

**MATERIAL SAFETY AND DATA SHEET
ACCORDING TO ISO 11014 - 1**

1. SUBSTANCE/PREPARATION IDENTITY

IDENTITY OF THE MANUFACTURER, IMPORTER OR DISTRIBUTOR.

Substance name: Elemental sulphur with bentonite
 Trade name: Sovereign Sulphur
 Usage: Mineral fertiliser, for fertilisation of sulphurophilic plants (on its own, or as a mixture with other fertilisers).
 Importer: Pan Agriculture Ltd, 8 Cromwell Mews, Station Road, St.Ives, Cambs, PE27 5HJ
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2. CHEMICAL CONTENT AND COMPONENT INFORMATION:

The fertiliser, depending on the type, contains: - 85 ÷ 95 % sulphur and 5 ÷ 15 % bentonite.

Chemical formula: - sulphur
 - bentonite- mineral compound (clay), containing 70 ÷ 80 % montmorillonite
 CAS no: - sulphur 7704-34-9
 WE no: - sulphur 231-722-6

3. HAZARDS:

According to laws on chemical substances and preparations, the fertiliser and its ingredients (sulphur and bentonite) are not classified as hazardous.

Fire hazard:

Limited fire hazard, linked to the presence of sulphur in the fertiliser – burning sulphur emits toxic and irritating gasses, vapours and smoke.

Explosion hazard:

The fertiliser in the offered form (granules) does not pose an explosion hazard. A limited explosion hazard, can be caused if a substantial amount of fertilizer dust, would be stirred up in an enclosed space (sulphur dust and air create an explosive mixture, but the presence of the bentonite additive reduces the risk to a minimum).

Toxicological hazard:

Limited hazard linked to the presence of sulphur in the fertiliser, a substance with limited acute toxicity (sulphur dust irritates the mucous membranes of the respiratory tract and eyes as well as skin and lungs).

Ecotoxicological hazards:

The fertiliser has a low marine toxicity. In water, the granules dissolve, creating a sulphur and bentonite suspension. Fertiliser ingredients are present in the natural environment. Only large quantities deposited in water or on land can be harmful.

4. FIRST AID:

Exposure symptoms:

Adverse effects of fertiliser exposure can be linked to the sulphur present in it. Detailed information about the effects of sulphur on the body is presented in paragraph 11.

Inhalation:

Inhalation of sulphur based fertilizer dust: move affected person to fresh air.
 Inhalation of SO₂, created during fire: move affected person to fresh air.

Skin contact:

Remove fertilizer.

Eye contact:

Wash with plenty of water for about 15 minutes, holding eyes wide open.

Swallowing:

Immediately flush mouth and subsequently drink a lot of water or milk with scrambled egg-whites. Flush stomach with 5% sodium hydrocarbonate solution, administer laxative.

Safety measures for rescue personnel:

In case of fire (formation of SO₂) use breathing apparatus.

In all cases, seek medical help if needed.

5. IN CASE OF FIRE:

Due to the presence of sulphur, the ignition of the fertiliser can occur. Burning sulphur emits toxic (in contact with the respiratory tract) and irritating gas – sulphur dioxide SO₂.

Extinguishing media:

- water mist
- foam
- CO₂ extinguishers
- other available extinguishing means

Combustion products: sulphur dioxide constituting a health hazard.

Specific methods:

- small fires should be extinguished using on-site fire fighting equipment, water spray. Do not direct water jets at the burning surface. When possible remove stored fertiliser from the affected area. Fire should be fought with from secure locations.
- large and extensive fires should be extinguished using water spray and mist
- steam is effective in enclosed spaces.

Eliminate (minimise) the risk of fertiliser dust formation – there is a limited (slight) risk of creating an explosive with fertiliser dust and air mixture.

Fire-fighter safety equipment:

- protection equipment: upper respiratory tract and whole body, explosimeter.

6. IN CASE OF UNINTENDED RELEASE INTO THE ENVIRONMENT:

Personal protection equipment:

In case of stirring up significant quantities of fertiliser dust during cleaning operations of the effects of unintended release into the environment – avoid breathing in dust; use a dust mask if required.

Specific recommendations:

- not applicable

Environmental safeguards:

- not applicable

Disposal:

- use gathered substance for fertilisation.

7. SUBSTANCE/~~PREPARATION~~ USE AND STORAGE:

Preventing poisoning:

While conducting any operations on the fertiliser – do not eat, drink, smoke, take medications, avoid inhaling dust, abide work and safety regulations, use appropriate clothing, and, when needed, personal protection equipment.

Specific recommendations for storage spaces:

All enclosed storage spaces must be ventilated. Keep away from open flame, heat sources, keep away from reactive substances (strong bases, oxidants). Protect from moisture.

Storage:

Fertiliser is stored in unit packages in a roofed space, protecting it from atmospheric conditions, especially moisture.

Due to reactivity of sulphur contained in the fertiliser – protect from direct contact with pyrophoric iron, copper items, ammonia, nitric acid, metal dust, chlorates, nitrates, perchlorates, permanganates, anhydrides.

Waste:

Waste can be defined as fertiliser contaminated with non-fertiliser chemical compounds, which cannot be used in any form. Such waste should be subjected to recycling or disposal as defined in paragraph 13.

8. EXPOSURE CONTROL AND PERSONAL PROTECTION EQUIPMENT:

Technical means:

General – required for proper transportation, storage and use of fertiliser, i.e. working ventilation.

Personal protection:

Hands: Cloth gloves, preferably cotton, with protective elements made from leather.

Respiratory tract:

- in case of large quantities of stirred up fertiliser dust (e.g. after spilling and crushing the fertiliser granules) – dust mask
- in case of fire and ignition of sulphur in the fertiliser – respiratory tract protection equipment with class P2 protective filter, as well as yellow acid vapour, “E” filter.

Skin and body: Protective clothing made from tight-woven cloth, work shoes.

Group protection: Workplace ventilation in enclosed spaces.

Other information:

Where, due to large scale fertiliser operations, there is an increased risk of container damage and fertiliser spilling, it is recommended to provide means of spraying water mist.

9. PHYSICAL DATA:

Physical form	solid
Colour:	greenish-yellow-grey
Odour:	characteristic
pH (100g/l - 20 °C):	neutral or slightly alkalic
Vapour pressure at 20 °C	0,0001 mm Hg
Density (20 °C)	2,07 g/cm ³
Bulk density	1100÷1300 kg/m ³
Solubility in Water	water causes the granules to swell and decompose, creating sulphur suspension in water

Explosive properties

- The fertiliser, in the offered form has no explosive properties
- Under specific conditions – large quantities of fertiliser dust – a limited (slight) risk of forming an explosive mixture (dust and air)
- A limited explosion risk for sulphur contained in the fertiliser reacting with nitrates, chlorates, perchlorates and permanganates

Chemical self-ignition:

- Possible, limited self-ignition due to contact with oxidisers, and as a mixture with carbon, soot, greases and oils

10. STABILITY AND REACTIVITY:

Due to the properties of the fertiliser – protect from moisture during transport and storage.
 Due to the properties of sulphur present in the fertiliser – avoid contact with direct flame, protect from contact with pyrophoric iron, copper items, ammonia, nitric acid, metal dust, chlorates, nitrates, perchlorates, permanganates, anhydrides. The sulphur present in the fertiliser has corrosive properties on metals and plastics.

11. TOXICOLOGICAL INFORMATION:

General information – toxicity mechanism

The sulphur present in the fertiliser has two routes of entry. Ingested in larger amounts is subject to partial reduction to hydrogen sulphide, which can cause mild poisoning effects. Sulphur dust can irritate the respiratory tract.

Exposure: inhalation, ingestion, skin and eye contact.

Local effects:

Ingestion: causes nausea and vomiting. In more serious cases, causes trembling of the arms and legs, as well as dizziness.

Skin contact: Can cause reddening, sporadically can cause skin lesions.

Eye contact: Can cause reddening, and even pain.

Effects of long-term exposure: Persons, who are constantly at risk of breathing dusty air, can complain of mucous membrane irritation (sore throat), headaches and dizziness, agitation or drowsiness, problems with the digestive system, dry skin and dermatorrhexis.

12. ECOLOGICAL INFORMATION:

The ecological information pertains only to the sulphur present in the fertiliser.

Acute toxicity index: bacteria – 1, 3; fish – 1, 2.

Harmful effects to water organisms: slight.

Stability: The product undergoes physicochemical changes resulting from the specific qualities of sulphur-based fertilisers. Subjected to humidity (water) the granules decompose, releasing small particles of elemental sulphur. This sulphur, left in the soil in set concentration does not constitute a significant burden to the environment, as it's concentration is being constantly reduced – being a substance required for the synthesis of proteins, chlorophyll, etc., it is extracted from the soil both by micro organisms and plants.

Ecotoxicity: if a substantial quantity of fertiliser is left on the surface, the sulphur can, due to atmospheric conditions, be partially oxidised to sulphates, locally raising soil acidity.

13. HANDLING WASTE:

Waste associated with using the fertiliser can be:

- fertiliser contaminated with chemical, non-fertiliser substances
- used fertiliser packaging

Disposal methods:

Fertiliser contaminated with non-fertiliser chemical substances:

A fertiliser, which cannot be used in any form, can be considered waste. Its classification and methods of disposal depend on individual agreements with appropriate administrative bodies.

Contaminated packaging:

Undamaged packaging can be reused for the same purpose.

Damaged packaging constitutes packaging waste:

- for corporate entities – constitutes communal waste, disposed of according to the regulations in force in the local area waste producer
- for natural persons – is subject to disposal and/or recycling by the owner of the waste, according to the binding local law (waste law from 27 April 2001, with further amendments) as well as local agreements, e.g. regulations of the appropriate administrative body

A summary of the most important laws pertaining to the subject is presented in paragraph 15.

14. TRANSPORT INFORMATION:

The fertiliser is not subject to ADR/RID regulations.

During transport, the fertiliser has to be protected from atmospheric conditions, especially humidity.

15. REGULATORY INFORMATION:

Markings on the package, according to the regulations on marking the packaging for dangerous substances and preparations:

- Warning symbols:* - not applicable
- Symbol:* - not applicable
- R Phrases:* - not applicable
- S Phrases:* - not applicable

Regulations:

- law on chemical substances and preparations from 11 January 2001 (Journal of Laws no 11, item 84 with further amendments)
- Environmental protection law from 27 April 2001 (Journal of Laws no 62, item 627 with further amendments)
- Health Minister's regulation from 3 July 2002 on material safety and data sheets (Journal of Laws. no 140, item 1171 with further amendments)
- law on waste from 27 April 2001 (Journal of Laws no 62, item 628 with further amendments)
- law on maintaining cleanness and order in local authority districts from 13 September 1996 (Journal of Laws no 132, item 622 with further amendments)
- Labour law – unified act from 26 June 1974 (Journal of Laws no 21, item 94 from 1998, with further amendments),
- Work and Social Policy Minister's regulation from 26 September 1997 on the general work hygiene and safety laws (Journal of Laws no 169, item 1650 from 2003).

16. Other information:

Warning: The user is responsible for undertaking every step to fulfil the requirements of local law. The information contained herein constitutes a description of the safety of use requirements for the substance. The user is solely responsible for determining the usability of the product for a given task. Data contained herein does not constitute an assessment of user's work place safety. The sheet cannot be interpreted as a warranty of properties of the substance.