

NOTE.—The Institution desires to call attention to the fact that this Specification is intended to include the technical provisions necessary for the supply of the material herein referred to, but does not purport to comprise all the necessary provisions of a contract.

British Standards Institution.

Incorporated by Royal Charter.

FORMED IN 1901 AS THE ENGINEERING STANDARDS COMMITTEE.

INCORPORATED IN 1918 AS THE BRITISH ENGINEERING STANDARDS ASSOCIATION.

British Standard Specification for Aircraft Material.

HEMP LINES AND ROPES FOR KITE BALLOONS.

1. **Description.** (a) The lines and ropes shall be made from clean and well conditioned hemp. (Carded hemp or tow must not be used).

(b) The yarn shall be not coarser than 6 lea. Different counts shall not be mixed in any one line or rope.

(c) Each thread shall be tube twisted and shall contain not fewer than 6 or more than 10 yarns. The number of yarns in each thread shall be the same as the number of the lea.

(d) One yarn dyed blue shall be laid up on one of the 3 strands in each size of line or rope, except for No. 4 line, when one yarn dyed blue shall be laid up in each of two strands for lines made in the rope walk, and in each strand for lines made on a house-machine.

(e) Each strand shall be formed with the twist in the same direction as that of the thread.

(f) The lines and ropes shall be 3 strand.

(g) The lines and ropes shall be dry, clean and unpolished.

2. **Construction and Properties.** (a) The details of construction and the properties of each line or rope when determined by the methods described in Appendices A, B and C shall comply with the requirements specified in the following Table:—

Size	Line 1	Line 2	Line 3	Line 4	Line 5	Rope A	Rope B
Minimum number of threads per strand -	2	3	5	9	12	18	32
Turns per foot in lines and ropes	22±2	17±2	15±1	11±1	10±1	8±1	6±1
*Minimum number of turns per foot held in strand -	30	24	18	14	12	8	6
Circumference in inches -	$\frac{1}{2} \pm \frac{1}{16}$	$\frac{5}{8} \pm \frac{1}{16}$	$\frac{7}{8} \pm \frac{1}{16}$	$1\frac{1}{8} \pm \frac{1}{16}$	$1\frac{1}{2} \pm \frac{1}{16}$	$1\frac{3}{4} \pm \frac{1}{16}$	$2\frac{1}{4} \pm \frac{1}{16}$
Maximum weight per 100 fathoms in lb. -	6	9	15	26	34	52	84
Minimum breaking strength in lb. untreated -	500	650	1000	1800	2250	3500	5000

(b) The supplies shall be in accordance with the relevant standard† patterns in respect of hardness of strand and angle of lay.

(c) The twist held in the strand shall only be determined when there is any question of the lay in the line or rope being unsatisfactory, and the method of determination shall be as described in Appendix D.

*The following information is given for guidance only:—Each thread should contain 1.5 turns per inch with a tolerance of ±10%.
†To be obtained from the British Standards Institution, 28 Victoria Street, London, S.W. 1.

APPENDIX A.

Method for the determination of weight.

The test specimen shall be subjected for one minute to a load equal to the maximum specified weight per 100 fathoms, and the length of specimen used for determining the weight shall be measured under this tension.

The test shall be carried out under ordinary atmospheric conditions but in cases of dispute the specimens shall be conditioned for not less than 48 hours in an atmosphere with a relative humidity of 65 per cent and a temperature of 70° F. (21·1° C.) and then tested under the same conditions.

APPENDIX B.

Method for the determination of turns per foot in lines and ropes.

Five specimens shall be taken from the selected test sample. Each specimen shall be held at both ends in an approved machine and a load equal to 2 per cent of the specified breaking load shall be applied. The average number of turns per foot shall then be determined.

The test shall be carried out under ordinary atmospheric conditions but in cases of dispute the specimens shall be conditioned for not less than 48 hours in an atmosphere with a relative humidity of 65 per cent and a temperature of 70° F. (21·1° C.) and then tested under the same conditions.

APPENDIX C.

Method for the determination of breaking strength.

Each test specimen shall be soaked in water at ordinary room temperature for not less than 3 hours, and whilst still water soaked shall be fixed in an approved testing machine so that the minimum length between the supports is not less than 24 inches. The load shall be gradually and continuously increased until the specimen breaks. The conditions during testing shall be such that the time required for the specified breaking load to be reached after the commencement of the application of the load is in accordance with the following Table:—

Size	Time
Line 1	One minute approximately
" 2	" "
" 3	" "
" 4	" "
" 5	Not more than three minutes or less than one minute
Rope A	" " " "
" B	" " " "

APPENDIX D.

Method for the determination of the number of turns per foot held in strand.

A sample 3 yards long shall be cut 3 feet from either end of the line or rope and tested in three places, each of which shall be not less than 10 inches long. Each end of each length tested shall be fixed firmly in suitable jaws and two of the strands cut away and removed. The third strand shall then be stretched to its full length by moving the jaws (without rotation) and measured. The twist held in the strand shall be ascertained by rotating one of the jaws, the number of turns being divided by the length of the strand (in feet) before untwisting. The average of the three determinations shall be regarded as the number of turns per foot held in the strand.

This Specification having been approved by the Aircraft Industry Committee and endorsed by the Chairman of the Engineering Divisional Council, was published under the authority of the General Council of the Institution as a British Standard on 15th June, 1943.

NOTE.

In order to keep abreast of progress in the Industries concerned, the British Standard Specifications are subjected to periodical review.

Suggestions for improvements, addressed to the British Standards Institution, 28 Victoria Street, London, S.W. 1, will be welcomed at all times. They will be recorded and in due course brought to the notice of the Committees charged with the revision of the Specifications to which they refer.

Scale of Charges for Standard Patterns.

Lines 1 to 4	-	-	9d each; Post free* 1/- each
Line 5	-	-	1/- " " " 1/3 "
Rope A	-	-	1/3 " " " 1/6 "
Rope B	-	-	2/- " " " 2/6 "

*Extra for Colonial and Foreign addresses.