JIS G3441 Alloy steel tubes for machine purposes

1. Scope

This Japanese Industrial Standard specifies the alloy steel tubes, hereinafter referred to as the "tubes", used for machinery, automobiles and other machine parts.

2. Grade and Designation

The tubes shall be classified into 7 grades, and their designations shall be as given in Table1.

Table 1. Designation of Grade

Designation of grade	Informative reference Former symbol	Classification
SCr 420 TK	-	Chromium steel
SCM 415 TK	-	Chromium molybdenum steel
SCM 418 TK	-	
SCM 420 TK	-	
SCM 430 TK	Akin to STKS 1	
SCM 435 TK	Akin to STKS 3	
SCM 440 TK	-	

World Standard Comparative Table

KS		ASTM		JIS		BS	
Number	GRADE	Number	GRADE	Number	GRADE	Number	GRADE
D 3574	SCr 420 TK	A519		G-3441	SCr 420TK	632	
	SCM 415 TK				SCM 415TK		
	SCM 418 TK				SCM 418TK		CFS10
	SCM 420 TK		5120		SCM 420TK		
	SCM 430 TK		4130		SCM 430TK		
	SCM 435 TK		4135		SCM 435TK		
	SCM 440 TK		4140		SCM 440TK		CFS10
						1717	C6 (CF3)
						6323	CFS, CFS3A
						6323	CFS4, CFS51

						6323 6323 6323	CFS6, CFS7 CFS8, CFS9 CFS11

3. Chemical Composition

The tubes shall be tested in accordance with 7.1 and the ladle analysis values obtained shall conform to Table 2.

Table 2 Chemical Composition

Unit: %

Designation of grade	Former symbol (informative reference)	C	Si	Mn	P	S	Cr	Mo
SCr 420TK	-	0.18~0.23	0.15~0.35	0.60~0.85			0.90~1.20	-
SCM 415TK	-	0.13~0.18	0.15~0.35	0.60~0.85	0.030 max	0.030 max	0.90~1.20	0.15~0.30
SCM 418TK	-	0.16~0.21	0.15~0.35	0.60~0.85	0.030 max	0.030 max	0.90~1.20	0.15~0.30
SCM 420TK	-	0.18~0.23	0.15~0.35	0.60~0.85	0.030 max	0.030 max	0.90~1.20	0.15~0.30
SCM 430TK	Akin to STKS 1	0.28~0.33	0.15~0.35	0.60~0.85	0.030 max	0.030 max	0.90~1.20	0.15~0.30
SCM 435TK	Akin to STKS 3	0.33~0.38	0.15~0.35	0.60~0.85	0.030 max 0.030 max	0.030 max 0.030 max	0.90~1.20	0.15~0.30
SCM 440TK	-	0.38~0.43	0.15~0.35	0.60~0.85			0.90~1.20	0.15~0.30

Remark

1. As impurities, Ni and Cu for each grade shall not exceed 0.25 % and 0.30 %, respectively
2. When the product analysis is required by the purchaser, the tolerances for the values given in the above Table shall be as specified in Table 3 in JIS G 0321

4. Dimensional Tolerances

(1) This tolerances on outside diameter on outside diameter and wall thickness of the tubes shall be as specified in Table 3 and Table , respectively.

Table 3 Tolerances on Outside Diameter

Classification	Tolerances on outside diameter
Class 1	Under 50mm 【 0.5mm 50mm or over 【 1%
Class 2	Under 50mm 【 0.25mm 50mm or over 【 0.5%

Class 3	Under 25mm 【0.12mm 25mm or over to and excl. 40mm 【 0.15mm 40mm or over to and excl. 50mm 【0.18mm 50mm or over to and excl. 60mm 【0.20mm 60mm or over to and excl. 70mm 【0.23mm 70mm or over to and excl. 80mm 【 0.25mm 80mm or over to and excl 90mm 【0.30mm 90mm or over to and excl 100mm 【 040mm 100mm or over 【0.50%
Class 4	Under 13mm 【0.25mm 13mm or over to and excl. 25mm 【0.40mm 25mm or over to and excl, 40mm 【0.60mm 40mm or over and excl, 65mm 【0.80mm 65mm or over to and excl, 90mm 【1.00mm 90mm or over to and excl. 140mm 【1.20mm 140mm or over Subject to agreement between the parties concerned

Remark

1. For the tolerances on the outside diameter of hot finished seamless steel tubes, the values for Class 1 shall be applied.
2. For the tolerances on the outside diameter of quenched and tempered tubes, the values for Class 4 shall, as a rule, be applied.

Table 4 Tolerances on Wall Thickness

Classification	Tolerances on wall thickness
Class 1	Under 4mm + 0.6mm, -0.5mm 4mm or over +15%, 12.5%
Class 2	Under 3mm 【0.3mm 3mm or over 【10%
Class 3	Under 2mm 【0.15mm 2mm or over 【8%

Remark: For the tolerances on the wall thickness of hot finished seamless steel tubes steel tubes, the values for Class 1 shall be applied.

(2) The tolerances on the length of tubes shall be in the range of $^{+50}_{0}$ mm. When the tolerances outside this range are particularly required, they shall e agreed upon by the purchaser and the manufacturer

5. Appearance

(1) The tube shall be practically straight. and its both ends shall be at right angles to the axis of the tube.

(2) The tube shall be free from defects detrimental to practical use.

(3) When particularly required by the purchaser, the surface finishing of tubes shall be agreed upon by the purchaser and the manufacturer.

6. Method of Manufacture

(1) Tubes shall be manufactured by the seamless process or the electric resistance welding process.

(2) Tube shall, as a rule, be furnished as manufactured, as cold finished, or after annealed. However, the purchaser may specify a heat treatment other than annealing, if necessary.

7. Test

7.1 Chemical Analysis

7.1.1 Chemical analysis

The general requirements for chemical analysis and method of sampling specimens for analysis shall be in accordance with the specifications of 3. in JIS G 0303

7.1.2 Analytical Method

The analytical method shall be in accordance with one of the following Standards.

JIS G 1211, JIS G 1212, JIS G 1213, JIS G 1214, JIS G 1215, JIS G 1216,

JIS G 1217, JIS G 1218, JIS G 1219, JIS G 1253, JIS G 1256, JIS G 1257

8. Inspection

(1) The general requirements for inspection shall be in accordance with JIS G 0303.

(2) The chemical composition, appearance and dimensions for tube shall conform to the requirements specified in 3., 5.

(3) The purchaser may specify tensile test ([1]), hardness test ([2]), flattening test, flaring test, grain size test ([3])

decarburization test ([3]) and hydrostatic test, etc, in addition to the inspection items specified in 8.2 In this case, the test items, sampling method, test method and their acceptance standard shall previously be agreed upon by the manufacturer.

(4) The number of specimens for product analysis shall be agreed upon by the purchaser and the manufacturer.

Note

([1]) Tensile test shall be in accordance with JIS Z 2201 and JIS Z 2241.

([2]) Hardness test shall be in accordance with JIS Z 2245.

([3]) Grain size test shall be in accordance with JIS G 0551.

([4]) Decarburization test shall be in accordance with JIS G 0558

9.Marking

Each tube having passed the inspection shall be legibly marked with the following items.

Smaller tubes and other tubes as requested by the purchaser. However, may be bundled and marked for each bundle by suitable means. When approved by the purchaser, part of the items may be omitted.

(1) Designation of grade

(2) Symbol indicating the manufacturing process([5])

(3) Dimensions

(4) Manufacturer's name or its abbreviation

Note ([5]) The symbols indicating the manufacturing processes shall be as follows..

Hot finished seamless steel tube -S-H

Cold finished seamless steel tube -S-C

Electric resistance welded steel tubes other than cold finished -E-G

Cold finished electric resistance welded steel tube -E-C

10. Report

The manufacturer shall, as a rule, submit to the purchaser reports on the test results, method of manufacture, ordered dimensions, quantity and work lot number traceable to the manufacturing conditions etc.

JIS Number and Corresponding Foreign Standards

JIS			ASTM			BS			DIN			Index Number
Standard Number	Grade	Type	Standard Number	Grade	Type	Standard Number	Grade	Type	Standard Number	Grade	Type	
G3441	SCr420TK	Cr										C018
	SCM415TK	CrMo										
	SCM418TK	CrMo				6323	CFS10	CrMo				
	SCM420TK	CrMo	A519	5120	CrMo							
	SCM430TK	CrMo	A519	4130	CrMo							
	SCM435TK	CrMo	A519	4135	CrMo							
	SCM440TK	CrMo	A519	4140	CrMo	6323	CFS10	CrMo				