Material Safety Data Sheet MSDS according to decree (EG) Nr. 1907/2006 (amended by decree (EU) Nr. 453/2010)

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Version: 1.0

1. Description of Material / Compound and Company Information

1.1 Product Identifier

Binder-containing dry-mix for mortar / concrete /
Trademark: QuantumUHPC grey
QuantumUHPC white

1.2 Relevant identified Applications of the Material / Compound and Applications

Relevant identified Applications:
Binder-containing compound for production of concrete goods and artificial stone

Applications advised against:
Uncontrolled application of aluminum powder in wet compound should be avoided, as this produces hydrogen. The contact to acids, sal ammoniac or other base metals are to be avoided as well.

1.3 Details about the Supplier providing this MSDS

Producer / Supplier
QuantumFusion GmbH

Street/PO Box
Nordstraße 11

Postal Code/City
34513 Waldeck - Deutschland

Telephone / Telefax / E-Mail
contact@quantumfusion.de

1.4 Emergency Telephone Nr.

Tel.: +49-6131-19 24 0 – Poison Control Center of the University Johannes Gutenberg, Mainz

2. Possible Hazards

When mixing binding agent with water, a superalkaline dilution is being generated.

2.1 Classification of the Compound

According to decree (EG) Nr. 1272/2008

Class of Risk	Hazard Category	Classification Basis
Skin-irritating	2	Test result
Eye damage / eye irritation	1	Test result
Specific target organ toxicity (STOT) – on single Exposure	3	Literature research
Specific target organ toxicity (STOT) – on repeated Exposure	1	Literature research

Hazard Statements
H372: Damage of lungs by prolonged or repeated exposure through inhalation
H318: Causes severe eye damage
H315: Causes skin irritation
H335: May cause irritation of respiratory tracts

Classified according to Directive 1999/45/EG

Xi	Irritating
Xn	Harmful to health
R37/38	Irritation of respiratory organs and skin
R41	Danger of severe eye damage
R48/20	Harmful to health: Danger of severe harm to health by prolonged exposure through inhalation
R43	Possible allergization of skin

The cement contained in this compound may cause irritation of respiratory organs. Cement reacts with water to farm a superalkaline dilution. Due to the high alkalinity, wet cement may cause skin and eye irritations.

2.2 Labeling Elements

Labeling Elements according to decree (EG) Nr. 1272/2008 (Materials) Directive 1999/45/EG (Compounds)

Pictogram / Hazard Symbol:

Signal Word / Indication of Danger: DANGER

H318	Causes severe eye damage
H315	Causes skin irritations
H317	May cause allergic skin reactions.
H335	May cause respiratory system irritation
H372	Damage of lungs by prolonged or repeated exposure through inhalation

P260	Do not inhale dust
P285	Wear respiratory protective equipment if ventilation is inadequate
P280	Protective gloves / protective clothing / eye protection
P305+P351 +P333+	**Eye Contact:** Rinse eyes thoroughly with water for some minutes. Remove contact lenses. Continue rinsing.
P310	Immediately seek medical attention.
P302+P352 +P333+ P313	**Skin Contact:** Wash with cool water and soap. In case of skin irritation or rash: Seek medical attention.
P261+P304 +P340+ P312	Avoid inhaling of dust. **Inhalation:** Move person to fresh air and keep at rest in a position comfortable for breathing. In case of indisposition call POISON CENTER or doctor.

If product is publicly available, additionally:

P102	Keep out of the reach of children
P501	Dispose of contents/container in strict accordance with local and national legislation

2.3 Possible Harmful Effect to the Human Body

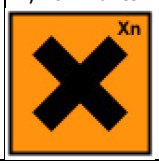
Inhalation: Repeated inhaling of large quantities of binding agents over an extended period increases the risk of lung disease.
This product contains quartz flour: Prolonged and/or massive inhaling of respireable crystalline silica can lead to silicosis. Important symptoms of silicosis include coughing and breathlessness. It is recommended to evaluate and supervise the exposure to dust.
Eyes: Eye contact with dry or wet cement can cause severe and possibly permanent damage to the eye.
Skin: Cement, or the binding agent at hand, can have an irritating effect on wet skin (due to perspiration or humidity). Prolonged or direct contact to wet or mixed fresh concrete may cause skin irritation, Dermatitis or severe damages to the skin. The described damage to the skin develops at first without initial pain.

2.4 Possible Harmful Effect to the Environment

Cement is deemed not to be environmentally hazardous to the environment in normal use.

3. Composure/Specification to Properties

3.1 Materials

Hazardous Ingredients	Classification according to Decree (EG) Nr. 1272/2008	Classification according to Directive 67/548/EWG
Substance name: Portland cement clinker EINECS: 266-043-4 CAS-Nr.: 65997-15-1	Hazard, cat. 1; H315, H318, H335 	Xi, irritating; R37/38, R41 
Substance name: Quartz (flour) Contains >2% alveolar Quartz EINECS: 238-878-4 CAS-Nr.: 014808-60-7	Hazard, cat. 1; H372 	Xn, harmful to health; R48/20 

4. First Aid Measures

4.1 Description of First Aid Measures

After Inhaling

Provide for fresh air. Quickly remove dust from throat and nose area. In the event of health complaints (malaise, coughing or long-term irritation), seek medical advice.

After Skin Contact

Remove dry binding agent and rinse with plenty of water. Remove wet cement with plenty of water. Remove soaked clothing, shoes, watches etc. Launder thoroughly before reusing. In case of indisposition seek medical advice.

After Eye Contact

Do not rub the dry eye, as additional damage of the cornea is possible through mechanical stress. Rinse open eye for at least 20 minutes under running water. If possible, use isotonic eye solution (0,9% NaCl). Always contact specialist or occupational physician.

After Swallowing

In case of consciousness, rinse mouth thoroughly and drink plenty of water. Do not induce vomiting if not otherwise indicated by a doctor or the Poison Center. Consult doctor or Poison Center (section 1.4).

4.2 Most important symptoms and effects, both acute and delayed

In the event of persistent symptoms seek medical treatment.
Eyes: Eye contact with compound (dry and/or wet) may cause severe and possibly persistent eye damage.
Skin: The compound and the cement applied to it can have an irritating effect on wet skin (due to perspiration or humidity) by prolonged contact. Contact of compound and wet skin may cause skin irritation, Dermatitis or severe damages to the skin.
Due to water-soluble chromate content in the cement, allergic chromate dermatitis can be developed by permanent or prolonged contact. More Information (1).
Respiration: Repeated inhaling of large quantities of the compound over an extended period increases the risk of lung disease.
Environment: The compound is deemed not to be environmentally hazardous to the environment in normal use.

4.3 Indications of Emergency Health Care or Special Treatment

Symptomatic treatment (Decontamination, vital functions)

5. Fire-Fighting Measures

5.1 Fire Suppressant

The product is not flammable or explosive either as delivered or when treated by mixing with water. Extinguishing agents and fire-fighting measures are to be coordinated in accordance with the surrounding fire.

5.2 Special Hazards Arising from Substance or Compound

Not applicable.

5.3 Advice for Fire-Fighting

No special measures are necessary.

6. Measures in Case of Accidental Release

6.1 Person-related precautions, protective equipment and emergency measures:

Avoid formation of dust. Use personal protective equipment.

6.2 Environmental Precautions

Contain contaminated water/firefighting water. Do not spread binding-agent into canalization/surface water/ groundwater.

6.3 Methods and Material for Containment and Cleaning up

For small amounts: Pick up with suitable appliance and dispose of according to regulations.
For large amounts: Pick up with suitable appliance and dispose of according to regulations.
Where possible use dry methods for cleaning, which do not produce dust, e.g. use low pressure suctioning (portable appliances with highly efficient filtering systems or equivalent techniques). Never use compressed air for cleaning measures.
Avoid formation of dust. Wear appropriate protective equipment.
For wet binding agent: Pick up wet binding agent mechanically, let dry on foil pad or in container and dispose of according to section 13.

6.4 Reference to other Sections

Indications of limiting of exposure and the surveillance of the exposure/personal protective equipment as well as indications of disposition can be learned from sections 8 and 13.

7. Handling and Storage

7.1 Precautions for Safe Handling

Avoid formation of dust. Areas with dust formation have to be equipped with adequate ventilation systems. In case of inadequate ventilation wear suitable respiratory protection. Packed products have to be handled with care in order to avoid damage of packaging.
Do not eat, drink or smoke in working areas. Wash hands after use. Do not sweep. Where possible use dry methods for cleaning, which do not produce dust, such as low pressure suctioning
When refilling large amounts without suction unit, wear respiratory protection.

7.2 Conditions for Safe Storage, Including any Incompatibilities

The binding agent should be stored in a clean condition under dry, waterproof and clean conditions.
Do not use aluminum containers for reasons of material incompatibility.
Minimize formation of dust. Avoid drift during loading operations. Keep containers closed and ensure safe storage of wrapped products.

Storage class: VCl- Storage class 13 (non-combustible solids)

7.3 Specific End Use

Manufacturer of the product provides indications to specific use. More information will be provided by the guideline about good practices for health safety of workers through good handling and use of crystalline silicone dioxide and products containing this material.

7.4 Control of Content on Water-Soluble Chromium VI

In the case of cements, which contain chromate reducers, it must be noted that the efficacy of the reducing agent is reduced over time. Therefore adhere to storage period. Within this period the content of water-soluble chromium (IV) is below 0,0002 % (regulation according to EN 196-10). The manufacturers instructions on correct storage are to be observed. In the event of incorrect storage (ingress of moisture) or overlong storage, the chromate reducers contained in the product lose their efficacy prematurely and a sensitizing effect on the skin cannot be excluded.

8. Minimization and Surveillance of Exposure/ Personal Protection Equipment

8.1 Control Parameters

Limit Values		Exposure Route	Exposure Frequency	Comment
Portland cement (dust) General dust limit	5 (E) mg/m³ 3 (A) mg/m³ 10 (E) mg/m³	Inhalative	Occupational limit value (time-weighted average)	TRGS 900
Water-soluble chromium VI	2 ppm	Dermal	Short-time period (acute) Long-time period (repeated)	Regulation (EG) Nr. 1907/2006
silicon dioxide (dust)	1,5 (A) mg/m³	Inhalative	Occupational limit value	TRGS 900

8.2 Limitation and Surveillance of Exposure

For compliance with occupational exposure limit values, combinations of technical and individual protection measures may be necessary. In case there are no adequate workplace measurements available, an exposure assessment and the choice of adequate protection measures can be estimated on the basis of the tool MEASE (3).

8.2.1 Suitable Technical Control System

Keep formation of dust low. Ensure that dust load does not exceed the limit values by isolation of processing, installation of ventilation systems or other technical measures. If user operations generate dust, vapor or mist, ensure compliance with the limit values of particle load. Take organizing measures, e.g. keep persons away from dust-polluted areas.

8.2.2 Individual Protection Measures – Personal Protection Equipment

General protective and hygienic measures: Avoid contact with skin and eyes. Avoid kneeling or standing in fresh mortar/concrete during processing. In case this is necessary, however, make sure to wear appropriate waterproof clothing. Exchange soaked clothing immediately.
Do not eat, drink or smoke during work. Wash hands or shower before interrupting or finishing work to remove adhesive dust of binding agent. Clean contaminated clothing, shoes, watches etc. before reuse.

Eye- / Face Protection

If dust is produced or there is a risk of splashing, use close fitting safety goggles as per EN 166

Skin Protection

Gloves

Use skin protection according to skin protection plan BGR 195 (The employers' and professional liability association's rules 195). Apply skin care products after work. Use abrasive resistant cotton gloves with nitrile impregnation and CE label (see information sheet BGR 195). Do not exceed maximum period of wear. Leather gloves are inappropriate due to water permeability.

Other Skin Protection

Body Protection: wear long-sleeved clothing, trousers and closed shoes. In case that contact with fresh mortar/concrete cannot be avoided, ensure that clothing is waterproof. Take care that no fresh mortar/concrete enters shoes or boots from above.

Respiratory Protection

Wear suitable respirator mask according to EN 149. EN 140, EN 14387. EN 1827 when exceeding exposure limit value (possible e.g. at open handling or mixing of powdery product). Generally use particle filtering half-masks type FFP1 or FFP2. General information is provided by the employers' and professional liability association's rules BGR/GUV-R 190.

8.2.3 Limitation and Surveillance of Exposure to Environment

Air: Compliance with dust emission limits based on the Technical Instructions on Air.
Water: Do not flush binding agent into groundwater or public water systems as an increase of the pH-value is possible.
Ground: Compliance with the Federal Soil Protection.

9. Physical and Chemical Properties

9.1 Indications of Basic Physical and Chemical Properties

Appearance	Powdery inorganic compound
- Aggregate state:	solid
- Color:	White or grey
Odor:	Odorless
Odor threshold:	none, as odorless
pH-value :	(T=20 °C in Water at appropriate use): 11-13,5
Melting point/freezing point:	> 1250 °C
Boiling point/Boiling range:	Not applicable
Flash point:	Not applicable, as material is non-combustible
Evaporation rate:	Not applicable, as no liquid
Flammability (solid gaseous):	Not applicable, as material is non-combustible
Upper/lower flammability or explosive limits:	Not applicable, as not gaseous
Vapor Pressure:	Not applicable
Vapor density:	Not applicable
Relative density:	2,70 – 3,00 g/cm^3
Solubility:	Gering (0,1-1,5g/l) – depends on cement
Partition coefficient: n-Octanol/Water:	Not applicable, as inorganic
Auto ignition temperature:	Not applicable (not pyrophoric)
Decomposition temperature:	Not applicable
Viscosity:	Not applicable, as no liquid
Explosive properties:	Not explosive and not pyrotechnic
Oxidant properties:	Not applicable

9.2 Other Information

10. Stability and Reactivity

10.1 Reactivity
The cement contained in the compound is a hydraulic material. The contact with water generates an intended reaction. In this process the cement hardens to a solid mass, which no longer reacts to its surroundings.

10.2 Chemical Stability
Provided an adequate storage, the compound and the containing cement keep stable (section 7). Avoid contact with incompatible material. Wet compound is alkaline and incompatible with ammonium salt, aluminum and other base metals. Hydrogen could develop. The compound/cement is soluble in hydrofluoric acid, developing caustic silicon tetra fluoride gas. Avoid contact with these incompatible materials. Getting in contact with water, the compound develops Calciumsilicathydrate, Calciumaluminathydrate and calcium hydroxide. The calcium silicates of the cement can react with strong oxidizing agents such as fluorides.

10.3 Possibilities of Hazardous Reactions
Not applicable

10.4 Conditions to be Avoided
Moisture during storage may lead to formation of lumps and a reduction of the product`s properties.

10.5 Incompatible Materials
Uncontrolled use of von aluminum powder in in wet compound should be avoided, as hydrogen develops. Acids, ammonium salts or other base metals.

10.6 Hazardous Decomposition Products
Not known

11. Toxicological Information

11.1 Information on Toxicological Effects
Like all other data, the present information is an extraction of the safety data sheets of the applied raw materials, providing the toxicological effects.

Class of Hazard	Cat.	Effect	Reference	
Acute Toxicity - dermal	-	Limit test, rabbit, 24 h exposure, 2000mg/kg body weight - no lethality. The available data does not meet the classification criteria	(4)	
Acute Toxicity - inhalation	-	Limit Test, rat, with 5 g/m3, no acute toxicity. Study was conducted with Portland cement clinker, main component of cement. The available data does not meet the classification criteria	(10)	
Acute Toxicity - oral	-	Animal studies wit cement kiln dust and cement dust did not show acute oral toxicity. The available data does not meet the classification criteria.	Literature research	
Caustic /Irritating effect on skin	2	Cement has an irritating effect on skin and mucosa. Dry cement in contact with wet skin or skin in contact with wet cement may lead to different inflammatory reactions of the skin, e.g. redness, crack growth. Prolonged contact in connection with mechanical abrasion may lead to severe skin damages.	(4) and experience on humans	

Severe eye irritations / eye damages	1	The in vitro test of Portland cement clinker (main component of cement) showed varying effects on the cornea. The calculated "irritation index" is 128. Direct contact with cement can cause damages on the cornea due to mechanical impact or an immediate or retarded irritation or inflammation. Direct contact large amounts of dry cement or splashes of wet cement may have effects in the range of conjunctivitis, severe eye damages blindness.	(11), (12) and experience on humans	
Sensitization of the skin	1	After contact with wet cement some people may develop skin eczema. These can either be caused by the pH-value (Irritant contact dermatitis) or by immunologic reactions with water soluble Chrome (VI) (allergic contact dermatitis).	(5), (13)	
Sensitization of respiratory tracts	-	No indication of sensitization of respiratory tracts detected. The available data does not meet the classification criteria	(1)	
Germ cell mutagenicity	-	No indications of Germ cell mutagenicity detected. The available data does not meet the classification criteria	(14), (15)	
Carcinogenicity	-	No causal connection between cement and carcinosis detected. Epidemiologic studies did not show a connection between the exposure to cement and carcinosis. According to ACGIH A4 Portland cement is not classified as human carcinogen: "Material which cannot be definitely classified regarding human carcinogenity due to inaccessible data. In vitro-tests or animal tests do not give sufficient evidence to carcinogenity to classify this material to another categorization." Portland cement contains over 90% Portland cement clinker. The available data does not meet the classification criteria	(1) (16)	
Reproductive toxicity	-	The available data does not meet the classification criteria	No evidence on experience with humans	
Specific Target Organ Systemic Toxicity (single exposure)	3	**Cement:** Cement dust exposure may lead to irritation of respiratory organs (throat, cervix, lungs). Coughing, sneezing and breathlessness may be the consequence, in case the exposure exceeds the workplace limit. Occupational exposure with cement dust may have defacing effects on the respiratory function. There is currently no sufficient knowledge to infer a dose/effect relationship.	(1)	
Specific Target Organ Systemic Toxicity (repeated exposure)	-	Long-term exposure with respirable cement dust exceeding the workplace limit may lead to coughing, shortness of breath and chronically obstructive changes in the respiratory tract. No chronic effects were observed at low concentrations. The available data does not meet the classification criteria	(17)	

	STOT RE1	**Crystalline Silicon Dioxide:** Long-term and/or intensive exposure to dust containing alveolar crystalline silicon dioxide, can cause silicosis. This disease involves a nodular pulmonary fibrosis, caused by inhalation and accretion of mineral dust. There is much evidence that an increased risk of lung cancer is limited to persons who are already suffering from silicosis. The protection of workers should be ensured by adherence to the limit values of occupational exposure defined by the authorities. If necessary implementation of additional risk management measures should be realized.	(18), (19), (20)	
Aspiration hazard	-	Not applicable, as cement is not available as Aerosol		

Cement (normal cement) and Portland cement clinker have the same toxicological and eco toxicological properties.

Effects on Health through Exposure

Cement can worsen existing illnesses of eyes, skin and respiratory tracts e.g. emphysema or asthma.
This also applies to crystalline silicon dioxide.

12. Environment-related Indications

12.1 Toxicity

Cement is not classified as dangerous for the environment. Eco toxicological studies with Portland cement on Daphnia magna (U.S. EPA,1994a) [reference (6)] und Selenastrum Coli (U.S. EPA, 1993) [reference (7)] have only shown little toxicological effect so that the values of LC50 und EC50 could not be determined. [Reference (8)]. No toxic effects to sediments could be asserted [reference (9)]. The release of large amounts of cement into water, however, can lead to an increase of the pH-value and thus be toxic to aquatic life in particular circumstances.

12.2 Persistence and Degradability

Not applicable, as the compound is an inorganic mineral material. Remaining cement after hydration do not pose a toxicological risk.

12.3 Bioaccumulation Potential

Not applicable, as the compound is an inorganic mineral material. Remaining cement after hydration do not pose a toxicological risk.

12.4 Mobility in Soil

Not applicable, as the compound is an inorganic mineral material. Remaining cement after hydration do not pose a toxicological risk.

12.5 Results of PBT- and vPvB Assessment

Not applicable, as the compound is an inorganic mineral material. Remaining cement after hydration do not pose a toxicological risk.

12.6 Other Adverse Effects

Not applicable. Do not flush compound into canalization, ground water or surface water.

13. Instructions for Disposal

13.1 Waste Treatment Methods

Within the existing possibilities recycling takes absolute priority over waste disposal. Disposal should be carried out in accordance with the local, regional or national regulations. Do not dispose compound into wastewater or surface water.
Avoid dust formation trough residues in packaging. Ensure appropriate health protection of workers. Keep contaminated packaging materials in airtight containers. Recycling and disposal of packaging material has to be carried out in accordance with the locally valid regulations. Do not re-use packaging material. A certified waste disposal company should carry out Recycling and disposal of packaging material.

14. Instructions for Transport

The compound and its raw material are not subject to the International Dangerous Goods (IMDG, IATA, ADR/RID). Thus, a dangerous goods classification is not required.

14.1 UN-Number

Not applicable

14.2 UN Proper Shipping Name

ADR/RID

Not applicable

IMDG-Code / ICAO-TI / IATA-DGR

Not applicable

14.3 Transport Hazard Class

Not applicable

14.4 Packaging Group

Not applicable

14.5 Environmental Hazard

Not applicable

14.6 Special Warnings and Precautions for User

Not applicable

14.7 Transportation in Bulk According to Annex II of MARPOL73/78 and IBC Code

Not applicable

15. Legal Provisions

15.1 Safety, Health and Environmental Regulations/Legislation Specific for the Substance or Compound

The cement contained in the compound is a mixture that is not subject to registration obligation defined in the EC-Regulation 1907/2006 (REACH). Portland cement clinker is excluded from the registration obligation according to art. 2.7(b) and annex V.10 of the EC-Regulation 1907/2006 (REACH).

In accordance with Appendix XVII Section 47 of the EC Regulation 1907/2006, the use and sale of cement and preparations containing cement are prohibited,
1. Cement and cement-containing mixtures shall not be placed on the market, or used, if they contain, when hydrated, more than 2 mg/kg (0,0002 %) soluble chromium.
2. If reducing agents are used, then without prejudice to the application of other Community provisions on the classification, packaging and labeling of substances and mixtures, suppliers shall ensure before the placing on

the market that the packaging of cement or cement-containing mixtures is visibly, legibly and indelibly marked with information on the packing date, as well as on the storage conditions and the storage period appropriate to maintaining the activity of the reducing agent and to keeping the content of soluble chromium VI below the limit indicated in paragraph 1.
3. By way of derogation, paragraphs 1 and 2 shall not apply to the placing on the market for, and use in, controlled closed and totally automated processes in which cement and cement-containing mixtures are handled solely by machines and in which there is no possibility of contact with the skin.

Within the frame of the "Agreement on Workers Health Protection through the Good Handling and Use of Crystalline Silica and Products containing it" producers of cement have agreed to introduce so-called "best practices" for a safe use. (http://www.nepso.eu/good-practice-guide.aspx).

National Provisions

Water Hazard Class

Cement: WGK 1 (slightly water polluting) (own classification according to VwVwS of 17.05.1999).

Further Provisions

Cement: GISCODE: ZP1 (cement containing products, chromatarm)
Cement: Hazardous Substance Ordinance (GefStoffV) Chemicals Prohibition Ordinance (ChemVerbotsV)

15.2 Chemical Safety Assessment

Crystalline silicon dioxide:
Excluded from REACH-Registration duty.

For Germany:
TRGS 900 und TRGS 906 are to be observed in their current version.
For Austria and Switzerland:
The limit value for occupational exposure of respirable crystalline silica in Austria and Switzerland is 0,15 mg/m3 (time weighted average of measurement results of 8h). Information on limit values of other countries can be obtained from skillful experts for work hygiene or the appropriate regulatory authority of the respective country.

Cement:
The cement Producer has conducted no safety assessment.

16. Other Information

Changes compared to the last version

Abbreviations:

ACGIH	American Conference of Industrial Hygienists
ADR/RID	European Agreements on the transport of Dangerous goods by Road/Railway
APF	Assigned protection factor (Protection factor for respiratory masks)
BGR 195	Employers' liability insurance association BGR rule 195
CAS	Chemical Abstracts Service
CLP	Classification, labeling and packaging (Regulation (EG) Nr. 1272/2008)
EC50	Half maximal effective concentration (median effective concentration)
ECHA	European Chemicals Agency (European Chemicals Authority)
EINECS	European Inventory of Existing Commercial chemical Substances
GHS	Globally Harmonized System of Classification and Labeling of Chemicals
IATA	International Air Transport Association

IMDG	International agreement on the Maritime transport of Dangerous Goods
IUPAC	International Union of Pure and Applied Chemistry
LC50	Median lethal dose (median lethal dose)
MEASE	Metals estimation and assessment of substance exposure
PBT	Persistent, bio-accumulative and toxic (persistent, bio accumulative, toxic)
PROC	Process category (Process category/use category)
REACH	Registration, Evaluation and Authorization of Chemicals (Regulation (EG) 1907/2006)
SDB	Sicherheitsdatenblatt = MSDS Material Safety Data Sheet
STOT	Specific target organ toxicity (specific target organ toxicity)
TRGS	Technical Rules for Hazardous Goods
UVCB	Substances of unknown or Variable composition, Complex reaction products or Biological materials
VCI	Verband der chemischen Industrie e.V. = The Association of the Chemical Industry
vPvB	Very persistent, very bio accumulative
VwVwS	Verwaltungsvorschrift wassergefährdende Stoffe Administrative Regulation on Substances Hazardous to Water

Literature References and Sources for Data

(1)	Portland Cement Dust – Hazard assessment document EH75/7, UK Health and Safety Executive, 2006: http://www.hse.gov.uk/pubns/web/portlandcement.pdf
(2)	Technische Regel für Gefahrstoffe „Arbeitsplatzgrenzwerte", 2009, GMBI Nr.29 S.605
(3)	MEASE 1.02.01 Exposure assessment tool for metals and inorganic substances, EBRC Consulting GmbH für Eurometaux, 2010: http://www.ebrc.de/ebrc/ebrc-mease.php
(4)	Observations on the effects of skin irritation caused by cement, Kietzman et al, Dermatosen, 477, 5, 184-189 (1999)
(5)	Epidemiological assessment of the occurrence of allergic dermatitis in workers in the construction industry related to the content of Cr (VI) in cement, NIOH, Page 11, 2003
(6)	U.S. EPA, Short term Methods for Estimating the Chronic Toxicity of Efflunets and Receiving Waters to freshwater Organisms, 3rd ed. EPA/600/7-91/002, Envirinmental Monitoring and Support Laboratory, U.S. EPA, Cincinnati, OH (1994a)
(7)	U.S. EPA, Methods of Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, 4th ed. EPA/600/4-90/027F, Environmental Monitoring and Support Laboratory, U.S. EPA Cincinnati, OH (1993)
(8)	Environmental Impact of Construction and repair Materials on Surface and Ground Waters. Summary of Methodology, Laboratory Results, and Model Development. NCHRP report 448, National Academy Press, Washington, D.C., 2001
(9)	Final report Sediment Phase Toxicity Test Results with Corophium volutator for Portland clinker prepared for Norcem A.S. by AnalyCen Ecotox AS, 2007
(10)	TNO report V8801/02, An acute (4-hour) inhalation toxicity study with Porltand Cement Clinker CLP/GHS 03-2010-fine in rats, August 2010
(11)	TNO report V8815/09, Evaluation of eye irritation potential of cement clinker G in vitro using the isolated chicken eye test, April 2010
(12)	TNO report V8815/10, Evaluation of eye irritation potential of cement clinker W in vitro using the isolated chicken eye test, April 2010
(13)	European Commission's Scientific Committee on Toxicology, Ecotoxicology and the Einvironment (SCTEE) opinion of the risks to health from Cr (VI) in cement (Europäische Kommission, 2002): http://ec.europa.eu/health/archive/ph_risk/committees/sct/documents/out158_en.pdf
(14)	Investigation of the cytotoxic and proinflammatory effects of cement dusts in rat alveolar macrophages, Van Berlo et al, Chem. Res. Toxicol., 2009 Sept; 22(9): 1548-58
(15)	Cytotoxicity and genotoxicity of cements dusts in A549 human epithelial lung cells in vitro; Gminski et al, Abstract DGPT conference Mainz, 2008
(16)	Comments on a recommendation from the American Conference of governmental industrial Hygienists to change the threshold limit value für Portland cement, Patrick A. Hessel and John F. Gamble, EpiLung Consulting, June 2008
(17)	Prospective monitoring of exposure and lung function among cement workers, Interim report of the study after the data collection of Phase I-II 2006-2010, H.Noto, H.Kjuus, M.Skogstad and K.-C. Nordby, National Institute of Occupational Health, Oslo, Norway, March 2010

	IARC-Monographien zur Evaluierung von Krebsrisiken für den Menschen durch Chemikalien,
(18)	Siliziumdioxid, siliziumdioxidhaltige Stäube und organische Fasern, 1997, Band 68, IARC, Lyon, Frankreich
(19)	SCOEL SUM Doc 1994-final, June 2003
(20)	Amtsblatt der Europäischen Union, 2006/C279/02

Professional Training for Employees

Additional to training programs for employees, e.g. on the subject of health, security, and environment, the employer has to ensure that his/her employees read and understand this MSDS and adhere to the requirements stated herein.

Further Information

The data mentioned in the present safety data sheet correspond to our latest knowledge and experience and may be used to precise safety requirements for the different products. However, they are no assurance of product properties and products made from this compound.
Existing laws, decrees and regulations, also those that are not specified in this MSDS.auch solche, die in diese Datenblatt nicht genannt werden, sind vom Empfänger unserer Produkte in eigener Verantwortung zu beachten.