

CSA G40.21 Structural quality steel shapes, plates, and bars.

CSA G40.21 covers the chemical and mechanical requirements for structural quality steel shapes, plates, and bars for use in general construction and engineering purposes.

G40.21 Types

Type W	Weldable Steel
Type WT	Weldable Notch Tough Steel (low temperature)
Type R	Atmospheric Corrosion Resistant Steel
Type A	Atmospheric Corrosion Resistant Weldable Steel
Type AT	Atmospheric Corrosion Resistant Weldable Notch Tough Steel
Type Q	Quenched and Tempered Low Alloy Steel Plate Steel
Type QT	Quenched and Tempered Low Alloy Notch Tough Steel Plate

G40.21 Grades, Types and Strength Levels

Type	38	44	50	55*	60	70	80	100
W	38W	44W	50W	55W	60W	70W	80W	-
WT	38WT	44WT	50WT	55WT	60WT	70WT	80WT	-
R			50R					
A			50A		60A	70A	80A	
AT			50AT		60AT	70AT	80AT	
Q								100Q
QT								100QT
*Grade 55W is available only as hollow sections, angles and bars. 55WT as hollow sections only								

G40.21 Imperial / Metric Conversion

Imperial, ksi	Metric, MPa
38	260
44	300
50	350
55	380
60	400
70	480
80	550
100	700

G40.21 Mechanical Requirements for Plates, Bars, and Shapes

Grade	Tensile, ksi	Yield, ksi min, up to 2-1/2"	Yield, ksi min, above 2-1/2" to 4"	Elongation, % min, Longitudinal in 8"
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38W	60-85	38	36	20
44W	65-90	44	40	20
50W	65-95	50	46	19
55W	70-95	55	-	18
60W	75-100	60	-	16
70W	85-115	70	-	15
80W	90-125	80	-	13
38WT	60-85	38	36	20
44WT	65-90	44	40	20
50WT	70-95	50	46	19
60WT	75-100	60	-	18
70WT	85-115	70	-	15
80WT	90-125	80	-	13
50R	70-95	50	-	19
50A	70-95	50	50	19
60A	75-100	60	-	18
70A	85-115	70	-	15
80A	90-125	80	-	13
50AT	70-95	50	50	19
60AT	75-100	60	-	18
70AT	85-115	70	-	15
80AT	90-125	80	-	13
100Q	110-130	100	90	18 in 2"
100QT	110-130	100	90	18 in 2"

The above table has been abridged for clarity and relevance. The complete table can be found in the CSA standard at

shop.csa.ca

G40.21 Chemical Requirements

Grade	Carbonmax	Manganese	Phosphorous	Sulfur max	Silicon	Chromium	Nickel	Copper
38W	0.20	0.50-1.50	0.04 max	0.05	0.40 max	-	-	-
44W	0.22	0.50-1.50	0.04 max	0.05	0.40 max	-	-	-
50W	0.23	0.50-1.50	0.04 max	0.05	0.40 max	-	-	-
55W	0.23	0.50-1.50	0.04 max	0.05	0.40 max	-	-	-
60W	0.23	0.50-1.50	0.04 max	0.05	0.40 max	-	-	-
70W	0.26	0.50-1.50	0.04 max	0.05	0.40 max	-	-	-
80W	0.15	1.75 max	0.04 max	0.05	0.40 max	-	-	-

38WT	0.20	0.80-1.50	0.03 max	0.04	0.15-0.40	-	-	-
44WT	0.22	0.80-1.50	0.03 max	0.04	0.15-0.40	-	-	-
50WT	0.22	0.80-1.50	0.03 max	0.04	0.15-0.40	-	-	-
60WT	0.22	0.80-1.50	0.03 max	0.04	0.15-0.40	-	-	-
70WT	0.26	0.80-1.50	0.03 max	0.04	0.15-0.40	-	-	-
80WT	0.15	1.75 max	0.03 max	0.04	0.15-0.40	-	-	-
50R	0.16	0.75 max	0.05-0.15	0.04	0.75 max	0.30-1.25	0.90 max	0.20-0.60
50A	0.20	0.75-1.35	0.03 max	0.04	0.15-0.50	0.70 max	0.90 max	0.20-0.60
60A	0.20	0.75-1.35	0.03 max	0.04	0.15-0.50	0.70 max	0.90 max	0.20-0.60
70A	0.20	1.00-1.60	0.025 max	0.035	0.15-0.50	0.70 max	0.25-0.50	0.20-0.60
80A	0.15	1.75 max	0.025 max	0.035	0.15-0.50	0.70 max	0.25-0.50	0.20-0.60
50AT	0.20	0.75-1.35	0.03 max	0.04	0.15-0.50	0.70 max	0.90 max	0.20-0.60
60AT	0.20	0.75-1.35	0.03 max	0.04	0.15-0.50	0.70 max	0.90 max	0.20-0.60
70AT	0.20	1.00-1.60	0.025 max	0.035	0.15-0.50	0.70 max	0.25-0.50	0.20-0.60
80AT	0.15	1.75 max	0.025 max	0.035	0.15-0.40	0.70 max	0.25-0.50	0.20-0.60
100Q	0.20	1.50 max	0.03 max	0.04	0.15-0.40	-	-	-
100QT	0.20	1.50 max	0.03 max	0.04	0.15-0.40	-	-	-

In addition, grades 100Q and 100QT shall have a Boron composition of 0.0005-0.005% The above table has been abridged for clarity and relevance. The complete table can be found in the CSA standard at shop.csa.ca

G40.21 Charpy Impact Testing

Grade	Minimum Absorbed Energy, Categories 1-4, in ft-lb
38WT	15
44WT	15
50WT	20
55WT	20
60WT	20
70WT	20
80WT	20
50AT	20
60AT	20
70AT	20
80AT	20
100QT	25

Absorbed energy for Category 5 shall be specified by the purchaser

Category	Test Temperature, °F
1	32

2	0
3	-20
4	-50
5	To be specified by purchaser

Commentary on ASTM Equivalents

The most common merchant structural grade of CSA G40.21 is 44W(300W). Most steel mills in the US manufacture their merchant bars (rounds, flats) to meet both this grade and ASTM A36 in order to satisfy users on both sides of the border. Becoming more common in recent years is structural steel per 50W. ASTM A572/A529 grade 50 will typically satisfy these requirements. All of Portland Bolt’s A36 rounds bar will cross certify to 44W and our F1554G55 round bar will meet the requirements of grade 50W. There may be some other cross certification available on a case by case basis. Ask your Portland Bolt salesperson for more information.



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