Safety data sheet
according to 1907/2006/EC, Article 31

Printing date 28.12.2010 *2-800-26-017-EU version 4* *Revision: 28.12.2010*

*
1 Identification of the substance/mixture and of the company/undertaking

· **Product identifier**

· **Trade name:** **Superphosphate, concentrated (TSP)**

· **Synonyms**
Triple Superphosphate, TSP
Granulated Triple Superphosphate, GTSP
Granular TSP
· **CAS Number:**
65996-95-4
· **EINECS Number:**
266-030-3
· **Index number:** *None*
· **Registration number** *01-2119493057-33-0007*
· **Relevant identified uses of the substance or mixture and uses advised against**
Fertilizer
Processing aid/ Additive
Intermediate

· **Details of the supplier of the safety data sheet**
· **Manufacturer/Supplier:**
Rotem Amfert Negev Ltd.
Mishor Rotem Plants
M.P. Arava 86800
ISRAEL
Phone: +972-52-3927170
E-mail: wpacmarketing@rotem-group.com

Only Representative:
ICL FERTILIZERS EUROPE C.V.
HSE-QA Manager
Richard van der Sluis
TEL: 0031-(0)20-5815132
FAX: 0031-(0)20-6868328
E-mail: sluis@iclfertilizers.eu
FOSFAATWEG 48, 313
AMSTERDAM 1013 BM
Netherlands
· **Emergency telephone number:**
In Europe call: +31-205-815100 (24 hours a day, 365 days a year)
In Israel call: +972-8-6504777 (24 hours a day, 365 days a year)
+972-8-6504915

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2 Hazards identification

· **Classification of the substance or mixture**
· **Classification according to Regulation (EC) No 1272/2008**

GHS05 corrosion

Eye Dam. 1 H318 Causes serious eye damage.

· **Classification according to Directive 67/548/EEC or Directive 1999/45/EC**

Xi; Irritant

R41: Risk of serious damage to eyes.

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· **Label elements**
· **Labelling according to Regulation (EC) No 1272/2008**
The substance is classified and labelled according to the CLP regulation.
· **Hazard pictograms**

GHS05

· **Signal word** Danger
· **Hazard statements**
H318 Causes serious eye damage.
· **Precautionary statements**
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310 Immediately call a POISON CENTER or doctor/physician.
· **Other hazards**
· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.

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3 Composition/information on ingredients

· **Chemical characterization: Substances**
· **CAS No. Description**
65996-95-4 Superphosphates, concd
· **EINECS Number:** 266-030-3
· **Additional information:** This product is a multi-constituent substance

· **Components:**			
CAS: 7758-23-8 EINECS: 231-837-1	Calcium bis(dihydrogenorthophosphate)	Xi R41 Eye Dam. 1, H318	≥65%
CAS: 7778-18-9 EINECS: 231-900-3	calcium sulphate, natural		≥3%
CAS: 7757-93-9 EINECS: 231-826-1	calcium hydrogenorthophosphate		≥2%

· **SVHC** None

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4 First aid measures

· **Description of first aid measures**
· **General information:** Do not leave affected persons unattended.
· **After inhalation:** Supply fresh air; consult doctor in case of complaints.
· **After skin contact:**
Immediately wash with water and soap and rinse thoroughly.
If skin irritation continues, consult a doctor.
· **After eye contact:**
Rinse opened eye for several minutes under running water.
Seek medical treatment.

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· **After swallowing:**
Rinse out mouth and then drink plenty of water.
If symptoms persist consult doctor.
NOTE: Never give an unconscious person anything to drink.
· **Information for doctor:**
· **Most important symptoms and effects, both acute and delayed** Irritating to eyes.
· **Indication of any immediate medical attention and special treatment needed**
No further relevant information available.

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5 Firefighting measures

· **Extinguishing media**
· **Suitable extinguishing agents:**
The product is not flammable.
Use fire extinguishing methods suitable to surrounding conditions.
· **For safety reasons unsuitable extinguishing agents:** None
· **Special hazards arising from the substance or mixture**
During heating or in case of fire poisonous gases are produced.
Phosphorus oxides (e.g. P2O5)
Sulphur oxides (SOx)
Danger of toxic fluorine based pyrolysis products.
· **Advice for firefighters**
· **Protective equipment:**
Wear fully protective suit.
Mouth respiratory protective device.
· **Additional information**
Collect contaminated fire fighting water separately. It must not enter the sewage system.

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6 Accidental release measures

· **Personal precautions, protective equipment and emergency procedures**
Avoid formation of dust.
Ensure adequate ventilation
Use respiratory protective device against the effects of fumes/dust/aerosol.
Wear protective clothing.
· **Environmental precautions:** Do not allow product to reach sewage system or any water course.
· **Methods and material for containment and cleaning up:**
Pick up mechanically.
Damp down dust with water spray.
· **Reference to other sections**
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

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7 Handling and storage

· **Handling:**
· **Precautions for safe handling**
Prevent formation of dust.
Ensure good ventilation/exhaustion at the workplace.
· **Information about fire - and explosion protection:**
The product is not flammable.

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No special measures required.

· **Conditions for safe storage, including any incompatibilities**
· **Storage:**
· **Requirements to be met by storerooms and receptacles:** *Store in a cool location.*
· **Information about storage in one common storage facility:**
Do not store together with alkalis (caustic solutions).
Do not store together with urea
· **Further information about storage conditions:**
Protect from humidity and water.
Protect from heat and direct sunlight.

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8 Exposure controls/personal protection

· **Additional information about design of technical facilities:**
Ventilation must be sufficient to maintain TLV-TWA below 3 mg/m³, respirable particles, and 10 mg/m³, inhalable particles [ACGIH recommendation for Particles (Insoluble or poorly soluble). Not Otherwise Specified (PNOS)]

· **Control parameters**
· **Ingredients with limit values that require monitoring at the workplace:** *Not required.*
· **DNELs**
For workers:
Long-term-systemic effects (inhalation) DNEL: 3.1 mg/m³
Long-term-systemic effects (dermal) DNEL: 17.4 mg/kg bw/day
For general population:
Long-term-systemic effects (inhalation) DNEL: 0.9 mg/m³
Long-term-systemic effects (oral) DNEL: 2.1 mg/kg bw/day
Long-term-systemic effects (dermal) DNEL: 10.4 mg/kg bw/day
· **PNECs**
PNEC aqua (freshwater): 1.7 mg/L
PNEC aqua (marine water): 0.17 mg/L
PNEC aqua (intermittent releases): 17 mg/L
PNEC STP: 10 mg/L

· **Exposure controls**
· **Personal protective equipment:**
· **General protective and hygienic measures:**
The usual precautionary measures are to be adhered to when handling chemicals.
Do not eat or drink while working.
Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing
Wash hands before breaks and at the end of work.
Avoid contact with the eyes and skin.
· **Respiratory protection:** *Use suitable respiratory protective device in case of insufficient ventilation.*
· **Protection of hands:**

Protective gloves

· **Material of gloves**
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.

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· **Penetration time of glove material**
The exact break trough time has to be found out by the manufacturer of the protective gloves and has to be observed.
· **Eye protection:**

Tightly sealed goggles

· **Body protection:** Light weight protective clothing
· **Limitation and supervision of exposure into the environment**
Based on all data available this product is not considered to pose a risk to the environment.
The product should not get in high quantities into waste water because it may act as a plant nutrient and cause eutrophication.
· **Risk management measures**
Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.

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9 Physical and chemical properties

· **Information on basic physical and chemical properties**
· **General Information**
· **Appearance:**

Form:	Granulate
Colour:	Grey Brownish
· **Odour:**	Acidic
· **pH-value (10 g/l) at 20°C:**	3,6
· **Change in condition**	
Melting point/Melting range:	Undetermined. Decomposes before melting.
Boiling point/Boiling range:	None The substance decomposes before boiling
· **Flash point:**	Not applicable. This product is inorganic substance.
· **Flammability (solid, gaseous):**	Product is not flammable. (based on molecular structure)
· **Ignition temperature:**	Not applicable
· **Decomposition temperature:**	>200°C Thermal decomposition on losing water.
· **Self-igniting:**	Product is not selfigniting. (based on molecular structure)
· **Danger of explosion:**	Product does not present an explosion hazard. (based on molecular structure)
· **Explosion limits:**	None
· **Oxidizing properties**	None The substance does not contain any groups associated with oxidising properties.

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· **Vapour pressure at 20°C:** 8,4x10-7 Pa (OECD 104, EC A.4)
· **Density at 20°C:** 2,09 g/cm³ (OECD 109, EC A.3)
· **Bulk density at 20°C:** 1000-1200 kg/m³
· **Solubility in / Miscibility with water at 20°C:** 1-100 g/L
Partly soluble.
· **Segregation coefficient (n-octanol/water):** Not applicable
This substance is inorganic chemical.
· **Viscosity:** Not applicable
This product is solid. Viscosity is only relevant to liquids.

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10 Stability and reactivity

· **Reactivity**
Reacts with alkali (lyes).
Mixing with urea causes formation of very sticky urea phosphate.
· **Chemical stability** No decomposition if used and stored according to specifications.
· **Possibility of hazardous reactions** Toxic fumes may be released if heated above the decomposition point.
· **Conditions to avoid** To avoid thermal decomposition do not overheat.
· **Incompatible materials:**
Alkalis
Urea
· **Hazardous decomposition products:**
Formation of toxic gases is possible during heating or in case of fire.
Phosphorus oxides (e.g. P2O5)
Sulphur oxides (SOx)
Danger of toxic fluorine based pyrolysis products.

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11 Toxicological information

· **Information on toxicological effects**
· **Acute toxicity:**
· **LD/LC50 values relevant for classification:**
No reliable study with this product is present.
This study is conducted on an analogous substance. (read-across)

7783-28-0 diammonium hydrogenorthophosphate		
Oral	LD50	>2000 mg/kg (rat) (OECD 425, EPA) not classified
Dermal	LD50	>2000 mg/kg (rat) (OECD 402, EPA) not classified
Inhalative	LC50/4 h	>5,0 mg/l (rat) (OECD 403)

· **Primary irritant effect:**

· **Effect**	**Species**	**Method**
7722-76-1 Ammonium dihydrogenorthophosphate		
Irritation of skin	OECD 404	not irritating (rabbit)

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65996-95-4 Superphosphates, concd		
Irritation of eyes	OECD 405, EC B.5	Irritating effect (rabbit)
7783-28-0 diammonium hydrogenorthophosphate		
Sensitisation	OECD 429, EC B.42	not sensitizing (mouse)

· **Toxicokinetics, metabolism and distribution**
This product dissociates into calcium, sulfate and phosphate ions, which are normal body and nutritional components.

· **Repeated dose toxicity**		
Oral	NOAEL	250 mg/kg bw day (rat) (OECD 422 (subacute)) should not be classified for general toxicity

· **CMR effects (carcinogenity, mutagenicity and toxicity for reproduction)**
· **Mutagenicity:**
None
(acc to OECD 471 and OECD 473 tests with CAS 65996-95-4 TSP
and acc. to OECD 476 with CAS 7722-76-1 ammonium dihydrogenorthophosphate).
· **Carcinogenicity:**
no data available
(no carcinogenicity study needs to be performed as this substance is not genotoxic)
· **Toxicity for reproduction:**
no classification is necessary
reproductive toxicity: NOAEL: 750 mg/kg bw/day; rat, oral
developmental toxicity: NOAEL: 750 mg/kg bw/day; rat, oral
(OECD 422)

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12 Ecological information

· **Toxicity**
· **Acquatic toxicity:**
Inorganic phosphates are not considered to be toxic to aquatic species.

7722-76-1 Ammonium dihydrogenorthophosphate	
LC50/96 h (static)	>85,9 mg/L (rainbow trout) (OECD 203) freshwater
8011-76-5 Superphosphate (SSP)	
LC50/72 h	1790 mg/L (Daphnia carinata) (Stand Meth for the Exam of Water and Wastewater) freshwater
65996-95-4 Superphosphates, concd	
EC50/72 h (static)	>87,6 mg/L (Selenastrum capricornutum algae) (OECD 201) NOEC ≥87.6 mg/L

· **Persistence and degradability**
The substance is inorganic; therefore no biodegradation tests are applicable.
This product dissociates into Ca+2, sulfate and phosphate ions, which cannot be further degraded.
· **Other information:**
The product should not get in high quantities into waste water because it may act as a plant nutrient and cause eutrophication.
· **Bioaccumulative potential**
Does not accumulate in organisms
This substance is highly water soluble and dissociating.
Low potential for bioaccumulation (based on substance properties)
· **Mobility in soil** Low potential for adsorption (based on substance properties).

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· **Behaviour in sewage processing plants:**

· Type of test	Effective concentration	Method	Assessment
8011-76-5 Superphosphate (SSP)			
EC50/3 h	>100 mg/L (activated sludge) (OECD 209, EC C.11)		

· **Remark:**
No reliable study with this product is present.
This study is conducted on an analogous substance. (read-across)
Inorganic phosphates are not considered to be toxic to sewage treatment plant microorganisms.
· **General notes:**
According to the criteria of the EU-classification and labelling "dangerous for environment"(93/21/EWG) the substance/ the product has to be classified as non-hazardous for the environment.
· **Results of PBT and vPvB assessment**
· **PBT:** No assessment is required for inorganic substances.
· **vPvB:** No assessment is required for inorganic substances.

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13 Disposal considerations

· **Waste treatment methods**
· **Recommendation**
This product is used as fertiliser. However, large spills can kill vegetation. Prevent large quantities from entering waterways. If uncontaminated, sweep up or collect, and reuse as product. If contaminated with other materials, collect in suitable containers.
Can be reused without reprocessing.
Disposal must be made in accordance with Local Authority requirements.

· European waste catalogue	
06 00 00	WASTES FROM INORGANIC CHEMICAL PROCESSES
06 09 00	wastes from the MSFU of phosphorous chemicals and phosphorous chemical processes
06 09 04	calcium-based reaction wastes other than those mentioned in 06 09 03

· **Uncleaned packaging:**
· **Recommendation:**
Packaging may be reused or recycled after cleaning.
Disposal must be made in accordance with Local Authority requirements.
· **Recommended cleansing agents:** Water, if necessary together with cleansing agents.

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14 Transport information

· **DOT regulations:**
· **Hazard class:** None

· **Land transport ADR/RID (cross-border)**
· **ADR/RID class:** None

· **Maritime transport IMDG:**
· **IMDG Class:** None
· **Marine pollutant:** No

· **Air transport ICAO-TI and IATA-DGR:**
· **ICAO/IATA Class:** None
· **UN "Model Regulation":** None
· **Special precautions for user** Not applicable.

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· **Transport/Additional information:** Not dangerous according to the above specifications.
· **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code** Not applicable.

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15 Regulatory information

· **Safety, health and environmental regulations/legislation specific for the substance or mixture**
Directive 2000/60 EC (phosphates)

· **National regulations:**
· **Additional classification according to Decree on Hazardous Materials, Annex II:** None

· **Other regulations, limitations and prohibitive regulations**
· **Substances of very high concern (SVHC) according to REACH, Article 57** None
· **Registration status (Chemical Inventories listing) :**
United States (TSCA) : listed
Australia (AICS) : listed
Korea (ECL) : listed
China (IECSC) : listed
NTP (National Toxicology Program) : Substance is not listed
IARC (International Agency for Research on Cancer) : Substance is not listed
· **Chemical safety assessment:** A Chemical Safety Assessment has been carried out.

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16 Other information

· **Relevant phrases**
H318 Causes serious eye damage.

R41 Risk of serious damage to eyes.

· **Department issuing MSDS:** EHS UNIT in ISRAEL
· **Contact:**
Dr.J.Lati
Tel. : +972-8-6465-341
Fax. : +972-8-6465-342
E-mail : lati@dsw.co.il
· **Abbreviations and acronyms:**
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
IATA-DGR: Dangerous Goods Regulations by the "International Air Transport Association" (IATA)
ICAO: International Civil Aviation Organization
ICAO-TI: Technical Instructions by the "International Civil Aviation Organization" (ICAO)
GHS: Globally Harmonized System of Classification and Labelling of Chemicals
EINECS: European Inventory of Existing Commercial Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
DNEL: Derived No-Effect Level (REACH)
PNEC: Predicted No-Effect Concentration (REACH)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
NOAEL: No Observable Adverse Effect Level
NOEC: No Observable Effect Concentration
OECD: Organisation for Economic Co-operation and Development

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· **Sources**
REACH dossier, 2010
REACH CSR, 2010
· **** Data compared to the previous version altered.***
Reason for revision: Compliance with Reg. 453/2010 EC, amending Reg. 1907/2006 EC.
The sections where alterations took place are marked with an asterisk in the left border
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EU

Annex I – Exposure Scenario

General remarks

Table 1 contains the identified uses. It also contains all the information necessary for a Tier 1 exposure assessment with ECETOC TRA (workers and consumers). However, a qualitative assessment will be performed for man, as the leading effect is eye irritation from which no dose-response curve can be established and a DNEL cannot be set. Normally the information from table 1 is used to derive a table listing the target group template needed to build the exposure scenarios based on the Tier 1 method: for worker (PROC driver of Tier 1 exposure estimate) and for consumer (PC or AC driver of Tier 1 exposure estimate). In this table IUs with the same driver of exposure/release would be grouped. However, as in this case a qualitative assessment will be done the reported uses will be grouped into the main sector of uses as the applicable RMMs will be comparable for all processes within a specific sector. The following exposure scenarios will be described:

Table 1: Overview of exposure scenarios and coverage of substance life cycle

ES No.	Name of ES	Life cycle stage (s) covered by the IU						Sector of Use (SU)	Product Category (PC)	Process category (PROC)	Article category (AC)	Environm. Release Categ. (ERC)
		Manufacture	Formulation	End-use			Service life					
				Industrial	Professional	Consumer						
ES 1	Industrial use of TSP, including distribution and other activities related to the processes in industrial settings (IU2 – IU3 – IU4 – IU5 – IU6 – IU7)	--	x	x	--	--	--	SU 3, 10	PC 9b, 12, 19	PROC 1, 2, 3, 4, 5, 8a, 8b, 9, 14	--	ERC 2, 3, 6a,
ES 2	Professional end-use of fertilizers and plaster (IU8 – IU9 – IU10 – IU11 – IU12 – IU13 – IU14 – IU15)	--	--	--	x	--	--	SU 22	PC 9b, 12	PROC 2, 5, 8a, 8b, 11, 13, 19,	--	ERC 8b, 8e, 8f, 9b, 10a
ES 3	Consumer end-use of fertilizers and plaster (IU16 – IU17)	--	--	--	--	x	--	SU 21	PC 9b, 12	--	--	ERC 8b, 8e, 8f, 10a

9.1. ES 1: Industrial use of TSP for formulation of preparations/articles, intermediate use and end use in industrial settings, including distribution and other activities related to then processes in industrial settings

9.1.1. Exposure Scenario

Table 2: Exposure Scenario 1: **Industrial use of TSP for formulation of preparations/articles, intermediate use and end use in industrial settings**

1. Industrial use of TSP for formulation of preparations/articles, intermediate use and end use in industrial settings		
Free short title	Industrial use of TSP for formulation of preparations/articles, intermediate use and end use in industrial settings	
Systematic title based on use descriptor	SU 3 – Industrial manufacturing; SU 10 – Formulation of preparations and/or re-packaging.	
Name(s) of contributing worker scenarios and corresponding PROCs	PROC 1 – Use in closed process, no likelihood of exposure; PROC 2 – Use in closed, continuous process with occasional controlled 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; PROC 8a – Transfer of substance or preparation from/to vessel /large container at non dedicated facilities; PROC 8b – Transfer of substance or preparation from/to vessel /large container at dedicated facilities; PROC 9 – Transfer of substance or preparation into small containers; PROC 14 – Production of preparations or articles by tabletting, compression, extrusion, pelettisation.	
Name(s) of ES related product (PC) and article (AC) categories	PC 9b – Fillers, Putties; PC 12 – Fertilizers; PC 19 – Intermediate.	
Name(s) of contributing environmental scenario and corresponding ERCs	ERC 2 – Formulation of preparations; ERC 3 – Formulation in materials; ERC 6a – Industrial use of intermediates.	
Assessment Method	qualitative	
2. Operational conditions and risk management measures		
Process Categories: PROC: 1, 2, 3, 4, 5, 8a, 8b, 9, 14 The amount used per worker varies from activity to activity and therefore it will be considered unlimited for exposure assessment. The maximum duration considered for exposure is a working shift of above 4h/day. Because TSP is corrosive to eyes, the risk management measures for human health aim to avoid direct contact with the substance. RMMs related to workers are: establish a good standard of general ventilation, wear chemical goggles to reduce exposure of the eye to a negligible level, minimise number of staff exposed, minimise manual phases, segregate the emitting process, extract contaminant effectively, avoid contact with contaminated tools and objects, clean the equipment and work area regularly, establish a management scheme in place to check that the RMMs are being used correctly and OCs followed, train staff on good practice, establish a good standard of personal hygiene. Additional good practices (Operational Conditions and Risk Management Measures) beyond the REACH Chemical Safety Assessment established within Chemical Industry are also advised and communicated through Safety Data Sheets but are not necessarily required to control risk Environmental Release Categories: ERC 2, 3, 6a		
2.1 Contributing exposure scenario controlling worker exposure for PROC 1, 2, 3, 4, 5, 8a, 8b, 9, 14		
Product characteristics	solid/ liquid (substance as such)	
	low volatility	
Amounts used	unlimited	
Frequency and duration of use	Frequency of exposure (weekly)	5

	Frequency of exposure (annual)	not specified
	Duration of exposure [per day]	> 4h
Human factors not influenced by risk management	Potentially exposed body parts	eyes
Other given operational conditions affecting workers exposure	Room size	not specified
	Setting (indoor / outdoor)	Indoor
Technical conditions and measures at process level (source) to prevent release	not specified	
Technical conditions and measures to control dispersion from source towards the worker	no local exhaust ventilation needed	
Organisational measures to prevent/limit releases, dispersion and exposure	not specified	
Conditions and measures related to personal protection, hygiene and health evaluation	no respiratory and skin protection needed	

2.2 Contributing exposure scenario controlling environmental exposure for ERC 2, 3, 6a

An environmental exposure and risk assessment has not been performed. Based on all data available TSP is of low hazard for the aquatic environment. The substance showed to be of low toxicity towards aquatic organisms. TSP has been evaluated within the OECD HPV program (SIAM 24) as part of the phosphates category. It was concluded that all substances within this category are of low priority for further work for the environment due to their low hazard profile. As inorganic compounds, traditional degradation studies are not applicable to triple superphosphate (TSP). The degradation pathway is through simple dissociation into phosphates and the corresponding cation (Ca2+). Due to the water solubility and the ionic nature, the substance is not expected to adsorb or bioaccumulate, water is the main target compartment, and the substance will not volatilize from soil.

P is non toxic and has no negative effect on the environment and thus an environmental exposure and risk assessment for TSP is not considered necessary. However, TSP may trigger eutrophication under some circumstances. TSP is hydrolysed in the sewerage pipes, the sewage treatment plants and the environment to soluble inorganic phosphates or transformed to insoluble inorganic forms. These are the same phosphates as those formed by natural hydrolysis of human urine and faeces, animal wastes, food and organic wastes, mineral fertilisers, bacterial recycling of organic materials in ecosystems, etc. Phosphates are an essential nutrient for plants, and stimulate the growth of water plants and/or algae if they represent the growth-limiting factor. Although in some cases nutrient enrichment will be absorbed and might not have an apparent effect, in other circumstances, it can lead to negative effects. These can range from ecosystem modifications, through algal blooms, to in extreme cases oxygen depletion and collapse of the biocenosis in surface water.

As eutrophication is a common effect due to an excess of phosphates in the environment, the problem is covered in European Regulations. The Directive 2000/60/EC of the European parliament and of the council of 23 October 2000 establishing a framework for Community action in the field of water policy is an important European Regulation regulating the emission and concentration of phosphate substances in the environment.

De Madariaga BM (2007) developed a conceptual model and protocol for performing European quantitative eutrophication risk assessments of (poly)-phosphates in detergents. In this model, the risk probability for eutrophication occurring in the most sensitive areas of a river basin (lakes, reservoirs, meadow zones, estuaries), is based on the TP (total phosphorous) concentration of the inflow water. The variability observed for similar TP concentrations is the consequence of variations in concentrations of N and/or other nutrients, other ecosystem factors and other natural variability. The study also covered the implementation of the model and a set of examples based on generic European scenarios as well as a pan European probabilistic estimation covering the diversity observed for the European conditions and enabled a probabilistic risk assessment of eutrophication relating to the use of STTP in detergents. The scientific validity of this methodology was confirmed by the EU scientific committee SCHER (Opinion of 29th November 2007).

3. Exposure estimation and reference to its source

3.1 Workers exposure for PROC 1, 2, 3, 4, 5, 8a, 8b, 9, 14

A qualitative assessment has been performed since the leading toxicological effect is a local endpoint (eye irritation). For this endpoint no dose-effect response curve can be determined and therefore a DNEL cannot be derived. However, DNELs are derived for systemic toxicity for workers and the general population but are not assessed against exposure estimates. A quantitative assessment for systemic toxicity is not considered relevant for this substance as the lowest NOAEL derived from an oral repeated dose study was set at 250 mg/kg body weight/day. Although effects on haematology and blood chemistry parameters were seen in this study they only become evident at extreme exposure levels to which humans are normally not exposed to.

Furthermore, TSP was assessed within the OECD HPV program (SIAM 24) as part of the phosphates category and concluded to be of low priority for further work for human health. Although properties indicating a hazard for human

health were noted no further work was recommended as these effects only become evident at extreme exposure levels. However, they should be noted by chemical safety professionals and users.
3.2 Environmental release and exposure for ERC 2, 3, 6a
not applicable – see argumentation in 9.1.1.2.2
4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES
not applicable

9.2. ES 2: Professional use of TSP in fertilizer and plaster

9.2.1. Exposure Scenario

Table 3: Exposure Scenario 2: **Professional use of TSP in fertilizer and plaster**

1. Professional use of TSP in fertilizer and plaster	
Free short title	Professional use of TSP in fertilizer and plaster
Systematic title based on use descriptor	SU 22 – Public domain.
Name(s) of contributing worker scenarios and corresponding PROCs	PROC 2 – Use in closed, continuous process with occasional controlled exposure (e.g. sampling); PROC 5 – Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact); PROC 8a – Transfer of substance or preparation from/to vessel /large container at non dedicated facilities; PROC 8b – Transfer of substance or preparation from/to vessel /large container at dedicated facilities; PROC 11 – Non-industrial spraying; PROC 13 – Treatment of articles by dipping and pouring; PROC 19 – Hand-mixing with intimate contact and only PPE available.
Name(s) of ES related product (PC) and article (AC) categories	PC 9b – Fillers, Putties; PC 12 – Fertilizers.
Name of contributing environmental scenario and corresponding ERCs	ERC 8b – Wide dispersive indoor use of reactive substances in open systems; ERC 8e – Wide dispersive outdoor use of reactive substances in open systems; ERC 8f – Wide dispersive outdoor use resulting in inclusion into or onto a matrix; ERC 9b – Wide dispersive outdoor use of substances in closed systems; ERC 10a – Wide dispersive outdoor use of long-life articles and materials with low release.
Assessment Method	qualitative
2. Operational conditions and risk management measures	
Process Categories: PROC: 2, 5, 8a, 8b, 11, 13, 19 The amount used per worker varies from activity to activity and therefore it will be considered unlimited for exposure assessment. The maximum duration considered for exposure is a working shift of above 4h/day. Because TSP is irritating/corrosive to eyes, the risk management measures for human health should focus on the prevention of direct contact with the substance. Product related design measures preventing direct eye contact with TSP and preventing formation of dust and splashes are more important in addition to the personal protective equipment measures. Product related operational measures are required. These include specific dispensers and pumps etc specifically designed to prevent splashes/spills/exposure to occur. However, it has to be noted that the end products are further diluted, which can lead to levels where no eye irritation/corrosion occur. RMMs related to workers are: establish a good standard of general ventilation, wear chemical goggles to reduce exposure of the eye to a negligible level, minimise number of staff exposed, minimise manual phases, segregate the emitting process, extract contaminant effectively, avoid contact with contaminated tools and objects, clean the equipment and work area regularly, establish a management scheme in place to check that the RMMs are being used correctly and OCs	

followed, train staff on good practice, establish a good standard of personal hygiene.
Additional good practices (Operational Conditions and Risk Management Measures) beyond the REACH Chemical Safety Assessment established within Chemical Industry are also advised and communicated through Safety Data Sheets but are not necessarily required to control risk

Environmental Release Categories: ERC: 8b, 8e, 8f, 9b, 10a

2.1 Contributing exposure scenario controlling worker exposure for PROC 2, 5, 8a, 8b, 11, 13, 19

Product characteristics	solid/ liquid > 25% (TSP can occur in different concentrations in the end products)	
	low volatility	
Amounts used	No information	
Frequency and duration of use	Frequency of exposure (weekly)	5
	Frequency of exposure (annual)	not specified
	Duration of exposure [per day]	> 4h
Human factors not influenced by risk management	Potentially exposed body parts	eyes
Other given operational conditions affecting workers exposure	Room size	not specified
	Setting (indoor / outdoor)	Indoor /outdoor
	Respiratory protection	no
Technical conditions and measures at process level (source) to prevent release	not specified	
Technical conditions and measures to control dispersion from source towards the worker	no local exhaust ventilation needed	
Organisational measures to prevent/limit releases, dispersion and exposure	not specified	
Conditions and measures related to personal protection, hygiene and health evaluation	no respiratory and skin protection needed	

2.2 Contributing exposure scenario controlling environmental exposure for ERC 8b, 8e, 8f, 9b, 10a

An environmental exposure and risk assessment has not been performed. Based on all data available TSP is of low hazard for the aquatic environment. The substance showed to be of low toxicity towards aquatic organisms. TSP has been evaluated within the OECD HPV program (SIAM 24) as part of the phosphates category. It was concluded that all substances within this category are of low priority for further work for the environment due to their low hazard profile. As inorganic compounds, traditional degradation studies are not applicable to triple superphosphate (TSP). The degradation pathway is through simple dissociation into phosphates and the corresponding cation (Ca2+). Due to the water solubility and the ionic nature, the substance is not expected to adsorb or bioaccumulate, water is the main target compartment, and the substance will not volatilize from soil.
P is non toxic and has no negative effect on the environment and thus an environmental exposure and risk assessment for TSP is not considered necessary. However, TSP may trigger eutrophication under some circumstances. TSP is hydrolysed in the sewerage pipes, the sewage treatment plants and the environment to soluble inorganic phosphates or transformed to insoluble inorganic forms. These are the same phosphates as those formed by natural hydrolysis of human urine and faeces, animal wastes, food and organic wastes, mineral fertilisers, bacterial recycling of organic materials in ecosystems, etc. Phosphates are an essential nutrient for plants, and stimulate the growth of water plants and/or algae if they represent the growth-limiting factor. Although in some cases nutrient enrichment will be absorbed and might not have an apparent effect, in other circumstances, it can lead to negative effects. These can range from ecosystem modifications, through algal blooms, to in extreme cases oxygen depletion and collapse of the biocenosis in surface water.
As eutrophication is a common effect due to an excess of phosphates in the environment, the problem is covered in European Regulations. The Directive 2000/60/EC of the European parliament and of the council of 23 October 2000 establishing a framework for Community action in the field of water policy is an important European Regulation regulating the emission and concentration of phosphate substances in the environment.
De Madariaga BM (2007) developed a conceptual model and protocol for performing European quantitative eutrophication risk assessments of (poly)-phosphates in detergents. In this model, the risk probability for eutrophication occurring in the most sensitive areas of a river basin (lakes, reservoirs, meadow zones, estuaries), is

based on the TP (total phosphorous) concentration of the inflow water. The variability observed for similar TP concentrations is the consequence of variations in concentrations of N and/or other nutrients, other ecosystem factors and other natural variability. The study also covered the implementation of the model and a set of examples based on generic European scenarios as well as a pan European probabilistic estimation covering the diversity observed for the European conditions and enabled a probabilistic risk assessment of eutrophication relating to the use of STTP in detergents. The scientific validity of this methodology was confirmed by the EU scientific committee SCHER (Opinion of 29th November 2007).

3. Exposure estimation and reference to its source

3.1 Worker exposure for PROC 2, 5, 8a, 8b, 11, 13, 19

A qualitative assessment has been performed since the leading toxicological effect is a local endpoint (eye irritation). For this endpoint no dose-effect response curve can be determined and therefore a DNEL cannot be derived. However, DNELs are derived for systemic toxicity for workers and the general population but are not assessed against exposure estimates. A quantitative assessment for systemic toxicity is not considered relevant for this substance as the lowest NOAEL derived from an oral repeated dose study was set at 250 mg/kg body weight/day. Although effects on haematology and blood chemistry parameters were seen in this study they only become evident at extreme exposure levels to which humans are normally not exposed to.
Furthermore, TSP was assessed within the OECD HPV program (SIAM 24) as part of the phosphates category and concluded to be of low priority for further work for human health. Although properties indicating a hazard for human health were noted no further work was recommended as these effects only become evident at extreme exposure levels. However, they should be noted by chemical safety professionals and users.

3.2 Environmental release and exposure for ERC 8b, 8e, 8f, 9b, 10a

not applicable – see argumentation in 9.2.1.2.2

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

not applicable

9.3. ES 3: Consumer end-use of fertilizers and plaster

9.3.1. Exposure Scenario

Table 4: Exposure Scenario 3: **Consumer end-use of fertilizers and plaster**

1. Consumer end-use of fertilizers and plaster	
Free short title	Consumer end-use of fertilizers and plaster
Systematic title based on use descriptor	SU 21 – Private households
Name(s) of ES related product (PC) and article (AC) categories	PC 9b – Fillers, Putties; PC 12 – Fertilizers.
Name(s) of contributing environmental scenarios and corresponding ERCs	ERC 8b – Wide dispersive indoor use of reactive substances in open systems; ERC 8e – Wide dispersive outdoor use of reactive substances in open systems; ERC 8f – Wide dispersive outdoor use resulting in inclusion into or onto a matrix; ERC 10a – Wide dispersive outdoor use of long-life articles and materials with low release.
Assessment Method	qualitative
2. Operational conditions and risk management measures	
Product Categories: PC: 9b,12 TSP is classified corrosive to eyes (R41 under 67/548/EEC and H318 under CLP). Exposure of the eye to dust/splashes at concentrations leading to irritation/corrosion during consumer use of TSP can occur. However, it has to be noted that the end-products are further diluted which can lead to levels where no eye irritation will occur. Exposure to eye irritating dilutions of TSP can occur during consumer use of fertilizers and plaster. It is assumed that during normal use exposure will only occur incidentally. Furthermore, it is assumed that existing controls (i.e. personal protective	

equipment based on classification and labelling with R41/H318) are applied for these exposure situations.

Environmental Release Categories: ERC: 8b, 8e, 8f, 10a

2.1 Contributing exposure scenario controlling consumer exposure for PC 9b, 12

not applicable

2.2 Contributing exposure scenario controlling environmental exposure for ERC ERC: 8b, 8e, 8f, 10a

An environmental exposure and risk assessment has not been performed. Based on all data available TSP is of low hazard for the aquatic environment. The substance showed to be of low toxicity towards aquatic organisms. TSP has been evaluated within the OECD HPV program (SIAM 24) as part of the phosphates category. It was concluded that all substances within this category are of low priority for further work for the environment due to their low hazard profile. As inorganic compounds, traditional degradation studies are not applicable to triple superphosphate (TSP). The degradation pathway is through simple dissociation into phosphates and the corresponding cation (Ca2+). Due to the water solubility and the ionic nature, the substance is not expected to adsorb or bioaccumulate, water is the main target compartment, and the substance will not volatilize from soil.

P is non toxic and has no negative effect on the environment and thus an environmental exposure and risk assessment for TSP is not considered necessary. However, TSP may trigger eutrophication under some circumstances. TSP is hydrolysed in the sewerage pipes, the sewage treatment plants and the environment to soluble inorganic phosphates or transformed to insoluble inorganic forms. These are the same phosphates as those formed by natural hydrolysis of human urine and faeces, animal wastes, food and organic wastes, mineral fertilisers, bacterial recycling of organic materials in ecosystems, etc. Phosphates are an essential nutrient for plants, and stimulate the growth of water plants and/or algae if they represent the growth-limiting factor. Although in some cases nutrient enrichment will be absorbed and might not have an apparent effect, in other circumstances, it can lead to negative effects. These can range from ecosystem modifications, through algal blooms, to in extreme cases oxygen depletion and collapse of the biocenosis in surface water.

As eutrophication is a common effect due to an excess of phosphates in the environment, the problem is covered in European Regulations. The Directive 2000/60/EC of the European parliament and of the council of 23 October 2000 establishing a framework for Community action in the field of water policy is an important European Regulation regulating the emission and concentration of phosphate substances in the environment.

De Madariaga BM (2007) developed a conceptual model and protocol for performing European quantitative eutrophication risk assessments of (poly)-phosphates in detergents. In this model, the risk probability for eutrophication occurring in the most sensitive areas of a river basin (lakes, reservoirs, meadow zones, estuaries), is based on the TP (total phosphorous) concentration of the inflow water. The variability observed for similar TP concentrations is the consequence of variations in concentrations of N and/or other nutrients, other ecosystem factors and other natural variability. The study also covered the implementation of the model and a set of examples based on generic European scenarios as well as a pan European probabilistic estimation covering the diversity observed for the European conditions and enabled a probabilistic risk assessment of eutrophication relating to the use of STTP in detergents. The scientific validity of this methodology was confirmed by the EU scientific committee SCHER (Opinion of 29th November 2007).

3. Exposure estimation and reference to its source

3.1 Consumer exposure for PC 9b,12

A qualitative assessment has been performed since the leading toxicological effect is a local endpoint (eye irritation). For this endpoint no dose-effect response curve can be determined and therefore a DNEL cannot be derived. However, DNELs are derived for systemic toxicity for workers and the general population but are not assessed against exposure estimates. A quantitative assessment for systemic toxicity is not considered relevant for this substance as the lowest NOAEL derived from an oral repeated dose study was set at 250 mg/kg bw/day. Although effects on haemataology and blood chemistry parameters were seen in this study they only become evident at extreme exposure levels to which humans are normally not exposed to.

Furthermore, TSP was assessed within the OECD HPV program (SIAM 24) as part of the phosphates category and concluded to be of low priority for further work for human health. Although properties indicating a hazard for human health were noted no further work was recommended as these effects only become evident at extreme exposure levels. However, they should be noted by chemical safety professionals and users.

3.2 Environmental exposure for ERC ERC: 8b, 8e, 8f, 10a

not applicable – see argumentation in 9.3.1.2.2

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

not applicable