

ANSI B11.10 – 2003 (R2020)

American National Standard

Safety Requirements for Metal Sawing Machines

ANSI-Accredited Standards Developer and Secretariat:



B11 Standards, Inc.
POB 690905
Houston, TX 77269, USA

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Board of Standards Review



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Foreword (This foreword is not part of the requirements of American National Standard B11.10-2003 (R2020)).

The primary objective of this standard is to eliminate or control hazards to personnel associated with metal sawing machines by establishing requirements for the construction, operation and maintenance of these machines. To accomplish this objective, responsibilities have been assigned to the supplier (e.g., manufacturer, rebuilder, modifier, installer, integrator), the user, and personnel in the working environment.

Metal sawing machines and associated equipment technologies are continuously evolving. This standard reflects the most commonly used and time-tested state of the art at the time of its approval. The inclusion or omission of language relative to any evolving technology, either in the requirements or explanatory area of this standard, in no way infers acceptance or rejection of such technologies.

The words "safe" and "safety" are not absolutes. Safety begins with good design. While the goal of this standard is to eliminate injuries, it is recognized that risk factors cannot be practically reduced to zero in any human activity. This standard is not intended to replace good judgment and personal responsibility. Operator skill, attitude, training, job monotony, fatigue and experience are safety factors that must be considered by the user.

Inquiries with respect to the application or the substantive requirements of this standard and suggestions for its improvement are welcomed, and should be sent to B11 Standards, Inc., POB 690905, Houston TX 77269, Attention: B11 Secretariat.

EFFECTIVE DATE

The following is informative guidance only, and not a normative part of this standard. This Subcommittee recognizes that some period of time after the approval date on the title page of this document is necessary for suppliers and users to develop new designs, or modify existing designs or manufacturing processes in order to incorporate the new or revised requirements of this standard into their product development or production system.

This Subcommittee recommends that suppliers complete and implement design changes within 30 months of the approval of this standard.

For existing or modified machines, users should confirm that the equipment / process has tolerable risk using generally recognized risk assessment methods. If the risk assessment shows that modification(s) is necessary, refer to the requirements of this standard to implement protective measures for appropriate risk reduction.

This standard was prepared by the B11.10 Subcommittee, processed and submitted for ANSI approval by the B11 Accredited Standards Committee on Safety Standards for Machine Tools. Committee approval of this standard does not necessarily imply that all committee members voted for its approval. At the time this standard was approved as an American National Standard, the ANSI B11 Accredited Standards Committee was composed of the following member organizations:

John W. Russell, PE, CSP Chairman
Gary D. Kopps, Vice-Chairman
David A. Felinski, Secretary

Organizations Represented

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Alliance of American Insurers
American Institute of Steel Construction
American Society of Safety Engineers
Association For Manufacturing Technology
Automotive Industry Action Group
Can Manufacturers Institute
General Motors Corporation
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Metal Building Manufacturers Association
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Tooling and Manufacturing Association	Daniel Kiraly	Jeffery W. Hayes
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At the time this standard was approved, the ANSI B11 ASC **B11.10 Subcommittee** had the following members who participated in the development of this revision:

Jim Cunningham, Chairman	John Bloodgood, PE	JFB Enterprises
Armstrong - Blum	Tony Bratkovich, PE	AMT
David Felinski, Secretary	Dennis Cloutier, CSP	Cloutier Consulting
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	Bob Klingerman	Savage Saws
	Lanny Landale	Dake
	Bruce Main, PE	design safety engineering
	Eric Offerdahl, CSP	Aegis Safety Consulting
	Pat Whitehead	Hyd Mechanical Group

Explanation of the format of this standard, and ANSI B11 conventions

This ANSI B11.10 – 2003 (R2020) American National Standard is divided into parts formerly referred to as sections or chapters and now referred to as clauses in line with the new ANSI style manual. Major divisions of clauses are referred to as subclauses and, when referenced by other text in the standard, are denoted by the subclause number (e.g., see 5.1).

The standard uses a two-column format to provide supporting information for requirements. The material in the left column is confined to “Standards Requirements” only, and is so captioned. The right column, captioned “Explanatory Information” contains information that the writing Subcommittee felt would clarify the standard. This column should not be construed as being a part of this American National Standard.

B11 conventions: Operating rules (safe practices) are not included in either column of this standard unless they are of such nature as to be vital safety requirements, equal in weight to other requirements, or guides to assist in compliance with the standard. The B11 standards do not use the term “and/or” but instead, the term “OR” is used as an inclusive disjunction, meaning *one or the other or both*. A distinction between the terms “*individual*” and “*personnel*” is drawn. Individual includes personnel (employees, subcontractors, consultants, or other contract workers under the indirect control of the supplier or user) but also encompasses persons who are not under the direct or indirect control of the supplier or user (e.g., visitors, vendors, etc.). Gauge refers to a measuring or testing instrument; gage refers to limiting device (e.g., backgage).

As in all American National Standards, the term “SHALL” denotes a requirement that is to be strictly followed in order to conform with this standard; no deviation is permitted. The term “SHOULD” denotes a recommendation, a practice or condition among several alternatives, or a preferred method or course of action.

Similarly, the term “CAN” denotes a possibility, ability or capability, whether physical or casual, and the term “MAY” denotes a permissible course of action within the limits of the standard.

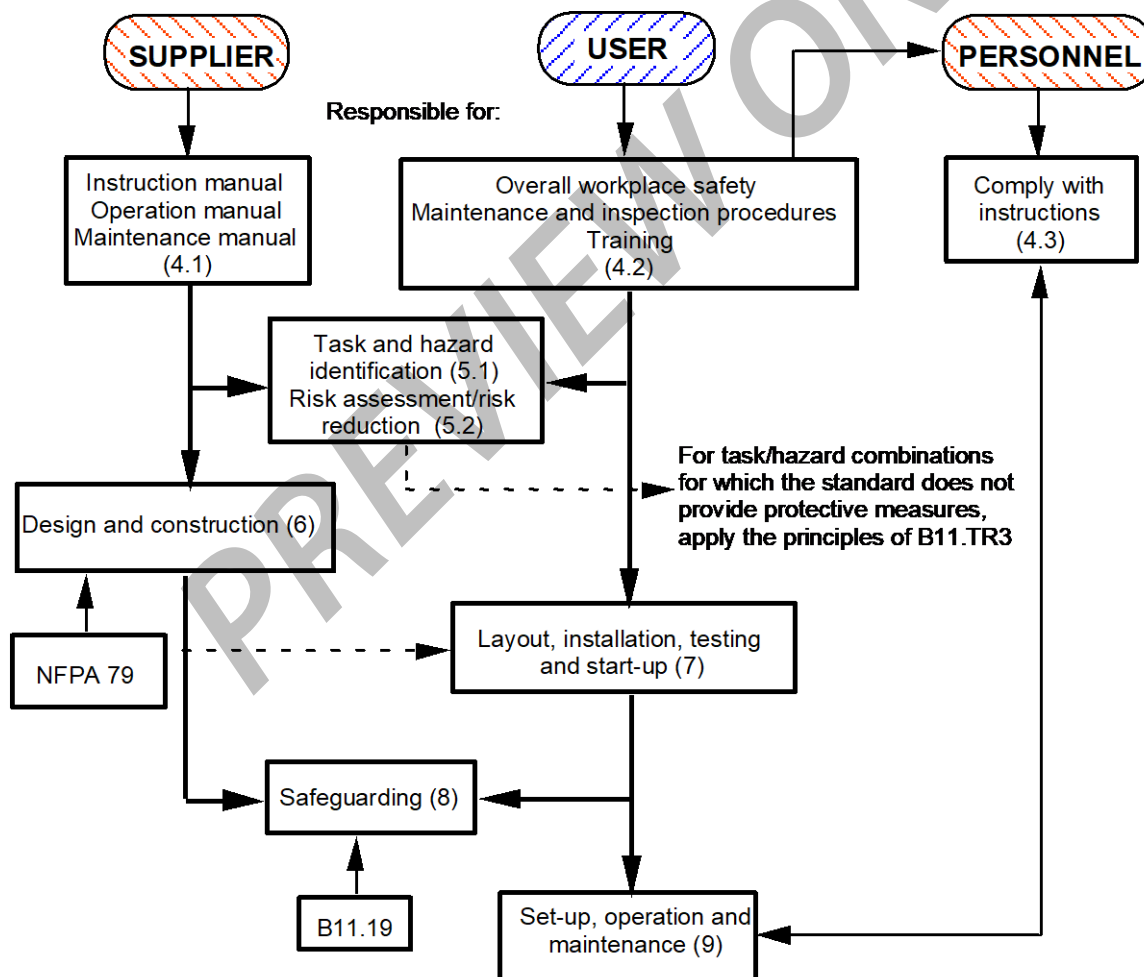
Suggestions for improvement of this standard will be welcome. They should be sent to B11 Standards, Inc., POB 690905, Houston TX 77269, USA - Attention: B11 Secretariat.

Introduction

The primary purpose of every machine tool is to process parts. This is accomplished by the machine imparting process energy onto the workpiece. It is during this interaction between the machine and the workpiece where inadvertent interference with, or accidental misdirection of the released process energy can potentially cause injury. Hazards exist that may result in injury during production, maintenance, commissioning and de-commissioning.

The purpose of the ANSI B11 series machine tool safety standards is to devise and propose ways to minimize risks of the potential safety hazards. This can be accomplished either by an appropriate machine design, by restricting personnel or other individuals' access to hazard areas, and by devising work procedures to minimize personnel exposure to hazardous situations. This is the essence of the ANSI B11 safety standards.

The responsibility for the alleviation of these risks is divided between the equipment supplier, the equipment user and its operating personnel, as follows (numbers in parentheses refer to the clause numbers in these standards which address that responsibility):



American National Standard for Machine Tools –
Safety Requirements for Metal Sawing Machines
with or without Automatic Control

STANDARDS REQUIREMENTS**EXPLANATORY INFORMATION**

(Not part of the requirements of this American National Standard for Machine Tools – Safety requirements for Metal Sawing Machines (ANSI B11.10 – 2003 (R2020))

1 Scope**1.1 General**

This American National Standard specifies safety requirements for the design, construction, modification, operation and maintenance (including installation, dismantling and transport) of a general class of stationary machine tools that use a saw blade (tool) to cut off or change the shape of the workpiece.

This standard also applies to ancillary devices integrated into the machine (e.g., part handling mechanisms, chip handling systems).

1.2 Sawing machines included

Sawing machines included in this standard use toothed blades and include circular saws, bandsaws and hacksaws.

1.2.1 General description

Machines of this general class are capable of moving a saw blade across a workpiece surface, causing a cutting action and relative feeding motion between blade and workpiece, as metal is removed in such a manner as to cause the workpiece to be parted, slotted, or to change its shape.

NOTE – Friction cutting of metal could be performed with most of the described types of band and circular metal sawing machines and is part of this standard.

1.2.2 Band sawing machines

Sawing machines of this general class utilize a band saw blade traveling over the rims or periphery of two or more band wheels, one or more of which is power driven, and produce a cutting action on a workpiece by applying the cutting edge of the band saw blade to the workpiece.

1.2.2.1 Horizontal band saw

A sawing machine of this class consists of a head assembly that carries the band wheels and the band saw blade, and is mounted on a work support table. Cutting action is produced by a downward motion of the head and is in a vertical plane, owing to twisting of the band saw blade through guides.

E1.1

NOTE - For purposes of this standard, the terms *machine* and *machine tool* refer to metal sawing machines.

E1.2

These sawing machines include a variety of configurations, e.g., horizontal, vertical, chop, swing and angular.

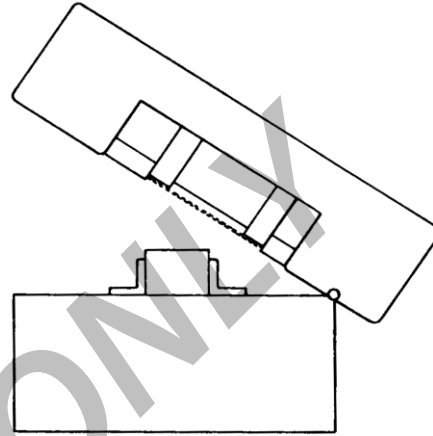
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STANDARD REQUIREMENTS

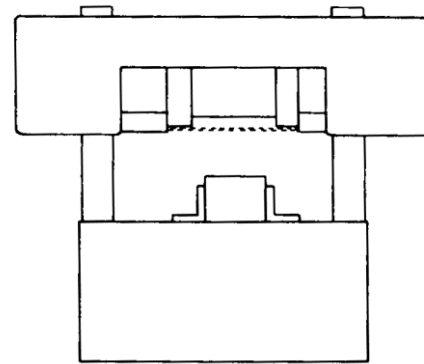
1.2.2.1.1 Horizontal band saw – Hinge-type

The head of this type of machine is pivoted at one end, producing a hinge– or scissor–type downward motion.

EXPLANATORY INFORMATION

E1.2.2.1.1**Figure 1 – Hinge-type horizontal band saw****1.2.2.1.2 Horizontal band saw – Column-type**

The head of this type of machine is mounted on one or more vertical columns and travels downward on these columns in a vertical plane.

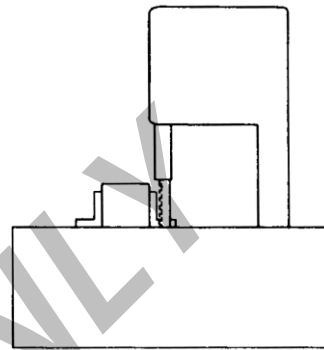
E1.2.2.1.2**Figure 2 – Column-type horizontal band saw****1.2.2.2 Vertical band saw**

A metal sawing machine of this class consists of an assembly or frame carrying the band wheels and the band saw blade. The assembly is mounted in order to have the cutting portion of the blade in a vertical line. The cutting action is produced by feeding the work horizontally into the saw blade, or feeding the assembly horizontally toward the workpiece.

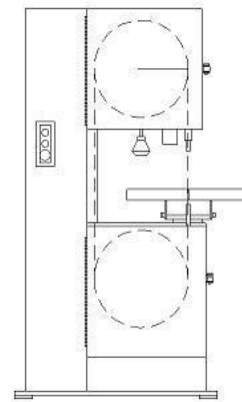
STANDARD REQUIREMENTS

1.2.2.2.1 Vertical cutoff band saw

This type of machine has either a horizontally moving table or frame assembly. The work is normally clamped on the table, and relative horizontal feed motion causes the saw blade to cut the workpiece.

E1.2.2.2.1**Figure 3 – Vertical cutoff band saw****1.2.2.2.2 Vertical contour band saw**

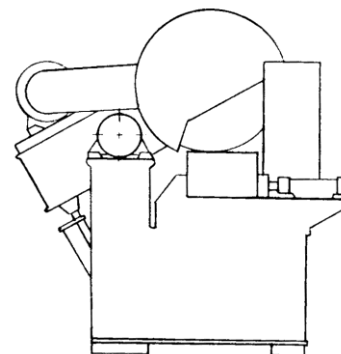
The frame assembly of this type of machine is fixed, and cutting action takes place when the workpiece is moved into the cutting tool. The cutting path may be curved or straight. Miter cutting is usually achieved by tilting the work support.

E1.2.2.2.2**Figure 4 – Vertical contour band saw****1.2.3 Circular saw**

Metal sawing machines of this general class are machines utilizing a power-driven rotating spindle on which is mounted a circular saw blade. The rotating action of the circular saw blade periphery against the work causes a cutting action.

1.2.3.1 Chop saw

Circular metal sawing machines of this general class are machines on which the spindle and circular saw blade are mounted to a fulcrum arm that pivots from a point behind the workplace and approaches the workpiece in an arc.

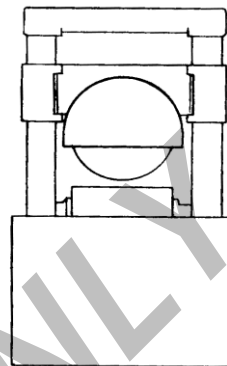
E1.2.3.1**Figure 5 – Circular chop saw**

STANDARD REQUIREMENTS

1.2.3.2 Vertical circular saw

Circular metal sawing machines of this general class are machines on which the spindle and circular saw blade are mounted to a carriage that approaches the workplace in a straight vertical line from either above or below the workpiece.

EXPLANATORY INFORMATION

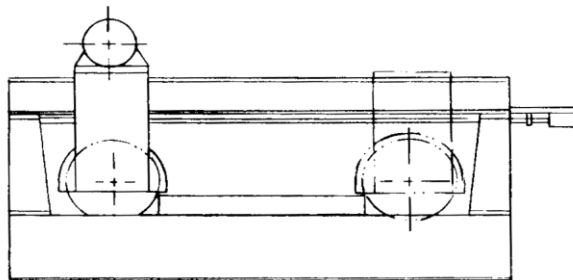
E1.2.3.2**Figure 6 – Vertical circular saw****1.2.3.3 Horizontal circular saw**

Circular metal sawing machines of this general class are machines on which the spindle and circular saw blade are mounted to a carriage that approaches the workpiece in a straight horizontal line, either from above or below the worktable.

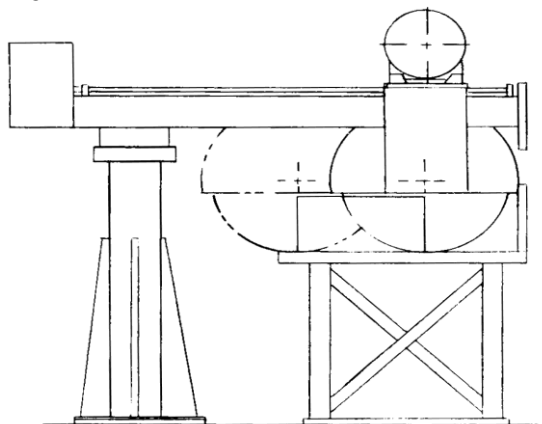
E1.2.3.3

This general classification of horizontal circular metal saws includes those commonly referred to as:

- billet or bar cut-off;
- plate,
- panel, or traverse-type cutoff;
- straight horizontal cutoff; and
- horizontal flying cutoff.

**Figure 7 – Horizontal circular saw****1.2.3.4 Radial circular saw**

Circular radial sawing machines of this general class are machines on which the spindle and circular saw blade are mounted to a carriage traveling on an overhead support that swivels. Its approach is from above and behind the workpiece.

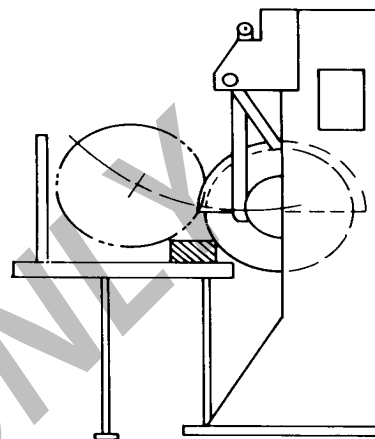
E1.2.3.4**Figure 8 – Radial circular saw**

STANDARD REQUIREMENTS

1.2.3.5 Swing-type circular saw

Circular swing-type sawing machines of this general class are machines on which the spindle and circular saw blade are mounted on a fulcrum arm that pivots from a point either above or below the workpiece and approaches the piece in an arc.

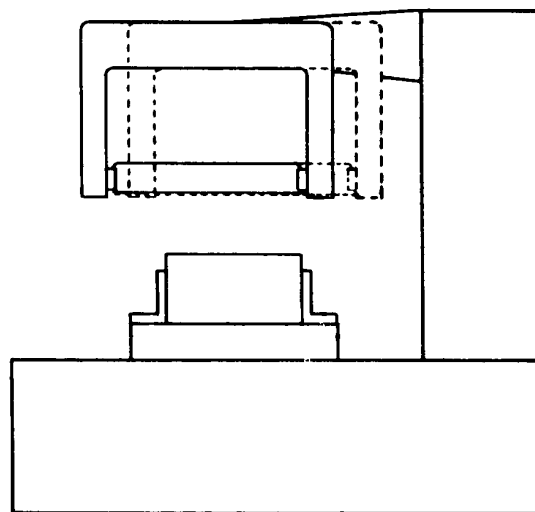
EXPLANATORY INFORMATION

E1.2.3.5**Figure 9 – Swing-type circular saw****1.2.4 Hacksaw machines**

Sawing machines of this general class consist of a supported reciprocating frame and saw blade, mounted to a machine base and work support. A feeding motion to the supporting component causes the saw blade to enter the fixed workpiece, producing a sawing action to part the workpiece.

1.2.4.1 Horizontal – Column-type hacksaw

The supporting component, which carries the reciprocating frame and saw blade, is mounted on one or more vertical columns and travels on the column(s) to enter the workpiece from above and then travels downward in a vertical plane while sawing the workpiece.

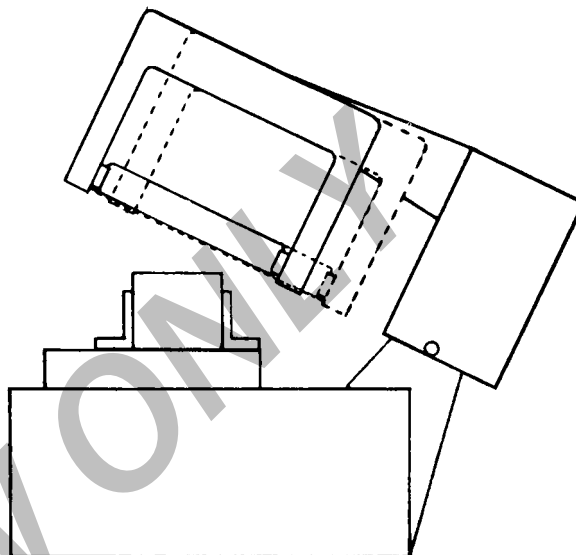
E1.2.4.1**Figure 10 – Column-type, horizontal hacksaw**

STANDARD REQUIREMENTS

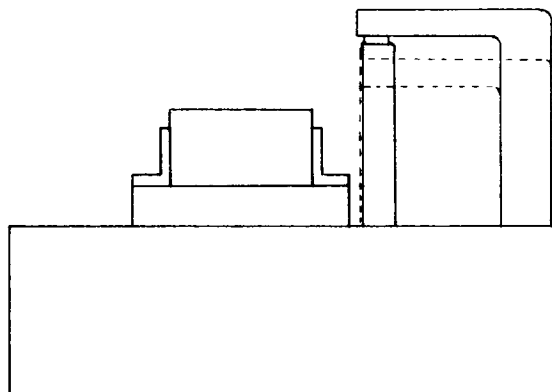
1.2.4.2 Horizontal – Hinge-type hacksaw

The supporting component, which carries the reciprocating frame and saw blade, is mounted at one end of the work support, producing a hinge– or scissor–type downward motion to enter the workpiece from above and arc downward in a vertical plane while sawing the workpiece.

EXPLANATORY INFORMATION

E1.2.4.2**Figure 11 – Hinge-type horizontal hacksaw****1.2.4.3 Vertical hacksaw**

The supporting component, which carries the reciprocating frame and saw blade, is mounted to a work support. The frame reciprocates in a vertical plane. Feeding motion of the supporting component allows the vertically reciprocating saw blade to enter the fixed workpiece from the side and travel in a horizontal plane while sawing the workpiece.

E1.2.4.3**Figure 12 – Vertical hacksaw****1.3 Sawing machines excluded**

The following sawing machines are specifically excluded from the scope of this standard:

- Woodworking sawing machines;
- Stonecutting sawing machines;
- Food-processing sawing machines;
- Abrasive-sawing machines;
- Portable by-hand sawing machines.