



AISI S908-13



AISI STANDARD

Base Test Method for Purlins Supporting a Standing Seam Roof System

2013 Edition

Approved by
the AISI Committee on Specifications for the Design of
Cold-Formed Steel Structural Members

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PREFACE

The American Iron and Steel Institute Committee on Specifications developed this standard to obtain the reduction factor for use in determining the nominal flexural strength of a purlin supporting a standing seam roof system.

The Committee acknowledges and is grateful for the contribution of the numerous engineers, researchers, producers and others who have contributed to the body of knowledge on this subject.

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Base Test Method for Purlins Supporting a Standing Seam Roof System

1. Scope

1.1 The purpose of this test method is to obtain the reduction factor for use in determining the nominal flexural strength of a purlin supporting a standing seam roof system.

1.2 This test method, herein also referred as “Base Test Method,” applies to an assembly consisting of the standing seam panel, purlin, and attachment devices used in the system being tested. The test specimen boundary conditions, described in Section 7.6, apply only to standing seam roof systems for which the roof deck is positively anchored to the supporting structural system at one or more purlin or eave member lines.

1.3 The Base Test Method is used to evaluate the nominal flexural strength of C- and Z-sections of multi-span, multiple purlin line, standing seam systems, with or without discrete intermediate braces.

1.4 The Base Test Method is applicable to both “rib” or “pan” type standing seam roof panels with “sliding” or “fixed” type clips.

1.5 The Base Test Method is conducted using standing seam roof panels, clips, fasteners, insulation, thermal blocks, discrete braces, and purlins as used in the actual standing seam roof system except as noted in Section 1.6.

1.6 Tests conducted with insulation are applicable to identical systems with thinner or no insulation.

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:

S100-12, *North American Specification for the Design of Cold-Formed Steel Structural Members*

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

A370-12a, *Standard Test Methods and Definitions for Mechanical Testing of Steel Products*

E6-09be1, *Standard Terminology Relating to Methods of Mechanical Testing*

IEEE/ASTM-SI10-10, *American National Standard for Metric Practice*

3. Terminology

Where the following terms appear in this Standard, they shall have the meaning as defined herein. Terms not defined in Section 3 of this standard, AISI S100, ASTM E6, or IEEE/ASTM-SI10 shall have the ordinary accepted meaning for the context for which they are intended.

Failure. A stage at which the specimen will accept no further loading.

Fixed Clip. A hold-down clip which does not allow the roof panel to move independently of the roof substructure.

Insulation. Glass fiber blanket or rigid board.

Lateral. A direction normal to the span of the purlins in the plane of the roof sheets.

Thermal Block. Strips of rigid insulation located directly over the purlin between clips.

Negative Moment. A moment which causes tension in the purlin flange attached to the clips and standing seam panels.

Pan-Type Standing Seam Roof. A U-shaped panel which has vertical sides.

Positive Moment. A moment which causes compression in the purlin flange attached to the clips and standing seam panels.

Rib-Type Standing Seam Roof. A panel that has ribs with sloping sides and forms a trapezoidal-shaped void at the sidelap.

Sliding Clip. A hold-down clip which allows the roof panel to move independently of the roof substructure.

Standing Seam Roof System. A roof system in which the sidelaps between the roof panels are arranged in a vertical position above the roof line. The roof panel system is secured to the purlins by means of concealed hold-down clips that are attached to the purlins with mechanical fasteners.

Yield Stress. Generic term to denote either yield point or yield strength, as appropriate for the material.

4. Symbols:

b	= Flange width of the purlin
d	= Depth of the purlin
B	= Purlin spacing
F_y	= Design yield stress
F_{yt}	= Measured yield stress of tested purlin
I_x	= Moment of inertia of full unreduced section about x-axis
I_{xy}	= Product of inertia of flange about major axis
L	= Span of the purlins tested, center to center of the supports
M_n	= Nominal flexural strength of a fully constrained beam, $S_e F_y$
$\bar{M}_{nt_{min}}$	= Average flexural strength of the thinnest sections tested
$\bar{M}_{nt_{max}}$	= Average flexural strength of the thickest sections tested
M_{nt}	= Flexural strength of a tested purlin, $S_e F_{yt}$
M_{ts}	= Failure moment for the single span purlins tested, $w_{ts} L^2 / 8$
p_d	= Weight of the specimen (force/area)
p_{ts}	= Failure load (force/area) of the single span system tested
P_L	= Lateral anchorage force in accordance with Section D6.3.1 of AISI S100
R_t	= Modification factor from test, M_{ts} / M_{nt}
R	= Reduction factor computed for nominal purlin properties
R_{tmin}	= Mean minus one standard deviation of the modification factors of the three