

Manufacturing Tolerances *for* Standard Steel Doors and Frames



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Manufacturing Tolerances for Standard Steel Doors and Frames

1 Introduction

It is the intent of this publication to provide users with definitive information regarding manufacturing tolerances of standard steel doors and frames. This document is not to be referenced for manufacturing tolerances of specialty products, i.e., bullet, acoustical, windstorm. This document is intended for in-plant inspections. It may be used as a reference document for on-site inspections where there is no evidence of damage to material or improper installation.

The information contained herein pertains to doors and frames manufactured in accordance with ANSI/SDI A250.8, *Specifications for Standard Steel Doors and Frames*. It is not intended to be a reference for specialty doors or unusual door and frame conditions.

2 Reference Documents:

ANSI/SDI A250.8-2017 *SDI 100 Specifications for Standard Steel Doors & Frames*

ANSI/SDI A250.6-2020 *Recommended Practice for Hardware Reinforcings on Standard Steel Doors and Frames*

ANSI/SDI A250.3-2019 *Test Procedure & Acceptance Criteria for Factory Applied Finish Coatings for Steel Doors & Frames*

ANSI/SDI A250.10-2020 *Test Procedure & Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors & Frames*

ANSI/SDI A250.11-2022 *Recommended Erection Instructions for Steel Frames*

ANSI/BHMA A115 *Specifications for Steel Door and Frame Preparation for Hardware* (A115.1 – A115.18)

ASTM A568-2019 *Standard Specification for Steel, Sheet, Carbon, Structural, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for*

ASTM A653-2018 *Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process*

ASTM A924-2022 *Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process*

NFPA 80, *Standard for Fire Doors and Other Opening Protectives*, 2022 Edition.

SDI 122-2021, *Installation and Troubleshooting Guide for Standard Steel Doors and Frames*

SDI 134-2020 *Glossary of Terms for Hollow Metal Doors and Frames*

3 Notes

3.1 Tolerances

All values which do not carry specific tolerances or are not marked maximum or minimum shall have the following tolerances: Linear dimensions shall be $\pm 1/16$ in. (1.6 mm). Weight or force shall be $\pm 2\%$. Angles shall be ± 2 degrees. Where only minus tolerances are given, the dimensions are permitted to be exceeded at the option of the manufacturers.

3.2 Gauge vs. Thickness

While the term 'gauge' is no longer common for defining material thickness it is still used to specify doors and frames for ordering purposes. The term 'thickness' is used when defining the actual dimension of an item, and the term 'gauge' is used in the context of specifying a particular door or frame.

3.3 Metric

Values stated without parenthesis are the requirement. Values in the parenthesis are explanatory or approximate information.

4 Materials and Finishes

4.1 Steel Thickness

Manufacturers no longer order sheet and coil to a specific gauge, but rather to a minimum decimal thickness. This thickness is the lowest of the range for a specific gauge. The steel supplier is therefore permitted to exceed, but not be less than the specified decimal thickness. These minimum values meet the stringent requirements of test facilities and labeling agencies such as UL Solutions, and ITS/Intertek Testing/War-nock Hersey. Examples of minimum allowable steel thickness:

Gauge (MSG)	Minimum
20	0.032"
18	0.042"
16	0.053"
14	0.067"
12	0.093"
10	0.123"
7	0.167"

Gauge (MSG) are for reference purposes only.

4.2 Steel Coatings

Thickness of metallic coatings (generally zinc) are defined by ASTM A924, *Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process* and A653, *Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process*. The two most commonly used designations are A40 and A60. Minimum requirements for these designations are:

A40 = 0.40 oz/ft² total both sides.

A60 = 0.60 oz/ft² total both sides.

For reference, 1 oz/ft² = 1.7 mils thickness.

4.3 Factory Applied Coatings

Factory applied coatings (primer, finish paint, etc.) are subject to performance standards rather than thickness, the dry film thickness is irrelevant. Such coatings must comply with performance criteria of:

ANSI/SDI A250.3 – *Test Procedure and Acceptance Criteria for Factory Applied Finished Coatings for Steel Doors and Frames*

OR

ANSI/SDI A250.10 – *Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames*.

5 Frame Tolerances

5.1 Frame Cross Section Profile

Permissible tolerances in frame profile surfaces are as shown in Figure A:

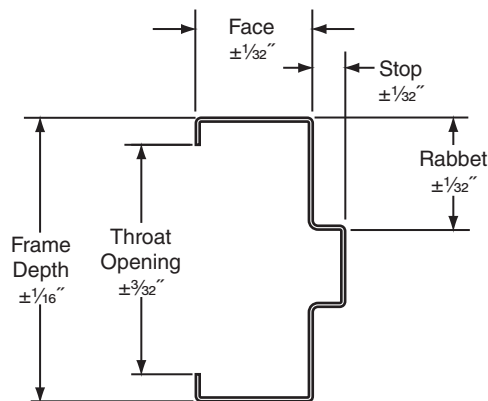


Figure A – Profile Tolerances

5.2 Frame Opening & Vertical Locations

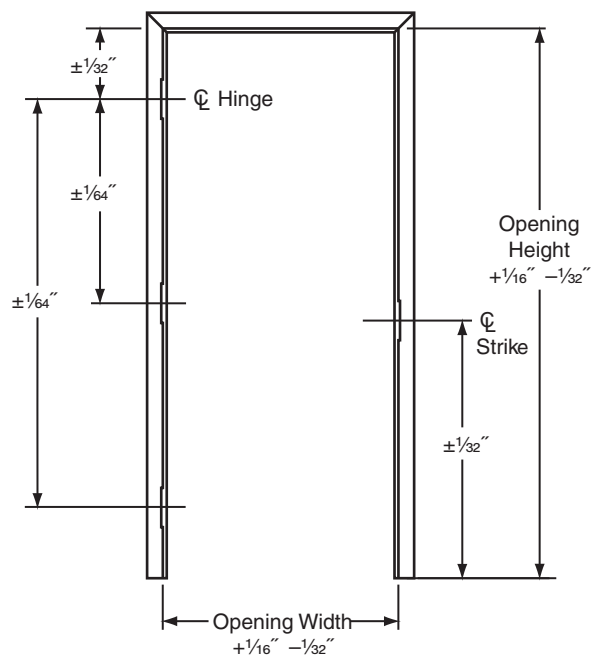


Figure B – Opening Tolerances

5.3 Bow or Twist of Jambs or Header

Realizing that frames are somewhat "pliable," and require bracing and alignment during installation, allowable deformation (bow, twist, etc.) of jambs or header of frame **prior to installation** shall not result in a reduction of opening sizes more than 1/16" beyond those shown in Figure "B" when measured at any point.