

ANSI B11.11-2001

# American National Standard

## *Safety Requirements for Gear and Spline Cutting Machines*

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**American National Standards Institute**  
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**Designation**

**Approved American National Standards**

**ANSI-**

B11.1-2001		<i>Safety Requirements for Mechanical Power Presses</i>
B11.2-1995	(R2000)*	<i>Hydraulic Power Presses – Safety Requirements for Construction, Care and Use</i>
B11.3-2002		<i>Safety Requirements for Power Press Brakes</i>
B11.4-1993		<i>Shears – Safety Requirements for Construction, Care and Use</i>
B11.5-1988	(R1994)*	<i>Iron Workers – Safety Requirements for Construction, Care and Use</i>
B11.6-2001		<i>Safety Requirements for Manual Turning Machines with or without Automatic Control</i>
B11.7-1995	(R2000)*	<i>Cold Headers and Cold Formers – Safety Requirements for Construction, Care and Use</i>
B11.8-2001		<i>Safety Requirements for Drilling, Milling, and Boring Machines</i>
B11.9-1975	(R1997)*	<i>Grinding Machines – Safety Requirements for Construction, Care and Use</i>
B11.10-1990	(R1998)*	<i>Metal Sawing Machines – Safety Requirements for Construction, Care and Use</i>
B11.11-2001		<i>Safety Requirements for Gear &amp; Spline Cutting Machines</i>
B11.12-1996		<i>Roll Forming and Roll Bending Machines – Safety Requirements for Construction, Care and Use</i>
B11.13-1992	(R1998)*	<i>Single- and Multiple-Spindle Automatic Screw/Bar and Chucking Machines – Safety Requirements for Construction, Care and Use</i>
B11.14-1996		<i>Coil Slitting Machines/Systems – Safety Requirements for Construction, Care and Use</i>
B11.15-2001		<i>Safety Requirements for Pipe, Tube, and Shape Bending Machines</i>
B11.16-1988		<i>Metal Powder Compacting Presses – Safety Requirements for Construction, Care and Use (WITHDRAWN)</i>
B11.17-1996		<i>Horizontal Hydraulic Extrusion Presses – Safety Requirements for Construction, Care and Use</i>
B11.18-1997		<i>Machinery and Machine Systems for the Processing of Strip, Sheet, or Plate from Coiled Configurations – Safety Requirements for Construction, Care and Use</i>
B11.19-1990	(R1997)*	<i>Performance Criteria for the Design, Construction, Care and Operation of Safeguarding when Referenced by the other B11 Machine Safety Standards</i>
B11.20-1991	(R1997)*	<i>Manufacturing Systems/Cells – Safety Requirements for Construction, Care and Use</i>
B11.21-1997		<i>Machine Tools Using Lasers for Processing Materials – Safety Requirements for Construction, Care and Use</i>

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B11.TR3-2000		<i>Risk Assessment and Risk Reduction – A Guide to Estimate, Evaluate and Reduce Risks Associated With Machine Tools</i>

\* = Standard that has been reaffirmed by the ANSI B11 Accredited Standards Committee, and the year of reaffirmation. The date next to the standard designation is its last revision.

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## **ANSI B11.11–2001**

*American National Standard for Machine Tools –  
Safety Requirements for Gear  
and Spline Cutting Machines*

Secretariat and Accredited Standards Developer:

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

**Approved: DECEMBER 21, 2001**

**American National Standards Institute, Inc.**

## American National Standard

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**Foreword** (This foreword is not part of the requirements of American National Standard B11.11-2001)

The primary objective of this standard is to eliminate or control hazards to personnel associated with gear and spline cutting 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.

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.

Manual turning machines and associated equipment technologies are continuously evolving. This standard is reflective of 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 areas 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 B11.6 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  
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**Organizations Represented**

**Name of Representative(s)**

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International Association of Machinists & Aerospace Workers, District Lodge 142	Jim Soptic	Ken Hass
International Union, United Automobile, Aerospace and Agricultural Implement Workers of America (UAW)	Jim Howe, CSP	Luiz Vazquez
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Unified Abrasives Manufacturers' Assoc., Bonded Div.	Charles S. Conant	
U.S. Department of the Navy (NAVSEA)	William Aberg	William E. Riley

At the time this standard was approved, the ANSI B11 ASC **B11.11 Subcommittee** had the following members who participated in the development of this revision:

<b>Name</b>	<b>Company</b>	<b>Title</b>
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John F. Bloodgood, PE	JFB Enterprises	Secretary
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Richard A. Denison	Gleason	
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## Explanation of the format of the standard

This ANSI B11.11 – 2001 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.

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.

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.

By convention, 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*.

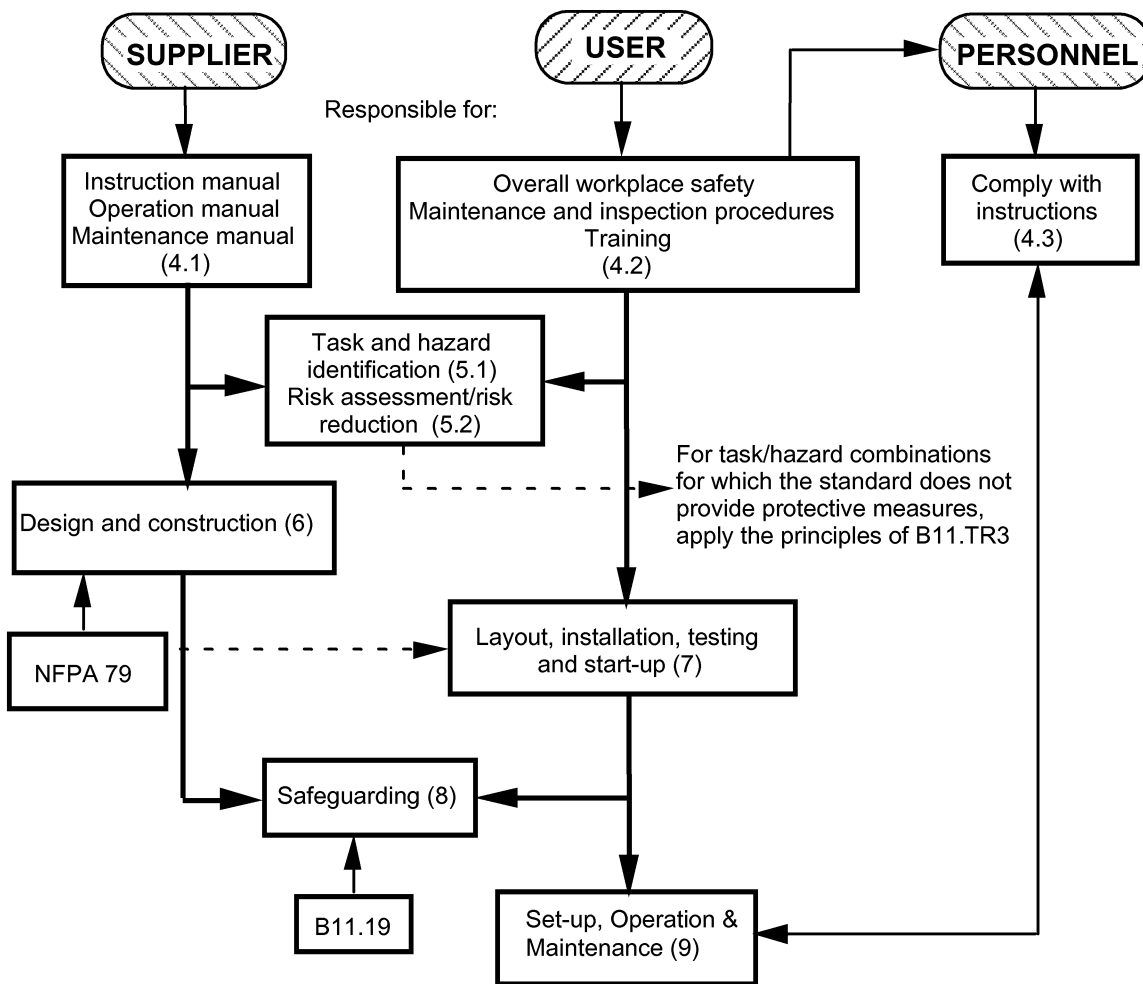
Suggestions for improvement of this standard will be welcome. They should be sent to AMT-The Association For Manufacturing Technology, 7901 Westpark Drive, McLean, VA 22102 - Attention: B11 Secretariat.

## 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 primary 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 and 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):



# *American National Standard for Machine Tools – Safety Requirements for Gear and Spline Cutting Machines*

## **STANDARDS REQUIREMENTS**

### **1 Scope**

This standard specifies safety requirements for the design, construction, operation and maintenance (including installation, dismantling and transport) of gear and spline cutting machines (see 3.1).

The requirements of this standard apply to machines with single or multiple spindles that are specifically constructed to produce gear teeth by the process of hobbing, milling, shaping, and broaching. It also applies to those machines that shave, hone, lap, or chamfer gear teeth and machines used to produce ratchet, spline, or sprocket teeth.

#### **1.1 Exclusions**

The requirements of this standard do not apply to machines used for molding, rolling, flame cutting, gear grinding, stamping, impact forming, forging, and gear inspection. Power tools, portable by hand are also excluded from this standard.

NOTE: The terms machine and machinery as used throughout this standard mean gear– [spline] cutting machine.

### **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. All normative documents are subject to revision, and parties to agreements subject to this American National Standard should apply the most recent editions of the normative documents listed below.

29 CFR 1910.147, *Control of hazardous energy (Lockout/Tagout)*

## **EXPLANATORY INFORMATION**

(Not part of the requirements of American National Standard for Machine Tools – Safety requirements for Gear & Spline Cutting Machines, ANSI B11.11-2001).

### **E1**

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

Gear and spline cutting machines are specifically designed and constructed to produce gear and spline tooth forms by the processes of hobbing, milling, shaping, and broaching.

For examples of gear and spline cutting machines, see Annex A.

### **E2 Informative references**

For more information, go to [www.osha.gov](http://www.osha.gov)