JIS C8380 PLASTIC COATED STEEL PIPES FOR CABLE WAYS

1.Scope

This Japanese Industrial Standard specifies plastic coated steel pipes for cable-ways which are mainly used in general cable installation works, and in underground cable-ways of duct system and conduit system, to protect the cables (hereafter referred to as "coated steel pipes").

Remarks The following Standards are cited in this Standard

- JIS A 1415 Recommended practice for accelerated artificial exposure of plastics building materials
- JIS B 0204 Screw threads for rigid metal conduits and fittings
- JIS B 4751 Hand hacksaw blades
- JIS C 8305 Rigid steel conduits
- JIS G 3132 Hot-rolled carbon steel strip for pipes and tubes
- JIS G 3141 Cold rolled carbon steel sheets and strip
- JIS G 3444 Carbon steel tubes for general structural purposes
- JIS S 6006 Pencils and colored pencils
- JIS Z 1522 Pressure sensitive adhesive cellophane tapes
- JIS Z 2371 Methods of neutral salt spray testing
- JIS Z 8401 Rules for rounding off of numerical values

2. Definitions

For the purposes of this Standard, the following principal definitions apply

(1) cable-way This means the wires between power station, substation, switchyard, similar places, and electric service places; and the structures which support or protect such wires.

(2) underground cable-way This means the cable-way installed under the ground, and there are conduit system, duct system and direct laying system as the installation procedures.

(3) conduit system This is such a system that conduits which withstand the pressure due to vehicles or other heavy things are employed to accommodate the cables, and underground cable boxes (mangoles or the like) are installed on the route and the ends of the cable-way.

(4) duct system Such a system that the cables are accommodated in a structure which withstands the load resulted from the pressure of vehicles or other heavy things and which has a space to install the cables.

(5) direct laying system A system to install cables under the ground with the cables being accommodated in such cable protector as trough, or with the top being protected by plates.

(6) original pipe The steel pipe before execution of covering or painting

(7) covering To cover the original pipe with a synthetic resin by means of fluidized immersion method, extrusion molding method, etc.

(8) painting To cover the original pipe with a paint by means of spray coating, brush coating, etc.

3. Classification and symbol

The classification and symbols of coated steel pipes shall be as follows

(1) Coated steel pipes are classified and symbolized in accordance with the original pipe as shown in Table 1.

lable 1. Classification and symbols of coated steel pipes according to original pipe	
Classification	Symbol
Coated steel pipe employing the original pipe having the same outside diameter, thickness and thread length as those of the thick rigid steel	G
conduit of JIS C 8305 (hereafter referred to as "type G")	U I
Coated steel pipe employing the original pipe having the same outside diameter, thickness and thread length as those of the thin rigid steel	<u>_</u>
conduit of JIS C 8305 (hereafter referred to as "type C")	
Coated steel pipe employing the original pipe having the same outside diameter and thickness as those of the threadless rigid steel conduit	E

(2) coated steel pipes ate classified and symbolized in accordance with the covering or painting as shown in Table 2.

of JIS C 8305 (hereafter referred to as "type E")

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Table 2.	CIASSIFICATION	and symbols		i steel pipes	according to	covering or	painting

Classification	Symbol
Coated steel pipe whose inside and outside surfaces are covered	LL
Coated steel pipe whose outside surface is covered and inside surface is painted	LT

4. Performances

4.1 Bending property When the coated steel pipe is subjected to the test of 9.1, the bending property shall be such that the change of outside diameter falls within ± 20% of the original outside diameter, that no cracks or fissures appears on the welded portion, and that no cracks, peeling off, or the like appears on the paint film or cover film.

4.2 Resistance to corrosion When the covered or painted surface is subjected to the test of 9.2, no blister, peeling or rust shall appear on the surface.

4.3 Paint-film performance When the coated steel pipe, whose inside surface is treated with deterrent to rust by painting, is subjected to the test of 9.3, no break or scratch detrimental to service shall appear on the paint film.

4.4 Cover-film performance The covered outside surface shall be as follows

(1) Peeling property When the test of 9.4 is carried out, the cover film shall not peel off.

(2) Resistance to burning When the test of 9.5 is carried out, the specimen shall comply with either of the following requirements

(a) The specimen shall not burn

(b) When the specimen is ignited, the burning shall go out naturally within 30 s from removal of the flame.

(3) Pinholes When the test of 9.6 is carried out, the specimen shall show no pinholes.

(4) Resistance to weather When the test of 9.7 is carried out, the specimen shall show no blister, crack or fissure on the cover film, no remarkable change or deterioration in color, either.

(5) Resistance to damage by shock When the test of 9.8 is carried out, the continuity tester shall hot operate.

5. Manufacturing methods

The manufacturing methods shall be as given below.

(1) The both ends of a coated steel pipe shall be cut perpendicular to the pipe axis and then chamfered.

(2) Covering shall be carried out on the outside surface of a coated steel pipe to a thickness of 0.6 ± 0.2 mm.

(3) Covering shall be carried out on the inside surface of a coated steel pipe.

(4) The external thread (1) specified in JIS B 0204 shall be machined on both ends of coated steel pipes of type G and type C, and the threads on both ends of coated steel pipes

of type G and type C may be omitted subject to agreement between the parties concerned with acceptance.

Note

(1) The inspection of threaded part is carried out similar to JIS B 0204.

(5) Painting shall be carried out on the threaded parts of coated steel pipes.

6. Dimension, mass and thread length, together with tolerances on outside diameter and mass

The dimension, mass and thread length together with tolerances on outside diameter and mass, shall be as stated below.

(1) The dimension, mass and thread length tolerances on outside diameter and mass of original pipe shall be as shown in Tables 3, 4 and 5.

(2) The length shall be 3660mm and the tolerance thereon shall be ± 5mm. However, the length may be changed subject to agreement between the parties concerned with acceptance.

Tuno designation (2)	Outside diameter mm	Nominal thickness mm	Unit mass $(^3)(^4)$	Thread length mm	
				Max.	Min.
G16LL G16LT	21.0 ± 0.3	2.3	1.06	19	16
G 22LL G 22LT	26.5 ± 0.3	2.3	1.37	22	19
G 28LL G 28LT	33.3 ± 0.3	2.5	1.90	25	22
G 36LL G 36LT	41.9 ± 0.3	2.5	2.43	28	25
G 42LL G 42LT	47.8 ± 0.3	2.5	2.79	28	25
G 54LL G 54LT	59.6 ± 0.3	2.8	3.92	32	28
G 70LL G 70LT	75.2 ± 0.3	2.8	5.00	36	32
G 82LL G 82LT	87.9 ± 0.3	2.8	5.88	40	36
G 92LL G 92LT	100.7 ± 0.4	3.5	8.39	42	36
G 104LL G 104LT	113.4 ± 0.4	3.5	9.48	45	39

Table 3. Dimension, mass and thread length together with tolerances on outside diameter and mass of type G original pipe

Notes

(²) For this type designation, a combination of the symbol denoting coated steel pipe classification according to original pipe, the designation specified in JIS C 8305 and the

symbol denoting coated steel pipe classification according to covering or painting, is used.

(³) This indicates the mass of pipe not including the threaded parts.

(⁴) The tolerance on mass of one bundle (within 50 kg) of original pipes shall be -7% and the plus side is not specified.

The calculation method for checking the tolerance on mass shall be such that the difference between the actually measured value and the calculated value is divided by the calculated value and this quotient is expressed in percentage. The numerical value of mass shall be calculated from the formula given below by assuming 1 cm3 steel is 7.85g and then rounded off to three significant figures according to JIS Z 8401.

W = 0.02466t (D-t)

where, W: unit mass of original pipe (kg/m)

D : outside diameter of original pipe (basic size)(mm)

t : nominal thickness of original pipe (mm)

Type designation $(^2)$	Outside diameter mm	Nominal thicknoss mm	Unit mass $\binom{3}{4}$	Thread length mm	
				Max.	Min.
C 19LL	10.1 + 0.2	1.6	0.690	14	12
C 19LT	19.1 ± 0.2	1.0	0.090	14	12
C 25LL	25.4 + 0.2	1.6	0 030	17	15
C 25LT	25.4 ± 0.2	1.0	0.737	17	
C 31LL	31.8 ± 0.2	1.6	1.19	19	17
C 31LT					
C 39LL	38 1 + 0 2	1.6	1 44	21	19
C 39LT	00.1 - 0.2	1.0			
C 51LL	50.8 + 0.2	1.6	1.94	24	22
C 51LT	55.5 - 5.2				
C 63LL	63 5 + 0 35	2.0	3.03	27	25
C 63LT	03.5 ± 0.35				23
C 75LL	76.2 + 0.25	2.0	3.66	30	28
C 75LT	10.2 - 0.55				

Table 4. Dimension, mass and thread length together with tolerances on outside diameter and mass of type C original pipe

Table 5. Dimension and mass together with tolerances on outside diameter and mass of type E original pipe

Type designation (²)	Outside diameter mm	Nominal thickness mm	Unit mass (³)(⁴)
E 19LL E19LT	19.1 ± 0.15	1.2	0.530
E 25LL E 25LT	25.4 ± 0.15	1.2	0.716
E 31LL E 31LT	31.8 ± 0.15	1.4	1.05
E 39LL E 39LT	38.1 ± 0.15	1.4	1.27
E 51LL E 51LT	50.8 ± 0.15	1.4	1.71
E 63LL E 63LT	63.5 ± 0.25	1.6	2.44
E 75LL E 75LT	76.2 ± 0.25	1.8	3.30

7. Appearance

The appearance of coated steel pipes shall be as follows

(1) The coated steel pipe shall be practically straight.

(2) The inside and outside surfaces of coated steel pipe shall be smooth and well finished, and the inside surface shall especially be free from any projection or the like detrimental to service.

(3) The covered or painted surface of coated steel pipe shall be free from any abnormality such as scratch, lift, flaw detrimental to service.

8. Original pipe

The original pipes shall be either of the following pipes

(1) Pipes which are made from the steel strip of JIS G 3132 or JIS G 3141 or a strip at least equivalent by means of electric welding and are before the plation specified in JIS C 8305.

(2) The tube of STK 290 specified in JIS G 3444.

9. Tests

9.1 Bending test

9.1.1 Specimen Cut the coated steel pipe to a suitable length and use it as the specimen.

9.1.2 Test method Bend the specimen through 90° at the inside radius specified in Table 6 by means of a roll bender or a push bender at ordinary temperature. Place the welded part to a position about 45° from the inside of the bend

Classification	Designation (²)	Inside radius of curvature
Туре G	G 16LL G 22LL G 28LL	
	G 16LT G 22LT G 28LT	
Туре С	C 19LL C 25LL	6 times outside diameter of coated steel pipe
	C 19LT C 25LT	
Туре Е	E 19LL E 25LL	
	E 19LT E 25LT	

Table 6. Bending test

Remarks

Subject to agreement between the parties concerned with acceptance, the test may be made for the coated steel pipe of a designation other than given in Table 6, by determining the inside radius of curvature and the relative deformation rate to the original outside diameter.

9.2 Corrosion resistance test

9.2.1 Specimen Cut the coated steel pipe to a length of about 150mm, then cut open a half of the piece. Cover all the cut faces by pasting paint or wax to prepare the specimen. Make the specimen so that the welded part lies almost in the middle of test surface.

9.2.2 Test method The method shall be as specified in JIS Z 2371. Repeat two cycles of spraying ; each cycle consisting of continuous spray of salt water for 8 h and a rest of 16 h. Further, carry out the spraying for 8 h.

9.3 Test of paint film

9.3.1 Specimen Cut the coated steel pipe to a suitable length and use it as the specimen.

9.3.2 Test method The test method of paint film shall be as follows

(1) Sharpen the pencil of hardness H specified in JIS S 6006 as illustrated in Fig. 1 to form a plane at right angle to the lengthwise direction.

Fig. 1. Sharpening of pencil

(2) Write a line in the direction shown in Fig. 2 with the pencil so prepared maintained at about 45° to the test surface. The length of scratched line shall be at least 20mm and the number of lines shall be at least three.

Fig. 2. Method of writing lines

Remarks

The load at writing the line shall be about 10N in vertical direction.

9.4 Peeling test

9.4.1 Specimen Cut the coated steel pipe to a length of about 150mm and use it as the specimen.

9.4.2 Test method Immerse the specimen as a straight pipe into hot water maintained at a temperature $98 \pm 2^{\circ}$ for 2 h, take it out and allow it to stand in a room for 2 h, then make 10 pieces of 10mm square (2X5) by cutting the coating in alattice form. The cutting shall reach the surface of the original pipe. Apply the tape of JIS Z 1522 with a width of 24mm on the cut surface in close contact, hold an end of the tape and peel it off instantaneously.

9.5 Burning resistance test

9.5.1 Specimen Cut the coated steel pipe to a length of about 350mm and use it as the specimen.

9.5.2 Test method Make the specimen vertical and fix it at the top. Adjust a Bunsen burner as illustrated in Fig. 3 (a) so that the length of reducing flame is about 50mm and the length of oxidizing flame is about 100mm. Apply the trip of reducing flame to a position about 100mm in height from the bottom end by inclining the Bunsen burner so adjusted about 45° to the horizontal plane as illustrated in Fig 3 (b) for 1 min, and then remove the flame. However, the length of oxidizing falme may exceed about 100mm when the reducing flame is adjusted to 50mm

Fig. 3. Burning resistance test equipment

9.6 Pinhole test

9.6.1 Specimen Cut the coated steel pipe to a length of about 300mm, and use it as the specimen.

9.6.2 Test method Examine existence or non-existence of pinhole by applying a voltage of 5000V using oa pinhole detector.

9.7 Weather resistance test

9.7.1 Specimen Cut the coated steel pipe to a length of about 150mm, and use it as the specimen

9.7.2 Test method Carry out the exposure test on the specimen by means of a carbon arc lamp for 1000 h in accordance with the recommended practice for accelerated artificial exposure stated in JIS A 1415.

9.8 Test for damage due to shock

9.8.1 Specimen Cut the coated steel pipe to a suitable length and use it as the specimen.

9.8.2 Test method The test method shall be as stated below.

(1) Place the testing device illustrated in Fig. 4 on the shock absorber of chloroprene rubber with a thickness of 40mm before compression. The mass of the weight of this testing device shall be 1.0 kg.

(2) Mount the specimen on the supporting metal having V-shaped groove in this testing device, and put the back of all hard hand hacksaw blade of 0.64mm thick specified in JIS B 4751 in the almost middle of upper surface of the specimen so that they intersect each other at right angles.

Attach a continuity tester so that 100V is applied between the metal part of the specimen and the gane gacksaw blaed.

(3) For the test, let the weight fall freely from a height of 150 ± 1.5 mm above the upper face of hand hacksaw blade mounting metal. Carry out this operation on optional three positions on the circumference of one specimen.

Fig. 4. Testing device for damage due to shock

10. Inspection

10.1 Type inspection

The results of type inspection shall be as follows

- (1) The bending property shall comply with 4.1.
- (2) The resistance to corrosion shall comply with 4.2.
- (3) The performance of paint film shall comply with 4.3.
- (4) The performance of cover film shall comply with 4.4.
- (5) The dimension, mass and thread length shall comply with 6.
- (6) The appearance shall comply with 7.
- (7) The original pipe shall comply with 8.
- 10.2 Acceptance inspection
- The results of acceptance inspection shall be as follows
- (1) The dimension, mass and thread length shall comply with 6.
- (2) The appearance shall comply with 7.

11. Marking

The following items shall be indelibly marked on each coated steel pipe accepted by the inspection

- (1) Type designation
- (2) Manufacturer's name or abbreviation