

OBSOLESCENT
MARCH 1977

Pren type electric cables for aircraft

NOTE The current ratings quoted in this British Standard apply only when the cables are used in aircraft, and are nominal values. Actual ratings appropriate to various conditions of installation in aircraft are given in Section J of British Civil Airworthiness Requirements.

UDC 621.315.2:629.13.066

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Foreword

This revision of BS E 21 has been prepared to bring the specification up to date in the light of current practice and of experience gained in working to the first issue, published in November 1952. The principal changes are:—

- a) the introduction of Duprensheathround 6 cable;
- b) the modification of the construction of Septopren, Septoprenmet and Septoprensheath cables to consist of seven cores laid up around a central dummy core, and to avoid confusion with cables in the previous issue of this standard, the addition of the suffix “large” to the names of these cables;
- c) the introduction of Sextoprensheath 6 and Nonoprensheath 6 cables;
- d) the deletion of reference to Uniflexpren 3 cable and the introduction of a Uniflexpren 6 cable, coloured black;
- e) the amendment of the values required for the physical properties of the polychloroprene compound insulation and sheath;
- f) the introduction of a requirement for the printing of the letters “AL” in addition to the current rating on aluminium cables.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 11 and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

This British Standard, having been approved by the Aircraft Industry Standards Committee, and endorsed by the Chairman of the Engineering Divisional Council, was published under the authority of the General Council of the Institution on 23 December 1957

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The following BSI references relate to work on this standard:—
Committee reference ACE/6
Draft for comment CW(ACE)9628

ISBN 0 580 34563 7

Amendments issued since publication

Amd. No.	Date of issue	Comments
4417	January 1962	
5947	November 1966	
146	November 1968	
2250	March 1977	

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1 Scope

This British Standard specifies the requirements for “Pren” type cables for aircraft wiring of circuits where the potential between conductors, or between a conductor and metal braid or the aircraft structure does not exceed 600 volts (r.m.s.) in voltage and 1 600 c/s in frequency; also where any combination of ambient temperature and conductor current for continuous service does not produce a stabilized conductor temperature in excess of 90 °C. These cables are suitable for fixed wiring in aircraft when low temperatures (– 75 °C) are encountered, but are not suitable for severe flexing below – 40 °C. The cables do not support combustion but they should not be regarded as complying with the requirements of BS G 100, “*General requirements for electrical equipment and indicating instruments for aircraft*”, in regard to fire resistance.

The cables are unsuitable for use without additional protection in areas where ester-based fluids are present.

The generic name “Pren” shall be applied only to cables covered by this British Standard and complying with all requirements of the specification.

The standard includes the following four ranges of cables, the complete nomenclature of which is given in Appendix A:—

- a) *Pren*. Cable with a copper conductor and an insulation of glass braid and polychloroprene compound, for single core cables: multi-core cables have an overall finish of glass braid and lacquer: the conductor of the Uniflexpren cable is of a braided construction which shall not be on a string centre.
- b) *Prenal*. Similar to the Pren range but with a conductor of aluminium instead of copper.
- c) *Prenmet*. Similar to the Pren range but with the addition of a metal braid.
- d) *Prensheath*. Multi-core Pren cables sheathed with a polychloroprene compound in place of the lacquered glass braid

Section 1. Requirements

2 Materials

a) *Copper conductors and wires*. Copper conductors and wires shall be in accordance with BS 7, “*Rubber-insulated cables and flexible cords for electric power and lighting*”, as far as applicable. Wires taken from conductors, but not from braids, shall meet the requirements for maximum tensile strength and minimum elongation at break specified in Clause 22 of this British Standard.

b) *Aluminium conductors*. Aluminium wires shall be hard drawn and, before stranding, shall comply with the requirements of BS 2791, “*Aluminium conductors in insulated cables*”, where applicable. Aluminium wires taken from the stranded or bunched conductor shall comply with the tensile and wrapping test requirements of Clause 22 of this British Standard.

c) *Glass braid*. The free alkali content of the glass shall not exceed 1 per cent. The glass shall be of such fineness that the finished cable complies with all the test requirements of this British Standard.

d) *Polychloroprene compound*. The polychloroprene compound shall be of such a quality that the finished cable complies with all the test requirements of this British Standard.

e) *Lacquer*. The lacquer shall consist of a non-inflammable, heat-, oil-, and water-resistant compound.

3 Construction

a) *General*.

i) *Conductor*. The conductor shall be braided, bunched, stranded or rope stranded, as specified. It shall consist of tinned annealed copper wires complying with the requirements of Clause 2 a), or of hard drawn aluminium wires complying with the requirements of Clause 2 b). Joints in the single copper wires shall be brazed or soldered but the complete conductor shall not be joined. In the case of aluminium and braided copper conductors the ends of the wires may be tucked into the conductor. The conductor of the Uniflexpren cable shall be of a braided construction which shall not be on a string centre.

Table 1 and Table 2 state the number and diameter of individual wires and the formation to be used for the complete conductor.

There shall be no kinks or other irregularities in the conductor.

ii) *Complete cable*. The insulation adjacent to the conductor shall consist of a glass braid. A polychloroprene compound, the colour of which shall be in accordance with Clause 5, shall be applied over the glass braid to the dimensions given in Table 1 and Table 2. The insulation shall be of uniform circular cross-section throughout the length of the cable and the conductor shall be evenly centred in the insulation.

The insulation shall not be loose, but it shall be possible to strip the complete insulation, leaving the conductor in a condition sufficiently clean to permit satisfactory connection to terminations.