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DRAFT TANZANIA STANDARD

Cold drawn mild steel wire for general engineering purposes — Specification

TANZANIA BUREAU OF STANDARDS

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Tanzania Bureau of Standards
P O Box 9524
Dar es Salaam
Tel +255 (22) 2450206/2450949/2450298
Fax: +255 22 2450298
E-mail: info@tbs.go.tz

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0 Foreword

In formulating this standard, due consideration was given to international co-ordination among the practices prevailing in different countries in addition to relating it to the practices in the field in this country.

This Tanzania Standard is a revision of the second version published in 2009. This third edition cancels and replaces the second edition (TZS 11:2009) which has been technically revised.

In the preparation of this standard, reference was made to the following publications:

a) IS 280: 1972, *Mild steel wire for general engineering (second revision)*, published by the Indian Standards Institution.

b) BS 443: 1982, *Specification for galvanized coatings on round steel wire,* published by the British Standards Institution.

c) IS 4826: 1968, *Specification for galvanized coatings on round steel wire,* published by the Indian Standards Institution.

In reporting the result of a test or analysis made in accordance with this standard, if the final value, observed or calculated is to be rounded off, it shall be done in accordance with TZS 4, *Rounding off numerical values.*

1 Scope

1.1 This Tanzania Standard specifies the quality requirements, dimensions and sampling of cold drawn mild steel wire of sizes 1-mm to 10-mm diameter for general engineering purposes with exception of fencing applications.

1.2 Steel wires and steel wire products for fencing are covered in TZS 1795.

2 Reference

For the purpose of this standard, the following references shall apply:

TZS 9, *Steel — Methods of testing zinc coating on wire*

TZS 10, *General requirements for the supply of metallurgical materials*

TZS 12, *Steel — Tensile testing of wire*

TZS 13, *Steel — Wrapping test of wire*

TZS 14, *Steel — Plain carbon — Determination of sulphur by combustion method*

TZS 15, *Steel — Determination of phosphorus by alkalimetric method*

3 Terminology

For the purpose of this standard, the following definitions shall apply:

3.1 Wire rod

A semi-finished hot-rolled mild steel product capable of being drawn into wire of required diameter

3.2 Wire

A product of a wire rod whose sectional area has been reduced at normal temperatures either by drawing through a specially prepared orifice or passing under pressure between suitably driven rolls

3.3 Length

A straight piece of a drawn or rolled wire cut to a specified or random length

3.4 Coil

A continuous length of wire drawn and rolled in the form of a reel

3.5 Lot

Any quantity of coils of wire of the same thickness from which test samples shall be taken.

4 Supply of material

General requirements relating to the supply of mild steel wire shall be as laid down in TZS 10 (see Clause 2).

5 Dimensions

The nominal diameters and tolerances of mild steel wires shall be as specified in Table 1.

Table 1: Diameters of mild steel wires

Nominal value	Tolerance	Nominal value	Tolerance
1.00		3.15	
1.12		3.55	
1.25		4.00	± 0.05
1.40		4.50	
1.60	± 0.04	5.00	
1.80		5.60	
2.00		6.30	
2.24		7.15	
2.50		8.00	± 0.06
2.80		9.00	
		10.00	

6 Quality requirements

6.1 Chemical composition

The base metal of which the wires shall be drawn, shall be mild steel having not more than 0.06% of phosphorus or sulphur when analyzed in accordance with TZS 15 and TZS 14 (see Clause 2) respectively.

6.2 Manufacture

The wire shall be cold drawn. It shall be drawn to the specified nominal diameter, and shall be sound and free from splits, surface flaws, scale and other manufacturing defects.

6.3 Finish

The wire shall have one of the following finishes:

a) bright drawn
b) annealed
c) galvanized (zinc coated)

6.4 Mechanical properties

6.4.1 Tensile test

The tensile strength (R_m) of the wire shall not be less than 550 N/mm^2 when tested according to 8.2. In case the wire is annealed, the tensile strength shall be between 310 N/mm and 430 N/mm^2 for wires of diameter 1.6 mm and above and shall not exceed 490 N/mm^2 for wires of diameter 1.4 mm and below. For high tensile wire then the tensile strength should range from 900MPa to 1800MPa.

6.4.2 Wrapping test

A wire smaller than 5 mm diameter shall withstand without breaking or splitting being wrapped eight times round its own diameter and subsequently straightened when subjected to wrapping test in accordance with 8.2.

6.4.3 Bend test

A wire of 5 mm diameter and over shall withstand being bent through an angle of 90º round a former of diameter equal to twice its own diameter without breaking or splitting.

7 Sampling

7.1 Samples for test purposes shall be taken at random from lots according to Table 2.

Table 2: Number of coils to be selected from lots

Number of coils in the lot	Number of coils to be selected
Up to 25	3
26 to 65	4
66 to 180	5
181 to 300	7
Above 300	10

7.2 From one end of the coil or length of wire selected, two separate test pieces at a distance of not less than 600 mm from the end shall be cut. One test piece shall be used for tensile test and the other for the wrapping test or bend test depending on its diameter as specified in 6.4.

8 Tests

8.1 All the coils sampled shall be examined for compliance with the requirements specified in 6.2.

8.2 Tensile test and wrapping test shall be conducted according to TZS 12 and TZS 13 (see Clause 2) respectively and the product shall comply with the requirements specified in 6.4.

8.3 Methods of testing zinc coating shall be as specified in TZS 9 (see Clause 2), the mass of coating shall conform to the requirements given in Table 3 and the coating shall be able to withstand the specified number of dips.

Table 3: Minimum mass of coating and number of dips

Nominal diameter of coated wire mm		**Heavy**			**Medium**			**Commercial**	
		mass of coating g/m^2	**Number of dips**		**mass of coating** g/m^2	**Number of dips**		**mass of coating** g/m^2	**Number of dips**
Above	Up to and including		1 min	1/2 min		1 min	1/2 min		1 min
0.90	1.0	170	2	-	150	1	1	27	no test
1.00	1.25	180	2	-	160	2	-	34	1
1.25	1.40	200	2	-	180	2	-	40	1
1.4	1.60	210	2	-	190	2	-	50	1
1.60	1.80	230	2	1	200	2	-	56	1
1.80	2.00	240	3	-	210	2	-	69	1
2.00	2.24	260	3	-	210	2	-	69	1
2.24	2.50	260	3	-	230	2	1	72	1
2.50	2.80	270	3	-	230	2	1	72	1
2.80	3.15	270	3	1	240	3	-	72	1
3.15	3.55	280	3	1	250	3	-	78	1
3.55	4.00	290	3	1	260	3	-	80	1
4.00	5.00	290	3	1	275	3	1	85	1
5.00	7.00	300	4	-	290	4	-	100	1
7.00	10.00				300	4	-		

9 Retest

9.1 Should any of the test pieces first cut from the samples not fulfill the test requirements specified in clause 8, two additional test pieces taken at random from another coil of the same lot in respect of each failure shall be taken from the samples.
9.2 Should both the additional test pieces pass the test, the lot represented shall be accepted as conforming to this standard, provided it complies with all the other requirements specified in this standard.
9.3 If either of the test pieces fails the retest, the lot shall be rejected.

10 Packaging

Finished wire coils may be wrapped with suitable material, e.g. jute, sisal or bituminous paper in order to prevent rust development.

11 Marking

Coils of cold drawn mild steel wire shall legibly and durably be marked with the following information:

a) Finish;
b) Size and quantity;
c) Lot number and date manufactured;
d) Name of manufacturer and trade mark, if any;
e) Outgoing inspection certificate report number; and
f) Country of origin.

12 Designation

In making orders and in all commercial and technical documents, coils of cold drawn mild steel wire (CMSW) shall be designated as follows:

CMSW/Finish/Diameter/TZS

Example:

CMSW/Bright/4.50/TZS 11:2021 means cold drawn mild steel wire with a bright finish of diameter of 4.50 mm as specified in TZS 11:2021.

