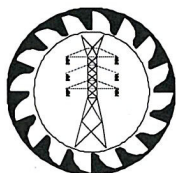


012: 2015

**CEB
SPECIFICATION**

**GALVANIZED STEEL WIRE
(EXCEPT SHIELDING WIRE FOR TOWER
LINE APPLICATION)**



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SPECIFICATION FOR GALVANIZED STEEL WIRE (EXCEPT SHIELDING WIRE FOR TOWER LINE APPLICATION)

1.0 SCOPE

This Specification covers the manufacture and testing of Galvanized Steel Wire of Stranded and Solid type for application as stay wire ropes for line supports (poles) and line earth conductors in Electricity Distribution Networks, except shielding wire for tower line application.

2.0 SYSTEM PARAMETERS

(a)	Nominal voltage	33 kV	11kV	230V/400 V
(b)	System highest voltage	36 kV	12 kV	240V/440V
(c)	System frequency	50 Hz	50 Hz	50 Hz
(d)	Method of earthing	Non Effectively earthed	Effectively earthed	Effectively earthed
(e)	System faults level	13.1 kA	12.5 kA	25 kA

3.0 SERVICE CONDITIONS

(a)	Annual average ambient temperature	30 °C
(b)	Maximum ambient temperature	40 °C
(c)	Maximum relative humidity	90%
(d)	Environmental conditions	Humid tropical climate with polluted atmosphere
(e)	Operational altitude	From M.S.L. to 1900 m above M.S.L.
(f)	Isokeraunic (Thunder days) level	100 days

4.0 APPLICABLE STANDARDS

The equipment and components supplied shall be in accordance with the latest editions of the standards specified below and amendments thereof.

(a)	BS 183:1972	Specification for general purpose galvanized steel wire strand
(b)	BS 182:1972	Specification for galvanized line-wire for telephone and telegraph purposes
(c)	BS 443:1982	Specification for testing zinc coatings on steel wire and for quality requirements
(d)	BSEN 10218 -1,2 : 2012	Steel wire and wire products-General.

5.0 BASIC FEATURES

5.1 Design of Wire

The Wire shall be drawn from steel by a suitable process and shall conform to BS 183. It shall be of uniform quality, circular cross section, clean and smooth.

5.2 Construction

a) Stranded Galvanized Steel Wire for Stay Wire Application

Suitably manufactured and constructed for guying (staying) LV and HV distribution line supports (poles) at angle / section / terminal poles of the line, stranding shall be done in accordance with Table 3 of BS 183.

The number of strands, size of wires and the grade of steel are as given below.

- i) 7 Strand of 4.00 mm Diameter Wire of Grade 700
- ii) 7 Strand of 3.25 mm Diameter Wire of Grade 700

The breaking strength of the G.S. Wire shall be within the limits as stipulated in Clause 5.9 below.

b) Solid Single Galvanized Steel Wire for Earth Wire Application

The wire shall be suitably manufactured for use as earth conductor (ground wire) for LV and HV (up to 33KV) distribution pole lines and for binding purposes.

The size of wires and the grade of steel are as given below.

- i) Diameter 5.0 mm Grade 700

The breaking strength of the G.S. Wire shall be within the limits as stipulated in Clause 5.9 below.

c) Solid Single Galvanized Steel Wire for Binding Wire Application

The wire shall be suitably manufactured for use as binding wire.

The size of wires and the grade of steel are as given below.

- i) Diameter 2.0 mm Grade 350
- ii) Diameter 1.5 mm Grade 350

The breaking strength of the G.S. Wire shall be within the limits as stipulated in Clause 5.9 below.

5.3 Joints during manufacture

No joints shall be made while drawing, galvanizing and stranding the wire.

5.4 Strand Lay

The outer wires of the Stranded Galvanized Steel Wire shall have a right-hand lay conforming to BS 183.

5.5 Galvanizing

The wire shall be galvanised by hot dip process and the galvanized coating thickness shall conform to BS 443.

5.6 Tolerance on Diameter

The Tolerance on the diameter of the Galvanized Steel Wire shall be in accordance with the Table I of BS 183.

5.7 Elongation

Elongation shall conform to Table-2 of BS 183.



5.8 Freedom from defects

The finished wire shall be free from harmful defects, splinter irregularities and brittle places.

5.9 Technical Requirements

The Galvanized Steel Wire shall conform to the following technical requirements;

i)	Strand Lay	Right Hand
ii)	Galvanizing coating Thickness	As per BS 443
iii)	Tolerance on diameter	As per Table 1 of BS 183
iv)	Elongation	As per Table 2 of BS 183
v)	Number of wires, Grade of steel Wire and Breaking load	
a)	Stranded Galvanized Steel Wire for Stay Wire Application 1) 7 Strand of 4.00 mm Diameter Wire of Grade 700 Breaking Load Minimum Maximum 2) 7 Strand of 3.25 mm Diameter Wire of Grade 700 Breaking Load Minimum Maximum	62.0 kN 74.0 kN 41.0 kN 49.0 kN
b)	Solid Single Galvanized Steel Wire for Earth Wire Application 1) Diameter 5.0 mm Grade 700 Breaking Load Minimum Maximum	13.75 kN 14.30 kN
c)	Solid Single Galvanized Steel Wire for Binding Wire Application 1) Diameter 2.0 mm Grade 350 Breaking Load Minimum Maximum 2) Diameter 1.5 mm Grade 350 Breaking Load Minimum Maximum	1.10 kN 1.17 kN 0.62 kN 0.65 kN

6.0 ADDITIONAL REQUIREMENTS

6.1 Manufacturing Experience

The manufacturer shall have at least 5 years experience in manufacturing and supply of Galvanized Steel Wires and manufacturer shall furnish documentary evidence with the offer to prove his manufacturing experience.

6.2 Marking

Each coil / drum shall carry a label marked with the following particulars. The label shall be weather proof and corrosion proof.

- Number and year of standard adopted
- Configuration of strand
- Number of wires and grade
- Size of wires
- Breaking load (for wire strand or single solid wire as the case may be)
- Net weight of the coil to the nearest half kilogram
- The word "CEB" and the "Bid No....."
- The name of manufacturer and country of origin



6.3 Packing

The wire strand of grade 700 and, the solid single wire of grades 700 and 350 shall be supplied in continuous lengths uniformly wound in coils of 100 kg.

The diameter of eye of coils shall be as given in Table 4 of BS 183. Each coil shall be securely bound with four separate binders of galvanized steel wire of diameter in the range 2.0mm to 3.75mm.

These coils shall be treated and wrapped in hessian or synthetic material so as to withstand corrosion against water or contamination with any other chemicals during transport in ship, transit in docks and storage.

6.4 Sample

One prototype sample of minimum of five meter length of the offered galvanized steel wire strand/solid single wire concerned shall accompany the Bid to facilitate analysis and evaluation.

While analyzing samples, Purchaser reserves the right to check dimensions, inspect workmanship and perform essential tests as prescribed in relevant standards.

7.0 QUALITY ASSURANCE

The manufacturer shall possess ISO 9001:2008 Quality Assurance Certification valid throughout the delivery period of this bid, for the manufacture of Galvanized Steel Wire for the plant where the Galvanized Steel Wires are being manufactured. The Bidder shall furnish a copy of the ISO certificate certified as true copy of the original by the manufacturer, along with the offer.

8.0 INFORMATION TO BE SUPPLIED WITH THE OFFER

The following shall be furnished with the offer;

- (a) A copy of type test certificates in accordance with clause 9.1.
- (b) Quality Assurance Certification conforming to ISO 9001:2008 in accordance with clause 7.
- (c) A list of names and address of five utilities, giving the time of delivery and the quantities supplied in the recent past.
- (d) Duly completed Schedule of particulars (Annex A).
- (e) A sample in accordance with clause 6.4.

Failure to furnish the above will result in the offer being rejected.



9.0 INSPECTION AND TESTING

9.1 Type Test

Following Type Test Certificates shall be provided with the offer.

- (a) Complete mechanical properties including the following.
 - i) Minimum Breaking load
 - ii) Maximum Breaking load
 - iii) Modulus of elasticity
 - iv) Co-efficient of linear thermal expansion.
- (b) Electrical characteristics including DC resistance value at 20°C, co-efficient of variation of resistance.
- (c) The Test Certificates for the following conforming to BS 183.
 - i) Tensile & Elongation Test
 - ii) Wrapping Test
 - iii) Tolerances on Diameter
 - iv) Galvanizing Test

Test certificates referred to shall be from an **accredited independent testing laboratory acceptable to the purchaser**. Proof of accreditation by a national/ international authority shall be forwarded with the offer. Test reports shall be complete including all the pages as issued by the testing authority. Parts of test reports shall not be acceptable.

9.2 Routine Test

Following routine tests shall be carried out in accordance with BS 183 on galvanized steel wire and the routine test certificates shall be made available for the observation of CEB Engineer at the time of inspection.

- i) Tolerances on Diameter
- ii) Galvanizing Test

9.3 Inspection

The selected Bidder shall make necessary arrangement for inspection by an Engineer appointed by the CEB during manufacture and before dispatch and also to carry out in his presence necessary acceptance tests of the materials offered. CEB may waive off the inspection with the condition of carrying out the acceptance tests by an independent testing authority acceptable to CEB. In such a situation a notice of waive off will be issued in advance to the supplier.

9.4 Acceptance Test

The following acceptance tests in accordance with BS 183 shall be witnessed by the Engineer.

- i) Tolerances on Diameter
- ii) Galvanizing Test
- iii) DC Resistance Value at 20 °C
- iv) Wrapping Test
- v) Breaking Load Test

10.0 ANNEX

Annex A - Schedule of Guaranteed Technical Particulars
Annex B - Non-Compliance Schedule



Annex- A

Schedule of Guaranteed Technical Particulars
(Following Information shall be furnished with the offer)

1.	Manufacturer's name	
2.	Country of origin	
3.	Number and diameter of wire	No/mm
4.	Applicable Standard	
5.	Lay direction and length	
6.	Grade of Steel	
7.	Guaranteed Breaking Load	kN
8.	Weight per km	kg
9.	Elongation	%
10.	Tolerance in diameter	mm
11.	Modulus of Elasticity	kg/mm ²
12.	Co-efficient of linear expansion	/ °C
13.	Maximum calculated DC resistance per km at 20 deg. C.	Ω
14.	Length of wire in a coil	m
15.	Weight of coil (gross)	kg
16.	Diameter of eye of coil	mm
17.	Whether the Type Test Certificates conforming to the clause 9.1 furnished Yes/No?	
18.	Whether the Quality Assurance Certification conforming to ISO 9001:2008 furnished Yes/No?	

.....
Signature of the Manufacturer and seal

.....
Date

I/We certify that the above data are true and correct

.....
Signature of the Bidder and seal

.....
Date



Annex – B

Non-Compliance Schedule

On this schedule the bidder shall provide a list of non-compliances with this specification, documenting the effects that such non-compliance is likely to have on the equipment's life and operating characteristics. Each non-compliance shall be referred to the relevant specification clause.

Clause No.	Non-Compliance

.....
Signature of the Manufacturer/bidder and seal

.....
Date

