EPA Application Form

7.4.1 - Emissions to Atmosphere - Main and Fugitive Emissions - Attachment

Organisation Name: *	Takeda Ireland Ltd. Grange Castle
Application I.D.: *	LA010134

Amendments to this Application Form Attachment

Version No.	Date	Amendment since previous version	Reason
V2.0	Oct 2024	Updated emission limit values, efficiency of abatement systems, reference conditions for abatement systems and boilers	Updated in response to RFI 19 Aug 2024
V.1.0	July 2017	N/A	Online application form attachment
As above	Mar 2017	Identification of required fields	Assist correct completion of attachment

EMISSIONS TO ATMOSPHERE

Emissions to air/atmosphere include the following:

Main Emissions
Main emissions include all emissions of environmental significance. Where a **mass emission threshold** is specified in a BAT document (BAT Conclusions, National BAT note or BREF), emissions which exceed this threshold prior to abatement are regarded as significant, i.e., 'main emissions'. (In some cases emissions below the threshold can still be significant and qualify as Main Emissions).

Minor Emissions
Emissions below the mass emission threshold may be considered minor emissions and therefore do not generally need to be specifically controlled by the conditions or schedules of the licence (i.e., setting of ELVs, abatement control measures, or monitoring requirements). Emissions may also be deemed minor by virtue of their source/nature (e.g., laboratory fume hoods, workspace extractions, passive vents from storage tanks, HVAC exhausts), or composition (e.g., water vapour emissions).
For combustion plant such as boilers, these can be considered minor where the rated thermal input is < 1MW where natural gas is the main fuel, and for liquid and solid fuels where its < 250kW.

In completing the separate '*Emissions to Atmosphere - Minor and Potentia*l' attachment for minor emissions, the applicant should supply sufficient information to justify the determination of the emission as minor. Notwithstanding this guidance, the Agency may consider any emission to be significant (i.e., a main emission) on the basis of environmental impact.

Fugitive Emissions
Fugitive emissions include emissions from non-point sources and diffuse sources.

Potential Emissions
These are emissions which only operate under abnormal process conditions. Typical examples include bursting discs, pressure relief valves, and emergency generators. Bypasses and flares may also fall within this category, depending on how they are operated or designed to operate. Although the Agency does not normally set controls in licences for potential emissions, it may do so for the purposes of environmental protection.

This attachment collects information on main and fugitive emissions to atmosphere. Waste gas means the final gaseous emission from a stack or abatement equipment.

For minor and potential emissions to atmosphere, complete the separate '*Emissions to Atmosphere - Minor and Potentia*l' attachment.

Main Emissions to Atmosphere - Waste Gas Emission Point Details - one row per emission point *

Complete the following table with summary details for all main emission points to atmosphere.

(Guidance on completing the table is included in Note i at the end of this attachment)

The applicant should address in particular any emissions which may contain the principal polluting substances listed in the First Schedule of Environmental Protection Agency (Integrated Pollution Control) (Licensing) Regulations 2013/ (Industrial Emissions)(Licensing) Regulations 2013.

Please note that the determination of any emission limit values and monitoring requirements in a proposed licence if granted will be based on the information supplied hereunder.

Emission Point Code	Emission Point Grid Ref.		Typical Days Usage/ Year	Measures to reduce /minimise / prevent emissions (list techniques) [1] *Where EQS considerations require measures stricter than BAT, highlight these measures in **bold***	Source of Waste Gases [2]	Minimum Discharge Height Above Ground (m)	Reference Conditions			
	Easting [3]	Northing [4]					Pressure [5]	Temp. [6]	% Oxygen [7]	Moisture [8]
EP-UT-01	303305	231912	351	Two gas boilers are high efficiency units (88% efficiency as per service reports) and sized to meet the full site steam demand. An electrical boiler is installed onsite*.	Boilers	15	101.325kPa	273.15K	3	Dry

[1] Detailed descriptions and schematics of all abatement systems should be included in the Operational Report (Tab 4.8 – '*Reports*').

[2] **Options:** Boiler, Gas Turbine, Incineration, Co-Incineration, CHP, Kiln, Engine, Indirect drying activity (e.g. milk drying), Other Combustion activity (e.g., oven), Distillation/Chemical reaction, Solvent based coating activity, Other coating activity (provide description), Composting Tunnels, General extraction from buildings **or** Other (provide a description if '**Other**' is selected).

[3] **Six Digit GPS Irish National Grid Reference.**

[4] **Six Digit GPS Irish National Grid Reference**.

[5] **Options:** 101.325kPa **or** No correction.

[6] **Options:** 273.15K or No correction.

[7] **Options:** 3%, 6%, 10%, 11%, 15%, 18% **or** No correction.

[8] **Options:** Wet **or** Dry.

Emission Point Code	Emission Point Grid Ref.		Typical Days Usage/ Year	Measures to reduce /minimise / prevent emissions (list techniques) [1] *Where EQS considerations require measures stricter than BAT, highlight these measures in **bold***	Source of Waste Gases [2]	Minimum Discharge Height Above Ground (m)	Reference Conditions			
	Easting [3]	Northing [4]					Pressure [5]	Temp. [6]	% Oxygen [7]	Moisture [8]
EP-P1-02	303323	231902	351	Carbon Adsorption System with Steam Regeneration	Gas containing solvents from the production process	11	101.325kPa	273.15K	No correction	No correction
EP-P1-03	303307	231989	351	Carbon Adsorption System	Gas containing solvents from the production process	37.4	101.325kPa	273.15K	No correction	No correction
EP-P1-04	303172	231925	351	Thermal Oxidiser Quench and Caustic Scrubber for acids removal. Selective Catalytic Reduction for NOx reduction.	Gas containing solvents from the production process	12	101.325kPa	273.15K	No correction	No correction

*There are two 4.1 MW natural gas fuelled boilers on the site. One gas boiler will be operational, and the second gas boiler will be in hot standby mode. The electrical boiler (non-combustion unit) will be used in Demand mode and when this is the case, the two gas boilers will be in hot standby mode.

Emission Points from Combustion, Incineration or Co-incineration Sources Only

Complete the table below for each emission point to atmosphere from a combustion source, waste incineration or co-incineration plant

Emission Point Code	**Primary Fuel Type** [9] (where applicable)	**Secondary Fuel Type** [10] (where applicable)	**LCP Plant Reference** (where applicable)	**Waste incineration or co-incineration plant reference** (where applicable)
EP-UT-01	Natural Gas	Gas Oil	N/A	N/A
EP-P1-04	Natural Gas	N/A	N/A	N/A

*add rows to the table as necessary

[9] **Options:** Coal, Lignite, Heavy Fuel Oil, Other Fuel Oil, Peat, Natural Gas, Biogas, Solid Biomass, Waste, Gas Oil, Other **or** None

[10] **Options:** Coal, Lignite, Heavy Fuel Oil, Other Fuel Oil, Peat, Natural Gas, Biogas, Solid Biomass, Waste, Gas Oil, Other **or** None

Emission Points with Solvent Emissions Only

Complete the table below for each emission point associated with a solvent activity

Emission Point Code	Are specific Hazardous Substances [11] Emitted?	Mass Flow of Emitted Hazardous Substances (g/hour)	Halogenated VOCs [12] Emitted?	Mass Flow of Emitted Halogenated VOCs (g/hour)
EP-P1-02	Dimethylformamide Dimethylacetamide N-Methyl-2-pyrrolidone	N/A	Dichloromethane	N/A
EP-P1-03	Dimethylacetamide	N/A	No	-
EP-P1-04	Dimethylformamide Dimethylacetamide N-Methyl-2-pyrrolidone	N/A	Dichloromethane	N/A

*add rows to the table as necessary

[11] Emissions of volatile organic compounds referred to in Article 58 (Substances or mixtures which, because of their content of volatile organic compounds classified as carcinogens, mutagens, or toxic to reproduction under Regulation (EC) No. 1272/2008, are assigned or need to carry the hazard statements H340, H350,H350i, H360D or H360F) of the Industrial Emissions Directive.

[12] Halogenated volatile organic compounds which are assigned or need to carry the hazard statements H341 or H351.

Waste Gas Emission Monitoring Points

Complete the table below for each emission point, by entering the Emission Point Code, the associated Monitoring Point Code and the grid reference of the Monitoring Point. *

Emission Point Code	Monitoring Point Code [13]	Monitoring Point Grid Reference	
		Easting [14]	Northing [15]
EP-UT-01	EP-UT-01 M	303305	231912
EP-P1-02	EP-P1-02M	303323	231902
EP-P1-03	EP-P1-03 M	303307	231989
EP-P1-04	EP-P1-04 M	303172	231925

*add rows to the table as necessary

[13] To include monitoring and sampling points
[14] Six Digit GPS Irish National Grid Reference
[15] Six Digit GPS Irish National Grid Reference

Waste Gas - Abatement /Treatment Control

Complete the table below for each emission point with an abatement/treatment system (one table per emission point)

Emission Point Code: **EP-UT-01**

Control[16] parameter	Monitoring to be carried out [17]	Additional notes (where relevant)
Boiler efficiency	Flue Gas Analysis	Flue Gas Analyser. Controlled by a PLC based controller in the boiler control panel.

Emission Point Code: **EP-P1-02**

Control[18] parameter	Monitoring to be carried out [19]	Additional notes (where relevant)
Steam Regeneration Cycle	Continuous Timer	
Carbon Unit Changeover	Continuous based on TOC analyser	
Volatile Organic Compounds as TOC	Continuous Flame Ionisation Detection monitoring	
Air Flow	Continuous flow transmitter	

[16] List the operating parameters of the treatment/abatement system which control its function.
[17] List the monitoring of the control parameter to be carried out.
[18] List the operating parameters of the treatment/abatement system which control its function.
[19] List the monitoring of the control parameter to be carried out.

Emission Point Code: **EP-P1-03**

Control[20] parameter	Monitoring to be carried out [21]	Additional notes (where relevant)
The carbon adsorption system: • Humidity	Carbon bed is changed based on number of batches and operational hours. This is not used for all processes and used on occasions where avoidance of hydrogen to the VOC C beds is chosen as the basis of safety. VOC Monitoring is conducted on a quarterly basis when this emission point is being used.	

Emission Point Code: **EP-P1-04**

Control[22] parameter	Monitoring to be carried out [23]	Additional notes (where relevant)
Thermal Oxidizer: • Inlet Lower Explosion Limit (LEL) • Combustion Flow Rate • Combustion Temperature • Waste Gas Flow Rate	Continuous : LEL analysers Continuous: Air flow meter Continuous: Temperature probe Continuous: flow meter	

[20] List the operating parameters of the treatment/abatement system which control its function.
[21] List the monitoring of the control parameter to be carried out.
[22] List the operating parameters of the treatment/abatement system which control its function.
[23] List the monitoring of the control parameter to be carried out.

Control[22] parameter	Monitoring to be carried out [23]	Additional notes (where relevant)
Quench caustic/Water Scrubbers: • Air flow rate • Scrubber solution flow • Scrubber solution temperature • Scrubber solution condition	Continuous: Air flow meter Continuous: Liquid flow meter Continuous: Temperature sensor Continuous: pH meter	
Back up Abatement system on stand by.	See above EP-P1-02	The current VOC system will become the back up system once the TO is commissioned
Selective Catalytic Reduction: • Outlet temperature • NOx value • Urea media flow	Continuous	

Waste Gas Emissions

Complete the table below for all main emission points to atmosphere (include one row for each identified parameter) *

Emission Point Code	Parameter	Monitoring Point Code	Proposed Emission Limits [24]					BAT Associated Emission Range (if applicable)	Sampling / Monitoring EPA Guidance for Monitoring - AG2 Index of Preferred Methods		
			Max. Hourly[25]	Max. Daily [26]	Average Month [27]	Average Annual [28]	How was the Proposed Emission Limit Derived?		Proposed Monitoring Frequency	Proposed Monitoring and Analysis Method [29]	Compliant with BAT Monitoring Requirement?
EP-UT-01	Volumetric Flowrate	EP-UT-01M	10,368 m^3	248,832 m^3	N/A	N/A	As per existing Licence P0693-02		Annual	Standard method	Not applicable
EP-UT-01	Nitrogen Oxides (as NO_2)	EP-UT-01M	150 mg/m^3	N/A	N/A	N/A	Medium Combustion Plants Regulations (MCPR) 2017 (Note 1)		Annual	Flue Gas Analyser	Not applicable – Covered by Directive (EU) 2015/2193 (MCPR), Refer Note 1.
EP-P1-02	Volumetric Flowrate	EP-P1-02M	500 m^3	12,000 m^3	N/A	N/A	As per existing Licence P0693-02		Continuous	Flow Transmitter	Not applicable

[24] For emissions outside the BAT Conclusion, BREF or BAT guidance limit, a full evaluation of the existing abatement/treatment system must be provided. **A planned programme of improvement towards meeting upgraded standards is required**. This should highlight specific goals and a time scale, together with options for modification, upgrading or replacement as required to bring emissions within the limits set out in the BAT Conclusion(s), BREF(s) or BAT guidance note(s). These notes can be found on the EPA website at www.epa.ie.

[25] Specify the proposed limit **and** the units.

[26] Specify the proposed limit **and** the units.

[27] Specify the proposed limit **and** the units.

[28] Specify the proposed limit **and** the units.

[29] For continuous monitoring 'EN15267 approved CEMS' is the standard method. For periodic monitoring please refer to the EPA guidance document 'AG2 Index of Preferred Methods'.

Emission Point Code	Parameter	Monitoring Point Code	Proposed Emission Limits [24]					BAT Associated Emission Range (if applicable)	Sampling / Monitoring EPA Guidance for Monitoring - AG2 Index of Preferred Methods		
			Max. Hourly[25]	Max. Daily [26]	Average Month [27]	Average Annual [28]	How was the Proposed Emission Limit Derived?		Proposed Monitoring Frequency	Proposed Monitoring and Analysis Method [29]	Compliant with BAT Monitoring Requirement?
EP-P1-02	Total volatile organic carbon (TVOC)	EP-P1-02M	20 mgC/Nm^3 at mass flow> 100gC/h or CMR substance used (Note 2)	N/A	N/A	N/A	As per CWG BAT (Note 3)	CID 2022/2427 BAT 11	Continuous if a TVOC mass flow of ≥ 2 kgC/h Biannual if a TVOC mass flow < 2kgC/h (note 4)	Flame ionisation Detection EN 12619	Yes
EP-P1-02	Dichloromethane	EP-P1-02M	15 mg/Nm^3 at mass flow > 50g/h (Note 2 and 5)	N/A	N/A	N/A	As per CWG BAT (Note 3)	CID 2022/2427 BAT 11	Once every 6 months	Standard Method	Yes
EP-P1-02	Sum of VOCs classified as CMR 2 (as may be relevant)	EP-P1-02M	10 mg/Nm^3 at mass flow > 50 g/h (Note 2)	N/A	N/A	N/A	As per CWG BAT (Note 3)	CID 2022/2427 BAT 11	Once every 6 months	Standard Method	Yes
EP-P1-02	Sum of the individual Halogenated VOCs (hazard	EP-P1-02M	20 mg/m^3 (at mass flow>100 g/h)	N/A	N/A	N/A	As per the existing licence P0693-02		Quarterly	Standard Method	Not applicable

Emission Point Code	Parameter	Monitoring Point Code	Proposed Emission Limits [24]					BAT Associated Emission Range (if applicable)	Sampling / Monitoring EPA Guidance for Monitoring - AG2 Index of Preferred Methods		
			Max. Hourly[25]	Max. Daily [26]	Average Month [27]	Average Annual [28]	How was the Proposed Emission Limit Derived?		Proposed Monitoring Frequency	Proposed Monitoring and Analysis Method [29]	Compliant with BAT Monitoring Requirement?
	statement H341, H351)										
EP-P1-02	Sum of the individual hazardous substances contain H340, H350, H350i, H360D or H360F	EP-P1-02M	2 mg/m^3 (at mass flow>10g/h)	N/A	N/A	N/A	As per the existing licence P0693-02		Quarterly	Standard Method	Not applicable
EP-P1-02	Toluene	EP-P1-02M	20 mg/Nm^3 at mass flow > 1g/h (Note 2 and 6)	N/A	N/A	N/A	As per CWG BAT (Note 3)	CID 2022/2427 BAT 11	Once every 6 months	Standard Method	Yes
EP-P1-03	Volumetric Flowrate	EP-P1-03M	90m^3	500m^3	N/A	N/A	As per existing Licence P0693-02		Continuous	Flow Transmitter	Not applicable
EP-P1-03	Total volatile organic carbon (TVOC)	EP-P1-03M	20 mgC/Nm^3 at mass flow> 100gC/h or CMR substance used (Note 2)	N/A	N/A	N/A	As per CWG BAT (Note 3)	CID 2022/2427 BAT 11	Continuous if a TVOC mass flow of ≥ 2 kgC/h Biannual if a TVOC mass flow <	Flame ionisation Detection EN 12619	Yes

Emission Point Code	Parameter	Monitoring Point Code	Proposed Emission Limits [24]					BAT Associated Emission Range (if applicable)	Sampling / Monitoring EPA Guidance for Monitoring - AG2 Index of Preferred Methods		
			Max. Hourly[25]	Max. Daily [26]	Average Month [27]	Average Annual [28]	How was the Proposed Emission Limit Derived?		Proposed Monitoring Frequency	Proposed Monitoring and Analysis Method [29]	Compliant with BAT Monitoring Requirement?
									2kgC/h (note 4)		
EP-P1-03	Sum of VOCs classified as CMR 2 (as may be relevant)	EP-P1-03M	10 mg/Nm^3 at mass flow > 50g/h (Note 2)	N/A	N/A	N/A	As per CWG BAT (Note 3)	CID 2022/2427 BAT 11	Once every 6 months	Standard Method	Yes
EP-P1-03	Sum of the individual hazardous substances contain H340, H350, H350i, H360D or H360F	EP-P1-03M	2 mg/m^3 (at mass flow>10g/h)	N/A	N/A	N/A	As per the existing licence P0693-02		Quarterly	Standard Method	Not applicable
EP-P1-04	Volumetric Flowrate	EP-P1-04M	1,160 m^3	27,840 m^3	N/A	N/A	Manufacturer Specifications		Continuous	Standard method	Not applicable
EP-P1-04	Total volatile organic carbon (TVOC)	EP-P1-04M	20 mgC/Nm^3 at mass flow> 100gC/h or CMR substance used (Note 2)	N/A	N/A	N/A	As per CWG BAT (Note 3)	CID 2022/2427 BAT 11	Continuous if a TVOC mass flow of ≥ 2 kgC/h Biannual if a TVOC mass flow <	Flame ionisation Detection EN 12619	Yes

Emission Point Code	Parameter	Monitoring Point Code	Proposed Emission Limits [24]					BAT Associated Emission Range (if applicable)	Sampling / Monitoring EPA Guidance for Monitoring - AG2 Index of Preferred Methods		
			Max. Hourly[25]	Max. Daily [26]	Average Month [27]	Average Annual [28]	How was the Proposed Emission Limit Derived?		Proposed Monitoring Frequency	Proposed Monitoring and Analysis Method [29]	Compliant with BAT Monitoring Requirement?
									2kgC/h (note 4)		
EP-P1-04	Dichloromethane	EP-P1-04M	15 mg/Nm^3 at mass flow > 50g/h (Note 2 and 5)	N/A	N/A	N/A	As per CWG BAT (Note 3)	CID 2022/2427 BAT 11	Once every 6 months	Standard Method	Yes
EP-P1-04	Sum of VOCs classified as CMR 1A or 1B (as may be relevant)	EP-P1-04M	5 mg/Nm^3 at mass flow > 1g/h (Note 2)	N/A	N/A	N/A	As per CWG BAT (Note 3)	CID 2022/2427 BAT 11	Once every 6 months	Standard Method	Yes
EP-P1-04	Sum of VOCs classified as CMR 2 (as may be relevant)	EP-P1-04M	10 mg/Nm^3 at mass flow > 50g/h (Note 2)	N/A	N/A	N/A	As per CWG BAT (Note 3)	CID 2022/2427 BAT 11	Once every 6 months	Standard Method	Yes
EP-P1-04	Sum of the individual Halogenated VOCs (hazard statement H341, H351)	EP-P1-04M	20 mg/m^3 (at mass flow>100 g/h)	N/A	N/A	N/A	As per the existing licence P0693-02		Quarterly	Standard Method	Not applicable

Emission Point Code	Parameter	Monitoring Point Code	Proposed Emission Limits [24]					BAT Associated Emission Range (if applicable)	Sampling / Monitoring EPA Guidance for Monitoring - AG2 Index of Preferred Methods		
			Max. Hourly[25]	Max. Daily [26]	Average Month [27]	Average Annual [28]	How was the Proposed Emission Limit Derived?		Proposed Monitoring Frequency	Proposed Monitoring and Analysis Method [29]	Compliant with BAT Monitoring Requirement?
EP-P1-04	Sum of the individual hazardous substances contain H340, H350, H350i, H360D or H360F	EP-P1-04M	2 mg/m^3 (at mass flow>10g/h)	N/A	N/A	N/A	As per the existing licence P0693-02		Quarterly	Standard Method	Not applicable
EP-P1-04	Toluene	EP-P1-04M	20 mg/Nm^3 at mass flow > 1g/h (Note 2 and 6)	N/A	N/A	N/A	As per CWG BAT (Note 3)	CID 2022/2427 BAT 11	Once every 6 months	Standard Method	Yes
EP-P1-04	Nitrogen oxides (NOx)	EP-P1-04M	200 mg/Nm^3 (Note 2 and 7)	N/A	N/A	N/A	As per CWG BAT (Note 3)	CID 2022/2427 BAT 16	Continuous if a NO_X mass flow of ≥ 2.5 kg/h Biannual if a NOx mass flow < 2.5kg/h (note 4)	Generic EN Standards EN 14792	Yes
EP-P1-04	Carbon monoxide (CO)	EP-P1-04M	50 mg/Nm^3	N/A	N/A	N/A	As per CWG BAT (Note 3)	CID 2022/2427	Continuous	N/A	N/A

Emission Point Code	Parameter	Monitoring Point Code	Proposed Emission Limits [24]					BAT Associated Emission Range (if applicable)	Sampling / Monitoring EPA Guidance for Monitoring - AG2 Index of Preferred Methods		
			Max. Hourly[25]	Max. Daily [26]	Average Month [27]	Average Annual [28]	How was the Proposed Emission Limit Derived?		Proposed Monitoring Frequency	Proposed Monitoring and Analysis Method [29]	Compliant with BAT Monitoring Requirement?
								BAT 16			
EP-P1-04	Ammonia (NH_3)	EP-P1-04M	8 mg/Nm^3 (Note 4 and 2)	N/A	N/A	N/A	As per CWG BAT (Note 3)	CID 2022/2427 BAT 17	Biannual (Note 4)	EN 21877	Yes
EP-P1-04	Dioxins/ furans (TEQ)	EP-P1-04M	0.05 ng/m^3 (Note 2)	N/A	N/A	N/A	As per CWG BAT (Note 3)	CID 2022/2427 BAT 12	Biannual (Note 4)	EN 21877	Yes
EP-P1-04	Gaseous chlorides (as HCL)	EP-P1-04M	10 mg/Nm^3 at mass flow > 30g/h (Note 2)	N/A	N/A	N/A	As per CWG BAT (Note 3)	CID 2022/2427 BAT 18	N/A	N/A	Yes

** For continuous monitoring 'EN15267 approved CEMS' is the standard method. For periodic monitoring please refer to the EPA guidance document 'AG2 Index of Preferred Methods' linked above*

*add rows to the table as necessary

Note 1: European Union (Medium Combustion Plants) Regulations 2017 (S.I. No.595 of 2017). As of 1 January 2030, the existing combustion plant (in this case two gas Boilers) is to meet the emission limit values set out in Table 1 of Part 1 to Schedule 2 of the MCPR.

Note 2: The emission limit values (ELVs) stated are derived from CWG BAT and will be effective from the 6th of December 2026. The proposed ELVs and the monitoring frequency are only applied if the substance mass flow is greater than its threshold post-abatement.

Note 3: Commission Implementing Decision (CID) 2022/2427: Best available techniques (BAT) conclusions, under Directive 2010/75/EU of the European Parliament and the Council on industrial emissions, for common waste gas management and treatment systems in the chemical sector (CWG BAT).

Note 4: Applying Footnote (4) of Table in BAT 8 of CID 2022/2427, the minimum monitoring frequency may be reduced to once every year or once every 3 years if the emission levels are proven to be sufficiently stable.

Note 5: Applying Footnote (10) of Table 1.1 of BAT 11 of CID 2022/2427 on common waste gas whereby condensation is used to recover Dichloromethane pre-abatement and the ultimate abatement efficiency of the emissions to air abatement systems (carbon adsorption system with steam carbon bed regeneration and TO) are > 95%. This % efficiency calculation is based on performance to date for the steam carbon bed regeneration and the design philosophy and commissioning results of the TO.

Note 6: Applying Footnote (11) of Table 1.1 of BAT 11 of CID 2022/2427 on common waste gas whereby condensation is used to recover Toluene pre-abatement and the ultimate abatement efficiency of the emissions to air abatement systems (carbon adsorption system with steam carbon bed regeneration and TO) are > 95%. This % efficiency calculation is based on performance to date for the steam carbon bed regeneration and the design philosophy and commissioning results of the TO.

Note 7: Dimethylacetamide and Dimethylformamide are two nitrogen-containing organic compounds (NOx precursors) that are used on-site that will be contained in the off-gases, applying Footnote (02) of Table 1.4 of BAT 16 of CID 2022/2427, the proposed Nitrogen oxides (NOx) is 200 mg/m^3.

Note 8: As per IED directive 2010/75/EU on industrial emissions (Integrated Pollution Prevention and Control), for the purpose of the calculation of the average emission values, the values measured during during the start-up and shut-down periods of the Thermal Oxidiser can be disregarded.

Minor and/or Potential Emissions to Atmosphere [30]

Are there any minor **or** potential emission point(s) to atmosphere at the installation/facility? (**Yes/No**) *	**Yes**

If '**Yes**' complete and upload the ***Emissions to Atmosphere – Minor and Potential Emissions*** template with details of minor and potential emissions (select Document Type: '**Minor - Potential Emissions**' in the application form)

Emissions to Atmosphere - Minor - Potential Emissions file name:	Attachment-7-4-2-Emissions to Air-Minor and Potential

[30] Refer to page 3 for guidance on what constitutes a minor or potential emission.

Fugitive Emission to Atmosphere

Fugitive emissions must be controlled by way of appropriate controls and techniques to minimise emissions.
(Additional information on fugitive emission is included in Note ii at the end of this attachment)

Are there any sources of fugitive emissions at the installation/facility?[31] (**Yes/No**) * **Yes**

If '**Yes**' provide summary details of the fugitive emissions in the table below:

Type of Fugitive Emission	Emission Type Applicable? (Yes/No)	Description of fugitive emissions source(s)	Maximum Level	Units	Descriptor/Location
Dust	**No**			*$mg/m^2/day$*	*Dust deposition*
VOC [32]	**Yes**	VOC/solvents are used in laboratory and production areas	0.99	%	*of solvent input*
Ammonia	**No**			*ug/m^3*	*at the nearest European Site*
Nitrogen	**No**			*kgN/ha/yr*	*at the nearest European Site*
Odour	**No**			*Odour Units*	*at boundary of installation*

[31] For waste activities, dust and odour emissions should be considered and described in the table below where applicable.

[32] In relation to activities listed in Chapter V (for installations using Organic Solvents) of the Industrial Emissions Directive (2010/75/EU):
- specify how the requirements in relation to fugitive emissions will be met.

Provide details of the techniques to be used to reduce / minimise / prevent fugitive emissions in text bow below

- There are robust systems for the transport and handling of solvents and VOC's on site, all overhead pipelines are welded, the plant is new, and it was designed to prevent fugitive emissions.
- Solvents are handled within high containment gloveboxes and drum booth.
- QC lab uses pumping and drain systems within isolators and fume cupboards to transfer waste to waste containers. Bulk Solvents are contained in closed systems and venting from tanks is to direct to the onsite abatement systems. The onsite abatement system is continually monitored to ensure compliance with emission limits.

Note i Complete the table for each emission point having regard to the guidance hereunder.

The following convention should be observed when labelling emission points:

Boiler Emissions A1-1, A1-2, A1-3,…etc.
Main Emissions A2-1, A2-2, A2-3,…etc.
Minor Emissions A3-1, A3-2, A3-3,...etc. (NOTE: Minor emission points are to be included in the '*Emissions to Atmosphere - Minor and Potential*' attachment)
Potential Emissions A4-1, A4-2, A4-3,…etc. (NOTE: Potential emission points are to be included in the '*Emissions to Atmosphere - Minor and Potential*' attachment)

A National Grid Reference (12 digit, 6E, 6N) must be provided for each emission point.
Measures are usually required to reduce, minimise or prevent emissions from occurring. They may involve the application of a single technique or a combination of techniques including process integrated, recovery, abatement and treatment techniques. List all techniques proposed/employed. Technique(s) employed must comply with BAT. Highlight additional measures required for the purposes of protecting the environment i.e. AQS considerations. The measures or techniques to be taken must be capable of complying with the proposed/known emission level(s).
The measures required shall be informed by the following:
1. BAT techniques with BAT-AEL
2. BAT techniques without BAT-AEL
3. Stricter measures/techniques than BAT (due to AQS)
4. BAT determined by competent authority in consultation with the applicant
5. Measures to minimise pollution over long distances or in the territory of other states.
6. Emerging techniques
7. Less strict measures than BAT (due to derogation)
8. Other measures

Select from the drop down list the source of the emission as it helps explain the nature of the emission.

Particular attention should be paid to ensuring that emissions data (volumetric flow and pollutant concentrations) are presented at the required reference conditions for oxygen, temperature, pressure and moisture.

Note ii **Fugitive emissions include the following:**

- Dust from area sources such as a quarry.
- Odour from volume sources such as a pig unit, waste water treatment plant, waste handling etc.
- VOCs from processes using solvent not captured in waste gases.
- Ammonia and nitrogen from pig and poultry units.

Processes that can give rise to fugitive emissions include:

o Leaks from valve seals, pump seals and flanges;
o Breathing and working losses from liquid storage facilities;
o Dust emissions from solids stored in the open;
o Loading and unloading operations;
o Cleaning operations; and,
o Emissions from waste water treatment (e.g. volatile organics).

The measures taken to reduce/ prevent fugitive emissions to atmosphere must be addressed, and the facilities and operations required to control emissions must be detailed.