



AMERICAN NATIONAL STANDARDS INSTITUTE/ STEEL DECK INSTITUTE

ANSI/SDI AISI S920-2024

**Test Standard for Determining The Screw Penetration Through
Gypsum Board Into Cold-Formed Steel Framing Members**





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2024 Edition

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PREFACE

(This Preface is not part of the ANSI/SDI AISI S920-2024, *Test Standard for Determining the Screw Penetration Through Gypsum Board Into Cold-Formed Steel Framing Members*, but is included for informational purposes only.)

This Standard has been developed as a consensus document for the design of cold-formed steel members and structures. The intention is to provide criteria for routine use and not to provide specific criteria for infrequently encountered problems, which occur in the full range of structural design. The Symbols and Appendices to this Standard are an integral part of the Standard. The user is cautioned that professional judgment must be exercised when data or recommendations in the Standard are applied, as described more fully in the disclaimer notice preceding this Preface.

ANSI/SDI AISI S920-2024
TEST STANDARD FOR DETERMINING THE SCREW PENETRATION THROUGH
GYPHUM BOARD INTO COLD-FORMED STEEL FRAMING MEMBERS

1. Scope

This Standard applies to nonstructural cold-formed steel framing members to evaluate the ability of the member to pull the head of a screw below the surface of gypsum wallboard when tested in accordance with this Standard.

This Standard is composed of Sections 1 through 10 inclusive.

2. Referenced Documents

The following documents or portions thereof are referenced within this Standard and shall be considered as part of the requirements of this document.

a. American Iron and Steel Institute (AISI), Washington, DC:

AISI S220-20, North American Standard for Cold-Formed Steel Nonstructural Framing

AISI S240-20, North American Standard for Cold-Formed Steel Structural Framing

b. ASTM International (ASTM), West Conshohocken, PA:

ASTM C475/C475M-17(2022), Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board

ASTM C1002-22, Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs

ASTM C1396/C1396M-17, Standard Specification for Gypsum Board

ASTM E6-23a, Standard Terminology Relating to Methods of Mechanical Testing

IEEE/ASTM SI10-16, American National Standard for Metric Practice

c. Steel Deck Institute, P.O. Box 70, Florence, South Carolina 29503:

ANSI/SDI AISI S100-2024, North American Specification for the Design of Cold-Formed Steel Structural Members

3. Terminology

Terms used in this Standard that are not defined, ANSI/SDI AISI S100, AISI S240, or ASTM E6 shall have the ordinary accepted meaning for the context for which they are intended.

4. Units of Symbols and Terms

Any compatible system of measurement units shall be permitted to be used in this Standard, except where explicitly stated otherwise. The unit systems considered in this Standard shall include U.S. customary units (force in pounds and length in inches) and SI units (force in Newtons and length in millimeters) in accordance with IEEE/ASTM SI 10.

5. Test Apparatus

5.1 The following equipment shall be used:

- a) Power-driven drill screw gun capable of 4000 rpm (free spindle speed) equipped with a depth-sensitive nosepiece, supplied with a screw driving bit to fit the screw used in the test.
- b) Stopwatch capable of being read to the nearest 0.1 s.

5.2 The test material shall satisfy the following:

- a) Cold-formed steel framing members conforming to AISI S220.
- b) Gypsum board conforming to ASTM C1396/C1396M, Type X, 5/8 in. (15.9 mm) thick.
- c) Screws conforming to ASTM C1002, Type S, minimum 1 in. (25.4 mm) long.
- d) Paper joint tape conforming to ASTM C475/C475M.

6. Test Specimen

6.1 One C-shape member or furring channel member shall be selected from each bundle or package. No more than 10 members shall be selected from any one shipment for testing. Each cold-formed steel member to be tested shall be cut into test specimens not less than 18 in. (460 mm) long.

6.2 For each test, one piece of gypsum wallboard, 6 in. (152 mm) square, shall be cut from not less than 12 in. (305 mm) from the edge or end of the gypsum wallboard.

6.3 For each test, four pieces of paper joint tape, 2 in. (51 mm) square shall be used.

7. Test Procedure

7.1 Prior to performing the test, screws shall be driven through the wallboard and into the stud without the paper joint tape to set the depth of the nosepiece on the screw gun. The screw shall be driven below the surface of the wallboard without breaking the gypsum wallboard face paper.

7.2 The member, gypsum wallboard and paper joint tape shall be assembled on a rigid, flat surface as shown in Figure 1 or 2.

7.3 The screw shall be driven through the paper joint tape, using the screw gun, while a force (dead weight and applied force) of 30 lb (133 N) is applied. Screw shall be driven until the nosepiece of the screw gun has stopped, the screw is seated, or if the screw spins out. The time required to seat the screw or the screw spun out shall all be recorded.

7.4 A sample consisting of five specimens shall be tested.

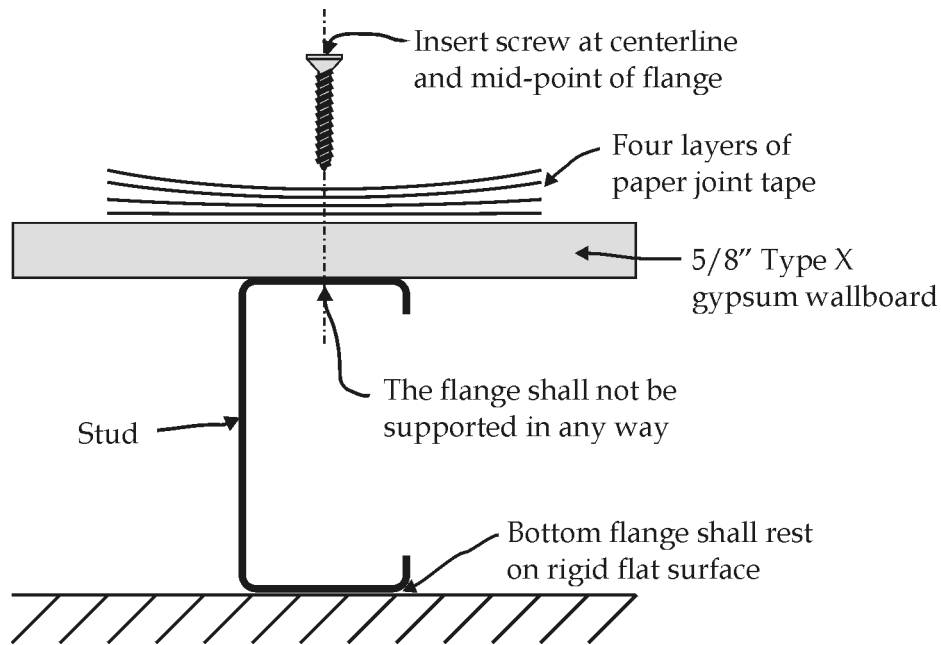


Figure 1: Test Set-up for C-Shape Members

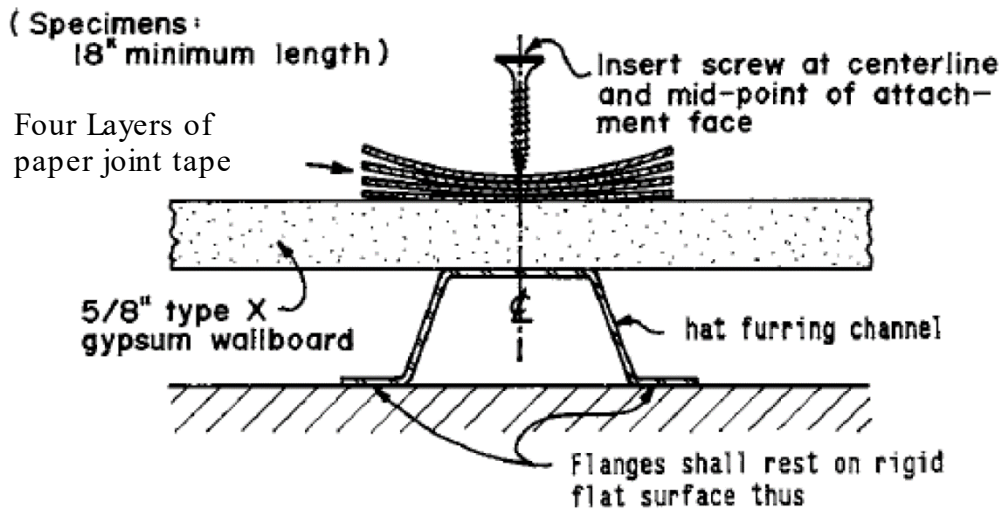


Figure 2: Test Set-up for Furring Channels

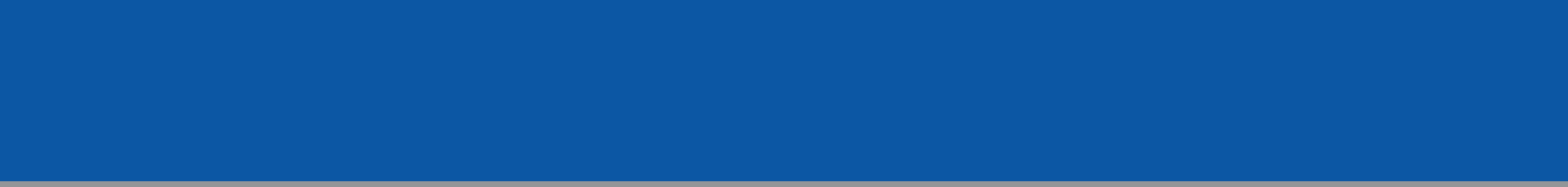
8. Data Evaluation

8.1 When tested in accordance with this Standard, members shall be capable of pulling the head of the screw below the surface of the gypsum board in 2 seconds or less without spin out.

8.2 If not more than one of the test specimens fails to meet the requirements in accordance with Section 8.1, the sample shall be considered to meet the requirements of this test. If two of the five test specimens fail to meet the requirements, two additional test specimens shall be chosen for retesting. If either of the two additional test specimens fails, the sample shall be considered failed to meet the requirements of this test.

9. Test Report

- 9.1** The test report shall include a description of the tested specimens and test method. For each specimen tested, the report shall indicate whether the screw has spun out or if it has exceeded 2 seconds to seat the screw in the gypsum wallboard.
- 9.2** The test report shall indicate the total number of specimens tested and the number of specimens meeting the performance requirements of this Standard.



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