



Moura, Silva & Filhos, S.A.
EXPLOSIVOS - PÓLVORAS - RASTILHOS

SAFETY DATA SHEET

in accordance with Reg. No. 1907/2006, as amended by Reg. 2020/878, of 18 June 2020

Black Powder
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2.3 Other hazards

None of the substances present in the mixture in a concentration equal to or greater than 0,1% by mass fulfils the criteria for Persistent, Bioaccumulative and Toxic Substances or Very Persistent and Very Bioaccumulative substances in accordance with Annex XIII to Regulation 1907/2006, as amended. None of the substances present in the mixture at a concentration of 0,1% or more by weight have endocrine-disrupting properties.

When it burns/deflagrates, it produces nitrogen dioxide (NO₂), sulphur dioxide (SO₂) and carbon dioxide (CO₂).

3. COMPOSITION/INFORMATION ON INGREDIENTS

| CHEMICAL DESIGNATION | % (w/w) | CAS No. | EC No. | REACH REGISTRATION NUMBER | Regulation (EC) No 1272/2008 | |
|----------------------|---------|-----------|-----------|---------------------------|---|----------|
| | | | | | HAZARD CLASS | WARNINGS |
| Potassium nitrate | 65 - 85 | 7757-79-1 | 231-818-8 | 01-2119488224-35-0045 | Oxidizing solid, category 3 (Ox. Sun. 3) | H272 |
| Sulphur | 10 - 20 | 7704-34-9 | 231-722-6 | 01-2119487295-27-xxxx | Skin irritation, category 2 (Skin Irrit. 2) | H315 |

Note: The remaining components of the mixture do not meet the criteria for classification.
(See full text of the hazard statements in section 16)

4. FIRST AID MEASURES

4.1 Description of first aid measures

Eye contact: Rinse the eyes with running water for at least 15 minutes, keeping the eyelids open. If you wear contact lenses, remove them before washing your eyes. Contact your doctor immediately.

Skin contact: Remove contaminated clothing carefully so as not to contaminate the eyes. Start immediate skin decontamination by washing with mild soap and water. Consult your doctor in case of skin irritation.

Ingestion: Oral exposure is quite unlikely. Do not induce vomiting. If the victim is conscious, rinse his mouth with water. If the victim is unconscious, convulsive or has difficulty swallowing, never induce vomiting or give them fluids. Seek medical assistance by showing this Safety Data Sheet.

Inhalation: In the event of inhalation of the product or the gases resulting from the thermal decomposition of the product, its combustion, or deflagration, remove the victim from the contaminated area, move him to a clean air zone and keep him at rest. Consult your doctor if you have any symptoms.

In case of injury caused by the deflagration of the product, provide immediate medical help.

4.2 Most important symptoms and effects, both acute and delayed

Product Exposure: eye irritation and skin irritation.

Exposure to flue gases or deflagration: Methemoglobinaemia, pulmonary oedema, skin irritation, eyes, mouth, throat and other affected tissues.

4.3 Indication of any immediate medical attention and special treatment needed

Under normal conditions of use, no special medical care is required, either associated with the product or with the gases resulting from its combustion or deflagration.

Inhalation of gases from a fire or the deflagration of the product can cause irritation and corrosive effects on the respiratory system under abnormal oxygenation conditions. Administer oxygen (if a competent practitioner is present), especially if the area around the mouth is bluish (methemoglobinaemia). After exposure to toxic gases, the victim should remain under medical supervision for at least 48 hours to prevent the possible occurrence of pulmonary edema.

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

If the fire reaches the explosives, DO NOT attempt to fight it as there is a risk of explosion.

5.2 Special hazards arising from the substance or mixture

When it burns/deflagrates, it produces nitrogen dioxide (NO₂), sulphur dioxide (SO₂) and carbon dioxide (CO₂).

5.3 Advice for firefighters

Prevent the fire from reaching the containers by flooding the area with large amounts of water.

If there is time, remove the containers to a safe area.

Cool containers and exposed structures with water spray. Risk of explosion in the event of a fire.

To fight fires that could potentially involve this material, but that have not yet reached the containers, self-breathing equipment and a full chemical protection suit must be used.

In the event of a fire: evacuate the area. Do not fight fires involving explosive material. Do not fight fires involving containers of these products. Remove yourself from the area and let the fire burn. Get everyone in the vicinity out of the fire. Alert the authorities.



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6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

In the event of a spill, remove ignition sources. Keeping unauthorized personnel out of the enclosure. Avoid contact with eyes, skin and clothing. Wear hand, foot and body protection equipment. (see paragraph 8)

6.2 Environmental precautions

Prevent the product from reaching the soil or water environment.

6.3 Methods and material for containment and cleaning up

Wearing gloves, collect the product into a clean and properly identified container. Do not use electric discharge or sparking tools. Use wooden or aluminum tools, for example. The deflagration or neutralization of the spilled product must be carried out by competent authorities or technicians.

6.4 Reference to other sections

The control measures provided for in point 8 shall be taken.

Waste and materials contaminated with the product shall be treated as explosive waste in accordance with section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Technical recommendations: Do not use electric discharge or sparking tools. Never use in an underground environment or in explosive or potentially explosive atmospheres.

Always wear protective equipment for your hands, feet and body.

Before loading, the loading surface of the vehicle or container must be thoroughly cleaned. [CV2(1), paragraph 7.5.11 of the ADR]

It is forbidden to smoke, use fire or naked flame in vehicles carrying explosives, either in the vicinity of them or during loading and unloading. The smoking ban also applies to the use of e-cigarettes and similar devices. [S1 (3), item 8.5 of the ADR]

Do not subject the product to shock or friction. Do not open the packages during transport. Open and handle the packages with care. Prevent dust from forming.

Avoid exposure to gases resulting from the combustion or deflagration of the product.

General hygiene recommendations in the workplace: Do not eat, drink or smoke in work areas. Remove contaminated clothing and protective equipment after handling the product. Wash your hands before breaks and after work. Do not handle the explosive under the influence of alcohol or drugs.

7.2 Conditions for safe storage, including any incompatibilities

Recommendations: Store packages in a cool, dry and well-ventilated place.

Keep the packages closed. Avoid exposure to heat and direct sunlight. Do not allow the product to come into contact with oxidizable materials.

Incompatible products and materials: strong acids and bases, flammable or combustible products, oxidizers and primary explosives.

The storage of explosives is subject to specific legislation (Decreto-Lei n.º 139/2002, May 17th, amended by Decreto-Lei n.º 87/2005, May 23rd). It should only be stored with materials from the same compatibility group.

7.3 Specific end uses

- H1/H2 Ruff, 1F/2F/3F/4F: Pyrotechnics and hunting.

- 1F Graphitised: Splitting rocks in ornamental quarries.

Follow the recommendations set out in subsections 7.1 and 7.2.

8. EXPOSURE CONTROL/PERSONAL PROTECTION

8.1 Control parameters

No occupational or biological exposure limit values have been defined for any of the substances in the mixture.

However, during the deflagration of black powder, there is the formation of air contaminants subject to occupational exposure limit values. These contaminants should be considered when using black powder in poorly ventilated environments. The occupational exposure limit values are as follows:

| Substance | National limit value | | Legal basis |
|-----------------|------------------------------------|---------------------------------|--|
| | 8 hours | Short-term | |
| Azote dioxide | 0,96 mg/m ³ 0,5 ppm | 1,91 mg/m ³ 1 ppm | Decreto-Lei n.º 24/2012, in the current wording [Directive 98/24/EC, Directive (EU) 2017/164, Directive (EU) 2019/1831 |
| Sulphur dioxide | 1,3 mg/m ³ 0,5 ppm | 2,7 mg/m ³ 1 ppm | |
| Carbon dioxide | 9000 mg/m ³ 5000 ppm | - | |

8.2 Exposure controls

8.2.1 Appropriate roadworthiness checks

Regarding exposure to the product, there is no additional information to that provided in section 7.



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8.2.2 Personal protective measures, including personal protective equipment

| | |
|-------------------------|---|
| Eye/face protection: | No eye or face protection is required under normal conditions of use. |
| Skin protection: | Wear protective clothing; wear PVC or PVA gloves; Wear protective footwear. |
| Respiratory protection: | Respiratory protection is not required when handling black powder under normal conditions. In the case of finer-grained black powder, if dust is formed, a mask with a particulate filter (EN 143 standard) must be used. |



8.2.3 Environmental exposure control

Prevent the product from reaching the water environment. Do not leave any residue of the product at the site of application.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

| | | |
|---|---|---|
| a) Physical condition: | Solid (granules/powder) | |
| b) Colour: | Black | |
| c) Odor: | Characteristic odor of black powder (Sulfur) | |
| d) Melting point/freezing point: | Not determined/Not applicable | |
| e) Boiling point: | Not determined/Not applicable | |
| f) Flammability: | Flammable (ignition causes the product to deflagrate or explode, depending on the confinement) | |
| g) Upper and lower explosive limit: | Not applicable to solids | |
| h) Flash point: | Not applicable to solids | |
| i) Auto-ignition temperature: | Not applicable to solids | |
| j) Decomposition temperature: | Not applicable | |
| k) pH: | Not determined/Not applicable | |
| l) Kinematic viscosity: | Not applicable to solids | |
| m) Solubility: | Soluble in water | |
| n) n-octanol/water partition coefficient: | Not determined/Not applicable | |
| o) Vapor pressure: | Not applicable (solid mixture) | |
| p) Density and/or relative density: | Density (specific mass): <ul style="list-style-type: none"> • H1 and H2 Ruff: 0,95± 10% (g/cm³) / 950± 10% (kg/m³) • 1F, 2F, 3F, 4F: 0,8± 10% (g/cm³) / 800± 10% (kg/m³) • 1F Graphitised: 0,85± 10% (g/cm³) / 850± 10% (kg/m³) | Relative density: <ul style="list-style-type: none"> • H1 and H2 Ruff: 1,2± 10% • 1F, 2F, 3F, 4F: 0,85± 10% • 1F Graphitised: 1,08± 10% |
| q) Relative vapour density: | Not applicable to solids | |
| r) Characteristics of the particles: | Particle dimensions: <ul style="list-style-type: none"> • H1 Ruff: > 0,8 mm (60-65%) • H2 Ruff: > 0,8 mm (55-60%) • 1F and 2F: > 0,8mm (100%) • 3F: > 0,8mm (65-75%) • 4F: ≤ 0,8mm (65-75%) • 1F Graphitised: > 0,8 mm (100%) | |

9.2 Other information

Explosive 1.1 D;
Impact sensitivity (EN 13631-4): > 2 J;
Friction sensitivity (EN 13631-3): > 80 N;
Thermal stability (EN 13631-2): Not reacted at 75 °C (348,15 K) for 48 h



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10. STABILITY AND REACTIVITY

10.1 Reactivity

Explosive product. The mixture is not reactive under the recommended conditions for handling, transport and storage (see section 7). The product reacts if it is mixed with strong acids or bases, flammable or combustible products, oxidizers and primary explosives.

10.2 Chemical stability

The mixture is stable under normal ambient conditions and at the foreseeable temperature and pressure conditions during handling, transport and storage (see section 7). No change in the physical appearance of the mixture is expected within its shelf life (5 years).

10.3 Possibility of hazardous reactions

Possibility of dangerous reactions in contact with incompatible materials.
The product reacts if it is mixed with primary explosives, causing an explosion.
Risk of explosion from shock, fire and other sources of ignition.

10.4 Conditions to avoid

Temperature: Avoid exposure to or contact with extreme temperatures [below 263,15 K (-10 °C) and above 373,15 K (+100 °C)].
Pressures: Avoid exposure to high pressures.
Shock: Avoid collisions.
Friction: Avoid product friction.
Ignition: Avoid sources of ignition.
Water: Avoid contact with water (only for functional reasons).

Note: Low temperatures and water are not a danger factor in terms of stability and reactivity, they only condition the performance of the product.

10.5 Incompatible materials

Flammable products, oxidizers, organic peroxides, corrosive materials and primary explosives.

10.6 Hazardous decomposition products

Thermal decomposition, combustion and deflagration produce hazardous gases, namely nitrogen dioxide (NO₂) and sulphur dioxide (SO₂).

11. TOXICOLOGICAL INFORMATION

11.1 Information on hazard classes as defined in Regulation (EC) No 1272/2008

- a) Acute toxicity: Based on the available data, the classification criteria are not met.
- b) Corrosion/skin irritation: Mixture classified - Skin irritation, category 2 (Skin Irrit. 2); H315: Causes skin irritation.
- c) Serious eye damage/eye irritation: Based on the available data, the classification criteria are not met.
- d) Respiratory or skin sensitization: Based on the available data, the classification criteria are not met.
- e) Germ cell mutagenicity: Based on the available data, the classification criteria are not met.
- f) Carcinogenicity: Based on the available data, the classification criteria are not met.
- g) Reproductive toxicity: Based on the available data, the classification criteria are not met.
- h) Specific target organ toxicity (STOT) - single exposure: Based on the available data, the classification criteria are not met.
- i) Specific target organ toxicity (STOT) - repeated exposure: Based on the available data, the classification criteria are not met.
- j) Aspiration hazard: On the basis of the available data, the classification criteria are not met.

11.2 Information on other hazards

Endocrine disrupting properties: None of the substances present in the mixture at a concentration equal to or greater than 0,1% by weight have endocrine disrupting properties.

Other information: No information on other adverse health effects is available.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

No data are available on the toxicity of the mixture.

12.2 Persistence and degradability

For the constituent potassium nitrate [according to the supplier's SDS]:
No information is available on the persistence and degradability of the substance.



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For the sulphur constituent [according to the supplier's SDS]:
Persistence: No data available;
Degradability: The methods for determining biological degradability are not applicable to inorganic substances.

12.3 Bioaccumulative potential

For the constituent potassium nitrate [according to the supplier's SDS]:
Very low level of bioaccumulation.

For the sulphur constituent [according to the supplier's SDS]:
Bioaccumulation is unlikely.

12.4 Mobility in soil

For the constituent potassium nitrate [according to the supplier's SDS]:
No information is available on the soil mobility of the substance.

For the sulphur constituent [according to the supplier's SDS]:
Insoluble in water.

12.5 Results of PBT and vPvB assessment

The PBT and vPvB evaluation of the mixture was not performed.

12.6 Endocrine disrupting properties

None of the substances present in the mixture at a concentration of 0,1% or more by weight have endocrine-disrupting properties.

12.7 Other adverse effects

No other adverse effects are known.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Explosive waste and contaminated packaging are disposed of by combustion, detonation, or chemically, using small fractions in each operation, under the terms of Decreto-Lei n.º 139/200, May 17th, amended by Decreto-Lei n.º 87/2005, May 23rd.
The disposal of explosive products is carried out under the guidance of the on-site technical manager.

Note: Pursuant to of paragraph e) of paragraph 2 of article 2 of the General Waste Management Regime, approved by Decreto-Lei n.º 102-D/2020, December 10th, as amended, explosives are excluded from the scope of this regime.

Do not leave waste or discharge it into collectors or the water environment.

14. TRANSPORT INFORMATION

14.1 UN number or ID number: UN 0027

14.2 UN proper shipping name: BLACK POWDER

14.3 Transport hazard classes:

| | |
|---|------|
| ADR / RID / ADN (via road/rail/inland waterways): | 1.1D |
| IMDG (By sea) | 1.1D |



Tunnel restriction code [ADR]: B1000C

14.4 Packing group: Not applicable.

14.5 Environmental hazards: The mixture is not hazardous to the environment in the light of the criteria of the UN Model Regulations (as referred to in the ADR, the RID and the DNA) and is not a marine pollutant in accordance with the IMDG code.

14.6 Special precautions for user: Not applicable.

14.7 Maritime transport in bulk according to IMO instruments: Not applicable.

15. REGULATORY INFORMATION

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

Seveso hazard category (Directive 2012/18/EU of the European Parliament and of the Council of 4 July 2012; Decreto-Lei n.º 150/2015, August 5th):
P1a Explosives (Lower level requirements: 10 t; Higher level requirements: 50 t)



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Mixture not covered by the Regulations:

- Regulation (EC) No 1005/2009, of 16 September 2009, on substances that deplete the ozone layer;
- Regulation (EC) No 850/2004, of 29 April 2004, on persistent organic pollutants;
- Regulation (EU) No. 649/2012, of 4 July 2012, on the export and import of hazardous chemicals.

15.2 Chemical safety assessment

An assessment of the chemical safety of the mixture has not been carried out.

16. OTHER INFORMATION

Safety Data Sheet review:

This revision replaces revision 1, dated 2020/05/15, effective 2022/12/06.

Changes introduced:

General: adequacy of the designation of sections and sub-sections to Regulation (EU) 2020/878, of 18 June 2020; updating of applicable legal references;

Section 9: Reorganisation and updating of information on the physical and chemical properties of the mixture;

Section 11: Introduction of sub-section 11.2 - Information on other hazards;

Section 12: Introduction of sub-section 12.6 - Endocrine disrupting properties;

Section 16: Introduction of the abbreviations CLP, ECHA, IMO/IMO, ID Number, PSP, PVA, PVC, REACH, SOLAS and UNEC in the caption; updating of bibliographic references; introduction of recommendations on training.

Subtitle:

ADN - European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways

ADR - Agreement concerning the International Carriage of Dangerous Goods by Road

CLP - Classification, Labelling and Packaging

ECHA - European Chemicals Agency

SDS - Safety Data Sheet

IMDG - International Maritime Dangerous Goods

IMO - International Maritime Organization

ELW - European List of Waste

MEMU - Mobile Explosives Manufacturing Unit

vPvB - Very Persistent and Very Bioaccumulative Substances

ID Number - Identification number of the substance, mixture or article

IMO - International Maritime Organization

UN - United Nations

PBT - Persistent, Bioaccumulative and Toxic Substances

Pow - Octanol/Water Partition Coefficient

PSP - Public Security Police

PVA - Poliacetato de vinilo

PVC - Policloreto de vinilo

REACH - Registration, Evaluation and Authorization of Chemicals

RID - International Rail Transport of Dangerous Goods

RTMP - Recommendations on the Transport of Dangerous Goods (from the UN)

SOLAS - International Convention for the Safety of Life at Sea

UNEC - United Nations Economic Commission for Europe

Bibliographic references:

Regulation (EC) No 1907/2006, of 18 December 2006 (REACH), as amended (version as of 2022/10/14)

Regulation (EC) No 1272/2008, of 16 December 2008 (CLP), as amended (version as of 2022/03/01)

Regulation (EU) 2020/878, of 18 June 2020

Directive 2012/18/EU of the European Parliament and of the Council, of 4 July 2012

Regulation (EU) 2019/1148, of 20 June 2019 (explosives precursors)

Council Directive 80/181/EEC, of 20 December 1979, as amended

Directive 98/24/EC, of 7 April 1998

Directive (EU) 2017/164, of 31 January 2017

Directive (EU) 2019/1831, of 24 October

Decreto-Lei n.º 41/2018, June 11th

Decreto-Lei n.º 62/2021, of July 26th (precursors of explosives)

Decreto-Lei n.º 76/2020, September 25th (International System of Units)

Decreto-Lei n.º 139/2002, May 17th, amended by Decreto-Lei n.º 87/2005, May 23rd

Decreto-Lei n.º 102-D/2020, of December 10th, in the current wording (version as of 2021/08/10)

Decreto-Lei n.º 82/2003 of April 23, amended by Decreto-Lei n.º 63/2008, of April 2nd and by Decreto-Lei n.º 155/2013, November 5th

Decreto-Lei n.º 98/2010, August 11th

Decreto-Lei n.º 150/2015, August 5th

Decreto-Lei n.º 293/2009, October 13th

Decreto-Lei n.º 41-A/2010, of April 29th, in the current wording (version as of 2021/11/17)

Ordinance no. 309-A/2021, of 17 December (land transport of dangerous goods)

Decreto-Lei n.º 24/2012, of February 6th, in the current wording (version as of 2021/01/06)



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ADR 2021 - Agreement on the International Carriage of Dangerous Goods by Road, May 2021, Tutorial – Conteúdos e Tecnologia, Lda.
IMDG Code 2020 - International Maritime Dangerous Goods Code
Safety data sheets for the substances in the mixture (provided by the respective suppliers)
Manual of Intervention in Emergencies with Chemical, Biological and Radiological Hazardous Materials, Autoridade Nacional de Proteção Civil, June 2011, ISBN: 978-989-8343-08-6.
ECHA website: <https://echa.europa.eu/information-on-chemicals>
REACH & CLP national website: <http://www.reachhelpdesk.pt>
UNECE website: <https://www.unece.org>

Mixture classification method:

Physical hazards: Test Series 1 to 8 of Part 1 of the UN RTMP (Recommendations on the Transport of Dangerous Goods), Manual of Tests and Criteria;
Hazards to health and the environment: Based on the classification data of the components of the mixture, applying the criteria set out in Parts 3 and 4 of Annex I to CLP.

List of relevant hazard statements and precautionary statements:

H201: Explosive; danger of mass explosion.
H272: May aggravate fire; oxidizing.
H315: Causes skin irritation.

P210: Keep away from heat, hot surfaces, sparks, open flames, and other sources of ignition. No smoking.
P234: Always keep the product in its original packaging.
P250: Do not be crushed, shocked or rubbed.
P280: Wear protective gloves (chemical resistant) and protective clothing.
P370+P372+P380+P373: In case of fire: risk of explosion. Evacuate the area. If the fire reaches the explosives, DO NOT try to fight it.
P501: Dispose of the contents and container in accordance with national regulations (Decreto-Lei n.º 139/200, May 17th, amended by Decreto-Lei n.º 87/2005, May 23rd).

Other relevant precautionary recommendations applicable to the mixture, but not included on the label by imposition of the principles of precedence (Article 28 of Regulation (EC) No 1272/2008):

P401: Store in accordance with national regulations (Decreto-Lei n.º 139/2002, May 17th, amended by Decreto-Lei n.º 87/2005, May 23rd).

Precautionary Statements associated with other hazard classes of the mixture (other than "Explosive"):

P264: Wash exposed skin thoroughly after handling.
P321: Specific treatment - wash exposed skin with soap and water.
P302 + P352: IF IN CONTACT WITH SKIN: Wash thoroughly with soap and water.
P332 + P313: In case of skin irritation: consult a doctor.
P362 + P364: Remove contaminated laundry and wash it before using it again.

Training recommendations: Regular training should be provided to workers on the basis of the information contained in this safety data sheet and the specific conditions of use of the mixture, to ensure the protection of workers' health and the environment.