ANSI B11.17-2023

An American National Standard

Safety Requirements for Horizontal Extrusion Press Systems

ANSI-Accredited Standards Developer and Secretariat:

B11 Standards, Inc.
Houston, Texas
U.S.A.

APPROVED: 28 FEBRUARY 2023
by the American National Standards Institute
Board of Standards Review

AMERICAN NATIONAL STANDARDS

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Published by: B11 Standards, Inc.,
POB 690905, Houston, TX - USA

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Foreword (This Foreword is not part of the requirements of American National Standard B11.17-2023)

The primary objective of this standard is to eliminate, control or reduce hazards to individuals associated with horizontal extrusion presses 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 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 ANSI B11.17 Standard was developed and eventually approved in 1982, and it was reaffirmed in 1989 as originally written. ANSI B11.17 was then revised a second time and approved in 1996 and the third revision of this standard was approved in 2004. That 2004 edition was reaffirmed in 2015. This current published standard was revised for the fourth time by the B11.17 Subcommittee, was processed and administered by the Secretariat, approved by the B11 Standards Development Committee for submittal to ANSI, and approved by the ANSI Board of Standards Review as a revised American National Standard.

Horizontal extrusion press 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.

Effective Date

The following information on effective dates 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 and machinery systems within 30 months of the approval date of this standard.

The Subcommittee recommends that users evaluating whether existing machinery and machinery systems implement this edition within 30 months of the approval date of this standard using generally recognized risk assessment methods. If the risk assessment shows that modification(s) is necessary, refer to the requirements of this standard or the machine-specific “base” safety standard to implement risk reduction measures (protective measures) for appropriate risk reduction.

Context (how to read/use this document)

The writers of this document understand that the reader/user of this American National Standard is unlikely to read it cover-to-cover but instead (for example), might use the Table of Contents as a sort of ‘roadmap’ to find a very specific topic and then review only that topic. However, the reader/user of this standard is informed that the elements (clauses, subclauses, etc.) of these documents are sequenced and often interrelated in such a way as to state requirements that may very well be dependent on text in a section(s) that precedes the actual requirement. It therefore becomes vital and important for the reader/user of this standard to ensure they understand the depth, range and especially the context of the section or topic in which the actual requirement appears.

Inquiries

Inquiries with respect to the application of the substantive requirements of this standard and suggestions for its improvement are welcomed and should be sent to the B11 Standards Secretariat at their website (www.b11standards.org).

Development

This standard was processed and submitted for ANSI approval by the B11 Standards Development Committee (B11 SDC) on safety standards for machines. At the time this standard was approved as an American National Standard, the ANSI B11 SDC was composed of the following member organizations:

Alan Metelsky, FS Eng., **Chair** / Anne Mathias, PE, **Vice–Chair** / David Felinski, **Secretary**

Organizations Represented	Name of Representative	
	Delegate	**Alternate**
Aluminum Extruders Council	Mel Mitchell, CSP	Brad Wyatt, CSP
Amazon Robotics	Jeread Sines, B11 LMSS, FS Eng	Pat Barry
American Society of Safety Professionals	Ted Sberna, Sr.	Anne Mathias, PE
Association for Advancing Automation	Carole Franklin	Jeff Fryman
Association For Manufacturing Technology	Russ Bensman	Alan Metelsky, FS Eng
Assn. for Packaging & Processing Technologies	Bruce Main, PE, CSP	Tom Egan
The Boeing Company	Rhiannon McPherson	Mark Ellingson
Bridgestone	Kenji Furukawa, FS Eng	Joey Hinson, FS Eng
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General Motors Corporation	Tony Ross	Mike Douglas
IDEM Safety	Mark Witherspoon	Amir Mohtasham
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MAG Automotive	Erik Carrier	Doug Watts
Metal Powder Industries Federation	Bill Edwards	James Adams
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Occupational Safety & Health Administration	Ken Stevanus	Mary Bauer, CIH, CSP, B11 LMSS
Omron Scientific Technologies Incorporated	Tina Hull, FS Exp	
Pilz Automation Safety, LP	Mike Beerman, CMSE	Dino Mariuz
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Precision Metalforming Association	Jim Barrett, Jr. PhD	David Klotz
Presence–sensing Device Mfgs. Assn.	Jim Kirton	Mike Carlson
Rockwell Automation	Darin Magnuson, FS Eng	Jonathan Barrett, FS Eng
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Sheet Metal & Air Cond. Contractors Nat'l. Assn.	Justin Crandol, CSP	Rick Di Ioli
Toyota Motor Manufacturing North America	Chip Boertlein	Mike Collier, B11 LMSS

The B11.17 Subcommittee which revised the 2004 standard, had the following members:

Henry W. Dowler, Chairman, Werner Co.	Jerry Burt	Chase Brass
Alan Bartelt PE, Secretary, Alcoa	Floyd Kent	Hydro Aluminum
	David Kurtak	UBE Industries
	Rich Rutkowski	SMS Eumoco Inc.
	Robert Smith	R.L. Best Co.
	Barry Stockton	High Tech Consulting

The Subcommittee which developed this current revision of ANSI B11.17 had the following members:

Name	Organization
Mel Mitchell, Chairman,	Mountain Ridge Metals
Brad Wyatt, Vice-Chairman	Kaiser Aluminum
Chris Felinski, Secretary	B11 Standards
Angelo DeBono	Extrudex Aluminum Corp.
Michael Kramer	Bosch Rexroth
Ted Sberna, Jr.,	White Horse Safety
Jim Scheuing	Extrudex Aluminum Corp.
Ron Walls	Kaiser Aluminum

Explanation of the format, and ANSI B11 conventions

This standard uses a two-column format to provide supporting information for requirements. The material in the left-side column is confined to “Standards Requirements” only, and is so captioned. The right-side 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. 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.

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.

Generally speaking, 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, however, the terms can often be used interchangeably.

B11 conventions:

Normative inter-document or intra-document references are denoted by “See #.##.” Informative inter-document or intra-document references are denoted by “See also, #.##.”

The use of “hard” conversion between metric and English units does not imply a tolerance requirement.

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 with the standard.

The ANSI B11 standards generally use the term “OR” as an inclusive disjunction, meaning *one or the other or both,* but on occasion will use the term “and/or” to emphasize the fact that both are fully intended in cases where the Subcommittee believed it was imperative to make that clear.

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.).

Introduction

The main purpose of every machine tool is to process materials. Inadvertent interference with, or accidental misdirection of the released energy during production, maintenance, commissioning and de-commissioning can result in injury.

The purpose of the ANSI B11 series of machinery safety standards is to devise and propose ways to eliminate or minimize risks of the potential hazards associated with the required tasks. This can be accomplished either by an appropriate machine design or by restricting personnel or other individuals' access to hazard zones, and by devising work procedures to minimize personnel exposure to hazardous situations. This is the essence of the ANSI B11 series of safety standards. This standard recognizes that zero risk does not exist and cannot be attained. However, a good faith approach to risk assessment and risk reduction should achieve an acceptable risk level.

Since the last revision of B11.17, the format/style and even some content elements within the ANSI B11 series have evolved. This current revision has maintained many of the original safety requirements and in several instances, updated requirements using up-to-date standards of safety practices and technology while updating the format to the modern B11 standards structure. Additionally, the ANSI B11 series of standards now incorporates the integration of a stratified approach using "**types**" of standards (i.e., type-A, type-B and type-C standards – see a more detailed explanation of this approach in the Introduction). ANSI B11.17 is considered a type-C standard and is intended to be used (at a minimum) in conjunction with the type-A ANSI B11.0 and type-B ANSI B11.19 (see the B11 documents list on page xi).

Organization and Application of B11 Documents

The B11 standards and technical reports can be associated with the ISO "type A-B-C" structure as described immediately below, and as shown in Figure 1.

- **Type-A standards** (basis standards) give basic concepts, principles for design, and general aspects that can be applied to machinery;
- **Type-B standards** (generic safety standards) deal with one or more safety aspects or one or more types of engineering controls that can be used across a wide range of machinery:
- **Type-C standards** (machinery safety standards) deal with detailed safety requirements for a particular machine or group of machines**.**

The B11.0 standard on general safety requirements common to ANSI B11 machines is primarily a "type - A" standard in that it applies to a broad array of machines and contains very general requirements. However, in many areas it also contains very specific requirements. B11.19, B11.20, B11.21, B11.25, B11.26, as well as the entire B11 series of Technical Reports are all typical "Type-B" documents addressing general safety elements that can be used across a wide range of machinery (such as B11.19 and B11.26) or as a standard when combining machines (B11.20). The B11 series of Technical Reports are informative documents that may be generally applied to many different machines, and as such would fall into the "Type-B" category. The machine-specific ("Type-C") B11 standards contain detailed safety requirements for a particular machine or group of machines (such as this standard). The Type-A B11.0 and the Type-C (machine-specific) B11 standards are intended to be used concurrently by the supplier and user of machines. When a Type-C standard deviates from one or more provisions dealt with by this standard or by a Type-B standard, the Type-C standard requirement generally takes precedence. Any deviation in conforming to a requirement of any standard should be carefully evaluated and based on a documented risk assessment.

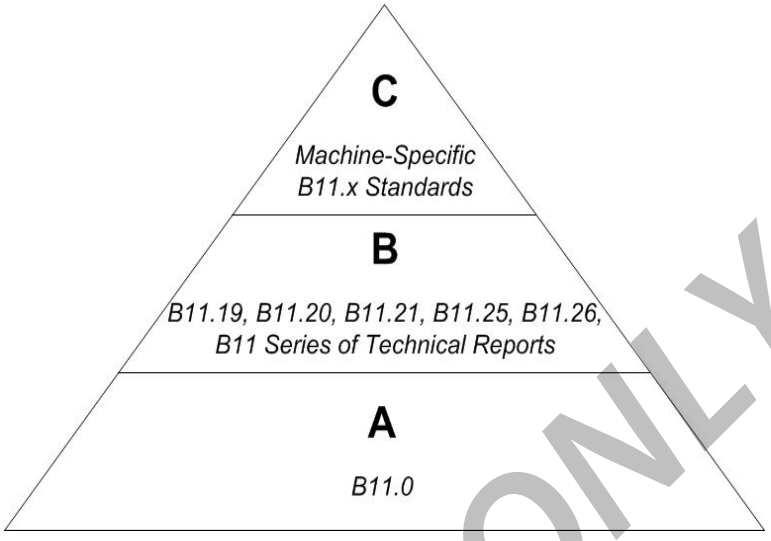

Figure 1 — Organization of the B11 Series of Documents

An overview of each clause of this standard is provided below.

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) Responsibilities – The general responsibilities of the supplier (builder), user, modifier and the user personnel are listed in clause 4 together with the remaining clauses for which they have primary responsibility.
5) Risk assessment process –Clause 5 presents the general approach to risk assessment (see B11.0 for further explanation of hazard/task identification and risk assessment/risk reduction).
6) Design and construction – It is assumed that the supplier of new equipment to the user will be responsible for the requirements of clause 6, understanding that the user may add to or modify these requirements through the purchase agreement. For existing machinery, the user is generally responsible for the requirements of clause 6.
7) Layout, 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) Risk reduction measures – This is normally a shared responsibility but often, either the supplier or the user will provide and/or meet the requirements of clause 8.
9) Set-up, operation and maintenance – The user is normally responsible for the requirements of clause 9 with possible assistance from the supplier for training.
10) Training – The user is normally responsible for the requirements of clause 10 with possible assistance from the supplier for materials or the training itself.
11) Decommissioning – This is primarily a user responsibility, however, the supplier shares responsibility for taking this aspect into consideration during the design.

As of the date of approval of this standard, the ANSI B11 series of American National Standards and Technical Reports on machinery safety consisted of the following documents shown in the list below. The user should check the B11 Standards store (www.b11standards.org) or a licensed reseller such as ANSI (www.ansi.org) for the current versions of any of these documents. All archival / historical editions of the documents, as well as current editions, are available at www.b11standards.org.

List of the ANSI B11 Series of Safety Standards and Technical Reports

#	SHORT TITLE / TOPIC	YEAR	TYPE
B11.0	Safety of Machinery	2020	A
B11.1	Mechanical Power Presses	2009 (R2020)	C
B11.2	Hydraulic & Pneumatic Power Presses	2013 (R2020)	C
B11.3	Power Press Brakes	2022	C
B11.4	Shears	2003 (R2020)	C
B11.5	Ironworkers	1988 (R2020)	C
B11.6	Manual Turning Machines w/ or without Auto Control	2022	C
B11.7	Cold Headers and Cold Formers	2020	C
B11.8	Manual Milling, Drilling, & Boring Machines	2022	C
B11.9	Grinding Machines	2010 (R2020)	C
B11.10	Sawing Machines	2003 (R2020)	C
B11.11	Gear and Spline Cutting Machines	2001 (R2012)	C
B11.12	Roll Forming and Roll Bending Machines	2005 (R2020)	C
B11.13	Single & Multiple-Spindle Automatic Bar and Chucking Machines	2020	C
B11.14	*Withdrawn* (Coil Slitting Machines; combined into B11.18)	(1996)	C
B11.15	Pipe, Tube and Shape Bending Machines	2022	C
B11.16	Powder / Metal Compacting Presses	2014 (R2020)	C
B11.17	Horizontal Extrusion Presses	2023	C
B11.18	Machines Processing or Slitting Coiled or Non-Coiled Metal	2006 (R2020)	C
B11.19	Performance Requirements for Risk Reduction Measures (Safeguarding)	2019	B
B11.20	Integration of Machinery into a System	2017 (R2022)	B
B11.21	Machine Tools Using Lasers for Processing Materials	2006 (R2020)	B
B11.22	Turning Centers and Automatic Numerically Controlled Turning Machines	2002 (R2020)	C
B11.23	Machining Centers & CNC Milling, Drilling & Boring Machines	2002 (R2020)	C
B11.24	Transfer Machines	2002 (R2020)	C
B11.25	Large Machines	2022	B
B11.26	Functional Safety for Equipment / Machine Control Systems	2018	B
B11.27	Electro-Discharge Machines	2020	C
B11.TR1	Ergonomics	2016	B
B11.TR2	Metal Working Fluids	1997 (R2016)	B
B11.TR3	*Withdrawn* (Risk Assessment / Risk Reduction Guide)	(2000 R2015)	B
B11.TR4	Selection of Programmable Electronic Systems (PES/PLC)	2004 (R2015)	B
B11.TR5	Noise Measurement	2006	B
B11.TR6	*Withdrawn* (Safety Control Systems for Machines)	(2010)	B
B11.TR7	Integration of Lean and Safety	2007 (R2017)	B
B11.TR8	Sustainable Safety Systems through Inspection of Risk Reduction Measures	2022	B
B11.TR9	Cybersecurity	2019	B
B11.TR10	Guidance on Artificial Intelligence into Machinery Safety Applications	2020	B
ANSI/ISO 12100	Safety of machinery (identical adoption of ISO 12100-2010)	2012	A

Safety Requirements for Horizontal Extrusion Press Systems

STANDARD REQUIREMENTS

1 Scope

1.1 General

The requirements of this standard apply only to those horizontal 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, and includes any other equipment and system(s) used in the press production operation.

The horizontal extrusion press system, hereafter referred to as a *press system*, is a system that functions to extrude metals horizontally either by the direct or indirect process. It includes components necessary to handle and process metals from the loading mechanism through the platen exit or external butt shear through the process of cooling.

EXPLANATORY INFORMATION

(Not a normative part of this ANS for the Safety Requirements for Horizontal Extrusion Press Systems - ANSI B11.17-2023).

E1.1

A press system includes all equipment that is used by the system. This will vary for each individual press system but in most cases, it will include all equipment from the time that the metal is placed into the system until that metal exits the control of the press or extrusion cycle at either a coiling system or a cooling table (before being stretched and/or cut).

A horizontal extrusion press system could include the following (this list is not all inclusive and each press system should be evaluated for hazards associated with all attached or affected machinery):

- log/billet table, where the metal is first introduced to the system;
- furnace, which heats aluminum billets or logs prior to extrusion;
- billet cutting machine, either a hot billet saw or a shear (this would not be necessary with the use of precut billets);
- billet conveyor – to move the hot billet into loading position;
- billet loader – to load the billet into the press;
- press;
- press runout – where the metal goes when it exits the press;
- puller or runout conveyor – this could be a mechanical puller, a series of belts, or a moving runout table to keep the material moving down the runout table;
- cutoff saw – this could be a flying cutoff saw attached to the puller or it could be another means of cutoff for the extrusion, including manual sawing or torches;
- cooling table or coiling system(s).

See Figures in Annex A for illustrations of horizontal extrusion press systems and their components.