

Environmental tests for aircraft equipment — Steady-state acceleration

ICS 49.020

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Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee ACE/58, Environmental and operating conditions for aircraft equipment, upon which the following bodies were represented:

- Civil Aviation Authority
- Federation of the Electronics Industry
- Ministry of Defence
- Society of British Aerospace Companies
- Society of Environmental Engineers

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National foreword

This British Standard has been prepared by Technical Committee ACE/58 and is identical with ISO 2669:1995 *Environmental tests for aircraft equipment — Steady-state acceleration*, published by the International Organization for Standardization (ISO).

Cross-reference

Publication referred to	Corresponding British Standard
ISO 7137:1995	BS 4G 229:1996 <i>Schedule for environmental conditions and test procedures for airborne equipment</i> (Identical)

NOTE The latest edition of an Aerospace series standard is indicated by a prefix number.

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 10, 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.

Introduction

The tests specified in this International Standard aim to determine the performance characteristics and to confirm the structural integrity and safety of airborne equipment and airborne equipment mountings when they are subjected to gradually changing acceleration forces generated by an aircraft, manoeuvre such as turn, pull-out, roll, etc. For example, the tests would be expected to indicate:

- a) any change in operating state and any variations in performance;
- b) any jamming occurring in moving parts and any variation in their path;
- c) any reduction in the free travel and change in the suspension characteristics of the anti-vibration mountings that could damage the operating state and capability of anti-vibration;
- d) any breakage or any weakness in the fastenings mounting devices or structure of the equipment that could constitute a hazard to the aircraft or its occupants.

1 Scope

This International Standard specifies two types of steady-state acceleration test and establishes five severity grades of acceleration forces used to simulate a gradually changing acceleration environment representative of that which civil aircraft equipment can encounter in operational use.

The emergency landing case is not within the scope of this International Standard; reference should be made to ISO 7137 for this case.

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards. ISO 7137:—, *Aircraft — Environmental conditions and test procedures for airborne equipment*¹⁾.

¹⁾ To be published. (Revision of ISO 7137:1992)

3 Apparatus

3.1 General characteristics

3.1.1 A centrifuge should be used for producing the required acceleration forces.

3.1.2 In special cases, if stated by the relevant equipment specification, inflight testing or any other method that can produce linear acceleration may be used instead of a centrifuge.

3.1.3 The apparatus shall be capable of producing the specified acceleration forces within $\pm 10\%$ at all points in the equipment.

3.1.4 The apparatus shall be fitted with the electrical, hydraulic and/or pneumatic input and output connections needed to operate the equipment under test and to conduct operational checks. The loss of the connections shall not exceed the limit specified in the relevant specification.

3.1.5 The test apparatus shall be equipped with an adjustable acceleration system, and any additional vibration due to the test apparatus shall be maintained within the tolerance specified in the relevant specifications.

3.1.6 The centrifuge shall be equipped with an adjustable mass balance system to compensate for any out-of-balance forces due to the mass of the test item.

3.2 Special cases

3.2.1 If, because of the excessive size of the equipment, it is not possible to maintain the tolerance specified in **3.1.3** at all points in the equipment, the relevant equipment specification may relax requirements on those parts not considered to be sensitive to specified acceleration forces.

3.2.2 During functional tests in vertical directions carried out with equipment sensitive to gravity or inversion and which could cause malfunctions, a special centrifuge, inflight test bed or other apparatus which reproduces the required acceleration shall be used.

3.2.3 Care should be taken when interpreting results of functional performance tests carried out on equipment subjected to acceleration tests using a centrifuge, if the equipment contains rotating parts with appreciable moments of inertia (e.g. a rate gyro). The relevant equipment specification shall state if the equipment may be tested on a centrifuge, if it is necessary to use other apparatus, or if special requirements for the tests need specifying.