

Aircraft Material Specification

NON-ROTATING STEEL WIRE ROPE OR CABLE (NOT PREFORMED)

NOTE:—This specification is one of a series issued by the Ministry of Supply either to meet a limited requirement not covered by any existing British Standard for aircraft material, or to serve as a basis for inspection of materials, the properties and uses of which are not sufficiently developed to warrant submission to the British Standards Institution for standardisation.

PART I—STEEL WIRE FOR MANUFACTURE OF WIRE ROPE OR CABLE

1. **Manufacture**

The steel wire for the manufacture of the non-rotating cable shall be of British manufacture and made from steel obtained from an approved manufacturer.

2. **Chemical composition**

(a) The steel shall contain:—

Phosphorus not more than 0.04 per cent.

Sulphur not more than 0.04 per cent.

(b) The wire manufacturer shall supply to the inspector the composition of each consignment of wire rods made from one cast.

3. **Size**

The diameter of the wire shall be within the limits given in columns 3 and 4 of Table 1 shown at the end of this specification.

4. **Freedom from defects**

The wire shall be free from defects.

5. **Coating**

To afford efficient protection against corrosion, all wires shall be coated by hot galvanising and subsequently drawn to size.

6. **Tests on wires**

(a) The following tests shall be carried out at the works of the wire manufacturer to the satisfaction of the inspector:—

(i) *Tensile test*:—

A sample from each coil of wire shall be tested in tension. The ultimate tensile strength must not be less than a value to be specified by the manufacturer of the wire rope or cable.

(ii) *Torsion test*:—

A sample from each coil of wire shall be tested in torsion. The wire shall be twisted in a torsion machine until it breaks. It must stand without breaking, the equivalent of twenty turns on a length equal to one hundred times the diameter of the wire. The wire shall twist uniformly throughout its length.

(iii) *Wrapping test*:—

When the wire is suspected of brittleness, it shall be subjected to the following wrapping test:—

The wire shall be closely wrapped round its own diameter eight times and unwound with the exception of the last turn. The wire must withstand this test without fracture.

(b) Should a test piece fail to fulfil any part of the tests specified, two further samples cut from the same coil of wire shall, if the manufacturer so desires, be submitted to the test under which failure occurred. If both samples fulfil the tests, the wire represented by them shall be accepted, but if either fail, the wire represented shall be rejected.

7. **Marking**

The wire manufacturer shall be responsible for seeing that each coil of wire bears an approved tally marked with the following:—

(i) The specification number and the diameter of the wire.

(ii) The wire manufacturer's or approved identification mark.

(iii) The stamp of the inspector.

PART II—FINISHED NON-ROTATING WIRE ROPE OR CABLE

8. Material

- (a) The steel wire used in the making of the cable shall comply with Part 1 of this specification.
- (b) The cable manufacturer shall specify to the wire manufacturer the minimum ultimate strength of the wire.

9. Construction

- (a) The construction, strength, diameter and weight of cable and the limits of diameter of the wires of which it is composed shall be in accordance with Table I at the end of this specification.
- (b) The construction of the non-rotating cable shall be as follows:—
18 strands (laid 12 right hand over 6 left hand) each strand comprising 7 wires laid 6 over 1, over one central strand comprising 7 wires laid 6 over 1 left hand.

10. Joints and defects

- (a) The jointing of wires shall be reasonably avoided. When it is necessary to introduce new lengths of wire, the joints shall be distributed as far apart as possible. The ends shall be tucked in, and in no case shall more than one joint occur in a length of 30 ft. of strand.
- (b) Each length of finished cable shall be of uniform lay, free from kinks, open and unequally tensioned strands and other irregularities.

11. Tests on the finished cable

- (a) The following test on the cable shall be carried out at the works of the cable manufacturer to the satisfaction of the inspector:—

Tensile test.

A sample selected as specified in clause 12, must give a breaking load of not less than that shown in Column I of Table I. The length of the test piece for the tensile test measured between the points of security shall be not less than four times the lay of the cable. If the cable breaks at a point of security, the tests may be neglected and repeated.

- (b) Should any test piece fail to fulfil the requirements of the tensile test specification in clause 11(a) above, two further samples cut from the same piece of cable shall be tested if the cable manufacturer so desires. If both these samples fulfil the test, the cable represented by them shall be accepted, but if either fail, the cable represented shall be rejected.

12. Selection of samples

A sample shall be cut from each piece of cable, or at the discretion of the inspector one test piece may be taken to represent five pieces of cable provided these pieces have been made in one closing operation.

13. Lengths

The lengths of the pieces, after the samples for testing have been cut off, shall be not shorter, nor more than 5 per cent longer than the length ordered.

14. Weight

The weight of the whole coil shall be used in determining the weight per 100 ft. which must not exceed the figure given in column 6 of Table I.

15. Packing

- (a) The cable shall be wound on a reel. No reel shall be used which in its construction contains any of the following timbers:—

Oak, Sweet Chestnut or Western Red Cedar.

The face of the barrel and the inside of the reel flanges shall be lined with waterproof paper. The diameter of the barrel shall be not less than 40 times the diameter of the cable.

- (b) More than one piece may be wound on a reel if all the pieces on the same reel are of identical diameter and construction. The lengths of the pieces need not be equal.
- (c) The ends of each piece of cable shall be whipped with wire or twine. The innermost end of each piece shall be passed through the side of the reel and left exposed.
- (d) The cable on the reel shall be efficiently protected by means of a suitable covering from mechanical injury.

16. Marking

- (a) The cable manufacturer shall be responsible for seeing that each piece of cable bears an approved tally or seal marked with the following:—

- (i) The specification number and the item number of the cable.
- (ii) The length of the piece (as measured by the drum of the closing machine).
- (iii) The manufacturer's name or approved identification mark.
- (iv) The test number.
- (v) The stamp of the inspector.

- (b) Each piece shall have the tally attached to the inside end which is left exposed. (See Clause 15 (c)).

TABLE I

1		2	3	4	5	6
Minimum Breaking Load		Construction	Diameter of Wire		Maximum Diameter of Cable	Maximum Weight
(cwt.)	(lb.)		Minimum (in.)	Maximum (in.)		
15	1680	19 by 7 See Clause 9 (b)	(a) Main Strands		0.15	3.75
			0.0088	0.0092		
			(b) Main Strand Core			
			0.0125	0.0132		

APPENDIX

Handling of Wire Rope or Cable

The wire ropes or cables in this specification need careful handling to ensure that the lays as manufactured are not disturbed, and further that a rope is not allowed to form a loop in itself, which if pulled tight will produce a kink. In this class of rope the kink is shown by inner strands or the core or individual wires leaving the rope's centre and either lying between the outer strands, or even protruding from the rope in the form of a small loop.

When rewinding a rope, the reel should be mounted in a stand with an axle shaft through the centre hole of the reel to enable the rope to be pulled off in a straight line. It is not advisable to pay off rope from a reel to make flat coils on the floor and then pull out one end for cutting to lengths. This latter practice is very conducive to core protrusion.

When the lengths have been cut off, it is frequently necessary owing to the length involved to coil up the cut lengths by hand coiling. In such cases the hand coil should be of large diameter, say not less than 50 diameters of the rope involved, with a minimum of 6 inches diameter. When these hand made coils are run out, it should be done by the "wheeling" method, or rotating the coil so that the rope is paid out in a straight line. If when handling a length of rope, the rope forms a loop on itself, this indicates a localisation of turn. This must be eliminated by taking the turn out from one end and never by pulling tight; the latter will produce the permanent malformation of core protrusion.

Approved for issue.

H. SUTTON,

Director of Materials Research and Development (Air).

TABLE I

Description of Wine		Quantity	Value
Wine of France	1000	1000	1000
Wine of Italy	500	500	500
Wine of Spain	200	200	200
Wine of Portugal	100	100	100
Wine of Germany	50	50	50
Wine of Austria	50	50	50
Wine of Hungary	50	50	50
Wine of Greece	50	50	50
Wine of Turkey	50	50	50
Wine of Russia	50	50	50
Wine of Poland	50	50	50
Wine of Bohemia	50	50	50
Wine of Moravia	50	50	50
Wine of Silesia	50	50	50
Wine of Prussia	50	50	50
Wine of Saxony	50	50	50
Wine of Brandenburg	50	50	50
Wine of Pomerania	50	50	50
Wine of Mecklenburg	50	50	50
Wine of Schleswig	50	50	50
Wine of Holstein	50	50	50
Wine of Lusatia	50	50	50
Wine of Westphalia	50	50	50
Wine of Rhineland	50	50	50
Wine of Franconia	50	50	50
Wine of Swabia	50	50	50
Wine of Bavaria	50	50	50
Wine of Württemberg	50	50	50
Wine of Baden	50	50	50
Wine of Hesse	50	50	50
Wine of Thuringia	50	50	50
Wine of Lower Saxony	50	50	50
Wine of Upper Saxony	50	50	50
Wine of East Prussia	50	50	50
Wine of West Prussia	50	50	50
Wine of Poznań	50	50	50
Wine of Greater Poland	50	50	50
Wine of Lesser Poland	50	50	50
Wine of Lublin	50	50	50
Wine of Galicia	50	50	50
Wine of Volhynia	50	50	50
Wine of Podolia	50	50	50
Wine of Bukovina	50	50	50
Wine of Bessarabia	50	50	50
Wine of Moldavia	50	50	50
Wine of Wallachia	50	50	50
Wine of Transylvania	50	50	50
Wine of Hungary	50	50	50
Wine of Croatia	50	50	50
Wine of Slavonia	50	50	50
Wine of Dalmatia	50	50	50
Wine of Istria	50	50	50
Wine of Venetia	50	50	50
Wine of Lombardy	50	50	50
Wine of Piedmont	50	50	50
Wine of Liguria	50	50	50
Wine of Tuscany	50	50	50
Wine of Umbria	50	50	50
Wine of Marche	50	50	50
Wine of Abruzzo	50	50	50
Wine of Molise	50	50	50
Wine of Campania	50	50	50
Wine of Basilicata	50	50	50
Wine of Apulia	50	50	50
Wine of Calabria	50	50	50
Wine of Sicily	50	50	50
Wine of Sardinia	50	50	50
Wine of Corsica	50	50	50

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