

Carbon Steel Tubing Standards

Japanese Standards		JOHS hydraulic line service		JIS B2351 bite type fitting		JIS G3455 carbon steel pipes for high pressure service	
Code Number		OST.1	OST.2	STPS.1	STPS.2	STS.410	STS.370
Chemical composition (%)	C	<0.20	0.08~0.18	<0.20	0.08~0.18	<0.30	<0.25
	Si	<0.035	0.10~0.35	<0.35	0.10~0.35	0.10~0.35	0.10~0.35
	Mn	0.25~0.60	0.30~0.60	0.25~0.60	0.30~0.60	0.30~1.40	0.30~1.10
	P	<0.040	<0.035	<0.040	<0.035	<0.035	<0.035
	S	<0.040	<0.035	<0.040	<0.035	<0.035	<0.035
	Cu		<0.20		<0.20		
Mechanical property	Tensile strength (kg/mm ²)	<45	<45	<45	<45	>410 (N/mm ²)	>370 (N/mm ²)
	Yield point (kg/mm ²)	>18	>20	>18	>18	>245 (N/mm ²)	>215 (N/mm ²)
	Elongation (%)	>35	>35	>30	>30	>25	>30
	Hardness						
	Bending test	4D x 180°	4D x 180°	4D x 180°	4D x 180°	6D x 90°	6D x 90°
	Flattening test					>20	>20
	Flaring test	1.2 x D	1.2 x D			$H = \frac{(1+e)t}{e+t/D}$	$H = \frac{(1+e)t}{e+t/D}$
Dimensional tolerance	Outside diameter (mm)	$\pm 0.10 \leq 22$ 28~35 ± 0.15 42~50 ± 0.20	$\pm 0.10 \leq 22$ 28~35 ± 0.15 42~50 ± 0.20	$\pm 0.10 \leq 25$ 30~38 ± 0.15	$\pm 0.10 \leq 25$ 30~38 ± 0.15	$\pm 0.8\%$, but minimum value is 0.3mm	$\pm 0.8\%$, but minimum value is 0.3mm
	Wall thickness (mm)	0.5 $\pm 20\%$ 1.0~1.5 $\pm 15\%$ 10% ≥ 2.0	0.5 $\pm 20\%$ 1.0~1.5 $\pm 15\%$ 10% ≥ 2.0	1.0 ± 0.15 1.5 $\pm 0.20\%$ 10% ≥ 2.0	1.0 ± 0.15 1.5 $\pm 0.20\%$ 10% ≥ 2.0	For smaller than 2mm ± 0.20 mm For over 2mm $\pm 10\%$	For smaller than 2mm ± 0.20 mm For over 2mm $\pm 10\%$
	Length (mm)	$\leq 6000 \begin{matrix} +10 \\ -0 \end{matrix}$ $\geq 6000 \begin{matrix} +15 \\ -0 \end{matrix}$	$\leq 6000 \begin{matrix} +10 \\ -0 \end{matrix}$ $\geq 6000 \begin{matrix} +15 \\ -0 \end{matrix}$	$\leq 6000 \begin{matrix} +10 \\ -0 \end{matrix}$ $\geq 6000 \begin{matrix} +15 \\ -0 \end{matrix}$	$\leq 6000 \begin{matrix} +10 \\ -0 \end{matrix}$ $\geq 6000 \begin{matrix} +15 \\ -0 \end{matrix}$	greater than specified length	greater than specified length
Inspection and test	Eddy current flaw detection	○	○	○	○	○	○
	Water pressure test (kg/cm ²)	50	50	50	50	p=200s t/D	p=200s t/D

Note :

In place of the water pressure test, the eddy current test shall be conducted.

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Western Standards Code Number		SAE J524b	AMS 5050F(E)	JIC APPENDIX-D	ANSI (NFPA) SMLS	DIN 2391
Chemical composition (%)	C	<0.18	<0.15	0.08~0.18	<0.18	0.10
	Si					
	Mn	0.30~0.60	0.30~0.60	0.30~0.60	0.30~0.60	
	P	<0.040	<0.040	<0.050	<0.040	
	S	<0.050	<0.050	<0.055	<0.050	
	Cu					
Mechanical property	Tensile strength (kg/mm ²)	>31.6		<38.7	<38.7	35~45
	Yield point (kg/mm ²)	>17.6			>17.6	>20.0
	Elongation (%)	>35	OD ≤ 12.7 > 32 OD ≥ 12.7 > 35	>35	>35	>25.0
	Hardness	<65		<65	<65	
	Flattening test	H=3 x t		H=3 x t	H=3 x t	
	Flaring test	1.25 x D	t < 7% x D 35% t > 7% x D 45%	1.30 x D	1.30 x D	
	Development test Lengthwise pressure test				○	
Dimensional tolerance	Outside diameter (mm)	≤ 25.4 ± 0.102		6.35~12.7 ± 0.076	≤ 12.7 ± 0.076	<10.00 ± 0.10
		OVER 25.4~ 38.1 ± 0.152	AMS2253	OVER 12.7~ 38.1 ± 0.127	OVER 12.7~ 38.1 ± 0.127	11.00~30.0 ± 0.08
		OVER 38.1~ 50.8 ± 0.203		OVER 38.1~ 88.9 ± 0.254	OVER 38.1~ 88.9 ± 0.254	32~40 ± 0.15
	Inside diameter	± 15%	AMS2253	6.35~12.7 OVER 12.7~ 38.1 ± 0.127 OVER 38.1~ 88.9 ± 0.254	≤ 12.7 OVER 12.7~ 38.1 ± 0.127 OVER 38.1~ 88.9 ± 0.254	
Inspection and test	Eddy current flow detection	○			○	○
	Water pressure test (kg/cm ²)					

SAE : Society of Automotive Engineers.
 JIC : The Joint Industrial Congress (JIC Hydraulic STD.)
 DIN : German Industry Standards.

AMS : Aerospace Materisl Specification.
 ANSI : American National Standards.
 JOHS : The Oil Hydraulic Association Standards