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BSI Standards Publication

Aircraft ground equipment — Passenger boarding bridge or transfer vehicle — Interface requirements with aircraft doors

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National foreword

This British Standard is the UK implementation of ISO 16004:2017. It supersedes BS ISO 16004:2005 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee ACE/57, Air cargo and ground support equipment.

A list of organizations represented on this committee can be obtained on request to its secretary.

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INTERNATIONAL STANDARD

ISO 16004

Second edition
2017-01

Aircraft ground equipment — Passenger boarding bridge or transfer vehicle — Interface requirements with aircraft doors

Matériel au sol pour aéronefs — Passerelle passagers ou autobus élévateur — Exigences d'interface avec les portes d'aéronefs

Reference number
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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

The committee responsible for this document it ISO/TC 20, *Aircraft and space vehicle*, Subcommittee SC 9, *Air cargo and ground equipment*.

This second edition cancels and replaces the first (ISO 16004:2005), which constitutes a minor revision and includes the following changes:

— clarification of the scope;

— normative references have been updated;

— table of contents has been added; and

— bibliography has been updated.

Introduction

Many aircraft types include, in the vicinity of the main deck doors used for passenger access, a variety of protruding items such as pitots, probes, sensors, strakes, etc. which are exposed to inadvertent damage and have been known to suffer from inappropriate design and/or positioning of passenger boarding bridges or passenger transfer vehicles. Since perfect condition of these items is generally essential to flight safety, it is the intent of this document to specify minimum interface requirements on passenger boarding bridges or passenger transfer vehicles such that systematic or inadvertent contact with one of them is avoided.

This document accordingly specifies the minimum interface requirements to be met by the aircraft mating section of either a passenger boarding bridge or a passenger transfer vehicle, in order to allow compatibility with aircraft passenger doors and their surroundings without interference with or risk of damage to these protruding items.

Throughout this document, the minimum essential criteria are identified by the use of the keyword “shall”. Recommended criteria are identified by the use of the keyword “should” and, while not mandatory, are considered to be of primary importance in providing safe passenger boarding bridge or passenger transfer vehicles and minimizing the risk of inadvertent damage to vital aircraft parts. Deviation from recommended criteria should only occur if positively required by basic passenger boarding bridge or passenger transfer vehicle design factors with a significant cost impact, and after careful consideration, extensive testing, and thorough service evaluation have shown alternate methods to be satisfactory.

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Aircraft ground equipment — Passenger boarding bridge or transfer vehicle — Interface requirements with aircraft doors

WARNING — Passenger boarding bridge or passenger transfer vehicle compliance with the provisions of this document will only ensure protection of the exposed devices on the indicated existing aircraft types. As to other potential circumstances:

- **where a passenger boarding bridge or passenger transfer vehicle is to be operated on another existing aircraft type, the responsible design or operating body should check the nature and location of any items protruding in the vicinity of the passenger door(s) used, in order to check if the aircraft is protected against interference or if particular positioning precautions are required, and**
- **features specific to one aircraft type or sub-type have been identified. Passenger boarding bridge design may not take them into account where bridge and/or aircraft stand characteristics preclude handling of the particular aircraft type concerned. Passenger transfer vehicles shall take them into account, inasmuch as the vehicle is capable of reaching the aircraft type's door sill height.**

1 Scope

This document specifies dimensional interface and unobstructed space requirements applicable to the aircraft mating section of either

a) passenger boarding bridges, or

b) passenger transfer vehicles

used at airports for boarding and disembarkation of passengers on the types of civil transport aircraft which have been listed hereafter. These types of aircraft have a door sill height greater than 2,0 m (80 in) over the ground. Lower aircraft usually do not require such means of access, and have not been taken into account.

Data was compiled and checked as to the exact location of such items on the most frequently used civil transport aircraft types, including the following:

— AIRBUS	A300/A310/A318/A319/A320/A321/A330/A340
— BOEING COMMERCIAL AIRPLANE	B717/B727/B737/B747/B757/B767/B777
— LOCKHEED AIRCRAFT	L1011
— McDONNELL DOUGLAS	DC9/DC10/MD11/MD80/MD90

NOTE "Aircraft type", in this context, means the whole family of aircraft sub-types with the same fuselage design and the same general type designator, i.e. potentially includes any future derivative aircraft with the same fuselage.

It is not the intent of the present document to specify any requirements applicable to aircraft design, but to make a status of aircraft passenger door 1 surrounding interface for aircraft designed up to year 2000. Future aircraft types with a new fuselage are expected to meet the main deck passenger doors requirements for interface with passenger boarding bridges or passenger transfer vehicles of ISO 7718 (all parts), which would ensure their compatibility with the aircraft mating section of passenger boarding bridges or passenger transfer vehicles meeting the requirements of the present document.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 6966-1, *Aircraft ground equipment — Basic requirements — Part 1: General design requirements*

ISO 6966-2, *Aircraft ground equipment — Basic requirements — Part 2: Safety requirements*

ISO 7718-1, *Aircraft — Passenger doors interface requirements for connection of passenger boarding bridge or passenger transfer vehicle — Part 1: Main deck doors*

ISO 7718-2, *Aircraft — Passenger doors interface requirements for connection of passenger boarding bridge or passenger transfer vehicles — Part 2: Upper deck doors*

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

4 General safety requirements

4.1 The passenger boarding bridge or passenger transfer vehicle design shall meet the appropriate requirements of ISO 6966-1 and ISO 6966-2.

4.2 In addition, the passenger boarding bridge design should, where applicable, meet the specific safety requirements of IATA AHM 922 and EN 12312-4.

5 Equipment requirements for interface with aircraft

5.1 Reference planes

5.1.1 The following reference planes are used in order to define the location of the potential interference areas in relation with the aircraft passenger doors.

5.1.2 Vertical reference plane

The plane, perpendicular to the local aircraft skin, passing through the most forward edge of the door when stowed in the open position.

For aircraft types with an inward opening door, the vertical reference plane shall be the plane, perpendicular to the local aircraft skin, located 0,915 m (3 ft) forward of the forward edge of the door opening.

NOTE This vertical reference plane was chosen because the most flight safety critical items on commonly operated aircraft types are located immediately forward of it and it is usually situated immediately in front of a passenger boarding bridge's operator, thus allowing optimum positioning accuracy.

5.1.3 Horizontal reference plane

The plane of the aircraft door sill.

NOTE 1 This plane is horizontal only in reference to the aircraft, not to the ground: most civil transport aircraft types present a nose down cabin floor slope of, typically, 1° to 2°. Unless the passenger boarding bridge or passenger transfer vehicle's platform is equipped with a "twisting" adjustment system, it will usually be at a slight angle from the reference plane.

NOTE 2 On those aircraft with an outward opening door, the lower edge of the door when stowed in the open position is located between 51 mm (2.0 in) and 90 mm (3.5 in) over the horizontal reference plane.

5.2 Critical areas

For the aircraft types taken into account, the critical areas where any interference from the passenger boarding bridge or passenger transfer vehicle shall be avoided are shown in Figure 1. In relation to the reference planes defined in 5.1, the areas concerned are the hatched areas shown in Figure 2.

NOTE Figures 1 and 2 concern the doors on the left-hand (LH) side of the aircraft. Where a passenger boarding bridge or passenger transfer vehicle is intended for use on right-hand (RH) side doors, a symmetrical pattern is used.

5.3 Minimum requirements

The design of the aircraft mating section of the passenger boarding bridge or passenger transfer vehicle shall guarantee the absence of interference with any of the critical areas defined in 5.2, while the suitably padded leading edge of the platform is in contact with the aircraft skin, including any effect of padding flexibility. The absence of interference shall be ensured

a) within a reasonable range of longitudinal (parallel to the aircraft centerline) positioning accuracy; a positioning accuracy of ±100 mm (4 in) or more should be considered,

b) with the passenger boarding bridge or passenger transfer vehicle platform floor level (see NOTE 1 in 5.1.3) with the horizontal reference plane (aircraft door sill), and

c) within the expected range of vertical excursion, during normal aircraft turnaround activities, of the relative positions of the aircraft and the passenger boarding bridge or passenger transfer vehicle's platform.

5.4 Automatic levelling

Passenger boarding bridges shall be equipped with an automatic levelling system as defined in IATA AHM 922. The automatic levelling system performance and operation shall meet the requirements of 5.3.

5.5 Back-up system

A back-up system as defined in IATA AHM 922 shall be provided on passenger boarding bridges in order to avoid a risk of damage to the aircraft in the event of automatic levelling system failure. The back-up system may consist in (a) bridge platform cut-out(s) of appropriate dimensions, ensuring the absence of interference with any of the critical areas defined in 5.2.

6 Operating requirements

Staff authorized to position and remove a passenger boarding bridge or passenger transfer vehicle shall be briefed at regular intervals on:

a) the existence, location and importance for flight safety of critical devices such as pitots, probes, sensors, etc. on those aircraft types and sub-types serviced at the airport,

b) the passenger boarding bridge or passenger transfer vehicle positioning and removal procedures, including longitudinal accuracy, required to ensure the absence of interference, and

c) the requirement to visually check the critical devices at passenger boarding bridge or passenger transfer vehicle removal, and advise the crew or qualified aeronautical engineer in charge in the event of traces of interference being apparent.

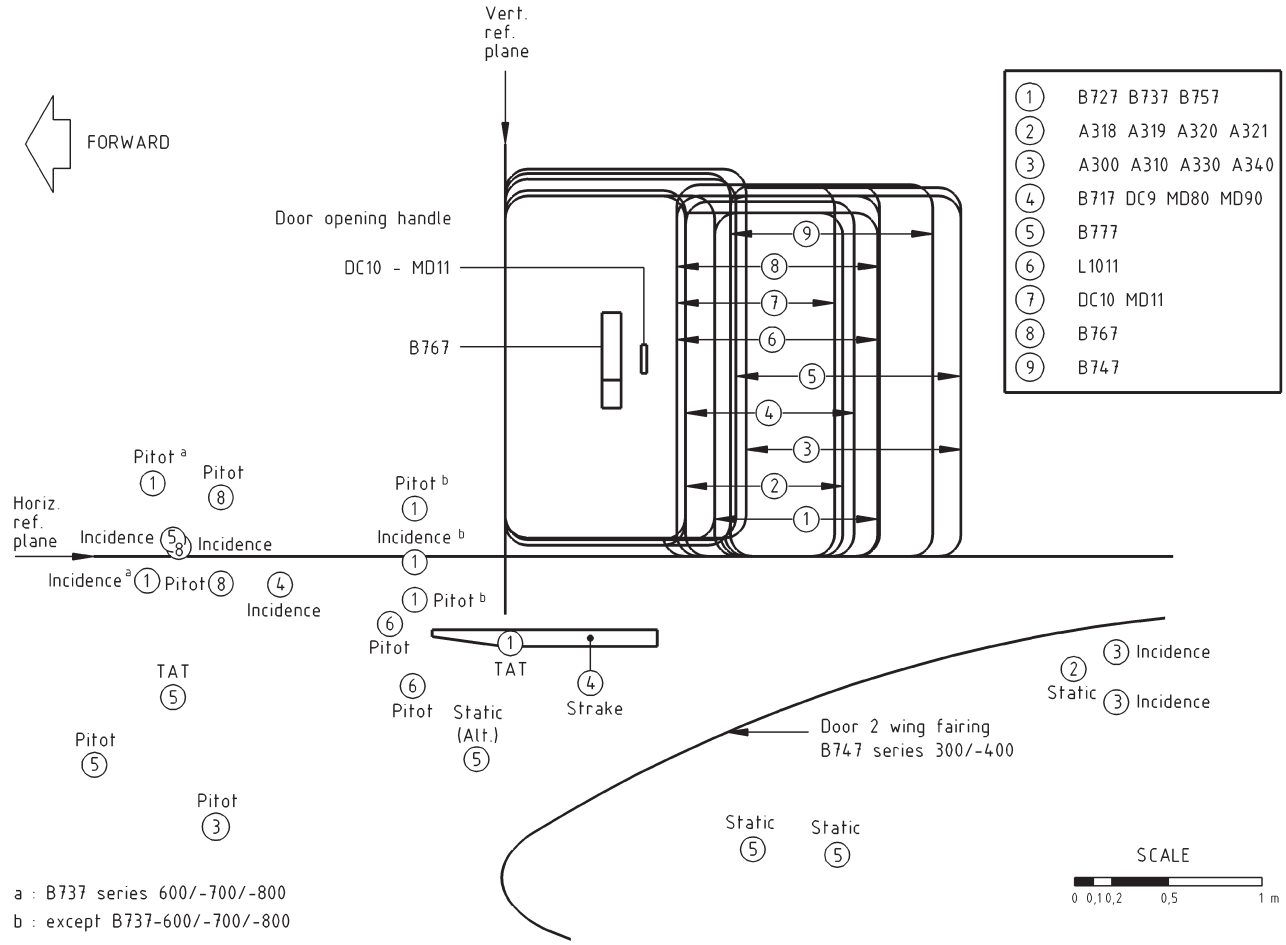

Figure 1 — Location of exposed devices on the indicated types of aircraft (aircraft left hand side shown, right hand side symmetrical)

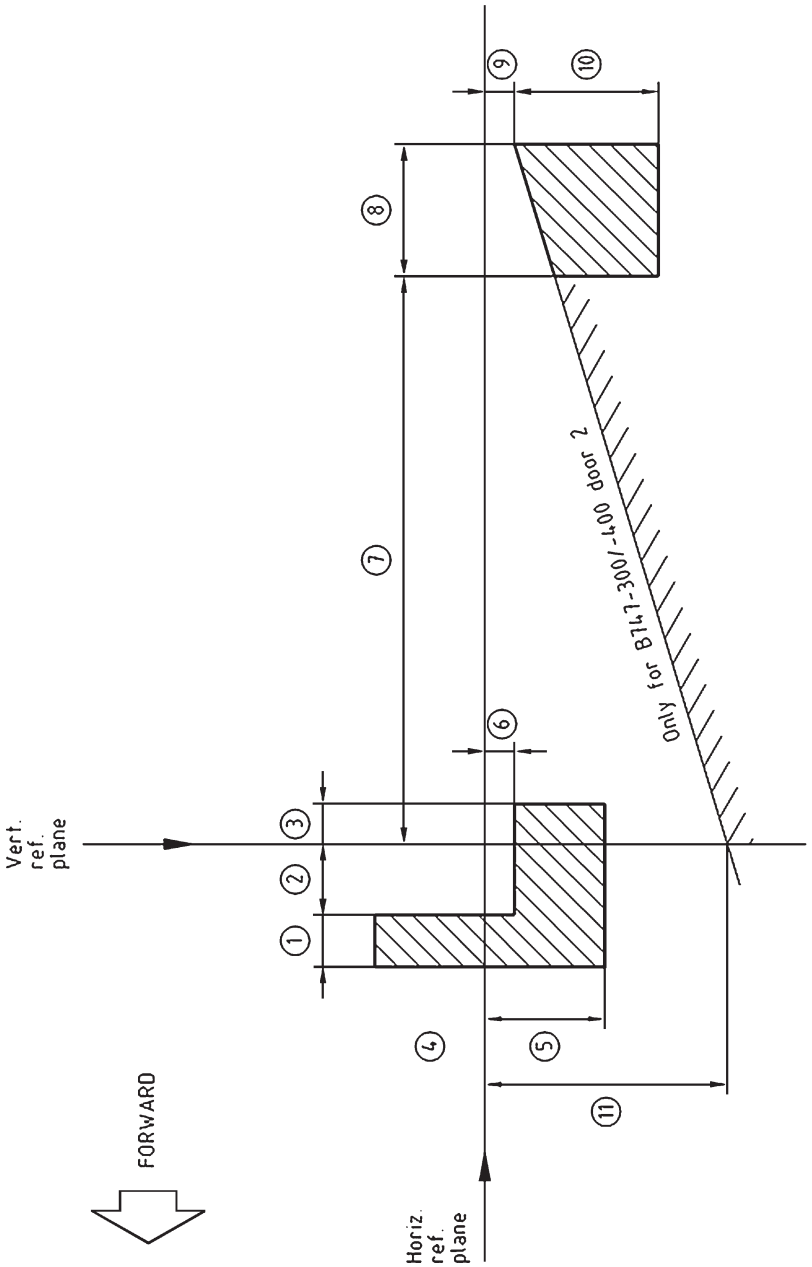

Figure 2 — Areas to be left clear by passenger boarding bridge or transfer vehicle (aircraft left hand side shown, right hand side symmetrical)

REF	DIM. (mm)	DIM. (in)
1	265	10,5
2	360	14,0
3	205	8,0
4	560	22,0
5	610	24,0
6	150	6,0
7	2 895	114,0
8	675	26,5
9	150	6,0
10	735	29,0
11	1 235	48,5
Conversions rounded up to nearest 5 mm or 0,5 inch		

Bibliography

[1] EN 12312-4[1)], *Aircraft ground support equipment — Specific requirements, Part 4: Passenger boarding bridges*

[2] IATA Airport Handling Manual specification (AHM) 922, *Basic requirements for passenger boarding bridge aircraft interface*[2)]

[3] IATA Airport Development Reference Manual (ADRM) section *Passenger boarding devices*[1)].

[4] Airport Planning / *Airplane Characteristics manuals for each aircraft type or sub-type*[3)]

[5] When applicable, *Aircraft Facility and Equipment Planning manuals for each aircraft type or sub-type*[3)].

1) European Standard EN 12312-4 principally concerns the prevention of safety risks to personnel associated with passenger boarding bridges, and can be obtained from:– Comité Européen de Normalisation (CEN), rue de Stassart 36, B 1050 Brussels, Belgium– or any of the 33 European national Standards Institutes, member bodies of CEN.

2) Specification AHM 922 and ADRM section Passenger Boarding Devices are respectively part of International Air Transport Association (IATA) Airport Handling Manual and Airport Development Reference Manual, which can be obtained from:– IATA Publication Dept. 800 place Victoria, P.O. Box 113, Montréal, Québec 4HZ1M1, Canada.

3) Can be obtained from each airframe manufacturer concerned.

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