

Mechanical Property								
Grade	Designation	Tensile strength N/mm ²	Yield point or proof stress N/mm ²	Elongation % No.11,No,12 Test pieces Longitudinal direction	Flattening Strength	Bending strength		
					Distance between flat plates(H)(D is outside dia. of the tube)	Bend angle	Inside radius (D is outside dia. Of the tube)	
Grade 11	A	STKM 11A	290 min.	-	35 min.	1/2 D	180°	4 D
Grade 12	A	STKM 12A	340 min.	175 min.	35 min.	2/3 D	90°	6 D
	B	STKM 12B	390 min.	275 min.	25 min.	2/3 D	90°	6 D
	C	STKM 12C	470 min.	355 min.	20 min.	-	-	-
Grade 13	A	STKM 13A	370 min.	215 min.	30 min.	2/3 D	90°	6 D
	B	STKM 13B	440 min.	305 min.	20 min.	3/4 D	90°	6 D
	C	STKM 13C	510 min.	380 min.	15 min.	-	-	-
Grade 14	A	STKM 14A	410 min.	245 min.	25 min.	3/4 D	90°	6 D
	B	STKM 14B	500 min.	355 min.	15 min.	7/8 D	90°	8 D
	C	STKM 14C	550 min.	410 min.	15 min.	-	-	-
Grade 15	A	STKM 15A	470 min.	275 min.	22 min.	3/4 D	90°	6 D
	C	STKM 15C	580 min.	430 min.	12 min.	-	-	-
Grade 16	A	STKM 16A	510 min.	325 min.	20 min.	7/8 D	90°	8 D
	C	STKM 16C	620 min.	460 min.	12 min.	-	-	-
Grade 17	A	STKM 17A	550 min.	345 min.	20 min.	7/8 D	90°	8 D
	C	STKM 17C	650 min.	480 min.	10 min.	-	-	-
Grade 18	A	STKM 18A	440 min.	275 min.	25 min.	7/8 D	90°	6 D
	B	STKM 18B	490 min.	315 min.	23 min.	7/8 D	90°	8 D
	C	STKM 18C	510 min.	380 min.	15 min.	-	-	-
Grade 19	A	STKM 19A	490 min.	315 min.	23 min.	7/8 D	90°	6 D
	C	STKM 19C	550 min.	410 min.	15 min.	-	-	-
Grade 20	A	STKM 20A	540 min.	390 min.	23 min.	7/8 D	90°	6 D

Remarks

1. When the tensile test is carried out on No. 12 test piece for the tube under 8mm in wall thickness, the minimum value of elongation shall be calculated by subtracting 1.5% from the values of elongation given in table for each 1mm decrease in wall thickness and rounding off to an integer in accordance with JIS Z8401.
2. The values of elongation in table shall not be applied to the tubes 40 mm or smaller in outside diameter. However, it may be agreed upon by the purchaser and the manufacturer, when especially required.
3. For electric resistance welded steel tubes and butt-welded steel tubes, the tensile test pieces shall be No. 12, and they shall be taken from a portion not involving welded seams.
4. For the flattening test, the minimum distance between the flat plates (H) shall be 5 times the plate thickness.

JIS G4052 Structural Steels with Specified Hardenability Bands

Symbol of class	Chemical composition %							
	C	Si	Mn	P	S	Ni	Cr	Mo
SCM 415H	0.12 to 0.18	0.15 to 0.35	0.55 to 0.90	0.030 max.	0.030 max.	-	0.85 to 1.25	0.15 to 0.35
SCM 418H	0.15 to 0.21	0.15 to 0.35	0.55 to 0.90	0.030 max.	0.030 max.	-	0.85 to 1.25	0.15 to 0.35
SCM 420H	0.17 to 0.23	0.15 to 0.35	0.55 to 0.90	0.030 max.	0.030 max.	-	0.85 to 1.25	0.15 to 0.35
SCM 435H	0.32 to 0.39	0.15 to 0.35	0.55 to 0.90	0.030 max.	0.030 max.	-	0.85 to 1.25	0.15 to 0.35

Chemical Composition for SAE/AISI

Carbon Steel

SAE/AISI					
NO.	C (%)	Si (%)	Mn (%)	P (%)	S (%)
1006	0.08max.	0.10 max. or 0.10 ∫ 0.25 or 0.15 ∫ 0.35	0.45max.	0.040 max.	0.050 max.
1008	0.10max.		0.50max.		
1009	0.15max.		0.60max.		
1010	0.08-0.13		0.30-0.60		
1012	0.10-0.15		0.30-0.60		
1015	0.12-0.18		0.30-0.60		
1016	0.12-0.18		0.60-0.90		
1017	0.14-0.20		0.30-0.60		
1018	0.14-0.20		0.60-0.90		
1019	0.14-0.20		0.70-1.00		
1020	0.17-0.23	0.30-0.60	0.030 max.	0.035 max.	
S10C	0.08-0.13	0.30-0.60			
S12C	0.10-0.15	0.30-0.60			
S15C	0.13-0.18	0.30-0.60			
S17C	0.15-0.20	0.30-0.60			
S20C	0.18-0.23	0.30-0.60			

Alloy Steel

	Chemical Composition %						
	C	Mn	P max	S max	Si	Cr	Mo
4118	0.18~0.23	0.70~0.90	0.030	0.040	0.15~0.35	0.40~0.60	0.08~0.15
4130	0.28~0.33	0.40~0.60	0.030	0.040	0.15~0.35	0.80~1.10	0.15~0.25