SEI/ASCE 8-02

American Society of Civil Engineers

Specification for the Design of Cold-Formed Stainless Steel Structural Members

This document uses both International System of Units (SI) and customary units.

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ABSTRACT
ASCE's standard *Specification for the Design of Cold-Formed Stainless Steel Structural Members* (ASCE 8-02) provides design criteria for the determination of the strength of stainless steel structural members and connections for use in buildings and other statically loaded structures. The members may be cold-formed to shape from annealed and cold-rolled sheet, strip, plate, or flat bar stainless steel material. Design criteria are provided for axially loaded tension or compression members, flexural members subjected to bending and shear, and members subjected to combined axial load and bending. The specification provides the design strength criteria using the load and resistance factor design (LRFD) and the allowable stress design (ASD) methods. The reasoning behind, and the justification for, various provisions of the specification are also presented. The design strength requirements of this standard are intended for use by structural engineers and those engaged in preparing and administrating local building codes.

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STANDARDS

In April 1980, the Board of Direction approved ASCE Rules for Standards Committees to govern the writing and maintenance of standards developed by the Society. All such standards are developed by a consensus standards process managed by the Management Group F (MGF), Codes and Standards. The consensus process includes balloting by the balanced standards committee made up of Society members and nonmembers, balloting by the membership of ASCE as a whole, and balloting by the public. All standards are updated or reaffirmed by the same process at intervals not exceeding 5 years.

The following Standards have been issued.

ANSI/ASCE 1-82 N-725 Guideline for Design and Analysis of Nuclear Safety Related Earth Structures
ANSI/ASCE 2-91 Measurement of Oxygen Transfer in Clean Water
ANSI/ASCE 3-91 Standard for the Structural Design of Composite Slabs and ANSI/ASCE 9-91 Standard Practice for the Construction and Inspection of Composite Slabs
ASCE 4-98 Seismic Analysis of Safety-Related Nuclear Structures
Building Code Requirements for Masonry Structures (ACI 530-99/ASCE 5-99/TMS 402-99) and Specifications for Masonry Structures (ACI 530.1-99/ASCE 6-99/TMS 602-99)
ASCE 7-98 Minimum Design Loads for Buildings and Other Structures
ASCE 8-90 Standard Specification for the Design of Cold-Formed Stainless Steel Structural Members
ANSI/ASCE 9-91 listed with ASCE 3-91
ASCE 10-97 Design of Latticed Steel Transmission Structures
SEI/ASCE 11-99 Guideline for Structural Condition Assessment of Existing Buildings
ANSI/ASCE 12-91 Guideline for the Design of Urban Subsurface Drainage
ASCE 13-93 Standard Guidelines for Installation of Urban Subsurface Drainage
ASCE 14-93 Standard Guidelines for Operation and Maintenance of Urban Subsurface Drainage
ASCE 15-98 Standard Practice for Direct Design of Buried Precast Concrete Pipe Using Standard Installations (SIDD)
ASCE 16-95 Standard for Load and Resistance Factor Design (LRFD) of Engineered Wood Construction
ASCE 17-96 Air-Supported Structures
ASCE 18-96 Standard Guidelines for In-Process Oxygen Transfer Testing
ASCE 19-96 Structural Applications of Steel Cables for Buildings
ASCE 20-96 Standard Guidelines for the Design and Installation of Pile Foundations
ASCE 21-96 Automated People Mover Standards—Part 1
ASCE 21-98 Automated People Mover Standards—Part 2
ASCE 21-00 Automated People Mover Standards—Part 3
SEI/ASCE 23-97 Specification for Structural Steel Beams with Web Openings
SEI/ASCE 24-98 Flood Resistant Design and Construction
ASCE 25-97 Earthquake-Actuated Automatic Gas Shut-Off Devices
ASCE 26-97 Standard Practice for Design of Buried Precast Concrete Box Sections
ASCE 27-00 Standard Practice for Direct Design of Precast Concrete Pipe for Jacking in Trenchless Construction
ASCE 28-00 Standard Practice for Direct Design of Precast Concrete Box Sections for Jacking in Trenchless Construction
SEI/ASCE 30-00 Guideline for Condition Assessment of the Building Envelope
EWRI/ASCE 33-01 Comprehensive Transboundary International Water Quality Management Agreement
EWRI/ASCE 34-01 Standard Guidelines for Artificial Recharge of Ground Water
EWRI/ASCE 35-01 Guidelines for Quality Assurance of Installed Fine-Pore Aeration Equipment
CI/ASCE 36-01 Standard Construction Guidelines for Microtunneling
SEI/ASCE 37-02 Design Loads on Structures During Construction

FOREWORD

Prior to 1990, the design of cold-formed stainless steel structural members was based on the allowable stress design specification issued by the American Iron and Steel Institute. Based on the initiative of Chromium Steels Research Group at Rand Afrikaans University in 1989, a new ASCE Standard Specification for the Design of Cold-Formed Stainless Steel Structural Members was developed at the University of Missouri-Rolla under the Sponsorship of the American Society of Civil Engineers. It was subsequently reviewed and approved by the ASCE Stainless Steel Cold-Formed Sections Standards Committee in 1990. This ASCE project was financially supported by the Chromium Centre in South Africa, the Nickel Development Institute in Canada, and the Specialty Steel Industry of the United States. The development of this new ASCE Standard Specification was primarily based on the 1974 Edition of the AISI specification for stainless steel design and the recent extensive research conducted by Chromium Steels Research Group at Rand Afrikaans University under the sponsorship of Columbus Stainless Steel (the Middleburg Steel and Alloys) in South Africa.

This new ASCE Standard Specification includes both the load and resistance factor design (LRFD) method and the allowable stress design (ASD) method. In the LRFD method, separate load and resistance factors are applied to specified loads and nominal resistance to ensure that the probability of reaching a limit state is acceptably small. These factors reflect the uncertainties of analysis, design, loading, material properties, and fabrication.

The material presented in this publication has been prepared in accordance with recognized engineering principles. This Standard and Commentary should not be used without first securing competent advice with respect to suitability for any given application. The publication of the material contained herein is not intended as a representation or warranty on the part of the American Society of Civil Engineers, or of any other person named herein, that this information is suitable for any general or particular use or promises freedom from infringement of any patent or patents. Anyone making use of this information assumes all liability from such use.

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ASCE acknowledges the work of the Stainless Steel Cold-Formed Section Standards Committee of the Management Group F. Codes and Standards. This group comprises individuals from many backgrounds including: consulting engineering, research, construction industry, education, government, design, and private practice.

This Standard was prepared through the consensus standards process by balloting in compliance with procedures of ASCE's Management Group F. Codes and Standards. Those individuals who serve on the Standards Committee are:

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COMMENTARY CONTENTS

(This Commentary is not a part of the standard. It is included for information purposes.)
Commentary on ASCE Standard Specification for the Design of Cold-Formed Stainless Steel Structural Members

Appendices

Tables

Figures

* Reproduced with permission of the American Iron and Steel Institute from AISI Specification for the Design of Cold-Formed Steel Structural Members with Commentary (1986).

NOTATION

Symbol	Definition	Section
A	Full, unreduced cross-sectional area of the member	3.3.1.2,3.4
A_b	$b_1t + A_s$, for transverse stiffeners at interior support and under concentrated load, and $b_2t + A_s$, for transverse stiffeners at end support	App. C.1
A_b	Gross cross-sectional area of bolt	5.3.4
A_c	$18t^2 + A_s$, for transverse stiffeners at interior support and under concentrated load, and $10t^2 + A_s$, for transverse stiffeners at end support	App. C.1
A_e	Effective area at the stress F_n	3.4,3.6.2
A_n	Net area of cross section	3.2,5.3.2
A_o	Reduced area of cross section	3.6.2
A_s	Cross-sectional area of transverse stiffeners	2.4,2.4.1,2.4.2, App. C.1
A'_s	Effective area of stiffener	2.4,2.4.1,2.4.2
A_{st}	Gross area of shear stiffener	App. C.2
a	For a reinforced web element, the distance between transverse stiffeners	App. C.2
a	Length of bracing interval	4.3.2.2
b	Effective design width of compression element	2.2.1,2.2.2,2.3.1,2.3.2, 2.4.1,2.4.2,2.5
b_d	Effective width for deflection calculation	2.2.1,2.2.2
b_e	Effective design width of sub-element or element	2.2.2,2.5
b_o	See Figure 4	2.4,2.4.1,2.5
b_1,b_2	Effective widths, see Figure 2	2.2.2
C	Ratio of effective proportional limit-to-yield strength, F_{pr}/F_y	3.6.1
C_b	Bending coefficient dependent on moment gradient	3.3.1.2
C_m	End moment coefficient in interaction formula	3.5
C_{mx}	End moment coefficient in interaction formula	3.5
C_{my}	End moment coefficient in interaction formula	3.5
C_s	Coefficient for lateral torsional buckling	3.3.1.2
C_v	Shear stiffener coefficient	App. C.2
C_w	Torsional warping constant of cross section	3.3.1.2
C_y	Compression strain factor	3.3.1.1
C_1	Coefficient as defined in Figures 4 and 5	2.4,2.4.2
C_2	Coefficient as defined in Figures 4 and 5	2.4,2.4.2
c_f	Amount of curling	2.1.1
D	Outside diameter of cylindrical tube	3.6.1,3.6.2
D	Dead load, includes weight of test specimen	6.2
D	Overall depth of lip	2.1.1,2.4,2.4.2,4.1.1
D	Shear stiffener coefficient	App. C.2
D_n	Nominal dead load	1.5.2
d	Depth of section	2.4,2.1.1,3.3.1, 4.1.1,4.3.2.2
d	Diameter of bolt	5.3,5.3.1,5.3.2,5.3.3
d_h	Diameter of standard hole	5.3.1
d_s	Reduced effective width of stiffener	2.4,2.4.2
d'_s	Actual effective width of stiffener	2.4,2.4.2
E_n	Nominal earthquake load	1.5.2

Symbol	Definition	Section
E_o	Initial modulus of elasticity	2.2.1,2.3.1,2.4,2.5, 3.3.1.1,3.3.1.2,3.3.2, 3.3.5,3.6.1,3.6.2, 4.3.3,App. B
E_r	Reduced modulus of elasticity	2.2.1
E_s	Secant modulus	3.3.1.1,3.4,App. B
E_{sc}	Secant modulus in compression flange	2.2.1
E_{st}	Secant modulus in tension flange	2.2.1
E_s/E_o	Plasticity reduction factor for unstiffened compression elements	3.3.1.1,3.4,App. B
E_t	Tangent modulus in compression	3.3.1.1,3.4,App. B, 3.4.1,3.6.2
E_t/E_o	Plasticity reduction factor for lateral buckling	3.3.1.2,3.6.2,App. B
$\sqrt{E_t/E_o}$	Plasticity reduction factor for stiffened compression elements	3.3.1.1,3.4,App. B
e	Distance measured in line of force from centerline of standard hole to nearest edge of adjacent hole or to end of connected part toward which force is directed	5.3.1
e_y	Yield strain = F_y/E_o	3.3.1.1
F_{cr}	Critical buckling stress	3.3.1.1,3.4
F_D	Dead load factor	6.2
F_L	Live load factor	6.2
F_n	Nominal buckling stress	3.4,3.6.2
F_{nt}	Nominal tensile strength of bolts	5.3.4
F_{nv}	Nominal shear strength of bolts	5.3.4
F'_{nt}	Nominal tensile strength for bolts subject to combination of shear and tension	5.3.4
F_p	Nominal bearing stress	5.3.3
F_{pr}	Effective proportional limit	3.6.1
F_t	Nominal tension stress limit on net section	5.3.2
F_u	Tensile strength in longitudinal direction	5.3.1,5.3.2,5.3.3,5.3.4
F_{ua}	Tensile strength of annealed base metal	5.2.1,5.2.2
F_{xx}	Strength level designation in AWS electrode classification	5.2.2
F_y	Yield strength used for design, not to exceed specified yield strength or established in accordance with Section 6.4, or as increased for cold work of forming in Section 1.5.4.2	1.5.4.2,2.2.1,2.5,3.2, 3.3.1,3.3.2,3.3.4,3.3.5, 3.6.1,3.6.2,5.2.1, App. C.1,App. B
F_{yc}	Yield strength in compression	3.3.1.1
F_{yt}	Yield strength in tension	3.3.1.1
F_{ys}	Yield strength of stiffener steel	App. C.1
F_{yv}	Shear yield strength	3.3.2
F_{yw}	Lower value of yield strength in beam web F_y or stiffener section F_{ys}	App. C.1
f	Stress in compression element computed on the basis of the effective design width	2.2.1,2.2.2, 2.3.2,2.4,2.4.1
f_{av}	Average computed stress in full, unreduced flange width	2.1.1
f_b	Perceptible stress for local distortion	3.3.1.1,3.4
f_d	Computed compressive stress in element being considered. Calculations are based on effective section at load for which deflections are determined.	2.2.1,2.2.2, 2.3.1,2.4.1,2.4.2
f_{d1},f_{d2}	Computed stresses f_1 and f_2 as shown in Figure 2. Calculations are based on the effective section at the load for which deflections are determined	2.2.2

Symbol	Definition	Section
f_{d3}	Computed stress f_3 in edge stiffener, as shown in Figure 5. Calculations are based on the effective section at the load for which deflections are determined.	2.3.2
f_v	Computed shear stress on bolt	5.3.4
f_1,f_2	Web stresses defined by Figure 2	2.2.2
f_3	Edge stiffener stress defined by Figure 5	2.3.2
G_o	Initial shear modulus	3.3.2
G_s	Secant shear modulus	3.3.2
G_s/G_o	Plasticity reduction factor for shear stress	3.3.2
g	Vertical distance between two rows of connections nearest to top and bottom flanges	4.1.1
h	Depth of flat portion of web measured along plane of web	2.1.2,3.3.2, 3.3.4,App. C.2
I_a	Adequate moment of inertia of stiffener so that each component element will behave as stiffened element	2.4.1,2.4.2
I_b	Moment of inertia of full, unreduced section about axis of bending	3.5
I_s	Actual moment of inertia of full stiffener about its own centroidal axis parallel to the element to be stiffened	2.1.1,2.4,2.4.1, 2.4.2, 2.5
I_{sf}	Moment of inertia of full area of multiple stiffened element, including intermediate stiffeners, about its own centroidal axis parallel to element to be stiffened	2.5
I_x, I_y	Moments of inertia of full section about principal axes	4.1.1,4.3.2.2
I_{xy}	Product of inertia of full section about major and minor centroidal axes	4.3.2.2
I_{yc}	Moment of inertia of compression portion of section about gravity axis of the entire section about the *y*-axis	3.3.1.2
J	St. Venant torsion constant	3.3.1.2
j	Section property for torsional-flexural buckling	3.3.1.2
K	Effective length factor	3.4,3.4.1
K′	A constant	4.3.2.2
K_b	Effective length factor in plane of bending	3.5
K_c	Reduction factor due to local buckling	3.6.1,3.6.2
K_t	Effective length factor for torsion	3.3.1.2
K_x	Effective length factor for bending about *x*-axis	3.3.1.2
K_y	Effective length factor for bending about *y*-axis	3.3.1.2
k	Plate buckling coefficient	2.2.1,2.2.2,2.3.1, 2.3.2,2.4.1,2.4.2
k_v	Shear buckling coefficient	App. C.2
L	Full span for simple beams, distance between inflection points for continuous beams, twice length of cantilever beams	4.1.1,2.1.1
L	Length of fillet weld	5.2.2
L	Unbraced length of member	3.3.1.2,3.4.1
L_b	Actual unbraced length in plane of bending	3.5
L_n	Nominal live load	1.5.2
L_{rn}	Nominal roof live load	1.5.2
L_{st}	Length of transverse stiffener	App. C.1
L_t	Unbraced length of compression member for torsion	3.3.1.2
L_x	Unbraced length of compression member for bending about *x*-axis	3.3.1.2
L_y	Unbraced length of compression member for bending about *y*-axis	3.3.1.2
M_c	Critical moment	3.3.1.2
M_{ld}	Permissible moment for local distortions	3.3.1.1

Symbol	Definition	Section
M_n	Nominal moment strength	3.3.1.1,3.3.1.2, 3.3.3,3.3.5,3.6.1
M_{nx},M_{ny}	Nominal flexural strength about centroidal axes determined in accordance with Section 3.3	3.5
M_u	Required flexural strength	3.3.3,3.3.5
M_{ux}	Required flexural strength bent about x-axis	3.5
M_{uy}	Required flexural strength bent about y-axis	3.5
M_y	Moment causing maximum strain e_y	2.2.1,3.3.1.2
M_1	Smaller end moment	3.3.1.2,3.5
M_2	Larger end moment	3.3.1.2,3.5
m	Distance from shear center of one channel to mid-plane of its web	4.1.1,4.3.2.2
N	Actual length of bearing	3.3.4
n	Coefficient	App. B
P	Concentrated load or reaction	4.1.1
P_E	$\pi^2 E_o I_b/(K_b L_b)^2$	3.5
P_L	Force to be resisted by intermediate beam brace	4.3.2.2
P_{ld}	Permissible load for load distortions	3.4
P_n	Nominal axial strength of member	3.3.4,3.3.5,3.4,3.6.2
P_n	Nominal strength of connection	5.2.1,5.2.2,5.2.3, 5.3.1,5.3.2,5.3.3,5.3.4
P_{no}	Nominal axial load determined in accordance with Section 3.4 for $F_n = F_y$.	3.5
P_u	Required axial strength	3.3.5,3.5
q	Uniformly distributed factored load in plane of web	4.1.1
R_p	Average tested value	6.2
R	Inside bend radius	3.3.4
R_a	Allowable design strength	App. D
R_{rn}	Nominal roof rain load	1.5.2
R_n	Nominal strength	1.5.1.1,1.5.3
r	Radius of gyration of full, unreduced cross section	3.3.1.1,3.4.1
r	Force transmitted by the bolt or bolts at the section considered, divided by the tension force in the member at that section	5.3.2
r_{cy}	Radius of gyration of one channel about its centroidal axis parallel to web	4.1.1
r_I	Radius of gyration of I-section about the axis perpendicular to the direction in which buckling would occur for given conditions of end support and intermediate bracing	4.1.1
r_o	Polar radius of gyration of cross section about shear center	3.3.1.2,3.4.3
r_x,r_y	Radius of gyration of cross section about centroidal principal axes	3.3.1.2
S	$1.28\sqrt{\mathbf{E}_o/f}$	2.4,2.4.1
S_c	Elastic section modulus of effective section calculated at stress M_c/S_f in extreme compression fiber	3.3.1.1,3.3.1.2
S_e	Elastic section modulus of effective section calculated with extreme compression or tension fiber at F_y	3.3.1.1
S_F	Elastic section modulus of full, unreduced section for the extreme compression fiber	3.3.1.1,3.3.1.2,3.6.1
S_n	Nominal snow load	1.5.2
s	Fastener spacing	4.1.2

Symbol	Definition	Section
s	Spacing in line of stress of welds, rivets, or bolts connecting a compression cover plate or sheet to a nonintegral or other element	5.3.2
s	Weld spacing	4.1.1
$s_{\max}$	Maximum permissible longitudinal spacing of welds or other connectors joining two channels to form I-section	4.1.1
T_n	Nominal tensile strength	3.2
T_s	Strength of connection in tension	4.1.1
t	Base steel thickness of any element or section	1.1.2,1.3.4,1.5.2.1, 2.1.1,2.1.2,2.2.1,2.4, 2.4.1,2.4.2,2.5,2.6.1, 3.3.1.1,3.3.1.3,3.3.2, 3.3.4,3.3.5,3.4,3.6.1, 3.6.2,4.1.2,5.2.2,5.3.2, App. C
t	Thickness of thinnest connected part	5.3.1
t_s	Equivalent thickness of multiple-stiffened element	2.5,App. C1
t_w	Effective throat of weld	5.2.2
V	Actual shear strength	3.3.3
V_n	Nominal shear strength	3.3.2
V_u	Required shear strength	3.3.3
w	Flat width of element exclusive of radii	1.1.2,2.1.2,2.2.1,2.4, 2.4.1,2.4.2,2.5,3.3.1.1, 3.3.1.3,3.3.2,3.3.4, 3.3.5,3.4,3.6.1, 3.6.2,4.1.2
w	Flat width of bearing plate	3.3.5
w_f	Width of flange projection beyond web or half distance between webs for box- or U-type sections	2.1.1c
w_f	Projection of flanges from inside face or web	2.1.1b
W_n	Nominal wind load	1.5.2
x	Distance from concentrated load to brace	4.3.2
x_o	Distance from shear center to centroid along the principal x-axis	3.3.1.2,3.4.3
Y	Yield strength of web steel divided by yield strength of stiffener steel	App. C.2
α	Reduction factor for computing effective area of stiffener section	2.5
α	Coefficient, for sections with stiffening lips, $\alpha = 1.0$; for sections without stiffening lips, $\alpha = 0$	4.1.1
$1/\alpha_{nx}$	Magnification factor	3.5
$1/\alpha_{ny}$	Magnification factor	3.5
β	Coefficient	3.4.3
η	Plasticity reduction factor	3.3.1.1,3.4,App. B
θ	Angle between web and bearing surface $\geq 45°$ but no more than $90°$	3.3.4
μ	Poisson's ratio in elastic range $= 0.3$	3.3.1.1,3.4
σ_{ex}	Buckling stress about x-axis	3.4.2,3.4.3
σ_{ey}	Buckling stress about y-axis	3.3.1.2
σ_t	Torsional buckling stress	3.3.1.2,3.4.3
σ	Normal stress	App. B
ε	Normal strain	App. B
ρ	Reduction factor	2.2.1
λ	Slenderness factor	2.2.1

Symbol	Definition	Section
λ_c	$3.048C$	3.6.1
ψ	f_2/f_1	2.2.2
ϕ	Resistance factor	1.1.1,1.5.1.1,5.2,5.2.1, 5.2.2,5.2.3,5.3.1,5.3.2, 5.3.3,5.3.4,6.2, App. D
ϕ_b	Resistance factor for bending strength	3.3.1,3.3.1.1,3.3.1.2, 3.3.3,3.3.5,3.5, 3.6.1,3.7
ϕ_c	Resistance factor for concentrically loaded compression member	3.4,3.5,3.6.2,App. C
ϕ_d	Resistance factor for local distortion	3.3.1.1,3.4
ϕ_t	Resistance factor for tension member	3.2
ϕ_v	Resistance factor for shear strength	3.3.2,3.3.3,App. C
ϕ_w	Resistance factor for web crippling strength	3.3.4,3.3.5
Ω	Safety factor	App. D

CONVERSION TABLE

This table contains some conversion factors between US Customary and SI Metric Units. The formulas included in this Specification are generally nondimensional, except that some adjustments are required for SI Unit in Section 3.3.4.

Metric Conversion Table

	To convert	to	Multiply by
Length	in.	mm	25.4
	mm	in.	0.03937
	ft	m	0.30480
	m	ft	3.28084
Area	in.^{2}	mm^2	645.160
	mm^2	in.^{2}	0.00155
	ft^2	m^2	0.09290
	m^2	ft^2	10.76391
Forces	kip force	kN	4.448
	lb	N	4.448
	kN	kip	0.2248
Stresses	ksi	MPa	6.895
	MPa	ksi	0.145
Moments	ft-kip	kN-m	1.356
	kN-m	ft-kip	0.7376
Uniform loading	kip/ft	kN/m	14.59
	kN/m	kip/ft	0.06852
	kip/ft^2	kN/m^2	47.88
	kN/m^2	kip/ft^2	0.02089
	psf	N/m^2	47.88
Angle	degree	radian	0.01745
	radian	degree	57.29579

Specification for the Design of Cold-Formed Stainless Steel Structural Members

1. GENERAL PROVISIONS

1.1 Limits of Applicability and Terms

1.1.1 Scope and Limits of Applicability

This ASCE Standard Specification shall apply to the design of structural members cold-formed to shape from annealed and cold-rolled sheet, strip, plate, or flat bar stainless steels when used for load-carrying purposes in buildings and other statically loaded structures. It may also be used for structures other than buildings provided appropriate allowances are made for thermal and/or dynamic effects. Appendices to this Specification shall be considered as integral parts of the Specification.

This ASCE Standard supersedes the 1974 edition of the Specification for the Design of Cold-Formed Stainless Steel Structural Members issued by the American Iron and Steel Institute.

1.1.2 Terms

Where the following terms appear in this Specification they shall have the meaning herein indicated:

1. *Stiffened or Partially Stiffened Compression Elements.* A stiffened or partially stiffened compression element is a flat compression element (i.e., a plane compression flange of a flexural member or a plane web or flange of a compression member) of which both edges parallel to the direction of stress are stiffened by a web, flange, stiffening lip, intermediate stiffener, or the like.
2. *Unstiffened Compression Elements.* An unstiffened compression element is a flat compression element which is stiffened at only one edge parallel to the direction of stress.
3. *Multiple-Stiffened Elements.* A multiple-stiffened element is an element that is stiffened between webs, or between a web and a stiffened edge, by means of intermediate stiffeners which are parallel to the direction of stress. A sub-element is the portion between adjacent stiffeners or between web and intermediate stiffener or between edge and intermediate stiffener.
4. *Flat-Width-to-Thickness Ratio.* The flat width of an element measured along its plane, divided by its thickness.
5. *Effective Design Width.* Where the flat width of an element is reduced for design purposes, the reduced design width is termed the effective width or effective design width.
6. *Stress.* Stress as used in this Specification means force per unit area.
7. *Performance Test.* A performance test is a test made on structural members, connections, and assemblies whose performance cannot be determined by the provisions of Sections 1 through 5 of this Specification or its specific references.
8. *Specified Minimum Yield Strength.* The specified minimum yield strength is the lower limit of yield strength which varies with the rolling direction (transverse or longitudinal) and the type of stress (tension or compression) must be equalled or exceeded in a specification test to qualify a lot of steel for use in a cold-formed stainless steel structural member designed at that yield strength.
9. *Cold-Formed Stainless Steel Structural Members.* Cold-formed stainless steel structural members are shapes which are manufactured by press-braking blanks sheared from sheets, cut lengths of coils or plates, or by roll forming slit widths from cold- or hot-rolled coils or sheets; both forming operations being performed at ambient room temperature, that is, without manifest addition of heat such as would be required for hot forming.
10. *Load and Resistance Factor Design (LRFD).* A method of proportioning structural components (members, connectors, connecting elements and assemblages) such that no applicable limit state is exceeded when the structure is subjected to all appropriate load combinations.
11. *Design Strength.* Factored resistance or strength (force, moment, as appropriate), ϕR_n, provided by the structural component.
12. *Required Strength.* Load effect (force, moment, as appropriate) acting on the structural component determined by structural analysis from the factored loads (using most appropriate critical load combinations).
13. *Nominal Loads.* The magnitudes of the loads specified by the applicable code.
14. *Allowable Stress Design (ASD).* A method of proportioning structural components on the basis of working loads and allowable capacities.

1.1.3 Units of Symbols and Terms

The Specification is written so that any compatible system of units may be used except where explicitly stated otherwise in the text of these provisions.