

## Technical Specification References

### - Steel Plates, Sheets

Excerpts from JIS G 3131, JIS G 3101, JIS G 3302 &amp; JIS G 3141 Specifications

Classification	Specification	Grade	Chemical Composition					Tensile Test					Bend Test *2		
			C max. %	Mn max. %	Si max. %	P max. %	S max. %	Tensile Strength N/mm <sup>2</sup>	Yield Strength N/mm <sup>2</sup>	Elongation			Bending Angle	Bending Radius	
										Test Pc	Thickness	%			
Hot Rolled Steel Plates and Sheets & Chequered Plates	JIS G 3131	SPHC	0.15	0.60	--	0.05	0.05	270 min.	--	No. 5	1.2mm & over, up to 1.6 mm	27 min.	180°	Flat on itself  0.5t	
											1.6mm & over, up to 3.2 mm	29 min.			
											3.2mm & over	31 min.			
		JIS G 3101	SS330	--	--	--	0.05	0.05	330 - 430	205 min.	No. 5	5 mm & under	26 min.	180°	0.5t
											No. 1A	over 5mm-16mm	21 min.		
		JIS G 3101	SS400	--	--	--	0.05	0.05	400 - 510	245 min.	No. 5	5 mm & under	21 min.	180°	1.5t
											No. 1A	over 5mm-16mm	17 min.		
Galvanised Steel Sheets	JIS G 3302	SGCC	--	--	--	--	--	270 min.	205 min.	--	Up to 1.6 mm	--	180°	t *1	
											1.6 mm & over, up to 3.0 mm			t *1	
											3.0 mm & over			2t *1	
		JIS G 3302	SGHC	--	--	--	--	270 min.	205 min.	--	Up to 1.6 mm	--	180°	t *1	
										1.6 mm & over, up to 3.0 mm		t *1			
										3.0 mm & over		2t *1			
Cold Rolled Steel Sheets	JIS G 3141	SPCC	0.12	0.50	--	0.04	0.045	270 min.	--	No. 5	0.6 mm & over, up to 1.0 mm	36 min.	180°	Flat on itself	
											1.0 mm & over, up to 1.6 mm	37 min.			
											1.6mm & over, up to 2.5 mm	38 min.			
											2.5 mm & over	39 min.			

**Notes:**

- \*1 - Up to grade Z27 maximum  
 \*2 - Bend Test test piece No. 3  
 t - Thickness

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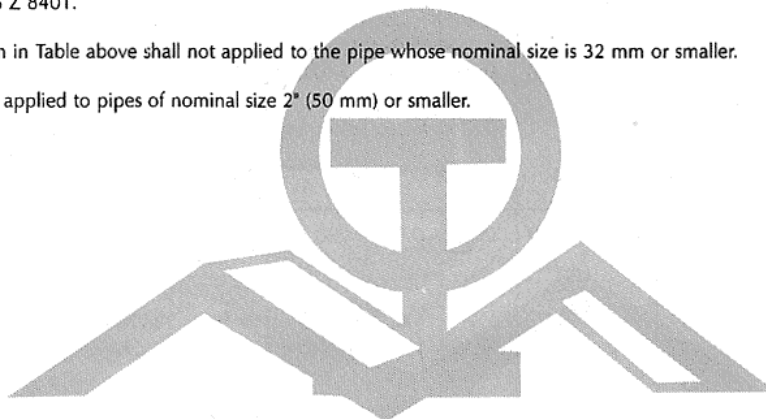
### - Steel Pipes

Excerpts from JIS G 3452, ASTM A-53 Specification

Classification	Specification	Grade	Chemical Composition					Tensile Test			Bend Test * <sup>1</sup>		Flattening Test H	
			C max.	Mn max.	Si max.	P max.	S max.	Tensile Strength	Yield Strength	Elongation	Bending Angle	Bending Radius		
			%	%	%	%	%	N/mm <sup>2</sup>	N/mm <sup>2</sup>	%				
Carbon Steel Pipes for Ordinary Piping	JIS G 3452	SCP	--	--	--	0.04	0.04	290 min.	--	*Test Piece No. 11 & 12 *Test Piece No. 5	30 min. 25 min.	90°	6D	$\frac{2}{3}D$
ASTM Standard Welded Steel Pipes	ASTM A53	A	0.25	0.95	--	0.05	0.06	330 min.	205 min.	As specified in A-53 specification		90°	12D	$\frac{1}{3}D$
	ASTM A53	B	0.30	1.20	--	0.05	0.06	415 min.	240 min.					

## Notes:

- \* - When the tensile test is carried out on No. 12 or No. 5 test piece for the pipe under 8 mm in wall thickness, the minimum value of elongation shall be obtained by subtracting 1.5% from the thickness values of elongation given in Table above for each 1 mm decrease in wall thickness, and rounding off to an integer in accordance with JIS Z 8401.
- \* - The values of elongation given in Table above shall not applied to the pipe whose nominal size is 32 mm or smaller.
- \*<sup>1</sup> - Bend test in table above only applied to pipes of nominal size 2" (50 mm) or smaller.
- H - Distance between the plates
- D - Outside diameter of the pipe



## Technical Specification References - Steel Tubes

Excerpts from JIS G 3444, JIS G 3445, BS 31 & BS 1139 specifications

Classification	Specification	Grade	Chemical Composition					Tensile Test				Bend Test		Flattening Test H
			C max. %	Mn max. %	Si max. %	P max. %	S max. %	Tensile Strength N/mm <sup>2</sup>	Yield Strength N/mm <sup>2</sup>	Elongation %		Bending Angle	Bending Radius	
Carbon Steel Tubes for General Structural Purposes	JIS G 3444	STK290	--	--	--	0.05	0.05	290 min.	--	* Test Piece No.11 & 12	30 min.	90°	6D	2/3 D
									* Test Piece No.5	25 min.				
	JIS G 3444	STK400	0.25	--	--	0.04	0.04	400 min.	235 min.	* Test Piece No.11 & 12	23 min.	90°	6D	2/3 D
									* Test Piece No.5	18 min.				
JIS G 3444	STK500	0.30	0.35	0.30-1.00	0.04	0.04	500 min.	355 min.	* Test Piece No.11 & 12	15 min.	90°	8D	7/8 D	
								* Test Piece No.5	10 min.					
JIS G 3444	STK540	0.23	0.55	1.50	0.04	0.04	540 min.	390 min.	* Test Piece No.11 & 12	20 min.	90°	6D	7/8 D	
								* Test Piece No.5	16 min.					
Carbon Steel Tubes For Machine Structural Purposes	JIS G 3445	STKM11A	0.12	0.35	0.60	0.04	0.04	290 min.	--	* Test Piece No. 11 & 12	35 min.	180°	4D	1/2 D
									* Test Piece No.5	30 min.				
British Standard Galvanized Steel Conduit	BS31	Class B (screwed)	--	--	--	--	--	273 to 365	--	Gauge Length (8 in.)	15 min.	90°	6D	--
British Standard Steel Tubes for Scaffolding	BS1139		0.20	--	0.30	0.05	0.05	340 to 480	235 min.	Gauge Length Lo=5.65√So	24 min.	--	--	--
Window Pipe	Manufacturer Standard	--	--	--	--	--	--	--	--	--	--	--	--	--
Earth Pipe	Manufacturer Standard	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:

- \* - Elongation values in Table above only applied to tubes over 40 mm in outside diameter
- \* - When the tensile test is carried out on No. 12 or No. 5 test piece for the tube under 8 mm in wall thickness the minimum elongation shall be determined by reducing 1.5% per 1 mm of decrease in wall thickness from the values given in the Table above and rounding off the value obtained to integer in accordance with JIS Z 8401.

H - Distance between flat plates

D - Outside diameter of the tube

**Technical Specification References**  
**- Steel Tubes & Lipped Channel**

Classification	Standard Specification		Application	Chemical Requirements (%)						Physical Requirements (%)		
				C max.	Mn max.	Si max.	P max.	S max.	Others	Tensile Strength	Yield Strength	Elongation
				%	%	%	%	%	%	N/mm <sup>2</sup>	N/mm <sup>2</sup>	%
Circular Hollow Section	BS1387	L	Carbon Steel Tubes for Ordinary Uses, Water Pipes and Structural Purposes	0.20	1.20	--	0.045	0.045	--	320-460	195 min.	20 min.
		M										
		H										
	JIS G 3444/ Mfg Standard	STK 290	Carbon Steel Tubes for Structural Purposes (Scaffolding)	--	--	--	0.05	0.05	--	290 min.	--	25 min.
		STK 400		0.25	--	--	0.04	0.04	--	400 min.	235 min.	18 min.
	STK 500		0.30	0.30 - 1.00	0.35	0.04	0.04	--	500 min.	355 min.	10 min.	
JIS G 3445/ Mfg Standard	STKM 11A	Carbon Steel Tubes for Machine Structural Purposes	0.12	0.60 max.	0.35	0.04	0.04	--	290 min.	--	30 min.	
JIS G 3452/ Mfg Standard	SGP	Carbon Steel Tubes for Ordinary Uses, Water Pipes and Structural Purposes	--	--	--	0.04	0.04	--	290 min.	--	25 min.	
Square and Rectangular Hollow Section	ASTM A500/ Mfg Standard	A	Carbon Steel Tubes for Structural Purposes and Machine Structural Purposes	0.30	--	--	0.05	0.063	Cu (max) = 0.18	310 min.	269 min.	25 min.
		B		0.30	--	--	0.05	0.063	Cu (max) = 0.18	400 min.	317 min.	23 min.
Circular Hollow Section	Mfg Standard	AA	Carbon Steel Tubes for Ordinary Uses	0.20	1.20	--	0.045	0.045	--	250 min.	190 min.	20 min.
Light Gauge Lipped Channel	Mfg Standard		For Civil Engineering	0.25	--	--	0.05	0.05	--	295 min.	--	25 min.
Conduit Pipe	BS 31/ Mfg Standard		For Electrical Wiring	--	--	--	--	--	--	273 - 365	--	15 min.
Window Pipe	Mfg Standard		For Window Usage	--	--	--	--	--	--	--	--	--