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TSP12

Version 2

Date de révision 11.10.2011

Date d'impression 12.10.2011

1. Identification de la substance/ du mélange et de la société/ l'entreprise

1.1 Identificateur de produit

Matériel-Numéro : 2493
Numéro d'enregistrement : 01-2119489800-32-0002
Nom de la substance : Phosphoric acid, trisodium salt, dodecahydrate
No. de la substance : 231-509-8

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

Utilisation de la substance/du mélange : Raw material / additiv / pigment / auxiliary material for chemical processes and technical applications, Agents de nettoyage, alcalins., Produit chimique pour le traitement de l'eau, Produit pharmaceutique, Additif alimentaire, Additif pour cosmétiques, Matière première pour l'industrie

1.3 Renseignements concernant le fournisseur de la fiche de données de sécurité

Société : Chemische Fabrik Budenheim KG
Rheinstraße 27
55257 Budenheim
Téléphone : +496139890
Téléfax : +49613989264
Service responsable : EHS@budenheim.com

1.4 Numéro d'appel d'urgence

Numéro d'appel d'urgence : +49(0) 6131-19240

2. Identification des dangers

2.1 Classification de la substance ou du mélange

Classification (RÈGLEMENT (CE) No 1272/2008)

Irritation cutanée, Catégorie 2 H315: Provoque une irritation cutanée.
Irritation oculaire, Catégorie 2 H319: Provoque une sévère irritation des yeux.
Toxicité spécifique pour certains organes cibles - exposition unique, Catégorie 3 H335: Peut irriter les voies respiratoires.

Classification (67/548/CEE, 1999/45/CE)

Irritant R36/37/38: Irritant pour les yeux, les voies respiratoires et la peau.

2.2 Éléments d'étiquetage

Étiquetage (RÈGLEMENT (CE) No 1272/2008)

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Pictogrammes de danger :



Mention d'avertissement : Attention

Mentions de danger : H315 Provoque une irritation cutanée.
H319 Provoque une sévère irritation des yeux.
H335 Peut irriter les voies respiratoires.

Conseils de prudence : **Prévention:**
P280 Porter des gants de protection/ des vêtements de protection/ un équipement de protection des yeux/ du visage.

Intervention:
P302 + P352 EN CAS DE CONTACT AVEC LA PEAU: laver abondamment à l'eau et au savon.
P304 + P340 EN CAS D'INHALATION: transporter la victime à l'extérieur et la maintenir au repos dans une position où elle peut confortablement respirer.

P305 + P351 + P338 EN CAS DE CONTACT AVEC LES YEUX: rincer avec précaution à l'eau pendant plusieurs minutes. Enlever les lentilles de contact si la victime en porte et si elles peuvent être facilement enlevées. Continuer à rincer.

2.3 Autres dangers

3. Composition/ informations sur les composants

3.1 Substances

Nom Chimique	No.-CAS No.-EINECS / No. ELINCS	Concentration [%]
Phosphoric acid, trisodium salt, dodecahydrate	10101-89-0 231-509-8	<= 100

4. Premiers secours

4.1 Description des premiers secours

Conseils généraux : S'éloigner de la zone dangereuse.

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- | | |
|---------------------------------|--|
| En cas d'inhalation | : En cas d'inhalation, transporter la personne hors de la zone contaminée.
Si les troubles se prolongent, consulter un médecin. |
| En cas de contact avec la peau | : Oter immédiatement les vêtements et les chaussures contaminés.
Laver au savon avec une grande quantité d'eau.
Si les troubles se prolongent, consulter un médecin. |
| En cas de contact avec les yeux | : Rincer immédiatement l'oeil (les yeux) à grande eau.
Si l'irritation oculaire persiste, consulter un médecin spécialiste. |
| En cas d'ingestion | : Appeler un médecin.
Se rincer la bouche à l'eau. |

4.2 Principaux symptômes et effets, aigus et différés

4.3 Indication des éventuels soins médicaux immédiats et traitements particuliers nécessaires

5. Mesures de lutte contre l'incendie

5.1 Moyens d'extinction

- | | |
|--------------------------------|--|
| Moyens d'extinction appropriés | : Utiliser de l'eau pulvérisée, de la mousse résistant à l'alcool, de la poudre sèche ou du dioxyde de carbone.
Utiliser des moyens d'extinction appropriés aux conditions locales et à l'environnement voisin. |
|--------------------------------|--|

5.2 Dangers particuliers résultant de la substance ou du mélange

- | | |
|--|---|
| Dangers spécifiques pendant la lutte contre l'incendie | : Ne pas laisser pénétrer l'eau d'extinction contaminée dans les égouts ou les cours d'eau. |
|--|---|

5.3 Conseils aux pompiers

- | | |
|---|--|
| Équipement de protection spécial pour le personnel préposé à la lutte contre le feu | : En cas d'incendie, porter un appareil de protection respiratoire autonome. |
| Information supplémentaire | : Collecter séparément l'eau d'extinction contaminée, ne pas la rejeter dans les canalisations.
Les résidus d'incendie et l'eau d'extinction contaminée doivent être éliminés conformément à la réglementation locale en vigueur. |

6. Mesures à prendre en cas de dispersion accidentelle

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

- | | |
|---------------------------|---|
| Précautions individuelles | : Utiliser un équipement de protection individuelle.
Éviter la formation de poussière. |
|---------------------------|---|

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Éviter l'inhalation de la poussière.
Assurer une ventilation adéquate.

6.2 Précautions pour la protection de l'environnement

Précautions pour la protection de l'environnement : Ne pas déverser dans des eaux de surface ou dans les égouts.

6.3 Méthodes et matériel de confinement et de nettoyage

Méthodes de nettoyage : Utiliser un équipement de manutention mécanique.
Conserver dans des récipients adaptés et fermés pour l'élimination.

6.4 Référence à d'autres sections

7. Manipulation et stockage

7.1 Précautions à prendre pour une manipulation sans danger

Conseils pour une manipulation sans danger : Éviter le contact avec la peau et les yeux.
Ne pas manger, fumer ou boire dans la zone de travail.

Indications pour la protection contre l'incendie et l'explosion : Mesures préventives habituelles pour la protection contre l'incendie.

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

Exigences concernant les aires de stockage et les conteneurs : Tenir le récipient bien fermé dans un endroit sec et bien aéré.

7.3 Utilisation(s) finale(s) particulière(s)

8. Contrôles de l'exposition/ protection individuelle

8.1 Paramètres de contrôle

Ne contient pas de substances avec des valeurs limites d'exposition professionnelle.

8.2 Contrôles de l'exposition

Équipement de protection individuelle

Protection respiratoire : En cas de formation de poussière ou d'aérosol, utiliser un respirateur avec un filtre homologué.

Protection des mains : Gants en polyalcool vinylique ou en caoutchouc nitrile-butyle
Les gants de protection sélectionnés doivent satisfaire aux spécifications de la Directive EU 89/686/CEE et au standard EN 374 qui en dérive.

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L'aptitude des gants pour un poste de travail spécifique devrait être discuté avec le fournisseur de gants de protection.

- Protection des yeux : Lunettes de sécurité à protection intégrale
- Protection de la peau et du corps : Tenue de protection étanche à la poussière
- Mesures d'hygiène : À manipuler conformément aux bonnes pratiques d'hygiène industrielle et aux consignes de sécurité.
Se laver les mains avant les pauses et à la fin de la journée de travail.

Contrôles d'exposition liés à la protection de l'environnement

- Conseils généraux : Ne pas déverser dans des eaux de surface ou dans les égouts.

9. Propriétés physiques et chimiques

9.1 Informations sur les propriétés physiques et chimiques essentielles

- Aspect : cristallisé
- Couleur : incolore
- Odeur : inodore
- Point d'éclair : Note: non applicable
- Indice de combustion : 1
- pH : 11,8 - 12,0 à 10,00 g/l
20 °C
- Point/intervalle de fusion : 75 °C
- Point/intervalle d'ébullition : Note: donnée non disponible
- Masse volumique apparente : 900 kg/m³
- Hydrosolubilité : 200 g/l
à 20 °C

9.2 Autres informations

10. Stabilité et réactivité

10.1 Réactivité

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10.2 Stabilité chimique

10.3 Possibilité de réactions dangereuses

Réactions dangereuses : Pas de réactions dangereuses connues dans les conditions normales d'utilisation.

10.4 Conditions à éviter

Conditions à éviter : donnée non disponible

10.5 Matières incompatibles

10.6 Produits de décomposition dangereux

Produits de décomposition dangereux : Pas de décomposition si le produit est entreposé et utilisé selon les prescriptions.

11. Informations toxicologiques

11.1 Informations sur les effets toxicologiques

Toxicité aiguë

Corrosion cutanée/irritation cutanée

Irritation de la peau : Remarques: Peut causer des irritations de la peau et/ou dermatites.

Irritation de la peau

Phosphoric acid, trisodium salt, dodecahydrate : Résultat: Irritant pour la peau.

Lésions oculaires graves/irritation oculaire

Irritation des yeux : Remarques: Les poussières du produit peuvent être irritantes pour les yeux, la peau et l'appareil respiratoire.

Irritation des yeux

Phosphoric acid, trisodium salt, dodecahydrate : Résultat: Irritant pour les yeux.

Sensibilisation respiratoire ou cutanée

Sensibilisation : Remarques: donnée non disponible

Toxique systémique pour un organe cible - expositions répétées

12. Informations écologiques

12.1 Toxicité

12.2 Persistance et dégradabilité

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12.3 Potentiel de bioaccumulation

12.4 Mobilité dans le sol

12.5 Résultats des évaluations PBT et VPVB

12.6 Autres effets néfastes

Information écologique supplémentaire : Il n'y a pas d'informations disponibles pour ce produit.

13. Considérations relatives à l'élimination

13.1 Méthodes de traitement des déchets

Produit : Remettre les excédents et les solutions non recyclables à une entreprise d'élimination des déchets agréée.
: Éliminer conformément aux Directives Européennes sur les déchets et les déchets dangereux.

Emballages contaminés : Vider les restes.
Éliminer comme produit non utilisé.
Ne pas réutiliser des récipients vides.

14. Informations relatives au transport

ADR

Marchandise non dangereuse

IATA

Marchandise non dangereuse

IMDG

Marchandise non dangereuse

RID

Marchandise non dangereuse

15. Informations réglementaires

15.1 Réglementations/législation particulières à la substance ou au mélange en matière de sécurité, de santé et d'environnement

Candidate List of Substances of Very High Concern for Authorisation : N'est pas interdite ni/ou contrôlée

Classe de contamination de l'eau (Allemagne) : WGK 1 pollue faiblement l'eau

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État actuel de notification

REACH	: N'est pas en conformité avec l'inventaire
CH INV	: N'est pas en conformité avec l'inventaire
US.TSCA	: Pas dans l'inventaire TSCA
DSL	: Ce produit contient les composants suivants qui ne sont ni sur la liste canadienne LIS ni sur la liste LES.
AICS	: Listé ou en conformité avec l'inventaire
NZIoC	: Listé ou en conformité avec l'inventaire
ENCS	: N'est pas en conformité avec l'inventaire
ISHL	: N'est pas en conformité avec l'inventaire
KECI	: N'est pas en conformité avec l'inventaire
PICCS	: Listé ou en conformité avec l'inventaire
IECSC	: Listé ou en conformité avec l'inventaire

15.2 Évaluation de la sécurité chimique

16. Autres informations

Texte intégral des phrases R mentionnées sous les Chapitres 2 et 3

R36/37/38 Irritant pour les yeux, les voies respiratoires et la peau.

Texte complet des Phrases-H citées dans les sections 2 et 3.

H315 Provoque une irritation cutanée.
H319 Provoque une sévère irritation des yeux.
H335 Peut irriter les voies respiratoires.

Les informations contenues dans la présente fiche 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, et 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.

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SUMMARY OF EXPOSURE SCENARIOS
Trisodium orthophosphate (TSP)
EC: 231-509-8

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Exposure Scenario 1: Manufacture of TSP

1. Short title of exposure scenario 1	
Manufacture of trisodium orthophosphate	
2. Description of activities and processes covered in the exposure scenario	
Sector of use (SU)	SU 3: Industrial uses: Uses of the substance as such or in preparations at industrial sites. SU 8: Manufacture of bulk, large scale chemicals (including petroleum products). SU 9: Manufacture of fine chemicals.
Product category (PC)	Not applicable
Process category (PROC)	PROC 2: Use in closed, continuous process with occasional controlled exposure. PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities. PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing). PROC 26: Handling of solid inorganic substances at ambient temperature.
Article category (AC)	Not applicable
Environmental release category (ERC)	ERC 1: Manufacture of substances
3. Operational conditions	
3.1 Operational conditions related with frequency and quantities of use	
Duration of exposure at workplace:	24 hours/day (3 working shifts of 8 hours/shift)
Frequency of exposure at workplace:	365 days/year for each worker
Annual amount used per site:	The daily and annual amount/emission per site is not considered to be the main determinant for environmental exposure.
3.2 Operational conditions related with substance/ product	
Physical state	Solid / Liquid
Concentration of substance in	No information about the concentration of the substance in dilute and concentrated solutions is available. In the first-tier assessment of exposure the concentration of

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mixture	TSP in solutions was 10% w/w. A concentration of 100% w/w was used to assess exposure to the solid substance.
3.3 Other relevant operational conditions	
. No information about frequency and duration of the various tasks is available. In the first-tier assessment of exposure a frequency of once a day and an exposure duration of 8 hours was considered. Workers are unlikely to be permanently subject to actual or potential exposure during the entire working shift.	
4. Risk Management Measures	
4.1 RMMs related to workers	
Organisational measures	The employer has also to ascertain that the required PPE is available and used according to instructions. PPE are required when breaching the system or handling the pure substance and concentrated solutions.
Technical measures	<ul style="list-style-type: none"> • Use closed/ automated systems or covering of open containers (e.g. screens) to avoid irritating mists, sprayings and potential splashes. (Good practice) • Transport over pipes, technical barrel filling/emptying of barrel with automatic systems (suction pumps etc.) (Good practice) • Use of pliers, grip arms with long handles with manual use "to avoid direct contact and exposure by splashes (no working over one's head)" (Good practice) • Store in cool, dry, clean, well ventilate areas. (Good practice). • Local exhaust / general ventilation should be present when solids are handled to reduce the likelihood of inhalation exposure to dusts.
Respiratory protection	Respiratory protection: Respiratory protection is not required but exposure to dusts from the handling of solid materials should be reduced by the use of local exhaust ventilation. If local exhaust ventilation is not present then in may be necessary to use respiratory protection.
Hand protection	Hand protection is required: impervious chemical resistant protective gloves. Material: chloroprene gloves or equivalent.
Eye protection	Wearing of eye/face protection is recommended. Goggles or face protection shield should be consistent with EN 166 or equivalent.
Skin and body protection	Wearing of suitable protective clothing and rubber boots is recommended.
Hygiene measures	Keep away from foodstuffs, drinks and tobacco. Wash hands before breaks and at end of work. Keep work clothes separate.
4.2 RMMs related to the environment	
Organisational measures	Emissions of particles into the air of workplaces or the atmosphere can be significantly reduced by the use of cyclones, gas scrubbers or bag filters.
Abatement measures related with wastewater	The efficiency of the process is maximised in such a way that minimal emission of phosphates into the wastewater will occur. In addition, phosphate can be precipitated from the wastewater by addition of metal ions.
Abatement measures waste air and solid	Solid and liquid waste has to be incinerated or appropriately disposed of as chemical waste.

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waste																																														
4.3 Waste related measures																																														
Type of waste	Liquid waste. Packaging material																																													
Disposal technique	The release of phosphates to wastewater is highly regulated. The residue of the containers or the used container itself should be disposed in accordance with local requirements.																																													
Fraction released to environment during waste treatment																																														
5. Prediction of exposure resulting from the conditions described above and the substance properties.																																														
5.1. Human exposure																																														
Workers (oral)	The manufacture and processing of TSP will not notably contribute to the oral intake of phosphates.																																													
Workers (inhalation) <i>DNEL: Worker, long-term, systemic, inhalation: 4.07 mg/m³</i>	<p>TSP is irritating to the eyes and the skin and causes transient respiratory tract irritation. Therefore, the use of safety goggles and dermal protection is compulsory when handling TSP. Further, local exhaust ventilation should be present during transfer of solid TSP to avoid high inhalation exposure concentrations.</p> <p>The DNEL for systemic long-term effects is 4.07 mg/m³ for inhalation exposure. This is compared to the predicted 8-hour time-weighted average inhalation exposure concentrations. The risk characterisation ratios (RCR, exposure concentration/DNEL) for long-term inhalation exposure are presented below. The RCRs for inhalation exposure are below (see table below) indicating that potential risks for worker health are controlled if the RMMs indicated above are implemented at the manufacture sites. It is concluded that the manufacture of TSP is safe for workers under the specified conditions of exposure.</p> <table border="1"> <thead> <tr> <th>Process Category</th> <th>Location</th> <th>LEV</th> <th>Duration (hours)</th> <th>PRE</th> <th>Content (% w/w)</th> <th>Airborne TSP conc. (mg/m³)</th> <th>RCR inhalation exposure</th> <th>Conclusion</th> </tr> </thead> <tbody> <tr> <td colspan="9">Industrial manufacture of solutions</td> </tr> <tr> <td>2</td> <td>Indoors</td> <td>No</td> <td>4 to 8</td> <td>No</td> <td>Up to 10</td> <td><0.41</td> <td><0.10</td> <td>Risk adequately controlled</td> </tr> <tr> <td>8b</td> <td>Indoors</td> <td>No</td> <td>4 to 8</td> <td>No</td> <td>Up to 10</td> <td><0.41</td> <td><0.10</td> <td>Risk adequately controlled</td> </tr> <tr> <td>9</td> <td>Indoors</td> <td>No</td> <td>4 to 8</td> <td>No</td> <td>Up to 10</td> <td><0.41</td> <td><0.10</td> <td>Risk adequately controlled</td> </tr> </tbody> </table>	Process Category	Location	LEV	Duration (hours)	PRE	Content (% w/w)	Airborne TSP conc. (mg/m ³)	RCR inhalation exposure	Conclusion	Industrial manufacture of solutions									2	Indoors	No	4 to 8	No	Up to 10	<0.41	<0.10	Risk adequately controlled	8b	Indoors	No	4 to 8	No	Up to 10	<0.41	<0.10	Risk adequately controlled	9	Indoors	No	4 to 8	No	Up to 10	<0.41	<0.10	Risk adequately controlled
Process Category	Location	LEV	Duration (hours)	PRE	Content (% w/w)	Airborne TSP conc. (mg/m ³)	RCR inhalation exposure	Conclusion																																						
Industrial manufacture of solutions																																														
2	Indoors	No	4 to 8	No	Up to 10	<0.41	<0.10	Risk adequately controlled																																						
8b	Indoors	No	4 to 8	No	Up to 10	<0.41	<0.10	Risk adequately controlled																																						
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	Industrial manufacture of solid products								
	2	Indoors	No	4 to 8	No	100	1	0.25	Risk adequately controlled
	8b	Indoors	No	4 to 8	No	100	25	6.14	RMMs needed to control risk
			90%	4 to 8	No	100	2.5	0.61	Risk adequately controlled
	2	Indoors	No	4 to 8	No	100	20	4.91	RMMs needed to control risk
			90%	4 to 8	No	100	2	0.49	Risk adequately controlled
Workers (dermal)	No systemic toxicity effects are expected due to the inorganic nature of the substance however local effects may occur but these effects will not be dose-dependant but will depend on the concentration of the substance present in the mixture/solution used in a specific application.								
Indirect exposure via the environment	No indirect exposure of humans via the environment is expected for TSP, as the substance can be effectively removed from the wastewater. Thus, no assessment of indirect exposure of humans via the environment is performed.								
Consumers	No direct consumer exposure is anticipated with the manufacture of TSP. It is concluded that the manufacture of TSP is of no risk for consumers.								
5.2. Environmental exposure (qualitative assessment)									
Environmental release	The production of TSP can potentially result in aquatic emissions and locally increase the phosphate (PO_4^{3-}) concentration. Phosphates reaching surface water increase the phosphorus content in the water body which may cause eutrophication and water quality deterioration.								
Waste water treatment plants (WWTP)	Phosphorus should be removed from industrial wastewater before it is released to the environment. This can be done by chemical treatment (by precipitation with the help of aluminium or iron addition) or biological treatments. A high degree of removal can be reliably achieved by the available phosphorus removal techniques. Site-specific conditions such as flow rate of the receiving surface water body and phosphorus concentration in the receiving surface water body should be taken into account when implementing an appropriate wastewater treatment. Council Directive 96/61/EC concerning integrated pollution prevention and control and national regulations concerning phosphates in industrial wastewater have to be followed to minimise the risk of eutrophication due to phosphate releases.								

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Aquatic pelagic compartment	No direct acute or long-term adverse effects on aqueous or terrestrial organisms are anticipated with orthophosphates in the environment.
Sediments	Not relevant.
Soil and groundwater	Not relevant.
Atmospheric compartment	Not relevant.
Secondary poisoning	Bioaccumulation in organisms is not relevant for inorganic phosphates.

Exposure Scenario 2: Use as a process aid in chemical synthesis

1. Short title of exposure scenario 2	
Use as process aid in chemical synthesis	
2. Description of activities and processes covered in the exposure scenario	
Sector of use (SU)	SU 3: Industrial uses: Uses of the substance as such or in preparations at industrial sites. SU 8: Manufacture of bulk, large scale chemicals (including petroleum products). SU 9: Manufacture of fine chemicals.
Product category (PC)	Not applicable
Process category (PROC)	PROC 2: Use in closed, continuous process with occasional controlled exposure. PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises. PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact). PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities.
Article category (AC)	Not applicable
Environmental release category (ERC)	ERC 1: Manufacture of substances ERC 4: Industrial use of processing aids in processes and products, not becoming part of articles.
3. Operational conditions	
3.1 Operational conditions related with frequency and quantities of use	
Duration of exposure at	24 hours/day (3 working shifts of 8 hours/shift)

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workplace:	
Frequency of exposure at workplace:	365 days/year for each worker
Annual amount used per site:	The daily and annual amount/emission per site is not considered to be the main determinant for environmental exposure.
3.2 Operational conditions related with substance/ product	
Physical state	Solid / Liquid
Concentration of substance in mixture	No information about the concentration of the substance in dilute and concentrated solutions is available. In the first-tier assessment of exposure the concentration of TSP in solutions was 10% w/w. A concentration of 100% w/w was used to assess exposure to the solid substance.
3.3 Other relevant operational conditions	
. No information about frequency and duration of the various tasks is available. In the first-tier assessment of exposure a frequency of once a day and an exposure duration of 8 hours was considered. Workers are unlikely to be permanently subject to actual or potential exposure during the entire working shift.	
4. Risk Management Measures	
4.1 RMMs related to workers	
Organisational measures	The employer has also to ascertain that the required PPE is available and used according to instructions. PPE are required when handling the pure substance and solutions or mixtures containing TSP.
Technical measures	<ul style="list-style-type: none"> • Use closed/ automated systems or covering of open containers (e.g. screens) to avoid irritating mists, sprayings and potential splashes. (Good practice) • Transport over pipes, technical barrel filling/emptying of barrel with automatic systems (suction pumps etc.) (Good practice) • Use of pliers, grip arms with long handles with manual use "to avoid direct contact and exposure by splashes (no working over one's head)" (Good practice) • Store in cool, dry, clean, well ventilate areas. (Good practice). • Local exhaust / general ventilation should be present when solids are handled to reduce the likelihood of inhalation exposure to dusts.
Respiratory protection	Respiratory protection: Respiratory protection is not required but exposure to dusts from the handling of solid materials should be reduced by the use of local exhaust ventilation. If local exhaust ventilation is not present then in may be necessary to use respiratory protection.
Hand protection	Hand protection is required: impervious chemical resistant protective gloves. Material: chloroprene gloves or equivalent.
Eye protection	Wearing of eye/face protection is recommended. Goggles or face protection shield should be consistent with EN 166 or equivalent.
Skin and body	Wearing of suitable protective clothing and rubber boots is recommended.

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protection																	
Hygiene measures	Keep away from foodstuffs, drinks and tobacco. Wash hands before breaks and at end of work. Keep work clothes separate.																
4.2 RMMs related to the environment																	
Organisational measures	Emissions of particles into the air of workplaces or the atmosphere can be significantly reduced by the use of cyclones, gas scrubbers or bag filters.																
Abatement measures related with wastewater	The efficiency of the process is maximised in such a way that minimal emission of phosphates into the wastewater will occur. In addition, phosphate can be precipitated from the wastewater by addition of metal ions.																
Abatement measures waste air and solid waste	Solid and liquid waste has to be incinerated or appropriately disposed of as chemical waste.																
4.3 Waste related measures																	
Type of waste	Liquid waste. Packaging material																
Disposal technique	The release of phosphates to wastewater is highly regulated. The residue of the containers or the used container itself should be disposed in accordance with local requirements.																
Fraction released to environment during waste treatment																	
5. Prediction of exposure resulting from the conditions described above and the substance properties.																	
5.1. Human exposure																	
Workers (oral)	The use of TSP as a process aid in chemical synthesis will not notably contribute to the oral intake of phosphates.																
Workers (inhalation) <i>DNEL: Worker, long-term, systemic, inhalation: 4.07 mg/m³</i>	<p>TSP is irritating to the eyes and the skin and causes transient respiratory tract irritation. Therefore, the use of safety goggles and dermal protection is compulsory when handling TSP. Further, local exhaust ventilation should be present in areas where open processes with solid TSP are run and where transfer of solid TSP takes place to avoid high inhalation exposure concentrations.</p> <p>The DNEL for systemic long-term effects is 4.07 mg/m³ for inhalation exposure. This is compared to the predicted 8-hours time-weighted average inhalation exposure concentrations. The risk characterisation ratios (RCR, exposure concentration/DNEL) for long-term inhalation exposure are presented below. The RCRs for inhalation exposure are below indicating that potential risks for worker health are controlled if the RMMs indicated above are implemented at sites performing chemical synthesis. It is concluded that the use of TSP as a process aid is safe for workers under the specified conditions of exposure.</p> <table border="1"> <thead> <tr> <th>Process Category</th> <th>Location</th> <th>LEV</th> <th>Duration (hours)</th> <th>Content (% w/w)</th> <th>Airborne TSP conc.</th> <th>RCR inhalation exposure</th> <th>Conclusion</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Process Category	Location	LEV	Duration (hours)	Content (% w/w)	Airborne TSP conc.	RCR inhalation exposure	Conclusion								
Process Category	Location	LEV	Duration (hours)	Content (% w/w)	Airborne TSP conc.	RCR inhalation exposure	Conclusion										

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						(mg/m3)		
Industrial handling of solutions								
2	Indoors	No	4 to 8	Up to 10	<0.41	<0.10	Risk adequately controlled	
4	Indoors	No	4 to 8	Up to 10	<0.41	<0.10	Risk adequately controlled	
5	Indoors	No	4 to 8	Up to 10	<0.41	<0.10	Risk adequately controlled	
8b	Indoors	No	4 to 8	Up to 10	<0.41	<0.10	Risk adequately controlled	
Industrial handling of solid products with high dustiness								
2	Indoors	No	4 to 8	100	1.00	0.25	Risk adequately controlled	
4	Indoors	No	4 to 8	100	25	6.14	RMMs needed to control risk	
	Indoors	90%	4 to 8	100	2.50	0.61	Risk adequately controlled	
5	Indoors	No	4 to 8	100	25	6.14	RMMs needed to control risk	
	Indoors	90%	4 to 8	100	2.50	0.61	Risk adequately controlled	
8b	Indoors	No	4 to 8	100	25	6.14	RMMs needed to control risk	
	Indoors	90%	4 to 8	100	2.50	0.61	Risk adequately controlled	
Workers (dermal)	No systemic toxicity effects are expected due to the inorganic nature of the substance however local effects may occur but these effects will not be dose-dependant but will depend on the concentration of the substance present in the mixture/solution used in a specific application.							
Indirect exposure via the environment	No indirect exposure of humans via the environment is expected for TSP, as the substance can be effectively removed from the wastewater. Thus, no assessment of indirect exposure of humans via the environment is performed.							
Consumers	No direct consumer exposure is anticipated with the use of TSP as a process aid. It is concluded that the use of TSP as process aid is of no risk for consumers.							
5.2. Environmental exposure (qualitative assessment)								

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Environmental release	The use of TSP can potentially result in aquatic emissions and locally increase the phosphate (PO_4^{3-}) concentration. Phosphates reaching surface water increase the phosphorus content in the water body which may cause eutrophication and water quality deterioration.
Waste water treatment plants (WWTP)	Phosphorus should be removed from industrial wastewater before it is released to the environment. This can be done by chemical treatment (by precipitation with the help of aluminium or iron addition) or biological treatments. A high degree of removal can be reliably achieved by the available phosphorus removal techniques. Site-specific conditions such as flow rate of the receiving surface water body and phosphorus concentration in the receiving surface water body should be taken into account when implementing an appropriate wastewater treatment. Council Directive 96/61/EC concerning integrated pollution prevention and control and national regulations concerning phosphates in industrial wastewater have to be followed to minimise the risk of eutrophication due to phosphate releases.
Aquatic pelagic compartment	No direct acute or long-term adverse effects on aqueous or terrestrial organisms are anticipated with orthophosphates in the environment.
Sediments	Not relevant.
Soil and groundwater	Not relevant.
Atmospheric compartment	Not relevant.
Secondary poisoning	Bioaccumulation in organisms is not relevant for inorganic phosphates.

Exposure Scenario 3: Formulation of solid and liquid mixtures

1. Short title of exposure scenario 3	
Formulation of mixtures	
2. Description of activities and processes covered in the exposure scenario	
Sector of use (SU)	SU 10: formulation (mixing) of preparations and/or repackaging (excluding alloys)
Product category (PC)	Not applicable
Process category (PROC)	<p>PROC 1: Use in closed, continuous process, no likelihood of exposure.</p> <p>PROC 2: Use in closed, continuous process with occasional controlled exposure.</p> <p>PROC 3: Use in closed batch process (synthesis or formulation)</p> <p>PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises.</p> <p>PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact).</p> <p>PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities.</p> <p>PROC 9: Transfer of chemicals into small containers (dedicated filling line).</p>

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	PROC 14: Production of preparations or articles by tableting, compression, extrusion, pelletisation. PROC 15: Use of laboratory reagents in small scale laboratories.
Article category (AC)	Not applicable
Environmental release category (ERC)	ERC 2: formulation of preparations. ERC 8a: Wide dispersive indoor use of processing aids in open systems.
3. Operational conditions	
3.1 Operational conditions related with frequency and quantities of use	
Duration of exposure at workplace:	8 hours/day
Frequency of exposure at workplace:	Once a day
Annual amount used per site:	The daily and annual amount/emission per site is not considered to be the main determinant for environmental exposure.
3.2 Operational conditions related with substance/ product	
Physical state	Solid / Liquid
Concentration of substance in mixture	No information about the concentration of the substance in solutions or in solids is available. In the first-tier assessment of exposure the concentration of TSP in solutions was 10% w/w. A concentration of 100% w/w was used to assess exposure to the solid raw substance. A concentration of TSP in preparations of 10% w/w was considered to assess exposure to the formulated preparations.
3.3 Other relevant operational conditions	
. No information about frequency and duration of the various tasks is available. In the first-tier assessment of exposure a frequency of once a day and an exposure duration of 8 hours was considered. Workers are unlikely to be permanently subject to actual or potential exposure during the entire working shift.	
4. Risk Management Measures	
4.1 RMMs related to workers	
Organisational measures	The employer has also to ascertain that the required PPE is available and used according to instructions. PPE are required when handling the pure substance and solutions or mixtures containing TSP.
Technical measures	<ul style="list-style-type: none"> • Use closed/ automated systems or covering of open containers (e.g. screens) to avoid irritating mists, sprayings and potential splashes. (Good practice) • Transport over pipes, technical barrel filling/emptying of barrel with automatic systems (suction pumps etc.) (Good practice) • Use of pliers, grip arms with long handles with manual use "to avoid direct contact and exposure by splashes (no working over one's head)" (Good practice) • Store in cool, dry, clean, well ventilate areas. (Good practice). • Local exhaust / general ventilation should be present when solids are handled to reduce the likelihood of inhalation exposure to dusts.

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Respiratory protection	Respiratory protection: Respiratory protection is not required but exposure to dusts from the handling of solid materials should be reduced by the use of local exhaust ventilation. If local exhaust ventilation is not present then it may be necessary to use respiratory protection.
Hand protection	Hand protection is required: impervious chemical resistant protective gloves. Material: chloroprene gloves or equivalent.
Eye protection	Wearing of eye/face protection is recommended. Goggles or face protection shield should be consistent with EN 166 or equivalent.
Skin and body protection	Wearing of suitable protective clothing and rubber boots is recommended.
Hygiene measures	Keep away from foodstuffs, drinks and tobacco. Wash hands before breaks and at end of work. Keep work clothes separate.
4.2 RMMs related to the environment	
Organisational measures	Emissions of particles into the air of workplaces or the atmosphere can be significantly reduced by the use of cyclones, gas scrubbers or bag filters.
Abatement measures related with wastewater	The efficiency of the process is maximised in such a way that minimal emission of phosphates into the wastewater will occur. In addition, phosphate can be precipitated from the wastewater by addition of metal ions.
Abatement measures waste air and solid waste	Solid and liquid waste has to be incinerated or appropriately disposed of as chemical waste.
4.3 Waste related measures	
Type of waste	Liquid waste. Packaging material
Disposal technique	The release of phosphates to wastewater is highly regulated. The residue of the containers or the used container itself should be disposed in accordance with local requirements.
Fraction released to environment during waste treatment	
5. Prediction of exposure resulting from the conditions described above and the substance properties.	
5.1. Human exposure	
Workers (oral)	The use of TSP in the formulation of preparations will not notably contribute to the oral intake of phosphates.
Workers (inhalation) <i>DNEL: Worker, long-term, systemic,</i>	TSP is irritating to the eyes and the skin and causes transient respiratory tract irritation. Therefore, the use of safety goggles and dermal protection is compulsory when handling TSP. Further, local exhaust ventilation should be present in areas where open processes with solid TSP are run, where transfer of solid TSP takes place and where solid TSP is agglomerated to tablets to avoid high inhalation exposure

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inhalation: 4.07 mg/m³

concentrations. Further, laboratory work with solid TSP should be performed under a fume hood.

The DNEL for systemic long-term effects is 4.07 mg/m³ for inhalation exposure. This is compared to the predicted 8-hours time-weighted average inhalation exposure concentrations. The risk characterisation ratios (RCR, exposure concentration/DNEL) for long-term inhalation exposure are presented below. The RCRs for inhalation exposure are below 1 (see table below) indicating that potential risks for worker health are controlled if the RMMs indicated above are implemented at the formulation sites. It is concluded that formulation processes with TSP are safe for workers under the specified conditions of exposure.

Process Category	Location	LEV	Duration (hours)	Content (% w/w)	Airborne TSP conc. (mg/m ³)	RCR inhalation exposure	Conclusion
Industrial handling of solutions							
1	Indoors	No	4 to 8	Up to 10	<0.04	<0.01	Risk adequately controlled
2	Indoors	No	4 to 8	Up to 10	<0.41	<0.1	Risk adequately controlled
3	Indoors	No	4 to 8	Up to 10	<0.41	<0.1	Risk adequately controlled
4	Indoors	No	4 to 8	Up to 10	<0.41	<0.1	Risk adequately controlled
5	Indoors	No	4 to 8	Up to 10	<0.41	<0.1	Risk adequately controlled
8b	Indoors	No	4 to 8	Up to 10	<0.41	<0.1	Risk adequately controlled
9	Indoors	No	4 to 8	Up to 10	<0.41	<0.1	Risk adequately controlled
14	Indoors	No	4 to 8	Up to 10	<0.41	<0.1	Risk adequately controlled
15	Indoors	No	4 to 8	Up to 10	<0.41	<0.1	Risk adequately controlled
Industrial handling of solid products with high dustiness							
1	Indoors	No	4 to 8	100	0.01	0.0025	Risk adequately controlled
2	Indoors	No	4 to 8	100	1.00	0.25	Risk adequately controlled
3	Indoors	No	4 to 8	100	1.00	0.25	Risk adequately controlled
4	Indoors	No	4 to 8	100	25	6.14	RMMs needed to control risk

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		Indoors	90%	4 to 8	100	2.50	0.61	Risk adequately controlled
	5	Indoors	No	4 to 8	100	25	6.14	RMMs needed to control risk
		Indoors	90%	4 to 8	100	2.50	0.61	Risk adequately controlled
	8b	Indoors	No	4 to 8	100	25	6.14	RMMs needed to control risk
		Indoors	90%	4 to 8	100	2.50	0.61	Risk adequately controlled
	9	Indoors	No	4 to 8	100	20	4.91	RMMs needed to control risk
		Indoors	90%	4 to 8	100	2.00	0.49	Risk adequately controlled
	14	Indoors	No	4 to 8	100	10	2.46	RMMs needed to control risk
		Indoors	90%	4 to 8	100	1.00	0.25	Risk adequately controlled
	15	Indoors	No	4 to 8	100	5.00	1.23	RMMs needed to control risk
		Indoors	90%	4 to 8	100	0.50	0.12	Risk adequately controlled
Workers (dermal)	No systemic toxicity effects are expected due to the inorganic nature of the substance however local effects may occur but these effects will not be dose-dependant but will depend on the concentration of the substance present in the mixture/solution used in a specific application.							
Indirect exposure via the environment	No indirect exposure of humans via the environment is expected for TSP, as the substance can be effectively removed from the wastewater. Thus, no assessment of indirect exposure of humans via the environment is performed.							
Consumers	No direct consumer exposure is anticipated with the use of TSP in formulation of preparations. It is concluded that the use of TSP in formulation is of no risk for consumers.							
5.2. Environmental exposure (qualitative assessment)								
Environmental release	The use of TSP can potentially result in aquatic emissions and locally increase the phosphate (PO ₄ ³⁻) concentration. Phosphates reaching surface water increase the phosphorus content in the water body which may cause eutrophication and water quality deterioration.							

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Waste water treatment plants (WWTP)	Phosphorus should be removed from industrial wastewater before it is released to the environment. This can be done by chemical treatment (by precipitation with the help of aluminium or iron addition) or biological treatments. A high degree of removal can be reliably achieved by the available phosphorus removal techniques. Site-specific conditions such as flow rate of the receiving surface water body and phosphorus concentration in the receiving surface water body should be taken into account when implementing an appropriate wastewater treatment. Council Directive 96/61/EC concerning integrated pollution prevention and control and national regulations concerning phosphates in industrial wastewater have to be followed to minimise the risk of eutrophication due to phosphate releases.
Aquatic pelagic compartment	No direct acute or long-term adverse effects on aqueous or terrestrial organisms are anticipated with orthophosphates in the environment.
Sediments	Not relevant.
Soil and groundwater	Not relevant.
Atmospheric compartment	Not relevant.
Secondary poisoning	Bioaccumulation in organisms is not relevant for inorganic phosphates.

Exposure Scenario 4: Manufacture of dyes and auxiliary chemicals for textiles, leather, paper and manufacture of plastics

1. Short title of exposure scenario 4	
Manufacture of dyes and auxiliary chemicals for textiles, leather, paper and manufacture of plastics.	
2. Description of activities and processes covered in the exposure scenario	
Sector of use (SU)	SU 9: Manufacture of fine chemicals SU 10: Formulation (mixing) of preparations and/or repackaging (excluding alloys) SU 12: Manufacture of plastics products, including compounding and conversion.
Product category (PC)	Not applicable
Process category (PROC)	PROC 1: Use in closed, continuous process, no likelihood of exposure. PROC 3: Use in closed batch process (synthesis or formulation) PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises. PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact). PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities. PROC 9: Transfer of chemicals into small containers (dedicated filling line). PROC 15: Use of laboratory reagents in small scale laboratories. PROC 26: Handling of solid inorganic substances at ambient temperature.

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Article category (AC)	Not applicable
Environmental release category (ERC)	ERC 1: Manufacture of substances. ERC 2: formulation of preparations. ERC 4: Industrial uses of processing aids in processes and products, not becoming part of articles. ERC 6b: Industrial use of reactive processing aids. ERC 6d: Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers.
3. Operational conditions	
3.1 Operational conditions related with frequency and quantities of use	
Duration of exposure at workplace:	24 hours per day (3 x 8 hours shifts)
Frequency of exposure at workplace:	365 days per year
Annual amount used per site:	The daily and annual amount/emission per site is not considered to be the main determinant for environmental exposure.
3.2 Operational conditions related with substance/ product	
Physical state	Solid / Liquid
Concentration of substance in mixture	No information about the concentration of the substance in solutions or in solids is available. In the first-tier assessment of exposure the concentration of TSP in solutions was 10% w/w. A concentration of 100% w/w was used to assess exposure to the solid raw substance.
3.3 Other relevant operational conditions	
. No information about frequency and duration of the various tasks is available. In the first-tier assessment of exposure a frequency of once a day and an exposure duration of 8 hours was considered. Workers are unlikely to be permanently subject to actual or potential exposure during the entire working shift.	
4. Risk Management Measures	
4.1 RMMs related to workers	
Organisational measures	The employer has also to ascertain that the required PPE is available and used according to instructions. PPE are required when handling the pure substance and solutions or mixtures containing TSP.
Technical measures	<ul style="list-style-type: none"> • Use closed/ automated systems or covering of open containers (e.g. screens) to avoid irritating mists, sprayings and potential splashes. (Good practice) • Transport over pipes, technical barrel filling/emptying of barrel with automatic systems (suction pumps etc.) (Good practice) • Use of pliers, grip arms with long handles with manual use "to avoid direct contact and exposure by splashes (no working over one's head)" (Good practice) • Store in cool, dry, clean, well ventilate areas. (Good practice). • Local exhaust / general ventilation should be present when solids are handled to reduce the likelihood of inhalation exposure to dusts.

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Respiratory protection	Respiratory protection: Respiratory protection is not required but exposure to dusts from the handling of solid materials should be reduced by the use of local exhaust ventilation. If local exhaust ventilation is not present then it may be necessary to use respiratory protection.
Hand protection	Hand protection is required: impervious chemical resistant protective gloves. Material: chloroprene gloves or equivalent.
Eye protection	Wearing of eye/face protection is recommended. Goggles or face protection shield should be consistent with EN 166 or equivalent.
Skin and body protection	Wearing of suitable protective clothing and rubber boots is recommended.
Hygiene measures	Keep away from foodstuffs, drinks and tobacco. Wash hands before breaks and at end of work. Keep work clothes separate.
4.2 RMMs related to the environment	
Organisational measures	Emissions of particles into the air of workplaces or the atmosphere can be significantly reduced by the use of cyclones, gas scrubbers or bag filters.
Abatement measures related with wastewater	The efficiency of the process is maximised in such a way that minimal emission of phosphates into the wastewater will occur. In addition, phosphate can be precipitated from the wastewater by addition of metal ions.
Abatement measures waste air and solid waste	Solid and liquid waste has to be incinerated or appropriately disposed of as chemical waste.
4.3 Waste related measures	
Type of waste	Liquid waste. Packaging material
Disposal technique	The release of phosphates to wastewater is highly regulated. The residue of the containers or the used container itself should be disposed in accordance with local requirements.
Fraction released to environment during waste treatment	
5. Prediction of exposure resulting from the conditions described above and the substance properties.	
5.1. Human exposure	
Workers (oral)	The use of TSP in the manufacture of dyes and auxiliary chemicals for textiles, leather, paper and manufacture of plastics will not notably contribute to the oral intake of phosphates.
Workers (inhalation) <i>DNEL: Worker, long-term, systemic,</i>	TSP is irritating to the eyes and the skin and causes transient respiratory tract irritation. Therefore, the use of safety goggles and dermal protection is compulsory when handling TSP. Further, local exhaust ventilation should be present in areas where open processes with solid TSP are run, where transfer of solid TSP takes place and where solid TSP is agglomerated to tablets to avoid high inhalation

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*inhalation: 4.07
mg/m³*

exposure concentrations. Further, laboratory work with solid TSP should be performed under a fume hood.

The DNEL for systemic long-term effects is 4.07 mg/m³ for inhalation exposure. This is compared to the predicted 8-hours time-weighted average inhalation exposure concentrations. The risk characterisation ratios (RCR, exposure concentration/DNEL) for long-term inhalation exposure are presented below. The RCRs for inhalation exposure are below 1 indicating that potential risks for worker health are controlled if the RMMs indicated above are implemented at the industrial manufacturing sites. It is concluded that manufacture of dyes, auxiliary chemicals and plastics with TSP are safe for workers under the specified conditions of exposure.

Process Category	Location	LEV	Duration (hours)	Weight fraction (% w/w)	Airborne TSP conc. (mg/m ³)	RCR inhalation	Conclusion
Handling of solutions							
1	Indoors	No	4 to 8	Up to 10	<0.04	<0.01	Risk adequately controlled
3	Indoors	No	4 to 8	Up to 10	<0.41	<0.1	Risk adequately controlled
4	Indoors	No	4 to 8	Up to 10	<0.41	<0.1	Risk adequately controlled
5	Indoors	No	4 to 8	Up to 10	<0.41	<0.1	Risk adequately controlled
8b	Indoors	No	4 to 8	Up to 10	<0.41	<0.1	Risk adequately controlled
9	Indoors	No	4 to 8	Up to 10	<0.41	<0.1	Risk adequately controlled
15	Indoors	No	4 to 8	Up to 10	<0.41	<0.1	Risk adequately controlled
Handling of solid product with high dustiness							
1	Indoors	No	4 to 8	100	0.01	0.002	Risk adequately controlled
3	Indoors	No	4 to 8	100	1.00	0.246	Risk adequately controlled
4	Indoors	No	4 to 8	100	25	6.14	RMMs needed to control risk
	Indoors	90%	4 to 8	100	2.50	0.614	Risk adequately controlled
5	Indoors	No	4 to 8	100	25	6.14	RMMs

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								needed to control risk
		Indoors	90%	4 to 8	100	2.50	0.614	Risk adequately controlled
	8b	Indoors	No	4 to 8	100	25	6.14	RMMs needed to control risk
		Indoors	90%	4 to 8	100	2.50	0.614	Risk adequately controlled
	9	Indoors	No	4 to 8	100	20	4.91	RMMs needed to control risk
		Indoors	90%	4 to 8	100	2.00	0.491	Risk adequately controlled
	15	Indoors	No	4 to 8	100	5.00	1.229	RMMs needed to control risk
		Indoors	90%	4 to 8	100	0.50	0.123	Risk adequately controlled
Workers (dermal)	No systemic toxicity effects are expected due to the inorganic nature of the substance however local effects may occur but these effects will not be dose-dependant but will depend on the concentration of the substance present in the mixture/solution used in a specific application.							
Indirect exposure via the environment	No indirect exposure of humans via the environment is expected for TSP, as the substance can be effectively removed from the wastewater. Thus, no assessment of indirect exposure of humans via the environment is performed.							
Consumers	No direct consumer exposure is anticipated with the use of TSP in manufacture of dyes and auxiliary chemicals for textiles, leather, paper and manufacture of plastics. It is concluded that the use of TSP in manufacture of dyes and auxiliary chemicals for textiles, leather, paper and manufacture of plastics is of no risk for consumers.							
5.2. Environmental exposure (qualitative assessment)								
Environmental release	The use of TSP can potentially result in aquatic emissions and locally increase the phosphate (PO_4^{3-}) concentration. Phosphates reaching surface water increase the phosphorus content in the water body which may cause eutrophication and water quality deterioration.							
Waste water treatment plants (WWTP)	Phosphorus should be removed from industrial wastewater before it is released to the environment. This can be done by chemical treatment (by precipitation with the help of aluminium or iron addition) or biological treatments. A high degree of removal can be reliably achieved by the available phosphorus removal techniques. Site-specific conditions such as flow rate of the receiving surface water body and phosphorus concentration in the receiving surface water body should be taken into account when implementing an appropriate wastewater treatment. Council Directive 96/61/EC concerning integrated pollution prevention and control and national regulations concerning phosphates in industrial wastewater have to be followed to							

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	minimise the risk of eutrophication due to phosphate releases.
Aquatic pelagic compartment	No direct acute or long-term adverse effects on aqueous or terrestrial organisms are anticipated with orthophosphates in the environment.
Sediments	Not relevant.
Soil and groundwater	Not relevant.
Atmospheric compartment	Not relevant.
Secondary poisoning	Bioaccumulation in organisms is not relevant for inorganic phosphates.

Exposure Scenario 5: Ferrous metal surface treatment

1. Short title of exposure scenario 5	
Ferrous metal surface treatment.	
2. Description of activities and processes covered in the exposure scenario	
Sector of use (SU)	SU 14: Manufacture of basic metals, including alloys. SU 15: Manufacture of fabricated metal products, except machinery and equipment. SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Product category (PC)	Not applicable
Process category (PROC)	PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises. PROC 7: Industrial spraying. PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities. PROC 10: Roller application and brushing. PROC 13: Treatment of articles by dipping and pouring. PROC 19: Hand-mixing with intimate contact and only PPE available.
Article category (AC)	Not applicable
Environmental release category (ERC)	ERC 6b: Industrial use of reactive processing aids.
3. Operational conditions	
3. 1 Operational conditions related with frequency and quantities of use	
Duration of exposure at workplace:	24 hours per day (3 x 8 hours shifts)

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Frequency of exposure at workplace:	365 days per year
Annual amount used per site:	The daily and annual amount/emission per site is not considered to be the main determinant for environmental exposure.
3.2 Operational conditions related with substance/ product	
Physical state	Solid / Liquid
Concentration of substance in mixture	No information about the concentration of the substance in solutions or in solids is available. In the first-tier assessment of exposure the concentration of TSP in solutions was 10% w/w. A concentration of 100% w/w was used to assess exposure to the solid raw substance.
3.3 Other relevant operational conditions	
. No information about frequency and duration of the various tasks is available. In the first-tier assessment of exposure a frequency of once a day and an exposure duration of 8 hours was considered. Workers are unlikely to be permanently subject to actual or potential exposure during the entire working shift.	
4. Risk Management Measures	
4.1 RMMs related to workers	
Organisational measures	The employer has also to ascertain that the required PPE is available and used according to instructions. PPE are required when handling the pure substance and solutions or mixtures containing TSP.
Technical measures	<ul style="list-style-type: none"> • Use closed/ automated systems or covering of open containers (e.g. screens) to avoid irritating mists, sprayings and potential splashes. (Good practice) • Transport over pipes, technical barrel filling/emptying of barrel with automatic systems (suction pumps etc.) (Good practice) • Use of pliers, grip arms with long handles with manual use "to avoid direct contact and exposure by splashes (no working over one's head)" (Good practice) • Store in cool, dry, clean, well ventilate areas. (Good practice). • Breathing masks and local exhaust ventilation should be present during manual spraying of solutions onto metal surfaces.
Respiratory protection	Respiratory protection: Respiratory protection is not required but exposure to dusts from the handling of solid materials should be reduced by the use of local exhaust ventilation. If local exhaust ventilation is not present then in may be necessary to use respiratory protection.
Hand protection	Hand protection is required: impervious chemical resistant protective gloves. Material: chloroprene gloves or equivalent.
Eye protection	Wearing of eye/face protection is recommended. Goggles or face protection shield should be consistent with EN 166 or equivalent.
Skin and body protection	Wearing of suitable protective clothing and rubber boots is recommended.
Hygiene measures	Keep away from foodstuffs, drinks and tobacco. Wash hands before breaks and at end of work. Keep work clothes separate.

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4.2 RMMs related to the environment																			
Organisational measures	Emissions of particles into the air of workplaces or the atmosphere can be significantly reduced by the use of cyclones, gas scrubbers or bag filters.																		
Abatement measures related with wastewater	The efficiency of the process is maximised in such a way that minimal emission of phosphates into the wastewater will occur. In addition, phosphate can be precipitated from the wastewater by addition of metal ions.																		
Abatement measures waste air and solid waste	Solid and liquid waste has to be incinerated or appropriately disposed of as chemical waste.																		
4.3 Waste related measures																			
Type of waste	Liquid waste. Packaging material																		
Disposal technique	The release of phosphates to wastewater is highly regulated. The residue of the containers or the used container itself should be disposed in accordance with local requirements.																		
Fraction released to environment during waste treatment																			
5. Prediction of exposure resulting from the conditions described above and the substance properties.																			
5.1. Human exposure																			
Workers (oral)	The use of TSP in ferrous metal surface treatment will not notably contribute to the oral intake of phosphates.																		
Workers (inhalation) <i>DNEL: Worker, long-term, systemic, inhalation: 4.07 mg/m³</i>	<p>TSP is irritating to the eyes and the skin and causes transient respiratory tract irritation. Therefore, the use of safety goggles and dermal protection is compulsory when handling TSP. Further, local exhaust ventilation should be present in areas where spraying and hand-mixing with TSP solutions takes place. Alternatively, the workers may wear respiratory protection during spraying and hand-mixing.</p> <p>The DNEL for systemic long-term effects is 4.07 mg/m³ for inhalation exposure. This is compared to the predicted 8-hours time-weighted average inhalation exposure concentrations. The risk characterisation ratios (RCR, exposure concentration/DNEL) for long-term inhalation exposure are presented below. The RCRs for inhalation exposure are below 1 (see table below) indicating that potential risks for worker health are controlled if the RMMs indicated above are implemented at sites where ferrous metal surface treatment is performed. It is concluded that ferrous metal surface treatment with TSP is safe for workers under the specified conditions of exposure.</p> <table border="1" data-bbox="451 1780 1453 1900"> <thead> <tr> <th>Process Category</th> <th>Location</th> <th>LEV</th> <th>Duration (hours)</th> <th>PRE</th> <th>Content (% w/w)</th> <th>Airborne TSP conc. (mg/m³)</th> <th>RCR inhalation exposure</th> <th>Conclusion</th> </tr> </thead> <tbody> <tr> <td colspan="9">Industrial use of solutions</td> </tr> </tbody> </table>	Process Category	Location	LEV	Duration (hours)	PRE	Content (% w/w)	Airborne TSP conc. (mg/m ³)	RCR inhalation exposure	Conclusion	Industrial use of solutions								
Process Category	Location	LEV	Duration (hours)	PRE	Content (% w/w)	Airborne TSP conc. (mg/m ³)	RCR inhalation exposure	Conclusion											
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	4	Indoors	No	4 to 8	No	Up to 10	<0.41	<0.17	Risk adequately controlled
	7	Indoors	No	4 to 8	No	Up to 1	68.31	16.79	RMMs needed to control risk
		Indoors	90%	4 to 8	90%	Up to 1	0.68	0.167	Risk adequately controlled
	8b	Indoors	No	4 to 8	No	Up to 10	<0.41	<0.17	Risk adequately controlled
	13	Indoors	No	4 to 8	No	Up to 1	<0.07	<0.017	Risk adequately controlled
	10	Indoors	No	4 to 8	No	Up to 1	0.005	0.001	Risk adequately controlled
	19	Indoors	No	4 to 8	No	Up to 10	0.05	0.012	Risk adequately controlled
Workers (dermal)	No systemic toxicity effects are expected due to the inorganic nature of the substance however local effects may occur but these effects will not be dose-dependant but will depend on the concentration of the substance present in the mixture/solution used in a specific application.								
Indirect exposure via the environment	No indirect exposure of humans via the environment is expected for TSP, as the substance can be effectively removed from the wastewater. Thus, no assessment of indirect exposure of humans via the environment is performed.								
Consumers	No direct consumer exposure is anticipated with the use of TSP in ferrous metal surface treatment. It is concluded that the use of TSP in metal surface treatment is of no risk for consumers								
5.2. Environmental exposure (qualitative assessment)									
Environmental release	The use of TSP can potentially result in aquatic emissions and locally increase the phosphate (PO_4^{3-}) concentration. Phosphates reaching surface water increase the phosphorus content in the water body which may cause eutrophication and water quality deterioration.								
Waste water treatment plants (WWTP)	Phosphorus should be removed from industrial wastewater before it is released to the environment. This can be done by chemical treatment (by precipitation with the help of aluminium or iron addition) or biological treatments. A high degree of removal can be reliably achieved by the available phosphorus removal techniques. Site-specific conditions such as flow rate of the receiving surface water body and phosphorus concentration in the receiving surface water body should be taken into account when implementing an appropriate wastewater treatment. Council Directive 96/61/EC concerning integrated pollution prevention and control and national regulations concerning phosphates in industrial wastewater have to be followed to minimise the risk of eutrophication due to phosphate releases.								
Aquatic pelagic compartment	No direct acute or long-term adverse effects on aqueous or terrestrial organisms are anticipated with orthophosphates in the environment.								

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Sediments	Not relevant.
Soil and groundwater	Not relevant.
Atmospheric compartment	Not relevant.
Secondary poisoning	Bioaccumulation in organisms is not relevant for inorganic phosphates.

Exposure Scenario 6: Use in treatment of potable water

1. Short title of exposure scenario 6	
Industrial and professional use in treatment of potable water.	
2. Description of activities and processes covered in the exposure scenario	
Sector of use (SU)	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen) SU 23: Electricity, steam, gas water supply and sewage treatment.
Product category (PC)	PC 20: Products such as ph-regulators, flocculants, precipitants, neutralisation agents PC 37: Water treatment chemicals.
Process category (PROC)	PROC 1: Use in closed process, no likelihood of exposure. PROC 2: Use in closed, continuous process with occasional controlled exposure. PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities.
Article category (AC)	Not applicable
Environmental release category (ERC)	ERC 8a: Wide dispersive indoor use of processing aids in open systems.
3. Operational conditions	
3.1 Operational conditions related with frequency and quantities of use	
Duration of exposure at workplace:	Transfer of concentrated solutions: Once a day for 10 minutes. Treatment: Once a day for 8 hours.
Frequency of exposure at workplace:	365 days per year
Annual amount used per site:	The daily and annual amount/emission per site is not considered to be the main determinant for environmental exposure.
3.2 Operational conditions related with substance/ product	

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Physical state	Solid / Liquid
Concentration of substance in mixture	No information about the concentration of the substance in dilute and concentrated solutions is available. In the first-tier assessment of exposure the concentration of TSP in concentrated solutions was 10% w/w and the concentration in the working solution was 1%, respectively. The concentration in solid preparations was 10%.
3.3 Other relevant operational conditions	
The conditions of exposure are characterised on the basis of an AISE exposure scenario developed for the treatment of drinking water (AISE 2009).	
4. Risk Management Measures	
4.1 RMMs related to workers	
Organisational measures	The employer has also to ascertain that the required PPE is available and used according to instructions. PPE are required when handling the pure substance and solutions or mixtures containing TSP.
Technical measures	<ul style="list-style-type: none"> • Use closed/ automated systems or covering of open containers (e.g. screens) to avoid irritating mists, sprayings and potential splashes. (Good practice) • Transport over pipes, technical barrel filling/emptying of barrel with automatic systems (suction pumps etc.) (Good practice) • Use of pliers, grip arms with long handles with manual use "to avoid direct contact and exposure by splashes (no working over one's head)" (Good practice) • Store in cool, dry, clean, well ventilate areas. (Good practice). • Breathing masks and local exhaust ventilation should be present during handling of solids
Respiratory protection	Respiratory protection: Respiratory protection is not required but exposure to dusts from the handling of solid materials should be reduced by the use of local exhaust ventilation. If local exhaust ventilation is not present then in may be necessary to use respiratory protection.
Hand protection	Hand protection is required: impervious chemical resistant protective gloves. Material: chloroprene gloves or equivalent.
Eye protection	Wearing of eye/face protection is recommended. Goggles or face protection shield should be consistent with EN 166 or equivalent.
Skin and body protection	Wearing of suitable protective clothing and rubber boots is recommended.
Hygiene measures	Keep away from foodstuffs, drinks and tobacco. Wash hands before breaks and at end of work. Keep work clothes separate.
4.2 RMMs related to the environment	
Organisational measures	Emissions of particles into the air of workplaces or the atmosphere can be significantly reduced by the use of cyclones, gas scrubbers or bag filters.
Abatement measures related with wastewater	The efficiency of the process is maximised in such a way that minimal emission of phosphates into the wastewater will occur. In addition, phosphate can be precipitated from the wastewater by addition of metal ions.

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Abatement measures waste air and solid waste	Solid and liquid waste has to be incinerated or appropriately disposed of as chemical waste.																																																														
4.3 Waste related measures																																																															
Type of waste	Liquid waste. Packaging material																																																														
Disposal technique	The release of phosphates to wastewater is highly regulated. The residue of the containers or the used container itself should be disposed in accordance with local requirements.																																																														
Fraction released to environment during waste treatment																																																															
5. Prediction of exposure resulting from the conditions described above and the substance properties.																																																															
5.1. Human exposure																																																															
Workers (oral)	The use of TSP in potable water treatment will not notably contribute to the oral intake of phosphates.																																																														
Workers (inhalation)	<p>TSP is irritating to the eyes and the skin and causes transient respiratory tract irritation. Therefore, the use of safety goggles and dermal protection is compulsory when handling TSP.</p> <p>The DNEL for systemic long-term effects is 4.07 mg/m³ for inhalation exposure. This is compared to the predicted 8-hours time-weighted average inhalation exposure concentrations. The risk characterisation ratios (RCR, exposure concentration/DNEL) for long-term inhalation exposure are presented below. The RCRs for inhalation exposure are below 1 (See table below) indicating that potential risks for worker health are controlled if the RMMs indicated above are implemented at water treatment sites. It is concluded that the use of TSP in potable water treatment is safe for workers under the specified conditions of exposure.</p> <table border="1"> <thead> <tr> <th>Process Category</th> <th>Activity Type</th> <th>Location</th> <th>Duration (hours)</th> <th>Content (% w/w)</th> <th>Airborne TSP conc. (mg/m³)</th> <th>RCR inhalation exposure</th> <th>Conclusion</th> </tr> </thead> <tbody> <tr> <td colspan="8">Industrial or professional use of solutions</td> </tr> <tr> <td>1</td> <td>Industrial/ Professional</td> <td>Indoors</td> <td>4 to 8</td> <td>Up to 1</td> <td><0.01</td> <td><0.0025</td> <td>Risk adequately controlled</td> </tr> <tr> <td>2</td> <td>Industrial/ Professional</td> <td>Indoors</td> <td>4 to 8</td> <td>Up to 1</td> <td><0.07</td> <td><0.017</td> <td>Risk adequately controlled</td> </tr> <tr> <td>8b</td> <td>Industrial/ Professional</td> <td>Indoors</td> <td>0.25</td> <td>Up to 10</td> <td><0.041</td> <td><0.01</td> <td>Risk adequately controlled</td> </tr> <tr> <td colspan="8">Industrial or professional use of solid products with medium dustiness</td> </tr> <tr> <td>8b</td> <td>Industrial/ Professional</td> <td>Indoors</td> <td>0.25</td> <td>Up to 10</td> <td>0.05</td> <td>0.012</td> <td>Risk adequately controlled</td> </tr> </tbody> </table>							Process Category	Activity Type	Location	Duration (hours)	Content (% w/w)	Airborne TSP conc. (mg/m ³)	RCR inhalation exposure	Conclusion	Industrial or professional use of solutions								1	Industrial/ Professional	Indoors	4 to 8	Up to 1	<0.01	<0.0025	Risk adequately controlled	2	Industrial/ Professional	Indoors	4 to 8	Up to 1	<0.07	<0.017	Risk adequately controlled	8b	Industrial/ Professional	Indoors	0.25	Up to 10	<0.041	<0.01	Risk adequately controlled	Industrial or professional use of solid products with medium dustiness								8b	Industrial/ Professional	Indoors	0.25	Up to 10	0.05	0.012	Risk adequately controlled
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Workers (dermal)	No systemic toxicity effects are expected due to the inorganic nature of the substance however local effects may occur but these effects will not be dose-dependant but will depend on the concentration of the substance present in the mixture/solution used in a specific application.
Indirect exposure via the environment	No indirect exposure of humans via the environment is expected for TSP, as the substance can be effectively removed from the wastewater. Thus, no assessment of indirect exposure of humans via the environment is performed.
Consumers	According to the United States National Sanitation Foundation, the maximum use level of TSP for the treatment of potable water is 17 mg/L. It is to be expected that the major portion of the dissolved TSP will be consumed before the drinking water reaches the households. In any case, it has to be assured that the maximum level of phosphate in drinking water, which is 5 mg/L according to the EU Drinking Water Directive, is respected to ensure that no risk for the consumers is resulting from the use of TSP in potable water treatment. It is concluded that the use of TSP in treatment of water is of no risk for consumers.
5.2. Environmental exposure (qualitative assessment)	
Environmental release	The use of TSP can potentially result in aquatic emissions and locally increase the phosphate (PO_4^{3-}) concentration. Phosphates reaching surface water increase the phosphorus content in the water body which may cause eutrophication and water quality deterioration.
Waste water treatment plants (WWTP)	Phosphorus should be removed from industrial wastewater before it is released to the environment. This can be done by chemical treatment (by precipitation with the help of aluminium or iron addition) or biological treatments. A high degree of removal can be reliably achieved by the available phosphorus removal techniques. Site-specific conditions such as flow rate of the receiving surface water body and phosphorus concentration in the receiving surface water body should be taken into account when implementing an appropriate wastewater treatment. Council Directive 96/61/EC concerning integrated pollution prevention and control and national regulations concerning phosphates in industrial wastewater have to be followed to minimise the risk of eutrophication due to phosphate releases.
Aquatic pelagic compartment	No direct acute or long-term adverse effects on aqueous or terrestrial organisms are anticipated with orthophosphates in the environment.
Sediments	Not relevant.
Soil and groundwater	Not relevant.
Atmospheric compartment	Not relevant.
Secondary poisoning	Bioaccumulation in organisms is not relevant for inorganic phosphates.

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Exposure Scenario 7: Treatment of industrial process water (boiler water conditioning)

1. Short title of exposure scenario 7	
Treatment of industrial process water (boiler water conditioning)	
2. Description of activities and processes covered in the exposure scenario	
Sector of use (SU)	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites SU 23: Electricity, steam, gas water supply and sewage treatment.
Product category (PC)	PC 20: Products such as ph-regulators, flocculants, precipitants, neutralisation agents PC 37: Water treatment chemicals.
Process category (PROC)	PROC 1: Use in closed process, no likelihood of exposure. PROC 2: Use in closed, continuous process with occasional controlled exposure. PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities.
Article category (AC)	Not applicable
Environmental release category (ERC)	ERC 7: Industrial use of substances in closed systems.
3. Operational conditions	
3.1 Operational conditions related with frequency and quantities of use	
Duration of exposure at workplace:	Transfer of concentrated solutions: Once a day for 10 minutes. Treatment: Once a day for 8 hours.
Frequency of exposure at workplace:	365 days per year
Annual amount used per site:	The daily and annual amount/emission per site is not considered to be the main determinant for environmental exposure.
3.2 Operational conditions related with substance/ product	
Physical state	Solid / Liquid
Concentration of substance in mixture	No information about the concentration of the substance in dilute and concentrated solutions available. In the first-tier assessment of exposure the concentration of TSP in concentrated solutions was 10% w/w and the concentration in the working solution was 1%, respectively. The concentration in solid preparations was 10%.
3.3 Other relevant operational conditions	
The conditions of exposure can be characterised on the basis of an AISE exposure scenario developed for	

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the treatment of industrial process water (AISE 2009).	
4. Risk Management Measures	
4.1 RMMs related to workers	
Organisational measures	The employer has also to ascertain that the required PPE is available and used according to instructions. PPE are required when handling the pure substance and solutions or mixtures containing TSP.
Technical measures	<ul style="list-style-type: none"> • Use closed/ automated systems or covering of open containers (e.g. screens) to avoid irritating mists, sprayings and potential splashes. (Good practice) • Transport over pipes, technical barrel filling/emptying of barrel with automatic systems (suction pumps etc.) (Good practice) • Use of pliers, grip arms with long handles with manual use "to avoid direct contact and exposure by splashes (no working over one's head)" (Good practice) • Store in cool, dry, clean, well ventilate areas. (Good practice). • Breathing masks and local exhaust ventilation should be present during handling of solids
Respiratory protection	Respiratory protection: Respiratory protection is not required but exposure to dusts from the handling of solid materials should be reduced by the use of local exhaust ventilation. If local exhaust ventilation is not present then in may be necessary to use respiratory protection.
Hand protection	Hand protection is required: impervious chemical resistant protective gloves. Material: chloroprene gloves or equivalent.
Eye protection	Wearing of eye/face protection is recommended. Goggles or face protection shield should be consistent with EN 166 or equivalent.
Skin and body protection	Wearing of suitable protective clothing and rubber boots is recommended.
Hygiene measures	Keep away from foodstuffs, drinks and tobacco. Wash hands before breaks and at end of work. Keep work clothes separate.
4.2 RMMs related to the environment	
Organisational measures	Emissions of particles into the air of workplaces or the atmosphere can be significantly reduced by the use of cyclones, gas scrubbers or bag filters.
Abatement measures related with wastewater	The efficiency of the process is maximised in such a way that minimal emission of phosphates into the wastewater will occur. In addition, phosphate can be precipitated from the wastewater by addition of metal ions.
Abatement measures waste air and solid waste	Solid and liquid waste has to be incinerated or appropriately disposed of as chemical waste.
4.3 Waste related measures	
Type of waste	Liquid waste. Packaging material
Disposal technique	The release of phosphates to wastewater is highly regulated. The residue of the containers or the used container itself should be disposed in accordance with local requirements.

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Fraction released to environment during waste treatment																																																									
5. Prediction of exposure resulting from the conditions described above and the substance properties.																																																									
5.1. Human exposure																																																									
Workers (oral)	The use of TSP in industrial process water treatment will not notably contribute to the oral intake of phosphates.																																																								
Workers (inhalation) DNEL: Worker, long-term, systemic, inhalation: 4.07 mg/m ³	<p>TSP is irritating to the eyes and the skin and causes transient respiratory tract irritation. Therefore, the use of safety goggles and dermal protection is compulsory when handling TSP.</p> <p>The DNEL for systemic long-term effects is 4.07 mg/m³ for inhalation exposure. This is compared to the predicted 8-hours time-weighted average inhalation exposure concentrations. The risk characterisation ratios (RCR, exposure concentration/DNEL) for long-term inhalation exposure are presented below. The RCRs for inhalation exposure are below 1 indicating that potential risks for worker health are controlled if the RMMs indicated above are implemented at sites of industrial process water treatment (Error! Reference source not found.). It is concluded that the use of TSP in the treatment of industrial process water is safe for workers under the specified conditions of exposure.</p> <table border="1"> <thead> <tr> <th>Process Category</th> <th>Activity Type</th> <th>Location</th> <th>Duration (hours)</th> <th>Content (% w/w)</th> <th>Airborne TSP conc. (mg/m³)</th> <th>RCR inhalation exposure</th> <th>Conclusion</th> </tr> </thead> <tbody> <tr> <td colspan="8">Industrial or professional use of solutions</td> </tr> <tr> <td>1</td> <td>Industrial/ Professional</td> <td>Indoors</td> <td>4 to 8</td> <td>Up to 1</td> <td><0.01</td> <td><0.0025</td> <td>Risk adequately controlled</td> </tr> <tr> <td>2</td> <td>Industrial/ Professional</td> <td>Indoors</td> <td>4 to 8</td> <td>Up to 1</td> <td><0.07</td> <td><0.017</td> <td>Risk adequately controlled</td> </tr> <tr> <td>8b</td> <td>Industrial/ Professional</td> <td>Indoors</td> <td>0.25</td> <td>Up to 10</td> <td><0.041</td> <td><0.01</td> <td>Risk adequately controlled</td> </tr> <tr> <td colspan="8">Industrial or professional use of solid products with medium dustiness</td> </tr> <tr> <td>8b</td> <td>Industrial/ Professional</td> <td>Indoors</td> <td>0.25</td> <td>Up to 10</td> <td>0.05</td> <td>0.012</td> <td>Risk adequately controlled</td> </tr> </tbody> </table>	Process Category	Activity Type	Location	Duration (hours)	Content (% w/w)	Airborne TSP conc. (mg/m ³)	RCR inhalation exposure	Conclusion	Industrial or professional use of solutions								1	Industrial/ Professional	Indoors	4 to 8	Up to 1	<0.01	<0.0025	Risk adequately controlled	2	Industrial/ Professional	Indoors	4 to 8	Up to 1	<0.07	<0.017	Risk adequately controlled	8b	Industrial/ Professional	Indoors	0.25	Up to 10	<0.041	<0.01	Risk adequately controlled	Industrial or professional use of solid products with medium dustiness								8b	Industrial/ Professional	Indoors	0.25	Up to 10	0.05	0.012	Risk adequately controlled
Process Category	Activity Type	Location	Duration (hours)	Content (% w/w)	Airborne TSP conc. (mg/m ³)	RCR inhalation exposure	Conclusion																																																		
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Workers (dermal)	No systemic toxicity effects are expected due to the inorganic nature of the substance however local effects may occur but these effects will not be dose-dependant but will depend on the concentration of the substance present in the mixture/solution used in a specific application.																																																								
Indirect exposure via	No indirect exposure of humans via the environment is expected for TSP, as the substance can be effectively removed from the wastewater. Thus, no assessment of indirect exposure																																																								

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the environment	of humans via the environment is performed.
Consumers	No direct consumer exposure is anticipated with the treatment of industrial process water with TSP. It is concluded that the use of TSP in treatment of water is of no risk for consumers.
5.2. Environmental exposure (qualitative assessment)	
Environmental release	The use of TSP can potentially result in aquatic emissions and locally increase the phosphate (PO_4^{3-}) concentration. Phosphates reaching surface water increase the phosphorus content in the water body which may cause eutrophication and water quality deterioration.
Waste water treatment plants (WWTP)	Phosphorus should be removed from industrial wastewater before it is released to the environment. This can be done by chemical treatment (by precipitation with the help of aluminium or iron addition) or biological treatments. A high degree of removal can be reliably achieved by the available phosphorus removal techniques. Site-specific conditions such as flow rate of the receiving surface water body and phosphorus concentration in the receiving surface water body should be taken into account when implementing an appropriate wastewater treatment. Council Directive 96/61/EC concerning integrated pollution prevention and control and national regulations concerning phosphates in industrial wastewater have to be followed to minimise the risk of eutrophication due to phosphate releases.
Aquatic pelagic compartment	No direct acute or long-term adverse effects on aqueous or terrestrial organisms are anticipated with orthophosphates in the environment.
Sediments	Not relevant.
Soil and groundwater	Not relevant.
Atmospheric compartment	Not relevant.
Secondary poisoning	Bioaccumulation in organisms is not relevant for inorganic phosphates.

Exposure Scenario 8: Use in leather treatment

1. Short title of exposure scenario 8	
Use in leather treatment.	
2. Description of activities and processes covered in the exposure scenario	
Sector of use (SU)	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites SU 5: Manufacture of textiles, leather, fur
Product	PC 23: Leather tanning, dye, finishing, impregnation and care products.

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category (PC)	
Process category (PROC)	<p>PROC 3: Use in closed batch process (synthesis or formulation)</p> <p>PROC 5: Mixing or blending in batch processes (multistage and/or significant contact)</p> <p>PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities</p> <p>PROC 9: Transfer of substance or preparation into small containers (dedicated filling line including weighing).</p> <p>PROC 13: Treatment of articles by dipping and pouring</p> <p>PROC 19: Hand mixing with intimate contact (only PPE available)</p> <p>PROC 26: Handling of solid inorganic substances at ambient temperatures</p>
Article category (AC)	Not applicable
Environmental release category (ERC)	<p>ERC 6b: Industrial use of reactive processing aids</p> <p>ERC 8a: Wide dispersive indoor use of processing aids in open systems.</p>
3. Operational conditions	
3.1 Operational conditions related with frequency and quantities of use	
Duration of exposure at workplace:	8 hours
Frequency of exposure at workplace:	Once a day / 365 days per year
Annual amount used per site:	The daily and annual amount/emission per site is not considered to be the main determinant for environmental exposure.
3.2 Operational conditions related with substance/ product	
Physical state	Solid / Liquid
Concentration of substance in mixture	. No information about the concentration of the substance in dilute and concentrated solutions is available. In the first-tier assessment of exposure the concentration of TSP in concentrated solutions was 10% w/w and the concentration in the working solution was 1%, respectively.
3.3 Other relevant operational conditions	
No information about frequency and duration of the various tasks is available. In the first-tier assessment of exposure a frequency of once a day and an exposure duration of 8 hours was considered.	
4. Risk Management Measures	
4.1 RMMs related to workers	
Organisational measures	The employer has also to ascertain that the required PPE is available and used according to instructions. PPE are required when handling the pure substance and solutions or mixtures containing TSP.
Technical measures	<ul style="list-style-type: none"> • Use closed/ automated systems or covering of open containers (e.g. screens) to avoid irritating mists, sprayings and potential splashes. (Good practice) • Transport over pipes, technical barrel filling/emptying of barrel with automatic

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	<p>systems (suction pumps etc.) (Good practice)</p> <ul style="list-style-type: none"> • Use of pliers, grip arms with long handles with manual use “to avoid direct contact and exposure by splashes (no working over one’s head)” (Good practice) • Store in cool, dry, clean, well ventilate areas. (Good practice). • Breathing masks and local exhaust ventilation should be present during handling of solids
Respiratory protection	Respiratory protection: Respiratory protection is not required but exposure to dusts from the handling of solid materials should be reduced by the use of local exhaust ventilation. If local exhaust ventilation is not present then in may be necessary to use respiratory protection.
Hand protection	Hand protection is required: impervious chemical resistant protective gloves. Material: chloroprene gloves or equivalent.
Eye protection	Wearing of eye/face protection is recommended. Goggles or face protection shield should be consistent with EN 166 or equivalent.
Skin and body protection	Wearing of suitable protective clothing and rubber boots is recommended.
Hygiene measures	Keep away from foodstuffs, drinks and tobacco. Wash hands before breaks and at end of work. Keep work clothes separate.
4.2 RMMs related to the environment	
Organisational measures	Emissions of particles into the air of workplaces or the atmosphere can be significantly reduced by the use of cyclones, gas scrubbers or bag filters.
Abatement measures related with wastewater	The efficiency of the process is maximised in such a way that minimal emission of phosphates into the wastewater will occur. In addition, phosphate can be precipitated from the wastewater by addition of metal ions.
Abatement measures waste air and solid waste	Solid and liquid waste has to be incinerated or appropriately disposed of as chemical waste.
4.3 Waste related measures	
Type of waste	Liquid waste. Packaging material
Disposal technique	The release of phosphates to wastewater is highly regulated. The residue of the containers or the used container itself should be disposed in accordance with local requirements.
Fraction released to environment during waste treatment	
5. Prediction of exposure resulting from the conditions described above and the substance properties.	
5.1. Human exposure	
Workers (oral)	The use of TSP in leather treatment will not notably contribute to the oral intake of phosphates.

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<p>Workers (inhalation)</p> <p><i>DNEL: Worker, long-term, systemic, inhalation: 4.07 mg/m³</i></p>	<p>safety goggles and dermal protection is compulsory when handling TSP. Further, areas where hand-mixing with liquid solutions takes place should be equipped with local exhaust ventilation. Alternatively, the workers may wear respiratory protection during the hand-mixing.</p> <p>The DNEL for systemic long-term effects is 4.07 mg/m³ for inhalation exposure. This is compared to the predicted 8-hours time-weighted average inhalation exposure concentrations. The risk characterisation ratios (RCR, exposure concentration/DNEL) for long-term inhalation exposure are presented below. The RCRs for inhalation exposure are below 1 (Error! Reference source not found. table below) indicating that potential risks for worker health are controlled if the RMMs indicated above are implemented at leather tanning sites. It is concluded that the use of TSP in leather treatment is safe for workers under the specified conditions of exposure.</p> <table border="1" data-bbox="451 743 1446 1549"> <thead> <tr> <th>Process Category</th> <th>Location</th> <th>LEV</th> <th>Duration (hours)</th> <th>Weight fraction (% w/w)</th> <th>Airborne TSP conc. (mg/m³)</th> <th>Skin surface area exposed (cm²)</th> <th>Dermal exposure (mg/kg/day)</th> </tr> </thead> <tbody> <tr> <td colspan="8">Handling of solutions</td> </tr> <tr> <td>3</td> <td>Indoors</td> <td>No</td> <td>4 to 8</td> <td>Up to 10</td> <td><0.41</td> <td><0.1</td> <td>Risk adequately controlled</td> </tr> <tr> <td>4</td> <td>Indoors</td> <td>No</td> <td>4 to 8</td> <td>Up to 10</td> <td><0.41</td> <td><0.1</td> <td>Risk adequately controlled</td> </tr> <tr> <td>5</td> <td>Indoors</td> <td>No</td> <td>4 to 8</td> <td>Up to 10</td> <td><0.41</td> <td><0.1</td> <td>Risk adequately controlled</td> </tr> <tr> <td>8b</td> <td>Indoors</td> <td>No</td> <td>4 to 8</td> <td>Up to 10</td> <td><0.41</td> <td><0.1</td> <td>Risk adequately controlled</td> </tr> <tr> <td>13</td> <td>Indoors</td> <td>No</td> <td>4 to 8</td> <td>Up to 1</td> <td><0.07</td> <td><0.017</td> <td>Risk adequately controlled</td> </tr> <tr> <td>19</td> <td>Indoors</td> <td>No</td> <td>4 to 8</td> <td>Up to 1</td> <td>0.005</td> <td>0.001</td> <td>Risk adequately controlled</td> </tr> </tbody> </table>	Process Category	Location	LEV	Duration (hours)	Weight fraction (% w/w)	Airborne TSP conc. (mg/m ³)	Skin surface area exposed (cm ²)	Dermal exposure (mg/kg/day)	Handling of solutions								3	Indoors	No	4 to 8	Up to 10	<0.41	<0.1	Risk adequately controlled	4	Indoors	No	4 to 8	Up to 10	<0.41	<0.1	Risk adequately controlled	5	Indoors	No	4 to 8	Up to 10	<0.41	<0.1	Risk adequately controlled	8b	Indoors	No	4 to 8	Up to 10	<0.41	<0.1	Risk adequately controlled	13	Indoors	No	4 to 8	Up to 1	<0.07	<0.017	Risk adequately controlled	19	Indoors	No	4 to 8	Up to 1	0.005	0.001	Risk adequately controlled
Process Category	Location	LEV	Duration (hours)	Weight fraction (% w/w)	Airborne TSP conc. (mg/m ³)	Skin surface area exposed (cm ²)	Dermal exposure (mg/kg/day)																																																										
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<p>Workers (dermal)</p>	<p>No systemic toxicity effects are expected due to the inorganic nature of the substance however local effects may occur but these effects will not be dose-dependant but will depend on the concentration of the substance present in the mixture/solution used in a specific application.</p>																																																																
<p>Indirect exposure via the environment</p>	<p>The use of TSP in leather treatment will not notably contribute to the oral intake of phosphates.</p>																																																																
<p>Consumers</p>	<p>Consumers are not exposed to TSP as a result from the substance's use in leather treatment. It is concluded that the identified use is of no risk for consumers.</p>																																																																

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5.2. Environmental exposure (qualitative assessment)	
Environmental release	The use of TSP can potentially result in aquatic emissions and locally increase the phosphate (PO ₄ ³⁻) concentration. Phosphates reaching surface water increase the phosphorus content in the water body which may cause eutrophication and water quality deterioration.
Waste water treatment plants (WWTP)	Phosphorus should be removed from industrial wastewater before it is released to the environment. This can be done by chemical treatment (by precipitation with the help of aluminium or iron addition) or biological treatments. A high degree of removal can be reliably achieved by the available phosphorus removal techniques. Site-specific conditions such as flow rate of the receiving surface water body and phosphorus concentration in the receiving surface water body should be taken into account when implementing an appropriate wastewater treatment. Council Directive 96/61/EC concerning integrated pollution prevention and control and national regulations concerning phosphates in industrial wastewater have to be followed to minimise the risk of eutrophication due to phosphate releases.
Aquatic pelagic compartment	No direct acute or long-term adverse effects on aqueous or terrestrial organisms are anticipated with orthophosphates in the environment.
Sediments	Not relevant.
Soil and groundwater	Not relevant.
Atmospheric compartment	Not relevant.
Secondary poisoning	Bioaccumulation in organisms is not relevant for inorganic phosphates.

Exposure Scenario 9: Use of dyes and auxiliaries for textiles, leather, paper

1. Short title of exposure scenario 9	
Use of dyes and auxiliaries for textiles, leather, paper.	
2. Description of activities and processes covered in the exposure scenario	
Sector of use (SU)	SU 5: Manufacture of textiles, leather, fur SU 6b: Manufacture of pulp, paper and paper products
Product category (PC)	PC 20: Products such as ph-regulators, flocculants, precipitants, neutralisation agents.
Process category (PROC)	PROC 5: Mixing or blending in batch processes (multistage and/or significant contact) PROC 6: Calendering operations PROC 7: Industrial spraying PROC 8a: Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to

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	vessels/large containers at dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line including weighing). PROC 10: Brushing and rolling applications PROC 13: Treatment of articles by dipping and pouring
Article category (AC)	AC 5: Fabrics, textiles, Apparel AC 6: Leather articles AC 8: Paper articles
Environmental release category (ERC)	ERC 2: Formulation of preparations ERC 3: Formulation in materials ERC 5: Industrial use resulting in inclusion into or onto a matrix ERC 10a: Wide dispersive outdoor use of long-life articles and materials with low release ERC 11a: Wide dispersive outdoor use of long-life articles and materials with high or intended release (including abrasive processing)
3. Operational conditions	
3.1 Operational conditions related with frequency and quantities of use	
Duration of exposure at workplace:	8 hours
Frequency of exposure at workplace:	Once a day / 365 days per year
Annual amount used per site:	The daily and annual amount/emission per site is not considered to be the main determinant for environmental exposure.
3.2 Operational conditions related with substance/ product	
Physical state	Solid / Liquid
Concentration of substance in mixture	No information about the concentration of the substance in the delivered mixtures or in working solutions is available. In the first-tier assessment of exposure the concentration of TSP in concentrated mixtures was 10% w/w and the concentration in the working solution was 1%, respectively.
3.3 Other relevant operational conditions	
No information about frequency and duration of the various tasks is available. In the first-tier assessment of exposure a frequency of once a day and an exposure duration of 8 hours was considered.	
4. Risk Management Measures	
4.1 RMMs related to workers	
Organisational measures	The employer has also to ascertain that the required PPE is available and used according to instructions. PPE are required when handling the pure substance and solutions or mixtures containing TSP.
Technical measures	<ul style="list-style-type: none"> • Use closed/ automated systems or covering of open containers (e.g. screens) to avoid irritating mists, sprayings and potential splashes. (Good practice) • Transport over pipes, technical barrel filling/emptying of barrel with automatic systems (suction pumps etc.) (Good practice)

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	<ul style="list-style-type: none"> • Use of pliers, grip arms with long handles with manual use "to avoid direct contact and exposure by splashes (no working over one's head)" (Good practice) • Store in cool, dry, clean, well ventilate areas. (Good practice). • Breathing masks and local exhaust ventilation should be present during handling of solids
Respiratory protection	Respiratory protection: Respiratory protection is not required but exposure to dusts from the handling of solid materials should be reduced by the use of local exhaust ventilation. If local exhaust ventilation is not present then in may be necessary to use respiratory protection.
Hand protection	Hand protection is required: impervious chemical resistant protective gloves. Material: chloroprene gloves or equivalent.
Eye protection	Wearing of eye/face protection is recommended. Goggles or face protection shield should be consistent with EN 166 or equivalent.
Skin and body protection	Wearing of suitable protective clothing and rubber boots is recommended.
Hygiene measures	Keep away from foodstuffs, drinks and tobacco. Wash hands before breaks and at end of work. Keep work clothes separate.
4.2 RMMs related to the environment	
Organisational measures	Emissions of particles into the air of workplaces or the atmosphere can be significantly reduced by the use of cyclones, gas scrubbers or bag filters.
Abatement measures related with wastewater	The efficiency of the process is maximised in such a way that minimal emission of phosphates into the wastewater will occur. In addition, phosphate can be precipitated from the wastewater by addition of metal ions.
Abatement measures waste air and solid waste	Solid and liquid waste has to be incinerated or appropriately disposed of as chemical waste.
4.3 Waste related measures	
Type of waste	Liquid waste. Packaging material
Disposal technique	The release of phosphates to wastewater is highly regulated. The residue of the containers or the used container itself should be disposed in accordance with local requirements.
Fraction released to environment during waste treatment	
5. Prediction of exposure resulting from the conditions described above and the substance properties.	
5.1. Human exposure	
Workers (oral)	The use of TSP in leather treatment will not notably contribute to the oral intake of phosphates.

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<p>Workers (inhalation) <i>DNEL: Worker, long-term, systemic, inhalation: 4.07 mg/m³</i></p>	<p>The DNEL for systemic long-term effects is 4.07 mg/m³ for inhalation exposure. This is compared to the predicted 8-hours time-weighted average inhalation exposure concentrations. The risk characterisation ratios (RCR, exposure concentration/DNEL) for long-term inhalation exposure are presented below. The RCRs for inhalation exposure are below 1 (see table below) indicating that potential risks for worker health are controlled if the RMMs indicated above are implemented at industrial use sites. It is concluded that the use of TSP in dyes and auxiliary chemicals for textiles, leather and paper is safe for workers under the specified conditions of exposure.</p>							
	Process Category	Location	LEV/PRE	Duration (hours)	Weight fraction (% w/w)	Airborne TSP conc. (mg/m ³)	RCR inhalation	Conclusion
	Handling of solutions							
	5	Indoors	No	4 to 8	Up to 10	<0.41	<0.1	Risk adequately controlled
	6	Indoors	No	4 to 8	Up to 1	<0.07	<0.017	Risk adequately controlled
	7	Indoors	No	4 to 8	Up to 1	68.31	16.78	RMMs needed to control risk
		Indoors	90%, 90%	4 to 8	Up to 1	0.68	0.167	Risk adequately controlled
	8a	Professional	No	4 to 8	Up to 10	<0.41	<0.1	Risk adequately controlled
	8b	Indoors	No	4 to 8	Up to 10	<0.41	<0.1	Risk adequately controlled
	9	Indoors	No	4 to 8	Up to 10	<0.41	<0.1	Risk adequately controlled
	10	Indoors	No	4 to 8	Up to 10	0.05	0.012	Risk adequately controlled
	13	Indoors	No	4 to 8	Up to 1	<0.07	<0.017	Risk adequately controlled
	Handling of solid products with high dustiness							
	5	Industrial	No	4 to 8	Up to 10	2.5	0.614	Risk adequately controlled
		Industrial	90%	4 to 8	Up to 10	0.25	0.061	Risk adequately controlled
8a	Industrial	No	4 to 8	Up to	2.5	0.614	Risk	

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					10			adequately controlled
		Industrial	80%	4 to 8	Up to 10	0.25	0.061	Risk adequately controlled
	8b	Industrial	No	4 to 8	Up to 10	2.5	0.614	Risk adequately controlled
		Industrial	90%	4 to 8	Up to 10	0.25	0.061	Risk adequately controlled
	9	Industrial	No	4 to 8	Up to 10	2.00	0.491	Risk adequately controlled
		Industrial	90%	4 to 8	Up to 10	0.20	0.049	Risk adequately controlled
Workers (dermal)	No systemic toxicity effects are expected due to the inorganic nature of the substance however local effects may occur but these effects will not be dose-dependant but will depend on the concentration of the substance present in the mixture/solution used in a specific application.							
Indirect exposure via the environment	No indirect exposure of humans via the environment is expected for TSP. Thus, no assessment of indirect exposure of humans via the environment is performed.							
Consumers	It is not expected that the use of TSP in dyes and auxiliary chemicals for textiles, leather, and paper will result in relevant amounts of residues on the surfaces of articles. Potential consumer exposure to TSP due to the processing and during the service life of articles is very low.							
5.2. Environmental exposure (qualitative assessment)								
Environmental release	The use of TSP can potentially result in aquatic emissions and locally increase the phosphate (PO_4^{3-}) concentration. Phosphates reaching surface water increase the phosphorus content in the water body which may cause eutrophication and water quality deterioration.							
Waste water treatment plants (WWTP)	Phosphorus should be removed from industrial wastewater before it is released to the environment. This can be done by chemical treatment (by precipitation with the help of aluminium or iron addition) or biological treatments. A high degree of removal can be reliably achieved by the available phosphorus removal techniques. Site-specific conditions such as flow rate of the receiving surface water body and phosphorus concentration in the receiving surface water body should be taken into account when implementing an appropriate wastewater treatment. Council Directive 96/61/EC concerning integrated pollution prevention and control and national regulations concerning phosphates in industrial wastewater have to be followed to minimise the risk of eutrophication due to phosphate releases.							
Aquatic pelagic compartment	No direct acute or long-term adverse effects on aqueous or terrestrial organisms are anticipated with orthophosphates in the environment.							
Sediments	Not relevant.							
Soil and groundwater	Not relevant.							

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Atmospheric compartment	Not relevant.
Secondary poisoning	Bioaccumulation in organisms is not relevant for inorganic phosphates.

Exposure Scenario 10: Ceramics, Refractory, Cements and Plasters

1. Short title of exposure scenario 10	
Ceramics, Refractory, Cements and Plasters	
2. Description of activities and processes covered in the exposure scenario	
Sector of use (SU)	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites SU 9: Manufacture of fine chemicals SU 10: Formulation [mixing] preparations and/or repackaging (excluding alloys) SU 19: Building and construction work SU 21: Consumer uses: private households SU 22: Professional uses: public domain
Product category (PC)	
Process category (PROC)	PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC 5: Mixing or blending in batch processes (multistage and/or significant contact) PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line including weighing). PROC 10: Brushing and rolling applications PROC 13: Treatment of articles by dipping and pouring PROC 19: Hand-mixing with intimate contact (only PPE available) PROC 23: Open processing and transfer operations with minerals/metals at elevated temperatures.
Article category (AC)	Not applicable
Environmental release category (ERC)	ERC 5: Industrial use resulting in inclusion into or onto a matrix
3. Operational conditions	
3.1 Operational conditions related with frequency and quantities of use	
Duration of exposure at workplace:	8 hours

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Frequency of exposure at workplace:	Once a day / 365 days per year
Annual amount used per site:	The daily and annual amount/emission per site is not considered to be the main determinant for environmental exposure.
3.2 Operational conditions related with substance/ product	
Physical state	Solid / Liquid
Concentration of substance in mixture	No information about the concentration of the substance in dilute and concentrated solutions or in solids is available. In the first-tier assessment of exposure the concentration of TSP in concentrated solutions and in solid preparations was 10% w/w.
3.3 Other relevant operational conditions	
No information about frequency and duration of the various tasks is available. In the first-tier assessment of exposure a frequency of once a day and an exposure duration of 8 hours was considered.	
4. Risk Management Measures	
4.1 RMMs related to workers	
Organisational measures	The employer has also to ascertain that the required PPE is available and used according to instructions. PPE are required when handling the pure substance and solutions or mixtures containing TSP.
Technical measures	<ul style="list-style-type: none"> • Use closed/ automated systems or covering of open containers (e.g. screens) to avoid irritating mists, sprayings and potential splashes. (Good practice) • Transport over pipes, technical barrel filling/emptying of barrel with automatic systems (suction pumps etc.) (Good practice) • Use of pliers, grip arms with long handles with manual use "to avoid direct contact and exposure by splashes (no working over one's head)" (Good practice) • Store in cool, dry, clean, well ventilate areas. (Good practice). • Breathing masks and local exhaust ventilation should be present during handling of solids
Respiratory protection	Respiratory protection: Respiratory protection is not required but exposure to dusts from the handling of solid materials should be reduced by the use of local exhaust ventilation. If local exhaust ventilation is not present then in may be necessary to use respiratory protection.
Hand protection	Hand protection is required: impervious chemical resistant protective gloves. Material: chloroprene gloves or equivalent.
Eye protection	Wearing of eye/face protection is recommended. Goggles or face protection shield should be consistent with EN 166 or equivalent.
Skin and body protection	Wearing of suitable protective clothing and rubber boots is recommended.
Hygiene measures	Keep away from foodstuffs, drinks and tobacco. Wash hands before breaks and at end of work. Keep work clothes separate.

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4.2 RMMs related to the environment	
Organisational measures	
Abatement measures related with wastewater	Phosphate can be precipitated from the wastewater by addition of metal ions.
Abatement measures waste air and solid waste	Solid and liquid waste has to be incinerated or appropriately disposed of as chemical waste.
4.3 Waste related measures	
Type of waste	Liquid waste. Packaging material
Disposal technique	The release of phosphates to wastewater is highly regulated. The residue of the containers or the used container itself should be disposed in accordance with local requirements.
Fraction released to environment during waste treatment	
5. Prediction of exposure resulting from the conditions described above and the substance properties.	
5.1. Human exposure	
Workers (oral)	The use of preparations containing TSP will not notably contribute to the oral intake of phosphates.
Workers (inhalation) <i>DNEL: Worker, long-term, systemic, inhalation: 4.07 mg/m³</i>	<p>TSP is irritating to the eyes and the skin and causes transient respiratory tract irritation. Therefore, the use of safety goggles and dermal protection is compulsory when handling TSP. Further, areas where hand-mixing with liquid solutions or solid preparations containing TSP takes place should be equipped with local exhaust ventilation. If the workers are hand-mixing TSP solutions with concentrations greater than 5%, they should in addition wear respiratory protection. If professionals are transferring powdery preparations containing up to 10% TSP, local exhaust ventilation should be installed. It is recommended that ventilation is always present when powdery mixtures containing TSP are handled in open processes, event if the risk characterisation is below 1, to avoid high dust exposure.</p> <p>The DNEL for systemic long-term effects is 4.07 mg/m³ for inhalation exposure. This is compared to the predicted 8-hours time-weighted average inhalation exposure concentrations. The risk characterisation ratios (RCR, exposure concentration/DNEL) for long-term inhalation exposure are presented below. The RCRs for inhalation exposure are below 1 (See table below) indicating that potential risks for worker health are controlled if the RMMs indicated above are implemented at construction and building sites. It is concluded that the use of TSP for ceramics, refractory, cements and plasters is safe for workers under the specified conditions of exposure.</p>

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Process Category	Activity Type	LEV	Duration (hours)	Content (% w/w)	Airborne TSP conc. (mg/m3)	RCR inhalation exposure	Conclusion
Industrial use of solutions							
4	Industrial	No	4 to 8	Up to 10	<0.41	<0.1	Risk adequately controlled
5	Industrial	No	4 to 8	Up to 10	<0.41	<0.1	Risk adequately controlled
8b	Industrial	No	4 to 8	Up to 10	<0.41	<0.1	Risk adequately controlled
10	Industrial	No	4 to 8	Up to 10	0.05	0.01	Risk adequately controlled
19	Industrial	No	4 to 8	Up to 10	0.05	0.012	Risk adequately controlled
Industrial use of solid products with high dustiness							
4	Industrial	No	4 to 8	Up to 10	2.5	0.61	Risk adequately controlled
	Industrial	90%	4 to 8	Up to 10	0.25	0.06	Risk adequately controlled
5	Industrial	No	4 to 8	Up to 10	2.5	0.61	Risk adequately controlled
	Industrial	90%	4 to 8	Up to 10	0.25	0.06	Risk adequately controlled
8b	Industrial	No	4 to 8	Up to 10	2.5	0.61	Risk adequately controlled
	Industrial	90%	4 to 8	Up to 10	0.25	0.06	Risk adequately controlled
19	Industrial	No	4 to 8	Up to 10	2.5	0.61	Risk adequately controlled
	Industrial	90%	4 to 8	Up to 10	0.25	0.06	Risk adequately controlled
23c	Industrial	No	4 to 8	Up to 10	1	0.25	Risk adequately controlled
	Industrial	90%	4 to 8	Up to 10	<0.1	<0.025	Risk adequately controlled

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								controlled
Professional use of solutions								
8a	Professional	No	4 to 8	Up to 10	<0.41	<0.1	Risk adequately controlled	
10	Professional	No	4 to 8	Up to 10	0.05	0.01	Risk adequately controlled	
19	Professional	No	4 to 8	Up to 10	0.05	0.012	Risk adequately controlled	
Professional use of solid products with high dustiness								
8a	Professional	No	4 to 8	Up to 10	5	1.25	RMMs needed to control risk	
	Professional	80%	4 to 8	Up to 10	1	0.25	Risk adequately controlled	
19	Professional	No	4 to 8	Up to 10	5	1.25	RMMs needed to control risk	
	Professional	90%	4 to 8	Up to 10	0.5	0.25	Risk adequately controlled	
23c	Professional	No	4 to 8	Up to 10	2	0.49	Risk adequately controlled	
	Professional	90%	4 to 8	Up to 10	0.2	0.05	Risk adequately controlled	
Workers (dermal)	No systemic toxicity effects are expected due to the inorganic nature of the substance however local effects may occur but these effects will not be dose-dependant but will depend on the concentration of the substance present in the mixture/solution used in a specific application.							
Indirect exposure via the environment	No indirect exposure of humans via the environment is expected for TSP. Thus, no assessment of indirect exposure of humans via the environment is performed.							
Consumers <i>DNEL (inhalation) = 3.04 mg/m³</i>	TSP is irritating to the eyes and the skin and causes transient respiratory tract irritation. Therefore, the use of safety goggles, dermal protection and personal respiratory equipment (dust masks) is recommended for the handling of solid, powdery mixtures containing TSP. The relevant consumer DNEL for long-term effects resulting from inhalation is 3.04 mg/m ³ . This is compared to the predicted worst-case airborne concentration of 0.72 mg/m ³ resulting from loading and mixing. The RCR for inhalation is well below 1 (see table below) and it is concluded that the consumer use of cements, plasters and other solid mixtures containing TSP is safe.							
	Short Exposure Scenario name	Duration (hours)	Content (% w/w)	Airborne TSP conc. (mg/m³)	RCR inhalation exposure	Conclusion		

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	Loading and hand mixing of cements	0.25	10	0.72	0.24	Risk adequately controlled
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5.2. Environmental exposure (qualitative assessment)

Environmental release	The use of TSP can potentially result in aquatic emissions and locally increase the phosphate (PO_4^{3-}) concentration. Phosphates reaching surface water increase the phosphorus content in the water body which may cause eutrophication and water quality deterioration.
Waste water treatment plants (WWTP)	Phosphorus should be removed from industrial wastewater before it is released to the environment. This can be done by chemical treatment (by precipitation with the help of aluminium or iron addition) or biological treatments. A high degree of removal can be reliably achieved by the available phosphorus removal techniques. Site-specific conditions such as flow rate of the receiving surface water body and phosphorus concentration in the receiving surface water body should be taken into account when implementing an appropriate wastewater treatment. Council Directive 96/61/EC concerning integrated pollution prevention and control and national regulations concerning phosphates in industrial wastewater have to be followed to minimise the risk of eutrophication due to phosphate releases.
Aquatic pelagic compartment	No direct acute or long-term adverse effects on aqueous or terrestrial organisms are anticipated with orthophosphates in the environment.
Sediments	Not relevant.
Soil and groundwater	Not relevant.
Atmospheric compartment	Not relevant.
Secondary poisoning	Bioaccumulation in organisms is not relevant for inorganic phosphates.

Exposure Scenario 11: Industrial and professional use of detergents and cleaners

1. Short title of exposure scenario 11	
Industrial and professional use of detergents and cleaners	
2. Description of activities and processes covered in the exposure scenario	
Sector of use (SU)	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites SU 19: Building and construction work SU 22: Professional uses: public domain
Product category (PC)	PC20: Products such as ph-regulators, flocculants, precipitants, neutralisation agents. PC 35: Washing and cleaning products (including solvent based products)

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Process category (PROC)	<p>PROC 1: Use in closed process, no likelihood of exposure</p> <p>PROC 2: Use in closed, continuous process with occasional controlled exposure</p> <p>PROC 3: Use in closed batch process (synthesis or formulation)</p> <p>PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises</p> <p>PROC 5: Mixing or blending in batch processes (multistage and/or significant contact)</p> <p>PROC 7: Industrial spraying</p> <p>PROC 8a: Transfer of chemicals from/to vessels/ large containers at non dedicated facilities</p> <p>PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities</p> <p>PROC 10: Roller application or brushing</p> <p>PROC 11: Non industrial spraying</p> <p>PROC 13: Treatment of articles by dipping and pouring</p> <p>PROC 19: Hand-mixing with intimate contact (only PPE available)</p> <p>PROC 26: Handling of solid inorganic substances at ambient temperatures</p>
Article category (AC)	Not applicable
Environmental release category (ERC)	<p>ERC 8a: Wide dispersive indoor use of processing aids in open systems</p> <p>ERC 8e: Wide dispersive outdoor use of reactive substances in open systems</p>
3. Operational conditions	
3.1 Operational conditions related with frequency and quantities of use	
Duration of exposure at workplace:	<p>Transfer of undiluted cleaners: Once a day for 10 minutes</p> <p>Use of diluted solutions: Once a day for 8 hours</p>
Frequency of exposure at workplace:	Once a day / 365 days per year
Annual amount used per site:	The daily and annual amount/emission per site is not considered to be the main determinant for environmental exposure.
3.2 Operational conditions related with substance/ product	
Physical state	Solid / Liquid
Concentration of substance in mixture	No information about the concentration of the substance in cleaners or in dilute solutions is available. In the first-tier assessment of exposure the concentration of TSP in liquid or solid preparations was 10% w/w and the concentration in the working solution was 1%, respectively.
3.3 Other relevant operational conditions	
The use of industrial and professional cleaners is characterised on the basis of AISE exposure scenarios for the use of such preparations developed in the context of REACH (AISE 2009).	
4. Risk Management Measures	
4.1 RMMs related to workers	

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Organisational measures	The employer has also to ascertain that the required PPE is available and used according to instructions. PPE are required when handling the pure substance and solutions or mixtures containing TSP.
Technical measures	<ul style="list-style-type: none"> • Use closed/ automated systems or covering of open containers (e.g. screens) to avoid irritating mists, sprayings and potential splashes. (Good practice) • Transport over pipes, technical barrel filling/emptying of barrel with automatic systems (suction pumps etc.) (Good practice) • Use of pliers, grip arms with long handles with manual use "to avoid direct contact and exposure by splashes (no working over one's head)" (Good practice) • Store in cool, dry, clean, well ventilate areas. (Good practice). • Breathing masks to be used during manual spraying of solutions onto surfaces
Respiratory protection	Respiratory protection: Breathing masks to be used for manual spraying onto surfaces.
Hand protection	Hand protection is required: impervious chemical resistant protective gloves. Material: chloroprene gloves or equivalent.
Eye protection	Wearing of eye/face protection is recommended. Goggles or face protection shield should be consistent with EN 166 or equivalent.
Skin and body protection	Wearing of suitable protective clothing and rubber boots is recommended.
Hygiene measures	Keep away from foodstuffs, drinks and tobacco. Wash hands before breaks and at end of work. Keep work clothes separate.
4.2 RMMs related to the environment	
Organisational measures	
Abatement measures related with wastewater	Phosphate can be precipitated from the wastewater by addition of metal ions.
Abatement measures waste air and solid waste	Solid and liquid waste has to be incinerated or appropriately disposed of as chemical waste.
4.3 Waste related measures	
Type of waste	Liquid waste. Packaging material
Disposal technique	The release of phosphates to wastewater is highly regulated. The residue of the containers or the used container itself should be disposed in accordance with local requirements.
Fraction released to environment during waste treatment	

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5. Prediction of exposure resulting from the conditions described above and the substance properties.

5.1. Human exposure

Workers (oral)	The use of preparations containing TSP will not notably contribute to the oral intake of phosphates.
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Workers (inhalation)	<p>TSP is irritating to the eyes and the skin and causes transient respiratory tract irritation. Therefore, the use of safety goggles and dermal protection is compulsory when handling detergents with a high concentration of TSP. Further, areas where hand-mixing with liquid solutions containing TSP takes place should be equipped with local exhaust ventilation. If the workers are hand-mixing TSP solutions with concentrations greater than 5%, they should in addition wear respiratory protection. During spraying of diluted solutions, ventilation with 90% efficacy should be present and the workers should wear respiratory protection to avoid high inhalation exposure.</p> <p>The DNEL for systemic long-term effects is 4.07 mg/m³ for inhalation exposure. This is compared to the predicted 8-hours time-weighted average inhalation exposure concentrations. The risk characterisation ratios (RCR, exposure concentration/DNEL) for long-term inhalation exposure are presented below. The RCRs for inhalation exposure are below 1 indicating that potential risks for worker health are controlled if the RMMs indicated above are implemented at industrial and professional cleaning sites (See table below) The use of pump sprays may lead to airborne TSP concentrations at a level of 0.005 mg/m³ and the corresponding RCR is 0.0012. It is concluded that the industrial and professional use of cleaners containing TSP is safe for workers under the specified conditions of exposure.</p>
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DNEL: Worker, long-term, systemic, inhalation: 4.07 mg/m³

Process Category	Activity Type	LEV	Duration (hours)	PRE	Content (% w/w)	Airborne TSP conc. (mg/m3)	RCR inhalation exposure	Conclusion
Industrial use of solutions								
1	Industrial	No	4 to 8	No	Up to 1	<0.004	<0.001	Risk adequately controlled
2	Industrial	No	4 to 8	No	Up to 1	<0.041	<0.01	Risk adequately controlled
3	Industrial	No	4 to 8	No	Up to 1	<0.041	<0.01	Risk adequately controlled
4	Industrial	No	4 to 8	No	Up to 1	<0.041	<0.01	Risk adequately controlled
5	Industrial	No	4 to 8	No	Up to 1	<0.041	<0.01	Risk adequately controlled
7	Industrial	No	4 to 8	No	Up to 1	68.31	16.78	RMMs needed to control risk

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	Industrial	90%	4 to 8	90%	Up to 1	0.68	0.17	Risk adequately controlled
8b	Industrial	No	4 to 8	No	10	<0.41	<0.1	Risk adequately controlled
10	Industrial	No	4 to 8	No	Up to 1	0.005	0.001	Risk adequately controlled
13	Industrial	No	4 to 8	No	Up to 1	<0.07	<0.017	Risk adequately controlled
19	Industrial	No	4 to 8	No	10	0.05	0.013	Risk adequately controlled
Industrial use of solid products with medium dustiness								
8b	Industrial	No	4 to 8	No	10	0.50	0.125	Risk adequately controlled
19	Industrial	No	4 to 8	No	10	0.50	0.125	Risk adequately controlled
Professional use of solutions								
8a	Professional	No	4 to 8	No	10	<0.41	<0.1	Risk adequately controlled
10	Professional	No	4 to 8	No	Up to 1	0.005	0.001	Risk adequately controlled
11	Professional	No	4 to 8	No	Up to 1	68.31	16.78	RMMs needed to control risk
	Professional	90%	4 to 8	90%	Up to 1	0.68	0.17	Risk adequately controlled
13	Professional	No	4 to 8	No	Up to 1	<0.07	<0.017	Risk adequately controlled
19	Professional	No	4 to 8	No	10	0.05	0.013	Risk adequately controlled
Professional use of solid products with medium dustiness								
8a	Professional	No	4 to 8	No	10	0.50	0.125	Risk adequately controlled
19	Professional	No	4 to 8	No	10	0.50	0.125	Risk adequately controlled

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Workers (dermal)	<p>No systemic toxicity effects are expected due to the inorganic nature of the substance however local effects may occur but these effects will not be dose-dependant but will depend on the concentration of the substance present in the mixture/solution used in a specific application.</p> <p>The TRA tool predicts also dermal exposure to the substance. It is recommended based on these predictions that industrial and professional workers handling the undiluted solid or liquid mixtures containing up to 10% w/w TSP wear appropriate working suits, protective gloves and safety glasses, which avoid skin and eye contact with the mixtures.</p>
Indirect exposure via the environment	No indirect exposure of humans via the environment is expected for TSP. Thus, no assessment of indirect exposure of humans via the environment is performed.
Consumers <i>DNEL (inhalation) = 3.04 mg/m³</i>	No direct consumer exposure is expected from the industrial and professional use of detergents and cleaners containing TSP. It is concluded that the industrial and professional use of detergents and cleaners is of no risk for consumers.
5.2. Environmental exposure (qualitative assessment)	
Environmental release	The use of TSP can potentially result in aquatic emissions and locally increase the phosphate (PO ₄ ³⁻) concentration. Phosphates reaching surface water increase the phosphorus content in the water body which may cause eutrophication and water quality deterioration.
Waste water treatment plants (WWTP)	Phosphorus should be removed from industrial wastewater before it is released to the environment. This can be done by chemical treatment (by precipitation with the help of aluminium or iron addition) or biological treatments. A high degree of removal can be reliably achieved by the available phosphorus removal techniques. Site-specific conditions such as flow rate of the receiving surface water body and phosphorus concentration in the receiving surface water body should be taken into account when implementing an appropriate wastewater treatment. Council Directive 96/61/EC concerning integrated pollution prevention and control and national regulations concerning phosphates in industrial wastewater have to be followed to minimise the risk of eutrophication due to phosphate releases.
Aquatic pelagic compartment	No direct acute or long-term adverse effects on aqueous or terrestrial organisms are anticipated with orthophosphates in the environment.
Sediments	Not relevant.
Soil and groundwater	Not relevant.
Atmospheric compartment	Not relevant.
Secondary poisoning	Bioaccumulation in organisms is not relevant for inorganic phosphates.

Exposure Scenario 12: Private use of detergents/cleaners

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1. Short title of exposure scenario 12	
Private use of detergents/cleaners	
2. Description of activities and processes covered in the exposure scenario	
Sector of use (SU)	SU 21: Consumer uses: private households
Product category (PC)	PC20: Products such as ph-regulators, flocculants, precipitants, neutralisation agents. PC 35: Washing and cleaning products (including solvent based products)
Process category (PROC)	Not applicable
Article category (AC)	Not applicable
Environmental release category (ERC)	ERC 8a: Wide dispersive indoor use of processing aids in open systems
3. Operational conditions	
3.1 Operational conditions related with frequency and quantities of use	
Duration of exposure at workplace:	The use of cleaning products containing TSP was modelled by using the default exposure scenarios implemented in the ConsExpo tool (RIVM 2006).
Frequency of exposure at workplace:	
Annual amount used per site:	The daily and annual amount/emission per site is not considered to be the main determinant for environmental exposure.
3.2 Operational conditions related with substance/ product	
Physical state	Solid / Liquid
Concentration of substance in mixture	No information about the concentration of the substance in cleaners or in dilute solutions is available. In the first-tier assessment of exposure the concentration of TSP in liquid or solid preparations was 10% w/w and the concentration in the working solution was 1%, respectively.
3.3 Other relevant operational conditions	
The use of cleaning products containing TSP was modelled by using the default exposure scenarios implemented in the ConsExpo tool (RIVM 2006).	
4. Risk Management Measures	
4.1 RMMs related to workers	
Organisational measures	T
Technical measures	It is recommended that consumers wear appropriate gloves and, if applicable, safety glasses when handling the undiluted products containing up to 10% TSP to avoid skin and eye contact.
Respiratory protection	Respiratory protection: Breathing masks to be used for manual spraying onto surfaces.

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Hand protection	Hand protection is required: impervious chemical resistant protective gloves. Material: chloroprene gloves or equivalent.
Eye protection	Wearing of eye/face protection is recommended. Goggles or face protection shield should be consistent with EN 166 or equivalent.
Skin and body protection	Wearing of suitable protective clothing and rubber boots is recommended.
Hygiene measures	Keep away from foodstuffs, drinks and tobacco. Wash hands before breaks and at end of work. Keep work clothes separate.
4.2 RMMs related to the environment	
Organisational measures	Not applicable
Abatement measures related with wastewater	The substance will be released to the sewer system. Phosphate can be precipitated from the wastewater by addition of metal ions.
Abatement measures waste air and solid waste	Not applicable
4.3 Waste related measures	
Type of waste	Liquid waste. Packaging material.
Disposal technique	Minor amounts of product may remain in the packages, which will be disposed of via the regular household waste and may be incinerated or deposited in landfills. The release of phosphates to wastewater is highly regulated. The residue of the containers or the used container itself should be disposed in accordance with local requirements.
Fraction released to environment during waste treatment	
5. Prediction of exposure resulting from the conditions described above and the substance properties.	
5.1. Human exposure	
Workers (oral)	Workers will not be exposed to TSP as a result of consumer use of mixtures containing the substance. No exposure assessment was carried out.
Workers (inhalation)	
Workers (dermal)	
Indirect exposure via the environment	No indirect exposure of humans via the environment is expected for TSP. Thus, no assessment of indirect exposure of humans via the environment is performed.

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<p>Consumers <i>DNEL (inhalation) = 3.04 mg/m³</i></p>	<p>Oral and dermal routes are not considered to contribute to the exposure of consumers to TSP.</p> <p>The inhalation exposure to TSP during consumer use of detergent powders and other cleaners is very low. The RCR for inhalation is well below 1 indicating that the consumer use of such products is safe with regard to exposure to TSP (See table below).</p> <table border="1" data-bbox="576 640 1445 934"> <thead> <tr> <th>Short Exposure Scenario name</th> <th>Duration (hours)</th> <th>Content (% w/w)</th> <th>Airborne TSP conc. (mg/m3)</th> <th>RCR inhalation exposure</th> <th>Conclusion</th> </tr> </thead> <tbody> <tr> <td>Transfer of detergent powders, loading of machine</td> <td>0.25</td> <td>10</td> <td>2.69 x 10⁻⁵</td> <td>8.8 x 10⁻⁶</td> <td>Risk adequately controlled</td> </tr> </tbody> </table>	Short Exposure Scenario name	Duration (hours)	Content (% w/w)	Airborne TSP conc. (mg/m3)	RCR inhalation exposure	Conclusion	Transfer of detergent powders, loading of machine	0.25	10	2.69 x 10 ⁻⁵	8.8 x 10 ⁻⁶	Risk adequately controlled
Short Exposure Scenario name	Duration (hours)	Content (% w/w)	Airborne TSP conc. (mg/m3)	RCR inhalation exposure	Conclusion								
Transfer of detergent powders, loading of machine	0.25	10	2.69 x 10 ⁻⁵	8.8 x 10 ⁻⁶	Risk adequately controlled								
<p>5.2. Environmental exposure (qualitative assessment)</p>													
<p>Environmental release</p>	<p>The use of TSP can potentially result in aquatic emissions and locally increase the phosphate (PO₄³⁻) concentration. Phosphates reaching surface water increase the phosphorus content in the water body which may cause eutrophication and water quality deterioration.</p>												
<p>Waste water treatment plants (WWTP)</p>	<p>Phosphorus should be removed from industrial wastewater before it is released to the environment. This can be done by chemical treatment (by precipitation with the help of aluminium or iron addition) or biological treatments. A high degree of removal can be reliably achieved by the available phosphorus removal techniques. Site-specific conditions such as flow rate of the receiving surface water body and phosphorus concentration in the receiving surface water body should be taken into account when implementing an appropriate wastewater treatment. Council Directive 96/61/EC concerning integrated pollution prevention and control and national regulations concerning phosphates in industrial wastewater have to be followed to minimise the risk of eutrophication due to phosphate releases.</p>												
<p>Aquatic pelagic compartment</p>	<p>No direct acute or long-term adverse effects on aqueous or terrestrial organisms are anticipated with orthophosphates in the environment.</p>												
<p>Sediments</p>	<p>Not relevant.</p>												
<p>Soil and groundwater</p>	<p>Not relevant.</p>												
<p>Atmospheric compartment</p>	<p>Not relevant.</p>												
<p>Secondary poisoning</p>	<p>Bioaccumulation in organisms is not relevant for inorganic phosphates.</p>												

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Exposure Scenario 13: Professional and private use of fertiliser

1. Short title of exposure scenario 13	
Professional and private use of fertiliser	
2. Description of activities and processes covered in the exposure scenario	
Sector of use (SU)	SU 1: Agriculture, forestry and fishing SU 21: Consumer uses: private households SU 22: Professional uses: public domain
Product category (PC)	PC 12: Fertilisers
Process category (PROC)	PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 5: Mixing or blending in batch processes (multistage and/or significant contact) PROC 8a: Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9: transfer of substance or preparation into small containers (dedicated filling line including weighing) PROC 11: Non industrial spraying PROC 13: Treatment of articles by dipping and pouring PROC 19: Hand-mixing with intimate contact (only PPE available)
Article category (AC)	Not applicable
Environmental release category (ERC)	ERC 8a: Wide dispersive indoor use of processing aids in open systems ERC 8e: Wide dispersive outdoor use of reactive substances in open systems
3. Operational conditions	
3.1 Operational conditions related with frequency and quantities of use	
Duration of exposure at workplace:	Information about the professional use of TSP solutions applied by fertigation during crop-growing season is available. The use may occur regularly up to 4 to 5 months a year. In the first-tier assessment of exposure a frequency of once a day and an exposure duration of 8 hours was considered for professional users/
Frequency of exposure at workplace:	
Annual amount used per site:	The daily and annual amount/emission per site is not considered to be the main determinant for environmental exposure.
3.2 Operational conditions related with substance/ product	
Physical state	Solid / Liquid

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Concentration of substance in mixture	The total TSP quantity applied during the season is approximately 5 to 30 kg per ha, which corresponds to an amount of 1 to 6 kg per ha per use if a monthly use is considered. The concentration in the undiluted fertiliser products was 10% w/w, the concentration in the working solution was 1% w/w, respectively.
3.3 Other relevant operational conditions	
4. Risk Management Measures	
4.1 RMMs related to workers	
Organisational measures	For professional uses the employer has also to ascertain that the required PPE is available and used according to instructions. PPE are required when handling the pure substance and solutions or mixtures containing TSP.
Technical measures	<ul style="list-style-type: none"> • Use closed/ automated systems or covering of open containers (e.g. screens) to avoid irritating mists, sprayings and potential splashes. (Good practice) • Transport over pipes, technical barrel filling/emptying of barrel with automatic systems (suction pumps etc.) (Good practice) • Use of pliers, grip arms with long handles with manual use "to avoid direct contact and exposure by splashes (no working over one's head)" (Good practice) • Store in cool, dry, clean, well ventilate areas. (Good practice). • Professional users may wear gloves and safety glasses during transfer activities. The use of gloves and glasses is also recommended for consumers handling the undiluted fertiliser products.
Respiratory protection	Respiratory protection: recommended.
Hand protection	Hand protection is required: impervious chemical resistant protective gloves. Material: chloroprene gloves or equivalent.
Eye protection	Wearing of eye/face protection is recommended. Goggles or face protection shield should be consistent with EN 166 or equivalent.
Skin and body protection	Wearing of suitable protective clothing and rubber boots is recommended.
Hygiene measures	Keep away from foodstuffs, drinks and tobacco. Wash hands before breaks and at end of work. Keep work clothes separate.
4.2 RMMs related to the environment	
Organisational measures	
Abatement measures related with wastewater	<p>Phosphorus losses from fertilised soil can be minimized by following a set of recommended safety measures (Lory, 1999):</p> <ul style="list-style-type: none"> • Apply phosphorus sources below the surface. • Surface-apply phosphorus sources during periods of the year when runoff is unlikely.

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	<ul style="list-style-type: none"> • Surface-apply phosphorus sources only on fields with a low potential for runoff. • Do not surface-apply phosphorus sources to frozen or snow-covered soils. • Maintain buffer strips around water resources where no phosphorus is applied. • Add alum or similar treatment to manure to reduce the availability of phosphorus. <p>There is little potential that phosphorus leaches through soil into groundwater. The affinity of soluble phosphorus to adsorb to particles limits its movement through soil as it leaches through soil. Considerable transport of phosphorus to groundwater is not anticipated with fertiliser use under normal conditions.</p> <p>Sandy soils may have limited capacity to absorb phosphorus and relatively high amounts of phosphorus deposited on such soils may overwhelm the absorption capacity. Cracking soils or areas with karst topography may create channels in the soil which allow direct travel of surface water into groundwater. In both cases elevated phosphorus concentrations in groundwater may occur. Specific risk measures may be required for the described soil properties.</p>
Abatement measures waste air and solid waste	Solid and liquid waste has to be incinerated or appropriately disposed of as chemical waste.
4.3 Waste related measures	
Type of waste	Liquid waste. Packaging material
Disposal technique	The release of phosphates to wastewater is highly regulated. The residue of the containers or the used container itself should be disposed in accordance with local requirements.
Fraction released to environment during waste treatment	
5. Prediction of exposure resulting from the conditions described above and the substance properties.	
5.1. Human exposure	
Workers (oral)	The use of fertilisers containing TSP will not notably contribute to the oral intake of phosphates.

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Workers (inhalation) DNEL: Worker, long-term, systemic, inhalation: 4.07 mg/m ³	<p>TSP is irritating to the eyes and the skin and causes transient respiratory tract irritation. Therefore, the use of safety goggles and dermal protection is compulsory for workers handling fertilisers containing high concentrations of TSP. If high amounts of solid powdery fertiliser are mixed, e.g. for the use with tractor-mounted sprayers, the workers should wear personal respiratory equipment to avoid exposure to elevated exposure to airborne dusts.</p> <p>The DNEL for systemic long-term effects is 4.07 mg/m³ for inhalation exposure. This is compared to the predicted 8-hour time-weighted average inhalation exposure concentrations. The risk characterisation ratios (RCR, exposure concentration/DNEL) for long-term inhalation exposure are presented below. The RCRs for inhalation exposure are below 1 indicating that potential risks for worker health are controlled if the RMMs indicated above are implemented (See table below). It is concluded that the use of fertilisers containing TSP is safe for workers under the specified conditions of exposure.</p>							
	Tractor-mounted/trailed boom sprayer		Hand-held sprayer			Unit		
	Hydraulic nozzles	Rotary atomiser	Air-assisted sprayer	15 L, hydraulic nozzles, low level target	2.5 L, rotary atomiser, low level target	2.5 L, rotary atomiser, high level target		
	Mixing and loading							
	<i>Solid, granular fertilizer</i>							
	Long-term exposure concentration of a.s.	1.08	1.08	0.32	0.03	0.04	0.04	mg/m ³
	RCR inhalation	0.27	0.27	0.08	0.01	0.01	0.01	-
	Conclusion	Risk controlled	Risk controlled	Risk controlled	Risk controlled	Risk controlled	Risk controlled	
	<i>Solid, powdery fertilizer</i>							
	Long-term exposure concentration of a.s.	6.3	6.3	1.89	0.61	0.92	0.92	mg/m ³
	RCR inhalation	1.55	1.55	0.464	0.15	0.226	0.226	-
	Conclusion	RMMs needed to control risk	RMMs needed to control risk	Risk controlled	Risk controlled	Risk controlled	Risk controlled	
	Long-term exposure concentration of a.s. with PRE, 90% efficacy	0.63	0.63					
	RCR inhalation with PRE, 90% efficacy	0.1547912	0.1547912					
	Conclusion	Risk controlled	Risk controlled					
	Spray Application							
	Long-term exposure concentration of a.s.	0.06	0.03	0.3	0.12	0.06	0.06	mg/m ³

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	inhalation RCR	0.015	007	0.074	0.029	0.015	0.015	-																																										
	Conclusion	Risk controlled	Risk controlled	Risk controlled	Risk controlled	Risk controlled	Risk controlled																																											
Workers (dermal)	No systemic toxicity effects are expected due to the inorganic nature of the substance however local effects may occur but these effects will not be dose-dependant but will depend on the concentration of the substance present in the mixture/solution used in a specific application.																																																	
Indirect exposure via the environment	No indirect exposure of humans via the environment is expected for TSP. Thus, no assessment of indirect exposure of humans via the environment is performed. The use of fertilizers containing TSP will not notably contribute to the oral intake of phosphates.																																																	
Consumers <i>DNEL (inhalation)</i> = 3.04 mg/m ³	<p>If consumers are handling undiluted fertiliser, it is recommended that they wear safety goggles and gloves because TSP is irritating to the eyes and the skin. Consumers are not expected to wear any other protective equipment.</p> <p>The consumer DNEL for systemic long-term effects is 3.04 mg/m³ for inhalation exposure. This is compared to the predicted 8-hours time-weighted average inhalation exposure concentrations. The risk characterisation ratios (RCR, exposure concentration/DNEL) for long-term inhalation are presented below. The RCRs for inhalation exposure are below 1 indicating that potential risks for consumer health are controlled (See table below). It is concluded that the use of fertilisers containing TSP is safe for consumers under the specified conditions of exposure.</p> <table border="1" data-bbox="406 1365 1177 1932"> <thead> <tr> <th></th> <th>Private spraying of liquid fertilizers with home garden sprayer, 5 L-tank, low-level target</th> <th>Unit</th> </tr> </thead> <tbody> <tr> <td colspan="3">Mixing and loading</td> </tr> <tr> <td colspan="3"><i>Solid, granular fertilizer</i></td> </tr> <tr> <td>Long-term concentration of a.s.</td> <td>0.00015</td> <td>mg/m3</td> </tr> <tr> <td>RCR inhalation</td> <td>4.9E-05</td> <td>-</td> </tr> <tr> <td>Conclusion</td> <td>Risk adequately controlled</td> <td></td> </tr> <tr> <td colspan="3"><i>Solid, powdery fertilizer</i></td> </tr> <tr> <td>Long-term concentration of a.s.</td> <td>0.004</td> <td>mg/m3</td> </tr> <tr> <td>RCR inhalation</td> <td>0.0013</td> <td>-</td> </tr> <tr> <td>Conclusion</td> <td>Risk adequately controlled</td> <td></td> </tr> <tr> <td colspan="3">Spray Application</td> </tr> <tr> <td>Long-term concentration of a.s.</td> <td>0.004</td> <td>mg/m3</td> </tr> <tr> <td>RCR inhalation</td> <td>0.0013</td> <td>-</td> </tr> <tr> <td>Conclusion</td> <td>Risk adequately controlled</td> <td></td> </tr> </tbody> </table>									Private spraying of liquid fertilizers with home garden sprayer, 5 L-tank, low-level target	Unit	Mixing and loading			<i>Solid, granular fertilizer</i>			Long-term concentration of a.s.	0.00015	mg/m3	RCR inhalation	4.9E-05	-	Conclusion	Risk adequately controlled		<i>Solid, powdery fertilizer</i>			Long-term concentration of a.s.	0.004	mg/m3	RCR inhalation	0.0013	-	Conclusion	Risk adequately controlled		Spray Application			Long-term concentration of a.s.	0.004	mg/m3	RCR inhalation	0.0013	-	Conclusion	Risk adequately controlled	
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	controlled
5.2. Environmental exposure (qualitative assessment)	
Environmental release	The use of TSP can potentially result in aquatic emissions and locally increase the phosphate (PO_4^{3-}) concentration. Phosphates reaching surface water increase the phosphorus content in the water body which may cause eutrophication and water quality deterioration.
Waste water treatment plants (WWTP)	Phosphorus should be removed from industrial wastewater before it is released to the environment. This can be done by chemical treatment (by precipitation with the help of aluminium or iron addition) or biological treatments. A high degree of removal can be reliably achieved by the available phosphorus removal techniques. Site-specific conditions such as flow rate of the receiving surface water body and phosphorus concentration in the receiving surface water body should be taken into account when implementing an appropriate wastewater treatment. Council Directive 96/61/EC concerning integrated pollution prevention and control and national regulations concerning phosphates in industrial wastewater have to be followed to minimise the risk of eutrophication due to phosphate releases.
Aquatic pelagic compartment	No direct acute or long-term adverse effects on aqueous or terrestrial organisms are anticipated with orthophosphates in the environment.
Sediments	Not relevant.
Soil and groundwater	Not relevant.
Atmospheric compartment	Not relevant.
Secondary poisoning	Bioaccumulation in organisms is not relevant for inorganic phosphates.

Exposure scenario 14: Use of toothpaste and dental care products

1. Short title of exposure scenario 14	
Use of toothpaste and dental care products	
2. Description of activities and processes covered in the exposure scenario	
Sector of use (SU)	SU 21: Consumer uses: private households.
Product category (PC)	PC 39: Cosmetics, personal care products.
Process category (PROC)	Not applicable.
Article category (AC)	Not applicable
Environmental release category (ERC)	ERC 8b: wide dispersive indoor use of reactive substances in open systems.

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3. Operational conditions	
The human exposure to TSP from use of toothpaste is to be assessed under the Cosmetics Directive and is not investigated under the REACH regulation. Therefore operational conditions are not relevant for this scenario.	
4. Risk Management Measures	
4.1 RMMs related to workers	
General advise	Consumer products should be intrinsically safe. The human exposure to TSP from use of toothpaste and other dental care products is to be assessed under the EU Cosmetics Directive and is not investigated under the REACH regulation. Risk management measures relating to the use of TSP in dental care products should be conveyed on the package and no further consideration is required.
4.2 RMMs related to the environment	
Organisational measures	Not applicable
Abatement measures related with wastewater	Wastewater is treated via chemical/biological municipal wastewater treatment plants.
Abatement measures waste air and solid waste	Not applicable.
4.3 Waste related measures	
Type of waste	After brushing teeth the mouth is flushed with water and the greatest portion of the toothpaste is disposed of via the sewer system. Sewage will be treated in municipal wastewater treatment plants. Minor amounts of products remain in the packages and will be disposed of via the regular household waste. Household waste may be deposited in a landfill.
Disposal technique	
Fraction released to environment during waste treatment	Not applicable.
5. Prediction of exposure resulting from the conditions described above and the substance properties.	
5.1. Human exposure	
Consumer exposure	Consumer exposure to TSP from the use of toothpaste is not assessed under REACH. The potential risk for consumers from the use of cosmetics and personal care products falls under the EU Cosmetics Directive.
Worker exposure	No occupational exposure to TSP is expected from the use of toothpaste.
Indirect exposure via the environment	No indirect exposure of humans via the environment is expected for TSP, as the substance can be effectively removed from the wastewater. Thus, no assessment of indirect exposure of humans via the environment is

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	performed.
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