

## Bite Type Fitting Material Chemical & Mechanical Properties in different Code

Fitting Material	Chemical Compositions					Mechanical Properties			
	C %	Si %	Mn %	P %	S %	Tensile Strength Kgf/mm2	Yield Point Kgf/mm2	Elongation %	Hardness HB
JIS G4051 S45C	0.42~0.48	0.15~0.45	0.60~0.90	0.030 MAX.	0.035 MAX.	58 (MIN.)	35 (MIN.)	20 (MIN.)	167~229 Normalizing
AISI G1045 & SAE1045	0.43~0.50	0.10~0.20	0.60~0.90	0.040 MAX.	0.050 MAX.	56	49	15	163
DIN 1652 C45	0.42~0.50	0.15~0.35	0.50~0.80	0.045 MAX.	0.045 MAX.	60 (MIN.)	34 (MIN.)	18 (MIN.)	206(MIN.) Normalizing

## Applicable Tubing

The listed below is recommended.

Unit : mm

Tube	Thickness Tolerance	0.5	1.0	1.5	2.0	2.5	3.0	3.3	3.5	4.0	4.5	5.0	5.5	6.0	7.0	8.0	9.0
		± 0.1	± 0.15	± 0.2	± 0.2	± 0.25	± 0.3	± 0.33	± 0.35	± 0.4	± 0.45	± 0.5	± 0.55	± 0.6	± 0.7		
O.D.	O.D. Tolerance																
4	± 0.1	○	○														
6			○	○													
8			○	○													
10			○	○	○												
12			○	○		○											
15				○		○											
16				○	○		○										
18						○		○									
20					○	○			○								
22					○			○			○						
25							○					○					
28		± 0.15					○			○			○				
30							○				○			○			
35									○			○			○		
38		± 0.2					○				○	○				○	
42						○				○			○			○	
50								○			○			○			○

Note : 1. The Dark area in the table indicates tube thickness to corresponding tube outer diameters as per JOHS-102-1964-Hydraulic Line Service.  
 2. Tube Thickness indicated by O mark is recommended.

## 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 <sup>2</sup> )	<45	<45	<45	<45	>410 (N/mm <sup>2</sup> )	>370 (N/mm <sup>2</sup> )
	Yield point (kg/mm <sup>2</sup> )	>18	>20	>18	>18	>245 (N/mm <sup>2</sup> )	>215 (N/mm <sup>2</sup> )
	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 $\pm 0.15$ 42~50 $\pm 0.20$	$\pm 0.10 \leq 22$ 28~35 $\pm 0.15$ 42~50 $\pm 0.20$	$\pm 0.10 \leq 25$ 30~38 $\pm 0.15$	$\pm 0.10 \leq 25$ 30~38 $\pm 0.15$	$\pm 0.8\%$ , 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% $\geq 2.0$	0.5 $\pm 20\%$ 1.0~1.5 $\pm 15\%$ 10% $\geq 2.0$	1.0 $\pm 0.15$ 1.5 $\pm 0.20\%$ 10% $\geq 2.0$	1.0 $\pm 0.15$ 1.5 $\pm 0.20\%$ 10% $\geq 2.0$	For smaller than 2mm $\pm 0.20$ mm For over 2mm $\pm 10\%$	For smaller than 2mm $\pm 0.20$ mm For over 2mm $\pm 10\%$
	Length (mm)	$\leq 6000 \begin{smallmatrix} +10 \\ -0 \end{smallmatrix}$ $\geq 6000 \begin{smallmatrix} +15 \\ -0 \end{smallmatrix}$	$\leq 6000 \begin{smallmatrix} +10 \\ -0 \end{smallmatrix}$ $\geq 6000 \begin{smallmatrix} +15 \\ -0 \end{smallmatrix}$	$\leq 6000 \begin{smallmatrix} +10 \\ -0 \end{smallmatrix}$ $\geq 6000 \begin{smallmatrix} +15 \\ -0 \end{smallmatrix}$	$\leq 6000 \begin{smallmatrix} +10 \\ -0 \end{smallmatrix}$ $\geq 6000 \begin{smallmatrix} +15 \\ -0 \end{smallmatrix}$	greater than specified length	greater than specified length
Inspection and test	Eddy current flaw detection	○	○	○	○	○	○
	Water pressure test (kg/cm <sup>2</sup> )	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.

## Carbon Steel Tubing Standards

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 <sup>2</sup> )	>31.6		<38.7	<38.7	35~45
	Yield point (kg/mm <sup>2</sup> )	>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 <sup>2</sup> )					

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