

SOLAR BE

BULK EMULSION PRODUCTS

SAFETY • QUALITY • RELIABILITY

IDENTIFICATION OF THE MATERIAL AND SUPPLIER

Product Name:	BULK EMULSION PRODUCTS SOLAR BE 101, SOLAR BE 101 ECO, SOLAR BE 101 RG, SOLAR BE 201, SOLAR BE 201 ECO, SOLAR EMUL BLEND
Packaging:	Class 5.1
Recommended use of the chemical & restrictions of use:	Mining, quarrying & general blasting work, usually in bulk applications, normally delivered down the bore hole as bulk explosives.
Supplier:	Solar Mining Services (Middelburg) 12 April Street Extension 33 Middelburg Mpumalanga South Africa
Supplier:	Solar Mining Services (Sandton) Building A, Upper Grayston Office Park 150 Linden Road Sandton Johannesburg Telephone number: +27 (0) 11 883 1110 Fax: +27 (0) 86 205 4048 Web: www.solarminingservices.com Email: info@solarminingservices.co.za

HAZARDS IDENTIFICATION

This material is hazardous according to criteria of NOHSC; HAZARDOUS SUBSTANCE.
Classified as Dangerous Goods by the criteria of the Code for the Transport of Explosives by Road and Rail;
DANGEROUS GOODS.

CLASSIFICATION OF THE SUBSTANCE OR MIXTURE:

Explosives	Class 5.1
Carcinogenicity	Category 2
Acute Aquatic Toxicity	Category 3
Chronic Aquatic Toxicity	Category 3
SIGNAL WORD	Danger

Hazard Statement:

H201 Explosives:	Mass explosion hazard.
H351:	Suspected of causing cancer.
H402:	Harmful to aquatic life.
H412:	Harmful to aquatic life with long lasting effects.

Precautionary Statement(s):

Prevention:

P210:	Keep away from heat/sparks/open flames/ hot surfaces. No smoking.
P285:	In case of inadequate ventilation wear respiratory protection.
P240:	Ground/bond container & receiving equipment.
P250:	Do not subject to grinding/shock/friction/impact/electrical energy from extraneous (lighting, static electricity, stray currents, galvanic electricity or electromagnetic radiation) or any form of heating.
P280:	Wear protective gloves/protective clothing/eye protection/face protection.
P103:	Read label before use.
P202:	Do not handle until all safety precautions have been read & understood.
P281:	Use personal protective equipment as required.
P273:	Avoid release to environment.

Response:

P370 + P380:	In case of fire: Evacuate.
P372:	Explosion risk in case of fire.
P373:	DO NOT fight fire when fire reaches explosives.
P308 + P313:	IF exposed or concerned: get medical advice/attention.

Storage:

- P401:** Store in accordance with hazardous substance (class 1 to 5) control regulations 2001
P501: Dispose of contents/container in accordance with local/regional/national/international regulations

Poisons Schedule:

None allocated.

COMPOSITION / INFORMATION ON INGREDIENTS

Component	CAS No.	Proportion	Risk Phrases
Ammonium Nitrate	6484-52-2	<60%	-
Calcium Nitrate	10124-37-5	<15%	R22
Mineral oil	-	<10%	-
Vegetable oil	-	<10%	-
No hazardous components	-	To 100%	-

FIRST AID MEASURES

For advice contact a Poisons Information Centre or a doctor

Inhalation:

Remove victim from area of exposure - avoid becoming a casualty. Remove contaminated clothing and loosen remaining clothing. Allow patient to assume most comfortable position and keep warm. Keep at rest until fully recovered. If patient finds breathing difficult and develops a bluish discolouration of the skin (which suggests a lack of oxygen in the blood – cyanosis), ensure airways are clear of any obstruction and have a qualified person give oxygen through a face mask. Apply artificial respiration if patient is not breathing. Seek immediate medical advice.

Skin Contact:

If skin or hair contact occurs, immediately remove any contaminated clothing and wash skin and hair thoroughly with running water. If irritation occurs seek medical advice. Nitrates can be absorbed through cut, burnt or broken skin. Launder contaminated clothing before use.

Eye Contact:

If in eyes, wash out immediately with water. In all cases of eye contamination, it is a sensible precaution to seek medical advice.

Ingestion:

Immediately rinse mouth with water. If swallowed, do NOT induce vomiting. Give a glass of water. Seek immediate medical assistance.

Medical attention and special treatment:

Treat symptomatically. Explosive material. May cause methemoglobinemia. Treat as for exposure to nitrates. For ammonium nitrate: clinical findings: the smooth muscle relaxant effect of nitrate salt may lead to headache, dizziness & marked hypertension. Cyanosis is clinically detectable when approximately 15% of the haemoglobin has been converted to methaemoglobin (ie. Ferric iron). Symptoms such as headache, dizziness, weakness and dyspnoea occur when methaemoglobin concentrations are 30% to 40%; at levels of about 60%, stupor, convulsions, coma and respiratory paralysis occur and the blood is a chocolate brown colour. At higher levels death may result.

Spectrophotometric analysis can determine the presence & concentration of methaemoglobin in blood.

Treatment:

1. Give 100% oxygen.
2. **In cases of (a) ingestion:** use gastric lavage, (b) contamination of skin (unburnt or burnt): continue washing to remove salts.
3. Observe blood pressure and treat hypotension if necessary.
4. When methaemoglobin concentrations exceed 40% or when symptoms are present, give methylene blue 1 to 2 mg/kg body weight in a 1% solution by slow intravenous injection. If cyanosis has not resolved within one hour a second dose of 2 mg/kg body weight may be given. The total dose should not exceed 7 mg/kg body weight as unwanted effects such as dyspnoea, chest pain, vomiting, diarrhoea, mental confusion and cyanosis may occur. Without treatment methaemoglobin levels of 20-30% revert to normal within 3 days.
5. Bed rest is required for methaemoglobin levels in excess of 40%.
6. Continue to monitor and give oxygen for at least two hours after treatment with methylene blue.
7. Consider transfer to centre where haemoperfusion can be performed to remove the nitrates from the blood if the condition of the patient is unstable.
8. Following inhalation of oxides of nitrogen, the patient should be observed in hospital for 24 hours for delayed onset of pulmonary oedema.

Further observation for 2-3 weeks may be required to detect the onset of the inflammatory changes of bronchiolitis fibrosa obliterations.

FIRE FIGHTING MEASURES

Hazards from combustion products:

On burning under confined or semi-confined conditions, some oxides of nitrogen and/or carbon will be present. Brown fumes indicate the presence of toxic oxides of nitrogen.

Precautions for fire fighters and special protective equipment:

Explosive material. In case of small fire where the actual explosive is not involved, carefully remove explosives to a safe distance, otherwise evacuate area immediately and allow to burn. Do NOT fight fire. A major fire may involve a risk of explosion. An adjacent detonation may also involve the risk of explosion.

Hazchem Code: E

ACCIDENTAL RELEASE MEASURES

Methods for cleaning up:

Review fire and explosion hazards before proceeding with clean up. Remove and protect ignition sources. Wear protective equipment during clean up. It is suggested that only personnel trained in Emergency Response should respond. Verify complete account of product. Notify authorities and follow applicable spill reporting requirements.

Emergency procedures/Environmental precautions:

Shut off all possible sources of ignition. Clear area of all unprotected personnel. Wear protective equipment to prevent skin and eye contact. Avoid friction & impact. In case of a transport accident notify the Police, Explosives Inspector & SMS.

If contamination of sewers or waterways has occurred advise local emergency services.

Personal precautions/Protective equipment/Methods and materials for containment and cleaning up:

Handle with care. Contain - prevent run off into drains & waterways. Collect with non-metallic implement. Use a spark free shovel. Collect and seal in properly labelled containers, with loose fitting lids, for disposal.

HANDLING AND STORAGE

Conditions for safe storage:

Store material in a well ventilated magazine suitably licensed for Class 5.1 Chemical. Store away from sources of heat or ignition. Store in a cool, dry, well ventilated place out of direct sunlight. Store away from strong acids, strong alkalis, nitrites, chlorates, chlorides & permanganates. Store away from incompatible materials described in Section 10.

Ammonium nitrate is incompatible with, and must be stored away from, etranitromethane, dichoroisocyanuric acid, any bromate, chlorate, chlorite, hypochlorite or chloroisocyanurate or any inorganic nitrite. Keep containers closed when not in use - check regularly for spills.

Precautions for safe handling:

Handle with care. Keep out of reach of children. Avoid skin and eye contact & breathing of vapour/dust. Avoid all contact with other chemicals. Do NOT subject the material to impact, friction between hard surfaces nor to any form of heating.

EXPOSURE CONTROLS/PERSONAL PROTECTION

Occupational Exposure Limits:

No value assigned for this specific material by the Occupational Health and Safety Act. However, Workplace Exposure Standard(s) for constituent(s):

Oil mist, refined mineral: 8hr TWA = 5 mg/m³

TWA – The time-weighted average airborne concentration of a particular substance when calculate over an eight hour working day, for five days a week.

These Workplace Exposure Standards are guides to be used in the control of occupational health hazards. All atmospheric contamination should be kept to as low a level workable. These workplace exposure standards should not be used as dividing lines between safe & dangerous concentrations of chemicals. These are not a measure of relative toxicity.

Supplier recommended Exposure Standard:

Fuels, diesel: 5mg/m³ (stable aerosol) for 8 hour time-weighted average (TWA). (1)

Fuels, diesel: 200mg/m³ (vapour) for 8-hour time-weighted average (TWA). (1)

Fuels, diesel: 100mg/m³ SKIN (total hydrocarbons, inhalable) for 8-hour time-weighted average (TWA). *ACGIH Exposure Standard from supplier (1)

TWA – The time-weighted average airborne concentration over an eight hour working day, for five days a week over an entire working life.

Skin – ACGIH – The designation of ‘skin’ refers to the potential significant contribution to the overall exposure by the cutaneous route, including mucous membranes & the eyes, either by contact with vapour or, of probable greater significance, by direct skin contact with the substance.

These Exposure Standards are guides to be used in the control of occupational health hazards. All atmospheric contamination should be kept to as low a level as is workable. The exposure standards should not be used as dividing lines between safe & dangerous concentrations of chemicals. These are not a measure of relative toxicity.

Engineering Measures:

Ensure ventilation is adequate & that air concentrations of compounds are controlled below quoted Workplace Exposure Standards.

Individual protection measures, such as Personal Protective Equipment (PPE):

The selection of PPE is dependent on a detailed risk assessment. The risk assessment should consider the work situation, the physical form of the chemical, the handling methods and environmental factors.

SMS Personal Protection Guide: - OVERALLS, SAFETY SHOES, SAFETY GLASSES, GLOVES.



Containment of charge prevents exposure. Wear protective clothes: Overall, safety shoes, gloves and eye protection when handling. Wash hands and exposed skin before meals and after work.

PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Emulsion, freshly prepared bulk explosive is hot (60-70°C)
Colour	Honey coloured
Odour	Negligible
Solubility	Insoluble in water
Specific Gravity	0.95-1.35 g/cc @ 20°C (0.8g/cc @ 20°C for SOLARANFO)
Relative Vapour Density (air=1)	Not Applicable
Vapour Pressure (20°C)	N Average
Flash Point (°C)	Not Applicable ANFO: >60°C
Flammability Limits (%)	Not Applicable
Auto ignition Temperature (°C)	N Average
Melting Point/Range (°C)	N Average
Decomposition Point (°C)	N Average
pH	N Average

STABILITY AND REACTIVITY

Chemical stability:

Explosives material. Avoid ignition sources, static electricity discharge & friction. Detonation may occur from heavy impact or excessive heating, particularly under confinement.

Conditions to avoid:

Avoid exposure to heat, sources of ignition, and open flame. Avoid build-up of static electricity. Avoid other chemicals.

Incompatible materials:

Incompatible with strong acids, incompatible with strong alkalis, incompatible with combustible materials, incompatible with permanganates, strong oxidising agents, acids & alkalis, Ammonium nitrate is a powerful oxidising agent. It is incompatible with tetra nitromethane, dichloroisocyanuric acid, trichloroisocyanuric acid, any bromate, chlorate, chlorite, perchlorate, chlorisocyanurate, any organic nitrite and metal powders.

Hazardous decomposition products:

Oxides of carbon. Oxides of nitrogen. When heated to decomposition (unconfined) ammonium nitrate produces nitrous oxide, white ammonium nitrate fumes & water. When mixed with strong acids, and occasionally during blasting, it produces an irritating toxic brown gas, mostly of nitrogen dioxide. Molten may decompose violently due to shock or pressure.

Hazardous reactions:

Explosive material. A major fire may involve a risk of explosion. An adjacent detonation may also involve the risk of explosion. Heating can cause expansion or decomposition of the material, which can lead to the containers exploding. Explosion may result due to shock, friction, fire and other sources of ignition.

TOXICOLOGICAL INFORMATION

No adverse health effects expected if the product is handled in accordance with this Material Safety Data Sheet and the product label. Symptoms or effects that may arise if the product is mishandled and overexposure occurs are:

Ingestion:

Swallowing can result in nausea, vomiting, diarrhoea & abdominal pain. Swallowing large amount may result in headaches, dizziness, & a reduction in blood pressure (hypotension)

Eye contact:

May be an eye irritant.

Skin contact:

Contact with skin will result in irritation. Repeated or prolonged skin contact may lead to irritant contact dermatitis. Can be absorbed through the skin with resultant adverse effects. See effects as noted under 'Inhalation'

Inhalation:

Material may be irritant to the mucous membranes of the respiratory tract (airways). Blasting may produce a toxic brown gas of nitrogen dioxide. Inhalation of the gas may result in chest discomfort, shortness of breath & possible pulmonary oedema, the onset of which may be delayed. Absorption of ammonium nitrate by inhalation, ingestion or through burnt or broken skin may cause dilation of blood vessels by direct smooth muscle relaxation & may cause methaemoglobinaemia.

Long Term Effects:

No information available on product. Available evidence from animal studies indicate that repeated or prolonged exposure to a component of this material could result in effects on the skin. This material contains the diesel oil component of this formulation polycyclic aromatic hydrocarbons (PAHs). Some PAHs have been implicated as potential skin carcinogens in humans under conditions of poor hygiene, prolonged or repeated skin contact & exposure to sunlight. Toxic effects are unlikely to occur if good personal hygiene is practised. (1)

In humans & animals methaemoglobinaemia has occurred under untreated circumstances following the ingestion of nitrates. (2) Diesel fuel has been classified by the International Agency for Research on Cancer (IARC) as a Group 3 agent. Group 3 – The agent is not classifiable as to its carcinogenicity to humans. (1)12

On the blood system, central nervous system, bone marrow, eye, kidneys and liver. Repeated or prolonged skin contact may cause dermatitis.

Toxicological Data:

No LD50 data available for the product.

For the consistent Ammonium nitrate:

Oral LD50 (rat): 2217 mg/kg. (2)

ECOLOGICAL INFORMATION

Eco toxicity:

Avoid contaminating waterways.

Aquatic toxicity:

Harmful to aquatic organisms. May cause long term adverse effects in the aquatic environment.

Ammonium nitrate was evaluated at 5, 10, 25, 50 mg (NH₄⁺)/L.

The fertility of *Daphnia magna* was decreased at 50 mg/L.

Post embryonic growth of crustacea was impaired at 10, 25, 50 mg/L. (2)

DISPOSAL CONSIDERATIONS

Disposal methods:

Refer to Waste Management Authority. Dispose of material through a licensed waste contractor. Small quantities of damaged or deteriorated explosives may be destroyed by inclusion in a blast hole containing good explosive(s). For large quantities of damaged or deteriorated explosives notify SMS.

Waste Disposal Method:

Burn under supervision of a Product matter expert at an approved explosive burning ground or destroy by detonation in boreholes, in accordance with applicable local, provincial and federal regulations. Call upon the services of an SMS Technical Representative.

Contaminated Packaging:

Not applicable.

TRANSPORT INFORMATION

Road and Rail Transport:

Classified as Dangerous Goods by the criteria of the Code for the Transport of Explosives by Road and Rail; DANGEROUS GOODS.

UN No	3375
Class-primary	5.1
Proper Shipping Name	OXIDISING MATERIAL
Hazchem Code	5.1
Marine Transport	Classified as Dangerous Goods by the criteria of the International Maritime Dangerous Goods Code (IMDG Code) for transport by sea; DANGEROUS GOODS. UN No: 3375
Class-primary	5.1
Proper Shipping Name	OXIDISING MATERIAL
Air Transport	TRANSPORT PROHIBITED under the International Air Transport Association (IATA) Dangerous Goods Regulations for transport by air in passenger aircraft and cargo aircraft.



REGULATORY INFORMATION

Classification of substance or mixture:

This material is hazardous according to United Nations criteria of OHSA; HAZARDOUS SUBSTANCE.
Explosives Class 5.1
Carcinogenicity Category 2
Acute Aquatic Toxicity Category 3
Chronic Aquatic Toxicity Category 3

Hazard Category:

T: Toxic
E: Explosive
N: Dangerous for the Environment

Hazard Statement (s):

H201: Explosive; mass explosion hazard
H351: Suspected to cause cancer
H402: Harmful to aquatic life
H412: Harmful to aquatic life with long lasting effects

Poisons Schedule:

None allocated.

OTHER INFORMATION

This Material Safety Data Sheet has been prepared by SMS.

Revised MSDS for Solar MS South Africa

This MSDS summarises to our best knowledge at the date of issue, the chemical health and safety hazards of the material and general guidance on how to safely handle the material in the workplace. Since Solar MS cannot anticipate or control the conditions under which the product may be handled, each user must, prior to handling, assess and control the risks arising from its use of the material.

If clarification or further information is needed, the user should contact their Solar MS representative or Solar MS at the contact details on page 1.

Solar MS's responsibility for the material as sold is subject to the terms and conditions of sale, a copy of which is available upon request.