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Safety of machinery - General safety requirements for production equipment

机械安全 生产设备安全通则

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Safety of machinery - General safety requirements for production equipment

1 Scope

This Standard specifies basic safety and occupational health requirements for production equipment.

This Standard is applicable to all in-service production equipment.

This Standard is not applicable to production equipment with regulations.

2 Normative references

The following referenced documents are indispensable 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 any amendments) applies.

GB/T 3766, *Hydraulic Fluid Power - General Rules Relating to Systems*

GB 5226.1-2008, *Electrical Safety of Machinery - Electrical Equipment of Machines - Part 1: General Requirements*

GB/T 7932, *Pneumatic fluid power - General rules and safety requirements for systems and their components*

GB/T 15706-2012, *Safety of machinery - General principles for design - Risk assessment and risk reduction*

GB/T 16754, *Safety of machinery - Emergency stop - Principles for design*

GB/T 16855.1-2008, *Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design*

GB/T 17888 (all parts), *Safety of machinery - Permanent means of access to machinery*

GB/T 18153-2000, *Safety of machinery - Temperatures of touchable surfaces - Ergonomics data to establish temperature limit values for hot surfaces*

d) other safety related tasks.

4.4 The manufacturer and manager shall maintain the production equipment according to the safe working procedures and take corresponding protective measures for the maintenance personnel. The manufacturer and manager shall keep the production equipment in a safe state throughout its life cycle.

4.5 The manufacturer and manager shall provide operators with safety and health related operating procedures.

4.6 The manufacturer and manager shall carry out the necessary safety training for all personnel using the production equipment. This training includes the methods that may be used when using the production equipment, as well as the risks that may affect health and the precautions that need to be taken during use.

4.7 The manufacturer and manager shall formulate an emergency plan for the existing risks.

5 Requirements for operator

5.1 Operator shall participate in training related to the safe use of production equipment.

5.2 Operator shall use the production equipment in accordance with the safe working procedures provided by the manufacturer and manager.

5.3 When the operator believes or finds that the production equipment is abnormal or unacceptable, he shall immediately take corresponding measures and report the relevant person in charge.

6 Basic safety requirements for production equipment

6.1 General

Measures shall be taken to reduce or eliminate risks to operators and other personnel throughout the life of the production equipment. For example, ensure that there is sufficient safety between the moving parts of the production equipment and the adjacent fixed or moving parts; install or disassemble the production equipment in a safe state according to the instructions provided by the manufacturer of the production equipment.

Control devices for production equipment shall avoid using interlocks instead of control switches to perform any conventional mechanical functions such as assembly, threading, reloading, starting or adjusting.

easily identifiable, and identified as necessary.

In addition to some necessary controls, the control of the production equipment shall be located outside the danger zone and there is no new danger to the operation of the controller. For control device, all reasonable and foreseeable operations shall not produce new danger or increase risk.

The operator shall be able to observe from the main control location or through the monitoring facility whether there is a person in the danger zone. If there is, the production equipment cannot be started

If there is a blind zone, there shall be a safety protection system. The system shall automatically issue a visual and/or audible warning signal before starting the production equipment. Personnel exposed to hazard zone shall have sufficient time and means to quickly circumvent the danger of starting or stopping production equipment.

It is only possible to start the production equipment when the controller is operated according to the intended purpose.

NOTE 1: This requirement also applies to restarts after a shutdown and control of significant changes in operating conditions (e.g. speed, pressure, etc.), unless the operator is not exposed to any hazard.

NOTE 2: This requirement does not apply to restarts or changes in operating conditions during the normal operating cycle of an automation device.

6.5 Ergonomics

Under the intended use conditions, the operator's discomfort, fatigue and physical and psychological stress shall be reduced as much as possible. Usually the following measures can be taken:

- allow the operator to change body size, strength and energy;
- provide sufficient space for the moving part of the operator's body;
- avoid machine-dependent work rates;
- avoid monitoring that requires long periods of concentration;
- adopt a human-machine interface suitable for predictable operator characteristics.

6.6 Safe stop

All production equipment shall be equipped with equipment that makes it reliable and safe to stop.

Depending on the type of hazard, each working position shall be equipped with

for mechanical press noise limits.

NOTE 2: Protection measures that reduce other risks may also reduce the risk of noise, such as protective covers that prevent both mechanical and noise emissions.

6.12 Vibration

For production equipment that generates vibration, damage caused by operator exposure to hand-transmitted vibration or whole body vibration shall be avoided. Appropriate measures can be taken to reduce risks, such as:

- choose other work methods that are less exposed to vibration risks;
- damp vibration by damping device or vibration isolating device;
- reduce the duration and intensity of exposure to vibration risks;
- arrange the operator's working hours reasonably.

6.13 Hazardous substance emission

When the production equipment has harmful substances such as gas, steam, liquid, dust, etc., measures shall be taken to reduce the risk of emissions to personnel in the workplace, for example, equip with local exhaust ventilation system that meets GB/T 35077.

6.14 Radiation

During mechanical installation, operation and cleaning, any functional radiation shall be limited to the minimum level required to ensure proper operation of the machine.

Avoid bad radiation emissions from the machine. If the machine's adverse radiation emissions cannot be avoided, appropriate protective measures shall be taken (see GB/T 26118).

6.15 Safe entry into production equipment

During installation, production, adjustment and maintenance, ensure that the operator can safely enter the production facility through a fixed facility (see GB/T 17888).

6.16 Surface temperature

The surface of the high-temperature or low-temperature components of the production equipment shall be protected from the risk of operator contact or cold heat source radiation. If necessary, the protective measures given in Annex B of GB/T 18153-2000 for protection can be chosen.

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