



Mine Dust and Black Powder

Technical note

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Contact

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ABOUT MARCOGAZ

Founded in 1968, MARCOGAZ represents 29 member organisations from 20 countries. Its mission encompasses monitoring and policy advisory activities related to the European technical regulation, standardisation and certification with respect to safety and integrity of gas systems and equipment, rational use of energy as well as environment, health and safety issues. It is registered in Brussels under number BE0877 785 464.

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1. Introduction

Mine dust and black powder are contaminants which can occur in natural gas transport pipelines. Mine dust occurs in pipelines dating back from the time when coke oven gas was transported. Mine dust contains amongst others toxic cyanides and thiocyanates, as well as rust, sand and clay.

Black powder is a mixture of corrosion products resulting from the interaction of iron with sulphur and/or oxygen (iron sulphides and rust). Black powder can also contain sand, clay and elemental sulfur. Black powder is also sometimes referred to as black dust.

This MARCOGAZ technical note describes risks and mitigating measures regarding Mine Dust and Black Powder.

2. Risks

The composition of mine dust and black powder can vary. Mine dust or black powder can be released in combination with each other and/or in conjunction with sand, salts, water, glycol, natural gas condensate, oil and related substances.

Mine dust and black powder are harmful to health and the environment. caution and alertness are therefore vital.

Black powder represents a possible source of ignition when (pipe) systems are opened (e. g. opening pig traps, removing filters, cutting lines, emptying tanks). Existing flammable substances or explosive mixtures, e. g. due to gas residues/outgassing, can be ignited by the heat of reaction. The self-ignition can be masked (hidden), so that it only occurs with a time delay. Exposition to oxygen is key for auto-ignition. Gas residues/outgassing can also be toxic (e. g. with coke oven gas).

3. Properties, dangers and measures after exposure

| Mine Dust | Black Powder |
|---|-------------------------------|
| A dry powder which can be caked onto the pipeline wall or appear as a greasy sludge | A dry powder or greasy sludge |
| Grey/black in colour | Brown/black in colour |

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| Hydrocyanic (prussic) acid can be formed on heating or contact with water or acid | Iron sulphides are pyrophoric, i. e. they can ignite or smoulder spontaneously upon contact with atmospheric oxygen |
| Environment: Hazardous to the environment | |
| Inhaling dust or related vapour: Toxic, dizziness, headache, cramps, vomiting, diarrhoea. Red or blue skin colour. Red, painful eyes, poor vision. | |
| Contact with skin: Hydrocyanic acid fumes can be absorbed through the skin, resulting in similar symptoms to those following inhalation. | |
| Contact with the eyes: Red, painful eyes, poor vision. | |
| Swallowing: Similar symptoms to those following inhalation. | |

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| Prescribed measures after exposure (First Aid) |
| <ul style="list-style-type: none"> • Take the casualty outside to breathe fresh air, allow to rest, apply artificial respiration if necessary • Remove contaminated clothing, rinse skin with plenty of water or get the casualty to take a shower • Rinse eyes with plenty of water or eyewash; remove any contact lenses • If the casualty is conscious: rinse his/her mouth out with water. DO NOT induce vomiting • Always call a doctor without delay |

4. Risks assessment and ranking of protective measures

Before starting the work, a risk assessment must be carried out and documented in writing. The applicable regulations and regulations (country-specific, EC law, etc.) must be observed. In the following, some tips for the risk assessment are given. For example, hazards may arise due to:

- Activities to be carried out
- Existing or possibly emerging/released hazardous substances
- Working environment
- Work equipment used

Regarding pipe dust/black powder, physical hazards such as pyrophoric properties must be considered in addition to health and environmental hazards. The resulting ignition hazards are taken into account when considering and evaluating existing fire and explosion hazards. Requirements for the conductivity of the PPE used must be taken into account.

Appropriate protective measures must be assigned to the identified hazards. The "hierarchy" of the protective measures must be observed here, the so called "TOP principle":

- Technical protective measures (e.g. special protective devices on work equipment, encapsulation of machines, closed systems)
- Organizational protective measure (e.g. limitation of working hours, application of a work permit procedure, creation of operating instructions, instruction, limitations of work due to youth and maternity protection)
- Personal measures (personal protective equipment)
- Hygiene measures (e.g. separate storage of private and work clothes, cleaning of work clothes, washing facilities, separate areas for eating and drinking from the workplace).

5. Required personal protection measures

Use the correct personal protection measures according to the results of the risk assessment (statutory requirement) and keep them in good condition. You will then protect yourself, others and the environment.

Once it has been established that mine dust and/or black powder are present, the following personal protective equipment shall be used:

- Flame retardant antistatic clothing

- (Disposable) chemical protection suits, e. g. overalls against particles and spray/splash liquids or special liquid-tight chemical protection overalls, if necessary flame retardant
- Chemical gloves
- Safety boots
- Helmet
- Goggles
- Suitable breathing apparatus, e. g. full-face mask with filter adapted to the risk assessment or independent breathing apparatus. The application limits of filter devices must be taken into account. Depending on the hazardous substances present, the filter recommendation must be adjusted (e.g. if CO is present).

6. To prevent pollution

- Use the rinsing tubs / decontamination unit
- Dispose of any clothing that is or could be contaminated in the designated waste bin
- Do the same with used (and finished) filter candles
- Clean your boots

7. During work activities

- Wear the correct Personal Protection Equipment (PPE)
- Ensure adequate ventilation
- Do not inhale dust, avoid contact with skin and eyes
- Smoking is prohibited, sources of ignition of any kind have to be removed
- Protect the substances from heat and direct sunlight
- No eating or drinking is allowed during work
- As personal hygiene always wash your hands with plenty of soap and water
 - Before each break
 - Before leaving the location
 - Before and after using the lavatory

In the event of work involving specific risks, extra protection measures shall be identified and established for instance in a Job Safety Analysis or Work Permit.