



SAFETY DATA SHEET
according to Annex II of Regulation n° 1907/2006 (REACH)

First issue date 31/07/2019
Rev 1 del 19/11/2020

0109453020 –MX PBO CONCRETE

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

1.1. Product identifier

Code: **0109453020**
Product name: **MX PBO CONCRETE**

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

Intended use **Inorganic matrix for strengthening reinforced concrete structures.**

1.3. Details of the supplier of the safety data sheet

Legal and administrative address: **RUREGOLD S.r.l.**
Via Vittorio Veneto 30
43045 Rubbiano di Forno (PR)
Italy
Tel. +39 0525 4198
Fax +39 0525 419988

e-mail address of the competent person responsible for the Safety Data Sheet **reach@ruregold.it**

Product delivered by: **RUREGOLD S.r.l.**

1.4. Emergency telephone number

Members of the public
In an emergency, if the patient has collapsed or is not breathing properly, call 999

For medical advice contact:

NHS 111 in England: 111

NHS 24 in Scotland: 111

NHS Direct in Wales: 0845 4647

In Northern Ireland: contact your local GP or pharmacist during normal hours.

In Ireland: contact NPIC on (01) 809 2166(8 am to 10 pm); outside of these hours contact your GP or hospital emergency department.

[hiip://www.npis.org/index.html](http://www.npis.org/index.html)

Healthcare professionals

UK NPIS 0344 892 0111

Ireland NPIC (01) 809 2566

[hiips://www.toxbase.org/](https://www.toxbase.org/)

SECTION 2. Hazards identification

2.1. Classification of the substance or mixture

The product is classified dangerous according to the provisions of Regulation (EC) 1272/2008 (CLP) (and subsequent amendments and supplement). The product therefore requires a Safety Data Sheet in accordance with the provisions of Regulation (EU) 2015/830. Any additional information regarding health and / or environmental risks is given in the sections. 11 and 12 of this sheet.

Hazard classification and indication according to Regulation (EC) n° 1272/2008 (CLP)

Serious eye damage, category 1;	H318	Causes serious eye damage.
Skin irritation, category 2	H315	Causes skin irritation
Specific target organ toxicity - single exposure, category 3	H335	May cause respiratory irritation cutanea
Skin sensitization, category 1B	H317	May cause an allergic skin reaction

2.2. Label elements

Hazard pictograms:



Signal words:

Danger

Hazard statements:

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

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/doctor
P261	Avoid breathing dust/fume/gas/mist/vapours/spray
P403+P233	Store in a well-ventilated place. Keep container tightly closed.
P264	Wash the hands with water and soap thoroughly after handling.

Contains:

Portland cement clinker – flue dust

2.3. Other hazards

On the basis of available data, the product does not contain any PBT or vPvB in percentage greater than 0,1%.

SECTION 3. Composition/information on ingredients

3.2. Mixtures

Identification	N° EINECS	N° CAS	N° REACH registration	CLP Classification	Conc. [%]	Note
Portland cement clinker	266-043-4	65997-15-1	exempt according to art. 2.7.b)	Skin Irrit. 2; H315 Eye. Dam. 1; H318 STOT SE 3; H335 Skin Sens. 1B; H317	49 - 67	
Flue dust	270-659-9	68475-76-3	01-2119486767-17-xxxx	Skin Irrit. 2; H315 Eye. Dam. 1; H318 STOT SE 3; H335 Skin Sens. 1B; H317	0,05 – 3,5	
Dried sand - quartz (crystalline silica diameter > 10 micron)	238-878-4	14808-60-7			30 - 50	Substance with a community exposure limit in the workplace
Dispersing polymer		9084-06-4			0 – 0,5	Substance with a community exposure limit in the workplace

The full wording of hazard (H) phrases is given in section 16 of the sheet.

SECTION 4. First aid measures

4.1. Description of first aid measures

EYES: Remove any contact lenses. Wash immediately with plenty of water for at least 30/60 minutes, opening the eyelids well. Consult a doctor immediately.

SKIN: Remove contaminated clothing. Take a shower immediately. Consult a doctor immediately.

INGESTION: Give water to drink as much as possible. Consult a doctor immediately. Do not induce vomiting unless expressly authorized by your doctor.

INHALATION: Call a doctor immediately. Bring the subject to fresh air, away from the accident site. If breathing stops, give artificial respiration. Take appropriate precautions for the rescuer.

Pozzolanic cementitious hydraulic binder - General rules

Personal protective equipment is not necessary for rescuers, who must avoid the inhalation of cement dust and contact with wet cement or with preparations containing wet cement. If this is not possible, they must adopt the personal protective equipment described in Section 8.

In case of eye contact

Do not rub your eyes in order to avoid possible corneal damage caused by rubbing. If present, remove contact lenses. Incline the head in the direction of the affected eye, open the eyelids well and rinse immediately and thoroughly with water for at least 20 minutes to remove all residues; if possible, use isotonic water (0.9% NaCl). If necessary, contact an occupational health specialist or ophthalmologist.

In case of skin contact

For dry cement, remove and rinse thoroughly with water. For wet and / or wet cement, wash the affected part with plenty of water and neutral pH soap or a suitable light detergent; in addition, remove contaminated clothing, shoes, glasses, watches, etc. and clean them completely before using them again. Consult a doctor in all cases of irritation or burns.

In case of inhalation

Take the person outdoors; dust in the throat and nostrils should be eliminated naturally.

Contact a doctor if irritation persists, or if it occurs later or if you have discomfort, cough or other symptoms persist.

If swallowed.

Do not induce vomiting. If the person is conscious, rinse the oral cavity with plenty of water; consult a doctor immediately or contact a Poison Control Center.

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

Refer to SECTION 2 and SECTION 11.

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

Refer to SECTION 4.1. Treat symptomatically.

SECTION 5. Firefighting measures

5.1. Extinguishing media

SUITABLE EXTINGUISHING EQUIPMENT

The extinguishing equipment should be of the conventional kind: carbon dioxide, foam, powder and water spray.

UNSUITABLE EXTINGUISHING EQUIPMENT

None in particular.

5.2. Special hazards arising from the substance or mixture

HAZARDS CAUSED BY EXPOSURE IN THE EVENT OF FIRE

Do not breathe combustion products.

The product is neither flammable nor explosive and does not facilitate the combustion of other materials.

5.3. Advice for firefighters

GENERAL INFORMATION

Use jets of water to cool the containers to prevent product decomposition and the development of substances potentially hazardous for health. Always wear full fire prevention gear. Collect extinguishing water to prevent it from draining into the sewer system. Dispose of contaminated water used for extinction and the remains of the fire according to applicable regulations.

Normal fire fighting clothing i.e. fire kit (BS EN 469), gloves (BS EN 659) and boots (HO specification A29 and A30) in combination with self-contained open circuit positive pressure compressed air breathing apparatus (BS EN 137).

SECTION 6. Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Avoid dust formation by spraying the product with water if there are no contraindications.

Wear appropriate protective equipment (including personal protective equipment referred to in section 8 of the safety data sheet) to prevent contamination of the skin, eyes and personal clothing. These indications are valid both for workers involved in the work and for emergency interventions.

6.2. Environmental precautions

Prevent the product from entering sewers, surface waters, phreatic water.

6.3. Methods and material for containment and cleaning up

Collect the spilled product and place it in containers for recovery or disposal. Eliminate the residue with jets of water if there are no contraindications.

Ensure adequate ventilation of the area affected by the loss. Evaluate the compatibility of the container to be used with the product, checking section 10. The disposal of contaminated material must be carried out in accordance with the provisions of point 13.

6.4. Reference to other sections

Any information regarding personal protection and disposal is given 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. Avoid dispersion of the product in the environment. Do not eat, drink or smoke during use. Remove contaminated clothing and protective equipment before entering areas where you eat.

7.2. Conditions for safe storage, including any incompatibilities

Store only in the original container. Keep the containers 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 use(s)

Inorganic matrix for strengthening reinforced concrete structures. For different and/or particular uses, contact the Commercial Office of Ruregold srl.

SECTION 8. Exposure controls/personal protection

8.1. Control parameters

Portland cement - respirable fraction	ACGIH - TWA (8 ore)	= 1 mg/m ³
Dust - inhalable fraction	ACGIH - TWA (8 ore)	= 10 mg/m ³
Dust - respirable fraction	ACGIH - TWA (8 ore)	= 3 mg/m ³
Free crystalline silica - respirable fraction	ACGIH - TWA (8 ore)	= 0.025 mg/m ³

Normative requirements:

EU	OEL EU	Directive (UE) 2017/2398; Directive (UE) 2017/164; Directive 2009/161/UE; Directive 2006/15/CE; Directive 2004/37/CE; Directive 2000/39/CE; Directive 91/322/CEE.
	TLV-ACGIH	ACGIH 2018

Flue dust

Predicted concentration of no effect on the environment - PNEC		
Reference value in fresh water	0,282	mg/l
Reference value in sea water	0,028	mg/l
Reference value for sediments in fresh water	0,875	mg/kg/d
Reference value for sediments in sea water	0,088	mg/kg/d
Reference value for STP microorganisms	6	mg/l
Reference value for the food chain (secondary poisoning)	NEE	
Reference value for the terrestrial compartment	5	mg/kg/d
Reference value for the atmosphere	NHI	

Health - Derived no effect level - DNEL / DMEL

Exposition route	Effects on consumers				Effects on workers			
	Local acute	Sistemic acute	Local chronic	Sistemic chronic	Local acute	Sistemic acute	Local chronic	Sistemic chronic
Inhalation	0,84 mg/m3	NHI	4 mg/m3	NHI	4 mg/m3	NHI	0,84 mg/m3	NPI
Dermal								

Dried sand - quartz (crystalline silica diameter > 10 micron)

Threshold Limit Value		TWA/8h		STEL/15min		
Type	State	mg/m3	ppm	mg/m3	ppm	
OEL	EU	0,1				RESPIR
TLV-ACGIH		0,025				RESPIR A2(R) fibrosis, lung cancer

Dispersing polymer

Threshold Limit Value		TWA/8h		STEL/15min		
Type	State	mg/m3	ppm	mg/m3	ppm	
OEL	EU		10			NIOSH

Legend:

(C) = CEILING; INHAL = Inhalable Fraction; RESPIR = Respirable Fraction; THORA = Thoracic fraction.
VND = danger identified but no DNEL / PNEC available; NEE = no expected exposure; NHI = no hazard identified

8.2. Exposure controls

Considering that the use of adequate technical measures should always take priority over personal protection equipment, ensure good ventilation in the workplace through effective local aspiration.

For the selection of personal protective equipment, ask your chemical suppliers for advice.

Individual protection devices must bear the CE mark attesting to their compliance with current regulations.

Provide emergency shower with visocular tray.

HAND PROTECTION

In the event of prolonged contact with the product, it is advisable to protect the hands with penetration resistant work gloves (ref. Standard EN 374).

For the final choice of material for work gloves, the process of using the product and any other products derived from it must also be evaluated. It should also be remembered that latex gloves can cause sensitization.

SKIN PROTECTION

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

EYE PROTECTION

It is advisable to wear a hooded visor or protective visor combined with airtight glasses (ref. Standard EN 166).

RESPIRATORY PROTECTION

Not necessary, unless otherwise indicated in the assessment of chemical risk.

ENVIRONMENTAL EXPOSURE CHECKS

Emissions from production processes, including those from ventilation equipment, should be checked for compliance with environmental protection regulations.

SECTION 9. Physical and chemical properties

9.1. Information on basic physical and chemical properties

a) Appearance:	dust
b) Colour:	grey
c) Odour:	odorless
d) Odour threshold:	not available
e) pH:	not available
f) Melting point / freezing point:	not available
g) Initial boiling point:	not available
h) Boiling range:	not available
i) Flash point:	not available
j) Evaporation rate:	not available
k) Flammability (solid, gas):	not available
l) Lower/higher inflammability or explosive limit	not available
m) Vapour pressure:	not available
n) Vapour density:	not available
o) Relative density:	not available
p) Solubility:	not available
q) Partition coefficient: n-octanol/water:	not available
r) Auto-ignition temperature:	not available
s) Decomposition temperature:	not available
t) Viscosity:	not available
u) Explosive properties:	not available
v) Oxidising properties:	not available

9.2. Other information

Chlorides (chloride ion):	0
Total solids:	100

SECTION 10. Stability and reactivity

10.1. Reactivity

There are no particular risks of reaction 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

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

10.4. Conditions to avoid

Avoid exposure to water and moisture and direct sunlight. Keep incompatible materials away.

10.5. Incompatible materials

Acids or acid solutions.

10.6. Hazardous decomposition products

Information not available

SECTION 11. Toxicological information

In the absence of experimental toxicological data on the product itself, the possible dangers of the health product have been assessed on the basis of the properties of the substances contained, according to the criteria set by the reference legislation for classification.

Therefore, consider the concentration of the individual dangerous substances possibly mentioned in section. 3, to assess the toxicological effects deriving from exposure to the product

11.1. Information on toxicological effects



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ACUTE TOXICITY

LC50 (Inhalation) of the mixture:

Not classified (no significant component)

LD50 (Oral) of the mixture:

Not classified (no significant component)

LD50 (Dermal) of the mixture:

Not classified (no significant component)

Cement Portland Clinker

LD50 (Oral) not toxic

LD50 (Dermal) > 2000 mg/kg Coniglio

LC50 (Inhalation) not toxic

Flue dust

LD50 (Oral) > 1848 mg/kg Rat (not classified for acute oral toxicity by the registrants)

LD50 (Dermal) > 2000 mg/kg Rat

LC50 (Inhalation) > 6,04 mg/l/4h Rat

Dispersing polymer

LD50 (Oral) > 3800 mg/kg Rat

LD50 (Dermal) > 1270 mg/kg mouse

SKIN CORROSION / IRRITATION

Causes skin irritation

Cement Portland Clinker

When in contact with damp skin, cement can cause thickening, cracking and cracking of the skin. Prolonged contact, in combination with existing abrasions, can cause severe burns

Flue dust

From in vitro studies on irritation and skin corrosion it was concluded that Flue Dust is irritating but not corrosive to the skin

SERIOUS EYE DAMAGE / IRRITATION

Causes serious eye damage

Cement Portland Clinker

In direct contact with the eyes, cement can cause serious eye damage, corneal opacity, iris lesion, irreversible eye coloration. It can also cause corneal injury due to mechanical stress, immediate or delayed irritation or inflammation. Large amounts of dry cement or wet cement projections can cause chemical burns and blindness

Flue dust

An in vitro eye irritation study concluded that Flue Dust is highly irritating to the eyes.

RESPIRATORY OR SKIN SENSITISATION

Sensitising for the skin

Skin sensitization

Cement Portland Clinker

Some individuals may develop eczema following exposure to wet cement dust, caused either by high pH, or by an immunological soluble Cr (VI) reaction. No sensitizing effect is expected if the cement contains a reducing agent of Cr (VI)

Flue dust

The hypothesis that combustion dust may have a skin sensitizing potential is based on the experience deriving from the



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use of Portland cement. It is known that water-soluble chromium (VI) is a sensitizer and that water-soluble chromium (VI) is found in the Portland cement clinker. Consequently, also Flue Dust can have a water-soluble chromium (VI) content that can be higher than 2 ppm. In these cases, Flue Dust may have a skin sensitizing potential. The epidemiological literature available supports the hypothesis of a relationship between Cr (VI) in wet cement and allergic dermatitis in workers

GERM CELL MUTAGENICITY

Does not meet the classification criteria for this hazard class

Cement Portland Clinker

Not mutagenic

Flue dust

In vitro study with cultured human lung epithelial cells on which both an in vitro micronucleus test and a comet test were performed: No mutagenic effect

CARCINOGENICITY

Does not meet the classification criteria for this hazard class

Cement Portland Clinker

Epidemiological literature does not support the identification of cement as a suspected human carcinogen. In vitro or animal studies do not provide sufficient indications to classify it as a carcinogen

Dried sand - quartz (crystalline silica diameter > 10 micron)

Crystalline silica - Quartz

Cancerogenesis: the IARC (International Agency for Research on Cancer) believes that crystalline silica inhaled in the workplace may cause lung cancer in humans. However, it is noted that the carcinogenic effect depends on the characteristics of the silica and on the biological-physical condition of the environment. It seems proven that the risk of developing cancer is limited to people who already suffer from silicosis. At the current state of the studies, the protection of workers against silicosis would be guaranteed by respecting the occupational exposure limit values.

REPRODUCTIVE TOXICITY

Does not meet the classification criteria for this hazard class

Cement Portland Clinker

not reprotoxic

Adverse effects on sexual function and fertility

Flue dust

Oral: NOAEL 1010 mg / kg body weight / day

Dermal route: the dermal route of exposure is not relevant; the absorption of Flue Dust through the skin is almost impossible and, in any case, workers and consumers are advised to wear a skin protection (gloves, appropriate clothing) due to the irritant effect the substance has on skin.

Inhalation: combustion dust is a dusty material, but only about 10% of the substance is breathable.

Adverse effects on development of the offspring

Flue dust

Flue Dust is not teratogenic. Based on the results of one study, no effects on the prenatal development of the tested animals were observed.

Effect on oral developmental toxicity: NOAEL 1010 mg / kg body weight / day

SPECIFIC TOXICITY FOR ORGANS TARGET (STOT) - SINGLE EXPOSURE

May irritate the respiratory tract

Target organs

Portland Cement Clinker

Cement dust can cause irritation of the throat and respiratory system. Occupational exposure to cement dust may cause

deficiency in respiratory function

Flue dust

From the data available on workers it can be concluded that Flue dust is irritating to the respiratory system.

Exposure route

Portland Cement Clinker

Inhalation

Flue dust

Inhalation

SPECIFIC TOXICITY FOR ORGANS TARGET (STOT) - REPEATEDEXPOSURE

Does not meet the classification criteria for this hazard class

ASPIRATION HAZARD

Does not meet the classification criteria for this hazard class

SECTION 12. Ecological information

Use this product according to good working practices. Avoid littering. Inform the competent authorities, should the product reach waterways or contaminate soil or vegetation.

12.1. Toxicity

Flue dust

EC50 – Algae / Aquatic Plants	22,4 mg/l/72h <i>Desmodesmus subspicatus</i>
EL10 – Crustaceans	68,2 mg/l/21d <i>Daphnia magna</i>
NOEC Chronic – Fish	11,1 mg/l /96h <i>Danio rerio</i>
NOEC Chronic – Crustaceans	100 mg/l /48h <i>Daphnia magna</i>
LC50 – Invertebrate sediments	9951 mg/kg sedimento/ 10d <i>Corophium sp</i>
EC10 – Soil microorganisms	501 mg/kg suolo/28d (Inibizione della formazione di nitrati)
NOEC – Terrestrial plants	1000 mg/kg suolo/ 21d <i>Avena sativa</i>
NOEC – Soil microorganisms	14d <i>Eisenia foetida</i> 1000 mg/kg suolo

12.2. Persistence and degradability

Not relevant (inorganic constituents)

Dispersing polymer

Ready degradable

12.3. Bioaccumulative potential

Not relevant (inorganic constituents)

12.4. Mobility in soil

Not relevant (inorganic constituents)

12.5. Results of PBT and vPvB assessment

The substances making up the product do not meet the classification criteria as PBT or vPvB as per Annex XIII of the EC Regulation n° 1907/2006 (REACH).

Based on the available data, the product does not contain PBT or vPvB substances in a percentage higher than 0.1%.

12.6. Other adverse effects

In case of dispersion of large quantities of product in an aquatic environment, the environmental pH may increase, with possible repercussions on the organisms present.



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SECTION 13. Disposal considerations

13.1. Waste treatment methods

Reuse, if possible. Product residues are to be considered special hazardous waste. The dangerousness of the waste that partly contains this product must be assessed according to the laws in force.

Disposal must be entrusted to an authorized waste management company, in compliance with national and local regulations.

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 classified as hazardous based on the provisions of current legislation concerning the transport of dangerous goods by road (ADR), by rail (RID), by sea (IMDG Code) and by air (IATA). During transport, keep the preparation in closed containers in order to avoid its dispersion.

14.1. UN number

Not applicable.

14.2. UN proper shipping name

Not applicable.

14.3. Transport hazard class(es)

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 Marpol and the IBC Code

Not applicable.

SECTION 15. Regulatory information

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

The product does not contain substances of very high concern (SVHC) which are candidates for authorization pursuant to EC Regulation No. 1907/2006 (REACH).

Seveso Category - Directive 2012/18/EC:

None

Restrictions relating to the product or contained substances pursuant to Annex XVII to EC Regulation 1907/2006

Substances in Candidate List (Art. 59 REACH)

On the basis of available data, the product does not contain any SVHC in percentage greater than 0,1%.

Substances subject to authorisation (Annex XIV REACH)

None

Substances subject to exportation reporting pursuant to (EC) Reg. 649/2012:

None

Substances subject to the Rotterdam Convention:

None

Substances subject to the Stockholm Convention:

None

Healthcare controls

Workers exposed to this hazardous chemical agent must be subjected to health surveillance carried out in accordance with the provisions of art. 41 of Legislative Decree 81 of 9 April 2008 unless the risk to the safety and health of the worker has been assessed as irrelevant, in accordance with the provisions of art. 224 paragraph 2

15.2. Chemical safety assessment

A chemical safety assessment has been carried out for the following substances: flue dust.

SECTION 16. Other information

Text of hazard (H) indications mentioned in section 2-3 of the sheet:

Eye Dam. 1	Serious eye damage, category 1
Skin Irrit. 2	Skin irritation, category 2
STOT SE 3	Specific target organ toxicity - single exposure, category 3
Skin Sens. 1B	Skin sensitization, category 1B
H318	Causes serious eye damage.
H315	Causes skin irritation.
H335	May cause respiratory irritation.
H317	May cause an allergic skin reaction.

Product classification criteria:

Calculation methods set out in Annex I of Regulation (EC) n. 1272/2008.

LEGEND:

- ADR: European Agreement concerning the carriage of Dangerous goods by Road
- CAS NUMBER: Chemical Abstract Service Number
- CE50: Effective concentration (required to induce a 50% effect)
- CE NUMBER: Identifier in ESIS (European archive of existing substances)
- CLP: EC Regulation 1272/2008
- DNEL: Derived No Effect Level
- EmS: Emergency Schedule
- GHS: Globally Harmonized System of classification and labeling of chemicals
- IATA DGR: International Air Transport Association Dangerous Goods Regulation
- IC50: Immobilization Concentration 50%
- IMDG: International Maritime Code for dangerous goods
- IMO: International Maritime Organization
- INDEX NUMBER: Identifier in Annex VI of CLP
- LC50: Lethal Concentration 50%
- LD50: Lethal dose 50%
- OEL: Occupational Exposure Level
- PBT: Persistent bioaccumulative and toxic as REACH Regulation
- PEC: Predicted environmental Concentration
- PEL: Predicted exposure level
- PNEC: Predicted no effect concentration
- REACH: EC Regulation 1907/2006
- RID: Regulation concerning the international transport of dangerous goods by train
- TLV: Threshold Limit Value
- TLV CEILING: Concentration that should not be exceeded during any time of occupational exposure.
- TWA STEL: Short-term exposure limit
- TWA: Time-weighted average exposure limit



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- VOC: Volatile organic Compounds
- vPvB: Very Persistent and very Bioaccumulative as for REACH Regulation
- WGK: Water hazard classes (Germany).

GENERAL BIBLIOGRAPHY:

1. Regulation (EC) 1907/2006 (REACH) of the European Parliament
 2. Regulation (EC) 1272/2008 (CLP) of the European Parliament
 3. Regulation (EU) 790/2009 (I Atp. CLP) of the European Parliament
 4. Regulation (EU) 2015/830 of the European Parliament
 5. Regulation (EU) 286/2011 (II Atp. CLP) of the European Parliament
 6. Regulation (EU) 618/2012 (III Atp. CLP) of the European Parliament
 7. Regulation (EU) 487/2013 (IV Atp. CLP) of the European Parliament
 8. Regulation (EU) 944/2013 (V Atp. CLP) of the European Parliament
 9. Regulation (EU) 605/2014 (VI Atp. CLP) of the European Parliament
 10. Regulation (EU) 2015/1221 (VII Atp. CLP) of the European Parliament
 11. Regulation (EU) 2016/918 (VIII Atp. CLP) of the European Parliament
 12. Regulation (EU) 2016/1179 (IX Atp. CLP)
 13. Regulation (EU) 2017/776 (X Atp. CLP)
- The Merck Index. - 10th Edition
 - Handling Chemical Safety
 - INRS - Fiche Toxicologique (toxicological sheet)
 - Patty - Industrial Hygiene and Toxicology
 - N.I. Sax - Dangerous properties of Industrial Materials-7, 1989 Edition
 - IFA GESTIS website
 - ECHA website
 - Database of SDS models for chemicals - Ministry of Health and ISS (Istituto Superiore di Sanità) - Italy

Note for users:

The information contained in the present sheet are based on our own knowledge on the date of the last version. Users must verify the suitability and thoroughness of provided information according to each specific use of the product.

This document must not be regarded as a guarantee on any specific product property.

The use of this product is not subject to our direct control; therefore, users must, under their own responsibility, comply with the current health and safety laws and regulations. The producer is relieved from any liability arising from improper uses.

Provide appointed staff with adequate training on how to use chemical products.

Note:

The information contained in this safety data sheet is based on our knowledge at the date of its publication. The information is provided for the sole purpose of facilitating use, storage, transport and disposal and should not be considered a specific quality guarantee. The user must make sure of the suitability and completeness of the information in relation to his particular use of the product.

Changes compared to the previous version:

The following sections were modified: 1.

ANNEX I: FLUE DUST EXPOSURE SCENARIO

Exposure scenario n. 9.1:

Industrial production of hydraulic *Industrial manufacture of hydraulic building and construction materials*

Exposure scenario addressing uses carried out by workers	
1. Title: Industrial production of hydraulic <i>building and construction materials</i>	
Title	Manufacture of Flue Dust containing mixtures: cement, hydraulic binder, controlled low strength material, concrete (ready-mixed or precast), mortar, grout and others for building and construction work.
Sector of use	Not applicable.
Commercial sectors	PC 0: Building and construction products ^[1] PC 9b: Fillers, putties, plasters, modelling clay PC 9a: Coatings and paints, thinners and fillers
Environmental scenario	ERC 2: Formulation of preparations
Working scenarios	Use in closed, continuous process with occasional controlled exposure ^[1] Use in closed batch process ^[1] Mixing or blending in batch process for formulation of preparations and articles Transfer of substance or preparation from / to vessels/large containers at dedicated facilities Transfer of substance or preparation into small containers Production of preparations or articles by tableting, compression extrusion, pelletising Handling of inorganic solid substances at room temperature
Evaluation method	The assessment of inhalation exposure is based on the dustiness / fugacity of the substance, using the exposure estimation tool MEASE ^[1] . The environmental assessment is based on a qualitative approach, described in the introduction. Relevant parameter is the pH in water and soil.
2. Operational conditions and measures for risk management	
2.1 Control of workers' exposure	
Product characteristics	
<p>Hydraulic building and construction materials are inorganic binders. Generally, these products are mixtures of Portland cement clinker and other hydraulic or non-hydraulic constituents.</p> <p>Flue Dust can be part of common cements, like Portland cement. In this main application, the Flue Dust content is below 5 %.</p> <p>In other hydraulic binders, the Flue Dust content could be up to 50 %. Generally, the content in a hydraulic mixture is not restricted. Flue Dust is a highly dusty powder.</p>	



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At all end uses, the substance will intentionally come into contact with water. Partly, the substance reacts with water and forms hydration products. At this stage of a wet or pasty suspension, the product is irritating, due to the pH, which is above 11. Finally, the end product is hardened (e.g. as mortar, concrete) and not irritating, since no free alkaline moisture remains.

Amounts used

The actual tonnage handled per shift is not considered to influence the workers' exposure as such for this scenario. Instead, the combination of the scale of operation (industrial vs. professional) and level of containment/automation (as reflected in the PROC) is the main determinant of the process intrinsic emission potential.

Frequency and duration of exposure / use

Processes	Duration of exposure
PROC 2, 3, 5, 8b, 9, 14, 26 (all)	Not restricted (480 minutes)

Human factors not influenced by risk management

The shift breathing volume during all process steps reflected in the PROCs is assumed to be 10 m³/shift (8 hours).

Other indicated operating conditions that influence worker exposure

Operational conditions like process temperature and process pressure are not considered relevant for occupational exposure assessment of the conducted processes.

Technical conditions and measures at the process (source) level to avoid emissions

Measurements of risk management, at the process level, are not usually required during the work activity.

Conditions and technical measures to control the dispersion of the source to the worker

Processes	Localized controls (LC)	Efficiency of the LC (according to MEASE)	Other information
PROC 2, 3	General ventilation	17%	-
PROC 5, 8b, 9, 14, 26	Generic local ventilation	78%	-

Organizational measures to prevent / limit releases, dispersion and exposure

Avoid inhalation or ingestion. General hygiene measures are required in the workplace to ensure safe handling of the substance. These measures include: good personal and management practices (eg, regular cleaning with suitable equipment), no eating or smoking in the workplace, wearing normal workwear and footwear, unless otherwise indicated below. Shower and change clothes at end of work shift. Do not wear contaminated clothing at home. Do not blow dust off with compressed air.

Conditions and measures associated with individual protection, hygiene and sanitary evaluation

Processes	Specific equipment for respiratory protection (RPE)	Efficiency RPE - Assigned protection factor (APF)	Glove indication	Other individual protection devices (PPE)
PROC 2, 3	Not required	Not applicable	Impervious, abrasion and	Safety goggles and visors (according to the

PROC 5, 8b, 9	Mask FF P2	APF = 10	alkali resistant gloves, internally lined with cotton. The use of gloves is mandatory, since Flue Dust is classified as irritating to skin.	UNI EN 166 standard) are mandatory, because the Flue Dust is highly irritating for the eyes. The use of appropriate protection devices for the face, protective clothing and safety footwear is also mandatory.
PROC 14, 26	Mask FF P1	APF = 4		

Gloves and eye protective equipment must be worn, unless potential contact with the skin and eyes can be excluded by the nature and type of application (i.e. closed process).

An overview of the APFs of different RPE (according to BS EN 529:2005) can be found in the glossary of MEASE. Any RPE as defined above shall only be worn if the following principles are implemented in parallel: The duration of work (compare with "duration of exposure" above) should reflect the additional physiological stress for the worker due to the breathing resistance and mass of the RPE itself, due to the increased thermal stress by enclosing the head.

In addition, it shall be considered that the worker's capability of using tools and communicating are reduced during the wearing of RPE.

For the reasons given above, the worker should therefore be (i) healthy (especially in view of medical problems that may affect the use of RPE), (ii) have suitable facial characteristics reducing leakages between face and mask (in view of scars and facial hair).

The recommended devices above which rely on a tight face seal will not provide the required protection unless they fit the contours of the face properly and securely.

The employer and self-employed persons have legal responsibilities for the maintenance and issue of respiratory protective devices and the management of their correct use in the workplace. Therefore, they should define and document a suitable policy for a respiratory protective device programme including training of the workers.

2.2 Control of environmental exposure

Product characteristics

The hydraulic materials for construction are inorganic binders; Generally, these products are made of Portland cement clinker mixtures with other hydraulic and non-hydraulic constituents.

Flue Dust can be constituents of common cements, such as, for example, Portland cement; in this case of main use, **the content of Flue Dust is less than 5%.**

In the other hydraulic binders, the content of Flue Dust could be higher than 50%; generally, its content is not limited in a hydraulic mixture. Flue Dust is a highly pulverulent substance.

In all final uses, the substance will be used intentionally in contact with water. In part, the substance reacts with water and forms hydration products. In this stage of wet or pasty suspension, the product is irritating, because of the pH that is higher than 11. On the other hand, the final product hardens (eg, mortar, concrete) and is not irritating, provided it is not present a free alkaline moisture.

Amounts used

The daily and annual amount for the plant (see point source of emission in industrial environment) is not considered a determining element to influence the environmental exposure scenario.

Frequency and duration of use

Intermittent use / emission (used <12 times / year for no more than 24 consecutive hours) or continuous use / emission.

Environmental factors not influenced by risk management



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Water flow of the receiving surface water body: 18,000 m³ / g

Other operating conditions indicated that influence the environmental exposure

Flow of the water discharges: 2,000 m³ / g

On-site technical conditions and measures to reduce or limit discharges, air emissions and emissions in the field

Risk management measures related to the environment aim to avoid discharging suspensions containing Flue Dust into municipal wastewater or to surface water, in case such discharges are expected to cause significant pH changes. Regular control of the pH value during introduction into open waters is therefore required. Usually, discharges should be carried out such that pH changes in receiving surface waters are minimised (e.g. through neutralisation). In general, most aquatic organisms can tolerate pH values in the range of 6-9. This is also reflected in the description of standard OECD tests with aquatic organisms.

Organizational measures to prevent / limit emissions from a site Employee

Training of workers, based on the safety data sheet (SDS)

Conditions and measures associated with the urban wastewater treatment facility

The pH content of the water discharges are transported to urban wastewater treatment facilities should be controlled regularly and, where necessary, neutralized.
Solid Flue Dust constituents must be separated from the sewage effluent.

Conditions and measures relating to the disposal of waste

Industrial solid waste containing Flue Dust should be reused or disposed of after hardening and / or neutralization.

3 Estimation of exposure

3.1 Occupational(health)

The exposure estimation tool MEASE was used for the assessment of inhalation exposure.
The risk characterisation ratio (RCR) is the quotient of the refined exposure estimate and the respective DNEL (derived no-effect level) and has to be below 1 to demonstrate a safe use.
For inhalation exposure, the RCR is based on the DNEL of 1 mg/m³ (as respirable dust) and the respective inhalation exposure estimate derived using MEASE (as inhalable dust).
Therefore, the RCR includes an additional safety margin since the respirable fraction is a sub-fraction of the inhalable fraction in accordance with EN 481.

Processes	Method used for the evaluation of the inhalation exposure	Estimation of the exposure Inhalation (RCR)	Method used for the evaluation of epidermal exposure	Estimation of epidermal exposure (RCR)
PROC 2, 3, 5, 8b, 9, 14, 26	MEASE	<1 mg / m ³ (0.44 - 0.83)		Since Flue Dust is classified as irritating to skin and eyes, dermal exposure has to be minimised as far as technically feasible. A DNEL for dermal effects has not been derived. Therefore, dermal exposure is not assessed in this exposure scenario.



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3.2 Emissions to the environment

Significant emissions or exposure to air have not been foreseeable due to the low vapor pressure of Flue Dust. On the other hand, specific preventive measures for impact on the ground are not necessary, excluding the correct application of practical and effective management procedures; these emissions are not considered relevant for this exposure scenario.

The environmental exposure assessment is relevant only for the aquatic environment, attributable to the influence of Flue Dust emissions in the different phases of the life cycle (production and use), mainly in the field and in the water discharges.

The environmental impact and the potential danger in aquatic organisms / ecosystems are associated with the increase in pH, attributed to the formation of hydroxides; however, the eco-toxicity derived from the other inorganic components (ions) is irrelevant, with respect to the negative effect of pH.

Anyway, any negative effect, associated to the cycle of production and use of Flue Dust, presents a localized impact in the industrial installation; in effect, the pH level could have a negative effect on urban wastewater treatment facilities (STPs) and on industrial wastewater treatment facilities (WWTPs). For this evaluation, a systematic approach is adopted, keeping in mind that the pH content in the wastewater should not be higher than 9.

<p>Emissions in the environment</p>	<p>Flue Dust production can potentially lead to water discharges and, in any case, to a level local, for the aquatic environment an increase in pH and the content of ions such as K⁺, Na⁺, Ca²⁺, Mg²⁺, SO²⁻, Cl⁻.</p> <p>When the pH is not neutralized, the discharge of the productive plants can affect the pH of the receiving water body; Generally, a period of sampling and measurement of pH in the wastewater is foreseen, which can be easily neutralized according to the prescriptions of the current national regulations.</p>
<p>Concentration of the exposure in the wastewater treatment facilities (WWTP)</p>	<p>The water discharges derived from production / use facilities of Flue Dust are characterized by the presence of inorganic compounds, for which no biological treatment is necessary.</p> <p>Normally, these water discharges are not treated in the biological wastewater treatment facilities (WWTPs), but they can be used to control the pH in the acid discharge flows, which are granted in the same biological treatment facilities.</p>
<p>Concentration of exposure in compartments pelagic aquatic</p>	<p>The discharge of water with Flue Dust has the following effects on the surface hydric body. Some constituents of Flue Dust (sulfuric and hydrochloric salts, potassium, calcium and magnesium) are high and moderately soluble and remain suspended in water.</p> <p>On the other hand, these salts are naturally present in seawater and groundwater; The amount present in groundwater depends on the geological formation of the land and varies between the different zones.</p> <p>In contrast, some constituents react with water and form highly insoluble inorganic hydration products.</p> <p>Because of the hydration reaction, the pH of the water may increase, depending on the absorptive capacity of the water; The higher this absorbent effect, the lower the effect on the pH. In general, the absorbent capacity, appropriate to avoid acidic or alkaline transformations in natural waters, is regulated by the balance between carbon dioxide (CO₂), the bicarbonate ion (HCO₃⁻) and the carbonate ion (CO₃²⁻)</p>



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<p>Concentration of exposure in sediments</p>	<p>A risk assessment for the sediment compartment is considered as not relevant and therefore not included. When Flue Dust is emitted to this compartment the following happens.</p> <p>Some Flue Dust constituents are inert and insoluble (calcite, quartz, clay minerals), they are naturally occurring minerals and will have no impact on the sediment.</p> <p>Some Flue Dust constituents react with water and form highly insoluble inorganic hydration products. Even these products have no bio-accumulation potential.</p> <p>Other constituents are highly soluble and will remain in water.</p>
<p>Concentrations of exposure in the ground and in groundwater</p>	<p>When Flue Dust is emitted to the soil and groundwater compartment the following happens. Some Flue Dust constituents are inert and insoluble (calcite, quartz, clay minerals), they are naturally occurring minerals and will have no impact on the soil.</p> <p>Some Flue Dust constituents (sulphate and chloride salts from sodium, potassium, calcium and magnesium) are moderate or highly soluble and will remain in groundwater.</p> <p>These chloride and sulphate salts are naturally occurring in sea water und ground water. The amount in groundwater depends on the geological soil formation and is therefore variable.</p> <p>Some other constituents react with water and form highly insoluble inorganic hydration products. Due to the hydration reaction, the pH of the groundwater may increase, depending on the buffer capacity of the groundwater. The higher the buffer capacity of the groundwater, the lower the effect on pH will be.</p> <p>In general, the buffer capacity preventing shifts in acidity or alkalinity in natural waters is regulated by the equilibrium between carbon dioxide (CO₂), the bicarbonate ion (HCO₃⁻) and the carbonate ion (CO₃²⁻).</p>
<p>Concentration of exposure in the atmospheric compartment</p>	<p>A risk assessment for the air compartment is considered as not relevant and therefore not included. When Flue Dust particles are emitted to air, they will sediment or washed out by rain in a reasonably short timeframe.</p> <p>Thereby, the atmospheric emissions end up in soil and water.</p>
<p>Concentration of the relevant exposure to the food chain (secondary poisoning)</p>	<p>The risk assessment for secondary poisoning is not required as bioaccumulation in organisms is not relevant to Flue Dust, which is an inorganic substance.</p>
<p align="center">Guidance for the DU to evaluate whether he/she is working inside the boundaries set out by the ES</p>	
<p align="center">Occupational exposure (health)</p>	
<p>A DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his/her own that his/her operational conditions and implemented technical-organisational measures for risk management are adequate and efficient.</p> <p>This must be supported by the actual guarantee that the exposure respects the limit set out according to the processes and/or activities identified by the PROCs (listed in Section 1), with a DNEL inhalation of 1 mg/m³ (as</p>	



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respirable dust). If measured data is not available, the DU may make use of an appropriate scaling tool such as MEASE (www.ebrc.de/mease.html) to estimate the working exposure associated with the inhalable fraction.

Important note: The DU has to be aware of the fact that, apart from the long-term DNEL given above, a DNEL for acute effects exists at a level of 4 mg/m³.

By demonstrating a safe use when comparing exposure estimates with the long-term DNEL, the acute DNEL is therefore also covered (*according to R.14 guidance, acute exposure levels can be derived by multiplying long-term exposure estimates by a factor of 2*).

It is noted that if the MEASE is used to calculate workers' exposure (relating to the inhalable fraction), the exposure duration should only be reduced to half-shift as a risk management measure (leading to an exposure reduction of 40 %).

Environmental exposure

For this assessment, a stepwise approach is recommended:

Level 1: Retrieve information on effluent pH and the contribution of flue dust on the resulting pH. Should the pH be above 9 and be predominantly attributable to flue dust, then further actions are required to demonstrate safe use.

Level 2: Retrieve information on receiving water pH after the discharge point. The pH of the receiving water shall not exceed the value of 9.

Level 3: Sample and measure the pH in the receiving water after the discharge point. If the pH is below 9, safe use is reasonably demonstrated, and the ES ends here. If the pH is found to be above 9, risk management measures have to be implemented: the effluent has to undergo neutralisation, thereby avoiding any environmental impacts arising from the dispersion of flue dust during production or use phase.