Exposure scenario's
4. Exposure scenario 4: Use at industrial sites - Intermediate for manufacturing furan derivatives

Title section

Environment contributing scenario(s):

| CS 1 | Intermediate for manufacturing furan derivatives | ERC 6a |

Worker contributing scenario(s):

| CS 2 | Transfer of large volume of the substance | PROC 8b |
| CS 3 | Quality control | PROC 15 |
| CS 4 | Synthesis of furan derivatives | PROC 1 |
| CS 5 | FF tar distillation (outdoors) | PROC 2 |
| CS 6 | Sampling/FF recycling (indoors, <15min, gloves, Temp<92 degrees C) | PROC 2 |
| CS 7 | Transfer of small amounts of the substance (indoors) | PROC 9 |
| CS 8 | Change of filter during FF recycling | PROC 8a |

Explanation on the approach taken for the ES

4.1 Environmental contributing scenario 1: Intermediate for manufacturing furan derivatives (ERC 6a)

4.1.1. Conditions of use

<table>
<thead>
<tr>
<th>Amount used, frequency and duration of use (or from service life)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Daily use amount at site: &lt;= 123.3 tonnes/day</td>
</tr>
<tr>
<td>• Annual use amount at site: &lt;= 37000 tonnes/year</td>
</tr>
<tr>
<td>• Percentage of EU tonnage used at regional scale: = 100.0 %</td>
</tr>
</tbody>
</table>

Conditions and measures related to biological sewage treatment plant

| • Biological STP: Standard |
| • Discharge rate of STP: >= 2000 m3/d |
| • Application of the STP sludge on agricultural soil: Yes |

Conditions and measures related to external treatment of waste (including article waste)

| • Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.) |

Other conditions affecting environmental exposure

| • Receiving surface water flow rate: >= 18000 m3/d |

4.1.2. Releases

The local releases to the environment are reported in the following table. Note that the releases reported do not account for the removal in the modelled biological STP.
Local releases to the environment

<table>
<thead>
<tr>
<th>Release</th>
<th>Release estimation method</th>
<th>Explanations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>Measured release rate (Company Specific Data)</td>
<td>Release factor after on site RMM: 3.24E-4%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Local release rate: 0.4 kg/day</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Explanation:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Company Specific Data</td>
</tr>
<tr>
<td>Air</td>
<td>Estimated release factor (Company Specific Data)</td>
<td>Release factor before on site RMM: 6.6E-4%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Release factor after on site RMM: 6.6E-4%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Local release rate: 0.814 kg/day</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Explanation:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Company Specific Data</td>
</tr>
<tr>
<td>Non-agricultural soil</td>
<td>ERC based</td>
<td>Release factor after on site RMM: 0.1%</td>
</tr>
</tbody>
</table>

4.1.3. Exposure and risks for the environment and man via the environment

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table. The exposure estimates have been obtained with EUSES 2.1.2 unless stated otherwise.

**Exposure concentrations and risks for the environment and man via the environment**

<table>
<thead>
<tr>
<th>Protection target</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fresh water</td>
<td>Local PEC: 3.21E-3 mg/L</td>
<td>RCR = 0.097</td>
</tr>
<tr>
<td>Sediment (freshwater)</td>
<td>Local PEC: 0.017 mg/kg dw</td>
<td>RCR = 0.142</td>
</tr>
<tr>
<td>Marine water</td>
<td>Local PEC: 3.15E-4 mg/L</td>
<td>RCR = 0.095</td>
</tr>
<tr>
<td>Sediment (marine water)</td>
<td>Local PEC: 1.67E-3 mg/kg dw</td>
<td>RCR = 0.139</td>
</tr>
<tr>
<td>Sewage Treatment Plant</td>
<td>Local PEC: 0.025 mg/L</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Agricultural soil</td>
<td>Local PEC: 9.3E-4 mg/kg dw</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Predator’s prey (freshwater)</td>
<td>Local PEC: 2.44E-3 mg/kg ww</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Predator’s prey (marine water)</td>
<td>Local PEC: 2.34E-4 mg/kg ww</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Top predator’s prey (marine water)</td>
<td>Local PEC: 1.17E-4 mg/kg ww</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Predator’s prey (terrestrial)</td>
<td>Local PEC: 2.59E-4 mg/kg ww</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Man via environment - Inhalation</td>
<td>Concentration in air: 1.89E-4 mg/m³</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Man via environment - Oral</td>
<td>Exposure via food consumption: 1.48E-4 mg/kg bw/day</td>
<td>RCR &lt; 0.01</td>
</tr>
</tbody>
</table>

4.2 Worker contributing scenario 2: Transfer of large volume of the substance (PROC 8b)

4.2.1. Conditions of use

**Product (Article) characteristics**

- Percentage (w/w) of substance in mixture/article: <= 100.0 %
- Physical form of the used product: Liquid

**Amount used (or contained in articles), frequency and duration of use/exposure**

- Duration of activity: <= 8.0 hours/day

**Technical and organisational conditions and measures**
Safety Data Sheet  
according to Regulation (EC) No 1907/2006

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- Occupational Health and Safety Management System: Advanced  
- Respiratory Protection: No [Effectiveness Inhalation: 0%]  
- Dermal protection: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]  
- Wear chemical goggles: Wear chemical goggles (Qualitative protection for eye irritants)

Other conditions affecting workers exposure  
- Place of use: Outdoor  
- Operating temperature: <= 33.0 °C  
- Skin surface potentially exposed: Two hands (960 cm2)

4.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>0.44 mg/m³ (Measured data: Company Specific Measured Data)</td>
<td>RCR = 0.025</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>4.83 mg/m³ (Measured data: Company Specific Measured Data)</td>
<td>RCR = 0.032</td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>0.44 mg/m³ (Measured data: Company Specific Measured Data)</td>
<td>RCR = 0.055</td>
</tr>
<tr>
<td>Inhalation, local, acute</td>
<td>4.83 mg/m³ (Measured data: Company Specific Measured Data)</td>
<td>RCR = 0.242</td>
</tr>
<tr>
<td>Dermal, systemic, long term</td>
<td>2.742 mg/kg bw/day (TRA Workers)</td>
<td>RCR = 0.685</td>
</tr>
<tr>
<td>Combined routes, systemic, long-term</td>
<td></td>
<td>RCR = 0.71</td>
</tr>
<tr>
<td>Combined routes, systemic, acute</td>
<td></td>
<td>RCR = 0.032</td>
</tr>
</tbody>
</table>

Risk characterisation

If conditions detailed in Section 4.2.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.

4.3 Worker contributing scenario 3: Quality control (PROC 15)

4.3.1. Conditions of use

Product (Article) characteristics  
- Percentage (w/w) of substance in mixture/article: <= 100.0 %  
- Physical form of the used product: Liquid

Amount used (or contained in articles), frequency and duration of use/exposure  
- Duration of activity: <= 8.0 hours/day

Technical and organisational conditions and measures  
- Occupational Health and Safety Management System: Advanced  
- General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness Inhalation: 0%]  
- Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]

Conditions and measures related to personal protection, hygiene and health evaluation  
- Respiratory Protection: No [Effectiveness Inhalation: 0%]  
- Dermal protection: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]  
- Wear chemical goggles: Wear chemical goggles (Qualitative protection for eye irritants)
### 4.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

#### Exposure concentrations and risks for workers

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>0.82 mg/m³ (Measured data: Company Specific Measured Data)</td>
<td>RCR = 0.046</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>1.64 mg/m³ (Measured data: Company Specific Measured Data)</td>
<td>RCR = 0.011</td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>0.82 mg/m³ (Measured data: Company Specific Measured Data)</td>
<td>RCR = 0.103</td>
</tr>
<tr>
<td>Inhalation, local, acute</td>
<td>1.64 mg/m³ (Measured data: Company Specific Measured Data)</td>
<td>RCR = 0.082</td>
</tr>
<tr>
<td>Dermal, systemic, long term</td>
<td>0.068 mg/kg bw/day (TRA Workers)</td>
<td>RCR = 0.017</td>
</tr>
<tr>
<td>Combined routes, systemic, long-term</td>
<td></td>
<td>RCR = 0.063</td>
</tr>
<tr>
<td>Combined routes, systemic, acute</td>
<td></td>
<td>RCR = 0.011</td>
</tr>
</tbody>
</table>

#### Risk characterisation

If conditions detailed in Section 4.3.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.

### 4.4 Worker contributing scenario 4: Synthesis of furan derivatives (PROC 1)

#### 4.4.1. Conditions of use

<table>
<thead>
<tr>
<th>Product (Article) characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Percentage (w/w) of substance in mixture/article: &lt;= 100.0 %</td>
</tr>
<tr>
<td>• Physical form of the used product: Liquid</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Amount used (or contained in articles), frequency and duration of use/exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Duration of activity: &lt;= 8.0 hours/day</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technical and organisational conditions and measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Closed process without likelihood of exposure</td>
</tr>
<tr>
<td>• Occupational Health and Safety Management System: Advanced</td>
</tr>
<tr>
<td>• General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness Inhalation: 0%]</td>
</tr>
<tr>
<td>• Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Conditions and measures related to personal protection, hygiene and health evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Respiratory Protection: No [Effectiveness Inhalation: 0%]</td>
</tr>
<tr>
<td>• Dermal protection: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]</td>
</tr>
<tr>
<td>• Wear chemical goggles: Wear chemical goggles (Qualitative protection for eye irritants)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other conditions affecting workers exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Place of use: Indoor</td>
</tr>
<tr>
<td>• Operating temperature: &lt;= 33.0 °C</td>
</tr>
<tr>
<td>• Skin surface potentially exposed: One hand face only (240 cm²)</td>
</tr>
</tbody>
</table>
4.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

### Exposure concentrations and risks for workers

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>0.04 mg/m³ (TRA Workers)</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>0.16 mg/m³ (TRA Workers)</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>0.04 mg/m³ (TRA Workers)</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Inhalation, local, acute</td>
<td>0.16 mg/m³ (TRA Workers)</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Dermal, systemic, long term</td>
<td>6.8E-3 mg/kg bw/day (TRA Workers)</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Combined routes, systemic, long-term</td>
<td></td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Combined routes, systemic, acute</td>
<td></td>
<td>RCR &lt; 0.01</td>
</tr>
</tbody>
</table>

### Risk characterisation

If conditions detailed in Section 4.4.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.

4.5 Worker contributing scenario 5: FF tar distillation (outdoors) (PROC 2)

#### 4.5.1. Conditions of use

<table>
<thead>
<tr>
<th>Product (Article) characteristics</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Percentage (w/w) of substance in mixture/article: &lt;= 100.0 %</td>
<td></td>
</tr>
<tr>
<td>• Physical form of the used product: Liquid</td>
<td></td>
</tr>
<tr>
<td>Amount used (or contained in articles), frequency and duration of use/exposure</td>
<td></td>
</tr>
<tr>
<td>• Duration of activity: &lt;= 1.0 hours/day</td>
<td></td>
</tr>
<tr>
<td>Technical and organisational conditions and measures</td>
<td></td>
</tr>
<tr>
<td>• Closed continuous process with occasional controlled exposure</td>
<td></td>
</tr>
<tr>
<td>• Occupational Health and Safety Management System: Advanced</td>
<td></td>
</tr>
<tr>
<td>Conditions and measures related to personal protection, hygiene and health evaluation</td>
<td></td>
</tr>
<tr>
<td>• Respiratory Protection: No [Effectiveness Inhalation: 0%]</td>
<td></td>
</tr>
<tr>
<td>• Dermal protection: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]</td>
<td></td>
</tr>
<tr>
<td>• Wear chemical goggles: Wear chemical goggles (Qualitative protection for eye irritants)</td>
<td></td>
</tr>
<tr>
<td>Other conditions affecting workers exposure</td>
<td></td>
</tr>
<tr>
<td>• Place of use: Outdoor</td>
<td></td>
</tr>
<tr>
<td>• Operating temperature: &lt;= 33.0 °C</td>
<td></td>
</tr>
<tr>
<td>• Skin surface potentially exposed: Two hands face (480 cm²)</td>
<td></td>
</tr>
</tbody>
</table>

#### 4.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

### Exposure concentrations and risks for workers

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>0.56 mg/m³ (TRA Workers)</td>
<td>RCR = 0.031</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>11.21 mg/m³ (TRA Workers)</td>
<td>RCR = 0.074</td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>0.56 mg/m³ (TRA Workers)</td>
<td>RCR = 0.07</td>
</tr>
<tr>
<td>Inhalation, local, acute</td>
<td>11.21 mg/m³ (TRA Workers)</td>
<td>RCR = 0.56</td>
</tr>
<tr>
<td>Dermal, systemic, long term</td>
<td>0.274 mg/kg bw/day (TRA Workers)</td>
<td>RCR = 0.069</td>
</tr>
<tr>
<td>Dermal, local, acute</td>
<td>0.04 mg/cm² (TRA Workers)</td>
<td>RCR = 0.069</td>
</tr>
</tbody>
</table>
Safety Data Sheet  
according to Regulation (EC) No 1907/2006

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<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combined routes, systemic, long-term</td>
<td></td>
<td>RCR = 0.1</td>
</tr>
<tr>
<td>Combined routes, systemic, acute</td>
<td></td>
<td>RCR = 0.074</td>
</tr>
</tbody>
</table>

The vapour pressure at operating temperature used for the calculation has been set by the assessor to 499 Pa.

The inhalation exposure is limited to the saturated vapour concentration (if relevant).

**Risk characterisation**

If conditions detailed in Section 4.5.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.

4.6 Worker contributing scenario 6: Sampling/FF recycling (indoors, <15min, gloves, Temp <92 degrees C) (PROC 2)

4.6.1. Conditions of use

**Product (Article) characteristics**

- Percentage (w/w) of substance in mixture/article: <= 100.0 %
- Physical form of the used product: Liquid

**Amount used (or contained in articles), frequency and duration of use/exposure**

- Duration of activity: <= 0.25 hours/day

**Technical and organisational conditions and measures**

- Closed continuous process with occasional controlled exposure
- Occupational Health and Safety Management System: Advanced
- General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness Inhalation: 0%]
- Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]

**Conditions and measures related to personal protection, hygiene and health evaluation**

- Respiratory Protection: No [Effectiveness Inhalation: 0%]
- Dermal protection: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]
- Wear chemical goggles: Wear chemical goggles (Qualitative protection for eye irritants)

**Other conditions affecting workers exposure**

- Place of use: Indoor
- Operating temperature: <= 92.0 °C
- Skin surface potentially exposed: Two hands face (480 cm2)

4.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

**Exposure concentrations and risks for workers**

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>0.2 mg/m³ (Measured data: Company Specific Measured Data)</td>
<td>RCR = 0.011</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>0.2 mg/m³ (Measured data: Company Specific Measured Data)</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>0.2 mg/m³ (Measured data: Company Specific Measured Data)</td>
<td>RCR = 0.025</td>
</tr>
<tr>
<td>Inhalation, local, acute</td>
<td>0.2 mg/m³ (Measured data: Company Specific Measured Data)</td>
<td>RCR = 0.01</td>
</tr>
<tr>
<td>Dermal, systemic, long term</td>
<td>0.027 mg/kg bw/day (TRA Workers)</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Combined routes, systemic, long-term</td>
<td></td>
<td>RCR = 0.018</td>
</tr>
<tr>
<td>Combined routes, systemic, acute</td>
<td></td>
<td>RCR &lt; 0.01</td>
</tr>
</tbody>
</table>
The vapour pressure at operating temperature used for the calculation has been set by the assessor to 9.9E3 Pa.

4.7 Worker contributing scenario 7: Transfer of small amounts of the substance (indoors) (PROC 9)

4.7.1. Conditions of use

<table>
<thead>
<tr>
<th>Product (Article) characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Percentage (w/w) of substance in mixture/article: &lt;= 100.0 %</td>
</tr>
<tr>
<td>• Physical form of the used product: Liquid</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Amount used (or contained in articles), frequency and duration of use/exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Duration of activity: &lt;= 8.0 hours/day</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technical and organisational conditions and measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Occupational Health and Safety Management System: Advanced</td>
</tr>
<tr>
<td>• General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness Inhalation: 0%]</td>
</tr>
<tr>
<td>• Local exhaust ventilation: Yes [Effectiveness Inhalation: 90%, Dermal: 90%]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Conditions and measures related to personal protection, hygiene and health evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Respiratory Protection: No [Effectiveness Inhalation: 0%]</td>
</tr>
<tr>
<td>• Dermal protection: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]</td>
</tr>
<tr>
<td>• Wear chemical goggles: Wear chemical goggles (Qualitative protection for eye irritants)</td>
</tr>
</tbody>
</table>

Other conditions affecting workers exposure

<table>
<thead>
<tr>
<th>Place of use: Indoor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating temperature: &lt;= 33.0 °C</td>
</tr>
<tr>
<td>Skin surface potentially exposed: Two hands face (480 cm2)</td>
</tr>
</tbody>
</table>

4.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>2.32 mg/m³ (Measured data: Company Specific Measured Data)</td>
<td>RCR = 0.13</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>2.32 mg/m³ (Measured data: Company Specific Measured Data)</td>
<td>RCR = 0.015</td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>2.32 mg/m³ (Measured data: Company Specific Measured Data)</td>
<td>RCR = 0.29</td>
</tr>
<tr>
<td>Inhalation, local, acute</td>
<td>2.32 mg/m³ (Measured data: Company Specific Measured Data)</td>
<td>RCR = 0.116</td>
</tr>
<tr>
<td>Dermal, systemic, long term</td>
<td>0.137 mg/kg bw/day (TRA Workers)</td>
<td>RCR = 0.034</td>
</tr>
<tr>
<td>Combined routes, systemic, long-term</td>
<td></td>
<td>RCR = 0.165</td>
</tr>
<tr>
<td>Combined routes, systemic, acute</td>
<td></td>
<td>RCR = 0.015</td>
</tr>
</tbody>
</table>

The local exhaust ventilation effectiveness has been taken into account for dermal exposure as well.

Risk characterisation

If conditions detailed in Section 4.7.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.
4.8. Worker contributing scenario 8: Change of filter during FF recycling (PROC 8a)

4.8.1. Conditions of use

<table>
<thead>
<tr>
<th>Product (Article) characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Percentage (w/w) of substance in mixture/article: &lt;= 100.0 %</td>
</tr>
<tr>
<td>• Physical form of the used product: Liquid</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Amount used (or contained in articles), frequency and duration of use/exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Duration of activity: &lt;= 1.0 hours/day</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technical and organisational conditions and measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Occupational Health and Safety Management System: Advanced</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Conditions and measures related to personal protection, hygiene and health evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Respiratory Protection: Yes (Respirator with APF of 20) [Effectiveness Inhalation: 95%]</td>
</tr>
<tr>
<td>• Dermal protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other conditions affecting workers exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Place of use: Outdoor</td>
</tr>
<tr>
<td>• Operating temperature: &lt;= 92.0 °C</td>
</tr>
<tr>
<td>• Skin surface potentially exposed: Two hands (960 cm²)</td>
</tr>
</tbody>
</table>

4.8.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>0.28 mg/m³ (TRA Workers)</td>
<td>RCR = 0.016</td>
</tr>
<tr>
<td></td>
<td>Supportive exposure (not used for RC): 1.86 mg/m³ (Measured data: Measured Data)</td>
<td></td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>5.605 mg/m³ (TRA Workers)</td>
<td>RCR = 0.037</td>
</tr>
<tr>
<td></td>
<td>Supportive exposure (not used for RC): 1.86 mg/m³ (Measured data: Measured Data)</td>
<td></td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>0.28 mg/m³ (TRA Workers)</td>
<td>RCR = 0.035</td>
</tr>
<tr>
<td></td>
<td>Supportive exposure (not used for RC): 1.86 mg/m³ (Measured data: Measured Data)</td>
<td></td>
</tr>
<tr>
<td>Inhalation, local, acute</td>
<td>5.605 mg/m³ (TRA Workers)</td>
<td>RCR = 0.28</td>
</tr>
<tr>
<td></td>
<td>Supportive exposure (not used for RC): 1.86 mg/m³ (Measured data: Measured Data)</td>
<td></td>
</tr>
<tr>
<td>Dermal, systemic, long term</td>
<td>1.371 mg/kg bw/day (TRA Workers)</td>
<td>RCR = 0.343</td>
</tr>
<tr>
<td>Dermal, local, acute</td>
<td>0.1 mg/cm² (TRA Workers)</td>
<td>RCR = 0.359</td>
</tr>
<tr>
<td>Combined routes, systemic, long-term</td>
<td></td>
<td>RCR = 0.037</td>
</tr>
<tr>
<td>Combined routes, systemic, acute</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The vapour pressure at operating temperature used for the calculation has been set by the assessor to 499 Pa.

**Risk characterisation**

If conditions detailed in Section 4.8.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.
4.9. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

The workers exposure and environmental emissions have been evaluated using EUSES (2.1.2), TRA Worker (v3) and an external tool (company specific measured data).

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
5. Exposure scenario 5: Use at industrial sites - Use of Furfural as intermediate in pesticide production

Title section

<table>
<thead>
<tr>
<th>Environment contributing scenario(s):</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 1</td>
<td>Use of Furfural as intermediate in pesticide production</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Worker contributing scenario(s):</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 2</td>
<td>Synthesis process (use as intermediate), incl. sampling (outdoors)</td>
</tr>
<tr>
<td>CS 3</td>
<td>Transfer of the substance (dedicated facilities, outdoors)</td>
</tr>
<tr>
<td>CS 4</td>
<td>Quality control (indoors with LEV)</td>
</tr>
</tbody>
</table>

Explanation on the approach taken for the ES

5.1. Environmental contributing scenario 1: Use of Furfural as intermediate in pesticide production (ERC 6a)

5.1.1. Conditions of use

<table>
<thead>
<tr>
<th>Amount used, frequency and duration of use (or from service life)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Daily use amount at site: &lt;= 28.0 tonnes/day</td>
</tr>
<tr>
<td>• Annual use amount at site: &lt;= 1200 tonnes/year</td>
</tr>
<tr>
<td>• Percentage of EU tonnage used at regional scale: = 100.0 %</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Conditions and measures related to biological sewage treatment plant</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Biological STP: Standard</td>
</tr>
<tr>
<td>• Discharge rate of STP: &gt;= 2000 m3/d</td>
</tr>
<tr>
<td>• Application of the STP sludge on agricultural soil: Yes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Conditions and measures related to external treatment of waste (including article waste)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other conditions affecting environmental exposure</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Receiving surface water flow rate: &gt;= 18000 m3/d</td>
<td></td>
</tr>
</tbody>
</table>

5.1.2. Releases

The local releases to the environment are reported in the following table. Note that the releases reported do not account for the removal in the modelled biological STP.

Local releases to the environment

<table>
<thead>
<tr>
<th>Release</th>
<th>Release estimation method</th>
<th>Explanations</th>
</tr>
</thead>
</table>
| Water   | Estimated release factor (Maximum allowable release) | Release factor before on site RMM: 0.01%  
Release factor after on site RMM: 0.01%  
Local release rate: 2.8 kg/day  
Explaination:  
There is no company specific data available. The local release rate has been set to the maximum rate at which the local environmental risks are controlled. |
5.1.3. Exposure and risks for the environment and man via the environment

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table. The exposure estimates have been obtained with EUSES 2.1.2 unless stated otherwise.

Exposure concentrations and risks for the environment and man via the environment

<table>
<thead>
<tr>
<th>Protection target</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fresh water</td>
<td>Local PEC: 0.018 mg/L</td>
<td>RCR = 0.556</td>
</tr>
<tr>
<td>Sediment (freshwater)</td>
<td>Local PEC: 0.097 mg/kg dw</td>
<td>RCR = 0.812</td>
</tr>
<tr>
<td>Marine water</td>
<td>Local PEC: 1.83E-3 mg/L</td>
<td>RCR = 0.554</td>
</tr>
<tr>
<td>Sediment (marine water)</td>
<td>Local PEC: 9.71E-3 mg/kg dw</td>
<td>RCR = 0.809</td>
</tr>
<tr>
<td>Sewage Treatment Plant</td>
<td>Local PEC: 0.177 mg/L</td>
<td>RCR = 0.023</td>
</tr>
<tr>
<td>Agricultural soil</td>
<td>Local PEC: 6.34E-3 mg/kg dw</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Predator’s prey (freshwater)</td>
<td>Local PEC: 2.44E-3 mg/kg ww</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Predator’s prey (marine water)</td>
<td>Local PEC: 2.34E-4 mg/kg ww</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Top predator’s prey (marine water)</td>
<td>Local PEC: 1.17E-4 mg/kg ww</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Predator’s prey (terrestrial)</td>
<td>Local PEC: 1.61E-3 mg/kg ww</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Man via environment - Inhalation</td>
<td>Concentration in air: 9.17E-4 mg/m³</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Man via environment - Oral</td>
<td>Exposure via food consumption: 4.25E-4 mg/kg bw/day</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Man via environment - combined routes</td>
<td></td>
<td>RCR &lt; 0.01</td>
</tr>
</tbody>
</table>

5.2. Worker contributing scenario 2: Synthesis process (use as intermediate), incl. sampling (outdoors) (PROC 2)

5.2.1. Conditions of use

<table>
<thead>
<tr>
<th>Product (Article) characteristics</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Percentage (w/w) of substance in mixture/article: &lt;= 100.0 %</td>
<td></td>
</tr>
<tr>
<td>• Physical form of the used product: Liquid</td>
<td></td>
</tr>
<tr>
<td>Amount used (or contained in articles), frequency and duration of use/exposure</td>
<td></td>
</tr>
<tr>
<td>• Duration of activity: &lt;= 8.0 hours/day</td>
<td></td>
</tr>
<tr>
<td>Technical and organisational conditions and measures</td>
<td></td>
</tr>
<tr>
<td>• Closed continuous process with occasional controlled exposure</td>
<td></td>
</tr>
<tr>
<td>• Occupational Health and Safety Management System: Advanced</td>
<td></td>
</tr>
<tr>
<td>Conditions and measures related to personal protection, hygiene and health evaluation</td>
<td></td>
</tr>
<tr>
<td>• Respiratory Protection: No [Effectiveness Inhalation: 0%]</td>
<td></td>
</tr>
<tr>
<td>• Dermal protection: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]</td>
<td></td>
</tr>
<tr>
<td>• Wear chemical goggles: Wear chemical goggles (Qualitative protection for eye irritants)</td>
<td></td>
</tr>
</tbody>
</table>
Furfural

Other conditions affecting workers exposure

- Place of use: Outdoor
- Operating temperature: <= 33.0 °C
- Skin surface potentially exposed: Two hands face (480 cm²)

5.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>2.802 mg/m³ (TRA Workers)</td>
<td>RCR = 0.157</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>11.21 mg/m³ (TRA Workers)</td>
<td>RCR = 0.074</td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>2.802 mg/m³ (TRA Workers)</td>
<td>RCR = 0.35</td>
</tr>
<tr>
<td>Inhalation, local, acute</td>
<td>11.21 mg/m³ (TRA Workers)</td>
<td>RCR = 0.56</td>
</tr>
<tr>
<td>Dermal, systemic, long term</td>
<td>0.274 mg/kg bw/day (TRA Workers)</td>
<td>RCR = 0.069</td>
</tr>
<tr>
<td>Dermal, local, acute</td>
<td>0.04 mg/cm² (TRA Workers)</td>
<td>RCR = 0.226</td>
</tr>
<tr>
<td>Combined routes, systemic, long-term</td>
<td></td>
<td>RCR = 0.226</td>
</tr>
<tr>
<td>Combined routes, systemic, acute</td>
<td></td>
<td>RCR = 0.074</td>
</tr>
</tbody>
</table>

The vapour pressure at operating temperature used for the calculation has been set by the assessor to 499 Pa.

The inhalation exposure is limited to the saturated vapour concentration (if relevant).

Risk characterisation

If conditions detailed in Section 5.2.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.

5.3. Worker contributing scenario 3: Transfer of the substance (dedicated facilities, outdoors) (PROC 8b)

5.3.1. Conditions of use

Product (Article) characteristics

- Percentage (w/w) of substance in mixture/article: <= 100.0 %
- Physical form of the used product: Liquid

Amount used (or contained in articles), frequency and duration of use/exposure

- Duration of activity: <= 1.0 hours/day

Technical and organisational conditions and measures

- Occupational Health and Safety Management System: Advanced
- Conditions and measures related to personal protection, hygiene and health evaluation
  - Respiratory Protection: No [Effectiveness Inhalation: 0%]
  - Dermal protection: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]
  - Wear chemical goggles: Wear chemical goggles (Qualitative protection for eye irritants)

Other conditions affecting workers exposure

- Place of use: Outdoor
- Operating temperature: <= 33.0 °C
- Skin surface potentially exposed: Two hands (960 cm²)
5.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>0.44 mg/m³ (Measured data: Measured Data)</td>
<td>RCR = 0.025</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>4.83 mg/m³ (Measured data: Measured Data)</td>
<td>RCR = 0.032</td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>0.44 mg/m³ (Measured data: Measured Data)</td>
<td>RCR = 0.055</td>
</tr>
<tr>
<td>Inhalation, local, acute</td>
<td>4.83 mg/m³ (Measured data: Measured Data)</td>
<td>RCR = 0.242</td>
</tr>
<tr>
<td>Dermal, systemic, long term</td>
<td>0.548 mg/kg bw/day (TRA Workers)</td>
<td>RCR = 0.137</td>
</tr>
<tr>
<td>Combined routes, systemic, long-term</td>
<td></td>
<td>RCR = 0.162</td>
</tr>
<tr>
<td>Combined routes, systemic, acute</td>
<td></td>
<td>RCR = 0.032</td>
</tr>
</tbody>
</table>

Risk characterisation
If conditions detailed in Section 5.3.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.

5.4. Worker contributing scenario 4: Quality control (indoors with LEV) (PROC 15)

5.4.1. Conditions of use

<table>
<thead>
<tr>
<th>Product (Article) characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Percentage (w/w) of substance in mixture/article: &lt;= 100.0 %</td>
</tr>
<tr>
<td>• Physical form of the used product: Liquid</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Amount used (or contained in articles), frequency and duration of use/exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Duration of activity: &lt;= 8.0 hours/day</td>
</tr>
</tbody>
</table>

Technical and organisational conditions and measures

| • Occupational Health and Safety Management System: Advanced |
| • General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness Inhalation: 0%] |
| • Local exhaust ventilation: Yes [Effectiveness Inhalation: 90%, Dermal: 0%] |

Conditions and measures related to personal protection, hygiene and health evaluation

| • Respiratory Protection: No [Effectiveness Inhalation: 0%] |
| • Dermal protection: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%] |
| • Wear chemical goggles: Wear chemical goggles (Qualitative protection for eye irritants) |

Other conditions affecting workers exposure

| • Place of use: Indoor |
| • Operating temperature: <= 33.0 °C |
| • Skin surface potentially exposed: One hand face only (240 cm²) |

5.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>2.002 mg/m³ (TRA Workers)</td>
<td>RCR = 0.113</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>8.007 mg/m³ (TRA Workers)</td>
<td>RCR = 0.053</td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>2.002 mg/m³ (TRA Workers)</td>
<td>RCR = 0.25</td>
</tr>
</tbody>
</table>
## Route of exposure and type of effects

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, local, acute</td>
<td>8.007 mg/m³ (TRA Workers)</td>
<td>RCR = 0.4</td>
</tr>
<tr>
<td>Dermal, systemic, long term</td>
<td>0.068 mg/kg bw/day (TRA Workers)</td>
<td>RCR = 0.017</td>
</tr>
<tr>
<td>Dermal, local, acute</td>
<td>0.02 mg/cm² (TRA Workers)</td>
<td>RCR = 0.13</td>
</tr>
<tr>
<td>Combined routes, systemic, long-term</td>
<td></td>
<td>RCR = 0.053</td>
</tr>
</tbody>
</table>

The vapour pressure at operating temperature used for the calculation has been set by the assessor to 499 Pa. The inhalation exposure is limited to the saturated vapour concentration (if relevant).

### Risk characterisation

If conditions detailed in Section 5.4.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.

#### 5.5. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

##### 5.5.1. Contributing scenario (1) for environmental exposure

If the local environmental emission conditions deviate significantly from the used default values, please use one of the equations below to estimate the corrected local emission and the RCR<sub>Actual</sub> for water. If the RCR<sub>Actual</sub> is below the RCR<sub>ES</sub> then safe use can be concluded.

For the environmental exposure (here only waste water), the DU can take the following starting points for the determinants:

- The quantity of product, in which the substance of concern is processed or used per year and site: \( M_{ES} \).
  
  \[ M_{ES} = 2.8E6 \text{ kg/year} \]

- The concentration or fraction of the substance in the product: \( C_{ES} \).
  
  \[ C_{ES} \text{ would be between 0 and 1} \]

- The concentration or fraction of the above mentioned quantity: \( C_{ES} \).
  
  \[ C_{ES} = 1.0 \]

- The emission factor: the fraction of the substance emitted from the process or use to wastewater (before abatement): \( f_{water} = \text{final release factor water} \).
  
  \[ f_{water} = 0.001 \text{ (for water would be between 0 and 1)} \]

- Efficiency of an abatement or control technology that reduces the emission to air, surface water or land: \( f_{abatement} \).
  
  \[ f_{abatement} = 0 \text{ (if there is no abatement or control technology, } f_{abatement} = 0) \]

- The removal of the substance in the STP:
  
  \[ F_{STP} = 0.8736 \]

- The duration of emission: \( T_{emission} \).
  
  \[ T_{emission} = 100 \text{ working days per year} \]

- Water treated in the sewage treatment plant (CAPACITY = Discharge rate of STP):
  
  \[ \text{In this ES: CAPACITY = Discharge rate of STP } >= 2E3 \text{ m}^3/d (>= 2 000 m}^3/d \]

- Dilution factor in the receiving water body: \( DILUTION = \frac{\text{Receiving surface water flow rate}}{\text{Discharge rate of STP}} \).
  
  \[ \text{In this ES: Receiving surface water flow rate } >= 1.8E4 \text{ m}^3/d (>= 18 000 m}^3/d \]

\[ DILUTION = 1.8E4 / 2E3 = 18 000 / 2 000 = 9 \]

The DU has to evaluate that under these use conditions that the exposure concentration in surface water can be predicted using the following equation:
The registrant calculates a RCR_ES for surface water, the DU calculates it for his use situation (RCR_Actual). If RCR_Actual is below the RCR_ES, then safe use can be concluded.

The registrant carries out the below steps in order to enable the DU to perform scaling. The numbering below refers to the steps given in section 1.3.3 of the “Guidance on information requirements and chemical safety assessment Part G: Extending the SDS”.

1) The registrant knows that the Operational Conditions in other similar uses of the product may vary, and concludes that he should provide information in the ES enabling the DU to scale the information of Operational Conditions / Risk Management Measures (OCs/RMMs) included in the ES.

2) He prepares the list of relevant determinants (see above)

3) The determinants which he considers likely to vary are: $M_{ES}$, $C_{ES}$, $f_{water}$, $f_{abatement}$, $T_{emission}$

4) None of the determinants are considered interdependent

5) All determinants are linear with respect to exposure level, so he proposes the following equation for scaling:

$$ RCR_{Actual} = RCR_{ES} \cdot \frac{M_{Actual}}{M_{ES}} \cdot \frac{C_{Actual}}{C_{ES}} \cdot \frac{f_{water,Actual}}{f_{water,ES}} \cdot \frac{(1-f_{abatement,Actual})}{(1-f_{abatement,ES})} \cdot \frac{T_{emission,ES}}{T_{emission,Actual}} $$

6) The concentration in the product ($C_{Actual}$) should be between 0 and 100%.
   The $f_{water,Actual}$ and $f_{abatement,Actual}$ would be between 0 and 1.
   The $T_{emission,Actual}$ should be between 1 and 365 days.

5.5.2. Contributing scenario (2) for workers

Evaluate whether work is done within the Risk Management Measures described in the Contributing scenario's above. Within those conditions, safe use was shown. If not, further assessment is required.
6. Exposure scenario 6: Formulation or re-packing - Manufacturing of blends/formulations

Title section

Environment contributing scenario(s):
| CS 1 | Manufacturing of blends/formulations | ERC 2 |

Worker contributing scenario(s):
| CS 2 | Mixing in a closed process, no likelihood of exposure | PROC 1 |
| CS 3 | Mixing in a closed, continuous process with occasional controlled exposure | PROC 2 |
| CS 4 | Mixing in a closed batch process (indoors) | PROC 3 |
| CS 5 | Mixing in a batch process where opportunity for exposure arises (indoors with LEV) | PROC 4 |
| CS 6 | Mixing in a batch process where the process is in stages and provides the opportunity for significant contact at any stage (>4hrs, indoors with LEV, room temp) | PROC 5 |
| CS 7 | Transfer of the substance or transfer of formulations containing the substance (large amounts, outdoors) | PROC 8b |
| CS 8 | Transfer of the substance or transfer of formulations containing the substance (small amounts, indoors with LEV) | PROC 9 |
| CS 9 | Quality control (indoors with LEV) | PROC 15 |
| CS 10 | Transfer of substance (dedicated facilities) | PROC 8b |
| CS 11 | Mixing in a batch process where opportunity for exposure arises (indoors with LEV) | PROC 4 |

Explanation on the approach taken for the ES

6.1 Environmental contributing scenario 1: Manufacturing of blends/formulations (ERC 2)

6.1.1. Conditions of use

<table>
<thead>
<tr>
<th>Amount used, frequency and duration of use (or from service life)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Daily use amount at site: &lt;= 28.0 tonnes/day</td>
</tr>
<tr>
<td>• Annual use amount at site: &lt;= 150.0 tonnes/year</td>
</tr>
</tbody>
</table>

In the European region there are 10 sites that use the substance for formulation of blends. This is the maximum tonnage at one of the 10 sites. Detailed information per site is not available.

| Percentage of EU tonnage used at regional scale: = 100.0 % |

Conditions and measures related to biological sewage treatment plant

| Biological STP: Standard |
| Discharge rate of STP: >= 2000 m3/d |
| Application of the STP sludge on agricultural soil: Yes |

Conditions and measures related to external treatment of waste (including article waste)

| Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.) |

Other conditions affecting environmental exposure

| Receiving surface water flow rate: >= 18000 m3/d |
6.1.2. Releases

The local releases to the environment are reported in the following table. Note that the releases reported do not account for the removal in the modelled biological STP.

Local releases to the environment

<table>
<thead>
<tr>
<th>Release</th>
<th>Release estimation method</th>
<th>Explanations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>Estimated release factor</td>
<td>Release factor before on site RMM: 0.01%</td>
</tr>
<tr>
<td></td>
<td>(Estimated release rate)</td>
<td>Release factor after on site RMM: 0.01%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Local release rate: 2.8 kg/day</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Explanation: There is no company specific data available. The local release</td>
</tr>
<tr>
<td></td>
<td></td>
<td>rate has been set to the maximum rate at which the local environmental risks</td>
</tr>
<tr>
<td></td>
<td></td>
<td>are controlled.</td>
</tr>
<tr>
<td>Air</td>
<td>Estimated release factor</td>
<td>Release factor before on site RMM: 0.1%</td>
</tr>
<tr>
<td></td>
<td>(Estimated release rate)</td>
<td>Release factor after on site RMM: 0.1%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Local release rate: 28 kg/day</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Explanation: There are no company specific data available. The 0.1% is</td>
</tr>
<tr>
<td></td>
<td></td>
<td>an estimation based on the properties and use of the substance.</td>
</tr>
<tr>
<td>Non-agricultural soil</td>
<td>ERC based</td>
<td>Release factor after on site RMM: 0.01%</td>
</tr>
</tbody>
</table>

6.1.3. Exposure and risks for the environment and man via the environment

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table. The exposure estimates have been obtained with EUSES 2.1.2 unless stated otherwise.

Exposure concentrations and risks for the environment and man via the environment

<table>
<thead>
<tr>
<th>Protection target</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fresh water</td>
<td>Local PEC: 0.018 mg/L</td>
<td>RCR = 0.556</td>
</tr>
<tr>
<td>Sediment (freshwater)</td>
<td>Local PEC: 0.097 mg/kg dw</td>
<td>RCR = 0.812</td>
</tr>
<tr>
<td>Marine water</td>
<td>Local PEC: 1.83E-3 mg/L</td>
<td>RCR = 0.554</td>
</tr>
<tr>
<td>Sediment (marine water)</td>
<td>Local PEC: 9.71E-3 mg/kg dw</td>
<td>RCR = 0.809</td>
</tr>
<tr>
<td>Sewage Treatment Plant</td>
<td>Local PEC: 0.177 mg/L</td>
<td>RCR = 0.023</td>
</tr>
<tr>
<td>Agricultural soil</td>
<td>Local PEC: 6.21E-3 mg/kg dw</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Predator's prey (freshwater)</td>
<td>Local PEC: 1.16E-3 mg/kg ww</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Predator's prey (marine water)</td>
<td>Local PEC: 1.06E-4 mg/kg ww</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Top predator's prey (marine water)</td>
<td>Local PEC: 9.14E-5 mg/kg ww</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Predator's prey (terrestrial)</td>
<td>Local PEC: 1.5E-3 mg/kg ww</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Man via environment - Inhalation</td>
<td>Concentration in air: 1.17E-4 mg/m³</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Man via environment - Oral</td>
<td>Exposure via food consumption: 1.62E-4 mg/kg bw/day</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Man via environment - combined routes</td>
<td></td>
<td>RCR &lt; 0.01</td>
</tr>
</tbody>
</table>
6.2. Worker contributing scenario 2: Mixing in a closed process, no likelihood of exposure (PROC 1)

6.2.1. Conditions of use

Product (Article) characteristics

- Percentage (w/w) of substance in mixture/article: <= 100.0 %
- Physical form of the used product: Liquid

Amount used (or contained in articles), frequency and duration of use/exposure

- Duration of activity: <= 8.0 hours/day

Technical and organisational conditions and measures

- Closed process without likelihood of exposure
- Occupational Health and Safety Management System: Advanced
- General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness Inhalation: 0%]
- Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]

Conditions and measures related to personal protection, hygiene and health evaluation

- Respiratory Protection: No [Effectiveness Inhalation: 0%]
- Dermal protection: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]
- Wear chemical goggles: Wear chemical goggles (Qualitative protection for eye irritants)

Other conditions affecting workers exposure

- Place of use: Indoor
- Operating temperature: <= 33.0 °C
- Skin surface potentially exposed: One hand face only (240 cm²)

6.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>0.04 mg/m³ (TRA Workers)</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>0.16 mg/m³ (TRA Workers)</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>0.04 mg/m³ (TRA Workers)</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Inhalation, local, acute</td>
<td>0.16 mg/m³ (TRA Workers)</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Dermal, systemic, long term</td>
<td>6.8E-3 mg/kg bw/day (TRA Workers)</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Dermal, local, acute</td>
<td>1.98E-3 mg/cm² (TRA Workers)</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Combined routes, systemic, long-term</td>
<td></td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Combined routes, systemic, acute</td>
<td></td>
<td>RCR &lt; 0.01</td>
</tr>
</tbody>
</table>

The vapour pressure at operating temperature used for the calculation has been set by the assessor to 499 Pa.

Risk characterisation

If conditions detailed in Section 6.2.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.

6.3. Worker contributing scenario 3: Mixing in a closed, continuous process with occasional controlled exposure (PROC 2)

6.3.1. Conditions of use

Product (Article) characteristics
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6.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>2.802 mg/m³ (TRA Workers)</td>
<td>RCR = 0.157</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>11.21 mg/m³ (TRA Workers)</td>
<td>RCR = 0.074</td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>2.802 mg/m³ (TRA Workers)</td>
<td>RCR = 0.35</td>
</tr>
<tr>
<td>Inhalation, local, acute</td>
<td>11.21 mg/m³ (TRA Workers)</td>
<td>RCR = 0.56</td>
</tr>
<tr>
<td>Dermal, systemic, long term</td>
<td>0.274 mg/kg bw/day (TRA Workers)</td>
<td>RCR = 0.069</td>
</tr>
<tr>
<td>Dermal, local, acute</td>
<td>0.04 mg/cm² (TRA Workers)</td>
<td>RCR = 0.226</td>
</tr>
<tr>
<td>Combined routes, systemic, long-term</td>
<td></td>
<td>RCR = 0.074</td>
</tr>
<tr>
<td>Combined routes, systemic, acute</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Operating temperature used for the calculation has been set by the assessor to 499 Pa. The inhalation exposure is limited to the saturated vapour concentration (if relevant).

**Risk characterisation**

If conditions detailed in Section 6.3.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.

6.4. Worker contributing scenario 4: Mixing in a closed batch process (indoors) (PROC 3)

6.4.1. Conditions of use

<table>
<thead>
<tr>
<th>Product (Article) characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Percentage (w/w) of substance in mixture/article: &lt;= 100.0 %</td>
</tr>
<tr>
<td>• Physical form of the used product: Liquid</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Amount used (or contained in articles), frequency and duration of use/exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Duration of activity: &lt;= 8.0 hours/day</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technical and organisational conditions and measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Closed continuous process with occasional controlled exposure</td>
</tr>
<tr>
<td>• Occupational Health and Safety Management System: Advanced</td>
</tr>
<tr>
<td>• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]</td>
</tr>
<tr>
<td>• Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Conditions and measures related to personal protection, hygiene and health evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Respiratory Protection: No [Effectiveness Inhalation: 0%]</td>
</tr>
<tr>
<td>• Dermal protection: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]</td>
</tr>
<tr>
<td>• Wear chemical goggles (Qualitative protection for eye irritants)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other conditions affecting workers exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Place of use: Indoor</td>
</tr>
<tr>
<td>• Operating temperature: &lt;= 33.0 °C</td>
</tr>
<tr>
<td>• Skin surface potentially exposed: Two hands face (480 cm²)</td>
</tr>
</tbody>
</table>
6.5. Worker contributing scenario 5: Mixing in a batch process where opportunity for exposure arises (indoors with LEV) (PROC 4)

6.5.1. Conditions of use

Product (Article) characteristics
- Percentage (w/w) of substance in mixture/article: <= 100.0 %
- Physical form of the used product: Liquid

Amount used (or contained in articles), frequency and duration of use/exposure
- Duration of activity: <= 8.0 hours/day

Technical and organisational conditions and measures
- Occupational Health and Safety Management System: Advanced
- General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness Inhalation: 0%]
- Local exhaust ventilation: Yes [Effectiveness Inhalation: 90%, Dermal: 0%]

Conditions and measures related to personal protection, hygiene and health evaluation
- Respiratory Protection: No [Effectiveness Inhalation: 0%]
- Wear chemical gloves: Wear chemical gloves (Qualitative protection for eye irritants)

The vapour pressure at operating temperature used for the calculation has been set by the assessor to 499 Pa. The inhalation exposure is limited to the saturated vapour concentration (if relevant).

Risk characterisation
If conditions detailed in Section 6.4.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.
6.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>2.002 mg/m³ (TRA Workers)</td>
<td>RCR = 0.113</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>8.007 mg/m³ (TRA Workers)</td>
<td>RCR = 0.053</td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>2.002 mg/m³ (TRA Workers)</td>
<td>RCR = 0.25</td>
</tr>
<tr>
<td>Inhalation, local, acute</td>
<td>8.007 mg/m³ (TRA Workers)</td>
<td>RCR = 0.4</td>
</tr>
<tr>
<td>Dermal, systemic, long term</td>
<td>1.372 mg/kg bw/day (TRA Workers)</td>
<td>RCR = 0.343</td>
</tr>
<tr>
<td>Dermal, local, acute</td>
<td>0.2 mg/cm² (TRA Workers)</td>
<td>RCR = 0.456</td>
</tr>
<tr>
<td>Combined routes, systemic, long-term</td>
<td></td>
<td>RCR = 0.456</td>
</tr>
<tr>
<td>Combined routes, systemic, acute</td>
<td></td>
<td>RCR = 0.053</td>
</tr>
</tbody>
</table>

The vapour pressure at operating temperature used for the calculation has been set by the assessor to 499 Pa. The inhalation exposure is limited to the saturated vapour concentration (if relevant).

Risk characterisation

If conditions detailed in Section 6.5.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.

6.6. Worker contributing scenario 6: Mixing in a batch process where the process is in stages and provides the opportunity for significant contact at any stage (>4hrs, indoors with LEV, room temp) (PROC 5)

6.6.1. Conditions of use

<table>
<thead>
<tr>
<th>Product (Article) characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Percentage (w/w) of substance in mixture/article: &lt;= 100.0 %</td>
</tr>
<tr>
<td>• Physical form of the used product: Liquid</td>
</tr>
</tbody>
</table>

| Amount used (or contained in articles), frequency and duration of use/exposure |
| • Duration of activity: <= 8.0 hours/day |

| Technical and organisational conditions and measures |
| • Occupational Health and Safety Management System: Advanced |
| • General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%] |
| • Local exhaust ventilation: Yes [Effectiveness Inhalation: 90%, Dermal: 0%] |

| Conditions and measures related to personal protection, hygiene and health evaluation |
| • Respiratory Protection: No [Effectiveness Inhalation: 0%] |
| • Dermal protection: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%] |
| • Wear chemical goggles: Wear chemical goggles (Qualitative protection for eye irritants) |

| Other conditions affecting workers exposure |
| • Place of use: Indoor |
| • Operating temperature: <= 33.0 °C |
6.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>1.401 mg/m³ (TRA Workers)</td>
<td>RCR = 0.079</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>5.605 mg/m³ (TRA Workers)</td>
<td>RCR = 0.037</td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>1.401 mg/m³ (TRA Workers)</td>
<td>RCR = 0.175</td>
</tr>
<tr>
<td>Inhalation, local, acute</td>
<td>5.605 mg/m³ (TRA Workers)</td>
<td>RCR = 0.28</td>
</tr>
<tr>
<td>Dermal, systemic, long term</td>
<td>2.742 mg/kg bw/day (TRA Workers)</td>
<td>RCR = 0.685</td>
</tr>
<tr>
<td>Dermal, local, acute</td>
<td>0.4 mg/cm² (TRA Workers)</td>
<td>RCR = 0.764</td>
</tr>
<tr>
<td>Combined routes, systemic, long-term</td>
<td></td>
<td>RCR = 0.037</td>
</tr>
<tr>
<td>Combined routes, systemic, acute</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The vapour pressure at operating temperature used for the calculation has been set by the assessor to 499 Pa. The inhalation exposure is limited to the saturated vapour concentration (if relevant).

**Risk characterisation**

If conditions detailed in Section 6.6.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.

6.7. Worker contributing scenario 7: Transfer of the substance or transfer of formulations containing the substance (large amounts, outdoors) (PROC 8b)

6.7.1. Conditions of use

**Product (Article) characteristics**

- Percentage (w/w) of substance in mixture/article: <= 100.0 %
- Physical form of the used product: Liquid

**Amount used (or contained in articles), frequency and duration of use/exposure**

- Duration of activity: <= 1.0 hours/day

**Technical and organisational conditions and measures**

- Occupational Health and Safety Management System: Advanced

**Conditions and measures related to personal protection, hygiene and health evaluation**

- Respiratory Protection: No [Effectiveness Inhalation: 0%]
- Dermal protection: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]
- Wear chemical goggles: Wear chemical goggles (Qualitative protection for eye irritants)

**Other conditions affecting workers exposure**

- Place of use: Outdoor
- Operating temperature: <= 33.0 °C
- Skin surface potentially exposed: Two hands (960 cm²)

6.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.
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Safety Data Sheet according to Regulation (EC) No 1907/2006

Exposure concentrations and risks for workers

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>0.44 mg/m³ (Measured data: Measured Data)</td>
<td>RCR = 0.025</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>4.83 mg/m³ (Measured data: Measured Data)</td>
<td>RCR = 0.032</td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>0.44 mg/m³ (Measured data: Measured Data)</td>
<td>RCR = 0.055</td>
</tr>
<tr>
<td>Inhalation, local, acute</td>
<td>4.83 mg/m³ (Measured data: Measured Data)</td>
<td>RCR = 0.242</td>
</tr>
<tr>
<td>Dermal, systemic, long term</td>
<td>0.548 mg/kg bw/day (TRA Workers)</td>
<td>RCR = 0.137</td>
</tr>
<tr>
<td>Combined routes, systemic, long-term</td>
<td></td>
<td>RCR = 0.162</td>
</tr>
<tr>
<td>Combined routes, systemic, acute</td>
<td></td>
<td>RCR = 0.032</td>
</tr>
</tbody>
</table>

Risk characterisation

If conditions detailed in Section 6.7.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.

6.8. Worker contributing scenario 8: Transfer of the substance or transfer of formulations containing the substance (small amounts, indoors with LEV) (PROC 9)

6.8.1. Conditions of use

Product (Article) characteristics

- Percentage (w/w) of substance in mixture/article: <= 100.0 %
- Physical form of the used product: Liquid

Amount used (or contained in articles), frequency and duration of use/exposure

- Duration of activity: <= 8.0 hours/day

Technical and organisational conditions and measures

- Occupational Health and Safety Management System: Advanced
- General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]
- Local exhaust ventilation: Yes [Effectiveness Inhalation: 90%, Dermal: 0%]

Conditions and measures related to personal protection, hygiene and health evaluation

- Respiratory Protection: No [Effectiveness Inhalation: 0%]
- Dermal protection: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]
- Wear chemical goggles: Wear chemical goggles (Qualitative protection for eye irritants)

Other conditions affecting workers exposure

- Place of use: Indoor
- Operating temperature: <= 33.0 °C
- Skin surface potentially exposed: Two hands face (480 cm²)

6.8.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Exposure concentrations and risks for workers

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>1.401 mg/m³ (TRA Workers)</td>
<td>RCR = 0.079</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>5.605 mg/m³ (TRA Workers)</td>
<td>RCR = 0.037</td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>1.401 mg/m³ (TRA Workers)</td>
<td>RCR = 0.175</td>
</tr>
<tr>
<td>Inhalation, local, acute</td>
<td>5.605 mg/m³ (TRA Workers)</td>
<td>RCR = 0.28</td>
</tr>
</tbody>
</table>
Safety Data Sheet
according to Regulation (EC) No 1907/2006

Furual

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dermal, systemic, long term</td>
<td>1.372 mg/kg bw/day (TRA Workers)</td>
<td>RCR = 0.343</td>
</tr>
<tr>
<td>Dermal, local, acute</td>
<td>0.2 mg/cm² (TRA Workers)</td>
<td>RCR = 0.422</td>
</tr>
<tr>
<td>Combined routes, systemic, long-term</td>
<td></td>
<td>RCR = 0.422</td>
</tr>
<tr>
<td>Combined routes, systemic, acute</td>
<td></td>
<td>RCR = 0.037</td>
</tr>
</tbody>
</table>

The vapour pressure at operating temperature used for the calculation has been set by the assessor to 499 Pa.

The inhalation exposure is limited to the saturated vapour concentration (if relevant).

**Risk characterisation**

If conditions detailed in Section 6.8.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.

6.9. Worker contributing scenario 9: Quality control (indoors with LEV) (PROC 15)

6.9.1. Conditions of use

**Product (Article) characteristics**

- Percentage (w/w) of substance in mixture/article: <= 100.0 %
- Physical form of the used product: Liquid

**Amount used (or contained in articles), frequency and duration of use/exposure**

- Duration of activity: <= 8.0 hours/day

**Technical and organisational conditions and measures**

- Occupational Health and Safety Management System: Advanced
- General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness Inhalation: 0%]
- Local exhaust ventilation: Yes [Effectiveness Inhalation: 90%, Dermal: 0%]

**Conditions and measures related to personal protection, hygiene and health evaluation**

- Respiratory Protection: No [Effectiveness Inhalation: 0%]
- Dermal protection: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]
- Wear chemical goggles: Wear chemical goggles (Qualitative protection for eye irritants)

**Other conditions affecting workers exposure**

- Place of use: Indoor
- Operating temperature: <= 33.0 °C
- Skin surface potentially exposed: One hand face only (240 cm²)

6.9.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

**Exposure concentrations and risks for workers**

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>2.002 mg/m³ (TRA Workers)</td>
<td>RCR = 0.113</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>8.007 mg/m³ (TRA Workers)</td>
<td>RCR = 0.053</td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>2.002 mg/m³ (TRA Workers)</td>
<td>RCR = 0.25</td>
</tr>
<tr>
<td>Inhalation, local, acute</td>
<td>8.007 mg/m³ (TRA Workers)</td>
<td>RCR = 0.4</td>
</tr>
<tr>
<td>Dermal, systemic, long term</td>
<td>0.068 mg/kg bw/day (TRA Workers)</td>
<td>RCR = 0.017</td>
</tr>
<tr>
<td>Dermal, local, acute</td>
<td>0.02 mg/cm² (TRA Workers)</td>
<td>RCR = 0.13</td>
</tr>
<tr>
<td>Combined routes, systemic, long-term</td>
<td></td>
<td>RCR = 0.037</td>
</tr>
<tr>
<td>Combined routes, systemic, acute</td>
<td></td>
<td>RCR = 0.053</td>
</tr>
</tbody>
</table>

The vapour pressure at operating temperature used for the calculation has been set by the assessor to 499 Pa.
6.10. Worker contributing scenario 10: Transfer of substance (dedicated facilities) (PROC 8b)

### 6.10.1. Conditions of use

<table>
<thead>
<tr>
<th>Product (Article) characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Percentage (w/w) of substance in mixture/article: &lt;= 100.0 %</td>
</tr>
<tr>
<td>• Physical form of the used product: Liquid</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Amount used (or contained in articles), frequency and duration of use/exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Duration of activity: &lt;= 8.0 hours/day</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technical and organisational conditions and measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Occupational Health and Safety Management System: Advanced</td>
</tr>
<tr>
<td>• General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness Inhalation: 0%]</td>
</tr>
<tr>
<td>• Local exhaust ventilation: Yes [Effectiveness Inhalation: 95%, Dermal: 0%]</td>
</tr>
</tbody>
</table>

LEV is equivalent to the use of dry breaks coupling for materials transfer in an outdoor setting is equivalent to this reduction efficiency.

<table>
<thead>
<tr>
<th>Conditions and measures related to personal protection, hygiene and health evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Respiratory Protection: No [Effectiveness Inhalation: 0%]</td>
</tr>
<tr>
<td>• Dermal protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]</td>
</tr>
<tr>
<td>• Wear chemical goggles: Wear chemical goggles (Qualitative protection for eye irritants)</td>
</tr>
</tbody>
</table>

Other conditions affecting workers exposure

| • Place of use: Indoor |
| • Operating temperature: <= 33.0 °C |
| • Skin surface potentially exposed: Two hands (960 cm2) |

### 6.10.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>1.001 mg/m³ (TRA Workers)</td>
<td>RCR = 0.056</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>4.004 mg/m³ (TRA Workers)</td>
<td>RCR = 0.026</td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>1.001 mg/m³ (TRA Workers)</td>
<td>RCR = 0.125</td>
</tr>
<tr>
<td>Inhalation, local, acute</td>
<td>4.004 mg/m³ (TRA Workers)</td>
<td>RCR = 0.2</td>
</tr>
<tr>
<td>Dermal, systemic, long term</td>
<td>1.371 mg/kg bw/day (TRA Workers)</td>
<td>RCR = 0.343</td>
</tr>
<tr>
<td>Dermal, local, acute</td>
<td>0.1 mg/cm² (TRA Workers)</td>
<td>RCR = 0.399</td>
</tr>
<tr>
<td>Combined routes, systemic, long-term</td>
<td></td>
<td>RCR = 0.026</td>
</tr>
<tr>
<td>Combined routes, systemic, acute</td>
<td></td>
<td>RCR = 0.217</td>
</tr>
</tbody>
</table>

The vapour pressure at operating temperature used for the calculation has been set by the assessor to 499 Pa.

The inhalation exposure is limited to the saturated vapour concentration (if relevant).

### Risk characterisation
If conditions detailed in Section 6.10.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.

6.11. Worker contributing scenario 11: Mixing in a batch process where opportunity for exposure arises (indoors with LEV) (PROC 4)

6.11.1. Conditions of use

<table>
<thead>
<tr>
<th>Product (Article) characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Percentage (w/w) of substance in mixture/article: &lt;= 100.0 %</td>
</tr>
<tr>
<td>• Physical form of the used product: Liquid</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Amount used (or contained in articles), frequency and duration of use/exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Duration of activity: &lt;= 8.0 hours/day</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technical and organisational conditions and measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Occupational Health and Safety Management System: Advanced</td>
</tr>
<tr>
<td>• General ventilation: Enhanced general ventilation (5-10 air changes per hour) [Effectiveness Inhalation: 70%]</td>
</tr>
<tr>
<td>• Local exhaust ventilation: Yes [Effectiveness Inhalation: 90%, Dermal: 0%]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Conditions and measures related to personal protection, hygiene and health evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Respiratory Protection: No [Effectiveness Inhalation: 0%]</td>
</tr>
<tr>
<td>• Dermal protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other conditions affecting workers exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Place of use: Indoor</td>
</tr>
<tr>
<td>• Operating temperature: &lt;= 50.0 °C</td>
</tr>
<tr>
<td>• Skin surface potentially exposed: Two hands face (480 cm²)</td>
</tr>
</tbody>
</table>

6.11.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

<table>
<thead>
<tr>
<th>Exposure concentrations and risks for workers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inhalation, systemic, long term</strong></td>
</tr>
<tr>
<td><strong>Inhalation, systemic, acute</strong></td>
</tr>
<tr>
<td><strong>Inhalation, local, long term</strong></td>
</tr>
<tr>
<td><strong>Inhalation, local, acute</strong></td>
</tr>
<tr>
<td><strong>Dermal, systemic, long term</strong></td>
</tr>
<tr>
<td><strong>Combined routes, systemic, long-term</strong></td>
</tr>
<tr>
<td><strong>Combined routes, systemic, acute</strong></td>
</tr>
</tbody>
</table>

The vapour pressure at operating temperature used for the calculation has been set by the assessor to 1.59E3 Pa.

**Risk characterisation**

If conditions detailed in Section 6.11.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.
6.12. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

6.12.1. Contributing scenario (1) for environmental exposure

If the local environmental emission conditions deviate significantly from the used default values, please use one of the equations below to estimate the corrected local emission and the RCR Actual for water. If the RCR Actual is below the RCR ES then safe use can be concluded.

For the environmental exposure (here only waste water), the DU can take the following starting points for the determinants:

- The quantity of product, in which the substance of concern is processed or used per year and site: \( M_{ES} \).
  \[ \text{In this ES: } M_{ES} = 2.8 \times 10^6 \text{ kg/year} \]

- The concentration or fraction of the substance in the product \( C_{ES} \); \( C_{ES} \text{ would be between 0 and 1} \)
  \[ \text{This is the concentration or fraction of the above mentioned quantity. In this ES: } C_{ES} = 1.0 \]

- The emission factor: the fraction of the substance emitted from the process or use to wastewater (before abatement) \( f_{water} = \text{final release factor water} \); \( f_{water} \text{ would be between 0 and 1} \)
  \[ \text{In this ES: } f_{water} = 0.01\% = 0.0001 \]

- Efficiency of an abatement or control technology that reduces the emission to air, surface water or land: \( f_{\text{abatement}} \).
  \[ \text{(} f_{\text{abatement}} \text{ would be between 0 and 1. If there is no abatement or control technology, } f_{\text{abatement}} = 0 \)\]
  \[ \text{In this ES there is no abatement (} f_{\text{abatement}} = 0 \)\]

- The removal of the substance in the STP
  \[ \text{In this ES: } F_{\text{STP}} = 0.8736 \]

- The duration of emission: \( T_{\text{emission}} \).
  \[ \text{(} T_{\text{emission}} \text{ would be between 1 and 365 days). In this ES: } T_{\text{emission}} = 100 \text{ working days per year} \]

- Water treated in the sewage treatment plant (CAPACITY = Discharge rate of STP)
  \[ \text{In this ES: } \text{CAPACITY} = \text{Discharge rate of STP} = 2 \times 10^3 \text{ m}^3/\text{d} (\geq 2000 \text{ m}^3/\text{day}) \]

- Dilution factor in the receiving water body: \( \text{DILUTION} = \frac{\text{Receiving surface water flow rate}}{\text{Discharge rate of STP}} \)
  \[ \text{In this ES: Receiving surface water flow rate } \geq 1.8 \times 10^4 \text{ m}^3/\text{d} (\geq 18000 \text{ m}^3/\text{d}) \]
  \[ \text{DILUTION} = 1.8 \times 10^4 / 2 \times 10^3 = 18000 / 2000 = 9 \]

The DU has to evaluate that under these use conditions that the exposure concentration in surface water can be predicted using the following equation:

\[
P_{\text{EC,local}} = P_{\text{EC,regional}} + \frac{M_{ES} \cdot C_{ES} \cdot f_{water} \cdot (1 - f_{\text{abatement}}) \cdot (1 - F_{\text{STP}})}{T_{\text{emission}} \cdot \text{CAPACITY} \cdot \text{DILUTION}}
\]

\[
P_{\text{EC,local}} = \frac{M_{ES} \cdot C_{ES} \cdot f_{water} \cdot (1 - f_{\text{abatement}}) \cdot (1 - F_{\text{STP}})}{T_{\text{emission}} \cdot \text{CAPACITY} \cdot \text{DILUTION}} (\text{as } P_{\text{EC,regional}} \equiv 0)
\]

The registrant calculates a RCR ES for surface water, the DU calculates it for his use situation (RCR Actual). If RCR Actual is below the RCR ES, then safe use can be concluded.

The registrant carries out the below steps in order to enable the DU to perform scaling. The numbering below refers to the steps given in section 1.3.3 of the "Guidance on information requirements and chemical safety assessment Part G: Extending the SDS".
1) The registrant knows that the Operational Conditions in other similar uses of the product may vary, and concludes that he should provide information in the ES enabling the DU to scale the information of Operational Conditions / Risk Management Measures (OCs/RMMs) included in the ES.
2) He prepares the list of relevant determinants (see above)
3) The determinants which he considers likely to vary are: $M_{ES}, C_{ES}, f_{water}, f_{abatement}, T_{emission}$
4) None of the determinants are considered interdependent
5) All determinants are linear with respect to exposure level, so he proposes the following equation for scaling:

$$RCR_{Actual} = RCR_{ES} \cdot \frac{M_{Actual}}{M_{ES}} \cdot \frac{C_{Actual}}{C_{ES}} \cdot \frac{f_{water,Actual}}{f_{water,ES}} \cdot \frac{(1-f_{abatement,Actual})}{(1-f_{abatement,ES})} \cdot \frac{T_{emission,ES}}{T_{emission,Actual}}$$

6) The concentration in the product ($C_{Actual}$) should be between 0 and 100%. The $f_{water,Actual}$ and $f_{abatement,Actual}$ would be between 0 and 1. The $T_{emission,Actual}$ should be between 1 and 365 days.

6.12.2. Contributing scenario (2) for workers

Evaluate whether work is done within the Risk Management Measures described in the Contributing scenario's above. Within those conditions, safe use was shown. If not, further assessment is required.
7. Exposure scenario 7: Use at industrial sites - Manufacturing of polymers

Title section

<table>
<thead>
<tr>
<th>Environment contributing scenario(s):</th>
<th>Worker contributing scenario(s):</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 1 Manufacturing of polymers</td>
<td>ERC 6c</td>
</tr>
<tr>
<td>CS 2 Manufacturing polymers in a closed process, no likelihood of exposure, concentration &gt;25%</td>
<td>PROC 1</td>
</tr>
<tr>
<td>CS 3 Manufacturing polymers in a closed, continuous process with occasional controlled exposure, concentration: &gt;25%</td>
<td>PROC 2</td>
</tr>
<tr>
<td>CS 4 Manufacturing polymers in a closed batch process, concentration: &gt;25%</td>
<td>PROC 3</td>
</tr>
<tr>
<td>CS 5 Manufacturing polymers in a batch process where opportunity for exposure arises, concentration: &gt;25% (indoors with LEV)</td>
<td>PROC 4</td>
</tr>
<tr>
<td>CS 6 Manufacturing polymers in a batch process where opportunity for significant exposure arises, concentration: &gt;25% (indoors with LEV)</td>
<td>PROC 5</td>
</tr>
<tr>
<td>CS 7 Transfer of the substance, concentration: &gt;25% (dedicated facilities, outdoors)</td>
<td>PROC 8b</td>
</tr>
<tr>
<td>CS 8 Quality control, concentration: &gt;25%</td>
<td>PROC 15</td>
</tr>
<tr>
<td>CS 9 Transfer of substance (dedicated facilities, indoors with LEV)</td>
<td>PROC 8b</td>
</tr>
</tbody>
</table>

Explanation on the approach taken for the ES

7.1 Environmental contributing scenario 1: Manufacturing of polymers (ERC 6c)

7.1.1. Conditions of use

Amount used, frequency and duration of use (or from service life)

- Daily use amount at site: <= 28.0 tonnes/day
- Annual use amount at site: <= 50.0 tonnes/year

In the European region there are 5 sites that use the substance for the manufacturing of polymers. Detailed information per site is not available. It is assumed that the total tonnage (250 tonnes/year) is evenly distributed to all sites.

- Percentage of EU tonnage used at regional scale: = 100.0 %

Conditions and measures related to biological sewage treatment plant

- Biological STP: Standard
- Discharge rate of STP: => 2000 m3/d
- Application of the STP sludge on agricultural soil: Yes

Conditions and measures related to external treatment of waste (including article waste)

- Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)

Other conditions affecting environmental exposure

- Receiving surface water flow rate: => 18000 m3/d
7.1.2. Releases

The local releases to the environment are reported in the following table. Note that the releases reported do not account for the removal in the modelled biological STP.

Local releases to the environment

<table>
<thead>
<tr>
<th>Release</th>
<th>Release estimation method</th>
<th>Explanations</th>
</tr>
</thead>
</table>
| Water                    | Estimated release factor (Estimated release rate) | Release factor before on site RMM: 0.01%  
                      |                                           | Release factor after on site RMM: 0.01%  
                      |                                           | Local release rate: 2.8 kg/day  
                      |                                           | Explanation: There is no company specific data available. The local release rate has been set to the maximum rate at which the local environmental risks are controlled. |
| Air                      | Estimated release factor (Estimated release rate) | Release factor before on site RMM: 0.1%  
                      |                                           | Release factor after on site RMM: 0.1%  
                      |                                           | Local release rate: 28 kg/day  
                      |                                           | Explanation: There are no company specific data available. The 0.1% is an estimation based on the properties and use of the substance. |
| Non-agricultural soil    | ERC based                                  | Release factor after on site RMM: 0%  

7.1.3. Exposure and risks for the environment and man via the environment

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table. The exposure estimates have been obtained with EUSES 2.1.2 unless stated otherwise.

Exposure concentrations and risks for the environment and man via the environment

<table>
<thead>
<tr>
<th>Protection target</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fresh water</td>
<td>Local PEC: 0.018 mg/L</td>
<td>RCR = 0.556</td>
</tr>
<tr>
<td>Sediment (freshwater)</td>
<td>Local PEC: 0.097 mg/kg dw</td>
<td>RCR = 0.812</td>
</tr>
<tr>
<td>Marine water</td>
<td>Local PEC: 1.83E-3 mg/L</td>
<td>RCR = 0.554</td>
</tr>
<tr>
<td>Sediment (marine water)</td>
<td>Local PEC: 9.71E-3 mg/kg dw</td>
<td>RCR = 0.809</td>
</tr>
<tr>
<td>Sewage Treatment Plant</td>
<td>Local PEC: 0.177 mg/L</td>
<td>RCR = 0.023</td>
</tr>
<tr>
<td>Agricultural soil</td>
<td>Local PEC: 6.2E-3 mg/kg dw</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Predator's prey (freshwater)</td>
<td>Local PEC: 1.03E-3 mg/kg ww</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Predator's prey (marine water)</td>
<td>Local PEC: 9.39E-5 mg/kg ww</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Top predator's prey (marine water)</td>
<td>Local PEC: 8.9E-5 mg/kg ww</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Predator's prey (terrestrial)</td>
<td>Local PEC: 1.49E-3 mg/kg ww</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Man via environment - Inhalation</td>
<td>Concentration in air: 4.09E-5 mg/m³</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Man via environment - Oral</td>
<td>Exposure via food consumption: 1.37E-4 mg/kg bw/day</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Man via environment - combined routes</td>
<td></td>
<td>RCR &lt; 0.01</td>
</tr>
</tbody>
</table>
7.2 Worker contributing scenario 2: Manufacturing polymers in a closed process, no likelihood of exposure, concentration >25% (PROC 1)

7.2.1. Conditions of use

<table>
<thead>
<tr>
<th>Product (Article) characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Percentage (w/w) of substance in mixture/article: &lt;= 100.0 %</td>
</tr>
<tr>
<td>• Physical form of the used product: Liquid</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Amount used (or contained in articles), frequency and duration of use/exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Duration of activity: &lt;= 8.0 hours/day</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technical and organisational conditions and measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Closed process without likelihood of exposure</td>
</tr>
<tr>
<td>• Occupational Health and Safety Management System: Advanced</td>
</tr>
<tr>
<td>• General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness Inhalation: 0%]</td>
</tr>
<tr>
<td>• Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Conditions and measures related to personal protection, hygiene and health evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Respiratory Protection: No [Effectiveness Inhalation: 0%]</td>
</tr>
<tr>
<td>• Dermal protection: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]</td>
</tr>
<tr>
<td>• Wear chemical goggles: Wear chemical goggles (Qualitative protection for eye irritants)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other conditions affecting workers exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Place of use: Indoor</td>
</tr>
<tr>
<td>• Operating temperature: &lt;= 33.0 °C</td>
</tr>
<tr>
<td>• Skin surface potentially exposed: One hand face only (240 cm²)</td>
</tr>
</tbody>
</table>

7.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>0.04 mg/m³ (TRA Workers)</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>0.16 mg/m³ (TRA Workers)</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>0.04 mg/m³ (TRA Workers)</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Inhalation, local, acute</td>
<td>0.16 mg/m³ (TRA Workers)</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Dermal, systemic, long term</td>
<td>6.8E-3 mg/kg bw/day (TRA Workers)</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Dermal, local, acute</td>
<td>1.98E-3 mg/cm² (TRA Workers)</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Combined routes, systemic, long-term</td>
<td></td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Combined routes, systemic, acute</td>
<td></td>
<td>RCR &lt; 0.01</td>
</tr>
</tbody>
</table>

The vapour pressure at operating temperature used for the calculation has been set by the assessor to 499 Pa.

Risk characterisation
If conditions detailed in Section 7.2.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.
7.3 Worker contributing scenario 3: Manufacturing polymers in a closed, continuous process with occasional controlled exposure, concentration: >25% (PROC 2)

7.3.1. Conditions of use

<table>
<thead>
<tr>
<th>Product (Article) characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Percentage (w/w) of substance in mixture/article: &lt;= 100.0 %</td>
</tr>
<tr>
<td>• Physical form of the used product: Liquid</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Amount used (or contained in articles), frequency and duration of use/exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Duration of activity: &lt;= 8.0 hours/day</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technical and organisational conditions and measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Closed continuous process with occasional controlled exposure</td>
</tr>
<tr>
<td>• Occupational Health and Safety Management System: Advanced</td>
</tr>
<tr>
<td>• General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness Inhalation: 0%]</td>
</tr>
<tr>
<td>• Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Conditions and measures related to personal protection, hygiene and health evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Respiratory Protection: No [Effectiveness Inhalation: 0%]</td>
</tr>
<tr>
<td>• Dermal protection: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]</td>
</tr>
<tr>
<td>• Wear chemical goggles: Wear chemical goggles (Qualitative protection for eye irritants)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other conditions affecting workers exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Place of use: Indoor</td>
</tr>
<tr>
<td>• Operating temperature: &lt;= 33.0 °C</td>
</tr>
<tr>
<td>• Skin surface potentially exposed: Two hands face (480 cm²)</td>
</tr>
</tbody>
</table>

7.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>4.004 mg/m³ (TRA Workers)</td>
<td>RCR = 0.225</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>16.01 mg/m³ (TRA Workers)</td>
<td>RCR = 0.105</td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>4.004 mg/m³ (TRA Workers)</td>
<td>RCR = 0.5</td>
</tr>
<tr>
<td>Inhalation, local, acute</td>
<td>16.01 mg/m³ (TRA Workers)</td>
<td>RCR = 0.801</td>
</tr>
<tr>
<td>Dermal, systemic, long term</td>
<td>0.274 mg/kg bw/day (TRA Workers)</td>
<td>RCR = 0.069</td>
</tr>
<tr>
<td>Dermal, local, acute</td>
<td>0.04 mg/cm² (TRA Workers)</td>
<td>RCR = 0.293</td>
</tr>
<tr>
<td>Combined routes, systemic, long-term</td>
<td></td>
<td>RCR = 0.105</td>
</tr>
<tr>
<td>Combined routes, systemic, acute</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The vapour pressure at operating temperature used for the calculation has been set by the assessor to 499 Pa.
The inhalation exposure is limited to the saturated vapour concentration (if relevant).

Risk characterisation

If conditions detailed in Section 7.3.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.
7.4 Worker contributing scenario 4: Manufacturing polymers in a closed batch process, concentration: >25% (PROC 3)

7.4.1. Conditions of use

<table>
<thead>
<tr>
<th>Product (Article) characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Percentage (w/w) of substance in mixture/article: &lt;= 100.0 %</td>
</tr>
<tr>
<td>• Physical form of the used product: Liquid</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Amount used (or contained in articles), frequency and duration of use/exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Duration of activity: &lt;= 8.0 hours/day</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technical and organisational conditions and measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Closed batch process with occasional controlled exposure</td>
</tr>
<tr>
<td>• Occupational Health and Safety Management System: Advanced</td>
</tr>
<tr>
<td>• General ventilation: Enhanced general ventilation (5-10 air changes per hour) [Effectiveness Inhalation: 70%]</td>
</tr>
<tr>
<td>• Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Conditions and measures related to personal protection, hygiene and health evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Respiratory Protection: No [Effectiveness Inhalation: 0%]</td>
</tr>
<tr>
<td>• Dermal protection: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]</td>
</tr>
<tr>
<td>• Wear chemical goggles: Wear chemical goggles (Qualitative protection for eye irritants)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other conditions affecting workers exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Place of use: Indoor</td>
</tr>
<tr>
<td>• Operating temperature: &lt;= 33.0 °C</td>
</tr>
<tr>
<td>• Skin surface potentially exposed: One hand face only (240 cm²)</td>
</tr>
</tbody>
</table>

7.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>3.603 mg/m³ (TRA Workers)</td>
<td>RCR = 0.202</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>14.41 mg/m³ (TRA Workers)</td>
<td>RCR = 0.095</td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>3.603 mg/m³ (TRA Workers)</td>
<td>RCR = 0.45</td>
</tr>
<tr>
<td>Inhalation, local, acute</td>
<td>14.41 mg/m³ (TRA Workers)</td>
<td>RCR = 0.721</td>
</tr>
<tr>
<td>Dermal, systemic, long term</td>
<td>0.138 mg/kg bw/day (TRA Workers)</td>
<td>RCR = 0.035</td>
</tr>
<tr>
<td>Dermal, local, acute</td>
<td>0.04 mg/cm² (TRA Workers)</td>
<td>RCR = 0.237</td>
</tr>
<tr>
<td>Combined routes, systemic, long-term</td>
<td></td>
<td>RCR = 0.095</td>
</tr>
<tr>
<td>Combined routes, systemic, acute</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The vapour pressure at operating temperature used for the calculation has been set by the assessor to 499 Pa. The inhalation exposure is limited to the saturated vapour concentration (if relevant).

**Risk characterisation**

If conditions detailed in Section 7.4.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.
7.5 Worker contributing scenario 5: Manufacturing polymers in a batch process where opportunity for exposure arises, concentration: >25% (indoors with LEV) (PROC 4)

7.5.1. Conditions of use

<table>
<thead>
<tr>
<th>Product (Article) characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Percentage (w/w) of substance in mixture/article: &lt;= 100.0 %</td>
</tr>
<tr>
<td>• Physical form of the used product: Liquid</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Amount used (or contained in articles), frequency and duration of use/exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Duration of activity: &lt;= 8.0 hours/day</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technical and organisational conditions and measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Occupational Health and Safety Management System: Advanced</td>
</tr>
<tr>
<td>• General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness Inhalation: 0%]</td>
</tr>
<tr>
<td>• Local exhaust ventilation: Yes [Effectiveness Inhalation: 90%, Dermal: 0%]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Conditions and measures related to personal protection, hygiene and health evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Respiratory Protection: No [Effectiveness Inhalation: 0%]</td>
</tr>
<tr>
<td>• Dermal protection: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]</td>
</tr>
<tr>
<td>• Wear chemical goggles: Wear chemical goggles (Qualitative protection for eye irritants)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other conditions affecting workers exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Place of use: Indoor</td>
</tr>
<tr>
<td>• Operating temperature: &lt;= 33.0 °C</td>
</tr>
<tr>
<td>• Skin surface potentially exposed: Two hands face (480 cm2)</td>
</tr>
</tbody>
</table>

7.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>2.002 mg/m³ (TRA Workers)</td>
<td>RCR = 0.113</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>8.007 mg/m³ (TRA Workers)</td>
<td>RCR = 0.053</td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>2.002 mg/m³ (TRA Workers)</td>
<td>RCR = 0.25</td>
</tr>
<tr>
<td>Inhalation, local, acute</td>
<td>8.007 mg/m³ (TRA Workers)</td>
<td>RCR = 0.4</td>
</tr>
<tr>
<td>Dermal, systemic, long term</td>
<td>1.372 mg/kg bw/day (TRA Workers)</td>
<td>RCR = 0.343</td>
</tr>
<tr>
<td>Dermal, local, acute</td>
<td>0.2 mg/cm² (TRA Workers)</td>
<td>RCR = 0.456</td>
</tr>
<tr>
<td>Combined routes, systemic, long-term</td>
<td></td>
<td>RCR = 0.053</td>
</tr>
<tr>
<td>Combined routes, systemic, acute</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The vapour pressure at operating temperature used for the calculation has been set by the assessor to 499 Pa.

The inhalation exposure is limited to the saturated vapour concentration (if relevant).

**Risk characterisation**

If conditions detailed in Section 7.5.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.
7.6. Worker contributing scenario 6: Manufacturing polymers in a batch process where opportunity for significant exposure arises, concentration: >25% (indoors with LEV) (PROC 5)

7.6.1. Conditions of use

<table>
<thead>
<tr>
<th>Product (Article) characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Percentage (w/w) of substance in mixture/article: &lt;= 100.0 %</td>
</tr>
<tr>
<td>• Physical form of the used product: Liquid</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Amount used (or contained in articles), frequency and duration of use/exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Duration of activity: &lt;= 8.0 hours/day</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technical and organisational conditions and measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Occupational Health and Safety Management System: Advanced</td>
</tr>
<tr>
<td>• General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness Inhalation: 0%]</td>
</tr>
<tr>
<td>• Local exhaust ventilation: Yes [Effectiveness Inhalation: 90%, Dermal: 0%]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Conditions and measures related to personal protection, hygiene and health evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Respiratory Protection: No [Effectiveness Inhalation: 0%]</td>
</tr>
<tr>
<td>• Dermal protection: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]</td>
</tr>
<tr>
<td>• Wear chemical goggles: Wear chemical goggles (Qualitative protection for eye irritants)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other conditions affecting workers exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Place of use: Indoor</td>
</tr>
<tr>
<td>• Operating temperature: &lt;= 33.0 °C</td>
</tr>
<tr>
<td>• Skin surface potentially exposed: Two hands face (480 cm2)</td>
</tr>
</tbody>
</table>

7.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>2.002 mg/m³ (TRA Workers)</td>
<td>RCR = 0.113</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>8.007 mg/m³ (TRA Workers)</td>
<td>RCR = 0.053</td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>2.002 mg/m³ (TRA Workers)</td>
<td>RCR = 0.25</td>
</tr>
<tr>
<td>Inhalation, local, acute</td>
<td>8.007 mg/m³ (TRA Workers)</td>
<td>RCR = 0.4</td>
</tr>
<tr>
<td>Dermal, systemic, long term</td>
<td>2.742 mg/kg bw/day (TRA Workers)</td>
<td>RCR = 0.685</td>
</tr>
<tr>
<td>Dermal, local, acute</td>
<td>0.4 mg/cm² (TRA Workers)</td>
<td>RCR = 0.798</td>
</tr>
<tr>
<td>Combined routes, systemic, long-term</td>
<td></td>
<td>RCR = 0.053</td>
</tr>
<tr>
<td>Combined routes, systemic, acute</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The vapour pressure at operating temperature used for the calculation has been set by the assessor to 499 Pa.

The inhalation exposure is limited to the saturated vapour concentration (if relevant).

**Risk characterisation**

If conditions detailed in Section 7.6.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.
7.7. Worker contributing scenario 7: Transfer of the substance, concentration: >25% (dedicated facilities, outdoors) (PROC 8b)

7.7.1. Conditions of use

<table>
<thead>
<tr>
<th>Product (Article) characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Percentage (w/w) of substance in mixture/article: &lt;= 100.0 %</td>
</tr>
<tr>
<td>• Physical form of the used product: Liquid</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Amount used (or contained in articles), frequency and duration of use/exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Duration of activity: &lt;= 1.0 hours/day</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technical and organisational conditions and measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Occupational Health and Safety Management System: Advanced</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Conditions and measures related to personal protection, hygiene and health evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Respiratory Protection: No [Effectiveness Inhalation: 0%]</td>
</tr>
<tr>
<td>• Dermal protection: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]</td>
</tr>
<tr>
<td>• Wear chemical goggles (Qualitative protection for eye irritants)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other conditions affecting workers exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Place of use: Indoor and outdoor</td>
</tr>
<tr>
<td>• Operating temperature: &lt;= 33.0 °C</td>
</tr>
<tr>
<td>• Skin surface potentially exposed: Two hands (960 cm2)</td>
</tr>
</tbody>
</table>

7.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>0.44 mg/m³ (Measured data: Measured Data)</td>
<td>RCR = 0.025</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>4.83 mg/m³ (Measured data: Measured Data)</td>
<td>RCR = 0.032</td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>0.44 mg/m³ (Measured data: Measured Data)</td>
<td>RCR = 0.055</td>
</tr>
<tr>
<td>Inhalation, local, acute</td>
<td>4.83 mg/m³ (Measured data: Measured Data)</td>
<td>RCR = 0.242</td>
</tr>
<tr>
<td>Dermal, systemic, long term</td>
<td>0.548 mg/kg bw/day (TRA Workers)</td>
<td>RCR = 0.137</td>
</tr>
<tr>
<td>Combined routes, systemic, long-term</td>
<td></td>
<td>RCR = 0.162</td>
</tr>
<tr>
<td>Combined routes, systemic, acute</td>
<td></td>
<td>RCR = 0.032</td>
</tr>
</tbody>
</table>

**Risk characterisation**

If conditions detailed in Section 7.7.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.

7.8. Worker contributing scenario 8: Quality control, concentration: >25% (PROC 15)

7.8.1. Conditions of use

<table>
<thead>
<tr>
<th>Product (Article) characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Percentage (w/w) of substance in mixture/article: &lt;= 100.0 %</td>
</tr>
<tr>
<td>• Physical form of the used product: Liquid</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Amount used (or contained in articles), frequency and duration of use/exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Duration of activity: &lt;= 8.0 hours/day</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technical and organisational conditions and measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>•</td>
</tr>
</tbody>
</table>
Safety Data Sheet  
according to Regulation (EC) No 1907/2006  

Furfural  

Conditions and measures related to personal protection, hygiene and health evaluation  

- **Respiratory Protection**: No [Effectiveness Inhalation: 0%]  
- **Dermal protection**: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]  
- **Wear chemical goggles**: Wear chemical goggles (Qualitative protection for eye irritants)  

Other conditions affecting workers exposure  

- **Place of use**: Indoor  
- **Operating temperature**: <= 33.0 °C  
- **Skin surface potentially exposed**: One hand face only (240 cm²)  

7.8.2. Exposure and risks for workers  
The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.  

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>2.002 mg/m³ (TRA Workers)</td>
<td>RCR = 0.113</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>8.007 mg/m³ (TRA Workers)</td>
<td>RCR = 0.053</td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>2.002 mg/m³ (TRA Workers)</td>
<td>RCR = 0.25</td>
</tr>
<tr>
<td>Inhalation, local, acute</td>
<td>8.007 mg/m³ (TRA Workers)</td>
<td>RCR = 0.4</td>
</tr>
<tr>
<td>Dermal, systemic, long term</td>
<td>0.068 mg/kg bw/day (TRA Workers)</td>
<td>RCR = 0.017</td>
</tr>
<tr>
<td>Dermal, local, acute</td>
<td>0.02 mg/cm² (TRA Workers)</td>
<td>RCR = 0.13</td>
</tr>
<tr>
<td>Combined routes, systemic, long-term</td>
<td></td>
<td>RCR = 0.053</td>
</tr>
<tr>
<td>Combined routes, systemic, acute</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The vapour pressure at operating temperature used for the calculation has been set by the assessor to 499 Pa.  
The inhalation exposure is limited to the saturated vapour concentration (if relevant).  

Risk characterisation  
If conditions detailed in Section 7.8.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.  

7.9. Worker contributing scenario 9: Transfer of substance (dedicated facilities, indoors with LEV) (PROC 8b)  

7.9.1. Conditions of use  

<table>
<thead>
<tr>
<th>Product (Article) characteristics</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Percentage (w/w) of substance in mixture/article: &lt;= 100.0 %</td>
<td></td>
</tr>
<tr>
<td>• Physical form of the used product: Liquid</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Amount used (or contained in articles), frequency and duration of use/exposure</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Duration of activity: &lt;= 8.0 hours/day</td>
<td></td>
</tr>
</tbody>
</table>

Technical and organisational conditions and measures  

- **Occupational Health and Safety Management System**: Advanced  
- **General ventilation**: Basic general ventilation (1-3 air changes per hour) [Effectiveness Inhalation: 0%]  
- **Local exhaust ventilation**: Yes [Effectiveness Inhalation: 95%, Dermal: 0%]  

*LEV is equivalent to the use of dry breaks coupling for materials transfer in an outdoor setting is equivalent to this reduction efficiency.*
Conditions and measures related to personal protection, hygiene and health evaluation

• Respiratory Protection: No [Effectiveness Inhalation: 0%]
• Dermal protection: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]
• Wear chemical goggles: Wear chemical goggles (Qualitative protection for eye irritants)

Other conditions affecting workers exposure

• Place of use: Indoor
• Operating temperature: <= 33.0 °C
• Skin surface potentially exposed: Two hands (960 cm²)

7.9.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Exposure concentrations and risks for workers

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>1.001 mg/m³ (TRA Workers)</td>
<td>RCR = 0.056</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>4.004 mg/m³ (TRA Workers)</td>
<td>RCR = 0.026</td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>1.001 mg/m³ (TRA Workers)</td>
<td>RCR = 0.125</td>
</tr>
<tr>
<td>Inhalation, local, acute</td>
<td>4.004 mg/m³ (TRA Workers)</td>
<td>RCR = 0.2</td>
</tr>
<tr>
<td>Dermal, systemic, long term</td>
<td>2.742 mg/kg bw/day (TRA Workers)</td>
<td>RCR = 0.685</td>
</tr>
<tr>
<td>Dermal, local, acute</td>
<td>0.2 mg/cm² (TRA Workers)</td>
<td>RCR = 0.742</td>
</tr>
<tr>
<td>Combined routes, systemic, long-term</td>
<td></td>
<td>RCR = 0.026</td>
</tr>
<tr>
<td>Combined routes, systemic, acute</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The vapour pressure at operating temperature used for the calculation has been set by the assessor to 499 Pa.
The inhalation exposure is limited to the saturated vapour concentration (if relevant).

Risk characterisation

If conditions detailed in Section 7.9.1 have implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.

7.10. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

7.10.1. Contributing scenario (1) for environmental exposure

If the local environmental emission conditions deviate significantly from the used default values, please use one of the equations below to estimate the corrected local emission and the RCR_{Actual} for water. If the RCR_{Actual} is below the RCR_{ES} then safe use can be concluded.

For the environmental exposure (here only waste water), the DU can take the following starting points for the determinants:

- The quantity of product, in which the substance of concern is processed or used per year and site: \( M_{ES} \).
  In this ES: \( M_{ES} = 2.8E6 \) kg/year
- The concentration or fraction of the substance in the product (\( C_{ES} \)): \( C_{ES} \) would be between 0 and 1
  This is the concentration or fraction of the above mentioned quantity.
  In this ES: \( C_{ES} = 1.0 \)
- The emission factor: the fraction of the substance emitted from the process or use to wastewater (before abatement) \( f_{\text{water}} \) = final release factor water \( (f_{\text{water}} \) would be between 0 and 1)
  In this ES: \( f_{\text{water}} = 0.01\% = 0.0001 \)
- Efficiency of an abatement or control technology that reduces the emission to air, surface water or land: \( f_{\text{abatement}} \).
  \( f_{\text{abatement}} \) would be between 0 and 1. If there is no abatement or control technology, \( f_{\text{abatement}} = 0 \)
  In this ES there is no abatement (\( f_{\text{abatement}} = 0 \))
Safety Data Sheet
according to Regulation (EC) No 1907/2006

Furfural

- The removal of the substance in the STP
  \[ F_{\text{STP}} = 0.8736 \]
- The duration of emission: \( T_{\text{emission}} \) (\( T_{\text{emission}} \) would be between 1 and 365 days).
  \[ T_{\text{emission}} = 100 \text{ working days per year} \]
- Water treated in the sewage treatment plant (\( \text{CAPACITY} = \text{Discharge rate of STP} \))
  \[ \text{CAPACITY} = \text{Discharge rate of STP} \geq 2\times10^3 \text{ m}^3/\text{day} \ (\geq 2000 \text{ m}^3/\text{day}) \]
- Dilution factor in the receiving water body: \( \text{DILUTION} = \frac{\text{Receiving surface water flow rate}}{\text{Discharge rate of STP}} \)
  \[ \text{DILUTION} = 1.8\times10^4 / 2\times10^3 = 18000 / 2000 = 9 \]

The DU has to evaluate that under these use conditions that the exposure concentration in surface water can be predicted using the following equation:

\[
\begin{align*}
P_{\text{EC,local}} &= P_{\text{EC,regional}} + \frac{M_{\text{ES}} \cdot C_{\text{ES}} \cdot f_{\text{water}} \cdot (1 - f_{\text{abatement}}) \cdot (1 - F_{\text{STP}})}{T_{\text{emission}} \cdot \text{CAPACITY} \cdot \text{DILUTION}} \\
&= \frac{M_{\text{ES}} \cdot C_{\text{ES}} \cdot f_{\text{water}} \cdot (1 - f_{\text{abatement}}) \cdot (1 - F_{\text{STP}})}{T_{\text{emission}} \cdot \text{CAPACITY} \cdot \text{DILUTION}} \\
&= \frac{M_{\text{ES}} \cdot C_{\text{ES}} \cdot f_{\text{water}} \cdot (1 - f_{\text{abatement}}) \cdot (1 - F_{\text{STP}})}{\text{CAPACITY} \cdot \text{DILUTION}} \quad \text{(as } P_{\text{EC,regional}} \approx 0) \\

\end{align*}
\]

The registrant calculates a \( RCR_{\text{ES}} \) for surface water, the DU calculates it for his use situation (\( RCR_{\text{Actual}} \)).
If \( RCR_{\text{Actual}} \) is below the \( RCR_{\text{ES}} \), then safe use can be concluded.

The registrant carries out the below steps in order to enable the DU to perform scaling. The numbering below refers to the steps given in section 1.3.3 of the “Guidance on information requirements and chemical safety assessment Part G: Extending the SDS”.

1) The registrant knows that the Operational Conditions in other similar uses of the product may vary, and concludes that he should provide information in the ES enabling the DU to scale the information of Operational Conditions / Risk Management Measures (OCs/RMMs) included in the ES.
2) He prepares the list of relevant determinants (see above)
3) The determinants which he considers likely to vary are: \( M_{\text{ES}}, C_{\text{ES}}, f_{\text{water}}, f_{\text{abatement}}, T_{\text{emission}} \)
4) None of the determinants are considered interdependent
5) All determinants are linear with respect to exposure level, so he proposes the following equation for scaling:

\[
R_{\text{CR,actual}} = R_{\text{CR,ES}} \cdot \frac{M_{\text{Actual}}}{M_{\text{ES}}} \cdot \frac{C_{\text{Actual}}}{C_{\text{ES}}} \cdot \frac{f_{\text{water,Actual}}}{f_{\text{water,ES}}} \cdot \frac{(1 - f_{\text{abatement,Actual}})}{(1 - f_{\text{abatement,ES}})} \cdot \frac{T_{\text{emission,ES}}}{T_{\text{emission,Actual}}} \\
\]

6) The concentration in the product (\( C_{\text{Actual}} \)) should be between 0 and 100%.
   The \( f_{\text{water,Actual}} \) and \( f_{\text{abatement,Actual}} \) would be between 0 and 1.
   The \( T_{\text{emission,Actual}} \) should be between 1 and 365 days.

7.10.2. Contributing scenario (2) for workers

Evaluate whether work is done within the Risk Management Measures described in the Contributing scenario's above. Within those conditions, safe use was shown. If not, further assessment is required.
8. Exposure scenario 8: Use at industrial sites - Industrial end-use: use of furfural in the manufacturing of abrasive wheels, brake linings and refractories - by using formulations

Title section

Environment contributing scenario(s):

| CS 1 | Industrial end-use: use of furfural in the manufacturing of abrasive wheels, brake linings and refractories - by using formulations | ERC 5 |

Worker contributing scenario(s):

| CS 2 | Mixing in a closed batch process (5-25%, indoors with LEV) | PROC 3 |
| CS 3 | Mixing in a batch process where opportunity for exposure arises (>4hrs, 5-25%, indoors with LEV) | PROC 4 |
| CS 4 | Mixing in a batch process where opportunity for significant exposure arises (5-25%) | PROC 5 |
| CS 5 | Transfer of formulations containing the substance (>25%, dedicated facilities, outdoors) | PROC 8b |
| CS 6 | Pressing, curing and hardening of refractories, abrasive wheels, friction, carbon impregnation (>4hr, 1-5%, indoors with LEV) | PROC 14 |
| CS 7 | Transfer of substance (dedicated facilities, indoors with LEV) | PROC 8b |
| CS 8 | Transfer of formulation containing the substance into small containers (5-25%, room temperature) | PROC 9 |

Explanation on the approach taken for the ES

8.1 Environmental contributing scenario 1: Industrial end-use: use of furfural in the manufacturing of abrasive wheels, brake linings and refractories - by using formulations (ERC 5)

8.1.1. Conditions of use

Amount used, frequency and duration of use (or from service life)

- Daily use amount at site: <= 28.0 tonnes/day
- Annual use amount at site: <= 150.0 tonnes/year

In the European region there are 30 sites that use the substance for manufacturing of abrasive wheels, brake linings and refractories. This is the maximum tonnage at one of the 30 sites. Detailed information per site is not available.

- Percentage of EU tonnage used at regional scale: = 100.0 %

Conditions and measures related to biological sewage treatment plant

- Biological STP: Standard
- Discharge rate of STP: >= 2000 m3/d
- Application of the STP sludge on agricultural soil: Yes

Conditions and measures related to external treatment of waste (including article waste)

- Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)
8.1.2. Releases
The local releases to the environment are reported in the following table. Note that the releases reported do not account for the removal in the modelled biological STP.

**Local releases to the environment**

<table>
<thead>
<tr>
<th>Release</th>
<th>Release estimation method</th>
<th>Explanations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>Estimated release factor (Estimated release rate)</td>
<td>Release factor before on site RMM: 0.01%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Release factor after on site RMM: 0.01%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Local release rate: 2.8 kg/day</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Explanation: There is no company specific data available. The local release rate has been set to the maximum rate at which the local environmental risks are controlled.</td>
</tr>
<tr>
<td>Air</td>
<td>Estimated release factor (Estimated release rate)</td>
<td>Release factor before on site RMM: 0.1%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Release factor after on site RMM: 0.1%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Local release rate: 28 kg/day</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Explanation: There is currently no company specific data available. This is an estimated value based on the properties of the substance.</td>
</tr>
<tr>
<td>Non-agricultural soil</td>
<td>ERC based</td>
<td>Release factor after on site RMM: 1%</td>
</tr>
</tbody>
</table>

8.1.3. Exposure and risks for the environment and man via the environment

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table. The exposure estimates have been obtained with EUSES 2.1.2 unless stated otherwise.

**Exposure concentrations and risks for the environment and man via the environment**

<table>
<thead>
<tr>
<th>Protection target</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fresh water</td>
<td>Local PEC: 0.018 mg/L</td>
<td>RCR = 0.556</td>
</tr>
<tr>
<td>Sediment (freshwater)</td>
<td>Local PEC: 0.097 mg/kg dw</td>
<td>RCR = 0.812</td>
</tr>
<tr>
<td>Marine water</td>
<td>Local PEC: 1.83E-3 mg/L</td>
<td>RCR = 0.554</td>
</tr>
<tr>
<td>Sediment (marine water)</td>
<td>Local PEC: 9.71E-3 mg/kg dw</td>
<td>RCR = 0.809</td>
</tr>
<tr>
<td>Sewage Treatment Plant</td>
<td>Local PEC: 0.177 mg/L</td>
<td>RCR = 0.023</td>
</tr>
<tr>
<td>Agricultural soil</td>
<td>Local PEC: 6.21E-3 mg/kg dw</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Predator’s prey (freshwater)</td>
<td>Local PEC: 1.16E-3 mg/kg ww</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Predator’s prey (marine water)</td>
<td>Local PEC: 1.06E-4 mg/kg ww</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Top predator’s prey (marine water)</td>
<td>Local PEC: 9.14E-5 mg/kg ww</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Predator’s prey (terrestrial)</td>
<td>Local PEC: 1.5E-3 mg/kg ww</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Man via environment - Inhalation</td>
<td>Concentration in air: 1.17E-4 mg/m³</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Man via environment - Oral</td>
<td>Exposure via food consumption: 1.62E-4 mg/kg bw/day</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Man via environment - combined routes</td>
<td></td>
<td>RCR &lt; 0.01</td>
</tr>
</tbody>
</table>
8.2 Worker contributing scenario 2: Mixing in a closed batch process (5-25%, indoors with LEV) (PROC 3)

8.2.1. Conditions of use

<table>
<thead>
<tr>
<th>Product (Article) characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Percentage (w/w) of substance in mixture/article: &lt;= 25.0 %</td>
</tr>
<tr>
<td>• Physical form of the used product: Liquid</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Amount used (or contained in articles), frequency and duration of use/exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Duration of activity: &lt;= 8.0 hours/day</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technical and organisational conditions and measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Closed batch process with occasional controlled exposure</td>
</tr>
<tr>
<td>• Occupational Health and Safety Management System: Advanced</td>
</tr>
<tr>
<td>• General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness Inhalation: 0%]</td>
</tr>
<tr>
<td>• Local exhaust ventilation: Yes [Effectiveness Inhalation: 90%, Dermal: 0%]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Conditions and measures related to personal protection, hygiene and health evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Respiratory Protection: No [Effectiveness Inhalation: 0%]</td>
</tr>
<tr>
<td>• Dermal protection: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]</td>
</tr>
<tr>
<td>• Wear chemical goggles: Wear chemical goggles (Qualitative protection for eye irritants)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other conditions affecting workers exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Place of use: Indoor</td>
</tr>
<tr>
<td>• Operating temperature: &lt;= 33.0 °C</td>
</tr>
<tr>
<td>• Skin surface potentially exposed: One hand face only (240 cm²)</td>
</tr>
</tbody>
</table>

8.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>0.721 mg/m³ (TRA Workers)</td>
<td>RCR = 0.04</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>2.883 mg/m³ (TRA Workers)</td>
<td>RCR = 0.019</td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>0.721 mg/m³ (TRA Workers)</td>
<td>RCR = 0.09</td>
</tr>
<tr>
<td>Inhalation, local, acute</td>
<td>2.883 mg/m³ (TRA Workers)</td>
<td>RCR = 0.144</td>
</tr>
<tr>
<td>Dermal, systemic, long term</td>
<td>0.083 mg/kg bw/day (TRA Workers)</td>
<td>RCR = 0.021</td>
</tr>
<tr>
<td>Dermal, local, acute</td>
<td>0.024 mg/cm² (TRA Workers)</td>
<td>RCR = 0.061</td>
</tr>
<tr>
<td>Combined routes, systemic, long-term</td>
<td>RCR = 0.019</td>
<td></td>
</tr>
<tr>
<td>Combined routes, systemic, acute</td>
<td>RCR = 0.019</td>
<td></td>
</tr>
</tbody>
</table>

The vapour pressure at operating temperature used for the calculation has been set by the assessor to 499 Pa. The inhalation exposure is limited to the saturated vapour concentration (if relevant).

Risk characterisation

If conditions detailed in Section 8.2.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.
8.3 Worker contributing scenario 3: Mixing in a batch process where opportunity for exposure arises (>4hrs, 5-25%, indoors with LEV) (PROC 4)

8.3.1. Conditions of use

<table>
<thead>
<tr>
<th>Product (Article) characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Percentage (w/w) of substance in mixture/article: &lt;= 25.0%</td>
</tr>
<tr>
<td>• Physical form of the used product: Liquid</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Amount used (or contained in articles), frequency and duration of use/exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Duration of activity: &lt;= 8.0 hours/day</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technical and organisational conditions and measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Occupational Health and Safety Management System: Advanced</td>
</tr>
<tr>
<td>• General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness Inhalation: 0%]</td>
</tr>
<tr>
<td>• Local exhaust ventilation: Yes [Effectiveness Inhalation: 90%, Dermal: 0%]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Conditions and measures related to personal protection, hygiene and health evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Respiratory Protection: No [Effectiveness Inhalation: 0%]</td>
</tr>
<tr>
<td>• Dermal protection: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]</td>
</tr>
<tr>
<td>• Wear chemical goggles: Wear chemical goggles (Qualitative protection for eye irritants)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other conditions affecting workers exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Place of use: Indoor</td>
</tr>
<tr>
<td>• Operating temperature: &lt;= 33.0 °C</td>
</tr>
<tr>
<td>• Skin surface potentially exposed: Two hands face (480 cm²)</td>
</tr>
</tbody>
</table>

8.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>1.201 mg/m³ (TRA Workers)</td>
<td>RCR = 0.067</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>4.804 mg/m³ (TRA Workers)</td>
<td>RCR = 0.032</td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>1.201 mg/m³ (TRA Workers)</td>
<td>RCR = 0.15</td>
</tr>
<tr>
<td>Inhalation, local, acute</td>
<td>4.804 mg/m³ (TRA Workers)</td>
<td>RCR = 0.24</td>
</tr>
<tr>
<td>Dermal, systemic, long term</td>
<td>0.823 mg/kg bw/day (TRA Workers)</td>
<td>RCR = 0.206</td>
</tr>
<tr>
<td>Dermal, local, acute</td>
<td>0.12 mg/cm² (TRA Workers)</td>
<td>RCR = 0.273</td>
</tr>
<tr>
<td>Combined routes, systemic, long-term</td>
<td></td>
<td>RCR = 0.273</td>
</tr>
<tr>
<td>Combined routes, systemic, acute</td>
<td></td>
<td>RCR = 0.032</td>
</tr>
</tbody>
</table>

The vapour pressure at operating temperature used for the calculation has been set by the assessor to 499 Pa. The inhalation exposure is limited to the saturated vapour concentration (if relevant).

Risk characterisation

If conditions detailed in Section 8.3.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.
8.4 Worker contributing scenario 4: Mixing in a batch process where opportunity for significant exposure arises (5-25%) (PROC 5)

8.4.1. Conditions of use

<table>
<thead>
<tr>
<th>Product (Article) characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Percentage (w/w) of substance in mixture/article: &lt;= 25.0 %</td>
</tr>
<tr>
<td>• Physical form of the used product: Liquid</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Amount used (or contained in articles), frequency and duration of use/exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Duration of activity: &lt;= 8.0 hours/day</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technical and organisational conditions and measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Occupational Health and Safety Management System: Advanced</td>
</tr>
<tr>
<td>• General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness Inhalation: 0%]</td>
</tr>
<tr>
<td>• Local exhaust ventilation: Yes [Effectiveness Inhalation: 90%, Dermal: 0%]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Conditions and measures related to personal protection, hygiene and health evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Respiratory Protection: No [Effectiveness Inhalation: 0%]</td>
</tr>
<tr>
<td>• Dermal protection: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]</td>
</tr>
<tr>
<td>• Wear chemical goggles: Wear chemical goggles (Qualitative protection for eye irritants)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other conditions affecting workers exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Place of use: Indoor</td>
</tr>
<tr>
<td>• Operating temperature: &lt;= 33.0 °C</td>
</tr>
<tr>
<td>• Skin surface potentially exposed: Two hands face (480 cm²)</td>
</tr>
</tbody>
</table>

8.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>1.201 mg/m³ (TRA Workers)</td>
<td>RCR = 0.067</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>4.804 mg/m³ (TRA Workers)</td>
<td>RCR = 0.032</td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>1.201 mg/m³ (TRA Workers)</td>
<td>RCR = 0.15</td>
</tr>
<tr>
<td>Inhalation, local, acute</td>
<td>4.804 mg/m³ (TRA Workers)</td>
<td>RCR = 0.24</td>
</tr>
<tr>
<td>Dermal, systemic, long term</td>
<td>1.645 mg/kg bw/day (TRA Workers)</td>
<td>RCR = 0.411</td>
</tr>
<tr>
<td>Dermal, local, acute</td>
<td>0.24 mg/cm² (TRA Workers)</td>
<td>RCR = 0.479</td>
</tr>
<tr>
<td>Combined routes, systemic, long-term</td>
<td></td>
<td>RCR = 0.302</td>
</tr>
<tr>
<td>Combined routes, systemic, acute</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The vapour pressure at operating temperature used for the calculation has been set by the assessor to 499 Pa. The inhalation exposure is limited to the saturated vapour concentration (if relevant).

Risk characterisation

If conditions detailed in Section 8.4.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.
8.5 Worker contributing scenario 5: Transfer of formulations containing the substance (>25%, dedicated facilities, outdoors) (PROC 8b)

8.5.1. Conditions of use

<table>
<thead>
<tr>
<th>Product (Article) characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Percentage (w/w) of substance in mixture/article: &lt;= 100.0 %</td>
</tr>
<tr>
<td>• Physical form of the used product: Liquid</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Amount used (or contained in articles), frequency and duration of use/exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Duration of activity: &lt;= 1.0 hours/day</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technical and organisational conditions and measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Occupational Health and Safety Management System: Advanced</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Conditions and measures related to personal protection, hygiene and health evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Respiratory Protection: No [Effectiveness Inhalation: 0%]</td>
</tr>
<tr>
<td>• Dermal protection: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]</td>
</tr>
<tr>
<td>• Wear chemical goggles: Wear chemical goggles (Qualitative protection for eye irritants)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other conditions affecting workers exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Place of use: Outdoor</td>
</tr>
<tr>
<td>• Operating temperature: &lt;= 33.0 °C</td>
</tr>
<tr>
<td>• Skin surface potentially exposed: Two hands (960 cm²)</td>
</tr>
</tbody>
</table>

8.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

### Exposure concentrations and risks for workers

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>0.44 mg/m³ (Measured data: Measured Data)</td>
<td>RCR = 0.025</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>4.83 mg/m³ (Measured data: Measured Data)</td>
<td>RCR = 0.032</td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>0.44 mg/m³ (Measured data: Measured Data)</td>
<td>RCR = 0.055</td>
</tr>
<tr>
<td>Inhalation, local, acute</td>
<td>4.83 mg/m³ (Measured data: Measured Data)</td>
<td>RCR = 0.242</td>
</tr>
<tr>
<td>Dermal, systemic, long term</td>
<td>0.548 mg/kg bw/day (TRA Workers)</td>
<td>RCR = 0.137</td>
</tr>
<tr>
<td>Combined routes, systemic, long-term</td>
<td></td>
<td>RCR = 0.162</td>
</tr>
<tr>
<td>Combined routes, systemic, acute</td>
<td></td>
<td>RCR = 0.032</td>
</tr>
</tbody>
</table>

**Risk characterisation**

If conditions detailed in Section 8.5.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.

8.6 Worker contributing scenario 6: Pressing, curing and hardening of refractories, abrasive wheels, friction, carbon impregnation (>4hr, 1-5%, indoors with LEV) (PROC 14)

8.6.1. Conditions of use

<table>
<thead>
<tr>
<th>Product (Article) characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Percentage (w/w) of substance in mixture/article: &lt;= 5.0 %</td>
</tr>
<tr>
<td>• Physical form of the used product: Liquid</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Amount used (or contained in articles), frequency and duration of use/exposure</th>
</tr>
</thead>
</table>
8.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

### Exposure concentrations and risks for workers

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>0.4 mg/m³ (TRA Workers)</td>
<td>RCR = 0.022</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>1.601 mg/m³ (TRA Workers)</td>
<td>RCR = 0.011</td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>0.4 mg/m³ (TRA Workers)</td>
<td>RCR = 0.05</td>
</tr>
<tr>
<td>Inhalation, local, acute</td>
<td>1.601 mg/m³ (TRA Workers)</td>
<td>RCR = 0.08</td>
</tr>
<tr>
<td>Dermal, systemic, long term</td>
<td>0.686 mg/kg bw/day (TRA Workers)</td>
<td>RCR = 0.172</td>
</tr>
<tr>
<td>Dermal, local, acute</td>
<td>0.1 mg/cm² (TRA Workers)</td>
<td>RCR = 0.194</td>
</tr>
<tr>
<td>Combined routes, systemic, long-term</td>
<td>0.1 mg/cm² (TRA Workers)</td>
<td>RCR = 0.194</td>
</tr>
<tr>
<td>Combined routes, systemic, acute</td>
<td>0.1 mg/cm² (TRA Workers)</td>
<td>RCR = 0.011</td>
</tr>
</tbody>
</table>

The vapour pressure at operating temperature used for the calculation has been set by the assessor to 499 Pa.

The inhalation exposure is limited to the saturated vapour concentration (if relevant).

### Risk characterisation

If conditions detailed in Section 8.6.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.

8.7 Worker contributing scenario 7: Transfer of substance (dedicated facilities, indoors with LEV) (PROC 8b)

8.7.1. Conditions of use

<table>
<thead>
<tr>
<th>Product (Article) characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Percentage (w/w) of substance in mixture/article: &lt;= 100.0 %</td>
</tr>
<tr>
<td>• Physical form of the used product: Liquid</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Amount used (or contained in articles), frequency and duration of use/exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Duration of activity: &lt;= 8.0 hours/day</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technical and organisational conditions and measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Occupational Health and Safety Management System: Advanced</td>
</tr>
<tr>
<td>• General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness Inhalation: 0%]</td>
</tr>
<tr>
<td>• Local exhaust ventilation: Yes [Effectiveness Inhalation: 95%, Dermal: 0%]</td>
</tr>
</tbody>
</table>

*LEV is equivalent to the use of dry breaks coupling for materials transfer in an outdoor setting is equivalent to this reduction efficiency*
8.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

### Exposure concentrations and risks for workers

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>1.001 mg/m³ (TRA Workers)</td>
<td>RCR = 0.056</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>4.004 mg/m³ (TRA Workers)</td>
<td>RCR = 0.026</td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>1.001 mg/m³ (TRA Workers)</td>
<td>RCR = 0.125</td>
</tr>
<tr>
<td>Inhalation, local, acute</td>
<td>4.004 mg/m³ (TRA Workers)</td>
<td>RCR = 0.2</td>
</tr>
<tr>
<td>Dermal, systemic, long term</td>
<td>2.742 mg/kg bw/day (TRA Workers)</td>
<td>RCR = 0.685</td>
</tr>
<tr>
<td>Dermal, local, acute</td>
<td>0.2 mg/cm² (TRA Workers)</td>
<td>RCR = 0.742</td>
</tr>
<tr>
<td>Combined routes, systemic, long-term</td>
<td></td>
<td>RCR = 0.026</td>
</tr>
<tr>
<td>Combined routes, systemic, acute</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The vapour pressure at operating temperature used for the calculation has been set by the assessor to 499 Pa.

The inhalation exposure is limited to the saturated vapour concentration (if relevant).

**Risk characterisation**

If conditions detailed in Section 8.7.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.

### 8.8 Worker contributing scenario 8: Transfer of formulation containing the substance into small containers (5-25%, room temperature) (PROC 9)

#### 8.8.1. Conditions of use

**Product (Article) characteristics**

- Percentage (w/w) of substance in mixture/article: <= 25.0 %
- Physical form of the used product: Liquid

**Amount used (or contained in articles), frequency and duration of use/exposure**

- Duration of activity: <= 8.0 hours/day

**Technical and organisational conditions and measures**

- Occupational Health and Safety Management System: Advanced
- General ventilation: Enhanced general ventilation (5-10 air changes per hour) [Effectiveness Inhalation: 70%]
- Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]

**Conditions and measures related to personal protection, hygiene and health evaluation**

- Respiratory Protection: No [Effectiveness Inhalation: 0%]
- Dermal protection: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]

**Other conditions affecting workers exposure**

- Place of use: Indoor
8.8.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Exposure concentrations and risks for workers

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>3.603 mg/m³ (TRA Workers)</td>
<td>RCR = 0.202</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>14.41 mg/m³ (TRA Workers)</td>
<td>RCR = 0.095</td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>3.603 mg/m³ (TRA Workers)</td>
<td>RCR = 0.45</td>
</tr>
<tr>
<td>Inhalation, local, acute</td>
<td>14.41 mg/m³ (TRA Workers)</td>
<td>RCR = 0.721</td>
</tr>
<tr>
<td>Dermal, systemic, long term</td>
<td>0.823 mg/kg bw/day (TRA Workers)</td>
<td>RCR = 0.206</td>
</tr>
<tr>
<td>Dermal, local, acute</td>
<td>0.12 mg/cm² (TRA Workers)</td>
<td>RCR = 0.408</td>
</tr>
<tr>
<td>Combined routes, systemic, long-term</td>
<td></td>
<td>RCR = 0.095</td>
</tr>
<tr>
<td>Combined routes, systemic, acute</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The vapour pressure at operating temperature used for the calculation has been set by the assessor to 499 Pa.

The inhalation exposure is limited to the saturated vapour concentration (if relevant).

Risk characterisation

If conditions detailed in Section 8.8.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.

8.9. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

8.9.1. Contributing scenario (1) for environmental exposure

If the local environmental emission conditions deviate significantly from the used default values, please use one of the equations below to estimate the corrected local emission and the RCR_{Actual} for water. If the RCR_{Actual} is below the RCR_{ES} then safe use can be concluded.

For the environmental exposure (here only waste water), the DU can take the following starting points for the determinants:

- The quantity of product, in which the substance of concern is processed or used per year and site: \( M_{ES} \).
  \[ \text{In this ES: } M_{ES} = 2.8 \times 10^6 \text{ kg/year} \]
- The concentration or fraction of the substance in the product \( C_{ES} \); \( C_{ES} \text{ would be between 0 and 1} \)
  \[ \text{This is the concentration or fraction of the above mentioned quantity.} \]
  \[ \text{In this ES: } C_{ES} = 1.0 \]
- The emission factor: the fraction of the substance emitted from the process or use to wastewater (before abatement) \( f_{water} = \text{final release factor water} \); \( f_{water} \text{ would be between 0 and 1} \)
  \[ \text{In this ES: } f_{water} = 0.01% = 0.0001 \]
- Efficiency of an abatement or control technology that reduces the emission to air, surface water or land: \( f_{abatement} \).
  \( f_{abatement} \text{ would be between 0 and 1. If there is no abatement or control technology, } f_{abatement} = 0 \)
  \[ \text{In this ES there is no abatement (} f_{abatement} = 0 \]
- The removal of the substance in the STP
  \[ \text{In this ES: } F_{STP} = 0.8736 \]
- The duration of emission: \( T_{emission} \); \( T_{emission} \text{ would be between 1 and 365 days}. \)
  \[ \text{In this ES: } T_{emission} = 100 \text{ working days per year} \]
- Water treated in the sewage treatment plant (CAPACITY = Discharge rate of STP)
  \[ \text{In this ES: CAPACITY = Discharge rate of STP} \geq 2 \times 10^3 \text{ m}^3/\text{d} (\geq 2 \times 10^3 \text{ m}^3/\text{day}) \]
• Dilution factor in the receiving water body: \( \text{DILUTION} = \frac{\text{Discharge rate of STP}}{\text{Receiving surface water flow rate}} \)

In this ES: Receiving surface water flow rate \(\geq 1.8E4 \text{ m}^3/\text{d} \) (\(\geq 18 000 \text{ m}^3/\text{d}\))
\[ \text{DILUTION} = \frac{1.8E4}{2E3} = \frac{18 000}{2 000} = 9 \]

The DU has to evaluate that under these use conditions that the exposure concentration in surface water can be predicted using the following equation:

\[
\begin{align*}
\text{PEC}_{\text{local}} &= \text{PEC}_{\text{regional}} + \frac{\frac{M_{\text{ES}} \cdot C_{\text{ES}} \cdot f_{\text{water}} \cdot (1 - f_{\text{abatement}})}{T_{\text{emission}}} \cdot (1 - F_{\text{STP}})}{\text{CAPACITY} \cdot \text{DILUTION}} \\
\text{PEC}_{\text{local}} &= \frac{\frac{M_{\text{ES}} \cdot C_{\text{ES}} \cdot f_{\text{water}} \cdot (1 - f_{\text{abatement}})}{T_{\text{emission}}} \cdot (1 - F_{\text{STP}})}{\text{CAPACITY} \cdot \text{DILUTION}} \quad \text{(as } \text{PEC}_{\text{regional}} \equiv 0) 
\end{align*}
\]

The registrant calculates a \( \text{RCR}_{\text{ES}} \) for surface water, the DU calculates it for his use situation (\( \text{RCR}_{\text{Actual}} \)). If \( \text{RCR}_{\text{Actual}} \) is below the \( \text{RCR}_{\text{ES}} \), then safe use can be concluded.

The registrant carries out the below steps in order to enable the DU to perform scaling. The numbering below refers to the steps given in section 1.3.3 of the "Guidance on information requirements and chemical safety assessment Part G: Extending the SDS".

1) The registrant knows that the Operational Conditions in other similar uses of the product may vary, and concludes that he should provide information in the ES enabling the DU to scale the information of Operational Conditions / Risk Management Measures (OCs/RMMs) included in the ES.
2) He prepares the list of relevant determinants (see above)
3) The determinants which he considers likely to vary are: \( M_{\text{ES}}, C_{\text{ES}}, f_{\text{water}}, f_{\text{abatement}}, T_{\text{emission}} \)
4) None of the determinants are considered interdependent
5) All determinants are linear with respect to exposure level, so he proposes the following equation for scaling:

\[
\text{RCR}_{\text{Actual}} = \text{RCR}_{\text{ES}} \cdot \frac{M_{\text{Actual}}}{M_{\text{ES}}} \cdot \frac{C_{\text{Actual}}}{C_{\text{ES}}} \cdot \frac{f_{\text{water,Actual}}}{f_{\text{water,ES}}} \cdot \frac{1 - f_{\text{abatement,Actual}}}{1 - f_{\text{abatement,ES}}} \cdot \frac{T_{\text{emission,ES}}}{T_{\text{emission,Actual}}} 
\]

6) The concentration in the product (\( C_{\text{Actual}} \)) should be between 0 and 100%.
The \( f_{\text{water,Actual}} \) and \( f_{\text{abatement,Actual}} \) would be between 0 and 1.
The \( T_{\text{emission,Actual}} \) should be between 1 and 365 days.

### 8.9.2. Contributing scenario (2) for workers

Evaluate whether work is done within the Risk Management Measures described in the Contributing scenario’s above. Within those conditions, safe use was shown. If not, further assessment is required.
9. Exposure scenario 9: Use at industrial sites - Use of Furfural in the petroleum refining industry as extraction agent

Title section

Environment contributing scenario(s):

| CS 1 | Use of Furfural in the petroleum refining industry as extraction agent | ERC 4 |

Worker contributing scenario(s):

| CS 2 | Use of the substance in a closed process, no likelihood of exposure (outdoors, Temp > 92 degrees C) | PROC 1 |
| CS 3 | Use of the substance in a closed process, with occasional controlled exposure, incl. sampling, clean down and maintenance (outdoors) | PROC 2 |
| CS 4 | Transfer of the substance (outdoors) | PROC 8b |
| CS 5 | Quality control (indoors with LEV) | PROC 15 |
| CS 6 | Clean-down and maintenance | PROC 8a |
| CS 7 | Sampling and maintenance in a closed process (15 min - 1hr, outdoors) | PROC 2 |
| CS 8 | Sampling and maintenance (outdoors, resp protection) | PROC 2 |
| CS 9 | Quality Control (15min-1hr, indoors with LEV, Temp < 92 degrees C) | PROC 15 |
| CS 10 | Transfer of the substance (outdoor) | PROC 8b |

Explanation on the approach taken for the ES

9.1 Environmental contributing scenario 1: Use of Furfural in the petroleum refining industry as extraction agent (ERC 4)

9.1.1. Conditions of use

Amount used, frequency and duration of use (or from service life)

- Daily use amount at site: <= 28.0 tonnes/day
- Annual use amount at site: <= 350.0 tonnes/year

*In the European region there are 20 sites that use the substance as extraction agent in the petroleum industry. This is the maximum tonnage at one of the 20 sites. Detailed information per site is not available.*

- Percentage of EU tonnage used at regional scale: = 100.0 %

Conditions and measures related to biological sewage treatment plant

- Biological STP: Standard
- Discharge rate of STP: >= 2000 m3/d
- Application of the STP sludge on agricultural soil: Yes

Conditions and measures related to external treatment of waste (including article waste)

- Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)

Other conditions affecting environmental exposure

- Receiving surface water flow rate: >= 18000 m3/d

9.1.2. Releases

The local releases to the environment are reported in the following table. Note that the releases reported do not account for the removal in the modelled biological STP.
Local releases to the environment

<table>
<thead>
<tr>
<th>Release</th>
<th>Release estimation method</th>
<th>Explanations</th>
</tr>
</thead>
</table>
| Water            | Estimated release factor (Maximum allowable release)   | **Release factor before on site RMM:** 0.01%  
 **Release factor after on site RMM:** 0.01%  
 **Local release rate:** 2.8 kg/day  
 **Explanation:** There is no company specific data available. The local release rate has been set to the maximum rate at which the local environment risks are controlled. |
| Air              | Estimated release factor (Estimated release rate)       | **Release factor before on site RMM:** 0.1%  
 **Release factor after on site RMM:** 0.1%  
 **Local release rate:** 28 kg/day  
 **Explanation:** There are no company specific data available. The 0.1% is an estimation based on the properties and use of the substance. |
| Non-agricultural soil | ERC based                                           | **Release factor after on site RMM:** 5%                                                                                                                                                                   |

9.1.3. Exposure and risks for the environment and man via the environment

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table. The exposure estimates have been obtained with EUSES 2.1.2 unless stated otherwise.

Exposure concentrations and risks for the environment and man via the environment

<table>
<thead>
<tr>
<th>Protection target</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fresh water</td>
<td>Local PEC: 0.018 mg/L</td>
<td>RCR = 0.556</td>
</tr>
<tr>
<td>Sediment (freshwater)</td>
<td>Local PEC: 0.097 mg/kg dw</td>
<td>RCR = 0.812</td>
</tr>
<tr>
<td>Marine water</td>
<td>Local PEC: 1.83E-3 mg/L</td>
<td>RCR = 0.554</td>
</tr>
<tr>
<td>Sediment (marine water)</td>
<td>Local PEC: 9.71E-3 mg/kg dw</td>
<td>RCR = 0.809</td>
</tr>
<tr>
<td>Sewage Treatment Plant</td>
<td>Local PEC: 0.177 mg/L</td>
<td>RCR = 0.023</td>
</tr>
<tr>
<td>Agricultural soil</td>
<td>Local PEC: 6.24E-3 mg/kg dw</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Predator’s prey (freshwater)</td>
<td>Local PEC: 1.4E-3 mg/kg ww</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Predator’s prey (marine water)</td>
<td>Local PEC: 1.31E-4 mg/kg ww</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Top predator’s prey (marine water)</td>
<td>Local PEC: 9.63E-5 mg/kg ww</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Predator’s prey (terrestrial)</td>
<td>Local PEC: 1.52E-3 mg/kg ww</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Man via environment - Inhalation</td>
<td>Concentration in air: 2.69E-4 mg/m³</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Man via environment - Oral</td>
<td>Exposure via food consumption: 2.12E-4 mg/kg bw/day</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Man via environment - combined routes</td>
<td></td>
<td>RCR &lt; 0.01</td>
</tr>
</tbody>
</table>

9.2 Worker contributing scenario 2: Use of the substance in a closed process, no likelihood of exposure (outdoors, Temp > 92 degrees C) (PROC 1)

9.2.1. Conditions of use

<table>
<thead>
<tr>
<th>Product (Article) characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Percentage (w/w) of substance in mixture/article: &lt;= 100.0 %</td>
</tr>
<tr>
<td>• Physical form of the used product: Liquid</td>
</tr>
</tbody>
</table>
9.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Exposure concentrations and risks for workers

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>0.028 mg/m³ (TRA Workers)</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>0.112 mg/m³ (TRA Workers)</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>0.028 mg/m³ (TRA Workers)</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Inhalation, local, acute</td>
<td>0.112 mg/m³ (TRA Workers)</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Dermal, systemic, long term</td>
<td>6.8E-3 mg/kg bw/day (TRA Workers)</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Combined routes, systemic, long-term</td>
<td></td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Combined routes, systemic, acute</td>
<td></td>
<td>RCR &lt; 0.01</td>
</tr>
</tbody>
</table>

The vapour pressure at operating temperature used for the calculation has been set by the assessor to 9.75E3 Pa.

Risk characterisation

If conditions detailed in Section 9.2.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.

9.3 Worker contributing scenario 3: Use of the substance in a closed process, with occasional controlled exposure, incl. sampling, clean down and maintenance (outdoors) (PROC 2)

9.3.1. Conditions of use

Product (Article) characteristics

- Percentage (w/w) of substance in mixture/article: <= 100.0 %
- Physical form of the used product: Liquid
9.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>0.27 mg/m³ (Measured data: Company Specific Measured Data)</td>
<td>RCR = 0.015</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>0.27 mg/m³ (Measured data: Company Specific Measured Data)</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>0.27 mg/m³ (Measured data: Company Specific Measured Data)</td>
<td>RCR = 0.034</td>
</tr>
<tr>
<td>Inhalation, local, acute</td>
<td>0.27 mg/m³ (Measured data: Company Specific Measured Data)</td>
<td>RCR = 0.014</td>
</tr>
<tr>
<td>Dermal, systemic, long term</td>
<td>0.274 mg/kg bw/day (TRA Workers)</td>
<td>RCR = 0.069</td>
</tr>
<tr>
<td>Combined routes, systemic, long-term</td>
<td></td>
<td>RCR = 0.084</td>
</tr>
<tr>
<td>Combined routes, systemic, acute</td>
<td></td>
<td>RCR &lt; 0.01</td>
</tr>
</tbody>
</table>

Risk characterisation

If conditions detailed in Section 9.3.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.

9.4 Worker contributing scenario 4: Transfer of the substance (outdoors) (PROC 8b)

9.4.1. Conditions of use

<table>
<thead>
<tr>
<th>Product (Article) characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Percentage (w/w) of substance in mixture/article: &lt;= 100.0 %</td>
</tr>
<tr>
<td>• Physical form of the used product: Liquid</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Amount used (or contained in articles), frequency and duration of use/exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Duration of activity: &lt;= 1.0 hours/day</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technical and organisational conditions and measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Occupational Health and Safety Management System: Advanced</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Conditions and measures related to personal protection, hygiene and health evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Respiratory Protection: No [Effectiveness Inhalation: 0%]</td>
</tr>
<tr>
<td>• Dermal protection: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]</td>
</tr>
<tr>
<td>• Wear chemical goggles: Wear chemical goggles (Qualitative protection for eye irritants)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other conditions affecting workers exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Place of use: Outdoor</td>
</tr>
<tr>
<td>• Operating temperature: &lt;= 33.0 °C</td>
</tr>
<tr>
<td>• Skin surface potentially exposed: Two hands (960 cm²)</td>
</tr>
</tbody>
</table>
9.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

**Exposure concentrations and risks for workers**

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>0.23 mg/m³ (Measured data: Company Specific Measured Data)</td>
<td>RCR = 0.013</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>0.23 mg/m³ (Measured data: Company Specific Measured Data)</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>0.23 mg/m³ (Measured data: Company Specific Measured Data)</td>
<td>RCR = 0.029</td>
</tr>
<tr>
<td>Inhalation, local, acute</td>
<td>0.23 mg/m³ (Measured data: Company Specific Measured Data)</td>
<td>RCR = 0.012</td>
</tr>
<tr>
<td>Dermal, systemic, long term</td>
<td>0.548 mg/kg bw/day (TRA Workers)</td>
<td>RCR = 0.137</td>
</tr>
<tr>
<td>Combined routes, systemic, long-term</td>
<td></td>
<td>RCR = 0.15</td>
</tr>
<tr>
<td>Combined routes, systemic, acute</td>
<td></td>
<td>RCR &lt; 0.01</td>
</tr>
</tbody>
</table>

**Risk characterisation**

If conditions detailed in Section 9.4.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.

### 9.5 Worker contributing scenario 5: Quality control (indoors with LEV) (PROC 15)

**9.5.1. Conditions of use**

<table>
<thead>
<tr>
<th>Product (Article) characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Percentage (w/w) of substance in mixture/article: &lt;= 100.0 %</td>
</tr>
<tr>
<td>• Physical form of the used product: Liquid</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Amount used (or contained in articles), frequency and duration of use/exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Duration of activity: &lt;= 8.0 hours/day</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technical and organisational conditions and measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Occupational Health and Safety Management System: Advanced</td>
</tr>
<tr>
<td>• General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness Inhalation: 0%]</td>
</tr>
<tr>
<td>• Local exhaust ventilation: Yes [Effectiveness Inhalation: 90%, Dermal: 0%]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Conditions and measures related to personal protection, hygiene and health evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Respiratory Protection: No [Effectiveness Inhalation: 0%]</td>
</tr>
<tr>
<td>• Dermal protection: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]</td>
</tr>
<tr>
<td>• Wear chemical goggles: Wear chemical goggles (Qualitative protection for eye irritants)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other conditions affecting workers exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Place of use: Indoor</td>
</tr>
<tr>
<td>• Operating temperature: &lt;= 33.0 °C</td>
</tr>
<tr>
<td>• Skin surface potentially exposed: One hand face only (240 cm²)</td>
</tr>
</tbody>
</table>

### 9.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

**Exposure concentrations and risks for workers**

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>2.002 mg/m³ (TRA Workers)</td>
<td>RCR = 0.113</td>
</tr>
</tbody>
</table>
The vapour pressure at operating temperature used for the calculation has been set by the assessor to 499 Pa. The inhalation exposure is limited to the saturated vapour concentration (if relevant).

**Risk characterisation**

If conditions detailed in Section 9.5.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.

### 9.6 Worker contributing scenario 6: Clean-down and maintenance (PROC 8a)

#### 9.6.1. Conditions of use

**Product (Article) characteristics**

- Percentage (w/w) of substance in mixture/article: <= 100.0 %
- Physical form of the used product: Liquid

**Amount used (or contained in articles), frequency and duration of use/exposure**

- Duration of activity: <= 4.0 hours/day

**Technical and organisational conditions and measures**

- Occupational Health and Safety Management System: Advanced
- Respiratory Protection: Yes (Respirator with APF of 20) [Effectiveness Inhalation: 95%]
- Dermal protection: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]
- Wear chemical goggles: Wear chemical goggles (Qualitative protection for eye irritants)

**Other conditions affecting workers exposure**

- Place of use: Outdoor
- Operating temperature: <= 33.0 °C
- Skin surface potentially exposed: Two hands (960 cm²)

#### 9.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>0.841 mg/m³ (TRA Workers)</td>
<td>RCR = 0.047</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>5.605 mg/m³ (TRA Workers)</td>
<td>RCR = 0.037</td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>0.841 mg/m³ (TRA Workers)</td>
<td>RCR = 0.105</td>
</tr>
<tr>
<td>Inhalation, local, acute</td>
<td>5.605 mg/m³ (TRA Workers)</td>
<td>RCR = 0.28</td>
</tr>
<tr>
<td>Dermal, systemic, long term</td>
<td>2.742 mg/kg bw/day (TRA Workers)</td>
<td>RCR = 0.685</td>
</tr>
<tr>
<td>Dermal, local, acute</td>
<td>0.2 mg/cm² (TRA Workers)</td>
<td>RCR = 0.733</td>
</tr>
<tr>
<td>Combined routes, systemic, long-term</td>
<td></td>
<td>RCR = 0.037</td>
</tr>
<tr>
<td>Combined routes, systemic, acute</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The vapour pressure at operating temperature used for the calculation has been set by the assessor to 499 Pa. The inhalation exposure is limited to the saturated vapour concentration (if relevant).

**Risk characterisation**

If conditions detailed in Section 9.6.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.

9.7  **Worker contributing scenario 7: Sampling and maintenance in a closed process (15 min - 1hr, outdoors) (PROC 2)**

### 9.7.1. Conditions of use

<table>
<thead>
<tr>
<th>Product (Article) characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Percentage (w/w) of substance in mixture/article: &lt;= 100.0 %</td>
</tr>
<tr>
<td>• Physical form of the used product: Liquid</td>
</tr>
<tr>
<td>Amount used (or contained in articles), frequency and duration of use/exposure</td>
</tr>
<tr>
<td>• Duration of activity: &lt;= 1.0 hours/day</td>
</tr>
<tr>
<td>Technical and organisational conditions and measures</td>
</tr>
<tr>
<td>• Closed continuous process with occasional controlled exposure</td>
</tr>
<tr>
<td>• Occupational Health and Safety Management System: Advanced</td>
</tr>
<tr>
<td>Conditions and measures related to personal protection, hygiene and health evaluation</td>
</tr>
<tr>
<td>• Respiratory Protection: No  [Effectiveness Inhalation: 0%]</td>
</tr>
<tr>
<td>• Dermal protection: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]</td>
</tr>
<tr>
<td>• Wear chemical goggles: Wear chemical goggles (Qualitative protection for eye irritants)</td>
</tr>
<tr>
<td>Other conditions affecting workers exposure</td>
</tr>
<tr>
<td>• Place of use: Outdoor</td>
</tr>
<tr>
<td>• Operating temperature: &lt;= 33.0 °C</td>
</tr>
<tr>
<td>• Skin surface potentially exposed: Two hands face (480 cm²)</td>
</tr>
</tbody>
</table>

### 9.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>0.56 mg/m³ (TRA Workers)</td>
<td>RCR = 0.031</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>11.21 mg/m³ (TRA Workers)</td>
<td>RCR = 0.074</td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>0.56 mg/m³ (TRA Workers)</td>
<td>RCR = 0.07</td>
</tr>
<tr>
<td>Inhalation, local, acute</td>
<td>11.21 mg/m³ (TRA Workers)</td>
<td>RCR = 0.56</td>
</tr>
<tr>
<td>Dermal, systemic, long term</td>
<td>0.274 mg/kg bw/day (TRA Workers)</td>
<td>RCR = 0.069</td>
</tr>
<tr>
<td>Dermal, local, acute</td>
<td>0.04 mg/cm² (TRA Workers)</td>
<td>RCR = 0.1</td>
</tr>
<tr>
<td>Combined routes, systemic, long-term</td>
<td></td>
<td>RCR = 0.074</td>
</tr>
<tr>
<td>Combined routes, systemic, acute</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The vapour pressure at operating temperature used for the calculation has been set by the assessor to 499 Pa. The inhalation exposure is limited to the saturated vapour concentration (if relevant).

**Risk characterisation**

If conditions detailed in Section 9.7.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.
9.8 Worker contributing scenario 8: Sampling and maintenance (outdoors, resp protection) (PROC 2)

9.8.1. Conditions of use

<table>
<thead>
<tr>
<th>Product (Article) characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Percentage (w/w) of substance in mixture/article: &lt;= 100.0 %</td>
</tr>
<tr>
<td>• Physical form of the used product: Liquid</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Amount used (or contained in articles), frequency and duration of use/exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Duration of activity: &lt;= 8.0 hours/day</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technical and organisational conditions and measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Closed continuous process with occasional controlled exposure</td>
</tr>
<tr>
<td>• Occupational Health and Safety Management System: Advanced</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Conditions and measures related to personal protection, hygiene and health evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Respiratory Protection: No [Effectiveness Inhalation: 0%]</td>
</tr>
<tr>
<td>• Dermal protection: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]</td>
</tr>
<tr>
<td>• Wear chemical goggles: Wear chemical goggles (Qualitative protection for eye irritants)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other conditions affecting workers exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Place of use: Outdoor</td>
</tr>
<tr>
<td>• Operating temperature: &lt;= 33.0 °C</td>
</tr>
<tr>
<td>• Skin surface potentially exposed: Two hands face (480 cm²)</td>
</tr>
</tbody>
</table>

9.8.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>2.802 mg/m³ (TRA Workers)</td>
<td>RCR = 0.157</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>11.21 mg/m³ (TRA Workers)</td>
<td>RCR = 0.074</td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>2.802 mg/m³ (TRA Workers)</td>
<td>RCR = 0.35</td>
</tr>
<tr>
<td>Inhalation, local, acute</td>
<td>11.21 mg/m³ (TRA Workers)</td>
<td>RCR = 0.56</td>
</tr>
<tr>
<td>Dermal, systemic, long term</td>
<td>0.274 mg/kg bw/day (TRA Workers)</td>
<td>RCR = 0.069</td>
</tr>
<tr>
<td>Dermal, local, acute</td>
<td>0.04 mg/cm² (TRA Workers)</td>
<td>RCR = 0.226</td>
</tr>
<tr>
<td>Combined routes, systemic, long-term</td>
<td></td>
<td>RCR = 0.074</td>
</tr>
<tr>
<td>Combined routes, systemic, acute</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The vapour pressure at operating temperature used for the calculation has been set by the assessor to 499 Pa. The inhalation exposure is limited to the saturated vapour concentration (if relevant).

Risk characterisation

If conditions detailed in Section 9.8.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.

9.9 Worker contributing scenario 9: Quality Control (15min-1hr, indoors with LEV, Temp < 92 degrees C) (PROC 15)

9.9.1. Conditions of use

<table>
<thead>
<tr>
<th>Product (Article) characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Percentage (w/w) of substance in mixture/article: &lt;= 100.0 %</td>
</tr>
</tbody>
</table>
9.9.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>4.004 mg/m³ (TRA Workers)</td>
<td>RCR = 0.225</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>16.01 mg/m³ (TRA Workers)</td>
<td>RCR = 0.105</td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>4.004 mg/m³ (TRA Workers)</td>
<td>RCR = 0.5</td>
</tr>
<tr>
<td>Inhalation, local, acute</td>
<td>16.01 mg/m³ (TRA Workers)</td>
<td>RCR = 0.801</td>
</tr>
<tr>
<td>Dermal, systemic, long term</td>
<td>0.068 mg/kg bw/day (TRA Workers)</td>
<td>RCR = 0.017</td>
</tr>
<tr>
<td>Combined routes, systemic, long-term</td>
<td></td>
<td>RCR = 0.242</td>
</tr>
<tr>
<td>Combined routes, systemic, acute</td>
<td></td>
<td>RCR = 0.105</td>
</tr>
</tbody>
</table>

The vapour pressure at operating temperature used for the calculation has been set by the assessor to 9.75E3 Pa.

**Risk characterisation**

If conditions detailed in Section 9.9.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.

9.10 Worker contributing scenario 10: Transfer of the substance (outdoor) (PROC 8b)

9.10.1. Conditions of use

<table>
<thead>
<tr>
<th>Product (Article) characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Percentage (w/w) of substance in mixture/article: &lt;= 100.0 %</td>
</tr>
<tr>
<td>• Physical form of the used product: Liquid</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Amount used (or contained in articles), frequency and duration of use/exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Duration of activity: &lt;= 1.0 hours/day</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technical and organisational conditions and measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Occupational Health and Safety Management System: Advanced</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Conditions and measures related to personal protection, hygiene and health evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Respiratory Protection: No [Effectiveness Inhalation: 0%]</td>
</tr>
</tbody>
</table>
9.10.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

**Exposure concentrations and risks for workers**

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>0.44 mg/m³ (Measured data: Measured Data)</td>
<td>RCR = 0.025</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>4.83 mg/m³ (Measured data: Measured Data)</td>
<td>RCR = 0.032</td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>0.44 mg/m³ (Measured data: Measured Data)</td>
<td>RCR = 0.055</td>
</tr>
<tr>
<td>Inhalation, local, acute</td>
<td>4.83 mg/m³ (Measured data: Measured Data)</td>
<td>RCR = 0.242</td>
</tr>
<tr>
<td>Dermal, systemic, long term</td>
<td>0.274 mg/kg bw/day (TRA Workers)</td>
<td>RCR = 0.069</td>
</tr>
<tr>
<td>Combined routes, systemic, long-term</td>
<td></td>
<td>RCR = 0.093</td>
</tr>
<tr>
<td>Combined routes, systemic, acute</td>
<td></td>
<td>RCR = 0.032</td>
</tr>
</tbody>
</table>

**Risk characterisation**

If conditions detailed in Section 9.9.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.

9.11. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

9.11.1. Contributing scenario (1) for environmental exposure

If the local environmental emission conditions deviate significantly from the used default values, please use one of the equations below to estimate the corrected local emission and the RCR_{Actual} for water. If the RCR_{Actual} is below the RCR_{ES} then safe use can be concluded.

For the environmental exposure (here only waste water), the DU can take the following starting points for the determinants:

- The quantity of product, in which the substance of concern is processed or used per year and site: (M_{ES}).
  \[ M_{ES} = 2.8E6 \text{ kg/year} \]

- The concentration or fraction of the substance in the product (C_{ES}); (C_{ES} \text{ would be between 0 and 1})
  \[ C_{ES} = 1.0 \]

- The emission factor: the fraction of the substance emitted from the process or use to wastewater (before abatement)
  \[ f_{water} = \text{final release factor water} \text{ (f}_{water} \text{ would be between 0 and 1)} \]
  \[ \text{In this ES: } f_{water} = 0.01\% = 0.0001 \]

- Efficiency of an abatement or control technology that reduces the emission to air, surface water or land: f_{abatement}.
  \[ f_{abatement} \text{ would be between 0 and 1. If there is no abatement or control technology, } f_{abatement} = 0 \]
  \[ \text{In this ES there is no abatement } (f_{abatement} = 0) \]

- The removal of the substance in the STP
  \[ F_{STP} = 0.8736 \]

- The duration of emission: T_{emission}. (T_{emission} \text{ would be between 1 and 365 days}).
  \[ T_{emission} = 100 \text{ working days per year} \]

- Water treated in the sewage treatment plant (CAPACITY = Discharge rate of STP)
  \[ \text{In this ES: CAPACITY = Discharge rate of STP } >= 2E3 \text{ m}^3/d (>= 2 000 m}^3\text{/day) } \]
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- Dilution factor in the receiving water body: \( DILUTION = \frac{\text{Receiving surface water flow rate}}{\text{Discharge rate of STP}} \)

In this ES: Receiving surface water flow rate \( \geq 1.8E4 \text{ m}^3/\text{d} \) (\( \geq 18 \text{ 000 m}^3/\text{d} \))
\[
DILUTION = \frac{1.8E4}{2E3} = 18 \text{ 000} / 2 \text{ 000} = 9
\]

The DU has to evaluate that under these use conditions that the exposure concentration in surface water can be predicted using the following equation:

\[
P\text{EC}_{\text{local}} = P\text{EC}_{\text{regional}} + \frac{T_{\text{emission}}}{\text{CAPACITY} \cdot DILUTION} \
\frac{M_{\text{ES}} \cdot C_{\text{ES}} \cdot f_{\text{water}} \cdot (1 - f_{\text{abatement}}) \cdot (1 - F_{\text{STP}})}{\text{CAPACITY} \cdot DILUTION} \
\]

The registrant calculates a RCR\(_{\text{ES}}\) for surface water, the DU calculates it for his use situation (RCR\(_{\text{Actual}}\)). If RCR\(_{\text{Actual}}\) is below the RCR\(_{\text{ES}}\), then safe use can be concluded.

The registrant carries out the below steps in order to enable the DU to perform scaling. The numbering below refers to the steps given in section 1.3.3 of the “Guidance on information requirements and chemical safety assessment Part G: Extending the SDS”.

1) The registrant knows that the Operational Conditions in other similar uses of the product may vary, and concludes that he should provide information in the ES enabling the DU to scale the information of Operational Conditions / Risk Management Measures (OCs/RMMs) included in the ES.
2) He prepares the list of relevant determinants (see above)
3) The determinants which he considers likely to vary are: \( M_{\text{ES}}, C_{\text{ES}}, f_{\text{water}}, f_{\text{abatement}}, T_{\text{emission}} \)
4) None of the determinants are considered interdependent
5) All determinants are linear with respect to exposure level, so he proposes the following equation for scaling:

\[
\text{RCR}_{\text{Actual}} = \text{RCR}_{\text{ES}} \cdot \frac{M_{\text{Actual}}}{M_{\text{ES}}} \cdot \frac{C_{\text{Actual}}}{C_{\text{ES}}} \cdot \frac{f_{\text{water,Actual}}}{f_{\text{water,ES}}} \cdot \frac{(1 - f_{\text{abatement,Actual}})}{(1 - f_{\text{abatement,ES}})} \cdot \frac{T_{\text{emission,ES}}}{T_{\text{emission,Actual}}}
\]

6) The concentration in the product (\( C_{\text{Actual}} \)) should be between 0 and 100%.
   The \( f_{\text{water,Actual}} \) and \( f_{\text{abatement,Actual}} \) would be between 0 and 1.
   The \( T_{\text{emission,Actual}} \) should be between 1 and 365 days.

9.11.2. Contributing scenario (2) for workers

Evaluate whether work is done within the Risk Management Measures described in the Contributing scenario’s above. Within those conditions, safe use was shown. If not, further assessment is required.
10. Exposure scenario 10: Widespread use by professional workers - Professional end use of acid resistant coatings - by using formulations

Title section

<table>
<thead>
<tr>
<th>Environment contributing scenario(s):</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 1 Professional end use of acid resistant coatings - by using formulations</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Worker contributing scenario(s):</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 2 Mixing and loading (&gt;25%, indoors with PPE)</td>
</tr>
<tr>
<td>CS 3 Laminating and cladding acid resistant coatings (&gt;25%, indoors with PPE)</td>
</tr>
</tbody>
</table>

Explanation on the approach taken for the ES

10.1. Environmental contributing scenario 1: Professional end use of acid resistant coatings - by using formulations (ERC 8c)

10.1.1. Conditions of use

<table>
<thead>
<tr>
<th>Amount used, frequency and duration of use (or from service life)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Daily local widespread use amount: &lt;= 0.0000055 tonnes/day</td>
</tr>
<tr>
<td>• Percentage of EU tonnage used at regional scale: = 10.0 %</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Conditions and measures related to biological sewage treatment plant</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Biological STP: Standard</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Conditions and measures related to external treatment of waste (including article waste)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)</td>
</tr>
</tbody>
</table>

10.1.2. Releases

The local releases to the environment are reported in the following table. Note that the releases reported do not account for the removal in the modelled biological STP.

Local releases to the environment

<table>
<thead>
<tr>
<th>Release</th>
<th>Release estimation method</th>
<th>Explanations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>ERC based</td>
<td>Release factor before on site RMM: 1%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Release factor after on site RMM: 1%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Local release rate: 5.5E-5 kg/day</td>
</tr>
<tr>
<td>Air</td>
<td>ERC based</td>
<td>Release factor before on site RMM: 15%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Release factor after on site RMM: 15%</td>
</tr>
<tr>
<td>Non-agricultural soil</td>
<td>ERC based</td>
<td>Release factor after on site RMM: 0%</td>
</tr>
</tbody>
</table>

10.1.3. Exposure and risks for the environment and man via the environment

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table. The exposure estimates have been obtained with EUSES 2.1.2 unless stated otherwise.
Safety Data Sheet  
according to Regulation (EC) No 1907/2006

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**Exposure concentrations and risks for the environment and man via the environment**

<table>
<thead>
<tr>
<th>Protection target</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fresh water</td>
<td>Local PEC: 6.89E-4 mg/L</td>
<td>RCR = 0.021</td>
</tr>
<tr>
<td>Sediment (freshwater)</td>
<td>Local PEC: 3.66E-3 mg/kg dw</td>
<td>RCR = 0.03</td>
</tr>
<tr>
<td>Marine water</td>
<td>Local PEC: 6.22E-5 mg/L</td>
<td>RCR = 0.019</td>
</tr>
<tr>
<td>Sediment (marine water)</td>
<td>Local PEC: 3.3E-4 mg/kg dw</td>
<td>RCR = 0.028</td>
</tr>
<tr>
<td>Sewage Treatment Plant</td>
<td>Local PEC: 3.47E-6 mg/L</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Agricultural soil</td>
<td>Local PEC: 1.93E-5 mg/kg dw</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Predator’s prey (freshwater)</td>
<td>Local PEC: 9.73E-4 mg/kg ww</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Predator’s prey (marine water)</td>
<td>Local PEC: 8.78E-5 mg/kg ww</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Top predator’s prey (marine water)</td>
<td>Local PEC: 8.78E-5 mg/kg ww</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Predator’s prey (terrestrial)</td>
<td>Local PEC: 2.5E-5 mg/kg ww</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Man via environment - Inhalation</td>
<td>Concentration in air: 2.78E-6 mg/m³</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Man via environment - Oral</td>
<td>Exposure via food consumption: 2.24E-5 mg/kg bw/day</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Man via environment - combined routes</td>
<td></td>
<td>RCR &lt; 0.01</td>
</tr>
</tbody>
</table>

**10.2. Worker contributing scenario 2: Mixing and loading (>25%, indoors with PPE) (PROC 8a)**

**10.2.1. Conditions of use**

<table>
<thead>
<tr>
<th>Product (Article) characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Percentage (w/w) of substance in mixture/article: &lt;= 100.0 %</td>
</tr>
<tr>
<td>• Physical form of the used product: Liquid</td>
</tr>
</tbody>
</table>

**Amount used (or contained in articles), frequency and duration of use/exposure**

<table>
<thead>
<tr>
<th>Duration of activity: &lt;= 4.0 hours/day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical and organisational conditions and measures</td>
</tr>
<tr>
<td>• Occupational Health and Safety Management System: Basic</td>
</tr>
<tr>
<td>• General ventilation: Enhanced general ventilation (5-10 air changes per hour) [Effectiveness Inhalation: 70%]</td>
</tr>
<tr>
<td>• Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]</td>
</tr>
</tbody>
</table>

**Conditions and measures related to personal protection, hygiene and health evaluation**

| Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhalation: 90%] |
| Dermal protection: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%] |
| Wear chemical goggles: Wear chemical goggles (Qualitative protection for eye irritants) |

**Other conditions affecting workers exposure**

| Place of use: Indoor |

Can be used indoor and outdoors.

| Operating temperature: <= 33.0 °C |
| Skin surface potentially exposed: Two hands (960 cm²) |

**10.2.2. Exposure and risks for workers**

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.
## Exposure concentrations and risks for workers

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>1.802 mg/m³ (TRA Workers)</td>
<td>RCR = 0.101</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>12.01 mg/m³ (TRA Workers)</td>
<td>RCR = 0.079</td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>1.802 mg/m³ (TRA Workers)</td>
<td>RCR = 0.225</td>
</tr>
<tr>
<td>Inhalation, local, acute</td>
<td>12.01 mg/m³ (TRA Workers)</td>
<td>RCR = 0.601</td>
</tr>
<tr>
<td>Dermal, systemic, long term</td>
<td>2.742 mg/kg bw/day (TRA Workers)</td>
<td>RCR = 0.685</td>
</tr>
<tr>
<td>Dermal, local, acute</td>
<td>0.2 mg/cm² (TRA Workers)</td>
<td></td>
</tr>
<tr>
<td>Combined routes, systemic, long-term</td>
<td></td>
<td>RCR = 0.787</td>
</tr>
<tr>
<td>Combined routes, systemic, acute</td>
<td></td>
<td>RCR = 0.079</td>
</tr>
</tbody>
</table>

The vapour pressure at operating temperature used for the calculation has been set by the assessor to 499 Pa. The inhalation exposure is limited to the saturated vapour concentration (if relevant).

### Risk characterisation

If conditions detailed in Section 10.2.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.

## 10.3. Worker contributing scenario 3: Laminating and cladding acid resistant coatings (>25%, indoors with PPE) (PROC 10)

### 10.3.1. Conditions of use

**Product (Article) characteristics**

- Percentage (w/w) of substance in mixture/article: <= 100.0 %
- Physical form of the used product: Liquid

**Amount used (or contained in articles), frequency and duration of use/exposure**

- Duration of activity: <= 4.0 hours/day

**Technical and organisational conditions and measures**

- Occupational Health and Safety Management System: Basic
- General ventilation: Enhanced general ventilation (5-10 air changes per hour) [Effectiveness Inhalation: 70%]
- Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]

**Conditions and measures related to personal protection, hygiene and health evaluation**

- Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhalation: 90%]
- Dermal protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]
- Wear chemical goggles: Wear chemical goggles (Qualitative protection for eye irritants)

**Other conditions affecting workers exposure**

- Place of use: Indoor
- Operating temperature: <= 33.0 °C
- Skin surface potentially exposed: Two hands (960 cm²)

### 10.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>1.802 mg/m³ (TRA Workers)</td>
<td>RCR = 0.101</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>12.01 mg/m³ (TRA Workers)</td>
<td>RCR = 0.079</td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>1.802 mg/m³ (TRA Workers)</td>
<td>RCR = 0.225</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, local, acute</td>
<td>12.01 mg/m³ (TRA Workers)</td>
<td>RCR = 0.601</td>
</tr>
<tr>
<td>Dermal, systemic, long term</td>
<td>2.743 mg/kg bw/day (TRA Workers)</td>
<td>RCR = 0.686</td>
</tr>
<tr>
<td>Dermal, local, acute</td>
<td>0.2 mg/cm² (TRA Workers)</td>
<td></td>
</tr>
<tr>
<td>Combined routes, systemic, long-term</td>
<td></td>
<td>RCR = 0.787</td>
</tr>
<tr>
<td>Combined routes, systemic, acute</td>
<td></td>
<td>RCR = 0.079</td>
</tr>
</tbody>
</table>

The vapour pressure at operating temperature used for the calculation has been set by the assessor to 499 Pa. The inhalation exposure is limited to the saturated vapour concentration (if relevant).

**Risk characterisation**

If conditions detailed in Section 10.3.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.

**10.4. Local exposure due to widespread use**

The predicted local environmental concentration (PEC local) based on the release from the widespread use is reported together with the risk characterisation ratio when a PNEC is available. The exposure estimates have been obtained with EUSES 2.1.2.
11. Exposure scenario 11: Widespread use by professional workers - Spray Turf Indoor Uses

**Title section**

**Market sector:** Nutrient Source for Specialty Crops  
**Product category used:** PC 12: Fertilizers  
**Sector of use:** SU 1: Agriculture, forestry, fishery

<table>
<thead>
<tr>
<th>Environment contributing scenario(s):</th>
</tr>
</thead>
</table>
| CS 1  | Spray Turf Indoor Uses  | ERC 8b  

<table>
<thead>
<tr>
<th>Worker contributing scenario(s):</th>
</tr>
</thead>
</table>
| CS 2  | Transfer of product to the irrigation premix tank  | PROC 8a  
| CS 3  | Diluting the product before application  | PROC 5  
| CS 4  | Spraying the product (indoor, Turf)  | PROC 11  

**Explanation on the approach taken for the ES**

11.1 Environmental contributing scenario 1: Spray Turf Indoor Uses (ERC 8b)

11.1.1. Conditions of use

<table>
<thead>
<tr>
<th>Amount used, frequency and duration of use (or from service life)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Daily local widespread use amount: &lt;= 0.0000018 tonnes/day</td>
</tr>
<tr>
<td>• Percentage of EU tonnage used at regional scale: = 10.0 %</td>
</tr>
</tbody>
</table>

**Conditions and measures related to biological sewage treatment plant**

<table>
<thead>
<tr>
<th>Conditions and measures related to external treatment of waste (including article waste)</th>
</tr>
</thead>
</table>
| • Biological STP: Standard  
| • Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)

11.1.2. Releases

The local releases to the environment are reported in the following table. Note that the releases reported do not account for the removal in the modelled biological STP.

<table>
<thead>
<tr>
<th>Local releases to the environment</th>
</tr>
</thead>
</table>
| Release  | Release estimation method  | Explanations  
|---------|---------------------------|---------------  
| Water   | ERC based  | Release factor before on site RMM: 2%  
|         |              | Release factor after on site RMM: 2%  
|         |              | Local release rate: 3.52E-5 kg/day  
| Air     | ERC based  | Release factor before on site RMM: 0.1%  
|         |              | Release factor after on site RMM: 0.1%  
| Non-agricultural soil  | ERC based  | Release factor after on site RMM: 0%  

11.1.3. Exposure and risks for the environment and man via the environment

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table. The exposure estimates have been obtained with EUSES 2.1.2 unless stated otherwise.
Exposure concentrations and risks for the environment and man via the environment

<table>
<thead>
<tr>
<th>Protection target</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fresh water</td>
<td>Local PEC: 6.89E-4 mg/L</td>
<td>RCR = 0.021</td>
</tr>
<tr>
<td>Sediment (freshwater)</td>
<td>Local PEC: 3.66E-3 mg/kg dw</td>
<td>RCR = 0.03</td>
</tr>
<tr>
<td>Marine water</td>
<td>Local PEC: 6.22E-5 mg/L</td>
<td>RCR = 0.019</td>
</tr>
<tr>
<td>Sediment (marine water)</td>
<td>Local PEC: 3.3E-4 mg/kg dw</td>
<td>RCR = 0.028</td>
</tr>
<tr>
<td>Sewage Treatment Plant</td>
<td>Local PEC: 2.22E-6 mg/L</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Agricultural soil</td>
<td>Local PEC: 1.92E-5 mg/kg dw</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Predator's prey (freshwater)</td>
<td>Local PEC: 9.73E-4 mg/kg ww</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Predator's prey (marine water)</td>
<td>Local PEC: 8.78E-5 mg/kg ww</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Top predator's prey (marine water)</td>
<td>Local PEC: 8.78E-5 mg/kg ww</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Predator's prey (terrestrial)</td>
<td>Local PEC: 2.5E-5 mg/kg ww</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Man via environment - Inhalation</td>
<td>Concentration in air: 2.78E-6 mg/m³</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Man via environment - Oral</td>
<td>Exposure via food consumption: 2.24E-5 mg/kg bw/day</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Man via environment - combined routes</td>
<td></td>
<td>RCR &lt; 0.01</td>
</tr>
</tbody>
</table>

11.2 Worker contributing scenario 2: Transfer of product to the irrigation premix tank (PROC 8a)

11.2.1. Conditions of use

Product (Article) characteristics

- Percentage (w/w) of substance in mixture/article: <= 25.0 %
- Physical form of the used product: Liquid

Amount used (or contained in articles), frequency and duration of use/exposure

- Duration of activity: <= 0.25 hours/day

Technical and organisational conditions and measures

- Occupational Health and Safety Management System: Basic
- General ventilation: Enhanced general ventilation (5-10 air changes per hour) [Effectiveness Inhalation: 70%]
- Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]

Conditions and measures related to personal protection, hygiene and health evaluation

- Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhalation: 90%]
- Dermal protection: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]
- Wear chemical goggles: Wear chemical goggles (Qualitative protection for eye irritants)

Other conditions affecting workers exposure

- Place of use: Indoor
- Operating temperature: <= 33.0 °C
- Skin surface potentially exposed: Two hands (960 cm²)

11.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>0.18 mg/m³ (TRA Workers)</td>
<td>RCR = 0.01</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>7.206 mg/m³ (TRA Workers)</td>
<td>RCR = 0.047</td>
</tr>
</tbody>
</table>
The vapour pressure at operating temperature used for the calculation has been set by the assessor to 499 Pa. The inhalation exposure is limited to the saturated vapour concentration (if relevant).

**Risk characterisation**

If conditions detailed in Section 11.2.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.

### 11.3 Worker contributing scenario 3: Diluting the product before application (PROC 5)

#### 11.3.1. Conditions of use

<table>
<thead>
<tr>
<th>Product (Article) characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Percentage (w/w) of substance in mixture/article: &lt;= 5.0 %</td>
</tr>
<tr>
<td>• Physical form of the used product: Liquid</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Amount used (or contained in articles), frequency and duration of use/exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Duration of activity: &lt;= 0.25 hours/day</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technical and organisational conditions and measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Occupational Health and Safety Management System: Basic</td>
</tr>
<tr>
<td>• General ventilation: Enhanced general ventilation (5-10 air changes per hour) [Effectiveness Inhalation: 70%]</td>
</tr>
<tr>
<td>• Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Conditions and measures related to personal protection, hygiene and health evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Respiratory Protection: No [Effectiveness Inhalation: 0%]</td>
</tr>
<tr>
<td>• Dermal protection: No [Effectiveness Dermal: 0%]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other conditions affecting workers exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Place of use: Indoor</td>
</tr>
<tr>
<td>• Operating temperature: &lt;= 33.0 °C</td>
</tr>
<tr>
<td>• Skin surface potentially exposed: Two hands face (480 cm²)</td>
</tr>
</tbody>
</table>

#### 11.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>0.24 mg/m³ (TRA Workers)</td>
<td>RCR = 0.013</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>9.608 mg/m³ (TRA Workers)</td>
<td>RCR = 0.063</td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>0.24 mg/m³ (TRA Workers)</td>
<td>RCR = 0.03</td>
</tr>
<tr>
<td>Inhalation, local, acute</td>
<td>9.608 mg/m³ (TRA Workers)</td>
<td>RCR = 0.48</td>
</tr>
<tr>
<td>Dermal, systemic, long term</td>
<td>2.742 mg/kg bw/day (TRA Workers)</td>
<td>RCR = 0.685</td>
</tr>
<tr>
<td>Dermal, local, acute</td>
<td>0.4 mg/cm² (TRA Workers)</td>
<td>RCR = 0.699</td>
</tr>
<tr>
<td>Combined routes, systemic, long-term</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Combined routes, systemic, acute</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Route of exposure and type of effects | Exposure concentration | Risk quantification
--- | --- | ---
Combined routes, systemic, acute | | RCR = 0.063

The vapour pressure at operating temperature used for the calculation has been set by the assessor to 499 Pa. The inhalation exposure is limited to the saturated vapour concentration (if relevant).

**Risk characterisation**
If conditions detailed in Section 11.3.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.

### 11.4. Worker contributing scenario 4: Spraying the product (indoor, Turf) (PROC 11)

#### 11.4.1. Conditions of use

**Product (Article) characteristics**

- Percentage (w/w) of substance in mixture/article: <= 1.0 %
- Physical form of the used product: Liquid

**Amount used (or contained in articles), frequency and duration of use/exposure**

- Duration of activity: <= 1.0 hours/day

**Technical and organisational conditions and measures**

- Occupational Health and Safety Management System: Basic
- General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]
- Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]

**Conditions and measures related to personal protection, hygiene and health evaluation**

- Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhalation: 90%]
- Dermal protection: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]

**Other conditions affecting workers exposure**

- Place of use: Indoor
- Operating temperature: <= 33.0 °C
- Skin surface potentially exposed: Two hands and upper wrists (1500 cm²)

#### 11.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

**Exposure concentrations and risks for workers**

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>0.56 mg/m³ (TRA Workers)</td>
<td>RCR = 0.031</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>11.21 mg/m³ (TRA Workers)</td>
<td>RCR = 0.074</td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>0.56 mg/m³ (TRA Workers)</td>
<td>RCR = 0.07</td>
</tr>
<tr>
<td>Inhalation, local, acute</td>
<td>11.21 mg/m³ (TRA Workers)</td>
<td>RCR = 0.56</td>
</tr>
<tr>
<td>Dermal, systemic, long term</td>
<td>2.143 mg/kg bw/day (TRA Workers)</td>
<td>RCR = 0.536</td>
</tr>
<tr>
<td>Dermal, local, acute</td>
<td>0.1 mg/cm² (TRA Workers)</td>
<td>RCR = 0.567</td>
</tr>
<tr>
<td>Combined routes, systemic, long-term</td>
<td></td>
<td>RCR = 0.567</td>
</tr>
<tr>
<td>Combined routes, systemic, acute</td>
<td></td>
<td>RCR = 0.074</td>
</tr>
</tbody>
</table>

The vapour pressure at operating temperature used for the calculation has been set by the assessor to 499 Pa. The inhalation exposure is limited to the saturated vapour concentration (if relevant).

**Risk characterisation**
If conditions detailed in Section 11.4.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.
11.5. Local exposure due to widespread use

The predicted local environmental concentration (PEC local) based on the release from the widespread use is reported together with the risk characterisation ratio when a PNEC is available. The exposure estimates have been obtained with EUSES 2.1.2.
12. Exposure scenario 12: Widespread use by professional workers - Spray Turf Outdoor Uses

Title section

Market sector: Nutrient Source for Specialty Crops
Product category used: PC 12: Fertilizers
Sector of use: SU 1: Agriculture, forestry, fishery

<table>
<thead>
<tr>
<th>Environment contributing scenario(s):</th>
<th>Worker contributing scenario(s):</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 1 Spraying Turf Outdoor Uses</td>
<td>ERC 8e</td>
</tr>
<tr>
<td>CS 2 Transfer of product to the irrigation premix tank</td>
<td>PROC 8a</td>
</tr>
<tr>
<td>CS 3 Diluting the product before application</td>
<td>PROC 5</td>
</tr>
<tr>
<td>CS 4 Spraying the product (outdoor, Turf)</td>
<td>PROC 11</td>
</tr>
</tbody>
</table>

Explanation on the approach taken for the ES

12.1. Environmental contributing scenario 1: Spray Turf Outdoor Uses (ERC 8e)

12.1.1. Conditions of use

<table>
<thead>
<tr>
<th>Amount used, frequency and duration of use (or from service life)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Daily local widespread use amount: &lt;= 0.00001 tonnes/day</td>
</tr>
<tr>
<td>• Percentage of EU tonnage used at regional scale: = 10.0 %</td>
</tr>
<tr>
<td>Conditions and measures related to biological sewage treatment plant</td>
</tr>
<tr>
<td>• Biological STP: Standard</td>
</tr>
<tr>
<td>Conditions and measures related to external treatment of waste (including article waste)</td>
</tr>
<tr>
<td>• Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)</td>
</tr>
</tbody>
</table>

12.1.2. Releases

The local releases to the environment are reported in the following table. Note that the releases reported do not account for the removal in the modelled biological STP.

<table>
<thead>
<tr>
<th>Release</th>
<th>Release estimation method</th>
<th>Explanations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>ERC based</td>
<td>Release factor before on site RMM: 2%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Release factor after on site RMM: 2%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Local release rate: 2.07E-4 kg/day</td>
</tr>
<tr>
<td>Air</td>
<td>ERC based</td>
<td>Release factor before on site RMM: 0.1%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Release factor after on site RMM: 0.1%</td>
</tr>
<tr>
<td>Non-agricultural soil</td>
<td>ERC based</td>
<td>Release factor after on site RMM: 1%</td>
</tr>
</tbody>
</table>

12.1.3. Exposure and risks for the environment and man via the environment

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table. The exposure estimates have been obtained with EUSES 2.1.2 unless stated otherwise.
Safety Data Sheet according to Regulation (EC) No 1907/2006

Furfural

Exposure concentrations and risks for the environment and man via the environment

<table>
<thead>
<tr>
<th>Protection target</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fresh water</td>
<td>Local PEC: 6.9E-4 mg/L</td>
<td>RCR = 0.021</td>
</tr>
<tr>
<td>Sediment (freshwater)</td>
<td>Local PEC: 3.66E-3 mg/kg dw</td>
<td>RCR = 0.031</td>
</tr>
<tr>
<td>Marine water</td>
<td>Local PEC: 6.23E-5 mg/L</td>
<td>RCR = 0.019</td>
</tr>
<tr>
<td>Sediment (marine water)</td>
<td>Local PEC: 3.31E-4 mg/kg dw</td>
<td>RCR = 0.028</td>
</tr>
<tr>
<td>Sewage Treatment Plant</td>
<td>Local PEC: 1.31E-5 mg/L</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Agricultural soil</td>
<td>Local PEC: 1.96E-5 mg/kg dw</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Predator’s prey (freshwater)</td>
<td>Local PEC: 9.74E-4 mg/kg ww</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Predator’s prey (marine water)</td>
<td>Local PEC: 8.79E-5 mg/kg ww</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Top predator’s prey (marine water)</td>
<td>Local PEC: 8.78E-5 mg/kg ww</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Predator’s prey (terrestrial)</td>
<td>Local PEC: 2.51E-5 mg/kg ww</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Man via environment - Inhalation</td>
<td>Concentration in air: 2.78E-6 mg/m³</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Man via environment - Oral</td>
<td>Exposure via food consumption: 2.24E-5 mg/kg bw/day</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Man via environment - combined routes</td>
<td></td>
<td>RCR &lt; 0.01</td>
</tr>
</tbody>
</table>

12.2. Worker contributing scenario 2: Transfer of product to the irrigation premix tank (PROC 8a)

12.2.1. Conditions of use

Product (Article) characteristics

- Percentage (w/w) of substance in mixture/article: <= 25.0 %
- Physical form of the used product: Liquid

Amount used (or contained in articles), frequency and duration of use/exposure

- Duration of activity: <= 0.25 hours/day

Technical and organisational conditions and measures

- Occupational Health and Safety Management System: Basic

Conditions and measures related to personal protection, hygiene and health evaluation

- Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhalation: 90%]
- Dermal protection: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]
- Wear chemical goggles: Wear chemical goggles (Qualitative protection for eye irritants)

Other conditions affecting workers exposure

- Place of use: Outdoor
- Operating temperature: <= 33.0 °C
- Skin surface potentially exposed: Two hands (960 cm²)

12.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Exposure concentrations and risks for workers

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>0.42 mg/m³ (TRA Workers)</td>
<td>RCR = 0.024</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>16.81 mg/m³ (TRA Workers)</td>
<td>RCR = 0.111</td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>0.42 mg/m³ (TRA Workers)</td>
<td>RCR = 0.053</td>
</tr>
</tbody>
</table>
Furfural

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, local, acute</td>
<td>16.81 mg/m³ (TRA Workers)</td>
<td>RCR = 0.841</td>
</tr>
<tr>
<td>Dermal, systemic, long term</td>
<td>1.645 mg/kg bw/day (TRA Workers)</td>
<td>RCR = 0.411</td>
</tr>
<tr>
<td>Dermal, local, acute</td>
<td>0.12 mg/cm² (TRA Workers)</td>
<td>RCR = 0.435</td>
</tr>
<tr>
<td>Combined routes, systemic, long-term</td>
<td></td>
<td>RCR = 0.435</td>
</tr>
<tr>
<td>Combined routes, systemic, acute</td>
<td></td>
<td>RCR = 0.111</td>
</tr>
</tbody>
</table>

The vapour pressure at operating temperature used for the calculation has been set by the assessor to 499 Pa. The inhalation exposure is limited to the saturated vapour concentration (if relevant).

Risk characterisation

If conditions detailed in Section 12.2.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.

12.3. Worker contributing scenario 3: Diluting the product before application (PROC 5)

12.3.1. Conditions of use

<table>
<thead>
<tr>
<th>Product (Article) characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Percentage (w/w) of substance in mixture/article: &lt;= 5.0 %</td>
</tr>
<tr>
<td>• Physical form of the used product: Liquid</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Amount used (or contained in articles), frequency and duration of use/exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Duration of activity: &lt;= 0.25 hours/day</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technical and organisational conditions and measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Occupational Health and Safety Management System: Basic</td>
</tr>
<tr>
<td>• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhalation: 90%]</td>
</tr>
<tr>
<td>• Dermal protection: No [Effectiveness Dermal: 0%]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other conditions affecting workers exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Place of use: Outdoor</td>
</tr>
<tr>
<td>• Operating temperature: &lt;= 33.0 °C</td>
</tr>
<tr>
<td>• Skin surface potentially exposed: Two hands face (480 cm²)</td>
</tr>
</tbody>
</table>

12.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>0.056 mg/m³ (TRA Workers)</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>2.242 mg/m³ (TRA Workers)</td>
<td>RCR = 0.015</td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>0.056 mg/m³ (TRA Workers)</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Inhalation, local, acute</td>
<td>2.242 mg/m³ (TRA Workers)</td>
<td>RCR = 0.112</td>
</tr>
<tr>
<td>Dermal, systemic, long term</td>
<td>2.742 mg/kg bw/day (TRA Workers)</td>
<td>RCR = 0.685</td>
</tr>
<tr>
<td>Dermal, local, acute</td>
<td>0.4 mg/cm² (TRA Workers)</td>
<td></td>
</tr>
<tr>
<td>Combined routes, systemic, long-term</td>
<td></td>
<td>RCR = 0.689</td>
</tr>
<tr>
<td>Combined routes, systemic, acute</td>
<td></td>
<td>RCR = 0.015</td>
</tr>
</tbody>
</table>

The vapour pressure at operating temperature used for the calculation has been set by the assessor to 499 Pa.
The inhalation exposure is limited to the saturated vapour concentration (if relevant).

Risk characterisation
If conditions detailed in Section 12.3.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.

12.4. Worker contributing scenario 4: Spraying the product (outdoor, Turf) (PROC 11)

12.4.1. Conditions of use

<table>
<thead>
<tr>
<th>Product (Article) characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Percentage (w/w) of substance in mixture/article: &lt;= 1.0 %</td>
</tr>
<tr>
<td>• Physical form of the used product: Liquid</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Amount used (or contained in articles), frequency and duration of use/exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Duration of activity: &lt;= 1.0 hours/day</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technical and organisational conditions and measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Occupational Health and Safety Management System: Basic</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Conditions and measures related to personal protection, hygiene and health evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhalation: 90%]</td>
</tr>
<tr>
<td>• Dermal protection: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other conditions affecting workers exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Place of use: Outdoor</td>
</tr>
<tr>
<td>• Operating temperature: &lt;= 33.0 °C</td>
</tr>
<tr>
<td>• Skin surface potentially exposed: Two hands and upper wrists (1500 cm²)</td>
</tr>
</tbody>
</table>

12.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>0.56 mg/m³ (TRA Workers)</td>
<td>RCR = 0.031</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>11.21 mg/m³ (TRA Workers)</td>
<td>RCR = 0.074</td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>0.56 mg/m³ (TRA Workers)</td>
<td>RCR = 0.07</td>
</tr>
<tr>
<td>Inhalation, local, acute</td>
<td>11.21 mg/m³ (TRA Workers)</td>
<td>RCR = 0.56</td>
</tr>
<tr>
<td>Dermal, systemic, long term</td>
<td>2.143 mg/kg bw/day (TRA Workers)</td>
<td>RCR = 0.536</td>
</tr>
<tr>
<td>Dermal, local, acute</td>
<td>0.1 mg/cm² (TRA Workers)</td>
<td>RCR = 0.567</td>
</tr>
<tr>
<td>Combined routes, systemic, long-term</td>
<td></td>
<td>RCR = 0.074</td>
</tr>
<tr>
<td>Combined routes, systemic, acute</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The vapour pressure at operating temperature used for the calculation has been set by the assessor to 499 Pa.

The inhalation exposure is limited to the saturated vapour concentration (if relevant).

Risk characterisation
If conditions detailed in Section 12.4.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.

12.5. Local exposure due to widespread use

The predicted local environmental concentration (PEC local) based on the release from the widespread use is reported together with the risk characterisation ratio when a PNEC is available. The exposure estimates have been obtained with EUSES 2.1.2.
13. Exposure scenario 13: Widespread use by professional workers - Dripper Indoor Uses

Title section
Market sector: Nutrient Source for Specialty Crops
Product category used: PC 12: Fertilizers
Sector of use: SU 1: Agriculture, forestry, fishery

| Environment contributing scenario(s): | CS 1 | Dripper Indoor Uses | ERC 8b |
| Worker contributing scenario(s): | CS 2 | Transfer of product to the irrigation premix tank | PROC 8a |
| | CS 3 | Diluting the product before application | PROC 5 |
| | CS 4 | Application of the product via dripper system | PROC 2 |

Explanation on the approach taken for the ES
13.1. Environmental contributing scenario 1: Dripper Indoor Uses (ERC 8b)

13.1.1. Conditions of use

| Amount used, frequency and duration of use (or from service life) |
| • Daily local widespread use amount: <= 0.000015 tonnes/day |
| • Percentage of EU tonnage used at regional scale: = 10.0 % |

Conditions and measures related to biological sewage treatment plant

| Biological STP: Standard |

Conditions and measures related to external treatment of waste (including article waste)

| • Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.) |

13.1.2. Releases

The local releases to the environment are reported in the following table. Note that the releases reported do not account for the removal in the modelled biological STP.

<p>| Local releases to the environment |</p>
<table>
<thead>
<tr>
<th>Release</th>
<th>Release estimation method</th>
<th>Explanations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>ERC based</td>
<td>Release factor before on site RMM: 2% Release factor after on site RMM: 2% Local release rate: 2.9E-4 kg/day</td>
</tr>
<tr>
<td>Air</td>
<td>ERC based</td>
<td>Release factor before on site RMM: 0.1% Release factor after on site RMM: 0.1%</td>
</tr>
<tr>
<td>Non-agricultural soil</td>
<td>ERC based</td>
<td>Release factor after on site RMM: 0%</td>
</tr>
</tbody>
</table>

13.1.3. Exposure and risks for the environment and man via the environment

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table. The exposure estimates have been obtained with EUSES 2.1.2 unless stated otherwise.
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Exposure concentrations and risks for the environment and man via the environment

<table>
<thead>
<tr>
<th>Protection target</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fresh water</td>
<td>Local PEC: 6.9E-4 mg/L</td>
<td>RCR = 0.021</td>
</tr>
<tr>
<td>Sediment (freshwater)</td>
<td>Local PEC: 3.67E-3 mg/kg dw</td>
<td>RCR = 0.031</td>
</tr>
<tr>
<td>Marine water</td>
<td>Local PEC: 6.23E-5 mg/L</td>
<td>RCR = 0.019</td>
</tr>
<tr>
<td>Sediment (marine water)</td>
<td>Local PEC: 3.31E-4 mg/kg dw</td>
<td>RCR = 0.028</td>
</tr>
<tr>
<td>Sewage Treatment Plant</td>
<td>Local PEC: 1.83E-5 mg/L</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Agricultural soil</td>
<td>Local PEC: 1.98E-5 mg/kg dw</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Predator's prey (freshwater)</td>
<td>Local PEC: 9.74E-4 mg/kg ww</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Predator's prey (marine water)</td>
<td>Local PEC: 8.79E-5 mg/kg ww</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Top predator's prey (marine water)</td>
<td>Local PEC: 8.78E-5 mg/kg ww</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Predator's prey (terrestrial)</td>
<td>Local PEC: 2.52E-5 mg/kg ww</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Man via environment - Inhalation</td>
<td>Concentration in air: 2.78E-6 mg/m³</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Man via environment - Oral</td>
<td>Exposure via food consumption: 2.24E-5 mg/kg bw/day</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Man via environment - combined routes</td>
<td></td>
<td>RCR &lt; 0.01</td>
</tr>
</tbody>
</table>

13.2. Worker contributing scenario 2: Transfer of product to the irrigation premix tank (PROC 8a)

13.2.1. Conditions of use

Product (Article) characteristics
- Percentage (w/w) of substance in mixture/article: <= 25.0 %
- Physical form of the used product: Liquid

Amount used (or contained in articles), frequency and duration of use/exposure
- Duration of activity: <= 0.25 hours/day

Technical and organisational conditions and measures
- Occupational Health and Safety Management System: Basic
- General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]
- Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]

Conditions and measures related to personal protection, hygiene and health evaluation
- Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhalation: 90%]
- Dermal protection: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]
- Wear chemical goggles: Wear chemical goggles (Qualitative protection for eye irritants)

Other conditions affecting workers exposure
- Place of use: Indoor
- Operating temperature: <= 33.0 °C
- Skin surface potentially exposed: Two hands (960 cm²)

13.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Exposure concentrations and risks for workers

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>0.42 mg/m³ (TRA Workers)</td>
<td>RCR = 0.024</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>16.81 mg/m³ (TRA Workers)</td>
<td>RCR = 0.111</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, local, long term</td>
<td>0.42 mg/m³ (TRA Workers)</td>
<td>RCR = 0.053</td>
</tr>
<tr>
<td>Inhalation, local, acute</td>
<td>16.81 mg/m³ (TRA Workers)</td>
<td>RCR = 0.841</td>
</tr>
<tr>
<td>Dermal, systemic, long term</td>
<td>1.645 mg/kg bw/day (TRA Workers)</td>
<td>RCR = 0.411</td>
</tr>
<tr>
<td>Dermal, local, acute</td>
<td>0.12 mg/cm² (TRA Workers)</td>
<td>RCR = 0.435</td>
</tr>
<tr>
<td>Combined routes, systemic, long-term</td>
<td></td>
<td>RCR = 0.435</td>
</tr>
<tr>
<td>Combined routes, systemic, acute</td>
<td></td>
<td>RCR = 0.111</td>
</tr>
</tbody>
</table>

The vapour pressure at operating temperature used for the calculation has been set by the assessor to 499 Pa.  
The inhalation exposure is limited to the saturated vapour concentration (if relevant).

Risk characterisation
If conditions detailed in Section 13.2.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.

13.3. Worker contributing scenario 3: Diluting the product before application (PROC 5)

13.3.1. Conditions of use

Product (Article) characteristics
• Percentage (w/w) of substance in mixture/article: <= 5.0 %
• Physical form of the used product: Liquid

Amount used (or contained in articles), frequency and duration of use/exposure
• Duration of activity: <= 0.25 hours/day

Technical and organisational conditions and measures
• Occupational Health and Safety Management System: Basic
• General ventilation: Enhanced general ventilation (5-10 air changes per hour) [Effectiveness Inhalation: 70%]
• Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]

Conditions and measures related to personal protection, hygiene and health evaluation
• Respiratory Protection: No [Effectiveness Inhalation: 0%]
• Dermal protection: No [Effectiveness Dermal: 0%]

Other conditions affecting workers exposure
• Place of use: Indoor
• Operating temperature: <= 33.0 °C
• Skin surface potentially exposed: Two hands face (480 cm²)

13.3.2. Exposure and risks for workers
The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Exposure concentrations and risks for workers

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>0.24 mg/m³ (TRA Workers)</td>
<td>RCR = 0.013</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>9.608 mg/m³ (TRA Workers)</td>
<td>RCR = 0.063</td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>0.24 mg/m³ (TRA Workers)</td>
<td>RCR = 0.03</td>
</tr>
<tr>
<td>Inhalation, local, acute</td>
<td>9.608 mg/m³ (TRA Workers)</td>
<td>RCR = 0.48</td>
</tr>
<tr>
<td>Dermal, systemic, long term</td>
<td>2.742 mg/kg bw/day (TRA Workers)</td>
<td>RCR = 0.685</td>
</tr>
<tr>
<td>Dermal, local, acute</td>
<td>0.4 mg/cm² (TRA Workers)</td>
<td>RCR = 0.699</td>
</tr>
<tr>
<td>Combined routes, systemic, long-term</td>
<td></td>
<td>RCR = 0.699</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combined routes, systemic, acute</td>
<td></td>
<td>RCR = 0.063</td>
</tr>
</tbody>
</table>

The vapour pressure at operating temperature used for the calculation has been set by the assessor to 499 Pa. The inhalation exposure is limited to the saturated vapour concentration (if relevant).

Risk characterisation

If conditions detailed in Section 13.3.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.

13.4. Worker contributing scenario 4: Application of the product via dripper system (PROC 2)

13.4.1. Conditions of use

Product (Article) characteristics

- Percentage (w/w) of substance in mixture/article: <= 1.0 %
- Physical form of the used product: Liquid

Amount used (or contained in articles), frequency and duration of use/exposure

- Duration of activity: <= 1.0 hours/day

Technical and organisational conditions and measures

- Closed continuous process with occasional controlled exposure
- Occupational Health and Safety Management System: Basic
- General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]
- Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]

Conditions and measures related to personal protection, hygiene and health evaluation

- Respiratory Protection: No [Effectiveness Inhalation: 0%]
- Dermal protection: No [Effectiveness Dermal: 0%]

Other conditions affecting workers exposure

- Place of use: Indoor
- Operating temperature: <= 33.0 °C
- Skin surface potentially exposed: Two hands face (480 cm²)

13.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Exposure concentrations and risks for workers

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>0.28 mg/m³ (TRA Workers)</td>
<td>RCR = 0.016</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>5.605 mg/m³ (TRA Workers)</td>
<td>RCR = 0.037</td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>0.28 mg/m³ (TRA Workers)</td>
<td>RCR = 0.035</td>
</tr>
<tr>
<td>Inhalation, local, acute</td>
<td>5.605 mg/m³ (TRA Workers)</td>
<td>RCR = 0.28</td>
</tr>
<tr>
<td>Dermal, systemic, long term</td>
<td>0.137 mg/kg bw/day (TRA Workers)</td>
<td>RCR = 0.034</td>
</tr>
<tr>
<td>Dermal, local, acute</td>
<td>0.02 mg/cm² (TRA Workers)</td>
<td>RCR = 0.05</td>
</tr>
<tr>
<td>Combined routes, systemic, long-term</td>
<td></td>
<td>RCR = 0.037</td>
</tr>
<tr>
<td>Combined routes, systemic, acute</td>
<td></td>
<td>RCR = 0.05</td>
</tr>
</tbody>
</table>

The vapour pressure at operating temperature used for the calculation has been set by the assessor to 499 Pa. The inhalation exposure is limited to the saturated vapour concentration (if relevant).
Risk characterisation
If conditions detailed in Section 13.4.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.

13.5. Local exposure due to widespread use
The predicted local environmental concentration (PEC local) based on the release from the widespread use is reported together with the risk characterisation ratio when a PNEC is available. The exposure estimates have been obtained with EUSES 2.1.2.
14. Exposure scenario 14: Widespread use by professional workers - Dripper Outdoor Uses

Title section
Market sector: Nutrient Source for Specialty Crops
Product category used: PC 12: Fertilizers
Sector of use: SU 1: Agriculture, forestry, fishery

<table>
<thead>
<tr>
<th>Environment contributing scenario(s):</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 1 Dripper Outdoor Uses</td>
<td>ERC 8e</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Worker contributing scenario(s):</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 2 Transfer of product to the irrigation premix tank</td>
<td>PROC 8a</td>
</tr>
<tr>
<td>CS 3 Diluting the product before application</td>
<td>PROC 5</td>
</tr>
<tr>
<td>CS 4 Application of the product via dripper system</td>
<td>PROC 2</td>
</tr>
</tbody>
</table>

Explanation on the approach taken for the ES
14.1. Environmental contributing scenario 1: Dripper Outdoor Uses (ERC 8e)

14.1.1. Conditions of use

<table>
<thead>
<tr>
<th>Amount used, frequency and duration of use (or from service life)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Daily local widespread use amount: &lt;= 0.0000097 tonnes/day</td>
</tr>
<tr>
<td>• Percentage of EU tonnage used at regional scale: = 10.0 %</td>
</tr>
</tbody>
</table>

Conditions and measures related to biological sewage treatment plant

<table>
<thead>
<tr>
<th>Biological STP: Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conditions and measures related to external treatment of waste (including article waste)</td>
</tr>
<tr>
<td>• Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)</td>
</tr>
</tbody>
</table>

14.1.2. Releases

The local releases to the environment are reported in the following table. Note that the releases reported do not account for the removal in the modelled biological STP.

<table>
<thead>
<tr>
<th>Release</th>
<th>Release estimation method</th>
<th>Explanations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>ERC based</td>
<td>Release factor before on site RMM: 2% Release factor after on site RMM: 2% Local release rate: 1.94E-4 kg/day</td>
</tr>
<tr>
<td>Air</td>
<td>ERC based</td>
<td>Release factor before on site RMM: 0.1% Release factor after on site RMM: 0.1%</td>
</tr>
<tr>
<td>Non-agricultural soil</td>
<td>ERC based</td>
<td>Release factor after on site RMM: 1%</td>
</tr>
</tbody>
</table>

14.1.3. Exposure and risks for the environment and man via the environment

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table. The exposure estimates have been obtained with EUSES 2.1.2 unless stated otherwise.
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**Exposure concentrations and risks for the environment and man via the environment**

<table>
<thead>
<tr>
<th>Protection target</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fresh water</td>
<td>Local PEC: 6.9E-4 mg/L</td>
<td>RCR = 0.021</td>
</tr>
<tr>
<td>Sediment (freshwater)</td>
<td>Local PEC: 3.66E-3 mg/kg dw</td>
<td>RCR = 0.031</td>
</tr>
<tr>
<td>Marine water</td>
<td>Local PEC: 6.23E-5 mg/L</td>
<td>RCR = 0.019</td>
</tr>
<tr>
<td>Sediment (marine water)</td>
<td>Local PEC: 3.31E-4 mg/kg dw</td>
<td>RCR = 0.028</td>
</tr>
<tr>
<td>Sewage Treatment Plant</td>
<td>Local PEC: 1.22E-5 mg/L</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Agricultural soil</td>
<td>Local PEC: 1.96E-5 mg/kg dw</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Predator’s prey (freshwater)</td>
<td>Local PEC: 9.74E-4 mg/kg ww</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Predator’s prey (marine water)</td>
<td>Local PEC: 8.79E-5 mg/kg ww</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Top predator’s prey (marine water)</td>
<td>Local PEC: 8.78E-5 mg/kg ww</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Predator’s prey (terrestrial)</td>
<td>Local PEC: 2.51E-5 mg/kg ww</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Man via environment - Inhalation</td>
<td>Concentration in air: 2.78E-6 mg/m³</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Man via environment - Oral</td>
<td>Exposure via food consumption: 2.24E-5 mg/kg bw/day</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Man via environment - combined routes</td>
<td></td>
<td>RCR &lt; 0.01</td>
</tr>
</tbody>
</table>

**14.2. Worker contributing scenario 2: Transfer of product to the irrigation premix tank (PROC 8a)**

**14.2.1. Conditions of use**

**Product (Article) characteristics**

- Percentage (w/w) of substance in mixture/article: <= 25.0 %
- Physical form of the used product: Liquid

**Amount used (or contained in articles), frequency and duration of use/exposure**

- Duration of activity: <= 0.25 hours/day

**Technical and organisational conditions and measures**

- **Occupational Health and Safety Management System:** Basic
- **Conditions and measures related to personal protection, hygiene and health evaluation**
  - Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhalation: 90%]
  - Dermal protection: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]
  - Wear chemical goggles: Wear chemical goggles (Qualitative protection for eye irritants)

**Other conditions affecting workers exposure**

- Place of use: Outdoor
- Operating temperature: <= 33.0 °C
- Skin surface potentially exposed: Two hands (960 cm²)

**14.2.2. Exposure and risks for workers**

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

**Exposure concentrations and risks for workers**

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>0.42 mg/m³ (TRA Workers)</td>
<td>RCR = 0.024</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>16.81 mg/m³ (TRA Workers)</td>
<td>RCR = 0.111</td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>0.42 mg/m³ (TRA Workers)</td>
<td>RCR = 0.053</td>
</tr>
<tr>
<td>Inhalation, local, acute</td>
<td>16.81 mg/m³ (TRA Workers)</td>
<td>RCR = 0.841</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dermal, systemic, long term</td>
<td>1.645 mg/kg bw/day (TRA Workers)</td>
<td>RCR = 0.411</td>
</tr>
<tr>
<td>Dermal, local, acute</td>
<td>0.12 mg/cm² (TRA Workers)</td>
<td>RCR = 0.435</td>
</tr>
<tr>
<td>Combined routes, systemic, long-term</td>
<td></td>
<td>RCR = 0.435</td>
</tr>
<tr>
<td>Combined routes, systemic, acute</td>
<td></td>
<td>RCR = 0.111</td>
</tr>
</tbody>
</table>

The vapour pressure at operating temperature used for the calculation has been set by the assessor to 499 Pa. The inhalation exposure is limited to the saturated vapour concentration (if relevant).

**Risk characterisation**

If conditions detailed in Section 14.2.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.

**14.3. Worker contributing scenario 3: Diluting the product before application (PROC 5)**

**14.3.1. Conditions of use**

**Product (Article) characteristics**

- Percentage (w/w) of substance in mixture/article: <= 5.0 %
- Physical form of the used product: Liquid

**Amount used (or contained in articles), frequency and duration of use/exposure**

- Duration of activity: <= 0.25 hours/day

**Technical and organisational conditions and measures**

- Occupational Health and Safety Management System: Basic
- Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhalation: 90%]
- Dermal protection: No [Effectiveness Dermal: 0%]

**Conditions and measures related to personal protection, hygiene and health evaluation**

- Place of use: Outdoor
- Operating temperature: <= 33.0 °C
- Skin surface potentially exposed: Two hands face (480 cm2)

**14.3.2. Exposure and risks for workers**

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

**Exposure concentrations and risks for workers**

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>0.056 mg/m³ (TRA Workers)</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>2.242 mg/m³ (TRA Workers)</td>
<td>RCR = 0.015</td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>0.056 mg/m³ (TRA Workers)</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Inhalation, local, acute</td>
<td>2.242 mg/m³ (TRA Workers)</td>
<td>RCR = 0.112</td>
</tr>
<tr>
<td>Dermal, systemic, long term</td>
<td>2.742 mg/kg bw/day (TRA Workers)</td>
<td>RCR = 0.685</td>
</tr>
<tr>
<td>Dermal, local, acute</td>
<td>0.4 mg/cm² (TRA Workers)</td>
<td>RCR = 0.689</td>
</tr>
<tr>
<td>Combined routes, systemic, long-term</td>
<td></td>
<td>RCR = 0.015</td>
</tr>
<tr>
<td>Combined routes, systemic, acute</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The vapour pressure at operating temperature used for the calculation has been set by the assessor to 499 Pa. The inhalation exposure is limited to the saturated vapour concentration (if relevant).
Risk characterisation

If conditions detailed in Section 14.3.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.

14.4. Worker contributing scenario 4: Application of the product via dripper system (PROC 2)

14.4.1. Conditions of use

<table>
<thead>
<tr>
<th>Product (Article) characteristics</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Percentage (w/w) of substance in mixture/article: &lt;= 1.0 %</td>
<td></td>
</tr>
<tr>
<td>• Physical form of the used product: Liquid</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Amount used (or contained in articles), frequency and duration of use/exposure</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Duration of activity: &lt;= 1.0 hours/day</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technical and organisational conditions and measures</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Closed continuous process with occasional controlled exposure</td>
<td></td>
</tr>
<tr>
<td>• Occupational Health and Safety Management System: Basic</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Conditions and measures related to personal protection, hygiene and health evaluation</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Respiratory Protection: No [Effectiveness Inhalation: 0%]</td>
<td></td>
</tr>
<tr>
<td>• Dermal protection: No [Effectiveness Dermal: 0%]</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other conditions affecting workers exposure</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Place of use: Outdoor</td>
<td></td>
</tr>
<tr>
<td>• Operating temperature: &lt;= 33.0 °C</td>
<td></td>
</tr>
<tr>
<td>• Skin surface potentially exposed: Two hands face (480 cm²)</td>
<td></td>
</tr>
</tbody>
</table>

14.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>0.28 mg/m³ (TRA Workers)</td>
<td>RCR = 0.016</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>5.605 mg/m³ (TRA Workers)</td>
<td>RCR = 0.037</td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>0.28 mg/m³ (TRA Workers)</td>
<td>RCR = 0.035</td>
</tr>
<tr>
<td>Inhalation, local, acute</td>
<td>5.605 mg/m³ (TRA Workers)</td>
<td>RCR = 0.28</td>
</tr>
<tr>
<td>Dermal, systemic, long term</td>
<td>0.137 mg/kg bw/day (TRA Workers)</td>
<td>RCR = 0.034</td>
</tr>
<tr>
<td>Dermal, local, acute</td>
<td>0.02 mg/cm² (TRA Workers)</td>
<td></td>
</tr>
<tr>
<td>Combined routes, systemic, long-term</td>
<td></td>
<td>RCR = 0.05</td>
</tr>
<tr>
<td>Combined routes, systemic, acute</td>
<td></td>
<td>RCR = 0.037</td>
</tr>
</tbody>
</table>

The vapour pressure at operating temperature used for the calculation has been set by the assessor to 499 Pa. The inhalation exposure is limited to the saturated vapour concentration (if relevant).

Risk characterisation

If conditions detailed in Section 14.4.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.

14.5 Local exposure due to widespread use

The predicted local environmental concentration (PEC local) based on the release from the widespread use is reported together with the risk characterisation ratio when a PNEC is available. The exposure estimates have been obtained with EUSES 2.1.2.
15. Exposure scenario 15: Widespread use by professional workers - Spray Indoor Uses

Title section

Market sector: Nutrient Source for Specialty Crops
Product category used: PC 12: Fertilizers
Sector of use: SU 1: Agriculture, forestry, fishery

<table>
<thead>
<tr>
<th>Environment contributing scenario(s):</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 1</td>
<td>Spray Indoor Uses</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Worker contributing scenario(s):</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 2</td>
<td>Transfer of product to the irrigation premix tank</td>
</tr>
<tr>
<td>CS 3</td>
<td>Diluting the product before application</td>
</tr>
<tr>
<td>CS 4</td>
<td>Spraying of the product</td>
</tr>
</tbody>
</table>

Explanation on the approach taken for the ES

15.1. Environmental contributing scenario 1: Spray Indoor Uses (ERC 8b)

15.1.1. Conditions of use

<table>
<thead>
<tr>
<th>Amount used, frequency and duration of use (or from service life)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Daily local widespread use amount: &lt;= 0.0000048 tonnes/day</td>
</tr>
<tr>
<td>• Percentage of EU tonnage used at regional scale: = 10.0 %</td>
</tr>
</tbody>
</table>

Conditions and measures related to biological sewage treatment plant

<table>
<thead>
<tr>
<th>Biological STP: Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conditions and measures related to external treatment of waste (including article waste)</td>
</tr>
<tr>
<td>• Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)</td>
</tr>
</tbody>
</table>

15.1.2. Releases

The local releases to the environment are reported in the following table. Note that the releases reported do not account for the removal in the modelled biological STP.

<table>
<thead>
<tr>
<th>Release</th>
<th>Release estimation method</th>
<th>Explanations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>ERC based</td>
<td>Release factor before on site RMM: 2% Release factor after on site RMM: 2% Local rate: 9.68E-5 kg/day</td>
</tr>
<tr>
<td>Air</td>
<td>ERC based</td>
<td>Release factor before on site RMM: 0.1% Release factor after on site RMM: 0.1%</td>
</tr>
<tr>
<td>Non-agricultural soil</td>
<td>ERC based</td>
<td>Release factor after on site RMM: 0%</td>
</tr>
</tbody>
</table>

15.1.3. Exposure and risks for the environment and man via the environment

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table. The exposure estimates have been obtained with EUSES 2.1.2 unless stated otherwise.
Exposure concentrations and risks for the environment and man via the environment

<table>
<thead>
<tr>
<th>Protection target</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fresh water</td>
<td>Local PEC: 6.89E-4 mg/L</td>
<td>RCR = 0.021</td>
</tr>
<tr>
<td>Sediment (freshwater)</td>
<td>Local PEC: 3.66E-3 mg/kg dw</td>
<td>RCR = 0.031</td>
</tr>
<tr>
<td>Marine water</td>
<td>Local PEC: 6.22E-5 mg/L</td>
<td>RCR = 0.019</td>
</tr>
<tr>
<td>Sediment (marine water)</td>
<td>Local PEC: 3.3E-4 mg/kg dw</td>
<td>RCR = 0.028</td>
</tr>
<tr>
<td>Sewage Treatment Plant</td>
<td>Local PEC: 6.11E-6 mg/L</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Agricultural soil</td>
<td>Local PEC: 1.94E-5 mg/kg dw</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Predator’s prey (freshwater)</td>
<td>Local PEC: 9.73E-4 mg/kg ww</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Predator’s prey (marine water)</td>
<td>Local PEC: 8.78E-5 mg/kg ww</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Top predator’s prey (marine water)</td>
<td>Local PEC: 8.78E-5 mg/kg ww</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Predator’s prey (terrestrial)</td>
<td>Local PEC: 2.51E-5 mg/kg ww</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Man via environment - Inhalation</td>
<td>Concentration in air: 2.78E-6 mg/m³</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Man via environment - Oral</td>
<td>Exposure via food consumption: 2.24E-5 mg/kg bw/day</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Man via environment - combined routes</td>
<td></td>
<td>RCR &lt; 0.01</td>
</tr>
</tbody>
</table>

15.2. Worker contributing scenario 2: Transfer of product to the irrigation premix tank (PROC 8a)

15.2.1. Conditions of use

Product (Article) characteristics
- Percentage (w/w) of substance in mixture/article: <= 25.0 %
- Physical form of the used product: Liquid

Amount used (or contained in articles), frequency and duration of use/exposure
- Duration of activity: <= 0.25 hours/day

Technical and organisational conditions and measures
- Occupational Health and Safety Management System: Basic
- General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]
- Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]

Conditions and measures related to personal protection, hygiene and health evaluation
- Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhalation: 90%]
- Dermal protection: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]
- Wear chemical goggles: Wear chemical goggles (Qualitative protection for eye irritants)

Other conditions affecting workers exposure
- Place of use: Indoor
- Operating temperature: <= 33.0 °C
- Skin surface potentially exposed: Two hands (960 cm²)

15.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Exposure concentrations and risks for workers

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>0.42 mg/m³ (TRA Workers)</td>
<td>RCR = 0.024</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>16.81 mg/m³ (TRA Workers)</td>
<td>RCR = 0.111</td>
</tr>
</tbody>
</table>
Safety Data Sheet
according to Regulation (EC) No 1907/2006

Furfural

The vapour pressure at operating temperature used for the calculation has been set by the assessor to 499 Pa. The inhalation exposure is limited to the saturated vapour concentration (if relevant).

Risk characterisation

If conditions detailed in Section 15.2.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.

15.3. Worker contributing scenario 3: Diluting the product before application (PROC 5)

15.3.1. Conditions of use

Product (Article) characteristics

• Percentage (w/w) of substance in mixture/article: <= 5.0 %
• Physical form of the used product: Liquid

Amount used (or contained in articles), frequency and duration of use/exposure

• Duration of activity: <= 0.25 hours/day

Technical and organisational conditions and measures

• Occupational Health and Safety Management System: Basic
• General ventilation: Enhanced general ventilation (5-10 air changes per hour) [Effectiveness Inhalation: 70%]
• Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]

Conditions and measures related to personal protection, hygiene and health evaluation

• Respiratory Protection: No [Effectiveness Inhalation: 0%]
• Dermal protection: No [Effectiveness Dermal: 0%]

Other conditions affecting workers exposure

• Place of use: Indoor
• Operating temperature: <= 33.0 °C
• Skin surface potentially exposed: Two hands face (480 cm2)

15.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>0.24 mg/m³ (TRA Workers)</td>
<td>RCR = 0.013</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>9.608 mg/m³ (TRA Workers)</td>
<td>RCR = 0.063</td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>0.24 mg/m³ (TRA Workers)</td>
<td>RCR = 0.03</td>
</tr>
<tr>
<td>Inhalation, local, acute</td>
<td>9.608 mg/m³ (TRA Workers)</td>
<td>RCR = 0.48</td>
</tr>
<tr>
<td>Dermal, systemic, long term</td>
<td>2.742 mg/kg bw/day (TRA Workers)</td>
<td>RCR = 0.685</td>
</tr>
</tbody>
</table>
Route of exposure and type of effects | Exposure concentration | Risk quantification |
--- | --- | ---
Dermal, local, acute | 0.4 mg/cm² (TRA Workers) | |
Combined routes, systemic, long-term | | RCR = 0.699 |
Combined routes, systemic, acute | | RCR = 0.063 |

The vapour pressure at operating temperature used for the calculation has been set by the assessor to 499 Pa. The inhalation exposure is limited to the saturated vapour concentration (if relevant).

Risk characterisation
If conditions detailed in Section 15.3.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.

15.4. Worker contributing scenario 4: Spraying of the product (PROC 11)

15.4.1. Conditions of use

Product (Article) characteristics
- Percentage (w/w) of substance in mixture/article: <= 1.0 %
- Physical form of the used product: Liquid

Amount used (or contained in articles), frequency and duration of use/exposure
- Duration of activity: <= 1.0 hours/day

Technical and organisational conditions and measures
- Occupational Health and Safety Management System: Basic
- General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]
- Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]

Conditions and measures related to personal protection, hygiene and health evaluation
- Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhalation: 90%]
- Dermal protection: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]

Other conditions affecting workers exposure
- Place of use: Indoor
- Operating temperature: <= 33.0 °C
- Skin surface potentially exposed: Two hands and upper wrists (1500 cm²)

15.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Exposure concentrations and risks for workers

| Route of exposure and type of effects | Exposure concentration | Risk quantification |
--- | --- | ---
Inhalation, systemic, long term | 0.56 mg/m³ (TRA Workers) | RCR = 0.031 |
Inhalation, systemic, acute | 11.21 mg/m³ (TRA Workers) | RCR = 0.074 |
Inhalation, local, long term | 0.56 mg/m³ (TRA Workers) | RCR = 0.07 |
Inhalation, local, acute | 11.21 mg/m³ (TRA Workers) | RCR = 0.56 |
Dermal, systemic, long term | 2.143 mg/kg bw/day (TRA Workers) | RCR = 0.536 |
Dermal, local, acute | 0.1 mg/cm² (TRA Workers) | RCR = 0.567 |
Combined routes, systemic, long-term | | RCR = 0.074 |
Combined routes, systemic, acute | | |

The vapour pressure at operating temperature used for the calculation has been set by the assessor to 499 Pa. The inhalation exposure is limited to the saturated vapour concentration (if relevant).
Risk characterisation
If conditions detailed in Section 15.4.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.

15.5 Local exposure due to widespread use
The predicted local environmental concentration (PEC local) based on the release from the widespread use is reported together with the risk characterisation ratio when a PNEC is available. The exposure estimates have been obtained with EUSES 2.1.2.
16. Exposure scenario 16: Widespread use by professional workers - Spray Outdoor Uses

Title section
Market sector: Nutrient Source for Specialty Crops
Product category used: PC 12: Fertilizers
Sector of use: SU 1: Agriculture, forestry, fishery

<table>
<thead>
<tr>
<th>Environment contributing scenario(s):</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 1 Spray Outdoor Uses</td>
<td>ERC 8e</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Worker contributing scenario(s):</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 2 Transfer of product to the irrigation premix tank</td>
<td>PROC 8a</td>
</tr>
<tr>
<td>CS 3 Diluting the product before application</td>
<td>PROC 5</td>
</tr>
<tr>
<td>CS 4 Spraying of the product</td>
<td>PROC 11</td>
</tr>
</tbody>
</table>

Explanation on the approach taken for the ES
16.1. Environmental contributing scenario 1: Spray Outdoor Uses (ERC 8e)

16.1.1. Conditions of use

<table>
<thead>
<tr>
<th>Amount used, frequency and duration of use (or from service life)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Daily local widespread use amount: ( \leq 0.0000073 ) tonnes/day</td>
</tr>
<tr>
<td>• Percentage of EU tonnage used at regional scale: = 10.0 %</td>
</tr>
</tbody>
</table>

Conditions and measures related to biological sewage treatment plant
• Biological STP: Standard

Conditions and measures related to external treatment of waste (including article waste)
• Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)

16.1.2. Releases

The local releases to the environment are reported in the following table. Note that the releases reported do not account for the removal in the modelled biological STP.

Local releases to the environment

<table>
<thead>
<tr>
<th>Release</th>
<th>Release estimation method</th>
<th>Explanations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>ERC based</td>
<td>Release factor before on site RMM: 2% Release factor after on site RMM: 2% Local release rate: 1.45E-4 kg/day</td>
</tr>
<tr>
<td>Air</td>
<td>ERC based</td>
<td>Release factor before on site RMM: 0.1% Release factor after on site RMM: 0.1%</td>
</tr>
<tr>
<td>Non-agricultural soil</td>
<td>ERC based</td>
<td>Release factor after on site RMM: 1%</td>
</tr>
</tbody>
</table>

16.1.3. Exposure and risks for the environment and man via the environment

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table. The exposure estimates have been obtained with EUSES 2.1.2 unless stated otherwise.
## Exposure concentrations and risks for the environment and man via the environment

<table>
<thead>
<tr>
<th>Protection target</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fresh water</td>
<td>Local PEC: 6.9E-4 mg/L</td>
<td>RCR = 0.021</td>
</tr>
<tr>
<td>Sediment (freshwater)</td>
<td>Local PEC: 3.66E-3 mg/kg dw</td>
<td>RCR = 0.031</td>
</tr>
<tr>
<td>Marine water</td>
<td>Local PEC: 6.22E-5 mg/L</td>
<td>RCR = 0.019</td>
</tr>
<tr>
<td>Sediment (marine water)</td>
<td>Local PEC: 3.3E-4 mg/kg dw</td>
<td>RCR = 0.028</td>
</tr>
<tr>
<td>Sewage Treatment Plant</td>
<td>Local PEC: 9.16E-6 mg/L</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Agricultural soil</td>
<td>Local PEC: 1.95E-5 mg/kg dw</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Predator’s prey (freshwater)</td>
<td>Local PEC: 9.73E-4 mg/kg ww</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Predator’s prey (marine water)</td>
<td>Local PEC: 8.78E-5 mg/kg ww</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Top predator’s prey (marine water)</td>
<td>Local PEC: 8.78E-5 mg/kg ww</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Predator’s prey (terrestrial)</td>
<td>Local PEC: 2.51E-5 mg/kg ww</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Man via environment - Inhalation</td>
<td>Concentration in air: 2.78E-6 mg/m³</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Man via environment - Oral</td>
<td>Exposure via food consumption: 2.24E-5 mg/kg bw/day</td>
<td>RCR &lt; 0.01</td>
</tr>
<tr>
<td>Man via environment - combined routes</td>
<td></td>
<td>RCR &lt; 0.01</td>
</tr>
</tbody>
</table>

## 16.2. Worker contributing scenario 2: Transfer of product to the irrigation premix tank (PROC 8a)

### 16.2.1. Conditions of use

**Product (Article) characteristics**
- Percentage (w/w) of substance in mixture/article: <= 25.0%
- Physical form of the used product: Liquid

**Amount used (or contained in articles), frequency and duration of use/exposure**
- Duration of activity: <= 0.25 hours/day

**Technical and organisational conditions and measures**
- Occupational Health and Safety Management System: Basic
- Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhalation: 90%]
- Dermal protection: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]
- Wear chemical goggles: Wear chemical goggles (Qualitative protection for eye irritants)

**Other conditions affecting workers exposure**
- Place of use: Outdoor
- Operating temperature: <= 33.0 °C
- Skin surface potentially exposed: Two hands (960 cm²)

### 16.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>0.42 mg/m³ (TRA Workers)</td>
<td>RCR = 0.024</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>16.81 mg/m³ (TRA Workers)</td>
<td>RCR = 0.111</td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>0.42 mg/m³ (TRA Workers)</td>
<td>RCR = 0.053</td>
</tr>
<tr>
<td>Inhalation, local, acute</td>
<td>16.81 mg/m³ (TRA Workers)</td>
<td>RCR = 0.841</td>
</tr>
</tbody>
</table>
Route of exposure and type of effects | Exposure concentration  | Risk quantification |
--- | --- | ---
Dermal, systemic, long term | 1.645 mg/kg bw/day (TRA Workers) | RCR = 0.411 |
Dermal, local, acute | 0.12 mg/cm² (TRA Workers) | RCR = 0.435 |
Combined routes, systemic, long-term | 2.742 mg/kg bw/day (TRA Workers) | RCR = 0.685 |
Combined routes, systemic, acute | 0.4 mg/cm² (TRA Workers) | RCR = 0.689 |

The vapour pressure at operating temperature used for the calculation has been set by the assessor to 499 Pa. The inhalation exposure is limited to the saturated vapour concentration (if relevant).

### Risk characterisation

If conditions detailed in Section 16.2.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.

#### 16.3. Worker contributing scenario 3: Diluting the product before application (PROC 5)

**16.3.1. Conditions of use**

**Product (Article) characteristics**

- Percentage (w/w) of substance in mixture/article: <= 5.0%
- Physical form of the used product: Liquid

**Amount used (or contained in articles), frequency and duration of use/exposure**

- Duration of activity: <= 0.25 hours/day

**Technical and organisational conditions and measures**

- Occupational Health and Safety Management System: Basic

**Conditions and measures related to personal protection, hygiene and health evaluation**

- Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhalation: 90%]
- Dermal protection: No [Effectiveness Dermal: 0%]

**Other conditions affecting workers exposure**

- Place of use: Outdoor
- Operating temperature: <= 33.0 °C
- Skin surface potentially exposed: Two hands face (480 cm²)

#### 16.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

### Exposure concentrations and risks for workers

**Route of exposure and type of effects** | **Exposure concentration**  | **Risk quantification** |
--- | --- | ---
Inhalation, systemic, long term | 0.056 mg/m³ (TRA Workers) | RCR < 0.01 |
Inhalation, systemic, acute | 2.242 mg/m³ (TRA Workers) | RCR = 0.015 |
Inhalation, local, long term | 0.056 mg/m³ (TRA Workers) | RCR < 0.01 |
Inhalation, local, acute | 2.242 mg/m³ (TRA Workers) | RCR = 0.112 |
Dermal, systemic, long term | 2.742 mg/kg bw/day (TRA Workers) | RCR = 0.685 |
Dermal, local, acute | 0.4 mg/cm² (TRA Workers) | RCR = 0.689 |
Combined routes, systemic, long-term |  | RCR = 0.015 |
Combined routes, systemic, acute |  | |

The vapour pressure at operating temperature used for the calculation has been set by the assessor to 499 Pa. The inhalation exposure is limited to the saturated vapour concentration (if relevant).
Risk characterisation

If conditions detailed in Section 16.3.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.

16.4. Worker contributing scenario 4: Spraying of the product (PROC 11)

16.4.1. Conditions of use

Product (Article) characteristics
- Percentage (w/w) of substance in mixture/article: <= 1.0 %
- Physical form of the used product: Liquid

Amount used (or contained in articles), frequency and duration of use/exposure
- Duration of activity: <= 1.0 hours/day

Technical and organisational conditions and measures
- Occupational Health and Safety Management System: Basic
- Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhalation: 90%]
- Dermal protection: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]

Other conditions affecting workers exposure
- Place of use: Outdoor
- Operating temperature: <= 33.0 °C
- Skin surface potentially exposed: Two hands and upper wrists (1500 cm²)

16.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

<table>
<thead>
<tr>
<th>Route of exposure and type of effects</th>
<th>Exposure concentration</th>
<th>Risk quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation, systemic, long term</td>
<td>0.56 mg/m³ (TRA Workers)</td>
<td>RCR = 0.031</td>
</tr>
<tr>
<td>Inhalation, systemic, acute</td>
<td>11.21 mg/m³ (TRA Workers)</td>
<td>RCR = 0.074</td>
</tr>
<tr>
<td>Inhalation, local, long term</td>
<td>0.56 mg/m³ (TRA Workers)</td>
<td>RCR = 0.07</td>
</tr>
<tr>
<td>Inhalation, local, acute</td>
<td>11.21 mg/m³ (TRA Workers)</td>
<td>RCR = 0.56</td>
</tr>
<tr>
<td>Dermal, systemic, long term</td>
<td>2.143 mg/kg bw/day (TRA Workers)</td>
<td>RCR = 0.536</td>
</tr>
<tr>
<td>Dermal, local, acute</td>
<td>0.1 mg/cm² (TRA Workers)</td>
<td>RCR = 0.567</td>
</tr>
<tr>
<td>Combined routes, systemic, long-term</td>
<td></td>
<td>RCR = 0.074</td>
</tr>
<tr>
<td>Combined routes, systemic, acute</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The vapour pressure at operating temperature used for the calculation has been set by the assessor to 499 Pa . The inhalation exposure is limited to the saturated vapour concentration (if relevant) .

Risk characterisation

If conditions detailed in Section 16.4.1 are implemented then risks associated with dermal and eye hazards are considered to be controlled and safe use achieved.

16.5 Local exposure due to widespread use

The predicted local environmental concentration (PEC local) based on the release from the widespread use is reported together with the risk characterisation ratio when a PNEC is available. The exposure estimates have been obtained with EUSES 2.1.2.