

Cold Formed Hollow Sections

Standard Specifications

Standard Specification	Scope	Grade of Tubes	Chemical Composition Percentage (max. unless range is given)				Mechanical Properties			
			C	Mn	P	S	Condition	Tensile Strength (min.)	Yield Strength (min.)	Elongation (% min.)
			4	5	6	7	8	9 ksi (MPa)	10 ksi (MPa)	11 (G.L = 2" or 50mm)
ASTM-A53	E.R.W. Carbon Steel Pipes	Type E Grade A	0.25	0.95	0.05	0.06	As Rolled	48 (331)	30 (207)	As per Table X7
ASTM-A120	E.R.W. Carbon Steel Pipes for ordinary use	Standard Pipe	--	--	--	--	--	--	--	
ASTM-A135	Standard Specification for ERW Steel Pipe	Grade A	0.25	0.95	0.05	0.06	As Rolled	48 (331)	30 (207)	As per Table I Equation: (Elongation) = 56 x (Actual Thickness of Specimen, inch) + 17.50
ASTM-A500	E.R.W Carbon Steel Structural Tubing in Round & Shapes	Round Grade A	0.26	--	0.04	0.05	As Rolled	45 (310)	33 (228)	25
		Grade B	0.26	--	0.04	0.05		58 (400)	42 (290)	23
		Shaped Grade A	0.26	--	0.04	0.05		45 (310)	39 (269)	25
		Grade B	0.26	--	0.04	0.05		58 (400)	46 (317)	23
ASTM-A513	E.R.W Carbon Steel Mechanical Tubing	MT 1010	0.5-0.15	0.3-0.6	0.04	0.05	As Rolled	45 (310)	32 (221)	15
		MT 1015	0.1-0.2	0.3-0.7	0.04	0.05		48 (331)	35 (241)	15
		MT 1020	0.15-0.25	0.3-0.8	0.04	0.05		52 (359)	38 (262)	12

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Flattenning (min.)	Bend Test	Hydrostatic Test	Dimensional Tolerances		
			On Diameter except for Non-Circular Tubes	On Wall Thickness	
12	13	14	15	16	
Apply for STD & XS of NB>2"	Apply for NB 2" I2D at 90°	As per Table X2	1-1/2" & under	+ 1/64"	+ not limited
Welded Portion: H= 2/3D	When ordered for Close coiling: 8D at 180°		2' & over	± 1% of OD	-12.5%
The Other Side: H= 1/3D		1/2 to 1": P=700psi 1-1/4" to 3": P=1,000 psi 3-1/2" to 6": P=1,200 psi	1-1/2" & under	+ 1/64"	+ not limited
			2' & over	± 1% of OD	-12.5%
Welded Portion: H = 2/3D		P=25t/D, Max. 2,500 psi S:	± 1% of OD		+ not limited
The Other Side: H = 1/3D		Allowable Fiber Stress (16,000-18,000 psi) for GradeA. But in no case shall the stress produced exceed 80% of the specified Y.P.		-12.5%	
Welded Portion: H = 2/3D			Up to 1.90"	± 0.5%	
			2" & over	± 0.75%	
			Under 2-1/2"	± 0.02"	
The Other Side: H = 1/2D			2-1/2" to 3-1/2" excluding	± 0.025"	± 10%
			3-1/2" to 5-1/2" excluding	± 0.03"	
			5-1/2" & over	± 1%	
			Square of radii	± 2% max.	
Welded Portion: H = 2/3D		P=25t/D	As per Table 4 & 7		As per Table 6 & 8
The Other Side: H = 1/3D		S: Allowable Fiber Stress of 14,000 psi			

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			C	Mn	P	S	Condition	Tensile Strength (min.) kgf/mm ²	Yield Strength (min.) kgf/mm	Elongation (% min.) longitudinal	Elongation (% min.) transverse
1	2	3	4	5	6	7	8	9	10	11	11
JIS-G 3444	E.R.W. Carbon Steel Pipes for Civil Engineer Architecture, Steel Towers, Scaffolding, Pile Struts & other Structures	STK - 30 STK - 41 STK - 51 STK - 50	-- 0.25 0.30 0.18	-- -- 0.3-1.0 1.50	0.05 0.04 0.04 0.04	0.05 0.04 0.04 0.04	As Rolled	30 41 51 50	-- 24 36 32	30 23 15 23	25 18 10 18
JIS-G 3445	E.R.W. Carbon Steel Pipes for Machine Structural Purposes	STKM-11A STKM-12A STKM-12B STKM-12C STKM-13A STKM-13B STKM-13C STKM-14A STKM-14B	0.12 0.20 40 48 0.25 45 0.30 42 51	0.25 - 0.6 0.25 - 0.6 28 36 0.30 - 0.9 31 0.30 - 1.0 25 36	0.04 0.04 25 20 0.04 15 0.04 20 10	0.04 0.04 20 15 0.04 15 0.04 20 10	As Rolled	30 35 -- -- 38 52	-- 18 22 39	35 35 30 15	30 30 25 10
JIS-G 3452	E.R.W. Carbon Steel Pipes for ordinary use	SGP	--	--	0.05	0.05	As Rolled (Black tubes)	30	--	No. 11, 12 T.P. 30	No. 5 T.P. 25
JIS-G 3466	E.R.W. Carbon Steel Square Tubes for General Structural Purposes	STKR-41 STKR-50	0.25 0.18	-- 1.50	0.04 0.04	0.04 0.04	As Rolled	41 50	25 33	No. 5 T.P. 23 23	-- -- --
EN 10219	Non-alloy & fine grain	S235JRH S275J0H S275J2H S355J0H S355J2H S355K2H	0.17 0.2 0.2 0.22 0.22 0.22	1.4 1.5 1.5 1.6 1.6 1.6	0.04 0.035 0.03 0.035 0.03 0.03	0.04 0.035 0.03 0.035 0.03 0.03	As rolled	26.1-37 31.2-42.1 31.2-42.1 37-49.3 37-49.3 37-49.3	17 20 20 25.7 25.7 25.7	27 - - - - -	

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			On Diameter except for Non-Circular Tubes	On Wall Thickness
12	13	14	15	16
H = 2/3D H = 2/3D H = 7/8D H = 7/8D	6D at 90° 6D at 90° 8D at 90° 6D at 90°	-- -- -- --	Under 50 mm ± 0.25 mm 50 mm & over ± 0.50 %	Under 3mm ± 0.30 mm 3mm - 12mm ± 10 % excluding
H = 1/2D H = 2/3D H = 2/3D -- H = 2/3D H = 3/4D -- H = 3/4D H = 7/8D	4D at 180° 6D at 90° 6D at 90° -- 6D at 90° 6D at 90° -- 6D at 90° 8D at 90°	-- -- -- -- -- -- -- --	As per Classification (No. 1,2,3) of Table 4	As per Classification (No. 1,2,3) of Table 5
H = 2/3D	8D at 90°	P=25 kgf/mm ²	10.5 to 48.6 mm ± 0.50 mm 60.5 to 165.2 mm ± 1 %	+ not limited - 12.5%
--	--	--	Up to 100 mm ± 1.50 mm Over 100 mm ± 1.5 % Squareness of side ± 1.5° Radii of corner Max. 3t'	Up to 3mm ± 0.30 mm 3mm & over ± 10 %
--	--	--	± 1 % with a minimum of ± 0,5 mm and a maximum of ± 1 0 mm	For D ≤ 406,4 mm: T δ 5 mm ± 10 % T > 5 mm ± 0,5 mm For D > 406,4 mm: ± 10 % with a maximum of ± 2 mm