

# INTERNATIONAL STANDARD

# ISO 1540

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## **Aerospace — Characteristics of aircraft electrical systems**

*Aéronautique — Caractéristiques des systèmes électriques à bord des  
aéronefs*



Reference number  
ISO 1540:2006(E)

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 1540 was prepared by Technical Committee ISO/TC 20, *Aircraft and space vehicles*, Subcommittee SC 1, *Aerospace electrical requirements*.

This third edition cancels and replaces the second edition (ISO 1540:1984), which has been technically revised.

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## Introduction

The purpose of this International Standard is to foster compatibility between the providers, distributors and users of aircraft electrical power. This third edition takes into account several recent trends in aircraft electrical system, including that towards increased nonlinear load content on aircraft. It defines design requirements for electrical equipment that will be verified by the test requirements specified in ISO 7137.

Limits defined in this International Standard are based upon historical as well as near term projected equipment characteristics, including recent trends towards increased nonlinear, electronic user equipment. Since these limits are influenced by the overall combination of source, distribution and user equipment, background to their integration sensitivities is also included herein. The intention is to provide system integrator guidance, without restricting flexibility of means by which the specified interface characteristics are achieved. This revision also addresses several power types not at present common on large transport aircraft, such as variable frequency a.c., 230/400 V a.c. and 42 V d.c.

Also fundamental to the basis of these requirements is the assumption that cost-effective utilization equipment needs to be usable on a wide range of new aircraft. This results in some penalties typically only realized on large aircraft, e.g. those associated with longer distribution feeder voltage drops, being accepted for smaller aircraft equipment. The realities of these situations and recent user equipment trends may likely be the reason for differences between this International Standard and other historical standards.

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# Aerospace — Characteristics of aircraft electrical systems

## 1 Scope

This International Standard specifies the characteristics of electrical power supplied to the terminals of electrical utilization equipment installed in an aircraft. It is intended to support the interface definition for user equipment designed to accept electrical power on a variety of new civil aircraft applications, such as those certified via the Technical Standard Order (TSO) certification process. It might not be desirable for equipment targeted to a single application or specific military application to follow this International Standard because of the penalties associated with multi-application.

This document also attempts to provide background to the development of these requirements that may be useful to those designing and/or integrating modern aircraft electrical systems. The delivered quality of this electrical power is a result of the combined characteristics of the electrical power source, distribution and user equipment. While only user equipment restrictions are specifically defined, background to key source and distribution equipment interfaces are identified in order to support development of the overall system.

A wide variety of electrical supply types and distribution parameters have been considered, as may be found on both small and large transport aircraft. Sources considered include physically rotating and static types, provided either on-aircraft, or as part of the ground support equipment. Distribution voltages addressed are

- nominal 14 V, 28 V and 42 V d.c.;
- nominal 26 V a.c., 400 Hz, one-phase;
- nominal 115/200 V rms and 230/400 V rms a.c., both one-phase and three-phase, at either a nominal 400 Hz constant frequency (CF), or over a variable frequency (VF) range which includes 400 Hz.

## 2 Normative references

The following referenced documents are indispensable for the application 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 6858, *Aircraft — Ground support electrical supplies — General requirements*

ISO 7137:1995, *Aircraft — Environmental conditions and test procedures for airborne equipment* <sup>1)</sup>

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1) Endorsement of EUROCAE ED-14C and RTCA/DO-160C.