PRODUCT SAFETY DATA SHEET

This generic SDS is provided by MGS Ltd to give information to assist with material handling of the products listed which are conforming to Annex II of the REACH Regulation (EC) 1907/2006 as amended by Commission Regulation (EU) 453/2010), and with CLP Regulation (EC) 1272/2008.

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SECTION 1: Identification of the substance / mixture and of the company / undertaking	
1.1 Product Identifier	
Product Name:	**Bentonite Granules**
Synonyms / Trade Name:	Bentonite, sodium; Bentonite, calcium; Montmorillonite; Sodium-activated Bentonite.
1.2 Relevant identified uses of the substance or mixture and uses advised against	
Recommended Use:	For use when drilling boreholes.
Restriction on Use:	None identified.
Physical Properties:	Light grey/ yellow or red / brown solid material of varying sizes: Lump, granular or fine powder
1.3 Details of the supplier of the Safety Data Sheet	
Name:	MGS Ltd
Address:	Rougham Industrial Estate, Bury St Edmunds, IP30 9ND
Country:	UK
Phone N°:	+44 1359 271167
E-mail:	info@mgs.co.uk
Website:	www.mgs.co.uk
1.4 Emergency telephone number	
Emergency telephone at the company	+44 7738 197 517
Available outside office hours:	Yes
Language of the phone service:	English
E-mail of competent person responsible	darren.portway@mgs.co.uk
National contact:	Darren Portway

SECTION 2: Hazard Identification

2.1 Classification of the substance or mixture

Not classified.

2.2 Label elements

The substance does not require labelling *according to CLP Regulation (EC) 1272/2008.

2.3 Other hazards

The substance does not meet the criteria for PBT (Persistent Bio accumulative and Toxic) or vPvB (very persistent, very Bio accumulative and/or Toxic) substance according to REACH Regulation (EC) 1907/2006.

Crystalline Silica Quartz, Crystobalite and Tridymite EC 238-878-4, CAS 14808-60-7, at <10% of which the Respirable Crystalline Silica (<7.1µ) is <1% may be present and at this concentration is not classified (as hazardous). See www.crystallinesilica.eu for further information.

SECTION 3: Composition / Information on Ingredients

3.1 Substances

Bentonite is a naturally occurring mineral classified as UVCB (Variable composition, Complex reaction products or Biological materials) according to REACH & CLP Regulations. While being of Variable Composition, the purity of the product is 100 % w/w. The composition of the substance consists mainly in Smectite (Montmorillonite, CAS: 1318-93-0) together with some other accessory minerals such as quartz, feldspar, mica, and calcite.

3.2 Mixtures

Not applicable.

SECTION 4: First Aid Measures

4.1 Description of first aid measures

General advice	No known delayed effects. Consult a physician for all exposures except for minor instances.
Inhalation:	Move source of dust or move person to fresh air. If respiratory irritation persists or breathing becomes difficult seek medical attention immediately.
Skin contact:	Wash affected area with soap and plenty of water. If necessary, seek medical advice.
Eye contact:	Rinse eyes immediately with plenty of water. If symptoms persist, seek medical advice.
Ingestion:	Clean mouth with water and drink afterwards plenty of water. If symptoms persist, seek medical advice.

4.2 Most important symptoms and effects, both acute and delayed

The acute symptoms would be pain in the eyes because of dust entry. No delayed effects are anticipated if first aid treatment is applied and is effective.

4.3 Indication of any immediate medical attention and special treatment needed

No need for immediate medical attention; follow the advice given in section 4.1.

SECTION 5: Fire Fighting Measures

5.1 Extinguishing media

The product is not combustible. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

By preference use a dry powder, foam, or CO2 fire extinguisher to extinguish the surrounding fire as the Bentonite becomes very slippery and hard to clean up when wet.

5.2 Special hazards arising from the substance or mixture

The material is not flammable, and it does not support fire. No hazardous thermal decomposition products.

5.3 Advice for fire fighters

Avoid generation of dust. Use breathing apparatus.
Product on floor when wetted will become slippery and may present a significant slip hazard; wear anti-slip boots
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

SECTION 6: Accidental Release Measures

6.1 Personal precautions, protective equipment, and emergency procedures

6.1.1. For non-emergency personnel

Ensure adequate ventilation.
Keep dust levels to a minimum respect Workplace Exposure Limits (WEL) Keep unprotected persons away.
Avoid contact with skin, eyes, and clothing – wear suitable protective equipment (see section 8).
Avoid inhalation of dust – ensure that sufficient ventilation or suitable respiratory protective equipment is used, wear suitable protective equipment (see section 8).
Try not to wet, and take care of wet product on floor, which presents a slip hazard.

6.1.2. For emergency responders

Keep dust levels to a minimum. Ensure adequate ventilation. Keep unprotected persons away.
Avoid contact with skin, eyes, and clothing – wear suitable protective equipment (see section 8).
Avoid inhalation of dust – ensure that sufficient ventilation or suitable respiratory protective equipment is used, wear suitable protective equipment (see section 8).
Try not to wet and take care of wet product on floor, which presents a slip hazard.

6.2 Environmental precautions

No special requirement.
Contain the spillage. If product is released from trucks in roads, place signposts to divert traffic and remove the spill using vacuum cleaning systems, or shovel into bags – do not attempt to wash away.

6.3 Methods and material for containment and cleaning up

Avoid dust formation; avoid dry sweeping where possible. Use vacuum suction unit, or shovel into bags.
Do not use water.

6.4 Reference to other sections

For more information on exposure controls/personal protection or disposal considerations, please refer to sections 8 and 13 of this safety data sheet.

SECTION 7: Handling & Storage

7.1 Precautions for safe handling

Protective measures

Keep dust levels to a minimum and minimize dust generation. Respect Workplace Exposure Limits (WEL). Provide appropriate exhaust ventilation at places where airborne dust is generated. In case of insufficient ventilation, wear suitable respiratory protective equipment refer to section 8 of this safety data sheet. Handle packaged products carefully to prevent accidental bursting. If you require advice on safe handling techniques, please contact your supplier or check the Good Practice Guide referred to in section 16.

Measures to prevent fire

The product is not flammable. No special protective measures against fire required.

Advice on general occupational hygiene

Keep dust levels to a minimum. Minimize dust generation. Keep dry.

General occupational hygiene measures are required to ensure safe handling of the substance. These measures involve good personal and housekeeping practices (i.e. regular cleaning with suitable cleaning devices), no drinking, eating and smoking at the workplace. Shower and change clothes at end of work shift. Do not wear contaminated clothing at home.

7.2 Conditions for safe storage, including any incompatibilities

Minimize airborne dust generation and prevent wind dispersal during loading and unloading. Keep containers closed and store packaged products so as to prevent accidental bursting.

Keep dry and do not use water for clean up as becomes slippery when wet.

7.3 Specific end use(s)

For use when drilling boreholes.

SECTION 8: Exposure Controls / Personal Protection

8.1 Control parameters

8.1.1 Components with occupational exposure limits and/or biological occupational exposure limits requiring monitoring

Air limits values:

Maintain personal exposure below occupational exposure limit for inhalable and respirable dust as according to COSHH E40/ 2005 amended Oct 2007 (For data on EU TWA for dust see Appendix 1)

Substance	Description	Inhalable Dust WEL – (Workplace Exposure Limit) 8 hr TWA (Time weighted average)	Respirable Dust WEL – (Workplace Exposure Limit) 8 hr TWA (Time weighted average)
Bentonite	Nuisance dust	10mg/m3	4mg/m3
Crystalline Silica	Respirable Dust <7.1µ		0.1mg/m3

For further information see "The occupational exposure limit for respirable crystalline silica in EU countries given in: http://www.crystallinesilica.eu/115-what-are-regulatory-measures-taken-eu-member-states

Biological limit values:

None

8.1.2 Recommended monitoring procedures

None

8.1.3 Occupational exposure limits and/or biological limits for air contaminants

Not applicable

8.1.4 DNEL/DMEL and PNEC values

Not available

8.2 Exposure controls

8.2.1. Appropriate Engineering Controls

Minimize airborne dust generation. Use process enclosures, local exhaust ventilation or other engineering controls to keep airborne levels below specified exposure limits. If user operations generate dust, fumes or mist, use ventilation to keep exposure to airborne particles below the exposure limit. Apply organizational measures e.g. by isolating personnel from dusty areas. Remove and wash soiled clothing.

8.2.2. Individual protection measures, such as personal protective equipment

Eye / Face:	Do not wear contact lenses. For powders, tight fitting goggles with side shields, or wide vision full goggles. It is also advisable to have individual pocket eyewash.	
Skin / Hands:	For skin, normal work clothes are appropriate. For hands, appropriate protection (e.g. gloves, barrier cream) is recommended for workers who suffer from dermatitis or sensitive skin. Wash hands at the end of each work session.	 
Respiratory:	Local ventilation to keep levels below established threshold values is recommended. In case of prolonged exposure to airborne dust concentrations, a suitable particle filter mask that complies with the requirements of national legislation is recommended, depending on the expected exposure levels.	

Thermal hazards

The substance does not represent a thermal hazard, thus special consideration is not required.

Environmental exposure controls

All ventilation systems should be filtered before discharge to atmosphere. Avoid releasing to the environment. Contain the spillage.

SECTION 9: Physical and Chemical Properties	
9.1 Information on basic physical and chemical properties	
Appearance:	light grey/ yellow or red / brown solid material of varying sizes: Lump, granular or fine powder
Odour:	odourless
Odour threshold:	not applicable
pH:	7 . 0 - 10.5 (5% solids in water suspension) typically 7.0 - 9.5
Melting point:	> 450 °C (study result, EU A.1 method)
Boiling point:	not applicable (solid with a melting point > 450 °C)
Flash point:	not applicable (solid with a melting point > 450 °C)
Evaporation rate:	not applicable (solid with a melting point > 450 °C)
Flammability:	non-flammable (study result, Method1 of the United Nations, Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria, fourth revised edition 2003).
Explosive limits:	non explosive (explosive properties predicted in accordance with Regulation (EC) No 1272/2008,using Appendix 6, screening procedures, specified in the United Nations, Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria, fourth revised edition 2003 (void of any chemical structures commonly associated with explosive properties)
Vapour pressure:	not applicable (solid with a melting point > 450 °C)
Vapour density:	not applicable
Relative density:	2.5 g/cm³ at 20°C
Bulk density:	1 – 1.4 g/cm³

Solubility in water:	<0.9 mg/L at 20°C (study results, EU A.6 method)
Partition of coefficient:	not applicable (inorganic substance)
Auto ignition temperature:	no self-ignition temperature below 400 °C (study result, Method 4 of the United Nations Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria, Fourth revised edition, 2003)
Decomposition temperature:	not applicable
Viscosity:	not applicable (solid with a melting point > 450 °C)
Oxidizing properties:	no oxidizing properties predicted from the structure in accordance with Appendix 6 section 6 of the United Nations Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria, Fourth revised edition 2003
9.2 Other information	
None.	
SECTION 10: Stability and Reactivity	
10.1 Reactivity	
Inert, not reactive.	
10.2 Chemical stability	
Bentonite is chemically stable under normal conditions of use and storage.	
10.3 Possibility of hazardous reactions	
No hazardous reactions.	

10.4 Conditions to avoid

Minimise exposure to air.
Slippery when wet.

10.5 Incompatible materials

Avoid storing together with materials that may be affected by dust.

10.6 Hazardous decomposition products

None.

SECTION 11: Toxicological Information

11.1 Information on toxicological effects

Acute toxicity	Bentonite is not acutely toxic.	
	Oral	LD50 > 2000 mg/kg bw (OECD 420, rat)
	Dermal	Data not available. Bentonite is almost insoluble and has a low absorption through the skin.
	Inhalation	LC50 > 5,27 mg/L (OECD 436, rat)
	Classification for acute toxicity is not warranted.	
Irritation / Corrosion	Bentonite is not irritating to skin (in vivo, OECD 404, rabbit). Bentonite is not irritating to eye (in vivo, OECD 405, rabbit). Bentonite is classified as a mild irritant to eyes (according to the modified Kay & Calandra criteria). Classification for irritation/corrosion is not warranted.	
Sensitisation	Bentonite is not a skin sensitizer in accordance with the local lymph node assay (OECD 429, mouse). Classification for sensitization is not warranted.	
STOT single exposure	No organ toxicity observed in acute tests.	
STOT repeated exposure - oral	Short-term repeated dose toxicity study (28 days) and sub-chronic toxicity study (90 day) on mice have been conducted with Bentonite. Bentonite fed to mice at 10%, 25%, or 50% for 61 days. Hepatoma was seen in mice receiving a diet of 50% Bentonite. This was due to Bentonite being a base- exchange silicate and thus removing choline from the content of the intestine >200 day feeding study of 50% Bentonite. Hepatomas developed in 11 of 12 mice. The livers of mice on 50/50 Bentonite-basal diet were severely damaged. The liver damage noted in the group ingesting Bentonite is consistent with that Exposure expected during prolonged choline deficiency, a base-exchange silicate, is advanced as a partial explanation for the development of the Hepatomas in the mice in these experiments. Effect seen on livers. However, study were conducted in mice at very high concentration and effects seen are considered secondary due to disruption of digestion. Therefore, classification of Bentonite for toxicity upon prolonged exposure by oral route is not warranted.	

STOT repeated exposure – inhalation	Animal and in vitro data indicate a difference between crystalline quartz and the quartz-content of Bentonite. A quantitative assessment based on the animal data is not possible as no relevant repeated-dose inhalation study is available. Human data is restricted to case reports that suggest a relationship between high Bentonite exposure (exposures in the early 20th century without state-of- the- art protective measures and maximum dust exposure limits). The link between Bentonite exposure and silicosis is not considered to be demonstrated sufficiently. With regards to classification and labelling of Bentonite, the evidence is not Inhalation considered adequate to come to a conclusion on specific classification of Bentonite with specific target organ toxicity upon repeated exposure (STOT-RE). The lung can be affected at repeated high-dose exposure which has been suggested by case reports in humans. Whether this effect occurs only at concentrations overloading the lung's clearance capacity and is not relevant to humans since establishment of general dust exposure limits. Therefore, classification of Bentonite for toxicity upon prolonged exposure is not warranted.
Aspiration hazard	No aspiration hazard envisaged.
Mutagenicity	In vitro tests (OECD 471, 473 and 476) negative.
Carcinogenicity	No data available. Sepiolite was evaluated by IARC as class 3 ("Cannot be classified as to Carcinogenicity carcinogenicity to humans"). Based on read-across with Sepiolite, Bentonite was assessed as non-carcinogenic. Therefore, classification of Bentonite for carcinogenicity is not warranted.
Toxicity for reproduction	Two developmental studies are available: Abdel-Wahhab et al (1999) Bentonite had no effect on maternal and fetal parameters at a dietary level of 0.5% w/w (equivalent to 250 mg/kg bw). Wiles et al (2004) 2% calcium Montmorillonite or sodium Montmorillonite in the diet had no effect on maternal weight or maternal organ weights, litter weight, embryonic implantations, or resorptions. In both animal studies no effects on maternal/foetal parameters were detected. Classification for reproductive toxicity according to regulation (EC) 1272/2008 is not warranted.

SECTION 12: Ecological Information

12.1 Toxicity

12.1.1. Acute/Prolonged toxicity to fish

LC50 (96h) for freshwater fish (rainbow trout): 16000 mg/l

LC50 (24h) for marine water fish (black bass, warmouth bass, blue gill and sunfish): 2800-3200 mg/l

12.1.2. Acute/Prolonged toxicity to aquatic invertebrates

EC50 (96h) for freshwater invertebrates (Dungeness crab): 81.6 mg/l EC50 (96h) for freshwater invertebrates (dock shrimp): 24.8 mg/l LC50 (24h) for C. dubia and H. limbata: >500 mg/L

12.1.3. Acute/Prolonged toxicity to aquatic plants

EC50 (72h) for freshwater algae: > 100 mg/l

12.1.4. Toxicity to micro-organisms e.g. bacteria

EC50 (48h) for daphnia magna (OECD 202): > 100 mg/l

12.1.5. Chronic toxicity to aquatic organisms

No data available

12.1.6. Toxicity to soil dwelling organisms

No data available

12.1.7. Toxicity to terrestrial plants

No effect was observed on the growth of beans (Phaseolus vulgaris) or corn (Zea mays) when Bentonite was added at a concentration of 135 g/1.6 kg soil

12.1.8. General effect

No specific adverse effects known

12.1.9. Further information

None

12.2 Persistence and degradability

Not relevant for inorganic substances.

12.3 Bio accumulative potential

Not relevant for inorganic substances.

12.4 Mobility in soil

Bentonite is almost insoluble and thus presents a low mobility in most soils.

12.5 Results of PBT and vPvB assessment

This substance does not meet the criteria for classification as PBT or vPvB.

12.6 Other adverse effects

No other adverse effects are identified. According to the criteria of the European classification and labeling system, the substance does not require classification as hazardous for the environment.

SECTION 13: Disposal Considerations

13.1 Waste treatment methods

The residues/unused product can be disposed in landfills following national and local regulations. Dispose of waste in accordance with the European Directives. Dispose in such a way to avoid dust generation. Where possible, recycling should be preferred to disposal.

Packaging disposal

No specific requirements. In all cases dust formation from residues in the packaging should be avoided and suitable protection be assured. Empty containers, -dispose of as unused product. The empty and clean containers are to be reused in conformity with regulations.

SECTION 14: Transportation Information

The material is not classified as dangerous in terms of transport regulations and no restrictions apply for land/sea/air transportation.

14.1 UN number

None.

14.2 UN proper shipping name

None.

14.3 Transport hazard class(es)

None.

14.4 Packing group

None.

14.5 Environmental hazards

None.

14.6 Special precaution for user

Avoid dust spreading.

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

None.

SECTION 15: Regulatory Information

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

Other EU Regulations:	Bentonite is not a SEVESO substance (SEVESO III is the latest EU legislation that deals specifically with the control of on-shore major accident hazards involving dangerous substances), it is not an ozone depleting substance and not a persistent organic pollutant.
National Regulations:	EH / COSHH limits for Workplace Exposure Limits (WEL).
International Legislation Requirements:	The product (Bentonite) is not separately classified by the Occupational Health and Safety Administration (OSHA). The product has not been classified as a human carcinogen by OSHA, the International Agency for Research on Cancer (IARC) and the National Toxicology Program (NTP).

15.2 Chemical safety assessment

Bentonite is exempted from REACH registration in accordance with Annex V.7. A hazard assessment has been conducted under the umbrella of the European Bentonite Association (EUBA) and the outcome was that Bentonite is not a hazardous substance. Therefore, in absence of identified hazard, the substance is safe and presents no risk.

SECTION 16: Other Information

Depending on the handling and use (grinding, drying, bagging), airborne respirable dust may be generated. Dust contains respirable crystalline silica. Prolonged and or massive inhalation of respirable crystalline silica dust may cause lung fibrosis, commonly referred to as silicosis. Principal symptoms of silicosis are cough and breathlessness. Occupational exposure to respirable dust should be monitored and controlled. The product should be handled using methods and techniques that minimize or eliminate dust generation.

The product contains less than 1% w/w RCS (respirable crystalline silica) as determined by the SWERF method. The respirable crystalline silica content can be measured using the “Size-Weighted Respirable Fraction – SWERF” method. All details about the SWERF method is available at www.crystallinesilica.eu.

16.1 Indications of Changes

See Section 16.5 Below.

16.2 Abbreviations and acronyms	
ACGIH =	American Conference of Industrial Hygienists
DMEL =	Derived maximum effect level
DNEL =	Derived no effect level
EC50 =	Median effect concentration
EU =	European Union
EWC =	European waste catalogue
IARC =	International agency for Research on Cancer
LC50 =	Median lethal concentration
LD50 =	Medial lethal dose
NIOSH =	National Institute of Occupational Safety & Health
OECD=	Organisation for Economic Co-operation and Development
OEL=	Occupational exposure level
OSHA=	Occupational Safety and Health Administration
PBT=	Persistent bioaccumulative toxic
PEL=	Permissible exposure limit
PNEC=	Predicted no effect level
REL=	Recommended exposure level
SCOEL=	Scientific Committee on Occupational Exposure Limits
SDS =	Safety data sheet
STOT =	Specific target organ toxicity
STOT RE=	Specific target organ toxicity upon repeated exposure
TLV =	Threshold limit value
TWA =	Time-Weighted Average
vPvB	Very persistent very bioaccumulative

16.3 Key literature references and sources of data

For any information on literature references or toxicity and ecotoxicity studies, please contact Kentish Minerals.

16.4 Relevant R phrases and/or H-statements

Not relevant as Bentonite is not classified under REACH or CLP.

16.5 Revision

Based on new available information, sections 11 & 12 have been amended.

Other minor changes (mainly format) have been made to comply with the ECHA Guidance on "How to complete a SDS) September 2011.

16.6 Training and other relevant information

Training workers must be informed of the presence of crystalline silica and trained in the proper use and handling of this product as required under the applicable regulations.

Social Dialogue on Respirable Crystalline Silica	A multi-sectoral social dialogue agreement on Workers Health Protection through the Good Handling and Use of Crystalline Silica and Products Containing it was signed on 25 April 2006. This autonomous agreement, which receives the European Commission's financial support, is Based on a Good Practices Guide. The requirements of the Agreement came into force on 25 October 2006. The Agreement was published in the Official Journal of the European Union (2006/C 279/02). The text of the Agreement and its annexes, including the Good Practices Guide, are available from http://www.nepsi.eu and provide useful information and guidance for the handling of products containing respirable crystalline silica. Literature references are available on request from EUROSIL, the European Association of Industrial Silica Producers, Prolonged and/or massive exposure to respirable crystalline silica- containing dust may cause silicosis, a nodular pulmonary fibrosis caused by deposition in the lungs of fine respirable particles of crystalline silica. Based on its evaluation in 2011, the International Agency for Research on Cancer (IARC) concluded that crystalline silica inhaled from occupational sources is a carcinogen category 1 also reduce the cancer risk…" (SCOEL SUM Doc 94-final, June 2003). In June 2003, the EU Scientific Committee on Occupational Exposure Limits (SCOEL) concluded that the main effect in humans of the inhalation of respirable crystalline silica dust is silicosis. "There is sufficient information to conclude that the relative risk of lung cancer is increased in persons with silicosis (and, apparently, not in employees without silicosis exposed to silica dust in quarries and in the ceramic industry). Therefore, preventing the onset of silicosis will So there is a body of evidence supporting the fact that increased cancer risk would be limited to people already suffering from silicosis. Worker protection against silicosis should be assured by respecting the existing regulatory occupational exposure limits and implementing additional risk management measures where required.

Disclaimer:

This information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process. Such information is, to the best of the company's knowledge and belief, accurate and reliable as of the date indicated. However, no warranty guarantee or representation is made to its accuracy, reliability of completeness. It is the user's responsibility to satisfy themselves as to the suitability of such information for their own particular use.