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**DZ**

# Standard of the Geology and Mineral Industry of the People's Republic of China

DZ/T XXXXX—XXXX

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## Construction Specification of Green Mines of the Coal Industry

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## Introduction

This standard is drafted in accordance with the rules given by GB/T 1.1-2009.

This standard is put forward by Ministry of Land and Resources of the People's Republic of China.

This standard is centralized by the National Technical Committee for Standardization of Land and Resources (SAC/TC93).

Drafting units of this standard: Productivity Promotion Center of China National Coal Association and Chinese Academy of Geological Sciences.

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# Construction Specification of Green Mines of the Coal Industry

## 1 Scope

This standard specifies the basic requirements for the environment of the mining area, the resource development mode, the comprehensive utilization of resources, energy saving and emission reduction, scientific and technological innovation and digital mine, enterprise management and enterprise image of green mines in the coal industry.

This standard applies to the construction of green mines of newly-built, reconstructed and expanded and production mines in the coal industry.

## 2 Normative references

The following documents are essential for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including all modifications) applies.

GB/T 13306 Signs  
GB 14161 Mine safety signs  
GB 20426-2006 Emission standard for pollutants from coal industry  
GB 21522-2008 Emission standard of coalbed methane/coal mine gas  
GB/T 28754-2012 Guidance for utilization of coalbed methane (coal mine gas)  
GB/T 29162-2012 Classification of coal gangue  
GB/T 29163-2012 Technical guidelines for utilization of coal gangue  
GB/T 29444 Limit of the energy consumption per unit product of coal underground mining  
GB/T 29445 Limit of the energy consumption per unit product of coal surface mining  
GB/T 31089-2014 Calculation method and requirements of the recovery rate of coal mine  
GB/T 31356-2014 Technical guidelines for quality evaluation and control of commercial coal  
GB 50187 Specification for general layout design of industrial enterprises  
GB 50197-2015 Code for design of open pit mine of coal industry  
GB 50215-2015 Code for mine design of coal industry  
AQ 1010-2005 Safety code for the coal preparation plant  
HJ 446-2008 Cleaner production standard Coal mining and processing industry  
HJ 651 Technical specification of eco-environmental protection and reclamation for mines  
TD 1036 Quality control standard for land reclamation

## 3 Terminology and definition

The following terms and definitions are applicable to this document.

### 3.1

#### Green mine

In the whole process of development of mineral resources, the scientific and orderly mining is implemented, and the ecological environment disturbance in the mining area and its surrounding is controlled within the controllable range. The mine with an ecological environment, a scientific mining mode, the efficient utilization of resources, the digital management information and a harmonious community in the mining area is realized.

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### 3.2 Green coverage rate of the mining area

The percentage of the greening area in the mining area in the area which can be greened within the boundary, including the waste rock yard, the industrial site in the mining area, and green belts on both sides of the mining area.

### 3.3

#### Input of R&D and technical innovation

The capital investment for an enterprise to carry out R&D and technical innovation activities. The R&D and technical innovation activities include scientific research and development, technology introduction, technological innovation, transformation and promotion, equipment renewal, scientific and technological training, information exchange, scientific and technological cooperation, etc.

## 4 General principles

4.1 A mine shall abide by national laws and regulations and related industrial policies, and run the mine according to law.

4.2 A mine shall carry out the development concept of innovation, coordination, greening, openness and sharing; follow the principle of adjusting measures to local conditions of the mine; and realize the overall consideration and comprehensive development of the utilization of resources, energy saving and emission reduction, environmental protection, land reclamation, corporate culture and enterprise and harmony of enterprise and land in the whole process of the development of mineral resources.

4.3 A mine shall be people-oriented, protect workers' health and prevent, control and eliminate occupational hazards.

4.4 A newly built, reconstructed or expanded mine shall be built according to this standard; a production mine shall be upgraded according to this standard; and the construction of green mines shall run through the whole process of design, construction, production and closing.

## 5 Environment of the mining area

### 5.1 Basic requirements

5.1.1 The layout of functional zonings of the mining area shall be reasonable; the mining area shall be greened and beautified, and the whole environment shall be clean and beautiful.

5.1.2 The management of production, transportation and storage of coal shall be standardized and orderly.

### 5.2 Appearance of the mine

5.2.1 The mining area shall be divided into functional zones such as production area, management area, living area and ecological area. Each functional zone shall comply with the provisions of GB 50187; and the production, living, management and other functional zones shall have corresponding management institutions and management systems, order operation and standard management.

5.2.2 The ground transportation, water supply, power supply, health, environmental protection and other supporting facilities shall be complete in the mining area; in the production area, the operating signs, illustration signs, roadmap and other signs shall be set and comply with the provisions of GB/T 13306; and the safety marks shall be set in the areas requiring safety warning, such as intersection of underground coal roads, ground substation, wellhead, switching room, the main ventilated machine room, gangue dump, the nearby area of flood discharge trenches, centralized drainage sumps of the pits of an open coal mine, transformer room, slope curve, substation outside the pit, road intersection, gas station or oil depot, and the safety sign shall comply with the provisions of GB 14161.

5.2.3 The ground coal transportation system, transportation equipments and the coal storage place of

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large and medium-sized coal mines shall be completely closed; and for the small coal mines whose coal transportation and storage are not managed closely, the dust prevention and water spraying device shall be set.

5.2.4 For the solid wastes formed in the production and life of the mining area, a special storage place shall be set, and it shall comply with provisions of safety, environment protection and monitoring of *Law of the People's Republic of China on the Prevention and Control of Environmental Pollution by Solid Waste, Geological Disaster Prevention and Control Regulations of the People's Republic of China, Safety Supervision Regulations of Coal Mines*, etc.

5.2.5 The appearance of the mine shall be harmonious with the natural environment such as the surrounding ground surface and vegetation.

### 5.3 Greening of the mining area

5.3.1 The greening of the mining area shall be harmonious with the surrounding natural landscape. The greening plants shall reasonably match and grow well, and the greening coverage rate of the mining area shall reach 100%.

5.3.2 The waste dump of an open cut ore mine shall be reclaimed and greened. Isolated green belts shall be set on both sides of the special road in the mining area according to local conditions.

## 6 Resource development mode

### 6.1 Basic requirements

6.1.1 The development of resources shall be harmonious with environmental protection, resource protection and urban and rural construction, and minimize disturbance and destruction to the natural environment. The resource-saving and environment-friendly development mode shall be chosen.

6.1.2 According to the occurrence of coal resources, characteristics of the ecological environment and other conditions in the mining area, the emission reduction protection mining technology with a high utilization rate of resources, a small amount of waste production, a high recycling rate of water and a small ecological damage to the mining area shall be chosen according to local conditions.

6.1.3 The principle of "mining while managing and recovering" shall be followed, the geological environment of the mine shall be timely managed and restored, and the land occupied and destroyed by the mine shall be reclaimed.

### 6.2 Emission reduction protection mining technology

#### 6.2.1 Mining with filling

The technology of mining with filling shall be used in the following circumstances:

a) The technology of mining with filling shall be adopted in the eastern region, the environment sensitive area and "three under and above" (under the buildings, under the railway, under the water body, above the pressure bearing aquifers and so on. The same below) to ensure that there is no gangue dump on the ground;

b) The mining with filling is preferred in other areas. The choice of filling area and the plan of mining with filling shall be organically combined with the geological environment protection and land reclamation plan of the mine;

c) On the premise of not producing secondary pollution, solid wastes such as coal gangue shall be used first to fill the goaf.

#### 6.2.2 Water-preserved mining

The water-preserved mining technology shall be used in the following circumstances:

a) The water-preserved mining technology shall be adopted in the ecological fragile areas in the west, underground strong aquifers or the area with serious seepage of groundwater;

b) In the mining, the operable and effective measures shall be taken to prevent and control the adverse effects of the mining-induced fractures on the critical aquifers; or

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c) The areas which may be connected with important rivers, reservoirs or civilian water sources shall be effectively isolated through curtain, aquifer reinforcement and other methods.

#### 6.2.3 Co-mining of coexisted and associated resources

The co-mining technology of coexisted and associated resources shall be used in the following circumstances:

a) The coexisted and associated resources whose industrial grade has met the requirements of accessibility shall be mined and recovered simultaneously with coal;

b) The coexisted and associated mineral resources in the strata contained coal shall be explored and evaluated comprehensively, and the comprehensive development and utilization scheme of coal and its coexisted and associated resources shall be made and strictly implemented in accordance with the provisions of the state;

c) The comprehensive utilization project of coexisted and associated mineral resources in a newly-built mine shall be designed, constructed and put into production simultaneously with the coal mining and preparation project; or

d) The coal mine gas shall be extracted before digging and mining. It shall be extracted as much as possible, and the balance between extracting and mining shall be realized. For a high gas mine and an outburst mine of coal (rocks) and gas (carbon dioxide), gas shall be mined before the coal, and the extracting and mining shall reach the standard.

### 6.3 Mining method and process

6.3.1 The mechanized, automatic, information and intelligent mining technology and process encouraged, supported and promoted by the state shall be selected.

6.3.2 The mining method and process of an underground coal mine shall be implemented according to the provisions of GB 50215-2015.

6.3.3 The mining method and process of an open-pit coal shall be implemented according to the provisions of GB 50197-2015.

6.3.4 The mechanization degree of fully-mechanized excavating in large and medium-sized coal mines shall not be less than 65%, and the mechanization degree of fully-mechanized coal mining shall not be less than 85%. The unattended intelligent coal face looked over by people shall be promoted.

6.3.5 The emission reduction protection mining technologies generally include mining with filling, water-preserved mining, co-mining of coexisted and associated resources (co-mining of coal and gas) and other mining technologies.

### 6.4 Recovery rate

6.4.1 The recovery rate of the mining area and the working face of an underground coal mine shall comply with the provisions of GB/T 31089-2014. See Table A.1 and Table A.2 in Appendix A, respectively.

6.4.2 The recovery rate of open-pit coal mines shall comply with the provisions of HJ 446-2008. See Table A.3 in Appendix A.

### 6.5 Ecological environment protection

6.5.1 Environmental control and land reclamation shall be carried out in accordance with the geological environment protection and land reclamation plan of the mine. The specific requirements are as follows:

a) The protection and restoration of the ecological environment such as mine dump, open pit, special roads in the mining area, industrial site of the mine, subsidence area, barrow and contaminated site of the mine shall comply with the provisions of HJ 651;

b) The quality of land reclamation shall comply with the provisions of TD/T 1036;

c) The land with surface subsidence which is difficult to govern temporarily shall be dynamically monitored and governed at the right time;

d) All kinds of sites after the recovery and management shall not threaten the animals and plants, and be harmonious with the surrounding natural landscape; and

e) The groundwater system shall be isolated by layer, and the pollution of water in the goaf to the

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resource aquifer shall be effectively prevented and controlled.

6.5.2 An environmental monitoring mechanism shall be established, specialized institutions shall be set up, and there shall be full-time management and monitoring personnel. The specific requirements are as follows:

- a) The pollution sources and pollutants such as gas, mine water and noise shall be dynamically monitored, and the monitoring data shall be managed by a special person and disclosed to the society;
- b) The stability and quality of land reclamation areas shall be monitored dynamically during and after the mining, and the quality of land reclamation shall be inspected by a full-time personnel.

6.5.3 Coal resources with a big impact on the ecological environment such as high sulfur, high arsenic, high ash and high fluoride shall be restricted.

## 7 Comprehensive utilization of resources

### 7.1 Basic requirements

In accordance with the principle of reduction, recycling and reuse, coexisted and associated mineral resources shall be comprehensively developed and utilized. The solid wastes, wastewater and others shall be scientifically used to develop the recycling economy.

### 7.2 Coal dressing

7.2.1 A newly-built large and medium-sized coal mine shall have a coal preparation plant or a central coal preparation plant. The preparation rate of raw coal shall be not lower than 75%.

7.2.2 The production, operation and management of the coal preparation plant shall be carried out in accordance with the provisions of AQ 1010-2005.

7.2.3 According to different coal quality, the advanced and applicable coal preparation equipment and technology shall be selected to realize the clean and efficient utilization of coal resources.

7.2.4 The quality of commercial coal shall comply with the provisions of GB/T 31356-2014.

### 7.3 Utilization of coexisted and associated resources

7.3.1 The comprehensive exploration, comprehensive evaluation and comprehensive development shall be made on the coexisted and associated resources.

7.3.2 The coexisted and associated mineral resources in the coal mines shall be processed and comprehensively utilized with an advanced and economically rational process.

7.3.3 The development of the deep processing industry of coexisted and associated minerals, such as coal series kaolin (rocks), refractory clay, diatomite, bauxite, bentonite, iron pyrite, oil shale, graphite and limestone, shall be promoted to reduce the waste of resources; and the resources such as gallium and germanium coexisted and associated with coal shall be developed and utilized.

7.3.4 The safe utilization, gradient utilization and large-scale utilization of coal mine gas shall be promoted. The utilization of coal mine gas (coalbed methane) shall be implemented according to the provisions of GB/T28754-2012. The index of utilization rate of coalbed methane (coal mine gas) is shown in Table B.1 of Appendix B.

### 7.4 Treatment and utilization of solid waste

7.4.1 Solid wastes such as coal gangue shall be treated and utilized through resource utilization. The specific requirements are as follows:

- a) They shall be used according to the type of coal gangue, and they are mainly used in circulating fluidized bed fuel, sintered bricks, cement, light aggregate and other building materials, railway subgrade, road subgrade and other fillers, sulfur concentrate, kaolin, aluminum-containing chemical products and other recovered beneficial minerals and chemical products, and microbial fertilizer, organic compound fertilizer and other agricultural production;

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b) The classification of coal gangue shall comply with the provisions of GB/T 29162-2012; and  
c) The technical requirements for the utilization of coal gangue shall meet the requirements of GB/T 29163-2012.

7.4.2 The solid wastes such as coal gangue piled up in the coal mine shall be treated by classification and utilized continuously. The rate of disposal shall reach 100%.

7.4.3 The stripped topsoil and waste residues from an open-pit mine shall comply with relevant regulations such as safety, environmental protection and monitoring. The disposal rate shall reach 100%.

7.4.4 The domestic wastes of the mine shall be disposed of in a harmless way together.

7.5 Utilization of mine water and drainage water

7.5.1 Mine water and drainage water shall be disposed of by clean and resourceful technology and process with a disposal rate of 100%.

7.5.2 The utilization rate of mine water shall comply with the provisions of HJ 446-2008. The index of the utilization index of mine water is shown in Table C.1 of Appendix C.

7.5.3 For a mine to be closed, the water in the goaf which can be utilized shall be isolated and protected.

8 Energy saving and emission reduction

8.1 Basic requirements

The system of energy consumption accounting in the whole process of production of a mine shall be established. By taking measures of energy saving and emission reduction, the energy consumption, material consumption and water consumption of the unit products shall be controlled and reduced, and the emission of "three wastes" shall be reduced.

8.2 Energy saving and consumption reduction

8.2.1 The limit of the energy consumption per unit of product of the existing underground mine and the threshold of the energy consumption per unit of product of a newly-built mine shall be carried out according to the provisions of 4.1 and 4.2 of GB/T 29444-2012; and the limit of the energy consumption per unit of product of an open-pit coal mine shall be carried out according to the provisions of 4.1 and 4.2 of GB/T 29445-2012.

8.2.2 New technologies, new processes, new equipments and new materials with a high efficiency and energy saving shall be developed and used. The processes and equipments with high energy consumption, high pollution and a low efficiency shall be eliminated.

8.2.3 The underground supporting technology shall be improved. Under the premise of ensuring safety, the number of steel shed beams shall be greatly reduced, the technology of anchor net support shall be promoted, and the amount of steel used shall be saved.

8.3 Waste gas, dust and noise emission

8.3.1 The emission of coalbed methane (coal mine gas) shall comply with the provisions of GB 21522-2008. The value of emission limit of coalbed methane (coal mine gas) is shown in Table B.2 of Appendix B.

8.3.2 The dustproof and water sprinkler system shall be established for an underground coal mine and run normally. Among them, the capacity of a permanent dustproof pool shall not be less than 200m<sup>3</sup>, the water storage capacity shall not be less than the water consumption for continuous 2 hours underground. The water storage capacity of the spare pool shall not be less than 50% of that of the permanent dustproof pool. The dustproof pipes shall be laid to all the workplaces where dust and dust can be produced. The dust removal efficiency of respirable dust of the dust collector shall not be lower than 90%.

8.3.3 An open-pit coal mine shall be equipped with a special water supply adding station (pool). The spray and dust control shall be completed during drilling, crushing operation and excavator loading.

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8.3.4 The dust concentration in the workplace of a coal mine shall meet the requirements of Table D.1 of Appendix D.

8.3.5 In the process of raw coal preparation in a coal washing and dressing plant (coal feeding, crushing, screening and reloading), the dust source shall be closed, and a spray fall or dust collector shall be used.

8.3.6 In the plant area of the coal storage yard, water shall be sprayed to suppress the dust regularly, a dust suppression network shall be set around the coal storage yard, the dust reduction by spray or water spraying is required during the loading and unloading of coal, and the closed measures shall be taken for coal transportation.

8.3.7 A coal mine shall be equipped with noise measuring instruments. The noise of ventilators, hoists, coal cutters, heading machines and so on of an underground coal mine, excavators, piercers, mine trucks and so on of an open-pit coal mine, and crushers, sieving machines, air compressors and so on of a coal preparation plant shall be regularly monitored. The noise emission limit shall comply with Table D.5 of Appendix D.

#### 8.4 Sewage discharge

8.4.1 A sewage treatment station shall be established to dispose of mine water reasonably. The realize rainwater diversion and the clean-up diversion shall be realized in the mining area.

8.4.2 An intercepting drain (drainage channel) shall be built in the mining area and the coal storage yard, and the surface runoff water will be discharged after the sedimentation treatment according to the standard.

8.4.3 The discharge of toxic pollutants from wastewater of the coal industry, pollutants from the coal mining wastewater and pollutants from the coal preparation wastewater shall comply with the provisions of GB20426-2006. The index value of the discharge limit of toxic pollutants from wastewater of the coal industry is shown in Table D.2 of Appendix D. The index value of the discharge limit of pollutants from the coal mining wastewater is shown in Table D.3 of Appendix D. The index value of the discharge limit of pollutants from the coal preparation wastewater is shown in Table D.4 of Appendix D.

#### 8.5 Solid waste discharge

8.5.1 The technology and process of coal mining and dressing by washing shall be optimized to enhance comprehensive utilization and reduce the discharge of solid wastes such as coal gangue and coal slime.

8.5.2 The storage of solid wastes shall be reduced by resource utilization of stripped topsoil of an open-pit mine and overlying rocks of a coal seam.

### 9 Scientific and technological innovation and digital mine

#### 9.1 Basic requirements

9.1.1 A technical R&D team shall be established, the transformation of scientific and technological achievements shall be promoted, the technological transformation shall be intensified, and the upgrading of the green industry shall be promoted.

9.1.2 A digital mine shall be built. The informationization of production, operation and management of the mining enterprise shall be realized.

#### 9.2 Scientific and technological innovation

9.2.1 The scientific and technological innovation system with the enterprise as the main body and market orientation combining production, teaching and research shall be established.

9.2.2 The specialized scientific and technological personnel shall be recruited to research the key technologies which support the development of the main business of the enterprise and improve the technological level.

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9.2.3 The investment in R&D and technical innovation shall be no less than 1.5% of the main business income of the previous year.

### 9.3 Digital mine

9.3.1 The automation system of mine production shall be built, and the centralized control and information linkage of subsystems such as production and monitoring shall be realized.

9.3.2 The digital resource reserve model and economic model shall be established, the dynamic management and economic evaluation of mineral resources reserves shall be carried out, and the precision management of the reserves utilization of geological and mineral resources shall be realized.

9.3.3 The safety monitoring and control system shall be established to ensure the safety in production.

9.3.4 The mechanized reduction of personnel and the automatic substitution shall be promoted. The mining mechanization and the automation of the washing and dressing technology shall be realized.

9.3.5 The computer, intelligent control and other technologies shall be used to build the intelligent mine and realize the deep integration of informatization and industrialization.

## 10 Enterprise management and corporate image

### 10.1 Basic requirements

10.1.1 The enterprise management system of property rights, responsibilities, management, culture and other aspects shall be established.

10.1.2 The quality management system, environmental management system and occupational health and safety management system shall be established to ensure the management of quality, environment, occupational health and safety.

### 10.2 Corporate culture

10.2.1 The core values of the enterprise of people orientation, innovative learning, standard behaviors, high efficiency and safety, ecological civilization and green development shall be established. The enterprise spirit of unity and struggle, optimism, innovation, pragmatic entrepreneurship and advancement shall be cultivated.

10.2.2 The vision of enterprise development shall be consistent with the goal pursued by all the staffs. The long-term development strategy of the enterprise and the personal value of employees shall be closely integrated.

10.2.3 The trade union organization shall be improved, and it shall play an effective role. The staffs' material, sports and cultural life shall be enriched. The satisfaction of the employees of the enterprise shall not less than 70%. The occupational health inspection rate of workers exposed to occupational hazards shall not be less than 90% during their work.

10.2.4 The mechanism of synchronous growth of employees' income with the performance of the enterprise shall be established.

### 10.3 Enterprise management

10.3.1 The rules and regulations for resource management, ecological environment protection, safety production, occupational disease prevention and control and others shall be established. The working mechanism shall be defined and the duties shall be fulfilled.

10.3.2 All kinds of statements, standing books and archival data shall be complete.

10.3.3 The standardized management of safety production shall pass the compliance inspection of Level 2 and above.

10.3.4 The staff training system shall be established. The training plan and the training records shall be clear.

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#### 10.4 Enterprise credit

10.4.1 The production and operation activities and the performance of social responsibilities must be honest and trustworthy. The mining right owner shall fulfill the obligation to publicize the information about prospecting and mining, and relevant information shall be publicized.

10.4.2 Relevant information shall be disclosed on the company's website and other locations accessible by the public, mainly including: a) the environmental impact report and reply for the establishment of the enterprise and subsequent construction projects; b) the monitoring and emission data of coal gangue, mine water, dust, noise and other pollutants; and c) the contact information of the responsible department for the safety production and environmental protection of the enterprise.

#### 10.5 Harmony of enterprise and land

10.5.1 The mining concept of construction of the enterprise and land, sharing of interests and common development shall be established. A long-term cooperative mechanism shall be built by creating a community development platform. The resources and advantages of different parties shall be given full play to, and a multi-cooperative model of win-win for the social management of the mining area shall be established.

10.5.2 The investigation mechanism of mass satisfaction in the mining area shall be established. Support shall be provided in the aspect of education, employment, transportation, life and environmental protection. The quality of people's life in the mining area shall be improved, and the harmony of enterprise and land shall be promoted.

10.5.3 The mechanism of consultation and negotiation with the township and town (street) and village (community) of a mine shall be established, all kinds of interest disputes shall be handled in a proper and timely manner, and there shall be no major group event.

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Appendix A  
(normative appendix)  
Value of the recovery rate  
of coal resources

Table A.1 Recovery rate of  
the mining area

No.	Conditions of occurrence				Recovery rate of the mining area %
	Thickness of coal seam m	Dip angle of coal seam °	Grading of roof and floor	Grading of geological structure	
1	h≤1.5m	α ≤35°	I, II	Simple structure and medium structure	≥91
2				Complex and extremely complex structure	≥89
3			III, IV	Simple structure and medium structure	≥89
4				Complex and extremely complex structure	≥87
5		α > 35°	I, II	Simple structure and medium structure	≥89
6				Complex and extremely complex structure	≥87
7			III, IV	Simple structure and medium structure	≥87
8				Complex and extremely complex structure	≥85

9	1.5m < h ≤ 4m	$\alpha \leq 35^\circ$	I, II	Simple structure and medium structure	≥86
10				Complex and extremely complex structure	≥84
11			III, IV	Simple structure and medium structure	≥84
12				Complex and extremely complex structure	≥82
13		$\alpha > 35^\circ$	I, II	Simple structure and medium structure	≥84
14				Complex and extremely complex structure	≥82
15			III, IV	Simple structure and medium structure	≥82
16				Complex and extremely complex structure	≥80
17	h > 4m			$\alpha \leq 35^\circ$	I, II
18		Complex and extremely complex structure	≥79		
19		III, IV	Simple structure and medium structure	≥79	
20			Complex and extremely complex structure	≥77	
21		$\alpha > 35^\circ$	I, II	Simple structure and medium structure	≥79

22				Complex and extremely complex structure	≥77
23			Ⅲ IV	Simple structure and medium structure	≥77
24				Complex and extremely complex structure	≥75

Note: 1 The values of the indexes in the table are selected from GB/T 31089.

2 The value of the index of recovery rate in the mining area in the table shall conform to the actual characteristics of resource occurrence in different regions in the specific assessment.

Table A.2 Recovery rate of the working face

No.	Conditions of occurrence			Recovery rate of the mining area %
	Thickness of coal seam m	Dip angle of coal seam °	Grading of roof and floor	
1	h≤1.5m	$\alpha \leq 35^\circ$	I, II	≥97
2			Ⅲ IV	≥95
3	1.5m < h ≤ 4m	$\alpha > 35^\circ$	I, II	≥94
4			Ⅲ IV	≥92
5	1.5m < h ≤ 4m	$\alpha \leq 35^\circ$	I, II	≥92
6	h > 4m	$\alpha > 35^\circ$	Ⅲ IV	≥90
7			I, II	≥89
8			Ⅲ IV	≥87
9	h > 4m	$\alpha \leq 35^\circ$	I, II	≥87
10			Ⅲ IV	≥85
11		h > 4m	$\alpha > 35^\circ$	I, II
12	Ⅲ IV			≥82

Note: 1 The values of the indexes in the table are selected from GB/T 31089.

2 The value of the index of recovery rate on the working face in the table shall conform to the actual characteristics of resource occurrence in different regions in the specific assessment.

Table A.3 Value of the recovery rate of open-pit coal mine resources

The comprehensive recovery rate of resources of coal seams of an open-pit coal mine %	Thick coal seam (> 10m)	97
	Coal seam with a medium thickness (3.5 ~ 10m)	95
	Thin coal seam (< 3.5m)	93

Note: 1 The values of the indexes in the table are selected from HJ 446-2008.

Appendix B  
(normative appendix)  
The utilization rate and emission limit of  
the coal bed gas (gas of coal mine)

Table B.1 The grading, utilization scope and utilization rate of  
coalbed methane (coal mine gas)

Level	Methane content,%, V/V	Method of utilization	Utilization rate
1	≥90	Preferentially used for industrial raw materials, vehicle gas, industrial and domestic fuels, etc.	Not lower than 80%
2	≥50~90	Preferentially used for industrial raw materials, industrial and domestic fuels, power generation, etc.	Not lower than 60%
3	≥30~50	Can be used for industrial and domestic fuels, power generation, etc.	Not lower than 40%
4	< 30	On the basis of ensuring safety, it can be used for power generation, etc.	Encourage to use

Note: 1 The coalbed methane (coal mine gas) in the table does not contain the windblown mine gas whose methane content is equal to or less than 0.75%.

2 The coalbed methane level, methane content, method of utilization and utilization rate in the table are selected from GB/T 28754-2012.

Table B.2 Emission limit of coal bed gas (coal mine gas)

Controlled facilities	Controlled item	Emission limit
Ground development system of coalbed methane	Coalbed methane	The emission is prohibited

Gas drainage system of coal mine	High-concentration gas (methane concentration $\geq 30\%$ )	The emission is prohibited
	Low-concentration gas (methane concentration $< 30\%$ )	—
Return air shaft of coal mine	Windblow n mine gas	—

Note: 1 The controlled facilities, controlled item and emission limit in the table are selected from GB 21522-2008.

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Appendix C  
(normative  
appendix)  
Value of the  
utilization rate of  
mine water

The utilization rate of mine water %	Mining area with water resource shortage	100
	Mining area with general water resources	≥90
	Mining area with rich water resources (industrial water)	≥80 (100)
	Mining area with complex water quality	≥70

Note: 1 The indexes in the table are selected from HJ 446-2008.

Appendix D  
(normative appendix)  
Emission limits for  
industrial pollutants of coal

Table D.1 Dust concentration limit in  
the coal mine workplace

Type of dust	Content of free SiO <sub>2</sub> (%)	Time weighted average permissible concentration (mg/m <sup>3</sup> )	
		Total dust	Respirable dust
Coal dust	<10	4	2.5
Silicic dust	10≤~≤50	1	0.7
	50≤~≤80	0.7	0.3
	>80	0.5	0.2
Cement dust	<10	4	1.5

Note: 1 The values of the indexes in the table are selected from Article 34 of the *Regulations on the Prevention and Control of Occupational Diseases in the Workplace of Coal Mine* (No. 73 Order of State Administration of Quality and Technical Supervision).

Table D.2 Emission limits of toxic pollutants from industrial wastewater of coal

No.	Pollutant	Daily maximum permissible emission mass concentration mg/L	No.	Pollutant	Daily maximum permissible emission mass concentration mg/l
1	Total mercury	0.05	6	Total chromium	1.5
2	Total cadmium	0.1	7	Hexavalent chromium	0.5

3	Total lead	0.5	8	Fluoride	1 0
4	Total arsenic	0.5	9	Total $\alpha$	1Bq/ L
5	Total zinc	2.0	1 0	Total $\beta$	10 Bq/L

Note: 1 The index values of the daily maximum allowable emission mass concentration corresponding to pollutants in the table are selected from GB 20426-2006.

Table D.3 Emission limits of pollutants from the coal mining wastewater

No	Pollutant	Daily maximum permissible emission mass concentration mg/L	
		Existing production line	Newly built (expanded, modified) production line

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1	pH value	6~9	6~9
2	Total suspended matter	70	70
3	Chemical oxygen demand (COD <sub>Cr</sub> )	70	50
4	Petroleum	10	5
5	Total iron	7	6
6	Total manganese	4	4
Note 1: The limit of total manganese applies only to the acidic coal mining wastewater.			

Note: 1 The index values of the daily maximum allowable emission mass concentration corresponding to pollutants in the table are selected from GB 20426-2006;

2 The limit of total manganese in the table only applies to the acidic coal mining wastewater.

Table D.4 Emission limits of pollutants from the coal preparation wastewater

No	Pollutant	Daily maximum allowable emission mass concentration mg/L (except pH value)	
		Existing production line	Newly built (expanded, modified) production line
1	PH value	6 ~	6~9
2	Total suspended matter	1 0 0	70

3	Chemical oxygen demand (COD <sub>Cr</sub> )	1 0 0	70
4	Petroleum	1 0	5
5	Total iron	7	6
6	Total manganese	4	4

Note: 1 The index values of the daily maximum allowable emission mass concentration corresponding to pollutants in the table are selected from GB 20426-2006;

2 The limit of total manganese in the table only applies to the acidic coal mining wastewater.

Table D.5 Limit of noise index of the coal mine workplace

Daily time of continuous exposure to noise by a worker h	Noise level limit dB(A)
8	≤85dB(A)
4	≤88dB(A)

Note: 1 The values of the indexes in the table are selected from Article 52 of the *Regulations on the Prevention and Control of Occupational Diseases in the Workplace of Coal Mine* (No. 73 Order of State Administration of Quality and Technical Supervision).

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2 When the daily time of continuous exposure to noise by a worker in the table is equal to or less than 4 hours, the noise level limit is equal to or less than 88dB (A). It indicates that if the worker's actual noise exposure time on every working day is reduced by half the noise level limit can be increased by 3dB (A) and the hygienic standard of noise can be relaxed to 88dB (A).

non-official translation

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## References

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