duplicate B8/ 41316 TD GOST RL.No. 26

COPY

COPPER STRIPS

TECHNICAL REQUIREMENTS.

SUPERSEDES GOST 1173-70 except in the portion of radiator strips.

41316 TD A1.26

This standard pertains to cold-rolled copper strips of general purpose. This standard does not cover copper strips used for radiators.

This standard fully corresponds to the SEV recommendations as per standard RS-1582-68.

1. ASSORTMENT

1.1. Thickness of strips and tolerance on thickness, depending on width and manufacturing accuracy should meet the data given in table 1.

Table 1.

mm

Strip thickness	Tolerance on thickness when strip width is			
	from 10 to 300		above 300 upto 600	
	Normal manufacturing accuracy (N)	High manufacturing accuracy (P)	Normal manufacturing accuracy (N)	High manufacturing accuracy (P)
1	2	3	4	5
0.05 0.06 0.07 0.08 0.09	-0.01			
0.10 0.12 0.14	-0.02			–
0.15 0.16 0.18 0.20 0.22	-0.03	-0.02		

19/1/87

2/11/07

APPROVED		MATL/SPECN.		
ENGINEER / IP. INCHARGE		HEAT TREAT.		
CHECKED		FINISH		
DRAWN			ISS NO.	ISSD. BY	APPRD

Contd. table 1.

1	2	3	4	5
0.25 0.28 0.30 0.35	-0.04	-0.03	-0.05	
0.40 0.45	-0.05	-0.04	-0.06	
0.50	-0.06		-0.07	-0.06
0.55 0.60 0.65 0.70		-0.05	-0.08	-0.07
0.75 0.80 0.85	-0.07	-0.06	-0.09	-0.08
0.90 1.00 1.05 1.10	-0.08		-0.10 -0.11	-0.10
1.20 1.30 1.40 1.50	-0.09	-0.07	-0.12	-0.11
1.60 1.70	-0.10	-0.08	-0.14	-0.13
1.80 1.90 2.00	-0.11	-0.09	-0.15	-0.14

Notes :- 1. By mutual agreement between the parties it is allowed to supply strips of intermediate thicknesses. Tolerances on thickness of such strips are fixed as the corresponding tolerances for the next larger dimension.

2. Strips of thickness from 0.05 upto 0.09 mm inclusively are fabricated with width from 10 upto 175 mm.

3. Strips of thickness 0.50 mm and above are fabricated with width 20 mm and above.

4. Strips of thickness from 0.25 upto 0.45 mm, having width above 300 upto 600 mm are fabricated by mutual agreement between both parties.

5. Theoretical weight of $1m^2$ strip is given in reference appendix.

1.2. Width of copper strips and tolerances on width should correspond to the values given in table 2.

Table 2.

mm

Strip width	Tolerances on width when strip thickness is:	
	upto 1 incl.	above 1
From 10 upto 175	-0.5	-0.8
Above 175 upto 300	-0.8	-1.0
Above 300 upto 600	-1.2	-1.8

Notes :- 1. Recommended width of strips (in mm) : 10, 11 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, (27), 28, (29), 30, (31), 32, 34, (35), 36, 38, (39), 40, 42, 45, (47), 48, 50, 53, (55), 56, 60, (62), 63, (65), 67, (70), 71, 75, 80, (82), 85, 90, 95, 100, (102), 105, 110, (115), 120, 125, 130, 135, (137), 140, (144), 150, 160, (165), 170, (175), 180, (185), 190, 200, 210, 220, (230), 240, 250, 260, 280, (290), 298, 300, (315), 320, (323), 325, 340, (350), 360, 380, 400, 420, 450, 480, 500, 530,

2. Strips of multipled width and also strips, whose dimensions are given in brackets, are fabricated by mutual agreement between both the parties.

1.3. Length of strips depending on thickness should correspond to the values given in table 3.

Table 3.

Strip thickness, mm	Strip length, m, minimum
From 0.05 upto 0.5 inclusively	20
" 0.55 " 1.0 "	10
" 1.05 " 2.0 "	7

Note :- It is allowed to supply strips with other lengths by mutual agreement between both the parties.

METHOD OF CALLING

Method of calling the strip is done as per the following diagram:

Strip | X | XX | X | X — condition
manufacturing accuracy
section
manufacturing method

with the following abbreviations:

cold rolled - D;
rectangular section - PR;
normal accuracy - N;
high accuracy - P;
soft - M;

Cold-rolled strip, rectangular section, normal manufacturing accuracy, hard, having thickness 0.10 mm, width 35 mm, non-standard length, made from copper of grade M1:

Strip DPRNT 0.10X35 ND M1 GOST 1173-77 ,

- do - , high manufacturing accuracy, soft, having thickness 0.10 mm, width 35 mm, non-standard length, made from copper of grade M2:

Strip DPRPM 0.10X35 ND M2 GOST 1173-77.

Note :- In case if any property is absent, set the symbol "X" in its place.

2. TECHNICAL REQUIREMENTS

2.1. Strips are fabricated from copper of grades M1, M1r, M2 M2r, M3 and M3r as per GOST 859-66.

2.2. Strips are fabricated in soft (annealed) and hard (non-annealed) state. Strips of thickness 0.12 mm and below are fabricated only in hard (non-annealed) state.

2.3. The strip surface should be clean and smooth. Defects, which when cleaned do not lead the strips beyond the tolerances on thickness, are allowed on the strip surface.

Presence of temper colour and partial darkening on strip surface are not causesfor rejection.

2.4. Strips should be cut uniformly and there should not be any burrs, corrugations and waviness. Crumpled or torn edge is not allowed.

Crescent-shaped portion of strip is allowed upto 3 mm maximum over 1 metre length of strip.

2.5. Mechanical properties of strips should correspond to the requirements given in table 4.

Table 4.

Material condition	Tensile strength, σ_u Kgf/mm²	Tensile strength, σ_u MPa	Percentage elongation, δ
	Minimum		
Soft	20	196.0	30
Hard	30	294.0	3

2.6. Depth of cupping of soft strip having thickness from 0.14 upto 1.50 mm incl. should correspond to the values, given in table 5.

Table 5

mm

Radius of punch.	Depth of cupping when strip thickness is, minimum				
	0.14-0.16	0.18-0.28	0.30-0.55	0.60-1.10	1.20-1.50
10	7.5	8.0	8.5	9.5	10.0
4	3.4	3.8	4.0	-	-
1.5	1.5	1.8	2.1	-	-

Note :- Norms of depth of cupping in case of test with punch of radius 4 mm for strips of thickness 0.60-1.10 mm and width from 20 upto 90 mm are set by mutual agreement between both the parties.

3. ACCEPTANCE RULES

3.1. Strips should be offered for acceptance in batches. Weight of a batch is not restricted. A batch should consist of

accuracy and should be furnished with a single quality certificate.

3.2. Each roll is subjected to checking of surface quality, dimensions and crescent-shaped portion. The roll is rejected if unsatisfactory test results are obtained even for one of the properties.

3.3. Three rolls from a batch from each complete or incomplete 1000 kg. are taken for tensile test.

Tensile strength is determined for strips having thickness 0.3 mm and above, relative elongation - for strips having thickness 0.5 mm and above.

3.4. Two rolls from a batch from each complete or incomplete 1000 kg. are taken for cupping test .

3.5. Chemical composition of strips is determined on 2 rolls, taken from a batch.

At the manufacturing plant, selection of samples for chemical analysis may be done from molten metal.

3.6. If unsatisfactory test results of strip are obtained even for one of the properties, repeated tests for the same property may be done on double the quantity of specimens taken from the same batch.

Results of repeated tests pertain to the whole batch.

4. TEST METHODS

4.1. Examination of strip surface is done without using magnifying devices.

4.2. Strip thickness is measured with micrometer as per GOST 6507-60 or beam micrometer as per GOST 4381-64 at 3 places from both ends of the strip and at the centre at a distance of

the edge for strips of width above 20 mm.

For strips having width 20 mm and below, measurement is done at the centre.

4.3. Width is measured at 3 places with vernier calipers as per GOST 166-73 or templates, ensuring the required measuring accuracy.

4.4. Crescent-shape portion of strip is measured at one place at the end of the roll. For measuring the crescent-shape portion the strip is placed on a flat uniform surface, then a checking scale of length 1 m as per GOST 8026-75 is laid such that the scale corners touch the strip edges. Maximum distance from edge of scale to edge of strip (crescent-shape portion) is measured with feeler gauge (GOST 882-75) or with a metal scale (GOST 427-75).

Crescent-shape portion may be measured by any other method which ensures the required measuring accuracy.

4.5. One specimen is cut from each selected roll along the direction of rolling for tensile test.

Tensile test of strips having thickness less than 0.5 mm is done on short specimens of types I and II of width 12.5 mm as per GOST 11701-66. Tensile test of strips of thickness 0.5 mm and above is done as per GOST 1497-73.

4.6. One specimen is cut from each selected roll for cupping test.

Strips of width upto 20 mm having thickness upto 0.55 mm are tested with a punch of radius 1.5 mm; strips having width above 20 upto 90 mm and thickness upto 1.10 mm - with a punch of radius 4.0 mm; strips having width above 90 mm and thickness from 0.14 upto 1.5 mm - with a punch of radius 10 mm.

4.7. One specimen is cut from each selected roll for

Analysis of chemical composition of strips should be done as per GOST 13938.0-68 - GOST 13938.12-68, GOST 13938.12-68, GOST 9717-75. It is allowed to carry out chemical analysis of the strips by other quicker methods which maintain the same accuracy as indicated in GOST 13938.0-68 - GOST 13938.12-68; GOST 13938.13-69 & GOST 9717-75.

5. PACKING, MARKING, TRANSPORTATION & STORAGE

5.1. Strips should be wound into rolls. In one roll there should not be more than 3 pieces of strips.

5.2. Rolls of strips of thickness upto 0.5 mm incl. should be wrapped in wrapping paper (GOST 8273-75) and packed in wooden boxes interlaid with wooden chippings, paper, corrugated cardboard (GOST 7376-55) or with any other material which protects the strips from damage. Strips of thickness upto 0.8 mm and width above 300 mm may be wound on wooden spools.

Rolls of strips of thickness above 0.5 mm should be bound with a strap or wire and wrapped in packing paper (GOST 10452-72) or burlap (GOST 19298-73) or any other similar material which does not lower the quality of packing.

Other types of packing as per standard tech. documents, approved in the established order, are allowed.

It is allowed to transport the strips, without packing in paper, boxes and burlap, in railway tank cars, open road transport and wagons to a single address without unloading on the way, in a special reversible tare. In this case a packing made from paper or corrugated cardboard should be laid between rows of rolls.

5.3. Weight of a packing item should not exceed 2000 kg.

5.4. A tag, indicating the following should be fastened to

a) name or trade mark of the manufacturing plant;

b) method of calling the strip;

c) batch No.

Besides this, there should be the stamp of quality control department at the end of the roll or on the tag.

5.5. Strips are transported in covered transportation means. The strips should be laid and fastened such that they do not move inside the container, wagon and automobile during the journey.

5.6. A packing list, in which all the data listed in point 5.4 and also net weight of a batch, should be placed inside each container or box.

5.7. Marking of boxes is done as per GOST 14192-71 with th following additions:

a) batch no;

b) net weight of a batch.

5.8. The following details should be present in the quality certificate to be sent to customer:

a) name or trade mark of the manufacturing plant;

b) metal grade;

c) strip dimensions;

d) manufacturing accuracy;

e) metal condition;

f) test results (as per customer's requirements);

g) batch no. and weight;

h) quantity of packing items (in case of supply in boxes);

i) this standard no.

5.9. During transportation and storage the strips should be protected from infiltration of moisture, mechanical damages

APPENDIX

(Reference)

Theoretical weight of 1 m^2 copper strip

Strip thickness in mm.	Weight of 1 m^2 strip, in kg.	Strip thickness in mm.	Weight of 1 m^2 strip, in kg
0.05	0.44	0.55	4.90
0.06	0.53	0.60	5.34
0.07	0.62	0.65	5.79
0.08	0.71	0.70	6.23
0.09	0.80	0.75	6.68
0.10	0.89	0.80	7.12
0.12	1.07	0.85	7.57
0.14	1.25	0.90	8.01
0.15	1.33	1.00	8.90
0.16	1.42	1.05	9.35
0.18	1.60	1.10	9.79
0.20	1.78	1.20	10.68
0.22	1.96	1.30	11.57
0.25	2.23	1.40	12.46
0.28	2.50	1.50	13.35
0.30	2.67	1.60	14.24
0.35	3.12	1.70	15.13
0.40	3.56	1.80	16.02
0.45	4.01	1.90	16.91
0.50	4.45	2.00	17.80

Note :- Theoretical weight of a strip is calculated at nominal thickness and density of copper (equal to 8.9 gm/cm^3).

Other standards referred to in this standard:

GOST 859-66
" 4381-68
" 8026-75
" 427-75
" 1497-73
GOST 6507-60
" 166-73
" 882-75
" 11701-66
" 9717-75
GOST 13938.0-68 upto GOST 13938.12-68
GOST 13938.13-69
" 7376-55
" 19298-73.
GOST 8273-75
" 10452-72
" 14192-71