

American National Standard for Machine Tools –

Safety requirements for Shears

Secretariat and Accredited Standards Developer:
B11 Standards, Inc.,
POB 690905
Houston, TX 77069-0905, USA
www.b11standards.org

Approved: FEBRUARY 10, 2003
Reaffirmed: MAY 29, 2013

by the American National Standards Institute, Inc.



COPYRIGHT PROTECTED DOCUMENT

Copyright © 2013 by B11 Standards, Inc.

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 B11 Standards, Inc.**

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 B11 Standards, Inc., (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 B11 Standards, Inc., 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 (B11 Standards, Inc.).

B11 Standards, Inc., 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. B11 Standards, Inc., 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. B11 Standards, Inc., does not undertake to guarantee the performance of any individual supplier 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 B11 Standards, Inc., 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, B11 Standards, Inc. is not undertaking to render professional or other services for or on behalf of any person or entity, nor is B11 Standards, Inc., 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.

B11 Standards, Inc., has no power, nor does it undertake to police or enforce conformance to the requirements of this document. B11 Standards, Inc., 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 B11 Standards, Inc., 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 periodic action be taken to reaffirm, revise, or withdraw this standard. You may contact the Secretariat for current status information on this, or other B11 standards.

Published by: B11 Standards, Inc., www.b11standards.com

Houston, TX 77069, USA

Copyright © 2013 by B11 Standards Inc.

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 Content	Page
FOREWORD	IV
INTRODUCTION	VII
1 SCOPE	1
1.1 SPECIFIC SHEAR TYPES INCLUDED	2
1.2 SPECIFIC SHEAR TYPES EXCLUDED	2
2 NORMATIVE REFERENCES	2
3 DEFINITIONS	3
4 RESPONSIBILITY	9
4.1 SUPPLIER	9
4.2 USER	10
4.3 PERSONNEL	11
5 HAZARD CONTROL	12
5.1 TASK AND HAZARD IDENTIFICATION	12
5.2 RISK ASSESSMENT / RISK REDUCTION.....	13
6 DESIGN AND CONSTRUCTION	15
6.1 GENERAL REQUIREMENTS – ALL SHEARS	15
6.2 ELECTRICAL REQUIREMENTS	17
6.3 CONTROL SYSTEMS	22
7 LAYOUT, INSTALLATION, TESTING AND START-UP	28
7.1 GENERAL	28
7.2 LAYOUT.....	28
7.3 INSTALLATION.....	29
7.4 TESTING AND START-UP	29
8 SAFEGUARDING	30
8.1 RESPONSIBILITY.....	30
8.2 SAFEGUARDING PERSONNEL	31
8.3 METHODS OF SAFEGUARDING.....	31
8.4 PERFORMANCE OF THE SAFETY-RELATED FUNCTION(S).....	34
9 SET-UP, OPERATION AND MAINTENANCE	35
9.1 SET-UP	35
9.2 OPERATION	35
9.3 MAINTENANCE	38
9.4 BLADE SERVICING.....	39
ANNEX A: GUARDING AND AWARENESS BARRIER SAFE OPENINGS	40
TABLE A.1 - MINIMUM DISTANCES FOR GUARDS IN MILLIMETERS (INCHES)	40
FIGURE A.1: LOCATION OF GUARDS VS. OPENINGS	41
ANNEX B : FIGURES	42
ANNEX C : TASK - BASED HAZARDS (INFORMATIVE)	53
ANNEX D: PERFORMANCE OF THE SAFETY-RELATED FUNCTION(S)	54

Foreword

(This Foreword is not part of the requirements of American National Standard B11.4–2003.)

The primary objective of this standard is to eliminate or control the risk of injuries to personnel associated with shears by establishing requirements for the machine's construction, care and use and for the production systems in which shears are used. To accomplish this objective, responsibilities have been assigned to the builder, user, modifier, rebuilder and system integrator, as well as to the employer and the employee in the working environment.

Point-of-operation safeguarding is the single most important factor in the elimination of point-of-operation injuries. A production system consists of the shear as one component, feeding methods (including part or scrap removal) as a second component, and the third component, point-of-operation safeguarding. The vital third component, point-of-operation safeguarding, can be evaluated for effectiveness only after the first two components and operator involvement is known. Since this information is known and controlled by the employer, the responsibility for compliance with clause 6 has been assigned accordingly.

The safeguarding of production systems in shearing operations is complicated by the wide variety of operations and operating conditions, the variations in size, speed, and type of shear used; the size, thickness, and 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 and scrap removal. Because of these varying factors in the operations and in the workplace, a wide variety of point-of-operation safeguarding methods (guards and devices) has been covered in this standard.

The words "safe" and "safety" are not absolutes. An element of safety is attitude. While the goal of this standard is to eliminate injuries, it is recognized that risk cannot be 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 employer.

To aid all parties concerned in conforming to the requirements of this standard, explanatory information has been placed in the right column, adjacent to the applicable requirements.

Shears 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 B11 Standards, Inc., POB 690905, Houston, TX 77269.

This standard was processed and approved for submittal to ANSI by the 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 it approved this standard, the B11 Accredited Standards Committee had the following members:

Alan Metelsky, Chairman
Barry Boggs, Vice-Chairman
David Felinski, Secretary

Organizations Represented

Aerospace Industries Association of America
Aluminum Extruders Council
American Society of Safety Engineers
Association For Manufacturing Technology
The Boeing Company
Canadian Standards Association
Deere & Co.
FDR Safety
General Motors Corporation
Komatsu America Industries
Metal Powder Industries Federation
National Institute for Occupational Safety & Health
Occupational Safety & Health Administration
Omron Scientific Technologies Incorporated
Packaging Machinery Manufacturers Institute
Pilz Automation Safety, LP
Precision Metalforming Association
Presence-sensing Device Manufacturers Association
Property Casualty Insurers
Robotic Industries Association
Rockwell Automation
Safe-T-Sense
Sheet Metal & Air Conditioning Contractors Nat'l. Assn.
System Safety Society
Toyota Motor Manufacturing North America
International United Automotive Workers

Name of Representative

Delegate

Willard Wood
Melvin Mitchell
Bruce Main, PE, CSP
Russell Bensman
Don Nelson
Elizabeth Rankin, CRSP
Gary Kopps
Michael Taubitz
Michael Douglas
George Schreck
Dennis R. Cloutier, CSP
Richard Current, PE
Kenneth Stevanus
Frank Webster
Charles Hayes
Michael Beerman
James Barrett, Jr. PhD
James V. Kirton
Stanford Brubaker
Jeffrey Fryman
Patrick Barry
Samuel Boytor
Michael McCullion
John Etherton, PhD, CSP
Barry Boggs
Tom Ford

Alternate

Lisa Goldberg / Chris Carnahan
Scott Burkett
George Karosas, PE,CSP
Alan Metelsky
Lance Chandler, PE
Walter Veugen
Scott Fowler
Flavius Brown

James Landowski
Teresa Stillman
James Harris, PhD, PE
Robert Bell
Christopher Soranno
Maria Ferrante
Lee Burk
Bill Gaskin / Christen Carmigiano
Michael Carlson
John Russell, PE,CSP
Claude Dinsmoor
Michael Miller
Mark Witherspoon
Roy Brown
Rod Simmons, PhD
Todd Mills

At the time this standard was approved, the ANSI B11 ASC **B11.4 Subcommittee** had the following members who participated in the development of this revision:

Dennis Cloutier, CSP, Chairman
David Felinski, Secretary

Peter Barroso, Jr., PE
Sam Boytor
Stan Brubaker
Christie Carmigiano
Christopher J. Cox
Gary Dunn
Carolyn Reifsteck
Chris Soranno
Barry A. Stockton

Barroso Engineering
Fox Controls
Liberty Mutual
Precision Metalforming Assn.
Deere & Co.
Dunn Sales
Safe-T-Sense
Safe-T-Sense
High Tech Consulting

Explanation of the format, and ANSI B11 conventions

This ANSI B11.4 – 2003 (R2013) 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 “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 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).

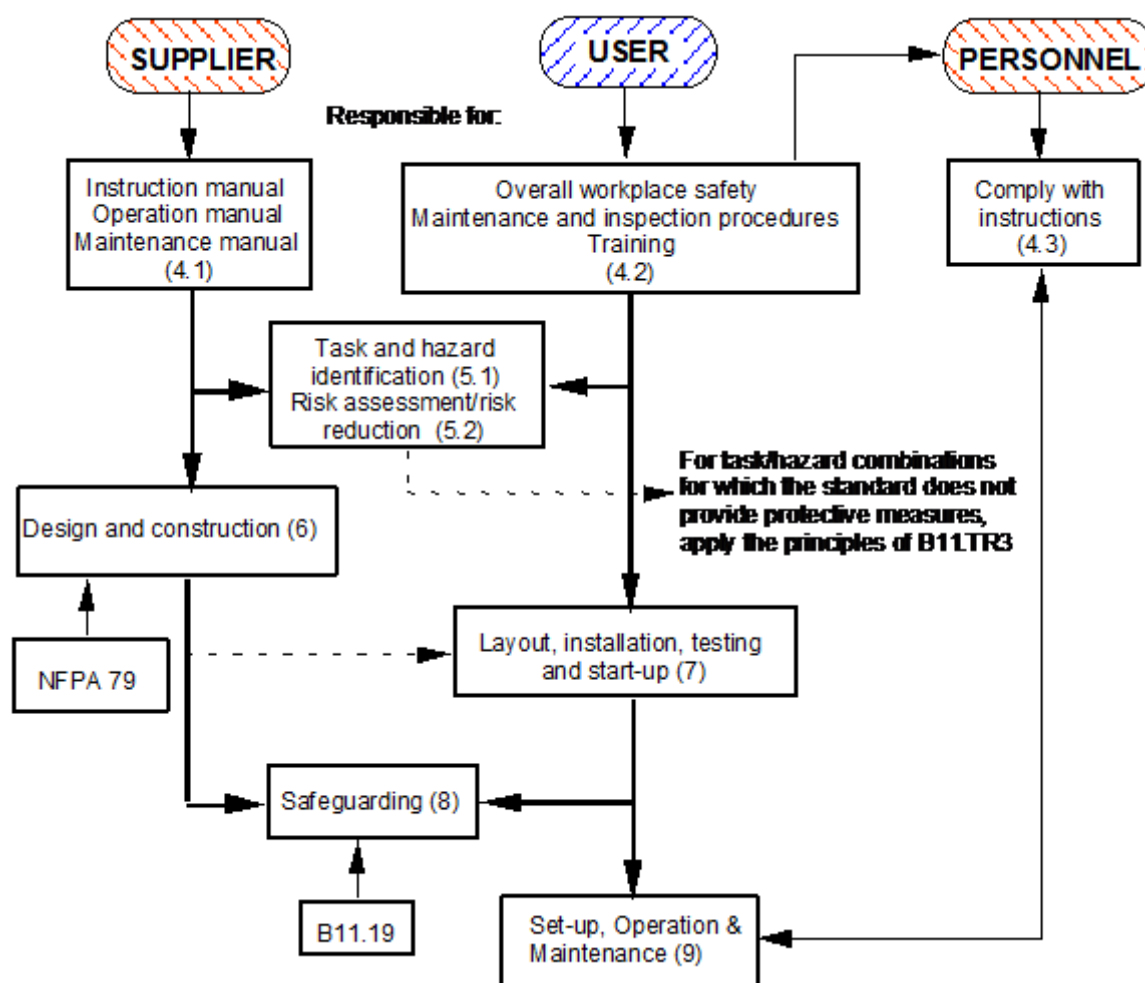
Suggestions for improvement of this standard will be welcome. They should be sent to B11 Standards, Inc., POB 690905, Houston, TX 77269.

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, 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, the equipment user and its operating personnel, as follows (numbers in parentheses refer to the clause numbers in these standards which address that responsibility):



Copyright B11 Standards Inc. (Formerly AMT)

STANDARD REQUIREMENTS

EXPLANATORY INFORMATION

*American National Standard for Machine Tools –**Safety Requirements for Shears*STANDARD REQUIREMENTSEXPLANATORY INFORMATION

(Not part of the requirements of this American National Standard for Machine Tools — Safety Requirements for Shears - ANSI B11.4–2003 R2013)

1 Scope

This standard applies to those mechanically, hydraulically, hydro-mechanically or pneumatically powered shears used to cut material by shearing, and which utilize a fixed blade(s) and non-rotary moving blade(s).

Shears addressed in this standard are commonly found in these basic applications:

- 1) stand-alone
- 2) stand-alone, automatic
- 3) process line

For the purpose of this standard, the term shear shall be inclusive of stand-alone, stand-alone automatic, and process line shears.

E1

See the following Figures in Annex B for examples of shears:

<u>Figure #</u>	<u>Description</u>
1	Mechanical power shear, underdrive type
2	Mechanical power shear overdrive type
3	Hydraulic power shear
4	Pneumatic powered shear
5	Manually powered shear
6	Right angle shear
7	Crop shear

1) Stand-alone shears are those single units in which each stroke is activated by some action of the operator. This may include initiation of a foot or hand control or feeding a sheet until it contacts a probe or other stroke initiating device.

2) Stand-alone, automatic shears include those single units with fully automatic sheet feeder and/or positioning systems in which, once started, a continuous series of cuts are made without operator intervention.

3) Process line shears include those machines which have been integrated into an automated system including a number of processes. Cycling of the shear stroking mechanism is a slave to the system control. Examples would be coil cut-to-length lines, coil slitting lines with crop shears (ANSI B11.18), or manufacturing systems (ANSI B11.20).

STANDARD REQUIREMENTS

EXPLANATORY INFORMATION

1.1 Specific shear types included

Shears included in this standard are the following:

- a) squaring;
- b) crop shears ;
- c) gap;
- d) right angle;

- e) plate;
- f) gate;
- g) pivot blade (swing beam);
- h) slitting – non-rotary;
- i) cut-to-length;
- j) guillotine.

d) Right angle shears may have a knife arrangement which changes rake angle during the shearing cycle and these are also included in this standard.

j) Special consideration should be given to applying the safeguarding requirements of this standard to guillotine shears used in the scrap metal industry due to the unique hazards associated with processing of non-flat or irregular-shaped material.

1.2 Specific shear types excluded

Specific shear types excluded are the following:

- a) slitting–rotary;
- b) nibblers;
- c) coil slitters;
- d) portable hand tools
- e) rotary–blade slitters and shears;
- f) iron workers;
- g) angle, bar, beam, channel and notching machines;
- h) alligator shears;
- i) rotary drum shears;
- j) manually powered shears.

E1.2

The shears excluded do not have one fixed and one moving non-rotary blade and do not utilize a constant rake for any one shearing stroke.

j) Manually powered shears are commonly known as jump shears (see Annex B, Figure 5).

2 Normative references

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

ANSI B11.19–2003, *Safety Requirements for Safeguarding*

ANSI / IESNA RP7-2001, *Practice for Industrial Lighting*.

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 documents listed in clause 2.

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

ANSI B11.14-1996, (Safety Requirements for) *Coil Slitting Machines*

ANSI B11.18-1997, (Safety Requirements for) *Coil Processing Systems*

STANDARD REQUIREMENTS

EXPLANATORY INFORMATION

ANSI / NFPA 79–2002, *Electrical standard for industrial machinery*

ANSI / NFPA / JIC T2.24.1— *Hydraulic Fluid Power – Systems standard for stationary industrial machinery*. First edition: 10 May 1990.

ANSI / NFPA 70E–2000, *Electrical safety requirements for employee workplaces*

ANSI Z535.1-2002, *Safety Colors*

ANSI / NFPA 70–2002, *National electrical code*

ANSI Z535.2-2002, *Safety Signs*

ANSI Z244.1–2003, *Control of hazardous energy – Lockout/tagout and alternative methods*

ANSI Z535.3-2002, *Criteria for Safety Symbols*

ANSI / ASME Boiler & Pressure Vessel Code, 2001, Division 1, Section VIII.

ANSI Z535.4-2002, *Product Safety Signs and Labels*

ANSI Z535.5-2002, *Safety Tags and Barricade Tapes (for Temporary Hazards)*

ANSI B11.TR3-2000 Risk Assessment and Risk Reduction – A guide to estimate, evaluate and reduce risks associated with machine tools.

29 CFR 1910.147, *The Control of Hazardous Energy (Lockout/Tagout)*. For more information, go to www.osha.gov

29 CFR 1910.333 b(2), *Selection and Use of Electrical Work Practices*. For more information, go to www.osha.gov

29 CFR 1910.219, *Mechanical Power-Transmission Apparatus*. For more information, go to www.osha.gov

3 Definitions

For the purposes of this standard, the following definitions apply.

3.1 auxiliary equipment: Additional or supplemental equipment or devices operating in association with the shear or shear production system.

E3.1 Auxiliary equipment can include such devices as material feeding and removal components, safeguarding, material support systems and vision systems.

3.2 awareness barrier: An attachment that, by physical contact or visual notice, warns personnel of a present or approaching hazard.

E3.2 See *protective measures*.

3.3 awareness device: A signal or device that, by means of audible sound or visual light, warns of a present or approaching hazard.

E3.3 See *protective measures*.

STANDARD REQUIREMENTS

EXPLANATORY INFORMATION

3.4 bed: The stationary portion of the shear that supports the fixed blade and other associated equipment.

3.5 blade (knife): A two-component tool consisting of a moving and a stationary element used to shear material for production parts.

3.6 block, safety: A prop which is inserted between opposing machine members.

3.7 brake: A mechanism for stopping or holding the moving member of the shear.

3.8 clutch: An assembly, that when engaged, transmits torque to impart motion from a driving member to a driven member.

3.8.1 clutch, full–revolution: A type of clutch that, when engaged, cannot be disengaged until the shear has completed a full cycle.

3.8.2 clutch, part–revolution: A type of clutch that may be engaged or disengaged during any portion of the shear cycle.

3.9 concurrent: Acting in conjunction; used to describe a situation wherein two or more controls exist in an operated condition at the same time but not necessarily actuated simultaneously.

3.10 continuous: Uninterrupted, multiple cycles without intervening stops at the end of an individual cycle.

3.11 control, emergency or master stop: A control that, when actuated, initiates immediate or controlled stopping action of hazardous motion.

3.12 control reliability: The capability of the shear control system, the safeguarding, other control components and related interfacing to achieve a safe state in the event of a failure within their safety-related functions.

3.13 control system: Sensors, manual input and mode selection elements, interlocked and decision making circuitry and output elements to the operating devices or mechanisms.

E3.5 Shear blades (knives) are removable tools that can be sharpened and re-used.

E3.7 On part revolution clutch machines, the brake can function at any point in the cycle. On full revolution clutch machines, the brake generally functions at the end of the cycle or at the top of the stroke.

E3.12 See *safety-related function*.

STANDARD REQUIREMENTS

EXPLANATORY INFORMATION

3.14 counterbalance: Means provided to balance the reciprocating weight of the ram, drive members and ram attachments.

3.15 cycle: A complete movement from the initial start position of the ram back to the same start position, and which may include loading and unloading.

3.16 decompression: The release of stored energy at the end of a machine stroke. In a hydraulic shear, the slow release of confined fluid to gradually release system pressure.

3.17 drive: The source of energy for ram motion.

3.18 eccentric: The offset portion of the main shaft or main gear that governs the distance that the ram travels.

3.19 employer: See *user*.

3.20 ensure: To establish, maintain and monitor an effective program, procedure or system to implement the requirements of this standard.

3.21 feeding or removal: The process of loading or unloading material or workpieces into or from the shear.

3.22 fluid: A liquid or gas.

3.23 foot control: A foot operated mechanism used with the shear control system.

3.24 foot pedal (treadle): A foot actuated lever designed to operate the mechanical linkage.

E3.24 A foot pedal typically operates the clutch control linkage and has sufficient area to accommodate only one foot.

A foot treadle typically operates the clutch control linkage and extends the full length of the shear thus allowing operation at any position along the length of the shear.

3.25 foot switch: A foot operated mechanism used with the shear control designed to operate with electrical, hydraulic or pneumatic control systems.

3.26 foot treadle bar: An operating bar that extends the full length of the shear and to which a foot treadle or pedal may be attached.

3.27 gage, material position: A stop against which the material or workpiece is placed to locate it within the point-of-operation.

STANDARD REQUIREMENTS

EXPLANATORY INFORMATION

3.28 gap (throat): An opening or recess in the frame of the shear to permit positioning of material or workpieces.

3.29 guard: A barrier which prevents entry into the point-of-operation or other hazard area. **E3.29** See *protective measures*.

3.30 handling slot: A recess below the surface of the table that aids in the handling or positioning of material or workpieces.

3.31 hazard(s): A potential source of harm.

3.32 hazard (hazardous) area: An area that poses an immediate or impending hazard.

3.33 hazardous motion (situation): Movement of machine components, or release of energy that poses a hazard.

3.34 helper: An individual who assists in the operation, maintenance or repair of the shear.

3.35 hold down: A mechanism intended to prevent movement of the workpiece during the shearing action.

3.36 hold down guard: A guard which prevents entry to the pinch point hazard caused by the hold down(s). **E3.36** See also, Figure 10, Annex B.

3.37 immediate stop command: A command that initiates an action(s) to stop a hazardous motion (or situation) at any point in the shear cycle.

3.38 inch: To impart intermittent motion to the shear ram by opening and closing the clutch on a mechanical machine with a part revolution clutch or the valves on a pneumatic or hydraulic machine.

3.39 individual: A particular human being.

E3.39 For the purposes of this standard, a distinction between *individual* and *personnel* is drawn. Individual includes personnel but encompasses persons who are not under direct or indirect control of the supplier or user (e.g., visitors, vendors, etc.). See also, *personnel*.

3.40 integrator: Any supplier that designs, provides, manufactures or assembles a shear, its associated machines or equipment, the safeguarding, control interfaces, interconnections or the control system into a shear production system. See also, *supplier*.

3.41 intensification: Pressure increase that is inversely proportional to the area ratios of a cylinder. Intensification can develop pressures several times higher than what can be developed by the pump.

STANDARD REQUIREMENTS

EXPLANATORY INFORMATION

3.42 jog: To impart intermittent motion to the shear ram by stopping and starting the main drive motor.

3.43 manufacturer: See *supplier*.

3.44 mode: The state or condition of the control system which allows specific operations of the shear.

3.45 modifier: Any supplier that changes the original purpose, function or capacity of the shear or the shear production system by design or construction. See also, *supplier*.

3.46 monitoring: Checking system components to detect a failure of a component, subassembly or module that affects the performance of the safety-related functions.

3.47 normal stop command: A command that initiates an action(s) to stop motion(s) or situation(s) at the end of a shear cycle or at other points required by the shear functions.

3.48 operator: An individual who performs production work and who controls the shear.

3.49 personnel: An individual(s) who is employed by or on behalf of the user.

E3.49 Personnel includes subcontractors, consultants, or other contract workers under the indirect control of the supplier or user.

3.50 point-of-operation: The location in the shear where material or a workpiece is positioned and work is performed.

E3.50 This is generally considered to be the area between the knives and directly under the holddowns. See Figure 9, Annex B for a graphical representation of the point-of-operation.

3.51 presence-sensing device: A device designed, constructed and arranged to create a sensing field, area or plane that will detect the presence of an individual or object.

3.52 probe: A control that indicates the presence of material or a workpiece by pressure, contact or electronic or electro–optical sensing.

3.53 protective measures: Design, safeguarding, administrative controls, warnings, training or personal protective equipment used to eliminate hazards or reduce risks.

3.54 rake: The inclination of one blade with respect to the other in the shearing plane.

3.55 ram: The shear member that reciprocates and to which the upper blade is attached.

STANDARD REQUIREMENTS

EXPLANATORY INFORMATION

3.56 rebuilder: A supplier that restores a shear to its original design, purpose, capacity and function. See also, *supplier*.

3.57 redundancy: The use of multiple means to perform the same function.

3.58 safeguarding: Guards, safeguarding devices, awareness devices, safeguarding methods or safe work procedures.

3.59 safety-related function: That portion of the control system or safeguarding device that eliminates exposure to a hazardous situation or reduces exposure to a tolerable level.

3.60 single-stroke: A mode of shear control that provides for one complete cycle of the ram. See also, *cycle*.

3.61 stroke: The maximum distance the ram travels in one direction.

3.62 supervisory control: A means to ensure that the shear and the safeguarding are used and operated such that personnel are protected from hazards.

3.63 supplier: An individual, corporation, partnership or other legal entity or form of business.

NOTE - For the purpose of this standard, a supplier provides, or makes available for use, all or part of the shear or shear production system.

3.64 table: That part of the shear on which material or workpieces are positioned.

3.65 trip: The momentary actuation of the controls or actuating mechanism to initiate a stroke.

3.66 two hand trip: An actuating means requiring the concurrent use of both hands of the operator to trip the shear.

3.67 two hand control: A control arrangement that requires the concurrent use of the operator's hands in order to initiate or continue the shear cycle (stroke).

3.68 user: An entity that utilizes shears, shear production systems or related equipment.

NOTE - Under certain circumstances (i.e., acting as a builder, modifier, integrator), the user may act as a supplier.

E3.58 See also, *protective measures*.

E3.63 A supplier can be the manufacturer, manufacturer's agent, representative or distributor, reseller, installer, modifier, rebuilder or integrator who provides equipment or services for the shear or shear production system.

NOTE – When the user provides any of the above services, the user is considered the supplier.

STANDARD REQUIREMENTS

EXPLANATORY INFORMATION

4 Responsibility

4.1 Supplier

For purposes of this standard, the supplier can be the manufacturer, integrator, modifier, rebuilder or installer of the shear or the shear production system.

Within the scope of the work activity, the supplier shall be responsible to ensure that the design, construction, modification, installation and safeguarding are in accordance with clauses 5, 6, 7 & 8.

4.1.1 Task and hazard identification

The supplier shall be responsible for identifying sources of hazards within the scope of their work activity in accordance with 5.1 and Annex C.

4.1.2 Risk assessment / risk reduction

The supplier shall be responsible for assessing and reducing the risks identified in 4.1.1, in accordance with 5.2.

E4.1

The supplier should refer to clause 2 of this standard for reference and related standards applicable to the scope of their work activity.

When the user provides any of the services normally assigned to the supplier, the user is considered to be the supplier within the scope of that work activity.

E4.1.1

All tasks associated with the shear or shear production system should be identified. Examples of categories of tasks include but are not limited to:

- packing and transportation,
- unloading/unpacking,
- systems installation,
- start up/commissioning,
- set up and try out,
- operation (all modes),
- knife change,
- planned maintenance,
- unplanned maintenance,
- major repair,
- recovery from jams,
- trouble shooting,
- housekeeping,
- decommissioning,
- disposal.

All hazards associated with the tasks should be identified. Annex C gives examples to assist in this process.

All tasks associated with the intended use and reasonably foreseeable misuse of the machine should be identified. This should include all phases in the lifecycle of the machine. Intended use includes consideration of the supplier's information for use. The intended use may be determined by the user.

E4.1.2

The risk assessment process yields a level of risk (probability of occurrence of harm and the severity of that harm). If the risk is not tolerable (see 5.2), risk reduction is necessary to reduce that risk by implementing protective measures. Risk reduction results from applying one or more protective measures.

The type of protective measure is determined by



Documents

Document Sharing Hub

STANDARD REQUIREMENTS

4.1.3 Documentation (information for use)

The supplier shall be responsible for providing documentation to the user that establishes guidelines for the installation, operation and maintenance of the shear or shear production system.

4.2 User

The user shall be responsible for the requirements contained in 4.2.1 through 4.2.7.

4.2.1 Task and hazard identification

The user shall identify sources of hazards, including point of operation hazards, associated with the installation, operation and maintenance of the shear and the shear production system in accordance with 5.1 and Annex C (C.2, C.3 and C.4).

4.2.2 Risk assessment / risk reduction

The user shall reduce the risks identified in 4.2.1, in accordance with 5.2.

EXPLANATORY INFORMATION

the nature of the task and associated hazard(s) for the shear or shear production system under consideration. Protective measures should be selected to provide the desired degree of risk reduction.

E4.1.3

Supplier documentation of the risk assessment and the risk reduction process should demonstrate the procedure that has been followed, and the results that have been achieved. The supplier should provide documentation of protective measures taken and recommendations for additional protective measures to be implemented by the user, system integrator or other entity involved with the shear or shear production system.

The documentation should include but not be limited to the following, where applicable:

- a) performance specifications;
- b) electrical or pneumatic schematics and diagrams;
- c) physical environment for which the shear or shear production system is designed;
- d) function and location of the operator controls, indicators, and displays;
- e) schedules for periodic maintenance, lubrication, and inspection;
- f) application of safeguarding and other protective measures;
- g) auxiliary equipment.

E4.2.1

All tasks associated with the shear or shear production system should be identified. See E5.1 for examples of categories of tasks.

All hazards associated with the tasks should be identified. Annex C gives examples to assist in this process.

All tasks associated with the intended use and reasonably foreseeable misuse of the machine should be identified. This should include all phases in the lifecycle of the machine. Intended use includes consideration of the supplier's information for use. The intended use may be determined by the user.

E4.2.2

The risk assessment process yields a level of risk (probability of occurrence of harm and its severity).

STANDARD REQUIREMENTS

4.2.3 Installation and start-up

The user shall ensure that installation and start-up of the shear and the shear production system is in accordance with clause 7.

4.2.4 Safeguarding

The user shall ensure that safeguarding is provided, installed, maintained, and used in accordance with clause 8, for all personnel involved in the production process.

4.2.5 Operation and maintenance

The user shall ensure that the shear production system is used and maintained in accordance with clause 9.

4.2.6 Training

The user shall ensure that supervisors, operators, and maintenance individuals are trained in the proper installation, adjustment, operation and maintenance of the shear and the shear production system. See clause 9.

4.2.7 Documentation

The user shall ensure that documentation is provided to personnel that establishes the training and safety procedures necessary for operation and maintenance of the shear or the shear production system.

4.3 Personnel

Personnel shall be responsible for following the training and safety procedures provided by the user in the operation and maintenance of the shear or shear production system, in accordance with clause 9.

EXPLANATORY INFORMATION

of that harm). If the risk is not tolerable (see 5.2), risk reduction is necessary to reduce that risk by implementing protective measures. Risk reduction results from applying one or more protective measures.

The type of protective measure is determined by the nature of the task and associated hazard(s) for the shear or shear production system under consideration. Protective measures should be selected to provide the desired degree of risk reduction.

E4.2.4

Safeguarding is one element of protective measures.

E4.2.7

User documentation of the risk assessment and risk reduction process should demonstrate the procedure that has been followed, and the results that have been achieved.

The user documentation should include the protective measures taken, the resulting residual risk and the requirements for additional protective measures to be implemented by personnel involved with the shear or shear production system.

E4.3

The Occupational Safety and Health Act of 1970 – Public Law 91-596, states in section 5(b), “Each employee shall comply with occupational safety and health standards and all rules, regulations and orders issued pursuant to this Act which are applicable to his own actions and conduct.”