

**BUREAU OF INDIAN STANDARDS**

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**भारतीय मानक मसौदा**

**धातु या पॉलीमर चढ़ी –  
वैलड तार फेंसिंग — विशिष्टि**

**DRAFT Indian Standard**

**METALLIC OR POLYMER COATED –  
WELDED WIRE MESH FENCING — SPECIFICATION**

ICS 25.220.99; 77.140.65

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Wire Ropes and Wire Products  
Sectional Committee, MED 10

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comments is: **27 March 2024**

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**FOREWORD**

*(Formal clause to be added later)*

This standard does not intend to address all of the safety concerns, associated with the use of gabions and gabion mattresses. It is the responsibility of the manufacturers and users of this standard to establish and employ appropriate safety measures and to ensure compliance with applicable regulations.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2022 'Rules for rounding off numerical values (*second revision*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard

**DRAFT Indian Standard**

**METALLIC OR POLYMER COATED –  
WELDED WIRE MESH FENCING — SPECIFICATION**

**1 SCOPE**

This standard specifies requirements for fencing mesh manufactured from metallic-coated welded wire Mesh supplied as rolls or panels. The metallic-coated Mesh may be Polymer coated after fabrication. This standard covers only orthogonal welded mesh i.e. wires welded at right angles to one another.

**2 REFERENCES**

The standards listed contain provisions, which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All the standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards.

<i>IS/ISO No.</i>	<i>Title</i>
IS 432 (Part 2) : 1982	Specification for Mild Steel and medium tensile steel bars and hard drawn steel wire for concrete reinforcement Part II – Hard drawn steel wire
IS 1566 : 1982	Specification for hard - Drawn steel wire fabric for concrete reinforcement ( <i>second revision</i> )
IS 1956 (Part 3) : 2019	Glossary of terms relating to iron and steel: Part 3 long products (Including Bars, Rods, Sections and Wires) ( <i>second revision</i> )
IS 4948 : 2020	Welded steel wire mesh for General Use – Specification ( <i>third revision</i> )
IS 4826 : 2023	Hot-Dipped Galvanized Coatings on round Steel wires – Specification ( <i>second revision</i> )
IS 12753 : 1989	Electrogalvanized Coatings on round steel wire – Specification
IS 6745 : 1972	Methods for determination of mass of zinc coating on zinc coated iron and steel articles
IS 2633 : 1986	Method for testing uniformity of coating on zinc coated articles ( <i>second revision</i> )
IS 13360 (Part 8/Sec 13) : 2021	Plastics methods of testing Part 8 Permanence/chemical properties Section 13 Determination of changes in colour and variations in properties after exposure to daylight under glass natural weathering or laboratory light sources ( <i>second revision</i> )
ISO 9227 : 2022	Corrosion tests in artificial atmospheres — Salt spray tests
ISO 2178 : 2016	Non-Magnetic Coatings on Magnetic substrates – Measurement of coating thickness – Magnetic method.

### **3 TERMINOLOGY**

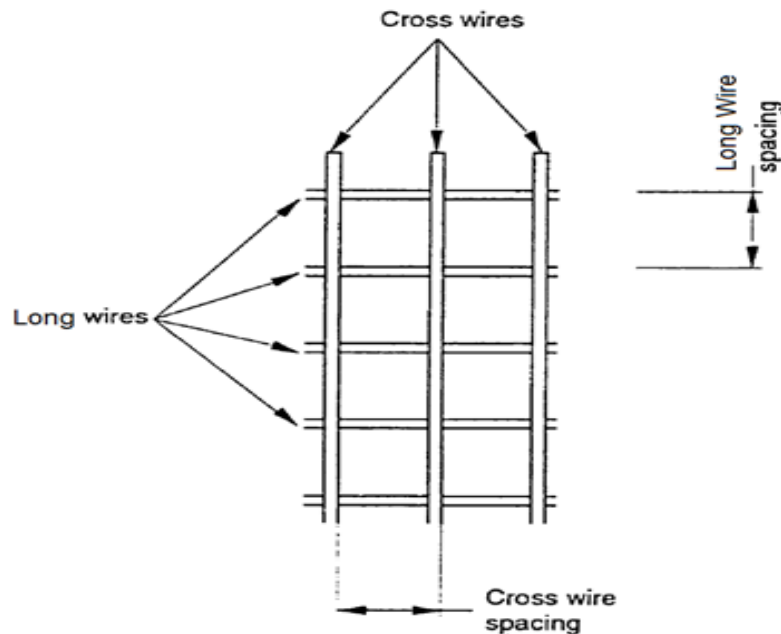
**3.1 Definitions** — For the purpose of this standard, definitions given in IS 1956 (Part 5) shall apply.

#### **3.2 Terms Specific to this Standard**

**3.2.1 Welded Wire Mesh** — A material composed of mild as drawn or Zinc coated or Zinc alloy coated wires, fabricated into sheet (or mesh) formed by the process of electric resistance welding. The finished material shall consist essentially of a series of longitudinal and Cross or transverse wires arranged substantially at right angles to each other and then welded together at all points of intersection. The Long and /or Cross Wires may be crimped in case of Panel form of Welded Mesh Fencing.

**3.2.2 Fencing** — Material for a barrier enclosing or bordering a field, yard, plot, etc., usually made of posts and wire or mesh, used to prevent entrance, confine, or mark a boundary.

**3.2.3 Spacing** — The distance measured from centre to centre of the wires in either direction i.e. Long spacing being spacing between Long wires running along the length of the Roll or Panels and Cross Spacing being spacing between Cross Wires running along the width or shorter direction of the Roll or Panels. (see Fig. 1).



**FIG. 1 EXAMPLE OF MESH**

**3.2.4 Mesh Size** — The spacing of Long wires followed by the spacing of cross wire e.g. for 50 mm Long Spacing and 25 mm Cross Spacing, the Mesh sizes shall be 50 × 25.

**3.2.5 Panel** — Welded Wire mesh produced and supplied in flat form to specified dimensions or cut from rolls of Welded mesh. Panels are produced either with overhanging edges or flush cut edges.

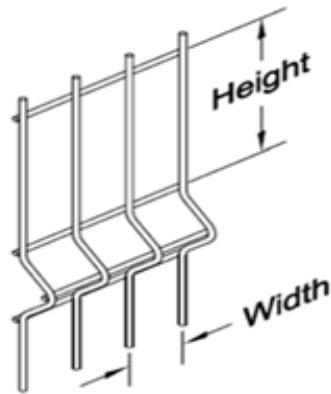
## **4 CLASSIFICATIONS**

**4.1** Welded wire fencing shall be classified according to coating, as follows:

**4.1.1** Class A, consists of welded wire Mesh made from wire which is zinc-coated before being welded into Mesh.

**4.1.2** Class B, consists of welded wire Mesh which is made from uncoated wire and the Mesh is subsequently zinc-coated after fabrication.

**4.1.3** Class C, consists of welded wire Mesh, as Styles A or B and over coated with Polymer. The term “Polymer” includes either of various synthetic compounds such as PVC (Poly Vinyl Chloride), Epoxy, Polyester, Polyurethane which are employed for corrosion protection coatings.



**FIG. 2 FENCING PANEL WITH CRIMP (BEAM)**

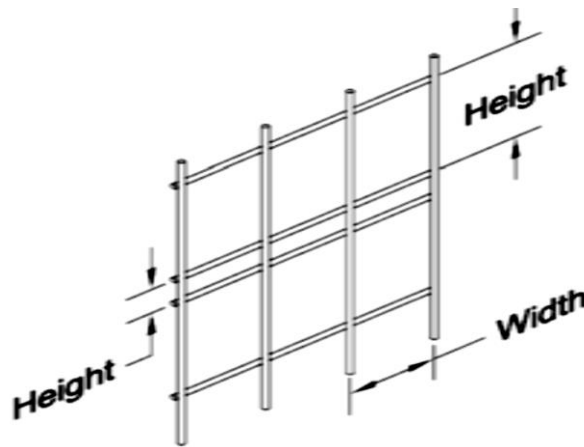
**4.2** Welded wire mesh fencing is classified in accordance with the method of fabrication, as follows:

**4.2.1 Model A:** Welded Mesh Fencing Panels fabricated with single wires in horizontal and vertical direction. With horizontal reinforcing crimps (beams) to increase rigidity. (*see* Table 1 and Fig. 2) no. of crimps (beams) increase with height of the panels with two crimps (beams) for panels shorter than 1.45m, three crimps (beams) for panels shorter than 2.0 m and four crimps (beams) for taller panels up to 2.50 m.

**Table 1 Fencing Mesh Typical Sizes in Panel Form with Crimps**  
(*Clause 4.2.1*)

<b>Horizontal Wire Spacing, mm</b>	<b>Vertical Wire Spacing, mm</b>	<b>Wire Diameter, mm</b>	<b>Panel Height, mm</b>
150	50	4.0/ 4.50 / 4.80	1200–1500–1800–2400
100	50	4.0/ 4.50	1050–1200–1500–1800–2100
200	50	4.0 / 4.5 / 5.0	1050–1200–1500–1800–2100–2400

**4.2.2 Model B:** Welded Mesh Fencing Panels fabricated with single wires in horizontal and vertical direction—flat in structure without crimps (beams). Panels may have variable wire spacing in panel height (see Table 2 and Fig. 3).

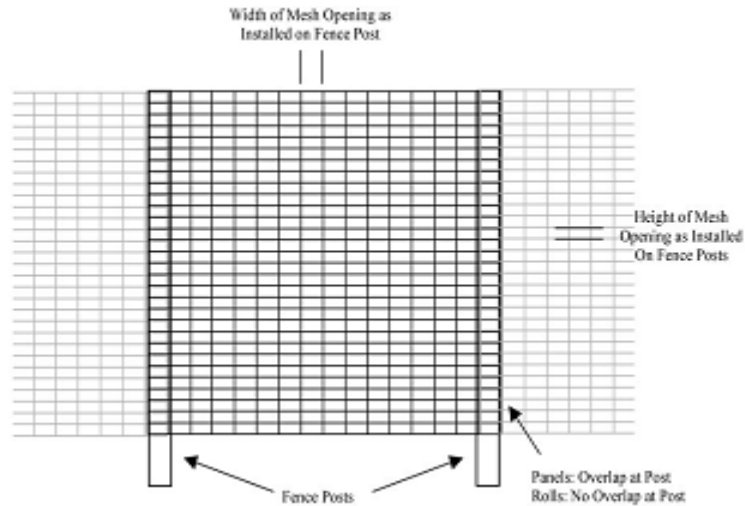


**FIG. 3 FENCING PANEL WITHOUT CRIMPS**

**Table 2 Fencing Mesh Typical Sizes in Panel Form without Crimps**  
(Clause 4.2.2)

<b>Horizontal Wire Spacing, mm</b>	<b>Vertical Wire Spacing, mm</b>	<b>Wire Diameter, mm</b>	<b>Panel Height, mm</b>
Variable	50	3.00	1200–1500–1800
Variable	50	4.00	1200–1500–1800
Variable	50	5.00	1200–1500–1800

**4.2.3 Model C:** Welded Mesh fencing fabricated in the form of continuous length Rolls (see Table 3 and Fig. 4).



**FIG. 4 FENCING MESH IN ROLL FORM**

**Table 3 Fencing Mesh Typical Sizes in Roll Form**  
*(Clause 4.2.3)*

<b>Horizontal Wire Spacing, mm</b>	<b>Vertical Wire Spacing, mm</b>	<b>Wire Diameter, mm</b>	<b>Roll Height, mm</b>
25	25	2.50	900 to 3000 mm
25	25	3.00	900 to 3000 mm
40	40	2.50	900 to 3000 mm
40	40	3.00	900 to 3000 mm
50	50	3.00	900 to 3000 mm
50	25	2.50	900 to 3000 mm
50	25	3.00	900 to 3000 mm
75	25	3.00	900 to 3000 mm

## **5 MATERIAL AND MANUFACTURE**

**5.1** The wire used in the manufacture of welded wire Mesh for use in fencing mesh shall conform to the specifications given in **5.1.1** as appropriate for the class ordered, except that the tensile strength shall conform to **6.1**. The wire may be produced from any grade of steel listed in IS 1566.

**5.1.1** Class A, welded wire Mesh shall be manufactured from zinc-coated steel wire conforming to IS 4826 (Heavily Coated) or IS 12753 (Heavily Coated). Criteria for uniformity of zinc coating in these specifications shall be checked for conformity on the welded wire Mesh sample with the welded joints in accordance with **12.2**.

**5.1.2** Class B, welded wire Mesh shall be manufactured from uncoated steel wire conforming to IS 432 Part 2 and the Mesh shall be subsequently zinc-coated by the hot-dip process.

**5.1.3** Class C, welded wire Mesh shall be manufactured from zinc-coated steel wire conforming to IS 4826 (Light Coated) or IS 12753 (Light Coated), if the Mesh panels are subsequently overcoated with Polymer coating.

**5.3** Welded wire Mesh shall be assembled by automatic machines or other suitable mechanical means which will ensure accurate spacing and alignment of all members of the finished Mesh with specified tolerances. Longitudinal and Cross or transverse members of the welded wire Mesh shall be connected at every intersection by the process of electric resistance welding to meet the requirements of **6.2**.

**5.4** The Polymer coating used in the manufacture of Polymer coated fencing mesh shall conform to properties in **7.2 and 8.2**.

**5.4.1** The Polymer coated welded wire Mesh shall have the Polymer coating fused and bonded onto the metallic-coated welded wire Mesh after fabrication of mesh. No cutting of the panels closer than  $6 \pm 3.18$  mm to the weld shall be permitted after fabrication in order to prevent exposure near the welds.

## **6 MECHANICAL PROPERTIES**

### **6.1 Tensile Strength**

The tensile strength of the wire used for the welded wire Mesh, shall be soft in accordance with the requirements of Specifications IS 4826 (Heavy Coated) or IS 12753 (Heavy Coated) for Class A Gabions, or hard drawn wire according to IS 432(II) for Class B Mesh . The cross-sectional area of the test specimen shall be based on the diameter of the metallic coated wire. All the wires used in the fabrication of fencing mesh shall use the same temper wire as per given order.

### **6.2 Weld Shear Strength**

When tested in accordance with **12.5**, the minimum average shear value in new tons shall be 50% of the breaking strength of the wire or as indicated in the Table 4, whichever is greater, (*see* Specification IS 4948). Typical minimum average shear strengths is given in Table 4.

#### **6.2.1 Conformance to Requirement**

The material shall be deemed to conform with the requirements for weld shear strength if the average of the test results of the first four specimens tested complies with the value in **6.2**, or if the average of the test results for all welds tested complies with the value in **6.2**.

## **7 PHYSICAL PROPERTIES**

### **7.1 Metallic Coating**

The coating weights shall conform to the requirements of IS 4826 (Heavy Coated) or IS 12753 (Heavy Coated) for zinc coating (including the zinc coating on the Class B Mesh) in case of Class A Mesh Panels not subsequently Polymer Coated . The coating weights shall conform to the requirements of IS 4826 (Light Coated) or IS 12753 (Light Coated) for zinc coating in case of Class C Mesh Panels which are subsequently Polymer Coated. Uniformity of Zinc Coating shall be determined according to IS 2633 with requirements as per IS 4826 on samples of Welded Wire Mesh i.e. random sample with minimum two welded joints.

## **7.2 Polymer Coating on Welded Mesh**

The initial properties of Polymer coating material on Welded Wire Mesh shall have a demonstrated ability to conform to the following requirements:

### **7.2.1 Salt Spray Exposure and Ultraviolet Light Exposure**

**7.2.1.1** The Polymer shall show no effect after 1000 h of salt spray exposure in accordance with Practice ISO 9227

**7.2.1.2** The Polymer shall show no effect of exposure to ultraviolet light with test exposure of 1000 h, using apparatus Type E and 63°C, when tested in accordance with Practice IS 13360 Part 8: Sec 13

#### **7.2.1.3** *Evaluation of coating after salt spray and ultraviolet exposure test*

After the salt spray test and exposure to ultraviolet light as specified in **7.2.1.1** and **7.2.1.2**, the Polymer coating shall not show cracks nor noticeable change of color, or blisters or splits. In addition, the specific gravity, tensile strength, modulus of elasticity, and resistance to abrasion shall not change more than 6 %, 25 %, 25%, and 10 %, respectively,

**7.2.1.4** If so agreed between Supplier and Purchaser the Supplier may certify at the time of supply the conformance to requirements of **7.2.1.1** to **7.2.1.3** based on running historic batch samples tested within 3 months prior to supply and may later confirm with actual supply batch sample results as and when the 3000 hr. test results become available.

### **7.2.2 Adhesion**

The Polymer coating shall adhere to the wire such that the coating breaks rather than separates from the wire when tested in accordance with **12.3**.

### **7.2.3 Mandrel Bend**

The Polymer coated wire when subjected to a single 360° bend at -0 °F [-18 °C] around a mandrel ten times the diameter of the wire, shall not exhibit breaks or cracks in the Polymer coating.



## **8 DIMENSIONS AND TOLERANCES**

**8.1** The diameter of metallic-coated wire shall have the size tolerances in accordance with IS 4826 or IS 12753 or IS 432 (II) for Class - B.

**8.2** The Minimum thickness of the Polymer overcoat which covers the wire shall be 0.05 mm measured radially at any cross-section transverse to the wire length when checked as per **12.2**

### **8.3 Tolerance on Mesh Dimensions**

The tolerances on Mesh Spacing measured from centre to centre of the wires shall be subject to the following tolerances:

<b>Mesh Spacing, mm</b>	<b>Tolerance, mm</b>
25	+/-1.0
25 < x < 75	+/- 2.0
>75	+/- 3.0

### **8.4 Tolerance on Roll/Panel Dimensions**

The tolerances on dimensions (length or height or Width) for Roll form of Welded Wire Fencing shall be +/- 0.5% or 25 mm whichever is larger.

The tolerance on Width or Height for Panel form of Welded Wire Fencing shall be +/- 0.50% or 10 mm whichever is larger.

## **9 WORKMANSHIP**

Workmanship and finish as determined by visual inspection shall conform to requirements of this specification.

## **10 SAMPLING**

**10.1** Samples for determination of the mechanical and physical properties of welded wire Mesh shall be obtained by cutting from the finished Mesh a full-width section of sufficient length to perform the testing. Samples for determination the mechanical and physical properties of coated wire used for spiral binders, lacing wire, and stiffeners shall be selected at random in sufficient number to perform the testing.

## **11 NUMBER OF TESTS**

**11.1** Perform a minimum of four tests for conformance to tensile strength of metallic-coated wire, weld shear strength, wire and Mesh dimensions, metallic coating weight, PVC coating thickness, adhesion of PVC Coating, and mandrel bend from each 19000 m<sup>2</sup> of Mesh or remaining fraction

thereof. Perform a minimum of four tests for conformance to tensile strength, wire dimensions, coating weight, PVC coating thickness, adhesion of PVC Coating, and mandrel bend from the wire accessories used with each 19000 m<sup>2</sup> of Mesh. The lot shall be acceptable if the results of all four tests conform to the requirements.

## **12. TEST METHODS**

### **12.1 Metallic Coating Weight**

Perform coating weight tests in accordance with Tests in IS 6745 as applicable. For coating weight tests on wire of the welded wire Mesh, secure multiple lengths between welds, including both longitudinal and transverse wire, and cut no closer than 6.4 mm from any weld. The combined length shall be 305 mm, minimum, but preferably about 610 mm.

### **12.2 Polymer Coating Thickness**

**12.2.1** Determine the thickness of the Polymer coating on an individual piece of wire removed from the Mesh.

**12.2.2** Determine the diameter of the metallic coated wire after stripping the Polymer coating by chemical means. Determine the thickness of the Polymer coating by scraping the coating from one side of the wire and measuring the reduced diameter with a micrometer. The thickness of the coating at this point is the difference between the measurement thus obtained and the measured diameter of the metallic coated wire. Determine the thickness of the coating at right angles to the first determination in a similar manner. When removing the Polymer coating by scraping, take care not to remove any of the metallic surface. The magnetic method can be applied as a non-destructive measurement of the thickness in accordance with ISO 2178

### **12.3 Polymer Adhesion Test**

Make two cuts parallel to the axis of the wire through the coating, approximately 1.6 mm apart, at least 12.7 mm long. With a knife, peel back a section of the coating between 3.2 mm and 6.4 mm long to produce a tab. Attempt to remove the 1.6mm. Strip of coating by pulling the tab. The lot shall be acceptable if the coating breaks rather than separates from the core wire on all four specimens.

### **12.4 Weld Shear Strength of Mesh**

**12.4.1** *Scope*—This test method covers the procedure for determining the strength of welded intersections of welded wire Mesh.

**12.4.2** *Significance and Use*—The weld shear strength is a measure of the ability of welds in wire Mesh to resist the forces imposed on the wires tending to pull them apart.

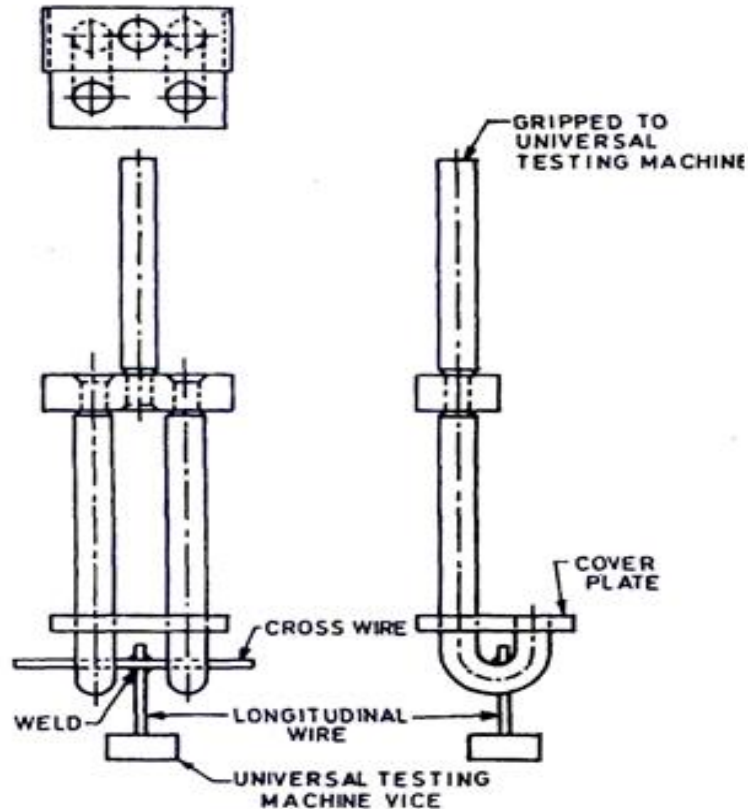


FIG. 5 WELDED WIRE MESH WELD TESTER

### 12.4.3 Apparatus

Use a testing fixture such as shown in Fig. 5, which is intended to stress the vertical wire close to its centerline, and to prevent rotation of the horizontal wire. This fixture can be used in most tensile testing machines and should be hung in a ball and socket arrangement at the center of the machine. This or a similarly effective fixture designed on the same principle, is acceptable (*see* IS 4948).

### 12.5.4 Test Specimens

Test specimens shall be obtained by cutting, from the finished Mesh, a full-width section including at least two transverse wires.

**12.5.4.1** The transverse wire of each specimen shall extend approximately 25 mm on each side of the longitudinal wire. The longitudinal wire of each test specimen shall be of such length below the transverse wire so as to be adequately engaged by the grips of the testing machine. It shall be of such length above the transverse wire that its end shall be above the centerline of the upper bearing of the testing device.

**12.5.4.2** A test specimen shall consist of four welds selected at random from one transverse wire for weld shear strength. If the width of the Mesh is such as to not include four welds that are suitable for testing, additional welds shall be taken from a second transverse wire to total four.

(Welds at the edge wire are excluded from testing as there is no overhang to permit proper testing). If the average weld shear strength from the four specimens does not conform to the requirement of 7.2, test all the welds across the width (excluding edge welds) on one transverse wire, or on two transverse wires if some of the initial specimens were from the second transverse wire.

#### **12.5.5 Weld Shear Test Procedure**

Insert the long end of the vertical wire through the notch in the anvil. The vertical wire shall be in contact with the surface of the free-rotating rollers while the horizontal wires shall be supported by the anvil on each side of the slot. The bottom jaws of the testing machine shall grip the lower end of the vertical wire and the load shall be applied at a rate of stressing not to exceed 690 MPa/min.

#### **12.5.6 Report**

Report the test results to the nearest 25 N for both individual results and the average of all tests.

### **13 MARKING**

**13.1** Each finished product shall be marked legibly and indelibly with the following details on a metal tag:

- a) Name of manufacturer;
- b) Product Class;
- c) Mesh Size in mm;
- d) Mesh wire diameter, in mm;
- e) Roll or Panel form ;
- f) Length & Height of Fencing Mesh, in m;
- g) Class of Coating;
- h) Batch No. or date of manufacturing; and
- j) Any other information as specified by the purchase.

#### **13.2 BIS Certification Marking.**

The product may also be marked with Standard Mark.

**13.2.1** The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act, 2016* and the Rules and Regulations framed thereunder, and the products may be marked with the standard mark.

### **14 INFORMATION TO BE SUPPLIED BY THE PURCHASER/INDENTER**

The information to be supplied by the purchaser/indenter is given in Annex A.

### **15 CERTIFICATE**

**Doc: MED 10 (24962)WC**

**February 2024**

When specified in the purchase order or contract, a manufacturer's certificate shall be furnished to the purchaser that the material has been manufactured, tested, and inspected in accordance with requirements this specification and has been found to be conforming to the requirements. When specified in the contract or purchase order, reports of the test results for each batch supplied, shall be furnished.

## **16 INSTALLATION MANUAL**

The manufacturer shall supply Installation Manual for installation of the product.

**ANNEX A**

*(Clause 14)*

**INFORMATION TO BE SUPPLIED BY THE PURCHASER/INDENTER**

**A-1** The following information shall be supplied by the purchaser/indenter:

- a) Fencing Mesh: Panel or Roll form ;
- b) Size in m (length x height);
- c) Class (*see 4.1*);
- d) Mesh Size in mm and Mesh wire diameter, in mm;
- e) IS designation and year of issue;
- f) Quantity (number of units);
- g) Manufacturer's Certificate, if required (*see 15*); and
- h) Any other requirement.