD	May damage fertility. May damage the unborn child.

· **2.2 Label elements**

· **Labelling according to Regulation (EC) No 1272/2008**
The product is classified and labelled according to the CLP regulation.

· **Hazard pictograms**

GHS05 GHS07 GHS08

· **Signal word** Danger

· **Hazard-determining components of labelling:**
sodium hydrogensulphate
tetrasodium pyrophosphate
Disodium tetraborate, pentahydrate
Reaction product of Benzenesulfonic acid, 4-C10-13-sec-alkyl derivs. and Benzenesulfonic acid, 4-methyl- and sodium hydroxide

· **Hazard statements**
H302 Harmful if swallowed.
H315 Causes skin irritation.
H318 Causes serious eye damage.
H360FD May damage fertility. May damage the unborn child.

· **Precautionary statements**
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310 Immediately call a POISON CENTER/doctor.

(Contd. on page 2)

(Contd. of page 1)

P321 Specific treatment (see on this label).
P405 Store locked up.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

· **Additional information:**
Restricted to professional users.
· **2.3 Other hazards**
· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.

SECTION 3: Composition/information on ingredients

· **3.2 Chemical characterisation: Mixtures**
· **Description:** Mixture of substances listed below with nonhazardous additions.

· **Dangerous components:**

CAS: 12179-04-3 EINECS: 215-540-4 Index number: 005-011-02-9	Disodium tetraborate, pentahydrate Repr. 1B, H360FD	25 - <50%
CAS: 7681-38-1 EINECS: 231-665-7 Index number: 016-046-00-X Reg.nr.: 01-2119552465-36-0000	sodium hydrogensulphate Eye Dam. 1, H318	25 - <50%
CAS: 7722-88-5 EINECS: 231-767-1 Reg.nr.: 01-2119489794-17	tetrasodium pyrophosphate Eye Dam. 1, H318; Acute Tox. 4, H302	15 - <25%
EC number: 932-051-8 Reg.nr.: 01-2119565112-48	Reaction product of Benzenesulfonic acid, 4-C10-13-sec-alkyl derivs. and Benzenesulfonic acid, 4-methyl- and sodium hydroxide Eye Dam. 1, H318; Skin Irrit. 2, H315; Aquatic Chronic 3, H412	5 - < 15%

· **SVHC**

12179-04-3	Disodium tetraborate, pentahydrate

· **Additional information:** For the wording of the listed hazard phrases refer to section 16.

SECTION 4: First aid measures

· **4.1 Description of first aid measures**
· **General information:**
PERSONAL PROTECTION FOR THE FIRST AIDER.
Immediately remove any clothing soiled by the product.
· **After inhalation:** Supply fresh air; consult doctor in case of complaints.
· **After skin contact:** If skin irritation continues, consult a doctor.
· **After eye contact:**
Rinse opened eye for several minutes under running water. Then consult a doctor.
If present remove the contact lenses immediately.
· **After swallowing:** If symptoms persist consult doctor.
· **4.2 Most important symptoms and effects, both acute and delayed** No further relevant information available.
· **4.3 Indication of any immediate medical attention and special treatment needed**
No further relevant information available.

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SECTION 5: Firefighting measures

· **5.1 Extinguishing media**
· **Suitable extinguishing agents:** Use fire extinguishing methods suitable to surrounding conditions.
· **5.2 Special hazards arising from the substance or mixture**
During heating or in case of fire poisonous gases are produced.
Carbon monoxide (CO)
Sulphur dioxide (SO2)
· **5.3 Advice for firefighters**
· **Protective equipment:** Do not inhale explosion gases or combustion gases.
· **Additional information**
Collect contaminated fire fighting water separately. It must not enter the sewage system.

SECTION 6: Accidental release measures

· **6.1 Personal precautions, protective equipment and emergency procedures** Not required.
· **6.2 Environmental precautions:** Do not allow to enter sewers/ surface or ground water.
· **6.3 Methods and material for containment and cleaning up:**
Dispose contaminated material as waste according to item 13.
· **6.4 Reference to other sections**
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

*
SECTION 7: Handling and storage

· **7.1 Precautions for safe handling**
Open and handle receptacle with care.
Prevent formation of dust.
· **Information about fire - and explosion protection:** Keep respiratory protective device available.

· **7.2 Conditions for safe storage, including any incompatibilities**
· **Storage:**
· **Requirements to be met by storerooms and receptacles:** Store only in the original receptacle.
· **Information about storage in one common storage facility:** Store away from foodstuffs.
· **Further information about storage conditions:**
Protect from frost.
Protect from heat and direct sunlight.
· **Maximum storage temperature:** 40 °C
· **Minimum storage temperature:** 5 °C
· **Storage class:** 6.1 D
· **7.3 Specific end use(s)** No further relevant information available.

*
SECTION 8: Exposure controls/personal protection

· **Additional information about design of technical facilities:** No further data; see item 7.

· **8.1 Control parameters**

· **Ingredients with limit values that require monitoring at the workplace:**	
7722-88-5 tetrasodium pyrophosphate	
WEL	Long-term value: 5 mg/m³

(Contd. on page 4)

(Contd. of page 3)

· **DNELs**

7722-88-5 tetrasodium pyrophosphate		
Inhalative	exposure long term - systemic effects	2.79 mg/m³ (worker)
Reaction product of Benzenesulfonic acid, 4-C10-13-sec-alkyl derivs. and Benzenesulfonic acid, 4-methyl- and sodium hydroxide		
Dermal	exposure long term - systemic effects	170 mg/kg bw/day (worker)
Inhalative	exposure long term - systemic effects	12 mg/m³ (worker)

· **PNECs**

7681-38-1 sodium hydrogensulphate	
PNEC	800 mg/l (sewage treatment plant)
	1.109 mg/l (marine water)
	17.66 mg/l (sporadic emission)
	11.09 mg/l (fresh water)
PNEC	1.54 mg/kg (soil)
	4.02 mg/kg (sediment marine water)
	40.2 mg/kg (sediment fresh water)
7722-88-5 tetrasodium pyrophosphate	
PNEC	50 mg/l (sewage treatment plant)
	0.005 mg/l (marine water)
	0.5 mg/l (sporadic emission)
	0.05 mg/l (fresh water)
Reaction product of Benzenesulfonic acid, 4-C10-13-sec-alkyl derivs. and Benzenesulfonic acid, 4-methyl- and sodium hydroxide	
PNEC	5.6 mg/l (sewage treatment plant)
	0.0268 mg/l (marine water)
	0.055 mg/l (sporadic emission)
	0.268 mg/l (fresh water)
PNEC	35 mg/kg (soil)
	8.1 mg/kg (sediment marine water)
	8.1 mg/kg (sediment fresh water)

· **Additional information:** The lists valid during the making were used as basis.

· **8.2 Exposure controls**
· **Personal protective equipment:**
· **General protective and hygienic measures:**
Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing
Wash hands before breaks and at the end of work.
Store protective clothing separately.
Avoid contact with the eyes.
Avoid contact with the eyes and skin.
· **Respiratory protection:** Not required.
· **Protection of hands:**
Check the permeability prior to each anewed use of the glove.
The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation
· **Material of gloves**

(Contd. on page 5)

(Contd. of page 4)

The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.
Chemical-protective gloves (EN 374-1, -2, -3).
Butyl rubber, BR ≥ 0,3 mm (Level 6)

· **Penetration time of glove material**
≥ 8 h
The exact break trough time has to be found out by the manufacturer of the protective gloves and has to be observed.

· **For the permanent contact in work areas without heightened risk of injury (e.g. Laboratory) gloves made of the following material are suitable:**
Butyl rubber, BR ≥ 0,3 mm (Level 6)

· **Not suitable are gloves made of the following materials:**
Leather gloves
Strong material gloves

· **Eye protection:**

Tightly sealed goggles

Ensure the eyewash stations and safety showers are close to the workplace.

SECTION 9: Physical and chemical properties

· **9.1 Information on basic physical and chemical properties**	
· **General Information**	
· **Appearance:**	
Form:	Powder
Colour:	light brown
· **Odour:**	Nearly odourless
· **Odour threshold:**	Not determined.
· **pH-value (30 g/l) at 20 °C:**	8.0 - 8.5
· **Change in condition**	
Melting point/freezing point:	not determined
Initial boiling point and boiling range:	not determined
· **Flash point:**	Not applicable.
· **Flammability (solid, gas):**	Not determined.
· **Ignition temperature:**	490 °C
· **Decomposition temperature:**	Not determined.
· **Auto-ignition temperature:**	Product is not selfigniting.
· **Explosive properties:**	Product does not present an explosion hazard.
· **Explosion limits:**	
Lower:	Not determined.
Upper:	Not determined.
· **Vapour pressure at 20 °C:**	- hPa
· **Density:**	DIN 53217-5 Determination of density - vibration method
· **Relative density**	Not determined.
· **Vapour density**	Not applicable.
· **Evaporation rate**	Not applicable.

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· **Solubility in / Miscibility with water:**	Soluble.
· **Partition coefficient: n-octanol/water:**	Not determined.
· **Viscosity:**	
Dynamic:	Not applicable.
Kinematic:	Not applicable.
· **Solvent content:**	
Organic solvents:	0.0 %
VOC (EU)	0.00 %
· **9.2 Other information**	No further relevant information available.
· **Additional information**	The physical data in section 9 correspond to typical values for this product and can not be seen as a product specification.

SECTION 10: Stability and reactivity

· **10.1 Reactivity** No further relevant information available.
· **10.2 Chemical stability**
· **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
· **10.3 Possibility of hazardous reactions** No dangerous reactions known.
· **10.4 Conditions to avoid** No further relevant information available.
· **10.5 Incompatible materials:** No further relevant information available.
· **10.6 Hazardous decomposition products:** No dangerous decomposition products known.

*

SECTION 11: Toxicological information

· **11.1 Information on toxicological effects**
· **Acute toxicity**
Harmful if swallowed.

· **LD/LC50 values relevant for classification:**		
12179-04-3 Disodium tetraborate, pentahydrate		
Oral	LD50	3,200-3,400 mg/kg (rat) (Fremd-Sicherheitsdatenblatt)
Dermal	LD50	>2,000 mg/kg (rabbit) (Fremd-Sicherheitsdatenblatt)
Inhalative	LD50	>2 mg/kg (rat) (Fremd-Sicherheitsdatenblatt)
7681-38-1 sodium hydrogensulphate		
Oral	LD50	2,000 mg/kg (rat) (OECD 423 Na2SO4)
Inhalative	LC50/4h	>2.4 mg/l (rat) (OECD 436 Na2SO4)
7722-88-5 tetrasodium pyrophosphate		
Oral	LD50	300-2,000 mg/kg (rat) (OECD 420)
Dermal	LD50	>2,000 mg/kg (rabbit) (OECD 402)
Reaction product of Benzenesulfonic acid, 4-C10-13-sec-alkyl derivs. and Benzenesulfonic acid, 4-methyl- and sodium hydroxide		
Oral	LD50	2,000-5,000 mg/kg (rat) (OECD 401)
Dermal	LD50	>2,000 mg/kg (rat) (OECD 402)

· **Primary irritant effect:**
· **Skin corrosion/irritation**
Causes skin irritation.
· **Serious eye damage/irritation**
Causes serious eye damage.
· **Respiratory or skin sensitisation** Based on available data, the classification criteria are not met.

(Contd. on page 7)

(Contd. of page 6)

· ***CMR effects (carcinogenity, mutagenicity and toxicity for reproduction)***
· ***Germ cell mutagenicity*** *Based on available data, the classification criteria are not met.*
· ***Carcinogenicity*** *Based on available data, the classification criteria are not met.*
· ***Reproductive toxicity***
May damage fertility. May damage the unborn child.
· ***STOT-single exposure*** *Based on available data, the classification criteria are not met.*
· ***STOT-repeated exposure*** *Based on available data, the classification criteria are not met.*
· ***Aspiration hazard*** *Based on available data, the classification criteria are not met.*

*

SECTION 12: Ecological information

· ***12.1 Toxicity***

· ***Aquatic toxicity:***	
12179-04-3 Disodium tetraborate, pentahydrate	
EC50/96h	158 mg/l (desmodesmus subspicatus - green algae) (ETOX)
EC50/24h	242 mg/l (daphnia magna - water flea) (Fremd-Sicherheitsdatenblatt)
7681-38-1 sodium hydrogensulphate	
LC50/48h	1,766 mg/l (daphnia magna - water flea) (EPA 600/R-94/024, Na2SO4, read-across)
LC50/96h	7,960 mg/l (pimephales promelas - fathead minnow) (EPA 600/4-90/027 Na2SO4, read across)
EC50/120h	1,900 mg/l (algae) (Na2SO4, read-across)
NOEC	1,109 mg/l (ceriodaphnia dubia - water flea) (ASTM E 1295-01 Na2SO4, read-across)
7722-88-5 tetrasodium pyrophosphate	
LC50/96h (static)	>100 mg/l (oncorhynchus mykiss - rainbow trout) (OECD 203)
EC50/48h (static)	>100 mg/l (daphnia magna - water flea) (EPA OTS 797.1300)
EC50/72h	>100 mg/l (desmodesmus subspicatus - green algae) (OECD 201)
Reaction product of Benzenesulfonic acid, 4-C10-13-sec-alkyl derivs. and Benzenesulfonic acid, 4-methyl- and sodium hydroxide	
LC50/96h	>1-10 mg/l (cyprinus carpio - carp) (OECD 203)
EC50/17h	63 mg/l (pseudomonas putida - bacteria) (ISO 10712)
EC50/48h (static)	>1-10 mg/l (daphnia magna - water flea) (OECD 202)

· ***12.2 Persistence and degradability*** *No further relevant information available.*
· ***12.3 Bioaccumulative potential*** *No further relevant information available.*
· ***12.4 Mobility in soil*** *No further relevant information available.*
· ***Additional ecological information:***
· ***General notes:***
The classification into the water hazard class resulted according to the administrative regulation water-polluting substances (VwVwS) dated 17.05.1999.
Water hazard class 1 (German Regulation) (Self-assessment): slightly hazardous for water
The product does not contain AOX.
The product does not contain VOC.
The product does not contain EDTA
Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
The surfactant(s) contained in this preparation complies(comply) with the biodegradability criteria as laid down in Regulation (EC) No.648/2004 on detergents. Data to support this assertion are held at the disposal of the competent authorities of the Member States and will be made available to them, at their direct request or at the request of a detergent manufacturer.
The product does not contain organic complexing agents.
· ***12.5 Results of PBT and vPvB assessment***

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Safety data sheet
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According to Annex XIV of Regulation (EC) No. 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH): The product does not contain a substance fullfilling the PBT (persistent/bioaccumulative/toxic) criteria or the vPvB (very persistent/very bioaccumulative) criteria: Self classification.

· **PBT:** *Not applicable.*
· **vPvB:** *Not applicable.*
· **12.6 Other adverse effects** *No further relevant information available.*

SECTION 13: Disposal considerations

· **13.1 Waste treatment methods**
· **Recommendation**
Must not be disposed together with household garbage. Do not allow product to reach sewage system. Contact manufacturer for recycling information.

· **European waste catalogue**	
06 03 14	solid salts and solutions other than those mentioned in 06 03 11 and 06 03 13

· **Uncleaned packaging:**
· **Recommendation:** *Disposal must be made according to official regulations.*
· **Recommended cleansing agents:** *Water, if necessary together with cleansing agents.*

SECTION 14: Transport information

· **14.1 UN-Number**	
· **ADR, ADN, IMDG, IATA**	*Void*
· **14.2 UN proper shipping name**	
· **ADR, ADN, IMDG, IATA**	*Void*
· **14.3 Transport hazard class(es)**	
· **ADR, ADN, IMDG, IATA**	
· **Class**	*Void*
· **14.4 Packing group**	
· **ADR, IMDG, IATA**	*Void*
· **14.5 Environmental hazards:**	
· **Marine pollutant:**	*No*
· **14.6 Special precautions for user**	*Not applicable.*
· **14.7 Transport in bulk according to Annex II of Marpol and the IBC Code**	*Not applicable.*
· **Transport/Additional information:**	*Not dangerous according to the above specifications.*
· **UN "Model Regulation":**	*Void*

*

SECTION 15: Regulatory information

· **15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**

· **Directive 2012/18/EU - SEVESO III**
· **Named dangerous substances - ANNEX I** *None of the ingredients is listed.*
· **REGULATION (EC) No 1907/2006 ANNEX XVII** *Conditions of restriction: 30*

· **National regulations:**

· **Waterhazard class:** *Water hazard class 1 (Self-assessment): slightly hazardous for water.*

(Contd. on page 9)

(Contd. of page 8)

· **Other regulations, limitations and prohibitive regulations**

· **Substances of very high concern (SVHC) according to REACH, Article 57**	
12179-04-3	Disodium tetraborate, pentahydrate

· **15.2 Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

*

SECTION 16: Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

Safety Data Sheet to the regulation 1907/2006/EG, article 31.
EINECS numbers of the type 9xx-xxx-x are automatically allocated from ECHA for substances which were pre-registrated without EG or CAS numbers. Additionally, such numbers are also allocated for non-phase-in-substances which have no CAS number.
Material Safety Data Sheets are to be kept for at least 10 years, according to Article 36 of REACH Regulation (EC) No 1907/2006.

· **Relevant phrases**
H302 Harmful if swallowed.
H315 Causes skin irritation.
H318 Causes serious eye damage.
H360FD May damage fertility. May damage the unborn child.
H412 Harmful to aquatic life with long lasting effects.

· **Department issuing SDS:**
Research and Development
E-Mail: fue@schloetter.de
· **Contact:** sds@schloetter.de
· **Abbreviations and acronyms:**
RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
ICAO: International Civil Aviation Organisation
RRN: REACH Registration Number
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
IATA: International Air Transport Association
GHS: Globally Harmonised System of Classification and Labelling of Chemicals
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
VOC: Volatile Organic Compounds (USA, EU)
DNEL: Derived No-Effect Level (REACH)
PNEC: Predicted No-Effect Concentration (REACH)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
PBT: Persistent, Bioaccumulative and Toxic
SVHC: Substances of Very High Concern
vPvB: very Persistent and very Bioaccumulative
Acute Tox. 4: Acute toxicity – Category 4
Skin Irrit. 2: Skin corrosion/irritation – Category 2
Eye Dam. 1: Serious eye damage/eye irritation – Category 1
Repr. 1B: Reproductive toxicity – Category 1B
Aquatic Chronic 3: Hazardous to the aquatic environment - long-term aquatic hazard – Category 3
· *** Data compared to the previous version altered.**

Degreaser
SLOTOCLEAN AK 90

The Degreaser SLOTOCLEAN AK 90 is a weak alkaline immersion degreasing process for the removal of **processing oils and drawing compounds** from copper, brass, aluminium or German silver 2.0740. A separate station should be available for each type of metal in order to prevent cementation (e.g. copper ions on aluminium).
A treatment with this cleaning system results in a **hydrophile** surface.

In order to support the removal of **pigmented drawing compounds, polishing or grinding paste** from the above mentioned base materials, the cleaning process can be enhanced effectively by the ultrasonic support.

Please refer to technical data sheet BATH 02300-E Summary of Degreaser Additives which informs you about cleaning enhancers suitable for ultrasound installations.

The information in this data sheet is based on laboratory as well as practical experience. Figures quoted for operating limits and replenishment quantities are for guidance. Actual values necessary will depend on the components being plated (material and geometry), their application and plating plant conditions.

Important:
Please read this instruction carefully prior to the use of the process and carefully follow all the parameters that have a direct influence on the operation. We reserve the right to make technical changes. In the interest of safety, please pay attention to the hazard warnings on the labels of the containers. The minimum shelf life of the products is included on the labels and is also available in the appropriate Quality Assurance (QA03).
The current IMDS number of the layer deposited from the process is available on the internet at www.schloetter.com/downloads.
For the storage of chemical products the TRGS 510 must be followed.
If the additives used in this process contain a SVHC-substance, then this will be specified in the corresponding Material Safety Data Sheet, section 15.

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1.0 TECHNICAL INFORMATION AND EQUIPMENT REQUIREMENTS

Tanks:	isolated tanks made of steel respectively rubber-lined steel (heat resistant hard rubber lining), stainless steel or reinforced plastic vessels made of polypropylene for smaller volumes
Local Exhaust Ventilation:	tank rim extraction
Part/Electrolyte Agitation:	recommended; stirrer or circulation by educators, surface cleaning with overflow- respectively dirt collecting compartment
Ultrasound:	power > 8 W/l for the removal of polishing- and grinding residues
Heating/Cooling:	alkaline resistant immersion heaters, heating coils/heat exchanger made of stainless steel or PTFE
Filter units/oil separators or similar	recommended
Spray register:	optionally e.g. surface rinsing by pressure bottle

2.0 MAKE-UP AND OPERATING CONDITIONS

2.1 Product names

List of products required		
Product name	**Article no. (AN)**	**SG**
Degreaser Salt SLOTOCLEAN AK 91	020091	--
Degreaser additive depends on application, refer to TDS BATH 02300-E		
Sodium hydroxide, 50 % (756 g/l aqueous)	supplied by user*	1.52
Phosphoric acid, (75 %)	supplied by user*	1.58

* The current product qualities respectively -specifications recommended by us can be found on the internet at www.schloetter.com/downloads.

2.2 Composition

Degreaser Salt SLOTOCLEAN AK 91	borates, polyphosphate (complexing compounds), tensides; free from silicon and NaOH

2.3 Requirements for a 100 litre bath

Product name	**AN**	**SG**	**Quantity**	
Degreaser Salt SLOTOCLEAN AK 91	020091	--	3.5	kg
Degreaser additive depends on application, refer to TDS BATH 02300-E				

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2.4 Make up sequence for a 100 litre bath

All tanks and equipment to be used should be thoroughly cleaned prior to use.

- fill 70 litres of deionised water into the tank
- add the required quantity of Degreaser Salt SLOTOCLEAN AK 91 and dissolve
- add the required quantity of degreaser additive
- make up to final volume with preferably deionised water
- mix thoroughly

The degreaser is ready for use when the operating temperature has been reached.

2.5 Concentrations- and operating conditions

2.5.1 for the removal of processing oils and drawing compounds

	Range	Optimum	
Degreaser Salt SLOTOCLEAN AK 91	25 - 35	30	g/l
Treatment time	2 - 10	--	min.
Temperature range	50 - 80	--	°C
pH value	approx. 8.2	--	
Ultra sound	--	--	

2.5.2 for the removal of pigmented drawing compounds and grinding pastes

	Range	Optimum	
Degreaser Salt SLOTOCLEAN AK 91	25 - 35	30	g/l
Degreaser additive depends on application, refer to TDS BATH 02300-E			
Treatment time	1 - 5	--	min.
Temperature range	70 - 85	--	°C
pH value	approx. 8.2	--	
Ultra sound	--	> 8	W/l

raise pH value ↑: Sodium hydroxide, 50 % (765 g/l aqueous)
decrease pH-Wert ↓: phosphoric acid, (75 %)

3.0 PROCESS SEQUENCE

Our service department or technical field service would be pleased to provide you information on suitable process sequences respectively methods.

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4.0 MAINTENANCE AND FUNCTION OF THE INDIVIDUAL BATH COMPONENTS

The water quality used for make-up and continuous replenishment of the evaporation losses is essential to obtain good degreasing results. Therefore we strictly recommend the use of deionised- or partly desalted water. Tap water may only be used if the hardness degree does not exceed 6° dH. Using hard water results in precipitation of the active components of Degreaser SLOTOCLEAN AK 90.
This'll therefore necessarily result in unusable cleaning results !

4.1 Degreaser Salt SLOTOCLEAN AK 91

Degreaser Salt SLOTOCLEAN AK 91 contains all the components necessary for the operation of the degreaser. The content of Degreaser Salt SLOTOCLEAN AK 91 can be determined by acidimetric titration. Correction is made to nominal value according to the difference determined by titration. We're pleased to provide a suitable analysis description upon request.

4.2 Degreaser additives

Degreaser Salt SLOTOCLEAN AK 91 already contains tensides. But the cleaning effect can be enhanced by the use of suitable cleaning additives. Degreaser additives are only consumed by drag-out. A determination of the concentration isn't possible with justifiable methods. They're replenished either during replenishment of Degreaser Salt SLOTOCLEAN AK 91 proportionately or with decreasing effect.

4.3 Cloud point

When the operating temperature reaches a certain point - the cloud point - degreaser additives start to oil out and effectiveness diminishes. This is indicated by cloud formation in the electrolyte. Maximum operating temperature is defined by the cloud point.
The cloud point depends on quality and type of degreaser additive, as well as on the salt content of the solution. The salt content results from the degreaser salt added and the carbonate that forms during operation. The higher the salt content, the lower is the cloud point.

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4.4 pH value

The optimum pH value 8.2 should be maintained in the degreasing system (Degreaser Salt SLOTOCLEAN AK 91 with cleaning enhancer suitable for ultrasound) especially when removing grinding paste or similar products. (The pH value is measured at 20 °C).

pH value < 8.0	The solubility of the surfactants decreases. Degreaser solution turns cloudy. Cleaning effect deteriorates.
pH value > 8.7	Depending on temperature and immersion time there's the risk, that e.g. brass for example starts more or less tarnishing. Pigment removal decreases.

Corrections of the ph value if necessary

raise pH value ↑: sodium hydroxide, 50 % (765 g/l aqueous)
decrease pH-Wert ↓: phosphoric acid, (75 %)

5.0 TROUBLE SHOOTING

No information available at present.

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6.0 EFFLUENT

Legal regulations must be observed for disposal of the Degreaser SLOTOCLEAN AK 90. Different regulations normally apply for the additives and the ready-made electrolyte. Please refer to section **13** of the appropriate Material Safety Data Sheet for disposal code and recommendations.

The following detoxification sequence is only considered to be an aid:

Resulting rinse waters must be batch detoxified. Therefore the pH must be adjusted to approx. 2 with diluted acid, e.g. with technical hydrochloric acid, (10 %). After the addition of 5 g/l technical calcium chloride ($CaCl_2 \times H_2O$) the pH is increased to pH 9 with technical sodium hydroxide solution. After metal precipitation and flocculation it's filtered.

7.0 SAFETY

Reasonable care is required when handling Schlötter chemical products. Only personnel specially trained on working with chemicals should be deployed with their handling.

EC Material Safety Data Sheets must be made available to all personnel dealing with the chemicals to ensure they have all required information about product composition, hazards identification, first-aid measures, handling and storage, exposure controls, toxicological and ecological information, etc. It is required to ensure the supply and use of suitable protective clothing and -equipment.

The user must verify the designated purpose of the electrolyte. Previous experience has shown that not all metal surfaces are suitable for a trouble-free electroplating.

The above mentioned data are made according to our best knowledge. Consistent operation of the working solution requires appropriate maintenance. Degreaser SLOTOCLEAN AK 90 is a process of Dr.-Ing. Max Schlötter GmbH & Co KG. It can only be operated with the products described in this technical data sheet. Use of other chemicals (also partly) will impair quality and invalidates our service- and quality commitments (quality assurance).

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SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1. Product identifier

Name of the product: **SODIUM HYDROXIDE PELLETS**

Product identifier: Sodium hydroxide

Registration Number of the substance: 01-2119457892-27-0029

1.2. Relevant identified uses of the substance or mixture and uses advised against

Identified uses: Manufacturing of liquid NaOH (ES01)
Manufacturing of solid NaOH (ES02)
Industrial and professional use of NaOH (ES1)
Consumer use of NaOH (ES2)

Uses advised against: There are no uses advised against identified.

1.3. Details of the supplier of the safety data sheet

Company/undertaking:

Spolek pro chemickou a hutní výrobu, akciová společnost
Revoluční 1930/86, Ústí nad Labem 400 32, Czech Republic
Tel: +420 477 161 111 Fax.: +420 477 163 333
Responsible person: msds@spolchemie.cz

1.4. Emergency telephone number

CZ: +420 477 162 094/ EN: +420 476 163 111 non-stop service
Listing of national helpdesks at: http://echa.europa.eu/help/nationalhelp_contact_en.asp.

SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture

Met.Corr.1: H290
Skin Corr.1A: H314

Hazards to man and the environment: May be corrosive to metals. Causes severe skin burns and eye damage.
Full text of classification and text of H, EUH and P - Phrases is listed in section 16 this SDS.

2.2. Label elements

DANGER

May be corrosive to metals. Causes severe skin burns and eye damage.
Do not breathe dust. Wear protective gloves/protective clothing/eye protection/face protection. IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/physician.

CAS: 1310-73-2 **Index:** 011-002-00-6
Contents: Sodium hydroxide
Obligatory phrasing: Not determined.

2.3. Other hazards

PBT and vPvB assessment : This substance is not considered to be persistent, bioaccumulative non toxic (PBT).

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Identifier	CAS/ EINECS/ Registration number	Classification 1272/2008/ES	Content %	Note
Sodium hydroxide	1310-73-2/ 215-185-5/ 01-2119457892-27-0029	Met.Corr.1: H290, Skin Corr.1A: H314	> 96	OEL

Full text of classification and text of H, EUH and P - Phrases is listed in section 16 this SDS.

SECTION 4: FIRST AID MEASURES

4.1. Description of first aid measures

In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
In a life threatening condition soon carry out resuscitation affected and seek medical advice.
Respiratory arrest: immediately administer artificial respiration.
Cardiac arrest: immediately perform indirect heart massage.
Unconsciousness: place patient in recovery position.

After inhalation: Remove the victim quickly and considering own safety to fresh air, do not let the victim walk! Depending on situation, it is recommended to rinse oral cavity and, if necessary, nose with water. If the victim's clothing is contaminated, change it and protect the victim against cold. Depending on situation, call the rescue service or get medical attention due to the frequent need for further follow-up for at least 24 hours.

After skin contact: Remove contaminated clothing immediately; before washing or during washing, remove any rings, watches, bracelets that are in places of contact of the substance with skin. Rinse affected areas with stream of lukewarm water, if possible, for 10 to 30 minutes; do not use a brush, soap or neutralising agents! Cover burned areas of skin with a sterile dressing, do not use any ointments or other medical and pharmaceutical products. Cover the victim to protect him against cold. Depending on situation, call the rescue service or ensure medical attention.

After eye contact: Rinse eyes immediately under running water, open eyelids (even by force); if the victim wears contact lenses, remove them immediately. Do never neutralise! Rinse for 10 to 30 minutes from the inner to the outer ocular angle to prevent running of water in the other eye. Depending on the situation, call an ambulance or medical attention as quickly as possible, if possible professional treatment.The victim needs to get medical attention even with in the case of a small injuries.

After ingestion: DO NOT INDUCE VOMITING - risk of further damage to the digestive tract !!! There is a risk of perforation of the esophagus and the stomach! RINSE MOUTH IMMEDIATELY WITH WATER AND GIVE TO DRINK 2-5 dl of cold water to reduce the thermal effect of the caustics! Do not force the victim to drink, especially if he/she feels pain in mouth or throat. In this case, make the victim rinse his/her mouth. DO NOT ADMINISTER ACTIVATED CARBON! (blackening will make examination of the mucous membranes of more difficult and activated charcoal has not positive effect in case of acids and lyes). Do not give anything by mouth if the victim is unconscious or has convulsions. Depending on situation, call the rescue service or get medical attention as quickly as possible.

4.2. Most important symptoms and effects, both acute and delayed

Possible risk of corrosion on reaction with acids due high heat release and spray out of reaction mixture. Ingestion may produce burning of the gastrointestinal system. Small quantities may develop burning pain, feeling of constriction in the throat. Large quantities may cause an extensive destruction, and perforation of the stomach.

4.3. Indication of any immediate medical attention and special treatment needed

Not determined.

SECTION 5: FIRE-FIGHTING MEASURES

5.1. Extinguishing media

Suitable extinguishing media: Not flammable substance.

Extinguishing media to be avoided: High pressure water jet.

5.2. Special hazards arising from the substance or mixture

Not determined.

5.3. Advice for firefighters

Do not enter confined fire space without adequate protective clothing and an approved positive pressure self-contained breathing apparatus.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures

Twilled fabric clothing (or working suit with rubber apron), rubber boots, rubber gloves, face shield or goggles.

6.2. Environmental precautions

Avoid release of product or components to the environment, sewers and surface water or soil.

6.3. Methods and material for containment and cleaning up

Pick up spilled hydroxide and place into impervious containers. Neutralise residues with diluted sulphuric acid or hydrochloric acid and after that flush area with water. In case of large spills call fire emergency service.

6.4. Reference to other sections

Additional advice : Refer to section 8, 13.

SECTION 7: HANDLING AND STORAGE

7.1. Precautions for safe handling

Do not eat, drink or smoke during work, observe working instructions. Wash your hands and exposed parts of body thoroughly with soap and water after work and before meal and possibly treat with suitable reparation lotion. Store in original packaging, storage tanks and containers should be placed into containment basins of corresponding content and construction.

7.2. Conditions for safe storage, including any incompatibilities

Store in closed storerooms. Keep away from sources of ignition and other kinds of substances. Store in the original containers kept tightly closed. Storerooms should be well- ventilated, dry, provided with a first aid box and a source of drinking water supply. Prevent access of unauthorised personnel. Storage tanks and containers should be placed into containment basins of corresponding content and construction.

7.3. Specific end use(s)

No effect known.

SECTION 8: EXPOSURE CONTROLS/ PERSONAL PROTECTION

8.1. Control parameters

Sodium hydroxide: STEL: 2 mg/m³ (EH40/2005 Workplace exposure limits).

Sodium hydroxide:
DNEL- workers:
Long term (local effects): Inhalat: 1 mg/m³
DNEL- general population:
Long term (local effects): Inhalat: 1 mg/m³

Sodium hydroxide:
PNECs : Not determined.

8.2. Exposure controls

8.2.1 Appropriate engineering controls

Local exhaustion recommended.

8.2.2 Occupational exposure controls

Respiratory protection: Respirator.
Hand protection: Protective PVC gloves.
Eye / face protection: Safety goggles or safety shield.
Skin protection: Twilled fabric clothing, footwear.

8.2.3 Environmental exposure controls

Prevent entry into sewers, follow the plan of action in case of emergency. Cover with an absorbent material (Vapex) .Used material to store

in barrels and in cooperation with the department of environmental protection then defuse it.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties

Physical State:	Solid.
Colour:	White.
Odour:	Odourless.
pH:	14 (20°C)
Boiling point / boiling range (°C):	1388
Melting point / freezing point (°C):	323
Flash point (°C):	Inorganic substance.
Flammability (solid, gas):	Not flammable.
Explosive properties:	Not explosive.
Oxidising properties:	No.
Vapour pressure:	Not applicable.
Density (g/cm³):	2,130 (20°C)
Solubility:	
Water solubility (g/l):	1000 (25°C)
Partition coefficient: n-octanol/water:	Inorganic substance.
Auto-ignition temperature (°C):	Not self-igniting.
Viscosity:	Not applicable.
Vapour density:	Not applicable.
Evaporation rate:	Not determined.
Other information:	Not determined.

9.2. Other information

Miscibility:	Not determined.
Fat solubility (oil to be specified):	Not determined.
Conductivity:	Not determined.
Gas group:	Not determined.

SECTION 10: STABILITY AND REACTIVITY

10.1. Reactivity

With normal use no dangerous reaction.

10.2. Chemical stability

Stable under recommended conditions of storage and handling of the product.

10.3. Possibility of hazardous reactions

Exothermic reaction with strong acids.

10.4. Conditions to avoid

Extremes of temperature and direct sunlight. Exposure to moisture - hygroscopic substance.

10.5. Incompatible materials

Metals, strong acids, flammable materials.

10.6. Hazardous decomposition products

Hydrogen.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. Information on toxicological effects

Acute toxicity: Based on available data, the classification criteria are not met.

Skin corrosion/irritation: Causes severe burns.
Serious eye damage/irritation: Causes serious eye damage.
Respiratory or skin sensitisation: Based on available data, the classification criteria are not met.
Mutagenicity: Based on available data, the classification criteria are not met.
Carcinogenicity: Based on available data, the classification criteria are not met.
Reproductive toxicity: Based on available data, the classification criteria are not met.
STOT- single exposure: Based on available data, the classification criteria are not met.
STOT- repeated exposure: Based on available data, the classification criteria are not met.
Aspiration hazard: Based on available data, the classification criteria are not met.

Other information
If affected skin is not treated promptly, badly healing blisters are formed which leave scars. Affection of hands and fingers with the weak solution may be dangerous, because of painful irritation with delayed appearance (even after some hours), where it may be too late to provide an effective aid.

SECTION 12: ECOLOGICAL INFORMATION

12.1. Toxicity

Not determined.
Other hazards: Not determined.

12.2. Persistence and degradability

The methods for determining the biological degradability are not applicable to inorganic substances.

12.3. Bioaccumulative potential

Is not expected.

12.4. Mobility in soil

High soluble in water.
During movement through soil some ion exchange will occur.

12.5. Results of PBT and vPvB assessment

PBT and vPvB assessment : This substance is not considered to be persistent, bioaccumulative non toxic (PBT).

12.6. Other adverse effects

No effect known.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

Neutralise with diluted sulphuric acid or hydrochloric acid and then rinse with plenty of water.

Properly emptied metal packagings may be used like secondary raw material, remaining packagings should be buried in a landfill or disposed of by incineration in suitable incinerator units for hazardous waste.

Handling with wastes is regulated by Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives.

SECTION 14: TRANSPORT INFORMATION

14.1. UN number: 1823

14.2. UN proper shipping name:

ADR/RID: SODIUM HYDROXIDE, SOLID
IMDG: SODIUM HYDROXIDE, SOLID

14.3. Transport hazard class(es): 8

14.4. Packing group: II

14.5. Environmental hazards

ADR/RID: No.
IMDG: No.

14.6. Special precautions for user

Not applicable.

14.7. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code

Not applicable.

Other information

Classification code: C6
Note: -
Tunnel restriction codes: (E)
EmS: F-A/S-B

SECTION 15: REGULATORY INFORMATION

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration,Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC.

Commission Regulation (EU) No 453/2010 of 20 May 2010 amending Regulation (EC) No 1907/2006 of the European Parliament and of theCouncil on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH).

Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC)No 1907/2006.

Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives.

Directive 2008/68/EC of the European Parliament and of the Council of 24 September 2008 on the inland transport of dangerous goods.

Council Directive 1999/13/EC of 11 March 1999 on the limitation of emissions of volatile organic compounds due to the use of organic solvents in certain activities and installations.

Council Directive 89/391/EEC of 12 June 1989 on the introduction of measures to encourage improvements in the safety and health of workers at work.

Other regulatory information:
Not determined.

15.2. Chemical safety assessment

The chemical safety report has been prepared.

SECTION 16: OTHER INFORMATION

Full wording of H, EUH, P - Phrases

H290 May be corrosive to metals.
H314 Causes severe skin burns and eye damage.
P260A Do not breathe dust.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P303 + P361 + P353 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310 Immediately call a POISON CENTER or doctor/physician.

Used abbreviations

Met. Corr. 1: Substance or mixture corrosive to metals, category 1
Skin Corr. 1A: Skin corrosion, hazard category 1A
OEL: Substance with Occupational Exposure Limits
STEL: Short-Term Exposure Limit
TWA: Time weighted average
PNEC: Predicted no-effect concentration
DNEL: Derived no-effect level
WGK: Wassergefährdungsklasse (water hazard class)
PBT: Persistent, bioaccumulative and toxic substance.
vPvB: Very persistent and very bioaccumulative substance

Classification methods

Not relevant - substance.

Sources of data

The registration dossier.

Additional information

Not determined.

Training guidelines

Those who manipulate with the product must be demonstrably informed of its dangerous properties, principles of protecting the environment and health from its harmful effects and principles of first aid.

Revision data

16.11.2010 Changes made in accordance with Regulation (EC) No 1272/2008 and Regulation (EC) No 453/2010 .
20.06.2013 e-SDS
17.09.2015 Removed classification according to Directive 67/548 / EEC (DSD). Adding information in section 4.

1.TITLE OF THE EXPOSURE SCENARIO: ES1: Industrial and Professional Use of NaOH

Sector of use: SU1-24

Product category: PC0-40
Sodium hydroxide can be used in many different chemical product categories. It can be used for example as an adsorbent (PC2), metal surface treatment product (PC14), non-metal-surface treatment product (PC15), intermediate (PC19), pH regulator (PC20), laboratory chemical (PC21), cleaning product (PC35), water softener (PC36), water treatment chemical (PC37) or extraction agent. However, it could potentially also be used in other chemical product categories (PC0 – 40).

Process category: PROC1, PROC2, PROC3, PROC4, PROC8a,PROC8b, PROC9, PROC10, PROC11, PROC 13, PROC15
The process categories mentioned above are assumed to be the most important ones but other process categories could also be possible (PROC1 – 27).

Article category: Not applicable.

Environmental relase category: ERC1, ERC2, ERC4, ERC6a, ERC6b, ERC7, ERC8a, 8b, 8d, ERC9a
The environmental release categories mentioned above are assumed to be the most important ones but other industrial environmental release categories could also be possible (ERC 1 – 12).

Processes, task, activities covered: Typical uses include: production of organic and inorganic chemicals, formulation of chemicals, production and whitening of paper pulp, production of aluminium and other metals, food industry, water treatment, production of textiles, professional end use of formulated products and other industrial uses.

2. OPERATIONAL CONDITIONS AND RISK MAMAGEMENT MESURES

2.1. Control of worker exposure

Product characteristics:

Solid or liquid NaOH, all concentrations (0-100%), if solid: low dustiness class.
Frequency and duration of use/exposure: 8 hours/day, 200 days/year

Operational conditions:

For worker, both solid and liquid NaOH containing products at concentration > 2%:

Replacing, where appropriated, manual processes by automated and/or closed processes. This would avoid irritating mists, sprayings and subsequent potential splashes:
- Use closed systems or covering of open containers (e.g. screens)
- Transport over pipes, technical barrel filling/emptying of barrel with automatic systems (suction pumps etc.)
- Use of pliers, grip arms with long handles with manual use “to avoid direct contact and exposure by splashes (no working over one’s head)”

Contributing scenario:

CONTROLLING WORKER EXPOSURE

Risk management measures:

For worker and professional, both solid and liquid NaOH containing products at concentration > 2%:

ORGANIZATIONAL
- Workers in the risky process/areas identified should be trained:
  a) to avoid to work without respiratory protection,
  b) to understand the corrosive properties and, especially, the respiratory inhalation effects of sodium hydroxide and
  c) to follow the safer procedures instructed by the employer.
- The employer has also to ascertain that the required PPE is available and used according to instructions.
- Where possible for professional use, use of specific dispensers and pumps specifically designed to prevent splashes/spills/exposure to occur.

TECNICAL
- Local exhaust ventilation and/or general ventilation is good practice

PERSONAL PROTECTIVE EQUIPMENT
- Respiratory protection: In case of dust or aerosol formation (e.g. spraying): use respiratory protection with approved filter (P2).
- Hand protection: impervious chemical resistant protective gloves.
  material: butyl-rubber, PVC, polychloroprene with natural latex liner, material thickness: 0.5 mm, breakthrough time: > 480 min.
  material: nitrile-rubber, fluorinated rubber, material thickness: 0.35-0.4 mm, breakthrough time: > 480 min.
- If splashes are likely to occur, wear tightly fitting chemical resistant safety goggles, face –shield.
- If splashes are likely to occur, wear suitable protective clothing, aprons, shield and suits, rubber or plastic boots, rubber or plastic boots.

2.2. Control of environmental exposure

Product characteristics:
Solid or liquid NaOH, all concentrations (0-100%), if solid: low dustiness class.
Frequency and duration of use: Continuous

Operational conditions:
Not applicable.

Contributing scenario:
CONTROLLING ENVIRONMENTAL EXPOSURE

Risk management measures:
Risk management measures related to the environment aim to avoid discharging NaOH solutions into municipal wastewater or to surface water, in case such discharges are expected to cause significant pH changes. Regular control of the pH value during introduction into open waters is required. In general discharges should be carried out such that pH changes in receiving surface waters are minimised. In general most aquatic organisms can tolerate pH values in the range of 6-9. This is also reflected in the description of standard OECD tests with aquatic organisms.

There is no solid waste of NaOH. Liquid NaOH waste should be reused or discharged to the industrial wastewater and further neutralized if needed.

3. EXPOSURE ESTIMATION

Worker exposure:
NaOH is a corrosive substance. For the handling of corrosive substances and formulations, immediate dermal contacts occur only occasionally and it is assumed that repeated daily dermal exposure can be neglected. Therefore, dermal exposure to NaOH was not quantified.
NaOH is not expected to be systemically available in the body under normal handling and use conditions and therefore systemic effects of NaOH after dermal or inhalation exposure are not expected to occur. Based on NaOH measurements in the pulp and paper industry, de-inking waste paper, aluminium, textile and chemical industry and following the proposed risk management measures controlling worker and professional exposure, the inhalation exposure is below the DNEL of 1 mg/m3.
In addition to the measured exposure data the ECETOC TRA tool has been used to estimate the inhalation exposure (see Table below). It was assumed that there is no local exhaust ventilation and no respiratory protection unless specified otherwise. The duration of exposure was set at more than 4 hours per day as a worst-case assumption and professional use was specified where relevant as a worst-case assumption. For the solid, the low dustiness class was selected because NaOH is very hygroscopic. Only the most relevant PROCs were considered in the assessment.

PROC1 liq.(mg/m3) 0,17 solid(mg/m3) 0,01
PROC2 liq.(mg/m3) 0,17 solid(mg/m3) 0,01
PROC3 liq.(mg/m3) 0,17 solid(mg/m3) 0,10
PROC4 liq.(mg/m3) 0,17 solid(mg/m3) 0,20 (with LEV)
PROC5 liq.(mg/m3) 0,17 solid(mg/m3) 0,20 (with LEV)
PROC7 liq.(mg/m3) 0,17 solid(mg/m3) not applicable

PROC8a/b liq.(mg/m3) 0,17 solid(mg/m3) 0,50
PROC9 liq.(mg/m3) 0,17 solid(mg/m3) 0,50
PROC10 liq.(mg/m3) 0,17 solid(mg/m3) 0,50
PROC11 liq.(mg/m3) 0,17 solid(mg/m3) 0,20 (with LEV)
PROC13 liq.(mg/m3) 0,17 solid(mg/m3) 0,50
PROC14 liq.(mg/m3) 0,17 solid(mg/m3) 0,20 (with LEV)
PROC15 liq.(mg/m3) 0,17 solid(mg/m3) 0,10
PROC19 liq.(mg/m3) 0,17 solid(mg/m3) 0,50
PROC23 liq.(mg/m3) 0,17 solid(mg/m3) 0,40 (with LEV and RPE(90%))
PROC24 liq.(mg/m3) 0,17 solid(mg/m3) 0,50 (with LEV and RPE(90%))

Environmental exposure:
The aquatic effect and risk assessment only deals with the effect on organisms/ecosystems due to possible pH changes related to OH- discharges, as the toxicity of the Na+ ion is expected to be insignificant compared to the (potential) pH effect. The high water solubility and very low vapour pressure indicate that NaOH will be found predominantly in water. When the risk management measures related to the environment are implemented, there is no exposure to the activated sludge of a sewage treatment plant and there is not exposure of the receiving surface water.
The sediment compartment is not considered, because it is not considered relevant for NaOH. If emitted to the aquatic compartment, sorption to sediment particles will be negligible.
Significant emissions to air are not expected due to the very low vapour pressure of NaOH). If emitted to air as an aerosol in water, NaOH will be rapidly neutralised as a result of its reaction with CO2 (or other acids).
Significant emissions to the terrestrial environment are not expected either. The sludge application route is not relevant for the emission to agricultural soil, as no sorption of NaOH to particulate matter will occur in STPs/WWTPs. If emitted to soil, sorption to soil particles will be negligible. Depending on the buffer capacity of the soil, OH- will be neutralised in the soil pore water or the pH may increase.
Bioaccumulation will not occur.

4. GUIDANCE OF COMPLIANCE CHECK WITH REQUIREMENTS OF EXPOSURE SCENARIO

Combination of Risk management measures and Operational conditions stated in that exposure scenario guarantees Risk characterization Ratio (RCR) value < 1.
Downstream users could asses their own measures using model ECETOC TRA v2 or EUSES. They could calculate RCR as DEL/DNEL or PEC/PNEC (DNELs , PNECs in SDS).

1.TITLE OF THE EXPOSURE SCENARIO: ES2: Consumer Use of NaOH

Sector of use:	SU21
Product category:	PC 0-40 Sodium hydroxide can be used in many different chemical product categories: PC20, PC35, PC39 (neutralisation agents, cleaning products, cosmetics, personal care products). The other PCs are not explicitly considered in this exposure scenario. However, NaOH can also be used in other PCs in low concentrations e.g. PC3 (up to 0.01%), PC8 (up to 0.1%), PC28 and PC31 (up to 0.002%) but it can be used also in the remaining product categories (PC 0-40).
Process category:	Not applicable.
Article category:	Not applicable.
Environmental relase category:	ERC8a, ERC8 b, ERC8d, ERC9a The environmental release categories mentioned above are assumed to be the most important ones but other wide dispersive environmental release categories could also be possible (ERC8 – 11b).
Processes, task, activities covered:	NaOH (up to 100%) is also used by consumers. It is used at home for drain and pipe cleaning, wood treatment and it also used to make soap at home. NaOH is also used in batteries and in oven-cleaner pads.

2. OPERATIONAL CONDITIONS AND RISK MAMAGEMENT MESURES

2.1. Control of worker exposure

Product characteristics:

Solid or liquid NaOH, all concentrations (0-100%), if solid: low dustiness class.Typical concentrations: floor strippers (<10%), hair straighteners (<2%), oven cleaners (<5%), drain openers (liquid: 30%, solid: <100%), cleaning products (<1.1%)

Operational conditions:

It is required to use resistant labelling-package to avoid its auto-damage and loss of the label integrity, under normal use and storage of the product. The lack of quality of the package provokes the physical loss of information on hazards and use instructions.

It is required that household chemicals, containing sodium hydroxide for more than 2%, which may be accessible to children should be provided with a child-resistant fastening (currently applied) and a tactile warning of danger (Adaptation to Technical Progress of the Directive 1999/45/EC, annex IV, Part A and Article 15(2) of Directive 67/548 in the case of, respectively, dangerous preparations and substances intended for domestic use). This would prevent accidents by children and other sensitive groups of society.

It is advisable to deliver only in very viscous preparations.
It is advisable to delivery only in small amounts.
For use in batteries, it is required to use completely sealed articles with a long service life maintenance.

Contributing scenario:

CONTROLLING CONSUMER EXPOSURE

Risk management measures:

For consumer, both solid and liquid NaOH containing products at concentration > 2%:

ORGANISATIONAL
It is required that improved use instructions, and product information should always be provided to the consumers. This clearly can efficiently reduce the risk of misuse. For reducing the number of accidents in which (young) children or elderly people are involved, it should be advisable to use these products in the absence of children or other potential sensitive groups. To prevent improper use of sodium hydroxide, instructions for use should contain a warning against dangerous mixtures.

Instructions addressed to consumers:
- Keep out of reach of children.
- Do not apply product into ventilator openings or slots.

PERSONAL PROTECTIVE EQUIPMENT
- Respiratory protection: In case of dust or aerosol formation (e.g. spraying): use respiratory protection with approved filter (P2)
- Hand protection: impervious chemical resistant protective gloves.
- If splashes are likely to occur, wear tightly fitting chemical resistant safety goggles, face–shield.

2.2. Control of environmental exposure

Product characteristics:
Solid or liquid NaOH, all concentrations (0-100%), if solid: low dustiness class.

Operational conditions:
Not applicable.

Contributing scenario:
CONTROLLING ENVIRONMENTAL EXPOSURE

Risk management measures:
This material and its container must be disposed of in a safe way (e.g. by returning to a public recycling facility). If container is empty, trash as regular municipal waste.
Batteries should be recycled as much as possible (e.g. by returning to a public recycling facility). Recovery of NaOH from alkaline batteries includes emptying the electrolyte, collection and neutralization with sulphuric acid and carbon dioxide.

3. EXPOSURE ESTIMATION

Worker exposure:
Acute/short term exposure was assessed only for the most critical use: use of NaOH in a spray oven cleaner. Consexpo and SprayExpo were used to estimate exposure. The calculated short-term exposure of 0.3 – 1.6 mg/m3 is slightly higher than the long term DNEL for inhalation of 1 mg/m3 but smaller than the short term occupational exposure limit of 2 mg/m3. Furthermore, NaOH will be rapidly neutralised as a result of its reaction with CO2 (or other acids).

Environmental exposure:
Consumer uses relates to already diluted products which will further be neutralized quickly in the sewer, well before reaching a WWTP or surface water.

4. GUIDANCE OF COMPLIANCE CHECK WITH REQUIREMENTS OF EXPOSURE SCENARIO

Combination of Risk management measures and Operational conditions stated in that exposure scenario guarantees Risk characterization Ratio (RCR) value < 1.
Downstream users could asses their own measures using model ECETOC TRA v2 or EUSES. They could calculate RCR as DEL/DNEL or PEC/PNEC (DNELs , PNECs in SDS).

List of Abbreviations:

SU3 Industrial uses: Uses of substances as such or in preparations at industrial sites.
SU21 Consumer uses: Private households (= general public = consumers)
SU22 Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
PC2 Adsorbents
PC3 Air care products
PC8 Biocidal products (e.g. Disinfectants, pest control)
PC14 Metal surface treatment products, including gal-vanic and electroplating products
PC15 Non-metal-surface treatment products
PC20 Products such as ph-regulators, flocculants, pre-cipitants, neutralization agents
PC21 Laboratory chemicals
PC28 Perfumes, fragrances
PC31 Polishes and wax blends
PC36 Water softeners
PC37 Water treatment chemicals

PC39 Cosmetics, personal care products
PROC1 Use in closed process, no likelihood of exposure
PROC2 Use in closed, continuous process with occasional controlled exposure
PROC3 Use in closed batch process (synthesis or formulation)
PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises
PROC8a Transfer of substance or preparation (charging/discharging) from/to ves-sels/large containers at non-dedicated facilities
PROC8b Transfer of substance or preparation (charging/discharging) from/to ves-sels/large containers at dedicated facili-ties
PROC9 Transfer of chemicals into small containers (dedicated filling line)
PROC10 Roller application or brushing
PROC11 Non industrial spraying
PROC13 Treatment of articles by dipping and pouring
PROC15 Use of laboratory reagents in small scale laboratories
ERC1 Manufacture of substances
ERC2 Formulation of preparations
ERC4 Industrial use of processing aids in processes and products, not becoming part of articles
ERC6a Industrial use resulting in manufacture of another substance (use of intermediates)
ERC6b Industrial use of reactive processing aids
ERC7 Industrial use of substances in closed systems
ERC8a Wide dispersive indoor use of processing aids in open systems
ERC8b Wide dispersive indoor use of reactive substances in open systems
ERC8d Wide dispersive outdoor use of processing aids in open systems
ERC9a Wide dispersive indoor use of substances in closed systems
ODKAZ other descriptors can be found at:
http://echa.europa.eu/documents/10162/13632/information_requirements_r12_en.pdf

LEV Local Exhaust Ventilation
RPE Respiratory protective equipment
DNEL Derived no-effect level
PNEC Predicted no-effect concentration
RCR Risk characterisation ratio

Schlötter Galvanotechnik

Safety data sheet
according to 1907/2006/EC, Article 31

Printing date 03.07.2017 Version number 27 Revision: 28.06.2017

SECTION 1: Identification of the substance/mixture and of the company/undertaking

· **1.1 Product identifier**

· **Trade name: Pickle Additive SLOTOCLEAN AK 61**

· **Article number:** 010228

· **1.2 Relevant identified uses of the substance or mixture and uses advised against**
No further relevant information available.

· **Application of the substance / the mixture** Electroplating auxiliary

· **1.3 Details of the supplier of the safety data sheet**

· **Manufacturer/Supplier:**
Dr.-Ing. Max Schlötter GmbH & Co. KG
Galvanotechnik
Talgraben 30
73312 Geislingen/Steige
Germany

· **Further information obtainable from:** E-Mail: sds@schloetter.de

· **1.4 Emergency telephone number:**
University of Freiburg
Poisoning-Information-Center
+49(0)761-19240 (24h, 365 days/year)
Information in German and English
http://www.giftberatung.de/

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SECTION 2: Hazards identification

· **2.1 Classification of the substance or mixture**

· **Classification according to Regulation (EC) No 1272/2008**

Eye Irrit. 2 H319 Causes serious eye irritation.
Skin Sens. 1 H317 May cause an allergic skin reaction.
Carc. 2 H351 Suspected of causing cancer.

· **2.2 Label elements**

· **Labelling according to Regulation (EC) No 1272/2008**
The product is classified and labelled according to the CLP regulation.

· **Hazard pictograms**

GHS07 GHS08

· **Signal word** Warning

· **Hazard-determining components of labelling:**
sodium 3-nitrobenzenesulphonate
trisodium nitrilotriacetate

· **Hazard statements**
H319 Causes serious eye irritation.
H317 May cause an allergic skin reaction.
H351 Suspected of causing cancer.

· **Precautionary statements**

P261	Avoid breathing dust/fume/gas/mist/vapours/spray.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P321	Specific treatment (see on this label).
P405	Store locked up.
P501	Dispose of contents/container in accordance with local/regional/national/international regulations.

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· **2.3 Other hazards**
· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.

SECTION 3: Composition/information on ingredients

· **3.2 Chemical characterisation: Mixtures**
· **Description:** Mixture of substances listed below with nonhazardous additions.

· **Dangerous components:**

CAS: 127-68-4 EINECS: 204-857-3 Index number: 609-048-00-2 Reg.nr.: 01-2119965131-44	sodium 3-nitrobenzenesulphonate Eye Irrit. 2, H319; Skin Sens. 1, H317	< 7.0%
CAS: 5064-31-3 EINECS: 225-768-6 Index number: 607-620-00-6 Reg.nr.: 01-2119519239-36	trisodium nitrilotriacetate Carc. 2, H351; Acute Tox. 4, H302; Eye Irrit. 2, H319	< 7.0%

· **Additional information:** For the wording of the listed hazard phrases refer to section 16.

SECTION 4: First aid measures

· **4.1 Description of first aid measures**
· **General information:**
PERSONAL PROTECTION FOR THE FIRST AIDER.
Immediately remove any clothing soiled by the product.
· **After inhalation:**
In case of unconsciousness place patient stably in side position for transportation.
Supply fresh air and to be sure call for a doctor.
· **After skin contact:**
Immediately rinse with water.
If skin irritation continues, consult a doctor.
· **After eye contact:**
Rinse opened eye for several minutes under running water. Then consult a doctor.
If present remove the contact lenses immediately.
· **After swallowing:** If symptoms persist consult doctor.
· **4.2 Most important symptoms and effects, both acute and delayed** No further relevant information available.
· **4.3 Indication of any immediate medical attention and special treatment needed**
No further relevant information available.

SECTION 5: Firefighting measures

· **5.1 Extinguishing media**
· **Suitable extinguishing agents:** Use fire extinguishing methods suitable to surrounding conditions.
· **5.2 Special hazards arising from the substance or mixture**
During heating or in case of fire poisonous gases are produced.
Nitrogen oxides (NOx)
Carbon monoxide (CO)
· **5.3 Advice for firefighters**
· **Protective equipment:** Do not inhale explosion gases or combustion gases.
· **Additional information**
Collect contaminated fire fighting water separately. It must not enter the sewage system.

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Safety data sheet
according to 1907/2006/EC, Article 31

Printing date 03.07.2017 *Version number 27* *Revision: 28.06.2017*

***Trade name:* Pickle Additive SLOTOCLEAN AK 61**

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SECTION 6: Accidental release measures

· **6.1 Personal precautions, protective equipment and emergency procedures** Not required.
· **6.2 Environmental precautions:**
Dilute with plenty of water.
Do not allow to enter sewers/ surface or ground water.
· **6.3 Methods and material for containment and cleaning up:**
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
Dispose contaminated material as waste according to item 13.
Ensure adequate ventilation.
· **6.4 Reference to other sections**
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

SECTION 7: Handling and storage

· **7.1 Precautions for safe handling**
Ensure good ventilation/exhaustion at the workplace.
Prevent formation of aerosols.
· **Information about fire - and explosion protection:** No special measures required.

· **7.2 Conditions for safe storage, including any incompatibilities**
· **Storage:**
· **Requirements to be met by storerooms and receptacles:** Store only in the original receptacle.
· **Information about storage in one common storage facility:** Store away from foodstuffs.
· **Further information about storage conditions:**
Protect from frost.
Protect from heat and direct sunlight.
· **Maximum storage temperature:** 40 °C
· **Minimum storage temperature:** 5 °C
· **Storage class:** 12
· **7.3 Specific end use(s)** No further relevant information available.

SECTION 8: Exposure controls/personal protection

· **Additional information about design of technical facilities:** No further data; see item 7.

· **8.1 Control parameters**
· **Ingredients with limit values that require monitoring at the workplace:**
The product does not contain any relevant quantities of materials with critical values that have to be monitored at the workplace.

· **DNELs**		
127-68-4 sodium 3-nitrobenzenesulphonate		
Dermal	exposure long term - systemic effects	2.5 mg/kg bw/day (worker)
Inhalative	exposure long term - systemic effects	4.4 mg/m³ (worker)
5064-31-3 trisodium nitrilotriacetate		
Inhalative	exposure long term - systemic effects	3.5 mg/m³ (worker)
	exposure long term - local effects	3.5 mg/m³ (worker)
	exposure short term - systemic effects	5.25 mg/m³ (worker)
	exposure short term - local effects	5.25 mg/m³ (worker)

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· **PNECs**	
127-68-4 sodium 3-nitrobenzenesulphonate	
PNEC	1,000 mg/l (sewage treatment plant)
	0.05 mg/l (marine water)
	5 mg/l (sporadic emission)
	0.5 mg/l (fresh water)
PNEC	151 mg/kg (soil)
	526 mg/kg (sediment marine water)
	526 mg/kg (sediment fresh water)
5064-31-3 trisodium nitrilotriacetate	
PNEC	540 mg/l (sewage treatment plant)
	0.093 mg/l (marine water)
	0.915 mg/l (sporadic emission)
	0.93 mg/l (fresh water)
PNEC	0.182 mg/kg (soil)
	0.364 mg/kg (sediment marine water)
	3.64 mg/kg (sediment fresh water)

· **Additional information:** The lists valid during the making were used as basis.

· **8.2 Exposure controls**
· **Personal protective equipment:**
· **General protective and hygienic measures:**
Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing
Wash hands before breaks and at the end of work.
Do not inhale gases / fumes / aerosols.
Avoid contact with the eyes and skin.
· **Respiratory protection:**
Respiratory protection if vapours/aerosols are liberate. Particle filter with middle retention for solid and liquid particle (e.g. EN 143 or 149, Type P2 or FFP2).
· **Protection of hands:**

Protective gloves

Check the permeability prior to each anewed use of the glove.
The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation
· **Material of gloves**
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.
Chemical-protective gloves (EN 374-1, -2, -3).
Butyl rubber, BR ≥ 0,3 mm (Level 6)
· **Penetration time of glove material**
≥ 8 h
The exact break trough time has to be found out by the manufacturer of the protective gloves and has to be observed.
· **For the permanent contact in work areas without heightened risk of injury (e.g. Laboratory) gloves made of the following material are suitable:**
Butyl rubber, BR ≥ 0,3 mm (Level 6)

(Contd. on page 5)

(Contd. of page 4)

· **For the permanent contact gloves made of the following materials are suitable:**
Butyl rubber, BR ≥ 0,3 mm (Level 6)
· **Not suitable are gloves made of the following materials:**
Leather gloves
Strong material gloves
· **Eye protection:** Goggles recommended during refilling

SECTION 9: Physical and chemical properties

· **9.1 Information on basic physical and chemical properties**	
· **General Information**	
· **Appearance:**	
Form:	Fluid
Colour:	yellow to brown, turbid
· **Odour:**	Odourless
· **Odour threshold:**	Not determined.
· **pH-value at 20 °C:**	10 - 11.4 DIN 19261 Measuring methods with potentiometric cells
· **Change in condition**	
Melting point/freezing point:	not determined
Initial boiling point and boiling range:	100 °C
· **Flash point:**	Not applicable.
· **Flammability (solid, gas):**	Not applicable.
· **Ignition temperature:**	571 °C
· **Decomposition temperature:**	Not determined.
· **Auto-ignition temperature:**	Product is not selfigniting.
· **Explosive properties:**	Product does not present an explosion hazard.
· **Explosion limits:**	
Lower:	Not determined.
Upper:	Not determined.
· **Vapour pressure at 20 °C:**	23 hPa
· **Density at 20 °C:**	1.18 g/cm³ DIN 53217-5 Determination of density - vibration method
· **Relative density**	Not determined.
· **Vapour density**	Not determined.
· **Evaporation rate**	Not determined.
· **Solubility in / Miscibility with**	
water:	Fully miscible.
· **Partition coefficient: n-octanol/water:**	Not determined.
· **Viscosity:**	
Dynamic:	Not determined.
Kinematic:	Not determined.
· **Solvent content:**	
Organic solvents:	0.0 %
Water:	90.0 %
VOC (EU)	0.00 %
· **9.2 Other information**	No further relevant information available.

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· **Additional information** The physical data in section 9 correspond to typical values for this product and can not be seen as a product specification.

SECTION 10: Stability and reactivity

· **10.1 Reactivity** No further relevant information available.
· **10.2 Chemical stability**
· **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
· **10.3 Possibility of hazardous reactions** No dangerous reactions known.
· **10.4 Conditions to avoid** No further relevant information available.
· **10.5 Incompatible materials:** No further relevant information available.
· **10.6 Hazardous decomposition products:** No dangerous decomposition products known.

SECTION 11: Toxicological information

· **11.1 Information on toxicological effects**
· **Acute toxicity** Based on available data, the classification criteria are not met.

· **LD/LC50 values relevant for classification:**		
127-68-4 sodium 3-nitrobenzenesulphonate		
Oral	LD50	>5,000 mg/kg (rat) (OECD 401)
Inhalative	LC50/4h	>5.1 mg/l (rat) (OECD 403)
5064-31-3 trisodium nitrilotriacetate		
Oral	LD50	1,000-2,000 mg/kg (rat) (external MSDS)
Inhalative	LC50/4h	>5 mg/l (rat) (IUCLID)

· **Primary irritant effect:**
· **Skin corrosion/irritation** Based on available data, the classification criteria are not met.
· **Serious eye damage/irritation**
Causes serious eye irritation.
· **Respiratory or skin sensitisation**
May cause an allergic skin reaction.
· **CMR effects (carcinogenity, mutagenicity and toxicity for reproduction)**
· **Germ cell mutagenicity** Based on available data, the classification criteria are not met.
· **Carcinogenicity**
Suspected of causing cancer.
· **Reproductive toxicity** Based on available data, the classification criteria are not met.
· **STOT-single exposure** Based on available data, the classification criteria are not met.
· **STOT-repeated exposure** Based on available data, the classification criteria are not met.
· **Aspiration hazard** Based on available data, the classification criteria are not met.

SECTION 12: Ecological information

· **12.1 Toxicity**

· **Aquatic toxicity:**	
127-68-4 sodium 3-nitrobenzenesulphonate	
LC50/96h (static)	>500 mg/l (leuciscus idus - golden orfe) (DIN 38412)
EC50/17h	>10,000 mg/l (pseudomonas putida - bacteria) (DIN 38412-8)
EC50/48h (static)	8,670 mg/l (daphnia magna - water flea) (ECHA)
EC50/72h (dynamic)	>500 mg/l (scenedesmus subspicatus - green algae) (OECD 201)

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Safety data sheet
according to 1907/2006/EC, Article 31

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Trade name: Pickle Additive SLOTOCLEAN AK 61

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5064-31-3 trisodium nitrilotriacetate	
LC50/96h	>100 mg/l (pimephales promelas - fathead minnow) (external MSDS)
EC50/8h	3,200-5,600 mg/l (pseudomonas fluorescens - bacteria) (external MSDS)
EC50/96h	98 mg/l (aquatic invertebrates) (external MSDS)
EC50/72h (static)	>91.5 mg/l (scenedesmus subspicatus - green algae) (92/69/EWG, C3)

· **12.2 Persistence and degradability** No further relevant information available.
· **12.3 Bioaccumulative potential** No further relevant information available.
· **12.4 Mobility in soil** No further relevant information available.
· **Additional ecological information:**
· **General notes:**
The classification into the water hazard class resulted according to the administrative regulation water-polluting substances (VwVwS) dated 17.05.1999.
Water hazard class 2 (German Regulation) (Self-assessment): hazardous for water
The product does not contain AOX.
The product does not contain VOC.
The product does not contain EDTA
Do not allow product to reach ground water, water course or sewage system.
Danger to drinking water if even small quantities leak into the ground.
The product does not contain organic complexing agents.
· **12.5 Results of PBT and vPvB assessment**
According to Annex XIV of Regulation (EC) No. 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH): The product does not contain a substance fullfilling the PBT (persistent/bioaccumulative/toxic) criteria or the vPvB (very persistent/very bioaccumulative) criteria: Self classification.
· **PBT:** Not applicable.
· **vPvB:** Not applicable.
· **12.6 Other adverse effects** No further relevant information available.

SECTION 13: Disposal considerations

· **13.1 Waste treatment methods**
· **Recommendation**
Must not be disposed together with household garbage. Do not allow product to reach sewage system.
Contact manufacturer for recycling information.

· **European waste catalogue**	
07 01 04*	other organic solvents, washing liquids and mother liquors

· **Uncleaned packaging:**
· **Recommendation:** Disposal must be made according to official regulations.
· **Recommended cleansing agents:** Water, if necessary together with cleansing agents.

SECTION 14: Transport information

· **14.1 UN-Number**
· **ADR, ADN, IMDG, IATA** Void

· **14.2 UN proper shipping name**
· **ADR, ADN, IMDG, IATA** Void

· **14.3 Transport hazard class(es)**

· **ADR, ADN, IMDG, IATA**
· **Class** Void

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Safety data sheet
according to 1907/2006/EC, Article 31

Printing date 03.07.2017 *Version number 27* *Revision: 28.06.2017*

Trade name: Pickle Additive SLOTOCLEAN AK 61

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· **14.4 Packing group** · **ADR, IMDG, IATA**	Void
· **14.5 Environmental hazards:** · **Marine pollutant:**	No
· **14.6 Special precautions for user**	Not applicable.
· **14.7 Transport in bulk according to Annex II of Marpol and the IBC Code**	Not applicable.
· **Transport/Additional information:**	Not dangerous according to the above specifications.
· **UN "Model Regulation":**	Void

SECTION 15: Regulatory information

· **15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**

· **Directive 2012/18/EU - SEVESO III**
· **Named dangerous substances - ANNEX I** None of the ingredients is listed.
· **REGULATION (EC) No 1907/2006 ANNEX XVII** Conditions of restriction: 3

· **National regulations:**

· **Waterhazard class:** Water hazard class 2 (Self-assessment): hazardous for water.
· **15.2 Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

SECTION 16: Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

Safety Data Sheet to the regulation 1907/2006/EG, article 31.
Material Safety Data Sheets are to be kept for at least 10 years, according to Article 36 of REACH Regulation (EC) No 1907/2006.

· **Relevant phrases**
H302 Harmful if swallowed.
H317 May cause an allergic skin reaction.
H319 Causes serious eye irritation.
H351 Suspected of causing cancer.

· **Department issuing SDS:**
Research and Development
E-Mail: fue@schloetter.de
· **Contact:** sds@schloetter.de
· **Abbreviations and acronyms:**
RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
ICAO: International Civil Aviation Organisation
RRN: REACH Registration Number
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
IATA: International Air Transport Association
GHS: Globally Harmonised System of Classification and Labelling of Chemicals
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
VOC: Volatile Organic Compounds (USA, EU)
DNEL: Derived No-Effect Level (REACH)
PNEC: Predicted No-Effect Concentration (REACH)

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LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
PBT: Persistent, Bioaccumulative and Toxic
vPvB: very Persistent and very Bioaccumulative
Acute Tox. 4: Acute toxicity – Category 4
Eye Irrit. 2: Serious eye damage/eye irritation – Category 2
Skin Sens. 1: Skin sensitisation – Category 1
Carc. 2: Carcinogenicity – Category 2
· **** Data compared to the previous version altered.***

Aluminium Pickle
SLOTOCLEAN AK 60

Pickle Additive SLOTOCLEAN AK 61 is used as an additive in sodium hydroxide long-running pickle.

Pickle Additive SLOTOCLEAN AK 61 is a weak alkaline concentrate (approx. pH 9) and it is free from nitrate, nitride, chlorate and chloride. It has excellent wetting- and dispersing characters and contains specific organic oxidants and complexing agents to prevent the formation of scale even at high aluminium concentrations.

Pickle Additive SLOTOCLEAN AK 61 provides the achievement of equal E 6-surfaces on aluminium and its alloys.

The information in this data sheet is based on laboratory as well as practical experience. Figures quoted for operating limits and replenishment quantities are for guidance. Actual values necessary will depend on the components being plated (material and geometry), their application and plating plant conditions.

Important:
Please read this instruction carefully prior to the use of the process and carefully follow all the parameters that have a direct influence on the operation. We reserve the right to make technical changes. In the interest of safety, please pay attention to the hazard warnings on the labels of the containers. The minimum shelf life of the products is included on the labels and is also available in the appropriate Quality Assurance (QA03).
The current IMDS number of the layer deposited from the process is available on the internet at www.schloetter.com/downloads.
For the storage of chemical products the TRGS 510 must be followed.
If the additives used in this process contain a SVHC-substance, then this will be specified in the corresponding Material Safety Data Sheet, section 15.

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1.0 TECHNICAL INFORMATION AND EQUIPMENT REQUIREMENTS

Tanks:	steel or steel with alkali-resistant rubber-lining
Local Exhaust Ventilation:	required
Part-/Electrolyte Agitation:	stirring device or air agitation
Heating/Cooling:	heat exchanger, immersion heaters or heating coils; at high material throughput a cooling system is required

2.0 MAKE-UP AND OPERATING CONDITIONS

2.1 Product names

List of products required		
Product name	**Article no. (AN)**	**SG**
Pickle Additive SLOTOCLEAN AK 61	010228	1.16
Sodium hydroxide	supplied by user*	--

* The current product qualities respectively -specifications recommended by us can be found on the internet at www.schloetter.com/downloads.

2.2 Composition

Pickle Additive SLOTOCLEAN AK 61	Complexing agents and organic oxidants

2.3 Requirements for a 100 litre bath

Product name	**AN**	**SG**	**Quantity**	**Optimum**	
Pickle Additive SLOTOCLEAN AK 61	010228	1.16	0.9 - 2.2	1.5	ltr.
Sodium hydroxide	--	--	5	--	kg

2.4 Make-up sequence for a 100 litre bath

All tanks and equipment to be used must be thoroughly cleaned prior to use.

- fill the tank with 75 litres of deionised water
- carefully add with constant stirring 5 kg of sodium hydroxide and dissolve in compliance with the valid safety measures
- add the required quantity of Pickle Additive SLOTOCLEAN AK 61
- make up to final volume with water
- mix thoroughly

When the operating temperature is reached the pickle is ready for use.

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2.5 Concentrations and operating conditions

	Quantity	Optimum	
Pickle Additive SLOTOCLEAN AK 61	9 - 22	15	ml/l
Sodium hydroxide	--	50	g/l
Treatment time:			
In the field of Electroplating	20 - 60	--	sec.
In the field of Eloxal	5 - 15	--	min.
Temperature range	50 - 60	--	°C

NB
The treatment time depends on the particular surface quality of the aluminum, the aluminum alloy, the concentration of the long-term pickle and the temperature.

At higher aluminum concentrations in the pickle the following operating ranges are recommended:

	Range		
	at < 50 g/l Al	at > 50 g/l Al	
Pickel Additive SLOTOCLEAN AK 61	12 - 18	20 - 25	ml/l
Sodium hydroxide	50 - 60	80 - 90	g/l

2.6 Consumption and replenishment

The consumption of the additives is due to drag-out, geometry and surface condition of the parts.

The replenishment depends on analysis results of aluminum- and sodium hydroxide concentration as well as the content of Pickle Additive SLOTOCLEAN AK 61.

Approximate values for replenishment:

Additive	Replenishment / Consumption
Pickel Additive SLOTOCLEAN AK 61	80 ml/m²
Sodium hydroxide	150 g/m²

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2.7 Etch rates

The data of the etch rates listed below are relating to the basic material AlMg1.

Make-up	Aluminium content of the pickle	Etch rate					
		50 °C			60 °C		
		5 min.	10 min.	20 min.	5 min.	10 min.	20 min.
50 g/l sodium hydroxide 15 g/l Aluminium Pickle SLOTOCLEAN AK 61 1 ml/l spraying suppresant	--	19 µm	36 µm	69 µm	34 µm	70 µm	141 µm
	20 g/l	27 µm	41 µm	89 µm	36 µm	65 µm	140 µm
	40 g/l	21 µm	45 µm	91 µm	41 µm	75 µm	153 µm
80 g/l sodium hydroxide 25 g/l Pickle Additive SLOTOCLEAN AK 61 1 ml/l spraying suppresant	80 g/l	20 µm	39 µm	85 µm	41 µm	90 µm	182 µm

3.0 PROCESS SEQUENCE

3.1 Pre-treatment

Depending on the base material, the parts to be plated are pre-treated as usual. Our technical field service and our service department would be pleased to provide you with information about suitable process sequences respectively -methods as well as suitable products from our pre-treatment programme.

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3.2 Process sequence

- hot-soak degreasing
- rinsing
- Aluminium Pickle SLOTOCLEAN AK 60
- rinsing
- lighten, depending on the basic material
- zincate
- rinsing
- further coating

4.0 MAINTENANCE AND FUNCTION OF THE INDIVIDUAL BATH COMPONENTS

4.1 Pickle Additive SLOTOCLEAN AK 61

The Pickle Additive SLOTOCLEAN AK 61 contains all, except sodium hydroxide, necessary components for the operation of the pickle. The content of the pickle additive can be determined analytically.
We're pleased to provide you with an analysis method upon request.

4.2 Sodium hydroxide

The content of sodium hydroxide is, among others responsible for the aggressivity of the pickle and so for the degree of attack on the base material. Normally, a higher content of sodium hydroxide is required (see point **2.5**) at a higher aluminium concentration in the pickle.

The content of sodium hydroxide can be determined analytically. We're pleased to provide you with an analysis method upon request.

5.0 TROUBLE SHOOTING

No information available at present.

6.0 EFFLUENT

Legal regulations must be observed for disposal of the Aluminium Pickle SLOTOCLEAN AK 60. Different regulations normally apply for the additives and the ready-made electrolyte. Please refer to section **13** of the appropriate Material Safety Data Sheet for disposal code and recommendations.

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7.0 SAFETY

Reasonable care is required when handling chemical products. Only personnel specially trained on working with chemicals should be deployed with their handling.

EC Material Safety Data Sheets must be made available to all personnel dealing with the chemicals to ensure they have all required information about product composition, hazards identification, first-aid measures, handling and storage, exposure controls, toxicological and ecological information, etc. It is required to ensure the supply and use of suitable protective clothing and -equipment.

The user must verify the designated purpose of the electrolyte. Previous experience has shown that not all metal surfaces are suitable for a trouble-free electroplating.

The above mentioned data are made according to our best knowledge. Consistent operation of the working solution requires appropriate maintenance. Aluminium Pickle SLOTOCLEAN AK 60 is a process of Dr.-Ing. Max Schlötter GmbH & Co KG. It can only be operated with the products described in this technical data sheet. Use of other chemicals (also partly) will impair quality and invalidates our service- and quality commitments (quality assurance).

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SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1. Product identifier

Name of the product: **SODIUM HYDROXIDE PELLETS**

Product identifier: Sodium hydroxide

Registration Number of the substance: 01-2119457892-27-0029

1.2. Relevant identified uses of the substance or mixture and uses advised against

Identified uses: Manufacturing of liquid NaOH (ES01)
Manufacturing of solid NaOH (ES02)
Industrial and professional use of NaOH (ES1)
Consumer use of NaOH (ES2)

Uses advised against: There are no uses advised against identified.

1.3. Details of the supplier of the safety data sheet

Company/undertaking:

Spolek pro chemickou a hutní výrobu, akciová společnost
Revoluční 1930/86, Ústí nad Labem 400 32, Czech Republic
Tel: +420 477 161 111 Fax.: +420 477 163 333
Responsible person: msds@spolchemie.cz

1.4. Emergency telephone number

CZ: +420 477 162 094/ EN: +420 476 163 111 non-stop service
Listing of national helpdesks at: http://echa.europa.eu/help/nationalhelp_contact_en.asp.

SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture

Met.Corr.1: H290
Skin Corr.1A: H314

Hazards to man and the environment: May be corrosive to metals. Causes severe skin burns and eye damage.
Full text of classification and text of H, EUH and P - Phrases is listed in section 16 this SDS.

2.2. Label elements

DANGER

May be corrosive to metals. Causes severe skin burns and eye damage.
Do not breathe dust. Wear protective gloves/protective clothing/eye protection/face protection. IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/physician.

CAS: 1310-73-2 **Index:** 011-002-00-6
Contents: Sodium hydroxide
Obligatory phrasing: Not determined.

2.3. Other hazards

PBT and vPvB assessment : This substance is not considered to be persistent, bioaccumulative non toxic (PBT).

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Identifier	CAS/ EINECS/ Registration number	Classification 1272/2008/ES	Content %	Note
Sodium hydroxide	1310-73-2/ 215-185-5/ 01-2119457892-27-0029	Met.Corr.1: H290, Skin Corr.1A: H314	> 96	OEL

Full text of classification and text of H, EUH and P - Phrases is listed in section 16 this SDS.

SECTION 4: FIRST AID MEASURES

4.1. Description of first aid measures

In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
In a life threatening condition soon carry out resuscitation affected and seek medical advice.
Respiratory arrest: immediately administer artificial respiration.
Cardiac arrest: immediately perform indirect heart massage.
Unconsciousness: place patient in recovery position.

After inhalation: Remove the victim quickly and considering own safety to fresh air, do not let the victim walk! Depending on situation, it is recommended to rinse oral cavity and, if necessary, nose with water. If the victim's clothing is contaminated, change it and protect the victim against cold. Depending on situation, call the rescue service or get medical attention due to the frequent need for further follow-up for at least 24 hours.

After skin contact: Remove contaminated clothing immediately; before washing or during washing, remove any rings, watches, bracelets that are in places of contact of the substance with skin. Rinse affected areas with stream of lukewarm water, if possible, for 10 to 30 minutes; do not use a brush, soap or neutralising agents! Cover burned areas of skin with a sterile dressing, do not use any ointments or other medical and pharmaceutical products. Cover the victim to protect him against cold. Depending on situation, call the rescue service or ensure medical attention.

After eye contact: Rinse eyes immediately under running water, open eyelids (even by force); if the victim wears contact lenses, remove them immediately. Do never neutralise! Rinse for 10 to 30 minutes from the inner to the outer ocular angle to prevent running of water in the other eye. Depending on the situation, call an ambulance or medical attention as quickly as possible, if possible professional treatment.The victim needs to get medical attention even with in the case of a small injuries.

After ingestion: DO NOT INDUCE VOMITING - risk of further damage to the digestive tract !!! There is a risk of perforation of the esophagus and the stomach! RINSE MOUTH IMMEDIATELY WITH WATER AND GIVE TO DRINK 2-5 dl of cold water to reduce the thermal effect of the caustics! Do not force the victim to drink, especially if he/she feels pain in mouth or throat. In this case, make the victim rinse his/her mouth. DO NOT ADMINISTER ACTIVATED CARBON! (blackening will make examination of the mucous membranes of more difficult and activated charcoal has not positive effect in case of acids and lyes). Do not give anything by mouth if the victim is unconscious or has convulsions. Depending on situation, call the rescue service or get medical attention as quickly as possible.

4.2. Most important symptoms and effects, both acute and delayed

Possible risk of corrosion on reaction with acids due high heat release and spray out of reaction mixture. Ingestion may produce burning of the gastrointestinal system. Small quantities may develop burning pain, feeling of constriction in the throat. Large quantities may cause an extensive destruction, and perforation of the stomach.

4.3. Indication of any immediate medical attention and special treatment needed

Not determined.

SECTION 5: FIRE-FIGHTING MEASURES

5.1. Extinguishing media

Suitable extinguishing media: Not flammable substance.

Extinguishing media to be avoided: High pressure water jet.

5.2. Special hazards arising from the substance or mixture

Not determined.

5.3. Advice for firefighters

Do not enter confined fire space without adequate protective clothing and an approved positive pressure self-contained breathing apparatus.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures

Twilled fabric clothing (or working suit with rubber apron), rubber boots, rubber gloves, face shield or goggles.

6.2. Environmental precautions

Avoid release of product or components to the environment, sewers and surface water or soil.

6.3. Methods and material for containment and cleaning up

Pick up spilled hydroxide and place into impervious containers. Neutralise residues with diluted sulphuric acid or hydrochloric acid and after that flush area with water. In case of large spills call fire emergency service.

6.4. Reference to other sections

Additional advice : Refer to section 8, 13.

SECTION 7: HANDLING AND STORAGE

7.1. Precautions for safe handling

Do not eat, drink or smoke during work, observe working instructions. Wash your hands and exposed parts of body thoroughly with soap and water after work and before meal and possibly treat with suitable reparation lotion. Store in original packaging, storage tanks and containers should be placed into containment basins of corresponding content and construction.

7.2. Conditions for safe storage, including any incompatibilities

Store in closed storerooms. Keep away from sources of ignition and other kinds of substances. Store in the original containers kept tightly closed. Storerooms should be well- ventilated, dry, provided with a first aid box and a source of drinking water supply. Prevent access of unauthorised personnel. Storage tanks and containers should be placed into containment basins of corresponding content and construction.

7.3. Specific end use(s)

No effect known.

SECTION 8: EXPOSURE CONTROLS/ PERSONAL PROTECTION

8.1. Control parameters

Sodium hydroxide: STEL: 2 mg/m³ (EH40/2005 Workplace exposure limits).

Sodium hydroxide:
DNEL- workers:
Long term (local effects): Inhalat: 1 mg/m³
DNEL- general population:
Long term (local effects): Inhalat: 1 mg/m³

Sodium hydroxide:
PNECs : Not determined.

8.2. Exposure controls

8.2.1 Appropriate engineering controls

Local exhaustion recommended.

8.2.2 Occupational exposure controls

Respiratory protection: Respirator.
Hand protection: Protective PVC gloves.
Eye / face protection: Safety goggles or safety shield.
Skin protection: Twilled fabric clothing, footwear.

8.2.3 Environmental exposure controls

Prevent entry into sewers, follow the plan of action in case of emergency. Cover with an absorbent material (Vapex) .Used material to store

in barrels and in cooperation with the department of environmental protection then defuse it.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties

Physical State:	Solid.
Colour:	White.
Odour:	Odourless.
pH:	14 (20°C)
Boiling point / boiling range (°C):	1388
Melting point / freezing point (°C):	323
Flash point (°C):	Inorganic substance.
Flammability (solid, gas):	Not flammable.
Explosive properties:	Not explosive.
Oxidising properties:	No.
Vapour pressure:	Not applicable.
Density (g/cm³):	2,130 (20°C)
Solubility:	
Water solubility (g/l):	1000 (25°C)
Partition coefficient: n-octanol/water:	Inorganic substance.
Auto-ignition temperature (°C):	Not self-igniting.
Viscosity:	Not applicable.
Vapour density:	Not applicable.
Evaporation rate:	Not determined.
Other information:	Not determined.

9.2. Other information

Miscibility:	Not determined.
Fat solubility (oil to be specified):	Not determined.
Conductivity:	Not determined.
Gas group:	Not determined.

SECTION 10: STABILITY AND REACTIVITY

10.1. Reactivity

With normal use no dangerous reaction.

10.2. Chemical stability

Stable under recommended conditions of storage and handling of the product.

10.3. Possibility of hazardous reactions

Exothermic reaction with strong acids.

10.4. Conditions to avoid

Extremes of temperature and direct sunlight. Exposure to moisture - hygroscopic substance.

10.5. Incompatible materials

Metals, strong acids, flammable materials.

10.6. Hazardous decomposition products

Hydrogen.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. Information on toxicological effects

Acute toxicity: Based on available data, the classification criteria are not met.

Skin corrosion/irritation: Causes severe burns.
Serious eye damage/irritation: Causes serious eye damage.
Respiratory or skin sensitisation: Based on available data, the classification criteria are not met.
Mutagenicity: Based on available data, the classification criteria are not met.
Carcinogenicity: Based on available data, the classification criteria are not met.
Reproductive toxicity: Based on available data, the classification criteria are not met.
STOT- single exposure: Based on available data, the classification criteria are not met.
STOT- repeated exposure: Based on available data, the classification criteria are not met.
Aspiration hazard: Based on available data, the classification criteria are not met.

Other information
If affected skin is not treated promptly, badly healing blisters are formed which leave scars. Affection of hands and fingers with the weak solution may be dangerous, because of painful irritation with delayed appearance (even after some hours), where it may be too late to provide an effective aid.

SECTION 12: ECOLOGICAL INFORMATION

12.1. Toxicity

Not determined.
Other hazards: Not determined.

12.2. Persistence and degradability

The methods for determining the biological degradability are not applicable to inorganic substances.

12.3. Bioaccumulative potential

Is not expected.

12.4. Mobility in soil

High soluble in water.
During movement through soil some ion exchange will occur.

12.5. Results of PBT and vPvB assessment

PBT and vPvB assessment : This substance is not considered to be persistent, bioaccumulative non toxic (PBT).

12.6. Other adverse effects

No effect known.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

Neutralise with diluted sulphuric acid or hydrochloric acid and then rinse with plenty of water.

Properly emptied metal packagings may be used like secondary raw material, remaining packagings should be buried in a landfill or disposed of by incineration in suitable incinerator units for hazardous waste.

Handling with wastes is regulated by Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives.

SECTION 14: TRANSPORT INFORMATION

14.1. UN number: 1823

14.2. UN proper shipping name:

ADR/RID: SODIUM HYDROXIDE, SOLID
IMDG: SODIUM HYDROXIDE, SOLID

14.3. Transport hazard class(es): 8

14.4. Packing group: II

14.5. Environmental hazards

ADR/RID: No.
IMDG: No.

14.6. Special precautions for user

Not applicable.

14.7. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code

Not applicable.

Other information

Classification code: C6
Note: -
Tunnel restriction codes: (E)
EmS: F-A/S-B

SECTION 15: REGULATORY INFORMATION

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration,Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC.

Commission Regulation (EU) No 453/2010 of 20 May 2010 amending Regulation (EC) No 1907/2006 of the European Parliament and of theCouncil on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH).

Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC)No 1907/2006.

Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives.

Directive 2008/68/EC of the European Parliament and of the Council of 24 September 2008 on the inland transport of dangerous goods.

Council Directive 1999/13/EC of 11 March 1999 on the limitation of emissions of volatile organic compounds due to the use of organic solvents in certain activities and installations.

Council Directive 89/391/EEC of 12 June 1989 on the introduction of measures to encourage improvements in the safety and health of workers at work.

Other regulatory information:
Not determined.

15.2. Chemical safety assessment

The chemical safety report has been prepared.

SECTION 16: OTHER INFORMATION

Full wording of H, EUH, P - Phrases

H290 May be corrosive to metals.
H314 Causes severe skin burns and eye damage.
P260A Do not breathe dust.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P303 + P361 + P353 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310 Immediately call a POISON CENTER or doctor/physician.

Used abbreviations

Met. Corr. 1: Substance or mixture corrosive to metals, category 1
Skin Corr. 1A: Skin corrosion, hazard category 1A
OEL: Substance with Occupational Exposure Limits
STEL: Short-Term Exposure Limit
TWA: Time weighted average
PNEC: Predicted no-effect concentration
DNEL: Derived no-effect level
WGK: Wassergefährdungsklasse (water hazard class)
PBT: Persistent, bioaccumulative and toxic substance.
vPvB: Very persistent and very bioaccumulative substance

Classification methods

Not relevant - substance.

Sources of data

The registration dossier.

Additional information

Not determined.

Training guidelines

Those who manipulate with the product must be demonstrably informed of its dangerous properties, principles of protecting the environment and health from its harmful effects and principles of first aid.

Revision data

16.11.2010 Changes made in accordance with Regulation (EC) No 1272/2008 and Regulation (EC) No 453/2010 .
20.06.2013 e-SDS
17.09.2015 Removed classification according to Directive 67/548 / EEC (DSD). Adding information in section 4.

1.TITLE OF THE EXPOSURE SCENARIO: ES1: Industrial and Professional Use of NaOH

Sector of use: SU1-24

Product category: PC0-40
Sodium hydroxide can be used in many different chemical product categories. It can be used for example as an adsorbent (PC2), metal surface treatment product (PC14), non-metal-surface treatment product (PC15), intermediate (PC19), pH regulator (PC20), laboratory chemical (PC21), cleaning product (PC35), water softener (PC36), water treatment chemical (PC37) or extraction agent. However, it could potentially also be used in other chemical product categories (PC0 – 40).

Process category: PROC1, PROC2, PROC3, PROC4, PROC8a,PROC8b, PROC9, PROC10, PROC11, PROC 13, PROC15
The process categories mentioned above are assumed to be the most important ones but other process categories could also be possible (PROC1 – 27).

Article category: Not applicable.

Environmental relase category: ERC1, ERC2, ERC4, ERC6a, ERC6b, ERC7, ERC8a, 8b, 8d, ERC9a
The environmental release categories mentioned above are assumed to be the most important ones but other industrial environmental release categories could also be possible (ERC 1 – 12).

Processes, task, activities covered: Typical uses include: production of organic and inorganic chemicals, formulation of chemicals, production and whitening of paper pulp, production of aluminium and other metals, food industry, water treatment, production of textiles, professional end use of formulated products and other industrial uses.

2. OPERATIONAL CONDITIONS AND RISK MAMAGEMENT MESURES

2.1. Control of worker exposure

Product characteristics:

Solid or liquid NaOH, all concentrations (0-100%), if solid: low dustiness class.
Frequency and duration of use/exposure: 8 hours/day, 200 days/year

Operational conditions:

For worker, both solid and liquid NaOH containing products at concentration > 2%:

Replacing, where appropriated, manual processes by automated and/or closed processes. This would avoid irritating mists, sprayings and subsequent potential splashes:
- Use closed systems or covering of open containers (e.g. screens)
- Transport over pipes, technical barrel filling/emptying of barrel with automatic systems (suction pumps etc.)
- Use of pliers, grip arms with long handles with manual use “to avoid direct contact and exposure by splashes (no working over one’s head)”

Contributing scenario:

CONTROLLING WORKER EXPOSURE

Risk management measures:

For worker and professional, both solid and liquid NaOH containing products at concentration > 2%:

ORGANIZATIONAL
- Workers in the risky process/areas identified should be trained:
  a) to avoid to work without respiratory protection,
  b) to understand the corrosive properties and, especially, the respiratory inhalation effects of sodium hydroxide and
  c) to follow the safer procedures instructed by the employer.
- The employer has also to ascertain that the required PPE is available and used according to instructions.
- Where possible for professional use, use of specific dispensers and pumps specifically designed to prevent splashes/spills/exposure to occur.

TECNICAL
- Local exhaust ventilation and/or general ventilation is good practice

PERSONAL PROTECTIVE EQUIPMENT
- Respiratory protection: In case of dust or aerosol formation (e.g. spraying): use respiratory protection with approved filter (P2).
- Hand protection: impervious chemical resistant protective gloves.
  material: butyl-rubber, PVC, polychloroprene with natural latex liner, material thickness: 0.5 mm, breakthrough time: > 480 min.
  material: nitrile-rubber, fluorinated rubber, material thickness: 0.35-0.4 mm, breakthrough time: > 480 min.
- If splashes are likely to occur, wear tightly fitting chemical resistant safety goggles, face –shield.
- If splashes are likely to occur, wear suitable protective clothing, aprons, shield and suits, rubber or plastic boots, rubber or plastic boots.

2.2. Control of environmental exposure

Product characteristics:
Solid or liquid NaOH, all concentrations (0-100%), if solid: low dustiness class.
Frequency and duration of use: Continuous

Operational conditions:
Not applicable.

Contributing scenario:
CONTROLLING ENVIRONMENTAL EXPOSURE

Risk management measures:
Risk management measures related to the environment aim to avoid discharging NaOH solutions into municipal wastewater or to surface water, in case such discharges are expected to cause significant pH changes. Regular control of the pH value during introduction into open waters is required. In general discharges should be carried out such that pH changes in receiving surface waters are minimised. In general most aquatic organisms can tolerate pH values in the range of 6-9. This is also reflected in the description of standard OECD tests with aquatic organisms.

There is no solid waste of NaOH. Liquid NaOH waste should be reused or discharged to the industrial wastewater and further neutralized if needed.

3. EXPOSURE ESTIMATION

Worker exposure:
NaOH is a corrosive substance. For the handling of corrosive substances and formulations, immediate dermal contacts occur only occasionally and it is assumed that repeated daily dermal exposure can be neglected. Therefore, dermal exposure to NaOH was not quantified.
NaOH is not expected to be systemically available in the body under normal handling and use conditions and therefore systemic effects of NaOH after dermal or inhalation exposure are not expected to occur. Based on NaOH measurements in the pulp and paper industry, de-inking waste paper, aluminium, textile and chemical industry and following the proposed risk management measures controlling worker and professional exposure, the inhalation exposure is below the DNEL of 1 mg/m3.
In addition to the measured exposure data the ECETOC TRA tool has been used to estimate the inhalation exposure (see Table below). It was assumed that there is no local exhaust ventilation and no respiratory protection unless specified otherwise. The duration of exposure was set at more than 4 hours per day as a worst-case assumption and professional use was specified where relevant as a worst-case assumption. For the solid, the low dustiness class was selected because NaOH is very hygroscopic. Only the most relevant PROCs were considered in the assessment.

PROC1 liq.(mg/m3) 0,17 solid(mg/m3) 0,01
PROC2 liq.(mg/m3) 0,17 solid(mg/m3) 0,01
PROC3 liq.(mg/m3) 0,17 solid(mg/m3) 0,10
PROC4 liq.(mg/m3) 0,17 solid(mg/m3) 0,20 (with LEV)
PROC5 liq.(mg/m3) 0,17 solid(mg/m3) 0,20 (with LEV)
PROC7 liq.(mg/m3) 0,17 solid(mg/m3) not applicable

PROC8a/b liq.(mg/m3) 0,17 solid(mg/m3) 0,50
PROC9 liq.(mg/m3) 0,17 solid(mg/m3) 0,50
PROC10 liq.(mg/m3) 0,17 solid(mg/m3) 0,50
PROC11 liq.(mg/m3) 0,17 solid(mg/m3) 0,20 (with LEV)
PROC13 liq.(mg/m3) 0,17 solid(mg/m3) 0,50
PROC14 liq.(mg/m3) 0,17 solid(mg/m3) 0,20 (with LEV)
PROC15 liq.(mg/m3) 0,17 solid(mg/m3) 0,10
PROC19 liq.(mg/m3) 0,17 solid(mg/m3) 0,50
PROC23 liq.(mg/m3) 0,17 solid(mg/m3) 0,40 (with LEV and RPE(90%))
PROC24 liq.(mg/m3) 0,17 solid(mg/m3) 0,50 (with LEV and RPE(90%))

Environmental exposure:
The aquatic effect and risk assessment only deals with the effect on organisms/ecosystems due to possible pH changes related to OH- discharges, as the toxicity of the Na+ ion is expected to be insignificant compared to the (potential) pH effect. The high water solubility and very low vapour pressure indicate that NaOH will be found predominantly in water. When the risk management measures related to the environment are implemented, there is no exposure to the activated sludge of a sewage treatment plant and there is not exposure of the receiving surface water.
The sediment compartment is not considered, because it is not considered relevant for NaOH. If emitted to the aquatic compartment, sorption to sediment particles will be negligible.
Significant emissions to air are not expected due to the very low vapour pressure of NaOH). If emitted to air as an aerosol in water, NaOH will be rapidly neutralised as a result of its reaction with CO2 (or other acids).
Significant emissions to the terrestrial environment are not expected either. The sludge application route is not relevant for the emission to agricultural soil, as no sorption of NaOH to particulate matter will occur in STPs/WWTPs. If emitted to soil, sorption to soil particles will be negligible. Depending on the buffer capacity of the soil, OH- will be neutralised in the soil pore water or the pH may increase.
Bioaccumulation will not occur.

4. GUIDANCE OF COMPLIANCE CHECK WITH REQUIREMENTS OF EXPOSURE SCENARIO

Combination of Risk management measures and Operational conditions stated in that exposure scenario guarantees Risk characterization Ratio (RCR) value < 1.
Downstream users could asses their own measures using model ECETOC TRA v2 or EUSES. They could calculate RCR as DEL/DNEL or PEC/PNEC (DNELs , PNECs in SDS).

1.TITLE OF THE EXPOSURE SCENARIO: ES2: Consumer Use of NaOH

Sector of use:	SU21
Product category:	PC 0-40 Sodium hydroxide can be used in many different chemical product categories: PC20, PC35, PC39 (neutralisation agents, cleaning products, cosmetics, personal care products). The other PCs are not explicitly considered in this exposure scenario. However, NaOH can also be used in other PCs in low concentrations e.g. PC3 (up to 0.01%), PC8 (up to 0.1%), PC28 and PC31 (up to 0.002%) but it can be used also in the remaining product categories (PC 0-40).
Process category:	Not applicable.
Article category:	Not applicable.
Environmental relase category:	ERC8a, ERC8 b, ERC8d, ERC9a The environmental release categories mentioned above are assumed to be the most important ones but other wide dispersive environmental release categories could also be possible (ERC8 – 11b).
Processes, task, activities covered:	NaOH (up to 100%) is also used by consumers. It is used at home for drain and pipe cleaning, wood treatment and it also used to make soap at home. NaOH is also used in batteries and in oven-cleaner pads.

2. OPERATIONAL CONDITIONS AND RISK MAMAGEMENT MESURES

2.1. Control of worker exposure

Product characteristics:

Solid or liquid NaOH, all concentrations (0-100%), if solid: low dustiness class.Typical concentrations: floor strippers (<10%), hair straighteners (<2%), oven cleaners (<5%), drain openers (liquid: 30%, solid: <100%), cleaning products (<1.1%)

Operational conditions:

It is required to use resistant labelling-package to avoid its auto-damage and loss of the label integrity, under normal use and storage of the product. The lack of quality of the package provokes the physical loss of information on hazards and use instructions.

It is required that household chemicals, containing sodium hydroxide for more than 2%, which may be accessible to children should be provided with a child-resistant fastening (currently applied) and a tactile warning of danger (Adaptation to Technical Progress of the Directive 1999/45/EC, annex IV, Part A and Article 15(2) of Directive 67/548 in the case of, respectively, dangerous preparations and substances intended for domestic use). This would prevent accidents by children and other sensitive groups of society.

It is advisable to deliver only in very viscous preparations.
It is advisable to delivery only in small amounts.
For use in batteries, it is required to use completely sealed articles with a long service life maintenance.

Contributing scenario:

CONTROLLING CONSUMER EXPOSURE

Risk management measures:

For consumer, both solid and liquid NaOH containing products at concentration > 2%:

ORGANISATIONAL
It is required that improved use instructions, and product information should always be provided to the consumers. This clearly can efficiently reduce the risk of misuse. For reducing the number of accidents in which (young) children or elderly people are involved, it should be advisable to use these products in the absence of children or other potential sensitive groups. To prevent improper use of sodium hydroxide, instructions for use should contain a warning against dangerous mixtures.

Instructions addressed to consumers:
- Keep out of reach of children.
- Do not apply product into ventilator openings or slots.

PERSONAL PROTECTIVE EQUIPMENT
- Respiratory protection: In case of dust or aerosol formation (e.g. spraying): use respiratory protection with approved filter (P2)
- Hand protection: impervious chemical resistant protective gloves.
- If splashes are likely to occur, wear tightly fitting chemical resistant safety goggles, face–shield.

2.2. Control of environmental exposure

Product characteristics:
Solid or liquid NaOH, all concentrations (0-100%), if solid: low dustiness class.

Operational conditions:
Not applicable.

Contributing scenario:
CONTROLLING ENVIRONMENTAL EXPOSURE

Risk management measures:
This material and its container must be disposed of in a safe way (e.g. by returning to a public recycling facility). If container is empty, trash as regular municipal waste.
Batteries should be recycled as much as possible (e.g. by returning to a public recycling facility). Recovery of NaOH from alkaline batteries includes emptying the electrolyte, collection and neutralization with sulphuric acid and carbon dioxide.

3. EXPOSURE ESTIMATION

Worker exposure:
Acute/short term exposure was assessed only for the most critical use: use of NaOH in a spray oven cleaner. Consexpo and SprayExpo were used to estimate exposure. The calculated short-term exposure of 0.3 – 1.6 mg/m3 is slightly higher than the long term DNEL for inhalation of 1 mg/m3 but smaller than the short term occupational exposure limit of 2 mg/m3. Furthermore, NaOH will be rapidly neutralised as a result of its reaction with CO2 (or other acids).

Environmental exposure:
Consumer uses relates to already diluted products which will further be neutralized quickly in the sewer, well before reaching a WWTP or surface water.

4. GUIDANCE OF COMPLIANCE CHECK WITH REQUIREMENTS OF EXPOSURE SCENARIO

Combination of Risk management measures and Operational conditions stated in that exposure scenario guarantees Risk characterization Ratio (RCR) value < 1.
Downstream users could asses their own measures using model ECETOC TRA v2 or EUSES. They could calculate RCR as DEL/DNEL or PEC/PNEC (DNELs , PNECs in SDS).

List of Abbreviations:

SU3 Industrial uses: Uses of substances as such or in preparations at industrial sites.
SU21 Consumer uses: Private households (= general public = consumers)
SU22 Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
PC2 Adsorbents
PC3 Air care products
PC8 Biocidal products (e.g. Disinfectants, pest control)
PC14 Metal surface treatment products, including gal-vanic and electroplating products
PC15 Non-metal-surface treatment products
PC20 Products such as ph-regulators, flocculants, pre-cipitants, neutralization agents
PC21 Laboratory chemicals
PC28 Perfumes, fragrances
PC31 Polishes and wax blends
PC36 Water softeners
PC37 Water treatment chemicals

PC39 Cosmetics, personal care products
PROC1 Use in closed process, no likelihood of exposure
PROC2 Use in closed, continuous process with occasional controlled exposure
PROC3 Use in closed batch process (synthesis or formulation)
PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises
PROC8a Transfer of substance or preparation (charging/discharging) from/to ves-sels/large containers at non-dedicated facilities
PROC8b Transfer of substance or preparation (charging/discharging) from/to ves-sels/large containers at dedicated facili-ties
PROC9 Transfer of chemicals into small containers (dedicated filling line)
PROC10 Roller application or brushing
PROC11 Non industrial spraying
PROC13 Treatment of articles by dipping and pouring
PROC15 Use of laboratory reagents in small scale laboratories
ERC1 Manufacture of substances
ERC2 Formulation of preparations
ERC4 Industrial use of processing aids in processes and products, not becoming part of articles
ERC6a Industrial use resulting in manufacture of another substance (use of intermediates)
ERC6b Industrial use of reactive processing aids
ERC7 Industrial use of substances in closed systems
ERC8a Wide dispersive indoor use of processing aids in open systems
ERC8b Wide dispersive indoor use of reactive substances in open systems
ERC8d Wide dispersive outdoor use of processing aids in open systems
ERC9a Wide dispersive indoor use of substances in closed systems
ODKAZ other descriptors can be found at:
http://echa.europa.eu/documents/10162/13632/information_requirements_r12_en.pdf

LEV Local Exhaust Ventilation
RPE Respiratory protective equipment
DNEL Derived no-effect level
PNEC Predicted no-effect concentration
RCR Risk characterisation ratio

SAFETY DATA SHEET
PRODUCT DSZN 11

According to Regulation 1907/2006/EC AnnexII, as amended by Regulation 830/2015/EU. Important documentation :- Keep safe and available for inspection until superseded (up to 10 y). Keep up to date.

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product name PRODUCT DSZN 11

Product number 018111

1.2. Relevant identified uses of the substance or mixture and uses advised against

Identified uses Industrial uses (SU3). Formulation (SU10). Metal surface treatment products (PC14). Etchant / cleaner / activator. Electroplating.

Uses advised against Consumer use is not intended for any of our products; and is advised against for c.m.r. hazards.

1.3. Details of the supplier of the safety data sheet

Supplier
SCHLOETTER COMPANY LTD
NEW ROAD
PERSHORE
WORCESTERSHIRE WR10 1BY
Telephone: 01386 552333
Email: info@schloetter.co.uk
UK EMERGENCY PHONE No 01865 407333

Contact person Any further questions requiring information about this Safety Data Sheet, and, its REACH or RoHS implications, should be addressed to, reach@schloetter.co.uk

Safety Data Sheet Instructions While essential for COSHH evaluations, the SDS does not constitute a Risk Assessment.

1.4. Emergency telephone number

Emergency telephone 01865 407333 +441865 407333 outside the UK. In office hours telephone:- +44/(0) 1386 552331 (English only).

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification (EC 1272/2008)

Physical hazards Met. Corr. 1 - H290

Health hazards Acute Tox. 4 - H302 Skin Corr. 1B - H314 Eye Dam. 1 - H318

Environmental hazards Aquatic Chronic 3 - H412

Classification (67/548/EEC or 1999/45/EC) Xn;R22. C;R34. R52.

2.2. Label elements

PRODUCT DSZN 11

Pictogram

Signal word Danger

Hazard statements

H290 May be corrosive to metals.
H302 Harmful if swallowed.
H314 Causes severe skin burns and eye damage.
H412 Harmful to aquatic life with long lasting effects.

Precautionary statements

P342+P332+P337+P313 If experiencing respiratory symptoms: If skin irritation occurs: If eye irritation persists: Get medical attention.
P260+P280+P264 Do not breathe dust / fume / gas / mist / vapours / spray. Wear protective gloves / protective clothing / eye protection / face protection. Wash contaminated skin thoroughly after handling.
P234 Keep only in original packaging.
P405+P233+P273 Store locked up. Keep container tightly closed. Avoid release to the environment.
P260 Do not breathe vapour/ spray.
P303+P361+P353+P305+P351+P338 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P264 Wash contaminated skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P273 Avoid release to the environment.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301+P312 IF SWALLOWED: Call a POISON CENTRE/doctor if you feel unwell.
P301+P330+P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303+P361+P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower.
P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310 Immediately call a POISON CENTER/ doctor.
P321 Specific treatment (see medical advice on this label).
P363 Wash contaminated clothing before reuse.
P390 Absorb spillage to prevent material damage.
P405 Store locked up.
P406 Store in a corrosion-resistant container with a resistant inner liner.
P501 Dispose of contents/ container in accordance with national regulations.

Contains pentapotassium bis(peroxymonosulphate) bis(sulphate)

2.3. Other hazards

This product does not contain any substances classified as PBT or vPvB.

SECTION 3: Composition/information on ingredients

3.2. Mixtures

PRODUCT DSZN 11

pentapotassium bis(peroxymonosulphate) bis(sulphate)		**60 - <100 %**
CAS number: 70693-62-8	EC number: 274-778-7	REACH registration number: 01-2119485567-22-0000

Classification	**Classification (67/548/EEC or 1999/45/EC)**
Acute Tox. 4 - H302 Skin Corr. 1B - H314 Eye Dam. 1 - H318 Aquatic Chronic 3 - H412	Xn;R22. C;R34. R52.

The Full Text for all R-Phrases and Hazard Statements are Displayed in Section 16.

SECTION 4: First aid measures

4.1. Description of first aid measures

General information BURNS - Rinse with water until pain has disappeared. While rinsing remove clothing that is not burnt to the skin. If further treatment in a hospital is deemed necessary, continue rinsing during transport and until a physician can take over. Chemical burns must be treated by a physician. In case of accident or if you feel unwell, seek medical advice, show the label and safety data sheet where possible. When in doubt or symptoms persist, seek medical advice.

Inhalation Remove affected person from source of contamination. Move affected person to fresh air and keep warm and at rest in a position comfortable for breathing. When breathing is difficult, properly trained personnel may assist affected person by administering oxygen. Get immediate medical attention

Ingestion Do not induce vomiting. Rinse mouth thoroughly with water. Give plenty of water to drink. Obtain medical attention immediately.

Skin contact Rinse immediately with plenty of water. Remove contaminated clothing. Get medical attention if irritation persists after washing. Chemical burns must be treated by a physician.

Eye contact Remove any contact lenses and open eyelids wide apart. Continue to rinse for at least 15 minutes and get medical attention.

4.2. Most important symptoms and effects, both acute and delayed

General information Treat symptomatically. Chemical burns must be treated by a physician.

Inhalation Sore throat. Coughing, chest tightness, feeling of chest pressure. May cause an asthma-like shortness of breath.

Ingestion Nausea, vomiting.

Skin contact Skin irritation. Burns can occur.

Eye contact Corneal damage. May cause blurred vision and serious eye damage.

4.3. Indication of any immediate medical attention and special treatment needed

Notes for the doctor Corrosive chemical: tissue damage occurs at site of exposure. Symptomatic treatment.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media The product is not flammable. Use fire-extinguishing media suitable for the surrounding fire.

5.2. Special hazards arising from the substance or mixture

Specific hazards May give off noxious or toxic gases in a fire. Though not classified as such... The product increases the risk of fire and may accelerate combustion.

PRODUCT DSZN 11

5.3. Advice for firefighters

Protective actions during firefighting Control run-off water by containing and keeping it out of sewers and watercourses.

Special protective equipment for firefighters Self contained breathing apparatus. Full protective clothing

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Personal precautions Refer to section 8.2.

6.2. Environmental precautions

Environmental precautions Do not discharge into drains or watercourses or onto the ground. Bund containers to prevent environmental contamination. Store in a demarcated bunded area to prevent release to drains and/or watercourses.

6.3. Methods and material for containment and cleaning up

Methods for cleaning up Provide adequate ventilation. Contain spillage with sand, earth or other suitable non-combustible material. Avoid the spillage or runoff entering drains, sewers or watercourses. Wear suitable protective equipment, including gloves, goggles/face shield, respirator, boots, clothing or apron, as appropriate. Avoid generation and spreading of dust. Sweep or shovel up into suitable containers. Dispose of in accordance with local authority requirements. Flush contaminated area with plenty of water.

6.4. Reference to other sections

Reference to other sections For personal protection, see Section 8. See Section 11 for additional information on health hazards. Information in section 12, ecological, should be consulted. For waste disposal, see section 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Usage precautions Mechanical ventilation or local exhaust ventilation may be required. Avoid spilling. Avoid contact with skin and eyes. Do not breathe dust. Avoid handling which leads to dust formation. If ventilation is inadequate, suitable respiratory protection must be worn. In case of insufficient ventilation, wear suitable respiratory equipment. Note! When making up the working solution always add the product to water. Never add water to the product.

7.2. Conditions for safe storage, including any incompatibilities

Storage precautions Keep in cool, dry, ventilated storage and closed containers. Keep away from flammable and combustible materials. Keep away from heat. Store away from the following materials: Reducing agents. Protect from moist air.

Storage class Chemical storage.

7.3. Specific end use(s)

Specific end use(s) The identified uses for this product are detailed in Section 1.2.

SECTION 8: Exposure Controls/personal protection

8.1. Control parameters

PRODUCT DSZN 11

Ingredient comments DUST - The COSHH definition of a substance hazardous to health includes dust of any kind when present at a concentration in air equal to or greater than 10 mg.m-3 8-hour TWA of total inhalable dust or 4 mg.m-3 8-hour TWA of respirable dust. This means that any dust will be subject to COSHH if people are exposed above these levels. Please refer to the HSE publication EH40 for additional information on dusts.

8.2. Exposure controls

Protective equipment

Appropriate engineering controls Provide adequate general and local exhaust ventilation.

Personal protection Assign level of respiratory protection, (not required, dust mask, respirator etc.) according to risk assessment of ambient air pollution and according to the efficacy of local exhaust ventilation. Use personal protective equipment which conforms to international standards :- Respirator cartridge filters to conform to EN 14387 ABEK as a minimum. Gloves should be of a type tested to EN 374. Disposable gloves should be changed frequently: in particular, immediately after substantial contamination. This may be the best option, as breakthrough times and substance retention can be unpredictable for re-useable gloves. Gloves may cause an allergic reaction. Provide a non-allergenic, absorbent liner to minimise the risk.

Eye/face protection Wear eye/face protection to prevent any possibility of eye contact.

Hand protection Wear protective gloves.

Other skin and body protection Provide eyewash station and safety shower. Wear appropriate clothing to prevent repeated or prolonged skin contact.

Hygiene measures Wash at the end of each work shift and before eating, smoking and using the toilet. Promptly remove any clothing that becomes wet or contaminated. Contaminated clothing must be laundered before re-use. Do not eat, drink, or smoke when using this product.

Respiratory protection Wear suitable respiratory protection if there is dust formation or insufficient ventillation.

SECTION 9: Physical and Chemical Properties

9.1. Information on basic physical and chemical properties

Appearance Solid Crystalline solid.

Colour White.

Odour Odourless.

Odour threshold Not determined. Not relevant.

pH pH (diluted solution): <2.0 60 g/l

Melting point Not determined.

Initial boiling point and range Not determined.

Flash point n/a°C

Evaporation rate Not determined.

Evaporation factor Not determined.

Flammability (solid, gas) Not applicable.

PRODUCT DSZN 11

Upper/lower flammability or explosive limits	Not applicable.
Other flammability	Not applicable.
Vapour pressure	Not determined.
Vapour density	Not determined.
Relative density	Not applicable.
Bulk density	950 - 1250 kg/m³
Solubility(ies)	Soluble in water.
Partition coefficient	Not determined.
Auto-ignition temperature	Not applicable.
Decomposition Temperature	Not determined.
Viscosity	Not determined.
Explosive properties	Not determined. More sensitive to shock than m-dinitrobenzene: Not considered to be explosive. More sensitive to friction than m-dinitrobenzene: Not considered to be explosive.
Explosive under the influence of a flame	Not considered to be explosive.
Oxidising properties	Not applicable.
Comments	Typical data, as given in section 9 is not a specification

9.2. Other information

Other information	Additional data has not, as yet, been determined.

SECTION 10: Stability and reactivity

10.1. Reactivity

Reactivity	Reactions with the following materials may generate heat: Alkalis. Toxic or very toxic gases produced by reaction with: Inorganic cyanides. sulfides, sulfites...

10.2. Chemical stability

Stability	Stable under recommended storage and handling conditions.

10.3. Possibility of hazardous reactions

Possibility of hazardous reactions	See section 10.1, 10.2

10.4. Conditions to avoid

Conditions to avoid	Avoid contact with strong reducing agents. Contact with combustible material may cause fire. Avoid heat, flames and other sources of ignition.

10.5. Incompatible materials

Materials to avoid	Alkali metals. Alkaline earth metals. Powdered metal. Strong alkalis. Inorganic hydrides. Inorganic nitrides. Inorganic cyanides. Inorganic sulphides.

10.6. Hazardous decomposition products

Hazardous decomposition products	When heated, vapours/gases hazardous to health may be formed.

PRODUCT DSZN 11

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Toxicological effects Corrosive.

Other health effects Corrosive! See route of entry.....

Acute toxicity - oral

ATE oral (mg/kg) 588.82

General information See section 2 for applicable statements. Corrosive, Acidic.

Inhalation Irritating to respiratory system.

Ingestion Harmful if swallowed.

Skin contact Causes burns. Avoid contact with skin.

Eye contact Causes burns. Avoid contact with eyes.

Acute and chronic health hazards This product is corrosive. This product may cause skin and eye irritation. Prolonged contact may cause burns.

Route of exposure Inhalation Skin absorption Ingestion. Skin and/or eye contact

Medical symptoms Irritation of eyes and mucous membranes. Skin irritation. Chemical burns.

Medical considerations Splash in eye requires examination by eye specialist.

SECTION 12: Ecological Information

Ecotoxicity Do not allow to enter public watercourses, sewers or soil.

12.1. Toxicity

Acute aquatic toxicity

Acute toxicity - fish Not expected to be toxic.
Corrosive acid. Very dangerous to aquatic organisms.

12.2. Persistence and degradability

Persistence and degradability The degradability of the product is not known.

12.3. Bioaccumulative potential

Bioaccumulative potential No data available on bioaccumulation.

Partition coefficient Not determined.

12.4. Mobility in soil

Mobility The product is soluble in water. Mobile. The product is non-volatile.

12.5. Results of PBT and vPvB assessment

Results of PBT and vPvB assessment This substance is not classified as PBT or vPvB according to current EU criteria.

12.6. Other adverse effects

Other adverse effects Not determined.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

PRODUCT DSZN 11

General information	When handling waste, the safety precautions applying to handling of the product should be considered.
Disposal methods	Dispose of waste to licensed waste disposal site in accordance with the requirements of the local Waste Disposal Authority.
Waste class	European Waste Code 06 01 06 is suggested for acidic material. Note that the applicable waste code may depend on the industry sector in addition to the previous uses, composition and hazards of the waste.
Effluent Treatment Considerations	Waste waters must be monitored for adequate decontamination.If available, follow the disposal procedure given in the operating data.
Product Specific Information	Unused product, and product with contamination known to be effluent compatible, may be treated in the effluent plant.Do not contaminate with complexing agents. Designed for effluent treatment by neutralisation and filtration.The acute environmental hazard is removed by treatment in a pH neutralising effluent plant.Use of waste product in the effluent plant reduces chemical oxygen demand.Dilution and neutralisation of the pH will reduce the tendancy to oxidise chlorides to chlorine.When disposing of used solution, check that dissolved metal ions are removed.Treat only small amounts, to avoid producing chlorine.

SECTION 14: Transport information

General No other information known.

14.1. UN number

UN No. (ADR/RID)	3260
UN No. (IMDG)	3260
UN No. (ICAO)	3260
UN No. (ADN)	3260

14.2. UN proper shipping name

Proper shipping name (ADR/RID)	CORROSIVE SOLID, ACIDIC, INORGANIC, N.O.S.
Proper shipping name (IMDG)	CORROSIVE SOLID, ACIDIC, INORGANIC, N.O.S.
Proper shipping name (ICAO)	CORROSIVE SOLID, ACIDIC, INORGANIC, N.O.S.
Proper shipping name (ADN)	CORROSIVE SOLID, ACIDIC, INORGANIC, N.O.S.
Technical Name	(pentapotassium bis(peroxomonosulphate) bis(sulphate))

14.3. Transport hazard class(es)

ADR/RID class	8
ADR/RID classification code	C2
ADR/RID label	8
IMDG class	8
ICAO class/division	8
ADN class	8

PRODUCT DSZN 11

Transport labels

14.4. Packing group

ADR/RID packing group	II
IMDG packing group	II
ADN packing group	II
ICAO packing group	II

14.5. Environmental hazards

Environmentally hazardous substance/marine pollutant
No.

14.6. Special precautions for user

IMDG Code segregation group	1. Acids
EmS	F-A, S-B
ADR transport category	2
Emergency Action Code	2X
Hazard Identification Number (ADR/RID)	80
Tunnel restriction code	(E)

14.7. Transport in bulk according to Annex II of MARPOL and the IBC Code

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	Not applicable. Product not intended for carriage in bulk, (as defined for Marpol - International Bulk Chemical code). Carriage may still take place in Intermediate Bulk Containers (ie not International Bulk ["Chemical"] cargo ships - ie sea going tanker ships).

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

National regulations	Commission Decision 2000/532/EC as amended by Decision 2001/118/EC establishing a list of wastes and hazardous waste pursuant to Council Directive 75/442/EEC on waste and Directive 91/689/EEC on hazardous waste with amendments.

PRODUCT DSZN 11

EU legislation	Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) (as amended). Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures (as amended). Regulation 1272/2008/EC The CLP Regulation 790/2009/EC 1st ATP to the CLP. Regulation 286/2011/EU 2nd ATP to the CLP. Regulation 830/2015/EU REACh annexII (SDS) amended. IOELV Commission Directives Implementing Council Directive 98/24/EC:- 1. 2000/39/EC. 2. 2006/15/EC and 3. 2009/161/EC. Earlier directives were repealed (80/1107/EEC, 91/322/EEC and 96/94/EEC). Regulation 618/2012/EU 3rd ATP to the CLP. Regulation 487/2013/EU 4th ATP to the CLP. Regulation 944/2013/EU 5th ATP to the CLP. Regulation 605/2014/EU 6th ATP to the CLP.
Guidance	Workplace Exposure Limits EH40.
Class Related Information	Consult sections 8 (exposure limits) and 9 (explosion/flammability limits) to determine the nature of the hazard; and take appropriate action.
Definitions	"Well ventilated area" or "well ventilated place" means sufficient ventilation that :- exposure limits are not exceeded;respiratory and/or explosion hazards are anticipated and avoided;and dust and odours are prevented from becoming a nuisancein the work environment.

15.2. Chemical safety assessment

SECTION 16: Other information

General information	The data here is based on current knowledge and experience. This safety data describes the product in terms of safety requirements and does not signify any warranty with regard to the product properties. This safety data does not constitute a workplace risk assessment.
Revision date	14/12/2017
Revision	2017 - 12 - 14
Supersedes date	27/02/2012
SDS number	018111
SDS status	Revision 2, replaces version of..... 2012 - 02 - 27
Risk phrases in full	R22 Harmful if swallowed. R34 Causes burns. R52 Harmful to aquatic organisms.
Hazard statements in full	H290 May be corrosive to metals. H302 Harmful if swallowed. H314 Causes severe skin burns and eye damage. H318 Causes serious eye damage. H412 Harmful to aquatic life with long lasting effects.

SAFETY DATA SHEET
ACID CONCENTRATE DSZN 12

According to Regulation (EC) No 1907/2006, Annex II, as amended by Regulation (EU) No 453/2010 Important documentation :- Keep safe and available for inspection until superseded (up to 10 y). Keep up to date.

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product name ACID CONCENTRATE DSZN 12

Product number 018112

1.2. Relevant identified uses of the substance or mixture and uses advised against

Identified uses Industrial uses (SU3). Formulation (SU10). Metal surface treatment products (PC14). Electroplating.

1.3. Details of the supplier of the safety data sheet

Supplier

SCHLOETTER COMPANY LTD
NEW ROAD
PERSHORE
WORCESTERSHIRE WR10 1BY
Telephone: 01386 552333
Email: info@schloetter.co.uk
UK EMERGENCY PHONE No 01865 407333

Contact person Any further questions requiring information about this Safety Data Sheet, and, its REACH or RoHS implications, should be addressed to, reach@schloetter.co.uk

Safety Data Sheet Instructions While essential for COSHH evaluations, the SDS does not constitute a Risk Assessment.

1.4. Emergency telephone number

Emergency telephone 01865 407 333 +441865 407333 outside the UK. For sales and technical information (or further safety information) :- In office hours telephone:- +44/(0) 1386 552331 (English only).

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification (EC 1272/2008)

Physical hazards Met. Corr. 1 - H290

Health hazards Acute Tox. 3 - H301 Acute Tox. 3 - H311 Acute Tox. 4 - H332 Skin Corr. 1A - H314 Eye Dam. 1 - H318

Environmental hazards Not Classified

Classification (67/548/EEC or 1999/45/EC) T;R23/24/25. C;R35. Xi;R37.

2.2. Label elements

Pictogram

ACID CONCENTRATE DSZN 12

Signal word	Danger
Hazard statements	H290 May be corrosive to metals. H301+H311 Toxic if swallowed or in contact with skin. H314 Causes severe skin burns and eye damage. H332 Harmful if inhaled.
Precautionary statements	P303+P361+P353+P305+P351+P338+P315 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get immediate medical attention. P260+P280+P271+P264 Do not breathe dust / fume / gas / mist / vapours / spray. Wear protective gloves / protective clothing / eye protection / face protection. Use only outdoors or in a well ventilated area. Wash contaminated skin thoroughly after handling. P501 Dispose of contents / container to licensed hazardous waste contractor / pH neutralisation in authorised monitored effluent plant. P301+P330+P331+P315 IF SWALLOWED: rinse mouth. Do NOT induce vomiting. Get immediate medical attention. P406+P233+P405 Store in corrosive resistant container / container with a resistant inner liner. Keep container tightly closed. Store locked up. P390+P342+P332+P337+P315 Absorb spillage to prevent material damage. If experiencing respiratory symptoms: If skin irritation occurs: If eye irritation persists: Get immediate medical attention.
Contains	SULPHURIC ACID ...%, HYDROFLUORIC ACID ...%
Supplementary precautionary statements	P260 Do not breathe vapour/ spray. P261 Avoid breathing vapour/ spray. P264 Wash contaminated skin thoroughly after handling. P270 Do not eat, drink or smoke when using this product. P271 Use only outdoors or in a well-ventilated area. P280 Wear protective gloves/ protective clothing/ eye protection/ face protection. P301+P310 IF SWALLOWED: Immediately call a POISON CENTER/ doctor. P301+P330+P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. P302+P352 IF ON SKIN: Wash with plenty of water. P303+P361+P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing. P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P312 Call a POISON CENTRE/doctor if you feel unwell. P321 Specific treatment (see medical advice on this label). P361+P364 Take off immediately all contaminated clothing and wash it before reuse. P363 Wash contaminated clothing before reuse. P405 Store locked up. P501 Dispose of contents/ container in accordance with national regulations.

2.3. Other hazards

This substance is not classified as PBT or vPvB according to current EU criteria.

SECTION 3: Composition/information on ingredients

3.2. Mixtures

ACID CONCENTRATE DSZN 12

SULPHURIC ACID ...%		**30 - <50 %**
CAS number: 7664-93-9	EC number: 231-639-5	

Classification	**Classification (67/548/EEC or 1999/45/EC)**
Skin Corr. 1A - H314 Eye Dam. 1 - H318	C;R35

HYDROFLUORIC ACID ...%		**1.0 - <2.0 %**
CAS number: 7664-39-3	EC number: 231-634-8	REACH registration number: 01-2119458860-33-XXXX

Classification	**Classification (67/548/EEC or 1999/45/EC)**
Acute Tox. 2 - H300 Acute Tox. 1 - H310 Acute Tox. 2 - H330 Skin Corr. 1A - H314 Eye Dam. 1 - H318	T+;R26/27/28 C;R35

The Full Text for all R-Phrases and Hazard Statements are Displayed in Section 16.

SECTION 4: First aid measures

4.1. Description of first aid measures

General information

Get medical attention immediately. Remove affected person from source of contamination. Rinse immediately with plenty of water. While rinsing, remove clothing not adhering to the affected area. Get medical attention. Chemical burns must be treated by a physician. Get medical attention if any discomfort continues. Show the label and/or safety data sheet where possible. Consult a physician for specific advice. For breathing difficulties, oxygen may be necessary.

Inhalation

Remove affected person from source of contamination. When breathing is difficult, properly trained personnel may assist affected person by administering oxygen. If breathing stops, provide artificial respiration. Keep affected person warm and at rest. Get medical attention immediately.

Ingestion

Get medical attention immediately. Do not induce vomiting. Rinse mouth thoroughly with water. Move affected person to fresh air and keep warm and at rest in a position comfortable for breathing. If medical attention will be delayed, drink 100 to 200 ml of water; be prepared for vomiting. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs.

Skin contact

Remove contaminated clothing and rinse skin thoroughly with water. Continue to rinse for at least 15 minutes. Get medical attention. Chemical burns must be treated by a physician. Calcium Gluconate gel should be applied to the affected skin. Seek immediate medical advice.

Eye contact

Remove any contact lenses and open eyelids wide apart. Continue to rinse for at least 15 minutes and get medical attention.

Product Specific First Aid Measures

If calcium gluconate gel is available, rub it into affected skin.

4.2. Most important symptoms and effects, both acute and delayed

General information

Treat symptomatically. Chemical burns must be treated by a physician. The severity of the symptoms described will vary dependent on the concentration and the length of exposure. Get medical attention promptly if symptoms occur after washing.

ACID CONCENTRATE DSZN 12

Inhalation	Severe irritation of nose and throat. May cause an asthma-like shortness of breath. Hot sensation in the lungs, possibly leading to pain and severe breathing difficulties.
Ingestion	Burning sensation in mouth. Chemical burns. May cause stomach pain or vomiting. Ingestion of large amounts may cause extreme pain and death.
Skin contact	Severe irritation. Burns can occur.
Eye contact	Severe irritation, burning and tearing. Corneal damage. Severe pain.
Specific notes to the physician	Calcium Gluconate gel should be applied to the affected skin.If ingested, give milk or calcium gluconate by mouth.Alternatively...Take calcium tablets if ingested.

4.3. Indication of any immediate medical attention and special treatment needed

Notes for the doctor	Corrosive chemical: tissue damage occurs at site of exposure. Symptomatic treatment. Product may also have mildly toxic effects see section 2 and section 11.
Specific biochemical and physiological consequences	Fluoride reduces the calcium ion concentration in the blood, reducing muscle power, and putting severe strain on the heart.Take measures to restore calcium.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media	The product is not flammable. Use fire-extinguishing media suitable for the surrounding fire.

5.2. Special hazards arising from the substance or mixture

Specific hazards	May give off noxious or toxic gases in a fire.

5.3. Advice for firefighters

Protective actions during firefighting	Control run-off water by containing and keeping it out of sewers and watercourses.
Special protective equipment for firefighters	Wear positive-pressure self-contained breathing apparatus (SCBA) and appropriate protective clothing.
HAZMAT: Emergency Services as Responder	Containsfluoride:Smoke toxicity is thereby made worse.Heat may produce very toxic gas.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Personal precautions	Wear protective clothing as described in Section 8 of this safety data sheet.
Non Emergency Personnel	Keep a safe distance. If possible vacate the area.Spectators must leave.

6.2. Environmental precautions

Environmental precautions	Collect and dispose of spillage as indicated in Section 13.

6.3. Methods and material for containment and cleaning up

Methods for cleaning up	Provide adequate ventilation. Contain spillage with sand, earth or other suitable non-combustible material. Avoid the spillage or runoff entering drains, sewers or watercourses. Stop leak if possible without risk. DO NOT touch spilled material! Wear suitable protective equipment, including gloves, goggles/face shield, respirator, boots, clothing or apron, as appropriate. Absorb in vermiculite, dry sand or earth and place into containers. Dispose of in accordance with local authority requirements. Flush contaminated area with plenty of water. Take care as floors and other surfaces may become slippery.
Other Information:	If ventilation is inadequate, suitable respiratory protection must be worn.

6.4. Reference to other sections

ACID CONCENTRATE DSZN 12

Reference to other sections Wear protective clothing as described in Section 8 of this safety data sheet. See Section 11 for additional information on health hazards. Information in section 12, ecological, should be consulted. Collect and dispose of spillage as indicated in Section 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Usage precautions Mechanical ventilation or local exhaust ventilation may be required. Avoid spilling. Avoid contact with skin and eyes. Do not breathe vapour or spray. If ventilation is inadequate, suitable respiratory protection must be worn. In case of insufficient ventilation, wear suitable respiratory equipment. Do not eat, drink or smoke when handling this product. Refer to section 8 for PPE (personal protective equipment recommendation).

7.2. Conditions for safe storage, including any incompatibilities

Storage precautions Store in tightly-closed, original container in a dry, cool and well-ventilated place.

Storage class Corrosive storage (for Acids).

7.3. Specific end use(s)

Specific end use(s) The identified uses for this product are detailed in Section 1.2. One or more of these are End Uses.

SECTION 8: Exposure Controls/personal protection

8.1. Control parameters

Occupational exposure limits

SULPHURIC ACID ...%

Long-term exposure limit (8-hour TWA): WEL 0.05 mg/m³ mist (thoracic fraction)

HYDROFLUORIC ACID ...%

Long-term exposure limit (8-hour TWA): WEL 1.8 ppm 1.5 mg/m³
Short-term exposure limit (15-minute): WEL 3 ppm 2.5 mg/m³
WEL = Workplace Exposure Limit

Ingredient comments No other exposure limits noted for the ingredients. Exposure limits noted for the ingredients, including DNELs and PNECs, are those currently available at time of writing.

SULPHURIC ACID ...% (CAS: 7664-93-9)

DNEL
- Inhalation; Long term local effects: 0.05 mg / m³
No-threshold effect and/or dose-response information available.
(All other routes of exposure.)
Data waiving.
- Inhalation; Short term local effects: 0.1 mg / m³

PNEC
PNEC - Fresh water; AF = 10 2.5 µg / L
SI prefixes used; take care to observe the difference, eg. 1 µg = 0·001 mg
PNEC - Marine water; AF = 1 0.25 µg / L
PNEC - STP; AF = 10 8.8 mg / L
PNEC - Sediment (Freshwater); Extrapolation by Kow 2.0 µg / kg (dry wt.)
PNEC - Sediment (Marinewater); Extrapolation by Kow 2.0 µg / kg (dry wt.)

8.2. Exposure controls

ACID CONCENTRATE DSZN 12

Protective equipment

Appropriate engineering controls	Provide adequate general and local exhaust ventilation.
Personal protection	Assign level of respiratory protection, (not required, dust mask, respirator etc.) according to risk assessment of ambient air pollution and according to the efficacy of local exhaust ventilation. Use personal protective equipment which conforms to international standards :- Respirator cartridge filters to conform to EN 14387 ABEK as a minimum. Gloves should be of a type tested to EN 374. Disposable gloves should be changed frequently: in particular, immediately after substantial contamination. This may be the best option, as breakthrough times and substance retention can be unpredictable for re-useable gloves. Gloves may cause an allergic reaction. Provide a non-allergenic, absorbent liner to minimise the risk.
Eye/face protection	Wear eye/face protection to prevent any possibility of eye contact.
Hand protection	Use protective gloves.
Other skin and body protection	Provide eyewash station and safety shower. Wear appropriate clothing to prevent repeated or prolonged skin contact.
Hygiene measures	Possible danger, due to HF fumes. Exposure to sulfuric acid mist should be monitored.
Respiratory protection	No specific recommendations. Respiratory protection must be used if the airborne contamination exceeds the recommended occupational exposure limit.

SECTION 9: Physical and Chemical Properties

9.1. Information on basic physical and chemical properties

Appearance	Clear liquid.
Colour	Colourless.
Odour	No characteristic odour.
Odour threshold	Not determined. Not relevant.
pH	pH (concentrated solution): <1
Melting point	Not determined.
Initial boiling point and range	Not determined.
Flash point	n/a°C
Evaporation rate	Not determined.
Evaporation factor	Not determined.
Upper/lower flammability or explosive limits	Not applicable.
Other flammability	Not applicable.
Vapour pressure	Not determined.
Vapour density	Not determined.
Relative density	S.G 1.393 ± 0.01 @ 20°C
Bulk density	Not determined.

ACID CONCENTRATE DSZN 12

Solubility(ies)	Soluble in water.
Partition coefficient	Not determined.
Auto-ignition temperature	Not applicable.
Decomposition Temperature	Not determined.
Viscosity	Not determined.
Explosive properties	Not determined. More sensitive to shock than m-dinitrobenzene: Not considered to be explosive. More sensitive to friction than m-dinitrobenzene: Not considered to be explosive.
Explosive under the influence of a flame	Not considered to be explosive.
Oxidising properties	Not applicable.
Comments	Typical data, as given in section 9, is not a specification

9.2. Other information

Other information	Additional data has not, as yet, been determined.

SECTION 10: Stability and reactivity

10.1. Reactivity

Reactivity	Corrosives may react with metals to produce flammable gases. Corrosives may react with each other to produce heat (eg acid + base).
Product Specific Information	Avoid contact with alkalis.Avoid heat.The following materials may react violently with the product:Strong alkalis.The following materials may react strongly with the product:Alkaline earth metals.Powdered metal.Addition of alkalis and strong bases causes violent exothermic reaction.

10.2. Chemical stability

Stability	No hazardous reactions known if used for its intended purpose, with standard controls / RMM.
Hazardous Decomposition Properties	The product is non-combustible.Toxic gases or vapours.No significant hazard at normal ambient temperatures.Heating may generate the following products:Corrosive gases or vapours.

10.3. Possibility of hazardous reactions

Possibility of hazardous reactions	See section 10.1, 10.2

10.4. Conditions to avoid

Conditions to avoid	Avoid heat.

10.5. Incompatible materials

Materials to avoid	Powdered metal. Alkali metals. Alkaline earth metals. Inorganic cyanides. Inorganic hydrides. Inorganic nitrides. Organic cyanides (nitriles). Massive, solid metal. Other metals or alloys.

10.6. Hazardous decomposition products

Hazardous decomposition products	When heated, vapours/gases hazardous to health may be formed.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Toxicological effects	Corrosive. Refer to section 2 for toxicological classification.

ACID CONCENTRATE DSZN 12

Other health effects	Corrosive! See route of entry.....

Acute toxicity - oral

Notes (oral LD_{50})	See section 8.1 for Derived No Effect Levels (DNEL). Refer to relevant exposure scenarios for Risk Characterisation Ratios.
ATE oral (mg/kg)	268.82

Acute toxicity - dermal

ATE dermal (mg/kg)	268.82

Acute toxicity - inhalation

ATE inhalation (gases ppm)	5,376.34
ATE inhalation (vapours mg/l)	26.88
ATE inhalation (dusts/mists mg/l)	2.69

General information	Toxic and Corrosive, Causes severe burns.
Inhalation	Toxic by inhalation. Irritating to respiratory system.
Ingestion	Toxic if swallowed.
Skin contact	Toxic in contact with skin. Corrosive. Prolonged contact causes serious tissue damage.
Eye contact	Contact with concentrated chemical may very rapidly cause severe eye damage, possibly loss of sight.
Acute and chronic health hazards	Causes burns. Gas or vapour is toxic or extremely irritating, even on brief exposure. Toxic through skin absorption (percutaneous).
Route of exposure	Inhalation Skin absorption Ingestion. Skin and/or eye contact
Medical symptoms	Irritation of eyes and mucous membranes. Skin irritation. Chemical burns.
Medical considerations	Splash in eye requires examination by eye specialist.

Toxicological information on ingredients.

HYDROFLUORIC ACID ...%

Acute toxicity - oral

Acute toxicity oral (LD_{50} mg/kg)	546.0
Species	Mouse

SECTION 12: Ecological Information

Ecotoxicity	Do not allow to enter public watercourses, sewers or soil.

12.1. Toxicity

Ecotoxicological Characteristics	Extreme pH products are very dangerous to aquatic organisms, particularly fish.This product is much reduced in ecotoxicity if neutralised with :-lime (or other alkaline calcium salt).

Acute aquatic toxicity

Acute toxicity - fish	Corrosive acid. Very dangerous to aquatic organisms.

Ecological information on ingredients.

ACID CONCENTRATE DSZN 12

HYDROFLUORIC ACID ...%

Acute aquatic toxicity

Acute toxicity - fish	LC50, 96 hours: 107.5 mg/L, Oncorhynchus mykiss (Rainbow trout) LC50, 96 hours: 925 mg/L, Gambusia affinis (mosquitofish)
Acute toxicity - aquatic invertebrates	EC_{50}, 48 hours: 270 mg/L, Daphnia magna

12.2. Persistence and degradability

Persistence and degradability The degradability of the product is not known.

12.3. Bioaccumulative potential

Bioaccumulative potential The product does not contain any substances expected to be bioaccumulating.

Partition coefficient Not determined.

12.4. Mobility in soil

Mobility The product contains substances which are water-soluble and may spread in water systems.

12.5. Results of PBT and vPvB assessment

Results of PBT and vPvB assessment This substance is not classified as PBT or vPvB according to current EU criteria.

12.6. Other adverse effects

Other adverse effects No additional hazards identified as yet. See section 8.1 for Predicted No Effect Concentrations (PNEC). Refer to relevant exposure scenarios for Risk Characterisation Ratios.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Disposal methods Dispose of waste to licensed waste disposal site in accordance with the requirements of the local Waste Disposal Authority.

Waste class European Waste Code 06 01 06 is suggested for acidic material.

Effluent Treatment Considerations Sufficient calcium chloride should be added to effluent plant waters to precipitate fluorides.

SECTION 14: Transport information

General No other information known.

14.1. UN number

As given in the modal sections.

UN No. (ADR/RID)	2922
UN No. (IMDG)	2922
UN No. (ICAO)	2922
UN No. (ADN)	2922

14.2. UN proper shipping name

As given in the modal sections. See the bracketed terms below for the required "Technical Name(s)".

ACID CONCENTRATE DSZN 12

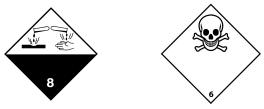
Proper shipping name (ADR/RID)	CORROSIVE LIQUID, TOXIC, N.O.S.,
Proper shipping name (IMDG)	CORROSIVE LIQUID, TOXIC, N.O.S.,
Proper shipping name (ICAO)	CORROSIVE LIQUID, TOXIC, N.O.S.
Proper shipping name (ADN)	CORROSIVE LIQUID, TOXIC, N.O.S.
Technical Name	(sulphuric acid,hydrofluoric acid)

14.3. Transport hazard class(es)

As given in the modal sections.

ADR/RID class	8 + 6.1
ADR/RID subsidiary risk	6.1
ADR/RID classification code	CT1
ADR/RID label	8 + 6.1
IMDG class	8 + 6.1
IMDG subsidiary risk	6.1
ICAO class/division	8
ICAO subsidiary risk	6.1
ADN class	8
ADN subsidiary risk	6.1

Transport labels



14.4. Packing group

As given in the modal sections.

ADR/RID packing group	II
IMDG packing group	II
ADN packing group	III
ICAO packing group	II

14.5. Environmental hazards

Environmentally hazardous substance/marine pollutant

No. Not applicable. Not classified environmentally hazardous under transport regulations.

14.6. Special precautions for user

As given below.

IMDG Code segregation group	1. Acids
EmS	F-A, S-B
ADR transport category	3

ACID CONCENTRATE DSZN 12

Emergency Action Code	2X
Hazard Identification Number (ADR/RID)	86
Tunnel restriction code	(E)

14.7. Transport in bulk according to Annex II of MARPOL and the IBC Code

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	Product not intended for carriage in bulk, (as defined for Marpol - International Bulk Chemical code). Carriage may still take place in Intermediate Bulk Containers (ie not International Bulk ["Chemical"] cargo ships - ie sea going tanker ships).

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

National regulations	Commission Decision 2000/532/EC as amended by Decision 2001/118/EC establishing a list of wastes and hazardous waste pursuant to Council Directive 75/442/EEC on waste and Directive 91/689/EEC on hazardous waste with amendments.
EU legislation	Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) (as amended). Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures (as amended). Regulation 1272/2008/EC The CLP. Regulation 790/2009/EC 1st ATP to the CLP. Regulation 286/2011/EU 2nd ATP to the CLP. Regulation 830/2015/EU REACh annexII (SDS) amended. IOELV Commission Directives Implementing Council Directive 98/24/EC:- 1. 2000/39/EC. 2. 2006/15/EC and 3. 2009/161/EC. Earlier directives were repealed (80/1107/EEC, 91/322/EEC and 96/94/EEC). Regulation 618/2012/EU 3rd ATP to the CLP. Regulation 487/2013/EU 4th ATP to the CLP. Regulation 944/2013/EU 5th ATP to the CLP. Regulation 605/2014/EU 6th ATP to the CLP. Regulation 1221/2015/EU 7th ATP to the CLP. Regulation 918/2016/EU 8th ATP to the CLP. Regulation 1179/2016/EU 9th ATP to the CLP.
Guidance	Workplace Exposure Limits EH40.
Class Related Information	Consult sections 8 (exposure limits) and 9 (explosion/flammability limits) to determine the nature of the hazard; and take appropriate action.
Definitions	"Well ventilated area" or "well ventilated place" means sufficient ventilation that :- exposure limits are not exceeded;respiratory and/or explosion hazards are anticipated and avoided;and dust and odours are prevented from becoming a nuisancein the work environment.

15.2. Chemical safety assessment

SECTION 16: Other information

General information	The data here is based on current knowledge and experience. This safety data describes the product in terms of safety requirements and does not signify any warranty with regard to the product properties. This safety data does not constitute a workplace risk assessment.
Revision date	19/01/2018
Revision	2018 - 01 - 19

ACID CONCENTRATE DSZN 12

Supersedes date	18/10/2013
SDS number	018112
SDS status	Revision 4, replaces version of..... 2013 - 10 - 18
Risk phrases in full	R23/24/25 Toxic by inhalation, in contact with skin and if swallowed. R26/27/28 Very toxic by inhalation, in contact with skin and if swallowed. R35 Causes severe burns. R37 Irritating to respiratory system.
Hazard statements in full	H290 May be corrosive to metals. H300 Fatal if swallowed. H301 Toxic if swallowed. H310 Fatal in contact with skin. H311 Toxic in contact with skin. H314 Causes severe skin burns and eye damage. H318 Causes serious eye damage. H330 Fatal if inhaled. H332 Harmful if inhaled.

Schloetter
Surface Technology

Desmut
SLOTOCLEAN DS 10

Desmut SLOTOCLEAN DS 10 Nitric-Free is a new generation process for the pre-treatment of aluminium prior to electroless or electrolytic plating.

Desmut SLOTOCLEAN DS 10 Nitric-Free is used for the removal of smut formed during the chemical etching of aluminium.

Desmut SLOTOCLEAN DS 10 Nitric-Free is especially suited for the processing of wrought aluminium alloys, it is also suitable for use on some cast alloys.

Desmut SLOTOCLEAN DS 10 :

- has a long life.
- is easily maintained.
- has negligible attack on the substrate.
- is easy to waste treat.
- is a viable alternative to nitric acid.

The information in this data sheet is based on laboratory as well as practical experience. Figures quoted for operating limits and replenishment quantities are for guidance. Actual values necessary will depend on the components being plated (material and geometry), their application and plating plant conditions.

Important:
Please read this instruction carefully prior to the use of the process and carefully follow all the parameters that have a direct influence on the operation. We reserve the right to make technical changes. In the interest of safety, please pay attention to the hazard warnings on the labels of the containers. The minimum shelf life of the products is included on the labels and is also available in the appropriate Quality Assurance (QA03).
The current IMDS number of the layer deposited from the process is available on the internet at www.schloetter.com/downloads.
For the storage of chemical products the HSG71 is suggested as guidance.
If the additives used in this process contain a SVHC-substance, then this will be specified in the corresponding Material Safety Data Sheet, section 15.

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Surface Technology

11.0 TECHNICAL INFORMATION AND EQUIPMENT REQUIREMENTS

Tanks:	highly compressed polypropylene
Local Exhaust Ventilation:	recommended
Part/Electrolyte Agitation:	Not essential but solution and/or work movement is suggested
Filtration:	Not necessary
Heating/Cooling:	PTFE coated heating coils if required

12.0 MAKE-UP AND OPERATING CONDITIONS

12.1 Product names

List of products required		
Product name	**Article no. (AN)**	**SG**
Product DSZN 11	018111	-
Acid Concentrate DSZN 12	018112	1.39

12.2 Requirements for a 100 litre bath

Product name	AN	SG	Quantity	
Product DSZN 11	018111	-	15	kg
Acid Concentrate DSZN 12	018112	1.39	8	ltr

12.3 Make-up sequence for a 100 litre bath

New, but also used tanks and equipment to be used must be thoroughly cleaned prior to use.

- Fill the clean process tank to 75% of final volume with deionised water.
- Add with stirring the required amount of Acid Concentrate DSZN 12 Concentrate.
- Add the required amount of Product DSZN 11 and mix until dissolved.
- Make up to final volume with deionised water.
- Ensure the temperature is correct and the solution is ready to use.

12.4 Concentrations and operating conditions

	Range	Optimum	
Product DSZN 11	135 - 165	150	g/1
Acid Concentrate DSZN 12	70 - 90	80	ml/1
Copper	-	<1	g/1
Temperature	15 - 30	22	OC
Immersion time	0.25 - 2	1	min

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12.5 Consumption

Consumption is through drag out loss and dissolution of the smut layer.
Product DSZN 11 12 - 16 g / m^2 surface area processed.
Acid Concentrate DSZN 12 10 - 15 ml/ m^2 surface area processed.

13.0 PROCESS SEQUENCE

The specific processing cycle varies from aluminium alloy to alloy. The following guideline should provide a basic outline of the pre-treatment necessary to obtain a uniform adherent deposit.

13.1 Process Sequence

- degreasing in a mild alkaline cleaner e.g SLOTOCLEAN AK 340
- rinsing
- Aluminium Pickle SLOTETCH 590 (alloys with a high purity can be etched stronger)
- rinsing
- desmut e.g SLOTOCLEAN DS 10
- rinsing
- zincate e.g Zincate CNF 10
- rinsing
- zinc strip e.g SLOTOSTRIP ZN 10
- rinsing
- zincate e.g Zincate CNF 10
- rinsing
- plating

  Electroless nickel e.g SLOTONIP 2010, 1850, 90
  Electrolytic nickel e.g Norma, SLOTONIK 20, Nickel Sulphamate MS
  Electrolytic copper e.g SLOTOCOUP CC 10

14.0 MAINTENANCE

Complete removal of the smut layer is essential in producing quality deposits on aluminium alloys. The concentration of DSZN 11, DSZN 12 and copper should be monitored on a regular basis.

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15.0 TROUBLE SHOOTING

No information available at present.

16.0 EFFLUENT

Legal regulations must be observed for the disposal of the Desmut SLOTOCLEAN OS 10. Different regulations normally apply for the additives and the ready-made electrolyte. Please refer to section 13 of the appropriate Material Safety Data Sheet for disposal code and recommendations.

The following detoxification sequence is only considered to be an aid:

Rinse water can be directly neutralised.
Spent solutions should be diluted 10 times prior to neutralisation with calcium hydroxide to pH 7-9.

17.0 SAFETY

Reasonable care is required when handling Schlotter chemical products. Only personnel specially trained on working with chemicals should be deployed with their handling.

EC Material Safety Data Sheets must be made available to all personnel dealing with the chemicals to ensure they have all required information about product composition, hazards identification, first-aid measures, handling and storage exposure controls. Toxicological and ecological information etc. It is required to ensure the supply and use of suitable protective clothing and equipment.

The user must verify the designated purpose of the bath. Previous experience has shown that not all metal surfaces are suitable for a trouble:.free electroplating.

The above mentioned data are made according to our best knowledge. Consistent operation of the working solution requires appropriate maintenance. Desmut SLOTOCLEAN OS 10 is a process of Dr. Ing Max Schlotter GmbH & Co KG. It can only be operated with the products described in this technical data sheet. Use of other chemicals (also partly) will impair quality and invalidates our service and quality commitments (quality assurance).

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Schlötter Galvanotechnik

Safety data sheet
according to 1907/2006/EC, Article 31

Printing date 03.07.2017 *Version number 30* *Revision: 28.06.2017*

SECTION 1: Identification of the substance/mixture and of the company/undertaking

· **1.1 Product identifier**

· **Trade name: Concentrate CNF 11**

· **Article number:** 010105

· **1.2 Relevant identified uses of the substance or mixture and uses advised against**
No further relevant information available.

· **Application of the substance / the mixture** Electroplating auxiliary

· **1.3 Details of the supplier of the safety data sheet**

· **Manufacturer/Supplier:**
Dr.-Ing. Max Schlötter GmbH & Co. KG
Galvanotechnik
Talgraben 30
73312 Geislingen/Steige
Germany

· **Further information obtainable from:** E-Mail: sds@schloetter.de

· **1.4 Emergency telephone number:**
University of Freiburg
Poisoning-Information-Center
+49(0)761-19240 (24h, 365 days/year)
Information in German and English
http://www.giftberatung.de/

*

SECTION 2: Hazards identification

· **2.1 Classification of the substance or mixture**

· **Classification according to Regulation (EC) No 1272/2008**

Skin Corr. 1A	H314	Causes severe skin burns and eye damage.
Eye Dam. 1	H318	Causes serious eye damage.
Aquatic Chronic 2	H411	Toxic to aquatic life with long lasting effects.

· **2.2 Label elements**

· **Labelling according to Regulation (EC) No 1272/2008**
The product is classified and labelled according to the CLP regulation.

· **Hazard pictograms**

GHS05 GHS09

· **Signal word** Danger

· **Hazard-determining components of labelling:**
sodium hydroxide

· **Hazard statements**
H314 Causes severe skin burns and eye damage.
H411 Toxic to aquatic life with long lasting effects.

· **Precautionary statements**

P260	Do not breathe dusts or mists.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P303+P361+P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310	Immediately call a POISON CENTER/doctor.
P501	Dispose of contents/container in accordance with local/regional/national/international regulations.

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· **2.3 Other hazards**
· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.

SECTION 3: Composition/information on ingredients

· **3.2 Chemical characterisation: Mixtures**
· **Description:** Mixture of substances listed below with nonhazardous additions.

· **Dangerous components:**

CAS: 1310-73-2 EINECS: 215-185-5 Index number: 011-002-00-6 Reg.nr.: 01-2119457892-27	sodium hydroxide Met. Corr.1, H290; Skin Corr. 1A, H314	25 - <50%
CAS: 1314-13-2 EINECS: 215-222-5 Index number: 030-013-00-7 Reg.nr.: 01-2119463881-32	zinc oxide Aquatic Acute 1, H400; Aquatic Chronic 1, H410	< 5.0%

· **Additional information:** For the wording of the listed hazard phrases refer to section 16.

SECTION 4: First aid measures

· **4.1 Description of first aid measures**
· **General information:**
PERSONAL PROTECTION FOR THE FIRST AIDER.
Immediately remove any clothing soiled by the product.
· **After inhalation:**
Take affected persons into fresh air and keep quiet.
In case of unconsciousness place patient stably in side position for transportation.
Call a doctor immediately.
· **After skin contact:**
Immediately rinse with water.
If skin irritation continues, consult a doctor.
· **After eye contact:**
Rinse opened eye for several minutes under running water. Then consult a doctor.
If present remove the contact lenses immediately.
· **After swallowing:** Drink plenty of water and provide fresh air. Call for a doctor immediately.
· **4.2 Most important symptoms and effects, both acute and delayed** No further relevant information available.
· **4.3 Indication of any immediate medical attention and special treatment needed**
No further relevant information available.

SECTION 5: Firefighting measures

· **5.1 Extinguishing media**
· **Suitable extinguishing agents:** Use fire extinguishing methods suitable to surrounding conditions.
· **5.2 Special hazards arising from the substance or mixture**
During heating or in case of fire poisonous gases are produced.
Nitrogen oxides (NOx)
Carbon monoxide (CO)
· **5.3 Advice for firefighters**
· **Protective equipment:**
Wear self-contained respiratory protective device.
Do not inhale explosion gases or combustion gases.

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· ***Additional information***
Collect contaminated fire fighting water separately. It must not enter the sewage system.

SECTION 6: Accidental release measures

· ***6.1 Personal precautions, protective equipment and emergency procedures***
Wear protective equipment. Keep unprotected persons away.
· ***6.2 Environmental precautions:***
Inform respective authorities in case of seepage into water course or sewage system.
Dilute with plenty of water.
Do not allow to enter sewers/ surface or ground water.
· ***6.3 Methods and material for containment and cleaning up:***
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
Use neutralising agent.
Dispose contaminated material as waste according to item 13.
Ensure adequate ventilation.
· ***6.4 Reference to other sections***
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

SECTION 7: Handling and storage

· ***7.1 Precautions for safe handling***
Keep receptacles tightly sealed.
Ensure good ventilation/exhaustion at the workplace.
Prevent formation of aerosols.
· ***Information about fire - and explosion protection:*** *No special measures required.*

· ***7.2 Conditions for safe storage, including any incompatibilities***
· ***Storage:***
· ***Requirements to be met by storerooms and receptacles:*** *Store only in the original receptacle.*
· ***Information about storage in one common storage facility:*** *Store away from foodstuffs.*
· ***Further information about storage conditions:***
Protect from frost.
Keep container tightly sealed.
Protect from heat and direct sunlight.
· ***Maximum storage temperature:*** *40 °C*
· ***Minimum storage temperature:*** *5 °C*
· ***Storage class:*** *8 B*
· ***7.3 Specific end use(s)*** *No further relevant information available.*

SECTION 8: Exposure controls/personal protection

· ***Additional information about design of technical facilities:*** *No further data; see item 7.*

· ***8.1 Control parameters***

· **Ingredients with limit values that require monitoring at the workplace:**	
1310-73-2 sodium hydroxide	
WEL	Short-term value: 2 mg/m³

· **DNELs**		
1310-73-2 sodium hydroxide		
Inhalative	exposure short term - local effects	1 mg/m³ (worker)

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1314-13-2 zinc oxide		
Dermal	exposure long term - systemic effects	83 mg/kg bw/day (worker)
Inhalative	exposure long term - systemic effects	5 mg/m³ (worker)

· **PNECs**

1314-13-2 zinc oxide	
PNEC	100 µg/l (sewage treatment plant)
	6.1 µg/l (marine water)
	20.6 µg/l (fresh water)
PNEC	35.6 mg/kg (soil)
	56.5 mg/kg (sediment marine water)
	117.8 mg/kg (sediment fresh water)

· **Additional information:** The lists valid during the making were used as basis.

· **8.2 Exposure controls**
· **Personal protective equipment:**
· **General protective and hygienic measures:**
Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing
Wash hands before breaks and at the end of work.
Do not inhale gases / fumes / aerosols.
Avoid contact with the eyes and skin.
· **Respiratory protection:**
Respiratory protection if vapours/aerosols are liberate. Particle filter with middle retention for solid and liquid particle (e.g. EN 143 or 149, Type P2 or FFP2).
For example: Composite filter type ABEK, company MSA-Auer by short or minimized exposure.
· **Protection of hands:**

Protective gloves

Check the permeability prior to each renewed use of the glove.
The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation
· **Material of gloves**
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.
Chemical-protective gloves (EN 374-1, -2, -3).
Butyl rubber, BR ≥ 0,3 mm (Level 6)
· **Penetration time of glove material**
≥ 8 h
The exact break trough time has to be found out by the manufacturer of the protective gloves and has to be observed.
· **For the permanent contact in work areas without heightened risk of injury (e.g. Laboratory) gloves made of the following material are suitable:**
Butyl rubber, BR ≥ 0,3 mm (Level 6)
· **For the permanent contact gloves made of the following materials are suitable:**
Butyl rubber, BR ≥ 0,3 mm (Level 6)
· **Not suitable are gloves made of the following materials:**
Leather gloves
Strong material gloves

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· **Eye protection:**

Tightly sealed goggles

Ensure the eyewash stations and safety showers are close to the workplace.

SECTION 9: Physical and chemical properties

· **9.1 Information on basic physical and chemical properties**	
· **General Information**	
· **Appearance:**	
Form:	*Fluid*
Colour:	*yellow*
· **Odour:**	*Odourless*
· **Odour threshold:**	*Not determined.*
· **pH-value at 20 °C:**	*>11.5* *DIN 19261 Measuring methods with potentiometric cells*
· **Change in condition**	
Melting point/freezing point:	*not determined*
Initial boiling point and boiling range:	*100 °C*
· **Flash point:**	*Not applicable.*
· **Flammability (solid, gas):**	*Not applicable.*
· **Ignition temperature:**	
Decomposition temperature:	*Not determined.*
· **Auto-ignition temperature:**	*Product is not selfigniting.*
· **Explosive properties:**	*Product does not present an explosion hazard.*
· **Explosion limits:**	
Lower:	*Not determined.*
Upper:	*Not determined.*
· **Vapour pressure at 20 °C:**	*23 hPa*
· **Density at 20 °C:**	*1.4 g/cm³* *DIN 53217-5 Determination of density - vibration method*
· **Relative density**	*Not determined.*
· **Vapour density**	*Not determined.*
· **Evaporation rate**	*Not determined.*
· **Solubility in / Miscibility with water:**	*Fully miscible.*
· **Partition coefficient: n-octanol/water:**	*Not determined.*
· **Viscosity:**	
Dynamic:	*Not determined.*
Kinematic:	*Not determined.*
· **Solvent content:**	
Organic solvents:	*0.0 %*
Water:	*66.7 %*
VOC (EU)	*0.00 %*
· **9.2 Other information**	*No further relevant information available.*

(Contd. on page 6)

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· **Additional information** The physical data in section 9 correspond to typical values for this product and can not be seen as a product specification.

SECTION 10: Stability and reactivity

· **10.1 Reactivity** No further relevant information available.
· **10.2 Chemical stability**
· **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
· **10.3 Possibility of hazardous reactions** No dangerous reactions known.
· **10.4 Conditions to avoid** No further relevant information available.
· **10.5 Incompatible materials:** No further relevant information available.
· **10.6 Hazardous decomposition products:** No dangerous decomposition products known.

SECTION 11: Toxicological information

· **11.1 Information on toxicological effects**
· **Acute toxicity** Based on available data, the classification criteria are not met.

· **LD/LC50 values relevant for classification:**		
1314-13-2 zinc oxide		
Oral	LD50	>5,000 mg/kg (rat) (OECD 401)
Dermal	LD50	>2,000 mg/kg (rat) (external MSDS)
Inhalative	LC50/4h	>5.7 mg/l (rat) (OECD 403)

· **Primary irritant effect:**
· **Skin corrosion/irritation**
Causes severe skin burns and eye damage.
· **Serious eye damage/irritation**
Causes serious eye damage.
· **Respiratory or skin sensitisation** Based on available data, the classification criteria are not met.
· **CMR effects (carcinogenity, mutagenicity and toxicity for reproduction)**
· **Germ cell mutagenicity** Based on available data, the classification criteria are not met.
· **Carcinogenicity** Based on available data, the classification criteria are not met.
· **Reproductive toxicity** Based on available data, the classification criteria are not met.
· **STOT-single exposure** Based on available data, the classification criteria are not met.
· **STOT-repeated exposure** Based on available data, the classification criteria are not met.
· **Aspiration hazard** Based on available data, the classification criteria are not met.

SECTION 12: Ecological information

· **12.1 Toxicity**

· **Aquatic toxicity:**	
1310-73-2 sodium hydroxide	
LC50/96h	196 mg/l (fishes) (literature)
EC50/48h	40.4 mg/l (aquatic invertebrates) (literature)
1314-13-2 zinc oxide	
LC50/96h (static)	0.17 mg/l (oncorhynchus mykiss - rainbow trout) (external MSDS ZnCl2)
EC50/48h (static)	0.41 mg/l (ceriodaphnia dubia - water flea) (EPA 821 R-02-012 Zn)
EC50/72h (dynamic)	136 mg/l (selenastrum capricornutum - algae) (OECD 201)

· **12.2 Persistence and degradability** No further relevant information available.
· **12.3 Bioaccumulative potential** No further relevant information available.
· **12.4 Mobility in soil** No further relevant information available.

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· ***Ecotoxical effects:***
· ***Remark:*** *Toxic for fish*
· ***Additional ecological information:***
· ***General notes:***
The classification into the water hazard class resulted according to the administrative regulation water-polluting substances (VwVwS) dated 17.05.1999.
Water hazard class 1 (German Regulation) (Self-assessment): slightly hazardous for water
The product does not contain AOX.
The product does not contain VOC.
The product does not contain EDTA
Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
Must not reach sewage water or drainage ditch undiluted or unneutralised.
Also poisonous for fish and plankton in water bodies.
Toxic for aquatic organisms
The product does not contain organic complexing agents.
Rinse off of bigger amounts into drains or the aquatic environment may lead to increased pH-values. A high pH-value harms aquatic organisms. In the dilution of the use-level the pH-value is considerably reduced, so that after the use of the product the aqueous waste, emptied into drains, is only low water-dangerous.
· ***12.5 Results of PBT and vPvB assessment***
According to Annex XIV of Regulation (EC) No. 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH): The product does not contain a substance fullfilling the PBT (persistent/bioaccumulative/toxic) criteria or the vPvB (very persistent/very bioaccumulative) criteria: Self classification.
· ***PBT:*** *Not applicable.*
· ***vPvB:*** *Not applicable.*
· ***12.6 Other adverse effects*** *No further relevant information available.*

SECTION 13: Disposal considerations

· ***13.1 Waste treatment methods***
· ***Recommendation***
Must not be disposed together with household garbage. Do not allow product to reach sewage system.
Contact manufacturer for recycling information.

· ***European waste catalogue***	
*06 02 04**	*sodium and potassium hydroxide*
*06 03 13**	*solid salts and solutions containing heavy metals*

· ***Uncleaned packaging:***
· ***Recommendation:*** *Disposal must be made according to official regulations.*
· ***Recommended cleansing agents:*** *Water, if necessary together with cleansing agents.*

SECTION 14: Transport information

· ***14.1 UN-Number***	
· ***ADR, IMDG, IATA***	*UN1824*
· ***14.2 UN proper shipping name***	
· ***ADR***	*1824 SODIUM HYDROXIDE SOLUTION mixture, ENVIRONMENTALLY HAZARDOUS*
· ***IMDG***	*SODIUM HYDROXIDE SOLUTION mixture, MARINE POLLUTANT*
· ***IATA***	*SODIUM HYDROXIDE SOLUTION mixture*

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Safety data sheet
according to 1907/2006/EC, Article 31

Printing date 03.07.2017 *Version number 30* *Revision: 28.06.2017*

Trade name: Concentrate CNF 11

(Contd. of page 7)

· **14.3 Transport hazard class(es)**

· **ADR, IMDG**

· **Class**	8 Corrosive substances.
· **Label**	8

· **IATA**

· **Class**	8 Corrosive substances.
· **Label**	8

· **14.4 Packing group**	
· **ADR, IMDG, IATA**	II
· **14.5 Environmental hazards:**	Product contains environmentally hazardous substances: zinc oxide
· **Marine pollutant:**	Yes Symbol (fish and tree)
· **Special marking (ADR):**	Symbol (fish and tree)
· **14.6 Special precautions for user**	Warning: Corrosive substances.
· **Danger code (Kemler):**	80
· **EMS Number:**	F-A,S-B
· **Segregation groups**	Alkalis
· **Stowage Category**	A
· **Segregation Code**	SG35 Stow "separated from" acids.
· **14.7 Transport in bulk according to Annex II of Marpol and the IBC Code**	Not applicable.
· **Transport/Additional information:**	
· **ADR**	
· **Limited quantities (LQ)**	1L
· **Excepted quantities (EQ)**	Code: E2 Maximum net quantity per inner packaging: 30 ml Maximum net quantity per outer packaging: 500 ml
· **Transport category**	2
· **Tunnel restriction code**	E
· **IMDG**	
· **Limited quantities (LQ)**	1L
· **Excepted quantities (EQ)**	Code: E2 Maximum net quantity per inner packaging: 30 ml Maximum net quantity per outer packaging: 500 ml
· **UN "Model Regulation":**	UN 1824 SODIUM HYDROXIDE SOLUTION MIXTURE, 8, II, ENVIRONMENTALLY HAZARDOUS

(Contd. on page 9)

Safety data sheet
according to 1907/2006/EC, Article 31

Printing date 03.07.2017 *Version number 30* *Revision: 28.06.2017*

***Trade name:* Concentrate CNF 11**

(Contd. of page 8)

SECTION 15: Regulatory information

· **15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**

· **Directive 2012/18/EU - SEVESO III**
· **Named dangerous substances - ANNEX I** None of the ingredients is listed.
· **Seveso category** E2 Hazardous to the Aquatic Environment
· **Qualifying quantity (tonnes) for the application of lower-tier requirements** 200 t
· **Qualifying quantity (tonnes) for the application of upper-tier requirements** 500 t
· **REGULATION (EC) No 1907/2006 ANNEX XVII** Conditions of restriction: 3

· **National regulations:**

· **Waterhazard class:** Water hazard class 1 (Self-assessment): slightly hazardous for water.
· **15.2 Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

SECTION 16: Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

Safety Data Sheet to the regulation 1907/2006/EG, article 31.
Material Safety Data Sheets are to be kept for at least 10 years, according to Article 36 of REACH Regulation (EC) No 1907/2006.

· **Relevant phrases**
H290 May be corrosive to metals.
H314 Causes severe skin burns and eye damage.
H400 Very toxic to aquatic life.
H410 Very toxic to aquatic life with long lasting effects.

· **Department issuing SDS:**
Research and Development
E-Mail: fue@schloetter.de
· **Contact:** sds@schloetter.de
· **Abbreviations and acronyms:**
RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
ICAO: International Civil Aviation Organisation
RRN: REACH Registration Number
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
IATA: International Air Transport Association
GHS: Globally Harmonised System of Classification and Labelling of Chemicals
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
VOC: Volatile Organic Compounds (USA, EU)
DNEL: Derived No-Effect Level (REACH)
PNEC: Predicted No-Effect Concentration (REACH)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
PBT: Persistent, Bioaccumulative and Toxic
vPvB: very Persistent and very Bioaccumulative
Met. Corr.1: Corrosive to metals – Category 1
Skin Corr. 1A: Skin corrosion/irritation – Category 1A
Eye Dam. 1: Serious eye damage/eye irritation – Category 1
Aquatic Acute 1: Hazardous to the aquatic environment - acute aquatic hazard – Category 1
Aquatic Chronic 1: Hazardous to the aquatic environment - long-term aquatic hazard – Category 1
Aquatic Chronic 2: Hazardous to the aquatic environment - long-term aquatic hazard – Category 2
· **** Data compared to the previous version altered.***

Schloetter
Surface Technology

Zincate CNF 10

Zincate CNF 10 produces in an immersion process a thin zincate layer on aluminium and its alloys which allows a subsequent electroless- or electrolytic plating.

Zincate CNF 10 is free of cyanide.

The information in this data sheet is based on laboratory as well as practical experience. Figures quoted for operating limits and replenishment quantities are for guidance. Actual values necessary will depend on the components being plated (material and geometry), their application and plating plant conditions

Important :
Please read this instruction carefully prior to the use of the process and carefully follow all the parameters that have a direct influence on the operation. We reserve the right to make technical changes. In the interest of safety, please pay attention to the hazard warnings on the labels of the containers. The minimum shelf life of the products is included on the labels and is also available in the appropriate Quality Assurance (QA03).
The current IMDS number of the layer deposited from the process is available on the internet at www.schloetter.com/downloads.
For the storage of chemical products the HSG71 is suggested as guidance.
If the additives used in this process contain a SVHC-substance, then this will be specified in the corresponding Material Safety Data Sheet, section 15.

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Schloetter
Surface Technology

11.0 TECHNICAL INFORMATION AND EQUIPMENT REQUIREMENTS

Tanks:	rubber-lined steel, plastic tanks (PVC, polypropylene)
Exhaust:	recommended
Part Agitation:	moderate work piece movement required
Electrolyte Agitation:	not required
Filtration:	not required
Heating/Cooling:	in most instances not required

12.0 MAKE-UP AND OPERATING CONDITIONS

12.1 Product names

List of products required		
Product name	Article no. (AN)	SG
Concentrate CNF 11	010105	1.40

12.2 Requirements for a 100 litre bath

Product name	AN	SG	Quantit y	
Concentrate CNF 11	010105	1.40	30	ltr.

12.3 Make-up sequence for a 100 litre bath

All tanks, filters and equipment to be used should be thoroughly cleaned prior to use.

- fill 50 litres of deionised water into the tank
- add 30 litres of Concentrate CNF 11
- mix well
- make up with deionised water to final volume

The zincate is ready for use after the operating temperature has been reached.

12.4 Concentrations and operating conditions

	RanQe	Optimum	
Concentrate CNF 11	300 - 550	300	ml/1
Temperature range	18-25	--	°C
Treatment time single-step process: Zincate treatment	0.5-2.0	--	min.
Treatment time two-step process: 1. Zincate treatment	--	30	sec.
2. Zincate treatment	0.5-2.0	--	min.

* for some aluminium alloys it's necessary to increase the concentration of Concentrate CNF 11 to 500 ml/1

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12.5 Consumption

Depending on part geometry and surface condition, the consumption of the Concentrate CNF 11 is more or less due to drag-out losses.

Approximate value for replenishment:

Additive	Re lenishment / Consumption
Concentrate CNF 11	30 ml/m² surface throu hput

With an increase of the surface throughput, the Zincate CNF 10 is enriched with aluminium. A new make-up of the electrolyte is required if the formation of the zinc coating is significantly slower or uneven.

13.0 PROCESS SEQUENCE

13.1 Process sequence respectively sequences

Base material aluminium (e.g. two-step process)

1.	immersion degreasing	e.g SLOTOCLEAN AK 340
2.	rinsing	
3.	pickling	e.g SLOTETCH 590 or SLOTOCLEAN AK 60
4.	rinsing	
5.	desmut	e.g SLOTOCLEAN DS 10
6.	rinsing	
7.	Zincate CNF 10	
8.	rinsing	
9.	zinc Strip	e.g SLOTOSTRIP ZN 10
10.	rinsing	
11.	Zincate CNF 10	
12.	rinsing	
13.	metallise	

A two-step zincate treatment usually means better adhesion of the subsequently deposited coating.
For the single-step process (single zincate treatment) the process steps 9- 12 are left out.

13.2 Pre-treatment - the single process steps and notes

The choice of the single processes and the operating conditions depends on the type of the aluminium alloy. Some typical examples are presented on page 4 and 5.

Our technical field service and our service department would be pleased to provide you with information about suitable process sequences respectively -methods as well as suitable products from our pre-treatment programme.

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13.2.1 Immersion degreasing e.g SLOTOCLEAN AK 340

SLOTOCLEAN AK 340 is a weakly alkaline immersion degreaser.

Concentration:	25 - 30	g/1
Temperature:	60-80	0C
Treatment time:	5 -15	min.

13.2.2 Pickling e.g SLOTETCH 590 or SLOTOCLEAN AK 60

Acidic pickle SLOTETCH 590,

Concentration:	100- 200	ml/1	Activator SLOTETCH 591
Temperature:	60-70	0C	
Treatment time:	30-120	sec.	

Alkaline pickle SLOTOCLEAN AK 60,

Concentration:	9-22	ml/1	Pickle Additive SLOTOCLEAN AK 61
	50-90	g/1	Sodium hydroxide
Temperature:	50-60	0C	
Treatment time:	20-60	sec.	

13.2.3 Desmut e.g SLOTOCLEAN DS 10

Nitric free desmut SLOTOCLEAN DS 10,

Concentration:	135-165	g/1	Product DSZN 11
	70-90	ml/1	Acid Concentrate DSZN 12
Temperature:	15-30	0C	
Treatment time:	15-120	sec.	

13.2.4 Zincate CNF 10

See point 2.4.

13.2.5 Zinc strip e.g SLOTOSTRIP ZN 10

Nitric free zinc strip SLOTOSTRIP ZN 10,

Concentration:	20-40	g/1	Product DSZN 11
	5-15	ml/1	Sulphuric acid
Temperature:	15-30	0C	
Treatment time:	15-120	sec.	

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13.2.6 Metallising

NB
Work pieces which have a scooping *effect* due to their unfavourable shape, may be dipped into a sulphuric acid solution, (0.5 %) between the last rinsing steps in order to avoid drag-in of Zincate CNF 10 into the subsequent electrolytic or electroless plating electrolytes.

The following processes can be applied for the metallisation of the zincate layer:

- electroless nickel plating e.g SLOTONIP 2010,1850 etc
- electrolytic nickel plating e.g SLOTONIK SB, 20, 50, Nickel Sulphamate MS etc
- cyanide copper plating e.g SLOTOCOUP CC 10

The cyanidic copper electrolytes may not contain free sodium- or potassium hydroxide.

14.0 MAINTENANCE AND FUNCTION OF THE INDIVIDUAL BATH COMPONENTS

14.1 Concentrate CNF 11

The Concentrate CNF 11 contains all components and complexing agents which are required for the formation of the zincate layer.

ls.0 TROUBLE SHOOTING

No information available at present.

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S.0 Effluent

Legal regulations must be observed for the disposal of the Zincate CNF 10. Different regulations normally apply for the additives and the ready-made electrolyte. Please refer to section **13** of the appropriate Material Safety Data Sheet for disposal code and recommendations.

The following detoxification sequence is only considered to be an aid:

The Zincate CNF 10 is a strong alkaline, cyanide-free solution with complexing agents. The concentrates must be diluted 1 : 5 prior to detoxification. For precipitation of the metals Precipitant AW 10 (AN 121010) is recommended.

17.0 SAFETY

Reasonable care is required when handling Schlotter chemical products. Only personnel specially trained on working with chemicals should be deployed with their handling.

EC Material Safety Data Sheets must be made available to all personnel dealing with the chemicals to ensure they have all required information about product composition, hazards identification, first-aid measures, handling and storage exposure controls. Toxicological and ecological information etc. It is required to ensure the supply and use of suitable protective clothing and equipment.

The user must verify the designated purpose of the bath. Previous experience has shown that not all metal surfaces are suitable for a trouble-free electroplating.

The above mentioned data are made according to our best knowledge. Consistent operation of the working solution requires appropriate maintenance. Zincate **CNF 10** is a process of Dr. Ing Max Schlotter GmbH & Co KG. It can only be operated with the products described in this technical data sheet. Use of other chemicals (also partly) will impair quality and invalidates our service and quality commitments (quality assurance).

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Zinc Strip
SLOTOSTRIP ZN 10

Zinc Strip SLOTOSTRIP ZN 10 Nitric-Free is a new generation process for the pre-treatment of aluminium prior to electroless or electrolytic plating.

Zinc Strip SLOTOSTRIP ZN 10 Nitric-Free is used for the removal of the first stage zincate layer in the double zincate process sequence.

Zinc Strip SLOTOSTRIP ZN 10 Nitric-Free is equally suited for the processing of both wrought and cast aluminium alloys.

Zinc Strip SLOTOSTRIP ZN 10 :

has a long life.
is easily maintained.
has negligible attack on the substrate.
is easy to waste treat.
is a viable alternative to nitric acid.

The information in this data sheet is based on laboratory as well as practical experience. Figures quoted for operating limits and replenishment quantities are for guidance. Actual values necessary will depend on the components being plated (material and geometry), their application and plating plant conditions.

Important :
Please read this instruction carefully prior to the use of the process and carefully follow all the parameters that have a direct influence on the operation. We reserve the right to make technical changes. In the interest of safety, please pay attention to the hazard warnings on the labels of the containers. The minimum shelf life of the products is included on the labels and is also available in the appropriate Quality Assurance (QA03).
The current IMDS number of the layer deposited from the process is available on the internet at www.schloetter.com/downloads.
For the storage of chemical products the HSG71 is suggested as guidance.
If the additives used in this process contain a SVHC-substance, then this will be specified in the corresponding Material Safety Data Sheet, section 15.

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1.0 TECHNICAL INFORMATION AND EQUIPMENT REQUIREMENTS

Tanks:	highly compressed polypropylene
Local Exhaust Ventilation:	recommended
Part/Electrolyte Agitation:	Not essential but solution and/or work movement is suggested
Filtration:	Not necessary
Heating/Cooling:	Porcelain or PTFE coated heating coils if required

2.0 MAKE-UP AND OPERATING CONDITIONS

2.1 Product names

List of products required		
Product name	**Article no. (AN)**	**SG**
Product DSZN 11	018111	-
Sulphuric acid pure 1.84	163030	1.84
Alternatively		
Sulphuric acid 50% w/w	164000	1.4

2.2 Requirements for a 100 litre bath

Product name	**AN**	**SG**	**Quantity**	
Product DSZN 11	018111	-	3	kg
Sulphuric acid pure 1.84	163030	1.84	1	ltr
Alternatively				
Sulphuric acid 50% w/w	164000	1.4	2.6	ltr

2.3 Make-up sequence for a 100 litre bath

New, but also used tanks and equipment to be used must be thoroughly cleaned prior to use.

- Fill the clean process tank to 90% of final volume with deionised water.
- Add with stirring the required amount of sulphuric acid (or sulphuric acid 50% w/w).
- Add the required amount of Product DSZN 11 and mix until dissolved
- Make upto final volume with deionised water.
- Ensure the temperature is correct and the solution is ready to use.

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2.4 Concentrations and operating conditions

	Range	Optimum	
Product DSZN 11	20 - 40	30	g/l
Sulphuric acid	5 - 15	10	ml/l
Zinc	-	<20	g/l
Temperature	15 - 30	22	°C
Immersion time	0.25 - 2	1	min

2.5 Consumption

Consumption is primarily by drag out loss
Product DSZN 11 4 - 6 g / m^2 surface area processed.

3.0 PROCESS SEQUENCE

The specific processing cycle varies from aluminium alloy to alloy. The following guideline should provide a basic outline of the pre-treatment necessary to obtain a uniform adherent deposit.

3.1 Process Sequence

- degreasing in a mild alkaline cleaner e.g SLOTOCLEAN AK 340
- rinsing
- Aluminium Pickle SLOTETCH 590 (alloys with a high purity can be etched stronger)
- rinsing
- desmut e.g SLOTOCLEAN DS 10
- rinsing
- zincate e.g Zincate CNF 10
- rinsing
- zinc strip e.g SLOTOSTRIP ZN 10
- rinsing
- zincate e.g Zincate CNF 10
- rinsing
- plating

  Electroless nickel e.g SLOTONIP 2010, 1850, 90
  Electrolytic nickel e.g Norma, SLOTONIK 20, Nickel Sulphamate MS
  Electrolytic copper e.g SLOTOCOUP CC 10

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4.0 MAINTENANCE

Clean stripping of the first zincate layer is essential in producing quality deposits on aluminium alloys. The concentration of Product DSZN 11 and zinc should be monitored on a regular basis.

5.0 TROUBLE SHOOTING

No information available at present.

6.0 EFFLUENT

Legal regulations must be observed for the disposal of the Desmut SLOTOCLEAN DS 10. Different regulations normally apply for the additives and the ready-made electrolyte. Please refer to section **13** of the appropriate Material Safety Data Sheet for disposal code and recommendations.

The following detoxification sequence is only considered to be an aid:

Rinse water can be directly neutralised.
Spent solutions will contain zinc and will need neutralising with sodium hydroxide to pH 8.5 - 10.
If the pH is too low (< 7.0) there will be incomplete precipitation of the zinc. If the pH is too high (>11) the zinc will re-dissolve as zincate.

7.0 SAFETY

Reasonable care is required when handling Schlötter chemical products. Only personnel specially trained on working with chemicals should be deployed with their handling.

EC Material Safety Data Sheets must be made available to all personnel dealing with the chemicals to ensure they have all required information about product composition, hazards identification, first-aid measures, handling and storage exposure controls. Toxicological and ecological information etc. It is required to ensure the supply and use of suitable protective clothing and equipment.

The user must verify the designated purpose of the bath. Previous experience has shown that not all metal surfaces are suitable for a trouble-free electroplating.

The above mentioned data are made according to our best knowledge. Consistent operation of the working solution requires appropriate maintenance. **Zinc Strip SLOTOSTRIP ZN 10** is a process of Schloetter UK Ltd. It can only be operated with the products described in this technical data sheet. Use of other chemicals (also partly) will impair quality and invalidates our service and quality commitments (quality assurance).

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SAFETY DATA SHEET
PRODUCT DSZN 11

According to Regulation 1907/2006/EC AnnexII, as amended by Regulation 830/2015/EU. Important documentation :- Keep safe and available for inspection until superseded (up to 10 y). Keep up to date.

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product name PRODUCT DSZN 11

Product number 018111

1.2. Relevant identified uses of the substance or mixture and uses advised against

Identified uses Industrial uses (SU3). Formulation (SU10). Metal surface treatment products (PC14). Etchant / cleaner / activator. Electroplating.

Uses advised against Consumer use is not intended for any of our products; and is advised against for c.m.r. hazards.

1.3. Details of the supplier of the safety data sheet

Supplier
SCHLOETTER COMPANY LTD
NEW ROAD
PERSHORE
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Telephone: 01386 552333
Email: info@schloetter.co.uk
UK EMERGENCY PHONE No 01865 407333

Contact person Any further questions requiring information about this Safety Data Sheet, and, its REACH or RoHS implications, should be addressed to, reach@schloetter.co.uk

Safety Data Sheet Instructions While essential for COSHH evaluations, the SDS does not constitute a Risk Assessment.

1.4. Emergency telephone number

Emergency telephone 01865 407333 +441865 407333 outside the UK. In office hours telephone:- +44/(0) 1386 552331 (English only).

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification (EC 1272/2008)

Physical hazards Met. Corr. 1 - H290

Health hazards Acute Tox. 4 - H302 Skin Corr. 1B - H314 Eye Dam. 1 - H318

Environmental hazards Aquatic Chronic 3 - H412

Classification (67/548/EEC or 1999/45/EC) Xn;R22. C;R34. R52.

2.2. Label elements

PRODUCT DSZN 11

Pictogram

Signal word	Danger
Hazard statements	H290 May be corrosive to metals. H302 Harmful if swallowed. H314 Causes severe skin burns and eye damage. H412 Harmful to aquatic life with long lasting effects.
Precautionary statements	P342+P332+P337+P313 If experiencing respiratory symptoms: If skin irritation occurs: If eye irritation persists: Get medical attention. P260+P280+P264 Do not breathe dust / fume / gas / mist / vapours / spray. Wear protective gloves / protective clothing / eye protection / face protection. Wash contaminated skin thoroughly after handling. P234 Keep only in original packaging. P405+P233+P273 Store locked up. Keep container tightly closed. Avoid release to the environment. P260 Do not breathe vapour/ spray. P303+P361+P353+P305+P351+P338 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P264 Wash contaminated skin thoroughly after handling. P270 Do not eat, drink or smoke when using this product. P273 Avoid release to the environment. P280 Wear protective gloves/ protective clothing/ eye protection/ face protection. P301+P312 IF SWALLOWED: Call a POISON CENTRE/doctor if you feel unwell. P301+P330+P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. P303+P361+P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing. P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P310 Immediately call a POISON CENTER/ doctor. P321 Specific treatment (see medical advice on this label). P363 Wash contaminated clothing before reuse. P390 Absorb spillage to prevent material damage. P405 Store locked up. P406 Store in a corrosion-resistant container with a resistant inner liner. P501 Dispose of contents/ container in accordance with national regulations.
Contains	pentapotassium bis(peroxymonosulphate) bis(sulphate)

2.3. Other hazards

This product does not contain any substances classified as PBT or vPvB.

SECTION 3: Composition/information on ingredients

3.2. Mixtures

PRODUCT DSZN 11

pentapotassium bis(peroxymonosulphate) bis(sulphate)		**60 - <100 %**
CAS number: 70693-62-8	EC number: 274-778-7	REACH registration number: 01-2119485567-22-0000

Classification	**Classification (67/548/EEC or 1999/45/EC)**
Acute Tox. 4 - H302 Skin Corr. 1B - H314 Eye Dam. 1 - H318 Aquatic Chronic 3 - H412	Xn;R22. C;R34. R52.

The Full Text for all R-Phrases and Hazard Statements are Displayed in Section 16.

SECTION 4: First aid measures

4.1. Description of first aid measures

General information BURNS - Rinse with water until pain has disappeared. While rinsing remove clothing that is not burnt to the skin. If further treatment in a hospital is deemed necessary, continue rinsing during transport and until a physician can take over. Chemical burns must be treated by a physician. In case of accident or if you feel unwell, seek medical advice, show the label and safety data sheet where possible. When in doubt or symptoms persist, seek medical advice.

Inhalation Remove affected person from source of contamination. Move affected person to fresh air and keep warm and at rest in a position comfortable for breathing. When breathing is difficult, properly trained personnel may assist affected person by administering oxygen. Get immediate medical attention

Ingestion Do not induce vomiting. Rinse mouth thoroughly with water. Give plenty of water to drink. Obtain medical attention immediately.

Skin contact Rinse immediately with plenty of water. Remove contaminated clothing. Get medical attention if irritation persists after washing. Chemical burns must be treated by a physician.

Eye contact Remove any contact lenses and open eyelids wide apart. Continue to rinse for at least 15 minutes and get medical attention.

4.2. Most important symptoms and effects, both acute and delayed

General information Treat symptomatically. Chemical burns must be treated by a physician.

Inhalation Sore throat. Coughing, chest tightness, feeling of chest pressure. May cause an asthma-like shortness of breath.

Ingestion Nausea, vomiting.

Skin contact Skin irritation. Burns can occur.

Eye contact Corneal damage. May cause blurred vision and serious eye damage.

4.3. Indication of any immediate medical attention and special treatment needed

Notes for the doctor Corrosive chemical: tissue damage occurs at site of exposure. Symptomatic treatment.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media The product is not flammable. Use fire-extinguishing media suitable for the surrounding fire.

5.2. Special hazards arising from the substance or mixture

Specific hazards May give off noxious or toxic gases in a fire. Though not classified as such... The product increases the risk of fire and may accelerate combustion.

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5.3. Advice for firefighters

Protective actions during firefighting Control run-off water by containing and keeping it out of sewers and watercourses.

Special protective equipment for firefighters Self contained breathing apparatus. Full protective clothing

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Personal precautions Refer to section 8.2.

6.2. Environmental precautions

Environmental precautions Do not discharge into drains or watercourses or onto the ground. Bund containers to prevent environmental contamination. Store in a demarcated bunded area to prevent release to drains and/or watercourses.

6.3. Methods and material for containment and cleaning up

Methods for cleaning up Provide adequate ventilation. Contain spillage with sand, earth or other suitable non-combustible material. Avoid the spillage or runoff entering drains, sewers or watercourses. Wear suitable protective equipment, including gloves, goggles/face shield, respirator, boots, clothing or apron, as appropriate. Avoid generation and spreading of dust. Sweep or shovel up into suitable containers. Dispose of in accordance with local authority requirements. Flush contaminated area with plenty of water.

6.4. Reference to other sections

Reference to other sections For personal protection, see Section 8. See Section 11 for additional information on health hazards. Information in section 12, ecological, should be consulted. For waste disposal, see section 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Usage precautions Mechanical ventilation or local exhaust ventilation may be required. Avoid spilling. Avoid contact with skin and eyes. Do not breathe dust. Avoid handling which leads to dust formation. If ventilation is inadequate, suitable respiratory protection must be worn. In case of insufficient ventilation, wear suitable respiratory equipment. Note! When making up the working solution always add the product to water. Never add water to the product.

7.2. Conditions for safe storage, including any incompatibilities

Storage precautions Keep in cool, dry, ventilated storage and closed containers. Keep away from flammable and combustible materials. Keep away from heat. Store away from the following materials: Reducing agents. Protect from moist air.

Storage class Chemical storage.

7.3. Specific end use(s)

Specific end use(s) The identified uses for this product are detailed in Section 1.2.

SECTION 8: Exposure Controls/personal protection

8.1. Control parameters

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Ingredient comments DUST - The COSHH definition of a substance hazardous to health includes dust of any kind when present at a concentration in air equal to or greater than 10 mg.m-3 8-hour TWA of total inhalable dust or 4 mg.m-3 8-hour TWA of respirable dust. This means that any dust will be subject to COSHH if people are exposed above these levels. Please refer to the HSE publication EH40 for additional information on dusts.

8.2. Exposure controls

Protective equipment

Appropriate engineering controls Provide adequate general and local exhaust ventilation.

Personal protection Assign level of respiratory protection, (not required, dust mask, respirator etc.) according to risk assessment of ambient air pollution and according to the efficacy of local exhaust ventilation. Use personal protective equipment which conforms to international standards :- Respirator cartridge filters to conform to EN 14387 ABEK as a minimum. Gloves should be of a type tested to EN 374. Disposable gloves should be changed frequently: in particular, immediately after substantial contamination. This may be the best option, as breakthrough times and substance retention can be unpredictable for re-useable gloves. Gloves may cause an allergic reaction. Provide a non-allergenic, absorbent liner to minimise the risk.

Eye/face protection Wear eye/face protection to prevent any possibility of eye contact.

Hand protection Wear protective gloves.

Other skin and body protection Provide eyewash station and safety shower. Wear appropriate clothing to prevent repeated or prolonged skin contact.

Hygiene measures Wash at the end of each work shift and before eating, smoking and using the toilet. Promptly remove any clothing that becomes wet or contaminated. Contaminated clothing must be laundered before re-use. Do not eat, drink, or smoke when using this product.

Respiratory protection Wear suitable respiratory protection if there is dust formation or insufficient ventillation.

SECTION 9: Physical and Chemical Properties

9.1. Information on basic physical and chemical properties

Appearance Solid Crystalline solid.

Colour White.

Odour Odourless.

Odour threshold Not determined. Not relevant.

pH pH (diluted solution): <2.0 60 g/l

Melting point Not determined.

Initial boiling point and range Not determined.

Flash point n/a°C

Evaporation rate Not determined.

Evaporation factor Not determined.

Flammability (solid, gas) Not applicable.

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Upper/lower flammability or explosive limits	Not applicable.
Other flammability	Not applicable.
Vapour pressure	Not determined.
Vapour density	Not determined.
Relative density	Not applicable.
Bulk density	950 - 1250 kg/m³
Solubility(ies)	Soluble in water.
Partition coefficient	Not determined.
Auto-ignition temperature	Not applicable.
Decomposition Temperature	Not determined.
Viscosity	Not determined.
Explosive properties	Not determined. More sensitive to shock than m-dinitrobenzene: Not considered to be explosive. More sensitive to friction than m-dinitrobenzene: Not considered to be explosive.
Explosive under the influence of a flame	Not considered to be explosive.
Oxidising properties	Not applicable.
Comments	Typical data, as given in section 9 is not a specification

9.2. Other information

Other information	Additional data has not, as yet, been determined.

SECTION 10: Stability and reactivity

10.1. Reactivity

Reactivity	Reactions with the following materials may generate heat: Alkalis. Toxic or very toxic gases produced by reaction with: Inorganic cyanides. sulfides, sulfites...

10.2. Chemical stability

Stability	Stable under recommended storage and handling conditions.

10.3. Possibility of hazardous reactions

Possibility of hazardous reactions	See section 10.1, 10.2

10.4. Conditions to avoid

Conditions to avoid	Avoid contact with strong reducing agents. Contact with combustible material may cause fire. Avoid heat, flames and other sources of ignition.

10.5. Incompatible materials

Materials to avoid	Alkali metals. Alkaline earth metals. Powdered metal. Strong alkalis. Inorganic hydrides. Inorganic nitrides. Inorganic cyanides. Inorganic sulphides.

10.6. Hazardous decomposition products

Hazardous decomposition products	When heated, vapours/gases hazardous to health may be formed.

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SECTION 11: Toxicological information

11.1. Information on toxicological effects

Toxicological effects Corrosive.

Other health effects Corrosive! See route of entry.....

Acute toxicity - oral

ATE oral (mg/kg) 588.82

General information See section 2 for applicable statements. Corrosive, Acidic.

Inhalation Irritating to respiratory system.

Ingestion Harmful if swallowed.

Skin contact Causes burns. Avoid contact with skin.

Eye contact Causes burns. Avoid contact with eyes.

Acute and chronic health hazards This product is corrosive. This product may cause skin and eye irritation. Prolonged contact may cause burns.

Route of exposure Inhalation Skin absorption Ingestion. Skin and/or eye contact

Medical symptoms Irritation of eyes and mucous membranes. Skin irritation. Chemical burns.

Medical considerations Splash in eye requires examination by eye specialist.

SECTION 12: Ecological Information

Ecotoxicity Do not allow to enter public watercourses, sewers or soil.

12.1. Toxicity

Acute aquatic toxicity

Acute toxicity - fish Not expected to be toxic.
Corrosive acid. Very dangerous to aquatic organisms.

12.2. Persistence and degradability

Persistence and degradability The degradability of the product is not known.

12.3. Bioaccumulative potential

Bioaccumulative potential No data available on bioaccumulation.

Partition coefficient Not determined.

12.4. Mobility in soil

Mobility The product is soluble in water. Mobile. The product is non-volatile.

12.5. Results of PBT and vPvB assessment

Results of PBT and vPvB assessment This substance is not classified as PBT or vPvB according to current EU criteria.

12.6. Other adverse effects

Other adverse effects Not determined.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

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General information	When handling waste, the safety precautions applying to handling of the product should be considered.
Disposal methods	Dispose of waste to licensed waste disposal site in accordance with the requirements of the local Waste Disposal Authority.
Waste class	European Waste Code 06 01 06 is suggested for acidic material. Note that the applicable waste code may depend on the industry sector in addition to the previous uses, composition and hazards of the waste.
Effluent Treatment Considerations	Waste waters must be monitored for adequate decontamination.If available, follow the disposal procedure given in the operating data.
Product Specific Information	Unused product, and product with contamination known to be effluent compatible, may be treated in the effluent plant.Do not contaminate with complexing agents. Designed for effluent treatment by neutralisation and filtration.The acute environmental hazard is removed by treatment in a pH neutralising effluent plant.Use of waste product in the effluent plant reduces chemical oxygen demand.Dilution and neutralisation of the pH will reduce the tendancy to oxidise chlorides to chlorine.When disposing of used solution, check that dissolved metal ions are removed.Treat only small amounts, to avoid producing chlorine.

SECTION 14: Transport information

General	No other information known.

14.1. UN number

UN No. (ADR/RID)	3260
UN No. (IMDG)	3260
UN No. (ICAO)	3260
UN No. (ADN)	3260

14.2. UN proper shipping name

Proper shipping name (ADR/RID)	CORROSIVE SOLID, ACIDIC, INORGANIC, N.O.S.
Proper shipping name (IMDG)	CORROSIVE SOLID, ACIDIC, INORGANIC, N.O.S.
Proper shipping name (ICAO)	CORROSIVE SOLID, ACIDIC, INORGANIC, N.O.S.
Proper shipping name (ADN)	CORROSIVE SOLID, ACIDIC, INORGANIC, N.O.S.
Technical Name	(pentapotassium bis(peroxomonosulphate) bis(sulphate))

14.3. Transport hazard class(es)

ADR/RID class	8
ADR/RID classification code	C2
ADR/RID label	8
IMDG class	8
ICAO class/division	8
ADN class	8

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Transport labels

14.4. Packing group

ADR/RID packing group	II
IMDG packing group	II
ADN packing group	II
ICAO packing group	II

14.5. Environmental hazards

Environmentally hazardous substance/marine pollutant
No.

14.6. Special precautions for user

IMDG Code segregation group	1. Acids
EmS	F-A, S-B
ADR transport category	2
Emergency Action Code	2X
Hazard Identification Number (ADR/RID)	80
Tunnel restriction code	(E)

14.7. Transport in bulk according to Annex II of MARPOL and the IBC Code

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	Not applicable. Product not intended for carriage in bulk, (as defined for Marpol - International Bulk Chemical code). Carriage may still take place in Intermediate Bulk Containers (ie not International Bulk ["Chemical"] cargo ships - ie sea going tanker ships).

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

National regulations	Commission Decision 2000/532/EC as amended by Decision 2001/118/EC establishing a list of wastes and hazardous waste pursuant to Council Directive 75/442/EEC on waste and Directive 91/689/EEC on hazardous waste with amendments.

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EU legislation	Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) (as amended). Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures (as amended). Regulation 1272/2008/EC The CLP Regulation 790/2009/EC 1st ATP to the CLP. Regulation 286/2011/EU 2nd ATP to the CLP. Regulation 830/2015/EU REACh annexII (SDS) amended. IOELV Commission Directives Implementing Council Directive 98/24/EC:- 1. 2000/39/EC. 2. 2006/15/EC and 3. 2009/161/EC. Earlier directives were repealed (80/1107/EEC, 91/322/EEC and 96/94/EEC). Regulation 618/2012/EU 3rd ATP to the CLP. Regulation 487/2013/EU 4th ATP to the CLP. Regulation 944/2013/EU 5th ATP to the CLP. Regulation 605/2014/EU 6th ATP to the CLP.
Guidance	Workplace Exposure Limits EH40.
Class Related Information	Consult sections 8 (exposure limits) and 9 (explosion/flammability limits) to determine the nature of the hazard; and take appropriate action.
Definitions	"Well ventilated area" or "well ventilated place" means sufficient ventilation that :- exposure limits are not exceeded;respiratory and/or explosion hazards are anticipated and avoided;and dust and odours are prevented from becoming a nuisancein the work environment.

15.2. Chemical safety assessment

SECTION 16: Other information

General information	The data here is based on current knowledge and experience. This safety data describes the product in terms of safety requirements and does not signify any warranty with regard to the product properties. This safety data does not constitute a workplace risk assessment.
Revision date	14/12/2017
Revision	2017 - 12 - 14
Supersedes date	27/02/2012
SDS number	018111
SDS status	Revision 2, replaces version of..... 2012 - 02 - 27
Risk phrases in full	R22 Harmful if swallowed. R34 Causes burns. R52 Harmful to aquatic organisms.
Hazard statements in full	H290 May be corrosive to metals. H302 Harmful if swallowed. H314 Causes severe skin burns and eye damage. H318 Causes serious eye damage. H412 Harmful to aquatic life with long lasting effects.

AL 3ATH 23
Co. Bath 7

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SECTION 1: Identification of the substance/mixture and of the company/undertaking

· **1.1 Product identifier**

· **Trade name: Sulphuric Acid 96%**

· **Article number:** 601890
· **CAS Number:** 7664-93-9
· **EINECS Number:** 231-639-5
· **Index number:** 016-020-00-8
· **Registration number** 01-2119458838-20-XXXX
· **1.2 Relevant identified uses of the substance or mixture and uses advised against**
No further relevant information available.
· **Application of the substance / the mixture** Raw material for laboratory and industrial use.

· **1.3 Details of the supplier of the safety data sheet**
· **Manufacturer/Supplier:**
Schlötter Ireland DAC
5 Pine Road,
Naas Enterprise Park,
Naas, Co. Kildare
Ireland
W91 KH68

Tel: +353 (0)45 447400 (09:00 - 17:00 Hrs)
Fax: +353 (0)45 447478
sds@schlotter.ie

· **Further information obtainable from:** Product safety department.
· **1.4 Emergency telephone number:**
National Poisons Information Centre at Beaumont Hospital,
PO Box 1297,
Beaumont Road,
Dublin 9
Phone 01 8092566
www.poisons.ie

Outside Ireland:
University of Freiburg
Poisoning-Information-Center
+49(0)761-19240 (24h, 365 days/year)
Information in German and English
http://www.giftberatung.de/

SECTION 2: Hazards identification

· **2.1 Classification of the substance or mixture**
· **Classification according to Regulation (EC) No 1272/2008**

GHS05 corrosion

Skin Corr. 1A H314 Causes severe skin burns and eye damage.
Eye Dam. 1 H318 Causes serious eye damage.

· **2.2 Label elements**
· **Labelling according to Regulation (EC) No 1272/2008**
The product is classified and labelled according to the CLP regulation.

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· **Hazard pictograms**

GHS05

· **Signal word** Danger

· **Hazard-determining components of labelling:**
sulphuric acid
· **Hazard statements**
H314 Causes severe skin burns and eye damage.
· **Precautionary statements**

P260	Do not breathe dusts or mists.
P264	Wash thoroughly after handling.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P405	Store locked up.
P501	Dispose of contents/container in accordance with local/regional/national/international regulations.

· **2.3 Other hazards**
· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.

SECTION 3: Composition/information on ingredients

· **3.2 Chemical characterisation: Mixtures**
· **Description:** Mixture of substances listed below with nonhazardous additions.

· **Dangerous components:**

CAS: 7664-93-9 EINECS: 231-639-5	sulphuric acid	Skin Corr. 1A, H314	90-100%

· **Additional information:** For the wording of the listed hazard phrases refer to section 16.

SECTION 4: First aid measures

· **4.1 Description of first aid measures**
· **General information:** Immediately remove any clothing soiled by the product.
· **After inhalation:**
In case of unconsciousness place patient stably in side position for transportation.
Move the exposed person to fresh air at once.
· **After skin contact:** Immediately wash with water and soap and rinse thoroughly.
· **After eye contact:** Rinse opened eye for several minutes under running water. Then consult a doctor.
· **After swallowing:** Drink plenty of water and provide fresh air. Call for a doctor immediately.
· **4.2 Most important symptoms and effects, both acute and delayed** No further relevant information available.
· **4.3 Indication of any immediate medical attention and special treatment needed**
No further relevant information available.

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SECTION 5: Firefighting measures

· **5.1 Extinguishing media**
· **Suitable extinguishing agents:**
CO_2, powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
· **5.2 Special hazards arising from the substance or mixture**
During heating or in case of fire poisonous gases are produced.
· **5.3 Advice for firefighters**
· **Protective equipment:** Mouth respiratory protective device.

SECTION 6: Accidental release measures

· **6.1 Personal precautions, protective equipment and emergency procedures**
Mount respiratory protective device.
Wear protective equipment. Keep unprotected persons away.
· **6.2 Environmental precautions:**
Dilute with plenty of water.
Do not allow to enter sewers/ surface or ground water.
· **6.3 Methods and material for containment and cleaning up:**
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
Use neutralising agent.
Dispose contaminated material as waste according to item 13.
Ensure adequate ventilation.
· **6.4 Reference to other sections**
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

SECTION 7: Handling and storage

· **7.1 Precautions for safe handling**
Ensure good ventilation/exhaustion at the workplace.
Prevent formation of aerosols.
Wear full protective clothing for prolonged exposure and/or high concentrations.
· **Information about fire - and explosion protection:** Keep respiratory protective device available.

· **7.2 Conditions for safe storage, including any incompatibilities**
· **Storage:** Please see Section 10.5 for information on storage incompatibilities.
· **Requirements to be met by storerooms and receptacles:** No special requirements.
· **Information about storage in one common storage facility:** Not required.
· **Further information about storage conditions:** Keep container tightly sealed.
· **Storage class:** Corrosive.
· **7.3 Specific end use(s)** No further relevant information available.

SECTION 8: Exposure controls/personal protection

· **Additional information about design of technical facilities:** No further data; see item 7.

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· **8.1 Control parameters**

· **Ingredients with limit values that require monitoring at the workplace:**	
7664-93-9 sulphuric acid	
OEL	Long-term value: 0.05 mg/m³ IOELV

· **Additional information:** The lists valid during the making were used as basis.

· **8.2 Exposure controls**
· **Personal protective equipment:**
· **General protective and hygienic measures:**
Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing
Wash hands before breaks and at the end of work.
Avoid contact with the eyes.
Avoid contact with the eyes and skin.
· **Respiratory protection:**
In case of brief exposure or low pollution use respiratory filter device. In case of intensive or longer exposure use self-contained respiratory protective device.
· **Protection of hands:**

Protective gloves

Protective gloves conforming to standard EN374 should be used.
The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation
If a spill occurs change gloves immediately. Dispose of contaminated gloves safely.
· **Material of gloves**
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.
· **Penetration time of glove material**
The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.
Value for the penetration time on Nitrile gloves: Level ≤ 10 minutes
· **Eye protection:**

Tightly sealed goggles conforming with standard EN 166.

SECTION 9: Physical and chemical properties

· **9.1 Information on basic physical and chemical properties**
· **General Information**
· **Appearance:**

Form:	Liquid
Colour:	Colourless to Yellow
· **Odour:**	Acrid

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· **Odour threshold:**	Not determined.
· **pH-value at 20 °C:**	< 1
· **Change in condition**	
Melting point/freezing point:	Undetermined.
Initial boiling point and boiling range:	360 °C
· **Flash point:**	Not applicable.
· **Flammability (solid, gas):**	Not applicable.
· **Ignition temperature:**	
Decomposition temperature:	Not determined.
· **Auto-ignition temperature:**	Product is not selfigniting.
· **Explosive properties:**	Product does not present an explosion hazard.
· **Explosion limits:**	
Lower:	Not determined.
Upper:	Not determined.
· **Vapour pressure at 20 °C:**	<0.01 hPa
· **Density at 20 °C:**	1.84 g/cm³
· **Relative density**	Not determined.
· **Vapour density**	Not determined.
· **Evaporation rate**	Not determined.
· **Solubility in / Miscibility with water:**	Fully miscible.
· **Partition coefficient: n-octanol/water:**	Not determined.
· **Viscosity:**	
Dynamic:	Not determined.
Kinematic:	Not determined.
· **Solvent content:**	
Organic solvents:	0.0 %
VOC (EC)	0.00 %
· **9.2 Other information**	No further relevant information available.

SECTION 10: Stability and reactivity

· **10.1 Reactivity** Reacts violently with water.
· **10.2 Chemical stability**
· **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
· **10.3 Possibility of hazardous reactions** No dangerous reactions known.
· **10.4 Conditions to avoid** Reacts with alkalis and amines generating excessive heat.
· **10.5 Incompatible materials:**
Materials To Avoid
Bases, alkalis (inorganic). Massive, solid metal. Powdered metal. Water, steam, water mixtures. Chemically active metals. Alkali metals.
· **10.6 Hazardous decomposition products:** Very toxic gases/vapours/fumes of: Sulphur.

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SECTION 11: Toxicological information

· **11.1 Information on toxicological effects**
· **Acute toxicity** Based on available data, the classification criteria are not met.
· **Primary irritant effect:**
· **Skin corrosion/irritation**
Causes severe skin burns and eye damage.
· **Serious eye damage/irritation**
Causes serious eye damage.
· **Respiratory or skin sensitisation** Based on available data, the classification criteria are not met.
· **CMR effects (carcinogenity, mutagenicity and toxicity for reproduction)**
· **Germ cell mutagenicity** Based on available data, the classification criteria are not met.
· **Carcinogenicity** Based on available data, the classification criteria are not met.
· **Reproductive toxicity** Based on available data, the classification criteria are not met.
· **STOT-single exposure** Based on available data, the classification criteria are not met.
· **STOT-repeated exposure** Based on available data, the classification criteria are not met.
· **Aspiration hazard** Based on available data, the classification criteria are not met.

SECTION 12: Ecological information

· **12.1 Toxicity**
· **Aquatic toxicity:** No further relevant information available.
· **12.2 Persistence and degradability** No further relevant information available.
· **12.3 Bioaccumulative potential** No further relevant information available.
· **12.4 Mobility in soil** No further relevant information available.
· **Additional ecological information:**
· **General notes:**
Water hazard class 1 (German Regulation) (Self-assessment): slightly hazardous for water
Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
Must not reach sewage water or drainage ditch undiluted or unneutralised.
Rinse off of bigger amounts into drains or the aquatic environment may lead to decreased pH-values. A low pH-value harms aquatic organisms. In the dilution of the use-level the pH-value is considerably increased, so that after the use of the product the aqueous waste, emptied into drains, is only low water-dangerous.
· **12.5 Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.
· **12.6 Other adverse effects** No further relevant information available.

SECTION 13: Disposal considerations

· **13.1 Waste treatment methods**
· **Recommendation**
Must not be disposed together with household garbage. Do not allow product to reach sewage system.

· **Uncleaned packaging:**
· **Recommendation:** Disposal must be made according to official regulations.
· **Recommended cleansing agents:** Water, if necessary together with cleansing agents.

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SECTION 14: Transport information

· 14.1 UN-Number · ADR, IMDG, IATA	UN1830
· 14.2 UN proper shipping name · ADR · IMDG, IATA	UN1830 SULPHURIC ACID SULPHURIC ACID
· 14.3 Transport hazard class(es) · ADR, IMDG, IATA	
· Class · Label	8 Corrosive substances. 8
· 14.4 Packing group · ADR, IMDG, IATA	II
· 14.5 Environmental hazards:	Not applicable.
· 14.6 Special precautions for user · Danger code (Kemler): · EMS Number: · Segregation groups · Stowage Category · Stowage Code	Warning: Corrosive substances. 80 F-A,S-B Acids E SW15 For metal drums, stowage category B.
· 14.7 Transport in bulk according to Annex II of Marpol and the IBC Code	Not applicable.
· Transport/Additional information:	
· ADR · Limited quantities (LQ) · Excepted quantities (EQ) · Transport category · Tunnel restriction code	 1L Code: E2 Maximum net quantity per inner packaging: 30 ml Maximum net quantity per outer packaging: 500 ml 2 E
· IMDG · Limited quantities (LQ) · Excepted quantities (EQ)	 1L Code: E2 Maximum net quantity per inner packaging: 30 ml Maximum net quantity per outer packaging: 500 ml
· UN "Model Regulation":	UN 1830 SULPHURIC ACID, 8, II

SECTION 15: Regulatory information

· **15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**

· **Directive 2012/18/EU**
· **Named dangerous substances - ANNEX I** None of the ingredients is listed.
· **REGULATION (EC) No 1907/2006 ANNEX XVII** Conditions of restriction: 3

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· **15.2 Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

SECTION 16: Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

· **Relevant phrases**
H314 Causes severe skin burns and eye damage.

· **Department issuing SDS:** Product safety department.
· **Contact:** Ms. Jennifer Habenicht
· **Abbreviations and acronyms:**
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
IATA: International Air Transport Association
GHS: Globally Harmonised System of Classification and Labelling of Chemicals
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
VOC: Volatile Organic Compounds (USA, EU)
PBT: Persistent, Bioaccumulative and Toxic
vPvB: very Persistent and very Bioaccumulative
Skin Corr. 1A: Skin corrosion/irritation – Category 1A
Eye Dam. 1: Serious eye damage/eye irritation – Category 1

IE

Schlötter Galvanotechnik

Safety data sheet
according to 1907/2006/EC, Article 31

Printing date 27.07.2017 *Version number 16* *Revision: 12.07.2017*

*
SECTION 1: Identification of the substance/mixture and of the company/undertaking

· **1.1 Product identifier**

· **Trade name:** **Nickel Additive BFL**

· **Article number:** 041010
· **1.2 Relevant identified uses of the substance or mixture and uses advised against**
No further relevant information available.
· **Application of the substance / the mixture** Electroplating auxiliary
· **1.3 Details of the supplier of the safety data sheet**
· **Manufacturer/Supplier:**
Dr.-Ing. Max Schlötter GmbH & Co. KG
Galvanotechnik
Talgraben 30
73312 Geislingen/Steige
Germany
· **Further information obtainable from:** E-Mail: sds@schloetter.de
· **1.4 Emergency telephone number:**
University of Freiburg
Poisoning-Information-Center
+49(0)761-19240 (24h, 365 days/year)
Information in German and English
http://www.giftberatung.de/

*
SECTION 2: Hazards identification

· **2.1 Classification of the substance or mixture**
· **Classification according to Regulation (EC) No 1272/2008**
The product is not classified according to the CLP regulation.

· **2.2 Label elements**
· **Labelling according to Regulation (EC) No 1272/2008** Void
· **Hazard pictograms** Void
· **Signal word** Void
· **Hazard statements** Void
· **2.3 Other hazards**
· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.

SECTION 3: Composition/information on ingredients

· **3.2 Chemical characterisation: Mixtures**
· **Description:** Mixture of substances listed below with nonhazardous additions.

· **Dangerous components:** Void
· **Additional information:** For the wording of the listed hazard phrases refer to section 16.

*
SECTION 4: First aid measures

· **4.1 Description of first aid measures**
· **General information:** No special measures required.
· **After inhalation:** Supply fresh air; consult doctor in case of complaints.
· **After skin contact:** If skin irritation continues, consult a doctor.
· **After eye contact:**
Rinse opened eye for several minutes under running water.
If present remove the contact lenses immediately.
· **After swallowing:** If symptoms persist consult doctor.
· **4.2 Most important symptoms and effects, both acute and delayed** No further relevant information available.

(Contd. on page 2)

(Contd. of page 1)

· **4.3 Indication of any immediate medical attention and special treatment needed**
No further relevant information available.

SECTION 5: Firefighting measures

· **5.1 Extinguishing media**
· **Suitable extinguishing agents:** Use fire extinguishing methods suitable to surrounding conditions.
· **5.2 Special hazards arising from the substance or mixture**
During heating or in case of fire poisonous gases are produced.
Nitrogen oxides (NOx)
Carbon monoxide (CO)
· **5.3 Advice for firefighters**
· **Protective equipment:** Do not inhale explosion gases or combustion gases.
· **Additional information**
Collect contaminated fire fighting water separately. It must not enter the sewage system.

*

SECTION 6: Accidental release measures

· **6.1 Personal precautions, protective equipment and emergency procedures** Not required.
· **6.2 Environmental precautions:** Dilute with plenty of water.
· **6.3 Methods and material for containment and cleaning up:**
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
· **6.4 Reference to other sections**
No dangerous substances are released.
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

*

SECTION 7: Handling and storage

· **7.1 Precautions for safe handling** No special measures required.
· **Information about fire - and explosion protection:** No special measures required.

· **7.2 Conditions for safe storage, including any incompatibilities**
· **Storage:**
· **Requirements to be met by storerooms and receptacles:** Store only in the original receptacle.
· **Information about storage in one common storage facility:** Store away from foodstuffs.
· **Further information about storage conditions:**
Protect from frost.
Protect from heat and direct sunlight.
· **Maximum storage temperature:** 40 °C
· **Minimum storage temperature:** 5 °C
· **Storage class:** 10
· **7.3 Specific end use(s)** No further relevant information available.

*

SECTION 8: Exposure controls/personal protection

· **Additional information about design of technical facilities:** No further data; see item 7.

· **8.1 Control parameters**
· **Ingredients with limit values that require monitoring at the workplace:**
The product does not contain any relevant quantities of materials with critical values that have to be monitored at the workplace.
· **Additional information:** The lists valid during the making were used as basis.

(Contd. on page 3)

(Contd. of page 2)

· **8.2 Exposure controls**
· **Personal protective equipment:**
· **General protective and hygienic measures:**
Keep away from foodstuffs, beverages and feed.
Do not inhale gases / fumes / aerosols.
Avoid contact with the eyes and skin.
· **Respiratory protection:** Not required.
· **Protection of hands:**
Check the permeability prior to each anewed use of the glove.
The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation
· **Material of gloves**
Chemical-protective gloves (EN 374-1, -2, -3).
Butyl rubber, BR ≥ 0,3 mm (Level 6)
· **Penetration time of glove material**
≥ 8 h
The exact break trough time has to be found out by the manufacturer of the protective gloves and has to be observed.
· **For the permanent contact in work areas without heightened risk of injury (e.g. Laboratory) gloves made of the following material are suitable:**
Butyl rubber, BR ≥ 0,3 mm (Level 6)
· **Not suitable are gloves made of the following materials:**
Leather gloves
Strong material gloves
· **Eye protection:** Goggles recommended during refilling.

*

SECTION 9: Physical and chemical properties

· **9.1 Information on basic physical and chemical properties**	
· **General Information**	
· **Appearance:**	
Form:	Fluid
Colour:	colorless to yellow
· **Odour:**	Odourless
· **Odour threshold:**	Not determined.
· **pH-value at 20°C:**	4.0 - 8.0 DIN 19261 Measuring methods with potentiometric cells
· **Change in condition**	
Melting point/freezing point:	not determined
Initial boiling point and boiling range:	100°C
· **Flash point:**	Not applicable.
· **Flammability (solid, gas):**	Not applicable.
· **Ignition temperature:**	
Decomposition temperature:	Not determined.
· **Auto-ignition temperature:**	Product is not selfigniting.
· **Explosive properties:**	Product does not present an explosion hazard.
· **Explosion limits:**	
Lower:	Not determined.
Upper:	Not determined.

(Contd. on page 4)

(Contd. of page 3)

· **Vapour pressure at 20°C:**	18 hPa
· **Density at 20°C:**	1.07 g/cm³ DIN 53217-5 Determination of density - vibration method
· **Relative density**	Not determined.
· **Vapour density**	Not determined.
· **Evaporation rate**	Not determined.
· **Solubility in / Miscibility with water:**	Fully miscible.
· **Partition coefficient: n-octanol/water:**	Not determined.
· **Viscosity:**	
Dynamic:	Not determined.
Kinematic:	Not determined.
· **Solvent content:**	
VOC (EU)	0.00 %
· **9.2 Other information**	No further relevant information available.
· **Additional information**	The physical data in section 9 correspond to typical values for this product and can not be seen as a product specification.

*

SECTION 10: Stability and reactivity

· **10.1 Reactivity** No further relevant information available.
· **10.2 Chemical stability**
· **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
· **10.3 Possibility of hazardous reactions** No dangerous reactions known.
· **10.4 Conditions to avoid** No further relevant information available.
· **10.5 Incompatible materials:** No further relevant information available.
· **10.6 Hazardous decomposition products:** No dangerous decomposition products known.

SECTION 11: Toxicological information

· **11.1 Information on toxicological effects**
· **Acute toxicity** Based on available data, the classification criteria are not met.
· **Primary irritant effect:**
· **Skin corrosion/irritation** Based on available data, the classification criteria are not met.
· **Serious eye damage/irritation** Based on available data, the classification criteria are not met.
· **Respiratory or skin sensitisation** Based on available data, the classification criteria are not met.
· **CMR effects (carcinogenity, mutagenicity and toxicity for reproduction)**
· **Germ cell mutagenicity** Based on available data, the classification criteria are not met.
· **Carcinogenicity** Based on available data, the classification criteria are not met.
· **Reproductive toxicity** Based on available data, the classification criteria are not met.
· **STOT-single exposure** Based on available data, the classification criteria are not met.
· **STOT-repeated exposure** Based on available data, the classification criteria are not met.
· **Aspiration hazard** Based on available data, the classification criteria are not met.

*

SECTION 12: Ecological information

· **12.1 Toxicity**
· **Aquatic toxicity:** No further relevant information available.
· **12.2 Persistence and degradability** No further relevant information available.
· **12.3 Bioaccumulative potential** No further relevant information available.
· **12.4 Mobility in soil** No further relevant information available.

(Contd. on page 5)

(Contd. of page 4)

· **Additional ecological information:**
· **General notes:**
The product does not contain AOX.
The product does not contain VOC.
The product does not contain EDTA
Generally not hazardous for water
The product does not contain organic complexing agents.
· **12.5 Results of PBT and vPvB assessment**
According to Annex XIV of Regulation (EC) No. 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH): The product does not contain a substance fullfilling the PBT (persistent/bioaccumulative/toxic) criteria or the vPvB (very persistent/very bioaccumulative) criteria: Self classification.
· **PBT:** Not applicable.
· **vPvB:** Not applicable.
· **12.6 Other adverse effects** No further relevant information available.

SECTION 13: Disposal considerations

· **13.1 Waste treatment methods**
· **Recommendation** Contact manufacturer for recycling information.

· **European waste catalogue**	
07 01 04*	other organic solvents, washing liquids and mother liquors

· **Uncleaned packaging:**
· **Recommendation:** Disposal must be made according to official regulations.
· **Recommended cleansing agents:** Water, if necessary together with cleansing agents.

*

SECTION 14: Transport information

· **14.1 UN-Number** · **ADR, ADN, IMDG, IATA**	Void
· **14.2 UN proper shipping name** · **ADR, ADN, IMDG, IATA**	Void
· **14.3 Transport hazard class(es)** · **ADR, ADN, IMDG, IATA** · **Class**	Void
· **14.4 Packing group** · **ADR, IMDG, IATA**	Void
· **14.5 Environmental hazards:** · **Marine pollutant:**	No
· **14.6 Special precautions for user**	Not applicable.
· **14.7 Transport in bulk according to Annex II of Marpol and the IBC Code**	Not applicable.
· **Transport/Additional information:**	Not dangerous according to the above specifications.
· **UN "Model Regulation":**	Void

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Safety data sheet
according to 1907/2006/EC, Article 31

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***Trade name:* Nickel Additive BFL**

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*
SECTION 15: Regulatory information

· **15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**

· **Directive 2012/18/EU - SEVESO III**
· **Named dangerous substances - ANNEX I** None of the ingredients is listed.

· **National regulations:**

· **Waterhazard class:** Generally not hazardous for water.
· **15.2 Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

*
SECTION 16: Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

Safety Data Sheet to the regulation 1907/2006/EG, article 31.
Material Safety Data Sheets are to be kept for at least 10 years, according to Article 36 of REACH Regulation (EC) No 1907/2006.

· **Department issuing SDS:**
Research and Development
E-Mail: fue@schloetter.de
· **Contact:** sds@schloetter.de
· **Abbreviations and acronyms:**
RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
ICAO: International Civil Aviation Organisation
RRN: REACH Registration Number
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
IATA: International Air Transport Association
GHS: Globally Harmonised System of Classification and Labelling of Chemicals
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
VOC: Volatile Organic Compounds (USA, EU)
PBT: Persistent, Bioaccumulative and Toxic
vPvB: very Persistent and very Bioaccumulative
· *** Data compared to the previous version altered.**

Nickel Bath
NORMA

Nickel Bath NORMA is a sturdy electrolyte which is operated in most cases without additives, which is mainly used for plating of intermediate nickel layers in the field of electrical and electronic application. Its deposits are very ductile and extremely active which is especially important for subsequent electroplating. On blank surfaces Nickel Bath NORMA produces light and relatively uniform nickel coatings.

The information in this data sheet is based on laboratory as well as practical experience. Figures quoted for operating limits and replenishment quantities are for guidance. Actual values necessary will depend on the components being plated (material and geometry), their application and plating plant conditions.

Important :
Please read this instruction carefully prior to the use of the process and carefully follow all the parameters that have a direct influence on the operation. We reserve the right to make technical changes. In the interest of safety, please pay attention to the hazard warnings on the labels of the containers. The minimum shelf life of the products is included on the labels and is also available in the appropriate Quality Assurance (QA03).
The current IMDS number of the layer deposited from the process is available on the internet at www.schloetter.com/downloads.
For the storage of chemical products the HSG71 is suggested as guidance.
If the additives used in this process contain a SVHC-substance, then this will be specified in the corresponding Material Safety Data Sheet, section 15.

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1.0 TECHNICAL INFORMATION AND EQUIPMENT REQUIREMENTS

Tanks:		rubber-lined steel, polypropylene or PVC
Local Exhaust Ventilation:		recommended
Part Agitation	PCBs	from and to the anodes; work piece movement 0.5 - 0.8 m/min at a stroke length of approx. 30 mm
	conventional	parallel to the anodes; work piece movement 2 - 3 m/min at a stroke length of 80 - 100 mm
	barrel rotation	4 - 8 rpm., preferably 4 rpm
Filtration:		continuous filtration with 1 - 2 turnovers per hour; filter mesh approx. 10 µm
Anodes:		usual nickel quality, preferably S-nickel e.g. rounds, pellets, etc. in titanium baskets
Anode bags:		polypropylene fabric
Heating/Cooling:		porcelain immersion heaters or heat exchangers made of graphite, titanium or suitable plastic

2.0 MAKE-UP AND OPERATING CONDITIONS

2.1 Product names

List of products required		
Product name	**Article no. (AN)**	**SG**
Nickel Sulphate Solution 550 g/l	160044	1.31
Alternatively		
Nickel Sulphate Hexahydrate	160043	--
Nickel Chloride Solution 720 g/l	160048	1.35
Alternatively		
Nickel Chloride Salt	160042	--
Boric Acid	160000	--
Nickel Additive SLOTONIK M	041203	1.01
optional:*		
Nickel Additive BFL	041010	1.06

* Product quality specifications recommended by us can be found on the internet at www.schloetter.com/downloads.

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2.2 Requirements for a 100 litre bath

Product name	AN	SG	Quantity	
Nickel Sulphate Solution 550 g/l	160044	1.31	46.4	ltr.
Alternatively				
Nickel Sulphate Hexahydrate	160043	--	25.5	kg
Nickel Chloride Solution 720 g/l	160048	1.35	4.6	ltr.
Alternatively				
Nickel Chloride Salt	160042	--	3.3	kg
Boric Acid	160000	--	4.0	kg
Nickel Additive SLOTONIK M	041203	1.01	0.5	ltr.
optional:*				
Nickel Additive BFL	041010	1.06	0.5	ltr.

* If light bright deposits are required, 5 ml/l of Nickel Additive BFL must be added after the addition of Nickel Additive SLOTONIK M.

2.3.1 Tank preparation

New, but also used tanks, filter equipment, anode bags etc. must be thoroughly cleaned prior to make-up.
New unused tanks, filtration equipment etc. should be leached out for several hours with warm acidified water (10 - 20 ml/l of hydrochloric acid and 2 - 5 ml/l Nickel Additive SLOTONIK M or with diluted sodium hydroxide solution 20 - 30 g/l) before use. If sodium hydroxide solution is used, neutralization with acidified water (hydrochloric acid) is required.

2.3.2 Make-up sequence for a 100 litre bath (Using nickel solutions)

- fill the clean tank with 40 litres of deionised water and heat to 60 - 70°C.
- add the required quantities of Nickel Sulphate Solution 550 g/l and Nickel Chloride Solution 720 g/l.
- add the required amount of Boric Acid and mix until dissolved.
- check and adjust pH to 4.0 (see point **4.6**)
- filter solution.
- add 0.5 litre Nickel Additive SLOTONIK M.
- **optional :** where required add the stipulated quantity of Nickel Additive BFL.
- make up to final volume with deionised water .
- mix thoroughly.

The electrolyte is ready for use when the operating temperature has been reached.

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2.3.3 Make-up sequence for a 100 litre bath (Using nickel salts)

- fill the clean tank with 70 litres of deionised water and heat to 60 - 70°C.
- add the required quantities of Nickel Sulphate Hexahydrate and Nickel Chloride Salt.
- add the required amount of Boric Acid and mix until dissolved.
- check and adjust pH to 4.0 (see point **4.6**)
- filter solution.
- add 0.5 litre Nickel Additive SLOTONIK M.
- **optional :** where required add the stipulated quantity of Nickel Additive BFL.
- make up to final volume with deionised water .
- mix thoroughly.

The electrolyte is ready for use when the operating temperature has been reached.

2.4 Concentrations and operating conditions

		Range	Optimum	
Nickel		40 - 80	65	g/l
Chloride		8 - 15	10	g/l
Boric acid		35 - 45	40	g/l
Nickel Additive SLOTONIK M		3 - 8	5	ml/l
Nickel Additive BFL		0 - 25	--	ml/l
pH value		3.8 - 4.2	4.0	
Temperature	PCB	28 - 32	30	°C
	conventional	30 - 60	50	°C
Deposition rate at 2 A/dm^2		approx. 0.4 µm/min		

raise ↑ pH value: Potassium hydroxide, 5 % (52 g/l aqueous)
decrease ↓pH value HCl, chem. pure diluted 1 : 1 **alternatively** H_2SO_4, (10 %)

2.5 Consumption and replenishment

The consumption of the additives is more or less due to drag-out depending on the part geometry and surface condition.
In the case of a lack of wetting agent, visible by the formation of pores, we recommend an addition of 1 - 2 ml/l of Nickel Additive SLOTONIK M. The replenishment of Nickel Additive BFL is made in accordance with the visual appearance of the plated deposit.

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3.0 PROCESS SEQUENCE

3.1 Pre-treatment

3.1.1 for PCB technology

- panel gold plating before etching:

PCBs plated in an acid copper electrolyte are rinsed and pre-dipped in sulphuric acid. Subsequently a layer thickness of 5 - 8 µm nickel is deposited from Nickel Bath NORMA. After rinsing the PCBs are plated with a 1 - 3 µm gold layer.

- partial gold plating

After the etching process the circuit boards are brightened. Then the areas of the PCB not to be gold plated are screened. Now, the lead-tin layer can be removed partially by a metal stripper. Then it's activated. Nickel plating of the PCBs is necessary to create a diffusion barrier. A layer thickness of 6 - 8 µm is sufficient. Finally the boards are gold plated.

3.1.2 for conventional electroplating

Thorough cleaning is essential to achieve a stain-free perfect nickel layer with good adhesion. After hot-soak degreasing in an alkaline degreaser solution follows the electrolytic degreasing. Iron and steel parts cathodically degreased have finally to be degreased anodically. Normally, non-ferrous metals are only degreased cathodically. Subsequently they're neutralized in diluted acid (e.g. sulphuric acid, 2 - 3 %).

3.2 Process sequence

3.2.1 for PCB technology

- panel gold plating:

- bright acid copper plating
- rinsing
- activation in diluted sulphuric acid
- rinsing
- nickel plating in Nickel Bath NORMA
- rinsing
- gold plating

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3.2.2 for PCB technology

- partial gold plating

- etching
- rinsing
- drying
- screening of the areas on the PCB which aren't to be gold plated
- partial stripping (lead-tin)
- rinsing
- copper activation
- rinsing
- immersing in diluted sulphuric acid
- nickel plating in Nickel Bath NORMA
- rinsing
- gold plating

3.2.3 for conventional electroplating

- base material steel

- hot-soak degreasing
- rinsing
- pickling
- rinsing
- electrolytic degreasing
- rinsing
- immersing in diluted sulphuric acid
- nickel plating in Nickel Bath NORMA

- base material non-ferrous metal

- hot-soak degreasing
- rinsing
- electrolytic degreasing
- rinsing
- immersing in diluted sulphuric acid
- nickel plating in Nickel Bath NORMA

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4.0 MAINTENANCE AND FUNCTION OF THE INDIVIDUAL BATH COMPONENTS

4.1 Nickel

The recommended concentration of nickel is 40 - 80 g/l, optimum of 65 g/l. Within the working range, the achievable current density increases with increased nickel concentration.

4.2 Chloride

The chloride content is 8 - 15 g/l, optimum 10 g/l. Chloride increases the conductivity of the electrolyte and anode solubility.

4.3 Boric acid

The boric acid content of the electrolyte is 35 - 45 g/l, optimum 40 g/l. Significant lack of boric acid causes a loss of buffer action and greater pH variations. High concentrations may exceed the solubility limit causing roughness in the plated deposit.

4.4 Nickel Additive SLOTONIK M

Nickel Additive SLOTONIK M is a wetting agent for mechanically agitated applications. It prevents formation of pores and stabilizes the operation of the nickel electrolyte. If the process is only operated with Nickel Additive SLOTONIK M the nickel deposits are sulphur-free. If an activated carbon treatment (A/C) with 6 g/l is performed, a loss up to approx. 50 % of the concentration has to be expected.
Nickel Additive SLOTONIK M is only consumed by drag-out. Experience has shown that 0.2 - 0.4 litre Nickel Additive SLOTONIK M has to be added after a throughput of 10 kAh.

4.5 Nickel Additive BFL

Nickel Additive BFL is only used if light bright deposits are required. The solubility limit is 50 - 55 ml/l. Crystallized Nickel Additive BFL leads to inclusions in the nickel coating. If Nickel Additive BFL is used the nickel deposits are sulphur containing. The content of Nickel Additive BFL can be monitored analytically. Usually the additive is dosed according to visual appearance. Consumption of Nickel Additive BFL is 0.5 - 1.0 l/10 kAh depending on local drag-out losses.
In case of carbon treatment (6 g/l) a loss of up to approx. 20 - 30 % of the additive concentration must be expected.

4.6 pH value

The pH should be between 3.8 and 4.2 and practically maintained at 4.0. Low pH will reduce the levelling power of the nickel deposits. In extreme cases it results in a reduction of the cathodic current efficiency subsequently effects the deposition. A high pH will cause instability in achieving the correct brightness level. The pH value must always be adjusted with diluted hydrochloric acid, chem. pure or sulphuric acid.
If in exceptional cases the pH value is too low, it is raised ↑ by an addition of diluted potassium hydroxide solution (52 g/l aqueous).
The addition of potassium hydroxide must be made extremely slowly and with intensive electrolyte agitation because due to local overconcentration nickel precipitates as hydroxide.

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5.0 TROUBLE SHOOTING

5.1 Fault finding chart

Fault	Cause	Correction
brittle and hard nickel coatings	organic impurities	6 g/l of activated carbon, decrease ↓ pH value to 3.2; after filtration add 3 - 5 ml/l of Nickel Additive SLOTONIK M
dark coatings		
dark deposits in the low current density range	foreign metal impurities	dummy plating of foreign metals at 0.4 A/dm^2 approx. 15 hours
coatings too matt	electrolyte is operated without Nickel Additive BFL	Addition of up to 5 ml/l of Nickel Additive BFL
Pores/pitting	lack of wetting agent	add 1 - 2 ml/l of Nickel Additive SLOTONIK M

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6.0 EFFLUENT

Legal regulations must be observed for disposal of the Nickel Bath NORMA. Different regulations normally apply for the additives and the ready-made electrolyte. Please refer to section **13** of the appropriate Material Safety Data Sheet for disposal code and recommendations.

The following detoxification sequence is only considered to be an aid:

Salts and additives recommended for the operation of Nickel Bath NORMA do not contain complexing agents. Resulting rinse waters may therefore be fed directly into the neutralisation step of the effluent plant.
For concentrates should be evaluated if a recycling respectively an electrolytic recovery of nickel by an external refinery is economical or an appropriate dilution (at least 1 : 10) which allows the solution to be fed directly into the neutralisation step of the effluent plant is reasonable.

7.0 SAFETY

Reasonable care is required when handling chemical products. Only personnel specially trained on working with chemicals should be deployed with their handling.

EC Material Safety Data Sheets must be made available to all personnel dealing with the chemicals to ensure they have all required information about product composition, hazards identification, first-aid measures, handling and storage, exposure controls, toxicological and ecological information, etc. It is required to ensure the supply and use of suitable protective clothing and -equipment.

The user must verify the designated purpose of the electrolyte. Previous experience has shown that not all metal surfaces are suitable for a trouble-free electroplating.

The above mentioned data are made according to our best knowledge. Consistent operation of the working solution requires appropriate maintenance. Nickel Bath NORMA is a process of Dr.-Ing. Max Schlötter GmbH & Co KG. It can only be operated with the products described in this technical data sheet. Use of other chemicals (also partly) will impair quality and invalidates our service- and quality commitments (quality assurance).

SCHLOETTER COMPANY LIMITED
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ENGLAND

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(01386) 552333 TECHNICAL
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(01386) 552335 EXPORT
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Safety data sheet
according to 1907/2006/EC, Article 31

Printing date 15.09.2016 *Version number 6* *Revision: 15.09.2016*

SECTION 1: Identification of the substance/mixture and of the company/undertaking

· **1.1 Product identifier**

· **Trade name: Boric acid**

· **Article number:** 191526
· **CAS Number:**
10043-35-3
· **EC number:**
233-139-2
· **Index number:**
005-007-00-2
· **1.2 Relevant identified uses of the substance or mixture and uses advised against**
No further relevant information available.
· **Application of the substance / the mixture**
Laboratory Chemical.
Industrial Chemical.

· **1.3 Details of the supplier of the safety data sheet**
· **Manufacturer/Supplier:**
Schlötter Ireland DAC
5 Pine Road,
Naas Enterprise Park,
Naas, Co. Kildare
Ireland
W91 KH68

Tel: +353 (0)45 447400 (09:00 - 17:00 Hrs)
Fax: +353 (0)45 447478
sds@schlotter.ie

· **Further information obtainable from:** Product safety department.
· **1.4 Emergency telephone number:**
National Poisons Information Centre at Beaumont Hospital,
PO Box 1297,
Beaumont Road,
Dublin 9
Phone 01 8092566
www.poisons.ie

Outside Ireland;
University of Freiburg
Poisoning-Information-Center
+49(0)761-19240 (24h, 365 days/year)
Information in German and English
http://www.giftberatung.de/

SECTION 2: Hazards identification

· **2.1 Classification of the substance or mixture**
· **Classification according to Regulation (EC) No 1272/2008**

GHS08 health hazard

Repr. 1B H360FD May damage fertility. May damage the unborn child.

(Contd. on page 2)

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according to 1907/2006/EC, Article 31

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Trade name: Boric acid

(Contd. of page 1)

· ***2.2 Label elements***
· ***Labelling according to Regulation (EC) No 1272/2008***
The substance is classified and labelled according to the CLP regulation.
· ***Hazard pictograms***

GHS08

· ***Signal word*** *Danger*

· ***Hazard-determining components of labelling:***
boric acid
· ***Hazard statements***
H360FD May damage fertility. May damage the unborn child.
· ***Precautionary statements***
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P308+P313 IF exposed or concerned: Get medical advice/attention.
P405 Store locked up.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.
· ***2.3 Other hazards***
· ***Results of PBT and vPvB assessment***
· ***PBT:*** *Not applicable.*
· ***vPvB:*** *Not applicable.*

SECTION 3: Composition/information on ingredients

· ***3.1 Chemical characterisation: Substances***
· ***CAS No. Description***
10043-35-3 boric acid
· ***Identification number(s)***
· ***EC number:*** *233-139-2*
· ***Index number:*** *005-007-00-2*

· ***SVHC***	
10043-35-3	*boric acid*

SECTION 4: First aid measures

· ***4.1 Description of first aid measures***
· ***After inhalation:*** *Supply fresh air; consult doctor in case of complaints.*
· ***After skin contact:*** *Generally the product does not irritate the skin.*
· ***After eye contact:*** *Rinse opened eye for several minutes under running water.*
· ***After swallowing:*** *If symptoms persist consult doctor.*
· ***4.2 Most important symptoms and effects, both acute and delayed*** *No further relevant information available.*
· ***4.3 Indication of any immediate medical attention and special treatment needed***
No further relevant information available.

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according to 1907/2006/EC, Article 31

Printing date 15.09.2016 *Version number 6* *Revision: 15.09.2016*

Trade name: Boric acid

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SECTION 5: Firefighting measures

· ***5.1 Extinguishing media***
· ***Suitable extinguishing agents:***
CO2, powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
· ***5.2 Special hazards arising from the substance or mixture*** *No further relevant information available.*
· ***5.3 Advice for firefighters***
· ***Protective equipment:*** *No special measures required.*

SECTION 6: Accidental release measures

· ***6.1 Personal precautions, protective equipment and emergency procedures*** *Not required.*
· ***6.2 Environmental precautions:*** *Do not allow to enter sewers/ surface or ground water.*
· ***6.3 Methods and material for containment and cleaning up:***
Dispose contaminated material as waste according to item 13.
· ***6.4 Reference to other sections***
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

SECTION 7: Handling and storage

· ***7.1 Precautions for safe handling*** *Open and handle receptacle with care.*
· ***Information about fire - and explosion protection:*** *Keep respiratory protective device available.*

· ***7.2 Conditions for safe storage, including any incompatibilities***
· ***Storage:*** *Please see Section 10.5 for information on storage incompatibilities.*
· ***Requirements to be met by storerooms and receptacles:*** *No special requirements.*
· ***Information about storage in one common storage facility:*** *Not required.*
· ***Further information about storage conditions:*** *Keep container tightly sealed.*
· ***7.3 Specific end use(s)*** *No further relevant information available.*

SECTION 8: Exposure controls/personal protection

· ***Additional information about design of technical facilities:*** *No further data; see item 7.*

· ***8.1 Control parameters***
· ***Ingredients with limit values that require monitoring at the workplace:*** *Not required.*
· ***Additional information:*** *The lists valid during the making were used as basis.*

· ***8.2 Exposure controls***
· ***Personal protective equipment:***
· ***General protective and hygienic measures:***
Keep away from foodstuffs, beverages and feed.
Wash hands before breaks and at the end of work.
Store protective clothing separately.
· ***Respiratory protection:*** *Not required.*
· ***Protection of hands:***

Protective gloves

Protective gloves conforming to standard EN374 should be used.

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Trade name: Boric acid

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The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation
If a spill occurs change gloves immediately, dispose of contaminated gloves safely.

· ***Material of gloves***
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.

· ***Penetration time of glove material***
The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.
Value for the penetration time on Nitrile gloves: Level ≤ 10 minutes

· ***Eye protection:*** *Not required.*

SECTION 9: Physical and chemical properties

· ***9.1 Information on basic physical and chemical properties***	
· ***General Information***	
· ***Appearance:***	
Form:	*Not determined.*
Colour:	*Not determined.*
· ***Odour:***	*Characteristic*
· ***Odour threshold:***	*Not determined.*
· ***pH-value:***	*Not applicable.*
· ***Change in condition***	
Melting point/Melting range:	*169 °C (Zers.)*
Boiling point/Boiling range:	*300 °C*
· ***Flash point:***	*Not applicable.*
· ***Flammability (solid, gaseous):***	*Product is not flammable.*
· ***Ignition temperature:***	
Decomposition temperature:	*Not determined.*
· ***Self-igniting:***	*Not determined.*
· ***Danger of explosion:***	*Product does not present an explosion hazard.*
· ***Explosion limits:***	
Lower:	*Not determined.*
Upper:	*Not determined.*
· ***Vapour pressure at 20 °C:***	*0 hPa*
· ***Density at 20 °C:***	*1.435 g/cm³*
· ***Bulk density at 20 °C:***	*500 kg/m³*
· ***Relative density***	*Not determined.*
· ***Vapour density***	*Not applicable.*
· ***Evaporation rate***	*Not applicable.*
· ***Solubility in / Miscibility with water at 20 °C:***	*300 g/l*
· ***Partition coefficient (n-octanol/water):***	*Not determined.*
· ***Viscosity:***	
Dynamic:	*Not applicable.*

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Trade name: Boric acid

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Kinematic:	*Not applicable.*
· ***Solvent content:***	
Organic solvents:	*0.0 %*
VOC (EC)	*0.00 %*
Solids content:	*100.0 %*
· ***9.2 Other information***	*No further relevant information available.*

SECTION 10: Stability and reactivity

· ***10.1 Reactivity*** *No further relevant information available.*
· ***10.2 Chemical stability***
· ***Thermal decomposition / conditions to be avoided:*** *No decomposition if used according to specifications.*
· ***10.3 Possibility of hazardous reactions*** *No dangerous reactions known.*
· ***10.4 Conditions to avoid*** *No further relevant information available.*
· ***10.5 Incompatible materials:*** *No further relevant information available.*
· ***10.6 Hazardous decomposition products:*** *No dangerous decomposition products known.*

SECTION 11: Toxicological information

· ***11.1 Information on toxicological effects***
· ***Acute toxicity*** *Based on available data, the classification criteria are not met.*

· ***LD/LC50 values relevant for classification:***		
10043-35-3 boric acid		
Oral	*LD50*	*2660 mg/kg (rat)*

· ***Primary irritant effect:***
· ***Skin corrosion/irritation*** *Based on available data, the classification criteria are not met.*
· ***Serious eye damage/irritation*** *Based on available data, the classification criteria are not met.*
· ***Respiratory or skin sensitisation*** *Based on available data, the classification criteria are not met.*
· ***CMR effects (carcinogenity, mutagenicity and toxicity for reproduction)***
· ***Germ cell mutagenicity*** *Based on available data, the classification criteria are not met.*
· ***Carcinogenicity*** *Based on available data, the classification criteria are not met.*
· ***Reproductive toxicity***
May damage fertility. May damage the unborn child.
· ***STOT-single exposure*** *Based on available data, the classification criteria are not met.*
· ***STOT-repeated exposure*** *Based on available data, the classification criteria are not met.*
· ***Aspiration hazard*** *Based on available data, the classification criteria are not met.*

SECTION 12: Ecological information

· ***12.1 Toxicity***
· ***Aquatic toxicity:*** *No further relevant information available.*
· ***12.2 Persistence and degradability*** *No further relevant information available.*
· ***12.3 Bioaccumulative potential*** *No further relevant information available.*
· ***12.4 Mobility in soil*** *No further relevant information available.*
· ***Additional ecological information:***
· ***General notes:***
Water hazard class 1 (German Regulation) (Assessment by list): slightly hazardous for water
Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.

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· ***12.5 Results of PBT and vPvB assessment***
· ***PBT:*** *Not applicable.*
· ***vPvB:*** *Not applicable.*
· ***12.6 Other adverse effects*** *No further relevant information available.*

SECTION 13: Disposal considerations

· ***13.1 Waste treatment methods***
· ***Recommendation***
Must not be disposed together with household garbage. Do not allow product to reach sewage system.

· ***Uncleaned packaging:***
· ***Recommendation:*** *Disposal must be made according to official regulations.*

SECTION 14: Transport information

· ***14.1 UN-Number***	
· ***ADR, ADN, IMDG, IATA***	*not regulated*
· ***14.2 UN proper shipping name***	
· ***ADR, ADN, IMDG, IATA***	*not regulated*
· ***14.3 Transport hazard class(es)***	
· ***ADR, ADN, IMDG, IATA***	
· ***Class***	*not regulated*
· ***14.4 Packing group***	
· ***ADR, IMDG, IATA***	*not regulated*
· ***14.5 Environmental hazards:***	*Not applicable.*
· ***14.6 Special precautions for user***	*Not applicable.*
· ***14.7 Transport in bulk according to Annex II of Marpol and the IBC Code***	*Not applicable.*
· ***UN "Model Regulation":***	*not regulated*

SECTION 15: Regulatory information

· ***15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture***

· ***Directive 2012/18/EU***
· ***Named dangerous substances - ANNEX I*** *Substance is not listed.*
· ***REGULATION (EC) No 1907/2006 ANNEX XVII*** *Conditions of restriction: 30*

· ***National regulations:***

· ***Other regulations, limitations and prohibitive regulations***

· ***Substances of very high concern (SVHC) according to REACH, Article 57***	
10043-35-3	*boric acid*

· ***15.2 Chemical safety assessment:*** *A Chemical Safety Assessment has not been carried out.*

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Trade name: Boric acid

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SECTION 16: Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

· ***Department issuing SDS:*** *Product safety department.*
· ***Contact:*** *Ms. Jennifer Habenicht*
· ***Abbreviations and acronyms:***
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
IATA: International Air Transport Association
GHS: Globally Harmonised System of Classification and Labelling of Chemicals
EINECS: European Inventory of Existing Commercial Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
VOC: Volatile Organic Compounds (USA, EU)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
PBT: Persistent, Bioaccumulative and Toxic
SVHC: Substances of Very High Concern
vPvB: very Persistent and very Bioaccumulative
Repr. 1B: Reproductive toxicity – Category 1B

Safety Data Sheet
NICKEL CHLORIDE

Safety Data Sheet dated 15/10/2015, version 2

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Identification of the substance:

Trade name:	NICKEL CHLORIDE
Trade code:	NICL
CAS number:	7791-20-0
EC number:	231-743-0
Index number:	028-011-00-6

REACH number: 01-2119486973-20

1.2. Relevant identified uses of the substance or mixture and uses advised against

Recommended use:

Only for industrial use.

1.3. Details of the supplier of the safety data sheet

Company:

TODINI AND CO. S.p.A. (ITALY) - TODINI FRANCE SAS (FRANCE) - TODINI, GmbH. (GERMANY) - TODINI QUIMICA IBERICA SLU (SPAIN) - TODINI EUROPE SP. Z O. O.(POLAND) - TODINI BVBA (BELGIUM)
Corso Milano 46
20900 Monza - Italy
T +39 0392302495

Competent person responsible for the safety data sheet:

sds@todini.com

1.4. Emergency telephone number

0039 039 2302495 (8:30 - 17:30)

IPCS Directory of poison centres in the European Region:
http://www.who.int/gho/phe/chemical_safety/poisons_centres/en/index.html

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

EC regulation criteria 1272/2008 (CLP)


Danger, Acute Tox. 3, Toxic if swallowed.


Danger, Acute Tox. 3, Toxic if inhaled.


Warning, Skin Irrit. 2, Causes skin irritation.


Warning, Eye Irrit. 2, Causes serious eye irritation.


Danger, Resp. Sens. 1, May cause allergy or asthma symptoms or breathing difficulties if inhaled.


Warning, Skin Sens. 1, May cause an allergic skin reaction.


Warning, Muta. 2, Suspected of causing genetic defects.


Danger, Carc. 1A, May cause cancer by inhalation.


Danger, Repr. 1B, May damage the unborn child.

Danger, STOT RE 1, Causes damage to organs through prolonged or repeated exposure.

Warning, Aquatic Acute 1, Very toxic to aquatic life.

Warning, Aquatic Chronic 1, Very toxic to aquatic life with long lasting effects.

Adverse physicochemical, human health and environmental effects:
No other hazards
2.2. Label elements
Symbols:

Danger
Hazard statements:
H301+H331 Toxic if swallowed or if inhaled.
H315 Causes skin irritation.
H319 Causes serious eye irritation.
H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H317 May cause an allergic skin reaction.
H341 Suspected of causing genetic defects.
H350i May cause cancer by inhalation.
H360D May damage the unborn child.
H372 Causes damage to organs through prolonged or repeated exposure.
H410 Very toxic to aquatic life with long lasting effects.
Precautionary statements:
P201 Obtain special instructions before use.
P273 Avoid release to the environment.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P308+P313 IF exposed or concerned: Get medical advice/attention.
P391 Collect spillage.
P501 Dispose of contents/container in accordance with applicable regulations.
Special Provisions:
None
Special provisions according to Annex XVII of REACH and subsequent amendments:
None
2.3. Other hazards
vPvB Substances: None - PBT Substances: None
Other Hazards:
No other hazards

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1. Substances
Identification of the substance:
Trade code: NICL
Chemical characterization: NICKEL CHLORIDE
CAS number: 7791-20-0
EC number: 231-743-0
REACH number: 01-2119486973-20

Qty	Name	Ident. Number	Classification
100 %	nickel dichloride	Index number: 028-011-00-6 CAS: 7791-20-0 EC: 231-743-0	 3.6/1A Carc. 1A H350  3.5/2 Muta. 2 H341  3.7/1B Repr. 1B H360  3.9/1 STOT RE 1 H372  3.2/2 Skin Irrit. 2 H315  3.4.1/1-1A-1B Resp. Sens. 1,1A,1B H334  3.4.2/1-1A-1B Skin Sens. 1,1A,1B H317  4.1/A1 Aquatic Acute 1 H400 M=1.  4.1/C1 Aquatic Chronic 1 H410 M=1. 3.1/3/Oral Acute Tox. 3 H301  3.1/3/Inhal Acute Tox. 3 H331

3.2. Mixtures

N.A.

SECTION 4: First aid measures

4.1. Description of first aid measures

In case of skin contact:

Immediately take off all contaminated clothing.
Areas of the body that have - or are only even suspected of having - come into contact with the product must be rinsed immediately with plenty of running water and possibly with soap.
Wash thoroughly the body (shower or bath).
Remove contaminated clothing immediately and dispose off safely.
After contact with skin, wash immediately with soap and plenty of water.

In case of eyes contact:

In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

In case of Ingestion:

Give nothing to eat or drink.
Do not under any circumstances induce vomiting. OBTAIN A MEDICAL EXAMINATION IMMEDIATELY.

In case of Inhalation:

If breathing is irregular or stopped, administer artificial respiration.
In case of inhalation, consult a doctor immediately and show him packing or label.

4.2. Most important symptoms and effects, both acute and delayed

None

4.3. Indication of any immediate medical attention and special treatment needed

In case of accident or unwellness, seek medical advice immediately (show directions for use or safety data sheet if possible).
Treatment:
None

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media:
Water.
Carbon dioxide (CO2).
Extinguishing media which must not be used for safety reasons:
None in particular.

5.2. Special hazards arising from the substance or mixture
Do not inhale explosion and combustion gases.
Burning produces heavy smoke.

5.3. Advice for firefighters
Use suitable breathing apparatus .
Collect contaminated fire extinguishing water separately. This must not be discharged into drains.
Move undamaged containers from immediate hazard area if it can be done safely.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures
Wear personal protection equipment.
Wear breathing apparatus if exposed to vapours/dusts/aerosols.
Provide adequate ventilation.
Use appropriate respiratory protection.
See protective measures under point 7 and 8.

6.2. Environmental precautions
Do not allow to enter into soil/subsoil. Do not allow to enter into surface water or drains.
Retain contaminated washing water and dispose it.
In case of gas escape or of entry into waterways, soil or drains, inform the responsible authorities.
Suitable material for taking up: absorbing material, organic, sand

6.3. Methods and material for containment and cleaning up
Wash with plenty of water.

6.4. Reference to other sections
See also section 8 and 13

SECTION 7: Handling and storage

7.1. Precautions for safe handling
Avoid contact with skin and eyes, inhalation of vapours and mists.
Use localized ventilation system.
Don't use empty container before they have been cleaned.
Before making transfer operations, assure that there aren't any incompatible material residuals in the containers.
Contamined clothing should be changed before entering eating areas.
Do not eat or drink while working.
See also section 8 for recommended protective equipment.

7.2. Conditions for safe storage, including any incompatibilities
Keep away from food, drink and feed.
Incompatible materials:
None in particular.
Instructions as regards storage premises:
Adequately ventilated premises.

7.3. Specific end use(s)
None in particular

SECTION 8: Exposure controls/personal protection

8.1. Control parameters
NICKEL CHLORIDE - CAS: 7791-20-0

ACGIH - LTE mg/m3(8h): 8 mg/m3 - Behaviour: Indicative

DNEL Exposure Limit Values

NICKEL CHLORIDE - CAS: 7791-20-0

Worker Professional: 0.7 mg/m3 - Consumer: 0.4 mg/m3 - Exposure: Human Inhalation - Frequency: Short Term (acute)

Worker Professional: 16 mg/m3 - Exposure: Human Dermal - Frequency: Short Term (acute)

Consumer: 0.00002 mg/m3 - Exposure: Human Inhalation - Frequency: Long Term, systemic effects

Consumer: 0.00002 mg/m3 - Exposure: Human Inhalation - Frequency: Long Term, local effects

PNEC Exposure Limit Values

N.A.

8.2. Exposure controls

Eye protection:

Not needed for normal use. Anyway, operate according good working practices.

Protection for skin:

Use clothing that provides comprehensive protection to the skin, e.g. cotton, rubber, PVC or viton.

Protection for hands:

Suitable material:

NBR (nitrile rubber).

PVC (polyvinyl chloride).

Respiratory protection:

Filtering Half-face mask (DIN EN 149).

Thermal Hazards:

None

Environmental exposure controls:

None

Appropriate engineering controls:

None

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Properties	Value	Method:	Notes:
Appearance and colour:	Solid yellowish green	--	--
Odour:	Odourless	--	--
Odour threshold:	Not Relevant	--	--
pH:	6,1	--	--
Melting point / freezing point:	N.A.	--	--
Initial boiling point and boiling range:	Not Relevant	--	--
Flash point:	Not Relevant	--	--
Evaporation rate:	Not Relevant	--	--
Solid/gas flammability:	Not Relevant	--	--
Upper/lower flammability or explosive limits:	Not Relevant	--	--
Vapour pressure:	Not Relevant	--	--
Vapour density:	Not Relevant	--	--

Relative density:	1,9	--	--
Solubility in water:	2500 g/l (20 °C)	--	--
Solubility in oil:	Not Relevant	--	--
Partition coefficient (n-octanol/water):	Not Relevant	--	--
Auto-ignition temperature:	Not Relevant	--	--
Decomposition temperature:	Not Relevant	--	--
Viscosity:	Not Relevant	--	--
Explosive properties:	Not Relevant	--	--
Oxidizing properties:	Not Relevant	--	--

9.2. Other information

Properties	**Value**	**Method:**	**Notes:**
Miscibility:	Not Relevant	--	--
Fat Solubility:	Not Relevant	--	--
Conductivity:	Not Relevant	--	--
Substance Groups relevant properties	N.A.	--	--

SECTION 10: Stability and reactivity

10.1. Reactivity
Stable under normal conditions
10.2. Chemical stability
Stable under normal conditions
10.3. Possibility of hazardous reactions
None
10.4. Conditions to avoid
Stable under normal conditions.
10.5. Incompatible materials
None in particular.
10.6. Hazardous decomposition products
None.

SECTION 11: Toxicological information

11.1. Information on toxicological effects
Toxicological information of the substance:
NICKEL CHLORIDE - CAS: 7791-20-0
a) acute toxicity:
Test: LD50 - Route: ORAL - Species: RAT 105 mg/kg - Duration: 4H

If not differently specified, the information required in Regulation (EU)2015/830 listed below must be considered as N.A.:
a) acute toxicity;
b) skin corrosion/irritation;
c) serious eye damage/irritation;
d) respiratory or skin sensitisation;
e) germ cell mutagenicity;
f) carcinogenicity;
g) reproductive toxicity;
h) STOT-single exposure;

i) STOT-repeated exposure;
j) aspiration hazard.

SECTION 12: Ecological information

12.1. Toxicity

Adopt good working practices, so that the product is not released into the environment.
NICKEL CHLORIDE - CAS: 7791-20-0
a) Aquatic acute toxicity:
Endpoint: LC50 - Species: Fish 0 100 mg/l - Duration h: 96
Endpoint: EC50 - Species: Daphnia 0 6.7 mg/l - Duration h: 48
Endpoint: EC50 - Species: Algae 0 0.06 mg/l - Duration h: 72
nickel dichloride - CAS: 7791-20-0
a) Aquatic acute toxicity:
Endpoint: EC50 - Species: Daphnia 0 6.38 mg/l - Duration h: 48
Endpoint: LC50 - Species: Fish 0 15.3 mg/l - Duration h: 96

12.2. Persistence and degradability

N.A.

12.3. Bioaccumulative potential

N.A.

12.4. Mobility in soil

N.A.

12.5. Results of PBT and vPvB assessment

vPvB Substances: None - PBT Substances: None

12.6. Other adverse effects

None

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Recover, if possible. Send to authorised disposal plants or for incineration under controlled conditions. In so doing, comply with the local and national regulations currently in force.

SECTION 14: Transport information

14.1. UN number

ADR-UN number:	3288
IATA-Un number:	3288
IMDG-Un number:	3288

14.2. UN proper shipping name

ADR-Shipping Name:	TOXIC SOLID, INORGANIC, N.O.S. (nickel dichloride hexahydrate)
IATA-Technical name:	TOXIC SOLID, INORGANIC, N.O.S. (nickel dichloride hexahydrate)
IMDG-Technical name:	TOXIC SOLID, INORGANIC, N.O.S. (nickel dichloride hexahydrate)

14.3. Transport hazard class(es)

ADR-Class:	6.1
ADR-Label:	6.1
IATA-Label:	6.1
IMDG-Class:	6.1
Enviromentally hazardous :	Symbol "fish and tree"

14.4. Packing group

ADR-Packing Group:	III
IATA-Packing group:	III
IMDG-Packing group:	III

14.5. Environmental hazards

Marine pollutant: Marine pollutant

14.6. Special precautions for user

ADR-Tunnel Restriction Code: E
Rail (RID): 3288
IMDG-Technical name: TOXIC SOLID, INORGANIC, N.O.S. (nickel dichloride hexahydrate)
IMDG-EMS: F-A,S-A

14.7. Transport in bulk according to Annex II of Marpol and the IBC Code

N.A.

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

Dir. 98/24/EC (Risks related to chemical agents at work)
Dir. 2000/39/EC (Occupational exposure limit values)
Regulation (EC) n. 1907/2006 (REACH)
Regulation (EC) n. 1272/2008 (CLP)
Regulation (EC) n. 790/2009 (ATP 1 CLP) and (EU) n. 758/2013
Regulation (EU) 2015/830
Regulation (EU) n. 286/2011 (ATP 2 CLP)
Regulation (EU) n. 618/2012 (ATP 3 CLP)
Regulation (EU) n. 487/2013 (ATP 4 CLP)
Regulation (EU) n. 944/2013 (ATP 5 CLP)
Regulation (EU) n. 605/2014 (ATP 6 CLP)

Restrictions related to the product or the substances contained according to Annex XVII Regulation (EC) 1907/2006 (REACH) and subsequent modifications:

None

Where applicable, refer to the following regulatory provisions :

Directive 2003/105/CE ('Activities linked to risks of serious accidents') and subsequent amendments.
Regulation (EC) nr 648/2004 (detergents).
1999/13/EC (VOC directive)

Provisions related to directives 82/501/EC(Seveso), 96/82/EC(Seveso II):

Products belongs to category: 2, 9i.

15.2. Chemical safety assessment

Yes

SECTION 16: Other information

Full text of phrases referred to in Section 3:

H350 May cause cancer.
H341 Suspected of causing genetic defects.
H360 May damage fertility or the unborn child.
H372 Causes damage to organs through prolonged or repeated exposure.
H315 Causes skin irritation.
H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H317 May cause an allergic skin reaction.
H400 Very toxic to aquatic life.
H410 Very toxic to aquatic life with long lasting effects.
H301 Toxic if swallowed.
H331 Toxic if inhaled.

This document was prepared by a competent person who has received appropriate training.

Main bibliographic sources:

ECDIN - Environmental Chemicals Data and Information Network - Joint Research Centre, Commission of the European Communities

SAX's DANGEROUS PROPERTIES OF INDUSTRIAL MATERIALS - Eight Edition - Van Nostrand Reinold
CCNL - Appendix 1
Insert further consulted bibliography

The information contained herein is based on our state of knowledge at the above-specified date. It refers solely to the product indicated and constitutes no guarantee of particular quality.
It is the duty of the user to ensure that this information is appropriate and complete with respect to the specific use intended.
This MSDS cancels and replaces any preceding release.

ADR:	European Agreement concerning the International Carriage of Dangerous Goods by Road.
CAS:	Chemical Abstracts Service (division of the American Chemical Society).
CLP:	Classification, Labeling, Packaging.
DNEL:	Derived No Effect Level.
EINECS:	European Inventory of Existing Commercial Chemical Substances.
GefStoffVO:	Ordinance on Hazardous Substances, Germany.
GHS:	Globally Harmonized System of Classification and Labeling of Chemicals.
IATA:	International Air Transport Association.
IATA-DGR:	Dangerous Goods Regulation by the “International Air Transport Association” (IATA).
ICAO:	International Civil Aviation Organization.
ICAO-TI:	Technical Instructions by the “International Civil Aviation Organization” (ICAO).
IMDG:	International Maritime Code for Dangerous Goods.
INCI:	International Nomenclature of Cosmetic Ingredients.
KSt:	Explosion coefficient.
LC50:	Lethal concentration, for 50 percent of test population.
LD50:	Lethal dose, for 50 percent of test population.
LTE:	Long-term exposure.
PNEC:	Predicted No Effect Concentration.
RID:	Regulation Concerning the International Transport of Dangerous Goods by Rail.
STE:	Short-term exposure.
STEL:	Short Term Exposure limit.
STOT:	Specific Target Organ Toxicity.
TLV:	Threshold Limiting Value.
TWATLV:	Threshold Limit Value for the Time Weighted Average 8 hour day. (ACGIH Standard).
WGK:	German Water Hazard Class.

1. Title : Use of nickel chloride for production of nickel metal - Electrolytic refining of nickel matte via a nickel chloride solution (Hydrometallurgical process)	
Life cycle	End use - DU of $NiCl_2$
Free short title	Use of $NiCl_2$ for production of Ni metal. Electrolytic refining of nickel matte via a nickel chloride solution (Hydrometallurgical process)
Systematic title based on use descriptor	SU: SU14: Manufacture of basic metals PC: PC 19 intermediate use ERC: ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates) PROC: PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 3: Use in closed batch process (synthesis or formulation) PROC 22: Potentially closed processing operations with minerals/metals at elevated temperature
Processes, tasks, activities covered (environment)	Industrial use of $NiCl_2$ for production of Ni metal: Leaching of nickel matte with chlorine (Cl_2) gas into a iron (III) or copper/nickel containing chloride solution; Electrowinning of Ni (as regular cathodes and crowns) from purified chloride solutions and annealing of cathodes to adjust the hardness. Cutting of Ni (as cathode) and packaging Ni cathodes and crowns Cleaning and maintenance.
Processes, tasks, activities covered (workers)	Contributing exposure scenario ES 4.1: PROC 2: Leaching of nickel matte with chlorine (Cl_2) gas into a iron(III) or copper/nickel containing chloride solution Contributing exposure scenario ES 4.2: PROC 2, PROC 3, PROC 22: Electrowinning of Ni (as regular cathodes and crowns) from purified chloride solutions and annealing of electrolytic cathodes Contributing exposure scenario ES 4.3: PROC 0: Cleaning and maintenance reported as an example
2. Operational conditions and risk management measures	
2.1 Control of environmental exposure	
Environmental related free short title	Industrial use of $NiCl_2$ for production of Ni metal
Systematic title based on use descriptor (environment)	ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates)
Processes, tasks, activities covered (environment)	Industrial use of $NiCl_2$ for production of Ni metal: Leaching of nickel matte with chlorine (Cl_2) gas into a iron (III) or copper/nickel containing chloride solution; Electrowinning of Ni (as regular cathodes and crowns) from purified chloride solutions and annealing of cathodes to adjust the hardness. Cutting of Ni (as cathode) and packaging Ni cathodes and crowns Cleaning and maintenance.
Environmental Assessment Method	Estimates based on monitoring local and regional concentrations are used for calculation of PEC
Product characteristics	
Nickel chloride containing solution. Ni squares of surface area 25 and 100 cm^2 and thickness 12-15 mm thick, full cathodes of surface area of 1 m^2 and thickness 12-15 mm and 'crowns' (30-60 g).	
Amounts used	

Maximum daily use at a site	45 tonnes
Maximum annual use at a site	15000 tonnes
Frequency and duration of use	
Pattern of release to the environment	330 days per year per site
Environment factors not influenced by risk management	
Receiving surface water flow rate	2000,000 m^3/d
Dilution capacity, freshwater	1000 (max)
Dilution capacity, marine	1000
Other given operational conditions affecting environmental exposure	
None	
Technical conditions and measures at process level (source) to prevent release	
None	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Wastewater: On-site wastewater treatment by chemical precipitation. Efficiency >99.8%. Release factor after on-site treatment: 28.0 g/T **Air:** Removal of nickel from stack emissions by fabric or bag filters and wet scrubbers. Release factor after on-site treatment: 23.7 g/T	
Organizational measures to prevent/limit release from site	
None	
Conditions and measures related to municipal sewage treatment plant	
Municipal Sewage Treatment Plant	No
Discharge rate of the Municipal STP	Not applicable
Incineration of the sludge of the Municipal	Not applicable
Conditions and measures related to external treatment of waste for disposal	
Ni bearing waste shall be recovered or recycled if possible. Ni bearing waste shall be considered hazardous if the Ni content is above the generic cutoffs (for mixtures) as stated in regulation (EC) No. 1272/2008. Ni bearing waste mixtures may be assessed as substances according to regulation (EC) No. 1272/2008 criteria. Disposal of Ni bearing waste shall comply with local, state or national waste legislation and remains the responsibility of the waste treatment operator.	
Conditions and measures related to external recovery of waste	
Not applicable	
2.2 Control of workers exposure for contributing exposure scenario 4.1	
Leaching of nickel matte with chlorine (Cl_2) gas into a iron(III) or copper/nickel containing chloride solution	
Workers related free short title	Use of $NiCl_2$ for production of Ni metal. Electrolytic refining of nickel matte via a nickel chloride solution (Hydrometallurgical process)
Use descriptor covered	PROC 2: Use in closed, continuous process with occasional controlled exposure
Processes, tasks, activities covered	Leaching of nickel matte with chlorine (Cl_2) gas into a iron(III) or copper/nickel containing chloride solution
Assessment Method	Estimation of exposure based on measured data

Product characteristic	
Nickel chloride containing solution	
Amounts used	
Not relevant	
Frequency and duration of use/exposure	
8 hour shifts. Duration of dermal exposure shall be less than 8 hours. Duration of exposure ranges from 0.5h/8h to 7h/8h. The actual pattern of exposure is determined by the amount of manual and driving work, use of control rooms and level of automation and mechanisation	
Human factors not influenced by risk management	
Respiration volume under conditions of use	Not relevant
Room size and ventilation rate	Not relevant
Area of skin contact with the substance under conditions of use	Not relevant
Body weight	Not relevant
Other given operational conditions affecting workers exposure	
Leaching is likely to be run from a control room. Atmospheric and pressure leaching is carried out in sealed autoclaves (~110 °C) and the leachate is purified and filtered in open filter presses or in a vacuum belt filter.	
Technical conditions and measures at process level (source) to prevent release	
Leaching operations shall be enclosed and the level of containment shall be high. The filter presses in the same area are not enclosed. The leaching process shall be fully automated with the only manual operation being the emptying of the filter	
Technical conditions and measures to control dispersion from source towards the worker	
LEV shall be installed on belt filters at the end of the leaching process (unknown effectiveness). No LEV is installed on the filter press.	
Organisational measures to prevent /limit releases, dispersion and exposure	
Training in how to wear and use respirators and in good personal hygiene practices is provided for new starts and annually or every two years for permanent and contractual employees.	
Conditions and measures related to personal protection, hygiene and health evaluation	
Inhalation: Control of inhalation exposure to particulate, vapours and fumes is required by RPE approved with regard to EN 12941 (powered filtering device with hood or helmet), to EN 12472 (powered filtering devices with full face masks, half masks or quarter masks) or to EN 140 (mask) and EN 143 (filter) for handling the filter presses. PPE such as 3M 7000 series half mask respirator, 3M Jupiter Powered Air Turbo Uni, approved with regard to EN 12947/2, (APF = 20) or self contained breathing apparatus would be required for maintenance, cleaning, and intermittent and non- routine production activities. These activities generally require manual work to be carried out often where LEV may be unavailable. Dermal: The skin exposure to liquid splashes, mists and particulate during filter press operation shall be	
2.3 Control of workers exposure for contributing exposure scenario 4.2	
Electrowinning of Ni (as regular cathodes and crowns) from purified chloride solutions and annealing of	
Workers related free short title	Use of $NiCl_2$ for production of Ni metal. Electrolytic refining of nickel matte via a nickel chloride solution (Hydrometallurgical
Use descriptor covered	PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 3: Use in closed batch process (synthesis or formulation) PROC 22: Potentially closed processing operations with

	elevated temperature
Processes, tasks, activities covered	Electrowinning of Ni (as regular cathodes and crowns) from purified chloride solutions and annealing of electrolytic cathodes
Assessment Method	Estimation of exposure based on measured data
Product characteristic	
Solids, low grade dust Ni squares of surface area 25 and 100 cm^2 and thickness 12-15 mm thick, full cathodes of surface area of 1 m^2 and thickness 12-15 mm and 'crowns' (30-60 g).	
Amounts used	
Not relevant	
Frequency and duration of use/exposure	
8 hour shifts. Duration of dermal exposure shall be less than 3 hours. Duration of exposure ranges from 0.5h/8h to 7h/8h. The actual pattern of exposure is determined by the amount of manual and driving work, use of control rooms and level of automation and mechanisation	
Human factors not influenced by risk management	
Respiration volume under conditions of use	Not relevant
Room size and ventilation rate	Not relevant
Area of skin contact with the substance under conditions of use	Not relevant
Body weight	Not relevant
Other given operational conditions affecting workers exposure	
$NiCl_2$ solution is fed to the electrowinning cells where the Ni from the purified leach solution is recovered by electrolysis. There are three steps involved in this activity: Starter sheet production on a blank electrolysed in starter seed cells; Removal of starter sheet from the blank - cathode stripping; and Nickel cathode production (on nickel starter sheets) from electrolysis in commercial cells. Electrowinning is carried out in open cells covered with styrophor beads to prevent evaporation of the electrolyte. This diaphragm cell is sealed around the anode in order to contain and extract the chlorine gas produced. Annealing of cathode plates by heating in a furnace (temperature unspecified) may be carried out in prior to	
Technical conditions and measures at process level (source) to prevent release	
Electrowinning shall be contained to avoid evaporation of solution contained in electrowinning bath.	
Technical conditions and measures to control dispersion from source towards the worker	
LEV shall be installed on the anodes in the electrolysis cells (unknown effectiveness) to extract chlorine gas. Furnaces shall be fitted with LEV to extract heat and fumes	
Organisational measures to prevent /limit releases, dispersion and exposure	
Training in how to wear and use respirators and in good personal hygiene practices is provided for new starts and annually or every two years for permanent and contractual employees.	
Conditions and measures related to personal protection, hygiene and health evaluation	
Inhalation: Diffuse cell emissions give rise to gases, vapours and mists and inhalation exposure in some electrolysis halls and require the need for further control by using RPE approved with regard to EN 140 (mask) and EN 143 (filter). PPE such as 3M 7000 series half mask respirator, 3M Jupiter Powered Air Turbo Uni, approved with regard to EN 12947/2 (APF = 20), or self contained breathing apparatus would be required for maintenance, cleaning, and intermittent and non-routine production activities. These activities generally require manual work to be carried out often where LEV may be unavailable. Dermal: Dermal exposure to gases, mists, liquid splashes and bulk metal (as cathodes) and to cuts from bulk	

2.4 Control of workers exposure for contributing exposure scenario 4.3	
Cleaning and maintenance reported as an example	
Workers related free short title	Use of $NiCl_2$ for production of Ni metal. Electrolytic refining of nickel matte via a nickel chloride solution (Hydrometallurgical process)
Use descriptor covered	PROC0 – Cleaning and maintenance
Processes, tasks, activities covered	Cleaning and maintenance reported as an example
Assessment Method	Estimation of inhalation exposure based on measured data. Estimation of dermal exposure based on Tier 1 model.
Product characteristic	
Solids, low grade dust Ni squares of surface area 25 and 100 cm^2 and thickness 12-15 mm thick, full cathodes of surface area of 1 m^2 and thickness 12-15 mm and 'crowns' (30-60 g).	
Amounts used	
Not relevant	
Frequency and duration of use/exposure	
Maximum 4 hours dermal exposure per shift	
Human factors not influenced by risk management	
Respiration volume under conditions of use	Not relevant
Room size and ventilation rate	Not relevant
Area of skin contact with the substance under conditions of use	960 cm^2
Body weight	Not relevant
Other given operational conditions affecting workers exposure	
Examples of cleaning and maintenance in the leaching plant include washing cells before maintenance is carried out on them. Examples of cleaning and maintenance in the electrowinning department include removing the titanium	
Technical conditions and measures at process level (source) to prevent release	
None	
Technical conditions and measures to control dispersion from source towards the worker	
None	
Organisational measures to prevent /limit releases, dispersion and exposure	
Training in how to wear and use respirators and in good personal hygiene practices is provided for new starts and annually or every two years for permanent and contractual employees.	
Conditions and measures related to personal protection, hygiene and health evaluation	
Inhalation: Inhalation of gas, fumes, liquid mists and particulate shall be controlled by RPE such as powered respirators and 3M 7000 series half mask approved with regard to EN 129471 (powered filtering device with hood or helmet), EN 12472 (powered filtering devices with full masks, half masks or quarter masks) or EN 140 (half mask and filter) for maintenance, cleaning, and intermittent and non-routine production activities. Dermal: Rigger gloves are required for controlling dermal exposure to particulate, liquid and bulk metal.	

3. Exposure and risk estimation

Environment

ERC 6a
Industrial use of $NiCl_2$ for production of Ni metal

Compartment	Unit	PNEC	$PEC_{Regional}$	C_{local}	PEC	RCR	Methods for calculation of environmental concentrations
Freshwater	µg Ni/L	3.55	2.9	0.46	3.36	0.95	Measured values, Tier 3-RWC
Marine	µg Ni/L	8.6	0.3	0.46	0.76	0.09	Measured values, Tier 3-RWC
Terrestrial	mg Ni/kg	29.9	16.2	0.12	16.3	0.55	Measured values, Tier 3-RWC

Workers

ES 4.1

PROC 2: Leaching of nickel matte with chlorine (Cl_2) gas into a iron(III) or copper/nickel containing chloride

	Unit	DNEL	Exposure concentration	RCR	Methods for calculation of
Dermal					
Acute systemic	mgNi/kg/day	-	NR	-	
Acute local	mgNi/cm²/day	-	NR	-	
Long-term systemic	mgNi/kg/day	-	NR	-	
Long-term local	mgNi/cm²/day	0.00044	0.00025[1]	0.57 (8h)	Read across estimate 75th percentile for dermal exposure
Inhalation					
Acute systemic	mgNi/m³	16	0.12	0.008	3x the long term exposure
Acute local	mgNi/m³	0.7	0.12	0.17	3x the long term exposure
Long-term systemic	mgNi/m³	0.05[2]	0.04	0.8	75th percentile over three
Long-term local	mgNi/m³	0.05[2]	0.04	0.8	75th percentile over three

[1]Gloves and other suitable protective clothing should be used where direct dermal contact with soluble Ni could occur.
[2] Collect process monitoring data. When handling respirable size powders, exposures (8h TWA) to

ES 4.2

PROC 2, PROC 3, PROC22: Electrowinning of Ni (as regular cathodes and crowns) from purified chloride solutions and surface treatment

	Unit	DNEL	Exposure concentration	CR	Methods for calculation of exposure
Dermal					
Acute systemic	mgNi/kg/day	-	NR	-	
Acute local	mgNi/cm²/day	-	NR	-	
Long-term systemic	mgNi/kg/day	-	NR	-	
Long-term local	mgNi/cm²/day	0.00044	0.00059[1]	1.34 (8h) 0.50 (<3h)	Estimated 75th percentile for dermal exposure to soluble Ni Exposure duration reduced to less than 3 hours, then hands

					before continuing
Inhalation					
Acute systemic	mgNi/m³	16	0.12	0.008	3x the long term 75th percentile
Acute local	mgNi/m³	0.7	0.12	0.17	3x the long term 75th percentile
Long-term systemic	mgNi/m³	0.05[2]	0.04	0.8	75th percentile
Long-term local	mgNi/m³	0.05[2]	0.04	0.8	75th percentile

[1]Gloves and other suitable protective clothing should be used where direct dermal contact with soluble Ni could occur.

[2] Collect process monitoring data. When handling respirable size powders, exposures (8h TWA) to

ES 4.3

PROC 0: Cleaning and maintenance reported as an example

	Unit	DNEL	Exposure concentration	RCR	Methods for calculation of
Dermal					
Acute systemic	mgNi/kg/day	-	NR	-	
Acute local	mgNi/cm²/day	-	NR	-	
Long-term systemic	mgNi/kg/day	-	NR	-	
Long-term local	mgNi/cm²/day	0.00044	0.00003	0.068 (4h)	Modelled 90th percentile for dermal exposure to Ni (PROC10, no direct handling and with intermittent contact during non- dispersive use, gloves, 4 hours maximum duration of operation) then hands must be
Inhalation					
Acute systemic	mgNi/m³	16	0.3	0.02	3x long term
Acute local	mgNi/m³	0.7	0.3	0.43	3x long term
Long-term systemic	mgNi/m³	0.05[1]	0.077	1.54 excl. RPE 0.077 with RPE (APF20	75th percentile. Mechanical maintenance, presumably in leaching plant, overhauling the
Long-term local	mgNi/m³	0.05[1]	0.077	1.54excl. RPE 0.077 with RPE (APF20)	75th percentile. Mechanical maintenance, presumably in leaching plant,

[1] Collect process monitoring data. When handling respirable size powders, exposures (8h TWA) to these powders should be kept under 0.01 mg Ni/m³.

4. Guidance to evaluate whether the site works inside the boundaries set by the ES

Environment

Scaling tool: Metals EUSES IT tool (free download: http://www.arche-consulting.be/Metal-CSA-toolbox/du-scaling-tool)

Scaling of the release to air and water environment includes:
Refining of the release factor to air and waste water and/or and the efficiency of the air filter and wastewater treatment facility.

Scaling of the PNEC for aquatic environment by using a tiered approach for correction for bioavailability and background concentration (C_{local} approach).

Scaling of the PNEC for soil compartment by using a tiered approach for correction for bioavailability and background concentration (C_{local} approach).

Workers

Scaling considering duration and frequency of use

Collect process monitoring data. Use aerosol particle size information, when available, to confirm the appropriate use of an inhalable DNEL (*e.g.*, ≤10% of Nickel mass in respirable fraction).

Man via Environment exposure and risk characterisation assessments for the use of nickel chloride for the production of nickel metal (GES 4)

For each sector, an overview of the range of operational conditions (OC) and predicted C_{local} air and PEC air are given below. To assess whether a site is compliant with the GES, the predicted C_{local} needs to be compared to 11.5 ng Ni/m^3 or the measured PEC needs to be compared to the DNEL of 20 ng Ni/m^3.

Sector overview

	tonnage (T Ni/year)	daily emissions to air (kg Ni/d)	release factor to air (g Ni/T)	Emission days to air per site (d/y)	C_{local}, air* (ng Ni/m^3)	PEC air$ (ng Ni/m^3)
median	15000	1	24	330	3	12

*: based on IFDM air Model

$: based on C_{local} predicted + regional background

1. Title: Use of nickel chloride for production of nickel chloride	
Life cycle	End use – DU of $NiCl_2$
Free short title	Use of nickel chloride for production of nickel chloride
Systematic title based on use descriptor	**SU:** SU 3 Industrial use SU 8 Manufacture of bulk, large scale chemicals SU 9 Manufacture of fine chemicals **PC:** PC 19 intermediate use **ERC:** ERC 6a: Industrial use resulting in manufacture of another substance (use of intermediates) **PROC:** PROC 8b Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 2: Used in closed, continuous process with occasional controlled exposure PROC 0 Cleaning and maintenance
Processes, tasks, activities covered (environment)	Industrial use of $NiCl_2$ for production of nickel chloride: Raw material handling, chemical reaction (production of nickel chloride), washing, drying, packaging, shipping, storage, cleaning and
Processes, tasks, activities covered (workers)	Contributing exposure scenario ES 3.1: PROC 8b: Raw material handling Contributing exposure scenario ES 3.2: PROC 2: Precipitation, recovery (filtration) and washing of crude nickel chloride Contributing exposure scenario ES
2. Operational conditions and risk management measures	
2.1 Control of environmental exposure	
Environmental related free short title	Use of nickel chloride for production of nickel chloride
Systematic title based on use descriptor (environment)	ERC: ERC 6a: Industrial use resulting in manufacture of another substance (use of intermediates)
Processes, tasks, activities covered (environment)	Industrial use of $NiCl_2$ for production of nickel chloride: Raw material handling, chemical reaction (production of nickel chloride), washing, drying, packaging, shipping, storage, cleaning and
Environmental Assessment Method	Estimates based on monitoring local and regional concentrations are used for calculation of PEC
Product characteristics	
Ni supplied as a solution of $NiCl_2$ Moist nickel chloride, Nickel chloride powder (median diameter ~25 µm) or granular (median diameter ~150 µm) form. Paste product containing nickel chloride.	
Amounts used	
Maximum daily use at a site	46 tonnes
Maximum annual use at a site	15000 tonnes
Frequency and duration of use	
Pattern of release to the environment	330 days per year per site
Environment factors not influenced by risk management	
Receiving surface water flow rate	2000,000 m^3/d
Dilution capacity, freshwater	1000 (max)
Dilution capacity, marine	1000

Other given operational conditions affecting environmental exposure	
None	
Technical conditions and measures at process level (source) to prevent release	
None	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Wastewater: On-site wastewater treatment by chemical precipitation. Efficiency >99.8%. Release factor after on-site treatment: 28.0 g/T **Air:** Removal of nickel from stack emissions by fabric or bag filters and wet scrubbers. Release factor after on-site treatment: 23.7 g/T	
Organizational measures to prevent/limit release from site	
None	
Conditions and measures related to municipal sewage treatment plant	
Municipal Sewage Treatment Plant	No
Discharge rate of the Municipal STP	Not applicable
Incineration of the sludge of the Municipal	Not applicable
Conditions and measures related to external treatment of waste for disposal	
Ni bearing waste shall be recovered or recycled if possible. Ni bearing waste shall be considered hazardous if the Ni content is above the generic cutoffs (for mixtures) as stated in regulation (EC) No. 1272/2008. Ni bearing waste mixtures may be assessed as substances according to regulation (EC) No. 1272/2008 criteria. Disposal of Ni bearing waste shall comply with local, state or national waste legislation and remains the responsibility of the waste treatment operator.	
Conditions and measures related to external recovery of waste	
Not applicable	
2.2 Control of workers exposure for contributing exposure scenario ES 3.1	
Raw material handling	
Workers related free short title	Use of nickel chloride for production of nickel chloride
Use descriptor covered	PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
Processes, tasks, activities covered	Raw material handling
Assessment Method	Estimation of inhalation exposure and dermal exposure based on Tier 1 model
Product characteristic	
Ni supplied as a solution of $NiCl_2$	
Amounts used	
Not relevant	
Frequency and duration of use/exposure	
8 hour shifts Maximum of 4 hours dermal exposure duration per shift	
Human factors not influenced by risk management	
Respiration volume under conditions of use	Light to medium level work, 10 m^3/d

Room size and ventilation rate	Not relevant
Area of skin contact with the substance under conditions of use	480 cm^2
Body weight	70 kg
Other given operational conditions affecting workers exposure	
Piping sodium carbonate solution, nickel chloride solution and water from storage silos into a reaction vessel. Apply ambient temperature and humidity. Maintain clean workplace to prevent accumulation of powders and dusts on surfaces. Oral: Good workplace hygiene practice	
Technical conditions and measures at process level (source) to prevent release	
Inhalation: Complete enclosure of transfer operations is likely to give rise to insignificant exposures to inhalable Ni during charging of reactor. Dermal: Automation of processes should be used where possible to eliminate requirement for dermal contact.	
Technical conditions and measures to control dispersion from source towards the worker	
LEV is required for processes not automated or enclosed involving $NiCl_2$ solution or likely to give rise to $NiCl_2$ mists or splashes	
Organisational measures to prevent /limit releases, dispersion and exposure	
None	
Conditions and measures related to personal protection, hygiene and health evaluation	
Inhalation: RPE (FFP3, APF 20) {approved with regard to EN 149:2001 } is required for unenclosed processes where exposure to Ni-containing dust or powder is possible. Dermal: Gloves suitable for handling liquids and other suitable protective clothing are required where direct contact with nickel solution could occur.	
2.3 Control of workers exposure for contributing exposure scenario ES 3.2	
Precipitation, recovery (filtration) and washing of crude nickel chloride	
Workers related free short title	Use of nickel chloride for production of nickel chloride
Use descriptor covered	PROC 2: Use in batch and other process (synthesis) where opportunity for exposure arises
Processes, tasks, activities covered	Precipitation, filtration and washing of crude nickel chloride. Following steps such as preparation and atomising of pulped nickel chloride, further processing and packaging of nickel chloride do not involve exposure to nickel chloride. The steps are covered in the CSR for nickel chloride and the GES on production of
Assessment Method	Estimation of inhalation exposure based on measured data. Estimation of dermal exposure based on Tier 1 model
Product characteristic	
Ni supplied as a solution of $NiCl_2$	
Amounts used	
Not relevant	
Frequency and duration of use/exposure	
8 hour shifts Maximum of 1 hour dermal exposure duration per shift	
Human factors not influenced by risk management	
Respiration volume under conditions of use	Not relevant
Room size and ventilation rate	Not relevant

Area of skin contact with the substance under conditions of use	480 cm^2
Body weight	Not relevant
Other given operational conditions affecting workers exposure	
Enclosed precipitation of crude nickel chloride, enclosed and automated transfer of crude nickel chloride fro reaction vessel onto a belt filter for partially enclosed spray washing and enclosed and automated transfer (scre conveyor) of washed nickel chloride from belt filter to pulp preparation area. Filtering on the belt filter i automated with some manual interventions and sampling of the nickel chloride. Maintain clean workplace to prevent accumulation of powders and dusts on surfaces. Oral: Good workplace hygiene practice	
Technical conditions and measures at process level (source) to prevent release	
Inhalation: Automation and complete enclosure of nickel chloride during transfer operations are likely to give ris to insignificant exposures to inhalable Ni. Manual scraping of the crude nickel chloride on the belt filter an sampling is likely to give rise to some inhalation of Ni. Dermal: Gloves suitable for handling powders and other suitable protective clothing are required where direct contact with nickel chloride could occur.	
Technical conditions and measures to control dispersion from source towards the worker	
LEV is required for processes not automated or enclosed involving nickel chloride or likely to give rise to Ni- containing dust or mists	
Organisational measures to prevent /limit releases, dispersion and exposure	
None	
Conditions and measures related to personal protection, hygiene and health evaluation	
Inhalation: RPE (FFP3, APF 20) {approved with regard to EN 149 *e.g.* 3M 9332 half-mask disposable dust/mist/metal fume valved respirator} is required for unenclosed processes and for manual scraping of the crude nickel chloride on the belt filter and sampling. Dermal: Gloves suitable for handling liquids and other suitable protective clothing are required where direct contact with nickel chloride could occur.	
2.6 Control of workers exposure for contributing exposure scenario ES 3.3	
Cleaning and maintenance	
Workers related free short title	Use of nickel chloride for production of nickel chloride
Use descriptor covered	PROC 0: Cleaning and maintenance
Processes, tasks, activities covered	Cleaning and maintenance
Assessment Method	Estimation of inhalation exposure and dermal exposure based on Tier 1 model
Product characteristic	
Ni present as nickel-containing dust such as nickel chloride	
Amounts used	
Not relevant	
Frequency and duration of use/exposure	
8 hour shifts	
Human factors not influenced by risk management	
Respiration volume under conditions of use	Light to medium level work, 10 m^3/d
Room size and ventilation rate	Not relevant
Area of skin contact with the substance under conditions of use	960 cm^2
Body weight	70 kg

Other given operational conditions affecting workers exposure
Smaller areas of the plant are to be cleaned out daily or weekly by vacuuming. Larger areas of the plant are to be cleaned during annual summer shutdown. Maintain clean workplace to prevent accumulation of powders and dusts on surfaces. Oral: Good workplace hygiene practice
Technical conditions and measures at process level (source) to prevent release
None
Technical conditions and measures to control dispersion from source towards the worker
Use of water or vacuum fitted with a HEPA filter to remove dusts and powders during cleaning.
Organisational measures to prevent /limit releases, dispersion and exposure
None
Conditions and measures related to personal protection, hygiene and health evaluation
Inhalation: Use RPE (FP3, APF 20) for cleaning and maintenance operations where exposure to Ni–containing dust or powder is possible. Dermal: Gloves suitable for handling powders and other suitable protective clothing are required to prevent direct contact with Ni.

3. Exposure and risk estimation

Environment

ERC 6a
Use of nickel chloride for production of nickel chloride

Compartment	Unit	PNEC	$PEC_{Regional}$	C_{local}	PEC	RCR	Methods for calculation of environmental concentrations
Freshwater	µg Ni/L	3.55	2.9	0.46	3.36	0.95	Measured values, Tier 3-RWC
Marine	µg Ni/L	8.6	0.3	0.46	0.76	0.09	Measured values, Tier 3-RWC
Terrestrial	mg Ni/kg	29.9	16.2	0.12	16.32	0.55	Measured values, Tier 3-RWC

Workers

ES 3.1

PROC 8b: Raw material handling

	Unit	DNEL	Exposure concentratio	RCR	Methods for calculation of exposure
Dermal					
Acute systemic	mg Ni/kg/day	-	NR	-	
Acute local	mg Ni/cm^2/day	-	NR	-	
Long-term systemic	mg Ni/kg/day	-	NR	-	
Long-term local	mg Ni/cm^2/day	0.00044	0.0003	0.68 (4h)	MEASE modelling (PROC 8b, automated with no direct handling of solution (m/m% Ni content >25%) and with no contact during non-dispersive use, no gloves, 4 hour maximum duration of
Inhalation					
Acute systemic	mg Ni/m^3	16	0.003	<0.001	3x Modelled exposure value

Acute local	mg Ni/m³	0.7	0.003	0.004	3x Modelled exposure value
Long-term systemic	mg Ni/m³	0.05	0.001	0.02	90th percentile modelled exposure value with MEASE (PROC 8b, automated,
Long-term local	mg Ni /m³	0.05	0.001	0.02	90th percentile modelled exposure value with MEASE (PROC 8b, automated,

ES 3.2
PROC 2: Precipitation, recovery (filtration) and washing of crude nickel chloride

	Unit	DNEL	Exposure concentratio	RCR	Methods for calculation of exposure
Derma<					
Acute systemic	mg Ni/kg/day	-	NR	-	
Acute local	mg Ni/cm²/day	-	NR	-	
Long-term systemic	mg Ni/kg/day	-	NR	-	
Long-term local	mg Ni/cm²/day	0.00044	0.0001	0.227 (1h)	Modelled exposure data using MEASE (PROC 2, direct handling during recovery of filer cake (m/m% Ni content >25%) with intermittent contact during non-dispersive use, gloves, 1 hour maximum duration of operation (sampling, filter cake spreading and inspection activities),
Inhalation					
Acute systemic	mg Ni/m³	16	0.06	0.003	3x Single static exposure measurement
Acute local	mg Ni/m³	0.7	0.06	0.08	3x Single static exposure measurement
Long-term systemic	mg Ni/m³	0.05	0.019	0.38	Single static exposure
Long-term local	mg Ni /m³	0.05	0.019	0.38	Single static exposure

ES 3.3
PROC 0: Cleaning and maintenance

	Unit	DNEL	Exposure concentratio	RCR	Methods for calculation of exposure
Dermal					
Acute systemic	mg Ni/kg/day	-	NR		
Acute local	mg Ni/cm²/day	-	NR		
Long-term systemic	mg	-	NR		

	Ni/kg/day				
Long-term local	mg Ni/cm²/day	0.00044	0.00003	0.068	Modelled exposure data using MEASE (PROC10, no direct handling and with intermittent contact during non-dispersive
Inhalation					
Acute systemic	mg Ni/m³	16	0.258	0.016	3x Modelled exposure value
Acute local	mg Ni/m³	0.7	0.258	0.37	3x Modelled exposure value
Long-term systemic	mg Ni/m³	0.05	0.086[1]	1.72 excl. RPE[2] 0.086 with RPE (APF 20)	90th percentile modelled exposure value with MEASE (PROC10, no direct handling and with intermittent contact during non-dispersive use, gloves, RPE (APF=20), 4 hour
Long-term local	mg Ni /m³	0.05	0.086[1]	1.72 excl. RPE 0.086 with RPE (APF 20)	90th percentile modelled exposure value with MEASE (PROC10, no direct handling and with intermittent contact during non-dispersive use, gloves, RPE (APF=20), 4 hour

[1] Estimated long term mean exposure concentrations for powder handling operations are likely to exceed the DNEL and appropriate RPE fitted with a P3 filter should be used to reduce operator exposure to less than the DNEL and prevent the risk of respiratory toxicity, respiratory cancer and possible reproductive effects. For operations not involving Ni- containing powders, it is unlikely that the DNEL will be exceeded.

Notes

Collect process monitoring data. Respirable fraction exposure levels should be kept below 0.01 mg Ni/m³. Use speciation to ensure that the appropriate inhalable DNEL is used (e.g., if only Ni metal and Ni oxide are present, an inhalable exposure of 0.2 mg Ni/m³ could be reasonably assumed to be safe).

Acute local inhalation

Based on respirable size aerosols. Equivalent inhalable fraction levels expected to be at least 3-fold higher

4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Environment

Scaling tool: Metals EUSES IT tool (free download: http://www.arche-consulting.be/Metal-CSA-toolbox/du-scaling-tool)

Scaling of the release to air and water environment includes:
Refining of the release factor to air and waste water and/or and the efficiency of the air filter and wastewater treatment facility.

Scaling of the PNEC for aquatic environment by using a tiered approach for correction for bioavailability and background concentration (C_{local} approach).

Scaling of the PNEC for soil compartment by using a tiered approach for correction for bioavailability and background concentration (C_{local} approach).

Scaling considering duration and frequency of use

Collect process monitoring data. Use aerosol particle size information, when available, to confirm the appropriate use of an inhalable long-term DNEL of 0.05 mg Ni/m³ (*e.g.*, ≤10% of Nickel mass in respirable fraction).

Man via Environment exposure and risk characterisation assessments for the use of nickel chloride for the production of nickel chloride

For each sector, an overview of the range of operational conditions (OC) and predicted C_{local} air and PEC air are given below. To assess whether a site is compliant with the GES, the predicted C_{local} needs to be compared to 11.5 ng Ni/m^3 or the measured PEC needs to be compared to the DNEL of 20 ng Ni/m^3.

Sector overview

	tonnage (T Ni/year)	daily emissions to air (kg Ni/d)	release factor to air (g Ni/T)	Emission days to air per site (d/y)	C_{local}, air* (ng Ni/m³)	PEC air$ (ng Ni/m³)
median	15000	1	24	330	3	12

*: based on IFDM air model

$: based on C_{local} predicted + regional background.

1. Title: Metal surface treatment – nickel electroplating, nickel electroforming and electroless nickel plating	
Life cycle	Intermediate use of $NiCl_2$
Free short title	Metal surface treatment – nickel electroplating, nickel electroforming and electroless nickel plating
Systematic title based on use descriptor	**SU:** SU 3 Industrial use **PC:** PC 19 intermediate use **ERC:** ERC5: Industrial use resulting in inclusion into or onto a matrix **PROC:** PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 13: Treatment of articles by dipping and pouring PROC 15: Use as laboratory reagent
Processes, tasks, activities covered (environment)	Metal surface treatment- nickel electroplating and nickel electroforming. Use of nickel chloride as 'make-up' salt in electrolytic nickel plating, in electroforming and electroless nickel
Processes, tasks, activities covered (workers)	Contributing exposure scenario ES 2.1: Operations involving dry salts Contributing exposure scenario ES 2.2: Operations with salt solutions
2. Operational conditions and risk management measures	
2.1 Control of environmental exposure	
Environmental related free short title	Metal surface treatment– nickel electroplating and nickel
Systematic title based on use descriptor (environment)	ERC5: Industrial use resulting in inclusion into or onto a matrix
Processes, tasks, activities covered (environment)	Metal surface treatment- nickel electroplating and nickel electroforming. Use of nickel chloride as 'make-up' salt in electrolytic nickel plating and in
Environmental Assessment Method	Estimates based on monitoring local and regional concentrations are used for calculation of PEC
Product characteristics	
Ni chloride: Dry salt of approximately 100 % or solution of 25-50%	
Amounts used	
Maximum daily use at a site	ES 1: 0.05 tonnes/day (median 50th % emission days, 50th % tonnage) ES 2: 1.23 tonnes/day (median 50th % emission days, 75th % tonnage)
Maximum annual use at a site	ES 1: 11 tonnes (median 50th %, 2007); Discharge to STP ES 2: 271 tonnes (75th %, 2007); Discharge to STP
Frequency and duration of use	
Pattern of release to the environment	Air: 220 days per year per site (50th %)
Environment factors not influenced by risk management	
Receiving surface water flow rate	ES 1 discharge to STP: 1.8xE4 m^3/d ES 2 discharge to STP: 2.0xE6 m^3/d ES 3 direct discharge: 1.6xE2 m^3/d
Dilution capacity, freshwater	ES 1: 10 (50th %) ES 2: 1000

	ES 3: 10 (50th %)
Dilution capacity, marine	100 (default)
Other given operational conditions affecting environmental exposure	
None	
Technical conditions and measures at process level (source) to prevent release	
None	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Waste water: On-site wastewater treatment in a physico-chemical treatment plant by chemical precipitation, sedimentation, filtration or a combination. Efficiency: 95 - >99% Off-site waste water treatment plant, community sewer system Efficiency 40% ES1 freshwater Discharge to STP and Marine: 131 g/T (median) ES2 freshwater Discharge to STP: 827 g/T (75%) ES3 Direct discharge to freshwater: 63 g/T (25th %) **Air:** Treatment of stack air emission by wet	
Organizational measures to prevent/limit release from site	
Regular and documented controls may be applied including checking the galvanic-line and chemical storage for	
Conditions and measures related to municipal sewage treatment plant	
Municipal Sewage Treatment Plant	Yes
Discharge rate of the Municipal STP	2000 m³/d (default)
Incineration of the sludge of the Municipal	The sludge is applied to agricultural soil
Conditions and measures related to external treatment of waste for disposal	
Ni bearing waste shall be recovered or recycled if possible. Ni bearing waste shall be considered hazardous if the Ni content is above the generic cutoffs (for mixtures) as stated in regulation (EC) No. 1272/2008. Ni bearing waste mixtures may be assessed as substances according to regulation (EC) No. 1272/2008 criteria. Disposal of Ni bearing waste shall	
Conditions and measures related to external recovery of waste	
Not applicable	
2.2 Control of workers exposure for contributing exposure scenario ES 2.1	
Operations involving dry salts	
Workers related free short title	Metal surface treatment – nickel electroplating, nickel electroforming and electroless nickel plating
Use descriptor covered	PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging from/to vessels/large containers at dedicated facilities PROC 13: Treatment of articles by dipping and pouring PROC 0: Cleaning and maintenance
Processes, tasks, activities covered	Raw material handling Preparation of Ni chloride solution

	Cleaning and maintenance
Assessment Method	Estimation of acute inhalation exposure based on measured data for an analogous substance. Estimation of long term inhalation exposure and dermal exposure based on Tier 1 model
Product characteristic	
Ni chloride: Dry salt of approximately 100 % or solution of 25-50%	
Amounts used	
Not relevant	
Frequency and duration of use/exposure	
Addition of Ni chloride to tank ranging from once per shift to once every 2 or 3 weeks	
Human factors not influenced by risk management	
Respiration volume under conditions of use	Light to medium level work, 10 m^3/d
Room size and ventilation rate	Not relevant
Area of skin contact with the substance under conditions of use	960 cm^2
Body weight	70 kg
Other given operational conditions affecting workers exposure	
Ni chloride is supplied and handled in dry form as pellets. Ambient temperature and humidity affects exposure. Maintain clean workplace to prevent accumulation of powders and dusts on surfaces. Use of water or vacuum fitted with HEPA filter to clear spilled material or accumulations of dust within the work area.	
Technical conditions and measures at process level (source) to prevent release	
Automation and enclosure of processes shall be used where possible	
Technical conditions and measures to control dispersion from source towards the worker	
LEV is required for operations involving handling of powder in open workspace such as ripping and tipping sacks, weighing, mixing, adding powders to solution	
Organisational measures to prevent /limit releases, dispersion and exposure	
None	
Conditions and measures related to personal protection, hygiene and health evaluation	
Inhalation: Use of RPE (FP3; APF = 20) is required Dermal: Gloves and other suitable protective clothing is required to minimise dermal contact	
2.3 Control of workers exposure for contributing exposure scenario ES 2.2	
Operations with salt solutions	
Workers related free short title	Metal surface treatment – nickel electroplating, nickel electroforming and electroless nickel plating
Use descriptor covered	PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharing from/to vessels/large containers at dedicated facilities PROC 13: Treatment of articles by dipping and pouring PROC 15: Use as laboratory reagent PROC 0: Cleaning and maintenance
Processes, tasks, activities covered	Addition of Ni chloride to tank Dipping of items to be coated Removal of coated items Rinsing of

	Removal of spent solution/rinse water from tank Wastewater handling – rinse water Cleaning and maintenance
Assessment Method	Estimation of exposure based on measured data for an analogous substance.
Product characteristic	
Ni chloride: Solution of 25-50%	
Amounts used	
Not relevant	
Frequency and duration of use/exposure	
8 hour shifts. Duration and frequency are regulated to type of working: 8 hours per shift by manual dipping and less than half hour by automatic lines.	
Human factors not influenced by risk management	
Respiration volume under conditions of use	Not relevant
Room size and ventilation rate	Not relevant
Area of skin contact with the substance under conditions of use	Not relevant
Body weight	Not relevant
Other given operational conditions affecting workers exposure	
Ni chloride is added to the plating bath in solution. Plating process involves immersion of piece into plating tank followed by immersion of piece into rinse tanks. Temperature of plating baths is typically 25-70°C. Plating bath is agitated by bubbling air through the electrolyte solution or strong floating rate to ensure even availability of Ni salt to piece being plated. Maintain a clean workplace. Oral: Good workplace hygiene practice	
Technical conditions and measures at process level (source) to prevent release	
Automation and enclosure of processes shall be used where possible. Plating is either manual, semi-automated or automated: Manual plating - parts are placed on racks or hangers and manually transferred from tank to tank Semi-automated plating - parts are manually loaded on to jigs that are moved between the baths using an overhead hoist Automated plating – as semi-automated process except jigs moved electronically If no LEV, automation and enclosure of the following processes are required: Addition of solutions to plating tanks (fluids shall be directly pumped in and out of tanks), dipping and removal of pieces to be plated (plating and rinsing tanks).	
Technical conditions and measures to control dispersion from source towards the worker	
LEV is required for operations where mists may be created including addition of solutions to plating tanks, dipping and removal of pieces to be plated (plating and rinsing tanks)	
Organisational measures to prevent /limit releases, dispersion and exposure	
None	
Conditions and measures related to personal protection, hygiene and health evaluation	
Inhalation: Use of RPE (APF 20) is required for cleaning and maintenance operations. Dermal: Gloves and other suitable protective clothing are required to minimise dermal contact with solution (acid	
3. Exposure and risk estimation	
Environment	

ERC 5 Metal surface treatment– nickel electroplating and nickel electroforming							
Compartment	Unit	PNEC	$PEC_{Regional}$	C_{local}	PEC	RCR	Methods for calculation of environmental concentrations
Freshwater ES 1	µg Ni/L	3.55	2.9	0.14	3.04	0.86	Measured values, Tier 3-RWC
Freshwater ES 2	µg Ni/L	3.55	2.9	0.22	3.12	0.88	
Freshwater ES 3	µg Ni/L	3.55	2.9	0.44	3.34	0.94	
Marine	µg Ni/L	8.6	0.3	6.43	6.73	0.78	
Terrestrial ES 2 - sludge	mg Ni/kg	29.9	16.2	9.56	25.76	0.86	
Terrestrial ES 2 – no sludge application	mg Ni/kg	29.9	16.2	0.01	16.21	0.54	

Workers

ES 2.1

PROC 5, PROC8a, PROC 8b, PROC 13, PROC 0: Operations involving dry salts

	Unit	DNEL	Exposure concentratio	RCR	Methods for calculation of
Dermal					
Acute systemic	mg Ni/kg/day	-	NR	-	
Acute local	mg Ni/cm²/day	-	NR	-	
Long-term systemic	mg Ni/kg/day	-	NR	-	
Long-term local	mg Ni/cm²/day	0.00044	0.00003	0.068	Exposure estimated using MEASE model. Use of LEV and properly
Inhalation					
Acute systemic	mg Ni/m³	16	0.099	0.006	3 X long-term exposure value
Acute local	mg Ni/m³	0.7	0.099	0.14	
Long-term systemic	mg Ni/m³	0.05	0.033	0.66	Exposure estimated using MEASE model. Use of LEV, RPE (APF 20) and properly designed gloves
Long-term local	mg Ni/m³	0.05	0.033	0.66	

ES 2.2

PROC8a, PROC 8b, PROC 13, PROC 15, PROC 0: Operations with salt solutions

	Unit	DNEL	Expo<u<e concentratio	RCR	Methods for calculation of
Dermal					
Acute systemic	mg Ni/kg/day	-	NR	-	
Acute local	mg Ni/cm²/day	-	NR	-	
Long-term systemic	mg Ni/kg/day	-	NR	-	
Long-term local	mg Ni/cm²/day	0.00044	$7x10^{-5}$	0.16	Estimated 75th percentile exposure to soluble Ni assuming suitable

Inhalation					
Acute systemic	mg Ni/m³	16	0.06	0.004	Estimated as 3x the estimated 75th percentile exposure to airborne soluble Ni
Acute local	mg Ni/m³	0.7	0.06	0.09	Estimated as 3x the estimated 75th percentile exposure to airborne
Long-term systemic	mg Ni/m³	0.05	0.02	0.4	Estimated 75th percentile exposure to airborne soluble Ni assuming manual plating process
Long-term local	mg Ni/m³	0.05	0.02	0.4	Estimated 75th percentile exposure to airborne soluble Ni assuming manual plating process

Notes

Collect process monitoring data. Respirable fraction exposure levels should be kept below 0.01 mg Ni/m³. Use speciation to ensure that the appropriate inhalable DNEL is used (e.g., if only Ni metal and Ni oxide are present, an inhalable exposure of 0.2 mg Ni/m³ could be reasonably assumed to be safe).

Acute local inhalation

Based on respirable size aerosols. Equivalent inhalable fraction levels expected to be at least 3-fold higher

4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Environment

Scaling tool: Metals EUSES IT tool (free download: http://www.arche-consulting.be/Metal-CSA-toolbox/du-scaling-tool)

Scaling of the release to air and water environment includes:
Refining of the release factor to air and waste water and/or and the efficiency of the air filter and wastewater treatment facility.

Scaling of the PNEC for aquatic environment by using a tiered approach for correction for bioavailability and background concentration (C_{local} approach).

Scaling of the PNEC for soil compartment by using a tiered approach for correction for bioavailability and background concentration (C_{local} approach).

Workers

Scaling considering duration and frequency of use.

Collect process monitoring data. Use aerosol particle size information, when available, to confirm the

Man via Environment exposure and risk characterisation assessments for the use of nickel chloride in metal surface treatment

For each sector, an overview of the range of operational conditions (OC) and predicted C_{local} air and PEC air are given below. To assess whether a site is compliant with the GES, the predicted C_{local} needs to be compared to 11.5 ng Ni/m³ or the measured PEC needs to be compared to the DNEL of 20 ng Ni/m³.

Sector overview

	tonnage (T/year)	daily emissions to air (kg/d)	release factor to air (g/T)	Emission days to air per site (d/y)	C_{local}, air* (ng Ni/m³)	PEC air$ (ng Ni/m³)
min	4	<0.01	15	220	<1	9
max	1500	0.24	4000	336	43	52
median	14	0.08	2032	235	12	12

*: based on EUSES Model

$: based on measured values and C_{local} predicted + regional background or monitoring data depending on available information

For two companies calculations were based on a SPERC with a release factor of 4000g/T.

Nickel Sulfate

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier

Trade name	:	Nickel Sulfate
Trade name	:	Nickel Sulphate Standard Grade ; Nickel Sulphate EN-grade ; Nickel Sulphate Hexahydrate ; Nickel Sulphate Electroless Grade Nickel Sulfate Special Grade
Product code	:	300000002057
Registration number	:	01-2119439361-44-0008
Substance name	:	Nickel (II) sulphate, hexahydrate
CAS-No.	:	10101-97-0

1.2 Relevant identified uses of the substance or mixture and uses advised against

Use of the Substance/Mixture	:	Chemical plating of metals, Production of batteries., Specialty chemical for industrial use, Production of catalysts and catalyst precursors

1.3 Details of the supplier of the safety data sheet

Company	:	Umicore Cobalt & Specialty Materials Rue du Marais 31 1000 Brussels Belgium
Telephone	:	+32 2777636
E-mail address of person responsible for the SDS	:	info.ipds@umicore.com

1.4 Emergency telephone number

Poison Center

Telephone	:	844 892 0111
Hours of operation	:	24HRS

Supplier

Emergency telephone number	:	For transport in Europe, Central- and South America, Israel and Africa (Non-Arabic speaking countries): +32 3 213 15 70 For transport in the Middle East (Israel excluded) & Arabic speaking Africa: +32 3 213 33 79 For transport in the USA and Canada: 1-877 986 4267 For transport in Asian and the Pacific (China excluded): +65 62 64 78 36 For transport in China: 400 88 71 190
Hours of operation	:	This telephone number is available 24 hours per day, 7 days per week.

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification (REGULATION (EC) No 1272/2008)

Acute toxicity, Category 4	H302: Harmful if swallowed.
Acute toxicity, Category 4	H332: Harmful if inhaled.
Skin irritation, Category 2	H315: Causes skin irritation.
Respiratory sensitisation, Category 1	H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled.
Skin sensitisation, Category 1	H317: May cause an allergic skin reaction.
Germ cell mutagenicity, Category 2	H341: Suspected of causing genetic defects.
Carcinogenicity, Category 1A	H350i: May cause cancer by inhalation.
Reproductive toxicity, Category 1B	H360: May damage fertility or the unborn child.
Specific target organ toxicity - repeated exposure, Category 1	H372: Causes damage to organs through prolonged or repeated exposure.
Acute aquatic toxicity, Category 1	H400: Very toxic to aquatic life.
Chronic aquatic toxicity, Category 1	H410: Very toxic to aquatic life with long lasting effects.

2.2 Label elements

Labelling (REGULATION (EC) No 1272/2008)

Hazard pictograms :

Signal word : Danger

Hazard statements :

H302 + H332	Harmful if swallowed or if inhaled
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H341	Suspected of causing genetic defects.
H350i	May cause cancer by inhalation.
H360	May damage fertility or the unborn child.
H372	Causes damage to organs through prolonged or repeated exposure.

	H410	Very toxic to aquatic life with long lasting effects.

Precautionary statements :

Prevention:	
P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P284	Wear respiratory protection.
Response:	
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P333 + P313	If skin irritation or rash occurs: Get medical advice/ attention.
P362 + P364	Take off contaminated clothing and wash it before reuse.
P391	Collect spillage.
Disposal:	
P501	Dispose of contents/ container to an approved waste disposal plant.

Additional Labelling:

.Restricted to professional users.

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Type of substance : Mono constituent substance

Substance name : Nickel (II) sulphate, hexahydrate

Chemical nature : inorganic

Hazardous components

Nickel Sulfate

Chemical Name	CAS-No. EC-No.	Classification (REGULATION (EC) No 1272/2008)	Concentration (%)
Nickel Sulphate Hexa-hydrate	10101-97-0	Acute Tox. 4; H302 Acute Tox. 4; H332 Skin Irrit. 2; H315 Resp. Sens. 1; H334 Skin Sens. 1; H317 Muta. 2; H341 Carc. 1A; H350i Repr. 1B; H360 STOT RE 1; H372 Aquatic Acute 1; H400 Aquatic Chronic 1; H410	<= 100

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice : Move out of dangerous area.
Show this safety data sheet to the doctor in attendance.
Do not leave the victim unattended.

If inhaled : Call a physician or poison control centre immediately.
If unconscious place in recovery position and seek medical advice.

In case of skin contact : If skin irritation persists, call a physician.
Wash contaminated clothing before reuse.
If on skin, rinse well with water.
If on clothes, remove clothes.

In case of eye contact : Remove contact lenses.
Flush eyes with water as a precaution.
Protect unharmed eye.
Keep eye wide open while rinsing.
If eye irritation persists, consult a specialist.

If swallowed : Clean mouth with water and drink afterwards plenty of water.
Induce vomiting immediately and call a physician.
Keep respiratory tract clear.
Do not give milk or alcoholic beverages.
Never give anything by mouth to an unconscious person.
If symptoms persist, call a physician.
Take victim immediately to hospital.

4.2 Most important symptoms and effects, both acute and delayed

Symptoms : Skin contact may provoke the following symptoms:
Allergic reactions
Redness
Inhalation may provoke the following symptoms:

Shortness of breath
Asthma
Ingestion may provoke the following symptoms:
Stomach/intestinal disorders
Eye contact
Excessive lachrymation

4.3 Indication of any immediate medical attention and special treatment needed

No information available.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media	:	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Unsuitable extinguishing media	:	High volume water jet

5.2 Special hazards arising from the substance or mixture

Specific hazards during fire-fighting	:	Do not allow run-off from fire fighting to enter drains or water courses.
Hazardous combustion products	:	Nickel compounds Sulphuric acid

5.3 Advice for firefighters

Special protective equipment for firefighters	:	Wear self-contained breathing apparatus for firefighting if necessary.
Further information	:	Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Personal precautions	:	Use personal protective equipment. Avoid dust formation. Avoid breathing dust. Ensure adequate ventilation.

6.2 Environmental precautions

Environmental precautions	:	Prevent product from entering drains. Prevent further leakage or spillage if safe to do so. If the product contaminates rivers and lakes or drains inform

respective authorities.

6.3 Methods and material for containment and cleaning up

Methods for cleaning up	:	Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

No data available

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling	:	Avoid formation of respirable particles. Do not breathe vapours/dust. Avoid exposure - obtain special instructions before use. Avoid contact with skin and eyes. For personal protection see section 8. Smoking, eating and drinking should be prohibited in the application area. Provide sufficient air exchange and/or exhaust in work rooms. Dispose of rinse water in accordance with local and national regulations. Persons susceptible to skin sensitisation problems or asthma, allergies, chronic or recurrent respiratory disease should not be employed in any process in which this mixture is being used.
Advice on protection against fire and explosion	:	Avoid dust formation. Provide appropriate exhaust ventilation at places where dust is formed.
Hygiene measures	:	When using do not eat or drink. When using do not smoke. Wash hands before breaks and at the end of workday.

7.2 Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers	:	Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Observe label precautions. Electrical installations / working materials must comply with the technological safety standards. To maintain product quality, do not store in heat or direct sunlight.
Other data	:	Keep in a dry place. No decomposition if stored and applied as directed.

7.3 Specific end use(s)

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Occupational Exposure Limits

Components	CAS-No.	Value type (Form of exposure)	Control parameters	Basis
Further information	Substances that can cause occupational asthma (also known as asthmagens and respiratory sensitisers) can induce a state of specific airway hyper-responsiveness via an immunological, irritant or other mechanism. Once the airways have become hyper-responsive, further exposure to the substance, sometimes even to tiny quantities, may cause respiratory symptoms. These symptoms can range in severity from a runny nose to asthma. Not all workers who are exposed to a sensitiser will become hyper-responsive and it is impossible to identify in advance those who are likely to become hyper-responsive. 54 Substances that can cause occupational asthma should be distinguished from substances which may trigger the symptoms of asthma in people with pre-existing airway hyper-responsiveness, but which do not include the disease themselves. The latter substances are not classified asthmagens or respiratory sensitisers., Wherever it is reasonably practicable, exposure to substances that can cause occupational asthma should be prevented. Where this is not possible, the primary aim is to apply adequate standards of control to prevent workers from becoming hyper-responsive. For substances that can cause occupational asthma, COSHH requires that exposure be reduced as low as is reasonably practicable. Activities giving rise to short-term peak concentrations should receive particular attention when risk management is being considered. Health surveillance is appropriate for all employees exposed or liable to be exposed to a substance which may cause occupational asthma and there should be appropriate consultation with an occupational health professional over the degree of risk and level of surveillance., Capable of causing occupational asthma. The identified substances are those which: - are assigned the risk phrase 'R42: May cause sensitisation by inhalation'; or 'R42/43: May cause sensitisation by inhalation and skin contact' or - are listed in section C of HSE publication 'Asthmagen? Critical assessments of the evidence for agents implicated in occupational asthma' as updated from time to time, or any other substance which the risk assessment has shown to be a potential cause of occupational asthma., Capable of causing cancer and/or heritable genetic damage. The identified substances include those which: - are assigned the risk phrases 'R45: May cause cancer'; 'R46: may cause heritable genetic damage'; 'R49: May cause cancer by inhalation' or - a substance or process listed in Schedule 1 of COSHH., Carcinogenic applies for nickel oxides and sulphides., The 'Sen' notation in the list of WELs has been assigned only to those substances which may cause occupational asthma., Sensitizing applies for nickel sulphate.			
Nickel Sulphate Hexahydrate	10101-97-0	TWA	0,1 mg/m3 (Nickel)	GB EH40
Further information	Substances that can cause occupational asthma (also known as asthmagens and respiratory sensitisers) can induce a state of specific airway hyper-responsiveness via an immunological, irritant or other mechanism. Once the airways have become hyper-responsive, further exposure to the substance, sometimes even to tiny quantities, may cause respiratory symptoms. These			

	symptoms can range in severity from a runny nose to asthma. Not all workers who are exposed to a sensitiser will become hyper-responsive and it is impossible to identify in advance those who are likely to become hyper-responsive. 54 Substances that can cause occupational asthma should be distinguished from substances which may trigger the symptoms of asthma in people with pre-existing airway hyper-responsiveness, but which do not include the disease themselves. The latter substances are not classified asthmagens or respiratory sensitisers., Wherever it is reasonably practicable, exposure to substances that can cause occupational asthma should be prevented. Where this is not possible, the primary aim is to apply adequate standards of control to prevent workers from becoming hyper-responsive. For substances that can cause occupational asthma, COSHH requires that exposure be reduced as low as is reasonably practicable. Activities giving rise to short-term peak concentrations should receive particular attention when risk management is being considered. Health surveillance is appropriate for all employees exposed or liable to be exposed to a substance which may cause occupational asthma and there should be appropriate consultation with an occupational health professional over the degree of risk and level of surveillance., Can be absorbed through skin. The assigned substances are those for which there are concerns that dermal absorption will lead to systemic toxicity., Capable of causing occupational asthma. The identified substances are those which: - are assigned the risk phrase 'R42: May cause sensitisation by inhalation'; or 'R42/43: May cause sensitisation by inhalation and skin contact' or - are listed in section C of HSE publication 'Asthmagen? Critical assessments of the evidence for agents implicated in occupational asthma' as updated from time to time, or any other substance which the risk assessment has shown to be a potential cause of occupational asthma., Capable of causing cancer and/or heritable genetic damage. The identified substances include those which: - are assigned the risk phrases 'R45: May cause cancer'; 'R46: may cause heritable genetic damage'; 'R49: May cause cancer by inhalation' or - a substance or process listed in Schedule 1 of COSHH., Where no specific short-term exposure limit is listed, a figure three times the long-term exposure should be used, Carcinogenic applies for nickel oxides and sulphides., The 'Sen' notation in the list of WELs has been assigned only to those substances which may cause occupational asthma., Sensitizing applies for nickel sulphate.

Derived No Effect Level (DNEL) according to Regulation (EC) No. 1907/2006:

Nickel Sulphate Hexahydrate : End Use: Workers
Exposure routes: Skin contact
Potential health effects: Long-term local effects
Value: 0,002 mg/cm2
End Use: Workers
Exposure routes: Inhalation
Potential health effects: Acute systemic effects
Value: 43 mg/m3
End Use: Workers
Exposure routes: Inhalation
Potential health effects: Acute local effects
Value: 1,25 mg/m3
End Use: Workers
Exposure routes: Inhalation
Potential health effects: Long-term systemic effects
Value: 0,22 mg/m3
End Use: Workers

Exposure routes: Inhalation
Potential health effects: Long-term local effects
Value: 0,22 mg/m3

Predicted No Effect Concentration (PNEC) according to Regulation (EC) No. 1907/2006:

Nickel Sulphate Hexahydrate	:	Fresh water Value: 0,0159 mg/l Marine water Value: 0,0385 mg/l Soil Value: 134 mg/kg dry weight (d.w.)

8.2 Exposure controls

Engineering measures

Handle only in a place equipped with local exhaust (or other appropriate exhaust).

Personal protective equipment

Eye protection	:	Safety glasses with side-shields conforming to EN166
Skin and body protection	:	Choose body protection according to the amount and concentration of the dangerous substance at the work place.
Respiratory protection	:	Dust safety masks are recommended when the dust concentration is more than 10 mg/m3.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance	:	crystalline
Colour	:	green
Odour	:	odourless
pH	:	3,5 - 4,2, Concentration: 100 g/l
Melting point/range	:	Decomposition
Boiling point/boiling range	:	Not applicable
Flash point	:	Method: closed cup does not flash
Flammability (solid, gas)	:	The product is not flammable.
Auto-ignition temperature	:	does not ignite
Relative density	:	2,07 (20 - 23 °C)
Density	:	2,07 g/cm3 (20 - 23 °C)

Solubility(ies)
Water solubility : 293 g/l soluble

Thermal decomposition : > 700 °C

9.2 Other information

Molecular weight : 262,89 g/mol

SECTION 10: Stability and reactivity

10.1 Reactivity

No data available

10.2 Chemical stability

No decomposition if stored and applied as directed.

10.3 Possibility of hazardous reactions

Hazardous reactions : None reasonably foreseeable.

No decomposition if stored and applied as directed.

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

No data available

10.6 Hazardous decomposition products

No decomposition if stored and applied as directed.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

Components:

Nickel Sulphate Hexahydrate:

Acute oral toxicity : LD50 (Rat): 361,9 mg/kg
Method: OECD Test Guideline 425
GLP: yes

Acute inhalation toxicity : LC50 (Rat): 2,48 mg/l
Exposure time: 4 h
Test atmosphere: dust/mist
Method: OECD Test Guideline 403
GLP: yes

Acute dermal toxicity : Assessment: No data available

Skin corrosion/irritation

Product:

Remarks: May cause skin irritation and/or dermatitis.

Components:

Nickel Sulphate Hexahydrate:
Species: Rabbit
Method: OECD Test Guideline 404
Result: No skin irritation

Species: human skin
Result: Skin irritation

Serious eye damage/eye irritation

Components:

Nickel Sulphate Hexahydrate:
Species: Rabbit
Method: OECD Test Guideline 405
Result: No eye irritation
GLP: yes

Respiratory or skin sensitisation

Product:

Remarks: Causes sensitisation.

Components:

Nickel Sulphate Hexahydrate:
Exposure routes: Inhalation
Species: Humans
Result: May cause sensitisation by inhalation.

Exposure routes: Skin contact
Species: Guinea pig
Result: May cause sensitisation by skin contact.

Germ cell mutagenicity

Components:

Nickel Sulphate Hexahydrate:
Genotoxicity in vitro : Test species: Mammalian-Animal
Result: positive
GLP: no

: Test species: Humans
Result: positive
GLP: no

Genotoxicity in vivo : Test Type: Micronucleus test
Test species: Rat
Application Route: Oral
Dose: 125, 250, 500
Method: OECD Test Guideline 474
Result: negative

Carcinogenicity

Components:

Nickel Sulphate Hexahydrate:
Species: Rat, (male and female)
Application Route: Inhalation
Exposure time: 104 weeks
Activity duration: 6 h
Dose: 0,027; 0,056; 0,11 mg/m³
Frequency of Treatment: day
NOAEL: No observed adverse effect level: 0,11 mg/m³
Result: negative
GLP: yes
Remarks: unit expressed as mg metal/kg

Species: Rat, (male and female)
Application Route: Oral
Exposure time: 104 weeks
Dose: 10; 30; 50 mg/kg body weight
Frequency of Treatment: daily
NOAEL: No observed adverse effect level: 11 mg/kg bw/day
Method: OECD Test Guideline 451
Result: negative
GLP: yes
Remarks: unit expressed as mg metal/kg

Species: Mouse, (male and female)
Application Route: Inhalation
Exposure time: 104 weeks
Dose: 0; 0,25; 0,5; 1 mg/m³
NOAEL: No observed adverse effect level: 0,22 mg/m³
Result: negative
Remarks: unit expressed as mg metal/kg

Reproductive toxicity

STOT - single exposure

STOT - repeated exposure

Components:

Nickel Sulphate Hexahydrate:
Assessment: Causes damage to organs through prolonged or repeated exposure.

Repeated dose toxicity

Components:

Nickel Sulphate Hexahydrate:
Species: Rat, male and female
NOAEL: 2,2 mg/kg
LOAEL: 6,7 mg/kg
Application Route: Oral
Exposure time: 104 weeks
Dose: 10; 30; 50
GLP: yes
Remarks: unit expressed as mg metal/kg

Species: Rat, male and female
NOAEL: 0,12
LOAEL: 0,056
Application Route: Inhalation
Exposure time: 104 weeks
Dose: 0,027; 0,056; 0,11
GLP: yes
Target Organs: Lungs
Remarks: unit expressed as mg metal/kg

Aspiration toxicity

Further information

Product:

Remarks: No data available

SECTION 12: Ecological information

12.1 Toxicity

Components:

Nickel Sulphate Hexahydrate:

Toxicity to fish	:	LC50 (Pimephales promelas (fathead minnow)): 0,4 mg/l Exposure time: 4 DAYS Method: OECD Test Guideline 203 Remarks: Fresh water
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia dubia (water flea)): 0,013 mg/l Exposure time: 48 h
Toxicity to algae	:	EC50 (Chlamydomonas sp.): 0,0588 mg/l Exposure time: 72 h Remarks: Fresh water EC10 (Chlamydomonas sp.): 0,0204 mg/l Exposure time: 72 h Remarks: Fresh water

M-Factor (Acute aquatic toxicity)	:	1, The data in this record has been derived from the water-free form of this substance.
Toxicity to fish (Chronic toxicity)	:	NOEC: 0,057 mg/l Exposure time: 32 DAYS Species: Pimephales promelas (fathead minnow) Remarks: Fresh water
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	EC10: 0,0028 mg/l Exposure time: 21 DAYS Species: Daphnia dubia (water flea) Remarks: Fresh water
M-Factor (Chronic aquatic toxicity)	:	1, The data in this record has been derived from the water-free form of this substance.

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

Components:

Nickel Sulphate Hexahydrate:

Bioaccumulation	:	Bioconcentration factor (BCF): > 1.631 Method: field study Remarks: terrestrial environment Based on read across from structural related substance: Bioconcentration factor (BCF): 270 Method: field study Remarks: Fresh water Based on read across from structural related substance:

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

Product:

Assessment	:	This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher..

12.6 Other adverse effects

Product:

Additional ecological information	:	Remarks: An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Very toxic to aquatic life with long lasting effects.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product : The product should not be allowed to enter drains, water courses or the soil.
Dispose of in accordance with the European Directives on waste and hazardous waste.
In accordance with local and national regulations.
Do not contaminate ponds, waterways or ditches with chemical or used container.
According to the European Waste Catalogue, Waste Codes are not product specific, but application specific.
Waste codes should be assigned by the user, preferably in discussion with the waste disposal authorities.
Send to a licensed waste management company.

Contaminated packaging : Empty remaining contents.
Dispose of as unused product.
Do not re-use empty containers.

SECTION 14: Transport information

14.1 UN number

ADN : UN 3077

ADR : UN 3077

RID : UN 3077

IMDG : UN 3077

IATA : UN 3077

14.2 UN proper shipping name

ADN : ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.
(Nickel Sulphate Hexahydrate)

ADR : ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.
(Nickel Sulphate Hexahydrate)

RID : ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.
(Nickel Sulphate Hexahydrate)

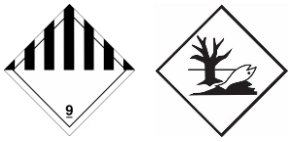
IMDG : ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.
(Nickel Sulphate Hexahydrate)

IATA : Environmentally hazardous substance, solid, n.o.s.
(Nickel Sulphate Hexahydrate)

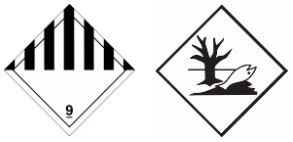
14.3 Transport hazard class(es)

ADR : 9

RID : 9



IMDG : 9



IATA : 9

14.4 Packing group

ADN

Packing group	:	III
Classification Code	:	M7
Hazard Identification Number	:	90
Labels	:	9

ADR

Packing group	:	III
Classification Code	:	M7
Hazard Identification Number	:	90
Labels	:	9
Tunnel restriction code	:	(E)
Limited quantity	:	5.00 KG

RID

Packing group	:	III
Classification Code	:	M7
Hazard Identification Number	:	90
Labels	:	9

IMDG

Packing group	:	III
Labels	:	9
EmS Code	:	F-A, S-F

IATA

Packing instruction (cargo aircraft)	:	956

Maximum quantity	:	400.00 KG
Packing instruction (passenger aircraft)	:	956
Maximum quantity	:	400.00 KG
Packing instruction (LQ)	:	Y956
Packing group	:	III
Labels	:	Miscellaneous

14.5 Environmental hazards

ADN
Environmentally hazardous : yes

ADR
Environmentally hazardous : yes

RID
Environmentally hazardous : yes

IMDG
Marine pollutant : yes

14.6 Special precautions for user

Not applicable

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable for product as supplied.

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

Regulation (EC) No 649/2012 of the European Parliament and the Council concerning the export and import of dangerous chemicals	:	Not applicable
REACH - Candidate List of Substances of Very High Concern for Authorisation (Article 59).	:	Not applicable
Regulation (EC) No 1005/2009 on substances that deplete the ozone layer	:	Not applicable
Regulation (EC) No 850/2004 on persistent organic pollutants	:	Not applicable

Seveso III: Directive 2012/18/EU of the European Parliament and of the Council on the control of major-accident hazards involving dangerous substances.

		Quantity 1	Quantity 2
E1	ENVIRONMENTAL HAZARDS	100 t	200 t

15.2 Chemical Safety Assessment

A Chemical Safety Assessment has been carried out for this substance.

SECTION 16: Other information

Further information

Other information : The Exposure Scenario is currently not incorporated in the SDS. It can be provided upon request by your regular SDS contact person.

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Bright Tin
CULMO 1

Bright Tin CULMO 1 is a sulphuric acid based electrolyte which is mainly applied for printed circuit boards manufacturing, electro-technical component finishing - also in barrel application -, and in the field of household accessories as well.

Bright Tin CULMO 1 deposits fully bright tin coatings in an extremely wide range of throwing power. High stability and easy maintenance are the features of this bright tin electrolyte.

Bright tin layers of any thickness are deposited from Bright Tin CULMO 1. Even thin layers are bright, and the brightness still improves with increasing layer thickness due to the good levelling quality. The tin deposits from Bright Tin CULMO 1 are resistant towards fingerprints to a great extent and also solderability is still excellent after prolonged storage periods.

The information in this data sheet is based on laboratory as well as practical experience. Figures quoted for operating limits and replenishment quantities are for guidance. Actual values necessary will depend on the components being plated (material and geometry), their application and plating plant conditions.

Important:
Please read this instruction carefully prior to the use of the process and carefully follow all the parameters that have a direct influence on the operation. We reserve the right to make technical changes. In the interest of safety, please pay attention to the hazard warnings on the labels of the containers. The minimum shelf life of the products is included on the labels and is also available in the appropriate Quality Assurance (QA03).
The current IMDS number of the layer deposited from the process is available on the internet at www.schloetter.com/downloads.
For the storage of chemical products the TRGS 510 must be followed.
If the additives used in this process contain a SVHC-substance, then this will be specified in the corresponding Material Safety Data Sheet, section 15.

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1.0 TECHNICAL INFORMATION AND EQUIPMENT REQUIREMENTS

Tanks:	rubber-lined steel, polypropylene or PVC
Local Exhaust Ventilation:	not required
Part/Electrolyte Agitation:	**Printed Circuit Boards (PCBs):** work piece movement from and to the anodes, at a rate of 0.5 - 0.8 m/min, stroke length approx. 30 mm **Rack application:** parallel to the anodes, at a rate of 3 - 4 m/min, stroke length approx. 50 - 70 mm **Barrel application:** barrel rotation 4 - 6 rpm
Filtration:	continuous, 2 - 3 turnovers per hour
Anodes:	pure tin, min. 99.90 %, preferably 99.93 % according to DIN EN 610; higher impurities would increase the formation of anode sludge
Anode bags:	polypropylene fabric
Cooling:	plastic coated steel pipes, thin-walled plastic pipes or stainless steel 1.4571

NB
Titanium should not be used for cooling coils or anode hooks. Plastic coated anode hooks are especially recommended for tin electrolytes.

2.0 MAKE-UP AND OPERATING CONDITIONS

2.1 Product names

List of products required		
Product name	**Article no. (AN)**	**SG**
Sulphuric acid, conc. (96 %) chem. pure	supplied by user*	1.84
Tin Salt SU	100000	--
Starter CULMO 1 (for new make-up see point **4.3**)	101501	1.03
Brightener CULMO 2	101502	1.00
Additive CULMO AN 11 1	101508	1.03
Additive CULMO IRA 1	101507	1.00
Corrector ACR (see point **4.6**)	100019	1.00

***** The current product qualities respectively -specifications recommended by us can be found on the internet at www.schloetter.com/downloads.

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2.2 Requirements for a 100 litre bath

2.2.1 when used as barrel application

Product name	AN	SG	Quantity	
Sulphuric acid, conc. (96 %) chem. pure	--	1.84	10	ltr.
Tin Salt SU	100000	--	3	kg
Starter CULMO 1	101501	1.03	3	ltr.

2.2.2 when used as rack application (high current densities)

Product name	AN	SG	Quantity	
Sulphuric acid, conc. (96 %) chem. pure	--	1.84	6.5	ltr.
Tin Salt SU	100000	--	6	kg
Starter CULMO 1	101501	1.03	3	ltr.

2.2.3 when used for the processing of PCBs

Product name	AN	SG	Quantity	
Sulphuric acid, conc. (96 %) chem. pure	--	1.84	10	ltr.
Tin Salt SU	100000	--	4	kg
Starter CULMO 1	101501	1.03	3	ltr.

2.3 Make-up sequence for a 100 litre bath

All tanks and equipment to be used should be thoroughly cleaned prior to use.

- fill 70 litres of deionised water into the tank
- add the required quantity of sulphuric acid, conc. (96 %) chem. pure while stirring constantly; observe safety measures!
- add the required quantity of Tin Salt SU while stirring vigorously and dissolve completely
- cool to operating temperature
- add the required quantity of Starter CULMO 1
- mix well
- make up to final volume with deionised water
- mix thoroughly
-

The electrolyte is ready for use when the operating temperature has been reached.

NB
When making-up the electrolyte, it has to be taken into consideration that the temperature of the solution raises quickly by the exothermic reaction which forms by the addition sulphuric acid, conc. (96 %) chem. pure. If the sulphuric acid is added too quickly, an intensive heat can develop which causes spattering of the corrosive liquid.
It's absolutely necessary to observe the safety measures applicable to make-up and handling (protective clothing, goggles, rubber gloves).

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2.4 Concentrations and operating conditions

2.4.1 when used as barrel application

	Range	Optimum	
Tin(II)		15	g/l
Free sulphuric acid	85 - 108 160 - 200	100 185	ml/l g/l
Starter CULMO 1	25 - 35	30	ml/l
Temperature range	10 - 25	18	°C
Cathodic current density	min. 0.6	--	A/dm²
Anodic current density	< 2.5	--	A/dm²
Deposition rate at 2 A/dm²	approx. 1.0		µm/min.

2.4.2 when used as rack application (high current densities)

	Range	Optimum	
Tin(II)		15	g/l
Free sulphuric acid		65 120	ml/l g/l
Starter CULMO AT 1	25 - 35	30	ml/l
Temperature range	10 - 25	18	°C
Cathodic current density	2 - 4	--	A/dm²
Anodic current density	< 2.5	--	A/dm²
Deposition rate at 2 A/dm²	approx. 1.0		µm/min.

2.4.3 when used for the processing of PCBs

	Range	Optimum	
Tin(II)		20	g/l
Free sulphuric acid		100 185	ml/l g/l
Starter CULMO AT 1	25 - 35	30	ml/l
Temperature range	10 - 25	18	°C
Cathodic current density	1.5 - 2	--	A/dm²
Anodic current density	< 2.5	--	A/dm²
Deposition rate at 2 A/dm²	approx. 1.0		µm/min.

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2.5 Consumption and replenishment

Consumption of the additives is mainly due to drag-out.

Approximate values for replenishment:

Additive	Replenishment / Consumption
Brightener CULMO 2	approx. 2.5 l/10 kAh

Depending in the local drag-out losses the following replenishment is required:

Additive	Replenishment / Consumption
Additive CULMO AN 11	approx. 4 ml/m² surface throughput
Additive CULMO IRA 1	approx. 1 ml/m² surface throughput

2.6 Deposit characteristics

Hardness of the tin deposit: 20 - 30 $HV_{0.05}$

3.0 PROCESS SEQUENCE

Our technical field service or service department will be pleased to provide you with detailed information on suitable process sequences respectively methods upon request.

3.1 Pre-treatment

Steel or copper parts are pre-treated as usual followed by dipping into diluted sulphuric acid and then transferred into Bright Tin CULMO 1. Please note that hydrochloric acid solutions may not be used in the pre-treatment process. Chloride contamination ≥ 0.3 g/l lead to irreparable disturbances in the form of matt tin deposition that starts in the low current density range.

Non-ferrous metal alloys containing zinc cannot be tin plated directly, since zinc would diffuse from the base material into the tin layer above even at room temperature. Therefore a 3 - 5 µm intermediate copper- or nickel layer as diffusion barrier should be plated. Therefore an intermediate copper- or nickel layer is applied as a diffusion barrier. Intermediate copper layers should be deposited from acidic- or cyanide high performance electrolytes. The adhesion of the tin layers would decrease if intermediate copper layers are deposited from additive-free cyanide pre-copper electrolytes.

Printed circuit boards is rinsed immediately after the electroplated copper deposition, followed by dipping into sulphuric acid, conc. (96 %) chem. pure (50 ml/l) and then transferred into Bright Tin CULMO 1. The copper layer may be precautionary activated in an aqueous sodium peroxodisulfate solution (100 g/l of sodium peroxodisulfate solution, 30 ml/l of sulphuric acid). Then it's carefully rinsed and also dipped into diluted sulphuric acid and immediately tin plated.

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3.2 Process sequences

Base material steel	Base material copper	Printed Circuit Boards (PCBs)
• immersion degreasing • rinsing • pickling in HCl diluted 1:1 • rinsing throughly • electrolytic degreasing, anodically • rinsing • acid dipping in **sulphuric acid**, (10 %) • rinsing • tin plating in Bright Tin CULMO 1 • rinsing • drying	• immersion degreasing • rinsing • electrolytic degreasing, anodically • rinsing • acid dipping in **sulphuric acid**, (10 %) • rinsing • tin plating Bright Tin CULMO 1 • rinsing • drying	• through hole plating • pattern plating • acid cleaner • rinsing • micro-etch • rinsing • acid dipping in **sulphuric acid**, (10 %) • copper plating in a sulfuric copper electrolyte • rinsing • acid dipping in **sulphuric acid**, (10 %) • rinsing • tin plating in Bright Tin CULMO 1 • rinsing • drying

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4.0 MAINTENANCE AND FUNCTION OF THE INDIVIDUAL BATH COMPONENTS

4.1 Tin

The tin content depends on the electrolyte application and should range between 10 and 30 g/l. The optimum for barrel parts is 15 g/l and for parts with difficult surface geometry or PCBs at 20 g/l.
If high demand is set on deposition speed, current densities of up to 4 A/dm² can be plated with a tin content of 30 g/l, but it would however impair the metal distribution. Lack of tin is replenished with Tin Salt SU (50 % tin).

4.2 Sulphuric acid

The sulphuric acid concentration should not fall below 85 ml/l or 160 g/l, except for the "rack high current density - version". As optimum concentration 100 ml/l respectively 185 g/l and max. 108 ml/l respectively 200 g/l are recommended. A higher concentration of sulfuric acid leads to disturbances caused by anode passivation and must therefore be avoided. In the high current density version with 30 g/l tin the optimum content of sulphuric acid is approx. 65 ml/l respectively 120 g/l. Lack of acid is replenished with sulphuric acid, conc. (96 %) chem. pure acid only.

4.3 Starter CULMO 1

Starter CULMO 1 is only used for make-up of a new electrolyte and contains all components required for deposition. The concentration should be 25 - 35 ml/l. The single components Brightener CULMO 2, Additive CULMO IRA 1 and Additive CULMO AN 11 1 are used for replenishment during electrolyte operation.

4.4 Brightener CULMO 2

Brightener CULMO 2 is responsible for the good brightness over the entire current density range. Lack of Brightener CULMO 2 starts with decreasing brightness in the low current density range. Lack of Brightener CULMO 2 can first of all be recognized by a decrease of brightness in the low current density area. At parts with a large surface, processed with low electrolyte agitation, the lack of brightener can be recognized by matt zones. Then, additions of 1 - 2 ml/l Brightener CULMO 2 are required.

First of all, excess dosing of Brightener CULMO 2 leads in areas with a favourable electrolyte flow (breakthroughs) to a matt-, partly stepped tin deposition with a brownish discolouration. In an extreme case the deposition will be completely inhibited. At parts with a large surface excess dosing is recognized by burnings in the high current density range. In this case the tin deposition is matt with a brownish discoloration. Excess dosing can be compensated (see point **4.5**) by the addition of the Additives CULMO AN 11 1 and IRA 1.
The continuous consumption of Brightener CULMO 2 is at a operating temperature of approx. 20 °C about 2.5 l/10 kAh. At a higher temperature an increased consumption must be expected.

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4.5 Additives CULMO IRA 1 and AN 11 1

The Additives CULMO IRA 1 and CULMO AN 11 1, are only indirectly involved in the brightening effect of the electrolyte. Both additives are consumed due to drag-out losses. Normally, 4 ml of Additive CULMO AN 11 1 and 1 ml of Additives CULMO IRA 1 must be added per m² surface throughput.

Lack of the Additives CULMO IRA 1 and CULMO AN 11 1 cause almost the same faulty depositions as described for excess dosing of Brightener CULMO 2 (see point **4.4).** Incremental additions of a total of 3 ml/l Additives CULMO IRA 1 followed by up to 20 ml/l of Additive CULMO AN 11 1 are may be required. If accidentally too much of the Additives CULMO IRA 1 and CULMO AN 11 1 is dosed, then this will result in decreasing brightness of the deposited tin coatings but can be corrected by an addition of 1 - 2 ml/l Starter CULMO 1. Although the alternating correction may be repeated but leads to an uneconomical and unnecessary raise of the total organic concentration and in some cases soldering problems cannot be excluded.

4.6 Corrector ACR

Corrector ACR contains an auxiliary brightener component which is partly included in Additive CULMO IRA 1. The required component concentration is maintained by continuous replenishment of Additive CULMO IRA 1. However, depending on the local working conditions, a lack can occur (see point **4.5**).
We recommend an addition of Corrector ACR if despite of an addition of 1 - 2 ml/l Additive CULMO IRA 1 the problem with step plating cannot be solved and so the deposition not be improved.
Additions with Corrector ACR should be performed in increments of 1 up to max. 5 ml/l.

4.7 Bright tin plating in barrel plants

In barrel application sufficient rectifier capacity must be available during plating. The current density should be > 0.6 A/dm² and the anode surface must be in such a dimension that the anodic current density does not exceed 2.5 A/dm². Too small anode surfaces lead to anode passivation and to oxidation of Sn(II) to Sn(IV). Combining rack and barrel application is not recommended since different operating conditions would require different dosing quantities of the additives which would result in bath instability.

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5.0 TROUBLE SHOOTING

5.1 Fault finding chart

Fault	Cause	Correction
step plating	extremely high concentration of Brightener CULMO 2	add 1 - 2 ml/l of Additive CULMO IRA 1 **and/or** 5 ml/l of CULMO AN 11 1; repeat the addition if required
dark rings around boreholes		work the electrolyte through for maybe 1 - 2 h/2 A/dm²
total inhibition of the tin deposition (no deposition around boreholes, no deposition on a large area		
frosted deposition around boreholes		
strong hydrogen formation at the cathode		
formation of pores in the high current density range	minor excess dosing of Brightener CULMO 2	add 1 - 2 ml/l of Additive CULMO IRA 1 **and/or** 5 ml/l of Additive CULMO AN 11 1
matt deposition in the low current density range	lack of Brightener CULMO 2	addition 1 - 2 ml/l of Brightener CULMO 2
	electrolyte temperature is too high	decrease the temperature to e.g. 15 °C
	tin content too high	dilute the electrolyte to optimum
	chloride contamination	it can be tried to correct chloride contaminations up to approx. 300 mg/l by incremental additions of 1 ml/l ; Brightener CULMO 2; at contaminations > 300 mg/l the electrolyte must be replaced by a new make-up
hazy or milky matt deposition in the entire current density range	lack of Brightener CULMO 2	incremental additions of 1 ml/l Brightener CULMO 2

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Fault	Cause	Correction
white-grey coating on the anodes	the anodic current density is too high (> 2,5 A/dm²)	increase the anode surface
the anodes are passive		
pitting, uneven erosion of the anode	sulphuric acid content too high	analyse the electrolyte and adjust to optimum
	poor flow conditions in the plating tank	improve the electrolyte exchange at the anode, e.g. by cleaning of the anode bags

6.0 EFFLUENT

Legal regulations must be observed for disposal of the Bright Tin CULMO 1. Different regulations normally apply for the additives and the ready-made electrolyte. Please refer to section **13** of the appropriate Material Safety Data Sheet for disposal code and recommendations.

The following detoxification sequence is only considered to be an aid:

Bright Tin CULMO 1 doesn't contain complexing agents. The rinse waters resulting from Bright Tin CULMO 1 are acidic and contain dissolved tin(II) sulphate as well as Sn(IV)-compounds (metastannic acid) as suspended particles. Resulting rinse waters must therefore be neutralised to insoluble tin hydrate and sedimented. The sedimentation, depending on the effluent plant, must if necessary be supported by a flocculant.

7.0 SAFETY

Reasonable care is required when handling chemical products. Only personnel specially trained on working with chemicals should be deployed with their handling.
EC Material Safety Data Sheets must be made available to all personnel dealing with the chemicals to ensure they have all required information about product composition, hazards identification, first-aid measures, handling and storage, exposure controls, toxicological and ecological information, etc. It is required to ensure the supply and use of suitable protective clothing and -equipment.

The user must verify the designated purpose of the electrolyte. Previous experience has shown that not all metal surfaces are suitable for a trouble-free electroplating.

The above mentioned data are made according to our best knowledge. Consistent operation of the working solution requires appropriate maintenance. Bright Tin CULMO 1 is a process of Dr.-Ing. Max Schlötter GmbH & Co KG. It can only be operated with the products described in this technical data sheet. Use of other chemicals (also partly) will impair quality and invalidates our service- and quality commitments (quality assurance).

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SECTION 1: Identification of the substance/mixture and of the company/undertaking

· **1.1 Product identifier**

· **Trade name: Sulphuric Acid 96%**

· **Article number:** 601890
· **CAS Number:** 7664-93-9
· **EINECS Number:** 231-639-5
· **Index number:** 016-020-00-8
· **Registration number** 01-2119458838-20-XXXX
· **1.2 Relevant identified uses of the substance or mixture and uses advised against**
No further relevant information available.
· **Application of the substance / the mixture** Raw material for laboratory and industrial use.

· **1.3 Details of the supplier of the safety data sheet**
· **Manufacturer/Supplier:**
Schlötter Ireland DAC
5 Pine Road,
Naas Enterprise Park,
Naas, Co. Kildare
Ireland
W91 KH68

Tel: +353 (0)45 447400 (09:00 - 17:00 Hrs)
Fax: +353 (0)45 447478
sds@schlotter.ie

· **Further information obtainable from:** Product safety department.
· **1.4 Emergency telephone number:**
National Poisons Information Centre at Beaumont Hospital,
PO Box 1297,
Beaumont Road,
Dublin 9
Phone 01 8092566
www.poisons.ie

Outside Ireland;
University of Freiburg
Poisoning-Information-Center
+49(0)761-19240 (24h, 365 days/year)
Information in German and English
http://www.giftberatung.de/

SECTION 2: Hazards identification

· **2.1 Classification of the substance or mixture**
· **Classification according to Regulation (EC) No 1272/2008**

GHS05 corrosion

Skin Corr. 1A H314 Causes severe skin burns and eye damage.
Eye Dam. 1 H318 Causes serious eye damage.

· **2.2 Label elements**
· **Labelling according to Regulation (EC) No 1272/2008**
The product is classified and labelled according to the CLP regulation.

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· **Hazard pictograms**

GHS05

· **Signal word** Danger

· **Hazard-determining components of labelling:**
sulphuric acid
· **Hazard statements**
H314 Causes severe skin burns and eye damage.
· **Precautionary statements**

P260	Do not breathe dusts or mists.
P264	Wash thoroughly after handling.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P405	Store locked up.
P501	Dispose of contents/container in accordance with local/regional/national/international regulations.

· **2.3 Other hazards**
· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.

SECTION 3: Composition/information on ingredients

· **3.2 Chemical characterisation: Mixtures**
· **Description:** Mixture of substances listed below with nonhazardous additions.

· **Dangerous components:**

CAS: 7664-93-9 EINECS: 231-639-5	sulphuric acid	Skin Corr. 1A, H314	90-100%

· **Additional information:** For the wording of the listed hazard phrases refer to section 16.

SECTION 4: First aid measures

· **4.1 Description of first aid measures**
· **General information:** Immediately remove any clothing soiled by the product.
· **After inhalation:**
In case of unconsciousness place patient stably in side position for transportation.
Move the exposed person to fresh air at once.
· **After skin contact:** Immediately wash with water and soap and rinse thoroughly.
· **After eye contact:** Rinse opened eye for several minutes under running water. Then consult a doctor.
· **After swallowing:** Drink plenty of water and provide fresh air. Call for a doctor immediately.
· **4.2 Most important symptoms and effects, both acute and delayed** No further relevant information available.
· **4.3 Indication of any immediate medical attention and special treatment needed**
No further relevant information available.

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SECTION 5: Firefighting measures

· ***5.1 Extinguishing media***
· ***Suitable extinguishing agents:***
CO2, powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
· ***5.2 Special hazards arising from the substance or mixture***
During heating or in case of fire poisonous gases are produced.
· ***5.3 Advice for firefighters***
· ***Protective equipment:*** *Mouth respiratory protective device.*

SECTION 6: Accidental release measures

· ***6.1 Personal precautions, protective equipment and emergency procedures***
Mount respiratory protective device.
Wear protective equipment. Keep unprotected persons away.
· ***6.2 Environmental precautions:***
Dilute with plenty of water.
Do not allow to enter sewers/ surface or ground water.
· ***6.3 Methods and material for containment and cleaning up:***
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
Use neutralising agent.
Dispose contaminated material as waste according to item 13.
Ensure adequate ventilation.
· ***6.4 Reference to other sections***
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

SECTION 7: Handling and storage

· ***7.1 Precautions for safe handling***
Ensure good ventilation/exhaustion at the workplace.
Prevent formation of aerosols.
Wear full protective clothing for prolonged exposure and/or high concentrations.
· ***Information about fire - and explosion protection:*** *Keep respiratory protective device available.*

· ***7.2 Conditions for safe storage, including any incompatibilities***
· ***Storage:*** *Please see Section 10.5 for information on storage incompatibilities.*
· ***Requirements to be met by storerooms and receptacles:*** *No special requirements.*
· ***Information about storage in one common storage facility:*** *Not required.*
· ***Further information about storage conditions:*** *Keep container tightly sealed.*
· ***Storage class:*** *Corrosive.*
· ***7.3 Specific end use(s)*** *No further relevant information available.*

SECTION 8: Exposure controls/personal protection

· ***Additional information about design of technical facilities:*** *No further data; see item 7.*

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· ***8.1 Control parameters***

· ***Ingredients with limit values that require monitoring at the workplace:***	
7664-93-9 sulphuric acid	
OEL	*Long-term value: 0.05 mg/m³* *IOELV*

· ***Additional information:*** *The lists valid during the making were used as basis.*

· ***8.2 Exposure controls***
· ***Personal protective equipment:***
· ***General protective and hygienic measures:***
Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing
Wash hands before breaks and at the end of work.
Avoid contact with the eyes.
Avoid contact with the eyes and skin.
· ***Respiratory protection:***
In case of brief exposure or low pollution use respiratory filter device. In case of intensive or longer exposure use self-contained respiratory protective device.
· ***Protection of hands:***

Protective gloves

Protective gloves conforming to standard EN374 should be used.
The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation
If a spill occurs change gloves immediately, dispose of contaminated gloves safely.
· ***Material of gloves***
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.
· ***Penetration time of glove material***
The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.
Value for the penetration time on Nitrile gloves: Level ≤ 10 minutes
· ***Eye protection:***

Tightly sealed goggles conforming with standard EN 166.

SECTION 9: Physical and chemical properties

· ***9.1 Information on basic physical and chemical properties***
· ***General Information***
· ***Appearance:***

Form:	*Liquid*
Colour:	*Colourless to Yellow*
· ***Odour:***	*Acrid*

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· **Odour threshold:**	Not determined.
· **pH-value at 20 °C:**	< 1
· **Change in condition**	
Melting point/freezing point:	Undetermined.
Initial boiling point and boiling range:	360 °C
· **Flash point:**	Not applicable.
· **Flammability (solid, gas):**	Not applicable.
· **Ignition temperature:**	
Decomposition temperature:	Not determined.
· **Auto-ignition temperature:**	Product is not selfigniting.
· **Explosive properties:**	Product does not present an explosion hazard.
· **Explosion limits:**	
Lower:	Not determined.
Upper:	Not determined.
· **Vapour pressure at 20 °C:**	<0.01 hPa
· **Density at 20 °C:**	1.84 g/cm³
· **Relative density**	Not determined.
· **Vapour density**	Not determined.
· **Evaporation rate**	Not determined.
· **Solubility in / Miscibility with water:**	Fully miscible.
· **Partition coefficient: n-octanol/water:**	Not determined.
· **Viscosity:**	
Dynamic:	Not determined.
Kinematic:	Not determined.
· **Solvent content:**	
Organic solvents:	0.0 %
VOC (EC)	0.00 %
· **9.2 Other information**	No further relevant information available.

SECTION 10: Stability and reactivity

· **10.1 Reactivity** Reacts violently with water.
· **10.2 Chemical stability**
· **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
· **10.3 Possibility of hazardous reactions** No dangerous reactions known.
· **10.4 Conditions to avoid** Reacts with alkalis and amines generating excessive heat.
· **10.5 Incompatible materials:**
Materials To Avoid
Bases, alkalis (inorganic). Massive, solid metal. Powdered metal. Water, steam, water mixtures. Chemically active metals. Alkali metals.
· **10.6 Hazardous decomposition products:** Very toxic gases/vapours/fumes of: Sulphur.

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SECTION 11: Toxicological information

· ***11.1 Information on toxicological effects***
· ***Acute toxicity*** *Based on available data, the classification criteria are not met.*
· ***Primary irritant effect:***
· ***Skin corrosion/irritation***
Causes severe skin burns and eye damage.
· ***Serious eye damage/irritation***
Causes serious eye damage.
· ***Respiratory or skin sensitisation*** *Based on available data, the classification criteria are not met.*
· ***CMR effects (carcinogenity, mutagenicity and toxicity for reproduction)***
· ***Germ cell mutagenicity*** *Based on available data, the classification criteria are not met.*
· ***Carcinogenicity*** *Based on available data, the classification criteria are not met.*
· ***Reproductive toxicity*** *Based on available data, the classification criteria are not met.*
· ***STOT-single exposure*** *Based on available data, the classification criteria are not met.*
· ***STOT-repeated exposure*** *Based on available data, the classification criteria are not met.*
· ***Aspiration hazard*** *Based on available data, the classification criteria are not met.*

SECTION 12: Ecological information

· ***12.1 Toxicity***
· ***Aquatic toxicity:*** *No further relevant information available.*
· ***12.2 Persistence and degradability*** *No further relevant information available.*
· ***12.3 Bioaccumulative potential*** *No further relevant information available.*
· ***12.4 Mobility in soil*** *No further relevant information available.*
· ***Additional ecological information:***
· ***General notes:***
Water hazard class 1 (German Regulation) (Self-assessment): slightly hazardous for water
Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
Must not reach sewage water or drainage ditch undiluted or unneutralised.
Rinse off of bigger amounts into drains or the aquatic environment may lead to decreased pH-values. A low pH-value harms aquatic organisms. In the dilution of the use-level the pH-value is considerably increased, so that after the use of the product the aqueous waste, emptied into drains, is only low water-dangerous.
· ***12.5 Results of PBT and vPvB assessment***
· ***PBT:*** *Not applicable.*
· ***vPvB:*** *Not applicable.*
· ***12.6 Other adverse effects*** *No further relevant information available.*

SECTION 13: Disposal considerations

· ***13.1 Waste treatment methods***
· ***Recommendation***
Must not be disposed together with household garbage. Do not allow product to reach sewage system.

· ***Uncleaned packaging:***
· ***Recommendation:*** *Disposal must be made according to official regulations.*
· ***Recommended cleansing agents:*** *Water, if necessary together with cleansing agents.*

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SECTION 14: Transport information

· **14.1 UN-Number**	
· **ADR, IMDG, IATA**	UN1830
· **14.2 UN proper shipping name**	
· **ADR**	UN1830 SULPHURIC ACID
· **IMDG, IATA**	SULPHURIC ACID
· **14.3 Transport hazard class(es)**	
· **ADR, IMDG, IATA**	
· **Class**	8 Corrosive substances.
· **Label**	8
· **14.4 Packing group**	
· **ADR, IMDG, IATA**	II
· **14.5 Environmental hazards:**	Not applicable.
· **14.6 Special precautions for user**	Warning: Corrosive substances.
· **Danger code (Kemler):**	80
· **EMS Number:**	F-A,S-B
· **Segregation groups**	Acids
· **Stowage Category**	E
· **Stowage Code**	SW15 For metal drums, stowage category B.
· **14.7 Transport in bulk according to Annex II of Marpol and the IBC Code**	Not applicable.
· **Transport/Additional information:**	
· **ADR**	
· **Limited quantities (LQ)**	1L
· **Excepted quantities (EQ)**	Code: E2 Maximum net quantity per inner packaging: 30 ml Maximum net quantity per outer packaging: 500 ml
· **Transport category**	2
· **Tunnel restriction code**	E
· **IMDG**	
· **Limited quantities (LQ)**	1L
· **Excepted quantities (EQ)**	Code: E2 Maximum net quantity per inner packaging: 30 ml Maximum net quantity per outer packaging: 500 ml
· **UN "Model Regulation":**	UN 1830 SULPHURIC ACID, 8, II

SECTION 15: Regulatory information

· **15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**

· **Directive 2012/18/EU**
· **Named dangerous substances - ANNEX I** None of the ingredients is listed.
· **REGULATION (EC) No 1907/2006 ANNEX XVII** Conditions of restriction: 3

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· ***15.2 Chemical safety assessment:*** *A Chemical Safety Assessment has not been carried out.*

SECTION 16: Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

· ***Relevant phrases***
H314 Causes severe skin burns and eye damage.

· ***Department issuing SDS:*** *Product safety department.*
· ***Contact:*** *Ms. Jennifer Habenicht*
· ***Abbreviations and acronyms:***
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
IATA: International Air Transport Association
GHS: Globally Harmonised System of Classification and Labelling of Chemicals
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
VOC: Volatile Organic Compounds (USA, EU)
PBT: Persistent, Bioaccumulative and Toxic
vPvB: very Persistent and very Bioaccumulative
Skin Corr. 1A: Skin corrosion/irritation – Category 1A
Eye Dam. 1: Serious eye damage/eye irritation – Category 1

AL. BATH 23

Cu - Bath 7

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SECTION 1: Identification of the substance/mixture and of the company/undertaking

· **1.1 Product identifier**

· **Trade name: Starter CULMO 1**

· **Article number:** 101501

· **1.2 Relevant identified uses of the substance or mixture and uses advised against**
No further relevant information available.

· **Application of the substance / the mixture** Electroplating auxiliary

· **1.3 Details of the supplier of the safety data sheet**

· **Manufacturer/Supplier:**
Dr.-Ing. Max Schlötter GmbH & Co. KG
Galvanotechnik
Talgraben 30
73312 Geislingen/Steige
Germany

· **Further information obtainable from:** E-Mail: sds@schloetter.de

· **1.4 Emergency telephone number:**
University of Freiburg
Poisoning-Information-Center
+49(0)761-19240 (24h, 365 days/year)
Information in German and English
http://www.giftberatung.de/

SECTION 2: Hazards identification

· **2.1 Classification of the substance or mixture**

· **Classification according to Regulation (EC) No 1272/2008**

Acute Tox. 4	H302	Harmful if swallowed.
Acute Tox. 4	H312	Harmful in contact with skin.
Skin Corr. 1A	H314	Causes severe skin burns and eye damage.
Skin Sens. 1	H317	May cause an allergic skin reaction.
Muta. 2	H341	Suspected of causing genetic defects.
Aquatic Chronic 3	H412	Harmful to aquatic life with long lasting effects.

· **2.2 Label elements**

· **Labelling according to Regulation (EC) No 1272/2008**
The product is classified and labelled according to the CLP regulation.

· **Hazard pictograms**

GHS05 GHS07 GHS08

· **Signal word** Danger

· **Hazard-determining components of labelling:**
Polyethylenglycol-decylether
2-(propyloxy)ethanol
Pyrocatechol
Sulphuric acid

· **Hazard statements**
H302+H312 Harmful if swallowed or in contact with skin.
H314 Causes severe skin burns and eye damage.
H317 May cause an allergic skin reaction.
H341 Suspected of causing genetic defects.
H412 Harmful to aquatic life with long lasting effects.

· **Precautionary statements**
P260 Do not breathe dusts or mists.
P280 Wear protective gloves/protective clothing/eye protection/face protection.

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P303+P361+P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310 Immediately call a POISON CENTER/doctor.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

· **2.3 Other hazards**
· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.

SECTION 3: Composition/information on ingredients

· **3.2 Chemical characterisation: Mixtures**
· **Description:** Mixture of substances listed below with nonhazardous additions.

· **Dangerous components:**		
CAS: 166736-08-9 Polymer	Polyethylenglycol-decylether Eye Dam. 1, H318; Acute Tox. 4, H302	15-<25%
CAS: 2807-30-9 EINECS: 220-548-6 Index number: 603-095-00-2 Reg.nr.: 01-2119883539-19	2-(propyloxy)ethanol Flam. Liq. 3, H226; Acute Tox. 4, H312; Eye Irrit. 2, H319	15-<25%
CAS: 68919-40-4 EINECS: 272-897-9	Cocoamphodipropionic acid Eye Dam. 1, H318; Aquatic Chronic 2, H411	≥2.5-<5%
CAS: 7664-93-9 EINECS: 231-639-5 Index number: 016-020-00-8 Reg.nr.: 01-2119458838-20	Sulphuric acid Met. Corr.1, H290; Skin Corr. 1A, H314	≥0.1-<3%
CAS: 120-80-9 EINECS: 204-427-5 Index number: 604-016-00-4	Pyrocatechol Acute Tox. 3, H301; Acute Tox. 3, H311; Muta. 2, H341; Eye Dam. 1, H318; Acute Tox. 4, H332; Skin Irrit. 2, H315; Skin Sens. 1, H317	≥1-<2%
CAS: 79-10-7 EINECS: 201-177-9 Index number: 607-061-00-8 Reg.nr.: 01-2119452449-31	acrylic acid Flam. Liq. 3, H226; Skin Corr. 1A, H314; Aquatic Acute 1, H400; Acute Tox. 4, H302; Acute Tox. 4, H312; Acute Tox. 4, H332	≥0.25-<1%

· **Additional information:** For the wording of the listed hazard phrases refer to section 16.

SECTION 4: First aid measures

· **4.1 Description of first aid measures**
· **General information:**
PERSONAL PROTECTION FOR THE FIRST AIDER.
Immediately remove any clothing soiled by the product.
Symptoms of poisoning may even occur after several hours; therefore medical observation for at least 48 hours after the accident.
· **After inhalation:**
Take affected persons into fresh air and keep quiet.
In case of unconsciousness place patient stably in side position for transportation.
Call a doctor immediately.
· **After skin contact:**
Immediately rinse with water.
If skin irritation continues, consult a doctor.
· **After eye contact:**
Rinse opened eye for several minutes under running water. Then consult a doctor.

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If present remove the contact lenses immediately.
· **After swallowing:** Drink plenty of water and provide fresh air. Call for a doctor immediately.
· **4.2 Most important symptoms and effects, both acute and delayed**
No further relevant information available.
· **4.3 Indication of any immediate medical attention and special treatment needed**
No further relevant information available.

SECTION 5: Firefighting measures

· **5.1 Extinguishing media**
· **Suitable extinguishing agents:**
CO2, powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
· **5.2 Special hazards arising from the substance or mixture**
During heating or in case of fire poisonous gases are produced.
Carbon monoxide (CO)
Sulphur dioxide (SO2)
· **5.3 Advice for firefighters**
· **Protective equipment:** Do not inhale explosion gases or combustion gases.
· **Additional information**
Collect contaminated fire fighting water separately. It must not enter the sewage system.

SECTION 6: Accidental release measures

· **6.1 Personal precautions, protective equipment and emergency procedures**
Wear protective equipment. Keep unprotected persons away.
Wear protective clothing.
· **6.2 Environmental precautions:**
Inform respective authorities in case of seepage into water course or sewage system.
Dilute with plenty of water.
Do not allow to enter sewers/ surface or ground water.
Keep contaminated washing water and dispose of appropriately.
· **6.3 Methods and material for containment and cleaning up:**
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
Use neutralising agent.
Dispose contaminated material as waste according to item 13.
Ensure adequate ventilation.
· **6.4 Reference to other sections**
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

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SECTION 7: Handling and storage

· **7.1 Precautions for safe handling**
Observe the usual precautions when handling chemicals. The substance / product may only be handled by suitably trained personnel.
Keep receptacles tightly sealed.
Ensure good ventilation/exhaustion at the workplace.
Prevent formation of aerosols.
· **Information about fire - and explosion protection:** No special measures required.
· **7.2 Conditions for safe storage, including any incompatibilities**
· **Storage:**
· **Requirements to be met by storerooms and receptacles:** Store only in the original receptacle.
· **Information about storage in one common storage facility:** Store away from foodstuffs.
· **Further information about storage conditions:**
Protect from frost.
Protect from heat and direct sunlight.

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Keep container tightly sealed.
· **Maximum storage temperature:** 40 °C
· **Minimum storage temperature:** 5 °C
· **Storage class:** 8 A
· **7.3 Specific end use(s)** No further relevant information available.

SECTION 8: Exposure controls/personal protection

· **Additional information about design of technical facilities:** No further data; see item 7.
· **8.1 Control parameters**

· **Ingredients with limit values that require monitoring at the workplace:**	
7664-93-9 Sulphuric acid	
WEL	Long-term value: 0.05* mg/m³ *mist: defined as thoracic fraction
120-80-9 Pyrocatechol	
WEL	Long-term value: 23 mg/m³, 5 ppm

· **DNELs**		
2807-30-9 2-(propyloxy)ethanol		
Dermal	exposure long term - systemic effects	3.4 mg/kg bw/day (worker)
Inhalative	exposure long term - systemic effects	36 mg/m³ (worker)
7664-93-9 Sulphuric acid		
Inhalative	exposure long term - local effects	0.05 mg/m³ (worker)
	exposure short term - local effects	0.1 mg/m³ (worker)
120-80-9 Pyrocatechol		
Dermal	exposure short term - systemic effects	2.5 mg/kg bw/day (worker)
Inhalative	exposure long term - systemic effects	1 mg/m³ (worker)
	exposure short term - systemic effects	85 mg/m³ (worker)
79-10-7 acrylic acid		
Dermal	exposure short term - local effects	1 mg/kg (worker)
Inhalative	exposure long term - local effects	30 mg/m³ (worker)
	exposure short term - local effects	30 mg/m³ (worker)

· **PNECs**	
2807-30-9 2-(propyloxy)ethanol	
PNEC	10 mg/l (sewage treatment plant)
	0.01 mg/l (marine water)
	1 mg/l (sporadic emission)
	0.1 mg/l (fresh water)
PNEC	0.0602 mg/kg (soil)
	0.0594 mg/kg (sediment marine water)
	0.594 mg/kg (sediment fresh water)
7664-93-9 Sulphuric acid	
PNEC	0.0025 mg/l (fresh water)
120-80-9 Pyrocatechol	
PNEC	0.167 µg/l (marine water)
	16.7 µg/l (sporadic emission)
	1.67 µg/l (fresh water)
PNEC	1.958 mg/l (sewage treatment plant)
PNEC	0.00417 mg/kg (soil)
	0.002576 mg/kg (sediment marine water)

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	0.02576 mg/kg (sediment fresh water)
79-10-7 acrylic acid	
PNEC	0.9 mg/l (sewage treatment plant)
	0.0003 mg/l (marine water)
	0.0013 mg/l (sporadic emission)
	0.003 mg/l (fresh water)
PNEC	1 mg/kg (soil)
	0.002346 mg/kg (sediment marine water)
	0.0236 mg/kg (sediment fresh water)

· **Additional information:** The lists valid during the making were used as basis.
· **8.2 Exposure controls**
· **Personal protective equipment:**
· **General protective and hygienic measures:**
Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing
Wash hands before breaks and at the end of work.
Do not inhale gases / fumes / aerosols.
Avoid contact with the eyes and skin.
· **Respiratory protection:**
Respiratory protection if vapours/aerosols are liberate. Particle filter with middle retention for solid and liquid particle (e.g. EN 143 or 149, Type P2 or FFP2).
For example: Composite filter type ABEK, company MSA-Auer by short or minimized exposure.
· **Protection of hands:**

Protective gloves

Check the permeability prior to each anewed use of the glove.
The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation
· **Material of gloves**
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.
Chemical-protective gloves (EN 374-1, -2, -3).
Butyl rubber, BR ≥ 0,3 mm (Level 6)
· **Penetration time of glove material**
≥ 8 h
The exact break trough time has to be found out by the manufacturer of the protective gloves and has to be observed.
· **For the permanent contact in work areas without heightened risk of injury (e.g. Laboratory) gloves made of the following material are suitable:**
Butyl rubber, BR ≥ 0,3 mm (Level 6)
· **For the permanent contact gloves made of the following materials are suitable:**
Butyl rubber, BR ≥ 0,3 mm (Level 6)
· **Not suitable are gloves made of the following materials:**
Leather gloves
Strong material gloves

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· **Eye protection:**

Tightly sealed goggles

Ensure the eyewash stations and safety showers are close to the workplace.

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SECTION 9: Physical and chemical properties

· **9.1 Information on basic physical and chemical properties**	
· **General Information**	
· **Appearance:**	
Form:	Fluid
Colour:	yellow to brown
· **Odour:**	Odourless
· **Odour threshold:**	Not determined.
· **pH-value at 20 °C:**	≤2 DIN 19261
· **Change in condition**	
Melting point/freezing point:	not determined
Initial boiling point and boiling range:	100 °C
· **Flash point:**	95 °C DIN EN ISO 2719 / DIN 51755
· **Flammability (solid, gas):**	Not applicable.
· **Ignition temperature:**	230 °C This value refers to the flammable ingredients.
· **Decomposition temperature:**	Not determined.
· **Auto-ignition temperature:**	Product is not selfigniting.
· **Explosive properties:**	Product does not present an explosion hazard.
· **Explosion limits:**	
Lower:	3.9 Vol % This value refers to the flammable ingredients.
Upper:	23.3 Vol % This value refers to the flammable ingredients.
· **Vapour pressure at 20 °C:**	23 hPa
· **Density at 20 °C:**	1.03 g/cm³ DIN 53217-5 Determination of density - vibration method
· **Relative density**	Not determined.
· **Vapour density**	Not determined.
· **Evaporation rate**	Not determined.
· **Solubility in / Miscibility with water:**	Easily soluble.
· **Partition coefficient: n-octanol/water:**	Not determined.
· **Viscosity:**	
Dynamic:	Not determined.
Kinematic:	Not determined.
· **Solvent content:**	
Organic solvents:	20.0 %
Water:	49.7 %

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VOC (EU)	20.00 %
· **9.2 Other information**	No further relevant information available.
· **Additional information**	The physical data in section 9 correspond to typical values for this product and can not be seen as a product specification.

SECTION 10: Stability and reactivity

· **10.1 Reactivity** No further relevant information available.
· **10.2 Chemical stability**
· **Thermal decomposition / conditions to be avoided:**
No decomposition if used according to specifications.
· **10.3 Possibility of hazardous reactions** No dangerous reactions known.
· **10.4 Conditions to avoid** No further relevant information available.
· **10.5 Incompatible materials:** No further relevant information available.
· **10.6 Hazardous decomposition products:** No dangerous decomposition products known.

SECTION 11: Toxicological information

· **11.1 Information on toxicological effects**
· **Acute toxicity**
Harmful if swallowed or in contact with skin.

· **LD/LC50 values relevant for classification:**		
166736-08-9 Polyethylenglycol-decylether		
Oral	LD50	>300-2,000 mg/kg (rat) (OECD 423)
Dermal	LD50	>2,000 mg/kg (rabbit) (external MSDS)
2807-30-9 2-(propyloxy)ethanol		
Oral	LD50	3,089 mg/kg (rat) (GESTIS, RTECS)
Dermal	LD50	1,337 mg/kg (rabbit) (RTECS)
7664-93-9 Sulphuric acid		
Oral	LD50	2,140 mg/kg (rat) (OECD 401)
Inhalative	LC50/4h	850 mg/l (mouse) (OECD 403)
120-80-9 Pyrocatechol		
Oral	LD50	300 mg/kg (rat) (ECHA)
Dermal	LD50	600 mg/kg (rat) (OECD 402)
79-10-7 acrylic acid		
Oral	LD50	1,500 mg/kg (rat) (BASF-Test)
Dermal	LD50	>2,000 mg/kg (rabbit) (OECD 402)
Inhalative	LC50/4h	5.1 mg/l (rat) (OECD 403)

· **Primary irritant effect:**
· **Skin corrosion/irritation**
Causes severe skin burns and eye damage.
· **Serious eye damage/irritation**
Causes severe skin burns and eye damage.
· **Respiratory or skin sensitisation**
May cause an allergic skin reaction.
· **CMR effects (carcinogenity, mutagenicity and toxicity for reproduction)**
· **Germ cell mutagenicity**
Suspected of causing genetic defects.
· **Carcinogenicity** Based on available data, the classification criteria are not met.
· **Reproductive toxicity** Based on available data, the classification criteria are not met.
· **STOT-single exposure** Based on available data, the classification criteria are not met.

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· **STOT-repeated exposure** Based on available data, the classification criteria are not met.
· **Aspiration hazard** Based on available data, the classification criteria are not met.

SECTION 12: Ecological information

· **12.1 Toxicity**

· **Aquatic toxicity:**	
166736-08-9 Polyethylenglycol-decylether	
LC50/96h	10-100 mg/l (brachydanio rerio - zebra danio) (OECD 203)
EC50/48h	>1-10 mg/l (daphnia magna - water flea) (OECD 202 part 1)
EC50/72h	10-100 mg/l (scenedesmus subspicatus - green algae) (external MSDS)
2807-30-9 2-(propyloxy)ethanol	
LC50/48h (static)	>5,000 mg/l (daphnia magna - water flea) (EPA/600/3-75-009)
LC50/96h (static)	>5,000 mg/l (pimephales promelas - fathead minnow) (EPA/600/4-85/013)
EC50/72h (static)	>100 mg/l (pseudokirchneriella subcapitata) (OECD 201)
7664-93-9 Sulphuric acid	
LC50/96h	16-28 mg/l (lepomis macrochirus - bluegill) (ECHA)
EC50/48h (static)	>100 mg/l (daphnia magna - water flea) (OECD 402)
EC50/72h (static)	>100 mg/l (desmodesmus subspicatus - green algae) (OECD 201)
120-80-9 Pyrocatechol	
LC50/96h (dynamic)	9.2 mg/l (pimephales promelas - fathead minnow) (OECD 203)
EC50/96h	22 mg/l (chlorella vulgaris - fresh water algae) (OECD 201)
EC50/24h (static)	2.1 mg/l (daphnia magna - water flea) (French Standard AFNOR T 90301)
79-10-7 acrylic acid	
LC50/48h (dynamic)	95 mg/l (daphnia magna - water flea) (Daphnientest akut)
LC50/96h (dynamic)	27 mg/l (oncorhynchus mykiss - rainbow trout) (EPA 72-1)
NOEC/21d (dynamic)	3.8 mg/l (daphnia magna - water flea) (OPP 72-4 (EPA-Richtlinie))

· **12.2 Persistence and degradability** No further relevant information available.
· **12.3 Bioaccumulative potential** No further relevant information available.
· **12.4 Mobility in soil** No further relevant information available.
· **Ecotoxical effects:**
· **Remark:** Harmful to fish
· **Additional ecological information:**
· **General notes:**
The classification into the water hazard class resulted according to the administrative regulation water-polluting substances (VwVwS) dated 17.05.1999.
Water hazard class 2 (German Regulation) (Self-assessment): hazardous for water
The product does not contain AOX.
The product does not contain EDTA
Do not allow product to reach ground water, water course or sewage system.
Must not reach sewage water or drainage ditch undiluted or unneutralised.
Danger to drinking water if even small quantities leak into the ground.
Harmful to aquatic organisms
The product does not contain organic complexing agents.
· **12.5 Results of PBT and vPvB assessment**
According to Annex XIV of Regulation (EC) No. 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH): The product does not contain a substance fullfilling the PBT (persistent/bioaccumulative/toxic) criteria or the vPvB (very persistent/very bioaccumulative) criteria: Self classification.
· **PBT:** Not applicable.
· **vPvB:** Not applicable.

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· **12.6 Other adverse effects** No further relevant information available.

SECTION 13: Disposal considerations

· **13.1 Waste treatment methods**
· **Recommendation**
Must not be disposed together with household garbage. Do not allow product to reach sewage system.
Contact manufacturer for recycling information.

· **European waste catalogue**	
07 01 04*	other organic solvents, washing liquids and mother liquors

· **Uncleaned packaging:**
· **Recommendation:** Disposal must be made according to official regulations.
· **Recommended cleansing agents:** Water, if necessary together with cleansing agents.

SECTION 14: Transport information

· **14.1 UN-Number**	
· **ADR, IMDG, IATA**	UN3264
· **14.2 UN proper shipping name**	
· **ADR**	3264 CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (SULPHURIC ACID)
· **IMDG, IATA**	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (SULPHURIC ACID)
· **14.3 Transport hazard class(es)**	
· **ADR, IMDG, IATA**	
· **Class**	8 Corrosive substances.
· **Label**	8
· **14.4 Packing group**	
· **ADR, IMDG, IATA**	III
· **14.5 Environmental hazards:**	Product contains environmentally hazardous substances: acrylic acid
· **Marine pollutant:**	No
· **14.6 Special precautions for user**	Warning: Corrosive substances.
· **Danger code (Kemler):**	80
· **EMS Number:**	F-A,S-B
· **Segregation groups**	Acids
· **Stowage Category**	A
· **Stowage Code**	SW2 Clear of living quarters.
· **14.7 Transport in bulk according to Annex II of Marpol and the IBC Code**	Not applicable.
· **Transport/Additional information:**	
· **ADR**	
· **Limited quantities (LQ)**	5L
· **Excepted quantities (EQ)**	Code: E1 Maximum net quantity per inner packaging: 30 ml Maximum net quantity per outer packaging: 1000

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·	ml
· **Transport category**	3
· **Tunnel restriction code**	E
· **IMDG**	
· **Limited quantities (LQ)**	5L
· **Excepted quantities (EQ)**	Code: E1 Maximum net quantity per inner packaging: 30 ml Maximum net quantity per outer packaging: 1000 ml
· **UN "Model Regulation":**	UN 3264 CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (SULPHURIC ACID), 8, III

SECTION 15: Regulatory information

· **15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**
· **Directive 2012/18/EU - SEVESO III**
· **Named dangerous substances - ANNEX I** None of the ingredients is listed.
· **REGULATION (EC) No 1907/2006 ANNEX XVII** Conditions of restriction: 3
· **National regulations:**
· **Waterhazard class:** Water hazard class 2 (Self-assessment): hazardous for water.
· **15.2 Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

SECTION 16: Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

Safety Data Sheet to the regulation 1907/2006/EG, article 31.
Material Safety Data Sheets are to be kept for at least 10 years, according to Article 36 of REACH Regulation (EC) No 1907/2006.

· **Relevant phrases**
H226 Flammable liquid and vapour.
H290 May be corrosive to metals.
H301 Toxic if swallowed.
H302 Harmful if swallowed.
H311 Toxic in contact with skin.
H312 Harmful in contact with skin.
H314 Causes severe skin burns and eye damage.
H315 Causes skin irritation.
H317 May cause an allergic skin reaction.
H318 Causes serious eye damage.
H319 Causes serious eye irritation.
H332 Harmful if inhaled.
H341 Suspected of causing genetic defects.
H400 Very toxic to aquatic life.
H411 Toxic to aquatic life with long lasting effects.
· **Department issuing SDS:**
Research and Development
E-Mail: fue@schloetter.de

· **Contact:** sds@schloetter.de

· **Abbreviations and acronyms:**
RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
ICAO: International Civil Aviation Organisation

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RRN: REACH Registration Number
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
IATA: International Air Transport Association
GHS: Globally Harmonised System of Classification and Labelling of Chemicals
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
VOC: Volatile Organic Compounds (USA, EU)
DNEL: Derived No-Effect Level (REACH)
PNEC: Predicted No-Effect Concentration (REACH)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
PBT: Persistent, Bioaccumulative and Toxic
vPvB: very Persistent and very Bioaccumulative
Flam. Liq. 3: Flammable liquids – Category 3
Met. Corr.1: Corrosive to metals – Category 1
Acute Tox. 3: Acute toxicity – Category 3
Acute Tox. 4: Acute toxicity – Category 4
Skin Corr. 1A: Skin corrosion/irritation – Category 1A
Skin Irrit. 2: Skin corrosion/irritation – Category 2
Eye Dam. 1: Serious eye damage/eye irritation – Category 1
Eye Irrit. 2: Serious eye damage/eye irritation – Category 2
Skin Sens. 1: Skin sensitisation – Category 1
Muta. 2: Germ cell mutagenicity – Category 2
Aquatic Acute 1: Hazardous to the aquatic environment - acute aquatic hazard – Category 1
Aquatic Chronic 2: Hazardous to the aquatic environment - long-term aquatic hazard – Category 2
Aquatic Chronic 3: Hazardous to the aquatic environment - long-term aquatic hazard – Category 3

· *** Data compared to the previous version altered.**

AL BATH 23.
CO.BATH 7.

Printing date 09.08.2017 Version number 19 Revision: 28.06.2017

SECTION 1: Identification of the substance/mixture and of the company/undertaking

· **1.1 Product identifier**

· **Trade name:** **Tin Salt SU**

· **Article number:** 100000
· **1.2 Relevant identified uses of the substance or mixture and uses advised against**
No further relevant information available.
· **Application of the substance / the mixture** Electroplating auxiliary
· **1.3 Details of the supplier of the safety data sheet**
· **Manufacturer/Supplier:**
Dr.-Ing. Max Schlötter GmbH & Co. KG
Galvanotechnik
Talgraben 30
73312 Geislingen/Steige
Germany
· **Further information obtainable from:** E-Mail: sds@schloetter.de
· **1.4 Emergency telephone number:**
University of Freiburg
Poisoning-Information-Center
+49(0)761-19240 (24h, 365 days/year)
Information in German and English
http://www.giftberatung.de/

SECTION 2: Hazards identification

· **2.1 Classification of the substance or mixture**
· **Classification according to Regulation (EC) No 1272/2008**

Acute Tox. 4	H332 Harmful if inhaled.
Skin Irrit. 2	H315 Causes skin irritation.
Eye Dam. 1	H318 Causes serious eye damage.
Skin Sens. 1	H317 May cause an allergic skin reaction.
STOT SE 3	H335 May cause respiratory irritation.
STOT RE 2	H373 May cause damage to organs through prolonged or repeated exposure.
Aquatic Chronic 3	H412 Harmful to aquatic life with long lasting effects.

· **2.2 Label elements**
· **Labelling according to Regulation (EC) No 1272/2008**
The product is classified and labelled according to the CLP regulation.
· **Hazard pictograms**

GHS05 GHS07 GHS08

· **Signal word** Danger

· **Hazard-determining components of labelling:**
tin sulphate
· **Hazard statements**
H332 Harmful if inhaled.
H315 Causes skin irritation.
H318 Causes serious eye damage.
H317 May cause an allergic skin reaction.
H335 May cause respiratory irritation.
H373 May cause damage to organs through prolonged or repeated exposure.
H412 Harmful to aquatic life with long lasting effects.

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· **Precautionary statements**

P260	Do not breathe dust/fume/gas/mist/vapours/spray.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310	Immediately call a POISON CENTER/doctor.
P321	Specific treatment (see on this label).
P405	Store locked up.
P501	Dispose of contents/container in accordance with local/regional/national/international regulations.

· **2.3 Other hazards**
· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.

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SECTION 3: Composition/information on ingredients

· **3.2 Chemical characterisation: Mixtures**
· **Description:** Mixture of substances listed below with nonhazardous additions.

· **Dangerous components:**

CAS: 7488-55-3 EINECS: 231-302-2 Reg.nr.: 01-2119560591-39	tin sulphate STOT RE 2, H373; Eye Dam. 1, H318; Acute Tox. 4, H332; Skin Irrit. 2, H315; Skin Sens. 1, H317; STOT SE 3, H335; Aquatic Chronic 3, H412	70-100%

· **Additional information:** For the wording of the listed hazard phrases refer to section 16.

SECTION 4: First aid measures

· **4.1 Description of first aid measures**
· **General information:**
PERSONAL PROTECTION FOR THE FIRST AIDER.
Immediately remove any clothing soiled by the product.
Symptoms of poisoning may even occur after several hours; therefore medical observation for at least 48 hours after the accident.
· **After inhalation:**
In case of unconsciousness place patient stably in side position for transportation.
Supply fresh air and to be sure call for a doctor.
· **After skin contact:**
Immediately rinse with water.
If skin irritation continues, consult a doctor.
· **After eye contact:**
Rinse opened eye for several minutes under running water. Then consult a doctor.
If present remove the contact lenses immediately.
· **After swallowing:** Seek medical treatment.
· **4.2 Most important symptoms and effects, both acute and delayed** No further relevant information available.
· **4.3 Indication of any immediate medical attention and special treatment needed**
No further relevant information available.

SECTION 5: Firefighting measures

· **5.1 Extinguishing media**
· **Suitable extinguishing agents:** Use fire extinguishing methods suitable to surrounding conditions.
· **5.2 Special hazards arising from the substance or mixture**
During heating or in case of fire poisonous gases are produced.
Tin oxide
Carbon monoxide (CO)

(Contd. on page 3)

(Contd. of page 2)

Sulphur dioxide (SO2)
· **5.3 Advice for firefighters**
· **Protective equipment:**
Wear self-contained respiratory protective device.
Do not inhale explosion gases or combustion gases.
· **Additional information**
Collect contaminated fire fighting water separately. It must not enter the sewage system.

SECTION 6: Accidental release measures

· **6.1 Personal precautions, protective equipment and emergency procedures** Not required.
· **6.2 Environmental precautions:**
Inform respective authorities in case of seepage into water course or sewage system.
Do not allow to enter sewers/ surface or ground water.
· **6.3 Methods and material for containment and cleaning up:**
Dispose contaminated material as waste according to item 13.
Ensure adequate ventilation.
· **6.4 Reference to other sections**
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

SECTION 7: Handling and storage

· **7.1 Precautions for safe handling**
Ensure good ventilation/exhaustion at the workplace.
Thorough dedusting.
Prevent formation of dust.
· **Information about fire - and explosion protection:** No special measures required.

· **7.2 Conditions for safe storage, including any incompatibilities**
· **Storage:**
· **Requirements to be met by storerooms and receptacles:** Store only in the original receptacle.
· **Information about storage in one common storage facility:** Store away from foodstuffs.
· **Further information about storage conditions:**
Protect from frost.
Keep container tightly sealed.
Protect from heat and direct sunlight.
· **Maximum storage temperature:** 40 °C
· **Minimum storage temperature:** 5 °C
· **Storage class:** 13
· **7.3 Specific end use(s)** No further relevant information available.

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SECTION 8: Exposure controls/personal protection

· **Additional information about design of technical facilities:** No further data; see item 7.

· **8.1 Control parameters**

· **Ingredients with limit values that require monitoring at the workplace:**	
7488-55-3 tin sulphate	
WEL	Short-term value: 4 mg/m³ Long-term value: 2 mg/m³ as Sn

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· **DNELs**

7488-55-3 tin sulphate		
Dermal	exposure long term - systemic effects	0.39 mg/kg bw/day (worker)
	exposure short term - systemic effects	0.78 mg/kg bw/day (worker)
Inhalative	exposure long term - systemic effects	1.375 mg/m³ (worker)
	exposure long term - local effects	14.51 mg/m³ (worker)
	exposure short term - systemic effects	2.75 mg/m³ (worker)
	exposure short term - local effects	14.51 mg/m³ (worker)

· **PNECs**

7488-55-3 tin sulphate	
PNEC	12 µg/l (sewage treatment plant)
	5 µg/l (sporadic emission)
PNEC	0.9 mg/l (fresh water)
PNEC	58 mg/kg (sediment fresh water)

· **Additional information:** The lists valid during the making were used as basis.

· **8.2 Exposure controls**
· **Personal protective equipment:**
· **General protective and hygienic measures:**
Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing
Wash hands before breaks and at the end of work.
Avoid contact with the skin.
Avoid contact with the eyes and skin.
· **Respiratory protection:** Filter P1
· **Protection of hands:**

Protective gloves

Check the permeability prior to each renewed use of the glove.
The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation
· **Material of gloves**
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.
Chemical-protective gloves (EN 374-1, -2, -3).
Butyl rubber, BR ≥ 0,3 mm (Level 6)
· **Penetration time of glove material**
≥ 8 h
The exact break trough time has to be found out by the manufacturer of the protective gloves and has to be observed.
· **For the permanent contact in work areas without heightened risk of injury (e.g. Laboratory) gloves made of the following material are suitable:**
Butyl rubber, BR ≥ 0,3 mm (Level 6)
· **For the permanent contact gloves made of the following materials are suitable:**
Nitrile rubber, NBR
Fluorocarbon rubber (Viton)
PVC gloves
Butyl rubber, BR ≥ 0,3 mm (Level 6)

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· **Not suitable are gloves made of the following materials:**
Leather gloves
Strong material gloves
· **Eye protection:**

Tightly sealed goggles

Ensure the eyewash stations and safety showers are close to the workplace.

SECTION 9: Physical and chemical properties

· **9.1 Information on basic physical and chemical properties**	
· **General Information**	
· **Appearance:**	
Form:	Powder
Colour:	white to light yellow
· **Odour:**	Odourless
· **Odour threshold:**	Not determined.
· **pH-value at 20°C:**	-
· **Change in condition**	
Melting point/freezing point:	not determined
Initial boiling point and boiling range:	not determined
· **Flash point:**	Not applicable.
· **Flammability (solid, gas):**	Not determined.
· **Ignition temperature:**	
Decomposition temperature:	Not determined.
· **Auto-ignition temperature:**	Product is not selfigniting.
· **Explosive properties:**	Product does not present an explosion hazard.
· **Explosion limits:**	
Lower:	Not determined.
Upper:	Not determined.
· **Vapour pressure:**	Not applicable.
· **Density:**	DIN 53217-5 Determination of density - vibration method
· **Relative density**	Not determined.
· **Vapour density**	Not applicable.
· **Evaporation rate**	Not applicable.
· **Solubility in / Miscibility with water:**	Soluble.
· **Partition coefficient: n-octanol/water:**	Not determined.
· **Viscosity:**	
Dynamic:	Not applicable.
Kinematic:	Not applicable.
· **Solvent content:**	
VOC (EU)	0.00 %
· **9.2 Other information**	No further relevant information available.

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· Additional information	The physical data in section 9 correspond to typical values for this product and can not be seen as a product specification.

SECTION 10: Stability and reactivity

· **10.1 Reactivity** No further relevant information available.
· **10.2 Chemical stability**
· **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
· **10.3 Possibility of hazardous reactions** No dangerous reactions known.
· **10.4 Conditions to avoid** No further relevant information available.
· **10.5 Incompatible materials:** No further relevant information available.
· **10.6 Hazardous decomposition products:**
Sulphur dioxide
Hydrogen sulphide
Sulphur trioxide (SO3) or SO3-mist

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SECTION 11: Toxicological information

· **11.1 Information on toxicological effects**
· **Acute toxicity**
Harmful if inhaled.

· LD/LC50 values relevant for classification:		
7488-55-3 tin sulphate		
Oral	LD50	2,207 mg/kg (rat) (OECD 401)

· **Primary irritant effect:**
· **Skin corrosion/irritation**
Causes skin irritation.
· **Serious eye damage/irritation**
Causes serious eye damage.
· **Respiratory or skin sensitisation**
May cause an allergic skin reaction.
· **CMR effects (carcinogenity, mutagenicity and toxicity for reproduction)**
· **Germ cell mutagenicity** Based on available data, the classification criteria are not met.
· **Carcinogenicity** Based on available data, the classification criteria are not met.
· **Reproductive toxicity** Based on available data, the classification criteria are not met.
· **STOT-single exposure**
May cause respiratory irritation.
· **STOT-repeated exposure**
May cause damage to organs through prolonged or repeated exposure.
· **Aspiration hazard** Based on available data, the classification criteria are not met.

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SECTION 12: Ecological information

· **12.1 Toxicity**

· Aquatic toxicity:	
7488-55-3 tin sulphate	
LC50/48h (static)	55 mg/l (daphnia magna - water flea) (OECD 202)
EC50/72h	0.2 mg/l (skeletonema costatum - diatom) (Fremd-Sicherheitsdatenblatt)

· **12.2 Persistence and degradability** No further relevant information available.
· **12.3 Bioaccumulative potential** No further relevant information available.
· **12.4 Mobility in soil** No further relevant information available.

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(Contd. of page 6)

· **Ecotoxical effects:**
· **Remark:** Harmful to fish
· **Additional ecological information:**
· **General notes:**
The classification into the water hazard class resulted according to the administrative regulation water-polluting substances (VwVwS) dated 17.05.1999.
Water hazard class 2 (German Regulation) (Self-assessment): hazardous for water
The product does not contain AOX.
The product does not contain VOC.
The product does not contain EDTA
Do not allow product to reach ground water, water course or sewage system.
Danger to drinking water if even small quantities leak into the ground.
Harmful to aquatic organisms
The product does not contain organic complexing agents.
· **12.5 Results of PBT and vPvB assessment**
According to Annex XIV of Regulation (EC) No. 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH): The product does not contain a substance fullfilling the PBT (persistent/bioaccumulative/toxic) criteria or the vPvB (very persistent/very bioaccumulative) criteria: Self classification.
· **PBT:** Not applicable.
· **vPvB:** Not applicable.
· **12.6 Other adverse effects** No further relevant information available.

SECTION 13: Disposal considerations

· **13.1 Waste treatment methods**
· **Recommendation**
Must not be disposed together with household garbage. Do not allow product to reach sewage system.
Contact manufacturer for recycling information.

· **European waste catalogue**	
06 03 13*	solid salts and solutions containing heavy metals

· **Uncleaned packaging:**
· **Recommendation:** Disposal must be made according to official regulations.
· **Recommended cleansing agents:** Water, if necessary together with cleansing agents.

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SECTION 14: Transport information

· **14.1 UN-Number** · **ADR, ADN, IMDG, IATA**	Void
· **14.2 UN proper shipping name** · **ADR, ADN, IMDG, IATA**	Void
· **14.3 Transport hazard class(es)** · **ADR, ADN, IMDG, IATA** · **Class**	Void
· **14.4 Packing group** · **ADR, IMDG, IATA**	Void
· **14.5 Environmental hazards:**	Product contains environmentally hazardous substances: tin sulphate
· **Marine pollutant:**	Yes
· **14.6 Special precautions for user**	Not applicable.

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· Stowage Category	A
· 14.7 Transport in bulk according to Annex II of Marpol and the IBC Code	Not applicable.
· Transport/Additional information:	Not dangerous according to the above specifications.
· UN "Model Regulation":	Void

SECTION 15: Regulatory information

· **15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**

· **Directive 2012/18/EU - SEVESO III**
· **Named dangerous substances - ANNEX I** None of the ingredients is listed.

· **National regulations:**

· **Waterhazard class:** Water hazard class 2 (Self-assessment): hazardous for water.
· **15.2 Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

SECTION 16: Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

Safety Data Sheet to the regulation 1907/2006/EG, article 31
Material Safety Data Sheets are to be kept for at least 10 years according to Article 36 of REACH Regulation (EC) No 1907/2006.

· **Relevant phrases**
H315 Causes skin irritation.
H317 May cause an allergic skin reaction.
H318 Causes serious eye damage.
H332 Harmful if inhaled.
H335 May cause respiratory irritation.
H373 May cause damage to organs through prolonged or repeated exposure.
H412 Harmful to aquatic life with long lasting effects.

· **Department issuing SDS:**
Research and Development
E-Mail: fue@schloetter.de
· **Contact:** sds@schloetter.de
· **Abbreviations and acronyms:**
RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
ICAO: International Civil Aviation Organisation
RRN: REACH Registration Number
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
IATA: International Air Transport Association
GHS: Globally Harmonised System of Classification and Labelling of Chemicals
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
VOC: Volatile Organic Compounds (USA, EU)
DNEL: Derived No-Effect Level (REACH)
PNEC: Predicted No-Effect Concentration (REACH)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
PBT: Persistent, Bioaccumulative and Toxic
vPvB: very Persistent and very Bioaccumulative

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Acute Tox. 4: Acute toxicity – Category 4
Skin Irrit. 2: Skin corrosion/irritation – Category 2
Eye Dam. 1: Serious eye damage/eye irritation – Category 1
Skin Sens. 1: Skin sensitisation – Category 1
STOT SE 3: Specific target organ toxicity (single exposure) – Category 3
STOT RE 2: Specific target organ toxicity (repeated exposure) – Category 2
Aquatic Chronic 3: Hazardous to the aquatic environment - long-term aquatic hazard – Category 3
· **** Data compared to the previous version altered.***

Schlötter Galvanotechnik

Safety data sheet
according to 1907/2006/EC, Article 31

Printing date 02.08.2017 *Version number 19* *Revision: 28.06.2017*

SECTION 1: Identification of the substance/mixture and of the company/undertaking

· **1.1 Product identifier**

· **Trade name: Antitarnish Concentrate ALS 31**

· **Article number:** 120031
· **1.2 Relevant identified uses of the substance or mixture and uses advised against**
No further relevant information available.
· **Application of the substance / the mixture** Electroplating auxiliary
· **1.3 Details of the supplier of the safety data sheet**
· **Manufacturer/Supplier:**
Dr.-Ing. Max Schlötter GmbH & Co. KG
Galvanotechnik
Talgraben 30
73312 Geislingen/Steige
Germany
· **Further information obtainable from:** E-Mail: sds@schloetter.de
· **1.4 Emergency telephone number:**
University of Freiburg
Poisoning-Information-Center
+49(0)761-19240 (24h, 365 days/year)
Information in German and English
http://www.giftberatung.de/

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SECTION 2: Hazards identification

· **2.1 Classification of the substance or mixture**
· **Classification according to Regulation (EC) No 1272/2008**
Skin Corr. 1B H314 Causes severe skin burns and eye damage.
Eye Dam. 1 H318 Causes serious eye damage.

· **2.2 Label elements**
· **Labelling according to Regulation (EC) No 1272/2008**
The product is classified and labelled according to the CLP regulation.
· **Hazard pictograms**

GHS05

· **Signal word** Danger

· **Hazard-determining components of labelling:**
phosphoric acid
· **Hazard statements**
H314 Causes severe skin burns and eye damage.
· **Precautionary statements**
P260 Do not breathe dusts or mists.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P303+P361+P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310 Immediately call a POISON CENTER/doctor.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.
· **2.3 Other hazards**
· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.

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Safety data sheet
according to 1907/2006/EC, Article 31

Printing date 02.08.2017 *Version number 19* *Revision: 28.06.2017*

Trade name: Antitarnish Concentrate ALS 31

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· **vPvB:** Not applicable.

SECTION 3: Composition/information on ingredients

· **3.2 Chemical characterisation: Mixtures**
· **Description:** Mixture of substances listed below with nonhazardous additions.

· **Dangerous components:**

CAS: 7664-38-2 EINECS: 231-633-2 Index number: 015-011-00-6 Reg.nr.: 01-2119485924-24	phosphoric acid	Met. Corr.1, H290; Skin Corr. 1B, H314	25-<50%

· **Additional information:** For the wording of the listed hazard phrases refer to section 16.

SECTION 4: First aid measures

· **4.1 Description of first aid measures**
· **General information:**
PERSONAL PROTECTION FOR THE FIRST AIDER.
Immediately remove any clothing soiled by the product.
· **After inhalation:**
Take affected persons into fresh air and keep quiet.
In case of unconsciousness place patient stably in side position for transportation.
Call a doctor immediately.
· **After skin contact:**
Immediately rinse with water.
If skin irritation continues, consult a doctor.
· **After eye contact:**
Rinse opened eye for several minutes under running water. Then consult a doctor.
If present remove the contact lenses immediately.
· **After swallowing:** Drink plenty of water and provide fresh air. Call for a doctor immediately.
· **4.2 Most important symptoms and effects, both acute and delayed** No further relevant information available.
· **4.3 Indication of any immediate medical attention and special treatment needed**
No further relevant information available.

SECTION 5: Firefighting measures

· **5.1 Extinguishing media**
· **Suitable extinguishing agents:** Use fire extinguishing methods suitable to surrounding conditions.
· **5.2 Special hazards arising from the substance or mixture**
During heating or in case of fire poisonous gases are produced.
Carbon monoxide (CO)
Phosphorus oxides
· **5.3 Advice for firefighters**
· **Protective equipment:** Do not inhale explosion gases or combustion gases.
· **Additional information**
Collect contaminated fire fighting water separately. It must not enter the sewage system.

SECTION 6: Accidental release measures

· **6.1 Personal precautions, protective equipment and emergency procedures**
Wear protective equipment. Keep unprotected persons away.
· **6.2 Environmental precautions:**
Dilute with plenty of water.
Do not allow to enter sewers/ surface or ground water.

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· **6.3 Methods and material for containment and cleaning up:**
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
Use neutralising agent.
Dispose contaminated material as waste according to item 13.
Ensure adequate ventilation.
· **6.4 Reference to other sections**
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

SECTION 7: Handling and storage

· **7.1 Precautions for safe handling**
Keep receptacles tightly sealed.
Ensure good ventilation/exhaustion at the workplace.
Prevent formation of aerosols.
· **Information about fire - and explosion protection:** No special measures required.

· **7.2 Conditions for safe storage, including any incompatibilities**
· **Storage:**
· **Requirements to be met by storerooms and receptacles:** Store only in the original receptacle.
· **Information about storage in one common storage facility:** Store away from foodstuffs.
· **Further information about storage conditions:**
Protect from frost.
Keep container tightly sealed.
Protect from heat and direct sunlight.
· **Maximum storage temperature:** 40 °C
· **Minimum storage temperature:** 5 °C
· **Storage class:** 8 B
· **7.3 Specific end use(s)** No further relevant information available.

SECTION 8: Exposure controls/personal protection

· **Additional information about design of technical facilities:** No further data; see item 7.

· **8.1 Control parameters**

· **Ingredients with limit values that require monitoring at the workplace:**	
7664-38-2 phosphoric acid	
WEL	Short-term value: 2 mg/m³ Long-term value: 1 mg/m³

· **DNELs**		
7664-38-2 phosphoric acid		
Inhalative	exposure long term - local effects	1 mg/m³ (worker)
	exposure short term - systemic effects	2 mg/m³ (worker)

· **Additional information:** The lists valid during the making were used as basis.

· **8.2 Exposure controls**
· **Personal protective equipment:**
· **General protective and hygienic measures:**
Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing
Wash hands before breaks and at the end of work.
Do not inhale gases / fumes / aerosols.
Avoid contact with the eyes and skin.

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· ***Respiratory protection:***
Respiratory protection if vapours/aerosols are liberate. Particle filter with middle retention for solid and liquid particle (e.g. EN 143 or 149, Type P2 or FFP2).
For example: Composite filter type ABEK, company MSA-Auer by short or minimized exposure.
· ***Protection of hands:***

Protective gloves

Check the permeability prior to each anewed use of the glove.
The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation
· ***Material of gloves***
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.
Chemical-protective gloves (EN 374-1, -2, -3).
Butyl rubber, BR ≥ 0,3 mm (Level 6)
· ***Penetration time of glove material***
≥ 8 h
The exact break trough time has to be found out by the manufacturer of the protective gloves and has to be observed.
· ***For the permanent contact in work areas without heightened risk of injury (e.g. Laboratory) gloves made of the following material are suitable:***
Butyl rubber, BR ≥ 0,3 mm (Level 6)
· ***For the permanent contact gloves made of the following materials are suitable:***
Butyl rubber, BR ≥ 0,3 mm (Level 6)
· ***Not suitable are gloves made of the following materials:***
Leather gloves
Strong material gloves
· ***Eye protection:***

Tightly sealed goggles

Ensure the eyewash stations and safety showers are close to the workplace.

SECTION 9: Physical and chemical properties

· ***9.1 Information on basic physical and chemical properties***	
· ***General Information***	
· ***Appearance:***	
Form:	*Fluid*
Colour:	*colorless to yellow*
· ***Odour:***	*Odourless*
· ***Odour threshold:***	*Not determined.*
· ***pH-value at 20°C:***	*<2* *DIN 19261 Measuring methods with potentiometric cells*
· ***Change in condition***	
Melting point/freezing point:	*not determined*
Initial boiling point and boiling range:	*100°C*

(Contd. on page 5)

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· **Flash point:**	Not applicable.
· **Flammability (solid, gas):**	Not applicable.
· **Ignition temperature:**	
Decomposition temperature:	Not determined.
· **Auto-ignition temperature:**	Product is not selfigniting.
· **Explosive properties:**	Product does not present an explosion hazard.
· **Explosion limits:**	
Lower:	Not determined.
Upper:	Not determined.
· **Vapour pressure at 20°C:**	23 hPa
· **Density at 20°C:**	1.16 g/cm³ DIN 53217-5 Determination of density - vibration method
· **Relative density**	Not determined.
· **Vapour density**	Not determined.
· **Evaporation rate**	Not determined.
· **Solubility in / Miscibility with water:**	Fully miscible.
· **Partition coefficient: n-octanol/water:**	Not determined.
· **Viscosity:**	
Dynamic:	Not determined.
Kinematic:	Not determined.
· **Solvent content:**	
Water:	65.0 %
VOC (EU)	0.00 %
· **9.2 Other information**	No further relevant information available.
· **Additional information**	The physical data in section 9 correspond to typical values for this product and can not be seen as a product specification.

SECTION 10: Stability and reactivity

· **10.1 Reactivity** No further relevant information available.
· **10.2 Chemical stability**
· **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
· **10.3 Possibility of hazardous reactions** No dangerous reactions known.
· **10.4 Conditions to avoid** No further relevant information available.
· **10.5 Incompatible materials:** No further relevant information available.
· **10.6 Hazardous decomposition products:** No dangerous decomposition products known.

SECTION 11: Toxicological information

· **11.1 Information on toxicological effects**
· **Acute toxicity** Based on available data, the classification criteria are not met.

· **LD/LC50 values relevant for classification:**		
7664-38-2 phosphoric acid		
Oral	LD50	2,600 mg/kg (rat) (OECD 423)
Dermal	LD50	2,740 mg/kg (rabbit) (Gestis)

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· ***Primary irritant effect:***
· ***Skin corrosion/irritation***
Causes severe skin burns and eye damage.
· ***Serious eye damage/irritation***
Causes serious eye damage.
· ***Respiratory or skin sensitisation*** *Based on available data, the classification criteria are not met.*
· ***CMR effects (carcinogenity, mutagenicity and toxicity for reproduction)***
· ***Germ cell mutagenicity*** *Based on available data, the classification criteria are not met.*
· ***Carcinogenicity*** *Based on available data, the classification criteria are not met.*
· ***Reproductive toxicity*** *Based on available data, the classification criteria are not met.*
· ***STOT-single exposure*** *Based on available data, the classification criteria are not met.*
· ***STOT-repeated exposure*** *Based on available data, the classification criteria are not met.*
· ***Aspiration hazard*** *Based on available data, the classification criteria are not met.*

SECTION 12: Ecological information

· ***12.1 Toxicity***

· **Aquatic toxicity:**	
7664-38-2 phosphoric acid	
LC50/96h	138 mg/l (gambusia affinis - mosquitofish) (external MSDS)
EC50/48h (static)	>100 mg/l (daphnia magna - water flea) (OECD 202)
EC50/72h	>100 mg/l (desmodesmus subspicatus - green algae) (OECD 201)

· ***12.2 Persistence and degradability*** *No further relevant information available.*
· ***12.3 Bioaccumulative potential*** *No further relevant information available.*
· ***12.4 Mobility in soil*** *No further relevant information available.*
· ***Additional ecological information:***
· ***General notes:***
The classification into the water hazard class resulted according to the administrative regulation water-polluting substances (VwVwS) dated 17.05.1999.
Water hazard class 1 (German Regulation) (Self-assessment): slightly hazardous for water
The product does not contain VOC.
The product does not contain AOX.
The product does not contain EDTA
Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
Must not reach sewage water or drainage ditch undiluted or unneutralised.
The product does not contain organic complexing agents.
· ***12.5 Results of PBT and vPvB assessment***
According to Annex XIV of Regulation (EC) No. 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH): The product does not contain a substance fullfilling the PBT (persistent/bioaccumulative/toxic) criteria or the vPvB (very persistent/very bioaccumulative) criteria: Self classification.
· ***PBT:*** *Not applicable.*
· ***vPvB:*** *Not applicable.*
· ***12.6 Other adverse effects*** *No further relevant information available.*

SECTION 13: Disposal considerations

· ***13.1 Waste treatment methods***
· ***Recommendation***
Must not be disposed together with household garbage. Do not allow product to reach sewage system.
Contact manufacturer for recycling information.

· **European waste catalogue**	
06 01 04*	phosphoric and phosphorous acid

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Safety data sheet
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Trade name: Antitarnish Concentrate ALS 31

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· **Uncleaned packaging:**
· **Recommendation:** Disposal must be made according to official regulations.
· **Recommended cleansing agents:** Water, if necessary together with cleansing agents.

SECTION 14: Transport information

· **14.1 UN-Number**	
· **ADR, IMDG, IATA**	UN1805
· **14.2 UN proper shipping name**	
· **ADR**	1805 PHOSPHORIC ACID, SOLUTION
· **IMDG, IATA**	PHOSPHORIC ACID, SOLUTION
· **14.3 Transport hazard class(es)**	
· **ADR, IMDG, IATA**	

· **Class**	8 Corrosive substances.
· **Label**	8
· **14.4 Packing group**	
· **ADR, IMDG, IATA**	III
· **14.5 Environmental hazards:**	
· **Marine pollutant:**	No
· **14.6 Special precautions for user**	Warning: Corrosive substances.
· **Danger code (Kemler):**	80
· **EMS Number:**	F-A,S-B
· **Segregation groups**	Acids
· **Stowage Category**	A
· **14.7 Transport in bulk according to Annex II of Marpol and the IBC Code**	Not applicable.
· **Transport/Additional information:**	
· **ADR**	
· **Limited quantities (LQ)**	5L
· **Excepted quantities (EQ)**	Code: E1 Maximum net quantity per inner packaging: 30 ml Maximum net quantity per outer packaging: 1000 ml
· **Transport category**	3
· **Tunnel restriction code**	E
· **IMDG**	
· **Limited quantities (LQ)**	5L
· **Excepted quantities (EQ)**	Code: E1 Maximum net quantity per inner packaging: 30 ml Maximum net quantity per outer packaging: 1000 ml
· **UN "Model Regulation":**	UN 1805 PHOSPHORIC ACID, SOLUTION, 8, III

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SECTION 15: Regulatory information

· **15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**

· **Directive 2012/18/EU - SEVESO III**
· **Named dangerous substances - ANNEX I** None of the ingredients is listed.
· **REGULATION (EC) No 1907/2006 ANNEX XVII** Conditions of restriction: 3

· **National regulations:**

· **Waterhazard class:** Water hazard class 1 (Self-assessment): slightly hazardous for water.
· **15.2 Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

SECTION 16: Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

Safety Data Sheet to the regulation 1907/2006/EG, article 31.
Material Safety Data Sheets are to be kept for at least 10 years, according to Article 36 of REACH Regulation (EC) No 1907/2006.

· **Relevant phrases**
H290 May be corrosive to metals.
H314 Causes severe skin burns and eye damage.

· **Department issuing SDS:**
Research and Development
E-Mail: fue@schloetter.de
· **Contact:** sds@schloetter.de
· **Abbreviations and acronyms:**
RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
ICAO: International Civil Aviation Organisation
RRN: REACH Registration Number
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
IATA: International Air Transport Association
GHS: Globally Harmonised System of Classification and Labelling of Chemicals
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
VOC: Volatile Organic Compounds (USA, EU)
DNEL: Derived No-Effect Level (REACH)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
PBT: Persistent, Bioaccumulative and Toxic
vPvB: very Persistent and very Bioaccumulative
Met. Corr.1: Corrosive to metals – Category 1
Skin Corr. 1B: Skin corrosion/irritation – Category 1B
Eye Dam. 1: Serious eye damage/eye irritation – Category 1
· ***** Data compared to the previous version altered.**

Antitarnish
ALS 30

Antitarnish ALS 30 is an acid based process (pH value approx. 1 - 2) for post-treatment of tin or tin-lead plated components. A liquid concentrate is used for make-up.

Antitarnish ALS 30 is non-foaming and can be used for rack-, barrel-, and reel-to-reel application.

The treatment of bright tin- or tin alloy layers in Antitarnish ALS 30 prevents discolouration during heat treatment > 200 °C and therefore improves the long term solderability.

Antitarnish ALS 30 is AOX-free.

The information in this data sheet is based on laboratory as well as practical experience. Figures quoted for operating limits and replenishment quantities are for guidance only. Actual values necessary will depend on the components being plated (material and geometry), their application and plating plant conditions.

Important :
Please read this instruction carefully prior to the use of the process and carefully follow all the parameters that have a direct influence on the operation. We reserve the right to make technical changes. In the interest of safety, please pay attention to the hazard warnings on the labels of the containers. The minimum shelf life of the products is included on the labels and is also available in the appropriate Quality Assurance (QA03).
The current IMDS number of the layer deposited from the process is available on the internet at www.schloetter.com/downloads.
For the storage of chemical products the HSG71 is suggested as guidance.
If the additives used in this process contain a SVHC-substance, then this will be specified in the corresponding Material Safety Data sheet, section 15.

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(01386) 556202 SALES
(01386) 552335 EXPORT
EMAIL: info@schloetter.co.uk
WEB: www.schloetter.co.uk

1.0 TECHNICAL INFORMATION AND EQUIPMENT REQUIREMENTS

Tanks:	rubber-lined steel, stainless steel
Local Exhaust Ventilation:	required
Part-/Electrolyte Agitation:	stirring device
Heating/Cooling:	heating made of stainless steel and controlled by thermostat

2.0 MAKE-UP AND OPERATING CONDITIONS

2.1 Product names

List of products required		
Product names	**Article no. (AN)**	**SG**
Antitarnish Concentrate ALS 31	120031	1.16

2.2 Requirements for a 100 litre bath

Product name	AN	SG	Quantity	Optimum	
Antitarnish Concentrate ALS 31	120031	1.16	7.5 - 15	10	ltr.

2.3 Make-up sequence for a 100 litre bath

New, but also unused tanks, filtration equipment etc. or tanks and equipment must be thoroughly cleaned prior to use.

- fill 70 litres of deionised water into the tank
- add 10 litres of Antitarnish Concentrate ALS 31
- make up to final volume with deionised water
- mix thoroughly

When the operating temperature is reached the antitarnish is ready for use.

NB
The water quality is very important for an optimum way of operating Antitarnish ALS 30. We recommend the use of deionised water since tap water from a hardness degree of 6 °dH may lead to a precipitation of Antitarnish ALS 30 components.

2.4 Concentrations and operating ranges

	Range	Optimum	
Antitarnish Concentrate ALS 31	75 - 150	100	ml/l
Treatment time	> 5	30	sec.
Temperature range	20 - 60	30	°C
pH value (at 20 °C)	1.0 - 2.0	--	

raise ↑ pH value: shouldn't be necessary
decrease ↓ pH value: with Antitarnish Concentrate ALS 31

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2.5 Consumption

Consumption of the additives is mainly due to drag-out.

3.0 PROCESS SEQUENCE

Our service department or technical field service would be pleased to provide you information on suitable process sequences respectively methods.

3.1 Process sequence

- plating with tin or tin-lead
- rinsing
- Antitarnish ALS 30
- rinsing
- drying

4.0 MAINTENANCE AND FUNCTION OF THE INDIVIDUAL BATH COMPONENTS

4.1 Antitarnish Concentrate ALS 31

Antitarnish Concentrate ALS 31 contains all the necessary components required for the operation of the degreaser.

The Antitarnish Concentrate ALS 31 may be determined by alkalimetric titration and replenished according to analysis results. We're pleased to provide you with suitable analysis description upon request.

4.2 pH value

The pH should be measured at regular intervals at a temperature of 20 °C. The optimum pH value is between 1.0 and 2.0.

5.0 TROUBLE SHOOTING

No information available at present.

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6.0 EFFLUENT

Legal regulations must be observed for disposal of the Antitarnish ALS 30. Different regulations normally apply for the additives and the ready-made electrolyte. Please refer to section **13** of the appropriate Material Safety Data Sheet for disposal code and recommendations.

The following detoxification sequence is only considered to be an aid:

Antitarnish ALS 30 doesn't contain complexing agents so a simple neutralisation for the treatment of resulting rinse waters is sufficient.

7.0 SAFETY

Reasonable care is required when handling Schlötter chemical products. Only personnel specially trained on working with chemicals should be deployed with their handling.

EC Material Safety Data Sheets must be made available to all personnel dealing with the chemicals to ensure they have all required information about product composition, hazards identification, first-aid measures, handling and storage, exposure controls, toxicological and ecological information, etc. It is required to ensure the supply and use of suitable protective clothing and -equipment.

The user must verify the designated purpose of the electrolyte. Previous experience has shown that not all metal surfaces are suitable for a trouble-free electroplating.

The above mentioned data are made according to our best knowledge. Consistent operation of the working solution requires appropriate maintenance. Antitarnish ALS 30 is a process of Dr.-Ing. Max Schlötter GmbH & Co KG. It can only be operated with the products described in this technical data sheet. Use of other chemicals (also partly) will impair quality and invalidates our service- and quality commitments (quality assurance).

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MSDS Copper

Schlötter Galvanotechnik

Safety data sheet
according to 1907/2006/EC, Article 31

Printing date 13.07.2017 *Version number 37* *Revision: 28.06.2017*

SECTION 1: Identification of the substance/mixture and of the company/undertaking

· **1.1 Product identifier**

· **Trade name: Degreaser Salt SLOTOCLEAN AK 91**

· **Article number:** 020091

· **1.2 Relevant identified uses of the substance or mixture and uses advised against**
No further relevant information available.

· **Application of the substance / the mixture** Electroplating auxiliary

· **1.3 Details of the supplier of the safety data sheet**

· **Manufacturer/Supplier:**
Dr.-Ing. Max Schlötter GmbH & Co. KG
Galvanotechnik
Talgraben 30
73312 Geislingen/Steige
Germany

· **Further information obtainable from:** E-Mail: sds@schloetter.de

· **1.4 Emergency telephone number:**
University of Freiburg
Poisoning-Information-Center
+49(0)761-19240 (24h, 365 days/year)
Information in German and English
http://www.giftberatung.de/

*

SECTION 2: Hazards identification

· **2.1 Classification of the substance or mixture**

· **Classification according to Regulation (EC) No 1272/2008**

Acute Tox. 4	H302	Harmful if swallowed.
Skin Irrit. 2	H315	Causes skin irritation.
Eye Dam. 1	H318	Causes serious eye damage.
Repr. 1B	H360FD	May damage fertility. May damage the unborn child.

· **2.2 Label elements**

· **Labelling according to Regulation (EC) No 1272/2008**
The product is classified and labelled according to the CLP regulation.

· **Hazard pictograms**

GHS05 GHS07 GHS08

· **Signal word** Danger

· **Hazard-determining components of labelling:**
sodium hydrogensulphate
tetrasodium pyrophosphate
Disodium tetraborate, pentahydrate
Reaction product of Benzenesulfonic acid, 4-C10-13-sec-alkyl derivs. and Benzenesulfonic acid, 4-methyl- and sodium hydroxide

· **Hazard statements**
H302 Harmful if swallowed.
H315 Causes skin irritation.
H318 Causes serious eye damage.
H360FD May damage fertility. May damage the unborn child.

· **Precautionary statements**
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310 Immediately call a POISON CENTER/doctor.

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P321 Specific treatment (see on this label).
P405 Store locked up.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

· **Additional information:**
Restricted to professional users.
· **2.3 Other hazards**
· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.

SECTION 3: Composition/information on ingredients

· **3.2 Chemical characterisation: Mixtures**
· **Description:** Mixture of substances listed below with nonhazardous additions.

· **Dangerous components:**

CAS: 12179-04-3 EINECS: 215-540-4 Index number: 005-011-02-9	Disodium tetraborate, pentahydrate Repr. 1B, H360FD	25 - <50%
CAS: 7681-38-1 EINECS: 231-665-7 Index number: 016-046-00-X Reg.nr.: 01-2119552465-36-0000	sodium hydrogensulphate Eye Dam. 1, H318	25 - <50%
CAS: 7722-88-5 EINECS: 231-767-1 Reg.nr.: 01-2119489794-17	tetrasodium pyrophosphate Eye Dam. 1, H318; Acute Tox. 4, H302	15 - <25%
EC number: 932-051-8 Reg.nr.: 01-2119565112-48	Reaction product of Benzenesulfonic acid, 4-C10-13-sec-alkyl derivs. and Benzenesulfonic acid, 4-methyl- and sodium hydroxide Eye Dam. 1, H318; Skin Irrit. 2, H315; Aquatic Chronic 3, H412	5 - < 15%

· **SVHC**

12179-04-3	Disodium tetraborate, pentahydrate

· **Additional information:** For the wording of the listed hazard phrases refer to section 16.

SECTION 4: First aid measures

· **4.1 Description of first aid measures**
· **General information:**
PERSONAL PROTECTION FOR THE FIRST AIDER.
Immediately remove any clothing soiled by the product.
· **After inhalation:** Supply fresh air; consult doctor in case of complaints.
· **After skin contact:** If skin irritation continues, consult a doctor.
· **After eye contact:**
Rinse opened eye for several minutes under running water. Then consult a doctor.
If present remove the contact lenses immediately.
· **After swallowing:** If symptoms persist consult doctor.
· **4.2 Most important symptoms and effects, both acute and delayed** No further relevant information available.
· **4.3 Indication of any immediate medical attention and special treatment needed**
No further relevant information available.

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Safety data sheet
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Printing date 13.07.2017 *Version number 37* *Revision: 28.06.2017*

Trade name: **Degreaser Salt SLOTOCLEAN AK 91**

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SECTION 5: Firefighting measures

· **5.1 Extinguishing media**
· **Suitable extinguishing agents:** Use fire extinguishing methods suitable to surrounding conditions.
· **5.2 Special hazards arising from the substance or mixture**
During heating or in case of fire poisonous gases are produced.
Carbon monoxide (CO)
Sulphur dioxide (SO2)
· **5.3 Advice for firefighters**
· **Protective equipment:** Do not inhale explosion gases or combustion gases.
· **Additional information**
Collect contaminated fire fighting water separately. It must not enter the sewage system.

SECTION 6: Accidental release measures

· **6.1 Personal precautions, protective equipment and emergency procedures** Not required.
· **6.2 Environmental precautions:** Do not allow to enter sewers/ surface or ground water.
· **6.3 Methods and material for containment and cleaning up:**
Dispose contaminated material as waste according to item 13.
· **6.4 Reference to other sections**
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

*
SECTION 7: Handling and storage

· **7.1 Precautions for safe handling**
Open and handle receptacle with care.
Prevent formation of dust.
· **Information about fire - and explosion protection:** Keep respiratory protective device available.

· **7.2 Conditions for safe storage, including any incompatibilities**
· **Storage:**
· **Requirements to be met by storerooms and receptacles:** Store only in the original receptacle.
· **Information about storage in one common storage facility:** Store away from foodstuffs.
· **Further information about storage conditions:**
Protect from frost.
Protect from heat and direct sunlight.
· **Maximum storage temperature:** 40 °C
· **Minimum storage temperature:** 5 °C
· **Storage class:** 6.1 D
· **7.3 Specific end use(s)** No further relevant information available.

*
SECTION 8: Exposure controls/personal protection

· **Additional information about design of technical facilities:** No further data; see item 7.

· **8.1 Control parameters**

· **Ingredients with limit values that require monitoring at the workplace:**	
7722-88-5 tetrasodium pyrophosphate	
WEL	Long-term value: 5 mg/m³

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· **DNELs**

7722-88-5 tetrasodium pyrophosphate		
Inhalative	exposure long term - systemic effects	2.79 mg/m³ (worker)
Reaction product of Benzenesulfonic acid, 4-C10-13-sec-alkyl derivs. and Benzenesulfonic acid, 4-methyl- and sodium hydroxide		
Dermal	exposure long term - systemic effects	170 mg/kg bw/day (worker)
Inhalative	exposure long term - systemic effects	12 mg/m³ (worker)

· **PNECs**

7681-38-1 sodium hydrogensulphate	
PNEC	800 mg/l (sewage treatment plant)
	1.109 mg/l (marine water)
	17.66 mg/l (sporadic emission)
	11.09 mg/l (fresh water)
PNEC	1.54 mg/kg (soil)
	4.02 mg/kg (sediment marine water)
	40.2 mg/kg (sediment fresh water)
7722-88-5 tetrasodium pyrophosphate	
PNEC	50 mg/l (sewage treatment plant)
	0.005 mg/l (marine water)
	0.5 mg/l (sporadic emission)
	0.05 mg/l (fresh water)
Reaction product of Benzenesulfonic acid, 4-C10-13-sec-alkyl derivs. and Benzenesulfonic acid, 4-methyl- and sodium hydroxide	
PNEC	5.6 mg/l (sewage treatment plant)
	0.0268 mg/l (marine water)
	0.055 mg/l (sporadic emission)
	0.268 mg/l (fresh water)
PNEC	35 mg/kg (soil)
	8.1 mg/kg (sediment marine water)
	8.1 mg/kg (sediment fresh water)

· **Additional information:** The lists valid during the making were used as basis.

· **8.2 Exposure controls**
· **Personal protective equipment:**
· **General protective and hygienic measures:**
Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing
Wash hands before breaks and at the end of work.
Store protective clothing separately.
Avoid contact with the eyes.
Avoid contact with the eyes and skin.
· **Respiratory protection:** Not required.
· **Protection of hands:**
Check the permeability prior to each anewed use of the glove.
The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation
· **Material of gloves**

(Contd. on page 5)

(Contd. of page 4)

The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.
Chemical-protective gloves (EN 374-1, -2, -3).
Butyl rubber, BR ≥ 0,3 mm (Level 6)

· **Penetration time of glove material**
≥ 8 h
The exact break trough time has to be found out by the manufacturer of the protective gloves and has to be observed.

· **For the permanent contact in work areas without heightened risk of injury (e.g. Laboratory) gloves made of the following material are suitable:**
Butyl rubber, BR ≥ 0,3 mm (Level 6)

· **Not suitable are gloves made of the following materials:**
Leather gloves
Strong material gloves

· **Eye protection:**

Tightly sealed goggles

Ensure the eyewash stations and safety showers are close to the workplace.

SECTION 9: Physical and chemical properties

· **9.1 Information on basic physical and chemical properties**	
· **General Information**	
· **Appearance:**	
Form:	Powder
Colour:	light brown
· **Odour:**	Nearly odourless
· **Odour threshold:**	Not determined.
· **pH-value (30 g/l) at 20 °C:**	8.0 - 8.5
· **Change in condition**	
Melting point/freezing point:	not determined
Initial boiling point and boiling range:	not determined
· **Flash point:**	Not applicable.
· **Flammability (solid, gas):**	Not determined.
· **Ignition temperature:**	490 °C
· **Decomposition temperature:**	Not determined.
· **Auto-ignition temperature:**	Product is not selfigniting.
· **Explosive properties:**	Product does not present an explosion hazard.
· **Explosion limits:**	
Lower:	Not determined.
Upper:	Not determined.
· **Vapour pressure at 20 °C:**	- hPa
· **Density:**	DIN 53217-5 Determination of density - vibration method
· **Relative density**	Not determined.
· **Vapour density**	Not applicable.
· **Evaporation rate**	Not applicable.

(Contd. on page 6)

(Contd. of page 5)

· **Solubility in / Miscibility with water:**	Soluble.
· **Partition coefficient: n-octanol/water:**	Not determined.
· **Viscosity:**	
Dynamic:	Not applicable.
Kinematic:	Not applicable.
· **Solvent content:**	
Organic solvents:	0.0 %
VOC (EU)	0.00 %
· **9.2 Other information**	No further relevant information available.
· **Additional information**	The physical data in section 9 correspond to typical values for this product and can not be seen as a product specification.

SECTION 10: Stability and reactivity

· **10.1 Reactivity** No further relevant information available.
· **10.2 Chemical stability**
· **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
· **10.3 Possibility of hazardous reactions** No dangerous reactions known.
· **10.4 Conditions to avoid** No further relevant information available.
· **10.5 Incompatible materials:** No further relevant information available.
· **10.6 Hazardous decomposition products:** No dangerous decomposition products known.

*

SECTION 11: Toxicological information

· **11.1 Information on toxicological effects**
· **Acute toxicity**
Harmful if swallowed.

· **LD/LC50 values relevant for classification:**		
12179-04-3 Disodium tetraborate, pentahydrate		
Oral	LD50	3,200-3,400 mg/kg (rat) (Fremd-Sicherheitsdatenblatt)
Dermal	LD50	>2,000 mg/kg (rabbit) (Fremd-Sicherheitsdatenblatt)
Inhalative	LD50	>2 mg/kg (rat) (Fremd-Sicherheitsdatenblatt)
7681-38-1 sodium hydrogensulphate		
Oral	LD50	2,000 mg/kg (rat) (OECD 423 Na2SO4)
Inhalative	LC50/4h	>2.4 mg/l (rat) (OECD 436 Na2SO4)
7722-88-5 tetrasodium pyrophosphate		
Oral	LD50	300-2,000 mg/kg (rat) (OECD 420)
Dermal	LD50	>2,000 mg/kg (rabbit) (OECD 402)
Reaction product of Benzenesulfonic acid, 4-C10-13-sec-alkyl derivs. and Benzenesulfonic acid, 4-methyl- and sodium hydroxide		
Oral	LD50	2,000-5,000 mg/kg (rat) (OECD 401)
Dermal	LD50	>2,000 mg/kg (rat) (OECD 402)

· **Primary irritant effect:**
· **Skin corrosion/irritation**
Causes skin irritation.
· **Serious eye damage/irritation**
Causes serious eye damage.
· **Respiratory or skin sensitisation** Based on available data, the classification criteria are not met.

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· ***CMR effects (carcinogenity, mutagenicity and toxicity for reproduction)***
· ***Germ cell mutagenicity*** *Based on available data, the classification criteria are not met.*
· ***Carcinogenicity*** *Based on available data, the classification criteria are not met.*
· ***Reproductive toxicity***
May damage fertility. May damage the unborn child.
· ***STOT-single exposure*** *Based on available data, the classification criteria are not met.*
· ***STOT-repeated exposure*** *Based on available data, the classification criteria are not met.*
· ***Aspiration hazard*** *Based on available data, the classification criteria are not met.*

*

SECTION 12: Ecological information

· ***12.1 Toxicity***

· ***Aquatic toxicity:***	
12179-04-3 Disodium tetraborate, pentahydrate	
EC50/96h	158 mg/l (desmodesmus subspicatus - green algae) (ETOX)
EC50/24h	242 mg/l (daphnia magna - water flea) (Fremd-Sicherheitsdatenblatt)
7681-38-1 sodium hydrogensulphate	
LC50/48h	1,766 mg/l (daphnia magna - water flea) (EPA 600/R-94/024, Na2SO4, read-across)
LC50/96h	7,960 mg/l (pimephales promelas - fathead minnow) (EPA 600/4-90/027 Na2SO4, read across)
EC50/120h	1,900 mg/l (algae) (Na2SO4, read-across)
NOEC	1,109 mg/l (ceriodaphnia dubia - water flea) (ASTM E 1295-01 Na2SO4, read-across)
7722-88-5 tetrasodium pyrophosphate	
LC50/96h (static)	>100 mg/l (oncorhynchus mykiss - rainbow trout) (OECD 203)
EC50/48h (static)	>100 mg/l (daphnia magna - water flea) (EPA OTS 797.1300)
EC50/72h	>100 mg/l (desmodesmus subspicatus - green algae) (OECD 201)
Reaction product of Benzenesulfonic acid, 4-C10-13-sec-alkyl derivs. and Benzenesulfonic acid, 4-methyl- and sodium hydroxide	
LC50/96h	>1-10 mg/l (cyprinus carpio - carp) (OECD 203)
EC50/17h	63 mg/l (pseudomonas putida - bacteria) (ISO 10712)
EC50/48h (static)	>1-10 mg/l (daphnia magna - water flea) (OECD 202)

· ***12.2 Persistence and degradability*** *No further relevant information available.*
· ***12.3 Bioaccumulative potential*** *No further relevant information available.*
· ***12.4 Mobility in soil*** *No further relevant information available.*
· ***Additional ecological information:***
· ***General notes:***
The classification into the water hazard class resulted according to the administrative regulation water-polluting substances (VwVwS) dated 17.05.1999.
Water hazard class 1 (German Regulation) (Self-assessment): slightly hazardous for water
The product does not contain AOX.
The product does not contain VOC.
The product does not contain EDTA
Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
The surfactant(s) contained in this preparation complies(comply) with the biodegradability criteria as laid down in Regulation (EC) No.648/2004 on detergents. Data to support this assertion are held at the disposal of the competent authorities of the Member States and will be made available to them, at their direct request or at the request of a detergent manufacturer.
The product does not contain organic complexing agents.
· ***12.5 Results of PBT and vPvB assessment***

(Contd. on page 8)

Safety data sheet
according to 1907/2006/EC, Article 31

Printing date 13.07.2017 *Version number 37* *Revision: 28.06.2017*

Trade name: Degreaser Salt SLOTOCLEAN AK 91

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According to Annex XIV of Regulation (EC) No. 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH): The product does not contain a substance fullfilling the PBT (persistent/bioaccumulative/toxic) criteria or the vPvB (very persistent/very bioaccumulative) criteria: Self classification.

· **PBT:** *Not applicable.*
· **vPvB:** *Not applicable.*
· **12.6 Other adverse effects** *No further relevant information available.*

SECTION 13: Disposal considerations

· **13.1 Waste treatment methods**
· **Recommendation**
Must not be disposed together with household garbage. Do not allow product to reach sewage system. Contact manufacturer for recycling information.

· **European waste catalogue**	
06 03 14	solid salts and solutions other than those mentioned in 06 03 11 and 06 03 13

· **Uncleaned packaging:**
· **Recommendation:** *Disposal must be made according to official regulations.*
· **Recommended cleansing agents:** *Water, if necessary together with cleansing agents.*

SECTION 14: Transport information

· **14.1 UN-Number**	
· **ADR, ADN, IMDG, IATA**	Void
· **14.2 UN proper shipping name**	
· **ADR, ADN, IMDG, IATA**	Void
· **14.3 Transport hazard class(es)**	
· **ADR, ADN, IMDG, IATA**	
· **Class**	Void
· **14.4 Packing group**	
· **ADR, IMDG, IATA**	Void
· **14.5 Environmental hazards:**	
· **Marine pollutant:**	No
· **14.6 Special precautions for user**	Not applicable.
· **14.7 Transport in bulk according to Annex II of Marpol and the IBC Code**	Not applicable.
· **Transport/Additional information:**	Not dangerous according to the above specifications.
· **UN "Model Regulation":**	Void

*

SECTION 15: Regulatory information

· **15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**

· **Directive 2012/18/EU - SEVESO III**
· **Named dangerous substances - ANNEX I** *None of the ingredients is listed.*
· **REGULATION (EC) No 1907/2006 ANNEX XVII** *Conditions of restriction: 30*

· **National regulations:**

· **Waterhazard class:** *Water hazard class 1 (Self-assessment): slightly hazardous for water.*

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· **Other regulations, limitations and prohibitive regulations**

· **Substances of very high concern (SVHC) according to REACH, Article 57**	
12179-04-3	Disodium tetraborate, pentahydrate

· **15.2 Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

*

SECTION 16: Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

Safety Data Sheet to the regulation 1907/2006/EG, article 31.
EINECS numbers of the type 9xx-xxx-x are automatically allocated from ECHA for substances which were pre-registrated without EG or CAS numbers. Additionally, such numbers are also allocated for non-phase-in-substances which have no CAS number.
Material Safety Data Sheets are to be kept for at least 10 years, according to Article 36 of REACH Regulation (EC) No 1907/2006.

· **Relevant phrases**
H302 Harmful if swallowed.
H315 Causes skin irritation.
H318 Causes serious eye damage.
H360FD May damage fertility. May damage the unborn child.
H412 Harmful to aquatic life with long lasting effects.

· **Department issuing SDS:**
Research and Development
E-Mail: fue@schloetter.de
· **Contact:** sds@schloetter.de
· **Abbreviations and acronyms:**
RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
ICAO: International Civil Aviation Organisation
RRN: REACH Registration Number
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
IATA: International Air Transport Association
GHS: Globally Harmonised System of Classification and Labelling of Chemicals
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
VOC: Volatile Organic Compounds (USA, EU)
DNEL: Derived No-Effect Level (REACH)
PNEC: Predicted No-Effect Concentration (REACH)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
PBT: Persistent, Bioaccumulative and Toxic
SVHC: Substances of Very High Concern
vPvB: very Persistent and very Bioaccumulative
Acute Tox. 4: Acute toxicity – Category 4
Skin Irrit. 2: Skin corrosion/irritation – Category 2
Eye Dam. 1: Serious eye damage/eye irritation – Category 1
Repr. 1B: Reproductive toxicity – Category 1B
Aquatic Chronic 3: Hazardous to the aquatic environment - long-term aquatic hazard – Category 3
· *** Data compared to the previous version altered.**

Degreaser
SLOTOCLEAN AK 90

The Degreaser SLOTOCLEAN AK 90 is a weak alkaline immersion degreasing process for the removal of **processing oils and drawing compounds** from copper, brass, aluminium or German silver 2.0740. A separate station should be available for each type of metal in order to prevent cementation (e.g. copper ions on aluminium).
A treatment with this cleaning system results in a **hydrophile** surface.

In order to support the removal of **pigmented drawing compounds, polishing or grinding paste** from the above mentioned base materials, the cleaning process can be enhanced effectively by the ultrasonic support.

Please refer to technical data sheet BATH 02300-E Summary of Degreaser Additives which informs you about cleaning enhancers suitable for ultrasound installations.

The information in this data sheet is based on laboratory as well as practical experience. Figures quoted for operating limits and replenishment quantities are for guidance. Actual values necessary will depend on the components being plated (material and geometry), their application and plating plant conditions.

Important:
Please read this instruction carefully prior to the use of the process and carefully follow all the parameters that have a direct influence on the operation. We reserve the right to make technical changes. In the interest of safety, please pay attention to the hazard warnings on the labels of the containers. The minimum shelf life of the products is included on the labels and is also available in the appropriate Quality Assurance (QA03).
The current IMDS number of the layer deposited from the process is available on the internet at www.schloetter.com/downloads.
For the storage of chemical products the TRGS 510 must be followed.
If the additives used in this process contain a SVHC-substance, then this will be specified in the corresponding Material Safety Data Sheet, section 15.

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1.0 TECHNICAL INFORMATION AND EQUIPMENT REQUIREMENTS

Tanks:	isolated tanks made of steel respectively rubber-lined steel (heat resistant hard rubber lining), stainless steel or reinforced plastic vessels made of polypropylene for smaller volumes
Local Exhaust Ventilation:	tank rim extraction
Part/Electrolyte Agitation:	recommended; stirrer or circulation by educators, surface cleaning with overflow- respectively dirt collecting compartment
Ultrasound:	power > 8 W/l for the removal of polishing- and grinding residues
Heating/Cooling:	alkaline resistant immersion heaters, heating coils/heat exchanger made of stainless steel or PTFE
Filter units/oil separators or similar	recommended
Spray register:	optionally e.g. surface rinsing by pressure bottle

2.0 MAKE-UP AND OPERATING CONDITIONS

2.1 Product names

List of products required		
Product name	**Article no. (AN)**	**SG**
Degreaser Salt SLOTOCLEAN AK 91	020091	--
Degreaser additive depends on application, refer to TDS BATH 02300-E		
Sodium hydroxide, 50 % (756 g/l aqueous)	supplied by user*	1.52
Phosphoric acid, (75 %)	supplied by user*	1.58

* The current product qualities respectively -specifications recommended by us can be found on the internet at www.schloetter.com/downloads.

2.2 Composition

Degreaser Salt SLOTOCLEAN AK 91	borates, polyphosphate (complexing compounds), tensides; free from silicon and NaOH

2.3 Requirements for a 100 litre bath

Product name	**AN**	**SG**	**Quantity**	
Degreaser Salt SLOTOCLEAN AK 91	020091	--	3.5	kg
Degreaser additive depends on application, refer to TDS BATH 02300-E				

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2.4 Make up sequence for a 100 litre bath

All tanks and equipment to be used should be thoroughly cleaned prior to use.

- fill 70 litres of deionised water into the tank
- add the required quantity of Degreaser Salt SLOTOCLEAN AK 91 and dissolve
- add the required quantity of degreaser additive
- make up to final volume with preferably deionised water
- mix thoroughly

The degreaser is ready for use when the operating temperature has been reached.

2.5 Concentrations- and operating conditions

2.5.1 for the removal of processing oils and drawing compounds

	Range	Optimum	
Degreaser Salt SLOTOCLEAN AK 91	25 - 35	30	g/l
Treatment time	2 - 10	--	min.
Temperature range	50 - 80	--	°C
pH value	approx. 8.2	--	
Ultra sound	--	--	

2.5.2 for the removal of pigmented drawing compounds and grinding pastes

	Range	Optimum	
Degreaser Salt SLOTOCLEAN AK 91	25 - 35	30	g/l
Degreaser additive depends on application, refer to TDS BATH 02300-E			
Treatment time	1 - 5	--	min.
Temperature range	70 - 85	--	°C
pH value	approx. 8.2	--	
Ultra sound	--	> 8	W/l

raise pH value ↑: Sodium hydroxide, 50 % (765 g/l aqueous)
decrease pH-Wert ↓: phosphoric acid, (75 %)

3.0 PROCESS SEQUENCE

Our service department or technical field service would be pleased to provide you information on suitable process sequences respectively methods.

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4.0 MAINTENANCE AND FUNCTION OF THE INDIVIDUAL BATH COMPONENTS

The water quality used for make-up and continuous replenishment of the evaporation losses is essential to obtain good degreasing results. Therefore we strictly recommend the use of deionised- or partly desalted water. Tap water may only be used if the hardness degree does not exceed 6° dH. Using hard water results in precipitation of the active components of Degreaser SLOTOCLEAN AK 90.
This'll therefore necessarily result in unusable cleaning results !

4.1 Degreaser Salt SLOTOCLEAN AK 91

Degreaser Salt SLOTOCLEAN AK 91 contains all the components necessary for the operation of the degreaser. The content of Degreaser Salt SLOTOCLEAN AK 91 can be determined by acidimetric titration. Correction is made to nominal value according to the difference determined by titration. We're pleased to provide a suitable analysis description upon request.

4.2 Degreaser additives

Degreaser Salt SLOTOCLEAN AK 91 already contains tensides. But the cleaning effect can be enhanced by the use of suitable cleaning additives. Degreaser additives are only consumed by drag-out. A determination of the concentration isn't possible with justifiable methods. They're replenished either during replenishment of Degreaser Salt SLOTOCLEAN AK 91 proportionately or with decreasing effect.

4.3 Cloud point

When the operating temperature reaches a certain point - the cloud point - degreaser additives start to oil out and effectiveness diminishes. This is indicated by cloud formation in the electrolyte. Maximum operating temperature is defined by the cloud point.
The cloud point depends on quality and type of degreaser additive, as well as on the salt content of the solution. The salt content results from the degreaser salt added and the carbonate that forms during operation. The higher the salt content, the lower is the cloud point.

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4.4 pH value

The optimum pH value 8.2 should be maintained in the degreasing system (Degreaser Salt SLOTOCLEAN AK 91 with cleaning enhancer suitable for ultrasound) especially when removing grinding paste or similar products. (The pH value is measured at 20 °C).

pH value < 8.0	The solubility of the surfactants decreases. Degreaser solution turns cloudy. Cleaning effect deteriorates.
pH value > 8.7	Depending on temperature and immersion time there's the risk, that e.g. brass for example starts more or less tarnishing. Pigment removal decreases.

Corrections of the ph value if necessary

raise pH value ↑: sodium hydroxide, 50 % (765 g/l aqueous)
decrease pH-Wert ↓: phosphoric acid, (75 %)

5.0 TROUBLE SHOOTING

No information available at present.

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6.0 EFFLUENT

Legal regulations must be observed for disposal of the Degreaser SLOTOCLEAN AK 90. Different regulations normally apply for the additives and the ready-made electrolyte. Please refer to section **13** of the appropriate Material Safety Data Sheet for disposal code and recommendations.

The following detoxification sequence is only considered to be an aid:

Resulting rinse waters must be batch detoxified. Therefore the pH must be adjusted to approx. 2 with diluted acid, e.g. with technical hydrochloric acid, (10 %). After the addition of 5 g/l technical calcium chloride ($CaCl_2 \times H_2O$) the pH is increased to pH 9 with technical sodium hydroxide solution. After metal precipitation and flocculation it's filtered.

7.0 SAFETY

Reasonable care is required when handling Schlötter chemical products. Only personnel specially trained on working with chemicals should be deployed with their handling.

EC Material Safety Data Sheets must be made available to all personnel dealing with the chemicals to ensure they have all required information about product composition, hazards identification, first-aid measures, handling and storage, exposure controls, toxicological and ecological information, etc. It is required to ensure the supply and use of suitable protective clothing and -equipment.

The user must verify the designated purpose of the electrolyte. Previous experience has shown that not all metal surfaces are suitable for a trouble-free electroplating.

The above mentioned data are made according to our best knowledge. Consistent operation of the working solution requires appropriate maintenance. Degreaser SLOTOCLEAN AK 90 is a process of Dr.-Ing. Max Schlötter GmbH & Co KG. It can only be operated with the products described in this technical data sheet. Use of other chemicals (also partly) will impair quality and invalidates our service- and quality commitments (quality assurance).

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SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1. Product identifier

Name of the product: **SODIUM HYDROXIDE PELLETS**

Product identifier: Sodium hydroxide

Registration Number of the substance: 01-2119457892-27-0029

1.2. Relevant identified uses of the substance or mixture and uses advised against

Identified uses: Manufacturing of liquid NaOH (ES01)
Manufacturing of solid NaOH (ES02)
Industrial and professional use of NaOH (ES1)
Consumer use of NaOH (ES2)

Uses advised against: There are no uses advised against identified.

1.3. Details of the supplier of the safety data sheet

Company/undertaking:

Spolek pro chemickou a hutní výrobu, akciová společnost
Revoluční 1930/86, Ústí nad Labem 400 32, Czech Republic
Tel: +420 477 161 111 Fax.: +420 477 163 333
Responsible person: msds@spolchemie.cz

1.4. Emergency telephone number

CZ: +420 477 162 094/ EN: +420 476 163 111 non-stop service
Listing of national helpdesks at: http://echa.europa.eu/help/nationalhelp_contact_en.asp.

SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture

Met.Corr.1: H290
Skin Corr.1A: H314

Hazards to man and the environment: May be corrosive to metals. Causes severe skin burns and eye damage.
Full text of classification and text of H, EUH and P - Phrases is listed in section 16 this SDS.

2.2. Label elements

DANGER

May be corrosive to metals. Causes severe skin burns and eye damage.
Do not breathe dust. Wear protective gloves/protective clothing/eye protection/face protection. IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/physician.

CAS: 1310-73-2 **Index:** 011-002-00-6
Contents: Sodium hydroxide
Obligatory phrasing: Not determined.

2.3. Other hazards

PBT and vPvB assessment : This substance is not considered to be persistent, bioaccumulative non toxic (PBT).

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Identifier	CAS/ EINECS/ Registration number	Classification 1272/2008/ES	Content %	Note
Sodium hydroxide	1310-73-2/ 215-185-5/ 01-2119457892-27-0029	Met.Corr.1: H290, Skin Corr.1A: H314	> 96	OEL

Full text of classification and text of H, EUH and P - Phrases is listed in section 16 this SDS.

SECTION 4: FIRST AID MEASURES

4.1. Description of first aid measures

In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
In a life threatening condition soon carry out resuscitation affected and seek medical advice.
Respiratory arrest: immediately administer artificial respiration.
Cardiac arrest: immediately perform indirect heart massage.
Unconsciousness: place patient in recovery position.

After inhalation: Remove the victim quickly and considering own safety to fresh air, do not let the victim walk! Depending on situation, it is recommended to rinse oral cavity and, if necessary, nose with water. If the victim's clothing is contaminated, change it and protect the victim against cold. Depending on situation, call the rescue service or get medical attention due to the frequent need for further follow-up for at least 24 hours.

After skin contact: Remove contaminated clothing immediately; before washing or during washing, remove any rings, watches, bracelets that are in places of contact of the substance with skin. Rinse affected areas with stream of lukewarm water, if possible, for 10 to 30 minutes; do not use a brush, soap or neutralising agents! Cover burned areas of skin with a sterile dressing, do not use any ointments or other medical and pharmaceutical products. Cover the victim to protect him against cold. Depending on situation, call the rescue service or ensure medical attention.

After eye contact: Rinse eyes immediately under running water, open eyelids (even by force); if the victim wears contact lenses, remove them immediately. Do never neutralise! Rinse for 10 to 30 minutes from the inner to the outer ocular angle to prevent running of water in the other eye. Depending on the situation, call an ambulance or medical attention as quickly as possible, if possible professional treatment.The victim needs to get medical attention even with in the case of a small injuries.

After ingestion: DO NOT INDUCE VOMITING - risk of further damage to the digestive tract !!! There is a risk of perforation of the esophagus and the stomach! RINSE MOUTH IMMEDIATELY WITH WATER AND GIVE TO DRINK 2-5 dl of cold water to reduce the thermal effect of the caustics! Do not force the victim to drink, especially if he/she feels pain in mouth or throat. In this case, make the victim rinse his/her mouth. DO NOT ADMINISTER ACTIVATED CARBON! (blackening will make examination of the mucous membranes of more difficult and activated charcoal has not positive effect in case of acids and lyes). Do not give anything by mouth if the victim is unconscious or has convulsions. Depending on situation, call the rescue service or get medical attention as quickly as possible.

4.2. Most important symptoms and effects, both acute and delayed

Possible risk of corrosion on reaction with acids due high heat release and spray out of reaction mixture. Ingestion may produce burning of the gastrointestinal system. Small quantities may develop burning pain, feeling of constriction in the throat. Large quantities may cause an extensive destruction, and perforation of the stomach.

4.3. Indication of any immediate medical attention and special treatment needed

Not determined.

SECTION 5: FIRE-FIGHTING MEASURES

5.1. Extinguishing media

Suitable extinguishing media: Not flammable substance.

Extinguishing media to be avoided: High pressure water jet.

5.2. Special hazards arising from the substance or mixture

Not determined.

5.3. Advice for firefighters

Do not enter confined fire space without adequate protective clothing and an approved positive pressure self-contained breathing apparatus.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures

Twilled fabric clothing (or working suit with rubber apron), rubber boots, rubber gloves, face shield or goggles.

6.2. Environmental precautions

Avoid release of product or components to the environment, sewers and surface water or soil.

6.3. Methods and material for containment and cleaning up

Pick up spilled hydroxide and place into impervious containers. Neutralise residues with diluted sulphuric acid or hydrochloric acid and after that flush area with water. In case of large spills call fire emergency service.

6.4. Reference to other sections

Additional advice : Refer to section 8, 13.

SECTION 7: HANDLING AND STORAGE

7.1. Precautions for safe handling

Do not eat, drink or smoke during work, observe working instructions. Wash your hands and exposed parts of body thoroughly with soap and water after work and before meal and possibly treat with suitable reparation lotion. Store in original packaging, storage tanks and containers should be placed into containment basins of corresponding content and construction.

7.2. Conditions for safe storage, including any incompatibilities

Store in closed storerooms. Keep away from sources of ignition and other kinds of substances. Store in the original containers kept tightly closed. Storerooms should be well- ventilated, dry, provided with a first aid box and a source of drinking water supply. Prevent access of unauthorised personnel. Storage tanks and containers should be placed into containment basins of corresponding content and construction.

7.3. Specific end use(s)

No effect known.

SECTION 8: EXPOSURE CONTROLS/ PERSONAL PROTECTION

8.1. Control parameters

Sodium hydroxide: STEL: 2 mg/m³ (EH40/2005 Workplace exposure limits).

Sodium hydroxide:
DNEL- workers:
Long term (local effects): Inhalat: 1 mg/m³
DNEL- general population:
Long term (local effects): Inhalat: 1 mg/m³

Sodium hydroxide:
PNECs : Not determined.

8.2. Exposure controls

8.2.1 Appropriate engineering controls

Local exhaustion recommended.

8.2.2 Occupational exposure controls

Respiratory protection: Respirator.
Hand protection: Protective PVC gloves.
Eye / face protection: Safety goggles or safety shield.
Skin protection: Twilled fabric clothing, footwear.

8.2.3 Environmental exposure controls

Prevent entry into sewers, follow the plan of action in case of emergency. Cover with an absorbent material (Vapex) .Used material to store

in barrels and in cooperation with the department of environmental protection then defuse it.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties

Physical State:	Solid.
Colour:	White.
Odour:	Odourless.
pH:	14 (20°C)
Boiling point / boiling range (°C):	1388
Melting point / freezing point (°C):	323
Flash point (°C):	Inorganic substance.
Flammability (solid, gas):	Not flammable.
Explosive properties:	Not explosive.
Oxidising properties:	No.
Vapour pressure:	Not applicable.
Density (g/cm³):	2,130 (20°C)
Solubility:	
Water solubility (g/l):	1000 (25°C)
Partition coefficient: n-octanol/water:	Inorganic substance.
Auto-ignition temperature (°C):	Not self-igniting.
Viscosity:	Not applicable.
Vapour density:	Not applicable.
Evaporation rate:	Not determined.
Other information:	Not determined.

9.2. Other information

Miscibility:	Not determined.
Fat solubility (oil to be specified):	Not determined.
Conductivity:	Not determined.
Gas group:	Not determined.

SECTION 10: STABILITY AND REACTIVITY

10.1. Reactivity

With normal use no dangerous reaction.

10.2. Chemical stability

Stable under recommended conditions of storage and handling of the product.

10.3. Possibility of hazardous reactions

Exothermic reaction with strong acids.

10.4. Conditions to avoid

Extremes of temperature and direct sunlight. Exposure to moisture - hygroscopic substance.

10.5. Incompatible materials

Metals, strong acids, flammable materials.

10.6. Hazardous decomposition products

Hydrogen.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. Information on toxicological effects

Acute toxicity: Based on available data, the classification criteria are not met.

Skin corrosion/irritation: Causes severe burns.
Serious eye damage/irritation: Causes serious eye damage.
Respiratory or skin sensitisation: Based on available data, the classification criteria are not met.
Mutagenicity: Based on available data, the classification criteria are not met.
Carcinogenicity: Based on available data, the classification criteria are not met.
Reproductive toxicity: Based on available data, the classification criteria are not met.
STOT- single exposure: Based on available data, the classification criteria are not met.
STOT- repeated exposure: Based on available data, the classification criteria are not met.
Aspiration hazard: Based on available data, the classification criteria are not met.

Other information
If affected skin is not treated promptly, badly healing blisters are formed which leave scars. Affection of hands and fingers with the weak solution may be dangerous, because of painful irritation with delayed appearance (even after some hours), where it may be too late to provide an effective aid.

SECTION 12: ECOLOGICAL INFORMATION

12.1. Toxicity

Not determined.
Other hazards: Not determined.

12.2. Persistence and degradability

The methods for determining the biological degradability are not applicable to inorganic substances.

12.3. Bioaccumulative potential

Is not expected.

12.4. Mobility in soil

High soluble in water.
During movement through soil some ion exchange will occur.

12.5. Results of PBT and vPvB assessment

PBT and vPvB assessment : This substance is not considered to be persistent, bioaccumulative non toxic (PBT).

12.6. Other adverse effects

No effect known.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

Neutralise with diluted sulphuric acid or hydrochloric acid and then rinse with plenty of water.

Properly emptied metal packagings may be used like secondary raw material, remaining packagings should be buried in a landfill or disposed of by incineration in suitable incinerator units for hazardous waste.

Handling with wastes is regulated by Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives.

SECTION 14: TRANSPORT INFORMATION

14.1. UN number: 1823

14.2. UN proper shipping name:

ADR/RID: SODIUM HYDROXIDE, SOLID
IMDG: SODIUM HYDROXIDE, SOLID

14.3. Transport hazard class(es): 8

14.4. Packing group: II

14.5. Environmental hazards

ADR/RID: No.
IMDG: No.

14.6. Special precautions for user

Not applicable.

14.7. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code

Not applicable.

Other information

Classification code: C6
Note: -
Tunnel restriction codes: (E)
EmS: F-A/S-B

SECTION 15: REGULATORY INFORMATION

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration,Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC.

Commission Regulation (EU) No 453/2010 of 20 May 2010 amending Regulation (EC) No 1907/2006 of the European Parliament and of theCouncil on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH).

Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC)No 1907/2006.

Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives.

Directive 2008/68/EC of the European Parliament and of the Council of 24 September 2008 on the inland transport of dangerous goods.

Council Directive 1999/13/EC of 11 March 1999 on the limitation of emissions of volatile organic compounds due to the use of organic solvents in certain activities and installations.

Council Directive 89/391/EEC of 12 June 1989 on the introduction of measures to encourage improvements in the safety and health of workers at work.

Other regulatory information:
Not determined.

15.2. Chemical safety assessment

The chemical safety report has been prepared.

SECTION 16: OTHER INFORMATION

Full wording of H, EUH, P - Phrases

H290 May be corrosive to metals.
H314 Causes severe skin burns and eye damage.
P260A Do not breathe dust.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P303 + P361 + P353 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310 Immediately call a POISON CENTER or doctor/physician.

Used abbreviations

Met. Corr. 1: Substance or mixture corrosive to metals, category 1
Skin Corr. 1A: Skin corrosion, hazard category 1A
OEL: Substance with Occupational Exposure Limits
STEL: Short-Term Exposure Limit
TWA: Time weighted average
PNEC: Predicted no-effect concentration
DNEL: Derived no-effect level
WGK: Wassergefährdungsklasse (water hazard class)
PBT: Persistent, bioaccumulative and toxic substance.
vPvB: Very persistent and very bioaccumulative substance

Classification methods

Not relevant - substance.

Sources of data

The registration dossier.

Additional information

Not determined.

Training guidelines

Those who manipulate with the product must be demonstrably informed of its dangerous properties, principles of protecting the environment and health from its harmful effects and principles of first aid.

Revision data

16.11.2010 Changes made in accordance with Regulation (EC) No 1272/2008 and Regulation (EC) No 453/2010 .
20.06.2013 e-SDS
17.09.2015 Removed classification according to Directive 67/548 / EEC (DSD). Adding information in section 4.

1.TITLE OF THE EXPOSURE SCENARIO: ES1: Industrial and Professional Use of NaOH

Sector of use: SU1-24

Product category: PC0-40
Sodium hydroxide can be used in many different chemical product categories. It can be used for example as an adsorbent (PC2), metal surface treatment product (PC14), non-metal-surface treatment product (PC15), intermediate (PC19), pH regulator (PC20), laboratory chemical (PC21), cleaning product (PC35), water softener (PC36), water treatment chemical (PC37) or extraction agent. However, it could potentially also be used in other chemical product categories (PC0 – 40).

Process category: PROC1, PROC2, PROC3, PROC4, PROC8a,PROC8b, PROC9, PROC10, PROC11, PROC 13, PROC15
The process categories mentioned above are assumed to be the most important ones but other process categories could also be possible (PROC1 – 27).

Article category: Not applicable.

Environmental relase category: ERC1, ERC2, ERC4, ERC6a, ERC6b, ERC7, ERC8a, 8b, 8d, ERC9a
The environmental release categories mentioned above are assumed to be the most important ones but other industrial environmental release categories could also be possible (ERC 1 – 12).

Processes, task, activities covered: Typical uses include: production of organic and inorganic chemicals, formulation of chemicals, production and whitening of paper pulp, production of aluminium and other metals, food industry, water treatment, production of textiles, professional end use of formulated products and other industrial uses.

2. OPERATIONAL CONDITIONS AND RISK MAMAGEMENT MESURES

2.1. Control of worker exposure

Product characteristics:

Solid or liquid NaOH, all concentrations (0-100%), if solid: low dustiness class.
Frequency and duration of use/exposure: 8 hours/day, 200 days/year

Operational conditions:

For worker, both solid and liquid NaOH containing products at concentration > 2%:

Replacing, where appropriated, manual processes by automated and/or closed processes. This would avoid irritating mists, sprayings and subsequent potential splashes:

- Use closed systems or covering of open containers (e.g. screens)
- Transport over pipes, technical barrel filling/emptying of barrel with automatic systems (suction pumps etc.)
- Use of pliers, grip arms with long handles with manual use “to avoid direct contact and exposure by splashes (no working over one’s head)”

Contributing scenario:

CONTROLLING WORKER EXPOSURE

Risk management measures:

For worker and professional, both solid and liquid NaOH containing products at concentration > 2%:

ORGANIZATIONAL

- Workers in the risky process/areas identified should be trained:
  a) to avoid to work without respiratory protection,
  b) to understand the corrosive properties and, especially, the respiratory inhalation effects of sodium hydroxide and
  c) to follow the safer procedures instructed by the employer.
- The employer has also to ascertain that the required PPE is available and used according to instructions.
- Where possible for professional use, use of specific dispensers and pumps specifically designed to prevent splashes/spills/exposure to occur.

TECNICAL
- Local exhaust ventilation and/or general ventilation is good practice

PERSONAL PROTECTIVE EQUIPMENT
- Respiratory protection: In case of dust or aerosol formation (e.g. spraying): use respiratory protection with approved filter (P2).
- Hand protection: impervious chemical resistant protective gloves.
  material: butyl-rubber, PVC, polychloroprene with natural latex liner, material thickness: 0.5 mm, breakthrough time: > 480 min.
  material: nitrile-rubber, fluorinated rubber, material thickness: 0.35-0.4 mm, breakthrough time: > 480 min.
- If splashes are likely to occur, wear tightly fitting chemical resistant safety goggles, face –shield.
- If splashes are likely to occur, wear suitable protective clothing, aprons, shield and suits, rubber or plastic boots, rubber or plastic boots.

2.2. Control of environmental exposure

Product characteristics:
Solid or liquid NaOH, all concentrations (0-100%), if solid: low dustiness class.
Frequency and duration of use: Continuous

Operational conditions:
Not applicable.

Contributing scenario:
CONTROLLING ENVIRONMENTAL EXPOSURE

Risk management measures:
Risk management measures related to the environment aim to avoid discharging NaOH solutions into municipal wastewater or to surface water, in case such discharges are expected to cause significant pH changes. Regular control of the pH value during introduction into open waters is required. In general discharges should be carried out such that pH changes in receiving surface waters are minimised. In general most aquatic organisms can tolerate pH values in the range of 6-9. This is also reflected in the description of standard OECD tests with aquatic organisms.

There is no solid waste of NaOH. Liquid NaOH waste should be reused or discharged to the industrial wastewater and further neutralized if needed.

3. EXPOSURE ESTIMATION

Worker exposure:
NaOH is a corrosive substance. For the handling of corrosive substances and formulations, immediate dermal contacts occur only occasionally and it is assumed that repeated daily dermal exposure can be neglected. Therefore, dermal exposure to NaOH was not quantified.
NaOH is not expected to be systemically available in the body under normal handling and use conditions and therefore systemic effects of NaOH after dermal or inhalation exposure are not expected to occur. Based on NaOH measurements in the pulp and paper industry, de-inking waste paper, aluminium, textile and chemical industry and following the proposed risk management measures controlling worker and professional exposure, the inhalation exposure is below the DNEL of 1 mg/m3.
In addition to the measured exposure data the ECETOC TRA tool has been used to estimate the inhalation exposure (see Table below). It was assumed that there is no local exhaust ventilation and no respiratory protection unless specified otherwise. The duration of exposure was set at more than 4 hours per day as a worst-case assumption and professional use was specified where relevant as a worst-case assumption. For the solid, the low dustiness class was selected because NaOH is very hygroscopic. Only the most relevant PROCs were considered in the assessment.

PROC1 liq.(mg/m3) 0,17 solid(mg/m3) 0,01
PROC2 liq.(mg/m3) 0,17 solid(mg/m3) 0,01
PROC3 liq.(mg/m3) 0,17 solid(mg/m3) 0,10
PROC4 liq.(mg/m3) 0,17 solid(mg/m3) 0,20 (with LEV)
PROC5 liq.(mg/m3) 0,17 solid(mg/m3) 0,20 (with LEV)
PROC7 liq.(mg/m3) 0,17 solid(mg/m3) not applicable

PROC8a/b liq.(mg/m3) 0,17 solid(mg/m3) 0,50
PROC9 liq.(mg/m3) 0,17 solid(mg/m3) 0,50
PROC10 liq.(mg/m3) 0,17 solid(mg/m3) 0,50
PROC11 liq.(mg/m3) 0,17 solid(mg/m3) 0,20 (with LEV)
PROC13 liq.(mg/m3) 0,17 solid(mg/m3) 0,50
PROC14 liq.(mg/m3) 0,17 solid(mg/m3) 0,20 (with LEV)
PROC15 liq.(mg/m3) 0,17 solid(mg/m3) 0,10
PROC19 liq.(mg/m3) 0,17 solid(mg/m3) 0,50
PROC23 liq.(mg/m3) 0,17 solid(mg/m3) 0,40 (with LEV and RPE(90%))
PROC24 liq.(mg/m3) 0,17 solid(mg/m3) 0,50 (with LEV and RPE(90%))

Environmental exposure:
The aquatic effect and risk assessment only deals with the effect on organisms/ecosystems due to possible pH changes related to OH- discharges, as the toxicity of the Na+ ion is expected to be insignificant compared to the (potential) pH effect. The high water solubility and very low vapour pressure indicate that NaOH will be found predominantly in water. When the risk management measures related to the environment are implemented, there is no exposure to the activated sludge of a sewage treatment plant and there is not exposure of the receiving surface water.
The sediment compartment is not considered, because it is not considered relevant for NaOH. If emitted to the aquatic compartment, sorption to sediment particles will be negligible.
Significant emissions to air are not expected due to the very low vapour pressure of NaOH). If emitted to air as an aerosol in water, NaOH will be rapidly neutralised as a result of its reaction with CO2 (or other acids).
Significant emissions to the terrestrial environment are not expected either. The sludge application route is not relevant for the emission to agricultural soil, as no sorption of NaOH to particulate matter will occur in STPs/WWTPs. If emitted to soil, sorption to soil particles will be negligible. Depending on the buffer capacity of the soil, OH- will be neutralised in the soil pore water or the pH may increase.
Bioaccumulation will not occur.

4. GUIDANCE OF COMPLIANCE CHECK WITH REQUIREMENTS OF EXPOSURE SCENARIO

Combination of Risk management measures and Operational conditions stated in that exposure scenario guarantees Risk characterization Ratio (RCR) value < 1.
Downstream users could asses their own measures using model ECETOC TRA v2 or EUSES. They could calculate RCR as DEL/DNEL or PEC/PNEC (DNELs , PNECs in SDS).

1.TITLE OF THE EXPOSURE SCENARIO: ES2: Consumer Use of NaOH

Sector of use:	SU21
Product category:	PC 0-40 Sodium hydroxide can be used in many different chemical product categories: PC20, PC35, PC39 (neutralisation agents, cleaning products, cosmetics, personal care products). The other PCs are not explicitly considered in this exposure scenario. However, NaOH can also be used in other PCs in low concentrations e.g. PC3 (up to 0.01%), PC8 (up to 0.1%), PC28 and PC31 (up to 0.002%) but it can be used also in the remaining product categories (PC 0-40).
Process category:	Not applicable.
Article category:	Not applicable.
Environmental relase category:	ERC8a, ERC8 b, ERC8d, ERC9a The environmental release categories mentioned above are assumed to be the most important ones but other wide dispersive environmental release categories could also be possible (ERC8 – 11b).
Processes, task, activities covered:	NaOH (up to 100%) is also used by consumers. It is used at home for drain and pipe cleaning, wood treatment and it also used to make soap at home. NaOH is also used in batteries and in oven-cleaner pads.

2. OPERATIONAL CONDITIONS AND RISK MAMAGEMENT MESURES

2.1. Control of worker exposure

Product characteristics:

Solid or liquid NaOH, all concentrations (0-100%), if solid: low dustiness class.Typical concentrations: floor strippers (<10%), hair straighteners (<2%), oven cleaners (<5%), drain openers (liquid: 30%, solid: <100%), cleaning products (<1.1%)

Operational conditions:

It is required to use resistant labelling-package to avoid its auto-damage and loss of the label integrity, under normal use and storage of the product. The lack of quality of the package provokes the physical loss of information on hazards and use instructions.

It is required that household chemicals, containing sodium hydroxide for more than 2%, which may be accessible to children should be provided with a child-resistant fastening (currently applied) and a tactile warning of danger (Adaptation to Technical Progress of the Directive 1999/45/EC, annex IV, Part A and Article 15(2) of Directive 67/548 in the case of, respectively, dangerous preparations and substances intended for domestic use). This would prevent accidents by children and other sensitive groups of society.

It is advisable to deliver only in very viscous preparations.
It is advisable to delivery only in small amounts.
For use in batteries, it is required to use completely sealed articles with a long service life maintenance.

Contributing scenario:

CONTROLLING CONSUMER EXPOSURE

Risk management measures:

For consumer, both solid and liquid NaOH containing products at concentration > 2%:

ORGANISATIONAL
It is required that improved use instructions, and product information should always be provided to the consumers. This clearly can efficiently reduce the risk of misuse. For reducing the number of accidents in which (young) children or elderly people are involved, it should be advisable to use these products in the absence of children or other potential sensitive groups. To prevent improper use of sodium hydroxide, instructions for use should contain a warning against dangerous mixtures.

Instructions addressed to consumers:
- Keep out of reach of children.
- Do not apply product into ventilator openings or slots.

PERSONAL PROTECTIVE EQUIPMENT
- Respiratory protection: In case of dust or aerosol formation (e.g. spraying): use respiratory protection with approved filter (P2)
- Hand protection: impervious chemical resistant protective gloves.
- If splashes are likely to occur, wear tightly fitting chemical resistant safety goggles, face–shield.

2.2. Control of environmental exposure

Product characteristics:
Solid or liquid NaOH, all concentrations (0-100%), if solid: low dustiness class.

Operational conditions:
Not applicable.

Contributing scenario:
CONTROLLING ENVIRONMENTAL EXPOSURE

Risk management measures:
This material and its container must be disposed of in a safe way (e.g. by returning to a public recycling facility). If container is empty, trash as regular municipal waste.
Batteries should be recycled as much as possible (e.g. by returning to a public recycling facility). Recovery of NaOH from alkaline batteries includes emptying the electrolyte, collection and neutralization with sulphuric acid and carbon dioxide.

3. EXPOSURE ESTIMATION

Worker exposure:
Acute/short term exposure was assessed only for the most critical use: use of NaOH in a spray oven cleaner. Consexpo and SprayExpo were used to estimate exposure. The calculated short-term exposure of 0.3 – 1.6 mg/m3 is slightly higher than the long term DNEL for inhalation of 1 mg/m3 but smaller than the short term occupational exposure limit of 2 mg/m3. Furthermore, NaOH will be rapidly neutralised as a result of its reaction with CO2 (or other acids).

Environmental exposure:
Consumer uses relates to already diluted products which will further be neutralized quickly in the sewer, well before reaching a WWTP or surface water.

4. GUIDANCE OF COMPLIANCE CHECK WITH REQUIREMENTS OF EXPOSURE SCENARIO

Combination of Risk management measures and Operational conditions stated in that exposure scenario guarantees Risk characterization Ratio (RCR) value < 1.
Downstream users could asses their own measures using model ECETOC TRA v2 or EUSES. They could calculate RCR as DEL/DNEL or PEC/PNEC (DNELs , PNECs in SDS).

List of Abbreviations:

SU3 Industrial uses: Uses of substances as such or in preparations at industrial sites.
SU21 Consumer uses: Private households (= general public = consumers)
SU22 Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
PC2 Adsorbents
PC3 Air care products
PC8 Biocidal products (e.g. Disinfectants, pest control)
PC14 Metal surface treatment products, including gal-vanic and electroplating products
PC15 Non-metal-surface treatment products
PC20 Products such as ph-regulators, flocculants, pre-cipitants, neutralization agents
PC21 Laboratory chemicals
PC28 Perfumes, fragrances
PC31 Polishes and wax blends
PC36 Water softeners
PC37 Water treatment chemicals

PC39 Cosmetics, personal care products
PROC1 Use in closed process, no likelihood of exposure
PROC2 Use in closed, continuous process with occasional controlled exposure
PROC3 Use in closed batch process (synthesis or formulation)
PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises
PROC8a Transfer of substance or preparation (charging/discharging) from/to ves-sels/large containers at non-dedicated facilities
PROC8b Transfer of substance or preparation (charging/discharging) from/to ves-sels/large containers at dedicated facili-ties
PROC9 Transfer of chemicals into small containers (dedicated filling line)
PROC10 Roller application or brushing
PROC11 Non industrial spraying
PROC13 Treatment of articles by dipping and pouring
PROC15 Use of laboratory reagents in small scale laboratories
ERC1 Manufacture of substances
ERC2 Formulation of preparations
ERC4 Industrial use of processing aids in processes and products, not becoming part of articles
ERC6a Industrial use resulting in manufacture of another substance (use of intermediates)
ERC6b Industrial use of reactive processing aids
ERC7 Industrial use of substances in closed systems
ERC8a Wide dispersive indoor use of processing aids in open systems
ERC8b Wide dispersive indoor use of reactive substances in open systems
ERC8d Wide dispersive outdoor use of processing aids in open systems
ERC9a Wide dispersive indoor use of substances in closed systems
ODKAZ other descriptors can be found at:
http://echa.europa.eu/documents/10162/13632/information_requirements_r12_en.pdf

LEV Local Exhaust Ventilation
RPE Respiratory protective equipment
DNEL Derived no-effect level
PNEC Predicted no-effect concentration
RCR Risk characterisation ratio

Schloetter
Plating Technology

OPERATING DATA
SLOTETCH 584
MICRO ETCH

SLOTETCH 584 is a micro etch specifically designed for the pre-treatment of printed circuit boards, integrated circuit lead frames, copper and Alloy 42 base materials.

SLOTETCH 584 is equally suited for use both in PTH and pattern plating stages of PCB manufacture.

SLOTETCH 584:
- gives a consistent etch rate.
- has a long life.
- is easily maintained.
- is economical to use.

Important :
Please read these instructions carefully and follow recommendations given.
We reserve the right to make technical changes as necessary.
In the interests of safety, please pay attention to the R- and S- phrases on the drum label.
The shelf life of the additives is generally 18 months.
The date of production is taken from the first part of the batch-number which shows the year and month. The final four figures are the specific batch code.

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1.0 TECHNICAL INFORMATION AND EQUIPMENT REQUIREMENTS

Tanks:	Polypropylene tank or liner.
Extraction:	Advisable.
Agitation:	Air and work movement at 0.6 m/min.
Heating/Cooling:	Porcelain or PTFE heaters with thermostat.

2.0 MAKE UP AND OPERATING RANGES)

2.1 Requirements for a 100 litre bath

Product name	Product no.	SG	Quantity			
			PTH	Pattern Plating	Nickel-Iron Alloys	
Slotetch 584	019004		6 - 10	3 - 6	6.0	kg
Sulphuric Acid	163030	1.84	1.0	1.0	1.0	ltrs

2.2 Procedure for make up of a 100 litre bath

1. Fill the cleaned process tank to 90% of its final volume with deionised water.
2. Stir in the required amount of sulphuric acid followed by the Slotetch 584 Salt.
3. Mix until the salt is completely dissolved and make up to final volume with deionised water.
4. Ensure the temperature is 20 - 30°C before use.

2.3 Concentrations and operating conditions

	PTH		Pattern Plating		Nickel-Iron Alloys		
		Optimum		Optimum		Optimum	
Slotetch 584:	60 - 100	60	30 - 60	30	50 - 70	60	g/l
Sulphuric Acid:	5 - 20	10	5 - 20	10	10 - 20	10	ml/l
Copper:	< 8		< 12		-		g/l
Nickel-Iron:	-		-		< 10		g/l
Temperature:	20 - 30	25	20 - 30	25	20 - 30	25	°C
Immersion time:	60 - 180	120	20 - 60	40	30 - 90	60	secs
Etch rates - with air agitation: without air agitation:	 0.9 - 1.3 0.6 - 1.0	 1.0 0.7	 0.7 - 1.0 0.3 - 0.7	 0.7 0.3	 - 0.3 - 0.6	 0.45	 µm/min µm/min

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2.4 Consumption of bath constituents

2.4.1 PTH

Based on an etch rate of 1.0 µm/min, and an immersion time of 2 minutes:	Slotetch 584	=	95 g/m²

2.4.2 Pattern Plating

Based on an etch rate of 0.7 µm/min, and an immersion time of 40 seconds:	Slotetch 584	=	22 g/m²

2.4.3 Nickel-Iron Alloys

Based on an etch rate of 0.45 µm/min, and an immersion time of 60 seconds:	Slotetch 584	=	40 g/m²
	Sulphuric acid	=	7 ml/m²

3.0 MAINTENANCE

SLOTETCH 584 salt should be added on a regular basis to maintain a constant concentration and hence a stable etch rate.

PTH applications	- replenishment should be made after a throughput of	5 m²/100 litres
Pattern plating applications	- replenishment should be made after a throughput of	20 m²/100 litres
Nickel-Iron alloys	- replenishment should be made after a throughput of	10 m²/100 litres

The concentration of Slotetch 584 salt must be confirmed by regular analysis.

The bath should be renewed when the copper content reaches 8 g/l for PTH, or 12 g/l for pattern plating applications, and in the case of nickel-iron alloys at 10 g/l metal. These levels would normally be expected after a throughput of 50 m²/100 litres, 290 m²/100 litres and 140 m²/100 litres respectively.

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4.0 ANALYSIS PROCEDURE

4.1 Copper

Reagents and Equipment

1. 100 vol. hydrogen peroxide
2. Hexamine buffer - (Dissolve 170 g hexamine in 900 ml deionised water, adjust pH to 5.9 - 6.1 with 30% sulphuric acid, then make up to 1 litre with deionised water).
3. Xylenol orange indicator - (Mix 1 g xylenol orange with 100 g sodium chloride using a mortar and pestle).
4. 0.05 M EDTA.
5. 0.05 M zinc sulphate.
6. 5 ml pipette
7. 250 ml conical flask
8. Hotplate
9. Fume cupboard
10. 50 ml measuring cylinder
11. 50 ml burette

Procedure

1. Pipette 5 ml of solution into a 250 ml conical flask.
2. Add 10 ml hydrogen peroxide.
3. Boil for 2 - 3 minutes (in a fume cupboard) and then cool.
4. Add 80 ml deionised water.
5. Add exactly 20 ml 0.05 M EDTA.
6. Add 30 ml hexamine buffer.
7. Add 2 spatula tips of xylenol orange indicator.
8. Titrate with 0.05 M zinc sulphate from green to a violet endpoint.

Calculation

(20 - titre) x 0.635 = g/l Copper.

4.2 Copper - alternative method (not as precise as 4.1)

Reagents and Equipment

1. Ammonia SG 0.88
2. Murexide indicator (Mix 1 g ammonium purpurate with 100 g sodium chloride using a mortar and pestle)
3. 0.05 M EDTA
4. 5 ml pipette
5. 250 ml conical flask
6. 50 ml burette.

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WORCESTERSHIRE WR10 1BY
ENGLAND

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(01386) 552333 TECHNICAL
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Procedure

1. Pipette 5 ml of solution into a 250 ml conical flask.
2. Add 150 ml deionised water.
3. Carefully add ammonia until the solution turns deep blue.
4. Add a spatula tip of murexide indicator.
5. Titrate with 0.05 M EDTA to a violet endpoint.

Calculation

Titre x 0.635 = g/l Copper.

4.3 Nickel-Iron (composition of alloy is required)

Reagents and Equipment

1. 100 vol hydrogen peroxide
2. Hexamine buffer - (Dissolve 170 g hexamine in 900 ml deionised water, adjust pH to 5.9 - 6.1 with 30% sulphuric acid, then make up to 1 litre with deionised water)
3. Xylenol Orange indicator -(Mix 1 g xylenol orange with 100 g sodium chloride using a mortar and pestle)
4. 0.05 M EDTA
5. 0.05 m zinc sulphate
6. 100 g/l ammonium fluoride solution
7. 5 ml pipette
8. 250 ml conical flask
9. Hotplate
10. Fume cupboard
11. 50 ml measuring cylinder
12. 2 x 50 ml burette

Procedure

1. Pipette 5 ml of solution into a 250 ml conical flask.
2. Add 10 ml hydrogen peroxide.
3. Boil for 2 - 3 minutes (in a fume cupboard) and then cool.
4. Add 25 ml ammonium fluoride solution.
5. Add 50 ml deionised water.
6. Add exactly 20 ml 0.05 M EDTA (let volume used = A)
7. Add 30 ml hexamine buffer.
8. Add 2 spatula tips of xylenol orange indicator.
9. Titrate with 0.05 M zinc sulphate from a green/yellow to a red-brown endpoint. (Let titre = B).

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Calculation

$$\frac{\frac{C}{100} \quad (58.71 \times 55.85)}{(F \times 58.71) + (N \times 55.85)} = \text{g/l total metal (Fe + Ni)}$$

where C = A ml 0.05 M EDTA - B ml 0.05 M zinc sulphate
F = % Fe in alloy ÷ 100
N = % Ni in alloy ÷ 100

4.4 Nickel-Iron alternative method (not as precise as 4.3)

Reagents and Equipment

1. Ammonia SG 0.88
2. Murexide indicator (Mix 1 g ammonium purpurate with 100 g sodium chloride using a mortar and pestle).
3. 100 g/l Ammonium fluoride solution
4. 0.05 M EDTA
5. 5 ml pipette
6. 250 ml conical flask
7. 50 ml burette
8. 50 ml measuring cylinder

Procedure

1. Pipette 5 ml of solution into a 250 ml conical flask.
2. Add 25 ml ammonium fluoride solution.
3. Add 125 ml deionised water.
4. Carefully add ammonia until the solution turns purple.
5. Add a spatula tip of murexide, the colour should turn to a yellow/brown.
6. Titrate with 0.05 M EDTA to a violet endpoint.

Calculation

$$\frac{\frac{Titre}{100} \quad (58.71 \times 55.85)}{(F \times 58.71) + (N \times 55.85)} = \text{g/l total metal (Fe + Ni)}$$

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4.5 Oxidant : Slotetch 584 Salt

Reagents and Equipment

1. 30% sulphuric acid
2. Potassium iodide salt
3. 5% sodium hydrogen carbonate
4. 0.1 M sodium thiosulphate
5. Starch or iodine indicator
6. 5 ml pipette
7. 250 ml stoppered flask
8. 25 ml measuring cylinder
9. 50 ml burette

Procedure

1. Pipette 5 ml of solution into a 250 ml stoppered flask.
2. Add 20 ml 30% sulphuric acid.
3. Add 10 ml 5% sodium hydrogen carbonate solution.
4. Add approx 3 g potassium iodide.
5. Stopper the flask and leave in the dark for 20 minutes.
6. Titrate with 0.1 M sodium thiosulphate to a straw yellow colour.
7. Add a spatula tip of iodine indicator (or starch). Solution should turn dark blue/violet.
8. Continue titrating to a colourless endpoint.

Calculation

For Copper Etches -

(Titre - [0.7868 x copper content (g/l)]) x 3.33 = g/l Slotetch 584.

For Nickel-Iron Etches -

(Titre x 3.33) - (2.981 x M) = g/l Slotetch 584

where M = g/l total metal x F
F = % Fe in alloy ÷ 100

4.6 Sulphuric Acid (Only for Copper Etches)

Reagents and Equipment

1. Methyl orange indicator (1 g/l in water)
2. 1.0 M sodium hydroxide
3. 25 ml pipette
4. 250 ml conical flask
5. 50 ml burette

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Procedure

1. Pipette 25 ml of solution into a 250 ml conical flask.
2. Add 75 ml deionised water.
3. Add 4 - 6 drops methyl orange indicator.
4. Titrate with 1.0 M sodium hydroxide from red to a yellow endpoint.

Calculation

Titre x 1.1 = ml/l sulphuric acid.

4.7 Etch Rate

Equipment

1. Copper or nickel-iron panel as appropriate (~ 0.25 dm²)
2. Acid cleaner
3. Drier
4. Analytical balance
5. Stop watch / timer

Procedure

1. Take a small copper or nickel-iron panel as appropriate for the application of the etch, of known surface area, eg 0.25 dm². Let surface = A dm².
2. Prepare the panel as follows:
   a. For copper: Immerse in acid cleaner (ie S20, Slotosit C10, Buz R) for 3 minutes at room temperature.
   For nickel-iron: Immerse in 50% v/v sulphuric acid (made fresh each time) for 1 - 1½ minutes at 60°C.
   b. Water wash.
   c. Hot air dry.
3. Accurately weigh the cleaned panel, accuracy + / - 1 mg. Let weight = W1 mg.
4. Immerse the cleaned panel in the Slotetch 584 Etch for a known time, eg 3 minutes. Let time = t minutes.
5. After removing from the solution wash thoroughly with water and then dry.
6. Reweigh the panel, accuracy + / - 1 mg. Let weight = W2 mg.

Calculation

$$\frac{W1 - W2}{A \times t \times D} = \text{micron / minute etch rate}$$

where

$$D = 89.3 \quad \text{for copper}$$

$$D = \frac{(89 \times N) + [78.6 \times F]}{100} \quad \text{for nickel-iron}$$

N = % Ni in alloy

F = % Fe in alloy

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5.0 EFFLUENT

SLOTETCH 584 does not contain complexing agents, but will contain metals (copper or nickel and iron) through use. Rinse waters can be directly neutralised with sodium hydroxide or sodium carbonate. Spent solutions should be diluted prior to neutralisation.

If you require any further toxicological or ecological information related to the disposal of this product, please refer to the individual safety data sheets.

6.0 SAFETY

The solution contains an oxidising agent and is an irritant.

When handling the solution protective clothing, gloves and goggles should be worn. Splashes on the skin or eyes should be washed out with water for 10 - 15 minutes. If irritation becomes apparent seek medical advice.

The hazards of the working solution may differ from those of its components. A risk assessment should be carried out as required by current regulations using information given in the individual safety data sheets.

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SECTION 1: Identification of the substance/mixture and of the company/undertaking

· **1.1 Product identifier**

· **Trade name: Slotech 584**

· **Article number:** 010231
· **1.2 Relevant identified uses of the substance or mixture and uses advised against**
No further relevant information available.
· **Application of the substance / the mixture**
Electroplating auxiliary.
Metal surface treatment products, including gal-vanic and electroplating products

· **1.3 Details of the supplier of the safety data sheet**
· **Manufacturer/Supplier:**
Schlötter Ireland DAC
5 Pine Road,
Naas Enterprise Park,
Naas, Co. Kildare
Ireland
W91 KH68

Tel: +353 (0)45 447400 (09:00 - 17:00 Hrs)
Fax: +353 (0)45 447478
sds@schlotter.ie

· **Further information obtainable from:** Product safety department.
· **1.4 Emergency telephone number:**
National Poisons Information Centre at Beaumont Hospital,
PO Box 1297,
Beaumont Road,
Dublin 9
Phone 01 8092566
www.poisons.ie

Outside Ireland;
University of Freiburg
Poisoning-Information-Center
+49(0)761-19240 (24h, 365 days/year)
Information in German and English
http://www.giftberatung.de/

SECTION 2: Hazards identification

· **2.1 Classification of the substance or mixture**
· **Classification according to Regulation (EC) No 1272/2008**

GHS03 flame over circle

Ox. Sol. 2 H272 May intensify fire; oxidiser.

GHS05 corrosion

Skin Corr. 1B H314 Causes severe skin burns and eye damage.
Eye Dam. 1 H318 Causes serious eye damage.

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GHS07

Acute Tox. 4 H302 Harmful if swallowed.
STOT SE 3 H335 May cause respiratory irritation.

· ***2.2 Label elements***
· ***Labelling according to Regulation (EC) No 1272/2008***
The product is classified and labelled according to the CLP regulation.
· ***Hazard pictograms***

GHS03 GHS05 GHS07

· ***Signal word*** *Danger*

· ***Hazard-determining components of labelling:***
pentapotassium bis(peroxymonosulphate)bis(sulphate)
potassium hydrogensulphate
· ***Hazard statements***
H272 May intensify fire; oxidiser.
H302 Harmful if swallowed.
H314 Causes severe skin burns and eye damage.
H335 May cause respiratory irritation.
· ***Precautionary statements***
P221 Take any precaution to avoid mixing with combustibles.
P260 Do not breathe dust/fume/gas/mist/vapours/spray.
P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P403+P233 Store in a well-ventilated place. Keep container tightly closed.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.
· ***2.3 Other hazards***
· ***Results of PBT and vPvB assessment***
· ***PBT:*** *Not applicable.*
· ***vPvB:*** *Not applicable.*

SECTION 3: Composition/information on ingredients

· ***Description:*** *Mixture of substances listed below with nonhazardous additions.*

· ***Dangerous components:***		
CAS: 70693-62-8 *EINECS: 274-778-7*	*pentapotassium bis(peroxymonosulphate)bis(sulphate)* *Ox. Liq. 2, H272; Skin Corr. 1B, H314; Acute Tox. 4, H302*	*35-<50%*
CAS: 7646-93-7 *EINECS: 231-594-1*	*potassium hydrogensulphate* *Skin Corr. 1B, H314; STOT SE 3, H335*	*15-<25%*

· ***Additional information:*** *For the wording of the listed hazard phrases refer to section 16.*

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SECTION 4: First aid measures

· ***4.1 Description of first aid measures***
· ***General information:***
Immediately remove any clothing soiled by the product.
Symptoms of poisoning may even occur after several hours; therefore medical observation for at least 48 hours after the accident.
· ***After inhalation:*** *In case of unconsciousness place patient stably in side position for transportation.*
· ***After skin contact:*** *Immediately wash with water and soap and rinse thoroughly.*
· ***After eye contact:*** *Rinse opened eye for several minutes under running water. Then consult a doctor.*
· ***After swallowing:***
Call for a doctor immediately.
Drink plenty of water and provide fresh air. Call for a doctor immediately.
· ***4.2 Most important symptoms and effects, both acute and delayed*** *No further relevant information available.*
· ***4.3 Indication of any immediate medical attention and special treatment needed***
No further relevant information available.

SECTION 5: Firefighting measures

· ***5.1 Extinguishing media***
· ***Suitable extinguishing agents:***
CO2, powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
· ***5.2 Special hazards arising from the substance or mixture***
During heating or in case of fire poisonous gases are produced.
· ***5.3 Advice for firefighters***
· ***Protective equipment:*** *Mouth respiratory protective device.*

SECTION 6: Accidental release measures

· ***6.1 Personal precautions, protective equipment and emergency procedures***
Mount respiratory protective device.
Wear protective equipment. Keep unprotected persons away.
· ***6.2 Environmental precautions:*** *Do not allow to enter sewers/ surface or ground water.*
· ***6.3 Methods and material for containment and cleaning up:***
Use neutralising agent.
Dispose contaminated material as waste according to item 13.
Ensure adequate ventilation.
· ***6.4 Reference to other sections***
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

SECTION 7: Handling and storage

· ***7.1 Precautions for safe handling***
Thorough dedusting.
Ensure good ventilation/exhaustion at the workplace.
· ***Information about fire - and explosion protection:*** *Keep respiratory protective device available.*

· ***7.2 Conditions for safe storage, including any incompatibilities***
· ***Storage:*** *Please see Section 10.5 for information on storage incompatibilities.*
· ***Requirements to be met by storerooms and receptacles:*** *No special requirements.*
· ***Information about storage in one common storage facility:*** *Not required.*

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· ***Further information about storage conditions:***
Keep container tightly sealed.
This product is hygroscopic, protect from humidity and water.
· ***7.3 Specific end use(s)*** *No further relevant information available.*

SECTION 8: Exposure controls/personal protection

· ***Additional information about design of technical facilities:*** *No further data; see item 7.*

· ***8.1 Control parameters***
· ***Ingredients with limit values that require monitoring at the workplace:***
The product does not contain any relevant quantities of materials with critical values that have to be monitored at the workplace.
· ***Additional information:*** *The lists valid during the making were used as basis.*

· ***8.2 Exposure controls***
· ***Personal protective equipment:***
· ***General protective and hygienic measures:***
Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing
Wash hands before breaks and at the end of work.
Avoid contact with the eyes.
Avoid contact with the eyes and skin.
· ***Respiratory protection:***
In case of brief exposure or low pollution use respiratory filter device. In case of intensive or longer exposure use self-contained respiratory protective device.
Short term filter device:
Filter P2
Respiratory protection if vapours/aerosols are liberate. Particle filter with middle retention for solid and liquid particle (e.g. EN 143 or 149, Type P2 or FFP2).
· ***Protection of hands:***

Protective gloves

Protective gloves conforming to standard EN374 should be used.
The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation
If a spill occurs change gloves immediately, dispose of contaminated gloves safely.
· ***Material of gloves***
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.
· ***Penetration time of glove material***
The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.
Value for the penetration time on Nitrile gloves: Level ≤ 10 minutes

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· **Eye protection:**

Tightly sealed goggles conforming with standard EN 166.

SECTION 9: Physical and chemical properties

· **9.1 Information on basic physical and chemical properties**	
· **General Information**	
· **Appearance:**	
Form:	Crystalline
Colour:	Whitish
· **Odour:**	Odourless
· **Odour threshold:**	Not determined.
· **pH-value at 20 °C:**	< 2
· **Change in condition**	
Melting point/Melting range:	Undetermined.
Boiling point/Boiling range:	100 °C
· **Flash point:**	Not applicable.
· **Flammability (solid, gaseous):**	Not determined.
· **Ignition temperature:**	
Decomposition temperature:	Not determined.
· **Self-igniting:**	Product is not selfigniting.
· **Danger of explosion:**	Product does not present an explosion hazard.
· **Explosion limits:**	
Lower:	Not determined.
Upper:	Not determined.
· **Vapour pressure at 20 °C:**	23 hPa
· **Density:**	Not determined.
· **Relative density**	Not determined.
· **Vapour density**	Not applicable.
· **Evaporation rate**	Not applicable.
· **Solubility in / Miscibility with water:**	Soluble.
· **Partition coefficient (n-octanol/water):**	Not determined.
· **Viscosity:**	
Dynamic:	Not applicable.
Kinematic:	Not applicable.
· **Solvent content:**	
Organic solvents:	0.0 %
Water:	25.0 %
VOC (EC)	0.00 %
Solids content:	25.0 %

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· **9.2 Other information** No further relevant information available.

SECTION 10: Stability and reactivity

· **10.1 Reactivity** No further relevant information available.
· **10.2 Chemical stability**
· **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
· **10.3 Possibility of hazardous reactions** No dangerous reactions known.
· **10.4 Conditions to avoid** No further relevant information available.
· **10.5 Incompatible materials:**
Store away from reducing agents.
Store away from flammable substances.
Store away from metals.
· **10.6 Hazardous decomposition products:** No dangerous decomposition products known.

SECTION 11: Toxicological information

· **11.1 Information on toxicological effects**
· **Acute toxicity**
Harmful if swallowed.

· **LD/LC50 values relevant for classification:**		
7646-93-7 potassium hydrogensulphate		
Oral	LD50	2340 mg/kg (rat)

· **Primary irritant effect:**
· **Skin corrosion/irritation**
Causes severe skin burns and eye damage.
· **Serious eye damage/irritation**
Causes serious eye damage.
· **Respiratory or skin sensitisation** Based on available data, the classification criteria are not met.
· **CMR effects (carcinogenity, mutagenicity and toxicity for reproduction)**
· **Germ cell mutagenicity** Based on available data, the classification criteria are not met.
· **Carcinogenicity** Based on available data, the classification criteria are not met.
· **Reproductive toxicity** Based on available data, the classification criteria are not met.
· **STOT-single exposure**
May cause respiratory irritation.
· **STOT-repeated exposure** Based on available data, the classification criteria are not met.
· **Aspiration hazard** Based on available data, the classification criteria are not met.

SECTION 12: Ecological information

· **12.1 Toxicity**
· **Aquatic toxicity:** No further relevant information available.
· **12.2 Persistence and degradability** No further relevant information available.
· **12.3 Bioaccumulative potential** No further relevant information available.
· **12.4 Mobility in soil** No further relevant information available.
· **Additional ecological information:**
· **General notes:**
Water hazard class 1 (German Regulation) (Self-assessment): slightly hazardous for water
Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
Must not reach sewage water or drainage ditch undiluted or unneutralised.

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· ***12.5 Results of PBT and vPvB assessment***
· ***PBT:*** *Not applicable.*
· ***vPvB:*** *Not applicable.*
· ***12.6 Other adverse effects*** *No further relevant information available.*

SECTION 13: Disposal considerations

· ***13.1 Waste treatment methods***
· ***Recommendation***
Must not be disposed together with household garbage. Do not allow product to reach sewage system.

· ***Uncleaned packaging:***
· ***Recommendation:*** *Disposal must be made according to official regulations.*
· ***Recommended cleansing agents:*** *Water, if necessary together with cleansing agents.*

SECTION 14: Transport information

· ***14.1 UN-Number***	
· ***ADR, IMDG, IATA***	*UN3260*
· ***14.2 UN proper shipping name***	
· ***ADR***	*UN3260 CORROSIVE SOLID, ACIDIC, INORGANIC, N.O.S.*
· ***IMDG, IATA***	*CORROSIVE SOLID, ACIDIC, INORGANIC, N.O.S.*
· ***14.3 Transport hazard class(es)***	
· ***ADR***	
· ***Class***	*8 Corrosive substances.*
· ***Label***	*8*
· ***14.4 Packing group***	
· ***ADR***	*III*
· ***14.5 Environmental hazards:***	
· ***Marine pollutant:***	*No*
· ***14.6 Special precautions for user***	*Warning: Corrosive substances.*
· ***Danger code (Kemler):***	*80*
· ***EMS Number:***	*F-A,S-B*
· ***Segregation groups***	*Acids*
· ***14.7 Transport in bulk according to Annex II of Marpol and the IBC Code***	*Not applicable.*
· ***Transport/Additional information:***	
· ***ADR***	
· ***Limited quantities (LQ)***	*5 kg*
· ***Excepted quantities (EQ)***	*Code: E1* *Maximum net quantity per inner packaging: 30 g* *Maximum net quantity per outer packaging: 1000 g*

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· ***UN "Model Regulation":*** *UN 3260 CORROSIVE SOLID, ACIDIC, INORGANIC, N.O.S., 8, III*

SECTION 15: Regulatory information

· ***15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture***

· ***Directive 2012/18/EU***
· ***Named dangerous substances - ANNEX I*** *None of the ingredients is listed.*
· ***Seveso category*** *P8 OXIDISING LIQUIDS AND SOLIDS*
· ***Qualifying quantity (tonnes) for the application of lower-tier requirements*** *50 t*
· ***Qualifying quantity (tonnes) for the application of upper-tier requirements*** *200 t*
· ***15.2 Chemical safety assessment:*** *A Chemical Safety Assessment has not been carried out.*

SECTION 16: Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

· ***Relevant phrases***
H272 May intensify fire; oxidiser.
H302 Harmful if swallowed.
H314 Causes severe skin burns and eye damage.
H335 May cause respiratory irritation.

· ***Department issuing SDS:*** *Product safety department.*
· ***Contact:*** *Ms. Jennifer Habenicht*
· ***Abbreviations and acronyms:***
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
IATA: International Air Transport Association
GHS: Globally Harmonised System of Classification and Labelling of Chemicals
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
VOC: Volatile Organic Compounds (USA, EU)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
PBT: Persistent, Bioaccumulative and Toxic
vPvB: very Persistent and very Bioaccumulative
SVHC: Substances of Very High Concern
Ox. Liq. 2: Oxidizing liquids – Category 2
Ox. Sol. 2: Oxidizing solids – Category 2
Acute Tox. 4: Acute toxicity – Category 4
Skin Corr. 1B: Skin corrosion/irritation – Category 1B
Eye Dam. 1: Serious eye damage/eye irritation – Category 1
STOT SE 3: Specific target organ toxicity (single exposure) – Category 3

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SECTION 1: Identification of the substance/mixture and of the company/undertaking

· **1.1 Product identifier**

· **Trade name: Sulphuric Acid 96%**

· **Article number:** 601890
· **CAS Number:** 7664-93-9
· **EINECS Number:** 231-639-5
· **Index number:** 016-020-00-8
· **Registration number** 01-2119458838-20-XXXX
· **1.2 Relevant identified uses of the substance or mixture and uses advised against**
No further relevant information available.
· **Application of the substance / the mixture** Raw material for laboratory and industrial use.

· **1.3 Details of the supplier of the safety data sheet**
· **Manufacturer/Supplier:**
Schlötter Ireland DAC
5 Pine Road,
Naas Enterprise Park,
Naas, Co. Kildare
Ireland
W91 KH68

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· **Further information obtainable from:** Product safety department.
· **1.4 Emergency telephone number:**
National Poisons Information Centre at Beaumont Hospital,
PO Box 1297,
Beaumont Road,
Dublin 9
Phone 01 8092566
www.poisons.ie

Outside Ireland;
University of Freiburg
Poisoning-Information-Center
+49(0)761-19240 (24h, 365 days/year)
Information in German and English
http://www.giftberatung.de/

SECTION 2: Hazards identification

· **2.1 Classification of the substance or mixture**
· **Classification according to Regulation (EC) No 1272/2008**

GHS05 corrosion

Skin Corr. 1A H314 Causes severe skin burns and eye damage.
Eye Dam. 1 H318 Causes serious eye damage.

· **2.2 Label elements**
· **Labelling according to Regulation (EC) No 1272/2008**
The product is classified and labelled according to the CLP regulation.

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· ***Hazard pictograms***

GHS05

· ***Signal word*** *Danger*

· ***Hazard-determining components of labelling:***
sulphuric acid
· ***Hazard statements***
H314 Causes severe skin burns and eye damage.
· ***Precautionary statements***

P260	*Do not breathe dusts or mists.*
P264	*Wash thoroughly after handling.*
P280	*Wear protective gloves/protective clothing/eye protection/face protection.*
P305+P351+P338	*IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.*
P405	*Store locked up.*
P501	*Dispose of contents/container in accordance with local/regional/national/international regulations.*

· ***2.3 Other hazards***
· ***Results of PBT and vPvB assessment***
· ***PBT:*** *Not applicable.*
· ***vPvB:*** *Not applicable.*

SECTION 3: Composition/information on ingredients

· ***3.2 Chemical characterisation: Mixtures***
· ***Description:*** *Mixture of substances listed below with nonhazardous additions.*

· ***Dangerous components:***

CAS: 7664-93-9 *EINECS: 231-639-5*	*sulphuric acid*	*Skin Corr. 1A, H314*	*90-100%*

· ***Additional information:*** *For the wording of the listed hazard phrases refer to section 16.*

SECTION 4: First aid measures

· ***4.1 Description of first aid measures***
· ***General information:*** *Immediately remove any clothing soiled by the product.*
· ***After inhalation:***
In case of unconsciousness place patient stably in side position for transportation.
Move the exposed person to fresh air at once.
· ***After skin contact:*** *Immediately wash with water and soap and rinse thoroughly.*
· ***After eye contact:*** *Rinse opened eye for several minutes under running water. Then consult a doctor.*
· ***After swallowing:*** *Drink plenty of water and provide fresh air. Call for a doctor immediately.*
· ***4.2 Most important symptoms and effects, both acute and delayed*** *No further relevant information available.*
· ***4.3 Indication of any immediate medical attention and special treatment needed***
No further relevant information available.

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SECTION 5: Firefighting measures

· ***5.1 Extinguishing media***
· ***Suitable extinguishing agents:***
CO2, powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
· ***5.2 Special hazards arising from the substance or mixture***
During heating or in case of fire poisonous gases are produced.
· ***5.3 Advice for firefighters***
· ***Protective equipment:*** *Mouth respiratory protective device.*

SECTION 6: Accidental release measures

· ***6.1 Personal precautions, protective equipment and emergency procedures***
Mount respiratory protective device.
Wear protective equipment. Keep unprotected persons away.
· ***6.2 Environmental precautions:***
Dilute with plenty of water.
Do not allow to enter sewers/ surface or ground water.
· ***6.3 Methods and material for containment and cleaning up:***
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
Use neutralising agent.
Dispose contaminated material as waste according to item 13.
Ensure adequate ventilation.
· ***6.4 Reference to other sections***
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

SECTION 7: Handling and storage

· ***7.1 Precautions for safe handling***
Ensure good ventilation/exhaustion at the workplace.
Prevent formation of aerosols.
Wear full protective clothing for prolonged exposure and/or high concentrations.
· ***Information about fire - and explosion protection:*** *Keep respiratory protective device available.*

· ***7.2 Conditions for safe storage, including any incompatibilities***
· ***Storage:*** *Please see Section 10.5 for information on storage incompatibilities.*
· ***Requirements to be met by storerooms and receptacles:*** *No special requirements.*
· ***Information about storage in one common storage facility:*** *Not required.*
· ***Further information about storage conditions:*** *Keep container tightly sealed.*
· ***Storage class:*** *Corrosive.*
· ***7.3 Specific end use(s)*** *No further relevant information available.*

SECTION 8: Exposure controls/personal protection

· ***Additional information about design of technical facilities:*** *No further data; see item 7.*

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· ***8.1 Control parameters***

· ***Ingredients with limit values that require monitoring at the workplace:***	
7664-93-9 sulphuric acid	
OEL	*Long-term value: 0.05 mg/m³* *IOELV*

· ***Additional information:*** *The lists valid during the making were used as basis.*

· ***8.2 Exposure controls***
· ***Personal protective equipment:***
· ***General protective and hygienic measures:***
Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing
Wash hands before breaks and at the end of work.
Avoid contact with the eyes.
Avoid contact with the eyes and skin.
· ***Respiratory protection:***
In case of brief exposure or low pollution use respiratory filter device. In case of intensive or longer exposure use self-contained respiratory protective device.
· ***Protection of hands:***

Protective gloves

Protective gloves conforming to standard EN374 should be used.
The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation
If a spill occurs change gloves immediately, dispose of contaminated gloves safely.
· ***Material of gloves***
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.
· ***Penetration time of glove material***
The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.
Value for the penetration time on Nitrile gloves: Level ≤ 10 minutes
· ***Eye protection:***

Tightly sealed goggles conforming with standard EN 166.

SECTION 9: Physical and chemical properties

· ***9.1 Information on basic physical and chemical properties***
· ***General Information***
· ***Appearance:***

Form:	*Liquid*
Colour:	*Colourless to Yellow*
· ***Odour:***	*Acrid*

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· ***Odour threshold:***	*Not determined.*
· ***pH-value at 20 °C:***	*< 1*
· ***Change in condition***	
Melting point/freezing point:	*Undetermined.*
Initial boiling point and boiling range:	*360 °C*
· ***Flash point:***	*Not applicable.*
· ***Flammability (solid, gas):***	*Not applicable.*
· ***Ignition temperature:***	
Decomposition temperature:	*Not determined.*
· ***Auto-ignition temperature:***	*Product is not selfigniting.*
· ***Explosive properties:***	*Product does not present an explosion hazard.*
· ***Explosion limits:***	
Lower:	*Not determined.*
Upper:	*Not determined.*
· ***Vapour pressure at 20 °C:***	*<0.01 hPa*
· ***Density at 20 °C:***	*1.84 g/cm³*
· ***Relative density***	*Not determined.*
· ***Vapour density***	*Not determined.*
· ***Evaporation rate***	*Not determined.*
· ***Solubility in / Miscibility with water:***	*Fully miscible.*
· ***Partition coefficient: n-octanol/water:***	*Not determined.*
· ***Viscosity:***	
Dynamic:	*Not determined.*
Kinematic:	*Not determined.*
· ***Solvent content:***	
Organic solvents:	*0.0 %*
VOC (EC)	*0.00 %*
· ***9.2 Other information***	*No further relevant information available.*

SECTION 10: Stability and reactivity

· ***10.1 Reactivity*** *Reacts violently with water.*
· ***10.2 Chemical stability***
· ***Thermal decomposition / conditions to be avoided:*** *No decomposition if used according to specifications.*
· ***10.3 Possibility of hazardous reactions*** *No dangerous reactions known.*
· ***10.4 Conditions to avoid*** *Reacts with alkalis and amines generating excessive heat.*
· ***10.5 Incompatible materials:***
Materials To Avoid
Bases, alkalis (inorganic). Massive, solid metal. Powdered metal. Water, steam, water mixtures. Chemically active metals. Alkali metals.
· ***10.6 Hazardous decomposition products:*** *Very toxic gases/vapours/fumes of: Sulphur.*

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SECTION 11: Toxicological information

· ***11.1 Information on toxicological effects***
· ***Acute toxicity*** *Based on available data, the classification criteria are not met.*
· ***Primary irritant effect:***
· ***Skin corrosion/irritation***
Causes severe skin burns and eye damage.
· ***Serious eye damage/irritation***
Causes serious eye damage.
· ***Respiratory or skin sensitisation*** *Based on available data, the classification criteria are not met.*
· ***CMR effects (carcinogenity, mutagenicity and toxicity for reproduction)***
· ***Germ cell mutagenicity*** *Based on available data, the classification criteria are not met.*
· ***Carcinogenicity*** *Based on available data, the classification criteria are not met.*
· ***Reproductive toxicity*** *Based on available data, the classification criteria are not met.*
· ***STOT-single exposure*** *Based on available data, the classification criteria are not met.*
· ***STOT-repeated exposure*** *Based on available data, the classification criteria are not met.*
· ***Aspiration hazard*** *Based on available data, the classification criteria are not met.*

SECTION 12: Ecological information

· ***12.1 Toxicity***
· ***Aquatic toxicity:*** *No further relevant information available.*
· ***12.2 Persistence and degradability*** *No further relevant information available.*
· ***12.3 Bioaccumulative potential*** *No further relevant information available.*
· ***12.4 Mobility in soil*** *No further relevant information available.*
· ***Additional ecological information:***
· ***General notes:***
Water hazard class 1 (German Regulation) (Self-assessment): slightly hazardous for water
Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
Must not reach sewage water or drainage ditch undiluted or unneutralised.
Rinse off of bigger amounts into drains or the aquatic environment may lead to decreased pH-values. A low pH-value harms aquatic organisms. In the dilution of the use-level the pH-value is considerably increased, so that after the use of the product the aqueous waste, emptied into drains, is only low water-dangerous.
· ***12.5 Results of PBT and vPvB assessment***
· ***PBT:*** *Not applicable.*
· ***vPvB:*** *Not applicable.*
· ***12.6 Other adverse effects*** *No further relevant information available.*

SECTION 13: Disposal considerations

· ***13.1 Waste treatment methods***
· ***Recommendation***
Must not be disposed together with household garbage. Do not allow product to reach sewage system.

· ***Uncleaned packaging:***
· ***Recommendation:*** *Disposal must be made according to official regulations.*
· ***Recommended cleansing agents:*** *Water, if necessary together with cleansing agents.*

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SECTION 14: Transport information

· **14.1 UN-Number**	
· **ADR, IMDG, IATA**	UN1830
· **14.2 UN proper shipping name**	
· **ADR**	UN1830 SULPHURIC ACID
· **IMDG, IATA**	SULPHURIC ACID
· **14.3 Transport hazard class(es)**	
· **ADR, IMDG, IATA**	
· **Class**	8 Corrosive substances.
· **Label**	8
· **14.4 Packing group**	
· **ADR, IMDG, IATA**	II
· **14.5 Environmental hazards:**	Not applicable.
· **14.6 Special precautions for user**	Warning: Corrosive substances.
· **Danger code (Kemler):**	80
· **EMS Number:**	F-A,S-B
· **Segregation groups**	Acids
· **Stowage Category**	E
· **Stowage Code**	SW15 For metal drums, stowage category B.
· **14.7 Transport in bulk according to Annex II of Marpol and the IBC Code**	Not applicable.
· **Transport/Additional information:**	
· **ADR**	
· **Limited quantities (LQ)**	1L
· **Excepted quantities (EQ)**	Code: E2 Maximum net quantity per inner packaging: 30 ml Maximum net quantity per outer packaging: 500 ml
· **Transport category**	2
· **Tunnel restriction code**	E
· **IMDG**	
· **Limited quantities (LQ)**	1L
· **Excepted quantities (EQ)**	Code: E2 Maximum net quantity per inner packaging: 30 ml Maximum net quantity per outer packaging: 500 ml
· **UN "Model Regulation":**	UN 1830 SULPHURIC ACID, 8, II

SECTION 15: Regulatory information

· **15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**

· **Directive 2012/18/EU**
· **Named dangerous substances - ANNEX I** None of the ingredients is listed.
· **REGULATION (EC) No 1907/2006 ANNEX XVII** Conditions of restriction: 3

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· ***15.2 Chemical safety assessment:*** *A Chemical Safety Assessment has not been carried out.*

SECTION 16: Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

· ***Relevant phrases***
H314 Causes severe skin burns and eye damage.

· ***Department issuing SDS:*** *Product safety department.*
· ***Contact:*** *Ms. Jennifer Habenicht*
· ***Abbreviations and acronyms:***
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
IATA: International Air Transport Association
GHS: Globally Harmonised System of Classification and Labelling of Chemicals
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
VOC: Volatile Organic Compounds (USA, EU)
PBT: Persistent, Bioaccumulative and Toxic
vPvB: very Persistent and very Bioaccumulative
Skin Corr. 1A: Skin corrosion/irritation – Category 1A
Eye Dam. 1: Serious eye damage/eye irritation – Category 1

Bright Tin
CULMO 1

Bright Tin CULMO 1 is a sulphuric acid based electrolyte which is mainly applied for printed circuit boards manufacturing, electro-technical component finishing - also in barrel application -, and in the field of household accessories as well.

Bright Tin CULMO 1 deposits fully bright tin coatings in an extremely wide range of throwing power. High stability and easy maintenance are the features of this bright tin electrolyte.

Bright tin layers of any thickness are deposited from Bright Tin CULMO 1. Even thin layers are bright, and the brightness still improves with increasing layer thickness due to the good levelling quality. The tin deposits from Bright Tin CULMO 1 are resistant towards fingerprints to a great extent and also solderability is still excellent after prolonged storage periods.

The information in this data sheet is based on laboratory as well as practical experience. Figures quoted for operating limits and replenishment quantities are for guidance. Actual values necessary will depend on the components being plated (material and geometry), their application and plating plant conditions.

Important:
Please read this instruction carefully prior to the use of the process and carefully follow all the parameters that have a direct influence on the operation. We reserve the right to make technical changes. In the interest of safety, please pay attention to the hazard warnings on the labels of the containers. The minimum shelf life of the products is included on the labels and is also available in the appropriate Quality Assurance (QA03).
The current IMDS number of the layer deposited from the process is available on the internet at www.schloetter.com/downloads.
For the storage of chemical products the TRGS 510 must be followed.
If the additives used in this process contain a SVHC-substance, then this will be specified in the corresponding Material Safety Data Sheet, section 15.

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1.0 TECHNICAL INFORMATION AND EQUIPMENT REQUIREMENTS

Tanks:	rubber-lined steel, polypropylene or PVC
Local Exhaust Ventilation:	not required
Part/Electrolyte Agitation:	**Printed Circuit Boards (PCBs):** work piece movement from and to the anodes, at a rate of 0.5 - 0.8 m/min, stroke length approx. 30 mm **Rack application:** parallel to the anodes, at a rate of 3 - 4 m/min, stroke length approx. 50 - 70 mm **Barrel application:** barrel rotation 4 - 6 rpm
Filtration:	continuous, 2 - 3 turnovers per hour
Anodes:	pure tin, min. 99.90 %, preferably 99.93 % according to DIN EN 610; higher impurities would increase the formation of anode sludge
Anode bags:	polypropylene fabric
Cooling:	plastic coated steel pipes, thin-walled plastic pipes or stainless steel 1.4571

NB
Titanium should not be used for cooling coils or anode hooks. Plastic coated anode hooks are especially recommended for tin electrolytes.

2.0 MAKE-UP AND OPERATING CONDITIONS

2.1 Product names

List of products required		
Product name	**Article no. (AN)**	**SG**
Sulphuric acid, conc. (96 %) chem. pure	supplied by user*	1.84
Tin Salt SU	100000	--
Starter CULMO 1 (for new make-up see point **4.3**)	101501	1.03
Brightener CULMO 2	101502	1.00
Additive CULMO AN 11 1	101508	1.03
Additive CULMO IRA 1	101507	1.00
Corrector ACR (see point **4.6**)	100019	1.00

***** The current product qualities respectively -specifications recommended by us can be found on the internet at www.schloetter.com/downloads.

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2.2 Requirements for a 100 litre bath

2.2.1 when used as barrel application

Product name	AN	SG	Quantity	
Sulphuric acid, conc. (96 %) chem. pure	--	1.84	10	ltr.
Tin Salt SU	100000	--	3	kg
Starter CULMO 1	101501	1.03	3	ltr.

2.2.2 when used as rack application (high current densities)

Product name	AN	SG	Quantity	
Sulphuric acid, conc. (96 %) chem. pure	--	1.84	6.5	ltr.
Tin Salt SU	100000	--	6	kg
Starter CULMO 1	101501	1.03	3	ltr.

2.2.3 when used for the processing of PCBs

Product name	AN	SG	Quantity	
Sulphuric acid, conc. (96 %) chem. pure	--	1.84	10	ltr.
Tin Salt SU	100000	--	4	kg
Starter CULMO 1	101501	1.03	3	ltr.

2.3 Make-up sequence for a 100 litre bath

All tanks and equipment to be used should be thoroughly cleaned prior to use.

- fill 70 litres of deionised water into the tank
- add the required quantity of sulphuric acid, conc. (96 %) chem. pure while stirring constantly; observe safety measures!
- add the required quantity of Tin Salt SU while stirring vigorously and dissolve completely
- cool to operating temperature
- add the required quantity of Starter CULMO 1
- mix well
- make up to final volume with deionised water
- mix thoroughly
-

The electrolyte is ready for use when the operating temperature has been reached.

NB
When making-up the electrolyte, it has to be taken into consideration that the temperature of the solution raises quickly by the exothermic reaction which forms by the addition sulphuric acid, conc. (96 %) chem. pure. If the sulphuric acid is added too quickly, an intensive heat can develop which causes spattering of the corrosive liquid.
It's absolutely necessary to observe the safety measures applicable to make-up and handling (protective clothing, goggles, rubber gloves).

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2.4 Concentrations and operating conditions

2.4.1 when used as barrel application

	Range	Optimum	
Tin(II)		15	g/l
Free sulphuric acid	85 - 108 160 - 200	100 185	ml/l g/l
Starter CULMO 1	25 - 35	30	ml/l
Temperature range	10 - 25	18	°C
Cathodic current density	min. 0.6	--	A/dm²
Anodic current density	< 2.5	--	A/dm²
Deposition rate at 2 A/dm²	approx. 1.0		µm/min.

2.4.2 when used as rack application (high current densities)

	Range	Optimum	
Tin(II)		15	g/l
Free sulphuric acid		65 120	ml/l g/l
Starter CULMO AT 1	25 - 35	30	ml/l
Temperature range	10 - 25	18	°C
Cathodic current density	2 - 4	--	A/dm²
Anodic current density	< 2.5	--	A/dm²
Deposition rate at 2 A/dm²	approx. 1.0		µm/min.

2.4.3 when used for the processing of PCBs

	Range	Optimum	
Tin(II)		20	g/l
Free sulphuric acid		100 185	ml/l g/l
Starter CULMO AT 1	25 - 35	30	ml/l
Temperature range	10 - 25	18	°C
Cathodic current density	1.5 - 2	--	A/dm²
Anodic current density	< 2.5	--	A/dm²
Deposition rate at 2 A/dm²	approx. 1.0		µm/min.

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2.5 Consumption and replenishment

Consumption of the additives is mainly due to drag-out.

Approximate values for replenishment:

Additive	Replenishment / Consumption
Brightener CULMO 2	approx. 2.5 l/10 kAh

Depending in the local drag-out losses the following replenishment is required:

Additive	Replenishment / Consumption
Additive CULMO AN 11	approx. 4 ml/m² surface throughput
Additive CULMO IRA 1	approx. 1 ml/m² surface throughput

2.6 Deposit characteristics

Hardness of the tin deposit: 20 - 30 $HV_{0.05}$

3.0 PROCESS SEQUENCE

Our technical field service or service department will be pleased to provide you with detailed information on suitable process sequences respectively methods upon request.

3.1 Pre-treatment

Steel or copper parts are pre-treated as usual followed by dipping into diluted sulphuric acid and then transferred into Bright Tin CULMO 1. Please note that hydrochloric acid solutions may not be used in the pre-treatment process. Chloride contamination ≥ 0.3 g/l lead to irreparable disturbances in the form of matt tin deposition that starts in the low current density range.

Non-ferrous metal alloys containing zinc cannot be tin plated directly, since zinc would diffuse from the base material into the tin layer above even at room temperature. Therefore a 3 - 5 µm intermediate copper- or nickel layer as diffusion barrier should be plated. Therefore an intermediate copper- or nickel layer is applied as a diffusion barrier. Intermediate copper layers should be deposited from acidic- or cyanide high performance electrolytes. The adhesion of the tin layers would decrease if intermediate copper layers are deposited from additive-free cyanide pre-copper electrolytes.

Printed circuit boards is rinsed immediately after the electroplated copper deposition, followed by dipping into sulphuric acid, conc. (96 %) chem. pure (50 ml/l) and then transferred into Bright Tin CULMO 1. The copper layer may be precautionary activated in an aqueous sodium peroxodisulfate solution (100 g/l of sodium peroxodisulfate solution, 30 ml/l of sulphuric acid). Then it's carefully rinsed and also dipped into diluted sulphuric acid and immediately tin plated.

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3.2 Process sequences

Base material steel	Base material copper	Printed Circuit Boards (PCBs)
• immersion degreasing • rinsing • pickling in HCl diluted 1:1 • rinsing throughly • electrolytic degreasing, anodically • rinsing • acid dipping in **sulphuric acid**, (10 %) • rinsing • tin plating in Bright Tin CULMO 1 • rinsing • drying	• immersion degreasing • rinsing • electrolytic degreasing, anodically • rinsing • acid dipping in **sulphuric acid**, (10 %) • rinsing • tin plating Bright Tin CULMO 1 • rinsing • drying	• through hole plating • pattern plating • acid cleaner • rinsing • micro-etch • rinsing • acid dipping in **sulphuric acid**, (10 %) • copper plating in a sulfuric copper electrolyte • rinsing • acid dipping in **sulphuric acid**, (10 %) • rinsing • tin plating in Bright Tin CULMO 1 • rinsing • drying

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4.0 MAINTENANCE AND FUNCTION OF THE INDIVIDUAL BATH COMPONENTS

4.1 Tin

The tin content depends on the electrolyte application and should range between 10 and 30 g/l. The optimum for barrel parts is 15 g/l and for parts with difficult surface geometry or PCBs at 20 g/l.
If high demand is set on deposition speed, current densities of up to 4 A/dm² can be plated with a tin content of 30 g/l, but it would however impair the metal distribution. Lack of tin is replenished with Tin Salt SU (50 % tin).

4.2 Sulphuric acid

The sulphuric acid concentration should not fall below 85 ml/l or 160 g/l, except for the "rack high current density - version". As optimum concentration 100 ml/l respectively 185 g/l and max. 108 ml/l respectively 200 g/l are recommended. A higher concentration of sulfuric acid leads to disturbances caused by anode passivation and must therefore be avoided. In the high current density version with 30 g/l tin the optimum content of sulphuric acid is approx. 65 ml/l respectively 120 g/l. Lack of acid is replenished with sulphuric acid, conc. (96 %) chem. pure acid only.

4.3 Starter CULMO 1

Starter CULMO 1 is only used for make-up of a new electrolyte and contains all components required for deposition. The concentration should be 25 - 35 ml/l. The single components Brightener CULMO 2, Additive CULMO IRA 1 and Additive CULMO AN 11 1 are used for replenishment during electrolyte operation.

4.4 Brightener CULMO 2

Brightener CULMO 2 is responsible for the good brightness over the entire current density range. Lack of Brightener CULMO 2 starts with decreasing brightness in the low current density range. Lack of Brightener CULMO 2 can first of all be recognized by a decrease of brightness in the low current density area. At parts with a large surface, processed with low electrolyte agitation, the lack of brightener can be recognized by matt zones. Then, additions of 1 - 2 ml/l Brightener CULMO 2 are required.

First of all, excess dosing of Brightener CULMO 2 leads in areas with a favourable electrolyte flow (breakthroughs) to a matt-, partly stepped tin deposition with a brownish discolouration. In an extreme case the deposition will be completely inhibited. At parts with a large surface excess dosing is recognized by burnings in the high current density range. In this case the tin deposition is matt with a brownish discoloration. Excess dosing can be compensated (see point **4.5**) by the addition of the Additives CULMO AN 11 1 and IRA 1.
The continuous consumption of Brightener CULMO 2 is at a operating temperature of approx. 20 °C about 2.5 l/10 kAh. At a higher temperature an increased consumption must be expected.

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4.5 Additives CULMO IRA 1 and AN 11 1

The Additives CULMO IRA 1 and CULMO AN 11 1, are only indirectly involved in the brightening effect of the electrolyte. Both additives are consumed due to drag-out losses. Normally, 4 ml of Additive CULMO AN 11 1 and 1 ml of Additives CULMO IRA 1 must be added per m² surface throughput.

Lack of the Additives CULMO IRA 1 and CULMO AN 11 1 cause almost the same faulty depositions as described for excess dosing of Brightener CULMO 2 (see point **4.4).** Incremental additions of a total of 3 ml/l Additives CULMO IRA 1 followed by up to 20 ml/l of Additive CULMO AN 11 1 are may be required. If accidentally too much of the Additives CULMO IRA 1 and CULMO AN 11 1 is dosed, then this will result in decreasing brightness of the deposited tin coatings but can be corrected by an addition of 1 - 2 ml/l Starter CULMO 1. Although the alternating correction may be repeated but leads to an uneconomical and unnecessary raise of the total organic concentration and in some cases soldering problems cannot be excluded.

4.6 Corrector ACR

Corrector ACR contains an auxiliary brightener component which is partly included in Additive CULMO IRA 1. The required component concentration is maintained by continuous replenishment of Additive CULMO IRA 1. However, depending on the local working conditions, a lack can occur (see point **4.5**).
We recommend an addition of Corrector ACR if despite of an addition of 1 - 2 ml/l Additive CULMO IRA 1 the problem with step plating cannot be solved and so the deposition not be improved.
Additions with Corrector ACR should be performed in increments of 1 up to max. 5 ml/l.

4.7 Bright tin plating in barrel plants

In barrel application sufficient rectifier capacity must be available during plating. The current density should be > 0.6 A/dm² and the anode surface must be in such a dimension that the anodic current density does not exceed 2.5 A/dm². Too small anode surfaces lead to anode passivation and to oxidation of Sn(II) to Sn(IV). Combining rack and barrel application is not recommended since different operating conditions would require different dosing quantities of the additives which would result in bath instability.

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5.0 TROUBLE SHOOTING

5.1 Fault finding chart

Fault	Cause	Correction
step plating	extremely high concentration of Brightener CULMO 2	add 1 - 2 ml/l of Additive CULMO IRA 1 **and/or** 5 ml/l of CULMO AN 11 1; repeat the addition if required
dark rings around boreholes		work the electrolyte through for maybe 1 - 2 h/2 A/dm²
total inhibition of the tin deposition (no deposition around boreholes, no deposition on a large area		
frosted deposition around boreholes		
strong hydrogen formation at the cathode		
formation of pores in the high current density range	minor excess dosing of Brightener CULMO 2	add 1 - 2 ml/l of Additive CULMO IRA 1 **and/or** 5 ml/l of Additive CULMO AN 11 1
matt deposition in the low current density range	lack of Brightener CULMO 2	addition 1 - 2 ml/l of Brightener CULMO 2
	electrolyte temperature is too high	decrease the temperature to e.g. 15 °C
	tin content too high	dilute the electrolyte to optimum
	chloride contamination	it can be tried to correct chloride contaminations up to approx. 300 mg/l by incremental additions of 1 ml/l ; Brightener CULMO 2; at contaminations > 300 mg/l the electrolyte must be replaced by a new make-up
hazy or milky matt deposition in the entire current density range	lack of Brightener CULMO 2	incremental additions of 1 ml/l Brightener CULMO 2

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Fault	Cause	Correction
white-grey coating on the anodes	the anodic current density is too high (> 2,5 A/dm²)	increase the anode surface
the anodes are passive		
pitting, uneven erosion of the anode	sulphuric acid content too high	analyse the electrolyte and adjust to optimum
	poor flow conditions in the plating tank	improve the electrolyte exchange at the anode, e.g. by cleaning of the anode bags

6.0 EFFLUENT

Legal regulations must be observed for disposal of the Bright Tin CULMO 1. Different regulations normally apply for the additives and the ready-made electrolyte. Please refer to section **13** of the appropriate Material Safety Data Sheet for disposal code and recommendations.

The following detoxification sequence is only considered to be an aid:

Bright Tin CULMO 1 doesn't contain complexing agents. The rinse waters resulting from Bright Tin CULMO 1 are acidic and contain dissolved tin(II) sulphate as well as Sn(IV)-compounds (metastannic acid) as suspended particles. Resulting rinse waters must therefore be neutralised to insoluble tin hydrate and sedimented. The sedimentation, depending on the effluent plant, must if necessary be supported by a flocculant.

7.0 SAFETY

Reasonable care is required when handling chemical products. Only personnel specially trained on working with chemicals should be deployed with their handling.
EC Material Safety Data Sheets must be made available to all personnel dealing with the chemicals to ensure they have all required information about product composition, hazards identification, first-aid measures, handling and storage, exposure controls, toxicological and ecological information, etc. It is required to ensure the supply and use of suitable protective clothing and -equipment.

The user must verify the designated purpose of the electrolyte. Previous experience has shown that not all metal surfaces are suitable for a trouble-free electroplating.

The above mentioned data are made according to our best knowledge. Consistent operation of the working solution requires appropriate maintenance. Bright Tin CULMO 1 is a process of Dr.-Ing. Max Schlötter GmbH & Co KG. It can only be operated with the products described in this technical data sheet. Use of other chemicals (also partly) will impair quality and invalidates our service- and quality commitments (quality assurance).

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Safety data sheet
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SECTION 1: Identification of the substance/mixture and of the company/undertaking

· **1.1 Product identifier**

· **Trade name: Sulphuric Acid 96%**

· **Article number:** 601890
· **CAS Number:** 7664-93-9
· **EINECS Number:** 231-639-5
· **Index number:** 016-020-00-8
· **Registration number** 01-2119458838-20-XXXX
· **1.2 Relevant identified uses of the substance or mixture and uses advised against**
No further relevant information available.
· **Application of the substance / the mixture** Raw material for laboratory and industrial use.

· **1.3 Details of the supplier of the safety data sheet**
· **Manufacturer/Supplier:**
Schlötter Ireland DAC
5 Pine Road,
Naas Enterprise Park,
Naas, Co. Kildare
Ireland
W91 KH68

Tel: +353 (0)45 447400 (09:00 - 17:00 Hrs)
Fax: +353 (0)45 447478
sds@schlotter.ie

· **Further information obtainable from:** Product safety department.
· **1.4 Emergency telephone number:**
National Poisons Information Centre at Beaumont Hospital,
PO Box 1297,
Beaumont Road,
Dublin 9
Phone 01 8092566
www.poisons.ie

Outside Ireland;
University of Freiburg
Poisoning-Information-Center
+49(0)761-19240 (24h, 365 days/year)
Information in German and English
http://www.giftberatung.de/

SECTION 2: Hazards identification

· **2.1 Classification of the substance or mixture**
· **Classification according to Regulation (EC) No 1272/2008**

GHS05 corrosion

Skin Corr. 1A H314 Causes severe skin burns and eye damage.
Eye Dam. 1 H318 Causes serious eye damage.

· **2.2 Label elements**
· **Labelling according to Regulation (EC) No 1272/2008**
The product is classified and labelled according to the CLP regulation.

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· ***Hazard pictograms***

GHS05

· ***Signal word*** *Danger*

· ***Hazard-determining components of labelling:***
sulphuric acid
· ***Hazard statements***
H314 Causes severe skin burns and eye damage.
· ***Precautionary statements***

P260	*Do not breathe dusts or mists.*
P264	*Wash thoroughly after handling.*
P280	*Wear protective gloves/protective clothing/eye protection/face protection.*
P305+P351+P338	*IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.*
P405	*Store locked up.*
P501	*Dispose of contents/container in accordance with local/regional/national/international regulations.*

· ***2.3 Other hazards***
· ***Results of PBT and vPvB assessment***
· ***PBT:*** *Not applicable.*
· ***vPvB:*** *Not applicable.*

SECTION 3: Composition/information on ingredients

· ***3.2 Chemical characterisation: Mixtures***
· ***Description:*** *Mixture of substances listed below with nonhazardous additions.*

· ***Dangerous components:***

CAS: 7664-93-9 *EINECS: 231-639-5*	*sulphuric acid*	*Skin Corr. 1A, H314*	*90-100%*

· ***Additional information:*** *For the wording of the listed hazard phrases refer to section 16.*

SECTION 4: First aid measures

· ***4.1 Description of first aid measures***
· ***General information:*** *Immediately remove any clothing soiled by the product.*
· ***After inhalation:***
In case of unconsciousness place patient stably in side position for transportation.
Move the exposed person to fresh air at once.
· ***After skin contact:*** *Immediately wash with water and soap and rinse thoroughly.*
· ***After eye contact:*** *Rinse opened eye for several minutes under running water. Then consult a doctor.*
· ***After swallowing:*** *Drink plenty of water and provide fresh air. Call for a doctor immediately.*
· ***4.2 Most important symptoms and effects, both acute and delayed*** *No further relevant information available.*
· ***4.3 Indication of any immediate medical attention and special treatment needed***
No further relevant information available.

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SECTION 5: Firefighting measures

· ***5.1 Extinguishing media***
· ***Suitable extinguishing agents:***
CO2, powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
· ***5.2 Special hazards arising from the substance or mixture***
During heating or in case of fire poisonous gases are produced.
· ***5.3 Advice for firefighters***
· ***Protective equipment:*** *Mouth respiratory protective device.*

SECTION 6: Accidental release measures

· ***6.1 Personal precautions, protective equipment and emergency procedures***
Mount respiratory protective device.
Wear protective equipment. Keep unprotected persons away.
· ***6.2 Environmental precautions:***
Dilute with plenty of water.
Do not allow to enter sewers/ surface or ground water.
· ***6.3 Methods and material for containment and cleaning up:***
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
Use neutralising agent.
Dispose contaminated material as waste according to item 13.
Ensure adequate ventilation.
· ***6.4 Reference to other sections***
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

SECTION 7: Handling and storage

· ***7.1 Precautions for safe handling***
Ensure good ventilation/exhaustion at the workplace.
Prevent formation of aerosols.
Wear full protective clothing for prolonged exposure and/or high concentrations.
· ***Information about fire - and explosion protection:*** *Keep respiratory protective device available.*

· ***7.2 Conditions for safe storage, including any incompatibilities***
· ***Storage:*** *Please see Section 10.5 for information on storage incompatibilities.*
· ***Requirements to be met by storerooms and receptacles:*** *No special requirements.*
· ***Information about storage in one common storage facility:*** *Not required.*
· ***Further information about storage conditions:*** *Keep container tightly sealed.*
· ***Storage class:*** *Corrosive.*
· ***7.3 Specific end use(s)*** *No further relevant information available.*

SECTION 8: Exposure controls/personal protection

· ***Additional information about design of technical facilities:*** *No further data; see item 7.*

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· ***8.1 Control parameters***

· ***Ingredients with limit values that require monitoring at the workplace:***	
7664-93-9 sulphuric acid	
OEL	*Long-term value: 0.05 mg/m³* *IOELV*

· ***Additional information:*** *The lists valid during the making were used as basis.*

· ***8.2 Exposure controls***
· ***Personal protective equipment:***
· ***General protective and hygienic measures:***
Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing
Wash hands before breaks and at the end of work.
Avoid contact with the eyes.
Avoid contact with the eyes and skin.
· ***Respiratory protection:***
In case of brief exposure or low pollution use respiratory filter device. In case of intensive or longer exposure use self-contained respiratory protective device.
· ***Protection of hands:***

Protective gloves

Protective gloves conforming to standard EN374 should be used.
The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation
If a spill occurs change gloves immediately, dispose of contaminated gloves safely.
· ***Material of gloves***
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.
· ***Penetration time of glove material***
The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.
Value for the penetration time on Nitrile gloves: Level ≤ 10 minutes
· ***Eye protection:***

Tightly sealed goggles conforming with standard EN 166.

SECTION 9: Physical and chemical properties

· ***9.1 Information on basic physical and chemical properties***
· ***General Information***
· ***Appearance:***

Form:	*Liquid*
Colour:	*Colourless to Yellow*
· ***Odour:***	*Acrid*

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· ***Odour threshold:***	*Not determined.*
· ***pH-value at 20 °C:***	*< 1*
· ***Change in condition***	
Melting point/freezing point:	*Undetermined.*
Initial boiling point and boiling range:	*360 °C*
· ***Flash point:***	*Not applicable.*
· ***Flammability (solid, gas):***	*Not applicable.*
· ***Ignition temperature:***	
Decomposition temperature:	*Not determined.*
· ***Auto-ignition temperature:***	*Product is not selfigniting.*
· ***Explosive properties:***	*Product does not present an explosion hazard.*
· ***Explosion limits:***	
Lower:	*Not determined.*
Upper:	*Not determined.*
· ***Vapour pressure at 20 °C:***	*<0.01 hPa*
· ***Density at 20 °C:***	*1.84 g/cm³*
· ***Relative density***	*Not determined.*
· ***Vapour density***	*Not determined.*
· ***Evaporation rate***	*Not determined.*
· ***Solubility in / Miscibility with water:***	*Fully miscible.*
· ***Partition coefficient: n-octanol/water:***	*Not determined.*
· ***Viscosity:***	
Dynamic:	*Not determined.*
Kinematic:	*Not determined.*
· ***Solvent content:***	
Organic solvents:	*0.0 %*
VOC (EC)	*0.00 %*
· ***9.2 Other information***	*No further relevant information available.*

SECTION 10: Stability and reactivity

· ***10.1 Reactivity*** *Reacts violently with water.*
· ***10.2 Chemical stability***
· ***Thermal decomposition / conditions to be avoided:*** *No decomposition if used according to specifications.*
· ***10.3 Possibility of hazardous reactions*** *No dangerous reactions known.*
· ***10.4 Conditions to avoid*** *Reacts with alkalis and amines generating excessive heat.*
· ***10.5 Incompatible materials:***
Materials To Avoid
Bases, alkalis (inorganic). Massive, solid metal. Powdered metal. Water, steam, water mixtures. Chemically active metals. Alkali metals.
· ***10.6 Hazardous decomposition products:*** *Very toxic gases/vapours/fumes of: Sulphur.*

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SECTION 11: Toxicological information

· ***11.1 Information on toxicological effects***
· ***Acute toxicity*** *Based on available data, the classification criteria are not met.*
· ***Primary irritant effect:***
· ***Skin corrosion/irritation***
Causes severe skin burns and eye damage.
· ***Serious eye damage/irritation***
Causes serious eye damage.
· ***Respiratory or skin sensitisation*** *Based on available data, the classification criteria are not met.*
· ***CMR effects (carcinogenity, mutagenicity and toxicity for reproduction)***
· ***Germ cell mutagenicity*** *Based on available data, the classification criteria are not met.*
· ***Carcinogenicity*** *Based on available data, the classification criteria are not met.*
· ***Reproductive toxicity*** *Based on available data, the classification criteria are not met.*
· ***STOT-single exposure*** *Based on available data, the classification criteria are not met.*
· ***STOT-repeated exposure*** *Based on available data, the classification criteria are not met.*
· ***Aspiration hazard*** *Based on available data, the classification criteria are not met.*

SECTION 12: Ecological information

· ***12.1 Toxicity***
· ***Aquatic toxicity:*** *No further relevant information available.*
· ***12.2 Persistence and degradability*** *No further relevant information available.*
· ***12.3 Bioaccumulative potential*** *No further relevant information available.*
· ***12.4 Mobility in soil*** *No further relevant information available.*
· ***Additional ecological information:***
· ***General notes:***
Water hazard class 1 (German Regulation) (Self-assessment): slightly hazardous for water
Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
Must not reach sewage water or drainage ditch undiluted or unneutralised.
Rinse off of bigger amounts into drains or the aquatic environment may lead to decreased pH-values. A low pH-value harms aquatic organisms. In the dilution of the use-level the pH-value is considerably increased, so that after the use of the product the aqueous waste, emptied into drains, is only low water-dangerous.
· ***12.5 Results of PBT and vPvB assessment***
· ***PBT:*** *Not applicable.*
· ***vPvB:*** *Not applicable.*
· ***12.6 Other adverse effects*** *No further relevant information available.*

SECTION 13: Disposal considerations

· ***13.1 Waste treatment methods***
· ***Recommendation***
Must not be disposed together with household garbage. Do not allow product to reach sewage system.

· ***Uncleaned packaging:***
· ***Recommendation:*** *Disposal must be made according to official regulations.*
· ***Recommended cleansing agents:*** *Water, if necessary together with cleansing agents.*

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SECTION 14: Transport information

· **14.1 UN-Number**	
· **ADR, IMDG, IATA**	UN1830
· **14.2 UN proper shipping name**	
· **ADR**	UN1830 SULPHURIC ACID
· **IMDG, IATA**	SULPHURIC ACID
· **14.3 Transport hazard class(es)**	
· **ADR, IMDG, IATA**	
· **Class**	8 Corrosive substances.
· **Label**	8
· **14.4 Packing group**	
· **ADR, IMDG, IATA**	II
· **14.5 Environmental hazards:**	Not applicable.
· **14.6 Special precautions for user**	Warning: Corrosive substances.
· **Danger code (Kemler):**	80
· **EMS Number:**	F-A,S-B
· **Segregation groups**	Acids
· **Stowage Category**	E
· **Stowage Code**	SW15 For metal drums, stowage category B.
· **14.7 Transport in bulk according to Annex II of Marpol and the IBC Code**	Not applicable.
· **Transport/Additional information:**	
· **ADR**	
· **Limited quantities (LQ)**	1L
· **Excepted quantities (EQ)**	Code: E2 Maximum net quantity per inner packaging: 30 ml Maximum net quantity per outer packaging: 500 ml
· **Transport category**	2
· **Tunnel restriction code**	E
· **IMDG**	
· **Limited quantities (LQ)**	1L
· **Excepted quantities (EQ)**	Code: E2 Maximum net quantity per inner packaging: 30 ml Maximum net quantity per outer packaging: 500 ml
· **UN "Model Regulation":**	UN 1830 SULPHURIC ACID, 8, II

SECTION 15: Regulatory information

· **15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**

· **Directive 2012/18/EU**
· **Named dangerous substances - ANNEX I** None of the ingredients is listed.
· **REGULATION (EC) No 1907/2006 ANNEX XVII** Conditions of restriction: 3

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· ***15.2 Chemical safety assessment:*** *A Chemical Safety Assessment has not been carried out.*

SECTION 16: Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

· ***Relevant phrases***
H314 Causes severe skin burns and eye damage.

· ***Department issuing SDS:*** *Product safety department.*
· ***Contact:*** *Ms. Jennifer Habenicht*
· ***Abbreviations and acronyms:***
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
IATA: International Air Transport Association
GHS: Globally Harmonised System of Classification and Labelling of Chemicals
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
VOC: Volatile Organic Compounds (USA, EU)
PBT: Persistent, Bioaccumulative and Toxic
vPvB: very Persistent and very Bioaccumulative
Skin Corr. 1A: Skin corrosion/irritation – Category 1A
Eye Dam. 1: Serious eye damage/eye irritation – Category 1

AL. BATH 23

Cu - Bath 7

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SECTION 1: Identification of the substance/mixture and of the company/undertaking

· **1.1 Product identifier**

· **Trade name: Starter CULMO 1**

· **Article number:** 101501

· **1.2 Relevant identified uses of the substance or mixture and uses advised against**
No further relevant information available.

· **Application of the substance / the mixture** Electroplating auxiliary

· **1.3 Details of the supplier of the safety data sheet**

· **Manufacturer/Supplier:**
Dr.-Ing. Max Schlötter GmbH & Co. KG
Galvanotechnik
Talgraben 30
73312 Geislingen/Steige
Germany

· **Further information obtainable from:** E-Mail: sds@schloetter.de

· **1.4 Emergency telephone number:**
University of Freiburg
Poisoning-Information-Center
+49(0)761-19240 (24h, 365 days/year)
Information in German and English
http://www.giftberatung.de/

SECTION 2: Hazards identification

· **2.1 Classification of the substance or mixture**

· **Classification according to Regulation (EC) No 1272/2008**

Acute Tox. 4	H302	Harmful if swallowed.
Acute Tox. 4	H312	Harmful in contact with skin.
Skin Corr. 1A	H314	Causes severe skin burns and eye damage.
Skin Sens. 1	H317	May cause an allergic skin reaction.
Muta. 2	H341	Suspected of causing genetic defects.
Aquatic Chronic 3	H412	Harmful to aquatic life with long lasting effects.

· **2.2 Label elements**

· **Labelling according to Regulation (EC) No 1272/2008**
The product is classified and labelled according to the CLP regulation.

· **Hazard pictograms**

GHS05 GHS07 GHS08

· **Signal word** Danger

· **Hazard-determining components of labelling:**
Polyethylenglycol-decylether
2-(propyloxy)ethanol
Pyrocatechol
Sulphuric acid

· **Hazard statements**
H302+H312 Harmful if swallowed or in contact with skin.
H314 Causes severe skin burns and eye damage.
H317 May cause an allergic skin reaction.
H341 Suspected of causing genetic defects.
H412 Harmful to aquatic life with long lasting effects.

· **Precautionary statements**
P260 Do not breathe dusts or mists.
P280 Wear protective gloves/protective clothing/eye protection/face protection.

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P303+P361+P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310 Immediately call a POISON CENTER/doctor.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

· **2.3 Other hazards**
· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.

SECTION 3: Composition/information on ingredients

· **3.2 Chemical characterisation: Mixtures**
· **Description:** Mixture of substances listed below with nonhazardous additions.

· **Dangerous components:**		
CAS: 166736-08-9 Polymer	Polyethylenglycol-decylether Eye Dam. 1, H318; Acute Tox. 4, H302	15-<25%
CAS: 2807-30-9 EINECS: 220-548-6 Index number: 603-095-00-2 Reg.nr.: 01-2119883539-19	2-(propyloxy)ethanol Flam. Liq. 3, H226; Acute Tox. 4, H312; Eye Irrit. 2, H319	15-<25%
CAS: 68919-40-4 EINECS: 272-897-9	Cocoamphodipropionic acid Eye Dam. 1, H318; Aquatic Chronic 2, H411	≥2.5-<5%
CAS: 7664-93-9 EINECS: 231-639-5 Index number: 016-020-00-8 Reg.nr.: 01-2119458838-20	Sulphuric acid Met. Corr.1, H290; Skin Corr. 1A, H314	≥0.1-<3%
CAS: 120-80-9 EINECS: 204-427-5 Index number: 604-016-00-4	Pyrocatechol Acute Tox. 3, H301; Acute Tox. 3, H311; Muta. 2, H341; Eye Dam. 1, H318; Acute Tox. 4, H332; Skin Irrit. 2, H315; Skin Sens. 1, H317	≥1-<2%
CAS: 79-10-7 EINECS: 201-177-9 Index number: 607-061-00-8 Reg.nr.: 01-2119452449-31	acrylic acid Flam. Liq. 3, H226; Skin Corr. 1A, H314; Aquatic Acute 1, H400; Acute Tox. 4, H302; Acute Tox. 4, H312; Acute Tox. 4, H332	≥0.25-<1%

· **Additional information:** For the wording of the listed hazard phrases refer to section 16.

SECTION 4: First aid measures

· **4.1 Description of first aid measures**
· **General information:**
PERSONAL PROTECTION FOR THE FIRST AIDER.
Immediately remove any clothing soiled by the product.
Symptoms of poisoning may even occur after several hours; therefore medical observation for at least 48 hours after the accident.
· **After inhalation:**
Take affected persons into fresh air and keep quiet.
In case of unconsciousness place patient stably in side position for transportation.
Call a doctor immediately.
· **After skin contact:**
Immediately rinse with water.
If skin irritation continues, consult a doctor.
· **After eye contact:**
Rinse opened eye for several minutes under running water. Then consult a doctor.

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If present remove the contact lenses immediately.
· **After swallowing:** Drink plenty of water and provide fresh air. Call for a doctor immediately.
· **4.2 Most important symptoms and effects, both acute and delayed**
No further relevant information available.
· **4.3 Indication of any immediate medical attention and special treatment needed**
No further relevant information available.

SECTION 5: Firefighting measures

· **5.1 Extinguishing media**
· **Suitable extinguishing agents:**
CO2, powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
· **5.2 Special hazards arising from the substance or mixture**
During heating or in case of fire poisonous gases are produced.
Carbon monoxide (CO)
Sulphur dioxide (SO2)
· **5.3 Advice for firefighters**
· **Protective equipment:** Do not inhale explosion gases or combustion gases.
· **Additional information**
Collect contaminated fire fighting water separately. It must not enter the sewage system.

SECTION 6: Accidental release measures

· **6.1 Personal precautions, protective equipment and emergency procedures**
Wear protective equipment. Keep unprotected persons away.
Wear protective clothing.
· **6.2 Environmental precautions:**
Inform respective authorities in case of seepage into water course or sewage system.
Dilute with plenty of water.
Do not allow to enter sewers/ surface or ground water.
Keep contaminated washing water and dispose of appropriately.
· **6.3 Methods and material for containment and cleaning up:**
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
Use neutralising agent.
Dispose contaminated material as waste according to item 13.
Ensure adequate ventilation.
· **6.4 Reference to other sections**
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

SECTION 7: Handling and storage

· **7.1 Precautions for safe handling**
Observe the usual precautions when handling chemicals. The substance / product may only be handled by suitably trained personnel.
Keep receptacles tightly sealed.
Ensure good ventilation/exhaustion at the workplace.
Prevent formation of aerosols.
· **Information about fire - and explosion protection:** No special measures required.
· **7.2 Conditions for safe storage, including any incompatibilities**
· **Storage:**
· **Requirements to be met by storerooms and receptacles:** Store only in the original receptacle.
· **Information about storage in one common storage facility:** Store away from foodstuffs.
· **Further information about storage conditions:**
Protect from frost.
Protect from heat and direct sunlight.

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Keep container tightly sealed.
· **Maximum storage temperature:** 40 °C
· **Minimum storage temperature:** 5 °C
· **Storage class:** 8 A
· **7.3 Specific end use(s)** No further relevant information available.

SECTION 8: Exposure controls/personal protection

· **Additional information about design of technical facilities:** No further data; see item 7.
· **8.1 Control parameters**

· **Ingredients with limit values that require monitoring at the workplace:**	
7664-93-9 Sulphuric acid	
WEL	Long-term value: 0.05* mg/m³ *mist: defined as thoracic fraction
120-80-9 Pyrocatechol	
WEL	Long-term value: 23 mg/m³, 5 ppm

· **DNELs**		
2807-30-9 2-(propyloxy)ethanol		
Dermal	exposure long term - systemic effects	3.4 mg/kg bw/day (worker)
Inhalative	exposure long term - systemic effects	36 mg/m³ (worker)
7664-93-9 Sulphuric acid		
Inhalative	exposure long term - local effects	0.05 mg/m³ (worker)
	exposure short term - local effects	0.1 mg/m³ (worker)
120-80-9 Pyrocatechol		
Dermal	exposure short term - systemic effects	2.5 mg/kg bw/day (worker)
Inhalative	exposure long term - systemic effects	1 mg/m³ (worker)
	exposure short term - systemic effects	85 mg/m³ (worker)
79-10-7 acrylic acid		
Dermal	exposure short term - local effects	1 mg/kg (worker)
Inhalative	exposure long term - local effects	30 mg/m³ (worker)
	exposure short term - local effects	30 mg/m³ (worker)

· **PNECs**	
2807-30-9 2-(propyloxy)ethanol	
PNEC	10 mg/l (sewage treatment plant)
	0.01 mg/l (marine water)
	1 mg/l (sporadic emission)
	0.1 mg/l (fresh water)
PNEC	0.0602 mg/kg (soil)
	0.0594 mg/kg (sediment marine water)
	0.594 mg/kg (sediment fresh water)
7664-93-9 Sulphuric acid	
PNEC	0.0025 mg/l (fresh water)
120-80-9 Pyrocatechol	
PNEC	0.167 µg/l (marine water)
	16.7 µg/l (sporadic emission)
	1.67 µg/l (fresh water)
PNEC	1.958 mg/l (sewage treatment plant)
PNEC	0.00417 mg/kg (soil)
	0.002576 mg/kg (sediment marine water)

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	0.02576 mg/kg (sediment fresh water)
79-10-7 acrylic acid	
PNEC	0.9 mg/l (sewage treatment plant)
	0.0003 mg/l (marine water)
	0.0013 mg/l (sporadic emission)
	0.003 mg/l (fresh water)
PNEC	1 mg/kg (soil)
	0.002346 mg/kg (sediment marine water)
	0.0236 mg/kg (sediment fresh water)

· **Additional information:** The lists valid during the making were used as basis.
· **8.2 Exposure controls**
· **Personal protective equipment:**
· **General protective and hygienic measures:**
Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing
Wash hands before breaks and at the end of work.
Do not inhale gases / fumes / aerosols.
Avoid contact with the eyes and skin.
· **Respiratory protection:**
Respiratory protection if vapours/aerosols are liberate. Particle filter with middle retention for solid and liquid particle (e.g. EN 143 or 149, Type P2 or FFP2).
For example: Composite filter type ABEK, company MSA-Auer by short or minimized exposure.
· **Protection of hands:**

Protective gloves

Check the permeability prior to each anewed use of the glove.
The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation
· **Material of gloves**
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.
Chemical-protective gloves (EN 374-1, -2, -3).
Butyl rubber, BR ≥ 0,3 mm (Level 6)
· **Penetration time of glove material**
≥ 8 h
The exact break trough time has to be found out by the manufacturer of the protective gloves and has to be observed.
· **For the permanent contact in work areas without heightened risk of injury (e.g. Laboratory) gloves made of the following material are suitable:**
Butyl rubber, BR ≥ 0,3 mm (Level 6)
· **For the permanent contact gloves made of the following materials are suitable:**
Butyl rubber, BR ≥ 0,3 mm (Level 6)
· **Not suitable are gloves made of the following materials:**
Leather gloves
Strong material gloves

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· **Eye protection:**

Tightly sealed goggles

Ensure the eyewash stations and safety showers are close to the workplace.

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SECTION 9: Physical and chemical properties

· **9.1 Information on basic physical and chemical properties**	
· **General Information**	
· **Appearance:**	
Form:	Fluid
Colour:	yellow to brown
· **Odour:**	Odourless
· **Odour threshold:**	Not determined.
· **pH-value at 20 °C:**	≤2 DIN 19261
· **Change in condition**	
Melting point/freezing point:	not determined
Initial boiling point and boiling range:	100 °C
· **Flash point:**	95 °C DIN EN ISO 2719 / DIN 51755
· **Flammability (solid, gas):**	Not applicable.
· **Ignition temperature:**	230 °C This value refers to the flammable ingredients.
· **Decomposition temperature:**	Not determined.
· **Auto-ignition temperature:**	Product is not selfigniting.
· **Explosive properties:**	Product does not present an explosion hazard.
· **Explosion limits:**	
Lower:	3.9 Vol % This value refers to the flammable ingredients.
Upper:	23.3 Vol % This value refers to the flammable ingredients.
· **Vapour pressure at 20 °C:**	23 hPa
· **Density at 20 °C:**	1.03 g/cm³ DIN 53217-5 Determination of density - vibration method
· **Relative density**	Not determined.
· **Vapour density**	Not determined.
· **Evaporation rate**	Not determined.
· **Solubility in / Miscibility with water:**	Easily soluble.
· **Partition coefficient: n-octanol/water:**	Not determined.
· **Viscosity:**	
Dynamic:	Not determined.
Kinematic:	Not determined.
· **Solvent content:**	
Organic solvents:	20.0 %
Water:	49.7 %

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VOC (EU)	20.00 %
· **9.2 Other information**	No further relevant information available.
· **Additional information**	The physical data in section 9 correspond to typical values for this product and can not be seen as a product specification.

SECTION 10: Stability and reactivity

· **10.1 Reactivity** No further relevant information available.
· **10.2 Chemical stability**
· **Thermal decomposition / conditions to be avoided:**
No decomposition if used according to specifications.
· **10.3 Possibility of hazardous reactions** No dangerous reactions known.
· **10.4 Conditions to avoid** No further relevant information available.
· **10.5 Incompatible materials:** No further relevant information available.
· **10.6 Hazardous decomposition products:** No dangerous decomposition products known.

SECTION 11: Toxicological information

· **11.1 Information on toxicological effects**
· **Acute toxicity**
Harmful if swallowed or in contact with skin.

· **LD/LC50 values relevant for classification:**

166736-08-9 Polyethylenglycol-decylether		
Oral	LD50	>300-2,000 mg/kg (rat) (OECD 423)
Dermal	LD50	>2,000 mg/kg (rabbit) (external MSDS)
2807-30-9 2-(propyloxy)ethanol		
Oral	LD50	3,089 mg/kg (rat) (GESTIS, RTECS)
Dermal	LD50	1,337 mg/kg (rabbit) (RTECS)
7664-93-9 Sulphuric acid		
Oral	LD50	2,140 mg/kg (rat) (OECD 401)
Inhalative	LC50/4h	850 mg/l (mouse) (OECD 403)
120-80-9 Pyrocatechol		
Oral	LD50	300 mg/kg (rat) (ECHA)
Dermal	LD50	600 mg/kg (rat) (OECD 402)
79-10-7 acrylic acid		
Oral	LD50	1,500 mg/kg (rat) (BASF-Test)
Dermal	LD50	>2,000 mg/kg (rabbit) (OECD 402)
Inhalative	LC50/4h	5.1 mg/l (rat) (OECD 403)

· **Primary irritant effect:**
· **Skin corrosion/irritation**
Causes severe skin burns and eye damage.
· **Serious eye damage/irritation**
Causes severe skin burns and eye damage.
· **Respiratory or skin sensitisation**
May cause an allergic skin reaction.
· **CMR effects (carcinogenity, mutagenicity and toxicity for reproduction)**
· **Germ cell mutagenicity**
Suspected of causing genetic defects.
· **Carcinogenicity** Based on available data, the classification criteria are not met.
· **Reproductive toxicity** Based on available data, the classification criteria are not met.
· **STOT-single exposure** Based on available data, the classification criteria are not met.

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· **STOT-repeated exposure** Based on available data, the classification criteria are not met.
· **Aspiration hazard** Based on available data, the classification criteria are not met.

SECTION 12: Ecological information

· **12.1 Toxicity**

· **Aquatic toxicity:**	
166736-08-9 Polyethylenglycol-decylether	
LC50/96h	10-100 mg/l (brachydanio rerio - zebra danio) (OECD 203)
EC50/48h	>1-10 mg/l (daphnia magna - water flea) (OECD 202 part 1)
EC50/72h	10-100 mg/l (scenedesmus subspicatus - green algae) (external MSDS)
2807-30-9 2-(propyloxy)ethanol	
LC50/48h (static)	>5,000 mg/l (daphnia magna - water flea) (EPA/600/3-75-009)
LC50/96h (static)	>5,000 mg/l (pimephales promelas - fathead minnow) (EPA/600/4-85/013)
EC50/72h (static)	>100 mg/l (pseudokirchneriella subcapitata) (OECD 201)
7664-93-9 Sulphuric acid	
LC50/96h	16-28 mg/l (lepomis macrochirus - bluegill) (ECHA)
EC50/48h (static)	>100 mg/l (daphnia magna - water flea) (OECD 402)
EC50/72h (static)	>100 mg/l (desmodesmus subspicatus - green algae) (OECD 201)
120-80-9 Pyrocatechol	
LC50/96h (dynamic)	9.2 mg/l (pimephales promelas - fathead minnow) (OECD 203)
EC50/96h	22 mg/l (chlorella vulgaris - fresh water algae) (OECD 201)
EC50/24h (static)	2.1 mg/l (daphnia magna - water flea) (French Standard AFNOR T 90301)
79-10-7 acrylic acid	
LC50/48h (dynamic)	95 mg/l (daphnia magna - water flea) (Daphnientest akut)
LC50/96h (dynamic)	27 mg/l (oncorhynchus mykiss - rainbow trout) (EPA 72-1)
NOEC/21d (dynamic)	3.8 mg/l (daphnia magna - water flea) (OPP 72-4 (EPA-Richtlinie))

· **12.2 Persistence and degradability** No further relevant information available.
· **12.3 Bioaccumulative potential** No further relevant information available.
· **12.4 Mobility in soil** No further relevant information available.
· **Ecotoxical effects:**
· **Remark:** Harmful to fish
· **Additional ecological information:**
· **General notes:**
The classification into the water hazard class resulted according to the administrative regulation water-polluting substances (VwVwS) dated 17.05.1999.
Water hazard class 2 (German Regulation) (Self-assessment): hazardous for water
The product does not contain AOX.
The product does not contain EDTA
Do not allow product to reach ground water, water course or sewage system.
Must not reach sewage water or drainage ditch undiluted or unneutralised.
Danger to drinking water if even small quantities leak into the ground.
Harmful to aquatic organisms
The product does not contain organic complexing agents.
· **12.5 Results of PBT and vPvB assessment**
According to Annex XIV of Regulation (EC) No. 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH): The product does not contain a substance fullfilling the PBT (persistent/bioaccumulative/toxic) criteria or the vPvB (very persistent/very bioaccumulative) criteria: Self classification.
· **PBT:** Not applicable.
· **vPvB:** Not applicable.

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· **12.6 Other adverse effects** No further relevant information available.

SECTION 13: Disposal considerations

· **13.1 Waste treatment methods**
· **Recommendation**
Must not be disposed together with household garbage. Do not allow product to reach sewage system.
Contact manufacturer for recycling information.

· **European waste catalogue**	
07 01 04*	other organic solvents, washing liquids and mother liquors

· **Uncleaned packaging:**
· **Recommendation:** Disposal must be made according to official regulations.
· **Recommended cleansing agents:** Water, if necessary together with cleansing agents.

SECTION 14: Transport information

· **14.1 UN-Number**	
· **ADR, IMDG, IATA**	UN3264
· **14.2 UN proper shipping name**	
· **ADR**	3264 CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (SULPHURIC ACID)
· **IMDG, IATA**	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (SULPHURIC ACID)
· **14.3 Transport hazard class(es)**	
· **ADR, IMDG, IATA**	
· **Class**	8 Corrosive substances.
· **Label**	8
· **14.4 Packing group**	
· **ADR, IMDG, IATA**	III
· **14.5 Environmental hazards:**	Product contains environmentally hazardous substances: acrylic acid
· **Marine pollutant:**	No
· **14.6 Special precautions for user**	Warning: Corrosive substances.
· **Danger code (Kemler):**	80
· **EMS Number:**	F-A,S-B
· **Segregation groups**	Acids
· **Stowage Category**	A
· **Stowage Code**	SW2 Clear of living quarters.
· **14.7 Transport in bulk according to Annex II of Marpol and the IBC Code**	Not applicable.
· **Transport/Additional information:**	
· **ADR**	
· **Limited quantities (LQ)**	5L
· **Excepted quantities (EQ)**	Code: E1 Maximum net quantity per inner packaging: 30 ml Maximum net quantity per outer packaging: 1000

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·	ml
· **Transport category**	3
· **Tunnel restriction code**	E
· **IMDG**	
· **Limited quantities (LQ)**	5L
· **Excepted quantities (EQ)**	Code: E1 Maximum net quantity per inner packaging: 30 ml Maximum net quantity per outer packaging: 1000 ml
· **UN "Model Regulation":**	UN 3264 CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (SULPHURIC ACID), 8, III

SECTION 15: Regulatory information

· **15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**
· **Directive 2012/18/EU - SEVESO III**
· **Named dangerous substances - ANNEX I** None of the ingredients is listed.
· **REGULATION (EC) No 1907/2006 ANNEX XVII** Conditions of restriction: 3
· **National regulations:**
· **Waterhazard class:** Water hazard class 2 (Self-assessment): hazardous for water.
· **15.2 Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

SECTION 16: Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

Safety Data Sheet to the regulation 1907/2006/EG, article 31.
Material Safety Data Sheets are to be kept for at least 10 years, according to Article 36 of REACH Regulation (EC) No 1907/2006.

· **Relevant phrases**
H226 Flammable liquid and vapour.
H290 May be corrosive to metals.
H301 Toxic if swallowed.
H302 Harmful if swallowed.
H311 Toxic in contact with skin.
H312 Harmful in contact with skin.
H314 Causes severe skin burns and eye damage.
H315 Causes skin irritation.
H317 May cause an allergic skin reaction.
H318 Causes serious eye damage.
H319 Causes serious eye irritation.
H332 Harmful if inhaled.
H341 Suspected of causing genetic defects.
H400 Very toxic to aquatic life.
H411 Toxic to aquatic life with long lasting effects.
· **Department issuing SDS:**
Research and Development
E-Mail: fue@schloetter.de

· **Contact:** sds@schloetter.de

· **Abbreviations and acronyms:**
RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
ICAO: International Civil Aviation Organisation

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RRN: REACH Registration Number
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
IATA: International Air Transport Association
GHS: Globally Harmonised System of Classification and Labelling of Chemicals
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
VOC: Volatile Organic Compounds (USA, EU)
DNEL: Derived No-Effect Level (REACH)
PNEC: Predicted No-Effect Concentration (REACH)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
PBT: Persistent, Bioaccumulative and Toxic
vPvB: very Persistent and very Bioaccumulative
Flam. Liq. 3: Flammable liquids – Category 3
Met. Corr.1: Corrosive to metals – Category 1
Acute Tox. 3: Acute toxicity – Category 3
Acute Tox. 4: Acute toxicity – Category 4
Skin Corr. 1A: Skin corrosion/irritation – Category 1A
Skin Irrit. 2: Skin corrosion/irritation – Category 2
Eye Dam. 1: Serious eye damage/eye irritation – Category 1
Eye Irrit. 2: Serious eye damage/eye irritation – Category 2
Skin Sens. 1: Skin sensitisation – Category 1
Muta. 2: Germ cell mutagenicity – Category 2
Aquatic Acute 1: Hazardous to the aquatic environment - acute aquatic hazard – Category 1
Aquatic Chronic 2: Hazardous to the aquatic environment - long-term aquatic hazard – Category 2
Aquatic Chronic 3: Hazardous to the aquatic environment - long-term aquatic hazard – Category 3

· * **Data compared to the previous version altered.**

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SECTION 1: Identification of the substance/mixture and of the company/undertaking

· **1.1 Product identifier**

· **Trade name: Tin Salt SU**

· **Article number:** 100000
· **1.2 Relevant identified uses of the substance or mixture and uses advised against**
No further relevant information available.
· **Application of the substance / the mixture** Electroplating auxiliary
· **1.3 Details of the supplier of the safety data sheet**
· **Manufacturer/Supplier:**
Dr.-Ing. Max Schlötter GmbH & Co. KG
Galvanotechnik
Talgraben 30
73312 Geislingen/Steige
Germany
· **Further information obtainable from:** E-Mail: sds@schloetter.de
· **1.4 Emergency telephone number:**
University of Freiburg
Poisoning-Information-Center
+49(0)761-19240 (24h, 365 days/year)
Information in German and English
http://www.giftberatung.de/

SECTION 2: Hazards identification

· **2.1 Classification of the substance or mixture**
· **Classification according to Regulation (EC) No 1272/2008**

Acute Tox. 4	H332 Harmful if inhaled.
Skin Irrit. 2	H315 Causes skin irritation.
Eye Dam. 1	H318 Causes serious eye damage.
Skin Sens. 1	H317 May cause an allergic skin reaction.
STOT SE 3	H335 May cause respiratory irritation.
STOT RE 2	H373 May cause damage to organs through prolonged or repeated exposure.
Aquatic Chronic 3	H412 Harmful to aquatic life with long lasting effects.

· **2.2 Label elements**
· **Labelling according to Regulation (EC) No 1272/2008**
The product is classified and labelled according to the CLP regulation.
· **Hazard pictograms**

GHS05 GHS07 GHS08

· **Signal word** Danger

· **Hazard-determining components of labelling:**
tin sulphate
· **Hazard statements**
H332 Harmful if inhaled.
H315 Causes skin irritation.
H318 Causes serious eye damage.
H317 May cause an allergic skin reaction.
H335 May cause respiratory irritation.
H373 May cause damage to organs through prolonged or repeated exposure.
H412 Harmful to aquatic life with long lasting effects.

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· **Precautionary statements**

P260	Do not breathe dust/fume/gas/mist/vapours/spray.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310	Immediately call a POISON CENTER/doctor.
P321	Specific treatment (see on this label).
P405	Store locked up.
P501	Dispose of contents/container in accordance with local/regional/national/international regulations.

· **2.3 Other hazards**
· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.

*

SECTION 3: Composition/information on ingredients

· **3.2 Chemical characterisation: Mixtures**
· **Description:** Mixture of substances listed below with nonhazardous additions.

· **Dangerous components:**

CAS: 7488-55-3 EINECS: 231-302-2 Reg.nr.: 01-2119560591-39	tin sulphate STOT RE 2, H373; Eye Dam. 1, H318; Acute Tox. 4, H332; Skin Irrit. 2, H315; Skin Sens. 1, H317; STOT SE 3, H335; Aquatic Chronic 3, H412	70-100%

· **Additional information:** For the wording of the listed hazard phrases refer to section 16.

SECTION 4: First aid measures

· **4.1 Description of first aid measures**
· **General information:**
PERSONAL PROTECTION FOR THE FIRST AIDER.
Immediately remove any clothing soiled by the product.
Symptoms of poisoning may even occur after several hours; therefore medical observation for at least 48 hours after the accident.
· **After inhalation:**
In case of unconsciousness place patient stably in side position for transportation.
Supply fresh air and to be sure call for a doctor.
· **After skin contact:**
Immediately rinse with water.
If skin irritation continues, consult a doctor.
· **After eye contact:**
Rinse opened eye for several minutes under running water. Then consult a doctor.
If present remove the contact lenses immediately.
· **After swallowing:** Seek medical treatment.
· **4.2 Most important symptoms and effects, both acute and delayed** No further relevant information available.
· **4.3 Indication of any immediate medical attention and special treatment needed**
No further relevant information available.

SECTION 5: Firefighting measures

· **5.1 Extinguishing media**
· **Suitable extinguishing agents:** Use fire extinguishing methods suitable to surrounding conditions.
· **5.2 Special hazards arising from the substance or mixture**
During heating or in case of fire poisonous gases are produced.
Tin oxide
Carbon monoxide (CO)

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Sulphur dioxide (SO_2)
· **5.3 Advice for firefighters**
· **Protective equipment:**
Wear self-contained respiratory protective device.
Do not inhale explosion gases or combustion gases.
· **Additional information**
Collect contaminated fire fighting water separately. It must not enter the sewage system.

SECTION 6: Accidental release measures

· **6.1 Personal precautions, protective equipment and emergency procedures** Not required.
· **6.2 Environmental precautions:**
Inform respective authorities in case of seepage into water course or sewage system.
Do not allow to enter sewers/ surface or ground water.
· **6.3 Methods and material for containment and cleaning up:**
Dispose contaminated material as waste according to item 13.
Ensure adequate ventilation.
· **6.4 Reference to other sections**
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

SECTION 7: Handling and storage

· **7.1 Precautions for safe handling**
Ensure good ventilation/exhaustion at the workplace.
Thorough dedusting.
Prevent formation of dust.
· **Information about fire - and explosion protection:** No special measures required.

· **7.2 Conditions for safe storage, including any incompatibilities**
· **Storage:**
· **Requirements to be met by storerooms and receptacles:** Store only in the original receptacle.
· **Information about storage in one common storage facility:** Store away from foodstuffs.
· **Further information about storage conditions:**
Protect from frost.
Keep container tightly sealed.
Protect from heat and direct sunlight.
· **Maximum storage temperature:** 40 °C
· **Minimum storage temperature:** 5 °C
· **Storage class:** 13
· **7.3 Specific end use(s)** No further relevant information available.

*

SECTION 8: Exposure controls/personal protection

· **Additional information about design of technical facilities:** No further data; see item 7.

· **8.1 Control parameters**

· **Ingredients with limit values that require monitoring at the workplace:**	
7488-55-3 tin sulphate	
WEL	Short-term value: 4 mg/m³ Long-term value: 2 mg/m³ as Sn

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· **DNELs**		
7488-55-3 tin sulphate		
Dermal	*exposure long term - systemic effects*	*0.39 mg/kg bw/day (worker)*
	exposure short term - systemic effects	*0.78 mg/kg bw/day (worker)*
Inhalative	*exposure long term - systemic effects*	*1.375 mg/m³ (worker)*
	exposure long term - local effects	*14.51 mg/m³ (worker)*
	exposure short term - systemic effects	*2.75 mg/m³ (worker)*
	exposure short term - local effects	*14.51 mg/m³ (worker)*

· **PNECs**	
7488-55-3 tin sulphate	
PNEC	*12 µg/l (sewage treatment plant)*
	5 µg/l (sporadic emission)
PNEC	*0.9 mg/l (fresh water)*
PNEC	*58 mg/kg (sediment fresh water)*

· ***Additional information:*** *The lists valid during the making were used as basis.*

· ***8.2 Exposure controls***
· ***Personal protective equipment:***
· ***General protective and hygienic measures:***
Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing
Wash hands before breaks and at the end of work.
Avoid contact with the skin.
Avoid contact with the eyes and skin.
· ***Respiratory protection:*** *Filter P1*
· ***Protection of hands:***

Protective gloves

Check the permeability prior to each renewed use of the glove.
The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation
· ***Material of gloves***
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.
Chemical-protective gloves (EN 374-1, -2, -3).
Butyl rubber, BR ≥ 0,3 mm (Level 6)
· ***Penetration time of glove material***
≥ 8 h
The exact break trough time has to be found out by the manufacturer of the protective gloves and has to be observed.
· ***For the permanent contact in work areas without heightened risk of injury (e.g. Laboratory) gloves made of the following material are suitable:***
Butyl rubber, BR ≥ 0,3 mm (Level 6)
· ***For the permanent contact gloves made of the following materials are suitable:***
Nitrile rubber, NBR
Fluorocarbon rubber (Viton)
PVC gloves
Butyl rubber, BR ≥ 0,3 mm (Level 6)

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· **Not suitable are gloves made of the following materials:**
Leather gloves
Strong material gloves
· **Eye protection:**

Tightly sealed goggles

Ensure the eyewash stations and safety showers are close to the workplace.

SECTION 9: Physical and chemical properties

· **9.1 Information on basic physical and chemical properties**	
· **General Information**	
· **Appearance:**	
Form:	Powder
Colour:	white to light yellow
· **Odour:**	Odourless
· **Odour threshold:**	Not determined.
· **pH-value at 20°C:**	-
· **Change in condition**	
Melting point/freezing point:	not determined
Initial boiling point and boiling range:	not determined
· **Flash point:**	Not applicable.
· **Flammability (solid, gas):**	Not determined.
· **Ignition temperature:**	
Decomposition temperature:	Not determined.
· **Auto-ignition temperature:**	Product is not selfigniting.
· **Explosive properties:**	Product does not present an explosion hazard.
· **Explosion limits:**	
Lower:	Not determined.
Upper:	Not determined.
· **Vapour pressure:**	Not applicable.
· **Density:**	DIN 53217-5 Determination of density - vibration method
· **Relative density**	Not determined.
· **Vapour density**	Not applicable.
· **Evaporation rate**	Not applicable.
· **Solubility in / Miscibility with water:**	Soluble.
· **Partition coefficient: n-octanol/water:**	Not determined.
· **Viscosity:**	
Dynamic:	Not applicable.
Kinematic:	Not applicable.
· **Solvent content:**	
VOC (EU)	0.00 %
· **9.2 Other information**	No further relevant information available.

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· Additional information	The physical data in section 9 correspond to typical values for this product and can not be seen as a product specification.

SECTION 10: Stability and reactivity

· **10.1 Reactivity** No further relevant information available.
· **10.2 Chemical stability**
· **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
· **10.3 Possibility of hazardous reactions** No dangerous reactions known.
· **10.4 Conditions to avoid** No further relevant information available.
· **10.5 Incompatible materials:** No further relevant information available.
· **10.6 Hazardous decomposition products:**
Sulphur dioxide
Hydrogen sulphide
Sulphur trioxide (SO3) or SO3-mist

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SECTION 11: Toxicological information

· **11.1 Information on toxicological effects**
· **Acute toxicity**
Harmful if inhaled.

· LD/LC50 values relevant for classification:		
7488-55-3 tin sulphate		
Oral	LD50	2,207 mg/kg (rat) (OECD 401)

· **Primary irritant effect:**
· **Skin corrosion/irritation**
Causes skin irritation.
· **Serious eye damage/irritation**
Causes serious eye damage.
· **Respiratory or skin sensitisation**
May cause an allergic skin reaction.
· **CMR effects (carcinogenity, mutagenicity and toxicity for reproduction)**
· **Germ cell mutagenicity** Based on available data, the classification criteria are not met.
· **Carcinogenicity** Based on available data, the classification criteria are not met.
· **Reproductive toxicity** Based on available data, the classification criteria are not met.
· **STOT-single exposure**
May cause respiratory irritation.
· **STOT-repeated exposure**
May cause damage to organs through prolonged or repeated exposure.
· **Aspiration hazard** Based on available data, the classification criteria are not met.

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SECTION 12: Ecological information

· **12.1 Toxicity**

· Aquatic toxicity:	
7488-55-3 tin sulphate	
LC50/48h (static)	55 mg/l (daphnia magna - water flea) (OECD 202)
EC50/72h	0.2 mg/l (skeletonema costatum - diatom) (Fremd-Sicherheitsdatenblatt)

· **12.2 Persistence and degradability** No further relevant information available.
· **12.3 Bioaccumulative potential** No further relevant information available.
· **12.4 Mobility in soil** No further relevant information available.

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· **Ecotoxical effects:**
· **Remark:** Harmful to fish
· **Additional ecological information:**
· **General notes:**
The classification into the water hazard class resulted according to the administrative regulation water-polluting substances (VwVwS) dated 17.05.1999.
Water hazard class 2 (German Regulation) (Self-assessment): hazardous for water
The product does not contain AOX.
The product does not contain VOC.
The product does not contain EDTA
Do not allow product to reach ground water, water course or sewage system.
Danger to drinking water if even small quantities leak into the ground.
Harmful to aquatic organisms
The product does not contain organic complexing agents.
· **12.5 Results of PBT and vPvB assessment**
According to Annex XIV of Regulation (EC) No. 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH): The product does not contain a substance fullfilling the PBT (persistent/bioaccumulative/toxic) criteria or the vPvB (very persistent/very bioaccumulative) criteria: Self classification.
· **PBT:** Not applicable.
· **vPvB:** Not applicable.
· **12.6 Other adverse effects** No further relevant information available.

SECTION 13: Disposal considerations

· **13.1 Waste treatment methods**
· **Recommendation**
Must not be disposed together with household garbage. Do not allow product to reach sewage system.
Contact manufacturer for recycling information.

· **European waste catalogue**	
06 03 13*	solid salts and solutions containing heavy metals

· **Uncleaned packaging:**
· **Recommendation:** Disposal must be made according to official regulations.
· **Recommended cleansing agents:** Water, if necessary together with cleansing agents.

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SECTION 14: Transport information

· **14.1 UN-Number** · **ADR, ADN, IMDG, IATA**	Void
· **14.2 UN proper shipping name** · **ADR, ADN, IMDG, IATA**	Void
· **14.3 Transport hazard class(es)** · **ADR, ADN, IMDG, IATA** · **Class**	Void
· **14.4 Packing group** · **ADR, IMDG, IATA**	Void
· **14.5 Environmental hazards:**	Product contains environmentally hazardous substances: tin sulphate
· **Marine pollutant:**	Yes
· **14.6 Special precautions for user**	Not applicable.

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· Stowage Category	A
· 14.7 Transport in bulk according to Annex II of Marpol and the IBC Code	Not applicable.
· Transport/Additional information:	Not dangerous according to the above specifications.
· UN "Model Regulation":	Void

SECTION 15: Regulatory information

· **15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**

· **Directive 2012/18/EU - SEVESO III**
· **Named dangerous substances - ANNEX I** None of the ingredients is listed.

· **National regulations:**

· **Waterhazard class:** Water hazard class 2 (Self-assessment): hazardous for water.
· **15.2 Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

SECTION 16: Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

Safety Data Sheet to the regulation 1907/2006/EG, article 31
Material Safety Data Sheets are to be kept for at least 10 years according to Article 36 of REACH Regulation (EC) No 1907/2006.

· **Relevant phrases**
H315 Causes skin irritation.
H317 May cause an allergic skin reaction.
H318 Causes serious eye damage.
H332 Harmful if inhaled.
H335 May cause respiratory irritation.
H373 May cause damage to organs through prolonged or repeated exposure.
H412 Harmful to aquatic life with long lasting effects.

· **Department issuing SDS:**
Research and Development
E-Mail: fue@schloetter.de
· **Contact:** sds@schloetter.de
· **Abbreviations and acronyms:**
RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
ICAO: International Civil Aviation Organisation
RRN: REACH Registration Number
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
IATA: International Air Transport Association
GHS: Globally Harmonised System of Classification and Labelling of Chemicals
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
VOC: Volatile Organic Compounds (USA, EU)
DNEL: Derived No-Effect Level (REACH)
PNEC: Predicted No-Effect Concentration (REACH)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
PBT: Persistent, Bioaccumulative and Toxic
vPvB: very Persistent and very Bioaccumulative

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Acute Tox. 4: Acute toxicity – Category 4
Skin Irrit. 2: Skin corrosion/irritation – Category 2
Eye Dam. 1: Serious eye damage/eye irritation – Category 1
Skin Sens. 1: Skin sensitisation – Category 1
STOT SE 3: Specific target organ toxicity (single exposure) – Category 3
STOT RE 2: Specific target organ toxicity (repeated exposure) – Category 2
Aquatic Chronic 3: Hazardous to the aquatic environment - long-term aquatic hazard – Category 3
· **** Data compared to the previous version altered.***

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SECTION 1: Identification of the substance/mixture and of the company/undertaking

· **1.1 Product identifier**

· **Trade name: Antitarnish Concentrate ALS 31**

· **Article number:** 120031
· **1.2 Relevant identified uses of the substance or mixture and uses advised against**
No further relevant information available.
· **Application of the substance / the mixture** Electroplating auxiliary
· **1.3 Details of the supplier of the safety data sheet**
· **Manufacturer/Supplier:**
Dr.-Ing. Max Schlötter GmbH & Co. KG
Galvanotechnik
Talgraben 30
73312 Geislingen/Steige
Germany
· **Further information obtainable from:** E-Mail: sds@schloetter.de
· **1.4 Emergency telephone number:**
University of Freiburg
Poisoning-Information-Center
+49(0)761-19240 (24h, 365 days/year)
Information in German and English
http://www.giftberatung.de/

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SECTION 2: Hazards identification

· **2.1 Classification of the substance or mixture**
· **Classification according to Regulation (EC) No 1272/2008**
Skin Corr. 1B H314 Causes severe skin burns and eye damage.
Eye Dam. 1 H318 Causes serious eye damage.

· **2.2 Label elements**
· **Labelling according to Regulation (EC) No 1272/2008**
The product is classified and labelled according to the CLP regulation.
· **Hazard pictograms**

GHS05

· **Signal word** Danger

· **Hazard-determining components of labelling:**
phosphoric acid
· **Hazard statements**
H314 Causes severe skin burns and eye damage.
· **Precautionary statements**
P260 Do not breathe dusts or mists.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P303+P361+P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310 Immediately call a POISON CENTER/doctor.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.
· **2.3 Other hazards**
· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.

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Trade name: Antitarnish Concentrate ALS 31

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· **vPvB:** Not applicable.

SECTION 3: Composition/information on ingredients

· **3.2 Chemical characterisation: Mixtures**
· **Description:** Mixture of substances listed below with nonhazardous additions.

· **Dangerous components:**

CAS: 7664-38-2 EINECS: 231-633-2 Index number: 015-011-00-6 Reg.nr.: 01-2119485924-24	phosphoric acid	Met. Corr.1, H290; Skin Corr. 1B, H314	25-<50%

· **Additional information:** For the wording of the listed hazard phrases refer to section 16.

SECTION 4: First aid measures

· **4.1 Description of first aid measures**
· **General information:**
PERSONAL PROTECTION FOR THE FIRST AIDER.
Immediately remove any clothing soiled by the product.
· **After inhalation:**
Take affected persons into fresh air and keep quiet.
In case of unconsciousness place patient stably in side position for transportation.
Call a doctor immediately.
· **After skin contact:**
Immediately rinse with water.
If skin irritation continues, consult a doctor.
· **After eye contact:**
Rinse opened eye for several minutes under running water. Then consult a doctor.
If present remove the contact lenses immediately.
· **After swallowing:** Drink plenty of water and provide fresh air. Call for a doctor immediately.
· **4.2 Most important symptoms and effects, both acute and delayed** No further relevant information available.
· **4.3 Indication of any immediate medical attention and special treatment needed**
No further relevant information available.

SECTION 5: Firefighting measures

· **5.1 Extinguishing media**
· **Suitable extinguishing agents:** Use fire extinguishing methods suitable to surrounding conditions.
· **5.2 Special hazards arising from the substance or mixture**
During heating or in case of fire poisonous gases are produced.
Carbon monoxide (CO)
Phosphorus oxides
· **5.3 Advice for firefighters**
· **Protective equipment:** Do not inhale explosion gases or combustion gases.
· **Additional information**
Collect contaminated fire fighting water separately. It must not enter the sewage system.

SECTION 6: Accidental release measures

· **6.1 Personal precautions, protective equipment and emergency procedures**
Wear protective equipment. Keep unprotected persons away.
· **6.2 Environmental precautions:**
Dilute with plenty of water.
Do not allow to enter sewers/ surface or ground water.

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· **6.3 Methods and material for containment and cleaning up:**
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
Use neutralising agent.
Dispose contaminated material as waste according to item 13.
Ensure adequate ventilation.
· **6.4 Reference to other sections**
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

SECTION 7: Handling and storage

· **7.1 Precautions for safe handling**
Keep receptacles tightly sealed.
Ensure good ventilation/exhaustion at the workplace.
Prevent formation of aerosols.
· **Information about fire - and explosion protection:** No special measures required.

· **7.2 Conditions for safe storage, including any incompatibilities**
· **Storage:**
· **Requirements to be met by storerooms and receptacles:** Store only in the original receptacle.
· **Information about storage in one common storage facility:** Store away from foodstuffs.
· **Further information about storage conditions:**
Protect from frost.
Keep container tightly sealed.
Protect from heat and direct sunlight.
· **Maximum storage temperature:** 40 °C
· **Minimum storage temperature:** 5 °C
· **Storage class:** 8 B
· **7.3 Specific end use(s)** No further relevant information available.

SECTION 8: Exposure controls/personal protection

· **Additional information about design of technical facilities:** No further data; see item 7.

· **8.1 Control parameters**

· **Ingredients with limit values that require monitoring at the workplace:**	
7664-38-2 phosphoric acid	
WEL	Short-term value: 2 mg/m³ Long-term value: 1 mg/m³

· **DNELs**		
7664-38-2 phosphoric acid		
Inhalative	exposure long term - local effects	1 mg/m³ (worker)
	exposure short term - systemic effects	2 mg/m³ (worker)

· **Additional information:** The lists valid during the making were used as basis.

· **8.2 Exposure controls**
· **Personal protective equipment:**
· **General protective and hygienic measures:**
Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing
Wash hands before breaks and at the end of work.
Do not inhale gases / fumes / aerosols.
Avoid contact with the eyes and skin.

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· ***Respiratory protection:***
Respiratory protection if vapours/aerosols are liberate. Particle filter with middle retention for solid and liquid particle (e.g. EN 143 or 149, Type P2 or FFP2).
For example: Composite filter type ABEK, company MSA-Auer by short or minimized exposure.
· ***Protection of hands:***

Protective gloves

Check the permeability prior to each anewed use of the glove.
The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation
· ***Material of gloves***
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.
Chemical-protective gloves (EN 374-1, -2, -3).
Butyl rubber, BR ≥ 0,3 mm (Level 6)
· ***Penetration time of glove material***
≥ 8 h
The exact break trough time has to be found out by the manufacturer of the protective gloves and has to be observed.
· ***For the permanent contact in work areas without heightened risk of injury (e.g. Laboratory) gloves made of the following material are suitable:***
Butyl rubber, BR ≥ 0,3 mm (Level 6)
· ***For the permanent contact gloves made of the following materials are suitable:***
Butyl rubber, BR ≥ 0,3 mm (Level 6)
· ***Not suitable are gloves made of the following materials:***
Leather gloves
Strong material gloves
· ***Eye protection:***

Tightly sealed goggles

Ensure the eyewash stations and safety showers are close to the workplace.

SECTION 9: Physical and chemical properties

· ***9.1 Information on basic physical and chemical properties***
· ***General Information***
· ***Appearance:***

Form:	*Fluid*
Colour:	*colorless to yellow*
· ***Odour:***	*Odourless*
· ***Odour threshold:***	*Not determined.*
· ***pH-value at 20°C:***	*<2* *DIN 19261 Measuring methods with potentiometric cells*
· ***Change in condition***	
Melting point/freezing point:	*not determined*
Initial boiling point and boiling range:	*100°C*

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· **Flash point:**	Not applicable.
· **Flammability (solid, gas):**	Not applicable.
· **Ignition temperature:**	
Decomposition temperature:	Not determined.
· **Auto-ignition temperature:**	Product is not selfigniting.
· **Explosive properties:**	Product does not present an explosion hazard.
· **Explosion limits:**	
Lower:	Not determined.
Upper:	Not determined.
· **Vapour pressure at 20°C:**	23 hPa
· **Density at 20°C:**	1.16 g/cm³ DIN 53217-5 Determination of density - vibration method
· **Relative density**	Not determined.
· **Vapour density**	Not determined.
· **Evaporation rate**	Not determined.
· **Solubility in / Miscibility with water:**	Fully miscible.
· **Partition coefficient: n-octanol/water:**	Not determined.
· **Viscosity:**	
Dynamic:	Not determined.
Kinematic:	Not determined.
· **Solvent content:**	
Water:	65.0 %
VOC (EU)	0.00 %
· **9.2 Other information**	No further relevant information available.
· **Additional information**	The physical data in section 9 correspond to typical values for this product and can not be seen as a product specification.

SECTION 10: Stability and reactivity

· **10.1 Reactivity** No further relevant information available.
· **10.2 Chemical stability**
· **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
· **10.3 Possibility of hazardous reactions** No dangerous reactions known.
· **10.4 Conditions to avoid** No further relevant information available.
· **10.5 Incompatible materials:** No further relevant information available.
· **10.6 Hazardous decomposition products:** No dangerous decomposition products known.

SECTION 11: Toxicological information

· **11.1 Information on toxicological effects**
· **Acute toxicity** Based on available data, the classification criteria are not met.

· **LD/LC50 values relevant for classification:**		
7664-38-2 phosphoric acid		
Oral	LD50	2,600 mg/kg (rat) (OECD 423)
Dermal	LD50	2,740 mg/kg (rabbit) (Gestis)

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· ***Primary irritant effect:***
· ***Skin corrosion/irritation***
Causes severe skin burns and eye damage.
· ***Serious eye damage/irritation***
Causes serious eye damage.
· ***Respiratory or skin sensitisation*** *Based on available data, the classification criteria are not met.*
· ***CMR effects (carcinogenity, mutagenicity and toxicity for reproduction)***
· ***Germ cell mutagenicity*** *Based on available data, the classification criteria are not met.*
· ***Carcinogenicity*** *Based on available data, the classification criteria are not met.*
· ***Reproductive toxicity*** *Based on available data, the classification criteria are not met.*
· ***STOT-single exposure*** *Based on available data, the classification criteria are not met.*
· ***STOT-repeated exposure*** *Based on available data, the classification criteria are not met.*
· ***Aspiration hazard*** *Based on available data, the classification criteria are not met.*

SECTION 12: Ecological information

· ***12.1 Toxicity***

· ***Aquatic toxicity:***	
7664-38-2 phosphoric acid	
LC50/96h	*138 mg/l (gambusia affinis - mosquitofish) (external MSDS)*
EC50/48h (static)	*>100 mg/l (daphnia magna - water flea) (OECD 202)*
EC50/72h	*>100 mg/l (desmodesmus subspicatus - green algae) (OECD 201)*

· ***12.2 Persistence and degradability*** *No further relevant information available.*
· ***12.3 Bioaccumulative potential*** *No further relevant information available.*
· ***12.4 Mobility in soil*** *No further relevant information available.*
· ***Additional ecological information:***
· ***General notes:***
The classification into the water hazard class resulted according to the administrative regulation water-polluting substances (VwVwS) dated 17.05.1999.
Water hazard class 1 (German Regulation) (Self-assessment): slightly hazardous for water
The product does not contain VOC.
The product does not contain AOX.
The product does not contain EDTA
Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
Must not reach sewage water or drainage ditch undiluted or unneutralised.
The product does not contain organic complexing agents.
· ***12.5 Results of PBT and vPvB assessment***
According to Annex XIV of Regulation (EC) No. 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH): The product does not contain a substance fullfilling the PBT (persistent/bioaccumulative/toxic) criteria or the vPvB (very persistent/very bioaccumulative) criteria: Self classification.
· ***PBT:*** *Not applicable.*
· ***vPvB:*** *Not applicable.*
· ***12.6 Other adverse effects*** *No further relevant information available.*

SECTION 13: Disposal considerations

· ***13.1 Waste treatment methods***
· ***Recommendation***
Must not be disposed together with household garbage. Do not allow product to reach sewage system.
Contact manufacturer for recycling information.

· ***European waste catalogue***	
*06 01 04**	*phosphoric and phosphorous acid*

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Safety data sheet
according to 1907/2006/EC, Article 31

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· **Uncleaned packaging:**
· **Recommendation:** Disposal must be made according to official regulations.
· **Recommended cleansing agents:** Water, if necessary together with cleansing agents.

SECTION 14: Transport information

· **14.1 UN-Number**	
· **ADR, IMDG, IATA**	UN1805
· **14.2 UN proper shipping name**	
· **ADR**	1805 PHOSPHORIC ACID, SOLUTION
· **IMDG, IATA**	PHOSPHORIC ACID, SOLUTION
· **14.3 Transport hazard class(es)**	
· **ADR, IMDG, IATA**	

· **Class**	8 Corrosive substances.
· **Label**	8
· **14.4 Packing group**	
· **ADR, IMDG, IATA**	III
· **14.5 Environmental hazards:**	
· **Marine pollutant:**	No
· **14.6 Special precautions for user**	Warning: Corrosive substances.
· **Danger code (Kemler):**	80
· **EMS Number:**	F-A,S-B
· **Segregation groups**	Acids
· **Stowage Category**	A
· **14.7 Transport in bulk according to Annex II of Marpol and the IBC Code**	Not applicable.
· **Transport/Additional information:**	
· **ADR**	
· **Limited quantities (LQ)**	5L
· **Excepted quantities (EQ)**	Code: E1 Maximum net quantity per inner packaging: 30 ml Maximum net quantity per outer packaging: 1000 ml
· **Transport category**	3
· **Tunnel restriction code**	E
· **IMDG**	
· **Limited quantities (LQ)**	5L
· **Excepted quantities (EQ)**	Code: E1 Maximum net quantity per inner packaging: 30 ml Maximum net quantity per outer packaging: 1000 ml
· **UN "Model Regulation":**	UN 1805 PHOSPHORIC ACID, SOLUTION, 8, III

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SECTION 15: Regulatory information

· **15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**

· **Directive 2012/18/EU - SEVESO III**
· **Named dangerous substances - ANNEX I** None of the ingredients is listed.
· **REGULATION (EC) No 1907/2006 ANNEX XVII** Conditions of restriction: 3

· **National regulations:**

· **Waterhazard class:** Water hazard class 1 (Self-assessment): slightly hazardous for water.
· **15.2 Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

SECTION 16: Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

Safety Data Sheet to the regulation 1907/2006/EG, article 31.
Material Safety Data Sheets are to be kept for at least 10 years, according to Article 36 of REACH Regulation (EC) No 1907/2006.

· **Relevant phrases**
H290 May be corrosive to metals.
H314 Causes severe skin burns and eye damage.

· **Department issuing SDS:**
Research and Development
E-Mail: fue@schloetter.de
· **Contact:** sds@schloetter.de
· **Abbreviations and acronyms:**
RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
ICAO: International Civil Aviation Organisation
RRN: REACH Registration Number
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
IATA: International Air Transport Association
GHS: Globally Harmonised System of Classification and Labelling of Chemicals
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
VOC: Volatile Organic Compounds (USA, EU)
DNEL: Derived No-Effect Level (REACH)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
PBT: Persistent, Bioaccumulative and Toxic
vPvB: very Persistent and very Bioaccumulative
Met. Corr.1: Corrosive to metals – Category 1
Skin Corr. 1B: Skin corrosion/irritation – Category 1B
Eye Dam. 1: Serious eye damage/eye irritation – Category 1
· ***** Data compared to the previous version altered.**

Antitarnish
ALS 30

Antitarnish ALS 30 is an acid based process (pH value approx. 1 - 2) for post-treatment of tin or tin-lead plated components. A liquid concentrate is used for make-up.

Antitarnish ALS 30 is non-foaming and can be used for rack-, barrel-, and reel-to-reel application.

The treatment of bright tin- or tin alloy layers in Antitarnish ALS 30 prevents discolouration during heat treatment > 200 °C and therefore improves the long term solderability.

Antitarnish ALS 30 is AOX-free.

The information in this data sheet is based on laboratory as well as practical experience. Figures quoted for operating limits and replenishment quantities are for guidance only. Actual values necessary will depend on the components being plated (material and geometry), their application and plating plant conditions.

Important :
Please read this instruction carefully prior to the use of the process and carefully follow all the parameters that have a direct influence on the operation. We reserve the right to make technical changes. In the interest of safety, please pay attention to the hazard warnings on the labels of the containers. The minimum shelf life of the products is included on the labels and is also available in the appropriate Quality Assurance (QA03).
The current IMDS number of the layer deposited from the process is available on the internet at www.schloetter.com/downloads.
For the storage of chemical products the HSG71 is suggested as guidance.
If the additives used in this process contain a SVHC-substance, then this will be specified in the corresponding Material Safety Data sheet, section 15.

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1.0 TECHNICAL INFORMATION AND EQUIPMENT REQUIREMENTS

Tanks:	rubber-lined steel, stainless steel
Local Exhaust Ventilation:	required
Part-/Electrolyte Agitation:	stirring device
Heating/Cooling:	heating made of stainless steel and controlled by thermostat

2.0 MAKE-UP AND OPERATING CONDITIONS

2.1 Product names

List of products required		
Product names	**Article no. (AN)**	**SG**
Antitarnish Concentrate ALS 31	120031	1.16

2.2 Requirements for a 100 litre bath

Product name	AN	SG	Quantity	Optimum	
Antitarnish Concentrate ALS 31	120031	1.16	7.5 - 15	10	ltr.

2.3 Make-up sequence for a 100 litre bath

New, but also unused tanks, filtration equipment etc. or tanks and equipment must be thoroughly cleaned prior to use.

- fill 70 litres of deionised water into the tank
- add 10 litres of Antitarnish Concentrate ALS 31
- make up to final volume with deionised water
- mix thoroughly

When the operating temperature is reached the antitarnish is ready for use.

NB
The water quality is very important for an optimum way of operating Antitarnish ALS 30. We recommend the use of deionised water since tap water from a hardness degree of 6 °dH may lead to a precipitation of Antitarnish ALS 30 components.

2.4 Concentrations and operating ranges

	Range	Optimum	
Antitarnish Concentrate ALS 31	75 - 150	100	ml/l
Treatment time	> 5	30	sec.
Temperature range	20 - 60	30	°C
pH value (at 20 °C)	1.0 - 2.0	--	

raise ↑ pH value: shouldn't be necessary
decrease ↓ pH value: with Antitarnish Concentrate ALS 31

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2.5 Consumption

Consumption of the additives is mainly due to drag-out.

3.0 PROCESS SEQUENCE

Our service department or technical field service would be pleased to provide you information on suitable process sequences respectively methods.

3.1 Process sequence

- plating with tin or tin-lead
- rinsing
- Antitarnish ALS 30
- rinsing
- drying

4.0 MAINTENANCE AND FUNCTION OF THE INDIVIDUAL BATH COMPONENTS

4.1 Antitarnish Concentrate ALS 31

Antitarnish Concentrate ALS 31 contains all the necessary components required for the operation of the degreaser.

The Antitarnish Concentrate ALS 31 may be determined by alkalimetric titration and replenished according to analysis results. We're pleased to provide you with suitable analysis description upon request.

4.2 pH value

The pH should be measured at regular intervals at a temperature of 20 °C. The optimum pH value is between 1.0 and 2.0.

5.0 TROUBLE SHOOTING

No information available at present.

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6.0 EFFLUENT

Legal regulations must be observed for disposal of the Antitarnish ALS 30. Different regulations normally apply for the additives and the ready-made electrolyte. Please refer to section **13** of the appropriate Material Safety Data Sheet for disposal code and recommendations.

The following detoxification sequence is only considered to be an aid:

Antitarnish ALS 30 doesn't contain complexing agents so a simple neutralisation for the treatment of resulting rinse waters is sufficient.

7.0 SAFETY

Reasonable care is required when handling Schlötter chemical products. Only personnel specially trained on working with chemicals should be deployed with their handling.

EC Material Safety Data Sheets must be made available to all personnel dealing with the chemicals to ensure they have all required information about product composition, hazards identification, first-aid measures, handling and storage, exposure controls, toxicological and ecological information, etc. It is required to ensure the supply and use of suitable protective clothing and -equipment.

The user must verify the designated purpose of the electrolyte. Previous experience has shown that not all metal surfaces are suitable for a trouble-free electroplating.

The above mentioned data are made according to our best knowledge. Consistent operation of the working solution requires appropriate maintenance. Antitarnish ALS 30 is a process of Dr.-Ing. Max Schlötter GmbH & Co KG. It can only be operated with the products described in this technical data sheet. Use of other chemicals (also partly) will impair quality and invalidates our service- and quality commitments (quality assurance).

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