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Replacing GB 16454-1996

Sawing machines for metal cutting - Safeguarding specifications

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Foreword

Chapter 3, 4, 5.7 and 5.9 of this Standard are recommendatory; the rest are mandatory.

This Standard replaces GB 16454-1996 “Sawing machines - Safeguarding requirements”. GB 16454-1996 shall be abolished from the date of implementation of this Standard.

Compared with GB 16454-1996, the main changes of this Standard are as below:

- The name of the standard is change from “Sawing machines - Safeguarding requirements” to “Sawing machines for metal cutting - Safeguarding specifications”.
- Delete “sawing machines for grinding wheel” in Chapter 1 Scope.
- Add “safety of sawing machines”, “sawing machines danger” and other 8 terms in Chapter 3. Delete “machining area guard”, “machining area fence” and other 8 terms.
- Add Chapter 4 “Sawing machines danger”.
- 5.1~5.5 of Chapter 5 are newly added.
- Chapter 6 “Requirements for operation and maintenance” of 1996 edition is changed into Chapter 7 “Responsibilities” of this Standard.

The products from manufacturing enterprises shall be in accordance with this Standard since October 1, 2009. It shall stop selling the products that fail to meet this Standard since October 1, 2010.

This Standard was proposed by China Machinery Industry Federation.

This Standard shall be under the jurisdiction of National Technical Committee on Metal Cutting Machines of Standardization of China SAC/TC 22.

Drafting organizations of this Standard: Changsha Sawing Machine Research Institute, and Hunan Taijia New Material Technology Co., Ltd (Hunan Machine Tool Works).

Main drafters of this Standard: Song Anxiang, Xie Wenzhong, and Ye jun.

The historical version replaced by this Standard is as follows:

- GB 16454-1996.

Sawing machines for metal cutting - Safeguarding specifications

1 Scope

This Standard aims at the major dangers of metal sawing machines and specifies the basic safety requirements and/or measures to eliminate the dangers and reduce the risks.

This Standard is applicable to horizontal band, vertical band, circular and horizontal hack sawing machines for general purposes (hereinafter abbreviated as sawing machines).

2 Normative references

The articles contained in the following documents have become part of this Standard when they are quoted herein. For the dated documents so quoted, all the modifications (excluding corrections) or revisions made thereafter shall not be applicable to this Standard. For the undated documents so quoted, the latest editions shall be applicable to this Standard.

GB 5226.1 Safety of Machinery – Electrical equipment of machines Part 1: General technical specifications (GB 5226.1-2002, IEC 60204-1:2000, IDT)

GB/T 15706.1-2007 Safety of Machinery – Basic concepts and general principles for design Part 1: Basic terms and methods (ISO 12100-1:2003, IDT)

GB/T 15706.2 Safety of Machinery – Basic concepts and general principles for design Part 2: Technical principles (GB/T 15706.2-2007, ISO 12100-2:2003, IDT)

GB 15760 Metal Sawing Machines – General safeguarding specifications

GB/T 16769 Metal Sawing Machines – Methods for measuring noise SPL

GB/T 16856.1 Safety of Machinery – Risk evaluation Part 1: Principles (GB/T 16856.1-2008, ISO 14121-1:2007, IDT)

3 Terms and definitions

The following terms and definitions, and those established in GB/T 15706.1 and GB 15760 apply to this Standard.

3.1

4 Sawing machines danger

4.1 Danger analysis and risk evaluation shall be conducted on sawing machines in accordance with the provisions of Chapter 5 of GB/T 15706.1-2007 and GB/T 16856.1. Identify and evaluate the dangers of sawing machines.

Note: for the dangers not involved in this Standard, safety measures shall be taken in accordance with relevant provisions of GB/T 15706.2.

4.2 During danger analysis, special attention shall be paid on the dangers caused by the operators and other personnel's misuse, including:

- operating period of sawing machines;
- adjustment, cleaning and maintenance periods of sawing machines.

4.3 Major dangers of sawing machines

4.3.1 Mechanical danger

4.3.1.1 The danger of squeezing or cutting caused during clamping the work-piece or changing the cutting tools.

4.3.1.2 The danger of squeezing between saw frame and operating vise, saw frame and working bench, saw frame and upright rod, saw blades box and operating vise or upright rod, saw arm and operating vise.

4.3.1.3 When saw frame, operating vise, saw blades box, saw arm and other parts are lifted or shifted, the danger of cutting or squeezing between these parts and positioning surface.

4.3.1.4 The sharp edges, sharp points and openings among components of sawing machines that may cause cutting dangers to operators.

4.3.1.5 If the operators touch the working cutting tools with hands, it may cause cutting dangers.

4.3.1.6 When the operators operate machines manually (such as during loading, disassembling work-piece or measuring), if they are close to rotating cutting tools, it may cause winding dangers.

4.3.1.7 Exposed gear, belt pulley, belt etc. that are easy to cause winding dangers.

4.3.1.8 When the units are shifted, exposed wires (turns), hydraulic pipes, cooling water pipes etc. that may cause winding dangers due to the inappropriate fixing measures.

4.3.1.9 It may cause inhaled or involved danger between high rotating cutting tools and

4.3.5 Dangers caused by interrupt of energy supply, damage of components and other dysfunctions

4.3.5.1 The accidental electricity interruption may cause work-piece falling.

4.3.5.2 If the cutting tools broke or crack, the fragments may burst out and cause dangers.

4.3.5.3 The accidental burst of hydraulic pipe may cause emission of oil fluids.

4.3.5.4 The accidental activation of mobile components and uncontrolled movement.

4.3.5.5 Mobile components stop and are blocked.

4.3.5.6 Dysfunctions of protective device.

4.3.5.7 Mistakes in motor program caused by assembling error of control elements may cause dangers.

4.3.5.8 Misdirection of machine running may cause dangers.

4.3.6 Dangers caused by mistakes of safety measures, incorrect installation of safety devices or incorrect positioning

4.3.6.1 Loose and non-durable guard structure or too large openings may cause dangers.

4.3.6.2 Improper design of guard structure may cause dangers, for example, it may block the sight or cause additional extrusion or cutting area.

4.3.6.3 Improper limiting position of guard device or non-effective limiting may cause dangers.

4.3.6.4 Unreliable interlocking device may cause dangers.

4.3.6.5 Vague (uneasy to be identified) signs or improper distribution of signs on start and stop devices may cause faulty operations and dangers.

4.3.6.6 Dysfunctions of start and stop devices caused by circuit faults may cause dangers.

4.3.6.7 There is no safety signal and signal device on sawing machines, or safety signals and signal devices are not easily understood. It may cause dangers.

4.3.6.8 There is no safety signal and warning device on sawing machines, or safety signals are not easily understood and warning devices lose efficacy. It may cause dangers.

4.3.6.9 Dangers caused by that emergency-stop devices are not easily identified.

4.3.6.10 If the installation position of emergency-stop device is far away from danger area, it may cause dangers.

obvious positions of sawing machines.

6 Safety protection requirements for various kinds of sawing machines

6.1 Horizontal band sawing machine and vertical band sawing machine

6.1.1 Protect the saw blades effectively and rationally. The protections for sawing wheel, belt pulley and saw blade (excluding machining area) shall adopt fixed and/or adjustable guard devices.

6.1.2 When horizontal band sawing machine and vertical band sawing machine are operating, the guard for machining area shall be adjusted to keep the minimum safe distance with work-piece, which means keeping as close as possible to work-piece.

6.1.3 For the cover fillet (or cushion block) used on work-bench of vertical band sawing machine, the intervals on both sides of saw blade shall not more than 3mm.

6.1.4 Provide machining area equipment for the manual feed on vertical band sawing machine, in order to avoid hands or fingers into machining area.

6.1.5 The feed sections on pulley-block type vertical band sawing machine shall be equipped with limiting device; the device shall be reliable.

6.2 Circular sawing machine

6.2.1 Circular sawing machine shall be equipped with fixed and/or mobile and/or adjustable safety guard devices. The design and manufacture of safety guard device for saw web shall meet the following requirements:

- a) The strength of fasteners shall be greater than that of safety guards;
- b) Restrict the maximum diameter of saw blade;
- c) Appropriate openings that do not produce accidents and measures for cleaning saw-dust shall be provided;
- d) The exposed section of circular saw blade shall not longer than the safety range of using the maximum cutting capacity.

6.2.2 The design of safety guard and safety shield of saw blades shall comply with the exposed section of circular saw blade; the positions of guard and shield shall be as close as possible to the front-use operating position.

6.2.3 The design and manufacture of principle shaft shall meet the following requirements:

7.1.1 Manufacturer shall be responsible for eliminating and/or controlling dangers from designs and structures of sawing machine and accompanied auxiliary equipment.

7.1.2 Manufacturer shall be responsible for the safety of sawing machine and accompanied auxiliary equipment.

7.1.3 Manufacturer shall be responsible for the information and recommendations provided to users.

7.2 User

7.2.1 Users shall pass through the training of safety operation of sawing machine, and familiarize and grasp the content of safety operation.

7.2.2 Users shall be responsible for the safety of the clamps, tooling and auxiliary equipment added by themselves, and be responsible for the dangers caused by them. Users shall also be responsible for the safety and dangers of original sawing machine, tooling and auxiliary equipment after being changed or modified by themselves.

7.2.3 Users shall be responsible for the dangers caused by the operation, adjustment, maintenance, installation, storage and transportation of sawing machine, if they fail to follow the instructions.

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