TEXAS SODIUM BENTONITE, INC.
2101 N. State Hwy 118
Alpine, Texas 79830
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PRODUCT SAFETY DATA SHEET: Bentonite

prepared in accordance with The Hazard Communication Standard (HCS) (29 CFR 1910.1200(g))

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

1.1 Product identifier

Substance name: Bentonite
Synonyms: Sodium Bentonite, Montmorillonite, Sodium Montmorillonite.
Please note that this list may not be exhaustive.

Chemical name and formula: Bentonite
Trade name: **Sodium Bentonite**
CAS: 1302-78-9
EINECS: 215-108-5
Molecular Weight: unspecified for this UVCB substance

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

Bentonite has a variety of uses. It can be used as a rheology modifier, binding agent, adsorbent, filler and other i.e for applications like: foundry, iron ore agglomeration, drilling, construction – civil engineering, filtration (i.e oil, wine, beer), pharmaceutical & cosmetics, cat litter, food and feed additives in human and animal nutrition.
Uses advises against: There are no uses advised against.

1.3 Details of the supplier of the safety data sheet

Name: **Texas Sodium Bentonite, Inc.**
Address: **2101 N. State Hwy 118 - Alpine, TX 79830**
Phone N°: **(325) 885 - 2339**
Fax N°: **NA**
E-mail of competent person responsible
for SDS or MSDS: **info@texassodiumbentonite.com**

1.4 Emergency telephone number

American Association of Poison Control Centers N°: **(800) 222 - 1222**
Emergency telephone at the company N°: **(325) 885 - 2339**
Available outside office hours: No

2 HAZARDS IDENTIFICATION

2.1 Classification of the substance

Unless specified otherwise limits are expressed as eight-hour time-weighted averages (TW*A).*
Reparable Crystalline Silica (quartz): MSHA-Proposed and OSHA-Proposed PEL = 0.1 mg/m3
Total Dust: MSHA PEL = 30 mg/m3 divided by (%SiO2 + 3)
MSHA, ACGEH. and OSHA have determined that adverse effects are not likely to occur in the workplace provided exposure levels does not exceed the appropriate TLVs / PELs. However, because of the wide variation in individual susceptibility, lower exposure limits may be appropriate for some individuals including persons with pre-existing medical conditions such as those listed below.

Bentonite with less than 10% w/w crystalline silica does not meet the criteria for classification as hazardous according to EC Regulation 1272/2008 and Directive 67/548/EC as amended.
Depending on the handling and use (grinding, drying, bagging), airborne reparable dust may be generated. Dust contains reparable crystalline silica. Prolonged and or massive inhalation of reparable crystalline silica dust may cause lung fibrosis, commonly referred to as silicosis. Principal symptoms of silicosis are cough and breathlessness. Occupational exposure to reparable 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 (reparable crystalline silica) as determined by the SWERF method. The reparable crystalline silica content can be measured using the “Size-Weighted Reparable Fraction – SWERF” method.

2.1.1 Classification according to Regulation (EC) 1272/2008

Not classified.
Bentonite with less than 10% w/w crystalline silica does not meet the criteria for hazardous substances

2.1.2 Classification according to Directive 67/548/EEC

Not classified.
Bentonite with less than 10% w/w crystalline silica does not meet the criteria for dangerous substances

2.2 Label elements

2.2.1 Labeling according to Regulation (EC) 1272/2008

Not applicable
Hazard statements: Not applicable
Precautionary statements: Not applicable

2.2.2 Labeling according to Directive 67/548/EEC

Indication of danger: Not applicable
Risk phrases: Not applicable
Safety phrases: Not applicable

2.3 Other hazards

The substance does not meet the criteria for PBT or vPvB substance. No other hazards identified.

3 COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Bentonite is a UVCB substance sub-type 4. The purity of the product is 100 % w/w.
Constituents
Name CAS EC number Concentration range
Smectite group minerals 1318-93-0 215-288-0
Calcium carbonate 471-34-1 207-439-9
Quartz (SiO_2) 148-60-7 238-878-4
Cristobalite (SiO_2) 14464-46-1 238-455-4

The product contains other constituents (e.g. feldspar, gypsum, kaolinite, opal CT) in small amount and these minor constituents are not relevant for classification and labeling.
Impurities: Not applicable for a UVCB substance.

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.
Following inhalation: No special measure; move source of dust or move person to fresh air. Obtain medical attention immediately.
Following skin contact: No special measure; wash affected area with soap and plenty of water. If necessary seek medical advice.
Following eye contact: No special measure; rinse eyes immediately with plenty of water. If symptoms persist seek medical advice.
Following ingestion: No special measure; 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 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 advises given in section 4.1

5 FIRE FIGHTING MEASURES

5.1 Extinguishing media

5.1.1 Suitable extinguishing media

Suitable extinguishing media: The product is not combustible. Use a dry water, powder, foam or CO_2 fire extinguisher to extinguish the surrounding fire.
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

5.1.2 Unsuitable extinguishing media

No restriction on the extinguishing media to be used in cases of fire in its vicinity.

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 hazard; wear anti-slip boots
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

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.
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).
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).
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

6.3 Methods and material for containment and cleaning up
Avoid dust formation; avoid dry sweeping
Use vacuum suction unit, or shovel into bags.

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

7 HANDLING AND STORAGE

7.1 Precautions for safe handling

7.1.1 Protective measures
Keep dust levels to a minimum.
Minimize dust generation.

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.

7.1.2 Advice on general occupational hygiene

Keep dust levels to a minimum.
Minimize dust generation.

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.

7.3 Specific end use(s)

If you require advice on specific uses, please contact your supplier or check the Good Practice Guide referred to in section 16.

8 EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control parameters

Maintain personal exposure below occupational exposure limit for inhalable and reparable dust as dictated in the national legislation. The occupational exposure limit for reparable crystalline silica in EU countries is given in: http://www.nepsi.eu/media/445/oel_table_dust-qct_may_2010_jan09.pdf

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

8.2.2.1 Eye/face protection

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.

8.2.2.2 Skin & hands protection

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.

8.2.2.3 Respiratory protection

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 (NIOSH approved respirator), depending on the expected exposure levels.

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

9 PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties
Appearance: Light grey/greenish solid material of varying sizes: Lump, granular or fine powder
Odor: odorless
Odor threshold: not applicable
pH: 9.0 – 10.5 (5% solids in water suspension)
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, EU A.10 method)
Explosive limits: non explosive (void of any chemical structures commonly associated with explosive properties)
Vapor pressure: not applicable (solid with a melting point > 450 °C)
Vapor density: not applicable
Relative density: 2.6 g/cm³
Bulk density: 1 – 1.4 g/cm³
Solubility in water: <0.9 mg/L at 20°C (study results, EU A.6 method)
Partition coefficient: not applicable (inorganic substance)
Auto ignition temperature: no relative self-ignition temperature below 400 °C (study result, EU A.16 method)
Decomposition temperature: not applicable
Viscosity: not applicable (solid with a melting point > 450 °C)
Oxidizing properties: no oxidizing properties (Based on the chemical structure, the substance does not contain a surplus of oxygen or any structural groups known to be correlated with a tendency to react exothermally with combustible material)

9.2 Other information
Not available

10 STABILITY AND REACTIVITY

10.1 Reactivity
Inert, not reactive.

10.2 Chemical stability
Bentonite is chemically stable

10.3 Possibility of hazardous reactions
No hazardous reaction

10.4 Conditions to avoid
Minimize 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.

11 TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects
The product does not meet the criteria for classification as hazardous according to EC Regulation 1272/2008 and Directive 67/548/EC as amended.
The product contains less than 1% w/w RCS (reparable crystalline silica)
Toxicity endpoints Outcome of the effects assessment

Absorption
Bentonite is not classified as a hazardous substance. Therefore, absorption is not a relevant parameter for the effects assessment.
Toxicity endpoints Outcome of the effects assessment

Acute toxicity
Bentonite is not acutely toxic.
Oral LD_{50} > 2000 mg/kg bw (OECD 425, rat)
Dermal Data not available. Bentonite is almost insoluble and has a low absorption through the skin.
Inhalation No data available. 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 a classified as a mild irritant to eyes (according to the modified Kay & Calandra criteria). Classification for Irritation/corrosion is not warranted

Sensitization
No data available. Bentonite is considered not to be a skin sensitizer based on experience in handling and low absorption through the skin. Classification for sensitization is not warranted.

Repeated dose toxicity - Oral
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 expected during prolonged colane deficiency, a base-exchange silicate, is advanced as a partial explanation for the development of the hematomas 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 disruptor of digestion. Therefore, classification of bentonite for toxicity upon prolonged exposure by oral route is not warranted.

Toxicity endpoints Outcome of the effects assessment

Repeated dose toxicity - 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 labeling of bentonite, the evidence is not considered adequate to come to a conclusion on specific classification of bentonite with specific target organ toxicity upon repeated exposure (STOTRE). 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 by inhalation is not warranted.

Mutagenicity *In vitro* gene mutation in bacteria (Ames) – negative
In vivo cytogenicity test in mammalian cells (chrom abb) – negative
In vivo cytogenicity test in mammalian cells (micronucleus assay) –negative
Classification for genotoxicity is not warranted.

Carcinogenicity No data available.
Sepiolite was evaluated by IARC as class 3 ("Cannot be classified as to carcinogenicity to humans"). Based on read-across with sepiolite, bentonite was assessed as non-carcinogenic.
Classification for carcinogenicity is not warranted.

Toxicity endpoints Outcome of the effects assessment

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 restorations
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.

12 ECOLOGICAL INFORMATION

12.1 Toxicity

12.1.1 Acute/Prolonged toxicity to fish
LC_{50} (96h) for freshwater fish (rainbow trout): 16000 mg/l
LC_{50} (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
EC_{50} (96h) for freshwater invertebrates (Dungeness crab): 81.6 mg/l
EC_{50} (96h) for freshwater invertebrates (dock shrimp): 24.8 mg/l

12.1.3 Acute/Prolonged toxicity to aquatic plants
EC_{50} (72h) for freshwater algae: > 100 mg/l

12.1.4 Toxicity to micro-organisms e.g. bacteria
EC_{50} (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 Bioaccumulative 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
Not relevant for inorganic substances

12.6 Other adverse effects
No other adverse effects are identified

13 DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods
The residues/unused product can be disposed in landfills following national and local regulations. Dispose in such a way to avoid dust generation. Where possible, recycling should be preferred to disposal.

Packaging
No specific requirements. In all cases dust formation from residues in the packaging should be avoided and suitable protection be assured.

14 TRANSPORT INFORMATION

The material is not classified as a dangerous substance and no restrictions apply for land/sea/air transportation. Avoid dust spreading

14.1 UN-Number

Not relevant

14.2 UN proper shipping name

Not relevant

14.3 Transport hazard class(s)

Class 50
ADR: Not classified
IMDG: Not classified
ICAO/IATA: Not classified
RID: Not classified

14.4 Packing group

Not applicable

14.5 Environmental hazards

Not relevant

14.6 Special precautions for user

Avoid any release of dust during transportation, by using air-tight tanks for powders and covered trucks for pebbles.

15 REGULATORY INFORMATION

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

Authorizations: Not required

Restrictions on use: None
Other EU regulations: Bentonite is not a SEVESO substance, not an ozone depleting substance and not a persistent organic pollutant.

National regulations: Refer to the regulatory exposure limits for workforce enforced in each country (see Annex 1 and link in section 8).
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).

Table 1: Occupational exposure limits for bentonite and crystalline silica

	OSHA, PEL – TWA, mg/m3	ACGIH, TLV – TWA, mg/m3	NIOSH, REL – TWA, mg/m3
Bentonite			
Reparable dust	5	3	
Total dust	15		
Inhalable dust		10	
Quartz			
Reparable dust	10/(2+% SiO2)	0,05	0,05
Total dust	30/(2+% SiO2)		

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 substances. Therefore, in absence of identified hazard, the substance is safe and presents no risk.

16 OTHER INFORMATION

Data are based on our latest knowledge but do not constitute a guarantee for any specific product features and do not establish a legally valid contractual relationship.

16.1 Hazard Statements

Not relevant

16.2 Precautionary Statements

Not relevant

16.3 Risk Phrases

Not relevant

16.4 Safety Phrases

Not relevant

16.5 Abbreviations

EC_{50}: median effective concentration
LC_{50}: median lethal concentration
LD_{50}: median lethal dose
NOEC: no observable effect concentration
OEL: occupational exposure limit
PBT: persistent, bioaccumulative, toxic chemical
PNEC: predicted no-effect concentration
STEL: short-term exposure limit
TWA: time weighted average
vPvB: very persistent, very bioaccumulative chemical

16.6 Revision
Mention which chapters were revised and update the revision data in the header

16.7 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 applicable regulations.

Disclaimer
This safety data sheet (SDS) is based on the legal provisions of The Hazard Communication Standard (HCS) (29 CFR 1910.1200(g)), as amended. Its contents are intended as a guide to the appropriate precautionary handling of the material. It is the responsibility of recipients of this SDS to ensure that the information contained therein is properly read and understood by all people who may use, handle, dispose or in any way come in contact with the product. Information and instructions provided in this SDS are based on the current state of scientific and technical knowledge at the date of issue indicated. It should not be construed as any guarantee of technical performance, suitability for particular applications, and does not establish a legally valid contractual relationship. This version of the SDS supersedes all previous versions.