

ANSI B11.18-2006

(NOTICE: This standard incorporates the safety requirements of ANSI B11.14-1996 – Safety Requirements for Coil Slitting Machines (ANSI B11.14-1996 was formally withdrawn on November 10, 2006)

American National Standard for Machine Tools —

Safety Requirements for Machines Processing or Slitting Coiled or Non-coiled Metal

Secretariat and Accredited Standards Developer:

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

Approved: AUGUST 31, 2006

by the American National Standards Institute



AMERICAN NATIONAL STANDARDS

By approving this American National Standard, the ANSI Board of Standards Review confirms that the requirements for due process, consensus, balance and openness have been met by AMT – The Association For Manufacturing Technology (the ANSI-accredited standards developing organization).

American National Standards are developed through a consensus process. Consensus is established when substantial agreement has been reached by directly and materially affected interests. Substantial agreement means much more than a simple majority, but not necessarily unanimity. Consensus requires that all views and objections be considered, and that a concerted effort be made toward resolution. This process brings together volunteers and/or seeks out the views of persons who have an interest in the topic covered by this publication. While AMT administers the process and establishes procedures to promote fairness in the development of consensus, it does not write the document and it does not independently test, evaluate or verify the accuracy or completeness of any information or the soundness of any judgments contained in its standards or guidelines.

American National Standards are promulgated through ANSI for voluntary use; their existence does not in any respect preclude anyone, whether they have approved the standards or not, from manufacturing, marketing, purchasing, or using products, processes, or procedures not conforming to the standards. However, users, distributors, regulatory bodies, certification agencies and others concerned may apply American National Standards as mandatory requirements in commerce and industry.

The American National Standards Institute does not develop standards and will in no circumstances give an interpretation of an American National Standard. Moreover, no person shall have the right or authority to issue an interpretation of an American National Standard in the name of the American National Standards Institute. Requests for interpretations should be addressed to the Secretariat (AMT).

AMT MAKES NO WARRANTY, EITHER EXPRESSED OR IMPLIED AS TO THE FITNESS OF MERCHANTABILITY OR ACCURACY OF THE INFORMATION CONTAINED WITHIN THIS STANDARD, AND DISCLAIMS AND MAKES NO WARRANTY THAT THE INFORMATION IN THIS DOCUMENT WILL FULFILL ANY OF YOUR PARTICULAR PURPOSES OR NEEDS. AMT disclaims liability for any personal injury, property or other damages of any nature whatsoever, whether special, indirect, consequential or compensatory, directly or indirectly resulting from the publication, use of, application or reliance on this document. AMT does not undertake to guarantee the performance of any individual manufacturer or seller's products or services by virtue of this standard or guide, nor does it take any position with respect to the validity of any patent rights asserted in connection with the items which are mentioned in or are the subject of this document, and AMT disclaims liability for the infringement of any patent resulting from the use of or reliance on this document. Users of this document are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, is entirely their own responsibility.

In publishing or making this document available, AMT is not undertaking to render professional or other services for or on behalf of any person or entity, nor is AMT undertaking to perform any duty owed by any person or entity to someone else. Anyone using this document should rely on his or her own independent judgment, or as appropriate, seek the advice of a competent professional in determining the exercise of reasonable care in any given circumstances.

AMT has no power, nor does it undertake to police or enforce conformance to the requirements of this document. AMT does not certify, test or inspect products, designs, or installations for safety or health purposes. Any certification or other statement of conformance to any health or safety-related information in this document shall not be attributable to AMT and is solely the responsibility of the certifier or maker of the statement.

NOTICE: This American National Standard may be revised or withdrawn at any time. The procedures of the American National Standards Institute require that action be taken periodically to reaffirm, revise, or withdraw this standard. You may contact the Secretariat for current status information on this, or other B11 standards. Individuals interested in obtaining up-to-date information on standards can access this information at <http://www.nssn.org> (or by contacting ANSI). NSSN - A National Resource for Global Standards, provides a central point to search for standards information from worldwide sources and can connect those who seek standards to those who supply them.

Published by: AMT – The Association For Manufacturing Technology
7901 Westpark Drive, McLean, VA 22102-4206, USA

Copyright © 2006 by AMT- The Association For Manufacturing Technology

All rights reserved. Printed in the United States of America

No part of this publication may be reproduced in any form, in an electronic retrieval system or otherwise, without the prior written permission of the publisher.

Table of Contents	Page
FOREWORD	i
EXPLANATION OF THE FORMAT, AND ANSI B11 CONVENTIONS	iii
INTRODUCTION	iv
1 SCOPE	1
1.1 SCOPE.....	1
1.2 INCLUDED MACHINES	1
1.3 EXCLUDED MACHINES.....	2
2 REFERENCES	3
2.1 NORMATIVE REFERENCES	3
2.2 INFORMATIVE REFERENCES.....	3
3 DEFINITIONS	4
4 RESPONSIBILITY	8
4.1 SUPPLIER'S RESPONSIBILITY	8
4.2 USER'S RESPONSIBILITY.....	9
4.3 PERSONNEL RESPONSIBILITY.....	10
5 HAZARD CONTROL	11
5.1 TASK AND HAZARD IDENTIFICATION	11
5.2 RISK ASSESSMENT / RISK REDUCTION	12
6 DESIGN AND CONSTRUCTION	13
6.1 GENERAL REQUIREMENTS	14
6.1.1 Component design	14
6.1.2 Component selection.....	14
6.1.3 Control of energy.....	14
6.1.4 Elimination of, or protection from, inherent hazards	14
6.1.5 Reaching into hazard zones	15
6.1.6 Control devices.....	15
6.1.7 Means for limiting access to control devices	15
6.2 MECHANICAL DESIGN REQUIREMENTS.....	15
6.2.1 Power transmission components.....	15
6.2.2 Powered moving components	15
6.2.3 Broken or falling machine components or accessories.....	16
6.2.4 Machine mounting	16
6.2.5 Contact with sharp edges, corners, and projections	16

6.3	ELECTRICAL DESIGN REQUIREMENTS	16
6.3.1	Stopping–performance monitor (brake monitor)	17
6.3.2	Disconnect switch.....	17
6.3.3	Stop functions.....	17
6.3.4	Emergency Stop.....	18
6.3.5	Stop control	20
6.3.6	Motor–start button	20
6.3.7	Motor starter.....	20
6.3.8	Voltage	20
6.3.9	Grounds	21
6.3.10	Control Systems	21
6.3.11	Fluctuation in or interruption of power sources.....	21
6.3.12	Machine initiation.....	22
6.3.13	Operator control stations	22
6.3.14	Indicators.....	22
6.4	FLUID SYSTEM DESIGN REQUIREMENTS.....	23
6.4.1	Supply pressure interlock	23
6.4.2	Interrupting supply pressure.....	23
6.4.3	Filtering and separating	23
6.4.4	Pneumatic system lubrication.....	23
6.4.5	Compatibility.....	23
6.4.6	Hydropneumatic accumulators and air receivers.....	23
6.4.7	Working pressure	23
6.5	CONSTRUCTION	23
7	INSTALLATION, TESTING AND START-UP.....	24
7.1	GENERAL.....	24
7.2	LAYOUT	24
7.3	FOUNDATION.....	24
7.4	LIGHTING	24
7.5	GROUNDING AND SHIELDING	24
7.6	TESTING AND START-UP.....	25
7.6.1	Procedures.....	25
7.6.2	Assigned personnel.....	25
7.6.3	Safeguarding.....	25
7.7	LOCKOUT/TAGOUT	25
8	SAFEGUARDING	25
8.1	GENERAL.....	25
8.2	SAFEGUARDING INDIVIDUALS FROM HAZARDS	26
8.3	METHODS OF SAFEGUARDING	26
8.3.1	Guards	26
8.3.2	Safeguarding devices.....	26
8.3.3	Awareness devices.....	27
8.3.4	Safe work procedures.....	27
8.4	COMPLEMENTARY EQUIPMENT	27
8.5	SAFETY DISTANCE	27
8.6	PERFORMANCE OF THE SAFETY–RELATED FUNCTIONS.....	28

9	OPERATION AND MAINTENANCE	29
9.1	GENERAL.....	29
9.2	TRAINING.....	29
9.2.1	Hazard Identification.....	29
9.2.2	Lockout/tagout.....	31
9.2.3	Personal protective equipment (PPE)	31
9.3	ALL PERSONNEL.....	31
9.3.1	Operating personnel.....	32
9.3.2	Maintenance personnel.....	32
9.4	SUPERVISION.....	33
9.5	UNAUTHORIZED USE.....	33
9.6	INSPECTION AND MAINTENANCE	33
9.7	REPAIRS.....	33
	ANNEX A – FIGURES AND DESCRIPTIONS	34
	ANNEX B – LIST OF HAZARDS	49
	ANNEX C – PERFORMANCE OF THE SAFETY-RELATED FUNCTIONS	52
	ANNEX D – GUARDING AND AWARENESS BARRIER SAFE OPENINGS	53
	ANNEX E – LEGEND PLATE	55
	ANNEX F – GUIDELINES FOR OPERATOR TRAINING	56
	ANNEX G – BANDING AND UNBANDING OF COILS AND CONSTRAINT OF PARTIAL COILS	57

FOREWORD (This Foreword is informative and not part of the requirements of American National Standard B11.18-2006.)

The primary objective of this standard is to eliminate, control or reduce hazards to individuals associated with metal, sheet, strip or plate processing systems 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., manufacturer, modifier, distributor, rebuilders 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 B11.18 Standard was approved in 1985 and revised and approved again in 1992. B11.18 was then reaffirmed in 1997. This current standard began revision in 2004, and with the approval of the B11 Accredited Standards Committee, includes and incorporates the safety requirements of coil slitting machines – the subject matter of ANSI B11.14—1996. B11.14 will be formally withdrawn as an American National Standard upon ANSI approval of this revised standard as an American National Standard.

Technology for metal/sheet/strip/plate processing systems from coiled or non-coiled configurations 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 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 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.

B11 Accredited Standards Committee ROSTER

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

Organizations Represented	Name of Representative	
	Delegate	Alternate
Aerospace Industries Association of America	Willard J. Wood, ARM	Lance E. Chandler
Aluminum Extruders Council	Melvin Mitchell	Douglas Hart
American Society of Safety Engineers	Bruce W. Main, PE, CSP	George Karosas, PE, CSP
Association For Manufacturing Technology	Russell A. Bensman	Daniel P. Soroka Alan Metelsky
Automotive Industry Action Group	Ronald Tillinger	Kent Lenzen
The Boeing Company	Don R. Nelson	Robert J. Eaker, PE, CSP
Can Manufacturers Institute	Geoffrey Cullen	Jenny Day
Deere and Company	Gary D. Kopps	Ellen Blanshan
General Motors Corporation	Michael Taubitz	Dallas Gatlin
Metal Building Manufacturers Association	Charles M. Stockinger	Charles E. Praeger
Metal Powder Industries Federation	Dennis R. Cloutier, CSP	Teresa F. Stillman
National Institute for Occupational Safety and Health	Richard S. Current, PE	James R. Harris, MS, PE
Occupational Safety & Health Administration	Kenneth Stevanus	
Packaging Machinery Manufacturers Institute	Charles F. Hayes	Maria Ferrante
Pilz Automation Safety, LP	Roberta Nelson Shea	Lee Burk
Property Casualty Insurers	John W. Russell, PE, CSP	Keith Lessner
Precision Metalforming Association	William E. Gaskin	Christen A. Carmigiano
Presence Sensing Device Manufacturers Association	James V. Kirton	Michael S. Carlson
Rockwell Automation	Steven Dukich	Jay Tamblingson
Robotics Industries Association	Jeffrey Fryman	Roberta Nelson Shea
Scientific Technologies, Inc.	Frank Webster	Christopher Soranno
Sheet Metal & Air Conditioning Contractors National Assn.	Michael McCullion	Roy Brown
Tooling and Manufacturing Association	Daniel Kiraly	
Toyota Motor Manufacturing North America	Barry Boggs	Thomas Huff

At the time this standard was approved, the ANSI B11 ASC **B11.18 Subcommittee** had the following members who participated in the development of this revision:

David Withrow	Withrow Industries	Chairman
Russ Bensman	Minster Machine	
Dennis Cloutier, CSP	Cloutier Consulting Services	
Chuck Damore	Braner USA, Inc.	
Bill Roorda	Alcona Associates	
Brett Snider	SMS-Demag, Ltd.	
Jim Wille	STI Machine Services, Inc.	
David Felinski	AMT	Secretary

Explanation of the format, and ANSI B11 conventions

This ANSI B11.18 – 2006 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., backage).

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 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.

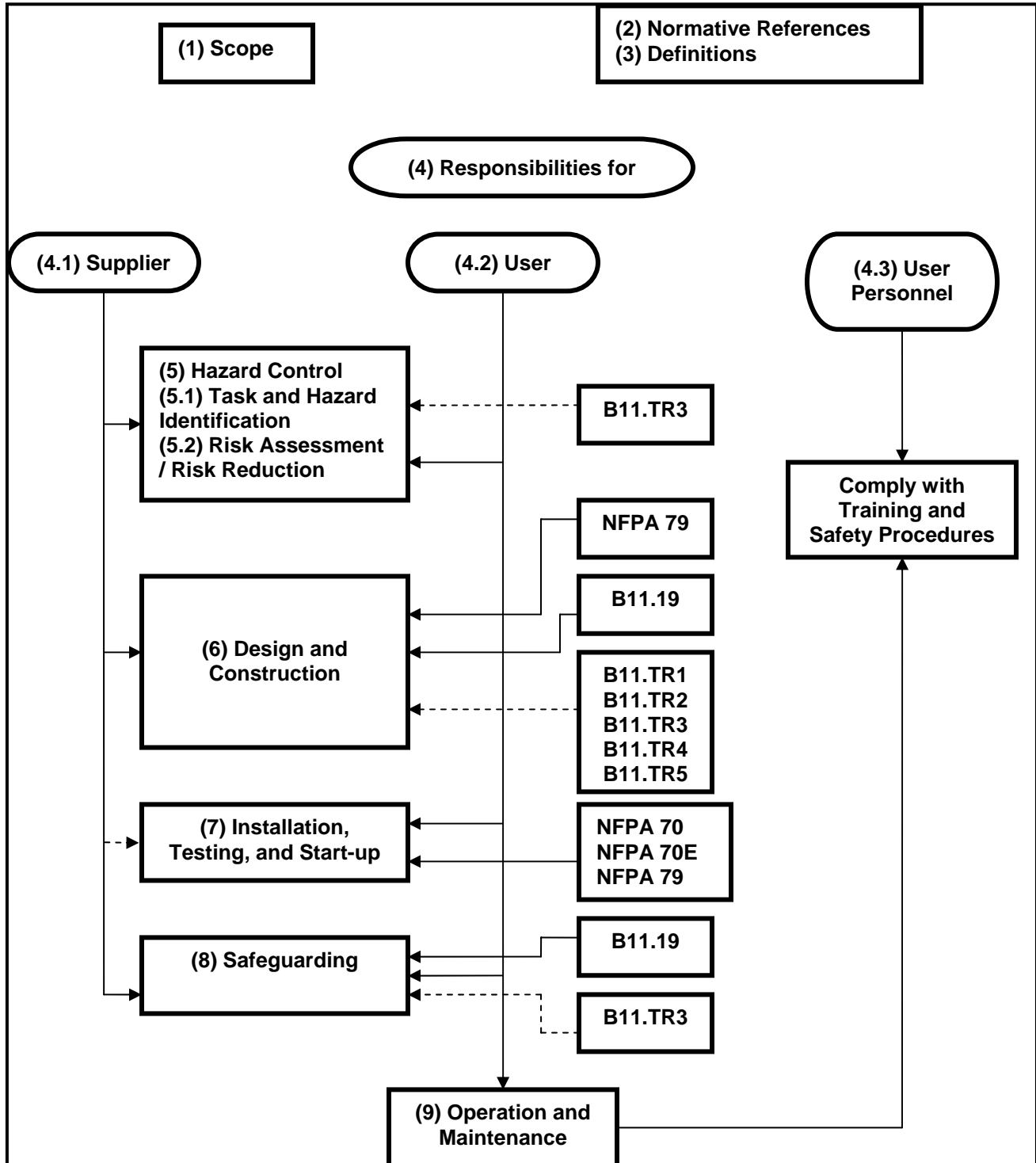


Figure 1 – General layout of the standard showing the various responsibilities

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.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 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.

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 Machines Processing or Slitting Coiled or Non-coiled Metal

STANDARD REQUIREMENTS

EXPLANATORY INFORMATION

(Not part of ANSI B11.18-2006, *American National Standard for Machine Tools — Safety Requirements for Machines Processing or Slitting Coiled or Non-coiled Metal*)

1 Scope

1.1 Scope

This standard applies to machines, and groups of machines arranged in production systems, for processing strip, sheet, or plate metal from a coiled or non-coiled configuration through machines that size or otherwise convert the metal into desired configurations.

1.2 Included machines

1.2.1 This standard covers the following machines and accessories, either individually or combined into metal processing systems:

- coil car and elevator (a.k.a. coil buggy, coil carriage, coil cart or automatic guided vehicle);
- coil conveyor;
- coil end joiner (a.k.a. end welder, stitcher, tape joiner or shear welder);
- coil peeler;
- feeder (a.k.a. roll feeder, grip feeder, air feeder, slide feeder or hitch feeder);
- press feed equipment (a.k.a. sheet feeders, electronic feed systems);

- pinch roll machine (a.k.a. thread-up stand, power run-in stand or pull-off stand);
- rack and saddle (a.k.a. coil holder);
- ramp;
- recoiler (a.k.a. rewinder, traverse winder, oscillating winder, down coiler, tension reel or turret recoiler);
- roll former feed equipment;

- scrap processor;
- shear;

- slitting machine (slitter head or side trimmer);

- stacker (a.k.a. piler);
- straightener (a.k.a. flattener or leveler);

E1.1

The terms "strip, sheet or plate" are used interchangeably without dimensional implications.

Typical machinery systems include cut-to-length lines, press feed lines, and slitting lines.

E1.2

See Annex A for a figure or description of the machines / accessories listed to the left.

See ANSI B11.1 and B11.2 for safety requirements that may apply to presses incorporated in metal processing systems.

See ANSI B11.12 for safety requirements that may apply to roll formers incorporated in metal processing systems.

See ANSI B11.4 for safety requirements that may apply to shears incorporated in metal processing systems. ANSI B11.18 now covers these (slitting machines were previously covered by ANSI B11.14-1996).