The American Society of Safety Engineers is pleased to partner with the ANSI B11 Committee to move machine guarding safety forward to better protect workers and reduce hazards and exposures resulting from the use of this type of equipment.


B11 Standards Inc. also participates in a very large number of both national and international standards development activities.

The Past

Standardization / standards provide a bridge between research, innovation and the market, thereby strengthening competitiveness and boosting growth and jobs. Standards are a valuable tool for market dissemination of research and development results and can therefore contribute to the objectives of overall market innovation and competitiveness.

The original project on Safety Standard for Power Presses, B11, was initiated under the procedures of the American Engineering Standards Committee (which later became the American Standards Association, the United States of America Standards Institute, and in 1969 the American National Standards Institute - ANSI), with the National Safety Council as sponsor. The first standard, bearing the title Safety Code for Power Presses and Foot and Hand Presses, was developed by Sectional Committee B11 and was approved on November 13, 1922. Only two purposes of that "code" were listed. The first and primary use was for state industrial commissions in developing their workplace codes. The second use was as an operating guide for users operating press production systems.

The Present

The B11 ASC is comprised of organizations representing different stakeholder groups having a substantial interest and competence in the overall scope of B11 standards. It is recognized by ANSI as the body that evaluates and votes on final draft standards (or technical reports) developed by B11 writing subcommittees for approval as American National Standards and ANSI Technical Reports by the ANSI Board of Standards Review. Each of the standards and technical reports within the B11 series has its own writing subcommittee. These subcommittees function somewhat autonomously from the B11 ASC, with their own Chair (and possibly Vice-Chair), however, they are ultimately responsible and answerable to the B11 ASC. Once they complete work on their document, it is turned over to the Secretariat for procedural commenting and balloting by the public and the interested Voting Group of B11 ASC Member organizations, which forms the "consensus body." Once this process has been completed, the candidate standard is submitted to the ANSI Board of Standards Review for approval as a new or revised or reaffirmed American National Standard.

Listing of the ANSI B11 Machine Guarding Standards

ANSI B11.0-2015: Safety of Machinery

Scope: This Type-A standard applies to new, existing, modified or rebuilt power driven machines, not portable by hand while working, that are used to process materials by cutting; forming; pressure; electrical, thermal or optical techniques; lamination; or a combination of these processes. This includes associated equipment used to transfer material or tooling, including fixtures, to assemble/disassemble, to inspect or test, or to package. The associated equipment, including logic controller(s) and associated software or logic together with the machine actuators and sensors, are considered a part of the industrial machinery.

This can be a single machine or a machinery system(s).

Informative Note 1: To improve readability, the terms “machine,” “machinery,” “machine tool” or “machinery system(s)” are used interchangeably throughout the document, either in singular or plural form.
Informative Note 2: A machine system is a systematic array of one or more industrial machines that is not portable by hand while working and includes any associated material handling, manipulating, gauging, measuring, or inspecting equipment.

Informative Note 3: See ANSI B11.20 for additional information on integrated manufacturing systems.

This standard specifies basic terminology, principles and a methodology for achieving safety in the design and the use of machinery. It specifies principles of risk assessment and risk reduction to help designers, integrators and users of machinery in achieving this objective. These principles are based on knowledge and experience of the design, use, incidents, accidents and risks associated with machinery. Procedures are described for identifying hazards and estimating and evaluating risks during relevant phases of the machine life cycle, and for the elimination of hazards or the provision of sufficient risk reduction. Guidance is given regarding the documentation and verification of the risk assessment and risk reduction process.

Other industry sectors may benefit from applying this standard. A risk assessment may be required to determine if a machine specific (Type-C) standard covers the hazards associated with the application of the machine covered by the Type-C standard.

Where a machine-specific (Type-C) standard exists, the requirements of the machine-specific (Type-C) standard shall generally apply. Deviations from the requirements of this standard or from any machine-specific (Type-C) standard shall be based on a documented risk assessment.

Informative Note 1: See clause 6 for additional information on risk assessment.
Informative Note 2: See 7.16 for a list of example machines covered by other specific standards.


Scope: The requirements of this standard apply only to those mechanically-powered machine tools commonly referred to as mechanical power presses, which transmit force mechanically to cut, form, or assemble metal or other materials by means of tools or dies attached to or operated by slides.

Excluded from the requirements of this standard are: bulldozers; cold-headers and cold formers; eyelet machines; forging presses and hammers; high-energy-rate presses; hot-bending and hot-metal presses; hydraulic power presses; iron workers and detail punches; metal shears; pneumatic power presses; powdered-metal presses; press welders; power pressure brakes; riveting machines; turret and plate-punch machines; wire terminating machines; and welding presses.
ANSI B11.2-2013: Safety Requirements for Hydraulic and Pneumatic Power Presses

Scope: The requirements of this standard apply only to those machine tools, commonly referred to as hydraulic power presses, which transmit force hydraulically to cut, form, or assemble metal or other materials by means of tools or dies attached to or operated by slides.

Excluded from the requirements of this standard are: Manually powered presses; mechanical power presses; air powered presses; powdered metal presses; horizontal hydraulic extrusion presses; high energy rate presses; manually positioned "C" frame punching and riveting presses; meat-processing presses; forging presses and hammers; powered press brakes; metal shears; iron workers; cold headers; die-casting machines; plastic injection molding machines; stretch forming machines; roll-bending machines; welding machines; welding presses; radial expanding and compression equipment; packaging machines; balers; laboratory machines or equipment used to determine properties of materials; and guillotine paper cutters.

ANSI B11.3-2012: Safety Requirements for Power Press Brakes

Scope: The requirements of this standard apply to those machine tools classified as power press brakes (hereinafter referred to simply as "press brakes"), which are designed and constructed for the specific purpose of bending material. The requirements of this standard also apply to powered folding machines.

Excluded from the requirements of this standard are mechanical power presses; hydraulic power presses, hand brakes; tangent benders; apron brakes; and other similar types of metal bending machines.

ASSE has published a tech brief specifically addressing this standard.
ANSI B11.4-2003 (R2013): Safety Requirements for Shears
Scope: This standard applies to those mechanically, hydraulically, hydraulically, or pneumatically powered shears used to cut material by shearing and which utilize a fixed blade(s) and non-rotary moving blade(s). The shears that are excluded from the requirements of this standard are slitting-rotary, nibblers; coil slitters; portable hand tools; rotary-blade slitters and shears; iron workers; alligator; angle, bar, bean, channel, and notching machines.

ANSI B11.5-1988 (R2013): Ironworkers - Safety Requirements for Construction, Care & Use
Scope: The requirements of this standard apply to those combination, multipurpose powered machines that punch, shear, notch, cope and form metal or other materials commonly referred to as ironworkers. The requirements of this standard also apply to those single or multipurpose powered machines similar in construction to, and identical in the use of, an ironworker or portions thereof.
The ironworkers or combinations that are excluded from the requirements of this standard are: Alligator shears; bar shears; billet shears; manually powered machines; nibblers; portable hand tools; portable machines; power press brakes; power presses; and power shears.

ANSI B11.6-2001 (R2012): Safety Requirements for Manual Turning Machines with or without Automatic Control
Scope: Safety Requirements for Manual Turning Machines w/ or without Auto Control This standard specifies safety requirements for the design, construction, operation and maintenance (including installation, dismantling, and transport) of the general class of manually controlled horizontal and vertical spindle turning machines. Machines covered by this standard are intended to work metals and other manmade materials. This standard also applies to devices that are integral to the machine. These machines may have automatic capability but may not be equipped with automatic part handling or bar–feed mechanisms nor automatic tool changing systems.

Excluded from the requirements of this standard are NC Turning Machines where manual control is used only to set the machine for automatic production.

ANSI B11.7-1995 (R2015): Cold Headers & Cold Formers - Safety Requirements for Construction
Scope: The requirements of this standard apply only to those mechanically-powered machines commonly referred to as cold headers and cold formers, which perform many operations such as shearing, heading, upsetting,
extruding, trimming, forming, cold working, or warm forming material by means of tools and dies. This type of equipment generally has the ram in a horizontal position. Included are pointers and roll formers when they are mechanically an integral part of the basic machine.

Excluded from the requirements of the standard are: mechanical, hydraulic, and pneumatic power presses; hot forgers; hot upsetters (including cold work); hot farmers; hot headers; vertical cold forgers; four slide machines; swagers; wine drawers; slotters; shavers, and high-energy machines. Also excluded are pointers and roll formers, unless they are an integral part of the basic machine.

**ANSI B11.8-2001 (R2012): Safety Requirements for Manual Milling, Drilling & Boring Machines with or without Automatic Control**

Scope: This standard specifies safety requirements for the design, construction, operation and maintenance (including installation, dismantling and transport) of manually controlled milling, drilling, and boring machines. This standard also applies to devices that are integral to the machine. These machines may have automatic capability but may not be equipped with automatic tool changing or automatic part handling systems.

Excluded from the requirements of this standard are NC milling, drilling, and boring machines where manual control is used only to set the machine for automatic production.

**ANSI B11.9-2010 (R2015): Safety Requirements for Grinding Machines**

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. This standard also applies to these machines when they are grinding materials other than metals such as glass, ceramics, plastics, and rubber.

Excluded from the requirements of this standard are: portable hand-held grinding machines, machines using loose abrasives, machines used in wood-working applications, or machines used for concrete cutting in road construction. Also, this standard does not apply to honing machines, lapping machines, polishing machines or belt grinding machines.

**ANSI B11.10-2003 (R2015): Safety Requirements for Metal Sawing Machines**

Scope: This standard specifies safety requirements for the design, construction, modification, operation and maintenance (including installation, dismantling and transport) of a general class of stationary
machine tools that use a saw blade (tool) to cut off or change the shape of the workpiece. This standard also applies to ancillary devices integrated into the machine (e.g., part handling mechanisms, chip handling systems).

Excluded from the requirements of this standard are: woodworking/sawing machines; stonecutting sawing machines; food-processing sawing machines; abrasive-sawing machines; and portable by-hand sawing machines.

**ANSI B11.11-2001 (R2012): Safety Requirements for Gear and Spline Cutting Machines**

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

**ANSI B11.15-2001 (R2012): Safety Requirements for Pipe, Tube and Shape Bending Machines**

Scope: The requirements of this standard apply to any power-driven machine designed for bending pipe, tube, and shapes by means of bending dies, clamp dies, pressure dies, mandrels, wiper dies, vertical bending punches, radius dies, wing dies, and associated tooling.

Excluded from the requirements for this standard are: Bench presses; hydro forming; forging presses; four-slide machines; hydraulic presses; mechanical presses; power press brakes; roll benders; roll formers; and assembly machines.

**ANSI B11.16-2014: Safety Requirements for Powder/Metal Compacting Presses**

Scope: The requirements of this standard apply to those mechanically, hydraulically or direct drive machines that are designed, modified, or converted for the purpose of compressing metallic or nonmetallic powders. These machines are commonly referred to as metal powder presses, powder metal presses, compacting presses, pill presses, rotary PM presses, PM briquetting presses,
powder metal forging presses, metal powder sizing presses or metal powder coining presses. For the purpose of this standard, they shall be referred to as "PM presses." PM press axes can be of a direct driven type.

Excluded from this standard are: mechanical and hydraulic power press brakes; mechanical and hydraulic power presses; bulldozers; conventional hot bending and hot metal presses; conventional forging presses; hammers; riveting machines and similar types of fastener applications; isostatic and hydrostatic presses; high energy rate presses.


Scope: The requirements of this standard apply to those horizontal hydraulically powered presses that extrude metals by means of applying sufficient pressure to an individual metal billet, confined within a container, to force the metal to be extruded through the configured openings of a die. Included are horizontal hydraulically powered presses that produce extruded shapes by the extrusion process, either direct or indirect.

Excluded from the requirements for this standard are: hydrostatic extrusion presses; vertical extrusion presses; laboratory presses used to develop extrusion techniques for new materials and products; and extruding machines of unconventional design.

**ANSI B11.18-2006 (R2012): Safety Requirements for Machines Processing or Slitting Coiled or Non-coiled Metal**

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. 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.

Specifically excluded from this standard are machinery and devices for the sole purpose of performing thermal, coating, chemical, and electrolytic processes and any emissions therefrom are commonly associated with metal processing systems. This standard does not provide safety requirements for these specific processes or devices.
ANSI B11.19-2010: Performance Requirements for Safeguarding

Scope: This standard provides performance requirements for the design, construction, installation, operation and maintenance of the safeguarding listed below when applied to machines.

a) Guards;
b) Safeguarding devices;
c) Awareness devices;
d) Safeguarding methods.

This standard also provides performance requirements for complementary equipment and measures, safe work procedures, and safety functions.

This standard does not provide the requirements for the selection of the safeguarding for a particular application.


Scope: This standard specifies the safety requirements for the design, construction, set-up, operation and maintenance (including installation, dismantling and transport) of integrated manufacturing systems.

This standard does not cover: safety aspects of individual machines and equipment that may be covered by standards specific to those machines and equipment (B11_ base_ standard), transfer machines or transfer lines, or continuous flow processes.


Scope: This standard applies to machine tools using a laser for processing materials, and its associated equipment. It describes the hazards generated by such machines and states the protective measures to be incorporated into such machines. The standard also contains requirements for the information provided with such machines.

Excluded from the requirements of this document are: photolithography; holography; equipment used in medical applications; data storage; laser printers; and copiers.
ANSI B11.22-2002 (R2012): Safety Requirements for Turning Centers & Automatic Numerically Controlled Turning Machines

Scope: This standard specifies the safety requirements for the design, construction, operation and maintenance (including installation, dismantling and transport) of turning centers and automatic numerically controlled turning machines.

This standard does not cover safety requirements of manufacturing systems/cells (integrated manufacturing systems, B11.20).

ANSI B11.23-2002 (R2012): Safety Requirements for Machining Centers and Automatic Numerically Controlled Milling, Drilling and Boring Machines

Scope: This standard specifies the safety requirements for the design, construction, operation and maintenance (including installation, dismantling, and transport) of machining centers and automatic numerically controlled milling, drilling and boring machines. This standard is applicable to machines where the axes of travel is not greater than 1x1x1 m (39x39x39 in).

ANSI B11.24-2002 (R2012): Safety Requirements for Transfer Machines

Scope: This standard specifies the safety requirements for the design, construction, operation and maintenance (including installation, dismantling, and transport) of machining centers and automatic numerically controlled milling, drilling and boring machines. This standard is applicable to machines where the axes of travel is not greater than 1x1x1 m (39x39x39 in).

ANSI B11.25-2015: Safety Requirements for Large Machines

Scope: This standard applies to machines with a work envelope equal to or greater than two cubic meters (2 m³) or two meters of linear axis travel, or where personnel are regularly required to enter into the working envelope to perform work or tasks.

The requirements in this standard apply to all large machines, unless they are specifically covered in or by another standard. This document is intended to be used with both ANSI B11.0
and ANSI B11.19 to execute the risk assessment process and the safeguarding of machinery respectively.

The requirements of this standard do not apply to turning machines and turning centers designed to accept work holding devices less than 500 mm (20 inches) outside diameter and with a distance between centers less than 2 meters (80 inches).


Scope: The purpose of this guideline is to provide a uniform approach to ergonomic considerations for machine tools within the workplace. This document addresses those considerations which will assist in design, installation and use of manufacturing systems, including individual and integrated machine tools and auxiliary components.


Scope: This document provides guidelines for a uniform approach to the control of airborne contaminants generated by stationary machine tools used to cut and form materials. Control shall be through the proper design, installation, use, and maintenance of the machine tool and its support systems (such as, but not limited to, metalworking fluid delivery systems and air cleaning equipment).


Scope: This B11 Technical Report provides a means to identify hazards associated with a particular machine or system when used as intended, and provides a procedure to estimate, evaluate, and reduce the risks of harm to individuals associated with these hazards under the various conditions of use of that machine or system.

**ANSI B11.TR4-2004 Selection of Programmable Electronic Systems (PES/PLC) for Machine Tools**

Scope: The purpose of this Technical Report is to provide guidance for the design or selection, integration, and validation of PESs for the safety related functions of a machine production system. The terminology used in this document may not be used consistently throughout the industry, but this
document does represent the concepts which are important when using and designing safety-related control systems.

**ANSI B11.TR5-2006: Sound (Noise) Level Measurement Guidelines**

Scope: The purpose of this Technical Report is to specify methods for measuring, evaluating and documenting sound levels emitted by a machine or machine production system(s) during normal operation and when running at idle, and to establish recommended sound levels at the various measurement locations around the machine or machine production system.

**ANSI B11.TR6-2010: Safety Control Systems for Machines**

Scope: This Technical Report provides guidance in understanding and implementing safety-related control functions (functional safety) as they relate to electrical, electronic, mechanical, pneumatic, hydraulic components and systems for machine tools covered by the B11 series of safety standards.

NOTE 1: The terminology used in this document may not be used consistently throughout the industry, but this document does represent concepts which are important when using and designing safety-related control systems.

NOTE 2: Usage of [machine] in the following text means any of the specific machine tools covered by the ANSI B11 ‘base' series of safety standards.

NOTE 3: This document is not intended to address programmable electronic systems / programmable electronic devices (PES / PED). See B11.TR4.


Scope: This document provides guidance on the practical application and integration of safety and lean manufacturing principles to machinery and manufacturing systems for improving performance, safety and quality by reducing injury and waste. The guidelines in this technical report assist machine tool users to minimize waste and risk associated with machinery and manufacturing systems, including individual and integrated machine tools and auxiliary components.
Links and information related to the ANSI B11 American National Standard

- **Essential Requirements used by ANSI**

- The links below will give information addressing how voluntary national consensus standards are used in regulatory settings:
  
  www.asse.org/assets/1/7/Dembystandardsarticle3-21-2006.doc
  

- There is an official memorandum of understanding between OSHA and ANSI. The link to the read the memorandum is at:
  

There are dozens of examples of how the B11 Standards are recognized by OSHA. Below are two examples:


https://www.osha.gov/SLTC/etools/machineguarding/bibliography.html

From the U.S. Occupational Safety and Health Review Commission:


From the State of California:

http://www.dir.ca.gov/oshsb/GP_Die_ISOR.pdf

From CDC/NIOSH:


From the State of Oregon:

In regards to 5A1 citations, B11 Standards are used extensively. Below is an example from the B11.3 Standard. The most recent inquiry indicates that B11.3 alone has been referenced 160 times at the level of Federal OSHA. Some examples are below:

| By Date |
|-----------------|----------------|----------------|-----------------|----------------|-----------------|
| Inspection     | Citation       | Issuance       | Report ID | Category     | SIC       | Establishment Name |
| 1              | 315739847      | 01001          | 03/20/2012 | 0418100      | 3511     | D & D Manufacturing Company, Inc. |
| 2              | 316226703      | 01001          | 01/26/2012 | 0213600      | 3499     | Truform Manufacturing Corp.       |
| 3              | 315977652      | 01001          | 01/18/2012 | 0213900      | 3443     | Kiker Sheet Metal Inc.            |
| 4              | 113740690      | 01001          | 11/18/2011 | 0316700      | 2541     | Fleetwood Industries, Incorporated |
| 5              | 315552109      | 01001A         | 10/04/2011 | 0522300      | 3496     | Advance Wire Forming              |
| 6              | 315568428      | 01001          | 10/03/2011 | 0213900      | 3499     | Crest Ultrasonics Corp.           |
| 7              | 315717173      | 01001          | 09/30/2011 | 0213900      | 3412     | Sp Sheet Metal Company            |
| 8              | 315717173      | 01007A         | 09/30/2011 | 0213900      | 3412     | Sp Sheet Metal Company            |
| 9              | 314723966      | 01001          | 09/21/2011 | 0317900      | 3599     | Stanley Vidmar                    |
| 10             | 314723966      | 01002          | 09/21/2011 | 0317900      | 3599     | Stanley Vidmar                    |
| 11             | 314890450      | 02001          | 06/30/2011 | 0953220      | 3442     | Arcadia, Inc.                     |
| 12             | 315361717      | 01001          | 06/28/2011 | 0420600      | 3422     | Quality Engineered Products Corp. |
| 13             | 315487264      | 01001          | 06/27/2011 | 0213900      | 3499     | Compass Wire Cloth Corporation    |
| 14             | 314378795      | 01001          | 06/10/2011 | 0453710      | 3568     | Fenner, Inc., Dba Fenner Drives   |
| 15             | 314371691      | 01001          | 06/09/2011 | 0453710      | 2011     | The Smithfield Packing Company, Incorporated |
| 16             | 315523084      | 01001          | 05/10/2011 | 0111100      | 3499     | Saunders Mfg. Co. Inc.            |
| 17             | 315156919      | 01001          | 05/02/2011 | 0521700      | 3446     | David Architectural Metals, Inc.   |
| 18             | 314205840      | 01001          | 04/19/2011 | 0418100      | 3444     | Don Park (Usa) Limited Partnership |
| 19             | 314205840      | 01002          | 04/19/2011 | 0418100      | 3444     | Don Park (Usa) Limited Partnership |
| 20             | 314205840      | 01003          | 04/19/2011 | 0418100      | 3444     | Don Park (Usa) Limited Partnership |