

ANSI B11.9 – 2010

*American National Standard for Machine Tools –
Safety Requirements for
Grinding Machines*

Secretariat and Accredited Standards Developer:

B11 Standards, Inc.
42293 Young Lane
Leesburg, Virginia 20176

APPROVED: 17 NOVEMBER 2010

American National Standards Institute



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Published by: B11 Standards, Inc.,
42293 Young Lane, Leesburg, VA 20176, USA
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FOREWORD

This Foreword is informative and not part of the requirements of American National Standard B11.9-2010.

The primary objective of this standard is to eliminate, control or reduce hazards to individuals associated with grinding machines by establishing requirements for the design, construction, installation, commissioning, operation, maintenance and decommissioning of these machines. To accomplish this objective, responsibilities have been assigned to the supplier (e.g., supplier, modifier, distributor, rebuilder and integrator), the user, and individuals in the working environment.

The words "safe" and "safety" are not absolutes. An element of safety is attitude. While the objective of this standard is to eliminate, control, or reduce hazards, this standard recognizes that hazards cannot be practically reduced to zero in any human activity. This standard is not intended to replace good judgment, proper training, and personal responsibility. Operator skill, job monotony, fatigue, and experience are safety factors that should be considered by the user.

The original B11.9 Standard was approved in 1975, and has simply been reaffirmed periodically since then. This current standard began revision in 2005, closely collaborating with the ANSI B7.1 Committee. A memorandum of understanding was reached between the two separate standards development committees that going forward, this B11.9 standard would address the safety requirements of the grinding machine only, and B7.1 would address the safety requirements of the abrasive product only (with the largest single area of overlap being the flange, mostly addressed in B7.1).

Technology for grinding machines is 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.

This standard was 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 document was approved as an American National Standard, the ANSI B11 Accredited Standards Committee was composed of the following member organizations:

Inquiries with respect to the application of the substantive requirements of this standard and suggestions for its improvement are welcomed and are to be sent to B11 Standards, Inc., 42293 Young Lane, Leesburg, Virginia 20176. 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 for new machines within 30 months of the approval of this standard.

For existing or modified machines, this Subcommittee recommends that users should confirm that the equipment / process has tolerable risk using generally recognized risk assessment methods within 30 months of the approval date of this standard. 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 B11.9 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:

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At the time this standard was approved, the ANSI B11 ASC **B11.9 Subcommittee** had the following members who participated in the development of this revision:

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William Pflager	Cinetic Landis	Vice-Chairman
James Sprague, PhD, PE	Engineering Systems, Inc.	Vice-Chairman
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Explanation of the format, and ANSI B11 conventions

This ANSI B11.9 – 2010 standard is divided into parts formerly referred to as sections or chapters and now referred to as clauses. 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 to clarify the requirements contained in the standard. This column is informative only, and 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 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 conformance to the standard. The B11 series of 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 a limiting device (e.g., backgage).

Suggestions for improvement of this standard will be welcome. They should be sent to B11 Standards, Inc., 42293 Young Lane, Leesburg, Virginia 20176
- 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 either by an appropriate machine design or by restricting personnel or other individuals' access to hazard zones, 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, the user and the user's operating personnel, as follows (numbers in parentheses refer to the clause numbers in these "base" B11 standards which address that responsibility).

The requirements of this ANSI standard are grouped according to those that apply to the supplier (i.e., manufacturer, rebuilder, modifier) and user. Some are shared between the supplier and user and are so indicated. Figure 1 provides an overview of this standard and in particular the responsibilities of and requirements for the supplier and user, including the user personnel. Numbers in parentheses denote the particular clause or subclause of the standard.

Notes for Figure 1:

- 1) Scope – Provides the boundaries or limits of the standard (i.e., what is/is not included).
- 2) Normative references – Other standards which in whole or in part provide additional requirements when referenced in the normative text (i.e., left-hand column of clauses 4 – 9) of this standard.
- 3) Definitions – Terms used in this standard, together with their definitions (terms used in the same context as are generally understood and commonly used in everyday English are not defined).
- 4) Responsibility – The general responsibilities of the supplier (builder), user, and the user personnel are listed in clause 4 together with which of the remaining clauses they have primary responsibility.
- 5) Hazard control (task/hazard identification & risk assessment/risk reduction) – Although clause 5 is intended to require a shared responsibility between supplier and user, the requirements of this clause may fall primarily on either entity (see B11.0 [B11.TR3] for further explanation of hazard/task identification and risk assessment/risk reduction).
- 6) Design and construction – It is assumed that the supplier will be responsible for the requirements of clause 6 with the understanding that the user may add to or modify these requirements through the purchase agreement.
- 7) Installation, testing and start-up – Although the requirements of clause 7 are predominantly the responsibility of the user, the supplier will normally provide assistance either directly (providing personnel) or indirectly (instruction materials).
- 8) Safeguarding – This is normally a shared responsibility but often, either the supplier or the user will provide and/or meet the requirements of clause 8.
- 9) Operation and maintenance – The user is normally responsible for the requirements of clause 9 with possible assistance from the supplier for training.

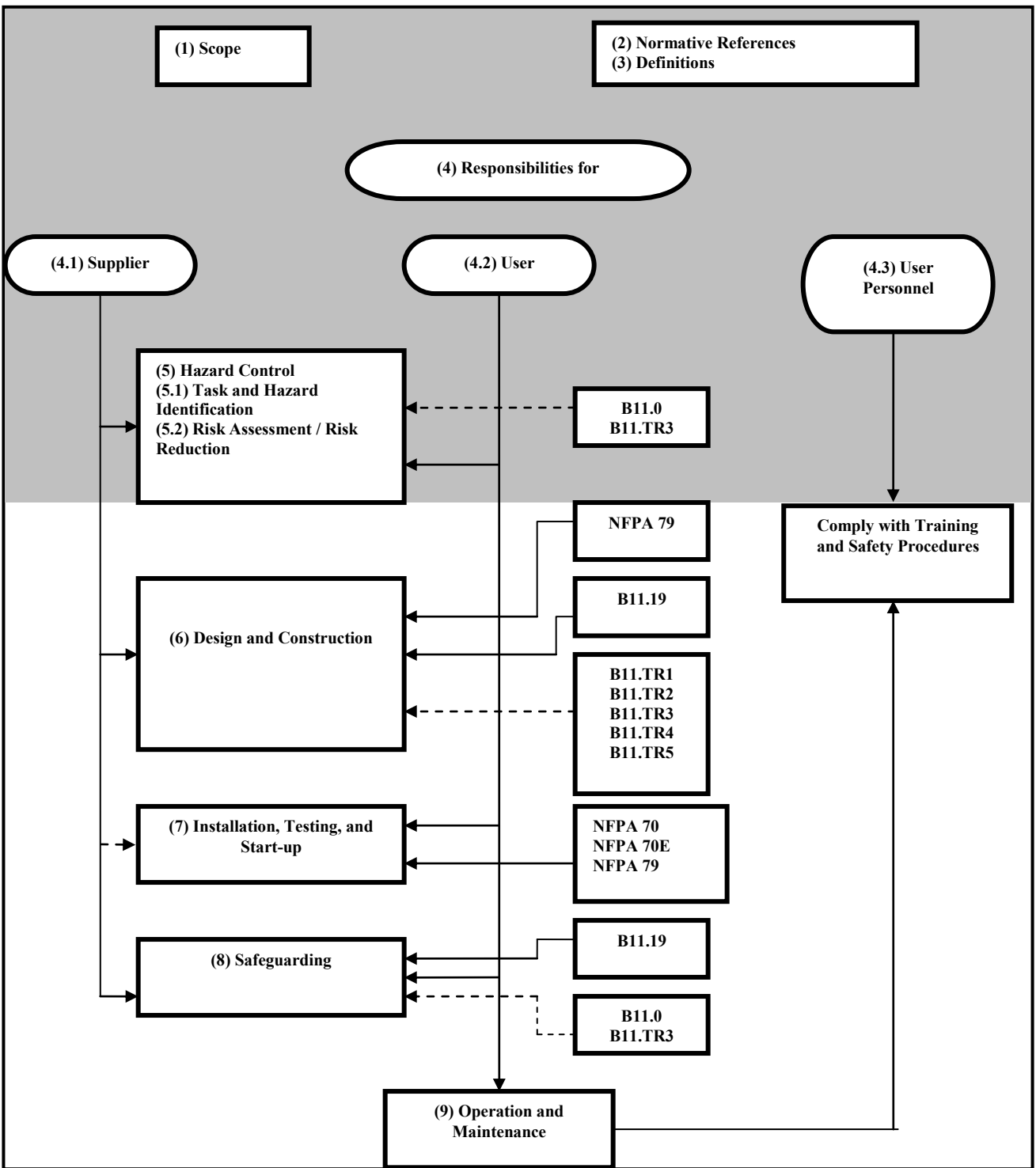


Figure 1 – Typical layout of B11 base standards showing the various responsibilities

The gray shading represents ANSI B11. A solid line between a block showing reference standard(s) and a block showing a normative clause denotes part of the requirements. A dashed line denotes an informative reference.

American National Standard for Machine Tools - Safety Requirements for Grinding Machines

STANDARD REQUIREMENTS

1 Scope

This standard applies to all stationary grinding machines, used in either industrial or commercial applications, that utilize an abrasive product to change the shape, size or surface finish of any material.

1.1 Included machines

This standard includes but is not limited to the following machines, regardless of their control method, that use an abrasive product to remove material:

1.1.1 External cylindrical grinding machine

A machine that grinds the external surface of a rotating workpiece.

1.1.2 Centerless external cylindrical grinding Machine

A machine that grinds the external surface of a rotating workpiece. The workpiece is rotated and mechanically guided with reference to the grinding wheel by means of a control-wheel, and rests on a straight-edge placed between the two wheels.

EXPLANATORY INFORMATION

(Not part of American National Standard for Safety Requirements for Grinding Machines, B11.9-2010.)

E1

Stationary grinding machines are fixed in position during operation and capable of a combination of one or more types of operations.

Abrasive products include coated abrasives and superabrasives, as well as abrasive products consisting of abrasive grains held together by organic or inorganic bonds.

E1.1

Control methods may include pneumatic, hydraulic, servo, NC, CNC, mechanical, manual, etc.).

Figures 1.1 through 1.16 are simplified schematics of different machine configurations and may not depict required guards (removed for clarity).

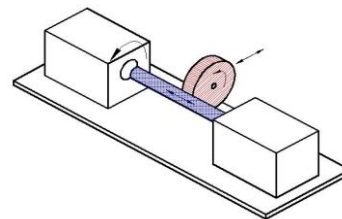


Figure 1.1.1 – External Cylindrical Grinding

Examples:
Center-type or cylindrical grinders
Gear grinders
Profile and cam grinders
Thread grinders

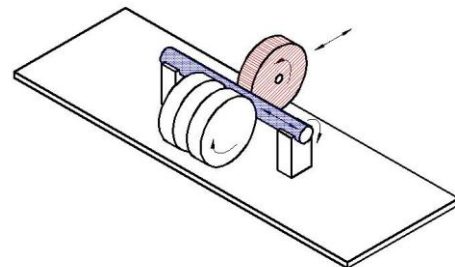


Figure 1.1.2 – Centerless Grinding