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DRAFT EAST AFRICAN STANDARD

Steel wire and Steel wire products for fencing — Specification

EAST AFRICAN COMMUNITY

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Foreword

Development of the East African Standards has been necessitated by the need for harmonizing requirements governing quality of products and services in the East African Community. It is envisaged that through harmonized standardization, trade barriers that are encountered when goods and services are exchanged within the Community will be removed.

In order to achieve this objective, the Community established an East African Standards Committee mandated to develop and issue East African Standards.

The Committee is composed of representatives of the National Standards Bodies in Partner States, together with the representatives from the private sectors and consumer organizations. Draft East African Standards are circulated to stakeholders through the National Standards Bodies in the Partner States. The comments received are discussed and incorporated before finalization of standards, in accordance with the procedures of the Community.

East African Standards are subject to review, to keep pace with technological advances. Users of the East African Standards are therefore expected to ensure that they always have the latest versions of the standards they are implementing.

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Steel wire and steel wire products for fencing — Specification

1 Scope

This draft East African Standard specifies requirements, sampling and test methods for steel wires and wire products used for fencing purposes.

2 Normative references

ISO 16120, *Non-alloy steel wire rod for conversion to wire -- Part 4: Specific requirements for wire rod for special applications*

ISO 7900, *Steel wire and wire products for fences — Zinc- and zinc-alloy-coated steel barbed wire*

ISO 6892-1, *Metallic materials — Tensile testing — Part 1: Method of test at room temperature*

ISO 6892-2, *Metallic materials — Tensile testing — Part 2: Method of test at elevated temperature*

ISO 8458-1, *Steel wire for mechanical springs — Part 1: General requirements*

3 Terms and definitions

3.1

barbed wire

steel fencing wire constructed with sharp edges or points arranged at intervals along the strands.

3.2

galvanized wire

wire to which a coating of zinc has been applied to the surface as a protection against corrosion

3.3

coating

application of zinc to the surface of wire to prevent environmental deterioration

3.4

fencing

exercising barrier, railing, or other upright structure of wire enclosing an area of ground to prevent or control access or escape

3.5

line wire

wire of specified diameter of which the barbed wire is made

3.6

point wire

wire of specified diameter of which the barbs are made

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3.7

wire netting

application of woven wire so as to produce hexagonal openings of uniform size

3.8

chain link fencing

fence of heavy steel wire woven to form a diamond

3.9

mesh

net made from wire, thread, or plastic

4.0

twist

Combined wire bent in opposite directions so that they are turned away from each other used for fencing

4 General requirements

4.1 Wire diameter, length and mass per meter run

Wires shall be designated in terms of nominal diameter sizes. The diameter shall refer to finished wire. Nominal diameters, nominal lengths per 1 kg and mass per metre run shall be as given in Table 1.

Table 1 — Nominal diameter, nominal length per 1 kg and mass per metre run

Nominal diameter (mm) ± 2.5 %	Length for 1 kg (m)			Mass per metre run (g/m)		
	Minimum -5%	Nominal	Maximum +5%	Minimum -5%	Nominal	Maximum +5%
0.60	427.85	450.4	472.89	2.11	2.2	2.33
0.75	273.83	288.2	302.65	3.30	3.5	3.64
0.80	240.67	253.3	266.00	3.75	3.9	4.14
0.90	190.16	200.2	210.17	4.75	5.0	5.25
1.00	154.03	162.1	170.24	5.86	6.2	6.48
1.25	98.58	103.8	108.95	9.16	9.6	10.12
1.40	78.59	82.7	86.86	11.48	12.1	12.69
1.60	60.17	63.3	66.50	15.00	15.8	16.58
1.80	47.54	50.0	52.54	18.98	20.0	20.98
2.00	38.51	40.5	42.56	23.44	24.7	25.90
2.25	30.43	32.0	33.63	29.66	31.2	32.79
2.50	24.64	25.9	27.24	36.62	38.5	40.48
2.65	21.93	23.1	24.24	41.15	43.3	45.48
3.00	17.11	18.0	18.92	52.73	55.5	58.29
3.15	15.52	16.3	17.16	58.14	61.2	64.26
3.55	12.22	12.9	13.51	73.84	77.7	81.62
3.75	10.95	11.5	12.11	82.40	86.7	91.07
4.00	9.63	10.1	10.64	93.75	98.7	103.62
4.50	7.61	8.0	8.41	118.65	124.9	131.14
5.00	6.16	6.5	6.81	146.48	154.2	161.90

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4.2 Wire physical properties

4.2.1 Tensile strength

Wire shall be drawn from steel according to the tensile strength required.

4.2.1.1 Drawn mild steel wire

a) For wires up to and including 2.0 mm, the tensile strength shall be not less than 550 MPa.

b) For wires above 2.0 mm up to and including 3.55 mm, the minimum tensile strength shall be 450 MPa.

c) For wires above 3.55 mm, tensile strength shall be not less than 400 MPa.

4.2.1.2 Low tensile wire

All Low tensile wire shall have a minimum tensile strength of 350 MPa.

4.2.1.3 High tensile wire

a) All wires of all sizes shall have a tensile strength of 900 MPa - 1 300 MPa.

b) Wires of other tensile strengths may be made by agreement between the purchaser and the manufacturer.

4.2.2 Nominal diameters and tolerances

Nominal diameters shall be as given in Table 1. All wires shall be subjected to a tolerance of 2.5 % nominal wire diameter.

4.2.3 Wrapping test for mild and annealed steel wire

The wire shall not fracture or show any sign of failure after being closely wrapped round a wire rod of the same diameter for a minimum of six turns.

Flaking off of the zinc coating in this test shall not be considered as a defect.

4.3 Galvanizing

Galvanized wire shall meet the following requirements:

4.3.1 The method of coating shall be hot-dip galvanizing.

4.3.2 Diameter of wire

For the purpose of this standard, only wire of circular section of diameters 0.6 mm to 5 mm is included. Coating shall be continuous and free from lumps, black spots, and inclusions.

4.3.3 Purity of coating

Metallic zinc used in the preparation of the coating bath shall have purity of not less than 'Zn grade 98'.

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4.3.4 Weight of coating

When determined in accordance with Annex A, the weight of coating shall be not less than that given in Table 2 for the appropriate wire; if the test piece has been taken from a fabricated product then the minimum weight of coating shall be reduced by 5 %.

4.3.5 Uniformity of coating

When tested in standard copper sulfate solution by the procedure given in Clause A.3 the wire shall not show any bright adherent copper deposit after the specified number of dips shown in Table 2.

If the test piece, has been taken from a fabricated product then the specified dips shall be reduced by one half-minute dip.

Table 2 — Minimum weight of coating and number of dips

Nominal diameter of coated wire	Heavy			Medium			Commercial	
	Weight of Coating	Number of dips		Weight of Coating	Number of dips		Weight of Coating	Number of dips
mm	g/m²	1 min	1/2 min	g/m²	1 min	1/2 min	g/m²	1 min
0.6	105	1	-	90	-	-	14	no test
0.75	120	1	-	100	1	-	16	no test
0.8	136	1	1	120	1	1	18	no test
0.9	150	1	1	140	1	1	25	no test
1.0	170	2	-	150	1	1	27	no test
1.25	200	2	-	170	2	-	34	1
1.4	215	2	-	180	2	-	40	1
1.6	230	2	-	200	2	-	50	1
1.8	235	2	1	210	2	-	56	1
2.0	240	3	-	215	2	-	69	1
2.5	260	3	-	230	2	1	72	1
2.65	270	3	1	235	2	1	78	1
3.0	275	3	1	240	3	-	80	1
3.15	280	3	1	250	3	-	85	1
3.55	290	3	1	260	3	-	90	1
4.0	300	3	1	270	3	-	100	1
5.0	300	3	1	270	3	-	100	1
0.6	105	1	-	90	-	-	14	no test
0.75	120	1	-	100	1	-	16	no test
0.8	136	1	1	120	1	1	18	no test

4.3.6 Adhesion of coating

4.3.6.1 For wires of 5 mm or less the adhesion of the zinc shall be tested by wrapping the wire, at least six close turns, round a cylindrical mandrel. Large wires shall be bent through an angle of at least 90° round the mandrel. The ratio of mandrel diameter to wire diameter (d) shall be as follows:

a) For wires up to and including 4 mm, the mandrel diameter shall be four times the nominal diameter of wire.

b) For wires of over 4 mm diameter, the mandrel shall be five times the nominal diameter of the wire.

4.3.6.2 The zinc shall remain firmly adherent to the steel and shall not crack or flake to such an extent that any flake of zinc can be removed by bare hand.

Scratching the surface with fingernails or other objects is not included.

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5 Specific requirements for Hot-dip galvanized barbed wire

5.1 Line and point wire

The line and point wire, which the barbed wire is made from, shall comply with the requirements of Clause 2 of this standard.

5.2 Line and point wire preferred diameters

The preferred line wire and point wire diameters shall be as given in Table 3.

Table 3 — Preferred nominal wire diameter

Wire type	Steel type	Nominal wire diameter (mm)
Line	High tensile	1.4 – 2.0
	Low Tensile	1.6, 2.0, 2.5
Point	High tensile	1.4 – 1.8
	Low Tensile	1.6, 2.0, 2.5

5.3 Finish

The wire shall be galvanized in accordance with the requirements of 4.3.

5.4 Barbed wire formation

5.4.1 Continuous twist

The barbs shall be wrapped around two line wires once and around a single strand once, making, in all, two turns round the line wires.

The barbs shall be wrapped around a line wire by a method, which prevents slipping to expose the four barbs approximately 90° apart in a plane at right angles to the line wire. The points of the barb shall have a length of 12 ± 2 mm and shall be sharp and cut at an angle not greater than 35° to the axis of the barb.

5.4.2 Reverse twist

The two line wires shall be twisted partially clockwise and partially anticlockwise. The barbs shall be placed at the points where the direction of twist changes from clockwise to anticlockwise. At these points the barbs shall be wrapped around the two line wires, two rounds each of barbed wire. The barbs shall have four points, approximately 90° apart in the plane at right angles to the line wire.

5.4.3 Other twists

The barbed wires in 3.4.1 and 3.4.2 shall normally be formed twisted together with an appropriate lay of 50 mm maximum with barb spacing of 75 mm ± 5 mm, 100 mm ± 10 mm or 150 mm ± 10 mm between centres for both low and high tensile.

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5.4.4 Joints

Packed rolls shall not have more than one twist joint in case the wire breaks during formation.

5.4.5 Packed rolls weight

Barbed wires shall be packed in rolls of nominal weights of 20 kg or 25 kg. Tolerance for weight shall be -1% to +2%.

6 Requirements for galvanized wire netting

6.1 Preferred wire diameters, mesh sizes and width of netting

Wires used for wire netting shall meet the requirements of Clause 2 of this standard.

6.1.1 Preferred nominal wire diameters shall be as given in Table 1,

6.1.2 The netting shall be manufactured in mesh and the width shall be as indicated in Table 4. For mesh sizes see Figure 1.

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Table 4 — Mesh sizes and widths of wire hexagonal netting

Mesh size and mesh details	Width of roll, (mm)						
	300	600	900	1200	1500	1 800	2100
10 mm			X	X			
12 mm	X	X	X	X	X	X	X
20 mm	X	X	X	X	X	X	X
25 mm	X	X	X	X	X	X	X
32 mm	X	X	X	X	X	X	X
40 mm	X	X	X	X	X	X	X
50 mm	X	X	X	X	X	X	X
75 mm 2 ply selvedge	X	X	X	X	X	X	X
100 mm 2 ply selvedge	X	X	X	X	X	X	X
100 mm 3 ply selvedge			X	X			
100 mm 1 centre strand 3 ply selvedge			X	X	X		

X denotes a mesh size and roll width combination which is normally available.

Note: Other sizes may be accepted for special orders only as agreed between the purchaser and manufacturer.

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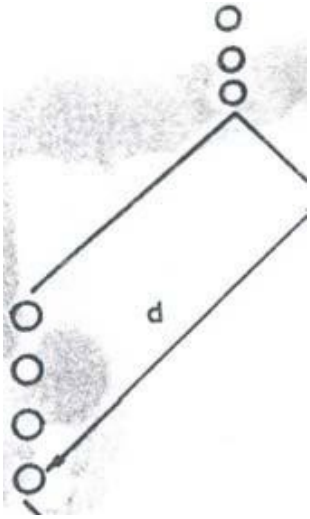

Figure 1 — Mesh size

6.2 Tolerances

Mesh size and width shall be subjected to the following tolerances:

(i) mesh size ± 20 %;

(ii) width ± 5 %.

6.3 Nominal lengths

Wire netting shall be supplied in roll lengths of 18 m, and 30 m subject to a tolerance of - 1 % + unlimited.

7 Specification for chain link fencing

7.1 Type of wire

The wire used for chain link fencing shall meet the requirements of Clause 2 of this standard.

Wire used for chain link fencing may be galvanized, and/or plastics coated to have two grades as given in 5.3.1.

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7.2 Preferred wire diameters, mesh sizes and width

5.2.1 Diameter

Galvanized wire shall be of any nominal diameter specified in Table 5 .

5.2.2 Plastics thickness

Plastics radial thickness shall be minimum 10% of the core diameter.

5.2.3 Chain link dimensions

Mesh sizes and mesh diameters and widths shall be as specified in Table 5.

TABLE 5 — Mesh sizes and wire diameters and widths of chain link fencing

Mesh size, ±5% mm	Nominal wire diameter, mm	Width of chain link, +2%, -0% (mm)								
		900	1 200	1 500	1 800	2100	2400	2700	3 000	3300
25	2.0	X	X	X	X	X	X			
40	2.0	X	X	X	X	X	X	X	X	X
	2.5	X	X	X	X	X	X	X	X	X
	3.0	X	X	X	X	X	X	X	X	X
50	2.0	X	X	X	X	X				
	2.5	X	X	X	X	X	X	X		
	3.0	X	X	X	X	X	X	X	X	X
	3.55	X	X	X	X	X	X	X	X	
	5.0			X	X	X	X	X	X	
63	2.0	X	X	X	X	X				
	2.5	X	X	X	X	X	X	X	X	
	3.0	X	X	X	X	X	X	X		
	3.55	X	X	X	X	X	X	X	X	X
	5.0			X	X	X	X	X	X	
75	2.5	X	X	X	X	X	X	X	X	
	3.0	X	X	X	X	X	X	X		

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X denotes a mesh size and roll width combination which is normally available.

7.3 Requirements of plastics coated wire

7.3.1 Plastics coated wire shall have hot-dip galvanized core wire of annealed condition.

a)

5.3.2 The plastics covering shall be applied to the wire using a compound manufactured from a composition based on vinyl chloride homopolymer of the suspension or granular type chloride, and no copolymer or emulsion polymer shall be included.

5.3.3 The vinyl chloride homopolymer shall be mixed with appropriate primary plasticizers, heat and light stabilizers, lubricators and pigments. No extender or filler other than specified material shall be added to the compound.

5.3.4 Not more than 5 % of clean, once reworked material, which shall be of the same composition, shall be added to the virgin material from which the compound is to be manufactured.

7.3.5 The colourfastness of the compound to daylight shall be not less rating 6, this shall be verified by preparing a sheet formed from compound in accordance with BS 2782, *Method of test for plastics*.

7.3.6 Physical requirements shall be as given in Table 6.

Table 6 — Physical characteristics of plastics coating

Physical	Value
Tensile strength, (MPa)	21 Mpa, min.
Elongation at break	150 %, min.
Softness	5 - 15 softness number
Cold bend temperature	-10°C, max.
Cold flex temperature before ageing	+15 °C, max.
Cold flex temperature after ageing	+20 °C, max.
Water absorption	100 mg, max.

The above requirements shall be in accordance with BS 2782, *Method of test for plastics.*

7.3.7 For the finish of plastics coated wire, the extruded plastics covering shall be smooth, and substantially free from cracks, blisters and non-uniformity. The variation in radial thickness of the coating shall be within ± 25 % nominal radial thickness.

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7.4 Tolerances

7.4.1 Plastics coated wire shall be subjected to a tolerance of 10 % of the nominal wire diameter.

7.4.2 Mesh sizes shall be subjected to 10 % tolerances measured at right angles between wires.

7.5 Nominal length

Nominal length shall be as specified in Table 1.

8.0 Labelling

8.1Barbed wire

Every roll of barbed wire shall be labelled legibly with the following:

a) Name of the manufacturer/trademark,
b) Length of barbed wire,
c) Nominal wire diameters of line wire and point wire in mm,
d) Batch number,
e) mass of the roll in kg.
f) Country of origin

8.2 Galvanized wire netting and Chain link

Every roll of galvanized wire netting shall be labelled legibly with the following:

a) Name of the manufacturer/trademark,
b) Mesh size,
c) Nominal wire diameters,
d) Batch number
e) Length and width in m..
f) Country of origin

9.0 Sampling

Unless otherwise agreed upon between the manufacturer and the purchaser, the sampling plan shall be according to Table 7.

Table 7: Scale of sampling

S/No.	Number of Reels in the Lot	Number of Reels to be Selected
01	Up to 25	3
02	26 to 50	4
03	51 to 150	5
04	151 to 300	7
05	301 and above	10

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Bibliography

IS 278:2009, Galvanized steel barbed wire for fencing — Specification

BS 2782, *Method of test for plastics*

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Annex A
(normative)

Test methods for weight and uniformity of zinc coating

A.1 Determination of weight of coating

The weight of coating may be obtained by either a gravimetric method or a volumetric method. The latter has an acceptable degree of accuracy and has the advantage of rapidity. It is therefore the preferred method for routine testing of all the sizes of wire, which can be conveniently accommodated in the measuring apparatus. In case of a dispute, the gravimetric method shall be accepted as the referee method.

A.2 Gravimetric method

A.2.1 Reagents

The following reagent shall be used:

Antimony chloride solution — Dissolve 20 g of antimony trioxide or 32 g antimony trichloride in 100 ml hydrochloric acid, of specific gravity not less than 1.14 stripping solution. Add 5 ml of the antimony chloride solution to every 100 ml of hydrochloric acid, of specific gravity not less than 1.14.

A.2.2 Test piece

For wires of 3 mm diameter and larger, the length of the test piece shall be not less than 200 mm. As a guide to the length for smaller sizes of wire, this should be such that the weight in grams is numerically not less than four times the diameter in millimetres.

After cleaning the test trichloroethylene, the weighed to the nearest piece in a suitable organic solvent, for example, wire shall be wiped dry with a clean cloth and 0.01 g.

A.2.3 Stripping the zinc

The galvanized coating shall be stripped from the steel wire by complete immersion of the test piece in any convenient volume of the stripping solution. The same solution may be repeatedly used, without further additions of antimony chloride solution, until the time of stripping becomes inconveniently long. The temperature of the stripping solution should not be allowed to exceed 38 °C and the number of test pieces immersed at anyone time shall not exceed 3 per 100 mL of solution.

As soon as the violent chemical action has ceased the wire shall be removed from the acid, washed thoroughly in running water and wiped dry. The diameter of the wire shall then be determined to the nearest 0.02 mm by taking the average of two measurements at right angles to each other. Each piece of stripped wire shall then be weighed to the nearest 0.01 g.

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A.2.4 Calculation

The weight of zinc per unit area of the steel surface shall be derived from the weight of zinc on the test length and the surface area of the steel. By taking into account the density of the steel as 7.85 kg/dm^3, the formula can be simplified to this form.

Weight of coating per unit area of steel surface = Kdr

where

$K = \frac{7.85 \times 1000}{4} = 1960$

d is the diameter of stripped wire; and

$r = \frac{\text{original weight} - \text{stripped weight in grams}}{\text{stripped weight}}$

If the stripped wire diameter d is measured in millimetres then weight of coating = 1 960 dr g/m^2.

A.3 Gas volumetric method

A.3.1 Explanation

The volumetric method of determining the weight of coating depends on the fact that a metal dissolved in acid always releases a quantity of hydrogen proportional to the amount of metal dissolved, that is, the chemical equivalent of the metal in question.

One gram of zinc releases 0.343 litres of hydrogen at a temperature of 0 °C and a pressure of 1 mbar. With very large wires, problems of test piece preparation and damage to the glass burette may be introduced. This method of determination is therefore usually limited to wires of maximum diameter 5 mm.

A.3.2 Reagents

The same reagents as specified for the gravimetric method shall be used (see A.2.1).

A.3.3 Apparatus

The apparatus consists of a 100-ml glass burette fitted with a stopcock at the top and bottom and connected at the bottom with a rubber tube to a reservoir. The apparatus is shown in Figure A.1 set up for the commencement of the test.

The 100-ml burette shall be graduated to at least 0.5 mL subdivisions.

Where small sizes of wire, less than 1.5 mm diameter, are regularly tested, it may be found useful to have a 50-ml burette of about the same length and graduated to at least 0.2 mL subdivisions.

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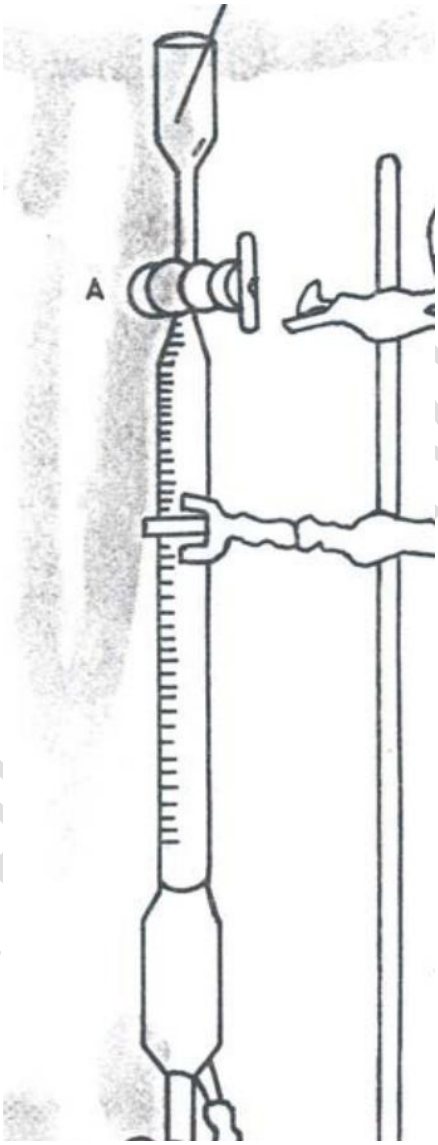

Figure A.1 — Apparatus ready for test

A.3.4 Test pieces

From a straightened and undamaged length of wire, test pieces of the required length shall be accurately cut (error not more than 1 %). The most suitable length of a test piece depends upon the size of the burette, diameter of wire and expected weight of coating. The lengths indicated in Table A.1 shall usually be found convenient.

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Table A.1 — Length of test piece

Galvanized wire diameter		Length of test piece	
Over, mm	Up to and Including, mm	For a 100-mL burette, mm	For a 50-mL burette, mm
0,45	0,85	-	200
0,85	1,06	200	150
1,06	1,8	100	75
1,8	3,6	75	-
3,6	5,0	50	-

A.3.5 Procedure

The acid reagent shall be poured into the reservoir *C* so that it shall completely fill the burette leaving a small portion in the reservoir when in an elevated position.

To carry out a test, the height of the reservoir *C* shall be adjusted so that the acid reagent just fills the burette up to the stopcock *A* with the bottom stopcork *B* closed. The test piece cut to the specified length shall be dropped into the burette and the stopcork *A* immediately closed. The zinc coating shall dissolve rapidly and liberate hydrogen, and the test shall be continued until evolution of hydrogen, but for a few fine bubbles, has ceased.

The reservoir shall then be lifted from its supporting ring alongside the burette until the levels of the acid reagents burette and the reservoir are equal, as shown in Figure A.2, volume of hydrogen is read off on the burette scale.

When the test is concluded, stopcock *A* shall be opened and all acid reagent drawn from the burette by lowering the reservoir to a position below stopcock *B.*

Stopcock *B* shall then be opened to eject the test piece and closed again after which the procedure given above shall be repeated for the succeeding test.

When long test pieces are necessary, rapid entry into the burette may to drop two short pieces and it may be more convenient simultaneously through the stopcork.

The stripped wire shall be washed dry and diameter measured.

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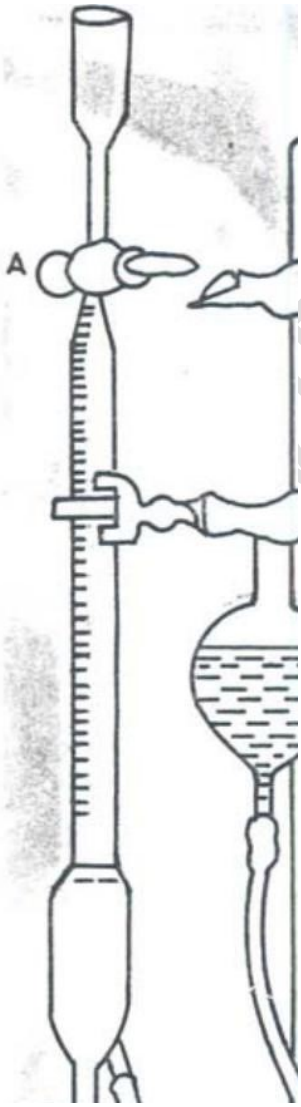

Figure A.2 — Apparatus after taking reading

A.3.6 Calculation

The weight of zinc coating shall be calculated from the formula:

Weight of coating/unit area of steel surface = $_{dl}{}^{V} \times f$

where

—

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v is the volume of hydrogen evolved in millilitres (mL);

d is the stripped wire diameter; and

l is the length of test piece.

Where length and diameter are in millimetres, *f* = 872 to give a weight of coat in grams/metre.

A.3.7 Correction for temperature and barometric pressure

The factor *(f)* has been calculated for a temperature of 18 °C and a barometric pressure of 1 bar. If the atmospheric pressure is outside the range of 987 mbar - 1 040 mbar or if the temperature is outside the range of 16 °C – 20 °C, apply the appropriate correction factor from Table A.2. If the combination of pressure and temperature results in a correction factor within ± 0.02 of unit (see outlined zone in Table A.2), then the factor need not be applied.

Where the test result is within 5 g/m^2 of the specified value, it shall be desirable to check the atmospheric pressure and temperature in case a negative correction shall be necessary.

Where climate or altitudes affect the test conditions, a permanent correction should be applied to the factor. At high altitudes it shall be convenient to have a burette of greater capacity than 50 ml or 100 ml. Table A.2 gives a list of corrections for temperature and pressure.

A.4 Test for uniformity of coating —'Preece' Dip method

A.4.1 Reagents

The following reagents shall be used:

Copper sulfate solution, made by dissolving approximately 36 g of crystalline copper sulfate ($CuSO_4.5H_2O$) in each 100 ml of distilled water. The water may be heated to aid solution of the crystals, but if heated the solution shall be allowed to cool before neutralizing.

For neutralization, the solution shall be shaken with an excess of cupric hydroxide (about 1 g/litre of solution) and allowed to stand, preferably for at least 24 h, before filtering or decanting the solution from the sediment.

About 0.7 g/L of cupric oxide may be used in place of the hydroxide, provided the solution shall be allowed to stand for, least 48 h before filtering from the sediment.

The specific gravity of the test solution shall be 1.186 at 18 °C. Adjustment may be made by adding distilled water or solution of higher specific gravity, as appropriate.

The solution shall be discarded and replaced with fresh solution after six samples have been tested.

A.4.2 Apparatus

The following apparatus is required:

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A glass container of internal diameter not less than 50 mm for wires of 2.8 mm diameter and smaller, or 75 mm for larger wires, shall be filled with the copper sulfate solution to a depth of at least 100 mm.

A.4.3 Test pieces

The test piece shall be not less than 150 mm in length and shall be undamaged as far as possible. The test piece may be hand straightened and shall be cleaned with a volatile organic solvent and then wiped dry with a clean soft cloth.

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Table A.2: Temperature and pressure corrections

Temperature °C	Atmospheric pressure, mbar														
	693	720	747	773	800	827	853	880	907	933	960	977	1 014	1 040	1 067
10	0.703	0.730	0.758	0.784	0.811	0.839	0.866	0.992	0.920	0.947	0.974	1.001	0.028	1,055	1.082
12	0.698	0.725	0.752	0.779	0.806	0.833	0.860	0.886	0.914	0.940	0.967	0.994	1.020	1.048	1.075
14	0.694	0.720	0.747	0.774	0.800	0.827	0.854	0.880	0.908	0.934	0.960	0.988	1.014	1.040	1.068
16	0.689	0.715	0.742	0.768	0.795	0.822	0.848	0.874	0.901	0.927	0.954	0.981	1.007	1.033	1.060
18	0.684	0.710	0.737	0.763	0.789	0.816	0.842	0.868	0.895	0.921	0.947	0.974	1.000	1.026	1.053
20	0.679	0.705	0.732	0.758	0.783	0.810	0.836	0.862	0.889	0.915	0.940	0.967	0.993	0.019	1.046
22	0.674	0.700	0.727	0.752	0.778	0.805	0.830	0.856	0.882	0.908	0.934	0.960	0.986	1.012	1.038
24	0.670	0.696	0.722	0.748	0.773	0.800	0.825	0.851	0.877	0.903	0.928	0.955	0.980	1.005	1.032
26	0.666	0.691	0.717	0.742	0.769	0.794	0.819	0.845	0.871	0.896	0.921	0.947	0.973	0.998	1.025
28	0.661	0.687	0.713	0.738	0.763	0.789	0.814	0.839	0.865	0.891	0.916	0.942	0.967	0.992	1.018
30	0.657	0.682	0.708	0.732	0.757	0.783	0.808	0.833	0.859	0.884	0.909	0.935	0.960	0.985	1.011
	520	540	560	580	600	620	640	660	680	700	720	740	760	780	800

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Height of Barometer, mm Hg.

A.4.4 Temperature

At the commencement, and during the progress of the test, the temperature of the test pieces and of the solution shall not vary outside the limits of 18 °C ± 2 °C.

A.4.5 Procedure

It is preferable that not more than three test pieces be immersed in the solution at one time. The test pieces shall not be disturbed, and the solution shall not be agitated.

The test piece shall be subjected to successive dips of exactly 1 min. After each dip the sample shall be removed and immediately rinsed in clean running water and wiped dry with a clean soft cloth. If running water is not available, the rinsing water shall be changed frequently so that there is no obvious contamination with copper sulfate solution.

Half-minute dips, where specified, shall be given after the completion of all the 1 min dips.

A.4.6 Examination

After the specified number of dips, the final rinsing and wiping dry, the test piece shall not show any adherent bright deposit of metallic copper on the steel. Any deposit of metallic copper within 25 mm of the cut end shall be disregarded.

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Annex B

(Informative)

Formula for Length per 1kg (m) and mass per metre run (g/m)

1. Length per 1kg (m) = 1 ÷ (diameter*diameter x π/4 x density of steel x 10^{-6})

Where:

Diameter in mm

Density of steel 7850kg/m^3

2. Mass per metre run (g/m) = 1000 ÷ Length per 1kg (m)

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