
वस्त्रादि — सामान्य उपयोगों के लिए मानव
निर्मित रेशों से बनी गोल-स्लिंग —
विशिष्टि

(पहला पुनरीक्षण)

**Textiles — Roundslings Made of
Man-Made Fibres for General Service
— Specification**

(*First Revision*)

ICS 59.080.50

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FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards after the draft was finalized by the Cordage Sectional Committee and approved by the Textiles Division Council.

Webbing Slings and Round Slings are two of the most popular sling types. As per the amount and type of load, slings are selected. Due to the considerable use of roundslings made of man-made fibre for lifting goods, formulation of a standard covering the construction and performance requirements for roundslings is of utmost importance from a safety point of view. This standard covers the terminology and specifications of round-type slings only. For the webbing sling, a separate standard IS 15041 is specified.

This standard was first published in 1987 in two following parts:

Part 1 General requirements

Part 2 Modes of assembly, mode factors, safe working loads and strength for roundslings

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

- a) Amalgamating both Part 1 and Part 2;
- b) Marking requirements have been modified to include the environment-friendly and recycling logo on the packing; and
- c) References to Indian standards have been updated.

The composition of the committee responsible for the formulation of this standard is listed in Annex D.

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.

Indian Standard

TEXTILES — ROUNDSLINGS MADE OF MAN-MADE FIBRES FOR GENERAL SERVICE — SPECIFICATION

(*First Revision*)

1 SCOPE

1.1 This standard specifies the terminology basic, characteristics of roundslings made from polyamide (nylon), polyester or polypropylene fibres, used for lifting loads, and the tests and procedures needed to verify these characteristics. In addition, this part of the standard also specifies the identification and marking of these slings as well as the means of recording their characteristics. It also specifies a test for verifying the working load limit chosen. The term 'lifting' as used in this standard includes the operations of lowering and suspending.

1.2 This standard also specifies the modes of assembly, mode factors, maximum safe working loads and strength for roundslings made of man-made fibres such as polyamide, polyester, and polypropylene.

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 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 listed in Annex A.

3 TERMINOLOGY

3.1 For the purpose of this standard the definition as

given in IS 3871 together with the following shall apply.

3.2 Sling — A flexible device for connecting the lifting appliance and the load.

3.3 Sling in Basic Configuration — A roundslings as illustrated in Fig. 1.

3.4 Sling Assembly — One or more roundslings in the form used.

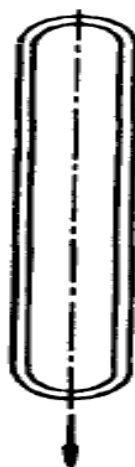
NOTE — This may be the same as the sling in basic configuration, or another mode of assembly (*see* Annex C). A sling assembly is sometimes referred to as a sling.

3.5 Roundslings — A sling comprising a core enclosed in a protective outer cover.

3.6 Core — A hank of yarn comprising the load bearing part of a roundslings.

3.7 Protective Outer Cover — A cover enclosing the core typically comprising seamed or seamless woven tube or tubes. The protective outer cover shall have no load bearing function.

3.8 Representative Sling — A roundslings representative of a production run or batch of roundslings of the same type, that is, having a protective outer cover of the same material, enclosing a core of the same material and number of turns of yarn, but not necessarily of the same length (*see* 6.2.3).



WORKING LOAD LIMIT

FIG. 1 ROUNDSLING IN BASIC CONFIGURATION

3.9 Coupling Component — A metal fitting attached to a roundsling for connecting an end fitting.

3.10 End Fitting — A metal fitting attached to a roundsling in the course of manufacture or by means of a coupling component that connects the sling and the load.

NOTE — A roundsling and the load may be connected without an end fitting.

3.11 Protective Sleeve — An additional sleeve fitted to a roundsling to provide extra protection for part of its length but having no effect on the strength of the sling.

3.12 Effective Length — The distance between the bearing points of the sling stretched out by hand (without noticeable tension) on a flat surface (see Fig. 2).

3.13 Strength of a Roundsling — The maximum mass (or force) that the roundsling can sustain (or withstand) when tested in the form of a representative sling, that is, complete with coupling components and end fittings (if any).

3.14 Safety Factor — The ratio of strength to the working load limit.

3.15 Working Load Limit (WLL) — The maximum mass that a roundsling in basic configuration is permitted to sustain vertically (see Fig. 1).

3.16 Mode Factor (M) — The factor that takes into account the geometry of the sling assembly, the multiplicity of parts, and empirically determined constants.

NOTE — Each mode of slinging is defined by a figure and a mode factor (see Annex C) which are used to calculate the safe working load from the working load limit (see Annex C).

3.17 Safe Working Load (SWL) — The maximum mass that the finished roundsling or sling assembly may raise, lower or suspend. The safe working load is equal to the product of working load limit and the mode factor (see Annex C). Roundslings shall be used only under conditions where their marked (see 4.2.5) safe working load applies.

3.18 Strength Teat — A test that confirms the strength of the roundsling, the coupling components and the end fittings if used.

3.19 Proof Force — The force to which coupling components and end fittings if used are submitted in order to prove their qualities.

NOTE — The proof force is equivalent to the product of the working load limit and a test factor of 2.

3.20 Proof Load — The mass equivalent to the proof force (see 3.19).

4 BASIC CHARACTERISTICS

4.1 Core

4.1.1 Materials

The core shall consist of yarns of one of the following:

- Polyamide (nylon)
- Polyester
- Polypropylene

NOTE — The resistance of man-made fibres to chemical, microbiological and physical attacks is described in Annex B as an aid to the selection of material for a particular use.

4.1.2 Construction

To form the core, one or more yarns are wound together in a plurality of turns and joined to form a hank. The core shall be uniformly wound to ensure even distribution of the load. There shall be no joint in any yarn except at the finishing point.

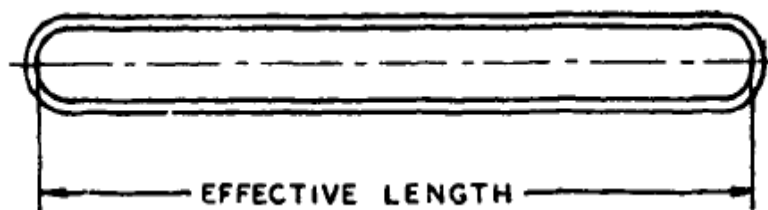


FIG. 2 EFFECTIVE LENGTH OF SLING

4.2 Protective Outer Cover

4.2.1 Material

The material of the cover shall be homogeneous and the same as the material of the core and it shall be one of the materials specified in 4.1.1. Woven materials shall be uniform and free from any significant defects.

4.2.2 Construction

A fabric outer cover shall be made from one length and the ends shall be overlapped and sewn. The ends shall not be such that they can be 'unpicked' if one of the yarns breaks. Welding of a fabric cover is not permitted.

4.2.2.1 For the purpose of 4.6 and 4.7 the protective cover shall have no load bearing function.

4.2.3 Sewing

A thread of the same material as the cover and the core shall be used and the seams made on a machine with a lock stitch.

NOTE — To facilitate inspection the stitching thread may be of a different colour from that of the cover.

4.2.4 Dimensions

The dimensions of the cover shall accommodate extension and spreading of the core under load.

4.2.5 Colour Coding

Roundslings shall have a protective outer cover of a colour which identifies their working load limit (WLL) according to the following code.

NOTE — Working load limit is equal to the safe working load in straight pull of the sling in basic configuration.

WLL (t)	Colour
1	Violet
2	Green
3	Yellow
4	Orange
5	Red
6	Brown
8	Blue
12	Grey

4.2.6 Other Treatments

Treatments shall be applied before the cover is fitted to the core. Such treatments may be impregnation, or complete covering with a flexible coating to improve its resistance to abrasion.

4.3 Coupling Components

4.3.1 Material

Coupling components shall be of metal, but not cast iron and they shall be shock resistant. They shall have a breaking load of at least four times the working load limit of the roundsling. The seating of the coupling component where the sling engages during lifting shall be so designed as to allow the sling to adopt a natural (flattened) form under load and shall be finished with no sharp edges.

NOTE — Coupling components should have good resistance to corrosion, ageing, fatigue and mechanical stress within a temperature range from $-40\text{ }^{\circ}\text{C}$ to $+80\text{ }^{\circ}\text{C}$.

4.4 End Fittings

4.4.1 Material

End fittings shall be of metal, but not of cast iron. They shall be shock resistant. They shall have a breaking load of at least four times the working load limit of the roundsling. If directly connected to a roundsling, the part of the end fitting where the roundsling engages shall be finished with no sharp edges and so designed as to allow the sling to adopt a natural (flattened) form under load.

NOTE — End fittings should have good resistance to corrosion ageing, fatigue and mechanical stresses within a temperature range from $-40\text{ }^{\circ}\text{C}$ to $+80\text{ }^{\circ}\text{C}$.

4.5 Proof Testing of Coupling Components and End Fittings

Coupling components and end fittings shall be proof tested in accordance with 6.3 and shall be free from permanent deformation, cracks, flaws or other defects when examined after testing.

NOTE — Proof-testing is preferably carried out before attachment to the roundsling.

4.6 Working Load Limit

The working load limit for each roundsling in basic configuration (*see* Fig. 1) shall be verified by use of the strength test given in 5.2.

4.7 Safe Working Load

The safe working load for a roundsling or sling assembly shall be the product of the working load limit of the roundsling in basic configuration and the mode factor as specified in Annex C of this standard.

4.8 Safety Factor

The minimum value for the safety factor, as defined in 3.14 shall be 6 for the roundsling and 4 for the coupling components and end fittings.

5 TEST METHOD

5.1 Atmospheric Condition for Conditioning and Testing

The tests shall normally be carried out under prevailing atmospheric conditions. In all cases of dispute, however, tests shall be carried out on samples which have been conditioned for 24 h in an atmosphere of (65 ± 2) percent relative humidity and $27 \text{ }^\circ\text{C} \pm 2 \text{ }^\circ\text{C}$ temperature (*see* IS 6359). Where practicable, tests shall be made in the standard conditioning atmosphere otherwise they shall be made as quickly as possible but not exceeding 15 minutes of removal of the test pieces from the conditioning atmosphere.

5.2 Strength Test

5.2.1 Principle

A representative roundsling (without coupling component and end fitting), a coupling component, a coupling component and end fitting or an end fitting is submitted to a load equal to at least the product of the working load limit and the safety factor in accordance with 4.8.

5.2.2 Apparatus

5.2.2.1 A tensile testing machine of appropriate capacity with constant rate of traverse of straining head not exceeding 250 mm per minute and with a maximum scale reading not greater than ten times the test force.

5.2.3 Selection of Roundslings Specimens

The first manufactured roundsling of each material and working load limit shall be the first test specimen and further test specimens of the same type shall be selected at intervals of at least 250 slings manufactured. If the roundslings as manufactured are of a length unsuitable for testing on available equipment, test specimens identical

except for length shall be made. A length of the cover shall be left open in order to permit examination of the core to establish that it is the same as in the production batch. The ends of the cover where they are abutted shall not be joined so that the cover shall not become load-bearing during the test on this representative sling. This also permits examination of the core.

NOTE — In cases where roundslings are produced with coupling components and ends fittings having a strength less than the product of the working load limit and the safety factor for the roundsling, the specimen should be tested without the coupling component and the end fitting, if provided.

5.2.4 Test Procedure

Place a roundsling specimen; straight and without twist in the test machine using a bollard or pin to attach it; of at least 18 mm diameter for roundslings of strength up to 20 tonne and at least 35 mm diameter for roundslings of larger strength. For a roundsling, apply the force so that the extension of the roundsling takes place at a constant rate not exceeding 250 mm per minute. Secure a specimen of a coupling component, a coupling component and an end fitting or an end fitting in the test machine. Submit the specimen to a test force as described in 5.2.1.

5.2.5 Results

If the test force specified in 5.2.1 is reached without failure the specimen shall be satisfactory.

5.3 Proof Test of Coupling Components and End Fittings

5.3.1 Apparatus

5.3.1.1 A tensile testing machine as described in 5.2.2.1.

5.3.2 Procedure

Subject specimen to a force equivalent to twice its safe working load and examine for freedom from defects.

6 SAMPLING AND CRITERIA FOR CONFORMITY

6.1 Lot

The number of slings of the same working load limit and grade manufactured under similar conditions and delivered to a buyer against a dispatch note shall constitute a lot.

6.2 Sample Size

Sampling shall be as representative as possible of the lot subject to the measurements and tests. Draw the samples at random, at the rate shown by the following formula:

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

where

N_s is the number of slings for sample, and
 N is the size of the lot

NOTE — In case 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 sling for sample.

7 PACKING

7.1 Unless otherwise specified, roundslings shall be packed in accordance with the requirements laid down in IS 3256.

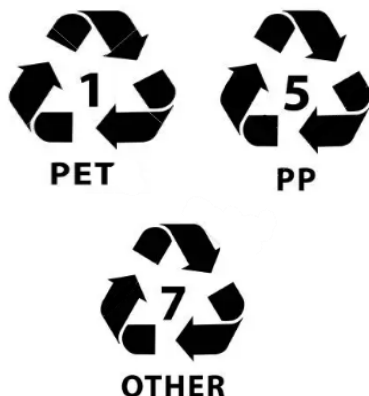
8 MARKING

8.1 Each roundsling shall have a label securely attached to it on which the following shall be marked:

- a) Identification mark or number;
- b) Manufacturer's name or trade-mark;
- c) Material of the roundsling, for example, polyester;
- d) Safe working load in basic configuration;
- e) Recycling logo;
- f) Swachh Bharat logo;
- g) Month and year of manufacture; and
- h) Any other information required by the law in force and/or by the buyers.

NOTES

1 Each roundsling shall be marked with a recycling logo as shown below. While marking the symbol, the respective basic raw material name corresponding to polymer identification number shall be indicated below the symbol in accordance with IS 14534.



2 Each roundsling shall also be marked with a Swachh Bharat logo, clearly visible on the label, either compatible with the art work of the buyer or in black colour.

8.1.1 Each roundsling may also be marked with other information such as effective length, circumference and safe working loads for various modes of use.

8.1.2 The material of the roundsling may be identified additionally by the colour of the label itself. The following label colour shall be reserved exclusively for this use:

Polyamide (nylon)	=	Green
Polyester	=	Blue
Polypropylene	=	Brown

8.1.3 Coupling components and end fittings shall be individually marked or numbered so as to identify them with the test report referred to in **9.3**.

8.1.4 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.

9 DESIGNATION STATEMENT OF CONFORMITY AND INFORMATION TO BE SUPPLIED WITH ENQUIRY OR ORDER

9.1 Designation

The following information shall comprise the full designation of a roundsling in accordance with this Indian Standard and is required when making an enquiry or placing an order:

- a) the expression 'ROUNDSLING';
- b) the effective length or circumference (*see 3.12*);
- c) constituent materials of the roundsling and end fittings (*see 4.1.1, 4.2.1, 4.3.1 and 4.4.1*);
- d) safe working load (*see 3.17*);
- e) required safety factor (*see 3.14*) if it is other than the minimum specified in **4.8**; and
- f) further treatment given, if any.

9.2 Statement of Conformity

The supplier shall submit to the buyer, upon request, a statement of conformity, dated, signed and certifying that the items detailed thereon have been inspected and tested and comply in all respects with

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the requirements of this Indian Standard, along with the following information:

- a) Name and address of supplier;
- b) Identification mark or number of roundsling; and
- c) Designation of the roundsling (*see 9.1*).

When a transaction concerns a batch of roundslings of the same designation the supplier shall submit only one overall statement.

9.3 Test Report for End Fittings

If the roundsling is fitted with coupling components and end fittings if provided; a report of the proof test and examination carried out in accordance with **5.3** shall be provided.

10 USE, MAINTENANCE, AND INSPECTION

10.1 Guidelines for the use, maintenance, and inspection of roundslings are given in Annex B.

ANNEX A
(Clause 2)

LIST OF REFERRED INDIAN STANDARDS

<i>IS No.</i>	<i>Title</i>	<i>IS No.</i>	<i>Title</i>
IS 667 : 1981	Methods for identification of textile fibres (<i>first revision</i>)		physical and mechanical properties (<i>second revision</i>)
IS 3256 : 1980	Code for inland packaging of ropes and cordages (<i>first revision</i>)	IS 14534 : 2016	Plastics — Guidelines for the recovery and recycling of plastics waste (<i>first revision</i>)
IS 3871 : 2013	Fibre ropes and cordage — Vocabulary (<i>third revision</i>)		
IS 6359 : 2023	Method for conditioning of textiles (<i>first revision</i>)	IS 15041 : 2001	Textiles — Flat woven webbing slings made of man-made fibres for general services
IS 7071 : 2021	Fibre ropes — Determination of certain		

ANNEX B
(Clauses 4.1.1 and 10.1)

GUIDELINES FOR USE, MAINTENANCE, AND INSPECTION

B-1 USE OF ROUNDSLING AND ITS MAINTENANCE

B-1.1 Only roundslings as identified in 6 of this standard shall be used.

B-1.2 Roundslings made from any material are liable to wear and other mechanical damage after a long use and can be weakened sometimes by various agencies, such as chemicals, heat, light and weather. Whenever any such damages are detected in the roundslings the same shall be discarded immediately.

B-1.3 Mode factor as indicated in Annex C of this standard shall be observed properly.

B-1.4 In a choked lift, the angle of the choke should be formed naturally and the same should not be forced.

B-1.5 The following precautions shall be ensured during use:

- a) That the sling is of adequate strength and length for the loads;
- b) When moving the sling and load, the same are not dragged;
- c) Knots are not made in the sling;
- d) While lifting, the sling is not twisted;
- e) Not to use the sling for a load with sharp edges without protective sleeves, especially on the parts of the roundslings where abrasion or cuts could occur;
- f) Not to allow the sling to remain under the load if this could cause damage;
- g) Not to drag the sling out from under the load when the load is resting on the sling;
- h) To avoid snatch or shock loading; and
- j) To ensure that the included angles of a sling assembly at the point of suspension do not exceed 90° (see Fig. 3).

B-1.6 The lifting should be carried out in such a manner so that the load is stable and without tilt. If the length of the load is such that several slings have to be used then suitable equipment should be used so that the slings hang nearly vertically and the effect of the load is as nearly as possible equally divided between the legs of the slings.

B-1.7 If slings are used to handle chemicals or are used at high temperature, the manufacturer's instructions should be observed for such uses. For guidance in the selection of roundslings for such uses the resistance of materials is broadly given in **B-1.7.1, B-1.7.2, B-1.7.3** and **B-1.7.4**.

B-1.7.1 Polyamide is virtually immune to the effects of alkalis. It is attacked by mineral acids (a moderate strength acid on a sling becomes progressively stronger by evaporation). User's attention is drawn to the loss of strength of polyamides when wet, which may be of the order of 15 percent.

B-1.7.2 Polyester is resistant to mineral acids but is damaged by alkalis.

B-1.7.3 Polypropylene is little affected by acids and alkalis and is suitable for applications where the highest resistance to chemicals (other than certain solvents) is required. Care should be taken to ensure that polypropylene is adequately stabilized against ultraviolet degradation.

B-1.7.4 All these fibres are highly resistant to mildew and other microbiological attacks.

B-1.8 Slings are subject to degradation by ultraviolet light, so these shall be stored away from sunlight and other sources of ultraviolet radiation.

B-1.9 A sling shall not be stored or dried near a source of heat.

B-1.10 Each sling shall be inspected before every period of use (see **B-2.3**).

B-1.11 A damaged sling shall never be repaired and used and if required the advice of the manufacturer or the supplier would be sought.

B-1.12 The slings shall be stored on a suitably designed rack when not in use.

B-2 INSPECTION OF SLINGS FOR DETECTION OF DAMAGE

B-2.1 Slings should be examined throughout their length for surface chafe, cross or longitudinal cuts in the cover, or any damage to the stitching, coupling components or end fittings.

B-2.2 Chemical attack is indicated by local weakening or softening of the material in the cover so that surface pieces can be plucked or rubbed off, as a powder in extreme cases. Damage to the core should be assumed in these cases and the roundslings immediately withdrawn from services.

B-2.3 Cuts in the cover should raise serious doubts as to the integrity of the core. A sling so affected should be taken out of service immediately.

ANNEX C
(Clauses 3.4, 3.16, 3.17, 4.7 and B-1.3)

**MODES OF ASSEMBLY, MODE FACTORS, SAFE WORKING
LOADS AND STRENGTH**

C-1 The modes of assembly and the mode factors shall be as shown in Fig. 3. The safe working loads and strength of roundslings in different configurations up to a working load limit of 12 tons shall be as given in Table 1.

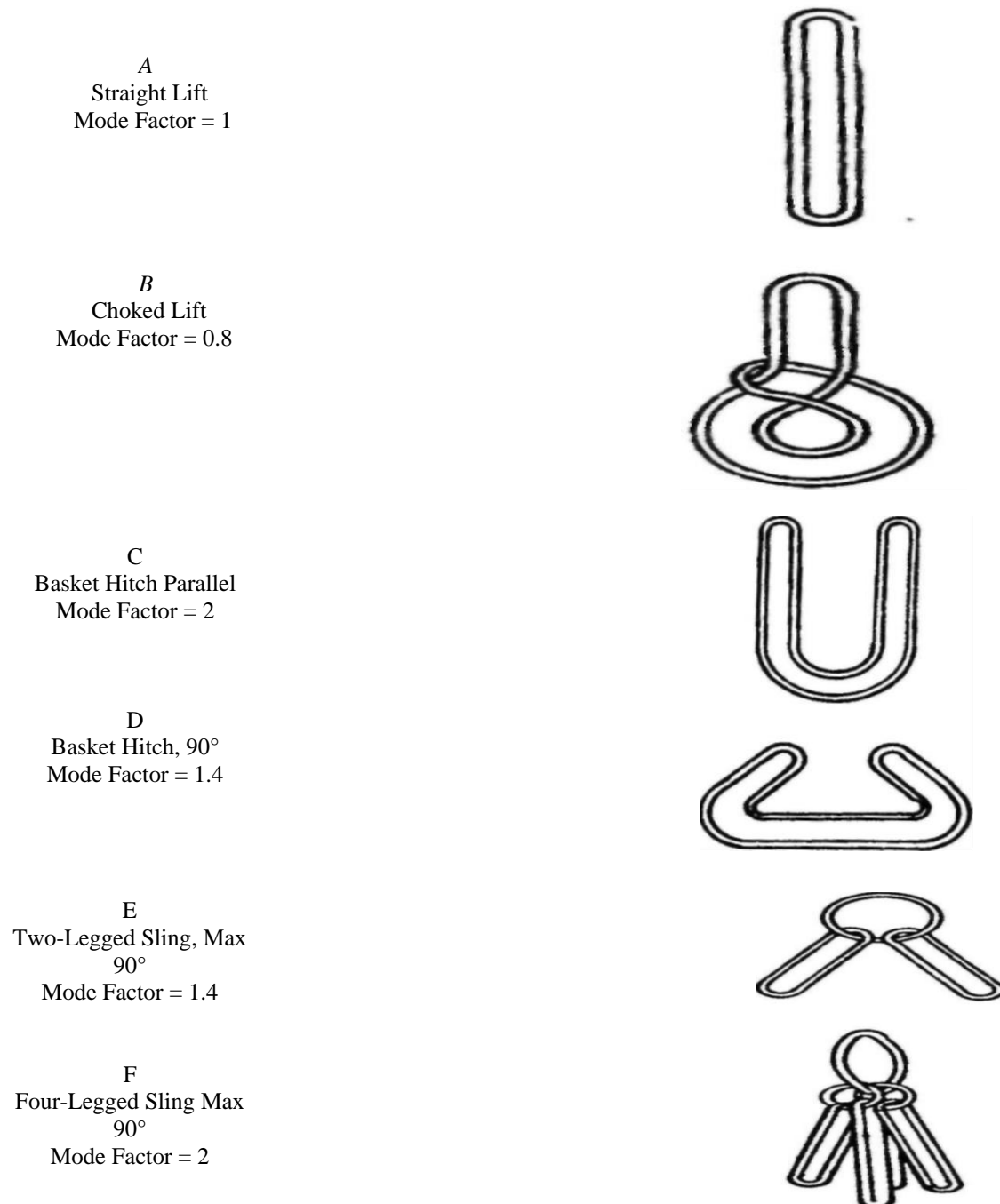


FIG. 3 MODES OF ASSEMBLY FOR ROUNDSLINGS

Table 1 Safe Working Loads and Strength Corresponding to Working Load Limits
(Clause C.1)

Sl No.	Working Load Limit for Each Sling in Basic Configuration	Corresponding Minimum Strength of the Roundsling	Safe Working Loads, <i>Max</i>					
			Straight Lift $M^1 = 1.0$	Choked Lift $M = 0.8$	Basket Hitch		2 Legged <i>Max</i> 90° $M = 1.4$	4-Legged Sling, <i>Max</i> , 90° $M = 2.0$
(1)	t	kN	t ²⁾	t	t	t	t	t
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
i)	1.0	58.8	1.0	0.8	2.0	1.4	1.4	2.0
ii)	2.0	117.7	2.0	1.6	4.0	2.8	2.8	4.0
iii)	3.0	176.5	3.0	2.4	6.0	4.2	4.2	6.0
iv)	4.0	235.4	4.0	3.2	8.0	5.6	5.6	8.0
v)	5.0	294.2	5.0	4.0	10.0	7.0	7.0	10.0
vi)	6.0	353.0	6.0	4.8	12.0	8.4	8.4	12.0
vii)	8.0	470.7	8.0	6.4	16.0	11.2	11.2	16.0
viii)	12.0	706.1	12.0	9.6	24.0	16.8	16.8	24.0

M^1 = Mode factor
t²⁾ = Ton = 1 000 kg
1 kN = 102 kgf approximately

ANNEX D
(Foreword)

COMMITTEE COMPOSITION

Cordage Sectional Committee, TXD 09

<i>Organization</i>	<i>Representative(s)</i>
Indian Institute of Technology Delhi, New Delhi	DR (PROF) R. CHATTOPADHYAY (Chairperson)
Association of Synthetic Fibre Industries, New Delhi	DR M. S. VERMA
Azuka Synthetics LLP, Panchkula	SHRI SUSHANT GUPTA SHRI DEVRAJ THAKUR (<i>Alternate</i>)
Central Coir Research Institute, Kochi	SHRIMATI SUMI SEBASTIAN DR ANITA JACOB (<i>Alternate</i>)
Central Ordnance Depot, Kanpur	REPRESENTATIVE
Chhotanagpur Rope Works Private Limited, Ranchi	SHRI SIDDHARTH JHAWAR SHRI ANURAG JHAWAR (<i>Alternate</i>)
Coast Guard Headquarters, New Delhi	CMDT NUPUR KULSHRESTHA SHRI D. D. SHARMA (<i>Alternate</i>)
Crown Industries, Kolkata	SHRI SANJEEV AGARWAL SHRI GH BHUNIA (<i>Alternate</i>)
Delta Ropes Manufacturing Company, Kolkata	SHRI ANAND MAJARIA SHRI AAYUSH MAJARIA (<i>Alternate</i>)
Directorate of Quality Assurance (DGQA) (Naval), Delhi	CAPT A. K. SHARMA SHRI G. S. N. MURTHY (<i>Alternate</i>)
Directorate of Quality Assurance (DGQA), New Delhi	SHRI K. I. SINGH
Garware Technical Fibres Limited, Pune	SHRI KISHOR J. DARDA SHRI SATISH J. CHITNIS (<i>Alternate</i>)
Indian Jute Industries Research Association, Kolkata	MS SOUMIATA CHOWDHURY SHRI PARTH SANYAL (<i>Alternate</i>)
Indian Jute Mills Association, Kolkata	SHRI SAMIR KUMAR CHANDRA SHRI BHUDIPTA SAHA (<i>Alternate</i>)
Jayshree Fibre Products Limited, Kolkata	SHRI N. K. SOMANI SHRI MANOJ BIYANI (<i>Alternate</i>)
Kohinoor Ropes Private Limited, Aurangabad	SHRI VINAY CHANDAK SHRI SUNIL BIHANI (<i>Alternate</i>)
National Institute of Natural Fibre Engineering and Technology (ICAR-NINFET), Kolkata	SHRI SURAJIT SENGUPTA SHRI KARTICK SAMANTA (<i>Alternate</i>)
Office of the Jute Commissioner, Kolkata	SHRI SOUMYADIPTA DATTA SHRI P. K. BISWAS (<i>Alternate</i>)

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<i>Organization</i>	<i>Representative(s)</i>
Office of the Textile Commissioner, Mumbai	SHRI N. K. SINGH SHRI HUMAYUN K. (<i>Alternate</i>)
Oil and Natural Gas Commission (ONGC), Mumbai	REPRESENTATIVE
Oil India Limited (OIL), Assam	REPRESENTATIVE
Protherm Engineering Private Limited, Faridabad	SHRI RATNESH DEWAN SHRI SANJEEV KUMAR SHARMA (<i>Alternate</i>)
Reliance Industries Limited, Mumbai	SHRI RAJIV GUPTA SHRI KESHAV PAREEK (<i>Alternate</i>)
Shipping Corporation of India Limited, Mumbai	CAPT YOGESH PURI
Thanawala and Company, Mumbai	SHRI HEMAL M. THANAWALA SHRI VIVAAN THANAWALA (<i>Alternate</i>)
Tufropes Private Limited, Silvassa	SHRI ANURAG SARIN SHRI SHASHI BHUSHAN NEGI (<i>Alternate</i>)
BIS Directorate General	SHRI J. K. GUPTA, SCIENTIST 'E'/DIRECTOR AND HEAD (TEXTILES) [REPRESENTING DIRECTOR GENERAL (<i>Ex-officio</i>)]

Member Secretary
SHRI ASHWANI KUMAR
SCIENTIST 'B'/ASSISTANT DIRECTOR
(TEXTILES), BIS

Bureau of Indian Standards

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