

# FICHE DE DONNÉES DE SÉCURITÉ

conformément au Règlement (CE) No. 1907/2006

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## LUNA PTSI-P

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### ***RUBRIQUE 1: Identification de la substance/du mélange et de la société/l'entreprise***

#### **1.1. Identificateur de produit**

**No.-Index** 615-012-00-7  
**No.-CAS** 4083-64-1  
**No.-CE** 223-810-8  
**No REACH** 01-2119980050-47-0002  
**Synonymes** p-Toluenesulfonyl isocyanate

**Code du produit** 110506181, 110152365, 110160438, 110262540, 110419102, 110430260, 110430262, 110509804, 110496377, 110515512, 110527935, 110527934, 110545997, 110578283, 110594436, 110594437, 110601049, 110612828, 110613557, 110633120, 110665534

#### **1.2. Utilisations identifiées pertinentes de la substance ou du mélange et utilisations déconseillées**

**Utilisation du produit** Additif pour polymères  
Industrie des polymères.  
Colles et/ou adhésifs.

#### **1.3. Renseignements concernant le fournisseur de la fiche de données de sécurité**

**Identification de la société/entreprise** DKSH France SA  
1475 quai du Rhone BP 266  
01702 Miribel Cedex  
FRANCE  
Phone +33 4 7855 7855  
safety@dksh.com

**1.4. Numéro d'appel d'urgence** +44(0) 1235 239670 (24/24 - 7/7)  
ORFILA (INRS) = + 33 (0)1 45 42 59 59 (24h/24 et 7j/7)

**Date de révision** 21.11.2017

**Version** eCLP4.4 (Version précédente: CLP4.4(27/06/2017))

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## **RUBRIQUE 2: Identification des dangers**

### **2.1. Classification de la substance ou du mélange**

**Classification conformément au Règlement (CE) No. 1272/2008** Corrosion/irritation cutanée, Catégorie 2, H315  
Lésions oculaires graves/irritation oculaire, Catégorie 2, H319  
Toxicité spécifique pour certains organes cibles - exposition unique, Inhalation, Catégorie 3, H335  
Sensibilisants respiratoires, Catégorie 1, H334  
Réagit violemment au contact de l'eau.

**Information complémentaire** Pour le texte complet des phrases mentionnées dans ce chapitre, voir section 16.

### **2.2. Éléments d'étiquetage**



**Mention d'avertissement** Danger

**Mentions de danger** H315: Provoque une irritation cutanée.  
H319: Provoque une sévère irritation des yeux.  
H334: Peut provoquer des symptômes allergiques ou d'asthme ou des difficultés respiratoires par inhalation.  
H335: Peut irriter les voies respiratoires.

**Conseils de prudence** P261: Éviter de respirer les poussières/ fumées/ gaz/ brouillards/ vapeurs/ aérosols.  
P264: Se laver la peau soigneusement après manipulation.  
P271: Utiliser seulement en plein air ou dans un endroit bien ventilé.  
P280: Porter des gants de protection/ un équipement de protection des yeux/ un équipement de protection du visage.  
P284: Porter un équipement de protection respiratoire.  
P501: Éliminer le contenu/ le conteneur dans une installation d'élimination des déchets agréée.

**Informations supplémentaires** Réagit violemment au contact de l'eau.

**Identificateur de produit** 4-Isocyanatosulphonyltoluene; Tosyl isocyanate, No.-CAS 4083-64-1, No.-CE 223-810-8

**2.3. Autres dangers** Toux. respiration sifflante Insuffisance respiratoire. Mal de tête. Nausée. Vomissements. Lachrymation.

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## **RUBRIQUE 3: Composition/informations sur les composants**

**Caractérisation chimique** Isocyanates.

### **3.1. Substances**

<b>Composants</b>	<b>%</b>	<b>Classification CLP</b>	<b>CAS</b>	<b>No.-CE</b>	<b>No REACH</b>
4-Isocyanatosulphonyltoluene; Tosyl isocyanate	>=99%	Eye Irrit. 2 H319, STOT SE 3 H335, Skin Irrit. 2 H315, Resp. Sens. 1 H334, EUH014 [CEy2: C ≥ 5 %   SSEIn3: C ≥ 5 %   CSk2: C ≥ 5 %]	4083-64-1	223-810-8	01- 2119980050 -47-0002
Tosyl chloride	<1%	Skin Irrit. 2 H315, Skin Sens. 1A H317, Eye Dam. 1 H318, Ox. Sol. 3 H272, Met. Corr. 1 H290	98-59-9	202-684-8	

Pour le texte complet des phrases mentionnées dans ce chapitre, voir section 16.

**Impuretés dangereuses** Tosyl chloride - CAS: 98-59-9

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## **RUBRIQUE 4: Premiers secours**

### **4.1. Description des premiers secours**

**Inhalation**

En cas d'inhalation, transporter la victime à l'air frais et la maintenir au repos dans une position confortable pour respirer.  
Appeler un médecin dans les cas graves.

**Contact avec la peau**

Laver immédiatement au savon et abondamment à l'eau en enlevant les vêtements contaminés et les chaussures.  
Appeler immédiatement un médecin.

**Contact avec les yeux**

Rincer immédiatement et abondamment à l'eau, y compris sous les paupières, pendant au moins 15 minutes.  
Appeler immédiatement un médecin.

**Ingestion**

Après ingestion : uniquement si le patient est pleinement conscient : rincer la bouche avec de l'eau.  
Ne pas faire vomir sans l'avis d'un médecin.  
Consulter un médecin si nécessaire.

### **4.2. Principaux symptômes et effets, aigus et différés**

Provoque une irritation cutanée.  
Provoque une sévère irritation des yeux.  
Peut irriter les voies respiratoires.  
Peut provoquer des symptômes allergiques ou d'asthme ou des difficultés respiratoires par inhalation.  
Toux  
respiration sifflante  
Insuffisance respiratoire.  
Mal de tête.

Vertiges.  
Vomissements.  
Lachrymation.

**4.3. Indication des éventuels soins médicaux immédiats et traitements particuliers nécessaires**

Traiter en fonction des symptômes.

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## ***RUBRIQUE 5: Mesures de lutte contre l'incendie***

### **5.1. Moyens d'extinction**

**Moyens d'extinction appropriés**      Dioxyde de carbone (CO<sub>2</sub>).  
Mousse.  
Poudre sèche.

**Moyen d'extinction à ne pas utiliser pour des raisons de sécurité**      Eau.

### **5.2. Dangers particuliers résultant de la substance ou du mélange**

Réagit violemment au contact de l'eau.  
En cas d'incendie, il peut se former NO<sub>x</sub>, HCN, SO<sub>x</sub>.  
En cas d'incendie, la fumée peut contenir le produit original en plus de composés non identifiés, toxiques et/ou irritants.

### **5.3. Conseils aux pompiers**

**Équipement spéciaux pour la protection des intervenants**      Porter un appareil de protection respiratoire autonome et des vêtements de protection.

**Méthodes particulières d'intervention**      Éviter la pénétration de l'eau d'extinction dans les eaux de surface ou les eaux souterraines.  
Réagit violemment au contact de l'eau.

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## ***RUBRIQUE 6: Mesures à prendre en cas de dispersion accidentelle***

### **6.1. Précautions individuelles, équipement de protection et procédures d'urgence**

**Conseils pour les non-secouristes**      Assurer une ventilation adéquate.  
Utiliser un équipement de protection individuelle.  
Éviter le contact avec la peau et les yeux.  
Ne pas inhaler les vapeurs/poussières.

**Conseils pour les secouristes**      Assurer une ventilation adéquate.  
Utiliser un équipement de protection individuelle.  
Éviter le contact avec la peau et les yeux.  
Ne pas inhaler les vapeurs/poussières.  
Enlever toute source d'ignition.  
Évacuer immédiatement le personnel vers des zones sûres.

**6.2. Précautions pour la protection de l'environnement**

Le produit ne doit pas contaminer les eaux souterraines.

**6.3. Méthodes et matériel de confinement et de nettoyage**

Enlever avec un absorbant inerte (sable, gel de silice, agglomérant pour acide, agglomérant universel, sciure).  
Conserver dans des récipients adaptés et fermés pour l'élimination.

**6.4. Référence à d'autres sections**

Voir chapitre 8 et 13.

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**RUBRIQUE 7: Manipulation et stockage****7.1. Précautions à prendre pour une manipulation sans danger**

Prendre les précautions nécessaires pour éviter le contact avec la peau et l'inhalation des vapeurs et brouillards générés.  
Tenir à l'écart de la chaleur et des sources d'ignition.  
Assurer une ventilation suffisante.  
Porter des gants et des lunettes.  
Lors de l'utilisation, ne pas manger, boire ou fumer.

**7.2. Conditions d'un stockage sûr, y compris d'éventuelles incompatibilités**

Garder les récipients bien fermés dans un endroit sec, frais et bien ventilé.  
Accès uniquement réservé à des experts ou conservation en un endroit fermé.  
Stockage sous gaz inerte (azote).  
Protéger de l'air humide et de l'eau.

**7.3. Utilisation(s) finale(s) particulière(s)**

Pas d'information disponible.

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**RUBRIQUE 8: Contrôles de l'exposition/protection individuelle****8.1. Paramètres de contrôle**

EU

Aucun(e).

Limite(s) d'exposition

Aucun à notre connaissance.

**8.2. Contrôles de l'exposition****Contrôle de l'exposition professionnelle**

À manipuler conformément aux bonnes pratiques d'hygiène industrielle et aux consignes de sécurité.  
Nettoyer régulièrement l'équipement, les locaux et les vêtements de travail.  
Conserver à l'écart des aliments et boissons, y compris ceux pour animaux.  
Se laver les mains avant les pauses et à la fin de la journée de travail.  
Entreposer séparément les vêtements de travail.  
Des rince-oeil de secours et des douches de sécurité doivent être

installés au voisinage de toute zone d'exposition potentielle.

**Protection individuelle****Protection des yeux**

Lunettes de sécurité avec protections latérales conforme à l'EN166.

**Protection des mains**

Les gants de protection sélectionnés doivent satisfaire aux spécifications de la Directive EU 89/686/CEE et au standard EN 374 qui en dérive.  
Gants en Butyl.  
Temps de percée: > 8 h.

Les gants doivent être choisis en fonction de l'application et de la durée d'utilisation au poste de travail.  
Les gants doivent être jetés et remplacés s'il existe une indication de dégradation ou de percée chimique.

**Protection de la peau et du corps**

Vêtement de protection.  
Choisissez la protection du corps en fonction de la quantité et de la concentration du produit chimique sur le lieu de travail.

**Protection respiratoire**

En cas de ventilation insuffisante, porter un appareil de protection respiratoire approprié.  
Appareil respiratoire avec filtre combiné vapeurs/particules (EN 14387).

**Risques thermiques**

Aucun à notre connaissance.

**Contrôle d'exposition de l'environnement**

Ne pas disperser les déchets dans l'environnement.

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**RUBRIQUE 9: Propriétés physiques et chimiques****9.1. Informations sur les propriétés physiques et chimiques essentielles**

<b>Aspect</b>	Liquide.
<b>Couleur</b>	Clair. Incolore.
<b>Odeur</b>	Inodore.
<b>Seuil olfactif</b>	Donnée non disponible.
<b>pH:</b>	donnée non disponible
<b>Point/intervalle de fusion:</b>	-2°C
<b>Point/intervalle d'ébullition:</b>	144 °C
<b>Point d'éclair:</b>	145°C
<b>Vitesse d'évaporation:</b>	Donnée non disponible.
<b>Inflammabilité:</b>	Donnée non disponible.
<b>Limites d'explosivité:</b>	Donnée non disponible.
<b>Pression de vapeur:</b>	1 mmHg (100 °C)
<b>Densité gazeuse:</b>	Donnée non disponible.
<b>Densité relative:</b>	1.295
<b>Hydrosolubilité:</b>	1318 mg/l (25°C)
<b>Coefficient de partage (n-octanol/eau):</b>	Log Pow: 0.82
<b>Température d'auto-inflammabilité:</b>	Donnée non disponible.
<b>Température de décomposition:</b>	Donnée non disponible.

**Viscosité:** Donnée non disponible.  
**Propriétés explosives:** Donnée non disponible.  
**Propriétés comburantes:** Aucun(e)

## 9.2. Autres informations

**Caractéristiques Générales du Produit** Formule: C<sub>8</sub>H<sub>7</sub>NO<sub>3</sub>S.  
Poids moléculaire: 197.21 g/mol.

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## **RUBRIQUE 10: Stabilité et réactivité**

**10.1. Réactivité** Réagit violemment au contact de l'eau.

**10.2. Stabilité chimique** Stable dans les conditions recommandées de stockage.  
Stable à température et pression ambiantes normales.

**10.3. Possibilité de réactions dangereuses** Réaction violente avec l'eau.

**10.4. Conditions à éviter** Eviter l'humidité et l'eau.  
Éviter l'accumulation de charges électrostatiques.  
Réaction exothermique en présence d' amines et d'alcools.

**10.5. Matières incompatibles** Réagit violemment au contact de l'eau.  
Incompatible avec les bases fortes et les oxydants.  
Des acides.  
Des amines.  
Alcools.  
Des sulfures.

**10.6. Produits de décomposition dangereux** Monoxyde de carbone. Dioxyde de carbone (CO<sub>2</sub>).  
Oxydes de soufre. Cyanure d'hydrogène (acide cyanhydrique). NO<sub>x</sub>.

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## **RUBRIQUE 11: Informations toxicologiques**

### 11.1. Informations sur les effets toxicologiques

**Toxicité aiguë** Ce produit NE doit PAS être considéré comme: nocif en cas d'ingestion.  
Sur la base de données publiées.  
  
DL<sub>50</sub>/orale/rat = 2600 mg/kg.  
[HPVIS report - VanDeMark Inc., Material Data Safety Sheet, p-Toluenesufonyl Isocyanate, 2002] (rapport non publié)

**Corrosion/irritation cutanée** Selon l'Annexe VI du règlement CE 1272/2008: Ce produit doit être considéré: Provoque une irritation cutanée.  
(donnée publiée)

<b>Lésions oculaires graves/irritation oculaire</b>	Selon l'Annexe VI du règlement CE 1272/2008: Ce produit doit être considéré: Provoque une sévère irritation des yeux. (données publiées)
<b>Sensibilisation respiratoire/cutanée</b>	Selon l'Annexe VI du règlement CE 1272/2008: Ce produit doit être considéré: Peut provoquer des symptômes allergiques ou d'asthme ou des difficultés respiratoires par inhalation. (données publiées)
<b>Mutagenicité sur les cellules germinales</b>	Par analogie avec PTSA - CAS 70-55-3, la substance n'est pas considérée comme mutagène. Sur la base de données publiées.  Il n'existe pas d'information disponible pour le produit lui même.  PTSA - CAS 70-55-3 Mutagenicité (test d'aberration chromosomique, in vitro): avec ou sans activation métabolique négatif Mutagenécité (Essai de mutation reverse sur bactéries "Test d'Ames", in vitro): avec ou sans activation métabolique négatif Référence(s): [OECD SIDS, 1994] (données publiées)
<b>Cancérogénicité</b>	Donnée non disponible.
<b>Toxicité pour la reproduction</b>	Donnée non disponible.
<b>Toxicité spécifique pour certains organes cibles - exposition unique</b>	Selon l'Annexe VI du règlement CE 1272/2008: Ce produit doit être considéré: Peut irriter les voies respiratoires. (données publiées)
<b>Toxicité spécifique pour certains organes cibles - exposition répétée</b>	Donnée non disponible.
<b>Danger par aspiration</b>	Donnée non disponible.
<b>Expérience chez l'homme</b>	Pas d'information disponible.
<b>Symptômes liés aux caractéristiques physiques, chimiques et toxicologiques</b>	Selon le fournisseur: Toux. respiration sifflante Insuffisance respiratoire. Mal de tête Vertiges. Vomissements. Lachrymation.

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## ***RUBRIQUE 12: Informations écologiques***

<b>12.1. Toxicité</b>	Donnée non disponible.
<b>12.2. Persistance et dégradabilité</b>	Donnée non disponible.
<b>12.3. Potentiel de bioaccumulation</b>	Donnée non disponible.



<b>12.4. Mobilité dans le sol</b>	Donnée non disponible.
<b>12.5. Résultats des évaluations PBT et vPvB</b>	Cette substance n'est pas considérée comme persistante, ni bioaccumulable ni toxique (PBT). Cette substance n'est pas considérée comme très persistante ni très bioaccumulable (vPvB). Référence(s): Dossier d'enregistrement - ECHA Chem (p-Toluenesulfonyl isocyanate - CAS: 4083-64-1, tel que publié le 20/06/2017) (donnée publiée)
<b>12.6. Autres effets néfastes</b>	RÈGLEMENT (CE) No 1005/2009 DU PARLEMENT EUROPÉEN ET DU CONSEIL du 16 septembre 2009 relatif à des substances qui appauvrissent la couche d'ozone et ses modifications p-Toluenesulfonyl isocyanate - CAS: 4083-64-1 & Tosyl chloride - CAS: 98-59-9 Pas listé.

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### ***RUBRIQUE 13: Considérations relatives à l'élimination***

#### **13.1. Méthodes de traitement des déchets**

<b>Résidus de produit / produit non utilisé</b>	Éliminer les déchets dangereux en conformité avec les réglementations locales et nationales. Le code de déchet doit être attribué par l'utilisateur, selon l'application du produit. Peut être évacué sur décharges ou incinéré, si les réglementations locales le permettent.
<b>Emballages contaminés</b>	Éliminer comme le produit non utilisé.

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### ***RUBRIQUE 14: Informations relatives au transport***

<b>ADR/RID</b>	Non réglementé.
<b>IMDG</b>	Non réglementé.
<b>IATA</b>	Non réglementé.
<b>Autres Informations</b>	Produit non dangereux au sens des réglementations de transport. Réagit violemment avec l'eau.

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### ***RUBRIQUE 15: Informations réglementaires***

<b>15.1. Réglementations/législation particulières à la substance ou</b>	p-Toluenesulfonyl isocyanate - CAS: 4083-64-1 Cette substance est inscrite aux inventaires suivants: TSCA, AICS, DSL, IECSC, EINECS, ENCS, ISHL, KECI, NZIoC, PICCS, TCSI,
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**au mélange en matière de  
sécurité, de santé et  
d'environnement**

TECI.

Tosyl chloride - CAS: 98-59-9

Cette substance est inscrite aux inventaires suivants: TSCA, AICS, DSL, IECSC, EINECS, ENCS, ISHL, KECI, INSQ, NZIoC, PICCS, TCSI, TECI.

p-Toluenesulfonyl isocyanate - CAS: 4083-64-1 & Tosyl chloride - CAS: 98-59-9

RÈGLEMENT (CE) N° 850/2004 DU PARLEMENT EUROPÉEN ET DU CONSEIL du 29 avril 2004 concernant les polluants organiques persistants et ses modifications  
Pas listé.

N'est pas considéré comme SVHC selon le règlement REACH (dernière mise à jour de la liste de SVHC: 12/01/2017).

REACH annexe XVII : restrictions applicables à la fabrication, la mise sur le marché et l'utilisation de certaines substances et préparations dangereuses et de certains articles dangereux  
Pas listé.

Directive 96/82/CE du Conseil du 9 décembre 1996 concernant la maîtrise des dangers liés aux accidents majeurs impliquant des substances dangereuses et ses modifications  
p-Toluenesulfonyl isocyanate - CAS: 4083-64-1  
Listé  
Tosyl chloride - CAS: 98-59-9  
Pas listé.

Directive 94/33/CE du Conseil, du 22 juin 1994, relative à la protection des jeunes au travail et ses modifications  
Directive 98/24/CE du Conseil du 7 avril 1998 concernant la protection de la santé et de la sécurité des travailleurs contre les risques liés à des agents chimiques sur le lieu de travail et ses modifications  
p-Toluenesulfonyl isocyanate - CAS: 4083-64-1  
Listé  
Tosyl chloride - CAS: 98-59-9  
Pas listé.

Directive 92/85/CEE du Conseil, du 19 octobre 1992, concernant la mise en oeuvre de mesures visant à promouvoir l'amélioration de la sécurité et de la santé des travailleuses enceintes, accouchées ou allaitantes au travail et ses modifications  
Directive 2004/37/CE du Parlement européen et du Conseil du 29 avril 2004 concernant la protection des travailleurs contre les risques liés à l'exposition à des agents cancérigènes ou mutagènes au travail et ses amendements  
Pas listé.

**15.2. Évaluation de la sécurité chimique**

Non disponible actuellement.  
Non demandé.

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**RUBRIQUE 16: Autres informations**

<b>Révision</b>	Sections de la fiche de données de sécurité qui ont été mises-à-jour: 1,3,12,15,16.
<b>Signification des abréviations et acronymes utilisés</b>	ADR: Accord européen sur le transport des marchandises Dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road) AICS: Inventaire des substances chimiques (Australie) CLP: Classification conformément au Règlement (CE) No. 1272/2008 (GHS) DSL: Domestic Substances List (Canada) EINECS: European Inventory of Existing Commercial Chemical Substances (EU) ENCS: Inventory of Existing & New Chemical Substances (Japan) IATA: International Air Transport Association IECSC: Inventory of Existing Chemical Substances (China) IMO-IMDG: International Maritime Code for Dangerous Goods ISHL: Industrial Safety & Health Law Inventory (Japan) KECI: Existing Chemicals Inventory (Korea) NZIoC: New Zealand Inventory of Chemicals (New Zealand) PBT: Produit chimique Persistant Bioaccumulable et Toxique PICCS: Inventory of Chemicals and Chemical Substances (Philippines) RID: Regulations concerning the International carriage of Dangerous goods by rail SVHC: Substances of Very High Concern TCSI: Taiwan Chemical Substance Inventory. TSCA: Toxic Substances Control Act - Chemical Substances Inventory (USA) vPvB: Produit chimique très Persistant, très Bioaccumulable. TECI: Existing Chemicals Inventory from FDA (Thailand)
<b>Les principales références bibliographiques et sources de données</b>	Données du fournisseur. L'information donnée provient de travaux qui font référence et de la littérature. Se reporter aux rubriques respectives.
<b>Procédure de classification</b>	Classification de la substance selon le règlement européen 1272/2008/CE. Selon l'Annexe VI du règlement CE 1272/2008 Sur la base de données publiées. Par analogie avec PTSA - CAS 70-55-3
<b>Libellés des phrases mentionnées aux sections 2 et 3</b>	EUH014: Réagit violemment au contact de l'eau. H272: Peut aggraver un incendie; comburant. H290: Peut être corrosif pour les métaux. H315: Provoque une irritation cutanée.

H317: Peut provoquer une allergie cutanée.  
H318: Provoque des lésions oculaires graves.  
H319: Provoque une sévère irritation des yeux.  
H334: Peut provoquer des symptômes allergiques ou d'asthme ou des difficultés respiratoires par inhalation.  
H335: Peut irriter les voies respiratoires.

**Autres informations**

Pas d'information disponible.

**Clause de non-responsabilité**

Les informations contenues dans la présente fiche de données de sécurité ont été établies sur la base de nos connaissances à la date de publication de ce document.

Ces informations ne sont données qu'à titre indicatif en vue de permettre des opérations de manipulation, fabrication, stockage, transport, distribution, mise à disposition, utilisation et élimination dans des conditions satisfaisantes de sécurité.

Ils ne sauraient donc être interprétées comme une garantie ou considérées comme des spécifications de qualité.

Ces informations ne concernent en outre que le produit nommément désigné et, sauf indication contraire spécifique, peuvent ne pas être applicables en cas de mélange dudit produit avec d'autres substances ou utilisables pour tout procédé de fabrication.

Cette fiche de données de sécurité ne contient que des informations relatives à la sécurité et ne remplace aucune information ni spécification concernant le produit.

# Annex to the Safety Data Sheet

## Exposure Scenarios

Source: Chemical Safety Report (November 2016)

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## ES 1: Use at industrial sites; Formulation (PC1; PC9a)

### 1.1. Title section

ES name: Formulation of PTSI for the purpose of drying raw materials and formulation process, and for shelf-life

<b>Environment</b>	
CS 1: Manufacture of organic solvent-borne coatings and inks	ERC 2
CS 2: Formulation of solvent-borne adhesives	ERC 2
<b>Worker</b>	
CS 3: Storage, blending operations, pipeline transport, etc. in technically "tight" equipment	PROC 1
CS 4: Enclosed use of PTSI in continuous or batch processes in "tight" equipment with minor breaches (e.g. sampling, cleaning, maintenance)	PROC 2
CS 5: Enclosed use of PTSI in continuous or batch processes in equipment with minor breaches (e.g. sampling, cleaning, maintenance)	PROC 3
CS 6: Blending and use of PTSI in continuous or batch processes in equipment with breaches (e.g. dosing, sampling, cleaning, maintenance)	PROC 4
CS 7: Blending and use of PTSI in open equipment	PROC 5
CS 8: Not enclosed non-dedicated transfers of chemicals (sampling, waste collection & transfer, charging, discharging): Tank truck unloading	PROC 8a
CS 9: Not enclosed non-dedicated transfers of chemicals (sampling, waste collection & transfer, charging, discharging): Transfer from drums at non-dedicated facilities	PROC 8a
CS 10: Not enclosed dedicated transfer of chemicals (sampling, waste collection & transfer, charging, discharging): Tank truck unloading with vapour return line / Transfer from drum with dedicated equipment under use-specific safety standards	PROC 8b
CS 11: Not enclosed transfer of substance or preparation into small containers (dedicated filling line, including weighing): Transfer of PTSI to or from cans with dedicated equipment under industrial safety standards	PROC 9
CS 12: Use of chemical in a laboratory environment, typically limited to 1 kg or 1 L of the chemical; working in extracted cabinet / booth / fume hood, if necessary	PROC 15
CS 13: Storage, blending operations, pipeline transport, etc. in technically "tight" equipment	PROC 1
CS 14: Enclosed use of PTSI in continuous or batch processes in "tight" equipment with minor breaches (e.g. sampling, cleaning, maintenance)	PROC 2
CS 15: Enclosed use of PTSI in continuous or batch processes in equipment with minor breaches (e.g. sampling, cleaning, maintenance)	PROC 3

CS 16: Blending and use of PTSI in continuous or batch processes in equipment with breaches (e.g. dosing, sampling, cleaning, maintenance)	PROC 4
CS 17: Blending and use of PTSI in open equipment	PROC 5
CS 18: Not enclosed non-dedicated transfers of chemicals (sampling, waste collection & transfer, charging, discharging): Tank truck unloading	PROC 8a
CS 19: Not enclosed non-dedicated transfers of chemicals (sampling, waste collection & transfer, charging, discharging): Transfer from drums at nondedicated facilities	PROC 8a
CS 20: Not enclosed dedicated transfer of chemicals (sampling, waste collection & transfer, charging, discharging): Tank truck unloading with vapour return line / Transfer from drum with dedicated equipment under use-specific safety standards	PROC 8b
CS 21: Not enclosed transfer of substance or preparation into small containers (dedicated filling line, including weighing): Transfer of PTSI to or from cans with dedicated equipment under industrial safety standards	PROC 9
CS 22: Use of chemical in a laboratory environment, typically limited to 1 kg or 1 L of the chemical; working in extracted cabinet / booth / fume hood, if necessary	PROC 15

## 1.2. Conditions of use affecting exposure

### 1.2.1. Control of environmental exposure: Manufacture of organic solvent-borne coatings and inks (ERC 2)

<b>Amount used, frequency and duration of use (or from service life)</b>
Daily amount per site <= 4.44 tonnes/day
Annual amount per site <= 999.0 tonnes/year
<b>Technical and organisational conditions and measures</b>
Process optimized for highly efficient use of raw materials.
<b>Conditions and measures related to biological sewage treatment plant</b>
Municipal STP: Yes [Effectiveness Water: 87.36%]
Assumed domestic sewage treatment plant flow >= 2000 m3/day
<b>Conditions and measures related to treatment of waste (including article waste)</b>
External treatment and disposal of waste should comply with applicable local and/or national regulations.
<b>Other conditions affecting environmental exposure</b>
Receiving surface water flow >= 18000 m3/day

### 1.2.2. Control of environmental exposure: Formulation of solvent-borne adhesives (ERC 2)

<b>Amount used, frequency and duration of use (or from service life)</b>
Daily amount per site <= 4.54 tonnes/day
Annual amount per site <= 999.0 tonnes/year
<b>Technical and organisational conditions and measures</b>
Solvent-based process
Indoor use
Process optimized for highly efficient use of raw materials.
Equipment must be cleaned with organic solvent. Washings from cleaning are collected and disposed of as solvent waste.
<b>Conditions and measures related to biological sewage treatment plant</b>
Municipal STP: Yes [Effectiveness Water: 87.36%]
Assumed domestic sewage treatment plant flow >= 2000 m3/day
<b>Conditions and measures related to treatment of waste (including article waste)</b>
External treatment and disposal of waste should comply with applicable local and/or national regulations.
<b>Other conditions affecting environmental exposure</b>
Receiving surface water flow >= 18000 m3/day

### 1.2.3. Control of worker exposure: Storage, blending operations, pipeline transport, etc. in technically “tight” equipment (PROC 1)

<b>Product (Article) characteristics</b>
Covers concentrations up to 100.0 %
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Covers use up to 8.0 h/day
<b>Technical and organisational conditions and measures</b>
Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Ensure control measures are regularly inspected and maintained.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training. For further specification, refer to section 8 of the SDS.
<b>Other conditions affecting workers exposure</b>
Assumes process temperature up to 40.0 °C
Indoor use



### 1.2.4. Control of worker exposure: Enclosed use of PTSI in continuous or batch processes in "tight" equipment with minor breaches (e.g. sampling, cleaning, maintenance) (PROC 2)

<b>Product (Article) characteristics</b>
Covers concentrations up to 100.0 %
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Covers use up to 8.0 h/day
<b>Technical and organisational conditions and measures</b>
Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the risk management measures in place are being used correctly and operation conditions followed.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. For further specification, refer to section 8 of the SDS.
<b>Other conditions affecting workers exposure</b>
Assumes process temperature up to 40.0 °C
Activity Class: Activities with open liquid surfaces or open reservoirs – Activities with agitated surfaces Duration: 465 minutes Surfaces > 3 m <sup>2</sup>
Activity Class: Transfer of liquid products - Falling liquids Duration: 15 minutes Application rate : 0.1 – 1 l/minute Handling that reduces contact between product and adjacent air Submerged loading
Indoor use

### 1.2.5. Control of worker exposure: Enclosed use of PTSI in continuous or batch processes in equipment with minor breaches (e.g. sampling, cleaning, maintenance) (PROC 3)

<b>Product (Article) characteristics</b>
Covers concentrations up to 100.0 %
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Covers use up to 8.0 h/day
<b>Technical and organisational conditions and measures</b>
Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition

Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the risk management measures in place are being used correctly and operation conditions followed.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. For further specification, refer to section 8 of the SDS.
<b>Other conditions affecting workers exposure</b>
Assumes process temperature up to 40.0 °C
Activity Class: Activities with open liquid surfaces or open reservoirs – Activities with agitated surfaces Duration: 465 minutes Surfaces > 3 m <sup>2</sup>
Activity Class: Transfer of liquid products - Falling liquids Duration: 15 minutes Application rate: 0.1 – 1 l/minute Handling that reduces contact between product and adjacent air Submerged loading
Indoor use

### 1.2.6. Control of worker exposure: Blending and use of PTSI in continuous or batch processes in equipment with breaches (e.g. dosing, sampling, cleaning, maintenance) (PROC 4)

<b>Product (Article) characteristics</b>
Covers concentrations up to 100.0 %
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Covers use up to 8.0 h/day
<b>Technical and organisational conditions and measures</b>
Use in semi-closed process with opportunity for exposure
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the risk management measures in place are being used correctly and operation conditions followed.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. For further specification, refer to section 8 of the SDS.
Wear a respirator providing a minimum efficiency of 90.0 %; For further specification, refer to section 8 of the SDS. (Concentration of substance in product > 0.1%)
<b>Other conditions affecting workers exposure</b>
Assumes process temperature up to 40.0 °C
Activity Class: Activities with open liquid surfaces or open reservoirs – Activities with agitated surfaces

Duration: 420 minutes Surfaces > 3 m <sup>2</sup>
Activity Class: Transfer of liquid products - Falling liquids Duration: 60 minutes Application rate: 100 – 1000 l/minute Handling that reduces contact between product and adjacent air Submerged loading
Indoor use

### 1.2.7. Control of worker exposure: Blending and use of PTSI in open equipment (PROC 5)

<b>Product (Article) characteristics</b>
Covers concentrations up to 100.0 %
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Covers use up to 8.0 h/day
<b>Technical and organisational conditions and measures</b>
Open systems
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the risk management measures in place are being used correctly and operation conditions followed.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. For further specification, refer to section 8 of the SDS.
Wear a respirator providing a minimum efficiency of 90.0 %; For further specification, refer to section 8 of the SDS. (Concentration of substance in product > 0.1%)
<b>Other conditions affecting workers exposure</b>
Assumes process temperature up to 40.0 °C
Activity Class: Activities with open liquid surfaces or open reservoirs – Activities with agitated surfaces Surfaces > 3 m <sup>2</sup>
Indoor use

### 1.2.8. Control of worker exposure: Not enclosed non-dedicated transfers of chemicals (sampling, waste collection & transfer, charging, discharging): Tank truck unloading (PROC 8a)

<b>Product (Article) characteristics</b>
Covers concentrations up to 100.0 %
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Covers use up to 8.0 h/day

<b>Technical and organisational conditions and measures</b>
Open systems
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the risk management measures in place are being used correctly and operation conditions followed.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. For further specification, refer to section 8 of the SDS.
Wear a respirator providing a minimum efficiency of 90.0 %; For further specification, refer to section 8 of the SDS. (Concentration of substance in product > 0.1%)
<b>Other conditions affecting workers exposure</b>
Assumes process temperature up to 40.0 °C
Activity Class: Handling of contaminated objects Duration : 30 minutes Contamination 10-90 % of surface Surfaces < 3 m <sup>2</sup>
Activity Class: Transfer of liquid products - Falling liquids Duration: 450 minutes Application rate: > 1000 l/minute Handling that reduces contact between product and adjacent air Submerged loading
Indoor use

### 1.2.9. Control of worker exposure: Not enclosed non-dedicated transfers of chemicals (sampling, waste collection & transfer, charging, discharging): Transfer from drums at non-dedicated facilities (PROC 8a)

<b>Product (Article) characteristics</b>
Covers concentrations up to 100.0 %
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Covers use up to 8.0 h/day
<b>Technical and organisational conditions and measures</b>
Open systems
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the risk management measures in place are being used correctly and operation conditions followed.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. For further specification, refer to section 8 of the SDS.
Wear a respirator providing a minimum efficiency of 90.0 %; For further specification, refer to section 8 of the SDS.

<b>Other conditions affecting workers exposure</b>
Assumes process temperature up to 40.0 °C
Activity Class: Handling of contaminated objects Duration: 30 minutes Contamination 10-90 % of surface Surfaces < 3 m <sup>2</sup>
Activity Class: Transfer of liquid products - Falling liquids Duration: 450 minutes Application rate: 100 – 1000 l/minute Handling that reduces contact between product and adjacent air Submerged loading
Indoor use

**1.2.10. Control of worker exposure: Not enclosed dedicated transfer of chemicals (sampling, waste collection & transfer, charging, discharging): Tank truck unloading with vapour return line / Transfer from drum with dedicated equipment under use specific safety standards (PROC 8b)**

<b>Product (Article) characteristics</b>
Covers concentrations up to 100.0 %
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Covers use up to 8.0 h/day
<b>Technical and organisational conditions and measures</b>
Use in semi-closed process with opportunity for exposure
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the risk management measures in place are being used correctly and operation conditions followed.
Vapour recovery system. Air - minimum efficiency of 80%.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. For further specification, refer to section 8 of the SDS.
Wear a respirator providing a minimum efficiency of 90.0 %; For further specification, refer to section 8 of the SDS. (Concentration of substance in product > 0.1%)
<b>Other conditions affecting workers exposure</b>
Assumes process temperature up to 40.0 °C
Activity Class: Handling of contaminated objects Duration: 30 minutes Contamination 10-90 % of surface Surfaces < 3 m <sup>2</sup>
Activity Class: Transfer of liquid products - Falling liquids Duration: 450 minutes

Application rate: > 1000 l/minute Handling that reduces contact between product and adjacent air Submerged loading
Indoor use

**1.2.11. Control of worker exposure: Not enclosed transfer of substance or preparation into small containers (dedicated filling line, including weighing): Transfer of PTSI to or from cans with dedicated equipment under industrial safety standards (PROC 9)**

<b>Product (Article) characteristics</b>
Covers concentrations up to 1.0 % (dermal) 0.5% (inhalation)
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Covers use up to 8.0 h/day
<b>Technical and organisational conditions and measures</b>
Use in semi-closed process with opportunity for exposure
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the risk management measures in place are being used correctly and operation conditions followed.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
Wear a respirator providing a minimum efficiency of 90.0 %; For further specification, refer to section 8 of the SDS. (Concentration of substance in product > 0.1%)
<b>Other conditions affecting workers exposure</b>
Assumes process temperature up to 40.0 °C
Activity Class: Handling of contaminated objects Duration: 30 minutes Contamination 10-90 % of surface Surfaces < 1 m <sup>2</sup>
Activity Class: Transfer of liquid products - Falling liquids Duration: 450 minutes Application rate: 10 – 100 l/minute Handling that reduces contact between product and adjacent air Splash loading
Indoor use

**1.2.12. Control of worker exposure: Use of chemical in a laboratory environment, typically limited to 1 kg or 1 L of the chemical; working in extracted cabinet / booth / fume hood, if necessary (PROC 15)**

<b>Product (Article) characteristics</b>
Covers concentrations up to 100.0 %
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Covers use up to 8.0 h/day
<b>Technical and organisational conditions and measures</b>
Open systems
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the risk management measures in place are being used correctly and operation conditions followed.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. For further specification, refer to section 8 of the SDS.
Wear a respirator providing a minimum efficiency of 90.0 %; For further specification, refer to section 8 of the SDS. (Concentration of substance in product > 0.1%)
<b>Other conditions affecting workers exposure</b>
Assumes process temperature up to 40.0 °C
Activity Class: Activities with open liquid surfaces or open reservoirs – Activities with agitated surfaces Duration: 15 minutes Surfaces < 3 m <sup>2</sup>
Activity Class: Transfer of liquid products - Falling liquids Duration: 15 minutes Application rate: 0.1 – 1 l/minute Handling that reduces contact between product and adjacent air Splash loading
Activities with open liquid surfaces or open reservoirs – Activities with undisturbed surfaces Duration: 435 minutes Surfaces <0.1 m <sup>2</sup>
Indoor use

### 1.2.13. Control of worker exposure: Storage, blending operations, pipeline transport, etc. in technically “tight” equipment (PROC 1)

<b>Product (Article) characteristics</b>
Covers concentrations up to 1.0 %
Vapour pressure: < 133 Pa (80°C)
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Covers use up to 8.0 h/day
<b>Technical and organisational conditions and measures</b>
Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Ensure control measures are regularly inspected and maintained.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<b>Other conditions affecting workers exposure</b>
Assumes process temperature up to 80.0 °C
Indoor use

### 1.2.14. Control of worker exposure: Enclosed use of PTSI in continuous or batch processes in "tight" equipment with minor breaches (e.g. sampling, cleaning, maintenance) (PROC 2)

<b>Product (Article) characteristics</b>
Covers concentrations up to 1.0 %
Vapour pressure: < 133 Pa (80°C)
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Covers use up to 8.0 h/day
<b>Technical and organisational conditions and measures</b>
Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Ensure control measures are regularly inspected and maintained.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<b>Other conditions affecting workers exposure</b>



Assumes process temperature up to 80.0 °C
Indoor use

### 1.2.15. Control of worker exposure: Enclosed use of PTSI in continuous or batch processes in equipment with minor breaches (e.g. sampling, cleaning, maintenance) (PROC 3)

<b>Product (Article) characteristics</b>
Covers concentrations up to 1.0 %
Vapour pressure: < 133 Pa (80°C)
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Covers use up to 8.0 h/day
<b>Technical and organisational conditions and measures</b>
Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Ensure control measures are regularly inspected and maintained.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<b>Other conditions affecting workers exposure</b>
Assumes process temperature up to 80.0 °C
Indoor use

### 1.2.16. Control of worker exposure: Blending and use of PTSI in continuous or batch processes in equipment with breaches (e.g. dosing, sampling, cleaning, maintenance) (PROC 4)

<b>Product (Article) characteristics</b>
Covers concentrations up to 1.0 % (dermal) 0.5% (inhalation)
Vapour pressure: < 133 Pa (80°C)
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Covers use up to 8.0 h/day
<b>Technical and organisational conditions and measures</b>
Use in semi-closed process with opportunity for exposure
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Ensure control measures are regularly inspected and maintained.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>

Wear a respirator providing a minimum efficiency of 90.0 %; For further specification, refer to section 8 of the SDS. (Concentration of substance in product > 0.1%)
<b>Other conditions affecting workers exposure</b>
Assumes process temperature up to 80.0 °C
Activity Class: Activities with open liquid surfaces or open reservoirs – Activities with agitated surfaces Duration: 420 minutes Surfaces > 3 m <sup>2</sup>
Activity Class: Transfer of liquid products - Falling liquids Duration: 60 minutes Application rate: 100 – 1000 l/minute Handling that reduces contact between product and adjacent air Submerged loading
Indoor use

### 1.2.17. Control of worker exposure: Blending and use of PTSI in open equipment (PROC 5)

<b>Product (Article) characteristics</b>
Covers concentrations up to 1.0 % (dermal) 0.5% (inhalation)
Vapour pressure: < 133 Pa (80°C)
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Covers use up to 8.0 h/day
<b>Technical and organisational conditions and measures</b>
Open systems
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Ensure control measures are regularly inspected and maintained.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. For further specification, refer to section 8 of the SDS.
Wear a respirator providing a minimum efficiency of 90.0 %; For further specification, refer to section 8 of the SDS. (Concentration of substance in product > 0.1%)
<b>Other conditions affecting workers exposure</b>
Assumes process temperature up to 80.0 °C
Activity Class: Activities with open liquid surfaces or open reservoirs – Activities with agitated surfaces Surfaces > 3 m <sup>2</sup>
Indoor use

### 1.2.18. Control of worker exposure: Not enclosed non-dedicated transfers of chemicals (sampling, waste collection & transfer, charging, discharging): Tank truck unloading (PROC 8a)

<b>Product (Article) characteristics</b>
Covers concentrations up to 1.0 % (dermal) 0.5% (inhalation)
Vapour pressure: < 133 Pa (80°C)
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Covers use up to 8.0 h/day
<b>Technical and organisational conditions and measures</b>
Open systems
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Ensure control measures are regularly inspected and maintained.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. For further specification, refer to section 8 of the SDS.
Wear a respirator providing a minimum efficiency of 90.0 %; For further specification, refer to section 8 of the SDS. (Concentration of substance in product > 0.1%)
<b>Other conditions affecting workers exposure</b>
Assumes process temperature up to 80.0 °C
Activity Class: Handling of contaminated objects Duration: 30 minutes Contamination 10-90 % of surface Surfaces < 3 m <sup>2</sup>
Activity Class: Transfer of liquid products - Falling liquids Duration: 450 minutes Application rate: > 1000 l/minute Handling that reduces contact between product and adjacent air Submerged loading
Indoor use

### 1.2.19. Control of worker exposure: Not enclosed non-dedicated transfers of chemicals (sampling, waste collection & transfer, charging, discharging): Transfer from drums at non-dedicated facilities (PROC 8a))

<b>Product (Article) characteristics</b>
Covers concentrations up to 1.0 % (dermal) 0.5% (inhalation)
Vapour pressure: < 133 Pa (80°C)
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Covers use up to 8.0 h/day
<b>Technical and organisational conditions and measures</b>
Open systems
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the risk management measures in place are being used correctly and operation conditions followed.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. For further specification, refer to section 8 of the SDS.
Wear a respirator providing a minimum efficiency of 90.0 %; For further specification, refer to section 8 of the SDS. (Concentration of substance in product > 0.1%)
<b>Other conditions affecting workers exposure</b>
Assumes process temperature up to 80.0 °C
Activity Class: Handling of contaminated objects Duration: 30 minutes Contamination 10-90 % of surface Surfaces < 3 m <sup>2</sup>
Activity Class: Transfer of liquid products - Falling liquids Duration: 450 minutes Application rate: 100 – 1000 l/minute Handling that reduces contact between product and adjacent air Submerged loading
Indoor use

**1.2.20. Control of worker exposure: Not enclosed dedicated transfer of chemicals (sampling, waste collection & transfer, charging, discharging): Tank truck unloading with vapour return line / Transfer from drum with dedicated equipment under use specific safety standards (PROC 8b)**

<b>Product (Article) characteristics</b>
Covers concentrations up to 1.0 % (dermal) 0.5% (inhalation)
Vapour pressure: < 133 Pa (80°C)
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Covers use up to 8.0 h/day
<b>Technical and organisational conditions and measures</b>
Semi-closed process with occasional controlled exposure
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Vapour recovery system. Air - minimum efficiency of 80%.
Supervision in place to check that the risk management measures in place are being used correctly and operation conditions followed.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. For further specification, refer to section 8 of the SDS.
Wear a respirator providing a minimum efficiency of 90.0 %; For further specification, refer to section 8 of the SDS. (Concentration of substance in product > 0.1%)
<b>Other conditions affecting workers exposure</b>
Assumes process temperature up to 80.0 °C
Activity Class: Handling of contaminated objects Duration: 30 minutes Contamination 10-90 % of surface Surfaces < 3 m <sup>2</sup>
Activity Class: Transfer of liquid products - Falling liquids Duration: 450 minutes Application rate: > 1000 l/minute Handling that reduces contact between product and adjacent air Submerged loading
Indoor use

**1.2.21. Control of worker exposure: Not enclosed transfer of substance or preparation into small containers (dedicated filling line, including weighing): Transfer of PTSI to or from cans with dedicated equipment under industrial safety standards (PROC 9)**

<b>Product (Article) characteristics</b>
Covers concentrations up to 1.0 % (dermal) 0.5% (inhalation)
Vapour pressure: < 133 Pa (80°C)
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Covers use up to 8.0 h/day
<b>Technical and organisational conditions and measures</b>
Use in semi-closed process with opportunity for exposure
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the risk management measures in place are being used correctly and operation conditions followed.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
Wear a respirator providing a minimum efficiency of 90.0 %; For further specification, refer to section 8 of the SDS. (Concentration of substance in product > 0.1%)
<b>Other conditions affecting workers exposure</b>
Assumes process temperature up to 80.0 °C
Activity Class: Handling of contaminated objects Duration: 30 minutes Contamination 10-90 % of surface Surfaces < 1 m <sup>2</sup>
Activity Class: Transfer of liquid products - Falling liquids Duration: 450 minutes Application rate: 10 – 100 l/minute Handling that reduces contact between product and adjacent air Splash loading
Indoor use

**1.2.22. Control of worker exposure: Use of chemical in a laboratory environment, typically limited to 1 kg or 1 L of the chemical; working in extracted cabinet / booth / fume hood, if necessary (PROC 15)**

<b>Product (Article) characteristics</b>
Covers concentrations up to 1.0 % (dermal) 0.5% (inhalation)
Vapour pressure: < 133 Pa (80°C)
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Covers use up to 8.0 h/day
<b>Technical and organisational conditions and measures</b>
Open systems
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the risk management measures in place are being used correctly and operation conditions followed.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
Wear a respirator providing a minimum efficiency of 90.0 %; For further specification, refer to section 8 of the SDS. (Concentration of substance in product > 0.1%)
<b>Other conditions affecting workers exposure</b>
Assumes process temperature up to 80.0 °C
Activity Class: Activities with open liquid surfaces or open reservoirs – Activities with agitated surfaces Duration: 15 minutes Surfaces < 3 m <sup>2</sup>
Activity Class: Transfer of liquid products - Falling liquids Duration: 15 minutes Application rate: 0.1 – 1 l/minute Handling that reduces contact between product and adjacent air Splash loading
Activities with open liquid surfaces or open reservoirs – Activities with undisturbed surfaces Duration: 435 minutes Surfaces <0.1 m <sup>2</sup>
Indoor use

### 1.3. Exposure estimation and reference to its source

#### 1.3.1. Environmental release and exposure: Manufacture of organic solvent-borne coatings and inks (ERC 2)

Release route	Release rate	Release estimation method
<b>Water</b>	0.222 kg/day	Estimated release factor (ESD Coatings)
<b>Air</b>	0.431 kg/day	Estimated release factor (ESD Coatings)
<b>Soil</b>	0 kg/day	Estimated release factor (ESD Coatings)

Protection target	Exposure estimate (based on: EUSES 2.1.2)	RCR
Fresh water	0.002 mg/L	0.052
Sediment (freshwater)	0.009 mg/kg dw	0.052
Marine water	1.551E-4 mg/L	0.052
Sediment (marine water)	8.916E-4 mg/kg dw	0.052
Sewage Treatment Plant	0.014 mg/L	0.035
Agricultural soil	9.354E-4 mg/kg dw	0.056

#### 1.3.2. Environmental release and exposure: Formulation of solvent-borne adhesives (ERC 2)

Release route	Release rate	Release estimation method
<b>Water</b>	0.227 kg/day	Estimated release factor (ESD Coatings)
<b>Air</b>	45.4 kg/day	Estimated release factor (ESD Coatings)
<b>Soil</b>	0 kg/day	Estimated release factor (ESD Coatings)

Protection target	Exposure estimate (based on: EUSES 2.1.2)	RCR
Fresh water	0.002 mg/L	0.053
Sediment (freshwater)	0.009 mg/kg dw	0.053
Marine water	1.583E-4 mg/L	0.053
Sediment (marine water)	9.097E-4 mg/kg dw	0.053
Sewage Treatment Plant	0.014 mg/L	0.036
Agricultural soil	0.004 mg/kg dw	0.22



**1.3.3. Worker exposure: Storage, blending operations, pipeline transport, etc. in technically “tight” equipment (PROC 1)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	<b>0.082 mg/m<sup>3</sup></b> (TRA Worker v3)	0.025
Dermal, systemic, long term	<b>0.003 mg/kg bw/day</b> (TRA Worker v3)	<0.01
Combined, systemic, long term		0.029

**1.3.4. Worker exposure: Enclosed use of PTSI in continuous or batch processes in "tight" equipment with minor breaches (e.g. sampling, cleaning, maintenance) (PROC 2)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	<b>0.18 mg/m<sup>3</sup></b> (External Tool (ART v1.5))	0.056
Dermal, systemic, long term	<b>0.137 mg/kg bw/day</b> (TRA Worker v3)	0.149
Combined, systemic, long term		0.205

**1.3.5. Worker exposure: Enclosed use of PTSI in continuous or batch processes in equipment with minor breaches (e.g. sampling, cleaning, maintenance) (PROC 3)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	<b>0.18 mg/m<sup>3</sup></b> (External Tool (ART v1.5))	0.056
Dermal, systemic, long term	<b>0.069 mg/kg bw/day</b> (TRA Worker v3)	0.075
Combined, systemic, long term		0.131

**1.3.6. Worker exposure: Blending and use of PTSI in continuous or batch processes in equipment with breaches (e.g. dosing, sampling, cleaning, maintenance) (PROC 4)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	<b>0.17 mg/m<sup>3</sup></b> (External Tool (ART v1.5))	0.052
Dermal, systemic, long term	<b>0.686 mg/kg bw/day</b> (TRA Worker v3)	0.746
Combined, systemic, long term		0.798

### 1.3.7. Worker exposure: Blending and use of PTSI in open equipment (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	<b>0.19 mg/m<sup>3</sup></b> (External Tool (ART v1.5))	0.059
Dermal, systemic, long term	<b>0.686 mg/kg bw/day</b> (TRA Worker v3)	0.745
Combined, systemic, long term		0.804

### 1.3.8. Worker exposure: Not enclosed non-dedicated transfers of chemicals (sampling, waste collection & transfer, charging, discharging): Tank truck unloading (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	<b>0.24 mg/m<sup>3</sup></b> (External Tool (ART v1.5))	0.074
Dermal, systemic, long term	<b>0.686 mg/kg bw/day</b> (TRA Worker v3)	0.745
Combined, systemic, long term		0.819

### 1.3.9. Worker exposure: Not enclosed non-dedicated transfers of chemicals (sampling, waste collection & transfer, charging, discharging): Transfer from drums at non-dedicated facilities (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	<b>0.11 mg/m<sup>3</sup></b> (External Tool (ART v1.5))	0.034
Dermal, systemic, long term	<b>0.686 mg/kg bw/day</b> (TRA Worker v3)	0.745
Combined, systemic, long term		0.779

### 1.3.10. Worker exposure: Not enclosed dedicated transfer of chemicals (sampling, waste collection & transfer, charging, discharging): Tank truck unloading with vapour return line / Transfer from drum with dedicated equipment under use specific safety standards (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	<b>0.095 mg/m<sup>3</sup></b> (External Tool (ART v1.5))	0.029
Dermal, systemic, long term	<b>0.686 mg/kg bw/day</b> (TRA Worker v3)	0.745
Combined, systemic, long term		0.774

**1.3.11. Worker exposure: Not enclosed transfer of substance or preparation into small containers (dedicated filling line, including weighing): Transfer of PTSI to or from cans with dedicated equipment under industrial safety standards (PROC 9)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	<b>3.2E-4 mg/m<sup>3</sup></b> (External Tool (ART v1.5))	<0.01
Dermal, systemic, long term	<b>0.686 mg/kg bw/day</b> (TRA Worker v3)	0.746
Combined, systemic, long term		0.746

**1.3.12. Worker exposure: Use of chemical in a laboratory environment, typically limited to 1 kg or 1 L of the chemical; working in extracted cabinet / booth / fume hood, if necessary (PROC 15)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	<b>0.086 mg/m<sup>3</sup></b> (External Tool (ART v1.5))	0.027
Dermal, systemic, long term	<b>0.034 mg/kg bw/day</b> (TRA Worker v3)	0.037
Combined, systemic, long term		0.064

**1.3.13. Worker exposure: Storage, blending operations, pipeline transport, etc. in technically “tight” equipment (PROC 1)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	<b>0.008 mg/m<sup>3</sup></b> (TRA Worker v3)	<0.01
Dermal, systemic, long term	<b>0.003 mg/kg bw/day</b> (TRA Worker v3)	<0.01
Combined, systemic, long term		<0.01

**1.3.14. Worker exposure: Enclosed use of PTSI in continuous or batch processes in "tight" equipment with minor breaches (e.g. sampling, cleaning, maintenance) (PROC 2)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	<b>0.822 mg/m<sup>3</sup></b> (TRA Worker v3)	0.254
Dermal, systemic, long term	<b>0.137 mg/kg bw/day</b> (TRA Worker v3)	0.149
Combined, systemic, long term		0.402

**1.3.15. Worker exposure: Enclosed use of PTSI in continuous or batch processes in equipment with minor breaches (e.g. sampling, cleaning, maintenance) (PROC 3)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	<b>2.465 mg/m<sup>3</sup></b> (TRA Worker v3)	0.761
Dermal, systemic, long term	<b>0.069 mg/kg bw/day</b> (TRA Worker v3)	0.075
Combined, systemic, long term		0.836

**1.3.16. Worker exposure: Blending and use of PTSI in continuous or batch processes in equipment with breaches (e.g. dosing, sampling, cleaning, maintenance) (PROC 4)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	<b>0.13 mg/m<sup>3</sup></b> (External Tool (ART v1.5))	0.04
Dermal, systemic, long term	<b>0.686 mg/kg bw/day</b> (TRA Worker v3)	0.746
Combined, systemic, long term		0.786

**1.3.17. Worker exposure: Blending and use of PTSI in open equipment (PROC 5)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	<b>0.15 mg/m<sup>3</sup></b> (External Tool (ART v1.5))	0.046
Dermal, systemic, long term	<b>0.137 mg/kg bw/day</b> (TRA Worker v3)	0.149
Combined, systemic, long term		0.195

**1.3.18. Worker exposure: Not enclosed non-dedicated transfers of chemicals (sampling, waste collection & transfer, charging, discharging): Tank truck unloading (PROC 8a)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	<b>0.045 mg/m<sup>3</sup></b> (External Tool (ART v1.5))	0.014
Dermal, systemic, long term	<b>0.137 mg/kg bw/day</b> (TRA Worker v3)	0.149
Combined, systemic, long term		0.163

**1.3.19. Worker exposure: Not enclosed non-dedicated transfers of chemicals (sampling, waste collection & transfer, charging, discharging): Transfer from drums at non-dedicated facilities (PROC 8a)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	<b>0.016 mg/m<sup>3</sup></b> (External Tool (ART v1.5))	<0.01
Dermal, systemic, long term	<b>0.137 mg/kg bw/day</b> (TRA Worker v3)	0.149
Combined, systemic, long term		0.154

**1.3.20. Worker exposure: Not enclosed dedicated transfer of chemicals (sampling, waste collection & transfer, charging, discharging): Tank truck unloading with vapour return line / Transfer from drum with dedicated equipment under use specific safety standards (PROC 8b)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	<b>0.035 mg/m<sup>3</sup></b> (External Tool (ART v1.5))	0.011
Dermal, systemic, long term	<b>0.137 mg/kg bw/day</b> (TRA Worker v3)	0.149
Combined, systemic, long term		0.16

**1.3.21. Worker exposure: Not enclosed transfer of substance or preparation into small containers (dedicated filling line, including weighing): Transfer of PTSI to or from cans with dedicated equipment under industrial safety standards (PROC 9)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	<b>0.014 mg/m<sup>3</sup></b> (External Tool (ART v1.5))	<0.01
Dermal, systemic, long term	<b>0.686 mg/kg bw/day</b> (TRA Worker v3)	0.746
Combined, systemic, long term		0.75

**1.3.22. Worker exposure: Use of chemical in a laboratory environment, typically limited to 1 kg or 1 L of the chemical; working in extracted cabinet / booth / fume hood, if necessary (PROC 15)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	<b>0.004 mg/m<sup>3</sup></b> (External Tool (ART v1.5))	<0.01
Dermal, systemic, long term	<b>0.034 mg/kg bw/day</b> (TRA Worker v3)	0.037
Combined, systemic, long term		0.038

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

Scaling method: Exposure estimation tool used: ECETOC TRA v3. ART v1.5. EUSES.  
 Scalable Parameters: exposure duration and maximum concentration. All other parameters have to be taken directly from the exposure scenario provided.  
 Boundaries of Scaling: RCRs not to be exceeded are given in Section 1.3 above.

## ES 2: Use at industrial site - Uses in Coatings, Adhesives, sealants

### 2.1. Title section

ES name: Use at industrial site - Industrial use of coatings, sealants and adhesives containing PTSI

<b>Environment</b>	
CS 1: Industrial application of coatings and inks by spraying	ERC 5
CS 2: Industrial coil coating	ERC 5
CS 3: Industrial use of paint, coatings in metal packaging	ERC 5
CS 4: Automotive vehicles	ERC 5
CS 5: Vehicle refinishing	ERC 5
CS 6: Industrial Use of Substances other than Solvents in Paper, Board and related Products / Woodworking and joinery / Footwear and Leather, Textile, Others Adhesives	ERC 5
CS 7: Industrial Use of Substances other than Solvents in Transportation (Automotive/aircraft/rail vehicles) / industrial Building Construction Adhesives	ERC 5
<b>Worker</b>	
CS 8: Storage, blending operations, pipeline transport, etc. of mixture containing PTSI in technically "tight" equipment	PROC 1
CS 9: Enclosed industrial use of mixture containing PTSI in continuous or batch processes in "tight" equipment with minor breaches (e.g. sampling, cleaning, maintenance)	PROC 2
CS 10: Enclosed industrial use of mixture containing PTSI in continuous or batch processes in equipment with minor breaches (e.g. sampling, cleaning, maintenance)	PROC 3
CS 11: Industrial use of mixture containing PTSI in continuous or batch processes in equipment with breaches (e.g. dosing, sampling, cleaning, maintenance)	PROC 4
CS 12: Industrial use of mixture containing PTSI in open equipment	PROC 5
CS 13: Industrial spraying of mixture containing PTSI	PROC 7
CS 14: Not enclosed non-dedicated transfers of chemicals (sampling, waste collection & transfer, charging, discharging)	PROC 8a
CS 15: Not enclosed dedicated transfer of chemicals (sampling, waste collection & transfer, charging, discharging)	PROC 8b
CS 16: Not enclosed transfer of substance or preparation into small containers (dedicated filling line, including weighing)	PROC 9
CS 17: Application with roller of brushing	PROC 10
CS 18: Application via dipping or pouring	PROC 13
CS 19: Tableting, compression, extrusion or pelletisation with mixture containing PTSI	PROC 14
CS 20: Use of chemical in a laboratory environment, typically limited to 1 kg or 1 L of the chemical; working in extracted cabinet / booth / fume hood, if necessary	PROC 15

## 2.2. Conditions of use affecting exposure

### 2.2.1. Control of environmental exposure: Industrial application of coatings and inks by spraying (ERC 5)

<b>Amount used, frequency and duration of use (or from service life)</b>
Daily amount per site <= 4.44 tonnes/day
Annual amount per site <= 100.0 tonnes/year
<b>Technical and organisational conditions and measures</b>
<b>Conditions and measures related to biological sewage treatment plant</b>
Municipal STP: Yes [Effectiveness Water: 100.0%]
Assumed domestic sewage treatment plant flow >= 2000 m3/day
<b>Conditions and measures related to treatment of waste (including article waste)</b>
External treatment and disposal of waste should comply with applicable local and/or national regulations.
<b>Other conditions affecting environmental exposure</b>
Receiving surface water flow >= 18000 m3/day
Indoor use

### 2.2.2. Control of environmental exposure: Industrial coil coating (ERC 5)

<b>Amount used, frequency and duration of use (or from service life)</b>
Daily amount per site <= 4.45 tonnes/day
Annual amount per site <= 100.0 tonnes/year
<b>Technical and organisational conditions and measures</b>
<b>Conditions and measures related to biological sewage treatment plant</b>
Municipal STP: Yes [Effectiveness Water: 87.36%]
Assumed domestic sewage treatment plant flow >= 2000 m3/day
<b>Conditions and measures related to treatment of waste (including article waste)</b>
External treatment and disposal of waste should comply with applicable local and/or national regulations.
<b>Other conditions affecting environmental exposure</b>
Receiving surface water flow >= 18000 m3/day



### 2.2.3. Control of environmental exposure: Industrial use of paint, coatings in metal packaging (ERC 5)

<b>Amount used, frequency and duration of use (or from service life)</b>
Daily amount per site <= 4.45 tonnes/day
Annual amount per site <= 100.0 tonnes/year
<b>Technical and organisational conditions and measures</b>
<b>Conditions and measures related to biological sewage treatment plant</b>
Municipal STP: Yes [Effectiveness Water: 100.0%]
Assumed domestic sewage treatment plant flow >= 2000 m3/day
<b>Conditions and measures related to treatment of waste (including article waste)</b>
External treatment and disposal of waste should comply with applicable local and/or national regulations.
<b>Other conditions affecting environmental exposure</b>
Receiving surface water flow >= 18000 m3/day

### 2.2.4. Control of environmental exposure: Automotive vehicles (ERC 5)

<b>Amount used, frequency and duration of use (or from service life)</b>
Daily amount per site <= 0.27 tonnes/day
Annual amount per site <= 100.0 tonnes/year
<b>Technical and organisational conditions and measures</b>
<b>Conditions and measures related to biological sewage treatment plant</b>
Municipal STP: Yes [Effectiveness Water: 100.0%]
Assumed domestic sewage treatment plant flow >= 2000 m3/day
<b>Conditions and measures related to treatment of waste (including article waste)</b>
External treatment and disposal of waste should comply with applicable local and/or national regulations.
<b>Other conditions affecting environmental exposure</b>
Receiving surface water flow >= 18000 m3/day

### 2.2.5. Control of environmental exposure: Automotive vehicles (ERC 5)

<b>Amount used, frequency and duration of use (or from service life)</b>
Daily amount per site <= 0.4 tonnes/day
Annual amount per site <= 100.0 tonnes/year

<b>Technical and organisational conditions and measures</b>
<b>Conditions and measures related to biological sewage treatment plant</b>
Municipal STP: Yes [Effectiveness Water: 100.0%]
Assumed domestic sewage treatment plant flow $\geq$ 2000 m <sup>3</sup> /day
<b>Conditions and measures related to treatment of waste (including article waste)</b>
External treatment and disposal of waste should comply with applicable local and/or national regulations.
<b>Other conditions affecting environmental exposure</b>
Receiving surface water flow $\geq$ 18000 m <sup>3</sup> /day

### 2.2.6. Control of environmental exposure: Industrial Use of Substances other than Solvents in Paper, Board and related Products / Woodworking and joinery / Footwear and Leather, Textile, Others Adhesives (ERC 5)

<b>Amount used, frequency and duration of use (or from service life)</b>
Daily amount per site $\leq$ 0.45 tonnes/day
Annual amount per site $\leq$ 100.0 tonnes/year
<b>Technical and organisational conditions and measures</b>
Dry process (no water used in process)
Covers indoor and outdoor use
Equipment must be cleaned with organic solvent. Washings from cleaning are collected and disposed of as solvent waste
Process with efficient use of raw materials.
<b>Conditions and measures related to biological sewage treatment plant</b>
Municipal STP: Yes [Effectiveness Water: 100.0%]
Assumed domestic sewage treatment plant flow $\geq$ 2000 m <sup>3</sup> /day
<b>Conditions and measures related to treatment of waste (including article waste)</b>
External treatment and disposal of waste should comply with applicable local and/or national regulations.
<b>Other conditions affecting environmental exposure</b>
Receiving surface water flow $\geq$ 18000 m <sup>3</sup> /day

### 2.2.7. Control of environmental exposure: Industrial Use of Substances other than Solvents in Transportation (Automotive/aircraft/rail vehicles) / industrial Building Construction Adhesives (ERC 5)

<b>Amount used, frequency and duration of use (or from service life)</b>
Daily amount per site <= 0.45 tonnes/day
Annual amount per site <= 100.0 tonnes/year
<b>Technical and organisational conditions and measures</b>
Dry process (no water used in process)
Covers indoor and outdoor use
Equipment must be cleaned with organic solvent. Washings from cleaning are collected and disposed of as solvent waste
Process with efficient use of raw materials.
<b>Conditions and measures related to biological sewage treatment plant</b>
Municipal STP: Yes [Effectiveness Water: 100.0%]
Assumed domestic sewage treatment plant flow >= 2000 m3/day
<b>Conditions and measures related to treatment of waste (including article waste)</b>
External treatment and disposal of waste should comply with applicable local and/or national regulations.
<b>Other conditions affecting environmental exposure</b>
Receiving surface water flow >= 18000 m3/day

### 2.2.8. Control of worker exposure: Storage, blending operations, pipeline transport, etc. of mixture containing PTSI in technically “tight” equipment (PROC 1)

<b>Product (Article) characteristics</b>
Covers concentrations up to 1.0 %
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Covers use up to 8.0 h/day
<b>Technical and organisational conditions and measures</b>
Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Ensure control measures are regularly inspected and maintained.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<b>Other conditions affecting workers exposure</b>

Assumes process temperature up to 40.0 °C
Indoor use

**2.2.9. Control of worker exposure: Enclosed industrial use of mixture containing PTSI in continuous or batch processes in "tight" equipment with minor breaches (e.g. sampling, cleaning, maintenance) (PROC 2)**

<b>Product (Article) characteristics</b>
Covers concentrations up to 1.0 %
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Covers use up to 8.0 h/day
<b>Technical and organisational conditions and measures</b>
Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Ensure control measures are regularly inspected and maintained.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<b>Other conditions affecting workers exposure</b>
Assumes process temperature up to 40.0 °C
Indoor use

**2.2.10. Control of worker exposure: Enclosed industrial use of mixture containing PTSI in continuous or batch processes in equipment with minor breaches (e.g. sampling, cleaning, maintenance) (PROC 3)**

<b>Product (Article) characteristics</b>
Covers concentrations up to 1.0 %
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Covers use up to 8.0 h/day
<b>Technical and organisational conditions and measures</b>
Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Ensure control measures are regularly inspected and maintained.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>

<b>Other conditions affecting workers exposure</b>
Assumes process temperature up to 40.0 °C
Indoor use

### 2.2.11. Control of worker exposure: Industrial use of mixture containing PTSI in continuous or batch processes in equipment with breaches (e.g. dosing, sampling, cleaning, maintenance) (PROC 4)

<b>Product (Article) characteristics</b>
Covers concentrations up to 1.0 %
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Covers use up to 8.0 h/day
<b>Technical and organisational conditions and measures</b>
Use in semi-closed process with opportunity for exposure
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Ensure control measures are regularly inspected and maintained.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
Wear a respirator providing a minimum efficiency of 90.0 %; For further specification, refer to section 8 of the SDS. (Concentration of substance in product > 0.1%)
<b>Other conditions affecting workers exposure</b>
Assumes process temperature up to 40.0 °C
Indoor use

### 2.2.12. Control of worker exposure: Industrial use of mixture containing PTSI in open equipment (PROC 5)

<b>Product (Article) characteristics</b>
Covers concentrations up to 1.0 %
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Covers use up to 8.0 h/day
<b>Technical and organisational conditions and measures</b>
Open systems
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Ensure control measures are regularly inspected and maintained.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

For further specification, refer to section 8 of the SDS.
Wear a respirator providing a minimum efficiency of 90.0 %; For further specification, refer to section 8 of the SDS. (Concentration of substance in product > 0.1%)
<b>Other conditions affecting workers exposure</b>
Assumes process temperature up to 40.0 °C
Indoor use

### 2.2.13. Control of worker exposure: Industrial spraying of mixture containing PTSI (PROC 7)

<b>Product (Article) characteristics</b>
Covers concentrations up to 1.0 % (dermal) 0.5% (inhalation)
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Covers use up to 8.0 h/day
<b>Technical and organisational conditions and measures</b>
Open systems
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour)
Supervision in place to check that the risk management measures in place are being used correctly and operation conditions followed.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. For further specification, refer to section 8 of the SDS.
Wear a respirator providing a minimum efficiency of 90.0 %; For further specification, refer to section 8 of the SDS. (Concentration of substance in product > 0.1%)
<b>Other conditions affecting workers exposure</b>
Assumes process temperature up to 40.0 °C
Indoor use
Activity Class: Spray application of liquids - Surface spraying of liquids Application rate : 0.1 – 1 l/minute Spraying with high compressed air use

### 2.2.14. Control of worker exposure: Not enclosed non-dedicated transfers of chemicals (sampling, waste collection & transfer, charging, discharging) (PROC 8a)

<b>Product (Article) characteristics</b>
Covers concentrations up to 1.0 %
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Covers use up to 8.0 h/day
<b>Technical and organisational conditions and measures</b>
Open systems

Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Ensure control measures are regularly inspected and maintained.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. For further specification, refer to section 8 of the SDS.
Wear a respirator providing a minimum efficiency of 90.0 %; For further specification, refer to section 8 of the SDS. (Concentration of substance in product > 0.1%)
<b>Other conditions affecting workers exposure</b>
Assumes process temperature up to 40.0 °C
Indoor use

### 2.2.15. Control of worker exposure: Not enclosed dedicated transfer of chemicals (sampling, waste collection & transfer, charging, discharging) (PROC 8b)

<b>Product (Article) characteristics</b>
Covers concentrations up to 1.0 %
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Covers use up to 8.0 h/day
<b>Technical and organisational conditions and measures</b>
Semi-closed process with occasional controlled exposure
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Ensure control measures are regularly inspected and maintained.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. For further specification, refer to section 8 of the SDS.
Wear a respirator providing a minimum efficiency of 90.0 %; For further specification, refer to section 8 of the SDS. (Concentration of substance in product > 0.1%)
<b>Other conditions affecting workers exposure</b>
Assumes process temperature up to 40.0 °C
Indoor use

### 2.2.16. Control of worker exposure: Not enclosed transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC 9)

<b>Product (Article) characteristics</b>
Covers concentrations up to 1.0 %
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Covers use up to 8.0 h/day
<b>Technical and organisational conditions and measures</b>
Semi-closed process with occasional controlled exposure
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Ensure control measures are regularly inspected and maintained.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
Wear a respirator providing a minimum efficiency of 90.0 %; For further specification, refer to section 8 of the SDS. (Concentration of substance in product > 0.1%)
<b>Other conditions affecting workers exposure</b>
Assumes process temperature up to 40.0 °C
Indoor use

### 2.2.17. Control of worker exposure: Application with roller of brushing (PROC 10)

<b>Product (Article) characteristics</b>
Covers concentrations up to 1.0 %
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Covers use up to 8.0 h/day
<b>Technical and organisational conditions and measures</b>
Open systems
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Ensure control measures are regularly inspected and maintained.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. For further specification, refer to section 8 of the SDS.
Wear a respirator providing a minimum efficiency of 90.0 %; For further specification, refer to section 8 of the SDS. (Concentration of substance in product > 0.1%)
<b>Other conditions affecting workers exposure</b>
Assumes process temperature up to 40.0 °C
Indoor use



### 2.2.18. Control of worker exposure: Application via dipping or pouring (PROC 13)

<b>Product (Article) characteristics</b>
Covers concentrations up to 1.0 %
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Covers use up to 8.0 h/day
<b>Technical and organisational conditions and measures</b>
Open systems
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Ensure control measures are regularly inspected and maintained.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. For further specification, refer to section 8 of the SDS.
Wear a respirator providing a minimum efficiency of 90.0 %; For further specification, refer to section 8 of the SDS. (Concentration of substance in product > 0.1%)
<b>Other conditions affecting workers exposure</b>
Assumes process temperature up to 40.0 °C
Indoor use

### 2.2.19. Control of worker exposure: Tableting, compression, extrusion or pelletisation with mixture containing PTSI (PROC 14)

<b>Product (Article) characteristics</b>
Covers concentrations up to 1.0 %
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Covers use up to 8.0 h/day
<b>Technical and organisational conditions and measures</b>
Open systems
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Ensure control measures are regularly inspected and maintained.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
Wear a respirator providing a minimum efficiency of 90.0 %; For further specification, refer to section 8 of the SDS. (Concentration of substance in product > 0.1%)
<b>Other conditions affecting workers exposure</b>
Assumes process temperature up to 40.0 °C
Indoor use

**2.2.20. Control of worker exposure: Use of chemical in a laboratory environment, typically limited to 1 kg or 1 L of the chemical; working in extracted cabinet / booth / fume hood, if necessary (PROC 15)**

<b>Product (Article) characteristics</b>
Covers concentrations up to 1.0 %
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Covers use up to 8.0 h/day
<b>Technical and organisational conditions and measures</b>
Open systems
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Ensure control measures are regularly inspected and maintained.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
Wear a respirator providing a minimum efficiency of 90.0 %; For further specification, refer to section 8 of the SDS. (Concentration of substance in product > 0.1%)
<b>Other conditions affecting workers exposure</b>
Assumes process temperature up to 40.0 °C
Indoor use

**2.3. Exposure estimation and reference to its source**

**2.3.1. Environmental release and exposure: Industrial application of coatings and inks by spraying (ERC 5)**

Release route	Release rate	Release estimation method
<b>Water</b>	0.0 kg/day	Estimated release factor ( <i>CEPE SPERC 5.1a.v1 / 5.2a.v1</i> )
<b>Air</b>	8.8 kg/day	Estimated release factor ( <i>ESD Coatings</i> )
<b>Soil</b>	0 kg/day	Estimated release factor

Protection target	Exposure estimate (based on: EUSES 2.1.2)	RCR
Fresh water	1.599E-4 mg/L	<0.01
Sediment (freshwater)	9.19E-4 mg/kg dw	<0.01
Marine water	1.487E-5 mg/L	<0.01
Sediment (marine water)	8.549E-5 mg/kg dw	<0.01
Sewage Treatment Plant	0.0 mg/L	<0.01

Protection target	Exposure estimate (based on: EUSES 2.1.2)	RCR
Agricultural soil	8.05E-4 mg/kg dw	0.048

### 2.3.2. Environmental release and exposure: Industrial coil coating (ERC 5)

Release route	Release rate	Release estimation method
<b>Water</b>	0.9 kg/day	Estimated release factor (ECCA SPERC 5.1a.v1)
<b>Air</b>	0.0 kg/day	Estimated release factor (ECCA SPERC 5.1a.v1)
<b>Soil</b>	0.0 kg/day	Estimated release factor (ECCA SPERC 5.1a.v1)

Protection target	Exposure estimate (based on: EUSES 2.1.2)	RCR
Fresh water	0.006 mg/L	0.195
Sediment (freshwater)	0.034 mg/kg dw	0.195
Marine water	5.834E-4 mg/L	0.194
Sediment (marine water)	0.003 mg/kg dw	0.195
Sewage Treatment Plant	0.057 mg/L	0.142
Agricultural soil	0.003 mg/kg dw	0.174

### 2.3.3. Environmental release and exposure: Industrial use of paint, coatings in metal packaging (ERC 5)

Release route	Release rate	Release estimation method
<b>Water</b>	0.0 kg/day	Estimated release factor (EMPAC SPERC 5.1.v1)
<b>Air</b>	7.65 kg/day	Estimated release factor (EMPAC SPERC 5.1.v1)
<b>Soil</b>	0.0 kg/day	Estimated release factor (EMPAC SPERC 5.1.v1)

Protection target	Exposure estimate (based on: EUSES 2.1.2)	RCR
Fresh water	1.599E-4 mg/L	<0.01
Sediment (freshwater)	9.19E-4 mg/kg dw	<0.01
Marine water	1.487E-5 mg/L	<0.01
Sediment (marine water)	8.549E-5 mg/kg dw	<0.01
Sewage Treatment Plant	0.0 mg/L	<0.01
Agricultural soil	7.218E-4 mg/kg dw	0.043

### 2.3.4. Environmental release and exposure: Automotive vehicles (ERC 5)

Release route	Release rate	Release estimation method
Water	0.0 kg/day	Estimated release factor (ACEA SPERC 5.1a.v1)
Air	4.59 kg/day	Estimated release factor (ACEA SPERC 5.1a.v1)
Soil	33.0%	Estimated release factor (ACEA SPERC 5.1a.v1)

Protection target	Exposure estimate (based on: EUSES 2.1.2)	RCR
Fresh water	1.599E-4 mg/L	<0.01
Sediment (freshwater)	9.19E-4 mg/kg dw	<0.01
Marine water	1.487E-5 mg/L	<0.01
Sediment (marine water)	8.549E-5 mg/kg dw	<0.01
Sewage Treatment Plant	0.0 mg/L	<0.01
Agricultural soil	7.218E-4 mg/kg dw	0.043

### 2.3.5. Environmental release and exposure: Vehicle refinishing (ERC 5)

Release route	Release rate	Release estimation method
Water	0.0 kg/day	Estimated release factor (BFL/ZKF SPERC 5.3a.v1)
Air	10.0 kg/day	Estimated release factor (BFL/ZKF SPERC 5.3a.v1)
Soil	47.5%	Estimated release factor (BFL/ZKF SPERC 5.3a.v1)

Protection target	Exposure estimate (based on: EUSES 2.1.2)	RCR
Fresh water	1.599E-4 mg/L	<0.01
Sediment (freshwater)	9.19E-4 mg/kg dw	<0.01
Marine water	1.487E-5 mg/L	<0.01
Sediment (marine water)	8.549E-5 mg/kg dw	<0.01
Sewage Treatment Plant	0.0 mg/L	<0.01
Agricultural soil	9.437E-4 mg/kg dw	0.056

### 2.3.6. Environmental release and exposure: Industrial Use of Substances other than Solvents in Paper, Board and related Products / Woodworking and joinery / Footwear and Leather, Textile, Others Adhesives (ERC 5)

Release route	Release rate	Release estimation method
<b>Water</b>	0.0 kg/day	Estimated release factor (FEICA 5.1a.v1)
<b>Air</b>	7.65 kg/day	Estimated release factor (FEICA 5.1a.v1)
<b>Soil</b>	0.0%	Estimated release factor (FEICA 5.1a.v1)

Protection target	Exposure estimate (based on: EUSES 2.1.2)	RCR
Fresh water	1.599E-4 mg/L	<0.01
Sediment (freshwater)	9.19E-4 mg/kg dw	<0.01
Marine water	1.487E-5 mg/L	<0.01
Sediment (marine water)	8.549E-5 mg/kg dw	<0.01
Sewage Treatment Plant	0.0 mg/L	<0.01
Agricultural soil	7.218E-4 mg/kg dw	0.043

### 2.3.7. Environmental release and exposure: Industrial Use of Substances other than Solvents in Transportation (Automotive/aircraft/rail vehicles) / industrial Building Construction Adhesives (ERC 5)

Release route	Release rate	Release estimation method
<b>Water</b>	0.0 kg/day	Estimated release factor (FEICA 5.1b.v1)
<b>Air</b>	7.65 kg/day	Estimated release factor (FEICA 5.1b.v1)
<b>Soil</b>	0.0%	Estimated release factor (FEICA 5.1b.v1)

Protection target	Exposure estimate (based on: EUSES 2.1.2)	RCR
Fresh water	1.599E-4 mg/L	<0.01
Sediment (freshwater)	9.19E-4 mg/kg dw	<0.01
Marine water	1.487E-5 mg/L	<0.01
Sediment (marine water)	8.549E-5 mg/kg dw	<0.01
Sewage Treatment Plant	0.0 mg/L	<0.01
Agricultural soil	7.218E-4 mg/kg dw	0.043

**2.3.8. Worker exposure: Storage, blending operations, pipeline transport, etc. of mixture containing PTSI in technically “tight” equipment (PROC 1)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	<b>0.008 mg/m<sup>3</sup></b> (TRA Worker v3)	<0.01
Dermal, systemic, long term	<b>0.003 mg/kg bw/day</b> (TRA Worker v3)	<0.01
Combined, systemic, long term		<0.01

**2.3.9. Worker exposure: Enclosed industrial use of mixture containing PTSI in continuous or batch processes in "tight" equipment with minor breaches (e.g. sampling, cleaning, maintenance) (PROC 2)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	<b>0.822 mg/m<sup>3</sup></b> (TRA Worker v3)	0.254
Dermal, systemic, long term	<b>0.137 mg/kg bw/day</b> (TRA Worker v3)	0.149
Combined, systemic, long term		0.402

**2.3.10. Worker exposure: Enclosed industrial use of mixture containing PTSI in continuous or batch processes in equipment with minor breaches (e.g. sampling, cleaning, maintenance) (PROC 3)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	<b>2.465 mg/m<sup>3</sup></b> (TRA Worker v3)	0.761
Dermal, systemic, long term	<b>0.069 mg/kg bw/day</b> (TRA Worker v3)	0.075
Combined, systemic, long term		0.836

**2.3.11. Worker exposure: Industrial use of mixture containing PTSI in continuous or batch processes in equipment with breaches (e.g. dosing, sampling, cleaning, maintenance) (PROC 4)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	<b>0.411 mg/m<sup>3</sup></b> (TRA Worker v3)	0.127
Dermal, systemic, long term	<b>0.686 mg/kg bw/day</b> (TRA Worker v3)	0.746
Combined, systemic, long term		0.872

### 2.3.12. Worker exposure: Industrial use of mixture containing PTSI in open equipment (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	<b>0.411 mg/m<sup>3</sup></b> (TRA Worker v3)	0.127
Dermal, systemic, long term	<b>0.137 mg/kg bw/day</b> (TRA Worker v3)	0.149
Combined, systemic, long term		0.276

### 2.3.13. Worker exposure: Industrial spraying of mixture containing PTSI (PROC 7)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	<b>0.2 mg/m<sup>3</sup></b> (External Tool (ART v1.5))	0.062
Dermal, systemic, long term	<b>0.429 mg/kg bw/day</b> (TRA Worker v3)	0.466
Combined, systemic, long term		0.528

### 2.3.14. Worker exposure: Not enclosed non-dedicated transfers of chemicals (sampling, waste collection & transfer, charging, discharging) (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	<b>0.822 mg/m<sup>3</sup></b> (TRA Worker v3)	0.254
Dermal, systemic, long term	<b>0.137 mg/kg bw/day</b> (TRA Worker v3)	0.149
Combined, systemic, long term		0.403

### 2.3.15. Worker exposure: Not enclosed dedicated transfer of chemicals (sampling, waste collection & transfer, charging, discharging) (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	<b>0.411 mg/m<sup>3</sup></b> (TRA Worker v3)	0.127
Dermal, systemic, long term	<b>0.137 mg/kg bw/day</b> (TRA Worker v3)	0.149
Combined, systemic, long term		0.276

**2.3.16. Worker exposure: Not enclosed transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC 9)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	<b>0.411 mg/m<sup>3</sup></b> (TRA Worker v3)	0.127
Dermal, systemic, long term	<b>0.686 mg/kg bw/day</b> (TRA Worker v3)	0.746
Combined, systemic, long term		0.872

**2.3.17. Worker exposure: Application with roller of brushing (PROC 10)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	<b>0.822 mg/m<sup>3</sup></b> (TRA Worker v3)	0.254
Dermal, systemic, long term	<b>0.274 mg/kg bw/day</b> (TRA Worker v3)	0.298
Combined, systemic, long term		0.552

**2.3.18. Worker exposure: Application via dipping or pouring (PROC 13)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	<b>0.822 mg/m<sup>3</sup></b> (TRA Worker v3)	0.254
Dermal, systemic, long term	<b>0.137 mg/kg bw/day</b> (TRA Worker v3)	0.149
Combined, systemic, long term		0.403

**2.3.19. Worker exposure: Tableting, compression, extrusion or pelletisation with mixture containing PTSI (PROC 14)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	<b>0.411 mg/m<sup>3</sup></b> (TRA Worker v3)	0.127
Dermal, systemic, long term	<b>0.343 mg/kg bw/day</b> (TRA Worker v3)	0.373
Combined, systemic, long term		0.5



**2.3.20. Worker exposure: Use of chemical in a laboratory environment, typically limited to 1 kg or 1 L of the chemical; working in extracted cabinet / booth / fume hood, if necessary (PROC 15)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	<b>0.411 mg/m<sup>3</sup></b> (TRA Worker v3)	0.127
Dermal, systemic, long term	<b>0.034 mg/kg bw/day</b> (TRA Worker v3)	0.037
Combined, systemic, long term		0.164

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

Scaling method: Exposure estimation tool used: ECETOC TRA v3. ART v1.5. EUSES.  
 Scalable Parameters: exposure duration and maximum concentration. All other parameters have to be taken directly from the exposure scenario provided.  
 Boundaries of Scaling: RCRs not to be exceeded are given in Section 2.3 above.

## ES 3: Use by professional worker - Uses in Coatings, Adhesives, sealants

### 3.1. Title section

ES name: Use by professional worker - Professional use of coatings, sealants and adhesives containing PTSI

<b>Environment</b>	
CS 1: Professional application of coatings and inks - brushing/rolling	ERC 8f, ERC 8c
CS 2: Professional application of coatings and inks - spraying	ERC 8f, ERC 8c
CS 3: Wide dispersive use of substances other than solvents in adhesives and sealants	ERC 8f, ERC 8c
<b>Worker</b>	
CS 4: Enclosed batch processes with occasional exposure (e.g. cavity filling)	PROC 3
CS 5: Open batch/continuous processes with opportunity for exposure (e.g. cavity filling)	PROC 4
CS 6: Open mixing	PROC 5
CS 7: Not enclosed transfer of chemicals (waste collection & transfer, charging, discharging)	PROC 8a
CS 8: Rolling or brushing	PROC 10
CS 9: Spray foam application by professional workers using PPE	PROC 11
CS 10: Application of coatings via dipping or pouring	PROC 13

### 3.2. Conditions of use affecting exposure

#### 3.2.1. Control of environmental exposure: Professional application of coatings and inks - brushing/rolling (ERC 8f, ERC 8c)

<b>Amount used, frequency and duration of use (or from service life)</b>
Daily local widespread use amount: <= 8.922E-5 tonnes/day
Emission Days (days/year): 225
<b>Technical and organisational conditions and measures</b>
Covers indoor and outdoor use
<b>Conditions and measures related to biological sewage treatment plant</b>
Municipal STP: Yes [Effectiveness Water: 87.36%]
Assumed domestic sewage treatment plant flow >= 2000 m3/day
<b>Conditions and measures related to treatment of waste (including article waste)</b>
External treatment and disposal of waste should comply with applicable local and/or national regulations.

<b>Other conditions affecting environmental exposure</b>
Receiving surface water flow $\geq$ 18000 m <sup>3</sup> /day

### 3.2.2. Control of environmental exposure: Professional application of coatings and inks – spraying (ERC 8f, ERC 8c)

<b>Amount used, frequency and duration of use (or from service life)</b>
Daily local widespread use amount: $\leq$ 8.922E-5 tonnes/day
Emission Days (days/year): 225
<b>Technical and organisational conditions and measures</b>
Covers indoor and outdoor use
<b>Conditions and measures related to biological sewage treatment plant</b>
Municipal STP: Yes [Effectiveness Water: 87.36%]
Assumed domestic sewage treatment plant flow $\geq$ 2000 m <sup>3</sup> /day
<b>Conditions and measures related to treatment of waste (including article waste)</b>
External treatment and disposal of waste should comply with applicable local and/or national regulations.
<b>Other conditions affecting environmental exposure</b>
Receiving surface water flow $\geq$ 18000 m <sup>3</sup> /day

### 3.2.3. Control of environmental exposure: Wide dispersive Use of Substances other than Solvents in Adhesives and Sealants (ERC 8f, ERC 8c)

<b>Amount used, frequency and duration of use (or from service life)</b>
Daily local widespread use amount: $\leq$ 5.5E-5 tonnes/day
Emission Days (days/year): 365
<b>Technical and organisational conditions and measures</b>
Covers indoor and outdoor use
Application of solvent-borne or water-borne products
Equipment cleaned with water, washing disposed of with wastewater. Worst case assumption for solvent-borne products.
Process with efficient use of raw materials.
<b>Conditions and measures related to biological sewage treatment plant</b>
Municipal STP: Yes [Effectiveness Water: 87.36%]
Assumed domestic sewage treatment plant flow $\geq$ 2000 m <sup>3</sup> /day
<b>Conditions and measures related to treatment of waste (including article waste)</b>
External treatment and disposal of waste should comply with applicable local and/or national regulations.
<b>Other conditions affecting environmental exposure</b>

Receiving surface water flow $\geq$ 18000 m <sup>3</sup> /day
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### 3.2.4. Control of worker exposure: Enclosed batch processes with occasional exposure (e.g. cavity filling) (PROC 3)

<b>Product (Article) characteristics</b>
Covers concentrations up to 1.0 %
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Covers use up to 8.0 h/day
<b>Technical and organisational conditions and measures</b>
Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Assumes a good basic standard of occupational hygiene is implemented
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<b>Other conditions affecting workers exposure</b>
Assumes process temperature up to 40.0 °C
Indoor use

### 3.2.5. Control of worker exposure: Open batch/continuous processes with opportunity for exposure (e.g. cavity filling) (PROC 4)

<b>Product (Article) characteristics</b>
Covers concentrations up to 1.0 %
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Covers use up to 8.0 h/day
<b>Technical and organisational conditions and measures</b>
Use in semi-closed process with opportunity for exposure
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Assumes a good basic standard of occupational hygiene is implemented
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. For further specification, refer to section 8 of the SDS.
Wear a respirator providing a minimum efficiency of 90.0 %; For further specification, refer to section 8 of the SDS. (Concentration of substance in product > 0.1%)
<b>Other conditions affecting workers exposure</b>
Assumes process temperature up to 40.0 °C

Indoor use
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### 3.2.6. Control of worker exposure: Open mixing (PROC 5)

<b>Product (Article) characteristics</b>
Covers concentrations up to 1.0 %
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Covers use up to 8.0 h/day
<b>Technical and organisational conditions and measures</b>
Open systems
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Assumes a good basic standard of occupational hygiene is implemented
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. For further specification, refer to section 8 of the SDS.
Wear a respirator providing a minimum efficiency of 90.0 %; For further specification, refer to section 8 of the SDS. (Concentration of substance in product > 0.1%)
<b>Other conditions affecting workers exposure</b>
Assumes process temperature up to 40.0 °C
Indoor use

### 3.2.7. Control of worker exposure: Not enclosed transfer of chemicals (waste collection & transfer, charging, discharging) (PROC 8a)

<b>Product (Article) characteristics</b>
Covers concentrations up to 1.0 %
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Covers use up to 8.0 h/day
<b>Technical and organisational conditions and measures</b>
Open systems
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Assumes a good basic standard of occupational hygiene is implemented
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. For further specification, refer to section 8 of the SDS.
Wear a respirator providing a minimum efficiency of 90.0 %; For further specification, refer to section 8 of the SDS. (Concentration of substance in product > 0.1%)
<b>Other conditions affecting workers exposure</b>
Assumes process temperature up to 40.0 °C

Indoor use
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### 3.2.8. Control of worker exposure: Rolling or brushing (PROC 10)

<b>Product (Article) characteristics</b>
Covers concentrations up to 1.0 %
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Covers use up to 8.0 h/day
<b>Technical and organisational conditions and measures</b>
Open systems
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Assumes a good basic standard of occupational hygiene is implemented
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. For further specification, refer to section 8 of the SDS.
Wear a respirator providing a minimum efficiency of 90.0 %; For further specification, refer to section 8 of the SDS. (Concentration of substance in product > 0.1%)
<b>Other conditions affecting workers exposure</b>
Assumes process temperature up to 40.0 °C
Indoor use

### 3.2.9. Control of worker exposure: Spray foam application by professional workers using PPE (PROC 11)

<b>Product (Article) characteristics</b>
Covers concentrations up to 1.0 % (dermal) 0.5% (inhalation)
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Covers use up to 8.0 h/day
<b>Technical and organisational conditions and measures</b>
Open systems
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour)
Supervision in place to check that the risk management measures in place are being used correctly and operation conditions followed.
Assumes a good basic standard of occupational hygiene is implemented
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
Wear a respirator providing a minimum efficiency of 90.0 %; For further specification, refer to section 8 of the SDS. (Concentration of substance in product > 0.1%)
<b>Other conditions affecting workers exposure</b>
Assumes process temperature up to 40.0 °C

Activity Class: Spray application of liquids - Surface spraying of liquids Application rate : 0.3 – 3 l/minute Spraying with high compressed air use
Indoor use

### 3.2.10. Control of worker exposure: Application of coatings via dipping or pouring (PROC 13)

<b>Product (Article) characteristics</b>
Covers concentrations up to 1.0 %
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Covers use up to 8.0 h/day
<b>Technical and organisational conditions and measures</b>
Open systems
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Assumes a good basic standard of occupational hygiene is implemented
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. For further specification, refer to section 8 of the SDS.
Wear a respirator providing a minimum efficiency of 90.0 %; For further specification, refer to section 8 of the SDS. (Concentration of substance in product > 0.1%)
<b>Other conditions affecting workers exposure</b>
Assumes process temperature up to 40.0 °C
Indoor use

## 3.3. Exposure estimation and reference to its source

### 3.3.1. Environmental release and exposure: Professional application of coatings and inks - brushing/rolling (ERC 8f, ERC 8c)

Release route	Release rate	Release estimation method
<b>Water</b>	8.922E-4 kg/day	Estimated release factor (CEPE SPERC 8f.2a.v1)
<b>Air</b>	0%	Estimated release factor (CEPE SPERC 8f.2a.v1)
<b>Soil</b>	0.5%	Estimated release factor (CEPE SPERC 8f.2a.v1)

Protection target	Exposure estimate (based on: EUSES 2.1.2)	RCR
Fresh water	1.655E-4 mg/L	<0.01

Protection target	Exposure estimate (based on: EUSES 2.1.2)	RCR
Sediment (freshwater)	9.514E-4 mg/kg dw	<0.01
Marine water	1.544E-5 mg/L	<0.01
Sediment (marine water)	8.873E-5 mg/kg dw	<0.01
Sewage Treatment Plant	5.637E-5 mg/L	<0.01
Agricultural soil	2.528E-4 mg/kg dw	0.015

### 3.3.2. Environmental release and exposure: Professional application of coatings and inks - spraying (ERC 8f, ERC 8c)

Release route	Release rate	Release estimation method
<b>Water</b>	0.002 kg/day	Estimated release factor (CEPE SPERC 8f.3a.v1)
<b>Air</b>	2.2%	Estimated release factor (CEPE SPERC 8f.3a.v1)
<b>Soil</b>	0.5%	Estimated release factor (CEPE SPERC 8f.3a.v1)

Protection target	Exposure estimate (based on: EUSES 2.1.2)	RCR
Fresh water	1.712E-4 mg/L	<0.01
Sediment (freshwater)	9.838E-4 mg/kg dw	<0.01
Marine water	1.6E-5 mg/L	<0.01
Sediment (marine water)	9.197E-5 mg/kg dw	<0.01
Sewage Treatment Plant	1.127E-4 mg/L	<0.01
Agricultural soil	2.554E-4 mg/kg dw	0.015

### 3.3.3. Environmental release and exposure: Wide dispersive Use of Substances other than Solvents in Adhesives and Sealants (ERC 8f, ERC 8c)

Release route	Release rate	Release estimation method
<b>Water</b>	8.25E-4 kg/day	Estimated release factor (FEICA 8c.3.v1)
<b>Air</b>	0%	Estimated release factor (FEICA 8c.3.v1)
<b>Soil</b>	0%	Estimated release factor (FEICA 8c.3.v1)

Protection target	Exposure estimate (based on: EUSES 2.1.2)	RCR
Fresh water	1.651E-4 mg/L	<0.01
Sediment (freshwater)	9.489E-4 mg/kg dw	<0.01



Protection target	Exposure estimate (based on: EUSES 2.1.2)	RCR
Marine water	1.54E-5 mg/L	<0.01
Sediment (marine water)	8.849E-5 mg/kg dw	<0.01
Sewage Treatment Plant	5.212E-5 mg/L	<0.01
Agricultural soil	2.526E-4 mg/kg dw	0.015

### 3.3.4. Worker exposure: Enclosed batch processes with occasional exposure (e.g. cavity filling) (PROC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	<b>2.465 mg/m<sup>3</sup></b> (TRA Worker v3)	0.761
Dermal, systemic, long term	<b>0.069 mg/kg bw/day</b> (TRA Worker v3)	0.075
Combined, systemic, long term		0.836

### 3.3.5. Worker exposure: Open batch/continuous processes with opportunity for exposure (e.g. cavity filling) (PROC 4)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	<b>0.822 mg/m<sup>3</sup></b> (TRA Worker v3)	0.254
Dermal, systemic, long term	<b>0.069 mg/kg bw/day</b> (TRA Worker v3)	0.075
Combined, systemic, long term		0.328

### 3.3.6. Worker exposure: Open mixing (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	<b>0.822 mg/m<sup>3</sup></b> (TRA Worker v3)	0.254
Dermal, systemic, long term	<b>0.137 mg/kg bw/day</b> (TRA Worker v3)	0.149
Combined, systemic, long term		0.403

### 3.3.7. Worker exposure: Not enclosed transfer of chemicals (waste collection & transfer, charging, discharging) (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	<b>2.054 mg/m<sup>3</sup></b> (TRA Worker v3)	0.634
Dermal, systemic, long term	<b>0.137 mg/kg bw/day</b> (TRA Worker v3)	0.149
Combined, systemic, long term		0.783

### 3.3.8. Worker exposure: Rolling or brushing (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	<b>2.054 mg/m<sup>3</sup></b> (TRA Worker v3)	0.634
Dermal, systemic, long term	<b>0.274 mg/kg bw/day</b> (TRA Worker v3)	0.298
Combined, systemic, long term		0.932

### 3.3.9. Worker exposure: Spray foam application by professional workers using PPE (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	<b>0.3 mg/m<sup>3</sup></b> (External Tool (ART v1.5))	0.093
Dermal, systemic, long term	<b>0.107 mg/kg bw/day</b> (TRA Worker v3)	0.116
Combined, systemic, long term		0.209

### 3.3.10. Worker exposure: Application of coatings via dipping or pouring (PROC 13)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	<b>0.822 mg/m<sup>3</sup></b> (TRA Worker v3)	0.254
Dermal, systemic, long term	<b>0.137 mg/kg bw/day</b> (TRA Worker v3)	0.149
Combined, systemic, long term		0.403

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

Scaling method: Exposure estimation tool used: ECETOC TRA v3. ART v1.5. EUSES.  
 Scalable Parameters: exposure duration and maximum concentration. All other parameters have to be taken directly from the exposure scenario provided.  
 Boundaries of Scaling: RCRs not to be exceeded are given in Section 3.3 above.

## ES 4: Consumer Use - Uses in Coatings, Adhesives, sealants

### 4.1. Title section

ES name: Consumer use of coatings, sealants and adhesives containing PTSI

<b>Environment</b>	
CS 1: Consumer application of coatings and inks - brushing/rolling	ERC 8f, ERC 8c
CS 2: Wide dispersive Use of Substances other than Solvents in Adhesives and Sealants	ERC 8f, ERC 8c
<b>Consumer</b>	
CS 3: Consumer use of adhesives and sealants - rolling / brushing	PC 1
CS 4: Consumer use of adhesives and sealants - spraying	PC 1
CS 5: Consumer use of coatings and paints - rolling / brushing	PC 9a
CS 6: Consumer use of coatings and paints - spraying	PC 9a

### 4.2. Conditions of use affecting exposure

#### 4.2.1. Control of environmental exposure: Consumer application of coatings and inks - brushing/rolling (ERC 8f, ERC 8c)

<b>Amount used, frequency and duration of use (or from service life)</b>
-
<b>Technical and organisational conditions and measures</b>
Covers indoor and outdoor use
<b>Conditions and measures related to biological sewage treatment plant</b>
Municipal STP: Yes [Effectiveness Water: 87.36%]
<b>Conditions and measures related to treatment of waste (including article waste)</b>
External treatment and disposal of waste should comply with applicable local and/or national regulations.
<b>Other conditions affecting environmental exposure</b>
-

#### 4.2.2. Control of environmental exposure: Wide dispersive Use of Substances other than Solvents in Adhesives and Sealants (ERC 8f, ERC 8c)

<b>Amount used, frequency and duration of use (or from service life)</b>
-
<b>Technical and organisational conditions and measures</b>
Covers indoor and outdoor use
<b>Conditions and measures related to biological sewage treatment plant</b>
Municipal STP: Yes [Effectiveness Water: 87.36%]
<b>Conditions and measures related to treatment of waste (including article waste)</b>
External treatment and disposal of waste should comply with applicable local and/or national regulations.
<b>Other conditions affecting environmental exposure</b>
Equipment cleaned with water, washing disposed of with wastewater. Worst case assumption for solvent-borne products.

#### 4.2.3. Control of consumer exposure: Consumer use of adhesives and sealants - rolling / brushing (PC 1)

<b>Product (article) characteristics</b>
Product (Sub-)Categories: Glues, DIY-use (carpet glue, tile glue, wood parquet glue)
Covers concentrations up to 0.5 %
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Exposure duration: 132 minutes
Covers use up to 1.0 events per day
<b>Other conditions affecting consumers exposure</b>
Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.

#### 4.2.4. Control of consumer exposure: Consumer use of adhesives and sealants - spraying (PC 1)

<b>Product (article) characteristics</b>
Product (Sub-)Categories: Glue from spray
Covers concentrations up to 0.5 %
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Exposure duration: 20 minutes
Covers use up to 1.0 events per day
<b>Other conditions affecting consumers exposure</b>
Assumes that potential dermal contact is limited to fingertips

#### 4.2.5. Control of consumer exposure: Consumer use of coatings and paints - rolling / brushing (PC 9a)

<b>Product (article) characteristics</b>
Product (Sub-)Categories: Solvent rich, high solid, water borne paint
Covers concentrations up to 0.5 %
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Exposure duration: 132 minutes
Covers use up to 1.0 events per day
<b>Other conditions affecting consumers exposure</b>
Assumes that potential dermal contact is limited to Inside hands / one hand / palm of hands

#### 4.2.6. Control of consumer exposure: Consumer use of coatings and paints - spraying (PC 9a)

<b>Product (article) characteristics</b>
Product (Sub-)Categories: Aerosol spray can
Covers concentrations up to 0.5 %
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Exposure duration: 20 minutes
Covers use up to 1.0 events per day
<b>Other conditions affecting consumers exposure</b>
-

### 4.3. Exposure estimation and reference to its source

#### 4.3.1. Environmental release and exposure: Consumer application of coatings and inks - brushing/rolling (ERC 8f, ERC 8c)

Release route	Release rate	Release estimation method
<b>Water</b>	5.5E-4 kg/day	Estimated release factor (CEPE SPERC 8f.2a.v1)
<b>Air</b>	0%	Estimated release factor (CEPE SPERC 8f.2a.v1)
<b>Soil</b>	0.5%	Estimated release factor (CEPE SPERC 8f.2a.v1)

Protection target	Exposure estimate (based on: EUSES 2.1.2)	RCR
Fresh water	1.634E-4 mg/L	<0.01
Sediment (freshwater)	9.389E-4 mg/kg dw	<0.01

Protection target	Exposure estimate (based on: EUSES 2.1.2)	RCR
Marine water	1.522E-5 mg/L	<0.01
Sediment (marine water)	8.749E-5 mg/kg dw	<0.01
Sewage Treatment Plant	3.475E-5 mg/L	<0.01
Agricultural soil	2.518E-4 mg/kg dw	0.015

#### 4.3.2. Environmental release and exposure: Wide dispersive Use of Substances other than Solvents in Adhesives and Sealants (ERC 8f, ERC 8c)

Release route	Release rate	Release estimation method
Water	8.25E-4 kg/day	Estimated release factor (FEICA 8c.3.v1)
Air	0%	Estimated release factor (FEICA 8c.3.v1)
Soil	0%	Estimated release factor (FEICA 8c.3.v1)

Protection target	Exposure estimate (based on: EUSES 2.1.2)	RCR
Fresh water	1.651E-4 mg/L	<0.01
Sediment (freshwater)	9.489E-4 mg/kg dw	<0.01
Marine water	1.54E-5 mg/L	<0.01
Sediment (marine water)	8.849E-5 mg/kg dw	<0.01
Sewage Treatment Plant	5.212E-5 mg/L	<0.01
Agricultural soil	2.526E-4 mg/kg dw	0.015

#### 4.3.3. Consumer exposure: Consumer use of adhesives and sealants - rolling / brushing (PC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	<b>0.38 mg/m<sup>3</sup></b> (External Tool (ART v1.5))	0.475
Dermal, systemic, long term	<b>0.179 mg/kg bw/day</b> (TRA Worker v3)	0.388
Combined, systemic, long term		0.863

#### 4.3.4. Consumer exposure: Consumer use of adhesives and sealants - spraying (PC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	<b>0.083 mg/m<sup>3</sup></b> (External Tool (ART v1.5))	0.104
Dermal, systemic, long term	<b>0.015 mg/kg bw/day</b> (TRA Worker v3)	0.032
Combined, systemic, long term		0.136

#### 4.3.5. Consumer exposure: Consumer use of coatings and

### paints - rolling / brushing (PC 9a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	<b>0.38 mg/m<sup>3</sup></b> (External Tool (ART v1.5))	0.475
Dermal, systemic, long term	<b>0.179 mg/kg bw/day</b> (TRA Worker v3)	0.388
Combined, systemic, long term		0.863

### 4.3.6. Consumer exposure: Consumer use of coatings and paints - spraying (PC 9a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	<b>0.083 mg/m<sup>3</sup></b> (External Tool (ART v1.5))	0.104
Dermal, systemic, long term	<b>0 mg/kg bw/day</b> (TRA Worker v3)	0
Combined, systemic, long term		0.104

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

Scaling method: Exposure estimation tool used: ECETOC TRA v3. ART v1.5. EUSES.  
 Scalable Parameters: exposure duration and maximum concentration. All other parameters have to be taken directly from the exposure scenario provided.  
 Boundaries of Scaling: RCRs not to be exceeded are given in Section 4.3 above.

## ES 5: Use at industrial site - Use as an intermediate (PC 29 - Pharmaceuticals)

### 5.1. Title section

ES name: Use at industrial site - Intermediate use PTSI in pharmaceuticals

<b>Environment</b>	
CS 1: Industrial use as an intermediate in the manufacture of pharmaceutical products	ERC 6a
<b>Worker</b>	
CS 2: Storage, blending operations, pipeline transport, etc. in technically "tight" equipment	PROC 1
CS 3: Enclosed intermediate use of PTSI in continuous or batch processes in "tight" equipment with minor breaches (e.g. sampling)	PROC 2
CS 4: Enclosed intermediate use of PTSI in continuous or batch processes in equipment with minor breaches (e.g. sampling)	PROC 3
CS 5: Intermediate use of PTSI in equipment with breaches	PROC 4
CS 6: Open intermediate use of PTSI	PROC 5
CS 7: Tank truck unloading	PROC 8a
CS 8: Transfer from drums at non-dedicated facilities	PROC 8a
CS 9: Tank truck unloading with vapour return line / Transfer from drum with dedicated equipment under use-specific safety standards	PROC 8b
CS 10: Transfer of PTSI to or from cans with dedicated equipment under industrial safety standards	PROC 9
CS 11: Use of chemical in a laboratory environment, typically limited to 1 kg or 1 L of the chemical; working in extracted cabinet / booth / fume hood, if necessary	PROC 15

### 5.2. Conditions of use affecting exposure

#### 5.2.1. Control of environmental exposure: Industrial use as an intermediate in the manufacture of pharmaceutical products (ERC 6a)

<b>Amount used, frequency and duration of use (or from service life)</b>
Daily amount per site <= 0.236 tonnes/day
Annual amount per site <= 4.71 tonnes/year
<b>Technical and organisational conditions and measures</b>
<b>Conditions and measures related to biological sewage treatment plant</b>
Municipal STP: Yes [Effectiveness Water: 87.36%]
Assumed domestic sewage treatment plant flow >= 2000 m3/day
<b>Conditions and measures related to treatment of waste (including article waste)</b>



External treatment and disposal of waste should comply with applicable local and/or national regulations.
<b>Other conditions affecting environmental exposure</b>
Receiving surface water flow $\geq$ 18000 m <sup>3</sup> /day

### 5.2.2. Control of worker exposure: Storage, blending operations, pipeline transport, etc. in technically “tight” equipment (PROC 1)

<b>Product (Article) characteristics</b>
Covers concentrations up to 100.0 %
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Covers use up to 8.0 h/day
<b>Technical and organisational conditions and measures</b>
Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Ensure control measures are regularly inspected and maintained.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<b>Other conditions affecting workers exposure</b>
Assumes process temperature up to 40.0 °C
Indoor use

### 5.2.3. Control of worker exposure: Enclosed intermediate use of PTSI in continuous or batch processes in "tight" equipment with minor breaches (e.g. sampling) (PROC 2)

<b>Product (Article) characteristics</b>
Covers concentrations up to 100.0 %
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Covers use up to 8.0 h/day
<b>Technical and organisational conditions and measures</b>
Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Ensure control measures are regularly inspected and maintained.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training. For further specification, refer to section 8 of the SDS.
<b>Other conditions affecting workers exposure</b>

Assumes process temperature up to 40.0 °C
Activity Class: Activities with open liquid surfaces or open reservoirs – Activities with agitated surfaces Duration: 465 minutes Surfaces > 3 m <sup>2</sup>
Activity Class: Transfer of liquid products - Falling liquids Duration: 15 minutes Application rate : 0.1 – 1 l/minute Handling that reduces contact between product and adjacent air Submerged loading
Indoor use

#### **5.2.4. Control of worker exposure: Enclosed intermediate use of PTSI in continuous or batch processes in equipment with minor breaches (e.g. sampling) (PROC 3)**

<b>Product (Article) characteristics</b>
Covers concentrations up to 100.0 %
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Covers use up to 8.0 h/day
<b>Technical and organisational conditions and measures</b>
Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Ensure control measures are regularly inspected and maintained.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. For further specification, refer to section 8 of the SDS.
<b>Other conditions affecting workers exposure</b>
Assumes process temperature up to 40.0 °C
Activity Class: Activities with open liquid surfaces or open reservoirs – Activities with agitated surfaces Duration: 465 minutes Surfaces > 3 m <sup>2</sup>
Activity Class: Transfer of liquid products - Falling liquids Duration: 15 minutes Application rate : 0.1 – 1 l/minute Handling that reduces contact between product and adjacent air Submerged loading
Indoor use

#### **5.2.5. Control of worker exposure: Intermediate use of PTSI in equipment with breaches (PROC 4)**

<b>Product (Article) characteristics</b>
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Covers concentrations up to 100.0 %
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Covers use up to 8.0 h/day
<b>Technical and organisational conditions and measures</b>
Semi-closed process with occasional controlled exposure
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Ensure control measures are regularly inspected and maintained.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. For further specification, refer to section 8 of the SDS.
Wear a respirator providing a minimum efficiency of 90.0 %; For further specification, refer to section 8 of the SDS. (Concentration of substance in product > 0.1%)
<b>Other conditions affecting workers exposure</b>
Assumes process temperature up to 40.0 °C
Activity Class: Activities with open liquid surfaces or open reservoirs – Activities with agitated surfaces Duration: 420 minutes Surfaces > 3 m <sup>2</sup>
Activity Class: Transfer of liquid products - Falling liquids Duration: 60 minutes Application rate : 100 – 1000 l/minute Handling that reduces contact between product and adjacent air Submerged loading
Indoor use

### 5.2.6. Control of worker exposure: Open intermediate use of PTSI (PROC 5)

<b>Product (Article) characteristics</b>
Covers concentrations up to 100.0 %
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Covers use up to 8.0 h/day
<b>Technical and organisational conditions and measures</b>
Open systems
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Ensure control measures are regularly inspected and maintained.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. For further specification, refer to section 8 of the SDS.
Wear a respirator providing a minimum efficiency of 90.0 %; For further specification, refer to section 8 of the SDS. (Concentration of substance in product > 0.1%)

<b>Other conditions affecting workers exposure</b>
Assumes process temperature up to 40.0 °C
Activity Class: Activities with open liquid surfaces or open reservoirs – Activities with agitated surfaces Surfaces > 3 m <sup>2</sup>
Indoor use

### 5.2.7. Control of worker exposure: Tank truck unloading (PROC 8a)

<b>Product (Article) characteristics</b>
Covers concentrations up to 100.0 %
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Covers use up to 8.0 h/day
<b>Technical and organisational conditions and measures</b>
Open systems
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Ensure control measures are regularly inspected and maintained.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. For further specification, refer to section 8 of the SDS.
Wear a respirator providing a minimum efficiency of 90.0 %; For further specification, refer to section 8 of the SDS. (Concentration of substance in product > 0.1%)
<b>Other conditions affecting workers exposure</b>
Assumes process temperature up to 40.0 °C
Activity Class: Handling of contaminated objects Duration : 30 minutes Contamination 10-90 % of surface Surfaces < 3 m <sup>2</sup>
Activity Class: Transfer of liquid products - Falling liquids Duration: 450 minutes Application rate : >1000 l/minute Handling that reduces contact between product and adjacent air Submerged loading
Indoor use

### 5.2.8. Control of worker exposure: Transfer from drums at non-dedicated facilities (PROC 8a)

<b>Product (Article) characteristics</b>
Covers concentrations up to 100.0 %
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Covers use up to 8.0 h/day

<b>Technical and organisational conditions and measures</b>
Open systems
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Ensure control measures are regularly inspected and maintained.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. For further specification, refer to section 8 of the SDS.
Wear a respirator providing a minimum efficiency of 90.0 %; For further specification, refer to section 8 of the SDS. (Concentration of substance in product > 0.1%)
<b>Other conditions affecting workers exposure</b>
Assumes process temperature up to 40.0 °C
Activity Class: Handling of contaminated objects Duration : 30 minutes Contamination 10-90 % of surface Surfaces < 3 m <sup>2</sup>
Activity Class: Transfer of liquid products - Falling liquids Duration: 450 minutes Application rate : 100 – 1000 l/minute Handling that reduces contact between product and adjacent air Submerged loading
Indoor use

### 5.2.9. Control of worker exposure: Tank truck unloading with vapour return line / Transfer from drum with dedicated equipment under use-specific safety standards (PROC 8b)

<b>Product (Article) characteristics</b>
Covers concentrations up to 100.0 %
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Covers use up to 8.0 h/day
<b>Technical and organisational conditions and measures</b>
Semi-closed process with occasional controlled exposure
Vapour recovery system. Air - minimum efficiency of 80%.
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Ensure control measures are regularly inspected and maintained.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. For further specification, refer to section 8 of the SDS.
Wear a respirator providing a minimum efficiency of 90.0 %; For further specification, refer to section 8 of the SDS. (Concentration of substance in product > 0.1%)

<b>Other conditions affecting workers exposure</b>
Assumes process temperature up to 40.0 °C
Activity Class: Handling of contaminated objects Duration : 30 minutes Contamination 10-90 % of surface Surfaces < 3 m <sup>2</sup>
Activity Class: Transfer of liquid products - Falling liquids Duration: 450 minutes Application rate : > 1000 l/minute Handling that reduces contact between product and adjacent air Submerged loading
Indoor use

### **5.2.10. Control of worker exposure: Transfer of PTSI to or from cans with dedicated equipment under industrial safety standards (PROC 9)**

<b>Product (Article) characteristics</b>
Covers concentrations up to 100.0 %
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Covers use up to 8.0 h/day
<b>Technical and organisational conditions and measures</b>
Semi-closed process with occasional controlled exposure
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Ensure control measures are regularly inspected and maintained.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' activity training. For further specification, refer to section 8 of the SDS.
Wear a respirator providing a minimum efficiency of 90.0 %; For further specification, refer to section 8 of the SDS. (Concentration of substance in product > 0.1%)
<b>Other conditions affecting workers exposure</b>
Assumes process temperature up to 40.0 °C
Activity Class: Transfer of liquid products - Falling liquids Application rate : 10 – 100 l/minute Handling that reduces contact between product and adjacent air Splash loading
Indoor use

### **5.2.11. Control of worker exposure: Use of chemical in a laboratory environment, typically limited to 1 kg or 1 L of the chemical; working in extracted cabinet / booth / fume hood, if necessary (PROC 15)**

<b>Product (Article) characteristics</b>
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Covers concentrations up to 100.0 %
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Covers use up to 8.0 h/day
<b>Technical and organisational conditions and measures</b>
Open systems
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Ensure control measures are regularly inspected and maintained.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' activity training. For further specification, refer to section 8 of the SDS.
Wear a respirator providing a minimum efficiency of 90.0 %; For further specification, refer to section 8 of the SDS. (Concentration of substance in product > 0.1%)
<b>Other conditions affecting workers exposure</b>
Assumes process temperature up to 40.0 °C
Activity Class: Activities with open liquid surfaces or open reservoirs – Activities with agitated surfaces Duration: 15 minutes Surfaces < 3 m <sup>2</sup>
Activity Class: Transfer of liquid products - Falling liquids Duration: 15 minutes Application rate : 0.1 – 1 l/minute Handling that reduces contact between product and adjacent air Splash loading
Activity Class: Transfer of liquid products - Falling liquids Duration: 15 minutes Application rate : <0.1 l/minute
Activities with open liquid surfaces or open reservoirs – Activities with undisturbed surfaces Duration: 435 minutes Surfaces <0.1 m <sup>2</sup>
Indoor use

### 5.3. Exposure estimation and reference to its source

#### 5.3.1. Environmental release and exposure: Industrial use as an intermediate in the manufacture of pharmaceutical products (ERC 6a)

Release route	Release rate	Release estimation method
<b>Water</b>	4.71 kg/day	Estimated release factor (ERC based)
<b>Air</b>	0.002 kg/day	Estimated release factor (ERC based)
<b>Soil</b>	0.1%	Estimated release factor (ERC based)

Protection target	Exposure estimate (based on: EUSES 2.1.2)	RCR
Fresh water	0.03 mg/L	0.997
Sediment (freshwater)	0.172 mg/kg dw	1
Marine water	0.003 mg/L	0.997
Sediment (marine water)	0.017 mg/kg dw	0.999
Sewage Treatment Plant	0.298 mg/L	0.744
Agricultural soil	0.014 mg/kg dw	0.846

### 5.3.2. Worker exposure: Storage, blending operations, pipeline transport, etc. in technically “tight” equipment (PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	<b>0.082 mg/m<sup>3</sup></b> (TRA Worker v3)	0.025
Dermal, systemic, long term	<b>0.034 mg/kg bw/day</b> (TRA Worker v3)	0.037
Combined, systemic, long term		0.062

### 5.3.3. Worker exposure: Enclosed intermediate use of PTSI in continuous or batch processes in "tight" equipment with minor breaches (e.g. sampling) (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	<b>0.18 mg/m<sup>3</sup></b> (External Tool (ART v1.5))	0.056
Dermal, systemic, long term	<b>0.137 mg/kg bw/day</b> (TRA Worker v3)	0.149
Combined, systemic, long term		0.205

### 5.3.4. Worker exposure: Enclosed intermediate use of PTSI in continuous or batch processes in equipment with minor breaches (e.g. sampling) (PROC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	<b>0.18 mg/m<sup>3</sup></b> (External Tool (ART v1.5))	0.056
Dermal, systemic, long term	<b>0.069 mg/kg bw/day</b> (TRA Worker v3)	0.075
Combined, systemic, long term		0.131

### 5.3.5. Worker exposure: Intermediate use of PTSI in equipment with breaches (PROC 4)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	<b>0.17 mg/m<sup>3</sup></b> (External Tool (ART v1.5))	0.052
Dermal, systemic, long term	<b>0.686 mg/kg bw/day</b> (TRA Worker v3)	0.746



Route of exposure and type of effects	Exposure estimate	RCR
Combined, systemic, long term		0.798

### 5.3.6. Worker exposure: Open intermediate use of PTSI (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	<b>0.19 mg/m<sup>3</sup></b> (External Tool (ART v1.5))	0.059
Dermal, systemic, long term	<b>0.686 mg/kg bw/day</b> (TRA Worker v3)	0.745
Combined, systemic, long term		0.804

### 5.3.7. Worker exposure: Tank truck unloading (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	<b>0.24 mg/m<sup>3</sup></b> (External Tool (ART v1.5))	0.074
Dermal, systemic, long term	<b>0.686 mg/kg bw/day</b> (TRA Worker v3)	0.745
Combined, systemic, long term		0.819

### 5.3.8. Worker exposure: Transfer from drums at non-dedicated facilities (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	<b>0.11 mg/m<sup>3</sup></b> (External Tool (ART v1.5))	0.034
Dermal, systemic, long term	<b>0.686 mg/kg bw/day</b> (TRA Worker v3)	0.745
Combined, systemic, long term		0.779

### 5.3.9. Worker exposure: Tank truck unloading with vapour return line / Transfer from drum with dedicated equipment under use-specific safety standards (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	<b>0.035 mg/m<sup>3</sup></b> (External Tool (ART v1.5))	0.011
Dermal, systemic, long term	<b>0.686 mg/kg bw/day</b> (TRA Worker v3)	0.745
Combined, systemic, long term		0.756

### 5.3.10. Worker exposure: Transfer of PTSI to or from cans with dedicated equipment under industrial safety standards (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	<b>0.056 mg/m<sup>3</sup></b> (External Tool (ART v1.5))	0.017
Dermal, systemic, long term	<b>0.686 mg/kg bw/day</b> (TRA Worker v3)	0.746

Route of exposure and type of effects	Exposure estimate	RCR
Combined, systemic, long term		0.763

**5.3.11. Worker exposure: Use of chemical in a laboratory environment, typically limited to 1 kg or 1 L of the chemical; working in extracted cabinet / booth / fume hood, if necessary (PROC 15)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	<b>0.086 mg/m<sup>3</sup></b> (External Tool (ART v1.5))	0.027
Dermal, systemic, long term	<b>0.034 mg/kg bw/day</b> (TRA Worker v3)	0.037
Combined, systemic, long term		0.064

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

Scaling method: Exposure estimation tool used: ECETOC TRA v3. ART v1.5. EUSES.  
 Scalable Parameters: exposure duration and maximum concentration. All other parameters have to be taken directly from the exposure scenario provided.  
 Boundaries of Scaling: RCRs not to be exceeded are given in Section 5.3 above.