

# ANSI / PLASTICS B151.1 – 2017

*American National Standard for Plastics Machinery*

## Safety Requirements for Injection Molding Machines

Secretariat and Accredited Standards Developer  
The Plastics Industry Association  
1425 K Street NW, Suite 500  
Washington, DC 20005

**APPROVED: 6 JANUARY 2017**

by the American National Standards Institute



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**Published by:**

**The Plastics Industry Association  
1425 K Street NW, Suite 500  
Washington, DC 20005**

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## Foreword

**(This Foreword is not part of American National Standard ANSI/PLASTICS B151.1-2017)**

The primary objective of this standard is to minimize hazards to personnel associated with the use of injection molding machines by establishing requirements for the manufacture and use of these machines.

This standard is a revision of American National Standard ANSI/SPI B151.1-2007 - Safety Requirements for the Manufacture, Care, and Use of Horizontal Clamp Injection Molding Machines, and it has been combined with American National Standard ANSI/SPI B151.29-2014 - Safety Requirements for Vertical Clamp Injection Molding Machines. The B151.29 standard has been formally withdrawn as an American National Standard upon the approval of this newly 'combined' B151.1.

Some of the key differences between this standard and the prior edition include but are not limited to:

- Additional definitions were required and some existing definitions were updated to reflect state of the art and harmonization;
- Inclusion of safety requirements addressing the characteristics of vertical clamp IMMs;
- Making optional, the use of a mechanical device on horizontal clamp IMMs (still required for vertical clamp IMMs);
- Some paragraphs required modification for clarity and intent;
- Additional details on electrical requirements were added;
- Additional explanatory material and illustrations were added;
- Some paragraphs required modification and other paragraphs were added to conform more closely to changes in technology;
- Extensive changes related to safety circuits and safety circuit performance were made, where safety interlocks are no longer exclusively done by the position sensors but other non-contact and coded interlock switches are now allowed so long as the same level of safeguarding performance is maintained, to effectively protect against hazards from IMMs;
- Risk reduction measures and hierarchy of controls added as a guide to the hazards elimination process;
- Information for use of the machinery is expanded to include PPE and operator's training as mandatory requirements for users of the equipment;
- Differentiations between electrically and mechanically powered machines have been minimized;
- Motion/No Motion option for platen core and ejectors movement has been updated to reflect new safety requirements for the area of access;
- Additional user requirements were defined to clearly state the need for using the risk assessment process in the molding operation;
- Extensive updates to annexes include presence sensing safeguarding devices and two hand control.

To assist in the interpretation of these requirements, responsibilities have been assigned to the supplier, the remanufacturer, the modifier, and the user. The project on revising the horizontal injection molding machine standard and combining the safety requirements for both horizontal IMMs and vertical IMMs into a single standard was initiated under the auspices of the Machinery Safety Standards Committee of the Equipment Council of the Plastics Industry Association. The Plastics Industry Association has long been concerned with operator safety on plastics processing equipment. Accordingly, the Equipment Council of the Plastics Industry Association has established a standards development committee charged with the task of establishing necessary standards.

A standard addressing the manufacture and use of both horizontal and vertical clamp injection molding machines is complicated by the wide variety and sizes of machines manufactured and in use, and by the virtually infinite combinations of parts being produced, the production methods used, and the operating conditions existing in industry today. The committee has made efforts to simplify and streamline the requirements as much as practicable.

### Effective Date

The following information on effective dates is informative guidance only, and not a normative part of this standard. This committee 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 committee recommends that suppliers complete and implement design changes for new machines and machinery systems within 18 months of the approval of this standard.

The committee recommends that users evaluate whether existing machinery and machinery systems have acceptable risk within 18 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 to implement risk reduction measures (protective measures) for appropriate risk reduction.

The ANSI/PLASTICS B151.1 is considered a “type-C” standard. Plastics Industry Association standards can be associated with the ISO “A-B-C level” structure as described below:

- **Type-A standards** (basis standards) give basic concepts, principles for design, and general aspects that can be applied to machinery (e.g., ANSI B11.0; ANSI/ISO 12100);
- **Type-B standards** (generic safety standards) deal with one or more safety aspects or one or more types of safeguards that can be used across a wide range of machinery (e.g., ANSI B11.19; ISO 13849-1);
- **Type-C standards** (machinery safety standards) deal with detailed safety requirements for a particular machine or group of machines (e.g., ANSI/PLASTICS B151.1; EN 201).

Suggestions for improvement of this standard will be welcome. Inquiries with respect to the application of, or substantive requirements of, this standard should be addressed to the Plastics Industry Association, 1425 K Street, NW, Ste. 500, Washington, DC 20005. The Injection Molding Subcommittee of the Equipment Council was responsible for the development of this standard, and had the following members who contributed substantively to the development of this standard:

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This ANSI/PLASTICS B151.1 – 2017 American National 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 committee believed would help clarify the requirements of the standard or to provide examples or additional reference information. This column is not a normative part of the standard as it contains no requirements 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, ability or capability, whether physical or causal, and the term “MAY” denotes a permissible course of action within the limits of the standard.

To achieve uniform interpretation, it is imperative to read and understand the definitions (clause 3) of this standard.

**B151 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 B151 standards generally do not use the term “and/or” but instead, preferentially use the term “OR” which is used as an inclusive disjunction, meaning ***one or the other or both***.

Suggestions for improvement of this standard are welcomed.

They should be sent to:

**Plastics Industry Association**

**1425 K Street NW, Suite 500**

**Washington, DC 20005 - Attention: B151 Secretariat.**

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*American National Standard for Plastics Machinery*

## Safety Requirements for Injection Molding Machines

STANDARD REQUIREMENTS

EXPLANATORY INFORMATION

(Not a normative part of American National Standard B151.1-2017 – Safety Requirements for Injection Molding Machines)

### 1 Scope, Purpose, and Application

#### 1.1 Scope

The requirements of this standard apply to Horizontal and Vertical Clamp Injection Molding Machines (HCIMMs and VCIMMs) that process plastic materials and inject said material into a mold(s) held closed by the acting clamp.

IMM suppliers and users shall use the risk assessment process in the manufacture, maintenance, and use of the machinery to eliminate or reduce risk.

Deviations from the requirements of this standard shall be based on a documented risk assessment that demonstrates acceptable residual risk.

Safety requirements for the use of ancillary equipment or molds for IMMs are not covered by this standard.

#### 1.2 Purpose

The purpose of this standard is to identify and address known hazards to personnel working on, or adjacent to, an IMM.

#### 1.3 Application

The user shall ensure that the use of an IMM shall be in conformance with the requirements of clause 4.

#### E1.1

Injection molding machines are used for the cyclic production of molded parts from plastics or rubber. The plasticized material is injected through a nozzle into a mold containing one or more cavities in which the article is formed. HCIMMs and VCIMMs (or "IMMs") simply differentiate between the orientation of the clamping mechanism to the molds.

Applications which are not covered or clearly detailed in this standard should be subject to a risk assessment.

A list of hazards common to IMMs appears in clause 6 of this standard. Compliance with this standard is considered to adequately control hazards identified in clause 6. Other hazards not listed in clause 6 that can occur with IMMs should be evaluated using the risk assessment process, and may require additional risk reduction measures not included in this standard.

See also, ANSI B11.0 for comprehensive information on the risk assessment process.