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Office of Climate, Licensing & Resource Use

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05 Jan 2018

IPC Reg. No: PO465-02

Johnstown Castle Estate

Re:Request for Information according to Reg. 10(2)(b)(ii) of EPA(IPC) (Licensing) Regulations 2013 - Emissions Assessment A2-1 – A2-4 Rubber Fume, A2-5 Gleitmo Fume

Dear Mr. Clabby,

PO Box 3000

County Wexford

I am enclosing the requested information on Emissions Assessment for all emissions to atmosphere on site. In addition, enclosed also are the emissions Tables E.1(ii)(iii) for existing emission points A2-1 – A2-4 Rubber Fume and for the proposed emission point A2-5 Gleitmo Coating Fume. The surveys and assessment was carried out by TMS Environment Ltd on our behalf. I have also included updated data on energy usage and site activities since the original appplication was submitted in 2014.

We declare that the content of the electronic files on the accompanying CD-ROM is a true copy of the original form.

Please find enclosed the following documents for review:

- 1 signed original, 1 copy
- Requested Information
- Attachments appendices supporting air emission assessments
- 2 electronic copies of all files on CD-ROM

Yours sincerely,

Anna Garvey

Environmental Manager

G. Bruss GmbH DICHTUNGSTECHNIK

Finisklin Road,

Sligo

Tel: 003537191564342 Fax: 00353719169352

Email: annagarvey@bruss.ie

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ASSESSMENT OF EMISSIONS TO ATMOSPHERE

For

G BRUSS GMBH Finisklin Road, Sligo

Licence Reg. P0465-01

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Report Ref 23888-2 20 December 2017

1.0 Introduction and Scope

This report presents an assessment of emissions to atmosphere in response to a request for information from the EPA dated 29th June 2016. The request for information included the following information relevant to this report:

- (i) Carry out monitoring and analysis of emissions to atmosphere for relevant substances as listed in the EPA BAT Guidance Note for the Manufacture of Organic Chemicals;
- (ii) Complete Tables E1(i) to E1(ii) for emission points A2-1 to A2-4;
- (iii) Provide an analysis based on conservative modelling to indicate whether there is a possibility of breach of relevant air quality standards for particulates.

This report collates the relevant information gathered to respond to this element of the request for information.

2.0 MATERIALS IN USE

A range of materials is in use at the facility in the relevant production areas. A full list of the materials together with details of the associated emission points is provided in Appendix I. One of those materials listed in Appendix I (Bruss Number 07781, containing lead monoxide) is no longer in use and is therefore not considered further in this assessment. The MSDS Information for each of the materials is presented in Appendix II.

These materials were reviewed and Table 1 presents a summary of the relevant characteristics specifically expressed in terms of the potential substances that could be present in emissions to atmosphere and grouped according to the list of Emission Limit Values that are stated in the BAT Guidance Note for Manufacture of Organic Chemicals. It is clear from the review that the only substances for which Emission Limit Values are specified in the BAT Guidance Note are particulates (expressed as total particulates) and organic substances not specifically classified (expressed as Total Organic Carbon).

3.0 Emissions Monitoring

Monitoring of emissions to atmosphere from emission points A2-01, A2-02, A2-03 and A2-04 was carried out in January 2017; the monitoring report is presented in Appendix III and has been submitted to the Agency. Monitoring was carried our pre- and post abatement. There is no separate emissions point prior to abatement so the pre-abatement monitoring was carried out by switching of the Electrostatic Precipitator; this meant that simultaneous monitoring could not be carried out and some runs had higher post-abatement than pre-abatement results for some parameters. It is also noted that although the analysis of rubber fume was carried out on the sample collected and gravimetrically analysed for total particulate, for some runs the rubber fume result was higher than that recorded for particulate matter. This is most likely due to measurement uncertainty in the analysis method for rubber fume.

The results showed that no Class I or Class II organic substances were detected and therefore all organic substances are classified under the heading Total Organic Carbon (TOC). The most notable feature of all of the TOC results is that extremely low mass emission rates were measured – the highest value recorded in any of the runs after abatement was 0.04kg/hour. The highest result pre-abatement was just 0.2 kg/hour. The ELV specified in the BAT Guidance Note is 50mg/m³ at a mass flow rate of 500g/hour (0.5kg/hour). None of the measurement results, even prior to abatement, exceeded the mass flow threshold at which an ELV would apply. And none of the measurement results exceeded the ELV that would apply if the mass flow threshold had been exceeded.

The total particulate results are compared with the BAT Guidance Note ELV of 20mg/m^3 at a mass flow rate of 200 g/hour (0.2kg/hour). None of the measurement results exceeded the mass flow threshold and therefore an ELV would not apply. The measured mass emission rates were orders of magnitude lower than the mass flow threshold in the BAT Guidance Note. There is no limit that would be specifically applied to rubber fume so the measurement results are compared with the result for total particulate matter. Again all of the measurement results were below the mass flow threshold at which an ELV would apply. This is entirely consistent with expectations considering the nature of the materials and the process.

The data acquired during the surveys was used to complete the Tables E1(i) to E1(II) for the Licence Review Application. In each case, it has been proposed that the maximum emission rate that would arise is less than the mass flow threshold at which an ELV would apply.

4.0 ASSESSMENT OF PARTICULATE EMISSIONS

The Agency requested that an analysis based on conservative modelling to indicate whether there is a possibility of breach of relevant air quality standards for particulates would be provided. As noted above the results of all measurements for particulates were significantly lower than the mass flow rate at which an ELV would apply. This indicates that the rate of the emissions is insignificant.

There is no ambient air quality standard for total particulate matter but there is a standard for fine particulate matter as PM_{10} and there will be an air quality standard in 2020 for $PM_{2.5}$. Even if all of the particulate matter was fine particulate matter as PM_{10} , the level of emission is so low that it is deemed to be insignificant and that there is no potential for breach of the air quality standard. The Agency Guidance in respect to significance of emissions when determining whether a Technical Amendment or a Licence Review would be required considers that emissions that are less than 30% of a relevant mass flow threshold are considered insignificant. The measured emission rate for this application is significantly lower than this assessment threshold and this supports our assessment that the emissions are insignificant.

 Table 1
 Assessment of the potential presence of substances in emissions which would have an Emission Limit Value

Parameter	Presence in any materials in use
Carcinogenic Substances Class I	None of the listed substances are present in any of the materials listed in Appendix I
Carcinogenic Substances Class II	None of the listed substances are present in any of the materials listed in Appendix I
Carcinogenic Substances Class III	None of the listed substances are present in any of the materials listed in Appendix I. Although butadiene rubbers (NBR and HNBR) are in use, 1,3-Butadiene is a gas and none of the free monomer is found in the product.
Organic Substances Class I	None of the listed substances are present in any of the materials listed in Appendix I
Organics Substances Class II	None of the listed substances are present in any of the materials listed in Appendix I
Total Organic Carbon (TOC)	There are a number of waxes and oils present which could contribute to a TOC reading in the emissions.
Mercaptans	Not present in any of the materials listed in Appendix I
Amines	Not present in any of the materials listed in Appendix I
Trimethylamine	Not present in any of the materials listed in Appendix I
Phenols, cresols and xylols	Not present in any of the materials listed in Appendix I
Toluene di-isocyanate	Not present in any of the materials listed in Appendix I
Substances with	Not present in any of the materials listed in Appendix I
Photochemical Ozone Potential (R59)	Follytida
Vaporous or gaseous Inorganic substances Class I	None of the listed substances are present in any of the materials listed in Appendix I
Vaporous or gaseous Inorganic substances Class II	None of the listed substances are present in any of the materials listed in Appendix I
Vaporous or gaseous Inorganic substances Class III	None of the listed substances are present in any of the materials listed in Appendix I
Vaporous or gaseous Inorganic substances Class IV	None of the listed substances are present in any of the materials listed in Appendix I
Inorganic Dust Particles Class I	None of the listed substances are present in any of the materials listed in Appendix I
Inorganic Dust Particles Class II	None of the listed substances are present in any of the materials listed in Appendix I
Inorganic Dust Particles Class III	None of the listed substances are present in any of the materials listed in Appendix I
Total particulates	There could be some particulate matter in the form of rubber fume present in the emissions



Specialists in laboratory analysis, monitoring and environmental consultancy 21

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Anna Garvey G Bruss GmbH Finisklin Road, Sligo

Re: Licence Reg. P0465-01 Assessment of emissions for Emission Point A2-05

3 January 2018

Dear Anna

Emissions to Atmosphere from emission point A2-05 ae projected to occur for no more than 4 hours per day, 100 days per year ie 400 hours per year. This is a very limited period of operation and means that the overall emission rate of any substances from this emission point is low. The assessment of emission was considered for the main substances of potential interest – organic carbon, expressed as TOC, and organic tin (as di butyl tin). The following rationale is presented for assessment of significance of the emissions.

- 1. There was no organic tin detected in any of the emissions surveys (pre or post-abatement) and the data presented in Tables E therefore represents potential maxima for hourly emission rates. The maximum hourly mass emission rate is less than 20% of the BAT ELV and therefore the emission is insignificant and there is no potential for breach of an air quality standard as a result of the emission especially when the very limited operational hours are considered.
- 2. Organic substances expressed as TOC were detected and an upper estimate of 600mg/m³ is considered for the emission which equates to 0.4kg/hour mass emission maximum. Since the process only operates for 400 hours per year, 4 hours per day, the average hourly emission rate per day is 0.067kg/hour and on an annual basis the average hourly emission rate is 0.0046kg/hour. These potential emission rates are significantly lower than the BAT threshold of 0.5 kg/hour. There is no Air Quality Standard for TOC specifically against which to assess the significance of the emissions so any assessment will be made against the annual air quality standard for some substance. Therefore it is reasonable to consider the annual average emission rate when assessing the significance of the emissions. The annual average mass emission rate is less than 1% of the BAT threshold. It is therefore concluded that the emissions are insignificant and that no breach of air quality standards would occur as a result of the emission.

The level of emission is so low that it is deemed to be insignificant and that there is no potential for breach of the air quality standards. The Agency Guidance in respect to significance of emissions when determining whether a Technical Amendment or a Licence Review would be required considers that emissions that are less than 30% of a relevant mass flow threshold are considered insignificant. As noted above, mass emission rates are significantly lower than this assessment threshold and this supports our assessment that the emissions are insignificant. We conclude that dispersion modelling is not required as there is no likelihood of a breach of an air quality standard given the low mass emission rate and infrequent operation hours for this activity.

Yours sincerely

Dr Imelda Shanahan

Imelda Staraham

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TABLE E.1(ii) MAIN EMISSIONS TO ATMOSPHERE (1 Page for each emission point)

Emission Point Ref. Nº: A2-1											
Source of Emission:	urce of Emission: Rubber Tempering Ovens – Rubber Fume Stack										
Location:	Business U	siness Unit 3									
Grid Ref. (12 digit, 6E,6I	N): 168395E,	58395E, 336310N									
Vent Details Diamet	350 mm										
Height above Ground(m): Date of commencement: 9.5 2001 (2014 change roof location < 100m)											
Date of commencement:		4 change roof location < 1	00m) ally other								
Characteristics of Em		, itight	on Purpose required								
Average/day	36000Nm ³ /d	Maximum/day Front					360	000Nm³/d			
Maximum rate/hour	1500Nm³/h	Min efflux velocity						4m.sec ⁻¹			
(ii) Other factors		- Cor									
Temperature	40°C(max)	40 °C(min)					4	40°C(avg)			
For Combustion Sources Volume terms expressed		Dry □ dry.	%O ₂								
iii) Period or perio to be included)		emissions are made, or a	re to be made, in	cluding dail	y or seaso	nal varia	tions (<i>star</i>	rt-up /shuta			
Periods of Emission			60	min/hr	24	hr/day	250	day/yr			

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TABLE E.1(ii) MAIN EMISSIONS TO ATMOSPHERE (1 Page for each emission point)

Emission Point Ref. Nº:	A2-2					
Source of Emission:	Rubber Te	mpering Ovens – Rubber Fu	ıme Stack			
Location:	Business l	Init 2				
Grid Ref. (12 digit, 6E,6	N): 168437E,					
Vent Details Diame	350 mm					
Height above Ground(m): 9.5		,	11 ^{56.}		
Date of commencement			Ently, and other	3.		
(i) Volume to be e		i The S	ection purposes of for air?			
Average/day	36000Nm ³ /d	Maximum/day Constitution	<u> </u>			36000Nm ³ /d
Maximum rate/hour	1500Nm³/h	Min efflux velocity				4m.sec ⁻¹
(ii) Other factors		'	<u> </u>			
Temperature	40°C(max)	20 °C(min)				40°C(avg)
For Combustion Source Volume terms expresse		□ dry	%O ₂			
iii) Period or perio		emissions are made, or a	re to be made, in	cluding daily or	seasonal variat	ions (<i>start-up /shut</i>
Periods of Emission			60	min/hr24	lhr/day	250day/yr

PAGE 9 TABLE E.1(ii) MAIN EMISSIONS TO ATMOSPHERE (1 Page for each emission point)

Emission Point Ref. Nº:	A2-3											
Source of Emission:	Rubber Tempering Ovens – Rubber Fume Stack											
Location:	Business Unit 2											
Grid Ref. (12 digit, 6E,6N):	168463E, 336311N											
Vent Details Diameter:	500mm											
Height above Ground(m):	9.5											
Date of commencement: 2001												
Characteristics of Emission	n:											
(i) Volume to be emitted:	2000Nm3/d Maximum/day 60 50 50 50 50 50 50 50 50 50 50 50 50 50											
Average/day 720	000Nm³/d Maximum/day York 7 72000Nm³/d											
Maximum rate/hour 27	700Nm³/h Min efflux velocity. 4m.sec ⁻¹											
(ii) Other factors												
Temperature 4	0°C(max) 20 °C(min) 20°C(avg)											
For Combustion Sources: Volume terms expressed as :	□ wet. Dry □ dry%O ₂											
(iii) Period or periods dur to be included):	ring which emissions are made, or are to be made, including daily or seasonal variations (start-up /shutdo											
Periods of Emission (avg)	60 min/hr 24 hr/day 250 day/yr											

PAGE 10 TABLE E.1(ii) MAIN EMISSIONS TO ATMOSPHERE (1 Page for each emission point)

Emission Point Ref. Nº:	A2-4											
Source of Emission:	Rubber Tempering Ovens – Rubber Fume Stack											
Location:	Business Unit 1											
Grid Ref. (12 digit, 6E,6N):	168440E, 336341N											
Vent Details Diameter:	250mm											
Height above Ground(m):	9.5											
Date of commencement:	ement: 2001											
Characteristics of Emissio	on:											
(i) Volume to be emitted:	: inspect wine											
Average/day 64	1800Nm ³ /d Maximum/day yoʻq yi ^{gʻ} 64800Nm ³ /d											
Maximum rate/hour 2	2500Nm³/h Min efflux velocity. 7m.sec ⁻¹											
(ii) Other factors												
Temperature	40°C(max) 20 °C(min) 30°C(avg)											
For Combustion Sources: Volume terms expressed as :	□ wet. Dry □ dry. %O ₂											
(iii) Period or periods du to be included):	ring which emissions are made, or are to be made, including daily or seasonal variations (start-up /shutdov											
Periods of Emission (avg)	60 min/hr 24 hr/day 250 day/yr											

PAGE 11 TABLE E.1(ii) MAIN EMISSIONS TO ATMOSPHERE (1 Page for each emission point)

Emission Point Ref. Nº:	Pi	roposed A	2-5										
Source of Emission:	,	Gleitmo' Co	oating Proess – Fume Stac	k									
Location:	В	Business Ur	nit 2										
Grid Ref. (12 digit, 6E,6	N): 10	.68443E, 3	336321N										
Vent Details Diame		00mm											
Height above Ground(r	m): 9	0.5		S.	USO.								
Date of commencement: 2014													
Characteristics of Emission:													
(i) Volume to be er	mitted:		·jūg	Pecker and									
Average/day	2000	ONm³/d	Maximum/day const						5	5000Nm ³ /d			
Maximum rate/hour	1000	ONm³/h	Min efflux velocity							2m.sec ⁻¹			
(ii) Other factors													
Temperature	30°C	C(max)	30 °C(min)							30°C(avg)			
For Combustion Sources Volume terms expresse		□ wet.	Dry □ dry.	%O ₂									
(iii) Period or period to be included		g which e	missions are made, or a	are to be made, inc	ludir	ng daily or s	easona	l variatio	ons (<i>sta</i>	art-up /shutdov			
Periods of Emission (avg)				6	50	min/hr _	2	_hr/day	5(0_day/yr			

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Emission Point Reference Number: A2-1

Parameter		Prior to tr	eatment ⁽¹⁾		Brief	As discharged ⁽¹⁾					
	mg/	′Nm³	kg/h		description	mg,	/Nm³	kg/h.		kg/	year
	Avg	Max	Avg	Max	of treatment	Avg	Max	Avg	Max	Avg	Max
Particulate Total Organic Carbon	5 20			0.2 0.5	Section but poses only any other		3 50	0.0075 0.03	0.375 0.5	45 180	2250 3000

^{1.} Concentrations should be based on Normal conditions of temperature and pressure, (i.e. 0°C,101.3kPa). Wet/dry should be the same as given in Table E.1(ii) unless clearly stated otherwise.

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Emission Point Reference Number: A2-2

Parameter		Prior to tr	eatment ⁽¹⁾	1	Brief	As discharged ⁽¹⁾					
	mg/Nm³		kg/h		description	mg,	/Nm³	kg/h.		kg/	year
	Avg	Max	Avg	Max	of treatment	Avg	Max	Avg	Max	Avg	Max
Particulate Total Organic Carbon				0.2 0.5	aspection purple sequired for any or which to the second sequence of the sequence of the second sequence of the se			0.0075 0.03		45 180	2250 3000

^{1.} Concentrations should be based on Normal conditions of temperature and pressure, (i.e. 0°C,101.3kPa). Wet/dry should be the same as given in Table E.1(ii) unless clearly stated otherwise.

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Emission Point Reference Number:	A2-3
----------------------------------	------

Parameter		Prior to tr	eatment ⁽¹⁾		Brief	As discharged ⁽¹⁾					
	mg/Nm³		kg	ı/h	description	mg,	/Nm³	kg/h.		kg/	year
	Avg	Max	Avg	Max	of treatment	Avg	Max	Avg	Max	Avg	Max
Particulate Total Organic Carbon				0.2 0.5	seedion dinoses only any or					90 360	4500 3000

^{1.} Concentrations should be based on Normal conditions of temperature and pressure, (i.e. 0° C,101.3kPa). Wet/dry should be the same as given in Table E.1(ii) unless clearly stated otherwise.

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Emission Point Reference Number: A2-4

Parameter		Prior to tr	eatment ⁽¹⁾)	Brief	As discharged ⁽¹⁾					
	mg/Nm³		kg	j/h	description	mg,	/Nm³	kg/h.		kg/	year
	Avg	Max	Avg	Max	of treatment	Avg	Max	Avg	Max	Avg	Max
Particulate Total Organic Carbon	5 20		0.0135 0.054	0.2 0.5	Section dinoses only any or strict to what required for any or strict to the strict to	5 20		0.0135 0.054	0.675 0.5	81 324	4050 3000

^{1.} Concentrations should be based on Normal conditions of temperature and pressure, (i.e. 0°C,101.3kPa). Wet/dry should be the same as given in Table E.1(ii) unless clearly stated otherwise.

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TABLE E.1(ii) MAIN EMISSIONS TO ATMOSPHERE (1 Page for each emission point)

Emission Point Ref. Nº:	Proposed A	2-5	
Source of Emission:	'Gleitmo' C	pating Proess – Fume Stack	
Location:	BRUSS Bus	ness Unit 2 Rear Roof Space	
Grid Ref. (12 digit, 6E,6N	N): 168443E,	336321N	
Vent Details Diamet			
Height above Ground(n	n): 9.5		
Date of commencement:	2014		of the.
Characteristics of Em	nission:	Olid.	IN OUT
(i) Volume to be em	nitted:	r Postited *	
Average/day	4000Nm ³ /d	Maximum/day etildi Recitation	24000Nm³/d
Maximum rate/hour	1000Nm³/h	Min efflux velocity	2m.sec ⁻¹
(ii) Other factors		att of con-	
Temperature	30°C(max)	15 °C(സ്ത്രീ)	20 °C(avg)
For Combustion Sources	: :		
Volume terms expressed	d as: □ wet.	\square dry%O ₂	

(iii) Period or periods during which emissions are made, or are to be made, including daily or seasonal variations (*start-up /shutdown to be included*):

Periods of Emission	60	min/hr	3.8 hr/day	<u>100</u> day/yr
(avg)				

TABLE E.1(iii): MAIN EMISSIONS TO ATMOSPHERE - Chemical characteristics of the emission (1 table per emission point)

Emission Point Reference Number: <u>A2-5</u>

Parameter		Prior to treatment ⁽¹⁾			Brief		As discharged ⁽¹⁾						
	mg,	/Nm³	kg	g/h	description	mg/Nm³		kg/h.		kg/year			
	Avg	Max	Avg	Max	of treatment	Avg	Max	Avg	Max	Avg	Max		
тос	1900	2300	1.24	1.5	Activated Carbon	400	600	0.26	0.39	104	156		
Di butyl tin	< 1.4	< 1.4	< 0.001	< 0.001	Sepection Purposes only any other use.	< 1.4	< 1.4	< 0.001	< 0.001	0.4	0.4		

^{1.} Concentrations should be based on Normal conditions of temperature and pressure, (i.e. 0°C,101.3kPa). Wet/dry should be the same as given in Table E.1(ii) unless clearly stated otherwise.



Dated: 04.01.2018

Regulation 10(2)(b)(ii) of EPA (Integrated Pollution Control)(Licencing) Regulations 2013 Request for supporting Information under Regulation 9 of the regulations.

Energy Consumption

BRUSS energy consumption 2014 – 2017 is presented in **Table 1** below.

Comparison is made with 2012 consumption to demonstrate how efficiencies have been maintained or improved upon. As noted in the application form Section G, BRUSS undertook an energy efficiency project starting 2012 and achieved an initial reduction of 20.4% (per 1,000pcs produced). Efficiencies were gained through retrofit of inverter drive motors on moulding machines and a change to energy efficient space heating and lighting.

Table 1 below shows reasonable performance in maintaining efficiencies when it is taken into account that the period between 2015 and 2017 saw significant remodelling works in the production area and moulding machine investment.

In 2016 – 2017, BRUSS invested in 5 off high output MAPLAN injection moulding machines, 2 of which replaced older high energy consuming machines. The company is now operating with 3 additional moulding machines compared to the 2012 levels.

A further energy project commenced in quarter 4 of 2017. BRUSS is currently installing continuous energy monitoring on all of its production equipment, starting with moulding. The aim of this project is to provide real-time data by machine, thus enabling improved scheduling of production activities from moulding to finishing processes and so reduce inadvertent wastages in energy.

Year	Annual KWh	Efficiencies gained compared to 2012 baseline (%)
2017	7698167	+12.8
2016	7692344	+12.8
2015	7673451	+13.1
2014	7488266	+15.1
2012	8825565	Baseline

Table 1 BRUSS annual energy consumption data in KWh

Site Activity Updates

Fuel Oils

In quarter 1 of 2017, BRUSS decommissioned the remaining fuel Oil standby tank used to supply an emergency generator for the site in the case of power outage. Alternative contracts are now in place with a mobile generator provider to cover emergency situations. The use of fuel oil on site has been eliminated.

Hazardous Substances

In 2018, BRUSS intends to phase out the use of Korro 60-90 (Boric Acid in solution <1%). Annual usage is currently 400litres as stated in Item 9 of Reg 10 Request, dated 17.07.2017. The product is used as a corrosion inhibitor at mould cleaning process. BRUSS intends to replace the current process with an air-dried finish, eliminating the need for the use of anti-corrosive in rinsing water.

Consent of copyright owner required for any other use In 2017, BRUSS phased out the use of raw material: 07781 FKM (Fluorocarbon Rubber) which contained Lead monoxide at (<3 % ref IMDS data Appendix II) . Production with this material ceased in November 2017.

Anna Garvey

Env. Manager

ATTACHMENTS

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	APPENDIX II MDS DATA BRUSS PRODUCT BY MATERIAL TYPE
ATTACHMENT 1.C	ITEM 1 A2-1 – A2-4 EMISSION ASSESSMENT REPORT
	APPENDIX III AIR EMISSION SURVEY A2-1-A204RUBBER FUME

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• ITEM 1: A2-1 — A2-4 EMISSION ASSESSMENT REPORT

APPENDIX I LIST OF BRUSS MATERIAL TYPES

Consent of contribution of the cont

EPA Export 11-01-2018:03:50:35



Elastomer Rubber Compound List

Rev : 00

DATE: 25.07.2016

Elastomer Rubber		Abbasis	Other Tends Norman	BRUSS	Percentage	Associated
Compound - Homogenous Type	Chemical Description	Abbreviation (ASTM 1418)	Other Trade Names / Abbreviations	Compound No.	Production (%)	Emission Point ²
Tromogenous Type	Chemical Description	(,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	7 7 1001 24 10110	01736	(/0)	Zimosion i ome
				01736		
Nitrile	Acrylonitrile-butadiene rubber	NBR	Buna-No	01722	4.0	A2-4
THEFT	Activitine saturation russer	NON	Dana No	01723	4.0	/\frac{1}{2}
				14750		
	Hydrogenated Acrylonitrile-		, ও	14615		
Hydrogenated Nitrile	butadiene rubber	HNBR	HNBR Johner	14617	5.2	A2-1
			iton differential for any of the state of th	09611		
			att ⁰ stred	09617		
	Ethylene Propylene Diene		ion pried	09716		
Ethylene Propylene	Rubber	EPDM 🚕	EP, EPT, EPR	09613	17.8	A2-3
		Consent of corput				
		of con.		07770		
		asente		07730		
		Con		07795		
				07781		
				07709		
			_	07694		
Fluorocarbon	Fluorocarbon Rubber	FKM	Viton [®] , Fluorel ^{® 1}	07712	15.0	A2-4
				05532		
				05501		
				05730		
Dalua amula t	Dalva amilata Bulblio	A C	0.004	05740	26.2	
Polyacrylate	Polyacrylate Rubber	ACM	ACM	05640	26.3	A2-1,2,3,



Elastomer Rubber Compound List

Rev: 00

DATE: 25.07.2016

Elastomer Rubber Compound - Homogenous Type	Chemical Description	Abbreviation (ASTM 1418)	Other Trade Names	BRUSS Compound No.	Percentage Production (%)	Associated Emission Point ²
				W 1150 11888 11721 11727 11827		
Ethylene Acrylic	Ethylene Acrylic Rubber	AEM	1 Offer i	41825 11621 11622	28.0	A2-1,2,3,

Table 1 Rubber and Elastomer Products Overwiew (www.professionalplastics.com)

Note 1 Viton * and Vamac * are registered trademarks of E.I.du Pont de Nemours. Fluore is a registered trademark of Dyneon LLC

Note 2 Associated emission points reflect current production schedules. Configuration of rubber types at emission points is subject to change according to needs of the business.

Consent of Configuration of rubber types at emission points is subject to change according to needs of the business.

• ITEM 1: A2-1 – A2-4 EMISSION ASSESSMENT REPORT

APPENDIX II MDS DATA BRUSS PRODUCT BY MATERIAL TYPE

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23888-2 Appendix II MDS Data Bruss Product by Material Type

2/3 IMDS ID / Version: 504607585 / 1 Page:

10/21/14 2:35:58 PM User: Garvey, Anna Date:

MDS Report Substances of assemblies and materials

Materials which are subject to legal prohibitions must not be included! Dangerous substances formed or released during use must also be declared Please note: GADSL list for substances that require declaration

2. Characterization of the Component

Part/Item No.: A 617 016 01 80

Description: Bruss 01722 NR

IMDS ID / Version:

Report No.:

504607585 / 1 504607585

Node ID:

Tree Level	Description Article Name Name Substance name	Part/Item No. Item- /MatNo. Material-No. CAS No.	IMDSAD / Version	Quantity	Weight	Portion	Portion (from - to) [%]	GADSL,	Parts Marking Pecyclate (Indust./Consumer) Application [ID]
1	Dichtung	A 617 016 01 80	504607585 / 1		122.62				No
-2	NBR NBR		785666 / 10		122.62			\$ 5.3	% No
-3	♠ Carbon black	4 1333-86-4				34	31 - 37		
-3	♠ Zinc oxide	4 1314-13-2				2.5	1.5 - 3.5	♦ D/P	
- 3	♠ NBR	4 -				51.5			
- 3	♣ Bis(2-ethylhexyl) adipate	4 103-23-1				3.5	2.5 - 4.5	♠ D	

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IMDS ID / Version: 504607585 / 1 Page: 3 / 3

User: Garvey, Anna Date: 10/21/14 2:35:58 PM

Tree Level	Description Article Name Name Substance name	Part/Item No. Item- /MatNo. Material-No. CAS No.	IMDS ID / Version	Quantity	Weight	Portion	Portion (from - to) [%]	GADSL,	
- 3	♠ Quartz (SiO2)	4 14808-60-7				5	4 - 6	♦ D	
- 3	♠ kaolinite	4 1318-74-7				1	0.5 - 1.5		
- 3	♦ Stearic acid	♦ 57-11-4				1	0.5 - 1.5		
⊢ з	♠ Paraffin waxes (petroleum), hydrotreated	4 64742-51-4			√ ²	2. 1.5	0.5 - 2.5		

For its perion purposes only

IMDS ID / Version:

2153933 / 3.01

User:

Garvey, Anna

Page:

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Date:

3/16/11 9:51:17 AM

MDS Report Substances of assemblies and materials

Materials which are subject to legal prohibitions must not be included! Dangerous substances formed or released during use must also be declared Please note: GADSL list for substances that require declaration

3. Characterization of the Component

3. Ch	aracterization of t	the Compo	onent	aut Poses of	decrated office.				
Part/Item l Article Nai	me: o-Ring	155 01736	NBK Fortige	citon Perseut Re Monner Perseut MI No	port No.: DS ID / Vers de ID:		- 2153933 / 3.01 155695439		
Tree Level	Article Name O Article Name Name Substance name	Part/Item No. Item-/MatNo. Material-No. CAS No.	IMDS 1D / Version	Quantity	Weight	O° A Portion	Portion (from - to)	GADSL,	Parts Marking Recyclate (Indust./Consumer) Application
1	o-Ring	004943120140	2153933 / 3.01		1.32				Not Applicable
- 2	• NBR		2153981 / 6		1.32			6 5.3	● No
- 3	▲ Carbon black	1 333-86-4				7	6 - 8		
- 3	▲ Zinc oxide	1 314-13-2				2.3	2.1 - 2.5		
- 3	▲ Stearic acid	Å 57-11-4				3.2	2.8 - 3.6		
- 3	▲ NBR	▲-				41.5	;		

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IMDS ID / Version: 2153933 / 3.01 Page: 3 / 3

User: Garvey, Anna Date: 3/16/11 9:51:17 AM

Free Level	Article Name Article Name Name Substance name	Part/Item No. Item- /MatNo. Material-No. CAS No.	IMDS ID / Version	Quantity	Weight	Portion	Portion (from - to)	☐ Classif. ☐ GADSL, SVHC	Parts Marking Recyclate (Indust./Consumer) Application
	Poly(oxy-1,2-ethanediyl), alpha,alpha'-(thiodi-2,1-ethanediyl)bis(omega-butoxy-	A 68958-65-6				6	5 - 7		
- 3	▲ Silicic acid, aluminum sodium salt	1 344-00-9				21	18 - 24		
- 3	▲ Silica, amorphous	1 12926-00-8				,. 8	7 - 9		
- 3	A Quartz (SiO2)	1 4808-60-7			iter in	8	7 - 9	▲D	
- 3	▲ kaolinite	1 318-74-7			17. WILL OF	3	2 - 4		

For inspection party leads



IMDS ID / Version:

1265180 / 3

User:

Garvey, Anna

Page:

2/3

Date:

7/28/16 1:37:10 PM

MDS Report Substances of assemblies and materials

Materials which are subject to legal prohibitions must not be included!

Dangerous substances formed or released during use must also be declared

Please note: GADSL list for substances that require declaration

2. Characterization of the Component

Part/Item No.:

A 005 997 78 48

Description:

O-Ring 12,5x1,8

Report No.:

11305

IMDS ID / Version:

1265180 / 3

S OFZ3 WBR Node ID:

54225222

Tree Level	Description Article Name Name Substance name	Part/Item No. Item-/MatNo. Material-No. CAS No.	IMDS ID / Version	Quantity	Weight	Portion [%]	Portion (from - to)	GADSL,	Parts Marking Recyclate (Indust/Consumer)
	O-Ring 12,5x1,8	A 005 997 78 48	1265180 / 3		0.14				Not Applicable
-2	NBR		785792 / 8		0.14			\$ 5.3	♣ No
- 3	♠ Carbon black	4 1333-86-4				34	31 - 37		
- 3	♠ Zinc oxide	4 1314-13-2				2.5	1.5 - 3.5	♦ D/P	
- 3	♦ NBR	4-				51.5			

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IMDS ID / Version: 1265180 / 3 Page: 3 / 3

User: Garvey, Anna Date: 7/28/16 1:37:10 PM

Free Level	☐ Description Article Name Name Substance name	Part/Item No. Item-/MatNo. Material-No. CAS No.	IMDS ID / Version	Quantity	Ø 🍑 🔧 Welght	Portion	Portion (from - to) [%]	Classif. GADSL, SVHC	 ✓ Parts Marking ♣ Recyclate (Indust/Consumer) ✓ Application [ID]
- 3	A Bis(2-ethylhexyl) adipate	103-23-1				3.5	2.5 - 4.5	♠ D	
- 3	♠ Quartz (SiO2)	4 14808-60-7				5	4 - 6	₽ D	
<u></u> -3	♠ kaolinite	4 1318-74-7				1	0.5 - 1.5		
- 3	♦ Stearic acid	4 57-11-4			ex USE	1	0.5 - 1.5		
- 3	♠ Paraffin waxes (petroleum), hydrotreated	4 64742-51-4		अग्रेप, अग्र	othe	1.5	0.5 - 2.5		

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IMDS ID / Version:

User:

36283089 / 2

Garvey, Anna

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Date:

7/28/16 10:52:37 AM

MDS Report Substances of assemblies and materials

Materials which are subject to legal prohibitions must not be included! Dangerous substances formed or released during use must also be declared Please note: GADSL list for substances that require declaration

. Ch	aracterization	of the Compo	nent insperior	ion,				Fi	
Part/Item Descriptio			12 HAUBR	Rep IMD	oort No.: OS ID / Vers de ID:		- 36283089 / 2 186097602		
Tree Level	Description	Part/Item No.	000		900	144	. 254	Classif.	Parts Marking
	Article Name Name Substance name	Item-/MatNo. Material-No. CAS No.	IMDS ID / Version	Quantity	Weight [g]	Portion [%]	Portion (from - to) [%]		(Indust/Consumer)
	Name Name	Material-No.	36283089 / 2	Quantity			(from - to)		(Indust/Consumer)
	Name Substance name	Material-No.		Quantity	[g]		(from - to)		(Indust/Consumer)
1 -2 -3	Name Substance name Dichtring	Material-No.	36283089 / 2	Quantity	[g] 4.06		(from - to) [%]	SVHC	(Indust/Consumer) Application [ID] Not Applicable

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IMDS ID / Version: 36283089 / 2 Page: 3 / 3

User: Garvey, Anna Date: 7/28/16 10:52:37 AM

Free Level	Description Article Name Name Substance name	Part/Item No. Item-/MatNo. Material-No. CAS No.	IMDS ID / Version	Quantity	Ø → ♣ Weight	Portion	Portion (from - to)	GADSL,	Parts Marking Recyclate (Indust./Consumer) Application [ID]
 3	1,1'-(1,3-Phenylene)bis-1H-pyrrole-2,5-dione	4 3006-93-7				0.55	0.4 - 0.7		
├ 3	4 Calcium-carbonate	471-34-1				3	2 - 4		
	4-(1-Methyl-1-phenylethyl)-N-[4- (1-methyl-1- phenylethyl)phenyl]aniline	4 10081-67-1			other use.	0.85	0.6 - 1.1		
- 3	♦ HNBR	4-		अग्रीर्भ वर्ष	3	55.2			
- 3	♦ Pentaerythritol-tetrastearate	4 115-83-3		oses all		0.65	0.4 - 0.9		
 - 3	A Paraffin waxes (petroleum), hydrotreated	4 64742-51-4	ion pul	Collin		0.45	0.2 - 0.7		
- 3	A Bis[2-[2-(2-butoxyethoxy)ethoxy] adipate	4 65520-46-9	of inspectionne	-		5	4 - 6		



IMDS ID / Version:

103844035 / 1

User:

Garvey, Anna

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Date:

7/28/16 10:56:53 AM

MDS Report Substances of assemblies and materials

Materials which are subject to legal prohibitions must not be included!

Dangerous substances formed or released during use must also be declared

Please note: GADSL list for substances that require declaration

2. Characterization of the Component

Part/Item No.:

2078-102-314

Description:

DD 00 4/1 2

D 86,1/1 Bruss

14750 HNB

Report No.:

IMDS ID / Version:

103844035 / 1

Node ID:

103844035

Tree Level	Description Article Name Name Substance name	Part/Item No. Item-/MatNo. Material-No. CAS No.	IMDS ID / Version	Quantity	Weight	Portion [%]	Portion (from - to)	GADSL,	Parts Marking Recyclate (Indust/Consumer) Application [ID]
1	PD 86,1/I	2078-102-314	103844035 / 1		3.46				Not Applicable
 -2	* HNBR		728752 / 5		3.46			5.3	% No
- 3	♠ Carbon black	4 1333-86-4				34	31 - 37		
- 3		4 1314-13-2				1.05	0.8 - 1.3	△ D/P	

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User: Garvey, Anna Date: 7/28/16 10:56:53 AM

ree Level	Description Article Name Name Substance name	Part/Item No. Item-/MatNo. Material-No. CAS No.	IMDS ID / Version	Quantity	Weight	Portion	Portion (from - to) [%]	GADSL,	 ☑ Parts Marking ♣ Recyclate (Indust./Consumer) ♠ Application [ID]
├ 3	4 1,1'-(1,3-Phenylene)bis-1H-pyrrole-2,5-dione	4 3006-93-7				0.55	0.4 - 0.7		
- 3	♦ Calcium-carbonate	471-34-1				3	2 - 4		
- 3	4-(1-Methyl-1-phenylethyl)-N-[4- (1-methyl-1- phenylethyl)phenyl]aniline	4 10081-67-1			other use.	0.85	0.6 - 1.1		
 3	♠ HNBR	4 -		37. 20		51.95			
⊢ 3	4 1,2,4-Benzenetricarboxylic acid, decyl octyl ester	4 67989-23-5	of its estimated	oses d for		7	6 - 8		
- 3	♠ Pentaerythritol-tetrastearate	4 115-83-3	tion of t	S		0.85	0.6 - 1.1		
 3	Paraffin waxes (petroleum), hydrotreated	4 64742-51-4	of its feet out			0.75	0.5 - 1		

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Date:

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MDS Report Substances of assemblies and materials

Materials which are subject to legal prohibitions must not be included! Dangerous substances formed or released during use must also be declared Please note: GADSL list for substances that require declaration

3. Characterization of the Component

	ar actoriza		the Compor	ioni	outpostite	3				
Part/Item Article Na		005 213 D 118	cuss 14615	HARAITE	iton Per IMI No	port No.: DS ID / Vers de ID:	sion:	- 500502 / 2.01 145378593		
Tree Level	Article Name Article Name Name Substance name	е	Part/Item No. O Item- /MatNo. Material-No. A CAS No.	IMDS 1D / Version	Quantity	Weight	O° A Portion	Portion (from - to)	GADSL,	Parts Marking Recyclate (Indust./Consumer)
	PD 118		S 005 213	500502 / 2.01		4				Not Applicable
-2	O HNBR			728708 / 6		4			5.3	● No
- 3	A Carbon black		1 333-86-4				34	31 - 37		
- 3	A Zinc oxide		1 314-13-2				1.05	0.8 - 1.3		
- 3	▲ 1,1'-(1,3-Phenyle	ene)bis-1H-	▲ 3006-93-7				0.55	0.4 - 0.7		



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 500502 / 2.01
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 Garvey, Anna
 Date:
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Article Name Article Name Name Substance name	Part/Item No. item- /MatNo. Material-No. CAS No.	IMDS ID / Version	Quantity	Weight	Portion	Portion (from - to) [%]	GADSL, SVHC	Parts Marking Recyclate (Indust./Consumer)
▲ Calcium-carbonate	471-34-1				3	2 - 4		
4-(1-Methyl-1-phenylethyl)-N-[4- (1-methyl-1- phenylethyl)phenyl]aniline	1 10081-67-1				0.85	0.6 - 1.1		
▲ HNBR	A -				51.95			
▲ 1,2,4-Benzenetricarboxylic acid, decyl octyl ester	A 67989-23-5			1 4 4	7	6 - 8		
A Pentaerythritol-tetrastearate	1 15-83-3		2	र्धा था	0.85	0.6 - 1.1		
A Paraffin waxes (petroleum), hydrotreated	A 64742-51-4		2 Purposition	\$	0.75	0.5 - 1		
	Article Name Name Substance name Calcium-carbonate 4-(1-Methyl-1-phenylethyl)-N-[4-(1-methyl-1-phenylethyl)phenyl]aniline HNBR 1,2,4-Benzenetricarboxylic acid, decyl octyl ester Pentaerythritol-tetrastearate Paraffin waxes (petroleum),	Article Name Name Name Substance name CAS No. Calcium-carbonate 4-(1-Methyl-1-phenylethyl)-N-[4-(1-methyl-1-phenylethyl)phenyl]aniline HNBR 1,2,4-Benzenetricarboxylic acid, decyl octyl ester Pentaerythritol-tetrastearate Paraffin waxes (petroleum), 64742-51-4	Article Name Name Name Substance name Cas No. 4-(1-Methyl-1-phenylethyl)-N-[4-(1-methyl-1-phenylethyl)phenyl]aniline HNBR 1,2,4-Benzenetricarboxylic acid, decyl octyl ester Pentaerythritol-tetrastearate Paraffin waxes (petroleum), item-/MatNo. Material-No. A71-34-1 10081-67-1 10081-67-1 471-34-1 A 10081-67-1 115-83-3	Article Name Name Name Material-No. CAS No. Calcium-carbonate 4-(1-Methyl-1-phenylethyl)-N-[4-(1-methyl-1-phenylethyl)phenyl]aniline HNBR 1,2,4-Benzenetricarboxylic acid, decyl octyl ester Pentaerythritol-tetrastearate	Article Name Name Material-No. Material-No. A Substance name A CAS No. Calcium-carbonate A 4-(1-Methyl-1-phenylethyl)-N-[4-(1-methyl-1-phenylethyl)phenyl]aniline A HNBR A 1,2,4-Benzenetricarboxylic acid, decyl octyl ester A Pentaerythritol-tetrastearate A Paraffin waxes (petroleum), A 64742-51-4	Article Name Name Name Name Name Name Name Name	Article Name Oitem- /MatNo. IMDS ID / Version Quantity Weight Portion Portion (from - to) Substance name ▲ CAS No. (g) [%] [%] ▲ Calcium-carbonate ▲ 471-34-1 3 2 - 4 ▲ 4-(1-Methyl-1-phenylethyl)-N-[4-(1-methyl-1-phenylethyl)phenyl]aniline ▲ 10081-67-1 0.85 0.6 - 1.1 ▲ HNBR ▲ - 51.95 ▲ 1,2,4-Benzenetricarboxylic acid, decyl octyl ester ▲ 67989-23-5 7 6 - 8 ▲ Pentaerythritol-tetrastearate ▲ 115-83-3 0.85 0.6 - 1.1	Article Name Name Name Name Name Name Name Name

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MDS Report Substances of assemblies and materials

Materials which are subject to legal prohibitions must not be included! Dangerous substances formed or released during use must also be declared Please note: GADSL list for substances that require declaration

2. Ch	aracterization of	the Compo	nent getion put	postified					
Part/Item Descriptio	n. Profilring	0 80 Baluss 0961	L. OBA	IMI	port No.: DS ID / Vers de ID:		- 98779099 / 1 98779099		
Tree Level	Description Article Name Name Substance name	Part/Item No. Item-/MatNo. Material-No. CAS No.	IMDS ID / Version	Quantity	Weight	Portion	Portion (from - to) [%]	GADSL,	Parts Marking Recyclate (Indust./Consumer)
1	Profilring	A 137 201 00 80	98779099 / 1		6.7				Not Applicable
-2	S EPDM		732289 / 5		6.7			5.3	⁰ No
 3	♠ Carbon black	4 1333-86-4				38	5 32 - 38		
 -3	A Residual oils (petroleum), solvent-dewaxed	4 64742-62-7				14	4 12 - 16		♠ Not applicable [40]



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User: Garvey, Anna Date: 7/28/16 1:11:34 PM

Free Level	Description Article Name Name Substance name	Part/Item No. Item-/MatNo. Material-No. CAS No.	IMDS ID / Version	Quantity	Weight	Portion [%]	Portion (from - to)	GADSL,	Parts Marking Recyclate (Indust./Consumer) Application [ID]
- 3	♠ Zinc oxide	4 1314-13-2				3	2 - 4	♠ D/P	
- 3	♠ Calcium-carbonate	4 471-34-1				3.5	2.5 - 4.5		
<u></u> -3	♦ Stearic acid	4 57-11-4				0.35	0.2 - 0.5		
- 3	♠ EPDM	4 -			ex USO.	42.55			
 3	2,2'-Oxydiethanol	4 111-46-6		.4. 6	othe	0.55	0.3 - 0.8		
- 3	N-(2-Hydroxyethyl)stearamide	4 111-57-9		es a foi an		1.05	0.8 - 1.3		

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1286704 / 2

User:

Garvey, Anna

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Date:

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MDS Report Substances of assemblies and materials

Materials which are subject to legal prohibitions must not be included! Dangerous substances formed or released during use must also be declared Please note: GADSL list for substances that require declaration

2. Ch	aracterization of	the Compo	nent gion put	edin					
Part/Item Descriptio	No.: A 024 997 28 on: DR 58,5	48 MUSS 6971	For its diffe	Re IMI No	port No.: DS ID / Vers de ID:	ion:	597056 1286704 / 2 51562164		
Tree Level	Description Article Name Name Substance name	Part/Item No. Item-/Mat-No. Material-No. CAS No.	IMDS ID / Version	Quantity	Weight	Portion	Portion (from - to)	GADSL,	Parts Marking Recyclate (Indust./Consumer)
ı	DR 58,5	A 024 997 28 48	1286704 / 2		3.06				Not Applicable
- 2	S EPDM		732322 / 4		3.06			5.3	™ No
1 4	♠ Carbon black	1333-86-4				34	31 - 37		
 2	- Carbon black							A	
<u>. </u>		4 1314-13-2				4	3-5	♦ D/P	



 IMDS ID / Version:
 1286704 / 2
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 User:
 Garvey, Anna
 Date:
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free Level	Description Article Name Name Substance name	Part/Item No. Item-/MatNo. Material-No. CAS No.	IMDS ID / Version	Quantity	Weight	Portion	Portion (from - to) [%]	GADSL,	 ✓ Parts Marking ❖ Recyclate (Indust./Consumer) ✓ Application [ID]
<u></u> -3	♦ Stearic acid	4 57-11-4				0.25	0.1 - 0.4		
- 3	4 Quartz (SiO2)	4 14808-60-7				5	4 - 6	△ D	
- 3	♦ EPDM	4 -				50.7			
- 3	♦ N-(2-Hydroxyethyl)stearamide	4 111-57-9			et 150	0.55	0.3 - 0.8		
- 3	4 1,2-Benzenedicarboxylic acid, polymer with 2,2'-(1,2-ethanedlylbis(o	4 68389-55-9		ses off of art	othe	2.5	1.5 - 3.5		

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User:

Garvey, Anna

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MDS Report Substances of assemblies and materials

Materials which are subject to legal prohibitions must not be included!

Dangerous substances formed or released during use must also be declared

Please note: GADSL list for substances that require declaration

2. Characterization of the Component

Part/Item No.:

N 903 03 403

Description:

OR 65x3

Report No.:

601262

IMDS ID / Version:

1344916 / 2

lode ID:

51561061

Tree Level	Description Article Name Name Substance name	Part/Item No. Item-/MatNo. Material-No. CAS No.	IMDS ID / Version	Quantity	Ø ♣ ♣ Weight	Portion	Portion (from - to)	GADSL,	Parts Marking Recyclate (Indust./Consumer) Application [ID]
1	OR 65x3	N 903 03 403	1344916 / 2		1.65				Not Applicable
- 2	S EPDM		732294 / 4		1.65			№ 5.3	% No
- 3	♠ Carbon black	4 1333-86-4				35	32 - 38		
├ 3	Residual oils (petroleum), solvent-dewaxed	4 64742-62-7				14	12 - 16		♠ Not applicable [40]





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Tree Level	Description Article Name Name Substance name	Part/Item No. Item-/MatNo. Material-No. CAS No.	IMDS ID / Version	Quantity	Weight	Portion	Portion (from - to)	GADSL,	 ✓ Parts Marking ♣ Recyclate (Indust./Consumer) ♠ Application [ID]
-3		4 1314-13-2				3	2 - 4	♠ D/P	
- 3	♠ Calcium-carbonate	471-34-1				3.5	2.5 - 4.5		
- 3	♠ Stearic acid	4 57-11-4				0.35	0.2 - 0.5		
-3	♦ EPDM	4-			ox USO.	42.55			
 3	N-(2-Hydroxyethyl)stearamide	4 111-57-9			Othe	1.05	0.8 - 1.3		
<u></u> -3	4 2,2'-Oxydiethanol	4 111-46-6		es afor an		0.55	0.3 - 0.8		

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Garvey, Anna

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MDS Report Substances of assemblies and materials

Materials which are subject to legal prohibitions must not be included! Dangerous substances formed or released during use must also be declared Please note: GADSL list for substances that require declaration

2. Ch	aracterization o	f the Compo	nent specifor pr	iegr.					
Part/Item Descriptio	OD 20×2	6 Bruss 09611	FOR THE DIM	IMI	port No.: DS ID / Vers de ID:		o.a. 2443134 / 2 73580586		
Tree Level	Description Article Name Name Substance name	Part/Item No. Item-/MatNo. Material-No. CAS No.	IMDS ID / Version	Quantity	⊘ → → Weight	Portion [%]	Portion (from - to)	GADSL,	Parts Marking Recyclate (Indust/Consumer)
	OR 20x2	9 07D 121 666	2443134 / 2		0.25				Not Applicable
- 2	S EPDM		35508627 / 1	-	0.25			\$ 5.3	ॐ No
- 3	♠ Carbon black	4 1333-86-4				3	5 32 - 38		
 3	A Residual oils (petroleum), solvent-dewaxed	4 64742-62-7				1	4 12 - 16		♠ Not applicable [40]



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User: Garvey, Anna Date: 7/28/16 12:58:34 PM

Free Level	Description Article Name Name Substance name	Part/Item No. Item-/MatNo. Material-No. CAS No.	IMDS ID / Version	Quantity	Weight	Portion [%]	Portion (from - to)	GADSL, SVHC	
-3	♠ Zinc oxide	4 1314-13-2				3	2 - 4	♦ D/P	
- 3	♠ Calcium-carbonate	4 471-34-1				3.5	2.5 - 4.5		
 - 3	♠ Stearic acid	4 57-11-4				0.35	0.2 - 0.5		
- 3	♦ EPDM	4-			a use.	42.55		- midituri	
 3	N-(2-Hydroxyethyl)stearamide	4 111-57-9			Othe	1.05	0.8 - 1.3		
<u></u> -3	4 2,2'-Oxydiethanol	4 111-46-6		es of soi and		0.55	0.3 - 0.8		

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539015265 / 1

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Garvey, Anna

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Date:

6/5/15 10:27:18 AM

MDS Report Substances of assemblies and materials

Materials which are subject to legal prohibitions must not be included! Dangerous substances formed or released during use must also be declared Please note: GADSL list for substances that require declaration

2. Characterization of the Component

2. Cha	aracterization o	f the Compo	nent	outposes of	for any				
Part/Item l Descriptio	No.: 24269837 n: SEAL-TUR I	f the Compo	uss 07708 300	MI No	port No.: DS ID / Vers de ID:	- sion: 5	39015265 / 1 39015265		
Tree Level	Description Article Name Name Substance name	Part/Item No. Item-/MatNo. Material-No. CAS No.	IMDS ID / Version	Quantity	Weight	Portion	Portion (from - to) [%]	GADSL,	Parts Marking Recyclate (Indust./Consumer)
	SEAL-TURB SHF (o-ring)	2 4269837	539015265 / 1		0.28				Not Applicable
-2	№ FKM		540288755 / 1		0.26			5.3	№ No
- 3	♠ Magnesium-oxide	1309-48-4				2	0.5 - 3.5		
- 3	♦ Wollastonite (Ca(SiO3))	4 13983-17-0				30	25 - 35		
-3	♠ Diiron-trioxide	4 1309-37-1				1.5	0 - 3		7.2
- 3	♠ Octadecylamine	124-30-1				1.5	0 - 3		



3/3 Page: IMDS ID / Version: 539015265 / 1 6/5/15 10:27:18 AM Date: Garvey, Anna User:

Tree Level	Description Article Name Name Substance name	Part/Item No. Item- /MatNo. Material-No. CAS No.	IMDS ID / Version	Quantity	Weight	Portion	Portion (from - to) [%]	Classif. GADSL, SVHC	Parts Marking Recyclate (Indust./Consumer)
- 3	♦ FKM	4) -				65	60 - 70		
<u>-2</u>	slide coating		21068026 / 7		0.02			9.2	
- 3	♠ Perfluoropolyether	4 60164-51-4				100			

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User:

394974449 / 1

Garvey, Anna

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Date:

7/28/16 9:42:23 AM

MDS Report Substances of assemblies and materials

Materials which are subject to legal prohibitions must not be included!

Dangerous substances formed or releases during use must also be declared

Please note: GADSL list for substances that require declaration

2. Characterization of the Component

Part/Item No.:

A 541 997 17 45

Description:

Dichtring Bruss 07795

Report No.:

IMDS ID / Version:

394974449 / 1

Node ID:

394974449

Tree Level	Description Article Name Name Substance name	Part/Item No. Item-/MatNo. Material-No. CAS No.	IMDS ID / Version	Quantity	Weight	Portion [%]	Portion (from - to)	GADSL,	
1	Dichtring	@ A 541 997 17 45	394974449 / 1		24.38				Not Applicable
<u> -2</u>	♣ FKM		5773161 / 6		24.38			5.3	№ No
- 3	♦ FKM	4-				77.6			
- 3	♠ Carbon black	4 1333-86-4				21	19 - 23		
- 3	♠ Octadecylamine	4 124-30-1				0.4	0.2 - 0.6		



IMDS ID / Version: 394974449 / 1 Page: 3 / 3

User: Garvey, Anna Date: 7/28/16 9:42:23 AM

Tree Level	Description Article Name Name Substance name	Part/Item No. Item-/MatNo. Material-No. CAS No.	IMDS ID / Version	Quantity	Weight	Portion	Portion (from - to) [%]	GADSL,	Parts Marking Recyclate (Indust./Consumer) Application [ID]
- 3	♠ Carnauba-wax	4 8015-86-9				1	0.5 - 1.5		

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132980255 / 1

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7/28/16 1:30:11 AM

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2. Cha	aracterization of		nent		nces that re	equire dec	ciaration		
Part/Item N Description	No.: 000730089800 DR 317x4,5	Bruss 077	-30 colification	IMI	port No.: DS ID / Vers de ID:	sion:	- 132980255 / 1 132980255		
Tree Level	Description Article Name Name Substance name	Part/Item No. Item-/MatNo. Material-No. CAS No.	IMDS ID / Version	Quantity	Weight	Portion	Portion (from - to) [%]	GADSL,	 ☑ Parts Marking ❖ Recyclate (Indust./Consumer) △ Application [ID]
	DR 317x4,5	000730089800	132980255 / 1		29				Yes
-2	♣ FKM		736983 / 9		29			\$ 5.3	№ No
 3	♦ FKM	₩-				59.	5		
- 3	♦ Calcium-dihydroxide	4 1305-62-0					2 1 - 3		
- 3	♠ Magnesium-oxide	1309-48-4				2.	5 1.5 - 3.5		



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User: Garvey, Anna Date: 7/28/16 1:30:11 AM

Tree Level	Description Article Name Name Substance name	Part/Item No. Item-/MatNo. Material-No. CAS No.	IMDS ID / Version	Quantity	Weight	Portion	Portion (from - to) [%]	GADSL,	Parts Marking Recyclate (Indust./Consumer) Application [ID]
- 3	♦ Chromium(III)oxide	4 1308-38-9				4	3 - 5		
<u></u> -3	A Barium sulphate	△ 7727-43-7			-	31	28 - 34		
- 3	♠ Carnauba-wax	4 8015-86-9				0.5	0.1 - 0.9		
- 3	Siloxanes and silicones, di-Me, hydroxy-terminated	4 70131-67-8			atter use.	0.5	0.1 - 0.9		

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70380585 / 0.01

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7/28/16 1:21:33 AM

MDS Report Substances of assemblies and materials

Materials which are subject to legal prohibitions must not be included! Dangerous substances formed or released during use must also be declared Please note: GADSL list for substances that require declaration

2. Ch	aracterization of t	he Compoi	nent specion pure	Shired					
Part/Item l Descriptio	07400		ille dill	Rep IMD	oort No.: OS ID / Vers de ID:	ion:	- 70380585 / 0.01 70380585		
Tree Level	Description Article Name	Part/Item No. Item-/MatNo. Material-No.	IMDS ID / Version	Quantity	⊘ → → Weight	Portion	Portion (from - to)	GADSL,	Parts Marking Recyclate (Indust./Consumer)
	h .	A CAS No.			[g]	[%]	[70]	SVHC	Application [ID]
	♦ Substance name ◎ DR 149,4x3,95	♦ CAS No. ■ 25466	70380585 / 0.01		13.12	[70]	[%]	SVHC	Not Applicable
 -2	△ Substance name	_	70380585 / 0.01 732382 / 5			[76]	[76]	3∨HC 3 5.3	
	Substance name DR 149,4x3,95	_			13.12	79.			Not Applicable
1 -2 -3 -3	Substance name DR 149,4x3,95 FKM	25466			13.12		6		Not Applicable



IMDS ID / Version: 70380585 / 0.01 Page: 3 / 3

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Tree Level	Description Article Name Name Substance name	Part/Item No. Item-/MatNo. Material-No. CAS No.	IMDS ID / Version	Quantity	Weight	Portion [%]	Portion (from - to) [%]	GADSL,	Parts Marking Recyclate (Indust./Consumer)
-3	♦ Octadecylamine	4 124-30-1				0.4	0.2 - 0.6		
- 3	♠ Lead-monoxide	4 1317-36-8				2	1 - 3	△ D/P/ SVHC	♠ none [0]
- 3	♠ Carnauba-wax	4 8015-86-9			۳۰.	1	0.5 - 1.5		

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443847599 / 0.01

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7/28/16 1:34:13 AM

MDS Report Substances of assemblies and materials

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2. Characterization of the Component

Part/Item I Description	No.: 1 460 225 09 n: Dichtring	51 Bruss 07712	FORTINGTH.	Rej IMI No	oort No.: DS ID / Vers de ID:	ion:	- 443847599 / 0.01 443847599		
Tree Level	Description Article Name Name Substance name	Part/Item No. Item-/MatNo. Material-No. CAS No.	IMDS ID / Version	Quantity	⊘ ⊘ ⊘ ⊘ ⊘ ⊘ ⊘ ⊘ ⊘ ⊘	Portion	Portion (from - to) [%]	GADSL,	Parts Marking Recyclate (Indust./Consumer) Application [ID]
1	Dichtring	1 460 225 051	443847599 / 0.01		4.066				Not Applicable
-2	♣ FKM		25212102 / 4		4.066			\$ 5.3	№ No
- 3	♦ FKM	4 -				68.5	5		
- 3	♠ Calcium-dihydroxide	1305-62-0				2	2 1-3		
- 3	♠ Magnesium-oxide	4 1309-48-4				5.5	5 4.5 - 6.5		



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Tree Level	Description Article Name Name Substance name	Part/Item No. Item-/MatNo. Material-No. CAS No.	IMDS ID / Version	Quantity	Weight	Portion	Portion (from - to) [%]	♣ Classif. ♠ GADSL, SVHC	 ☑ Parts Marking ❖ Recyclate (Indust/Consumer) △ Application [ID]
<u></u> -3	♦ Chromium(III)oxide	4 1308-38-9				5	4 - 6		
- 3	A Barium sulphate	4 7727-43-7				18	16 - 20		
- 3	♦ Carnauba-wax	4 8015-86-9				0.5	0.1 - 0.9		
 3	Siloxanes and silicones, di-Me, hydroxy-terminated	4 70131-67-8			ather use.	0.5	0.1 - 0.9		

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MDS Report Substances of assemblies and materials

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Dangerous substances formed or released during use must also be declared

Please note: GADSL list for substances that require declaration

2. Characterization of the Component

Part/Item No.:

0501.322.858

Description:

seal ring

ZRUSS 077700 FLW

Report No.:

601552

IMDS ID / Version:

45023873 / 2

Node ID:

446101264

Tree Level	Description Article Name Name Substance name	Part/Item No. Item-/MatNo. Material-No. CAS No.	IMDS ID / Version	Quantity	Weight	Portion	Portion (from - to) [%]	GADSL,	
I	seal ring	0 501.322.858	45023873 / 2		3.55				Not Applicable
- 2	♣ FKM		44113222 / 7		3.55			\$ 5.3	№ No
- 3	♠ Carbon black	4 1333-86-4				21	19 - 23		
- 3	♦ Octadecylamine	4 124-30-1				0.4	0.2 - 0.6		
- 3	♠ Carnauba-wax	4 8015-86-9				1	0.5 - 1.5		



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Tree Level	Description Article Name Name Substance name	Part/Item No. Item-/MatNo. Material-No. CAS No.	IMDS ID / Version	Quantity	Weight	Portion	Portion (from - to)	GADSL,	 ☑ Parts Marking ❖ Recyclate (Indust./Consumer) ❖ Application [ID]
-3	♦ FKM	4 -				77.6			

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7/28/16 2:02:31 AM

MDS Report Substances of assemblies and materials

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2. Ch	aracterization of	f the Compo	nent cion puro	guired					
Part/Item Descriptio	No.: 1886663 n: Gasket	Bruss 0769	For install	IMI	port No.: DS ID / Vers de ID:	sion:	- 121762376 / 2 158580533		
Tree Level	Description Article Name Name Substance name	Part/Item No. Item-/MatNo. Material-No. CAS No.	IMDS ID / Version	Quantity	Weight	Portion	Portion (from - to)	GADSL,	Parts Marking Recyclate (Indust./Consumer)
	Gasket	1886663	121762376 / 2		25.6				Yes
-2	♣ FKM		732359 / 7		25.6			\$ 5.3	№ No
- 3	♦ FKM	4-				80.0	3		
La		A 1000 00 1					5 4-6		
-3 -3	Carbon black	4 1333-86-4				•	7 7 0	1	



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User: Garvey, Anna Date: 7/28/16 2:02:31 AM

Tree Level	Description Article Name Name Substance name	Part/Item No. Item-/MatNo. Material-No. CAS No.	IMDS ID / Version	Quantity	Weight	Portion [%]	Portion (from - to) [%]	GADSL,	 ✓ Parts Marking ❖ Recyclate (Indust/Consumer) ✓ Application [ID]
- 3	A Kieselguhr, soda ash flux- calcined	4 68855-54-9				4	3 - 5		
- 3	♠ Zinc oxide	4 1314-13-2				4	3 - 5	♦ D/P	
- 3	♠ Calcium-carbonate	471-34-1			د.	2	1 - 3		
- 3	♦ Octadecylamine	4 124-30-1			alleri	0.4	0.2 - 0.6		
 -3	♠ Carnauba-wax	4) 8015-86-9		अग्रेप, अग्रेप	O ^z	1	0.5 - 1.5		

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Garvey, Anna

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7/28/16 9:56:10 AM

MDS Report Substances of assemblies and materials

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2. Ch	aracterization o	of the Compo	nent tot in the first owner	require					
Part/Item Descriptio		BRUSS 0574	, 20,	IMI	port No.: DS ID / Vers de ID:		o.a. 136906119 / 1 136906119		
Tree Level	Description Article Name Name Substance name	Part/Item No. Item-/MatNo. Material-No. CAS No.	IMDS ID / Version	Quantity	⊘ ⊘ ⋄ ⋄ Weight	Portion [%]	Portion (from - to)	GADSL,	Parts Marking Recyclate (Indust./Consumer)
	Dichtring	🦪 079 117 070 D	136906119 / 1		0.87				Not Applicable
- 2	♣ ACM		728621 / 6		0.87			5.3	⁰ No
- 3	△ ACM	4-				48.05	5	1	
- 3	♠ Carbon black	1333-86-4				47.5	5 45 - 50		
- 3	♦ Stearic acid	♦ 57-11-4	1			0.9	0.4 - 1.4		



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Free Level	Description Article Name Name Substance name	Part/Item No. Item-/MatNo. Material-No. CAS No.	[MDS ID / Version	Quantity	Weight	Portion [%]	Portion (from - to) [%]	GADSL,	Parts Marking Recyclate (Indust./Consumer) Application [ID]
- 3	♦ Sodium stearate	4 822-16-2				1.75	1.5 - 2		
├ 3	4-(1-Methyl-1-phenylethyl)-N-[4- (1-methyl-1- phenylethyl)phenyl]aniline	4 10081-67-1			0,0	0.6	0.1 - 1.1		
-3	♠ Pentaerythritol-tetrastearate	4 115-83-3			net use	0.6	0.1 - 1.1		
 -3	N,N'-Ethylenedi(stearamide)	4 110-30-5		2017. 30	y oth	0.6	0.1 - 1.1		

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74402000 / 1.01

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MDS Report Substances of assemblies and materials

Materials which are subject to legal prohibitions must not be included! Dangerous substances formed or released during use must also be declared Please note: GADSL list for substances that require declaration

2. Cha	aracterization of t	he Compoi	Dec Owl	oses of for equired for	nces that r	equire dec	ciaration		
Part/Item I Description	No.: F 01C 320 052 n: PD 70/IV	veuss 055	Fortiffield	Re IMI No	port No.: DS ID / Vers de ID:	sion:	- 74402000 / 1.01 555805364		
Tree Level	Description Article Name Name Substance name	Part/Item No. Item-/MatNo. Material-No. CAS No.	IMDS ID / Version	Quantity	Weight	Portion	Portion (from - to)	GADSL,	Parts Marking Recyclate (Indust/Consumer)
ı	PD 70/IV	F 01C 320 052	74402000 / 1.01		3.47				Not Applicable
- 2	S ACM		728562 / 7	-	3.47			\$ 5.3	№ No
- 3	△ ACM	4 -				59.9	9		
- 3	♠ Carbon black	1333-86-4				3:	5 32 - 38		
 -3	♠ Stearic acid	♦ 57-11-4				0.9	9 0.4 - 1.4		



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ree Level	Description Article Name Name Substance name	Part/Item No. Item-/MatNo. Material-No. CAS No.	IMDS ID / Version	Quantity	Weight	Portion	Portion (from - to)	GADSL,	 ☑ Parts Marking ♣ Recyclate (Indust./Consumer) ♠ Application [ID]
- 3	♦ Sodium stearate	4 822-16-2				2	1.5 - 2.5		
- 3	4-(1-Methyl-1-phenylethyl)-N-[4- (1-methyl-1- phenylethyl)phenyl]aniline	4 10081-67-1			<i>a.</i>	0.8	0.3 - 1.3		
 -3	♠ Pentaerythritol-tetrastearate	4 115-83-3			set uso	0.7	0.2 - 1.2		
<u></u> -3	♠ N,N'-Ethylenedi(stearamide)	4 110-30-5		77. 405	olli	0.7	0.2 - 1.2		

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Garvey, Anna

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MDS Report Substances of assemblies and materials

Materials which are subject to legal prohibitions must not be included! Dangerous substances formed or released during use must also be declared Please note: GADSL list for substances that require declaration

2. Cha	aracterization o	f the Compo	nent gion put	todited to					
Part/Item I Description		62 48 Bruss 0573	FOOTH	IMI	port No.: DS ID / Vers de ID:	sion:	- 1271045 / 2 51561232		
Tree Level	Description Article Name Name Substance name	Part/Item No. Item-/MatNo. Material-No. CAS No.	IMDS ID / Version	Quantity	Weight	Portion	Portion (from - to)	GADSL,	Parts Marking Recyclate (Indust./Consumer)
	OR 95x3	A 009 997 62 48	1271045 / 2		2.8				Not Applicable
-2	♣ ACM		728618 / 6		2.8			\$ 5.3	No No
 -3	△ ACM	4-				48.0	5		
 -3	♠ Carbon black	4 1333-86-4				47.	45 - 50		
- 3	♦ Stearic acid	4 57-11-4				0.9	0.4 - 1.4		



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Free Level	Description Article Name Name Substance name	Part/Item No. Item-/MatNo. Material-No. CAS No.	IMDS ID / Version	Quantity	Weight	Portion [%]	Portion (from - to)	GADSL, SVHC	Parts Marking Recyclate (Indust./Consumer) Application [ID]
- 3	♦ Sodium stearate	4 822-16-2			·	1.75	1.5 - 2		
	4-(1-Methyl-1-phenylethyl)-N-[4- (1-methyl-1- phenylethyl)phenyl]aniline	4 10081-67-1			3.	0.6	0.1 - 1.1		
- 3	Pentaerythritol-tetrastearate	4 115-83-3			nerise	0.6	0.1 - 1.1		
-3	N,N'-Ethylenedi(stearamide)	4 110-30-5		77. ot.	oll	0.6	0.1 - 1.1		

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User:

62976764 / 1

Garvey, Anna

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MDS Report Substances of assemblies and materials

Materials which are subject to legal prohibitions must not be included! Dangerous substances formed or released during use must also be declared Please note: GADSL list for substances that require declaration

2. Characterization of the Component

2. Cha	aracterization of t	the Compor	nent specification of the	foot					
Part/Item Descriptio	No.: 03C 103 196 n: DR 27,8	the Compor	ABM.	Re IMI No	port No.: DS ID / Vers de ID:	sion:	o.a. 62976764 / 1 62976764		
Tree Level	Description Article Name Name Substance name	Part/Item No. Item-/MatNo. Material-No. CAS No.	IMDS ID / Version	Quantity	Weight	Portion	Portion (from - to)	GADSL,	Parts Marking Recyclate (Indust./Consumer)
	DR 27,8	@ 03C 103 196	62976764 / 1		1.05				Not Applicable
-2	SACM BRUSS 05640		728608 / 7		1.05			\$ 5.3	№ No
- 3	♠ ACM	4 -				59.	9		
- 3	♠ Carbon black	4 1333-86-4				3:	5 32 - 38		
- 3	♦ Stearic acid	4 57-11-4				0.9	9 0.4 - 1.4		



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Free Level	Description Article Name Name Substance name	Part/Item No. Item-/MatNo. Material-No. CAS No.	IMDS ID / Version	Quantity	Weight	Portion	Portion (from - to)	GADSL, SVHC	 ☑ Parts Marking ❖ Recyclate (Indust./Consumer) △ Application [ID]
- 3	♦ Sodium stearate	4 822-16-2				2	1.5 - 2.5		
	4-(1-Methyl-1-phenylethyl)-N-[4- (1-methyl-1- phenylethyl)phenyl]aniline	4 10081-67-1			Q.	0.8	0.3 - 1.3		
-3	♠ Pentaerythritol-tetrastearate	4 115-83-3			net list	0.7	0.2 - 1.2		
- 3	♠ N,N'-Ethylenedi(stearamide)	4 110-30-5		97. SQ	Oll	0.7	0.2 - 1.2		

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136107783 / 2

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MDS Report Substances of assemblies and materials

Materials which are subject to legal prohibitions must not be included! Dangerous substances formed or released during use must also be declared Please note: GADSL list for substances that require declaration

2. Cha	aracterization	n of tl		ote: GADSL list t	190ses of for			claration		
Part/Item I Description	No.: 851227 n: Entko p	75 oplungse BRI	element Rail N47C	FOR HELDER	Re IMI No	port No.: DS ID / Vers de ID:	sion:	- 136107783 / 2 594393192		
Tree Level	Description Article Name Name Substance name		② Part/Item No. ② Item-/MatNo. ¹₃ Material-No. △ CAS No.	IMDS ID / Version	Quantity	Weight	Portion	Portion (from - to) [%]	GADSL,	Parts Marking Recyclate (Indust./Consumer)
1	Entkopplungselement R	Rail N47C	8512275	136107783 / 2		3.45				Not Applicable
- 2	♣ AEM			50588718 / 3		3.45			5.3	№ No
- 3	♦ AEM	HIT.	\Delta -				52.	5		
<u></u> -3	Carbon black		4 1333-86-4				39	9 37 - 41		



IMDS ID / Version: 136107783 / 2 Page: 3 / 3

User: Garvey, Anna Date: 7/28/16 10:46:37 AM

Free Level	Description Article Name Name Substance name	Part/Item No. Item-/MatNo. Material-No. CAS No.	IMDS ID / Version	Quantity	Ø ⊌ % Weight	Portion	Portion (from - to) [%]	GADSL,	Parts Marking Recyclate (Indust/Consumer) Application [ID]
 3	♠ Bis[2-[2-(2-butoxyethoxy)ethoxy]ethyl] adipate	4 65520-46-9				5.3	4.3 - 6.3		
├ 3	♦ Stearic acid	4 57-11-4				1	0.7 - 1.3		
- 3	♦ Octadecylamine	4 124-30-1			<u>ن</u> ي.	0.3	0.1 - 0.5		
- 3	4-(1-Methyl-1-phenylethyl)-N-[4- (1-methyl-1- phenylethyl)phenyl]aniline	4 10081-67-1		ज्याप्त, या	otherit	1.2	0.9 - 1.5		
- 3	♦ Octadecan-1-ol, ethoxylated, phosphates	4 62362-49-6	at a	Poses differ		0.7	0.4 - 1		

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MDS Report Substances of assemblies and materials

Materials which are subject to legal prohibitions must not be included!

Dangerous substances formed or released during use must also be declared

Please note: GADSL list for substances that require declaration

2. Characterization of the Component

Part/Item No.:

1466383

Description:

profile gasket

Report N

-

IMDS ID / Version:

226469658 / 1

Node ID:

226469658

	Description Article Name Name Substance name	Part/Item No. Item-/MatNo. Material-No. CAS No.	IMDS ID / Version	Quantity	Ø 🍑 🐁 Weight	Portion	Portion (from - to) [%]	GADSL,	Parts Marking Recyclate (Indust./Consumer)
	profile gasket	1466383	226469658 / 1		14.01				Not Applicable
-2	AEM		731022 / 8		14.01		***	5.3	№ No
- 3	♠ Carbon black	4 1333-86-4				40	36 - 44		
- 3	♦ Stearic acid	4 57-11-4				1.2	1 - 1.4		
 -3	♠ Octadecylamine	4 124-30-1				1	0.5 - 1.5		



IMDS ID / Version: 226469658 / 1 Page: 3 / 3

User: Garvey, Anna Date: 7/28/16 10:43:37 AM

Description Article Name Name Substance name	Part/Item No. Item-/MatNo. Material-No. CAS No.	IMDS ID / Version	Quantity	₩ eight	Portion	Portion (from - to) [%]	GADSL, SVHC	Parts Marking Recyclate (Indust/Consumer) Application [ID]
Octadecan-1-ol, ethoxylated, phosphates	4 62362-49-6				0.7	0.5 - 0.9		
♦ AEM	4 -				49.5			
4-(1-Methyl-1-phenylethyl)-N-[4- (1-methyl-1- phenylethyl)phenyl]aniline	1 0081-67-1			aller use.	1.1	0.8 - 1.4		
Siloxanes and silicones, di-Me, hydroxy-terminated	4 70131-67-8		कु तिर्धि वर्षि	S	0.5	0.3 - 0.7		
Bis[2-[2-(2-butoxy)ethoxy)ethoxy] adipate	4 65520-46-9	Duff	ostited		6	5-7		
	This is an und	controlled conv of a	Variable and the second		IMDS. End o	f the report.		
		ansent of copyright of						
	Article Name Name Substance name Cotadecan-1-ol, ethoxylated, phosphates AEM A-(1-Methyl-1-phenylethyl)-N-[4-(1-methyl-1-phenylethyl)phenyl]aniline Siloxanes and silicones, di-Me, hydroxy-terminated	Article Name Name Name CAS No.	Article Name Name Name CAS No. Octadecan-1-ol, ethoxylated, phosphates AEM 4-(1-Methyl-1-phenylethyl)-N-[4-(1-methyl-1-phenylethyl)phenyl]aniline Siloxanes and silicones, di-Me, hydroxy-terminated Bis[2-[2-(2-butoxylethoxy]ethoxy]ethoxy]ethoxylethyl] adipate	Article Name Name Name CAS No. CAS No. CAS No. CAS No. CAS No. A 62362-49-6 Phosphates A EM A-(1-Methyl-1-phenylethyl)-N-[4-(1-methyl-1-phenylethyl)phenyl]aniline Siloxanes and silicones, di-Me, hydroxy-terminated Bis[2-[2-(2-butoxyethoxy]ethyl] adipate This is an uncontrolled converted a document.	Article Name Material-No. CAS No. Octadecan-1-ol, ethoxylated, phosphates AEM A-(1-Methyl-1-phenylethyl)-N-[4-(1-methyl-1-phenylethyl)phenyl]aniline Siloxanes and silicones, di-Me, hydroxy-terminated Bis[2-[2-(2-butoxyethoxy]ethyl] adipate IMDS ID / Version Quantity Weight Material-No. 62362-49-6 Mosphates A 10081-67-1 A 10081-67-1	Article Name Name Name CAS No. CAS No. CAS No. CAS No. Material-No. CAS No. CAS No. Material-No. Material-No. CAS No. CAS No. Material-No. Ma	Article Name Name Name Substance name CAS No. C	Article Name Name Name CAS No.



IMDS ID / Version:

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User: Garvey, Anna

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MDS Report Substances of assemblies and materials

Materials which are subject to legal prohibitions must not be included!

Dangerous substances formed or released during use must also be declared

Please note: GADSL list for substances that require declaration

2. Characterization of the Component

Part/Item No.:

A 112 016 00 00

Description:

Dichtring

RALICO

Report No.:

IMDS ID / Version:

65423973 / 3

Node ID:

369212340

	Description Article Name Name Substance name	Part/Item No. Item-/MatNo. Material-No. CAS No.	IMDS ID / Version	Quantity	Ø → % Weight	Portion	Portion (from - to) [%]	GADSL,	Parts Marking Recyclate (Indust./Consumer)
	Dichtring	@ A 112 016 00 00	65423973 / 3		4.85				Not Applicable
-2	AEM		730856 / 8		4.85			5.3	No No
- 3	♠ Carbon black	4 1333-86-4				31	28 - 34		
- 3	♦ Stearic acid	♦ 57-11-4				1	0.5 - 1.5		
 -3	♦ Octadecylamine	4 124-30-1			,	0.7	0.4 - 1		

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User: Garvey, Anna Date: 7/28/16 10:38:45 AM

Tree Level	Description Article Name Name Substance name	Part/Item No. Item-/MatNo. Material-No. CAS No.	IMDS ID / Version	Quantity	Ø ❷ % Weight	Portion	Portion (from - to) [%]	GADSL,	☐ Parts Marking ☐ Recyclate (Indust/Consumer) ☐ Application [ID]
├ 3	♦ Octadecan-1-ol, ethoxylated, phosphates	4 62362-49-6				0.5	0.3 - 0.7		
-3	♦ AEM	△ -				59			
- 3	4-(1-Methyl-1-phenylethyl)-N-[4- (1-methyl-1- phenylethyl)phenyl]aniline	4 10081-67-1			other use.	1.2	0.9 - 1.5		
- 3	Siloxanes and silicones, di-Me, hydroxy-terminated	4 70131-67-8		as only and		0.6	0.4 - 0.8		
- 3	Bis[2-[2-(2-butoxyethoxy)ethoxy]ethyl] adipate	4 65520-46-9	Pur	ostifed		6	5 - 7		

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MDS Report Substances of assemblies and materials

Materials which are subject to legal prohibitions must not be included!

Dangerous substances formed or released during use must also be declared

Please note: GADSL list for substances that require declaration

2. Characterization of the Component

Part/Item No.:

A 023 997 20 45

Description:

Dichtring

Bruss 11875 464

Report No.:

IMDS ID / Version:

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lode ID:

304587348

Free Level	Description Article Name Name Substance name	Part/Item No. Item-/MatNo. Material-No. CAS No.	IMDS ID / Version	Quantity	Ø 🍑 🔧 Weight	Portion	Portion (from - to) [%]	GADSL,	Parts Marking Recyclate (Indust./Consumer) Application [ID]
	Dichtring	A 023 997 20 45	304587348 / 1		1.5				Not Applicable
-2	♣ AEM		729147 / 7		1.5		100	5.3	No No
- 3	♠ Carbon black	4 1333-86-4				39	37 - 41		
- 3	Bis[2-[2-(2-butoxy]ethyl] adipate	4 65520-46-9				5.3	4.3 - 6.3		

IMDS ID / Version: 304587348 / 1 Page: 3 / 3

User: Garvey, Anna Date: 7/28/16 10:34:00 AM

ree Level	Description Article Name Name Substance name	Part/Item No. Item-/MatNo. Material-No. CAS No.	IMDS ID / Version	Quantity	Weight	Portion	Portion (from - to)	GADSL,	Parts Marking Recyclate (Indust/Consumer) Application [ID]
├ 3	♦ Stearic acid	♦ 57-11-4				1	0.7 - 1.3		
- 3	△ AEM	4 -				52.5			
- 3	4-(1-Methyl-1-phenylethyl)-N-[4- (1-methyl-1- phenylethyl)phenyl]aniline	4 10081-67-1			reilise.	1.2	0.9 - 1.5		
- 3	Octadecan-1-ol, ethoxylated, phosphates	4 62362-49-6		अग्रेप, अग्रे	otti	0.7	0.4 - 1		
- 3	♠ Octadecylamine	4 124-30-1		ses dio		0.3	0.1 - 0.5		

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Materials which are subject to legal prohibitions must not be included! Dangerous substances formed or released during use must also be declared Please note: GADSL list for substances that require declaration

2. Cha	aracterization of	the Compo	Decrayin	oses of for equired for	nces that r	equire dec	claration		
Part/Item N Description		Sauss WII	For its diffe	Re IMI No	port No.: DS ID / Vers de ID:		- 412753538 / 1 412753538		
Tree Level	Description Article Name Name Substance name	Part/Item No. Item-/MatNo. Material-No. CAS No.	IMDS ID / Version	Quantity	Ø → % Weight	Portion	Portion (from - to) [%]	GADSL,	Parts Marking Recyclate (indust/Consumer) Application [ID]
1	gasket	12700375A	412753538 / 1		1.771				Not Applicable
- 2	♣ AEM		3632144 / 6		1.75			5.3	No No
- 3	♠ Carbon black	1333-86-4				19	9 17 - 21		
- 3	♠ Coke (petroleum), calcined	4 64743-05-1				2:	2 20 - 24		
- 3	♠ Cellulose	4 9004-34-6				7.5	5 6-9		

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User: Garvey, Anna Date: 7/28/16 10:28:13 AM

Free Level	Description Article Name Name Substance name	Part/Item No. Item-/MatNo. Material-No. CAS No.	IMDS ID / Version	Quantity	Ø 🍑 🗞 Weight	Portion	Portion (from - to) [%]	GADSL,	Parts Marking Recyclate (Indust/Consumer) Application [ID]
-3	♦ Stearic acid	4 57-11-4				0.5	0.3 - 0.7		
- 3	♦ AEM	4-				43.5			
- 3	♠ Bis[2-[2-(2- butoxyethoxy)ethoxy]ethyl] adipate	4 65520-46-9			Seo.	5	4 - 6		
- 3	4-(1-Methyl-1-phenylethyl)-N-[4- (1-methyl-1- phenylethyl)phenyl]aniline	4 10081-67-1		ारीप वार्	other use.	1	0.5 - 1.5		
- 3	♠ Calcium-carbonate	471-34-1		oses of to.		1	0.5 - 1.5		
-3	♠ Octadecylamine	4 124-30-1	n Pill	edin		0.5	0.3 - 0.7		
-2	slide coating		21068026/4		0.021			9.2	
 3	♠ Perfluoropolyether	4 60164-51-4	tor itight	14		100			

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De Gating applied post oven tempering 1e, us Air emission.



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MDS Report Substances of assemblies and materials

Materials which are subject to legal prohibitions must not be included! Dangerous substances formed or released during use must also be declared Please note: GADSL list for substances that require declaration

2. Characterization of the Component

Part/Item No.: Description:

420.239-01

Report No.:

IMDS ID / Version:

45892900 / 3

Dichtung 39,5x3,7 / sealing 38,5x3,7

Node ID:

334877937

Tree Level	Description Article Name Name Substance name	Part/Item No. Item-/Mat-No. Material-No. CAS No.	IMDS ID / Version	Quantity	Ø ♣ ♣ Weight	Portion	Portion (from - to) [%]	GADSL,	Parts Marking Recyclate (Indust./Consumer) Application [ID]
	Dichtung 39,5x3,7 / sealing 38,5x3,7	420.239-01	45892900 / 3		2.72				Not Applicable
-2	♣ AEM		730930 / 8		2.72			5.3	No No
-3	Carbon black	4 1333-86-4				31	28 - 34		
 -з	♦ Stearic acid	4 57-11-4				0.7	0.4 - 1		

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User: Garvey, Anna Date: 7/28/16 10:26:09 AM

Free Level	Description Article Name Name Substance name	Part/item No. Item-/MatNo. Material-No. CAS No.	IMDS ID / Version	Quantity	Ø → ♣ Weight	Portion [%]	Portion (from - to) [%]	GADSL,	 ☑ Parts Marking ♣ Recyclate (Indust/Consumer) ♠ Application [ID]
-3	♠ Octadecylamine	4 124-30-1				1	0.5 - 1.5		
-3	♦ Octadecan-1-ol, ethoxylated, phosphates	4 62362-49-6				0.4	0.2 - 0.6		
- 3	♦ AEM	4 -			Jeo.	59			
├ 3	4-(1-Methyl-1-phenylethyl)-N-[4- (1-methyl-1- phenylethyl)phenyl]aniline	4 10081-67-1		ज्योत्रं व्या	otherit	1.2	0.9 - 1.5		
- 3	Siloxanes and silicones, di-Me, hydroxy-terminated	4 70131-67-8	N. S.	oses ato		0.7	0.5 - 0.9		
⊢ 3	Poly(oxy-1,2-ethanediyl), alpha- (2-ethyl-1-oxohexyl)-omega-((2-ethyl- 1-oxohexyl)oxy)	4 9004-93-7	inspection for			6	5 - 7		

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MDS Report Substances of assemblies and materials

Materials which are subject to legal prohibitions must not be included! Dangerous substances formed or released during use must also be declared Please note: GADSL list for substances that require declaration

2. Cha	aracterization of		nent For inspection part	for substa	nces that re	equire dec	claration		
Part/Item I Description		5105 Bruss 1	For install Co.		port No.: DS ID / Vers de ID:	ion:	15820 65257549 / 1 65257549		
Tree Level	Description Article Name Name Substance name	Part/item No. Item-/MatNo. Material-No. CAS No.	IMDS ID / Version	Quantity	Ø 🍑 🐁 Weight	Portion	Portion (from - to)	GADSL,	Parts Marking Recyclate (Indust./Consumer)
1	DR 67,8 x 3,5/OS	24242872	65257549 / 1		1.79				Not Applicable
- 2	♣ AEM		5063215 / 5		1.79	-		5.3	No No
- 3	♠ Carbon black	4 1333-86-4				38	36 - 40		
- 3	♦ Stearic acid	♦ 57-11-4				1.2	0.9 - 1.5		
- 3	♦ Octadecylamine	4 124-30-1				0.9	0.3 - 0.7		

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IMDS ID / Version: 65257549 / 1 Page: 3 / 3

User: Garvey, Anna Date: 7/28/16 10:18:33 AM

Tree Level	Description Article Name Name Substance name	Part/Item No. Item-/MatNo. Material-No. CAS No.	IMDS ID / Version	Quantity	Ø → % Weight	Portion	Portion (from - to) [%]	GADSL,	 ☑ Parts Marking ☑ Recyclate (Indust/Consumer) △ Application [ID]
- 3	♦ Octadecan-1-ol, ethoxylated, phosphates	4 62362-49-6				0.9	0.7 - 1.1		
- 3	♦ AEM	4 >-				57.5			
- 3	4-(1-Methyl-1-phenylethyl)-N-[4- (1-methyl-1- phenylethyl)phenyl]aniline	1 0081-67-1			other use.	1.2	0.9 - 1.5		
- 3	Siloxanes and silicones, di-Me, hydroxy-terminated	4 70131-67-8		25 0114. यात्र		0.7	0.5 - 0.9		



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MDS Report Substances of assemblies and materials

Materials which are subject to legal prohibitions must not be included! Dangerous substances formed or released during use must also be declared Please note: GADSL list for substances that require declaration

2. Cha	aracteriz	ation of	Please in the Compo	nent red in the state of the st	for substa	nces that re	equire dec	claration		
Part/Item N Description		0561-102-06 Gasket	25 RUSS 11622	For Minde	Re IMI No	port No.: DS ID / Vers de ID:		- 12143280 / 3 433075838		
Tree Level	Description Article Name Name Substance n		Part/item No. Item-/MatNo. Material-No. CAS No.	IMDS ID / Version	Quantity	Ø Ø ♣ Weight	Portion [%]	Portion (from - to)	GADSL,	Parts Marking Recyclate (Indust./Consumer)
1	Gasket		0 0561-102-065	12143280 / 3		1.72				Not Applicable
- 2	♣ AEM			730882 / 6		1.72			\$ 5.3	No No
- 3	A Carbon black		4 1333-86-4				3.	1 28 - 34		
 3	♠ Stearic acid		4 57-11-4					1 0.5 - 1.5		
- 3	♠ Octadecylami	ne .	4 124-30-1				0.7	7 0.4 - 1		4.444

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User: Garvey, Anna Date: 7/28/16 10:14:43 AM

Tree Level	Description Article Name Name Substance name	Part/Item No. Item-/MatNo. Material-No. CAS No.	IMDS ID / Version	Quantity	Ø → % Weight	Portion	Portion (from - to) [%]	GADSL, SVHC	Parts Marking Recyclate (Indust/Consumer) Application [ID]
- 3	♦ Octadecan-1-ol, ethoxylated, phosphates	4 62362-49-6				0.5	0.3 - 0.7		
- 3	Bis[2-[2-(2-butoxyethoxy)ethoxy]ethyl] adipate	4 65520-46-9				-6	5 - 7		
- 3	♦ AEM	4)-			, 115°.	59			
	4-(1-Methyl-1-phenylethyl)-N-[4- (1-methyl-1- phenylethyl)phenyl]aniline	4 10081-67-1		as only and	Other	1.2	0.9 - 1.5		
-3	Siloxanes and silicones, di-Me, hydroxy-terminated	4 70131-67-8	Putt	editied		0.6	0.4 - 0.8		

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ITEM 1: A2-1 – A2-4 EMISSION ASSESSMENT REPORT

APPENDIX III AIR EMISSION SURVEY A2-1-A204RUBBER FUME

Consent of congregation particular transfer from the congregation of the congregati



TMS Environment Ltd 53 Broomhill Drive Tallaght Dublin 24 Phone: +353-1-4626710 Fax: +353-1-4626714 Web: www.tmsenv.ie

Revision Date: 20 December 2017



CONFIDENTIAL REPORT

ANNUAL AIR EMISSIONS SURVEY 2017

> AT G BRUSS GMBH Finisklin Road, Sligo

Licence Reg. P0465-01
TMS Environment Ref. 23888 Rev 2.0

Commencement Date: 11 January 2017 Completion Date: 13 April 2017

ReportingSite PersonnelAnalystsEnda FloodEnda FloodSarah KearneyTim HurleyIsabel Kerins

Approved by: Date: 20 December 2017

Imelda Sharahan

Dr Imelda Shanahan

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Technical Manager

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EXECUTIVE SUMMARY

This Air Emissions report presents results of emissions monitoring from emission point A2-01, A2-02, A2-03 &, A2-04 at G Bruss GmbH, Finisklin Road, Sligo, County Sligo. Monitoring has been conducted to satisfy the customer's requirements in respect of the following parameters, having regard to relevant substances listed in Table 6.1 of the Agency's "BAT Guidance Note for Manufacturing of Organic Chemicals"

Monitoring Scope	Annual Rubber Fume Emissions Monitoring 2017					
Emission Point	Parameter					
A2-1, A2-2, A2-3 & A2-4	 Carcinogenic substances listed as Class I, II or III Organic substances listed as Class I or Class II Total Organic Carbon as Carbon (TOC as C) Mercaptans Amines (Total) Trimethylamine Phenols, Cresols and xylols Toluene di-idocyante Organic Substances with Photochemical Ozone Potential (R59) Vaporous or Gaseous Inorganic Substances listed as Class I, II III or IV Inorganic Dust Particles Class I, II or III Total Particulates Rubber Fume Velocity and Temperature Moisture Moisture 					

Measurements were completed during a two day site visit on 11 & 12 January 2017. Details of the monitoring methods employed, Standard Reference Methods used and Guidance Notes consulted are presented in Section 4.0 of this report together with information on the equipment used and the monitoring personnel.

Prior to the site visit a review of all products used in the drying ovens was undertaken to identify which substances would be present in the emission streams, and the monitoring and analysis techniques to be used to report the concentration of these substances.

Monitoring for Total Particulate was carried out at each emission point, with subsequent analysis to determine the Rubber Fume composition of the total particulate. Additionally, at each emission point, monitoring of speciated Volatile Organic Compounds (VOC's) and Total Organic Carbon as Carbon (TOC as C) was also completed.

Monitoring at each location occurred at a location post the Electro Static Precipitators (ESP) abatement unit in each of the vents. To monitor "pre abatement" conditions, monitoring were

G Bruss GmBH P0465-01 Air Emissions Report 2017 Ref. 23888 Rev 2.0, Page 2 of 14 carried out at the same locations, however the ESP systems were turned off, details of the ESP units are included in Table 2-1.

The results for all of the measurement parameters reported are compared with the Licence Limit Values specified in the customer's IPPC Licence. With respect to this it can be seen that results for Rubber fume are below the Licence Limit Values specified in the BAT Guidance Note for all Stacks monitored.

All compounds identified, where applicable have been classified in to a category based on the BAT Guidance Note for the Manufacture of Organic Chemical, and have been compared to the emission limits as specified in Table 6.1 BAT Associated Levels of Emissions to Air, in addition to this, all Volatile Organic Compounds, identified have also been compared to TA Luft (Technical Instructions on the Air Quality Control), in accordance with BAT guidelines, as monitoring has been conducted at an existing facility.



1.0	Scope
2.0	Survey protocol
2.1	Protocol
3.0	Monitoring Results
3.1	Results for A2-01- Pre Abatement, 12 Jan 2017, 13:06-13:36
3.2	Results for A2-01- Post Abatement, 12 Jan 2017, 12:27 – 12:57
3.3	Results for A2-02- Pre Abatement, 12 Jan 2017, 15:34 – 16:04
3.4	Results for A2-02- Post Abatement, 12 Jan 2017, 14:52-15:22
3.5	Results for A2-03- Pre Abatement, 12 Jan 2017, 10:40-11:10
3.6	Results for A2-03- Post Abatement, 12 Jan 2017, 09:59-10:29 10
3.7	Results for A2-04- Pre Abatement, 11 Jan 2017, 15:16 – 15:46
3.8	Results for A2-04- Post Abatement, 11 Jan 2017, 16:00 – 16:30
3.9	Reference Conditions for emission point A2-01 – A2-04
4.0	Supporting Information
4.1	Supporting Information
4.2	Substance(s) monitored, SOP's and Standard Methods11
4.3	Equipment used and Quality checks
4.4	Reporting results
4.4.1	Expression of test results
4.4.2	Reporting results less than the detection limit 12
4.4.3	Uncertainty calculation

1.0 Scope

This Air Emissions report presents results of emissions monitoring from emission point A2-01 to A2-04 at G Bruss GmbH, Finisklin Road, Sligo, County Sligo.

Based on the review of the MSDS's monitoring has been conducted to satisfy the customer's requirements in respect of the following parameters:

Table 1-1Scope of Monitoring Survey

Reporting period		Annual 2017				
EMISSION PARAMETER POINT		SAMPLING METHOD AND MEDIUM & ANALYSIS METHODOLOGY	STANDARD REFERENCE METHOD			
A2-1 to A2-4	Total Particulate Rubber Fume/ Lead (Inorganic Dust Particle Class II) Speciated VOC's (organic substances Class I & Class II)	Isokinetic, Filter & rinse / Gravimetric analysis with cyclohexane extraction Non-isokinetic / Charcoal tube absorption / Analysis by solvent desorption followed by GC-MS or GC-FID	EN 13284-1:2002 CEN/TS 13649:2014			
	Organics TOC	In situ FSD, analyser	EN 12619:2013			
	Temperature, Pressure, Velocity, Flow	Pitot tube coupled with pressure measurement device or anemometer, and temperature measurement device	EN/ISO 16911-1:2013			

2.0 Survey protocol

2.1 Protocol

TMS Environment Ltd personnel conducted the monitoring survey on 11 & 12 January 2017. Emissions to atmosphere from the Emission Points A2-01, A2-02, A2-03 and A2-04 were monitored during the visit.

Particulate monitoring was conducted isokinetically with filters gravimetrically analysed to determine the concentration of total particulate matter found at each emission point, with the rubber fume concentration of the total particulate subsequently analysed via extraction with cyclohexane.

Lead particulate monitoring was conducted isokinetically with filters analysed by ICP to determine the concentration of total lead particulate matter found on filters at specific emission points.

G Bruss GmBH P0465-01 Air Emissions Report 2017 Ref. 23888 Rev 2.0, Page 5 of 14 Speciated VOC's were monitored by adsorption via charcoal sorbent tubes, flow rates through these tube was approximately 500ml/min. Tubes were subsequently sent for sub-contract analysis.

TOC as C analysis was completed *in-situ* via FID analysis, with results logged on site.

The survey was completed in order to meet the requirements of the company's IPPC Licence (Reg. No. P0465-01) for particulate matter and rubber fume concentrations, while VOC's, TOC as C and Lead particulate matter were monitored to collect information on the process on site with respect to the Client's application under Regulation 9 of the IPC Regulations 2013.

A Site Specific Protocol was prepared in accordance with EPA Air Guidance Note AG1 and CEN/TS 15675:2007 after a site review has been conducted with site personnel. A site risk assessment was completed prior to commencement of any monitoring to confirm that the monitoring could be carried out in a safe manner. All necessary PPE was worn at all times on site.

Relevant Process conditions during the survey are summarized below.

Ami.

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Table 2-1: Operational information during testing

Emission monitoring point	Date and time	Details	Products in Use in Drying Ovens	Abatement system
A2-01 Pre	12 January 2017 13:06 –	Normal operation	141617 HNBR,	ESP 08
Abatement	13:36	•	14615 HNBR,	251 00
A2-01 Post	12 January 2017 12:27 –	Normal operation –	05640 ACM	ESP 08
Abatement	12:57	ESP off	05532 ACM	ESF 06
A2-02 Pre	12 January 2017 15:34 –	Normal operation	05730 ACM	ESP 02
Abatement	16:04	Normal operation	11721 AEM	ESF 02
A2-02 Post	12 January 2017 14:52 –	Normal operation –	05532 ACM	ESP 02
Abatement	15:22	ESP off	11827 AEM	ESF 02
A2-03 Pre	12 January 2017 10:40 –	Normal operation a officer	W1150 AEM	ESP04
Abatement	11:10	1 1 2 2 1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1	11888 AEM	ESF04
A2-03 Post	12 January 2017 09:59 –	Normal operation –	11825 AEM	ESP04
Abatement	10:29	ESPLOTE	11823 AEW	ESF04
A2-04 Pre	11 January 2017 15:16 –	Normal operation	07781 FKM	ESP 03
Abatement	15:46	riormat operation	05730 ACM	ESP 05
A2-04 Post	11 January 2017 16:00 –	Normal operation –	07770 FKM	ESP 03
Abatement	16:30	ESP off	11827 AEM	ESP 05

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3.0 Monitoring Results

The results of the air emission monitoring reported in this document are presented in tables below. Where parameters have been classified according to Table 6.1 of The Agency's 'BAT Guidance Note for the Manufacture of Organic Chemicals', the sum of the total class is provided in Section 3, with individual compounds detailed Appendix I. Methods used are defined by Standard Operating Procedures (SOP), each SOP has a unique number, details regarding each SOP are given in Part 2 of this report.

3.1 Results for A2-01- Pre Abatement, 12 Jan 2017, 13:06-13:36

Parameter	Emission limit value	Emission results	Uncertainty	Units	Mass Emission kg/hr	Compliance
Total Particulate	20	< 1.5	±0.19	mg/m ³	2.13 x10 ⁻⁰³	Yes
Rubber Fume	20	0.8	±0.10 15°	mg/m ³	1.10 x10 ⁻⁰³	Yes
TOC as C	N/S	20.3		mg/m ³	0.03	N/A
Volume Flow	N/S	1,393 _{Qui}	20 etited ±81	Nm ³ /hr	-	N/A

3.2 Results for A2-01- Post Abatement, 12 Jan 2017, 12:27 – 12:57

Parameter	Emission limit value	Emission results	Uncertainty	Units	Mass Emission kg/hr	Compliance
Total Particulate	20	< 1.5	±0.19	mg/m ³	<2.09 x10 ⁻³	Yes
Rubber Fume	20	0.7	±0.09	mg/m ³	1.01 x10 ⁻⁰³	Yes
TOC as C	N/S	11.4	±2.24	mg/m ³	0.02	N/A
Volume Flow	N/S	1,426	±83	Nm ³ /hr	-	N/A

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3.3 Results for A2-02- Pre Abatement, 12 Jan 2017, 15:34 – 16:04

Parameter	Emission limit value	Emission results	Uncertainty	Units	Mass Emission kg/hr	Compliance
Total Particulate	20	< 0.4	±0.05	mg/m ³	< 4.79 x10 ⁻	Yes
Rubber Fume	20	3.4	±0.44	mg/m ³	4.48 x10 ⁻⁰³	Yes
TOC as C	N/S	34.6	±6.77	mg/m ³	0.05	N/A
Volume Flow	N/S	1,309	±76	Nm ³ /hr	-	N/A

3.4 Results for A2-02- Post Abatement, 12 Jan 2017, 14:52-15:22

Parameter	Emission limit value	Emission results	Uncertainty	Units	Mass Emission kg/hr	Compliance
Total Particulate	20	2.1	±63 Tuy die	mg/m ³	2.66 x10 ⁻⁰³	Yes
Rubber Fume	20	1.3 ection	±0.16	mg/m ³	1.62 x10 ⁻⁰³	Yes
TOC as C	N/S	28.7 Tight	±5.63	mg/m ³	0.04	N/A
Volume Flow		1,259	±73	Nm ³ /hr	-	N/A

3.5 Results for A2-03- Pre Abatement, 12 Jan 2017, 10:40-11:10

Parameter	Emission limit value	Emission results	Uncertainty	Units	Mass Emission kg/hr	Compliance
Total Particulate	20	< 1.3	±0.17	mg/m ³	< 3.56 x10 ⁻⁰³	Yes
Rubber Fume	20	4.4	±0.56	mg/m ³	0.01	Yes
TOC as C	N/S	7.0	±1.36	mg/m ³	0.02	N/A
Volume Flow	N/S	2,656	±154	Nm ³ /hr	-	N/A

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3.6 Results for A2-03 - Post Abatement, 12 Jan 2017, 09:59-10:29

Parameter	Emission limit value	Emission results	Uncertainty	Units	Mass Emission kg/hr	Compliance
Total Particulate	20	< 1.5	±0.19	mg/m ³	< 3.50 x10 ⁻⁰³	Yes
Rubber Fume	20	0.7	±0.08	mg/m ³	1.58 x10 ⁻⁰³	Yes
TOC as C	N/S	10.2	±1.99	mg/m ³	0.02	N/A
Volume Flow	N/S	2,400	±139	Nm ³ /hr	-	N/A

3.7 Results for A2-04- Pre Abatement, 11 Jan 2017, 15:16 – 15:46

Parameter	Emission limit value	Emission results	Uncertainty	Units	Mass Emission kg/hr	Compliance
Total Particulate	N/S	3.1	±0139117 off	mg/m³	7.17 x10 ⁻⁰³	Yes
Rubber Fume	20	1.5 etich	*±0.20	mg/m ³	3.53 x10 ⁻⁰³	Yes
TOC as C	N/S	3.00 april	±0.60	mg/m ³	7.14 x 10 ⁻⁰³	N/A
Volume Flow	N/S	sent 2,313	±134	Nm ³ /hr	-	N/A

3.8 Results for A2-04- Post Abatement, 11 Jan 2017, 16:00 – 16:30

Parameter	Emission limit value	Emission results	Uncertainty	Units	Mass Emission kg/hr	Compliance
Total Particulate	N/S	< 7.5	±0.95	mg/m ³	< 2.24 x10 ⁻⁰³	Yes
Rubber Fume	20	22.4	±2.85	mg/m ³	6.73 x10 ⁻⁰³	Yes
TOC as C	N/S	2.60	±0.50	mg/m ³	7.59 x 10 ⁻⁰⁴	N/A
Volume Flow	N/S	301	±17	Nm ³ /hr	-	N/A

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3.9 Reference Conditions for emission point A2-01 – A2-04

Reference Conditions for concentrations and volume flow as expressed as:

Temperature, K	Pressure, kPa	Oxygen %	Moisture %
273	101.3	N/A	Dry

4.0 Supporting Information

4.1 Monitoring team information

Name	Function	Qualification		
Enda Flood	Environmental Scientist	 PgC Green Tech (2010) UCD Dublin BAgSc (2008) UCD Dublin 		
Tim Hurley	Environmental Scientist	 Bsc (Hons) Chem, (2008) UCC MSc (Merit) GeoChem, (2009) University of Leeds 		

4.2 Substance(s) monitored, SOP's and Standard Methods ...

Substance Monitored	SOP	Standard Method	Analysis by	Accreditation Range mg/m ³	ISO 17025 Accreditation Status	Analysis Date
Total Particulate	QP-SITE-2010	EN 13248-1 ISO 9096:2003	TMS could	0.1-50 20-1,000	A	16 Jan 2017
Total Particulate (Rinse)	QP-SITE-2010	EN 13248-1 ISO 9096:2003	ger om	0.1-50 20-1,000	A	24 Jan – 02 Feb 2017
Rubber Fume	QP-SITE- 2010	EN 13248-1	TMS	0.1-50 20-1,000	С	02 Feb 2017
Lead	QP-SITE-2017	EN 14358: 2004	SAL	0.005-50	В	24 Jan – 02 Feb 2017
Speciated VOC's	QP-SITE- 2016	EN 13649: 2002	SAL	0.5-2,000	D	24 Jan – 02 Feb 2017
TOC as C	QP-SITE- 2025	EN 12619	TMS	0.6-6,200	A	11 & 12 Jan 2017
Moisture	QP-SITE- 2020	EN 14790:2005	TMS	2-40%	A	11 & 12 Jan 2017
Velocity & Temp	QP-SITE- 2006 QP- SITE2027	EN 13284- 1:2002/ EN/ISO 16911- 1:2013	TMS	2.8-25m/s 0.13-40m/s 0-1,200°C	A TMS	11 & 12 Jan 2017

Note 1: ISO 17025 Accreditation Status: A – TMS accredited for Monitoring and Analysis, , B – TMS accredited for Monitoring, Subcontract Lab accredited for Analysis, C - TMS accredited for Monitoring, non-accredited analysis by TMS, D - TMS not accredited for Monitoring, as non-accredited analysis preformed by subcontract lab.

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4.3 Equipment used and Quality checks

Equipment	Equipment ID	Quality Check
Tecora G4 Isokinetic sampler	M-S-E-1-1	Annual Calibration
Ratfisch FID	M-S-E-4-1	On-site per and post calibration check
Balance Scales	M-S-E-13-1	On Site Eccentricity check

4.4 Reporting results

4.4.1 Expression of test results

All test results are expressed to one decimal place lower than the Emission Limit Value (ELV), while uncertainty of measurement results are expressed to two decimal places lower than the ELV, e.g. where an ELV of 50mg/m^3 applies, the reported result shall be reported to the first decimal place e.g. 6.6mg/m^3 with the uncertainty of measurement reported to two decimal places, e.g. $\pm 0.12 \text{mg/m}^3$.

4.4.2 Reporting results less than the detection limit.

If a single result is reported as being less than the limit of detection, the measurement result is expressed using a less than "<" sign, e.g. <0.005 mg/Nm³. Where a number of parameter results, found to be less than the limit of detection, are expressed as an overall parameter, these results are calculated as per Section 3.3, Method 3 (Half the Limit of Detection) of the EPA BREF Guidance on the General Principles of Monitoring. This percentage method provides an estimation of the value of the measurement. It is reported without the less than "<" sign, e.g. 0.05 mg/Nm³.

4.4.3 Uncertainty calculation

An estimation of the uncertainty of measurement is attached to all measurements. Measurement uncertainties are based on calibration data and laboratory repeatability experiments. All uncertainties are given at a 95% confidence, based on applying a coverage factor of k=2 to the combined uncertainties for each measurement. The uncertainty of measurement associated with emissions monitoring are provided in the Table below.

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Table 4-1: Uncertainty of Measurement

PARAMETER	SOURCE OF UNCERTAINTY	ESTIMATE OF UNCERTAINTY %	COMBINED UNCERTAINTY %	EXPANDED UNCERTAINTY % (95% Confidence Limit)	
	Flow/ADM Manometer	1.73			
	Lancom Analyser	3.46			
	Temperature/Lancom Analyser	0.29			
Rubber Fume	Leak check**	0.00	6.38	12.75%	
	Moisture	0.58			
	Isokinetic uncertainty	0.50			
	Analytical/Lab	5.00			
	Velocity	1.15			
a	CSA	1.00			
Speciated VOC's	Pressure	0.58	4.24	8.48%	
voc s	Temperature	0.29			
	Analysis	5.00			
	Lancom Analyser	3.46		8.56%	
TOC as C	Temperature/Lancom Analyser	0.29	4.28		
	FID	2.50			
	Lancom Analyser	6			
	Temperature/Lancom Analyser	0.5	7.24		
Metals	Leak check**	2	7.24	14.48%	
(Lead)	Moisture	1 114. 1114	7.24		
	Isokinetic uncertainty	9.2 tot			
	Analytical/Lab	0.2 (d 100 100 100 100 100 100 100 100 100 10			
	Velocity Stack Temperature Stack Pressure O2 CSA Stack Pressure	17 10 1.15			
	Stack Temperature	0.29			
Volume Flow	Stack Pressure	0.58	2.90	5.81%	
	O ₂ Follytis	0.58			
	CSA	1.00			

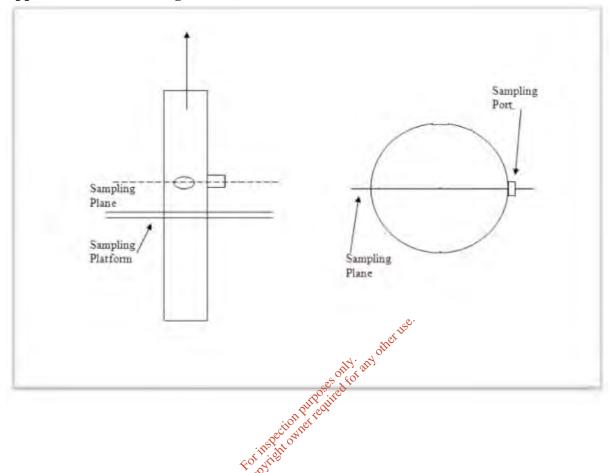
G Bruss GmBH P0465-01 ANNUAL AIR EMISSIONS
SURVEY 2017
G BRUSS GmBH
APPENDIX I
EMISSION POINT DETAILS

Licence Reg. P0465.01
TMS Environment Ref. 23888 Rev 2.0

G Bruss GmBH P0465-01

Appendix 1: Emission Point A2-01, A2-02, A2-03, A2-04

Appendix1:1 - Stack Diagram



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Stack Reference	A2-01	A2-02	A2-03	A2-04
Stack Diameter [m ²]	0.35	0.35	0.50	0.35
Stack Cross Sectional Area [m ³]	0.10	0.10	0.20	0.10
Number of Ports	2	2	2	1
Number of sampling planes	2	2	2	1
Number of Sampling points per line	1	1	1	1
Power supply available	110 supply	110 supply	110 supply	110 supply
Shelter at platform	Yes	Yes	Yes	Yes

Appendix 1:2 - Stack Measurements: VOC monitoring – A2-1 Pre Abatement

Appendix 1.2 - Stack Measurements: VOC mo	mioring 112 i i i e i i batement		
Reference method	EN 13649		
Sampling date	12 January 2017		
Sampling time	13:06-13:36		
Sampling technique			
Flue gas sampling system	SKC pump with Tygon tubing and low flow tube holder		
Oxygen measurement technique	FGA		
Material			
Sampling material	Charcoal tubes		
Sampling conditions			
Average sampling flow rate [l/min]] 0.5 per tube		
Total sampling time [min]	30		
Sampled volume of the dry gas at STP [m ³]	0.013		
Average flue gas temp temperature [°C]	39.7		
Reference conditions	Actual conditions		
Moisture [%] Dry	Moisture [%] 0.9		
Temperature [K] 273	Temperature [K] 313		
Pressure [kPa] 101.3	Pressure [kPa] 100.2		
Oxygen [%] N/A	Oxygen [%] N/A		
Deviation from isokinetic conditions [%]	NA S		
Deviation from reference method	There was no deviation from reference		
N	method.		

Appendix 1:3 - Stack Measurements: Particulate & Rubber Fume Monitoring - A2-1 Pre Abatement

Abatement	
Reference method	EN 13284
Sampling date	12 January 2017
Sampling time	13:06-13:36
Sampling technique	
Flue gas sampling system	Isokinetic in stack filtration system
Oxygen measurement technique	Flue Gas Analyser
Material	
Sampling probe material	Titanium
Filter material	Titanium
Sampling conditions	
Probe temperature [°C]	120
Filtration temperature [°C]	120
Average sampling flow rate [l/min]	7.83
Total sampling time [min]	30
Sampled volume of the dry gas at STP [m ³]	0.20
Average flue gas velocity [m/s]	4.70
Nozzle diameter [mm]	7
Ratio of highest to lowest velocity	< 1:3
Swirl test result	Pass Met
Initial leak test result [% of expected sampling	Pass the state of
flow rate]	es distail
Final leak test result [% of average samplings	Side Control of the C
flow rates	
Average flue gas temp temperature [C]	39.7
Moisture [%] N/A	Actual conditions
Moisture [%] N/A	Moisture [%] 0.9
Temperature [K] 273	Temperature [K] 313
Temperature [K] 273 Pressure [kPa] 101.3 of the line o	Pressure [kPa] 100.2
- 78 E - 1	Oxygen [%] N/A
Deviation from isokinetic conditions [%]	0.2
Deviation from reference method	There was no deviation from reference
	method.

Appendix 1:4 - Stack Measurements: TOC Monitoring - A2-1 Pre Abatement

Appendix 1:4 - Stack Measuren Re	eference method	EN 12619		
	Sampling date	12 January 2017		
	Sampling time	13:06-13:36		
Sampling technique				
	TOC	Flame ionisa	tion detection	
Material				
Samplin	g probe material	SS, PTFE		
	Fuel	Hydrogen		
Spai	n calibration gas	Propane 90.0) ppm	
Zero	o calibration gas	Ambient air	after passing charcoal filter	
Span gas drift	[% of the range]	<2		
Zero gas drift	[% of the range]	<2		
Sampling conditions				
Duct diameter [m]		0.35		
Number of sampling ports		2		
	Number of sampling lines		Single point sampling	
	emperature [°C]	180		
Number of samplin		1		
	as velocity [m/s]	4.70		
Average flue gas temp t	emperature [°C]	39.7 the		
Sampling conditions		July any		
Conditions	Refere	nce	Sampling plane	
Moisture	Dry		0.9	
Temperature [K]	ion 273		313	
Pressure [kPa]	<u> </u>		100.2	
Oxygen [%]	nod colling of 101.	A N/A		
Deviation from reference meth	od (%,			
There was no deviation from ref	erence method			
ල්	Þ			

G Bruss GmBH P0465-01 **Appendix 1:5 - Stack Measurements: VOC monitoring - A2-1 Post Abatement**

Appendix 1:5 - Stack Measurements: VOC inc	mitoring - A2-1 Post i	Abatement
Reference method	EN 13649	
Sampling date	12 January 2017	
Sampling time	12:27-12:57	
Sampling technique		
Flue gas sampling system	SKC pump with Ty flow tube holder	gon tubing and low
Oxygen measurement technique	FGA	
Material		
Sampling material	Charcoal tubes	
Sampling conditions		
Average sampling flow rate [l/min]	0.5 per tube	
Total sampling time [min]	30	
Sampled volume of the dry gas at STP [m ³]	0.013	
Average flue gas temp temperature [°C]	37.8	
Reference conditions	Actual co	onditions
Moisture [%] Dry	Moisture [%]	0.64
Temperature [K] 273	Temperature [K]	311
Pressure [kPa] 101.3	Pressure [kPa]	100.8
Oxygen [%] N/A	Oxygen [%]	N/A
Deviation from isokinetic conditions [%]	N/A: and	
Deviation from reference method	There was no devia	ation from reference
agt.	method.	
Deviation from reference method Consent of convinge tight owner to convenience t		

Appendix 1:6 - Stack Measurements: Particulate & Rubber Fume Monitoring - A2-1 Post Abatement

Post Adatement		
Reference method	EN 13284	
Sampling date	12 January 2017	
Sampling time	12:27-12:57	
Sampling technique		
Flue gas sampling system	Isokinetic in stack fil	tration system
Oxygen measurement technique	Flue Gas Analyser	
Material		
Sampling probe material	Titanium	
Filter material	Titanium	
Sampling conditions		
Probe temperature [°C]	120	
Filtration temperature [°C]	120	
Average sampling flow rate [l/min]	8.10	
Total sampling time [min]	30	
Sampled volume of the dry gas at STP [m ³]	0.21	
Average flue gas velocity [m/s]	4.74	
Nozzle diameter [mm]	7	
Ratio of highest to lowest velocity	< 1:3	
Swirl test result	Pass Mer	
Initial leak test result [% of expected sampling	Olly, and	
flow rate]	es a foi t	
Final leak test result [% of average samplings		
flow rates		
Average flue gas temp temperature [C]	37.8	
Reference conditions	Actual co	
Moisture [%] N/A	Moisture [%]	0.64
Temperature [K] 273	Temperature [K]	311
Pressure [kPa] 101.3 of the last of the la	Pressure [kPa]	100.8
Oxygen [%] N/A	Oxygen [%]	N/A
Deviation from isokinetic conditions [%]	0.2	
Deviation from reference method	There was no devia	ntion from reference
	method.	

Appendix 1:7 - Stack Measurements: TOC Monitoring - A2-1 Post Abatement

R	Reference method		
Sampling date		12 January 2017	
Sampling time		12:27-12:57	
Sampling technique			
TOC		Flame ionisation detection	
Material			
Sampling probe material		SS, PTFE	
Fuel		Hydrogen	
Span calibration gas		Propane 90.0 ppm	
Zero calibration gas		Ambient air after passing charcoal filter	
Span gas drift [% of the range]		<2	
Zero gas drift [% of the range]		<2	
Sampling conditions			
Duct diameter [m]		0.35	
Number of sampling ports		2	
Number of sampling lines		Single point sampling	
Heated line temperature [°C]		180	
Number of sampling points per line		1	
Average flue gas velocity [m/s]		4.74	
Average flue gas temp t	temperature [°C]	37.8 the	
Sampling conditions	T	aly any	
Conditions	Refere	nce	Sampling plane
Moisture	Dry		0.64
Temperature [K]	ion \$273		311
Pressure [kPa]	200° 04° 101.		100.8
Oxygen [%]	N/A	L	N/A
Deviation from reference meth	*		
There was no deviation from ref	erence method		
ර	ip.		

G Bruss GmBH P0465-01 Appendix 1:8 - Stack Measurements: VOC monitoring - A2-2 Pre Abatement

Appendix 1:6 - Stack Measurements: VOC mointoring - A2-2 Pre Abatement				
Reference method	EN 13649			
Sampling date	12 January 2017			
Sampling time	15:34-16:04			
Sampling technique				
Flue gas sampling system	SKC pump with Tygon tubing and low flow tube holder			
Oxygen measurement technique	FGA			
Material				
Sampling material	Charcoal tubes			
	Chartoan taces			
Sampling conditions				
Average sampling flow rate [l/min]	0.5 per tube			
Total sampling time [min]	30			
Sampled volume of the dry gas at STP [m ³]	0.014			
Average flue gas temp temperature [°C]	39.6			
Reference conditions	Actual co	onditions		
Moisture [%] Dry	Moisture [%]	0.72		
Temperature [K] 273	Temperature [K]	313		
Pressure [kPa] 101.3	Pressure [kPa]	100.6		
Oxygen [%] N/A	Oxygen [%]	N/A		
Deviation from isokinetic conditions [%]	N/A: and			
Deviation from reference method	1			
all the second s	method.			
Deviation from reference method Consent of convinge tight owner to converge to the converge t				

Appendix 1:9 - Stack Measurements: Particulate & Rubber Fume Monitoring - A2-2 Pre Abatement

Abatement			
Reference method	EN 13284		
Sampling date	12 January 2017		
Sampling time	15:34-16:04		
Sampling technique			
Flue gas sampling system	Isokinetic in stack filtration system		
Oxygen measurement technique	Flue Gas Analyser		
Material			
Sampling probe material	Titanium		
Filter material	Titanium		
Sampling conditions			
Probe temperature [°C]	120		
Filtration temperature [°C]	120		
Average sampling flow rate [l/min]	30.37		
Total sampling time [min]	30		
Sampled volume of the dry gas at STP [m ³]	0.85		
Average flue gas velocity [m/s]	4.39		
Nozzle diameter [mm]	7		
Ratio of highest to lowest velocity	< 1:3		
Swirl test result	Pass Met		
Initial leak test result [% of expected sampling	Pass of the first		
flow rate]	es a for		
Final leak test result [% of average samplings	We construct the second		
flow rates			
Average flue gas temp temperature [C]	39.6		
Moisture [%] N/A	Actual conditions		
Moisture [%] N/A	Moisture [%] 0.72		
Temperature [K] 273 Pressure [kPa] 101.3 of the line	Temperature [K] 313		
Pressure [kPa] 101.3 gree	Pressure [kPa] 100.6		
- 18- []	Oxygen [%] N/A		
Deviation from isokinetic conditions [%]	0.2		
Deviation from reference method	There was no deviation from reference		
	method.		

Appendix 1:10 - Stack Measurements: TOC Monitoring - A2-2 Pre Abatement

Appendix 1.10 - Stack Weasure Re	eference method	EN 12619		
	Sampling date	12 January 2017		
	Sampling time	15:34-16:04		
Sampling technique				
	TOC	Flame ionisa	ntion detection	
Material				
Samplin	g probe material	SS, PTFE		
	Fuel	Hydrogen		
	n calibration gas	Propane 90.0	**	
	o calibration gas		after passing charcoal filter	
	[% of the range]	<2		
	[% of the range]	<2		
Sampling conditions				
	Duct diameter [m]		0.35	
Number of sampling ports		2		
Number of sampling lines		Single point sampling		
Heated line temperature [°C]		180		
	Number of sampling points per line			
	as velocity [m/s]			
Average flue gas temp t	emperature [°C]	39.6 Mer		
Sampling conditions		ONLY SULL		
Conditions	Refere	nce'	Sampling plane	
Moisture	Dry		0.72	
Temperature [K]	ion 273	2	313	
Pressure [kPa]	ger of 101	3	100.6	
Oxygen [%]	N/A	L	N/A	
Deviation from reference meth	od o			
There was no deviation from refe	erence method			
Cos	Y			

Appendix 1:11 - Stack Measurements: VOC monitoring - A2-2 Post Abatement

Appendix 1.11 - Stack Measurements. VOC 1	nomtoring - A2-2 r ost	Abatement	
Reference method	EN 13649		
Sampling date	12 January 2017		
Sampling time	14:52-15:22		
Sampling technique			
Flue gas sampling system	SKC pump with Ty	gon tubing and low	
	flow tube holder		
Oxygen measurement technique	FGA		
Material			
Sampling material	Charcoal tubes		
Sampling conditions			
Average sampling flow rate [l/min]	0.5 per tube		
Total sampling time [min]	30		
Sampled volume of the dry gas at STP [m ³]	0.014		
Average flue gas temp temperature [°C]	39.8	39.8	
Reference conditions	Actual co	onditions	
Moisture [%] Dry	Moisture [%] 1.88		
Temperature [K] 273	Temperature [K]	313	
Pressure [kPa] 101.3	Pressure [kPa]	100.0	
Oxygen [%] N/A	Oxygen [%]	N/A	
Deviation from isokinetic conditions [%]	N/A: and		
Deviation from reference method	There was no deviation from reference		
<u>s</u>	method.		
Consent of congridation from the consent of congression from the congressio			

Appendix 1:12 - Stack Measurements: Particulate & Rubber Fume Monitoring - A2-2 Post Abatement

Post Abatement			
Reference method	EN 13284		
Sampling date	12 January 2017		
Sampling time	14:52-15:22		
Sampling technique			
Flue gas sampling system	Isokinetic in stack filtration system		
Oxygen measurement technique	Flue Gas Analyser		
Material			
Sampling probe material	Titanium		
Filter material	Titanium		
Sampling conditions			
Probe temperature [°C]	120		
Filtration temperature [°C]	120		
Average sampling flow rate [l/min]	8.80		
Total sampling time [min]	30		
Sampled volume of the dry gas at STP [m ³]	0.25		
Average flue gas velocity [m/s]	4.30		
Nozzle diameter [mm]	7		
Ratio of highest to lowest velocity	< 1:3 S		
Swirl test result	Pass Med		
Initial leak test result [% of expected sampling	Pass Her of the control of the contr		
flow rate]	es a for		
Final leak test result [% of average samplings			
now paregr			
Average flue gas temp temperature [C]	39.8		
Moisture [%] N/A	Actual conditions		
Moisture [%] N/A	Moisture [%] 1.88		
Temperature [K] 273	Temperature [K] 313		
Temperature [K] 273 Pressure [kPa] 101.3 of the limit of	Pressure [kPa] 100.0		
, 78 F. 1	Oxygen [%] N/A		
Deviation from isokinetic conditions [%]	0.2		
Deviation from reference method	There was no deviation from reference		
	method.		

Appendix 1:13 - Stack Measurements: TOC Monitoring - A2-2 Post Abatement

Ro	eference method	EN 12619		
	Sampling date	12 January 2017		
	Sampling time	14:52-15:22		
Sampling technique				
	TOC	Flame ionisa	tion detection	
Material				
Samplin	g probe material	SS, PTFE		
	Fuel	Hydrogen		
Spa	n calibration gas	Propane 90.0) ppm	
Zero	o calibration gas	Ambient air	after passing charcoal filter	
Span gas drift	[% of the range]	<2		
Zero gas drift	[% of the range]	<2		
Sampling conditions				
Di	Duct diameter [m]		0.35	
Number o	Number of sampling ports		2	
Number of sampling lines		Single point	sampling	
Heated line temperature [°C]		180		
Number of samplin	g points per line	1		
Average flue ga	as velocity [m/s]	4.30		
Average flue gas temp t	emperature [°C]	39.8 Met		
Sampling conditions		aly any		
Conditions	Refere	nce	Sampling plane	
Moisture	Dry		1.88	
Temperature [K]	ion 273		313	
Pressure [kPa]			100.0	
Oxygen [%]	or itself N/A		N/A	
Pressure [kPa] Oxygen [%] Deviation from reference meth There was no deviation from ref	od og			
There was no deviation from ref	erence method			
_ ó	isc.			
•				

Appendix 1:14 - Stack Measurements: VOC monitoring - A2-3 Pre Abatement

vicasurements. VOC in	omtoring - A2-3 i ic.	Abatement		
Reference method	EN 13649			
Sampling date		12 January 2017		
Sampling time	14:52-15:22			
-				
ue gas sampling system	SKC pump with Ty	gon tubing and low		
	flow tube holder			
measurement technique	FGA			
Sampling material	Charcoal tubes			
npling flow rate [l/min]	0.5 per tube			
tal sampling time [min]	30			
Sampled volume of the dry gas at STP [m ³]		0.014		
Average flue gas temp temperature [°C]		34.6		
Reference conditions		onditions		
Dry	Moisture [%]	1.10		
273	Temperature [K]	308		
101.3	Pressure [kPa]	100.4		
N/A	Oxygen [%]	N/A		
okinetic conditions [%]	N/A: M			
ce method	79 &			
	resethed			
THE STATE OF THE S	Method.			
	Reference method Sampling date Sampling time ue gas sampling system measurement technique Sampling material mpling flow rate [l/min] tal sampling time [min] the dry gas at STP [m³] stemp temperature [°C] conditions Dry 273 101.3 N/A okinetic conditions [%]	Sampling date Sampling time Sampling time 14:52-15:22 ue gas sampling system SKC pump with Ty flow tube holder FGA Sampling material Charcoal tubes mpling flow rate [l/min] 30 the dry gas at STP [m³] the dry gas at STP [m³] Stemp temperature [°C] Stemp temperature [°C] Temperature [%] Temperature [K] Temperature [K] N/A Okinetic conditions [%] N/A Okygen [%]		

Appendix 1:15 - Stack Measurements: Particulate & Rubber Fume Monitoring - A2-3 Pre Abatement

Pre Abatement			
Reference method	EN 13284		
Sampling date	12 January 2017		
Sampling time	14:52-15:22		
Sampling technique			
Flue gas sampling system	Isokinetic in stack filtration system		
Oxygen measurement technique	Flue Gas Analyser		
Material			
Sampling probe material	Titanium		
Filter material	Titanium		
Sampling conditions			
Probe temperature [°C]	120		
Filtration temperature [°C]	120		
Average sampling flow rate [l/min]	8.37		
Total sampling time [min]	30		
Sampled volume of the dry gas at STP [m ³]	0.23		
Average flue gas velocity [m/s]	4.32		
Nozzle diameter [mm]	7		
Ratio of highest to lowest velocity	< 1:3		
Swirl test result	Pass Met		
Initial leak test result [% of expected sampling	Pass the second of the second		
flow rate]	es a for		
Final leak test result [% of average samplings	Side Control of the C		
110 W. Latey			
Average flue gas temp temperature [C]	34.6		
Moisture [%] N/A	Actual conditions		
Moisture [%] N/A	Moisture [%] 1.10		
Temperature [K] 273	Temperature [K] 308		
Temperature [K] 273 Pressure [kPa] 101.3 of the limit of	Pressure [kPa] 100.4		
- 78 - Lisa	Oxygen [%] N/A		
Deviation from isokinetic conditions [%]	0.2		
Deviation from reference method	There was no deviation from reference		
	method.		

Appendix 1:16 - Stack Measurements: TOC Monitoring - A2-3 Pre Abatement

Appendix 1.10 - Stack Weasure Re	eference method			
	Sampling date	12 January 2017		
	Sampling time	14:52-15:22		
Sampling technique				
	TOC	Flame ionisa	tion detection	
Material				
Samplin	g probe material	SS, PTFE		
	Fuel	Hydrogen		
Spar	n calibration gas	Propane 90.0) ppm	
Zero	o calibration gas		after passing charcoal filter	
Span gas drift	[% of the range]	<2		
	[% of the range]	<2		
Sampling conditions				
Duct diameter [m]		0.5		
Number of sampling ports		2		
Number of sampling lines		Single point sampling 180		
Heated line t	Heated line temperature [°C]			
Number of samplin	Number of sampling points per line			
Average flue ga	as velocity [m/s]	4.32		
Average flue gas temp t	emperature [°C]	34.6 Mer		
Sampling conditions		aly any		
Conditions	Refere		Sampling plane	
Moisture	Dry		1.10	
Temperature [K]	ion 273		308	
Pressure [kPa]	2° 4101 3		100.4	
Oxygen [%]	coritive N/A	1	N/A	
Deviation from reference meth	iod Šog,			
Oxygen [%] Deviation from reference meth There was no deviation from reference	erence method			
cos	8			
_				

Appendix 1:17 - Stack Measurements: VOC monitoring - A2-3 Post Abatement

Appendix 1.17 - Stack I	vicasurements. VOC in	omtoring - A2-3 i ost	Abatement	
	Reference method	EN 13649		
Sampling date		12 January 2017		
	Sampling time	09:59-10:29		
Sampling technique				
Fl	ue gas sampling system	SKC pump with Ty	gon tubing and low	
		flow tube holder		
Oxygen	measurement technique	FGA		
Material				
	Sampling material	Charcoal tubes		
Sampling conditions				
Average sar	npling flow rate [l/min]	0.5 per tube		
То	tal sampling time [min]	30		
Sampled volume of	the dry gas at STP [m ³]	0.014		
Average flue gas temp temperature [°C]		16.7		
Reference conditions		Actual co	onditions	
Moisture [%]	Dry	Moisture [%] 0.80		
Temperature [K]	273	Temperature [K]	290	
Pressure [kPa]	101.3	Pressure [kPa]	101.4	
Oxygen [%]	N/A	Oxygen [%]	N/A	
Deviation from is	okinetic conditions [%]	N/A: and		
Deviation from reference	ce method	79 &		
	alth	method.		
	consent of convindence that the re-	<i>,</i>		

Appendix 1:18 - Stack Measurements: Particulate & Rubber Fume Monitoring - A2-3 Post Abatement

Post Abatement			
Reference method	EN 13284		
Sampling date	12 January 2017		
Sampling time	09:59-10:29		
Sampling technique			
Flue gas sampling system	Isokinetic in stack filtration system		
Oxygen measurement technique	Flue Gas Analyser		
Material			
Sampling probe material	Titanium		
Filter material	Titanium		
Sampling conditions			
Probe temperature [°C]	120		
Filtration temperature [°C]	120		
Average sampling flow rate [l/min]	7.57		
Total sampling time [min]	30		
Sampled volume of the dry gas at STP [m ³]	0.21		
Average flue gas velocity [m/s]	3.63		
Nozzle diameter [mm]	7		
Ratio of highest to lowest velocity	< 1:3		
Swirl test result	Pass Met		
Swirl test result Initial leak test result [% of expected sampling flow rate] Final leak test result [% of average sampling flow rate] Average flue gas temp temperature [**C] Reference conditions	0 24. 84		
flow rate]	E A FOT		
Final leak test result [% of average samplings			
flow rates			
Average flue gas temp temperature [C]	16.7		
Moisture [%] N/A	Moisture [%] 0.80		
Temperature [K] 273	Temperature [K] 290		
Temperature [K] 273 Pressure [kPa] 101.3 of the limit of	Pressure [kPa] 101.4		
- 78 - Li-1	Oxygen [%] N/A		
Deviation from isokinetic conditions [%]	0.2		
Deviation from reference method	There was no deviation from reference		
	method.		

Appendix 1:19 - Stack Measurements: TOC Monitoring - A2-3 Post Abatement

Appendix 1:19 - Stack Measure	ments: TOC Mo		2-3 Post Abatement	
Re	eference method	EN 12619		
	Sampling date	12 January 2017		
	Sampling time	09:59-10:29		
Sampling technique				
	TOC	Flame ionisa	ation detection	
Material				
Samplin	g probe material	SS, PTFE		
	Fuel	Hydrogen		
Spa	n calibration gas	Propane 90.0) ppm	
Zero	o calibration gas	Ambient air	after passing charcoal filter	
Span gas drift	[% of the range]	<2		
Zero gas drift	[% of the range]	<2		
Sampling conditions				
Duct diameter [m]		0.5		
Number of sampling ports		2		
Number of sampling lines		Single point	sampling	
Heated line temperature [°C]		180		
Number of sampling points per line		1		
Average flue ga	as velocity [m/s]	3.63		
Average flue gas temp t	emperature [°C]	16.7 Mes		
Sampling conditions		14. and		
Conditions	Refere	nce	Sampling plane	
Moisture	Dry		0.80	
Temperature [K]	ger 34101.		290	
Pressure [kPa]	ge ^{ct} o ^w 101.	3	101.4	
Oxygen [%]	colitable N/A		N/A	
Deviation from reference meth	nod jogi			
Oxygen [%] Deviation from reference meth There was no deviation from ref	erence method			
ර	isc.			
C				

Appendix 1:20 - Stack Measurements: VOC monitoring - A2-4 Pre Abatement

vicasui cilicitis. VOC ili	omtoring - A2-411C	Abatement		
Reference method	EN 13649			
Sampling date		12 January 2017		
Sampling time	15:16-15:46			
-				
ue gas sampling system	SKC pump with Ty	gon tubing and low		
	flow tube holder			
measurement technique	FGA			
Sampling material	Charcoal tubes			
mpling flow rate [l/min]	0.5 per tube			
Total sampling time [min]		30		
Sampled volume of the dry gas at STP [m ³]		0.014		
Average flue gas temp temperature [°C]				
Reference conditions		onditions		
Dry	Moisture [%]	1.09		
273	Temperature [K]	306		
101.3	Pressure [kPa]	101.2		
N/A	Oxygen [%]	N/A		
sokinetic conditions [%]	N/A: and			
Deviation from reference method		ntion from reference		
utp	method.			
i in specifon the re	, ·			
	Reference method Sampling date Sampling time ue gas sampling system measurement technique Sampling material mpling flow rate [l/min] tal sampling time [min] the dry gas at STP [m³] s temp temperature [°C] conditions Dry 273 101.3 N/A cokinetic conditions [%]	Sampling time 15:16-15:46 ue gas sampling system SKC pump with Ty flow tube holder FGA Sampling material Charcoal tubes mpling flow rate [l/min] tal sampling time [min] the dry gas at STP [m³] the dry gas at STP [m³] Temperature [%] Temperature [%] 273 Temperature [K] 101.3 Pressure [kPa] N/A Oxygen [%]		

Appendix 1:21 - Stack Measurements: Particulate & Rubber Fume Monitoring - A2-4 Pre Abatement

rre Abatement			
Reference method	EN 13284		
Sampling date	12 January 2017		
Sampling time	15:16-15:46		
Sampling technique			
Flue gas sampling system	Isokinetic in stack fil	tration system	
Oxygen measurement technique	Flue Gas Analyser		
Material			
Sampling probe material	Titanium		
Filter material	Titanium		
Sampling conditions			
Probe temperature [°C]	120		
Filtration temperature [°C]	120		
Average sampling flow rate [l/min]	13.9		
Total sampling time [min]	30		
Sampled volume of the dry gas at STP [m ³]	0.39		
Average flue gas velocity [m/s]			
Nozzle diameter [mm]	7		
Ratio of highest to lowest velocity	< 1:3		
Swirl test result	Pass Mer		
Initial leak test result [% of expected sampling	Olly, and		
flow rate]	esotioit		
Final leak test result [% of average samplings			
flow rates			
Average flue gas temp temperature [C]	33.1		
Reference conditions	Actual conditions		
Moisture [%] N/A	Moisture [%]	1.09	
Temperature [K] 273	Temperature [K]	306	
Pressure [kPa] 101.3 die	Pressure [kPa]	101.2	
Oxygen [%] N/A	Oxygen [%]	N/A	
Deviation from isokinetic conditions [%]	0.2		
Deviation from reference method	There was no devia	ntion from reference	
	method.		

Appendix 1:22 - Stack Measurements: TOC Monitoring - A2-4 Pre Abatement

Appendix 1.22 - Stack Weasure Re	eference method	EN 12619		
	Sampling date	12 January 2	2017	
	Sampling time	15:16-15:46		
Sampling technique				
	TOC	Flame ionisa	ation detection	
Material				
Samplin	g probe material	SS, PTFE		
	Fuel	Hydrogen		
Spai	n calibration gas	Propane 90.	0 ppm	
Zero	o calibration gas	Ambient air	after passing charcoal filter	
Span gas drift	[% of the range]	<2		
	[% of the range]	<2		
Sampling conditions				
Dı	act diameter [m]	0.35		
	f sampling ports	2		
	f sampling lines	Single point sampling		
	emperature [°C]	180		
Number of samplin		1		
	as velocity [m/s]	7.58		
Average flue gas temp t	emperature [°C]	33.1 Met		
Sampling conditions		Only any		
Conditions	Refere	nce	Sampling plane	
Moisture	Dry		1.09	
Temperature [K]	ion 273		306	
Pressure [kPa]	200 ou 101.	3	101.2	
Oxygen [%]	kot itight N/A	1	N/A	
Deviation from reference meth	_			
There was no deviation from ref	erence method			
ර	X			

Appendix 1:23 - Stack Measurements: VOC monitoring - A2-4 Post Abatement

Appendix 1.23 - Stack I	vicasurements. VOC in	omtoring - A2-4 i ost	Abatement
	Reference method	EN 13649	
	Sampling date	11 January 2017	
	Sampling time	16:00-16:30	
Sampling technique			
Fl	ue gas sampling system	SKC pump with Ty	gon tubing and low
		flow tube holder	
Oxygen	measurement technique	FGA	
Material			
	Sampling material	Charcoal tubes	
Sampling conditions			
Average sar	mpling flow rate [l/min]	0.5 per tube	
To	tal sampling time [min]	30	
Sampled volume of	the dry gas at STP [m ³]	0.014	
Average flue gas	s temp temperature [°C]	35.3	
Reference	Reference conditions		onditions
Moisture [%]	Dry	Moisture [%]	0.0
Temperature [K]	273	Temperature [K]	308
Pressure [kPa]	101.3	Pressure [kPa]	101.4
Oxygen [%]	N/A	Oxygen [%]	N/A
Deviation from is	okinetic conditions [%]	N/A: and	
Deviation from reference	ce method	There was no devia	ntion from reference
	utp	method.	
	Consent of copyright ourner re	<i>,</i>	

Appendix 1:24 - Stack Measurements: Particulate & Rubber Fume Monitoring - A2-4 Post Abatement

EN 13284
11 January 2017
16:00-16:30
Isokinetic in stack filtration system
Flue Gas Analyser
Titanium
Titanium
120
120
1.47
30
0.04
0.98
7
< 1:3
Pass Met
Only. and of
es of tot
α
35.3
Actual conditions
Moisture [%] 0.0
Temperature [K] 308
Pressure [kPa] 101.4
Oxygen [%] N/A
0.2
There was no deviation from reference
method.

Appendix 1:25 - Stack Measurements: TOC Monitoring - A2-4 Post Abatement

D.	eference method		2 4 1 OSt 1 Datement	
K			0017	
	Sampling date	11 January 2	2017	
G 1: 4 1 :	Sampling time	16:00-16:30		
Sampling technique				
	TOC	Flame ionisa	tion detection	
Material				
Samplin	g probe material	SS, PTFE		
	Fuel	Hydrogen		
Spar	n calibration gas	Propane 90.0		
	o calibration gas	Ambient air	after passing charcoal filter	
Span gas drift	[% of the range]	<2		
	[% of the range]	<2		
Sampling conditions				
Dı	uct diameter [m]	0.35		
Number o	f sampling ports	2		
	of sampling lines	Single point sampling		
	emperature [°C]	180		
Number of samplin		1		
*	as velocity [m/s]	0.98		
Average flue gas temp t		35.3 Mer		
Sampling conditions	<u>•••••••••••••••••••••••••••••••••••••</u>	यात्र, यात्र्य <mark>भाग्य</mark>		
Conditions	Refere		Sampling plane	
Moisture	Dry		0.0	
Temperature [K]	ion 273	•	308	
Pressure [kPa]	20 101	3 101.4		
Oxygen [%]	and constitution N/A			
Deviation from reference meth	od ob			
There was no deviation from ref	erence method			
A state was no de viation from feet	ise incomod			
Co				

ANNUAL AIR EMISSIONS SURVEY 2017 G BRUSS GmBH APPENDIX II MONITORING EQUIPMENT CALIBRATION CERTIFICATES

Licence Reg. P0465-01 TMS Environment Ref. 23888 Rev 2.0

23888, 23888, Eorinspection purposes only any office.

Temperature - Temperature (°C)

Campo di misura ingresso Termocoppie - Thermocouple input Range : 0 + 1200 °C Campo di misura sonda Pt100 - Pt100 sensor Range : -20 +80 °C

	Riferimento Reference	DUT	Dmax (°C)	Accett. Accept.	Emax (%)
TC Fumes	100	99.3	0.7	1%fs ±0.2 °C	0.06
TC Fumes	600	600.4	-0.4	1%fs ±0.2 °C	0.03
TC Aux1	100	99	ì	1%fs ±0.2 °C	0.08
TC Auxi	600	599.9	0.1	1%fs ±0.2 °C	0.01
TC Aux2	100	99.1	0.9	1%fs ±0.2 °C	0.08
TC Aux2	600	600.1	-0.1	1%fs ±0.2 °C	0.01
TC Probe	100	99.3	0.7	1%fs ±0.2 °C	0.06
1 C Probe	600	600.4	+0.4	1%fs ±0.2 °C	0.03
TC Box	100	99.4	0.6	1%fs ±0.2 °C	0.05
TC DOX	600	600.4	-0.4	1%fs ±0.2 °C	0.03
DGM Pt100	23.71	23.62	0.09	1%fs ±0.2 °C	0.09

Verifica misura del Volume - Volume Measure Verifying

Flusso di Taratura - Reference Flow rate: 15 l/min [4 mc/h pump] - 30 l/min [8mc/h pump]

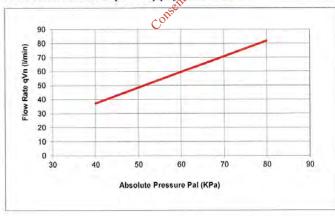
Ref DGM Volume riferimento alle condizioni attuali - Reference volume @ actual condition Volume attuale indicato dallo strumento - Instrument volume reading @ actual condition G4 Volume

Ref DGM ini	Ref DGM fin	Ref DGM corr.	Ref Volume (@actual)	DUT (@actual)	Dager (I)	Emax (%)	Accept.
172309.8	172789.4	1.005	482.00	484.241	S 2.2	0.47	±2%

Misura Portata - Flow rate measure
Flusso di Taratura - Reference Flow rate : 15 - 30 l/min [4 mc/h pump]

Point	Riferimento Reference	DUT	DmaxO (Vmm)	Accett. Accept.	Emax (%)
1	21.06	21.89	112088	±2 %	1.38
2	41.27	41.77	\$ 0.5	±2 %	0.83

Curva caratteristica Pompa - Pump performance curve



Pal	(KPa)	qVn (I/min)
79.9		81.82
4	0.05	37.35

TCR Tecora

Pag.2 di 3

mod. R14/028 ed. 0



Rapporto di taratura Calibration report N°

R-11420244P

Strumento - Instrument:

Isostack G4

Costruttore - Constructor: TCR Tecora

Firmware version:

1.9.2000

21.6

S.N.: 11420244P

Destinatario - Customer:

Il presente verbale di taratura non è utilizzabile per misure fiscali. Rappresenta la registrazione delle prove eseguite durante il collaudo dello strumento, in accordo ai requisiti qualitativi previsti dal nostro sistema di qualità.

Condizioni ambientali della prova - Ambient condition

Temp. - Temperature (°C):

Pressione - Pressure (KPa): 99.8

Riferimenti utilizzati - Reference used

Temperatura - Temperature : Eurotron Mod. Microcal 10 S.N. 29454 TCR std 28S S.N. 59S TCR std 59S Eurotron Mod. Microcal P2 Pressione - Pressure: S.N. 1043008FC TCR std 56S Pressione - Pressure : Tecora Flowcal Air S.N. 237 TCR std 43S **BGI Deltacal** Flusso - Flowrate : S.N. 0314A111213738 TCR std 67S Itron G4 Gallus Volume - Volume : S.N. 01021626 Rischi elettrici - Electr. Risk: Fulltest HT 4050 TCR std 39S

Pressione assoluta Pitot - Pitot Absolute pressure

Campo di misura - Range : 0 - 105 KPa

Deviazione massima della misura - Max reading deviation Dmax =

Max errore di indicazione percentuale sul campo di misura - Max fint ange percent indication error (%) E max =

Strumento in prova = Device under test DUT=

DUT=	Strumento in prova	My any			
Point	Riferimento Reference	DUT	Dmax (kPa)	Agoett. Accept.	Emax (%)
1	89.95	90	-0.05	1% ±0.1kPa	0.05
2	50.03	50	0.0301	1% ±0.1kPa	0.03

Pressione assoluta CV - DGM Absolute pressure

Campo di misura - Range : 0 - 105 KPa

Point	Riferimento Reference	DUTAL	Dmax (kPa)	Accett. Accept.	Emax (%)
i i	89.97	C090	-0.03	1% ±0.1kPa	0.03
2	49.98	50	-0.02	1% ±0.1kPa	0.02

Pressione differenziale Pitot - Pitot Differential pressure

Campo di misura - Range : 0 - 2500 Pa

Point	Riferimento Reference	DUT	Dmax (Pa)	Accett, Accept.	Emax (%)
1	50.8	51	-0.2	1%fs ±2Pa	0.01
2	500.3	500	0.3	1%fs ±2Pa	0.01

Pressione differenziale OM - OM Differential pressure

Campo di misura - Range : 0 - 10000 Pa

Point	Riferimento Reference	DUT	Dmax (Pa)	Accett. Accept.	Emax (%)
1	1000.6	1000	0.6	1%fs ±10Pa	0.01

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M-S-E-1-1 29 MAR 2016

Rischi. Elett. - Electr. Risk:

Fulltest HT 4050

S.N. 01021626

TCR std 39S

Verifica rischi elettrici - Electrical risk verifying

In accordo alle norme CEI EN 61010-1 e CEI EN 60601-1 - In accordance to norms CEI EN 61010-1 and CEI EN 60601-1

Test	Valore-Value	Accett Accept.
Corrente di dispersione - leakage current	4.3	< 15 mA
Resistenza di isolamento - Insulation resistance	O.R.	> 0.2 MΩ
Resistenza equipotenziale - Continuity resistance	0.101	< 0.2 Ω

Data - Date : 25/03/20

Eseguito da - Tested by:

Pasquini C.

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TCR Tecora

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