

ICS 91.220
CCS P 97



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

GB 26545-2011

**Building construction machinery and equipment -- Safety
requirements of drill rigs**

建筑施工机械与设备钻孔设备安全规范

(English Translation)

Issued on: June 16, 2011

Implemented on: May 1, 2012

**Issued by: General Administration of Quality Supervision, Inspection and
Quarantine**

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1 Scope

This Standard specifies the safety requirements for the design, manufacture, use and maintenance of drill rigs, mainly involving the important operational safety and ergonomics of drill rigs.

This Standard applies to drill rigs, including casing, for surface and underground hole formation in building, tunnels, railways, roads, hydropower stations and water conservancy projects.

Note: This Standard includes the major hazards of drill rigs under the conditions of intended use and foreseeable by the manufacturer. However, this Standard does not include all mechanical, electrical, hydraulic, pneumatic and other device hazards, nor does it include all hazards involved in general standards. Hazards not included in this Standard shall be subject to the relevant provisions of GB/T

15706.1 and GB/T 15706.2.

The drill rigs to which this Standard applies mainly has the following characteristics.

- a) There are three types of drilling methods. impact, rotary and rotary impact;
- b) Chassis types include fixed, towed and self-propelled;
- c) Mainly used to form pile holes, anchor holes, blasting holes and drainage holes, etc. Specifically including the following models.
 - Drill rigs for pile formation, mainly including impact drill rigs, rotary drill rigs, long spiral drill rigs, forward/reverse circulation drill rigs, swing/rotary casing drill rigs, pile top drill rigs, down-the-hole hammer rock drill rigs, etc.;

- Drill rigs for anchoring, mainly rotary and rotary impact drill rigs;
 - Drill rigs for blasting holes, mainly including rock drills (cars), down- the-hole drills, rotary drills, etc.;
 - Drill rigs for other purposes, including rotary spindle drill rigs, rotary and rotary impact drill rigs for surface/underground drilling, forward/reverse circulation drill rigs, horizontal directional drill rigs, etc.;
- d) Casing or drilling fluid may be used to stabilize the drill hole.

Self-propelled drill rigs includes equipment with a movable chassis such as a truck, tractor or other wheeled chassis, a tracked chassis, a walking chassis, a sliding chassis (pulled by a winch), etc. Drill rigs using a truck, tractor, trailer chassis or other wheeled chassis can travel at a higher speed on the road. Its design and manufacture shall comply with the standards and regulations for both drill rigs and road transport vehicles.

If the main machine of the drill rig is an excavator, crane, etc., this type of main machine shall comply with its own standards when the requirements of this

Standard are not applicable.

If the drill rig is equipped with additional working devices other than the drilling components specified in this Standard, such as piling devices, these additional working devices shall also comply with their own safety standards.

Drill rigs used in explosive gas environments shall comply with the provisions of relevant standards for equipment used in explosive gas environments.

This Standard does not apply to drill rigs used in the petroleum and natural gas industry, or drill rigs used in open pit and underground mines.

2 Normative references

The terms in the following documents become the terms of this Standard by reference to this Standard. For dated references, all subsequent amendments (not including errata content) or revisions do not apply to this standard. However, parties to agreements that are based on this Standard are encouraged to study whether the latest versions of these documents can be used. For undated references, the latest edition applies to this Standard.

GB/T 3766, Hydraulic Fluid Power - General Rules Relating to Systems (GB/T 3766-2001, eqv ISO 4413:1998)

GB/T 3811-2008, Design rules for cranes

GB 4351.1, Portable fire extinguishers - Part 1. Performance and construction (GB

4351.1-2005, ISO 7165.1999, Fire fighting - Portable fire extinguishers - Performance and construction, NEQ)

GB 5226.1-2008, Electrical Safety of Machinery - Electrical Equipment of Machines - Part 1.General Requirements (IEC 60204-1.2005, IDT)

3 Terms and definitions

The following terms and definitions are applicable to this Standard.

3.1

danger zone

Zone in and/or around drill rigs where there is a risk of injury to persons or damage to health.

Note: For drill rig, it refers to the zone where people can come into contact with the drill rig and its working, auxiliary, rotating and landing devices when they are in operation.

3.2

working area

The area near the equipment where drilling tools are moved to complete the work.

3.3

exposed person

Personnels who are completely or partially located in the danger zone.

3.4

operator

The person who operates the drill rig to perform drilling operations. The operator can also be the person who drives the drill rig.

3.5

driver

The person who is responsible for driving the drill rig.

3.6

hook load

The actual load lifted by the lower pulley hook block, including the weight of the lower pulley hook block and the moving wire rope.

4 List of hazards

Hazards listed in Table 1 include all the hazards covered by this Standard. These hazards are determined through risk assessment of drill rigs, and measures need to be taken to eliminate or reduce them.

5.1.1 Intended use of drill rigs

When developing and designing drill rigs, the intended use shall be considered in accordance with Chapter 5 of GB/T 15706.1-2007.

5.1.2 Ergonomics

The design of drill rigs shall comply with ergonomic principles to avoid operator stress and fatigue. It shall be taken into account that the operator may wear heavy gloves, boots and other personal protective equipment. Refer to GB/T 8420 and GB/T 21935.

5.1.4 Ventilation openings

Mechanical ventilation and cooling openings shall be equipped with protective grilles or similar devices in accordance with the requirements of GB 23821 to prevent fingers or upper limbs from touching moving parts.

5.1.6 Materials

The materials used in drill rigs shall not be harmful to the safety and health of exposed person.

5.1.9 Isolation of power source

All external power sources of drill rigs shall be isolated. Isolation devices shall be clearly marked. If reconnection will endanger exposed person, the isolation device shall be able to be locked. It shall comply with GB/T 19670 and GB 5226.1-2008 5.3.

After the power source is shut off, any residual or stored energy in the circuit shall be

5.2.1 General

Driving, tramming and operating positions shall be reasonably designed and manufactured so that the operator can complete all necessary actions of driving and operating the drill rig in these positions without causing danger to himself or other people near the drill rig. The operator's body size and minimum activity space, as well as the comfortable operation area and accessible range shall meet the requirements of

GB/T 8420 and GB/T 21935.