**SPERC fact sheet – *Explosives Manufacturing – Industrial (Solvent-borne)***

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| **General Information** | |
| **Title of Specific ERC** | Explosive Manufacturing (industrial): solvent-borne |
| **Applicable ERC** | 2 – Formulation of preparations |
| **Responsible** | ESIG/ESVOC |
| **Version** | V1 |
| **Code** | ESVOC 2.18a.v1 |
| **Scope** | Covers exposures arising from the manufacture of slurry explosives (including materials transfer, mixing and charging) and equipment cleaning.  *Substance Domain*: Applicable to petroleum substances (e.g., aliphatic and aromatic hydrocarbons) and petrochemicals (e.g., ketones, alcohols, acetates, glycols, glycol ethers, and glycol ether acetates).  *Size of installation: -Assumed that 5000 tonnes/year of substance is used*  *Process conditions : Dry process* |
| **Coverage** | Process Categories: Process Categories: 1 (use in closed process, no likelihood of exposure), 3 (use in closed batch process (synthesis or formulation)), 4 (use in batch and other process (synthesis) where opportunity for exposure arises), 5 (mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)), 8a (transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities), 8b (transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities) |

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|  | **Characteristics of specific ERC** | **Type of Input Information** |
| **Operational Conditions** | Indoor use. Solvent-based process. Process optimized for highly efficient use of raw materials (very minimal environmental release). |  |
| **Obligatory onsite RMMs** | Emission factors to wastewater are based on water solubility. Assumes no free product in wastewater stream; oil-water separation (e.g. *via* oil water separators, oil skimmers, dissolved air floatation) may be required under some circumstances |  |
| **Substance Use Rate** | The substance maximum use rate in a typical operation (mSpERC) is 50000 kg/d | Typical maximum site tonnage, based on sector knowledge\*May be overwritten with own site use rate |
| **Days Emitting** | 300 days/year | Default ‘Industrial end use’ – Tonnage > 5000 tonnes/year Consider overwriting if use rate is <5000 tonnes/year1 |
| **Environmental Parameters for Fate Calculation** | Assumed dilution factor in freshwater is 10. For marine assessments an additional tenfold dilution is assumed, i.e., dilution factor in marine water = 100. | ERC default settings2 |

\*Maximum amount of substance that is delivered to a site in one day based on typical site capacity (e.g., two trucks, each with a volume of 25 tonnes)

1ECHA Guidance on information requirements and chemical safety assessment, Chapter R.16: Environmental Exposure Estimation, Section R.16.3.2.1

2ECHA Guidance on information requirements and chemical safety assessment, Chapter R.16: Environmental Exposure Estimation, Section R.16.6.3

<http://echa.europa.eu/documents/10162/17224/information_requirements_r16_en.pdf>

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|  | **Characteristics of Specific ERC** | | **Justification** |
| **Emission Fractions**  **(from the process)** | ***To Air*** | 0.0005 | Based on 1.1 lbs of VOC produced per ton (2000 lbs) of TNT, EPA (1995)3 |
| ***To Wastewater/Sewer/ Water courses***  WS < 1 mg/L  WS 1-10 mg/L  WS 10-100 mg/L  WS 100-1000 mg/L  WS >1000 mg/L | ***f* (water solubility)**  0.000001  0.000003  0.00003  0.0003  0.001 | Emission factors to wastewater are conservatively calculated based on wastewater volume generated from blanket wash and cleaning of printing machines and substance aqueous solubility *Assumption of 1 m3 of wastewater generated per 1 tonne of substance used is relatively conservative.4 Example: 1 mg/L x 1 m3/tonne use x 1000 L/m3 x 1tonne/109mg = 0.000001 tonnes/tonne used. For WS range (e.g., 1-10 mg/L), the geometric mean (i.e., 3.2 mg/L) is used to calculate the fraction released.* |
| ***To Soil*** | 0.0001 | ERC2 default5 |

3United States Environmental Protection Agency (EPA) 1995. AP-42, 5th Ed., Compilation of Air Pollutant Emission Factors, Vol. 1: Stationary Point and Area Sources. Office of Air Quality Planning and Standards, U.S. EPA.

http://www.epa.gov/ttnchie1/ap42/

4 Water use of *1 m3 per tonne substance assumed as conservative estimate based on process knowledge and professional judgement*,

5ECHA Guidance on information requirements and chemical safety assessment, Chapter R.16: Environmental Exposure Estimation, Appendix R.16-1 Environmental Release Categories

<http://echa.europa.eu/documents/10162/17224/information_requirements_r16_en.pdf>

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|  | **Type of RMM** | **Typical Efficiency** |
| **Appropriate Risk Management Measures (RMM) that may be used to achieve required emission reduction** | ***Air*** | |
| *On-site Technology*  Wet scrubber – gas removal  Thermal oxidation  Vapor recovery – Adsorption  *Other* | 70%  98%  80%  Default efficiencies of the RMMs according to CEFIC Risk Management Library and 5*IPPC 2009 draft BREF on Common Waste Water & Waste Gas Treatment/Management Systems in the Chemical Sector*.  \*A default value of 80% was selected on the basis of expected RMM efficiency consistent with typical site use (i.e., 50 t/d). |
| ***Water*** | |
| *Offsite Technology*  Municipal wastewater treatment plant | The removal efficiency of a sewage treatment plant can be estimated. The standard estimation is via the SimpleTreat module of EUSES or ECETOC TRA.  \*Specific substance efficiency calculated via SimpleTreat and is assumed to represent default removal efficiency. |
| *Onsite Technology*  Distillation (*of used process solvent; prior to any water contact*)  Acclimated biological treatment  *Other* | The efficiency of the RMMs varies dependent on the treatment technology and the properties of the substance. The standard RMMs encountered in the processes considered here typically provide removal efficiencies in excess of 80% (according to CEFIC Risk Management Library)  For readily and inherently biodegradable substances, the removal efficiency for acclimated biological treatment may be significantly higher than SimpleTreat estimates; thus, SimpleTreat estimates can serve as a conservative lower bound.  Substance-specific efficiencies can be considered. |

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| **Narrative Description of / Justification for specific ERC** |
| Description: Industrial use of solvents in explosives covers materials transfer, mixing and charging and equipment cleaning. Substance losses to waste water are generally restricted to equipment cleaning as processes operate without contact with water. Such uses and substance properties result in limited to no discharge to wastewater or to soil from the industrial site. Air emissions are also limited based on available literature |

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| **Safe Use** |
| **Communication in SDS**  The REACH registrant establishes a set of standard conditions of safe use for a substance (for industrial use of a solvent-borne processing aid) by adopting the conditions specified in this SPERC and recommending a Required Removal Efficiency (RRE) for adequate risk reduction. If RRE = 0, wastewater emission controls (beyond those specified by the operational conditions) are not required to ensure safe use of the substance. If > 0, the RRE may be achieved via offsite municipal sewage treatment (providing substance removal efficiency, REOffsite) and/or onsite emission controls (providing substance removal efficiency, REOnsite). Multiple onsite emission reduction technologies can also be considered, if necessary and applicable (e.g., REOnsite = 1 – [(1 – REOnsite, 1) x (1 – REOnsite, 2) x etc.], where REOnsite, *n* represents the substance removal efficiency for each onsite emission reduction technology). For direct comparison to the RRE, a total substance emission reduction efficiency (RETotal) is calculated (RETotal = 1 – [(1 – REOnsite) x (1 – REOffsite)]. An RETotal < RRE is indicative of the safe use of a substance.  Removal efficiency requirements, as dictated by the assumed operating conditions, are documented in the Chemical Safety Report and communicated in the Safety Data Sheet. All other parameters underlying a substance exposure scenario based on the SPERC ‘Uses in coatings – industrial (solvent-borne)’ are implicitly referred to via the reference to this SPERC.  **Scaling**  *Wastewater*  The users of solvent-borne processing aids are responsible for evaluating the compliance of their specific situations with the registrant’s information. To that end, the users need to know their site-specific substance use rate (MSite) and days emitting (TEmission, Site), onsite and offsite emission controls and subsequent total substance emission reduction efficiency (RETotal, Site = 1 – [(1 – REOnsite, Site) x (1 – REOffsite, Site)]), sewage treatment plant effluent flow rate (GEffluent, Site) and receiving water dilution factor (qSite). Adequate control of risk exists if the following relevant expression holds true:  *for risk driven by wastewater treatment plant microbes*  [MSPERC x (1 – RETotal, SPERC)] / GEffluent, SPERC ≥ [MSite x (1 – RETotal, Site)] / GEffluent, Site  *for risk driven by freshwater/freshwater sediments, marine water/marine water sediments*  [MSPERC x (1 – RETotal, SPERC)] / (GEffluent, SPERC x qSPERC) ≥ [MSite x (1 – RETotal, Site)] / (GEffluent, Site x qSite)  *for risk driven by secondary poisoning (freshwater fish/marine top predator) or indirect exposure to humans (oral)*  [MSPERC x TEmission, SPERC x (1 – RETotal, SPERC)] / (GEffluent, SPERC x qSPERC) ≥ [MSite x TEmission, Site x (1 – RETotal, Site)] / (GEffluent, SpERC x qSite)  It is simpler and thus may be preferable to some users to compare MSite with MSafe (*the maximum tonnage that can be safely used, within the prescribed operating conditions, OCSpERC and RMM, RETotal, SpERC*). Adequate control of risk exists if the following conditions are met [RETotal, Site ≥ RETotal, SPERC, GEffluent, Site ≥ GEffluent, SPERC, and qSite ≥ qSPERC] and MSafe ≥ MSite.    Local amount used, emission days per year, receiving water flow rate (or dilution factor), sewage treatment plant effluent flow rate, and risk management measure removal efficiency are the adjustable parameters for emission assessment. These parameters can be refined using site-specific information, which often is obtainable with limited effort and expertise. Adjusting the assessment by refining these parameters is referred to as scaling. Scaling is applied to evaluate compliance of a specific use with a generic Exposure Scenario. For that reason, site parameter values which deviate from the default values need to reflect the actual situation. This may have to be justified on demand.  The release factors are an additional set of adjustable parameters; however, refining the default values requires significant justification and, thus, is beyond the boundary conditions defined in the SPERC Factsheet. For that reason, release factor refinements do not constitute a SPERC-based assessment and must be considered an element of downstream user chemical safety assessment. |

### ESVOC 2.18a.v1

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| **Determinant Label** | **Quali-/ Quanti-tative** | **Value** | **Description of Value** | **Effectiveness in % (default, min-max) for water and/or air** | **Exposure route** | | **Use conditions worker** | **Use condition consumer** | | **Standard Phrase** | | |
| Indoor/Outdoor use | Qual | Indoor use |  |  | Air/ water/ soil | | e-w-3 | e-c-4 | | Indoor | | |
| Process efficiency | Qual | Process optimized for highly efficient use of raw materials (very minimal environmental release) | - |  | Water | | e-w-3 | e-c-4 | | Same as “value” | | |
| On site treatment of wastewater | RMM | Acclimated biological treatment | For readily and inherently biodegradable substances, the removal efficiency for acclimated biological treatment may be significantly higher than SimpleTreat estimates; thus, SimpleTreat estimates can serve as a conservative lower bound.  Substance-specific efficiencies can be considered and can be used to overwrite the arbitrary default of this determinant value, which is set to 70% | Water 70% | Water | | e-w-3 |  | | Same as “value” | | |
| Further onsite technology | RMM | Distillation of used process solvent | The efficiency of the RMMs varies dependent on the treatment technology and the properties of the substance. The standard RMMs encountered in the processes considered here typically provide removal efficiencies in excess of 80% (according to CEFIC Risk Management Library) | Waste 80 % | Waste | e-w-3 | |  | | | | Same as “value” | |
| On-site treatment of off-air | RMM | Upgrade of the system in place or additional air treatment measures, such as wet scrubber and/or air filtration and/or thermal oxidation and/or vapor recovery systems, in order to achieve a reduction of the air emissions | Arbitrary default of this determinant value, which is set to 50%, to be overwritten by the assessor according to the required removal efficiency (assessment outcome) | Air 50% | Air | | e-w-3 | |  | | Same as “value” | |