

SAFETY DATA SHEET

In accordance with
Regulation (EC) No. 1906/2006
Version 3.0 Revision date 22.06.2011

1 IDENTIFICATION OF SUBSTANCES / MIXTURE AND OF THE COMPANY / UNDERTAKING

1.1 Product Identifiers

Product Name: **Zinc Phosphate**

Chemical name: Trizinc bis (orthophosphate)
Synonyms: Delaphos 4 (D4), Delaphos 2 (D2), Delaphos 2M (D2M)
CAS Number: 7779-90-0
Chemical formula: $Zn_3(PO_4)_2$
EINECS Number: 231-944-3
EC Number: 231-944-3
REACH registration Number: 01-2119485044-40-0005

This Safety Data Sheet covers the supply of zinc phosphate, zinc phosphate dihydrate, zinc phosphate tetrahydrate and mixtures of these substances

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses: Use in the manufacture of anti-corrosive coatings.
Uses advised against: This MSDS only applies to the uses identified above

1.3 Details of the supplier of the safety data sheet

Manufacturer: JPE Holdings Ltd,
The Lodge
Warstone Road
Essington
Wolverhampton
WV11 2AR

Telephone: +44 (0) 1922 475055
Fax: +44 (0) 1922 477354
E-mail: johnhale@delaphos.co.uk

1.4 Emergency telephone number

Telephone: +44 (0) 1922 475055

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

This material is a substance

Classification according to Regulation (EC) 1272/2008 (EU 'CLP' regulation) and GHS

Acute aquatic toxicity (category 1)
Chronic aquatic toxicity (category 1)

Classification according to EU Directive 67/548/EEC

R 50/53
Very toxic to aquatic organisms, may cause long-term harm in the aquatic environment

2.2 Label elements

Labelling according to Regulation (EC) 1272/2008 (EU 'CLP' regulation)

Pictogram(s)



Signal word(s)

Warning

Hazard statement(s)

H410

Very toxic to aquatic life with long term effects

Precautionary statements(s)

P273

Avoid release to the aquatic environment

P391

Collect spillage

P501

Dispose of contents/containers as hazardous waste in accordance with applicable legislation

2.3 Other hazards

None

3. COMPOSITION / INFORMATION ON INGREDIENTS

3.1 Substances

This material is a substance

Chemical name	CAS No	EC Number	%
Trizinc bis (orthophosphate) [Zinc phosphate]	7779-90-0	231-944-3	>99

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Remove from source of exposure.

This material is not classified as hazardous to health but exposure of first aiders should be minimised, particularly inhalation of dust or fumes

Inhalation

Move person to fresh air. If person experiences irritation or difficulty breathing seek medical advice

Ingestion

Wash out mouth with water. Make affected person drink plenty of water. Seek medical advice

Skin contact

Wash area with water and soap then rinse thoroughly with water.

Eye contact

Wash out with plenty of water. After initial flushing, remove any contact lenses and continue flushing. See medical advice in the event irritation or other complaints.

4.2 Most important symptoms and effects, both acute and delayed

No specific effects and/or symptoms have been reported or are known.

4.3 Indication of any immediate medical attention and special treatment needed

None

5. FIRE-FIGHTING MEASURES

5.1 Extinguishing media

This material is not combustible. Use extinguishing media based on surrounding materials.

5.2 Special hazards arising from the substances or mixture

Phosphorus oxides and zinc oxides may be formed in a fire situation

5.3 Advice for fire fighters

Use self-contained breathing apparatus.

Prevent fire-fighting water from entering watercourses, drains or the sewage system (environmental pollutant).

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

This material is not classified as hazardous to health but exposure should be minimised, particularly inhalation of dust.

Evacuate personnel from area of spillage.

Avoid breathing dust. If entry is necessary into an area of significant airborne dust, wear a particle dust mask: P3, P2 or P1.

Minimise time exposed to dust until a proper evaluation of risk can be undertaken.

Do not undertake actions that will create airborne dust.

6.2 Environmental precautions

Do not allow to enter sewage system.

Do not allow to enter surface water drains

Do not allow to enter streams, rivers or other waterways

Inform relevant authorities if the material does enter the above systems.

Prevent soil contact.

Remove spilled material from ground and soil as quickly as possible to minimise environmental contamination

6.3 Methods and material for containment and cleaning up

Take up mechanically while minimise dust generation.

Collect spilled material in sealable containers.

Re-use/recycling of spilled material is highly recommended.

All contaminated materials from the cleaning-up operation must be disposed of as hazardous waste.

Do not wash residues from spillage to drain with water

6.4 Reference to any other sections

See section 13 for disposal information

7. HANDLING AND STORAGE

7.1 Precautions for safe handling:

Powder may be irritating to the skin or eyes by mechanical action. Dust may be irritating to the respiratory system. Minimise dust generation and exposure to dust. See section 8 for details of personal protective equipment

Clear up spillages immediately. Granules / pellets may present a slip hazard.

Follow good hygiene practices: do not eat, drink or smoke in the workplace. Wash hands after use. Remove contaminated clothing before entering eating areas.

Predicted No Effect Concentrations - PNECs

PNEC aqua (freshwater)	20.6 µg/L
PNEC aqua (marine water)	6.1 µg/L
PNEC STP	52 µg/L
PNEC sediment (freshwater)	117.8 mg/kg sediment dw
PNEC sediment (marine water)	56.5 mg/kg sediment dw
PNEC soil	35.6 mg/kg soil dw
PNEC oral	No potential for bioaccumulation

8.2 Exposure controls

Appropriate engineering controls

If the occupational exposure limit is likely to be exceeded use ventilation (natural or forced) or extraction to reduce exposure to below the limit.

Personal protective equipment

This material does not have hazardous chemical properties that require the use of specific personal protective equipment.

Normal occupational hygiene practices should be followed to minimise skin contact with the material. This includes the use of gloves and long sleeved clothing to prevent irritation by mechanical action.

In the event of eye irritation due to mechanical action wear CEN approved box goggles.

If occupational exposure limits are exceeded use CEN approved dust masks with a filter type P1, P2 or P3. Dust masks must be used properly to be effective. Follow manufacturer's instructions and also obtain specialist advice to select the correct filter type.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemicals properties

Appearance:	White-yellowish solid (powder or granules)	
Odour:	Odourless.	
Odour threshold:	Not applicable	
pH:	6 – 8 (100g/l H ₂ O @20°C)	DIN ISO 787 Part 9
Melting point:	912 °C.	
Boiling point:	Not applicable (solid)	
Flash point:	Not flammable	
Evaporation rate	Not applicable (solid)	
Flammability	Not flammable	
Upper/lower flammability or explosive limits	Not flammable	
Vapour pressure	Not applicable (stable solid)	
Vapour density	Not applicable (stable solid)	
Relative density	not applicable to form supplied	
Bulk density:	1.1 g/cm ³	
Solubility in water:	<0.1% (20°C)	DIN ISO 787 Part 3
Solubility in other		
Ingredients:	Negligible.	
Partition coefficient		
Octanol/water:	Not applicable (essentially insoluble in water and octanol)	
Auto-ignition temperature	Not flammable	
Decomposition temperature	Not available	
Viscosity	Not applicable (solid)	
Explosion properties:	Not explosive	VDI 2263
Oxidising properties:	Not oxidising.	

9.2 Other information

No additional data available

10 STABILITY AND REACTIVITY

10.1 Reactivity

Not reactive to materials commonly used in the transportation, handling and storage of industrial materials.

10.2 Chemical stability

Stable at room temperature and temperatures up to 90 °C

10.3 Possibility of hazardous reactions

None

10.4 Conditions to avoid

Keep away from acids and bases.

10.5 Incompatible materials

Acids and bases

10.6 Hazardous decomposition products

Phosphorus oxides and zinc oxides may be formed in a fire situation

11 TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity	Oral: LD 50 (rat): > 5000 mg / kg
Skin corrosion/irritation	Not irritating (rabbit).
Serious eye damage/ eye irritation	Not irritating (rabbit).
Respiratory or skin sensitisation	Not sensitising.
Germ cell mutagenicity	no data available.
Carcinogenicity	no evidence of carcinogenicity.
Reproductive toxicity	no evidence of reproductive toxicity.
Specific target organ toxicity	
– Single exposure	no data available.
Specific target organ toxicity	
– Repeated exposure	no data available.
Aspiration hazard	no data available.

Not classified as having any of these hazards according to the harmonised classification given in REGULATION (EC) No 1272/2008 and the first ATP.

12 ECOLOGICAL INFORMATION

12.1 Toxicity

Acute toxicity for fish (Oncorhynchus mykiss)	LC(50) (96h)	0.14-0.26 mg Zn ²⁺ /L
Acute toxicity for crustacea (Daphnia magna)	EC(50) (48h)	0.04 – 0.86 mg Zn ²⁺ /L
Acute toxicity for algae (Selenastrum capriocornutum)	EC(50) (72h)	0.136 – 0.150 mg Zn ²⁺ /L

12.2 Persistence and biodegradability

Data not available.

12.3 Bioaccumulative potential

Data not available.

12.4 mobility in soil

Data not available.

12.5 Results of PBT and vPvB assessment

Data not available.

12.6 Other adverse effects

Very toxic to aquatic life.

13 DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Dispose of as hazardous waste in accordance with local / national legislation.
European waste code will depend upon the use of the material and cannot be specified here.

Packaging

Clean, uncontaminated packaging can be recycled.
Packaging contaminated with the product must be disposed of as hazardous waste.

14 TRANSPORT INFORMATION

14.1 UN number

3077

14.2 UN proper shipping name

ADR/RID: Environmentally hazardous substance, solid, n.o.s. (TRIZINC BIS ORTHOPHOSPHATE)
ADNR: Environmentally hazardous substance, solid, n.o.s. (TRIZINC BIS ORTHOPHOSPHATE)
IMDG: Environmentally hazardous substance, solid, n.o.s. (TRIZINC BIS ORTHOPHOSPHATE)
IATA Environmentally hazardous substance, solid, n.o.s. (TRIZINC BIS ORTHOPHOSPHATE)

14.3 Transport hazard class(s)

ADR/RID: 9 ADNR: 9 IMDG: 9 + MP IATA: 9

14.4 Packing group

ADR/RID: 111 ADNR: 111 IMDG: 111 IATA: 111

14.5 Environmental hazards

ADR/RID: yes ADNR: yes IMDG: Marine pollutant, Yes IATA: yes

14.6 Special precautions for user

None identified

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and IBC Code

15 REGULATORY INFORMATION

This Safety Data Sheet has been prepared in accordance with the requirements of regulation (EC) No 1907/2006 as amended by regulation (EU) No 453/2010.

The Workplace exposure Limit given in section 8 has been taken from the UK HSE document: EH40/2005 Workplace exposure limits as amended.

Relevant regulations:

Regulation (EC) 1272/2008 (EU 'CLP' regulation)
Regulation (EC) 790/2009 First Adaptation to Technical Progress (ATP) for CLP regulation
EU Directive 67/548/EEC ('Dangerous Substances Directive')
Regulation (EC) No 1907/2006 ('REACH')
Regulation (EU) No 453/2010.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
None identified

15.2 Chemical safety assessment

Chemical Safety Assessment has been undertaken as part of the REACH registration submission document for this material but this information has not yet been made public.

16 OTHER INFORMATION

Changes present in this SDS (version 3):

- Complete revision of the Annexe.
- section 13.1 additional information
- section 8 additional information – PNEC, DNEL

The information contained in the Safety Data Sheet is correct to the best of our knowledge at the date of issue. It is intended as a guide for the safe use, handling, disposal, storage and transportation and is not intended as warranty or as a specification. The information relates only to the product specified and may not be suitable for combinations with other materials or in processes other than those specifically described herein.

ANNEX

Exposure Scenario GES 1

Industrial use of zinc phosphate in the formulation of preparations by mixing thoroughly, dry or in a solvent, the starting materials with potentially pressing, pelletising, sintering, possibly followed by packing.

This activity can be part of the process to create a component for use in the production of coatings (paints, inks, enamels, varnishes) or animal feedstuffs, and to create the products themselves.

Description of activities/process(es) covered in the Exposure Scenario

In the described process, the zinc phosphate is:

- Removed from the packaging and stored in silos after delivery.
- Extracted from the silo, dosed and fed with the other reagents to the mixing tank. Mixing occurs batchwise or continuously, according to the process receipt. The mixing occurs in a closed tank/chamber.
- The preparation (dry or wet (solvent/paste) matrix) is further used as such or packed for further treatment/use.

Operational conditions

maximum 5000 T/y; Continuous production is assumed as a worst case.

Physical form, concentration of product and amount for which the RMMS, in combination with other operational conditions of use ensure control of risk.

The preparation can be solid or liquid. When the preparation is in solid state, it can be in a) powdery, b) glassy or c) pelletized form. In the powder form, it can be characterised by high dustiness in a worst case situation.

Zinc phosphate is used in minimum 80% purity; higher grades (>95%) are usual

The concentration of zinc phosphate in the produced mixtures can cover a broad range (<= 5% up to >25%) depending on the application.

Max 5000T/y = 14T/d = 5T/shift depending on the application. 8 hour shifts (default worst case) are assumed. (it is emphasised that the real duration of exposure could be less. This has to be considered when estimating exposure).

Other operational conditions determining exposure

All processes are performed indoor in a confined area.

Even when no process waters (e.g. when dry process throughout), some non-process water can be generated containing zinc (e.g. from cleaning)

elevated temperature steps (~100°C) can occur

All residues containing zinc are recycled.

Risk Management Measures that, in combination with the operational conditions of use, ensure control of risk

Occupational measures

Use high efficiency (90- 95%) local exhaust ventilation systems.

Use cyclones/filters (for minimizing dust emissions) : recommended efficiency: 70-90% (cyclones), 50-80% (dust filters), 85-95% (double stage, cassette filters)

Use process enclosures, especially in the drying /calcination / packaging (potentially dusty) units

Monitor dust and Zn in the workplace air (static or individual) to ensure compliance with national regulations.

Maintain a clean working environment: undertake regular cleaning of process equipment and work area.

Store packaged Zn product in dedicated zones

If possible implement a general integrated management systems e.g. ISO 9000, ISO-ICS 13100, or similar and, when appropriate, an IPPC-compliant system.

Such management system should include general industrial hygiene practice e.g.:

- information and training of workers on prevention of exposure/accidents,
- procedures for control of personal exposure (hygiene measures)
- regular cleaning of equipment and floors, extended workers instruction-manuals
- procedures for process control and maintenance,...
- personal protection measures (see below)

Consumer related measures:

Not applicable to this process

Environment related measures:

Use process enclosures and closed circuits where relevant and possible.

Use local exhaust ventilation with dust capturing and removal techniques on furnaces and other work areas with potential dust generation. Dust capturing and removal techniques may include the use of bag-house filters and/or other air emission abatement devices e.g. fabric (or bag) filters (up to 99% efficiency), wet scrubbers (50-99% efficiency). This may create a general negative pressure in the building.

Capture and contain liquids in sumps to collect/prevent accidental spillage

On-site waste water treatment techniques can be applied to prevent releases to water (if applicable)

e.g.: chemical precipitation, sedimentation and filtration (efficiency 90-99.98%).

In general emissions should be controlled and prevented by implementing an integrated management system e.g. ISO 9000, ISO 1400X series or similar, and when appropriate, an IPPC-compliant system.

Such management system should include general industrial hygiene practice e.g.:

- information and training of workers,
- regular cleaning of equipment and floors,
- procedures for process control and maintenance,...

Treat and monitor exhaust gas streams (process & hygiene) and other releases to outside air, to ensure compliance with national regulations.

Ensure SEVESO 2 compliance, if applicable.

Waste related measures

Recycle end-of-life products whenever possible.

Minimise waste containing Zn and Zn-compounds. Recycle where possible.

All remaining hazardous wastes are to be recycled, handled and conveyed only by certified contractors according to EU and national legislation.

Prediction of exposure

Implementation of recommended control measures should control respiratory exposure to meet national exposure limits.

PPE

Wear gloves and (skin) protective clothing (efficiency $\geq 90\%$).

With normal handling, no respiratory personal protection (breathing apparatus) is necessary. If OEL/DNEL likely to be exceeded use dust filter mask P1, P2 or P3 as appropriate

Eyes: safety glasses are optional

Exposure Scenario GES 4

Industrial use of zinc phosphate formulations as component for the manufacture of solid blends and matrices for further downstream use. Industrial formulation of dry preparations/mixtures by mixing thoroughly the zinc compounds with the other starting materials, with possible pressing, pelletising, sintering and packaging of the preparations/mixtures

This activity can be part of the process to create a component for use in the production of coatings (paints, inks, enamels, varnishes) or animal feedstuffs, and to create the products themselves.

Description of activities/process(es) covered in the Exposure Scenario

In the described process, the zinc phosphate (Zn compound) containing preparation/mixture is optionally:

- Pressed at high temperature ($>1000^{\circ}\text{C}$), grinded and re-pressed/sintered or fritted at high temperature
- Molten at high temperature ($>500^{\circ}\text{C}$) and further cast as glassy material
- Pressed and pelletized at low temperature
- And subsequently packed, or used as such, in further treatment/use

Operational conditions

maximum 5000 T/y; Continuous production is assumed as a worst case.

Physical form, concentration of product and amount for which the RMMS, in combination with other operational conditions of use ensure control of risk.

The preparation is in the solid state, usually with a low level of dustiness; however, powder forms can occur, the high dustiness is therefore applied as a worst case.

Zinc phosphate (Zn compound) in the initial preparation can be > 25%, usually <5%

The concentration of zinc phosphate in the mixtures can be up to >25% but is usually of the order of <= 5%, depending on the application.

Max 5000T/y = 15T/d = 5T/shift depending of application

8 hour shifts (default worst case) are assumed as starting point (the real duration of exposure could be less.

This has to be considered when estimating exposure).

Other operational conditions determining exposure

Dry processes: dry operational conditions throughout the process; no process waters;

Even when no process waters occur (with dry process

throughout), some non-process water can be generated containing zinc (e.g. from cleaning)

High temperature steps are possible.

All processes are performed indoor in a confined area.

All residues containing zinc are recycled.

Risk Management Measures that, in combination with the operational conditions of use, ensure control of risk

Occupational measures

Use process enclosures to minimise exposure to dust.

Use local exhaust ventilation (efficiency 84% -generic LEV)with dust capturing and removal techniques on furnaces and other work areas with potential dust generation. Use cyclones/filters (for minimizing dust emissions) : recommended efficiency: 70-90% (cyclones), 50-80% (dust filters), 85-95% (double stage, cassette filters)

If possible implement a general integrated management systems e.g. ISO 9000, ISO-ICS 13100, or similar and, when appropriate, an IPPC-compliant system.

Such management system would include general industrial hygiene practice e.g.:

- information and training of workers on prevention of exposure/accidents,
- procedures for control of personal exposure (hygiene measures)
- regular cleaning of equipment and floors, extended workers instruction-manuals
- procedures for process control and maintenance
- personal protection measures (see below)

Consumer related measures:

Not applicable to this process

Environment related measures:

Use process enclosures where relevant and possible.

Use local exhaust ventilation (with dust capturing and removal techniques) on furnaces and other work areas with potential dust generation. dust capturing and removal techniques can include the by use of bag-house filters and/or other air emission abatement devices e.g. fabric or bag filters, wet scrubbers. This may create a general negative pressure in the building.

No process waters, so possible emissions to water are limited and non-process related.

On-site waste water treatment techniques can be applied to prevent releases to water (if applicable)

e.g.: chemical precipitation, sedimentation and filtration (efficiency 90-99.98%).

In general emissions should be controlled and prevented by implementing an integrated management system e.g. ISO 9000, ISO 1400X series or similar, and when appropriate, an IPPC-compliant system.

- information and training of workers,
- regular cleaning of equipment and floors,
- procedures for process control and maintenance

Treat and monitor exhaust gas streams (process & hygiene) and other releases to outside air, to ensure compliance with national regulations.

Ensure SEVESO 2 compliance, if applicable.

Waste related measures

Recycle end-of-life products whenever possible.

Minimise waste containing Zn and Zn-compounds. Recycle where possible.

All remaining hazardous wastes are to be recycled, handled and conveyed only by certified contractors according to EU and national legislation.

Prediction of exposure

Implementation of recommended control measures should control respiratory exposure to meet national exposure limits.

PPE

Wear gloves and (skin) protective clothing (efficiency >=90%).

With normal handling, no respiratory personal protection (breathing apparatus) is necessary. If OEL/DNEL likely to be exceeded use dust filter mask P1, P2 or P3 as appropriate
Eyes: safety glasses are optional

Exposure Scenario GES 5

Industrial use of zinc phosphate formulations as component for the manufacture of dispersions, pastes or other viscous or polymerized matrices.

zinc phosphate containing preparations are used in the manufacture of liquid preparations by mixing thoroughly the starting materials, with a solvent in order to obtain a solution, dispersion or paste.

This activity can be part of the process to create a component for use in the production of animal feedstuffs and to create the feedstuffs themselves.

Description of activities/process(es) covered in the Exposure Scenario

In the described process, the zinc phosphate containing preparation/mixture is:

- unpacked and stored in silos
- Extracted from the silo, dosed and fed with the other reagents and/or solvents to the mixing tank, batchwise or continuously, according the process receipt.
- The resulting zinc salt containing mixture (solution, dispersion, paste) is directly further processed, or packed, for further treatment/use.

Operational conditions

maximum 5000 T/y; Continuous production is assumed as a worst case.

Physical form, concentration of product and amount for which the RMMs, in combination with other operational conditions of use ensure control of risk.

The preparation is in the liquid state, as a paste or dispersion or other viscous or polymerized matrix, with a low level of dustiness; however, powder forms can occur, medium dustiness is therefore applied as a worst case

Zinc phosphate (Zn compound) in preparation can be > 25%, usually <5%

Max 5000T/y = 20 T/d = 7T/shift depending of application. 8 hour shifts (default worst case) are assumed.

(it is emphasised that the real duration of exposure could be less. This has to be considered when estimating exposure).

Other operational conditions determining exposure

Even when no process waters occur, some non-process water can be generated containing zinc (e.g. from cleaning)

All processes are performed indoor in a confined area.

All residues containing zinc are recycled.

Processes are wet.

Risk Management Measures that, in combination with the operational conditions of use, ensure control of risk

Occupational measures

Use process enclosures where possible.

Use local exhaust ventilation (efficiency 84% -generic LEV) with dust capturing and removal techniques on furnaces and other work areas with potential dust generation. Dust capturing and removal techniques can include the by use of bag-house filters and/or other air emission abatement devices e.g. fabric or bag filters, wet scrubbers. Cyclones/filters (for minimizing dust emissions): efficiency 70%-90% (cyclones); dust filters (50-80%). This may create a general negative pressure in the building.

If possible implement a general integrated management systems e.g. ISO 9000, ISO-ICS 13100, or similar and, when appropriate, an IPPC-compliant system.

Such a management system should include general industrial hygiene practice e.g.:

- information and training of workers on prevention of exposure/accidents,
- procedures for control of personal exposure (hygiene measures)
- regular cleaning of equipment and floors, extended workers instruction-manuals
- procedures for process control and maintenance,...
- personal protection measures (see below)

Consumer related measures:

Not applicable to this process

Environment related measures:

Use local exhaust ventilation (with dust capturing and removal techniques) on mixing tanks and other work areas with potential dust generation.

Use process enclosures where relevant and possible.

Use wet process-steps where possible

Provide sump containment under tanks and filters to collect any accidental spillage

Use on-site waste water treatment techniques where possible to prevent releases to water (if applicable) e.g.: chemical precipitation, sedimentation and filtration (efficiency 90-99.98%).

Air emissions to be controlled by use of bag-house filters and/or other air emission abatement devices

e.g. fabric or bag filters, wet scrubbers. This may create a general negative pressure in the building.
In general emissions should be controlled and prevented by implementing an integrated management system
e.g. ISO 9000, ISO 1400X series or similar, and when appropriate, an IPPC-compliant system.
o Such management system should include general industrial hygiene practice e.g.:

- information and training of workers,
- regular cleaning of equipment and floors,
- procedures for process control and maintenance,...

Treat and monitor exhaust gas streams (process & hygiene) and other releases to outside air, to ensure compliance with national regulations.

Ensure SEVESO 2 compliance, if applicable.

Waste related measures

Recycle end-of-life products whenever possible.

Minimise waste containing Zn and Zn-compounds. Recycle where possible.

All remaining hazardous wastes are to be recycled, handled and conveyed only by certified contractors according to EU and national legislation.

Prediction of exposure

Implementation of recommended control measures should control respiratory exposure to meet national exposure limits.

PPE

Wear gloves and (skin) protective clothing (efficiency $\geq 90\%$).

With normal handling, no respiratory personal protection (breathing apparatus) is necessary. If OEL/DNEL likely to be exceeded use dust filter mask P1, P2 or P3 as appropriate

Eyes: safety glasses are optional

Exposure Scenario GES 7

Industrial and professional use of dispersions, pastes and polymerised substrates containing less than 25%w/w of zinc phosphate.

This covers use of zinc phosphate containing paints and coatings.

Description of activities/process(es) covered in the Exposure Scenario

This scenario covers both the industrial scale processes and professional use. In the described process, the Zinc phosphate containing preparation/mixture is further processed, involving potentially the following steps:

- Reception/unpacking of material
- Final application, spraying, embedding or to produce the end product or article.

Operational conditions

The quantities involved in this scenario are 10-50 times smaller than in blending (GES 4-GES 5); the concentration of the zinc substance is also lower (<25%).

Typical quantities for both industrial and professional are 50T/y (typical), maximum 500T/y (in industrial setting). Continuous production is assumed as a worst case. Usually, use is not continuous; this has to be considered when estimating exposure.

Physical form, concentration of product and amount for which the RMMS, in combination with other operational conditions of use ensure control of risk.

Particles can occur sporadically, the low level of dustiness is basically applied.

Most of the processes imply the use of solutions or pastes; the "solution status" is therefore taken as the worst case.

The concentration of zinc phosphate (or Zn compound) in the mixture is < 25%

The quantities involved in this scenario are 10-50 times smaller than in blending (GES 5-GES 5); the concentration of the zinc substance is also lower (<25%).

Typical quantities for both Industrial and professional are 50 T/y (typical), or 0.15 T/day, 0.05 T/shift. maximum use quantity is 500T/y (1.5T/d, 0.5T/shift) in industrial setting. 8 hour shifts (default worst case) are assumed. (it is emphasised that the real duration of exposure could be less. This has to be considered when estimating exposure).

Other operational conditions determining exposure

Wet processes.

All process and non-process waters should be recycled internally to a maximal extent.

Even when no process waters occur, some non-process water can be generated containing zinc (e.g. from cleaning)

In industrial and professional setting, all processes are performed in a confined area. All residues containing zinc should be recycled.

Most processes are indoors in confined areas.

Risk Management Measures that, in combination with the operational conditions of use, ensure control of risk

Occupational measures

Industrial /professional:

Use local exhaust ventilation systems and process enclosures. LEV in work area: efficiency 84% (generic LEV)

Use cyclones/filters to minimise dust emissions: efficiency 70%-90% (cyclones); dust filters (50-80%)

Implement a management system. The system should include general industrial hygiene practice e.g.:

- information and training of workers on prevention of exposure/accidents,
- procedures for control of personal exposure (hygiene measures)
- regular cleaning of equipment and floors, extended workers instruction-manuals
- procedures for process control and maintenance
- personal protection measures (see below)

Consumer related measures:

Not applicable to this process

Environment related measures:

In industrial and professional settings:

Use process enclosures where relevant and possible

Use local exhaust ventilation with dust capturing and removal techniques on work areas with potential dust generation.

Use sumps to contain / collect / prevent accidental spillage of liquids

If zinc emissions to water, use on-site waste water treatment techniques to prevent releases to water (if applicable) e.g.: chemical precipitation, sedimentation and filtration (efficiency 90-99.98%).

By exposure modelling it is predicted that at use quantities of >100T/y, refinement of the exposure assessment to water and sediment needs to be made (exposure assessment based on real measured data and local parameters). Treatment of the emissions to water may be needed under such conditions.

Air emissions to be controlled by use of bag-house filters and/or other air emission abatement devices e.g. fabric or bag filters, wet scrubbers. This may create a general negative pressure in the building.

Implement an appropriate management system to ensure emissions are controlled and prevented. This should involve:

- information and training of workers,
- regular cleaning of equipment and floors,
- procedures for process control and maintenance
- Treatment and monitoring of releases to outside air, and exhaust gas streams, according to national regulation.

Ensure SEVESO 2 compliance, if applicable.

Waste related measures

Recycle end-of-life products whenever possible.

Minimise waste containing Zn and Zn-compounds. Recycle where possible.

All remaining hazardous wastes are to be recycled, handled and conveyed only by certified contractors according to EU and national legislation.

Prediction of exposure

Implementation of recommended control measures should control respiratory exposure to meet national exposure limits.

PPE

Wear gloves and (skin) protective clothing (efficiency $\geq 90\%$).

With normal handling, no respiratory personal protection (breathing apparatus) is necessary. If OEL/DNEL likely to be exceeded use dust filter mask P1, P2 or P3 as appropriate

Eyes: safety glasses are optional