

ANSI B11.12-2005

*American National Standard for Machine Tools –
Safety Requirements for
Roll-forming and Roll-bending Machines*

Secretariat and Accredited Standards Developer:

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

Approved: May 10, 2005

by the American National Standards Institute, Inc.



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Foreword (This Foreword is not part of the requirements of American National Standard B11.12-2005)

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

The safeguarding of production systems in roll-forming and roll-bending operations is complicated by the wide variety of operations and operating conditions; the variations in size, speed, thickness, and the kind of pieces to be worked; the required accuracy of the finished work; the skill of operators; the length of run; and the method of sheet feeding and part removal. Because of these varying factors in the operations and in the workplace, a number of point-of-operation safeguarding methods (guards and devices) have been covered in this standard.

The words "safe" and "safety" are not absolutes. An important 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, or personal responsibility. Operator skill, job monotony, fatigue, and experience are safety factors that should be considered by the user.

The original B11.12 Standard was approved in 1983 and reaffirmed in 1989 as originally written. B11.12 was then revised and approved in 1996. That (1996) standard was then revised (its third) by the B11.12 Subcommittee, processed and administered by the Secretariat, and approved by the B11 Accredited Standards Committee for submittal to the ANSI Executive Standards Council as a newly revised American National Standard. Approval was given May 10, 2005.

Roll-forming and roll-bending machine technology 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.

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 the AMT - The Association For Manufacturing Technology, 7901 Westpark Drive, McLean, Virginia 22102-4206. 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 date 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 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:

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

Organizations Represented

Aerospace Industries Association of America
 Alliance of American Insurers
 Aluminum Extruders Council
 American Society of Safety Engineers
 AMT- The Association For Manufacturing Technology
 Automotive Industry Action Group
 The Boeing Company
 Can Manufacturers Institute
 General Motors Corporation
 John Deere
 Metal Building Manufacturers Association
 Metal Powder Industries Federation
 National Institute for Occupational Safety & Health
 Occupational Safety & Health Administration
 Packaging Machinery Manufacturers Institute
 Precision Metalforming Association
 Presence Sensing Device Manufacturers Association
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 Scientific Technologies, Inc.
 Sheet Metal & Air Conditioning Contractors' Natl. Assn.
 Tooling and Manufacturing Association
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At the time this standard was approved, the ANSI B11 ASC **B11.12 Subcommittee** had the following members:

Ashok Shah, Chairman
 David Felinski, Secretary
 John Bloodgood
 Dennis R. Cloutier, CSP
 Chris Soranno

Formtek
 AMT
 JFB Enterprises
 Cloutier Consulting Services
 STI Machine Services, Inc.

Explanation of the format, and ANSI B11 conventions

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 believed would help to clarify the requirements contained in the standard. This column should not be construed as being a part of the normative 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.).

This standard is segregated into the following clauses and attendant responsibilities (see also, the inter-relationships depicted in the Introduction's graphic):

- 1) **Scope** – Provides the boundaries or limits of the standard (i.e., what is included and usually, what is excluded).
- 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 are defined if they are unique, are jargon, or used in a manner or context inconsistent with their common everyday usage or meaning).
- 4) **Responsibility** – The general responsibilities of the supplier, user, and the user's personnel.
- 5) **Hazard control** (task/hazard identification & risk assessment/reduction) – Although clause 5 is intended to encourage a shared responsibility between supplier and user, the requirements of this clause may fall primarily on either entity.
- 6) **Design and construction** – Generally, the supplier is responsible for the entire requirements of clause 6, with the understanding that the user may add or modify these requirements through the purchase agreement.
- 7) **Installation, testing and start-up** – Although predominantly the responsibility of the user, the supplier will normally provide assistance either directly (providing personnel) or indirectly (instruction materials). The responsibility of the supplier for layout and installation is to the extent that the user requires his involvement.
- 8) **Safeguarding** – This is normally a shared responsibility but often, either the supplier or the user will provide 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 or documentation.

Annexes A through D are for information purposes only. As an aid to both the supplier and the user, a checklist of important requirements has been provided in Annex D.

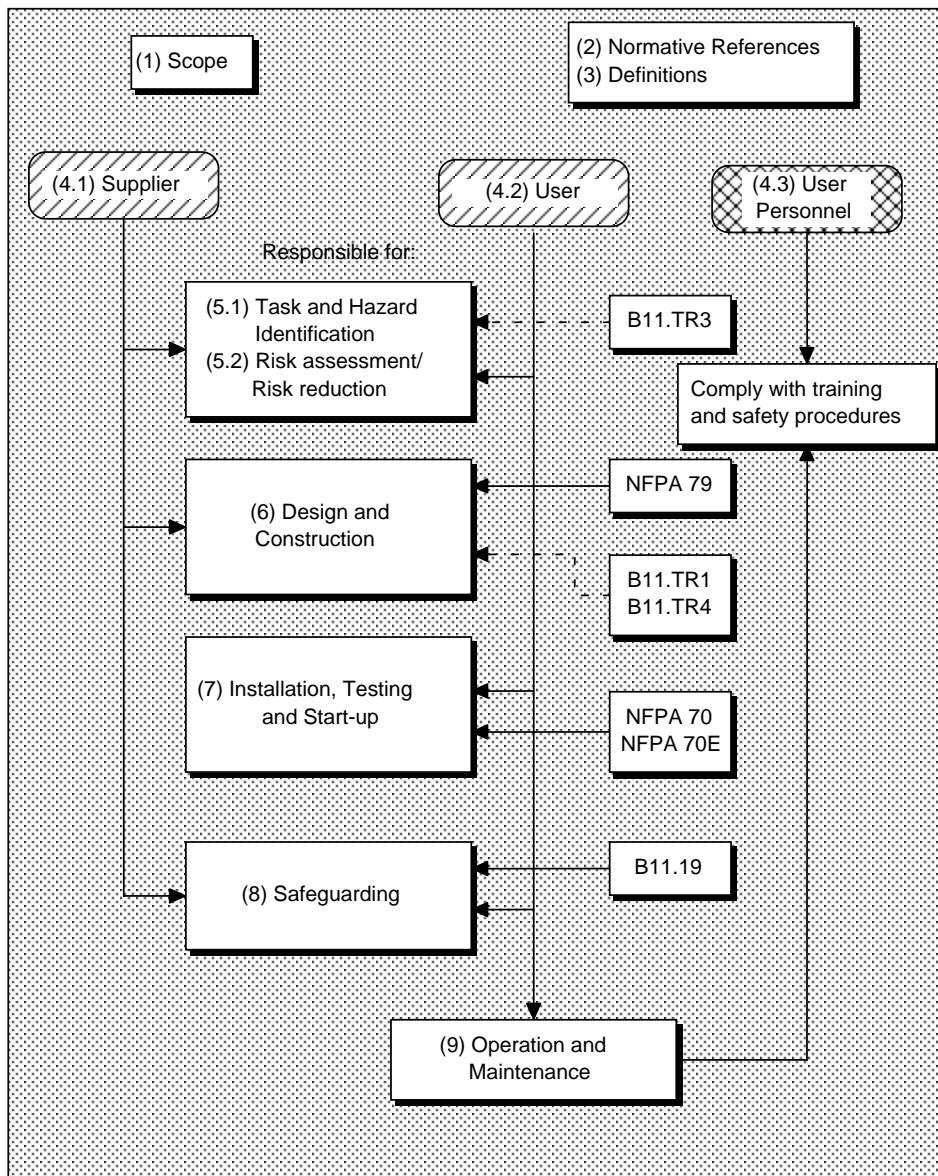
Suggestions for improvement of this standard will be welcome. They should be sent to AMT-The Association For Manufacturing Technology, 7901 Westpark Drive, McLean, VA 22102 - Attention: B11 Secretariat.

Introduction

The primary purpose of every machine tool is to process parts. Hazards exist that may result in injury during production, maintenance, commissioning and de-commissioning.

The primary purpose of the ANSI B11 series of machine tool safety standards is to devise and propose ways to minimize risks of those potential 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 series of safety standards.

The responsibility to reduce these risks to a tolerable level, or eliminate them is divided between the equipment supplier (i.e., manufacturer, rebuilder, modifier, integrator), the equipment user and its operating personnel. The figure below provides an overview of this standard and in particular, the responsibilities and requirements for the supplier and user, including the user personnel.



Note: Solid lines denote required references; dashed lines denote informative ones.

American National Standard for Machine Tools – Safety Requirements for Roll-forming and Roll-bending Machines

STANDARD REQUIREMENTS

1 Scope

1.1 General

This standard specifies the safety requirements for the design, construction, operation and maintenance (including installation, dismantling, and transport) of roll-forming and roll-bending machines.

NOTE: In the context of this standard, the term “machine” used without any other qualification refers to a roll-former / roll-bender.

1.2 Descriptions

roll-forming machines: Roll-formers are self-contained machines normally consisting of a base, chassis, stand, transmission drive, electrical system, tooling and lubrication system, which are capable of continuous lineal forming of material progressively through one or more sets of rotating dies or rolls and associated tooling to achieve a predetermined configuration (see Figures 1 and 2, Annex A).

roll-bending machines: Roll-benders are self-contained machines normally consisting of a base, chassis, transmission drive, electrical system, dies, or rolls, which are capable of producing a bend across the width of flat or preformed material by means of one or more rotating dies or rolls and other tooling to achieve a predetermined configuration (see Figures 3 and 4, Annex A).

1.3 Included machines

The requirements of this standard apply to those single-purpose or multipurpose powered machines similar in construction and function to roll-forming and roll-bending machines or portions thereof, such as, but not limited to:

Roll-forming machines:

- cold-roll-forming machines;
- panel forming machines;
- pipe mills;
- rotary power flanging machines;
- roll-tube reducing machines, tube mills, or a combination of the above.

Roll-bending machines:

- beading machines;
- carando rolls;
- combination rotary machines;
- crimping machines;
- curling machines;
- flanging machines;
- four-roll-bending machines;

EXPLANATORY INFORMATION

(Not part of American National Standard for machine tools – Safety Requirements for Roll-forming and Roll-bending Machines - ANSI B11.12-2005)

E1.1

For examples of roll-forming / roll-bending machines, see Figures A.1 – A.4 (Annex A).

The terms roll-former / roll-bender, and roll-forming / roll-bending machine are considered synonymous.