

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

**LIGHT ELASTIC CORD FOR PARACHUTES,  
W/T INSTRUMENTS AND AERIAL SUSPENSIONS**

FOR AIRCRAFT PURPOSES.

1. **Construction.** (a) The cord shall be made of multiple threads of rubber tightly encased in cotton braid, and shall be as smooth and as uniform as possible.

(b) Cords supplied cut to length shall have the ends bound in an approved manner.

Cords shall be allowed to remain for two days under no tension before being cut to length.

2. **Diameters of Finished Cord.** The overall diameter, including the braid, shall be:—

$\frac{3}{16}$  inch,  $\frac{1}{4}$  inch or  $\frac{5}{16}$  inch.

A tolerance of plus or minus 10 per cent shall be permitted on the overall diameter.

3. **Quality of Rubber Thread.** (a) The rubber forming the threads shall be compounded and vulcanised so as to give the maximum possible life. No waste or reclaimed rubber or rubber substitute shall be used.

(b) Square-section thread shall be made from first grade Hevea rubber.

(c) Round-section thread shall be made from high grade rubber latex.

4. **Sizes of Rubber Thread.** The size of the rubber thread shall be in accordance with Clause 6, Tables A and B. Only one size of rubber thread shall be used in any one cord. A tolerance of plus or minus 5 per cent shall be permitted on the respective sizes.

5. **Braiding.** (a) All braiding shall be made of two-fold cotton yarn in the grey. The number of coverings and the type of finish shall be in accordance with the following table:—

| Diameter of Cord.                | Number of Coverings. | Type of Finish.                |
|----------------------------------|----------------------|--------------------------------|
| in.<br>$\frac{3}{16}$            | One                  | Soft                           |
| $\frac{1}{4}$ and $\frac{5}{16}$ | Two                  | Inner, Soft.<br>Outer, Glazed. |

(b) The covering of the  $\frac{3}{16}$  inch diameter cord shall have a helix of cotton thread of approved colour running throughout its length to denote the Manufacturer of the cord and the pitch of the braiding as indicated by the coloured thread shall be uniform throughout the length of the cord.

(c) The outer covering of the  $\frac{1}{4}$  and  $\frac{5}{16}$  inch diameter cords shall have a helix of blue cotton thread running throughout its length and the pitch of the braiding as indicated by the coloured thread shall be uniform throughout the length of the cord. The inner covering shall have a helix of cotton thread of approved colour running throughout its length to denote the Manufacturer of the cord.

(d) The construction of the braid shall be such that when the cord is stretched to the appropriate extensions specified in Clause 7 no rubber shall be visible.

6. **Number of Rubber Threads.** The number of rubber threads used in each cord in accordance with the following tables:—

TABLE A—SQUARE THREADS.

| Diameter of Cord.     | Minimum Number of Rubber Threads. |                       |                       |                       |                       |
|-----------------------|-----------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|                       | in.<br>$\frac{1}{20}$             | in.<br>$\frac{1}{22}$ | in.<br>$\frac{1}{24}$ | in.<br>$\frac{1}{26}$ | in.<br>$\frac{1}{28}$ |
| in.<br>$\frac{3}{16}$ | 15                                | 18                    | 22                    | 26                    | 30                    |
| $\frac{1}{4}$         | 23                                | 28                    | 33                    | 39                    | 45                    |
| $\frac{5}{16}$        | 38                                | 46                    | 55                    | 65                    | 75                    |

TABLE B—ROUND THREADS.

| Diameter of Cord.     | Minimum Number of Rubber Threads. |                       |                       |                       |                       |
|-----------------------|-----------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|                       | in.<br>$\frac{1}{20}$             | in.<br>$\frac{1}{22}$ | in.<br>$\frac{1}{24}$ | in.<br>$\frac{1}{26}$ | in.<br>$\frac{1}{28}$ |
| in.<br>$\frac{3}{16}$ | 19                                | 23                    | 28                    | 33                    | 38                    |
| $\frac{1}{4}$         | 29                                | 35                    | 42                    | 49                    | 57                    |
| $\frac{5}{16}$        | 48                                | 58                    | 70                    | 83                    | 95                    |

7. **Mechanical Properties of the Cords.** The mechanical properties of the cords shall be as specified in the following table when determined by the method specified in Appendix I.

| Diameter of Cord.     | Load in lb. to give 100 per cent Extension. |      | Minimum Total Extension (without failure of the braid). |
|-----------------------|---|------|---|
|                       | Min.  | Max. |   |
| in.<br>$\frac{3}{16}$ | 5   | 7    | 150 per cent  |
| $\frac{1}{4}$         | 7   | 10   | 125 „ „   |
| $\frac{5}{16}$        | 13  | 16   | 125 „ „   |

After removal of the loads, recovery to the original dimensions shall be prompt and complete.

8. **Date of Manufacture.** (a) *Cords supplied in warps.* Coloured cottons shall be included with the rubber thread in the finished cord to indicate the date of manufacture of the finished cord.

The colours shall be as follows:—

| Year. | - | Colour.    |
|-------|---|------------|
| 1940  | - | Yellow     |
| 1941  | - | Blue       |
| 1942  | - | Red        |
| 1943  | - | Green      |
| 1944  | - | Heliotrope |

After 1944 the colours shall be repeated in the same sequence as above for each following group of five years.

The number of coloured cottons to be included shall be as follows:—

For cord made between January 1st and March 31st, inclusive 1.

|     |     |                         |      |
|-----|-----|-------------------------|------|
| " " | " " | April 1st and June 30th | " 2. |
| " " | " " | July 1st and Sept. 30th | " 3. |
| " " | " " | Oct. 1st and Dec. 31st  | " 4. |

(b) *Cords supplied cut to length.* Where cords are supplied cut to length the coloured cottons specified in paragraph (a) above shall be placed under and held in position by the bindings, the coloured cottons protruding from each end of each length by approximately  $\frac{1}{8}$  inch.

9. **Tests on Finished Cord.** (a) *Cords supplied in warps.* Each coil of finished cord shall be tested at three places, selected indiscriminately throughout its length, and the test results at each point shall be in accordance with the loads and extensions set out in the table in Clause 7. No mechanical test shall be carried out within 3 feet of either end of each coil.

(b) *Cords supplied cut to length.* Cords supplied cut to length shall be grouped in parcels of 50, all having the same length and size. One cord shall be selected by the Inspector from each parcel for the determination of the mechanical properties specified in Clause 7.

#### APPENDIX I.

##### Method for the Determination of the Mechanical Properties of the Cords.

The temperature of the test room shall be between 55° and 75° F. (preferably 65° F.). The cord shall be kept at the temperature at which it will be tested for not less than 12 hours prior to being tested. The portion of the cord to be tested shall be stretched three times to 100 per cent extension before actually testing. The mechanical properties shall be determined on the test length "in situ" in the coil.

The length of the test sample immediately before each actual test shall be 5 inches, and the pull shall be made in an approved testing machine.

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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 as a British Standard on 4th November, 1940.

#### NOTE.

*In order to keep abreast of progress in the Industries concerned, the British Standard Specifications are subject 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.*

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.

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*British Standard Specification for Aircraft Material.*

### LIGHT ELASTIC CORD FOR PARACHUTES, W/T INSTRUMENTS AND AERIAL SUSPENSIONS.

1. **Construction.** (a) The cord shall be made of multiple threads of rubber tightly encased in cotton braid and shall be as smooth and as uniform as possible.

(b) Cords supplied cut to length shall have the ends bound in an approved manner.

Cords shall be allowed to remain for two days under no tension before being cut to length.

2. **Sizes of Finished Cord.** The overall diameter, including the braid, shall be:—

$\frac{3}{16}$  inch,  $\frac{1}{4}$  inch or  $\frac{5}{16}$  inch.

A tolerance of plus or minus 10 per cent shall be permitted on the overall diameter.

3. **Quality of Rubber Thread.** The square section thread shall be made of hard, fine Para rubber and the round section thread from high grade rubber Latex, vulcanised with the admixture of sulphur or other approved agent.

4. **Sizes of Rubber Thread.** The count of the rubber thread shall be not larger in section than  $\frac{1}{20}$  inch nor smaller than  $\frac{1}{28}$  inch square or diameter. Only one count of rubber thread shall be used in any one cord. A tolerance of plus or minus 5 per cent shall be permitted on the respective counts.

5. **Braiding.** (a) All braiding shall be made of two-fold cotton yarn in the grey. The number of coverings and the type of finish shall be in accordance with the following table:—

| Size of Cord.                    | Number of Coverings. | Type of Finish.                |
|----------------------------------|----------------------|--------------------------------|
| In.<br>$\frac{3}{16}$            | One                  | Soft.                          |
| $\frac{1}{4}$ and $\frac{5}{16}$ | Two                  | Inner, Soft.<br>Outer, Glazed. |

(b) The outer covering shall have a helix of cotton thread of approved colour running throughout its length, and the pitch of the braiding, as indicated by the coloured thread, shall be uniform throughout the length of the cord.

(c) The weave shall be such as to give adequate covering of the rubber threads at the extensions specified under Clause 7.

6. **Number of Rubber Threads.** The standard sizes of cord shall be obtained by using a number of rubber threads in accordance with the following tables:—

TABLE A—SQUARE THREADS.

| Size of Cord.         | Minimum Number of Rubber Threads. |                       |                       |                       |                       |
|-----------------------|-----------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|                       | In.<br>$\frac{1}{20}$             | In.<br>$\frac{1}{22}$ | In.<br>$\frac{1}{24}$ | In.<br>$\frac{1}{26}$ | In.<br>$\frac{1}{28}$ |
| In.<br>$\frac{3}{16}$ | 15                                | 18                    | 22                    | 26                    | 30                    |
| $\frac{1}{4}$         | 23                                | 28                    | 33                    | 39                    | 45                    |
| $\frac{5}{16}$        | 38                                | 46                    | 55                    | 65                    | 75                    |

TABLE B—ROUND THREADS.

| Size of Cord.         | Minimum Number of Rubber Threads. |                       |                       |                       |                       |
|-----------------------|-----------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|                       | In.<br>$\frac{1}{20}$             | In.<br>$\frac{1}{22}$ | In.<br>$\frac{1}{24}$ | In.<br>$\frac{1}{26}$ | In.<br>$\frac{1}{28}$ |
| In.<br>$\frac{3}{16}$ | 19                                | 23                    | 28                    | 33                    | 38                    |
| $\frac{1}{4}$         | 29                                | 35                    | 42                    | 49                    | 57                    |
| $\frac{5}{16}$        | 48                                | 58                    | 70                    | 83                    | 95                    |

7. **Mechanical Properties of the Cords.** The mechanical properties of the cords shall be as specified in the following table when determined by the method specified in Appendix I.

| Size of Cord.         | Load in lb to give 100 per cent Extension. |      | Minimum Total Extension (without failure of the braid). |
|-----------------------|--|------|---|
|                       | Min.                                       | Max. |   |
| In.<br>$\frac{3}{16}$ | 5  | 7    | 150 per cent.   |
| $\frac{1}{4}$         | 7  | 10   | 125 " "   |
| $\frac{5}{16}$        | 13   | 16   | 125 " "   |

After removal of the loads, restitution shall be prompt and complete.

8. **Date of Manufacture.** (a) *Cords supplied in warps.* Coloured cottons shall be included with the rubber thread in the finished cord to indicate the date of manufacture of the finished cord.

The colours shall be as follows:—

| Year | Colour      |
|------|-------------|
| 1935 | Yellow.     |
| 1936 | Blue.       |
| 1937 | White.      |
| 1938 | Green.      |
| 1939 | Heliotrope. |

The number of coloured cottons to be included shall be as follows :—

|          |      |         |             |     |             |            |             |
|----------|------|---------|-------------|-----|-------------|------------|-------------|
| For cord | made | between | January 1st | and | March 31st, | inclusive, | 1.          |
| ”        | ”    | ”       | ”           | ”   | April 1st   | and        | June 30th,  |
| ”        | ”    | ”       | ”           | ”   | July 1st    | and        | Sept. 30th, |
| ”        | ”    | ”       | ”           | ”   | Oct. 1st    | and        | Dec. 31st,  |
|          |      |         |             |     |             |            | 2.          |
|          |      |         |             |     |             |            | 3.          |
|          |      |         |             |     |             |            | 4.          |

(b) *Cords supplied cut to length.* Where cords are supplied cut to length the coloured cottons specified in paragraph (a) above shall be placed under and held in position by the bindings, the coloured cottons protruding from each end of each length by approximately  $\frac{1}{8}$  inch.

9. **Tests upon Finished Cord.** (a) *Cords supplied in warps.* Each coil of finished cord shall be tested at four places, selected indiscriminately throughout its length, and the test results at each point shall be in accordance with the loads and extensions set out in the table in Clause 7. No mechanical test shall be carried out within 3 feet of a cut end.

(b) *Cords supplied cut to length.* Cords supplied cut to length shall be grouped in parcels of 50, all having the same length and size. One cord shall be selected by the Inspector from each parcel for the determination of the mechanical properties specified in Clause 7.

#### APPENDIX I.

##### Method for the Determination of the Mechanical Properties of the Cords.

The temperature of the test room should be preferably 65° F. The cord shall be kept at a temperature between 60° F. and 70° F. for not less than 3 hours prior to being tested. The portion of the cord to be tested shall be stretched three times to 100 per cent extension before actually testing. The mechanical properties shall be determined on the test length “in situ” in the coil.

The length of the test sample immediately before each actual test shall be 5 inches, and the pull shall be made in a testing machine designed to give a uniform rate of strain.

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This Specification having been approved by the Aircraft Industry Committee and endorsed by the Chairman of the Engineering Divisional Council, was published by the authority of the General Council as a British Standard on 28th October, 1935.

#### NOTE.

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