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**Technical specification for utilization of iron tailings for mine
ecological restoration**

矿山生态修复用铁尾矿应用技术规范

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Foreword

This document is a specification-type guiding technical document.

This document was drafted in accordance with the rules given in GB/T 1.1-2020 "Directives for standardization - Part 1: Rules for the structure and drafting of standardizing documents".

Attention is drawn to the possibility that some of the content of this document may be the subject of patent rights. The issuing body of this document shall not be held responsible for identifying patents.

This document was proposed by the China Iron and Steel Association.

This document is under the jurisdiction of the National Technical Committee on Iron Ore and Direct Reduced Iron of Standardization Administration of China (SAC/TC 317).

This document was drafted by twelve organizations led by Sinosteel Maanshan General Institute of Mining Research Co., Ltd., together with the China Metallurgical Information and Standardization Institute, mining and ecological restoration companies of the Masteel Mining Resources Group, the technical centres of the Ministry of Ecology and Environment for soil and rural ecological supervision and for solid waste and chemicals management, China Academy of Building Research, BGRIMM Technology Group, Anhui Jianzhu University and Inner Mongolia Hongshen Technology Development Co., Ltd.

1 Scope

This document specifies the general requirements, the technical requirements, the environmental and pollutant monitoring and the requirements for records and long-term

management for the utilization of iron tailings in mine ecological restoration, and describes the corresponding verification methods.

This document applies to the assessment, design, construction and management of projects that use iron tailings for backfilling, infilling and soil reconstruction in mine ecological restoration.

This document does not apply to underground infilling projects.

2 Normative references

The contents of the following documents constitute indispensable provisions of this document through normative reference in the text. For dated references, only the edition corresponding to that date applies. For undated references, the latest edition (including all amendments) applies.

GB 8978 Integrated wastewater discharge standard · GB 12348 Emission standard for industrial enterprises noise at boundary · GB/T 14848 Standard for groundwater quality · GB 15562.2 Environmental protection graphical symbols - Storage and disposal site for solid waste · GB 15618 Soil environmental quality - Risk control standard for soil contamination of agricultural land (trial) · GB 16297 Integrated emission standard of air pollutants · GB/T 17671 Test method of cement mortar strength (ISO method) · GB 18599 Standard for pollution control on the storage and landfill of general industrial solid wastes · GB 36600 Soil environmental quality - Risk control standard for soil contamination of development land (trial) · GB/T 43934 Technical specification for land reclamation and ecological restoration of coal mines · HJ 2.2 Technical guidelines for environmental impact assessment - Atmospheric environment · HJ 2.3 Technical guidelines for environmental impact assessment - Surface water environment · HJ 19 Technical guidelines for environmental impact assessment - Ecological impact · HJ/T 20 Technical specifications on sampling and sample preparation from industrial solid waste · HJ 25.3 Technical guidelines for risk assessment of soil contamination of land for construction · HJ 91.1 Technical specification for wastewater monitoring · HJ 91.2 Technical specification for surface water environmental quality monitoring · HJ 164 Technical specification for groundwater environmental monitoring · HJ/T 166 Technical specification for soil environmental monitoring · HJ 557 Solid waste - Extraction procedure for leaching toxicity - Horizontal vibration method · HJ 610 Technical guidelines for environmental impact assessment - Groundwater environment · HJ 651 Technical specification for ecological environment protection and restoration of mines (trial) · HJ 819 Self-monitoring technical guideline for pollutant discharging units - General rules · HJ 964 Technical guidelines for environmental impact assessment - Soil environment (trial) · HJ 1091 Technical guideline for pollution prevention and control of solid waste recycling · HJ 1272 Technical guideline for assessing the effectiveness of ecological protection and restoration (trial) · TD/T 1031 (all parts) Regulations for the preparation of land reclamation schemes · TD/T 1036 Quality control

standard for land reclamation · TD/T 1068 Regulations for the preparation of
implementation schemes for territorial space ecological protection and restoration projects ·
TD/T 1070.1 Technical specification for mine ecological restoration - Part 1: General rules

3 Terms and definitions

The following terms and definitions apply to this document.

- 3.1 iron tailings - The solid waste produced after the valuable concentrate has been separated at the dressing plant from the ore extracted from an iron mine.
- 3.2 backfilling use of iron tailings - The activity of using iron tailings in place of production materials such as sand, soil and stone to fill surface excavation areas of open-pit mining, borrow pits and natural hollows, in works of land reclamation, landscape restoration, site levelling and stabilization of open-pit slopes, for the purpose of land reclamation or ecological restoration.
- 3.3 infilling use of iron tailings - The activity of using iron tailings as filling material for mined-out areas such as shafts and subsidence zones, in order to support the surrounding rock, prevent rock movement and control ground pressure.
- 3.4 soil reconstruction - The human intervention process of redesigning and building a stable and productive soil profile in a severely disturbed area for a specific land use objective.
- 3.5 soil reconstruction using iron tailings - The process of soil reconstruction in which iron tailings are used as the main material to prepare soil conditioners or artificial soil by physical, chemical or biological methods.

4 General requirements

- 4.1 The use of iron tailings for ecological restoration shall ensure ecological, environmental and human health safety throughout the whole process.
- 4.2 A project using iron tailings for ecological restoration shall establish the source, the chemical composition, the radioactivity level and the moisture content of the tailings.
- 4.3 That basic information shall be verified by consulting the solid waste management ledger of the producer of the tailings, the factory test report, or a test report issued by a qualified third-party testing organization.
- 4.4 The sampling of iron tailings shall meet the requirements of HJ/T 20.
- 4.5 The leachate of iron tailings shall be obtained by the method specified in HJ 557. The concentration of the characteristic pollutants in the leachate shall not exceed the maximum permitted discharge concentrations specified in GB 8978, with the maximum permitted discharge concentrations of class 2 pollutants applied at the level 1 standard, and the pH

shall be within the range of 6 to 9.

4.6 The design, construction, acceptance and operation of backfilling projects and of standalone infilling projects using iron tailings shall comply with the relevant national policy documents, laws and regulations. The project shall establish a complete environmental management system covering environmental impact assessment, the environmental management plan, environmental protection responsibilities, the pollutant discharge permit, monitoring, information disclosure, the environmental emergency plan and the management of environmental protection records.

4.7 Pollution prevention and control for such projects shall comply with the relevant requirements of HJ 1091, GB 18599, GB 15618, GB 36600 and GB/T 14848.

4.8 Such projects shall comply with the relevant requirements of GB/T 43934, TD/T 1070.1 and HJ 651, and a dedicated ecological restoration plan shall be prepared and incorporated into the unified management of the mine ecological restoration plan.