
International Standard



1540

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Aerospace — Characteristics of aircraft electrical systems

Aéronautique — Caractéristiques des réseaux électriques à bord des aéronefs

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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. Every 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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 1540 was prepared by Technical Committee ISO/TC 20, *Aircraft and space vehicles*.

ISO 1540 was first published in 1977. This second edition cancels and replaces the first edition, following incorporation of draft Amendment 1 (new figures 13 and 14, and footnote to clause B.2 of annex B) and updating of the clause 1.1. reference (ISO 6858).

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Aerospace – Characteristics of aircraft electrical systems

1 SCOPE AND FIELD OF APPLICATION

1.1 This International Standard specifies the characteristics of electrical power supplied to the terminals of airborne equipment and defines limits for those aspects of utilization equipment which may adversely affect the characteristics of electrical power supplied to other equipment.

Its purpose is to achieve compatibility between airborne utilization equipment and aircraft electrical power supplies. Ground support electrical power supplies forms the subject of a separate International Standard.¹⁾

1.2 The characteristics specified in this International Standard are based on the following assumptions :

- 1) the system capacity is not less than 1,5 kW;
- 2) the normal loading on the system is between 5 % and 85 % of the power supply system capacity;
- 3) the load balance in a.c. systems is such that under steady-state conditions the maximum difference in line current on any power source does not exceed 15 % of the rated current of that power source; and
- 4) the power factor in a.c. systems is between 0,8 lag and 1,0 at loads between 30 % and 85 % of rated load, and between 0,5 lag and 1,0 at loads between 5 % and 30 % of rated load.

2 DEFINITIONS

2.1 electrical system (also called simply "system") : A combination of power sources and utilization equipment connected to a main distribution point.

NOTE – There may be more than one power source on each system and more than one system in an aircraft electrical installation.

2.2 power system capacity : The total nominal capacity of the power sources in a system under the prescribed operating and environmental conditions in the aircraft, due allowance being made for any reduction in available power in parallel operation.

2.3 main power source : A generator, usually driven by one of the aircraft propulsion engines, or a power conversion device (not forming part of utilization equipment) installed to provide electrical power during normal operation of the aircraft.

2.4 emergency power source : A generator, a power conversion device (not forming part of utilization equipment) or a battery, installed to provide electrical power for essential purposes during conditions of electrical emergency in flight.

2.5 normal system operation : The conditions which obtain when the electrical system performs the various intended operations during the aircraft operational period and when no fault occurs. Examples of such operations are switching of utilization equipments, engine speed changes, busbar switching and paralleling of power sources.

2.6 abnormal system operation : The condition that arises due to deterioration or loss of control of voltage and/or frequency, the magnitude and duration of the disturbance being limited by the protection circuits. This condition only occurs rarely and at random.

NOTE – In the event of a limited fault occurring, the system steady-state voltage could be anywhere within the abnormal steady-state limits (ASSL) since these define the limits for operation of the protective system. Such a fault is extremely rare and would only be revealed by a check of the system voltage, possibly requiring instruments of higher accuracy than those normally installed in the aircraft.

2.7 emergency system operation : The conditions that arise in flight when the main power sources are unable to provide sufficient or proper power, thus requiring use of the limited emergency power source(s).

2.8 steady-state conditions : Conditions that prevail at any fixed load when only inherent or natural changes occur, i.e. no fault occurs and no deliberate change is made to any part of the system.

1) ISO 6858, *Aircraft – Ground support electrical supplies – General requirements.*