

**भारतीय मानक ब्यूरो**  
**BUREAU OF INDIAN STANDARDS**

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भारतीय मानक मसौदा  
वस्त्रादि — सीसल या मनीला रेशों से बना हेलिडेक जाल — विशिष्टि

*Draft Indian Standard*

**Textiles — Helideck Net Made from Sisal or Manila Fibres — Specification**

ICS 59.080.50

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Cordage Sectional Committee  
TXD 09

Last date for receipt of comments  
**06 October 2024**

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FOREWORD

*(Formal clauses will be added later)*

Helideck nets, also known as helicopter landing nets or helideck safety nets, are specialized safety devices installed around the perimeter of helidecks on offshore platforms, ships, and other structures. The primary purpose of helideck net is to prevent helicopters from sliding off the helideck during landing, takeoff, and other operations, particularly in adverse weather conditions or emergencies. The nets provide a crucial safety measure to enhance the security of helicopter operations in these challenging environments. Fibre rope used in the net felicitate to avoid issues with rust and damage. The helideck landing net provides additional friction and grip to the tyres of a helicopter during landing.

The objective of this standard is to make available a specification that will enable users to obtain/purchase proper quality of helideck net and to assist manufacturers to make suitable nets.

In the preparation of this standard, considerable assistance has been derived from CAP 437 ‘Standards for Offshore Helicopter Landing Areas’ published in 2013 by Civil Aviation Authority.

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, 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.

## Textiles — Helideck Net Made from Sisal or Manila Fibres — Specification

### 1 SCOPE

**1.1** This standard prescribes the construction and performance requirements of helideck nets made from sisal or manila fibre ropes to prevent the helicopter from rolling and pitching on the helipads during landing and take-off on offshore/onshore platforms/rigs of any type.

**1.2** This standard does not specify the requirements of helideck net made from synthetic ropes and their blends.

**1.3** This standard does not specify the requirement for helicopter landing areas; visual aids; marking and lighting on helideck; and rescue and firefighting facilities for helideck.

### 2 NORMATIVE 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 subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of these standards.

### 3 TERMINOLOGY

**3.1** For the purpose of this standard, the definitions given in IS 3871 and the following may apply.

**3.2 Mesh** — The mesh is a square-like open space formed by the intersection of adjacent ropes in the netting.

**3.3 Mesh Cord** — Cord or rope from which the mesh of the net is constructed.

**3.3 Border Rope** — The rope surrounding the net and determining the overall dimension of the net.

**3.4 Hands** — The ropes are affixed to each of the four sides (border rope) and corners of the net at uniform intervals, serving the purpose of tightening and lifting the net.

**3.5 Mesh Size** — The distance between two intersection points of ropes measured from centre to centre when the net is in relax stage.

**3.6 Nominal Size** — The overall dimension of the net when laid evenly on a flat surface in a relaxed condition and without any tension on the border rope and net.

## 4 MANUFACTURE

### 4.1 Raw Material

The sisal (*Agava Sisalana*) or manila (*Abaca musa*) true to its types shall be used in the manufacture of ropes and shall be unadulterated and free from defects and shorts.

The fibre shall be well hackled and of quality, fineness and colour necessary to produce ropes having the characteristics required and specified in Tables 1.

NOTE — For offshore landing areas, guidelines do not recommend the use of synthetic ropes.

### 4.2 Yarn

The evenly spun yarn processed on hard fibre processing plant shall be used for the manufacture of the strand (*see* Fig. 1). Hand-hackled or hand-spun yarn shall not be used. It shall be made from the fibres as specified in 4.1.

The strand shall have 'S' twist. The minimum number of yarns per strand shall be as specified in Table 1 of IS 1084 and IS 1321 (Part 1) for manila and sisal ropes respectively. To comply with the minimum number of yarns specified in this standard, yarn of 4.6 ktex shall be used.

NOTE — The yarn count is given for guidance only.

### 4.3 Strand

The strand shall be made from yarn as specified in 4.2 (*see* Fig. 1). It shall be well-formed and free from grooves and sunken yarns, and each strand shall contain an equal number of yarns. The strand shall have 'S' lay.

### 4.4 Rope

4.4.1 The ropes shall be made by twisting three strands as specified in 4.3 (*see* Fig. 1). It shall be well laid and free from defects and each coil shall be continuous throughout its length and shall not contain loose ends, splices or joints in the strands or the rope.

4.4.2 The rope shall have 'Z' lay with an angle of lay of the ropes 37°.

NOTE — The angle of lay of rope is given for guidance only.

4.4.3 The finished rope shall contain no cuts, kinks or soft spots caused by change in lay or pitch length, hockles, chafed or damaged sections, or broken, loose or projecting ends in the rope or the strands.

4.4.4 The unspliced ends of all ropes shall be cut off squarely and shall be securely whipped, taped or heat-sealed.

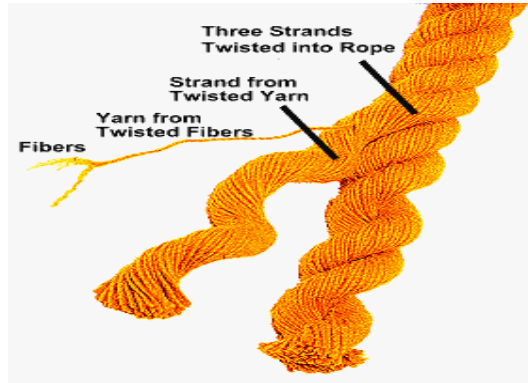


FIG. 1 FIBRE ROPE

#### 4.5 Helideck Net

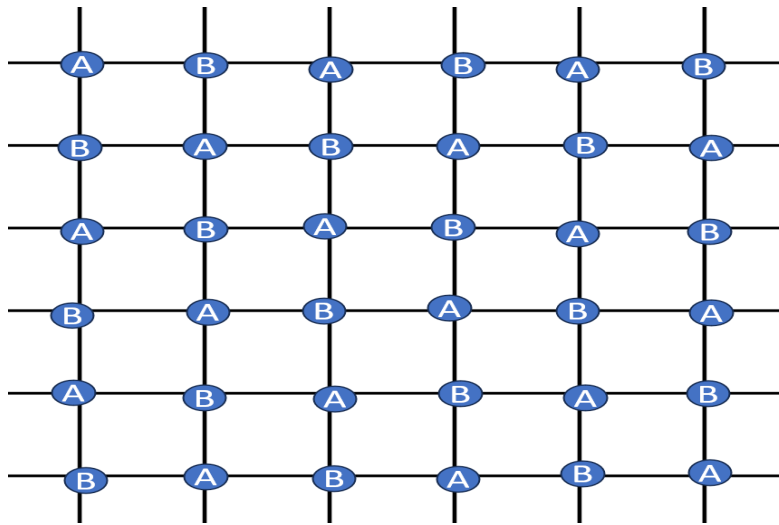
**4.5.1** The Helideck Net shall be constructed by tucking the ropes. The net involves inserting a vertical rope between strands of the horizontal direction rope (referred to as tuck A, as shown in Fig. 2) and inserting a horizontal rope between strands of the vertical rope (referred to as tuck B, as shown in Fig. 3). This alternating process of tuck A and tuck B is applied uniformly across the entire net, as illustrated in Fig. 5.

**4.5.2** A knotting (*see* Fig. 4) shall be performed at the tucking place. The yarn used in rope manufacturing shall be used for tying. Knots shall provide structural integrity by securing mesh that ensures reliable protection during helicopter landing and take-off operations. The knots shall be oriented horizontally to minimize the risk of unintentional untying.

NOTE — Knots should not untie unwillingly.



FIG. 4 TUCKED NET WITH KNOTTED



Keys

A = Tuck A

B = Tuck B

FIG. 5 SCHEMATIC DIAGRAM OF TUCKED HELIDECK NET

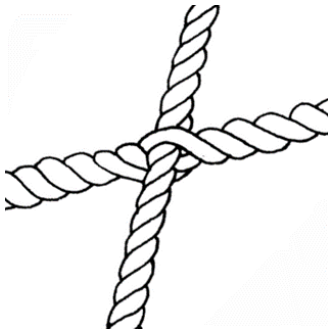


FIG. 2 TUCK A

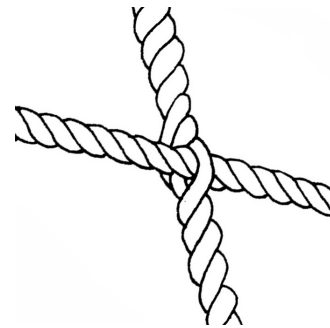


FIG. 3 TUCK B

#### 4.6 Lubrication

Weighing or loading materials shall not be used on the ropes. For the purpose of dressing the fibre or for the preservation of the rope, a lubricant shall be added preferably petroleum products. The quantity of dressing applied to the fibre shall be neither less than 10 percent nor more than 15% as calculated on the dry mass of the finished rope when determined by extraction with petroleum ether or other suitable solvents (*see* IS 7071).

#### 4.7 Rot-Proofing Treatment

If so ordered, ropes shall be rot-proofed by the application of zinc or copper-based rot-proofing agent in appropriate quantity as agreed to protect the rope from fungus and microbial attack. The

rot-proofing agent shall be applied at the dressing stage for uniform penetration in the rope. Ropes which have been so treated shall otherwise comply, in all respects with the requirements of this standard. The concentration of Zn or Cu shall be minimum 0.5 percent and 0.2 percent respectively on the mass of the test specimen when extracted and tested in accordance with IS 3522 (Part 1).

## 5 ATMOSPHERIC CONDITIONS FOR CONDITIONING AND TESTS

The tests shall normally be carried out under prevailing atmospheric conditions. In all cases of dispute, however, the tests shall be carried out on samples that have been conditioned for 24 h in a standard atmosphere at  $(65 \pm 2)$  percent relative humidity and  $(27 \pm 2)$  °C temperature as prescribed in IS 6359. Where practicable the tests shall be carried out in the standard conditioning atmosphere, otherwise they shall be carried out as quickly as possible but not exceeding 15 min after removal of the test pieces from the conditioning atmosphere.

## 6 REQUIREMENTS

### 6.1 Fibre Identification

The material of rope that is sisal or manila fibre shall be identified by the confirmatory test as specified in IS 667.

### 6.2 Pitch

The pitch of rope, when determined in accordance with IS 7071 shall be as specified in IS 1084 and IS 1321 (Part 1) for manila and sisal rope respectively.

NOTE — For a given reference number of rope, smaller the pitch, harder the rope will be. This hardness can affect the estimated breaking strength of the rope.

### 6.3 Diameter

The diameter of rope used for making helideck net shall be as per the agreement between the buyer and seller and shall be tested as per IS 7071. Ropes of 18 mm, 20 mm, 22 mm, 24 mm and 26 mm diameters are preferably used in netting, hands and borders of helideck net. The diameter shall not be less than the declared value and shall not be exceeded by more than the following tolerances:

| <i>Sl no.</i> | <i>Reference No. of Rope</i> | <i>Tolerances, mm</i> |
|---------------|------------------------------|-----------------------|
| (1)           | (2)                          | (3)                   |
| i)            | Up to 24                     | + 1                   |
| ii)           | 25 to 48                     | + 2                   |
| iii)          | 49 to 64                     | + 3                   |

NOTE — The rope size of hands/ties/slings and border rope may be of higher diameter than the ropes used in nets.

### 6.4 Size of Helideck Net

The size of the landing net required depends upon the size/type of helicopter for which the landing area is to be used and the same shall be declared by the buyer. A tolerance  $\pm 5$  cm shall be applicable on the length and width of the net. The size of a net shall be measured as per the method specified in Annex B. Some most prominent sizes of net are as follows:

- a) Small helideck net: 9 m  $\times$  9 m or 30 ft  $\times$  30 ft
- b) Medium helideck net: 12 m  $\times$  12 m or 40 ft  $\times$  40 ft
- c) Large helideck net: 15 m  $\times$  15 m or 50 ft  $\times$  50 ft

NOTE — The shape of a net is usually square, but it can also be circular or octagonal. Schematic diagrams of different sizes of helideck nets are given in Annex C for guidance only.

#### **6.4.1 Small Helideck Net (9 m $\times$ 9 m or 30ft $\times$ 30 ft)**

These nets are designed for smaller helidecks typically found on smaller offshore installations or vessels.

#### **6.4.2 Medium Helideck Net (12 m $\times$ 12 m or 40ft $\times$ 40 ft)**

Medium-sized nets are suitable for helidecks with moderate dimensions and structural complexity. They are engineered to cover a larger surface area than small helideck nets while ensuring proper fit and optimal safety measures.

#### **6.4.3 Large Helideck Net (15 m $\times$ 15 m or 50ft $\times$ 50 ft)**

Large helideck nets are designed for helidecks with extensive dimensions typically found on larger offshore installations or platforms. These nets provide comprehensive coverage for the expansive helideck surface, offering enhanced safety and protection during helicopter operations.

### **6.5 Mesh size**

The nets shall be made with a square mesh. The mesh size of the net shall be as specified by the buyer but not be more than 200 mm  $\times$  200 mm and measured by the test method as specified in Annex D. The tolerance on the declared mesh size shall be  $\pm 10$  mm, subjected to a maximum size of 200 mm  $\times$  200 mm.

### **6.6 Border Rope Diameter**

The border rope shall be a single-joint rope. The diameter of the border rope shall be as specified by the buyer but not less than diameter of rope used in netting. The specifications of the border rope shall confirm the requirements of the respective diameter as specified in Table 1.

### **6.7 Hands Length and Diameter**



The diameter of the hands shall be as specified by the buyer but not less than diameter of rope used in netting. The length of hands shall be measured from one end to the other end (as shown in Fig. 7) and the same shall be declared by the buyer but not less than 20 ft. The length of the hand shall not be less than 20 mm on the declared value. It should be secured at regular intervals but not more than 1.5 m between the lashing points around the landing area perimeter. The buyer must specify the requirement of an 'eye' at the end of the hands/ties/slings. The specifications of the rope shall confirm the requirements of the respective diameter as specified in Table 1.

## 6.8 Main Requirements

The breaking strength and linear density of rope extracted from the net as per 8.4.1 shall conform to the requirements given in Table 1.

**Table 1 Requirements of Sisal and Manila Ropes**  
(Clauses 7.6, 7.7 and 7.8)

| Reference number (Diameter)  | No. of Yarns per strand Min | Linear Density, Tolerance $\pm 5$ Percent | Breaking Strength of Rope used in Netting, <i>Min</i> |                  | Breaking Strength of Rope used in hands and border, <i>Min</i> |                  |
|--|-----------------------------|---|---|------------------|--|------------------|
|  |                             |   | Sisal   | Manila (Grade 1) | Sisal  | Manila (Grade 1) |
| mm   | <i>Min</i>                  | ktex (g/m)                                | kN (kgf)  |                  | kN (kgf)   |                  |
| (1)  | (2)                         | (3)                                       | (4)   | (5)              | (6)  | (7)              |
| 18   | 13                          | 220                                       | 18.83 (1 920)   | 21.96 (2 239)    | 20.93 (2 134)  | 24.40 (2 488)    |
| 20   | 16                          | 275                                       | 25.18 (2 567)   | 29.16 (2 973)    | 27.98 (2 853)  | 32.40 (3 304)    |
| 22   | 19                          | 330                                       | 30.04 (3 063)   | 34.73 (3 541)    | 33.38 (3 404)  | 38.59 (3 935)    |
| 24   | 23                          | 400                                       | 35.86 (3 656)   | 39.33 (4 010)    | 39.85 (4 064)  | 45.70 (4 660)    |
| 26   | 27                          | 470                                       | 41.69 (4 251)   | 48.01 (4 896)    | 46.32 (4 724)  | 53.35 (5 440)    |
| Method of Test, Ref to IS  | —                           | IS 7071                                   |   |                  |  |                  |
| <p>NOTES</p> <p>1 Other reference numbers of sisal and manila rope may also be used for manufacturing of netting of helideck net. The number of yarns per strand and linear density of the rope shall be as per IS 1321 (Part 1) or IS 1084. However, the breaking strength of the sisal and manila rope cut from the net shall be more than 10 percent lower than the values specified IS 1321 (Part 1) and IS 1084 respectively.</p> <p>2 Other reference numbers of sisal and manila rope may also be used in the hands and border of helideck net. The breaking strength, number of yarns per strand and linear density of the sisal and manila rope shall be as per IS 1321 (Part 1) or IS 1084 respectively.</p> <p>3 The reference number corresponds to the approximate diameter in millimetres.</p> <p>4 1 kN = 101.97 kgf approximately.</p> |                             |   |   |                  |  |                  |

## **6.9 Recommended Safe Working Load**

**6.9.1** Net employed for safety purposes, a ratio of maximum breaking load to working load of the net shall not be less than 6 which is recommended as a factor of safety. The factor of safety should be considered together with the purpose for which the net is used, the conditions of service and the condition of the net. Where conditions are adverse and warrant such a course being taken, it may be desirable to adopt more conservative values than those recommended above.

**6.9.2** Net is liable for wear and tear and can be weakened by various agencies like chemicals, heat, light, wind, weather etc., therefore, regular inspection is necessary to ensure that the net is still serviceable for the particular use. The decision whether to continue to use a net or replace it should be based on an assessment of the general conditions of the net and environmental working conditions like hazardous work, constant stretching under heavy load surging or sudden jerks under heavy stress, that is more than safe working load as specified above.

## **6.10 Finish**

Unless specifically required by the purchaser, no colouring agent, except the rot-proofing agent and lubricant shall be used. All ends shall be securely whipped or marled.

## **7 SAMPLING AND CRITERIA OF CONFORMITY**

### **7.1 Lot**

The number of nets of the same diameter of rope, linear density, type and dimensions, manufactured under similar conditions and delivered to a buyer against one dispatch note shall constitute a lot.

**7.2** The conformity of the lot shall be determined based on the tests carried out on the samples selected from it.

**7.3** Sampling shall be as representative as possible of the lot subject to the measurements and tests. Draw the samples at random to evaluate the size of helideck net, mesh size, length and diameter of hands, diameter and pitch of the rope at the rate shown by the following formula:

$$N_s = 0.4 \sqrt{N}$$

where  $N_s$  is the number of nets as samples to be tested and  $N$  is the total size of the lot. When  $N_s$  as calculated is not a whole number, round off the value obtained to give a whole number in accordance with the requirements of IS 2. In cases where  $N_s$  is less than 1, draw one net as a sample.

7.4 The number of nets chosen as samples from lot for assessing linear density, breaking strength and number of yarns per strand of the rope; fibre identification; rot and lubrication content in the rope shall be determined as follows:

| <i>Total Size of Lot</i> | <i>No. of samples</i> |
|--------------------------|-----------------------|
| (1)                      | (2)                   |
| Up to 100                | 1                     |
| 101 to 200               | 2                     |
| 201 to 300               | 3                     |
| 301 to 400               | 4                     |

7.4.1 Two specimens, each measuring 5 m in both horizontal and vertical directions of the net(s) as per col (2) in the above table for assessing requirements as specified in 7.4, will be cut using scissors or a knife, as illustrated in Fig. 6.

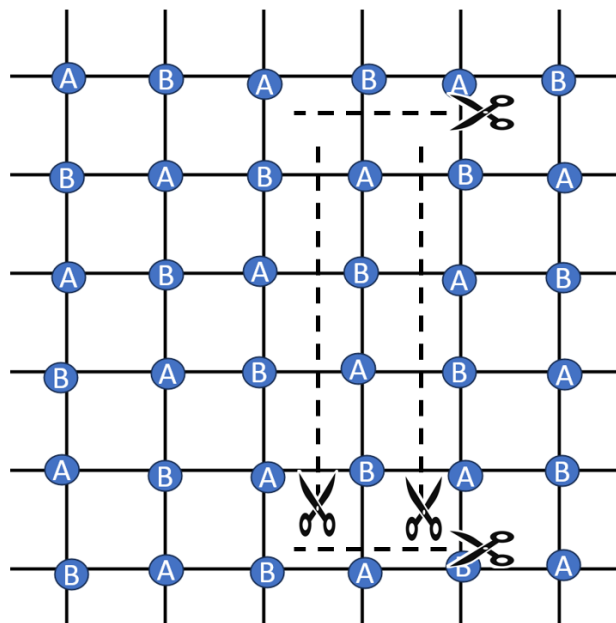


FIG. 6 SCHEMATIC REPRESENTATION FOR PREPARATION OF SPECIMEN FROM A SAMPLE

### 7.5 Criteria for Conformity

The lot shall be declared conforming to this standard, if the following conditions are satisfied:

- a) Length and width of the net; and diameter of ropes used in the net and hands satisfy the specified declared value;
- b) All the individual test samples tested for breaking strength satisfy the specified breaking strength. However, in case of failure of the test specimen drawn from a net, another specimen shall be retested from the same net and the same shall satisfy the specified requirement; and

- c) Individual values of the test results of the lot in respect of other characteristics conform to the specified requirements.

## **8 PACKAGING**

Each net shall be neatly folded and suitably packed to prevent damage in transit. Packing must be dust and waterproof. The pack shall be bound with at least 4 hooks of metal or plastic strips or should be packed individually as per the buyers' requirements.

## **9 MARKING**

**9.1** The following information shall be printed on the level of each net:

- a) Manufacturer's name or trade mark (if any);
- b) Date, month & year of manufacture;
- c) Lot number;
- d) Helideck net size \_\_\_\_\_ × \_\_\_\_\_;
- e) Guaranteed up to \_\_\_\_\_ year; and
- f) Any other information required by the law in force and/or by the buyers.

**9.2** The following information shall be printed on the top of the packing:

- a) Lot number;
- b) Helideck net size \_\_\_\_\_ × \_\_\_\_\_;
- c) Reference number (or Rope diameter in mm);
- d) Fibre used in the rope;
- e) Manufacturer's name or trade mark (if any);
- f) Date, month & year of manufacture;
- g) Net or gross weight of the package;
- h) Guaranteed up to \_\_\_\_\_ year; and
- i) Any other information required by the law in force and/or by the buyers.

### **9.3 BIS Certification Marking**

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.

## **10 INSTALLING GUIDELINE**

**10.1** Hands/ties/slings should be tensioned to at least 2 225 N. The landing net is kept sufficiently taut, and at least half of the fastenings shall be equipped with tightening mechanisms.

NOTE — As a rule of thumb, the helideck net should not be possible to raise any part of the net by more than approximately 250 mm above the helideck surface when applying a vigorous vertical pull by hand.

**10.2** During landing and taking off, the net should not create any hindrance or become entangled with the landing wheels/gears, as the high air turbulence generated by the rotating blades of the helicopter.

**10.3** Net shall follow the installation guidelines as specified in CAP 437.

**ANNEX A**  
(Clause 2)

**LIST OF REFERRED STANDARDS**

| <i>IS No.</i>                  | <i>Title</i>  |
|--------------------------------|---|
| IS 667 : 1981                  | Methods for identification of textile fibres ( <i>first revision</i> )                                  |
| IS 1084 : 2005                 | Textiles – Manila ropes – Specification ( <i>fifth revision</i> )                                       |
| IS 1321 (Part 1) : 2003        | Sisal ropes — Specification Part 1 Untarred varieties ( <i>fourth revision</i> )                        |
| IS 3522 (Part 1) : 1989        | Methods for estimation of common preservatives on textiles<br>Part 1                                    |
| IS 3871 : 2013/ISO 1968 : 2004 | Fibre ropes and cordage — Vocabulary ( <i>third revision</i> )  |
| IS 6359 : 2023                 | Method for conditioning of textiles ( <i>first revision</i> )   |
| IS 7071 : 2021/ISO 2307 : 2019 | Fibre ropes — Determination of certain physical and<br>mechanical properties ( <i>second revision</i> ) |

ANNEX B  
(Clause 7.4)

METHOD OF TEST FOR MEASUREMENT OF LENGTH AND WIDTH OF NET

**B-1.1** The sample helideck nets shall be unfolded. Lay the net flat on a level surface, such as the ground ensuring that each corner of the mesh is approximately right angle (90°). Initial tension shall be applied by pulling of the hands and then the net shall be allowed to relax on the floor for 3 minutes.

**B-1.2** The distance between two adjacent corners of the net as shown in Fig. 7 shall be measured using a steel tape having a 1mm least count. The same procedure shall be followed for all the samples as specified in 7.3.

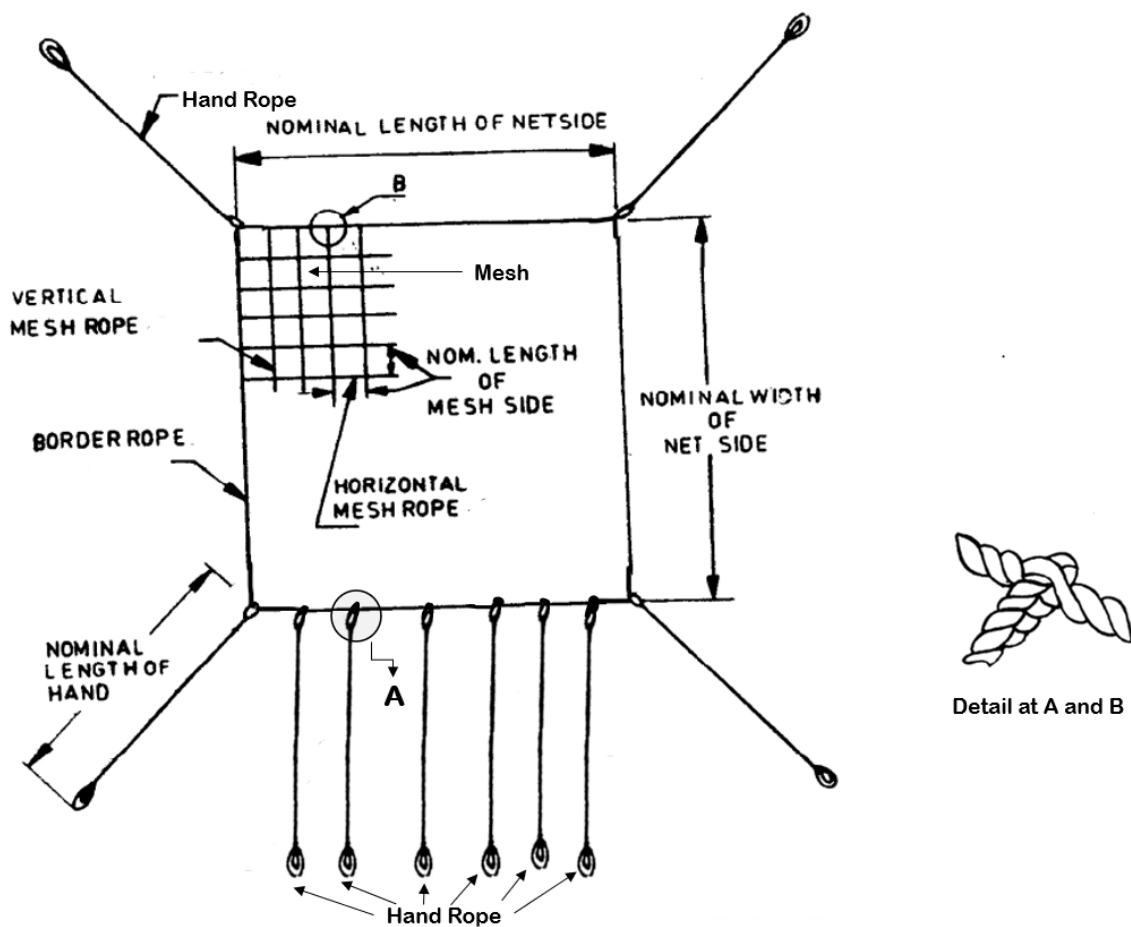
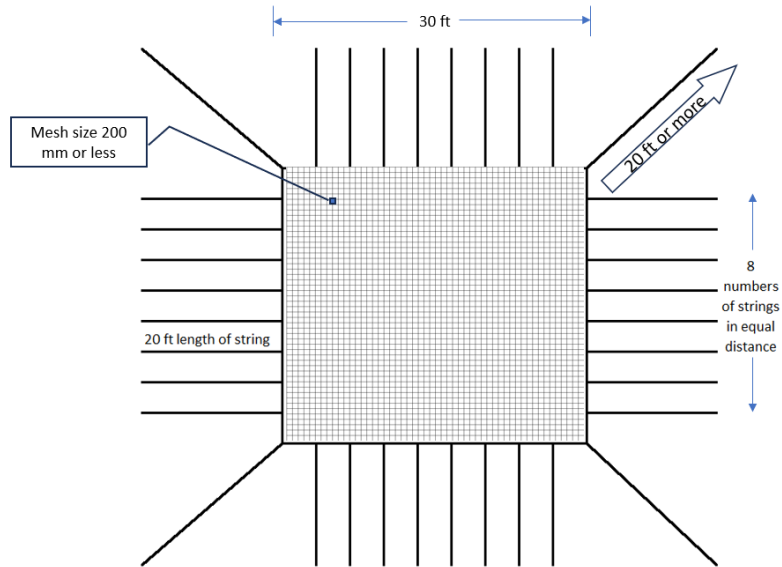


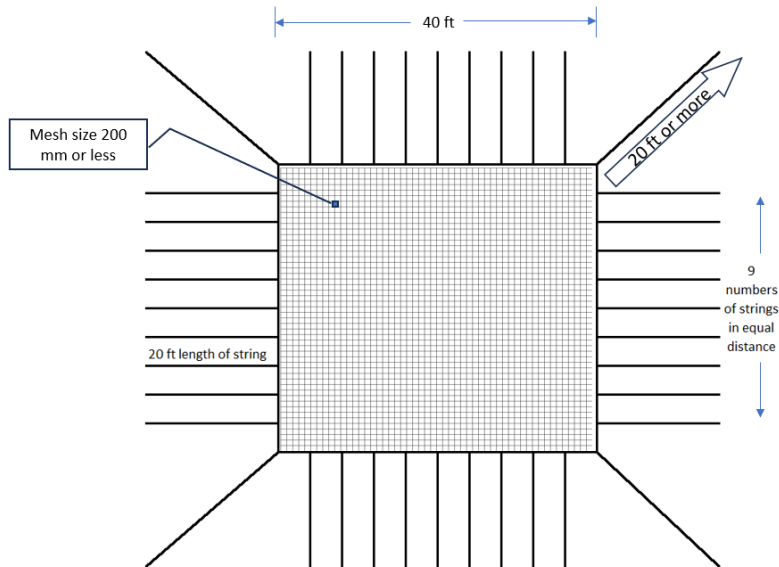
FIG. 7 HELIDECK NET

**ANNEX C**  
*(Clause 7.4)*

**SCHEMATIC DIAGRAMS OF HELIDECK NETS FOR GUIDANCE ONLY**



**FIG. 8 30 FT × 30 FT HELIDECK NET**



**FIG. 9 40 FT × 40 FT HELIDECK NET**



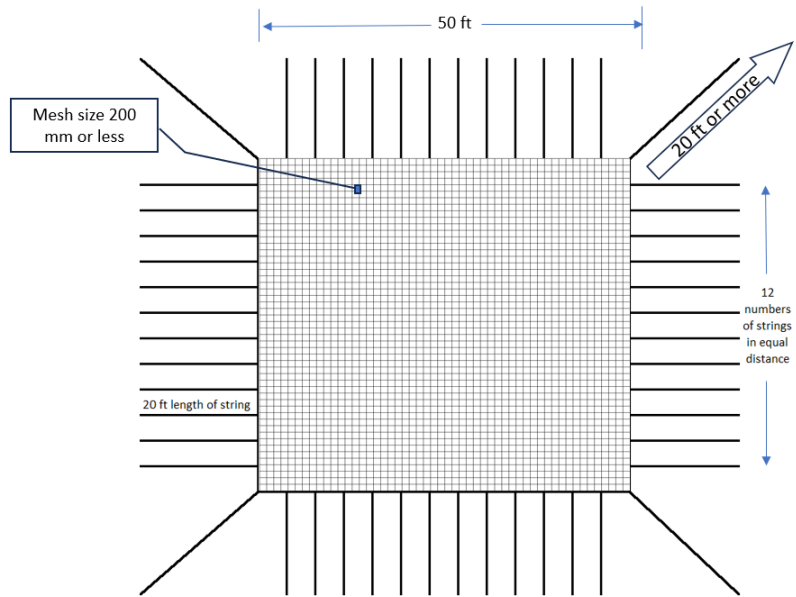


FIG. 10 50 FT × 50 FT HELIDECK NET

**ANNEX D**  
(Clause 7.5)

**METHOD FOR MEASUREMENT OF MESH SIZE**

**B-1.1** Lay the net flat on a level surface, such as the ground or a table ensuring that each corner of the mesh is right angle (90°).

**B-1.2** Determine the side length of the two adjacent intersection points of vertical and horizontal ropes in a mesh by employing a scale or steel tape having a least count of 1 mm, as shown in Fig. 11. Repeat the same procedure for the width of the same mesh.

**B-1.3** Repeat this measurement of 10 different meshes located in the whole net (avoid side meshes) and the mesh size ‘L × W’ shall be calculated by following formulas:

$$L = (l_1 + l_2 + \dots + l_{10}) \div 10$$

$$W = (w_1 + w_2 + \dots + w_{10}) \div 10$$

where

$l_1, l_2, \dots$  = length of mesh sides in vertical direction, in mm

$w_1, w_2, \dots$  = width of mesh sides in horizontal direction, in mm

L = Length of the mesh

W = Width of the mesh

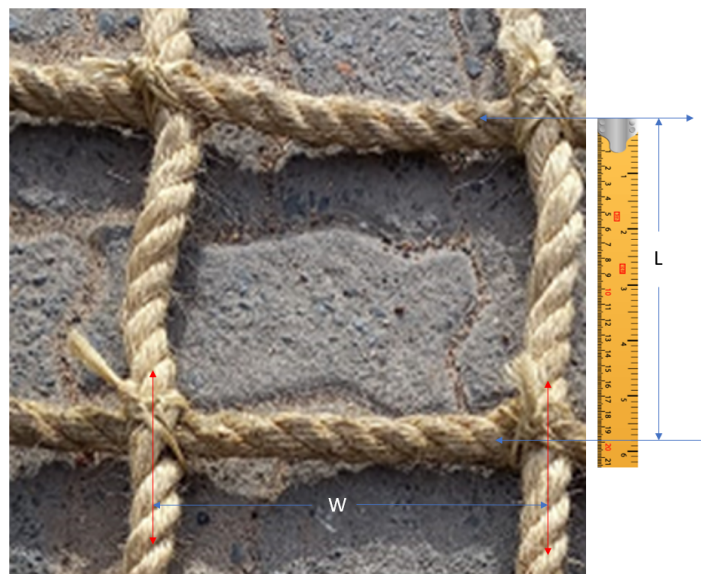


FIG. 11 SCHEMATIC DIAGRAM FOR MEASUREMENT OF MESH SIZE