ANSI B11.23–2002

American National Standard for Machine Tools –

Safety Requirements for Machining Centers and Automatic, Numerically Controlled Milling, Drilling and Boring Machines

Secretariat and Accredited Standards Developer:

The Association For Manufacturing Technology
7901 Westpark Drive
McLean, VA 22102

Approved: June 14, 2002

by the American National Standards Institute, Inc.

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Foreword (This Foreword is not part of the requirements of American National Standard B11.23-2002)

The primary objective of this standard is to eliminate or control hazards to personnel associated with machining centers and automatic numerically controlled milling, drilling and boring 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, reconstructor, installer, integrator), the user, and personnel in the working environment.

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.

Machining centers and automatic numerically controlled milling, drilling and boring 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.

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 the AMT – The Association For Manufacturing Technology, 7901 Westpark Drive, McLean, Virginia 22102-4206, Attention: B11 Secretariat.

This standard was prepared by the B11.23 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	***Name of Representative(s)***	
	Delegate	**Alternate**
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Aluminum Extruders Council	Jeff Dziki	Martin Bidwell
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AMT – The Association For Manufacturing Technology	Russell Bensman	
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General Motors Corporation	Michael Taubitz	
Graphic & Product Identification Mfgs. Assn.	Donald Root	
International Association of Machinists & Aerospace Workers, District Lodge 142	Jim Soptic	Ken Hass
Intl. Union, United Automobile, Aerospace and Agricultural Implement Workers of America (UAW)	Jim Howe, CSP	Luiz Vazquez
Machinery Dealers National Association	John Stencel, III	James Heppner, Jr.

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National Fluid Power Association	June VanPinsker	
National Institute for Occupational Safety & Health	John Etherton, PhD, PE	
National Tooling and Machining Association	Andy Levine	Richard R. Walker
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Sheet Metal and Air Conditioning Contractors' National Association	James T. Strother	Tom J. Meighen
Tooling and Manufacturing Association	Jeffery W. Hayes	Bruce C. Braker
Unified Abrasives Manufacturers' Association, Bonded Division	Charles S. Conant	
U.S. Department of the Navy (NAVSEA)	William Riley	William Aberg

At the time this standard was approved, the ANSI B11 ASC **B11.23 Subcommittee** had the following members who participated in the development of this standard:

Name	**Company**	**Title**
Miles Loretta	Cincinnati-Milacron	Chairman
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Anthony M. Bratkovich, PE	AMT	Administrator
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Mark Vetty	Okuma	

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

This ANSI B11.23 – 2002 American National Standard is divided into parts formerly referred to as sections or chapters and now referred to as clauses in line with the current 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 “Standard Requirements” only, and is so captioned. The right column, captioned "Explanatory Information" contains information that the writing Subcommittee believed would help clarify the standard. This column should not be construed as being a part of the requirements of this American National Standard.

As in all American National Standards, the term “SHALL” denotes a requirement that is to be strictly followed in order to conform to 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 causal, and the term “MAY” denotes a permissible course of action within the limits of the 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).

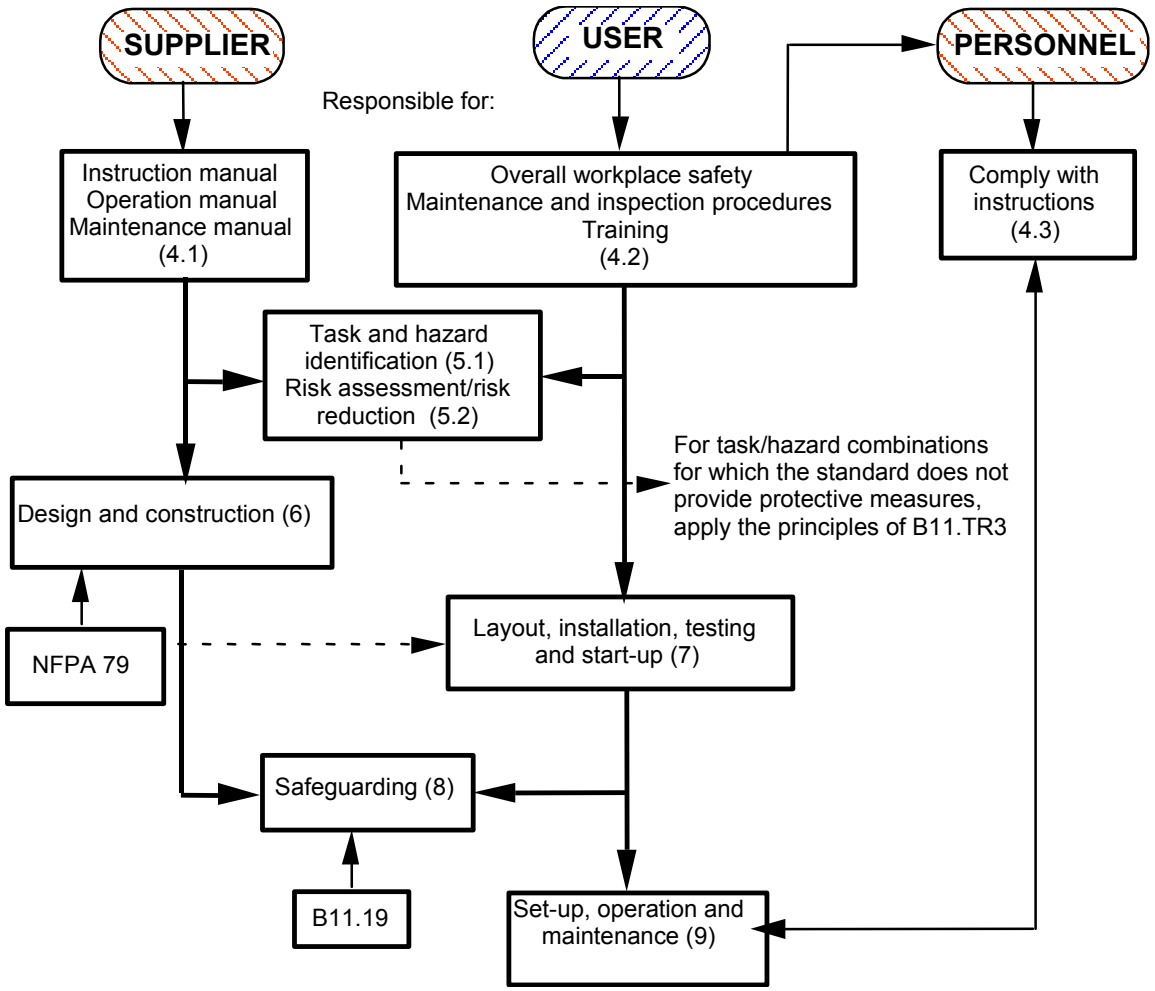
Suggestions for improvement of this standard will be welcome. They should be sent to AMT-The Association For Manufacturing Technology, 7901 Westpark Drive, McLean, VA 22102 - Attention: B11 Secretariat.

Introduction

The primary purpose of every machine tool is to process parts. This is accomplished by the machine imparting process energy onto the workpiece. Inadvertent interference with, or accidental misdirection of the released energy during production, maintenance, commissioning and de-commissioning may result in injury.

The purpose of the ANSI B11 series of machine tool safety standards is to devise and propose ways to minimize risks of the potential hazards. This can be accomplished 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 series of safety standards.

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



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STANDARD REQUIREMENTS

EXPLANATORY INFORMATION

(This column is not part of the requirements of this American National Standard for Machine Tools – Safety Requirements for Machining Centers and Automatic, Numerically Controlled Milling, Drilling and Boring Machines, ANSI B11.23-2002).

1 Scope

E1

This standard specifies the safety requirements for the design, construction, operation and maintenance (including installation, dismantling, and transport) of machining centers and automatic numerically controlled milling, drilling and boring machines (see 3.1).

This standard is not intended to cover safety requirements of manufacturing systems/cells (see B11.20).

This standard is applicable to machines where the axes of travel is not greater than 1x1x1 m (39x39x39 in.).

Larger machines may comply with this standard or use other effective means to reduce the risks associated with the identified hazards.

1.1 Machining center

A machining center is a numerically controlled machine tool with automatic tool changing capability and work support means capable of multiple functions of drilling, milling, boring or any combination of these operations normally utilizing a rotating tool. This machine operates in a continuous sequence of movements under numerical control (NC).

E1.1

A machining center can also include, but is not limited to, functions such as gaging, burnishing, grinding and machining operations that are not covered in this standard. A machining center may have one or more spindles, work stations and may include an automatic work changing means.

NOTE - The terms machine and machinery as used throughout this standard mean machining center.

2 Normative references

The following normative documents contain provisions that, through reference in this text, constitute provisions of this American National Standard. At the time of publication, the editions indicated were valid.

E2 Informative references

All normative documents are subject to revision and users of this standard are encouraged to investigate applying the most recent revisions of the normative references listed in clause 2.

The following documents (this column, below) are listed for information only, and are not essential for the completion of the requirements of this standard:

ANSI Z 244.1-1982, *Safety Requirements for the Lock Out/Tag Out of Energy Sources*

ANSI B11.TR1 – 1994 Ergonomic Guidelines for the Design and Installation of Machine Tools

ANSI B93.114M, *Pneumatic Fluid Power – Systems Standard for Industrial Machinery*

ANSI B11.TR2 – 1997 Mist Control Considerations for the Design, Installation and Use of Machine Tools Using Metalworking Fluids