JIS G3429 Seamless Steel Tubes for High Pressure Gas Cylinder

1. Scope

This Japanese Industrial Standard specifies the seamless steel tubes, hereinafter referred to as the "tubes" used for the manufacture of seamless steel gas cylinders specified in JIS B 8230 and JIS B 8241.

Remark

The units and numerical values given in { } in this Standard are based on the International System of Units (SI) and are appended for informative reference.

Further, the traditional units accompanied by numerical values in this Standard shall be converted to the SI units and numerical values on Jan. 1, 1991.

2. Classification and Symbol

The tubes shall be classified into five classes and their symbols shall be as give in Table 1.

Table1 Classes and Symbols

Class	Symbol
Manganese steel tube	STH 11 STH 12
Chrome-molybdenum steel tube	STH 21 STH 22
Nickel-molybdenum steel tube	STH 31

World standard comparative table

Standard basis	Standard num.	Symbol for class				
KS	D 3575	STHG 11	STHG 12	STHG 21	STHG 22	STHG 31
JIS	G 3429	STH 11	STH 12	STH 21	STH 22	STH 31

3. Method of Manufacture

The method of manufacture shall be as follows:

(1) The tubes shall be manufactured seamless from steel ingot made in the open-hearth furnace or the electric furnace.

(2) The tubes shall be as manufactured, and not to be subjected to any heat treatment.

4. Chemical Composition

The tubes shall be tested in accordance with 8.1 and the resulting ladle analysis values shall comply with the requirements given in Table 2.

Table 2 Chemical Composition

Unit:%

Class	C	Si	Mn	P	S	Ni	Cr	Mo
STH11	0.50 max	0.10~0.35	1.80 max	0.035max	0.035max	-	-	-
STH12	0.30~0.41	0.10~0.35	1.35~1.70	0.030max	0.030max	-	-	-
STH21	0.25~0.35	0.15~0.35	0.40~0.90	0.030max	0.030max	0.25 max	0.80~1.20	0.15~0.30
STH22	0.33~0.38	0.15~0.35	0.40~0.90	0.030max	0.030max	0.25 max	0.80~1.20	0.15~0.30
STH31	0.35~0.40	0.10~0.50	1.20~1.50	0.030max	0.030max	0.50~1.00	0.30~0.60	0.15~0.25

Remark

1. Alloying elements not included in Table 2 may be added as required.

2.The chemical composition given in Table 2 shall be similarly applied when product analysis is required by the purchaser.

5. Hydrostatic Characteristic or Nondestructive Characteristic

The tube shall be tested in accordance with 8.2 and the resulting hydrostatic or nondestructive characteristic shall comply with the respective requirements given below.

5.1-1 Hydrostatic Characteristic (Applicable till the end of 1990) When given a hydrostatic pressure of 50kgf/P {49 bar} the tube shall withstand it without any leakage. In this case the purchaser may specify a pressure higher than 50kgf/P

5.1-2 Hydrostatic Characteristic (Applicable on and after Jan. 1, 1991) When given a hydrostatic pressure of 5 MPa the tube shall withstand it without any given a hydrostatic pressure of 5 MPa the tube shall withstand it without any leakage. In this case the purchaser may specify a pressure higher than 5 MPa

5.2 Nondestructive Characteristic The tubes shall be subjected to the nondestructive examination in the form of either the ultrasonic test or the eddy current test, and there shall be no signal greater than those produced by he artificial defects of the reference test block graded UD of the working sensitivity division specified in JIS G 0582 or EY specified in JIS G 0583

6. Dimensional Tolerances

Tolerances on the outside diameter, wall thickness, wall thickness disparity and length of the tubes shall be as specified in Table 3. unless otherwise specified.

Table 3 Tolerances on Outside Diameter, Wall Thickness, Wall Thickness Disparity and Length of the Tube

Tolerance on outside diameter	Tolerance on wall thickness	Tolerance on wall thickness disparity	Tolerance on length
【1%	+30 0 %	Within 20% of the nominal wall thickness	$+30_{mm}$ 0

7. Appearance

The appearance shall be as follows:

(1) The tube shall be straight for practical purposes, and its ends shall be at right angles to its axis.

(2) The inside and outside surface of the tube shall be well-finished and free from defects injurious to use.

8. Test

8.1 Analysis Test

8.1.1 Analysis Test General matters of the analysis test and the method of sampling test specimens for the test shall be as specified in 3. of JIS G 0303.

8.1.2 Analysis Method The analysis method shall be in accordance with one of the following Standards.

JIS G 1221

JIS G 1212

JIS G 1213

JIS G 1214

JIS G 1215

JIS G 1216

JIS G 1217

JIS G 1218

JIS G 1253

JIS G 1256

JIS G 1257

8.2 Hydrostatic Characteristic or Nondestructive Characteristic The hydrostatic test or the nondestructive examination of the tubes shall be in accordance with the respective requirements below.

(1) When hydrostatic pressure is applied on the tubes and maintained at a specified or designated value, the tubes shall be checked for any leakage.

(2) The test method of the nondestructive examination shall be as specified in JIS G 0582 or JIS G 0583

9. Inspection

The inspection shall be as follows:.

(1) General matters of inspection shall be as specified in JIS G 0303.

(2) The test results of chemical composition, either hydrostatic or nondestructive characteristic, dimensions and appearance shall conform to the requirements of 3., 4., 5. and 6. However, the nondestructive examination other than that of 8.2 may substitute by agreement between the parties concerned.

(3) Either the hydrostatic test or the nondestructive examination shall be conducted for each tube.

(4) The number of specimens for product analysis shall be subject to agreement between the parties concerned.

(5) The purchaser may designate part or all of the items of examination listed below in addition to that of (2). In this case, the inspection items, method of sampling test specimens, test method and criteria of acceptance shall be agreed upon in advance by the parties concerned.

(a) Magnetic particle examination ([1])

(b) Hardenability examination ([2])

(c) Ultrasonic examination ([3])

(d) Mechanical property examination ([4])

Note ([1]) Shall be in accordance with JIS G 0565.

([2]) Shall be in accordance with JIS G 056.

([3]) Shall be in accordance with JIS G 0582.

([4]) Shall be in accordance with JIS Z 2201, JIS Z 2241, JIS Z 2202, JIS Z 2242, JIS Z 2243 or JIS Z 2245.

10. Marking

The tubes having passed the inspection shall be marked with the items listed below on each tube. However, the order of arranging the items is not specified.

Some of the items may be committed with the approval of the purchaser.

(1) Symbol of class

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

(3) Dimensions([6])

(4) Manufacturer's name or identifying brand

Note ([5]) The symbols indicating the manufacturing process shall be as follows. However, the sign - may be replaced by a blank.

Hot finished seamless tube: -S-H

Cold finished seamless tube : -S-C

([6]) The dimensions here involve the outside diameter and wall thickness.

11. Report

The manufacturer shall, as a rule, submit to the purchaser a report on the test results, manufacturing process, ordered dimensions, quantity and work lot number indicating the history of manufacture.