



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

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**Metal and non-metal mine filling engineering technical
standards**

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1 General

1.0.1 This standard is formulated in order to standardize the engineering design, production operation and quality inspection of mine filling, improve the technical level of mine filling in

my country, and promote the popularization and application of filling mining method.

1.0.2 This standard applies to the engineering design, production operation and quality inspection of metal and non-metal underground mine filling.

1.0.3 Metal and non-metal mine filling shall not only meet the provisions of this standard, but also meet the relevant current national standards.

2.0.1 mine backfill

The operation process of filling the underground mined-out area with sand, stone and other materials.

2.0.2 backfill material

Including filling aggregates, cementitious materials, water, and admixtures to improve the performance of filling slurry.

2.0.3 Backfill aggregate

The inert material that plays the role of filling and skeleton in the filling body.

2.0.4 tailings

Under the current economic and technological conditions, the concentrator grinds the ore finely, selects useful components and discharges solid waste.

2.0.5 Unclassified tailings

Unclassified full-grained tailings.

2.0.6 classified tailings

Coarse grit used for mine filling after tailings classification.

2.0.7 particle size distribution

The proportion of the particle content of each grade that constitutes the material to the total material, usually expressed as a percentage.

2.0.8 Cementitious material binder

Under physical and chemical action, it can change from slurry to solid stone-like body, and can cement other materials to form a composite solid material with certain mechanical strength.

2.0.9 backfill slurry

Filling aggregates, cementitious materials, etc. are mixed with water to form a slurry.

2.0.10 Recipe of backfill slurry

The mass ratio relationship between the filling materials in the filling slurry.

2.0.11 Solid content of backfill slurry

The percentage of the dry mass of filling aggregate and cementitious material to the total mass of filling slurry.

2.0.12 Settling ratio of backfill slurry

The ratio of the volume of the filling slurry to the volume of the filling body after final setting or consolidation.

2.0.13 Filling body backfill

Filling materials are solid or loose matter formed by dehydration, consolidation, hardening and other processes.

2.0.14 stope backfill

The filling material is filled into the filling body formed in the underground empty space such as the stope.

2.0.15 backfill specimen

Filling body samples obtained by casting or drilling and coring for the purpose of testing or quality inspection.

2.0.16 backfill strength

The limit stress that the filling body can keep itself from being damaged when it resists external force.

2.0.17 filling system backfill system

The general term for the equipment, facilities and structures used to collect, process and store filling materials. It is prepared into filling slurry and transported to the goaf.

2.0.18 cemented backfill

The filling material contains gelatinous material, which can harden the filling slurry and have a certain strength of mine filling.

2.0.19 Uncemented backfill

The filling material does not contain cementitious materials, and the filling aggregate can be consolidated or piled up.

2.0.20 Hydraulic backfill

Water is used as the transport carrier, and the filling material is transported to the goaf through pipelines in a two-phase fluid state.

2.0.21 Paste backfill

The filling material is transported to the goaf through pipelines in the state of structural fluid, and there is no need to set up a filling method for dehydration facilities in the goaf.

2.0.22 waste rock filling rock backfill

It is a filling method in which mine excavation waste rock or crushed waste rock is used as filling material to fill the goaf.

3.1 General provisions

3.1.1 Filling materials should meet the relevant requirements of my country's environmental protection and safety, and should not have harmful effects on the human body, the environment and the performance of the filling body.

3.1.2 The selection of filling aggregates should meet the following requirements.

- 1 Filling aggregates should meet the relevant provisions of the current national standard "General Industrial Solid Waste Storage and Landfill Pollution Control Standard" GB 18599;
- 2 The filling aggregate should be mine solid waste such as tailings waste rock or general industrial solid waste;
- 3 Aggregate with a sulfur content exceeding 8% should not be used for cemented filling.

3.1.4 The water quality requirements for filling water shall meet the following requirements.

- 1 pH must not be less than 5;
- 2 SO₄²⁻ content shall not exceed 2700mg/L.

3.1.5 Before the preliminary design of the filling system construction scheme, the filling material test shall be completed.

3.1.6 When the filling material changes or its properties change, the corresponding filling