

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)
1	2	3	4	5	6	7	8	9	10	11
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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Other Tests	Dimensional Tolerances			
	Bend Test	Hydrostatic Test	On Diameter except for Non-Circular Tubes	On Wall Thickness
12	13	14	15	16
Flattenning (min.)				
Apply for STD & XS of NB>2"	Apply for NB 2" 12D 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.		
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.)	Yield Strength (min.)	Elongation (% min.)	Elongation (% min.)
1	2	3	4	5	6	7	8	kgf/mm ²	kgf/mm	longitudinal	transverse
JIS-G 3444	E.R.W. Carbon Steel Pipes for Civil Engineer Architecture, Steel Towers, Scaffolding, Pile Struts & other Structures	STK - 30	--	--	0.05	0.05	As Rolled	30	--	30	25
		STK - 41	0.25	--	0.04	0.04		41	24	23	18
		STK - 51	0.30	0.3-1.0	0.04	0.04		51	36	15	10
		STK - 50	0.18	1.50	0.04	0.04		50	32	23	18
JIS-G 3445	E.R.W. Carbon Steel Pipes for Machine Structural Purposes	STKM-11A	0.12	0.25 - 0.6	0.04	0.04	As Rolled	30	--	35	30
		STKM-12A	0.20	0.25 - 0.6	0.04	0.04		35	18	35	30
		STKM-12B	40	28	25	20					
		STKM-12C	48	36	20	15					
		STKM-13A	0.25	0.30 - 0.9	0.04	0.04		38	22	30	25
		STKM-13B	45	31	20	15					
		STKM-13C	0.30	0.30 - 1.0	0.04	0.04		52	39	15	10
		STKM-14A	42	25	25	20					
STKM-14B	51	36	15	10							
JIS-G 3452	E.R.W. Carbon Steel Pipes for ordinary use	SGP	--	--	0.05	0.05	As Rolled (Black tubes)	30	--	30	25
JIS-G 3466	E.R.W. Carbon Steel Square Tubes for General Structural Purposes	STKR-41	0.25	--	0.04	0.04	As Rolled	41	25	23	--
		STKR-50	0.18	1.50	0.04	0.04		50	33	23	--
EN 10219	Non-alloy & fine grain	S235JRH	0.17	1.4	0.04	0.04	As rolled	26.1-37	17	27	
		S275J0H	0.2	1.5	0.035	0.035		31.2-42.1	20	-	
		S275J2H	0.2	1.5	0.03	0.03		31.2-42.1	20	-	
		S355J0H	0.22	1.6	0.035	0.035		37-49.3	25.7	-	
		S355J2H	0.22	1.6	0.03	0.03		37-49.3	25.7	-	
S355K2H	0.22	1.6	0.03	0.03	37-49.3	25.7	-				

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Flatness (min.)	Bend Test	Hydrostatic Test	Dimensional Tolerances	
			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