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Safety data sheet

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Code: **HARD (Various colours)**
 Name: Colored hardener for concrete surfaces

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

Description/Use: Colored hardener for stamped concrete or Stencil top

1.3. Details of the supplier of the safety data sheet

Company name: **IDEAL WORK SRL**
 Address: **Via Kennedy, 52**
 Place and country: **31030 Vallà di Riese Pio X (TV)**
Italy
 tel. **0423/4535**
 fax **0423/748429**
 e-mail address for a competent person, responsible for the safety data sheet: sicurezza@idealwork.it

1.4. Emergency telephone number

For information in an emergency: **Poison center:**
National Poisons Information Service (Birmingham Unit)
City Hospital
Dudley Rd
Birmingham
Telephone: +44 121 507 4123
Fax: +44 121 507 55 88
Emergency telephone: 844 892 0111

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

The product is classified as hazardous in accordance with the provisions of Regulation (EC) No. 1272/2008 (CLP) (and subsequent amendments and adaptations). The product accordingly requires a safety data sheet in accordance with the provisions of Regulation (EC) No. 1907/2006 and subsequent amendments.

Additional information on health and/or environmental risks are set out in sections 11 and 12 of this safety data sheet.

2.1.1. Regulation (EC) No. 1272/2008 (CLP) and subsequent amendments and adaptations

Classification and hazard statements:

Eye Dam. 1	H318
Skin Irrit. 2	H315
STOT SE 3	H335
Skin Sens. 1	H317

2.1.2. Directives 67/548/EEC and 1999/45/EC and subsequent amendments and adaptations

Hazard symbols:

Xi


R phrases:
37/38-41-43

The complete text of the risk phrases (R) and of the hazard statements (H) is set out in section 16 of the safety data sheet.

2.2. Label elements

Hazard labelling in accordance with Regulation (EC) No. 1272/2008 (CLP) and subsequent amendments and adaptations.

Hazard pictograms:

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Signal words: Danger

Hazard statements:

H318 Causes serious eye damage.
H315 Causes skin irritation.
H335 May cause respiratory irritation.
H317 May cause an allergic skin reaction.

Precautionary statements:

P264 Wash hands thoroughly after handling.
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.
P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
P403+P233 Store in a well-ventilated place. Keep container tightly closed.
P501 Dispose of contents/container to local/regional regulations.

Contains: Cement, portland, chemicals
Calcium dihydroxide
Flue dust, portland cement

2.3. Other hazards


Information not available.

SECTION 3: Composition/information on ingredients

3.2. Mixtures

Contains:

Identification	Conc. %.	Classification (67/548/EEC)	Classification (1272/2008 CLP)
Cement, portland, chemicals			
CAS Number 65997-15-1	30 - 50	Xi R37/38, Xi R41, Xi R43	Eye Dam. 1 H318, Skin Irrit. 2 H315, STOT SE 3 H335, Skin Sens. 1 H317
EC number 266-043-4			
INDEX NUMBER -			
Calcium dihydroxide			
CAS Number 1305-62-0	2 - 3	Xi R37/38, Xi R41	Eye Dam. 1 H318, Skin Irrit. 2 H315, STOT SE 3 H335
EC number 215-137-3			
INDEX NUMBER -			
Reg. Number 01-2119475151-45-0041			
Flue dust, portland cement			
CAS Number 68475-76-3	5 - 8	Xi R37/38, Xi R41	Eye Dam. 1 H318, Skin Irrit. 2 H315, STOT SE 3 H335
EC number 270-659--9			
INDEX NUMBER -			
Reg. Number 01-2119486767-17-0XXX			
Diiron trioxide			
CAS NUMBER 1309-37-1	3 - 3.5	Xi R36/37/38	Eye Irrit. 2 H319, Skin Irrit. 2 H315, STOT SE 3 H335
EC NUMBER 215-168-2			
INDEX NUMBER -			

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Quartz

CAS NUMBER 14808-60-7

30 - 50

Not classified

Not classified

EC NUMBER 238-878-4

INDEX NUMBER -

The product contains less than 1% free breathable crystalline silica.

The complete text of the risk phrases (R) and of the hazard statements (H) is set out in section 16 of the safety data sheet.

T+ = very toxic(T+), T = toxic(T), Xn = harmful(Xn), C = corrosive(C), Xi = irritant(Xi), O = oxidising(O), E = explosive(E), F+ = extremely flammable(F+), F = highly flammable(F), N = dangerous for the environment(N)

SECTION 4: First aid measures

4.1. Description of first aid measures

EYE CONTACT: remove contact lenses. Wash immediately with plenty of water for at least 60 minutes, keeping the lids wide open. Get immediate medical advice/attention.

SKIN CONTACT: remove immediately all contaminated clothing. Take a shower immediately. Get immediate medical advice/attention.

SWALLOWING: make the victim drink as much water as possible. Get immediate medical advice/attention. Do not induce vomiting unless expressly authorised by the physician.

INHALATION: call a physician immediately. Remove victim to fresh air, far from the site of the accident. If the victim has stopped breathing, administer artificial respiration. The emergency responders should adopt suitable precautions.

4.2. Most important symptoms and effects, both acute and delayed

For the symptoms and effects due to the substances contained, see section 11.

4.3. Indication of any immediate medical attention and special treatment needed

Information not available.

SECTION 5: Firefighting measures

5.1. Extinguishing media

The product is not classified as flammable, combustible, or oxidising, in the event of fire choose the most suitable extinguishing means for the surrounding environment.

5.2. Special hazards arising from the substance or mixture

EXPOSURE HAZARDS IN EVENT OF FIRE

The product is not combustible, nevertheless, do not breath in the combustion products.

5.3. Advice for firefighters

GENERAL INFORMATION

Cool the containers with jets of water to prevent the product decomposing and developing substances that are potential health hazards. Always wear personal protective equipment, including fire protection. Collect the extinguishing water, which must not be discharged into the drains. Dispose of the contaminated water used for extinguishing the fire and the fire residue in compliance with current standards.

EQUIPMENT


Normal firefighting gear like a self-contained open-circuit compressed air breathing apparatus (EN 137), firefighting suit (EN469), protective gloves for firefighters (EN 659) and boots for fire services (HO A29 or A30).

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

For non-emergency personnel

Leave the accident site immediately if you do not have suitable respiratory and eye protective devices (see section 8).

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For emergency responders

Stop the leak if it is safe to do so. Surround the accident zone. Wear suitable protective devices (including the personal protective equipment specified in section 8 of the safety data sheet) to prevent contamination of the skin, eyes and personal garments. Do not breathe mist and vapours.

6.2. Environmental precautions

Prevent the product entering drains, surface water or groundwater.

6.3. Methods and material for containment and cleaning up

Use mechanical equipment to collect the leaked product and place it in containers for recovery or disposal. Eliminate the residue with jets of water if there are no contraindications.

Ventilate the area adequately that has been affected by the leak. Check that the material of the containers in section 7 is compatible. The contaminated material must be disposed of in compliance with the provisions of section 13.

6.4. Reference to other sections

Information on personal protective equipment and disposal is set out in sections 8 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Handle the product after consulting all the other sections of this safety data sheet. Do not release the product in the environment. Do not eat, drink or smoke when using this product. Remove contaminated clothes and personal protective equipment before entering areas in which food is consumed.

7.2. Conditions for safe storage, including any incompatibilities

Keep only in original container. Keep container tightly closed, in a well ventilated place, away from direct sunlight. Keep the containers away from any incompatible materials, checking section 10.

7.3. Specific end uses

Information not available.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Reference standards:


Italy Italian legislative decree no. 81 of 9 April 2008
 OEL EU Directive 2009/161/EU; Directive 2006/15/EC; Directive 2004/37/EC; Directive 2000/39/EC. TLV-ACGIHACGIH 2013

CEMENT CLINKER					
Threshold Limit Value					
Type	State	TWA/8h		STEL/15 min	
		mg/m3	ppm	mg/m3	ppm
TLV-ACGIH		10	5		

CALCIUM DIHYDROXIDE					
Threshold Limit Value					
Type	State	TWA/8h		STEL/15 min	
		mg/m3	ppm	mg/m3	ppm
OEL	EU	5			
TLV-ACGIH		5			

DIIRON TRIOXIDE					
Threshold Limit Value					
Type	State	TWA/8h		STEL/15 min	
		mg/m3	ppm	mg/m3	ppm
TLV-ACGIH		5			

QUARTZ					
Threshold Limit Value					
Type	State	TWA/8h		STEL/15 min	
		mg/m3	ppm	mg/m3	ppm
TLV-ACGIH		0.025			

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FLUE DUST, PORTLAND CEMENT

Threshold Limit Value

Type	State	mg/m ³		ppm		Notes
DNEL	-	1				Breathable fraction

Legend:

(C) = CEILING ; INALAB = inhalable fraction; RESPIR = breathable fraction; TORAC = thoracic fraction.

The risk assessment should also consider the occupational exposure limit values set by ACGIH for inert dusts that are not otherwise classified (PNOC breathable fraction: 3 mg/m³; PNOC inhalable fraction: 10 mg/m³). If these limits are exceeded, a P-type filter should be used, the class (1, 2 or 3) must be chosen on the basis of the outcome of the risk assessment.

CALCIUM DIHYDROXIDE

PNEC water = 490 µg/l

PNEC soil/groundwater = 1080 mg/l

8.2. Exposure controls

As taking appropriate technical measures always has priority over personal protective equipment, ensure good ventilation in the workplace by means of an effective local extraction system.

When choosing personal protective equipment, ask your suppliers of chemical substances for advice.

The personal protective equipment must display CE marking certifying conformity to current standards.

Provide emergency shower with face and eye bath.

HAND PROTECTION

If prolonged contact with the product is envisaged, protect the hands with work gloves that resist penetration (reference standard EN 374), like latex, nitrile rubber, neoprene and PVC gloves.

When choosing the material of the work gloves, the use must be considered to which the product and further products based on it will be put. Also remember that latex gloves can give rise to sensitisation phenomena.

SKIN PROTECTION

Wear work clothes with long sleeves and category II safety footwear for professional use (ref. Directive 89/686/EEC and EN ISO 20344 standard). Wash yourself with soap and water after removing the protective clothing.

EYE/FACE PROTECTION

A hood with visor or a protective visor with hermetically sealed goggles should be worn (reference standard EN 166).

RESPIRATORY PROTECTION


A filtering half mask type P should be worn. The class (1, 2 or 3) and actual need must be defined on the basis of the outcomes of the risk assessment (reference standard EN 149).

Emissions from productive processes, including those from ventilation equipment, should be checked to ensure that they comply with environmental protection standards.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	Powder
Colour	<u>Green</u> <u>Black</u> <u>Brown</u> <u>Red</u> <u>Yellow</u> <u>Orange</u>
Odour	no odour
Odour threshold	Not available
pH	Not available
Melting point/freezing point	Not available
Initial boiling point	Not applicable
Boiling range	Not available
Flash point	<u>>60 °C</u>
Evaporation rate	Not available
Flammability (solid, gas)	Not available
Lower flammability limit	Not applicable (there are no chemical groups present in the molecule associated with explosive properties. Refer to Annex I of Regulation (EC) No. 1272/2008 section 2.8.4.2 a)
Upper flammability limit	Not applicable (there are no chemical groups present in the molecule associated with explosive properties. Refer to Annex I of Regulation (EC) No. 1272/2008 section 2.8.4.2 a)

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Lower explosive limit	Not available
Upper explosive limit	Not available
Vapour pressure	Not available
Vapour density	Not available
Relative density	Not available
Solubility	Not available
Partition coefficient: n-octanol/water	Not available
Auto-ignition temperature	Not available
Decomposition temperature	Not available
Viscosity	Not available
Explosive properties	Not applicable (there are no chemical groups present in the molecule associated with oxidising properties. Refer to Annex I of Regulation (EC) No. 1272/2008 section 2.1.4.3)
Oxidising properties	Not applicable (there are no chemical groups present in the molecule associated with explosive properties. Refer to Annex I of Regulation (EC) No. 1272/2008 section 2.8.4.2 a)

9.2. Other information

Not available.

SECTION 10: Stability and reactivity

10.1. Reactivity

There are no particular hazards of reactions with other substances in normal conditions of use.

10.2. Chemical stability

The product is stable in normal conditions of use and storage.

10.3. Possibility of hazardous reactions

No hazardous reactions are known for this product.

10.4. Conditions to avoid

Do not allow dust to accumulate in the atmosphere.

10.5. Incompatible materials

Prevent the product coming into contact with acids.

10.6. Hazardous decomposition products

None in particular.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

In the absence of experimental toxicological data on the product, possible health hazards from the product have been assessed on the basis of the properties of the substances that it contains, according to the criteria set by the reference standard for the classification. Therefore consider the concentration of the individual hazardous substances mentioned in section 3 to assess the toxicological effects of exposure to the product.

a) Acute toxicity

Swallowing can cause health complaints such as abdominal pains with a burning sensation, nausea and vomiting. Swallowing can cause irritation of the mouth, throat and of the oesophagus ; vomit, diarrhoea, oedemas, swelling of the larynx and consequent suffocation. Inhaling vapours causes irritation of the lower and upper respiratory tract with coughs and breathing difficulties; in higher concentrations it can also cause pulmonary oedemas. Swallowing can cause health complaints such as abdominal pains with a burning sensation, nausea and vomiting.

CALCIUM DIHYDROXIDE

LD50 (oral) > 2000 mg/kg by weight (OECD 425, rats)

LD50 (dermal) > 2500 mg/kg by weight (402, rabbits)

FLUE DUST, PORTLAND CEMENT

LD50 (dermal) – 2000 mg/kg rabbit

b) Skin corrosion/irritation


The mixture is classified according to CLP criteria as irritating to skin.

CALCIUM DIHYDROXIDE

According to the experimental results, calcium hydroxide is classified as irritating to skin [R38 Irritating to skin; Skin irritation Category 2 (H315 – Causes skin irritation)].

c) Serious damage to eyes/eye irritation

The mixture is classified according to CLP criteria as corrosive to eyes.

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CALCIUM DIHYDROXIDE

Calcium hydroxide entails the risk of severe eye damage (Studies of eye irritation (*in vivo*, rabbits).

d) Skin or respiratory sensitisation

The mixture is classified according to CLP criteria as skin sensitiser.

e) Germ cell mutagenicity

CALCIUM DIHYDROXIDE

In consideration of the universal presence and essential nature of calcium and in consideration of the physiological irrelevance to mutagenicity of any pH variation caused by calcium in a water means, Ca(OH)₂ is obviously devoid of any genotoxic potential. (Bacterial reverse mutation assay (Ames test, OECD 471): Negative)

f) Carcinogenicity

CALCIUM DIHYDROXIDE

The calcium (administered as a calcium lactate) is not carcinogen (experimental result, rats).

The effect of the pH of the calcium hydroxide does not give rise to a carcinogen risk.

Human epidemiological data reveal that the calcium hydroxide has no carcinogenic potential.

The carcinogenicity classification is not necessary.

g) Reproductive toxicity

CALCIUM DIHYDROXIDE

The calcium (administered as calcium carbonate) is not toxic for reproduction (experimental result, mice).

The effect of the pH does not give rise to reproductive risks.

Human epidemiological data reveal that the calcium hydroxide has no potential for reproductive toxicity.

Both studies of animals and clinical studies of various calcium salts detected no effects on reproduction or development. See also "Scientific Committee on Food" (section 16.6).

Consequently, calcium hydroxide is not toxic for reproduction and/or development.

The classification for reproductive toxicity in conformity to Regulation (EC) No. 1272/2008 (CLP) is not necessary.

h) STOT - Single exposure

The mixture may cause respiratory irritation.

CALCIUM DIHYDROXIDE

From the data on human beings it is concluded that Ca(OH)₂ is irritating to respiratory system.

i) STOT - Repeated exposure

CALCIUM DIHYDROXIDE

The oral toxicity of calcium refers to upper levels (UL) of intake for adults determined by the "Scientific Committee on Food".

UL = 2500 mg/d corresponds to 36 mg/kg bw/d (70 kg person) for calcium.

The dermal toxicity of Ca(OH)₂ is not considered to be relevant because of the insignificant absorption through the skin and because local irritation is the primary effect on health (pH variation).

It is not therefore necessary to classify Ca(OH)₂ for toxicity in the event of prolonged exposure.

j) Aspiration hazard

The mixture does not present aspiration hazards.

SECTION 12: Toxicological information

Follow good working practice to avoid releasing the product into the environment. Alert the competent authorities if the product has reached water courses or drains or if it has contaminated the soil or vegetation.

12.1. Toxicity

Cement is not hazardous to the environment. The ecotoxicity tests with Portland cement on *Daphnia magna* and *Selenastrum coli* demonstrated a small toxicological impact. The LC50 and EC50 values cannot therefore be determined.

CALCIUM DIHYDROXIDE

Acute/prolonged toxicity for fish

CL50 (96h) freshwater fish = 50.6 mg/l

CL50 (96h) saltwater fish = 457 mg/l


Acute/prolonged toxicity for invertebrates

CE50 (48h) for freshwater invertebrates = 49.1 mg/l

CL50 (96h) for saltwater invertebrates = 158 mg/l

Acute/prolonged toxicity for aquatic plants

CE50 (72h) for freshwater algae = 184.57 mg/l

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NOEC (72h) for saltwater algae = 48 mg/l

Toxicity for micro-organisms, for example bacteria

At high concentration, by raising the temperature and pH, calcium hydroxide is used to disinfect slurry and sewage sludge.

Chronic toxicity for aquatic organisms

NOEC (14d) for saltwater invertebrates = 32 mg/l

Toxicity for organisms living in the soil

CE₁₀/CL₁₀ or NOEC for soil micro-organisms = 2000 mg/kg soil dw

CE₁₀/CL₁₀ or NOEC for soil micro-organisms = 12000 mg/kg soil dw

Toxicity for terrestrial plants

NOEC (21d) for terrestrial plants = 1080 mg/kg

12.2. Persistence and degradability

Not relevant for inorganic substances.

12.3. Bioaccumulative potential

Not relevant for inorganic substances.

12.4. Mobility in soil

Calcium hydroxide is moderately soluble and has low mobility in most soils.

For cement, there are no indications of toxicity during the sedimentary phase.

12.5. Results of PBT and vPvB assessment

According to available data, the product does not contain more than 0.1% of PBT or vPvB substances.

12.6. Other adverse effects

Adding large quantities of cement to the water can nevertheless increase the pH and thus be toxic for aquatic life in certain circumstances.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

If possible, reuse. Product residues must be treated as special hazardous waste. The hazardousness of waste partially containing this product must be evaluated on the basis of current legislation.

An authorised waste-management company must be used to dispose of the waste in compliance with national and local legislation.

Under no circumstances allow the product to enter the soil, drains or water courses.

CONTAMINATED PACKAGING

Contaminated packaging must be sent for recovery or disposal in compliance with national waste-management regulations.

SECTION 14: Transport information

The product is not considered to be hazardous by current regulations governing the transport of hazardous products by road (A.D.R.), by rail (RID), by sea (IMDG Code) and by air (IATA).

14.1. UN number:	Not applicable.
14.2. UN proper shipping name:	Not applicable.
14.3. Transport hazard classes:	Not applicable.
14.4. Packing group:	Not applicable.
14.5. Environmental hazards:	Not applicable.
14.6. Special precautions for user:	Not applicable.
14.7. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code:	Not applicable.


SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

Seveso category None.

Restrictions relating to the product or to the substances contained therein according to Annex XVII Regulation (EC) No. 1907/2006

None.

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Substances on candidate list (Article 59 REACH)

None.

Substances subject to authorisation (Annex XIV REACH)

None.

Substances subject to export notification Regulation (EC) No. 649/2012

None.

Substances subject to the Rotterdam Convention

None.

Substances subject to the Stockholm Convention

None.

Healthcare controls

Workers exposed to this chemical agent that is hazardous to human health must be subject to health monitoring in compliance with the provisions of article 41 of Italian legislative decree no. 81 of 9 April 2008 unless the risk to the health of the worker is deemed to be insignificant pursuant to the provisions of article 224, sub-section 2 of

Italian legislative decree 152/2006 and subsequent amendments.

Emissions:

TABLE B Class 3 61.30 %

15.2. Chemical safety assessment

A chemical safety assessment has been carried out for some of the substances found in the product.

SECTION 16: Other information

Text of the hazard statements (H) mentioned in sections 2-3 of the safety data sheet:


STOT RE 1	Specific target organ toxicity — repeated exposure, category 1
Eye Dam. 1	Serious eye damage, category 1
Eye Irrit. 2	Eye irritation, category 2
Skin Irrit. 2	Skin irritation, category 2
STOT SE 3	Specific target organ toxicity — single exposure, category 3
Skin Sens. 1	Skin sensitization, category 1
H372	Causes damage to organs through prolonged or repeated exposure.
H318	Causes serious eye damage.
H319	Causes serious eye irritation.
H315	Causes skin irritation.
H335	May cause respiratory irritation.
H317	May cause an allergic skin reaction.

Text of the risk phrases (R) mentioned in sections 2-3 of the safety data sheet:

R36/37/38	IRRITATING TO EYES, RESPIRATORY SYSTEM AND SKIN.
R37/38	IRRITATING TO RESPIRATORY SYSTEM AND SKIN.
R41	RISK OF SERIOUS DAMAGE TO EYES.
R43	MAY CAUSE SENSITISATION BY SKIN CONTACT.
R48/23	TOXIC: DANGER OF SERIOUS DAMAGE TO HEALTH BY PROLONGED EXPOSURE THROUGH INHALATION.

LEGEND:


- ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road

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- CAS NUMBER: Chemical Abstract Service number
- CE50: Concentration affecting 50% of the population tested
- CE NUMBER: Identification number in ESIS (European Standardised Information Sheet relating to existing substances)
- CLP: Regulation (EC) No. 1272/2008
- DNEL: Derived No-Effect Level
- EmS: Emergency Schedule
- GHS: Globally Harmonized System of Classification and Labelling of Chemicals
- IATA DGR: International Air Transport Association Dangerous Goods Regulation
- IC50: Inhibitory concentration of 50% of the tested population
- IMDG: International Maritime Dangerous Goods code
- IMO: International Maritime Organization
- INDEX NUMBER: identification number in Annex VI of the CLP
- LC50: Lethal concentration, 50%
- LD50: Lethal dose, 50%
- OEL: Occupational Exposure Limits
- PBT: Persistent, bioaccumulative and toxic according to the REACH
- PEC: Predicted Environmental Concentration
- PEL: Permissible Exposure Limit
- PNEC: Predicted No Effect Concentration
- REACH: Regulation (EC) No. 1907/2006
- RID: Regulations concerning the International carriage of Dangerous goods by rail
- TLV: Threshold Limit Value
- TLV CEILING: concentration that must not be exceeded at any moment of working exposure
- TWA STEL: Short-term exposure limit
- TWA: time-weighted average exposure limit
- VOC: Volatile organic compound
- vPvB: very Persistent and very Bioaccumulative according to the REACH
- WGK: Water Hazard Class (Germany)

GENERAL BIBLIOGRAPHY:

1. Directive 1999/45/CE and subsequent amendments
2. Directive 67/548/EEC and subsequent amendments and adaptations
3. Regulation (EC) No. 1907/2006 of the European Parliament (REACH)
4. Regulation (EC) No. 1272/2008 of the European Parliament (CLP)
5. Regulation (EC) No. 790/2009 of the European Parliament (I Atp. CLP)
6. Regulation (EC) No. 453/2010 of the European Parliament
7. Regulation (EC) No. 286/2011 of the European Parliament (II Atp. CLP)
8. Regulation (EC) No. 618/2012 of the European Parliament (III Atp. CLP)
9. The Merck Index. Ed. 10
10. Handling Chemical Safety
11. Niosh - Registry of Toxic Effects of Chemical Substances
12. INRS - Fiche Toxicologique
13. Patty - Industrial Hygiene and Toxicology

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14. N.I. Sax - Dangerous properties of Industrial Materials-7 Ed., 1989

15. ECHA Agency website

Note for user:


The information contained in this data sheet is based on the knowledge in our possession at the date of the last version. The user must ascertain the suitability and completeness of the information in relation to the specific use of the product.


This document must not be interpreted as a guarantee of any specific property of the product.

As the use of the product is not under our direct control, it is the user's responsibility to comply with current health and safety laws and regulations. No liability is accepted for improper use.

Train operators appropriately in the use of chemical products.


First version of the document.


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Exposure scenario no. 9.1: Industrial production of hydraulic binding agents for building and constructions


Exposure scenario for professional uses	
1. Title: Industrial production of hydraulic materials for building and constructions	
Title	Production of mixtures containing flue dust: cement, hydraulic binder, material with low controlled resistance, concrete (ready-mixed or precast), mortar, grout and other items for building or construction work.
Sector of use	Not applicable.
Product category for consumers	PC 0: Products for buildings and constructions PC 9b: Fillers, putties, plasters, modelling clay PC 9a: Coatings and paints, thinners, paint removers
Environmental scenario	ERC 2: Formulation of preparations
Process scenarios	PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 3: Use in closed batch process (synthesis or formulation) 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 substance or preparation into small containers (dedicated filling line, including weighing) PROC 14: Production of preparations or articles by tableting, compression, extrusion, pelletisation PROC 26: Handling of solid inorganic substances at ambient temperature
Assessment tool	The assessment of exposure to inhalation is based on the dust level/volatility ratio of the substance, using the MEASE exposure estimation tool. The environmental assessment is based on a qualitative approach described in the introduction. The reference parameter is the pH in the water and soil.
2. Operating conditions and risk management measures	
2.1 Controlling exposure of workers	
Product characteristics	
<p>Hydraulic binders for building and constructions are inorganic binders. Generally, these products are mixtures of Portland cement clinker and other constituents, both hydraulic and non-hydraulic. The flue dusts may be part of common cements such as, for example, Portland cement. In this main application the flue dust content is less than 5%. In other hydraulic binders the flue dust content could be greater than 50%. Generally, the flue dust content is not limited in a hydraulic mixture. Flue dusts are very powdery substances.</p> <p>In all end uses, the substance will come intentionally into contact with water. In part, the substance reacts with water and forms hydration products. At this stage of wet or pasty suspension, the product is irritating because the pH value is above 11. At the end, the end product has hardened (e.g. into mortar, concrete) and is not irritating as there is no more free alkaline humidity.</p>	
Quantities used	
The current tonnage handled per shift is not considered to be significant for this scenario. On the other hand, the combination of the type of operation (industrial as opposed to professional) and the level of containment/automation (as set out in the PROC) is the main determinant of the intrinsic emission potential of the process.	
Frequency and duration of use/exposure	
Processes	Duration of exposure


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PROC 2, 3, 5, 8b, 9, 14, 26 (all)	No limit (480 minutes)
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Human factors not influenced by risk management				
The breathable volume per shift during all the steps of the process set out in the PROCs is assumed to be 10 m ³ /shift (8				
Other stated operating conditions that affect workers' exposure				
Operating conditions such as temperature and process pressure are not considered to be pertinent to the assessment of working exposure of the processes conducted.				
Technical measures and conditions at the process level (source) to prevent the				
Risk management measures at the process level are not generally required in the process.				
Technical measures and conditions for controlling dispersal from the source to the				
Processes	Localised controls (LC)	Efficiency of the LC (according to	Further information	
PROC 2, 3	General exhaust ventilation	17 %	-	
PROC 5, 8b, 9, 14, 26	Local exhaust ventilation	78 %	-	
Organisational measures for preventing/limiting releases, dispersal and exposure				
Do not inhale or swallow. Hygiene measures in the workplace are required to ensure safe handling of the substance. These measures include good personal and management practice (e.g. regular cleaning with suitable devices), not eating or smoking in the workplace, wearing standard work clothes and footwear unless otherwise stated below. Shower and change clothing at the end of the work shift. Do not wear contaminated clothing at home. Do not remove dust with compressed air.				
Conditions and measures regarding personal protection, hygiene and the health				
Processes	Indication for the respiratory protective equipment	Efficiency of the RPE – assigned protection factor (APF)	Indication for gloves	Further personal protective equipment (PPE)
PROC 2, 3	Not required	Not applicable.	Waterproof gloves, abrasion and alkali resistant, with inner cotton lining. The gloves must be worn because the flue dusts are classified as irritating to skin.	Goggles or face shields (in accordance with EN 166) are obligatory as the flue dusts are classified as highly irritating to eyes. Additional face protection, protective clothing and safety footwear must also be worn.
PROC 5, 8b, 9	Mask FFP2	APF = 10		
PROC 14, 26	Mask FFP1	APF = 4		

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Gloves and eye protective equipment must be worn until potential contact with the skin and eyes can be excluded by the nature and type of application (e.g. closed processes).

A summary of the APFs of the different types of RPE (in accordance with BS EN 529:2005) can be found in the MEASE glossary.

Each type of RPE as defined above should be worn if the following principles are implemented in parallel: the duration of the work (compared to the "exposure duration" specified above) should reflect the additional psychological stress for the worker due to the breathing resistance and rate of the RPE, and to the increase in thermal stress, also for the head. In addition, it should be considered that the worker's ability to use tools and communicate is reduced whilst he or she is wearing the RPE.

For the above reasons, the worker should therefore (i) be in good health (especially in consideration of the medical problems that the use of the RPE could entail), (ii) have facial features that are suitable for reducing points of discontinuity between the face and the mask (taking into account scars and hair). The protective devices recommended above that rely on fitting perfectly to the face will not provide the required protection unless they suit the facial features properly and securely.

Employers and the self-employed have the legal responsibility to maintain and distribute respiratory protective devices and control their correct use in the workplace. They must therefore define and document a policy for the respiratory protection programme that includes worker education and training.

2.2 Environmental exposure control

Product characteristics

Hydraulic binders for building and constructions are inorganic binders. Generally, these products are mixtures of Portland cement clinker and other constituents, both hydraulic and non-hydraulic. The flue dusts may be part of common cements such as, for example, Portland cement. In this main application the flue dust content is less than 5%. In other hydraulic binders the flue dust content could be greater than 50%. Generally, the flue dust content is not limited in a hydraulic mixture. Flue dusts are very powdery substances.

In all end uses, the substance will come intentionally into contact with water. In part, the substance reacts with water and forms hydration products. At this stage of wet or pasty suspension, the product is irritating because the pH value is above 11. At the end, the end product has hardened (e.g. into mortar, concrete) and is not irritating as there is no more free alkaline humidity.

Quantities used

The daily and annual quantity by installation (by workstation) is not considered to be a determining factor for environmental exposure.

Frequency and duration of use

Intermittent use/release (used < 12 times a year for no longer than 24 h) or continuous use.

Environmental factors not affected by risk management

Total receiving surface water flow: 18,000 m³/g.

Other indicated operating conditions relating to environmental exposure

Total effluent waste: 2,000 m³/g.


In situ technical conditions and measures to reduce or limit discharges, atmospheric emissions and releases into the soil


The environmental risk management measures aim to avoid discharge suspensions containing flue dust into sewage or surface waters. Such discharges are likely to cause significant changes in pH values. Regular control of the pH value during introduction into open water is required. In general, discharges should minimise the changes to pH of the receiving surface water (e.g. through neutralisation). In general, most aquatic organisms can tolerate a pH value in a 6-9 range. This is also stated in the description of the standard OECD tests with aquatic organisms. The reason for the risk management measure can be included in the introduction.

Organisational measures for preventing/limiting releases from the site

Training for workers based on the chemical safety data sheets.

Conditions and measures relating to sewage treatment plants

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The pH value of the waste water that reaches the sewage treatment plants must be checked regularly and neutralised if necessary. The solid constituents of the flue dusts must be separated from the sewage effluents.

Conditions and measures relating to waste

The solid industrial waste of the flue dust should be reused or disposed of after hardening and/or neutralisation.

3 Exposure estimation and reference to source

3.1 Work exposure

The MEASE exposure estimation tool has been used to estimate inhalation exposure.


Processes	Method for inhalation exposure assessment	Inhalation exposure estimation (RCR)	Method for dermal exposure assessment	Dermal exposure estimation (RCR)
PROC 2, 3, 5, 8b, 9, 14, 26	MEASE	< 1 mg/m ³ (0.44 - 0.83)	As flue dusts are classified as irritant to the skin and eyes, dermal exposure must be minimised as far as this is technically feasible. The DNEL for the dermal effects has not been obtained. Dermal exposure is thus not	
			assessed in this exposure scenario.	

3.2 Environmental emission


Significant emissions or exposure to air are not envisaged because of the lower pressure of the flue dust vapour. Emissions or exposure to the terrestrial environment are not envisaged and are thus not pertinent for this exposure scenario.


The environmental exposure assessment is pertinent only for aquatic environment as flue dust emissions in the different phases of the life cycle (production and use) mainly applied to the soil and to the waste water. Managing the aquatic effect and the risk covers the effect on the organisms/ecosystems because of the possible change in pH values associated with waste hydroxides. The toxicity of the different dissolved inorganic ions is negligible compared with the potential effect of the pH value. Only the local scale should be considered, which includes the sewage treatment plants (STPs) or the waste water treatment plants (WWTPs) when applicable, both for production and industrial use as any effect that could occur is expected to occur on the local scale. Exposure is assessed by evaluating the impact of the resulting pH value. The pH value of the surface water must not exceed the value 9.

Environmental emissions	The production of flue dust can be potentially an aquatic emission by which locally the pH value and the quantity of the following ions can be increased in the aquatic environment: K ⁺ , Na ⁺ , Ca ²⁺ , Mg ²⁺ , SO ₄ ²⁻ , Cl ⁻ . If the pH value is not neutralised, the effluent of the production sites may affect the pH value of the receiving water. Generally, the pH value of the effluents is measured frequently and can be easily neutralised at the frequency required by national regulation.
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<p>Exposure concentration in the waste water treatment plants (WWTPs)</p>	<p>The waste water from the flue dust production process is an inorganic waste flow, so no biological treatment is required. The waste water from the flue dust production sites will not normally be treated in the biological treatment sections of the waste water treatment plants (WWTPs) but can be used to control the pH value of the acid discharge flows that are treated in the waste water treatment plants (WWTPs).</p>
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Exposure concentration in pelagic aquatic communities	When flue dusts are emitted into surface water, the following happens. Certain constituents of the flue dust (sulphate and chloride salts, potassium, calcium and magnesium) are highly or moderately soluble and will remain in the water. These salts occur naturally in seawater and in groundwater. The amount in groundwater depends on the geological formation of the terrain and varies between different areas. Some constituents react with the water and form highly insoluble inorganic hydration products. Owing to the hydration reaction, the water's pH value may increase, in function of the water's buffering capacity. The greater the water's buffering capacity, the less the effect on the pH value will be. In general, the buffering capacity that prevents transformations into acidity or alkalinity in natural water is regulated by the balance between carbon dioxide (CO ₂), bicarbonate ion (HCO ₃ ⁻) and carbonate ion (CO ₃ ²⁻).
Exposure concentration in sediments	A risk assessment for sediments is not considered to be pertinent and has not therefore been included. When the flue dust is spread in this environment, the following occurs. Certain constituents of the flue dust are inert and insoluble (calcite, quartz, clay minerals), they are minerals that occur naturally and will not have an impact on the sediments. Certain constituents of the flue dust react with the water and form highly inorganic hydration products. Moreover, these products have no bioaccumulative potential. Other constituents are highly soluble and will remain in the water.
Exposure concentrations in soil and in groundwater	When the flue dust is spread in the soil and in the groundwater, the following occurs. Certain constituents of the flue dust are inert and insoluble (calcite, quartz, clay minerals), they are minerals that occur naturally and will not have an impact on the soil. Certain constituents of the flue dust (sulphate and chloride salts, potassium, calcium and magnesium) are moderately or highly soluble and will remain in the groundwater. These salts occur naturally in seawater and in groundwater. The amount in groundwater depends on the geological formation of the terrain and varies. Some constituents react with the water and form highly insoluble inorganic products. Owing to this hydration reaction, the groundwater's pH value may increase, in function of the water's buffering capacity. The greater the water's buffering capacity, the less the effect on the pH value will be. In general, the buffering capacity that prevents transformations into acidity or alkalinity in natural water is regulated by the balance between carbon dioxide (CO ₂), bicarbonate ion (HCO ₃ ⁻) and carbonate ion (CO ₃ ²⁻).
Atmospheric exposure concentration	A risk assessment for the atmosphere is not considered to be pertinent and has not therefore been included. When the flue dust particles are spread in the air, they will settle or will be removed by the rain reasonably quickly. In this way, the emissions into the air will finish in the soil and water.
Exposure concentration pertinent to the food chain (secondary intoxication)	A risk assessment for secondary intoxication is not required because the bioaccumulative potential of the organisms is not pertinent to flue dusts, which are an inorganic substance.
4 Guide for the FU to assessing whether its work activity falls within the scope of the ES	
Work exposure	

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An end user is working within the limits set by the Exposure Scenario if one of the proposed risk management measures described above is in place or if the end user can demonstrate that his or her operating conditions and the adopted risk management measures are appropriate. This must be done by demonstrating that they limit inhalation and dermal exposure to a level below the respective DNEL (as the processes and activities in question are covered by the PROCs listed previously) as set out below. If measured data are not available, the end user can use a suitable measuring tool like MEASE (www.ebrc.de/mease.html) to estimate the associated exposure.

DNEL of inhalation: 1 mg/m³ (as breathable dust)

Note: The end user must be aware of the fact that apart from the long-term DNEL set out above, a DNEL also exists for acute effects with a value of 4 mg/m³. Demonstrating safe use by comparing the exposure estimations with the long-DNEL thus also covers acute DNEL (according to Guide R.14, the acute exposure levels can be obtained by multiplying the long-term exposure level estimations by a factor of 2). When MEASE is used to extrapolate the exposure estimations, it is observed that the duration of exposure should only be reduced to a half shift as a risk-management measure (leading to a 40% reduction in exposure).

Environmental exposure

For this assessment, an approach by phase is recommended.

Phase 1: gathering information on the discharged pH value and on the effect of the flue dust on the resulting pH. The pH value should be greater than 9 and be mainly imputable to the flue dust; at the moment further steps are required to demonstrate safe use.

Phase 2: gathering information on the pH value in the receiving water after the discharge point. The pH value of the receiving water should not be greater than 9.

Level 3: measuring the pH value in the receiving water after the discharge point. If the pH value is lower than 9, safe use has been reasonably demonstrated and the exposure scenario finishes here. If the pH value is greater than 9, the risk management measures have to be implemented: the discharged pH must be neutralised so as to ensure secure use of the flue dust during production or the use phase.