

Specification for

Electrically-heated pitot and pitotstatic pressure heads

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Foreword

This revision of BS G 135:1955 takes account of new techniques of compensating for pressure errors and of new standards of de-icing requirements.

This standard makes reference to the following British Standards:
BS 3G 100, *General requirements for equipment in aircraft.*
BS G 101, *General requirements for aircraft indicators: presentation and case sizes.*

NOTE Where metric equivalents are given, the figures in British units are to be regarded as the standard. The metric conversions are approximate. More accurate conversions should be based on the tables in BS 350, “*Conversion factors and tables*”.

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 8, an inside back cover 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 Aerospace Industry Standards Committee and endorsed by the Chairman of the Engineering Divisional Council, was published under authority of the General Council on 29 December 1967

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The following BSI references relate to the work on this standard:
Committee reference ACE/30
Draft for comment D65/1698

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Amendments issued since publication

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1225	July 1973	Indicated by a sideline in the margin

Contents

	Page
Foreword	Inside front cover
1 Scope	1
2 Definitions	1
3 General construction	1
4 Particular requirements	1
5 Aerodynamic accuracy	2
6 Declarations	3
7 Tests: General	3
8 Type tests	3
9 Production routine tests	6
10 Production quality tests	6
Appendix A Serviceability tests	Inside back cover
Figure 1 — Low pressure connectors	6
Figure 2 — Screwed connections	7

1 Scope

1.1 This British Standard specifies the requirements for two grades of electrically-heated pitot and pitotstatic heads for aircraft.

Grade A, heads fully de-iced and suitable for high speeds.

Grade B, heads not suitable for flight in severe icing conditions.

1.2 Grade A comprises two classes of head:

Class 1, heads not compensated for pressure error.

Class 2, heads compensated for pressure error.

1.3 Grade B heads will normally be of the non-compensated type.

2 Definitions

For the purposes of this British Standard the following definitions apply:

2.1

pitot pressure head

a tube, having an open aperture at one end, facing in the direction of flight for sensing the total impact pressure, and a pipe connection at the other end for transmitting it to the aircraft pitot pressure system

2.2

pitotstatic pressure head

a tube similar to **2.1** with additional circumferential slots or holes connected to a separate duct and pipe connection for sensing the static air pressure and transmitting it to the aircraft static system

3 General construction

The design and construction of the head shall comply with the relevant requirements of BS 3G 100.

4 Particular requirements

4.1 External shape and contour. The external shape and contour of the head shall be such as to satisfy the aerodynamic accuracy requirements of Clause 5.

4.2 Orifices and pressure ducts

4.2.1 The pitot orifice shall be a single hole of at least $\frac{3}{16}$ in (4.8 mm) diameter.

4.2.2 Means shall be incorporated, in the pitot pressure path from the nose of the head, to ensure that driving rain cannot penetrate down the pitot tube.

4.2.3 Provision shall be made for positive locking of any draining plug which may be incorporated in the head.

4.2.4 The static orifices shall consist of a row, or rows, of small holes or slots disposed around the cross section of the head. These shall be of such a size that they will not be blocked by driving rain, and account shall be taken also of the mounting and the avoidance of lag errors. The finish of the orifices or slots shall be free from burrs or rounding of edges.

4.2.5 Except on Grade B heads, there shall be no drain hole between the pitot and the static systems (see note).

4.2.6 There shall be no restriction, in the diameter of the pipe leaving the heated region, which could cause blockage of the passage by a drop of condensate. In addition, any restriction to any part of the pressure path shall be kept to a minimum to avoid affecting the time constant or dynamic performance.

The preferred pipe connections from the head are $\frac{3}{8}$ in (9.5 mm) o.d. for the static line and $\frac{5}{16}$ in (7.9 mm) o.d. for the pitot line. If low pressure connectors are used they should comply with Figure 1, the correct position of the union on the pipe being indicated when the yellow band is uncovered. Alternatively, if screwed connections are used, e.g. on Grade A heads, they should be in accordance with Figure 2. If any other types of connector are used they should be of an approved design.

4.2.7 The entire pressure ducts of the head shall be designed to withstand a minimum pressure of at least 15 lbf/in² (1.0 kgf/cm²).

NOTE Whereas at low Mach number the error in the static pressure system, caused by a drain hole whose area relative to that of the pitot duct is 1 : 50, is of an acceptably low order, the error at higher Mach numbers becomes increasingly unacceptable.

4.3 Location, orientation and locking. The design of the head shall provide for positive location, correct orientation, and locking.

4.4 Heating element

4.4.1 The heating element shall be of such size and durability as will comply with the performance declared for the particular head.

4.4.2 The whole of the heating system to the external connections shall form a completely sealed unit.

4.4.3 In pitot pressure heads the function of the heating element is to maintain the pitot orifice and nose, together with any drain hole that may be incorporated, free from ice.

In pitotstatic heads the whole of the external surface of the head shall be kept sufficiently free from ice to maintain aerodynamic accuracy.