

OBSOLETE CANADIAN STRUCTURAL STEEL GRADES, 1935 - 1971

CESA = Canadian Engineering Standards Association (Incorporated 1919)

CSA = Canadian Standards Association (1944)

F_y = Yield Stress

F_u = Tensile Strength

Standards listed below are CSA Standards unless noted otherwise.

CESA S39 - 1935 Standard Specification for Mild Structural Steel

(Based on ASTM Specifications A7-1933 and A10-1934)

F_y = ½ F_u ≥ 30 ksi F_u = 55 - 65 ksi

CESA S40 - 1935 Standard Specification for Medium Structural Steel

(Based on ASTM Specification A7-34)

F_y = ½ F_u ≥ 33 ksi F_u = 60 - 72 ksi

CESA S41 - 1935 Standard Specification for Structural Silicon Steel

(Based on ASTM A94-33)

F_y = 45 ksi F_u = 80 - 95 ksi

CESA S42 - 1935 Standard Specification for Structural Rivet Steel

F_y = ½ F_u ≥ 28 ksi F_u = 52 - 62 ksi

G40.2 - 1950 Specification for Structural Rivet Steel

F_y = 28 ksi F_u = 52 - 62 ksi

G40.2 - 1959 Specification for Structural Rivet Steel, 2nd Edition

F_y = 28 ksi F_u = 52 - 62 ksi

G40.3 - 1950 Specification for Mild Structural Steel

(Corresponds to ASTM A113-49aT, Grade B)

F_y = 27 ksi F_u = 50 - 62 ksi

G40.3 - 1959 Specification for Structural Steel for Locomotives and Cars (2nd edition)

(In substantial agreement with AAR M-116-55)

Grade A: F_y = 33 ksi F_u = 60 - 72 ksi *

Grade B: F_y = 27 ksi F_u = 50 - 62 ksi

Grade C: F_y = 26 ksi F_u = 48 - 58 ksi

* The upper limit of 72 ksi may be increased by 3 ksi for material over 1½ inch in thickness.

G40.4 - 1950 Specification for Medium Structural Steel

F_y = 33 ksi F_u = 60 - 72 ksi *

* The upper limit of 72 ksi may be increased by 3 ksi for material over 1½ inch in thickness.

G40.4 - 1959 Specification for Medium Structural Steel - 2nd Edition

Fy = 33 ksi Fu = 60 - 72 ksi *

** The upper limit of 72 ksi may be increased by 3 ksi for all thicknesses of shapes, and for all other material over 1½ inch in thickness.*

G40.5 - 1950 Specification for Carbon Steel Plates of Structural Quality;
Plates 2 Inches and Under in Thickness

Grade A: Fy = 24 ksi Fu = 45 - 55 ksi

Grade B: Fy = 27 ksi Fu = 50 - 60 ksi

Grade C: Fy = 30 ksi Fu = 55 - 65 ksi

Grade D: Fy = 33 ksi Fu = 60 - 72 ksi

G40.5 - 1959 Specification for Low and Intermediate Tensile Strength Carbon Steel Plates of
Structural Quality; Plates 2 Inches and Under in Thickness, 2nd Edition

Grade A: Fy = 24 ksi Fu = 45 - 55 ksi

Grade B: Fy = 27 ksi Fu = 50 - 60 ksi

Grade C: Fy = 30 ksi Fu = 55 - 65 ksi

Grade D: Fy = 33 ksi Fu = 60 - 72 ksi *

** The upper limit of 72 ksi may be increased by 3 ksi for material over 1½ inch in thickness.*

G40.6 - 1950 Specification for Structural Silicon Steel

Fy = 45 ksi Fu = 80 - 95 ksi

G40.6 - 1959 Specification for Structural Silicon Steel (2nd Edition)

Fy = 45 ksi Fu = 80 - 95 ksi

G40.8 - 1960 Specification for Structural Steels with Improved Resistance to Brittle Fracture

Grades B and C: produced with fine grain killed steel practice

Thickness to ⅝ incl. Fy = 40 ksi Fu = 65 - 85 ksi

Over ⅝ to 1 incl. Fy = 38 ksi Fu = 65 - 85 ksi

Over 1 to 1½ incl. Fy = 36 ksi Fu = 65 - 85 ksi

Note: In the case of beams, channels and zees, thickness refers to beam thickness.

	Testing Temperature (V-Notch)	Impact Test Values (average of 3 tests)
Grade A	+25F	15 ft·lbs
Grade B	0F	15 ft·lbs
Grade C	-25F	15 ft·lbs

G40.8 - 1971 Structural Steels with Improved Resistance to Brittle Fracture

Grade A - produced to either semi-killed or killed steel practice (1½ inch maximum thickness)

Grade B - produced to fine grain killed steel practice (4 inches maximum thickness)

For shapes, thickness refers to nominal flange thickness.

Plates and Bars (thickness or diameter, inches)

To 5/8 incl.	Fy = 40 ksi	Fu = 65 - 85 ksi
Over 5/8 to 1 incl.	Fy = 38 ksi	Fu = 65 - 85 ksi
Over 1 to 1½ incl.	Fy = 36 ksi	Fu = 65 - 85 ksi
Over 1½ to 4 incl.	Fy = 36 ksi	Fu = 65 - 85 ksi (Grade B only)

Structural and Bar Size Shapes

All shapes other than those listed below

Fy = 40 ksi Fu = 65 - 85 ksi

Wide Flange Shapes Fy = 36 ksi Fu = 65 - 85 ksi

12x12 - 120 to 190 lbs

14x16 - all weights

33x15¾ - all weights

36x16½ - all weights

Angles: over ¾ inch in thickness

	Testing Temperature (V-Notch)	Impact Test Values (average of 3 tests) *
Grade A	+20F (Class 2)	15 ft·lbs
Grade B	0F (Class 3)	15 ft·lbs

** for thicknesses up to 1½ inch*

G40.10 - 1962 Structural Quality Carbon Steel Sheets

Grade A	Fy = 25 ksi	Fu = 48 ksi
Grade B	Fy = 30 ksi	Fu = 52 ksi
Grade C	Fy = 33 ksi	Fu = 55 ksi
Grade D	Fy = 40 ksi	Fu = 58 ksi

G40.11 - 1969 High Strength Low-Alloy Atmospheric Corrosion-Resisting Structural Steels

Grade A is intended for applications where atmospheric corrosion resistance is important, but where notch toughness properties are not a consideration (limited to material up to 1½ inch incl. in thickness).

Grade B is intended for applications where both atmospheric corrosion resistance and notch toughness properties are of importance (limited to material up to 4 inches incl. in thickness). Notch toughness of Grade B steels can be expected to be at least equal to those CSA G40.8 Grade B steel in comparable thicknesses.

Plates and Bars	Fy = 50 ksi	Fu = 70 - 95 ksi
All shapes other than those listed below	Fy = 50 ksi	Fu = 70 - 95 ksi *
Shapes 14x16 WF (over 426 lb/ft)	Fy = 46 ksi	Fu = 67 - 95 ksi

** Grade A is limited to shapes having a web thickness, or angles having a leg thickness of ½ inch maximum.*

G40.12 - 1964 General Purpose Structural Steel (*"Algoma 44" introduced in 1962*)

Plates and Bars Not Coiled (thickness or diameter, inches)		
To 1½ incl.	Fy = 44 ksi	Fu = 62 ksi
Over 1½ to 2½ incl.	Fy = 40 ksi	Fu = 62 ksi
Material Ordered in Coils	Fy = 40 ksi	Fu = 62 ksi
All shapes other than those listed below in Group 2		
	Fy = 44 ksi	Fu = 62 ksi
Group 2 - Wide Flange Shapes	Fy = 40 ksi	Fu = 62 ksi
12x12 - 120 to 190 lbs		
14x16 - all weights		
33x15¾ - all weights		
36x16½ - all weights		
Angles: over ¾ inch in thickness		

G40.12 - 1971 General Purpose Structural Steel

Grade A - plates and bars over 7/8 inch in thickness made to killed steel practice;
all other Grade A material made to semi-killed or killed steel practice (limited to 1½ inch
incl. in thickness)

Grade B - produced in accordance with fine grain killed steel practice (limited to 4 inches
incl. in thickness)

Plates and Bars Not Coiled (Thickness or Diameter, Inches)		
To 1½ incl.	Fy = 44 ksi	Fu = 65 ksi
Over 1½ to 2½ incl.	Fy = 40 ksi	Fu = 65 ksi
Over 2½ to 4 incl.	Fy = 36 ksi	Fu = 65 ksi
Plates and Bars Ordered in Coils	Fy = 40 ksi	Fu = 65 ksi
All shapes other than those listed below	Fy = 44 ksi	Fu = 65 ksi
Wide Flange Shapes	Fy = 40 ksi	Fu = 65 ksi
12x12 - 120 to 190 lbs		
14x16 - all weights		
33x15¾ - all weights		
36x16½ - all weights		
Angles: over ¾ inch in thickness		

G40.13 - 1969 Structural Steel Welded Shapes: Manufacture and Material

Plates or Bars to 1½ inch incl.	Fy = 44 ksi	Fu = 62 ksi
Plates or Bars Over 1½ to 2½ inch incl.	Fy = 40 ksi	Fu = 62 ksi

G40.14 - 1969 High Strength Carbon Structural Steel

Grade 50	Fy = 50 ksi	Fu = 75 - 100 ksi
Grade 55	Fy = 55 ksi	Fu = 80 - 105 ksi
Grade 60	Fy = 60 ksi	Fu = 80 - 105 ksi

G40.16 - 1969 Hot-Formed Welded or Seamless Hollow Structural Sections

Grade 36	Fy = 36 ksi	Fu = 58 ksi
Grade 50	Fy = 50 ksi	Fu = 65 ksi
Grade 55	Fy = 55 ksi	Fu = 70 ksi

G40.17 - 1969 Cold-Formed Welded or Seamless Hollow Structural Sections

Grade 42	Fy = 42 ksi	Fu = 60 ksi
Grade 50	Fy = 50 ksi	Fu = 65 ksi
Grade 55	Fy = 55 ksi	Fu = 70 ksi

G40.18 - 1971 High-Yield-Strength, Quenched and Tempered Structural Steel Plate

Suitable for Welding

Fy = 100 ksi Fu = 115 - 135 ksi

Historical Listing of Selected Structural Steels

CSA Standards

Designation	Date Published	Yield Strength		Tensile Strength (F _u)	
		ksi	MPa	ksi	MPa
A16	1924	½ F _u	½ F _u	55 - 65	380 - 450
S39	1935	30	210	55 - 65	380 - 450
S40	1935	33	230	60 - 72	410 - 500
G40.4	1950	33	230	60 - 72	410 - 500
G40.5	1950	33	230	60 - 72	410 - 500
G40.6	1950	45 ¹	310	80 - 95	550 - 650
G40.8	1960	40 ³	280	65 - 85	450 - 590
G40.12	1964 *	44 ²	300	65	450
G40.21	1973 **	Replaced all previous Standards, see CISC Handbook			

* Introduced in May 1962 by the Algoma Steel Corporation as "Algoma 44"

** In May 1997, grade 350W became the only grade for W and HP shapes produced by Algoma Steel Inc.

¹ Silicon steel

² Yield reduces when thickness exceeds 1½ inches (40 mm).

³ Yield reduces when thickness exceeds ⅝ inches (16 mm).

Rivet Steel

Designation	Date Published	Yield Strength		Tensile Strength (F _u)	
		ksi	MPa	ksi	MPa
G40.2	1950	28	190	52 - 62	360 - 430

ASTM Specifications

Designation	Date Published	Yield Strength		Tensile Strength (F _u)	
		ksi	MPa	ksi	MPa
A7 (bridges) A9 (buildings)	1914*	½ F _u	½ F _u	55 - 65	380 - 450
	1924	½ F _u ≥ 30	½ F _u ≥ 210	55 - 65	380 - 450
	1934	½ F _u ≥ 33	½ F _u ≥ 230	60 - 72	410 - 500
A373	1954	32	220	58 - 75	400 - 520
A242	1955	50 ¹	350	70 ¹	480
A36	1960	36	250	60 - 80	410 - 550
A440	1959	50 ¹	350	70 ¹	480
A441	1960	50 ¹	350	70 ¹	480
A572 grade 50	1966	50	345	65	450
A588	1968	50 ¹	345	70 ¹	485
A992	1998	50 min. to 65 max.	345 min. to 450 max.	65	450

¹ Reduces with increasing thickness

* Between 1900 and 1909, medium steel in A7 and A9 had a tensile strength 5 ksi higher than that adopted in 1914.

Reference: Handbook of Steel Construction, 8th Edition, CISC, 2004.