Lianhetech Seal Sands
Seal Sands, Middlesbrough
TS2 1UB, UK

Phone: +44 (0) 1642 546666
Email: enquiries@lianhetech-europe.com
Web: www.lianhetech-europe.com

Response to Air Quality Modelling Scope

EPR/PP3439GG – Fine Organics Limited

Permit Variation Application V008

1. Introduction and Purpose - Response to Air Quality Modelling Scope Query

The air quality modelling has focused on methanol and 1,2-dichloroethane (EDC) as these are the only substances within the FCM process with a credible potential for release to air under normal and reasonably foreseeable operating conditions.

This conclusion is based on a systematic review of all substances associated with the process, as listed in PP3439GG_FOL_Confidential Document_Substance Hazard Classification, considering:

- Substance function (solvent, reagent, product, etc.)
- Physicochemical properties (volatility and vapour pressure)
- Fate within the process (consumed, retained, vented)
- Process design and abatement systems

2. Fundamental Basis: Nature of Emissions from FCM Process

The principal emissions to air associated with the FCM process are VOC emissions arising from the volatilisation of methanol and 1,2-dichloroethane during solvent handling and distillation operations. There are small quantities of carbon dioxide generated during the neutralisation and acidification stages of process work-up. Carbon dioxide is not defined as a hazardous air pollutant and is generated in very small quantities (approximately 0.308 kg per batch). Consequently, it is considered environmentally insignificant and does not require detailed air dispersion modelling.

Therefore, only VOC substances present in the process with a credible and environmentally significant pathway to air require detailed assessment.

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3. Identification of Substances Taken Forward for Modelling

Methanol and EDC are the only substances that meet all of the following EA H1 screening criteria:

- Volatile (high vapour pressure VOCs)
- Used as solvents within the process
- Not fully consumed in reaction
- Actively transferred into the vapour phase during operation
- Connected to a controlled emission pathway (stack A1/5)

The process description confirms that there are high-risk activities in the process which involve the use of EDC and methanol. These stages provide a direct process-driven mechanism for vapour generation, which means that methanol and EDC are the only substances intentionally and systematically driven into the vapour phase and therefore represent the only credible point source emissions to air.

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4. Screening Out of Other Substances

All remaining substances in the process have been systematically screened out in line with EA H1 risk-based methodology, the details of this are provided below.

4.1 Final Product

- Non-volatile
- Solid
- Handled in contained systems with HEPA filtration
- No credible pathway to air emissions

4.2 Raw Materials and Intermediates

- Consumed within the reaction
- Not present in excess or free volatile form
- No sustained emission source

4.3 Catalysts and Aqueous Additives

- Non-volatile substances
- Remain in liquid or solid phase
- No volatilisation potential

4.4 Reagents

- Consumed during reaction/neutralisation
- Handled in closed systems

In summary, the process does not generate acid gas emissions. Neutralisation and acidification operations generate small quantities of carbon dioxide, which are discharged via the site scrubber system. The quantity generated is limited (approximately 0.308 kg per batch) and is not considered environmentally significant. No other inorganic gases are generated by the process. Acid reagents are consumed within the process and handled in closed systems, with no direct pathway for release to air. Any minor vapour or aerosol formation is effectively captured and treated via the installed abatement systems, including condensers and carbon filtration, prior to discharge to the stack.

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5. Process Design, Containment and BAT

The process has been designed and operated in accordance with BAT and IED requirements:

- Fully enclosed systems and contained transfers
- Negative pressure laboratory environment
- Condensers for solvent recovery
- Activated carbon abatement systems
- Single controlled emission point (A1/5)
- No uncontrolled or fugitive release of non-VOC substances
- Segregation of emission pathways

6. Conclusion

Methanol and EDC are the only substances taken forward for detailed air quality modelling because they are the only substances within the process that are intentionally transferred into the vapour phase and discharged via a defined point source emission pathway (A1/5). Although small quantities of carbon dioxide are generated during the neutralisation and acidification stages of process work-up, these emissions are limited in quantity (approximately 0.308kg per batch), are not associated with hazardous air pollutants and are not considered environmentally significant. Consequently, they do not require detailed air dispersion modelling. All other substances are either consumed within the process, non-volatile, or retained within contained liquid or solid streams. Therefore, the inclusion of methanol and EDC alone represents a proportionate, technically justified and risk-based approach to air quality assessment, aligned with EA H1 screening methodology and BAT principles.

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Appendix 1 – H1 Screening of Substances for Air Quality Modelling

Substance	Role in Process	Physical Form / Volatility	Fate in Process	Pathway to Air?	Abatement / Controls	Included in AQM? Justification (Aligned to EA H1 Criteria)
Methanol	Solvent	Highly volatile VOC	• Not fully consume • Used in solvent exchange (distillation stage)	Yes – vapour generated during distillation and venting	Condensers and carbon filtration	Yes - Meets all H1 criteria
1,2-Dichloroethane (EDC)	Solvent	Highly volatile VOC	• Not fully consumed • Vacuum distillation	Yes – vapour generated during distillation	Condensers and carbon filtration	Yes - Meets all H1 criteria
		Non-volatile solid / high MW	• Solid • Handled in contained systems	No	HEPA filtration, isolators, containment	No - No volatility, solid, no vapour phase transfer, no emission pathway; excluded under H1 screening
		Low volatility solid	Consumed in reaction	No	Closed system reaction	No - Fully consumed; not present as emission source; no volatilisation
		Low volatility organic liquid	Consumed in reaction	No	Closed system reaction	No - Not present post-reaction; no vapour emission mechanism
		Non-volatile solid / ionic	Remains in liquid phase	No	Aqueous phase handling, containment	No - Negligible vapour pressure; no pathway to air
		Aqueous / non-volatile	Consumed in the process (Effluent treatment)	No	Contained liquid handling	No - non-volatile; retained in liquid phase; irrelevant to air emissions
		Non-volatile liquid	Consumed within process	No	Closed system; containment	Np - No vapour phase generation; no evolved gas emissions; does not meet H1 inclusion criteria
		Aqueous acid (potential mist only)	Neutralised within process	No	Closed system; abated ventilation	No - No evolved acid gas emissions; any minor mist captured in abatement; not environmentally significant under H1 screening
Carbon dioxide (CO_2)	Neutralisation/ acidification on by-product	Gas	Generated during neutralisation and acidification	Yes	Absorption in NaOH scrubber	No - Generated in small quantities (~0.308 kg/ batch); not a hazardous air pollutant and environmentally insignificant.