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*भारतीय मानक* मसौदा

# वस्त्रादि — मछली पकड़ने के लिए पोलिएथाइलीन मोनोफिलमेंट की सुतली — विशिष्टि

(आईएस 6347 का *दूसरा पुनरीक्षण*)

Draft *Indian Standard*

**Textiles — Polyethylene Monofilament Twines for Fishing — Specification**
(*Second Revision*)

ICS: 67.120.30

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|---|---|
| Textile Materials for Marine/Fishing Purposes Sectional Committee, TXD 18 | last date for receipt of comments is February 2025 |

## FOREWORD
*(Formal clauses will be added later)*

This standard was first published in 1971 and was subsequently revised in 2003. The first revision of this standard was taken to incorporate the following changes:

a) Requirements for runnage, breaking load, elongation, sampling, and criteria for conformity was modified; and
b) Terminology was included.

This Second revision has been made in the light of experience gained since its last publication and to incorporate the following changes:

a) All three amendments have been incorporated;
b) Criteria for conformity have been modified;
c) Marking and sampling clause has been modified;
d) References to Indian Standards have been updated.

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.

## 1 SCOPE

**1.1** This standard prescribes requirements of high-density polyethylene monofilament twines used in the manufacture of fishing gear.

**1.2** This standard does not prescribe the type of finish, feel, etc., of the twines.

## 2 REFERENCES

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

## 3 TERMINOLOGY

For the purpose of this standard, the definitions given in IS 5508 (Part 1) and IS 5508 (Part 10) shall apply.

## 4 MANUFACTURE

**4.1** The material used in the manufacture of twines shall be of high-density continuous monofilament polyethylene having a relative density of 0.95 to 0.96 and a minimum tenacity of 40 g/tex within the range of 0.15 to 0.20 nominal diameter of yarn.

### 4.2 Twines

The twines shall either be supplied in natural colour or as required by the buyer. They shall be flexible. The finished twines shall be flexible and consist of 3 plies, each being uniform and well laid and as free as practicable from defects in the yarn.

## 5 REQUIREMENTS

**5.1** The twines shall confirm to the requirements given in Table 1. The twines shall have S twist unless otherwise agreed to between the buyer and the seller.

## Table 1 Requirements of Polyethylene Monofilament Twines
(*Clause* 5.1)

| Sl No. | Construction | | Runnage | Breaking Load, Dry and wet | Knot Dry and Wet | Elongation at Break, Dry and Wet | Turns/Metre[2]) | | Twine Diameter |
|--------|--------------|--------------|---------|---------|---------|---------|---------|---------|---------|
| | Thickness | (No of Filament) × Strand | | *Min* | *Min* | *Max* | Strand Z way | Twine S way | |
| | mm | | m/kg | N (kgf)[1] | N (kgf)[1] | Percent | | | mm |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| i) | 0.20 | 1 × 3 | 10 235 | 35 | 65 | 45.00 | - | 280 | 0.25 |
| ii) | 0.20 | 2 × 3 | 5 035 | 65 | 116 | 45.00 | 280 | 270 | 0.5 |
| iii) | 0.20 | 3 × 3 | 3 320 | 98 | 168 | 45.00 | 260 | 250 | 0.75 |
| iv) | 0.20 | 4 × 3 | 2 460 | 129 | 242 | 45.00 | 195 | 190 | 0.85 |
| v) | 0.20 | 5 × 3 | 1 970 | 160 | 289 | 45.00 | 185 | 185 | 1.0 |
| vi) | 0.20 | 6 × 3 | 1 640 | 190 | 335 | 45.00 | 175 | 170 | 1.25 |
| vii) | 0.20 | 8 × 3 | 1 230 | 253 | 438 | 45.00 | 170 | 160 | 1.50 |
| viii) | 0.20 | 9 × 3 | 1 095 | 280 | 484 | 45.00 | 160 | 150 | 1.60 |
| ix) | 0.20 | 10 × 3 | 975 | 313 | 559 | 45.00 | 155 | 150 | 1.80 |
| x) | 0.20 | 12 × 3 | 810 | 373 | 661 | 45.00 | 150 | 140 | 2.00 |
| xi) | 0.20 | 15 × 3 | 650 | 464 | 801 | 45.00 | 130 | 125 | 2.15 |
| xii) | 0.20 | 18 × 3 | 535 | 559 | 959 | 45.00 | 115 | 110 | 2.25 |
| xiii) | 0.20 | 21 × 3 | 460 | 647 | 1 117 | 45.00 | 110 | 100 | 2.50 |
| xiv) | 0.20 | 24 × 3 | 400 | 736 | 1 257 | 45.00 | 100 | 100 | 2.60 |
| xv) | 0.20 | 28 × 3 | 345 | 858 | 1 443 | 45.00 | 95 | 90 | 2.75 |
| xvi) | 0.20 | 39 × 3 | 240 | 1 206 | 1 922 | 45.00 | 90 | 80 | 3.00 |
| xvii) | 0.20 | 40 × 3 | 235 | 1 226 | 2 048 | 45.00 | 90 | 80 | 3.10 |
| Tolerance | - | - | ± 5 percent | - | - | - | - | - | ± 5 percent |
| Method of Test | - | - | Annex A | IS 5815 (Part 4) | | IS 5815 (Part 7) | IS 5815 (Part 3) | | Annex A |

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1) 1 N = 0.102 kgf (approximately).
2) For guidance only.

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## 5.2 Mass

A tolerance of $^{+\,10}_{-\,5}$ percent shall be allowed on the declared mass of any one package provided that the variation from the gross specified mass of any delivery to one code number does not exceed 5 percent.

## 5.3 UV Resistance

If agreed to between the buyer and the seller, the twine shall be manufactured from UV-stabilized polyethylene resin. The UV-stabilized twine shall have at least 65 percent retention of the original breaking strength, when tested after the same has been exposed to UV radiation and accelerated weathering in accordance with the test method given in Annex B. The mean twine tenacity before and after UV radiation exposure shall be determined as per the test procedure given in IS 5815 (Part 4).

## 6 MARKING

**6.1** The hank or cheeses containing twines shall be marked with the following information:

  a)  Name of the material,
  b)  Construction and runnage,
  c)  Net mass,
  d)  UV stabilized or not,
  e)  Month and year of manufacture, and
  f)  Indication of the source of manufacture.

## 6.2 BIS Certification Marking

The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act*, 2016 and Rules and Regulations made there under. The details of the conditions under which the licence for use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

## 7 PACKING

The twines shall be made into hanks or cheeses as required by the buyer. A suitable number of hanks, or cheeses shall be placed one over the other and shall be wrapped with a layer of waterproof packing material. The pack shall be tied with twine of adequate strength and a suitable number of such packs shall be packed in a container of adequate strength and a suitable number of such packs shall be packed in a container of adequate strength which is previously lined with one layer of waterproof packing paper (*see* Type 2 of IS 1398). If necessary, the gaps in the container shall be filled with cushioning materials to avoid damage in transit. The container shall be properly secured and bound by iron hoops or wires.

# 8 SAMPLING AND CRITERIA FOR CONFORMITY

## 8.1 Lot

The quantity of monofilament twines of the same runnage and construction details delivered to a buyer against one despatch note shall constitute a lot.

**8.2** Conformity of a lot to the requirements of this standard shall be determined on the basis of test carried out on the sample selected from it.

**8.3** Unless otherwise agreed to between the buyer and the seller, the number of cheeses/packs to be selected from a lot shall be given below:

| Sl No. | Lot Size | Sample Size |
|--------|----------|-------------|
| (1) | (2) | (3) |
| i) | Up to 100 | 3 |
| ii) | 101 to 300 | 4 |
| iii) | 301 to 500 | 5 |
| iv) | 501 to 1000 | 7 |
| v) | 1001 and above | 10 |

**8.4** The cheese or packs selected according to **8.3** shall be tested for length, breaking load, knot breaking load, elongation at break.

## 8.5 Criteria for Conformity

The lot shall be conforming to the requirements of this standard. If the following in details are satisfied:

a) From the test results for length, knot breaking load and breaking load, the average ($\bar{x}$) and the range ($R$) shall be determined and the value of the expression $\bar{x} - 0.4\,R$ shall not fall below the minimum value specified.

b) From the test results for elongation at break, the average ($\bar{x}$) and the range ($R$) shall be determined and the value of expression $\bar{x} + 0.4\,R$ shall be less than the maximum values specified.

## ANNEX A
(*Clause* 2)

### LIST OF REFERRED INDIAN STANDARDS

| *IS No.* | *Title* |
|---|---|
| IS 1398 : 1982 | Specification For Packing Paper Water Proof, Bitumen-Laminated (Second Revision) |
| IS 5508 (Part 1) : 2020 | Guide for fishing gear Part 1 General (*first revision*) |
| IS 5508 (Part 10) : 2015 | Guide for fishing gear  Part 10 Seer gillnet (*first revision*) |
| IS 5815 (Part 3) : 2021 | Textiles — Fishing gear materials — Methods of test Part 3 Determination of twist (*first revision*) |
| IS 5815 (Part 4) : 2018/ ISO 1805 : 2006 | Methods of test for fishing gear materials Part 4 Fishing nets – Determination of breaking force and knot breaking force of netting yarns (*second revision*) |
| IS 5815 (Part 7) : 1993 | Fishing nets — Determination of elongation of netting yarns (*first revision*) |

## ANNEX B
(*Table* 1 *Clause* 5.3)

# METHOD FOR DETERMINATION OF RUNNAGE AND TWINE DIAMETER, AND UV RESISTANCE TEST

## B-1 METHOD FOR DETERMINATION OF RUNNAGE

### B-1.1 TEST SPECIMENS

Remove 10 m length skeins from each of the hank or cheese constituting the sample under test.

### B-1.2 PROCEDURE

Determine the mass of a skein removed from a hank or cheese to the neatest gram. From the mass compute the runnage (m/kg).

## B-2 METHOD FOR DETERMINATION OF TWINE DIAMETER

### B-2.1 PRINCIPLE

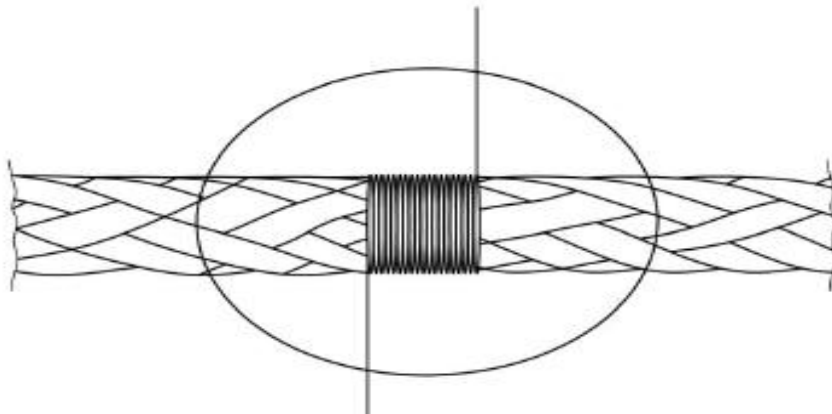Determination of twine diameter by yarn method as specified in Fig. 1.



FIG. 1 SCHEMATIC REPRESENTATION OF THE DETERMINATION OF TWINE DIAMETER BY YARN METHOD

### B-2.2 PROCEDURE

**B-2.2.1** First take a minimum 2 m twine sample, which is to be tested for diameter checking. Ensure no cut skinning, looping or damage in twine.

**B-2.2.2** Calculate the runnage of the twine (specimen) by the test method given in **B-1**.

**B-2.2.3** Apply the pre-tension in the twine by applying load as specified under:

$$\text{Weight} = \frac{10\ 00\ 000}{Runnage}$$

**B-2.2.4** After weight applying to the twine, a low-stretch synthetic mono-filament yarn less than 50 D is wrapped 20 times around the pre-tensioned twine as shown in Fig. 1.

NOTE — Ensure no gap and apply moderate tension during the wrapping of the yarn.

**B-2.2.5** Mark the extreme end of the yarn with any coloured marker and then unwrap for length measurement.

**B-2.2.6** Then remove the marked yarn from the twine. Measure the circumference as the length of the marked portion.

**B-2.2.7** Twine diameter shall be calculated by the following formula:

$$\text{Twine diameter (mm)} = \frac{Length\ of\ wrapped\ yarn\ in\ mm}{20\ \times 3.14}$$

**B-2.2.8** Take the average of at least three readings of different positions more than 2 lay lengths or twine pitches apart.

**B-3 UV RESISTANCE TEST**

**B-3.1 TEST SPECIMENS**

The test specimens for breaking strength shall be cut from the sample as specified in IS 5815 (Part 4).

**B-3.2 TEST CONDITION**

The test shall be carried out with fluorescent UV-B (313 nm or its equivalent). The duration of the test shall be 1 500 h (approximately 62 days). The test cycle shall be 8 h at 60 °C ± 3 °C with UV radiation alternating after 4 h at 50 °C ± 3 °C with condensation. Irradiance level throughout the test shall be maintained at $0.63 \begin{smallmatrix} +\ 0.03 \\ -\ 0.00 \end{smallmatrix}$ W/m$^2$.

**B-3.3 TEST PROCEDURE**

**B-3.3.1** Determine the original average breaking strength of the twine as per the test method specified in IS 5815 (Part 4).

**B-3.3.2** Expose the specimens alternately to ultraviolet light alone and to condensation in one respective cycle.

The type of fluorescent UV lamp, the timing of the UV exposure and the temperature of condensation shall be as specified in **B-3.2**.

**B-3.3.3** Determine the average breaking strength of the specimens separately after UV exposure as mentioned above.

**B-3.3.4** Determine the percent retention of original strength as follows:

$$\text{Percent retention of original breaking strength} = \frac{b}{a} \times 100$$

Where

$b$ = average breaking strength after UV exposure as obtained in **B-3.3.3**; and
$a$ = average breaking strength before UV exposure as obtained in B-**3.3.1**.

NOTES

**1** The UV source is an array of fluorescent lamps (with lamp emission concentrated in the UV range).
**2** Condensation is produced by exposing the test surface to a heated, saturated mixture of air and water vapour, while the reverse side of the test specimen is exposed to the cooling influence of ambient room air.'