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INTERNATIONAL STANDARD



1540

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

Aerospace — Characteristics of aircraft electrical systems

Aéronautique — Caractéristiques des réseaux électriques à bord des aéronefs

First edition — 1977-12-15

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UDC 629.7.064.5 : 621.311.012

Ref. No. ISO 1540-1977 (E)

Descriptors : aircraft industry, aircraft, aircraft equipment, electrical installations, electric power supply, electric power networks, specifications.

Price based on 19 pages

FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up 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.

International Standard ISO 1540 was developed by Technical Committee ISO/TC 20, *Aircraft and space vehicles*, and was circulated to the member bodies in July 1976.

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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

2.9 utilization equipment: Any individual unit or any functional group of units to which, as a whole, electrical power is applied.

NOTE — In the interests of simplicity only values applicable to the majority of aircraft electrical equipment are specified in this International Standard. These are to be regarded as preferred values.

It is recognized, however, that for special applications equipment may be required to operate over narrower, or alternatively, wider voltage ranges. For such special applications appropriate minimum values of steady-state voltages and step-functions of voltage must be specified in the relevant aircraft/equipment specification.

3.1.3 D.C. power

The d.c. power system shall be a two-wire system having a nominal voltage of 28 V. The negative of each power source shall normally be connected to earth, which shall then be considered the second wire.

3.2 Utilization equipment

3.2.1 Utilization equipment shall maintain the specified performance when supplied with power having the ranges of characteristics

4.2.1.2 NORMAL SYSTEM OPERATION

4.2.1.2.1 Limits 5 and 6 of figure 4 apply when switching loads from 5 % up to 85 % and down to 5 % of power system capacity. Limits 3 and 4 apply switching loads from 10 % up to 170 % and down to 10 %, this condition representing switching loads that include motor loads.

4.2.1.2.2 Under conditions of busbar switching or transfer an interruption of the a.c. supply is likely to

6 D.C. POWER SYSTEM CHARACTERISTICS

NOTE — The characteristics below apply to the power at the utilization equipment terminals.

All d.c. voltage values are mean values unless otherwise stated.

6.1 Steady-state characteristics

6.1.1 Voltage

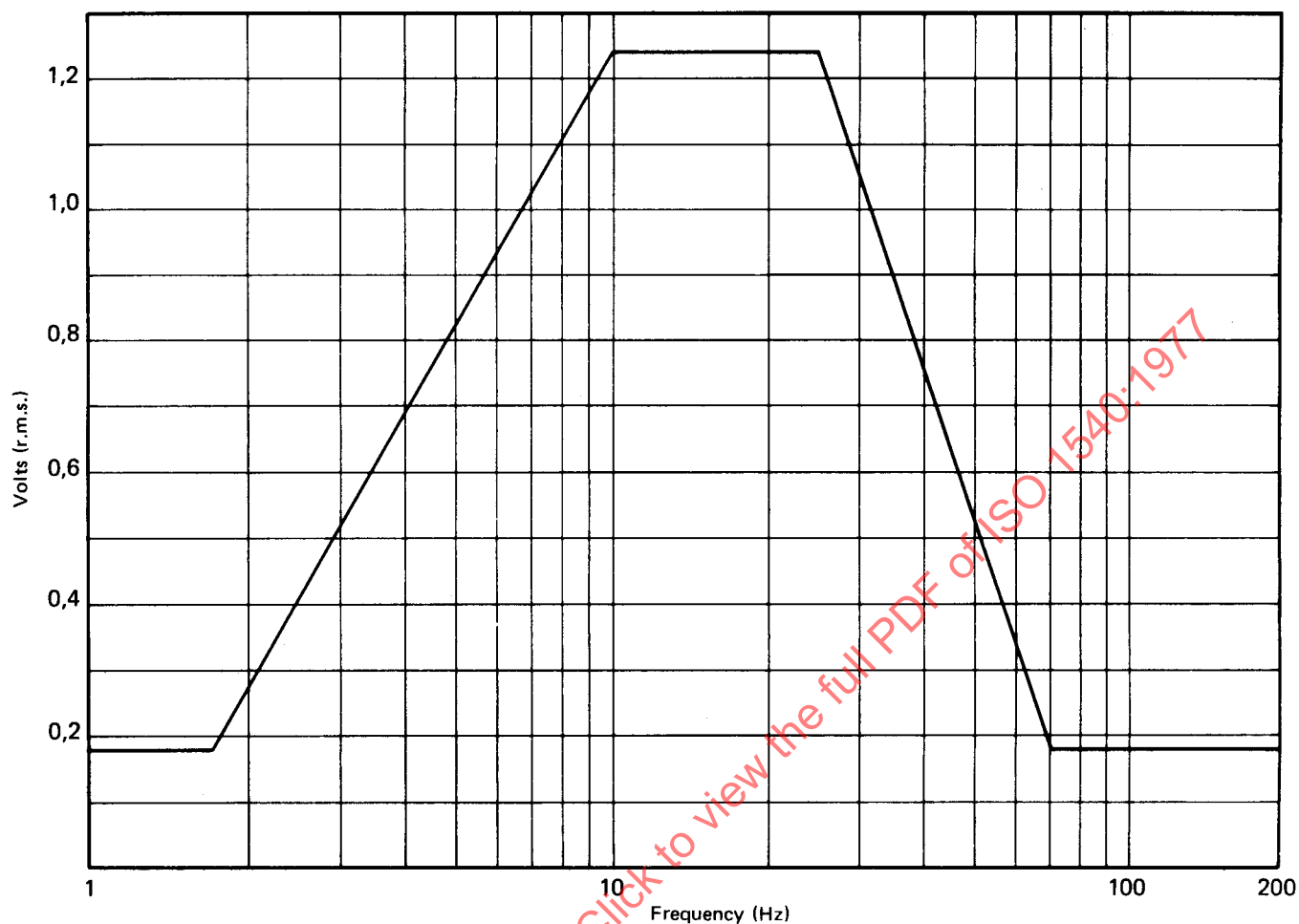
7.4 Influence on electrical systems

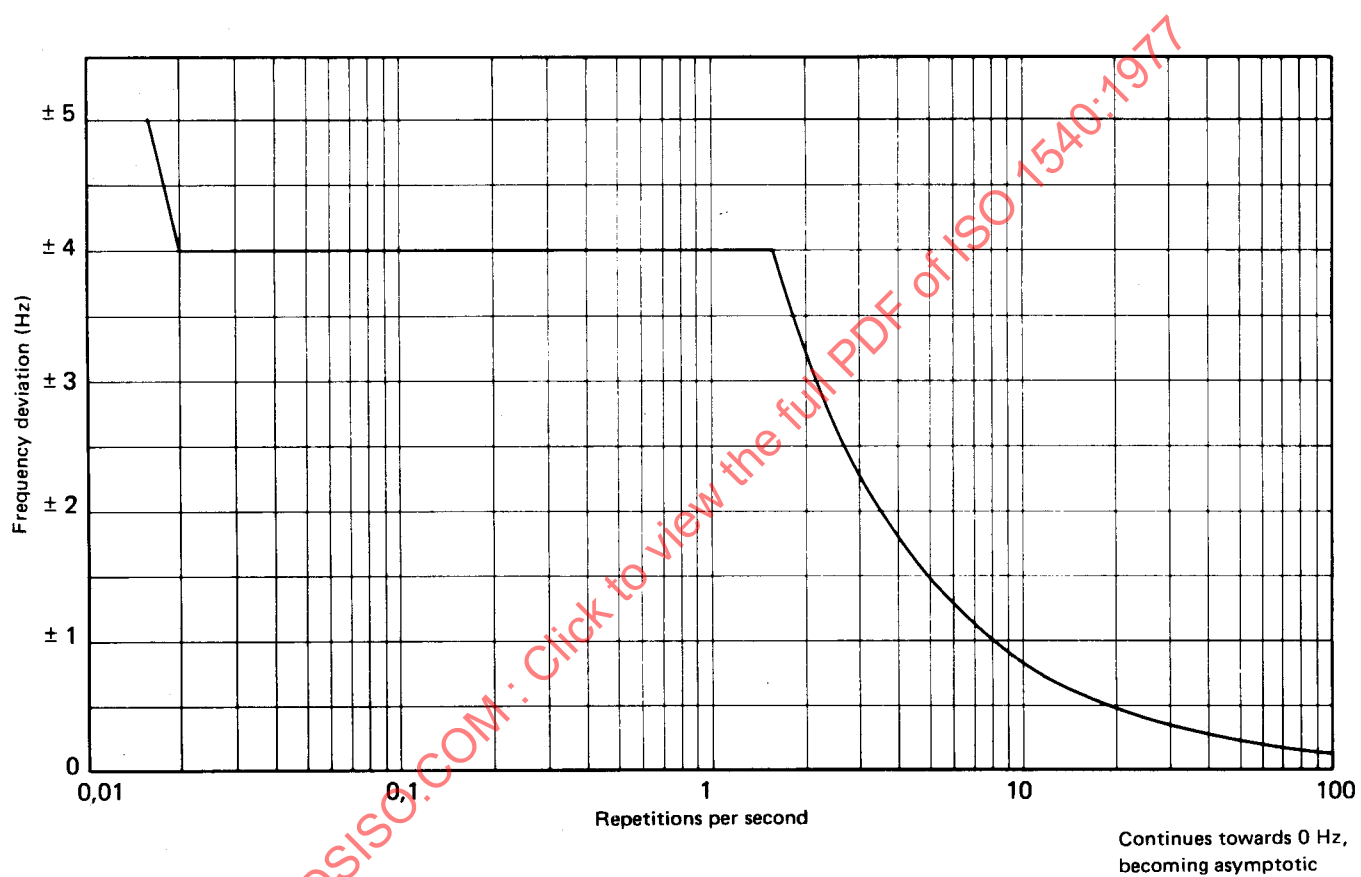
In order to limit influence by utilization equipment which would tend to cause the characteristics of power at the input terminals to go beyond the limits specified in clauses 4, 5 and 6 :

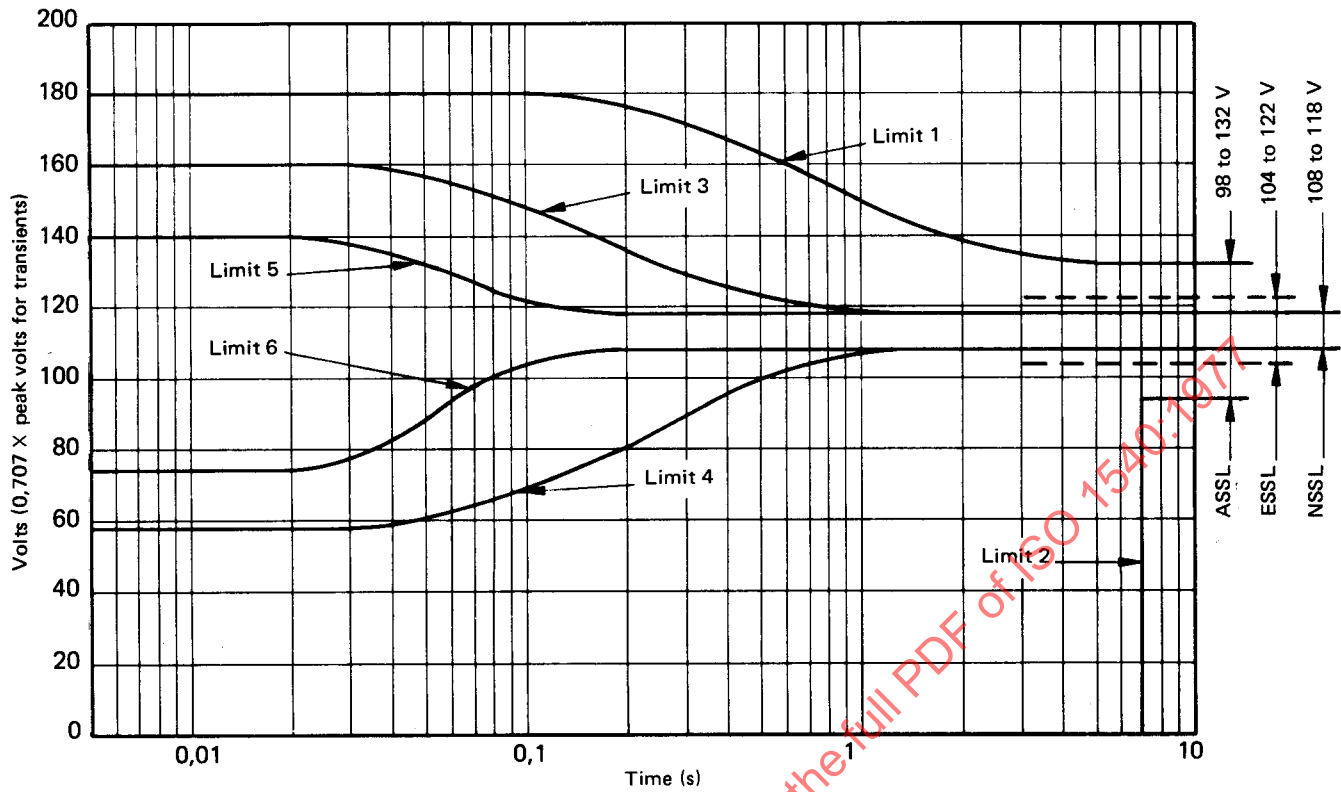
- 1) where the line current in a.c. equipment exceeds 5 A it shall be such that the r.m.s. value of the total harmonic content does not exceed 10 % of the fundamental r.m.s. current, unless otherwise agreed with the aircraft system designer;
- 2) for equipment in which

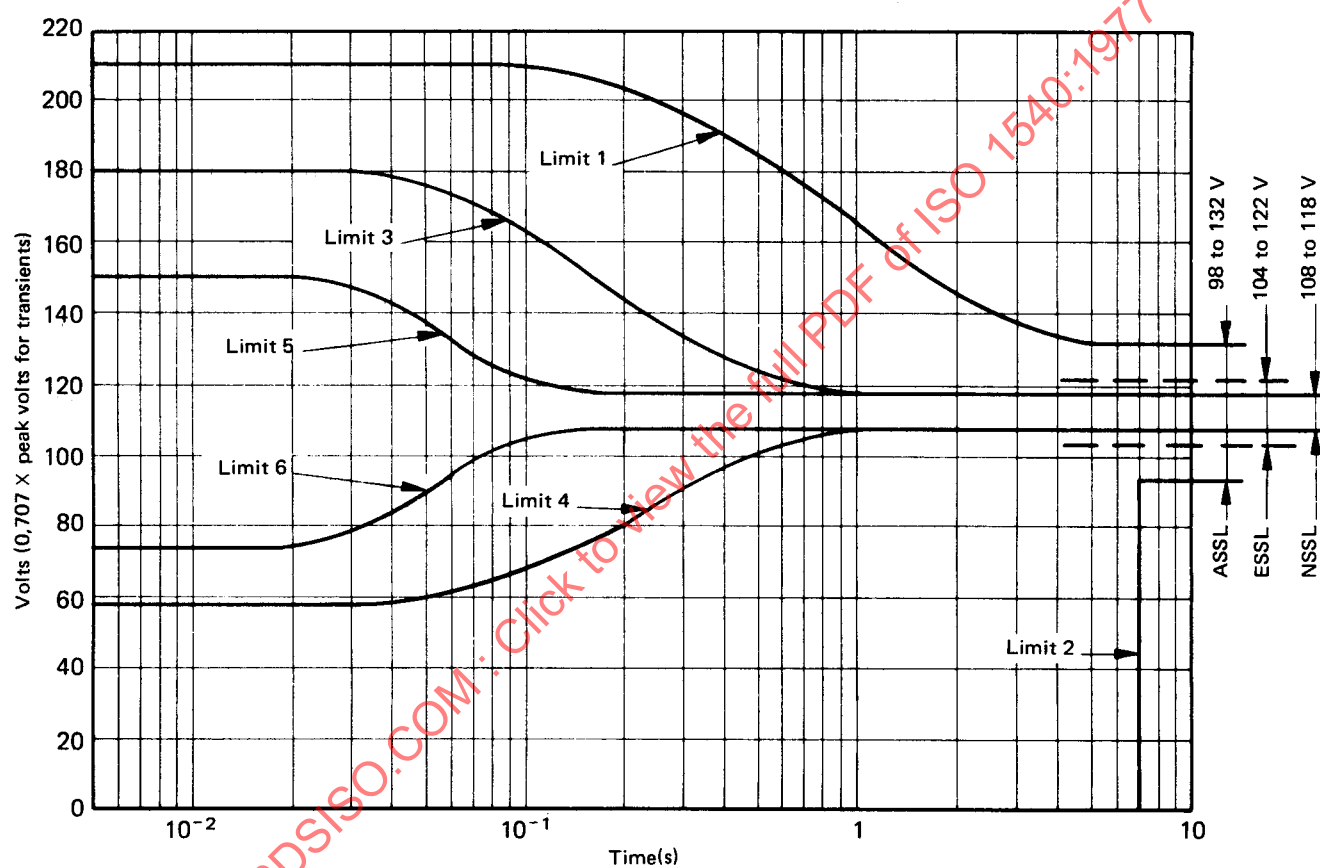
TABLE 1 – Derivation of a.c. voltage limits

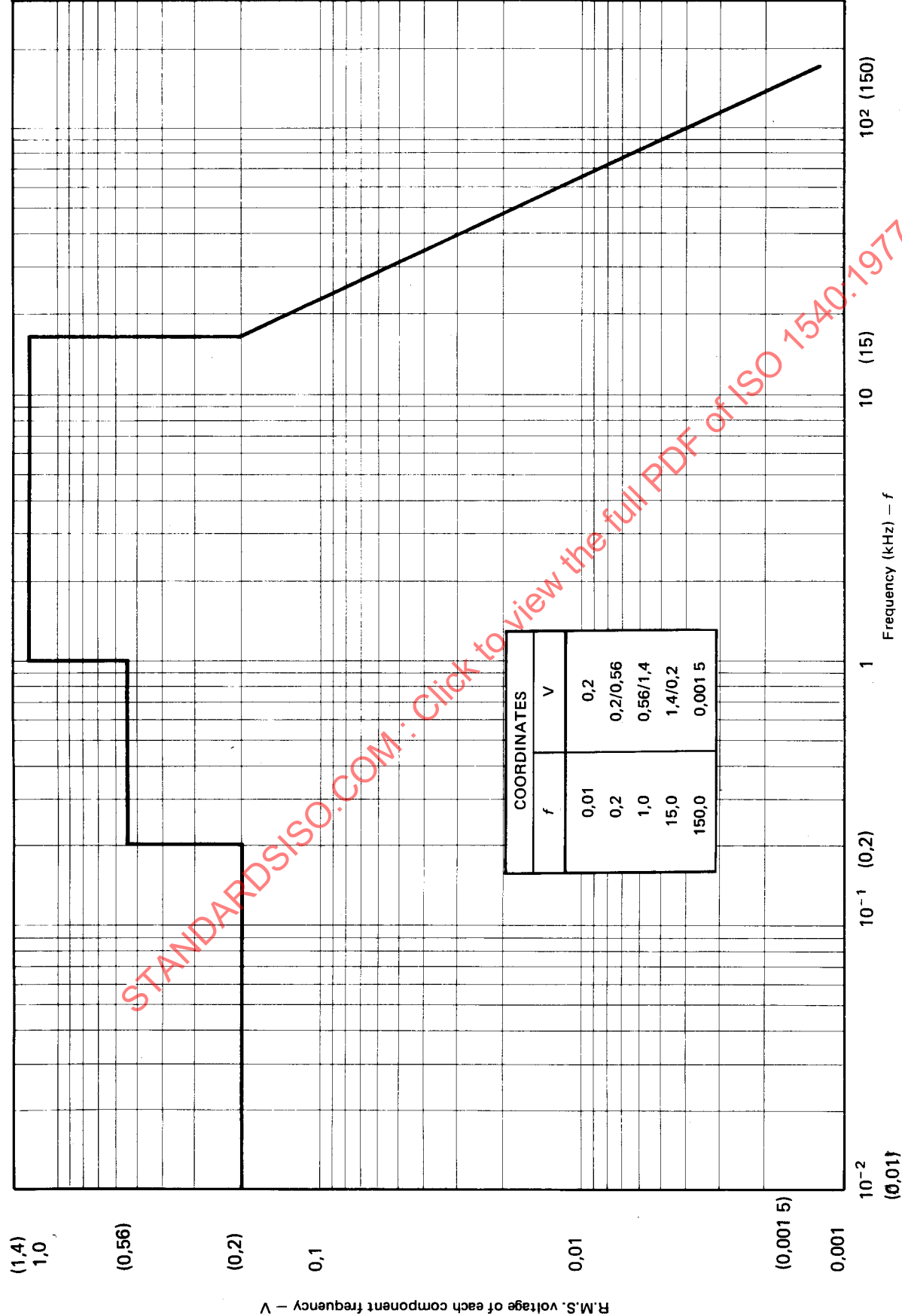
A.C. equipment	Main system	Emergency system
	V	V
Power source busbar voltage	112 to 118	108 to 122
Volt drop	- 4, + 0	- 4, + 0
Normal steady-state limits (NSSL)	108 to 118	—
U-V and O-V trip band limits	-	

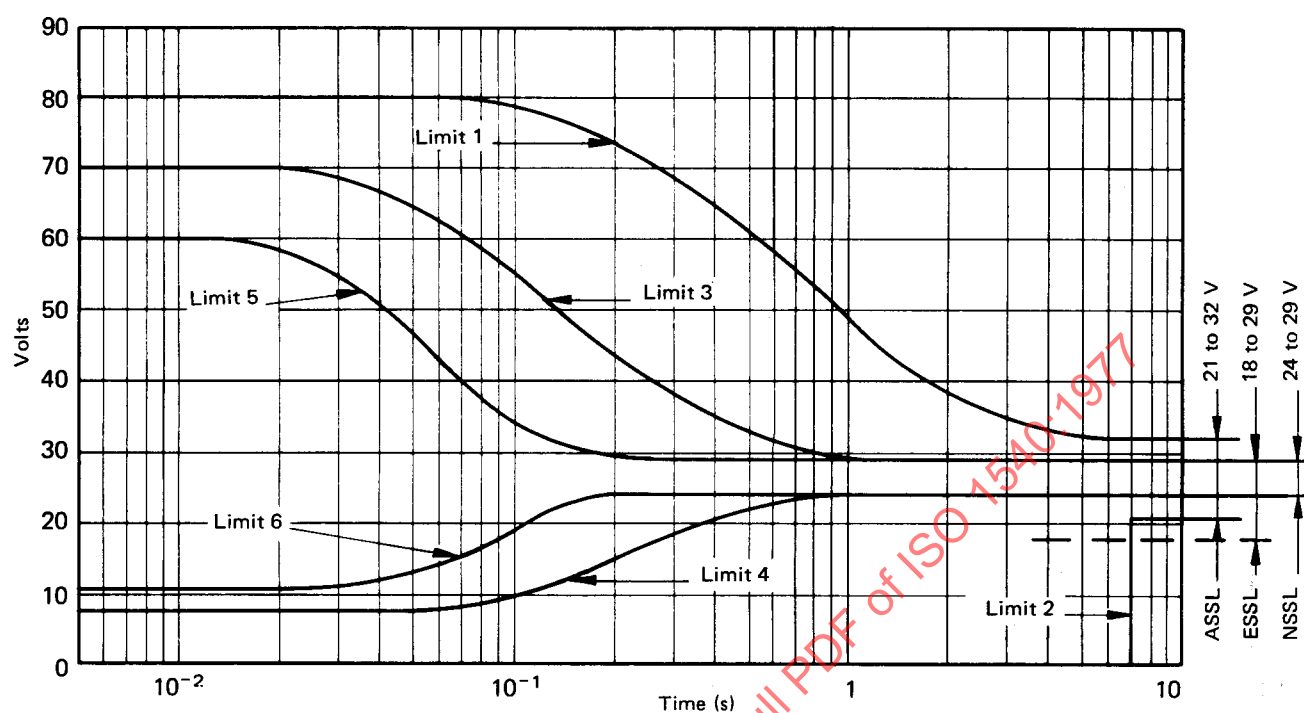


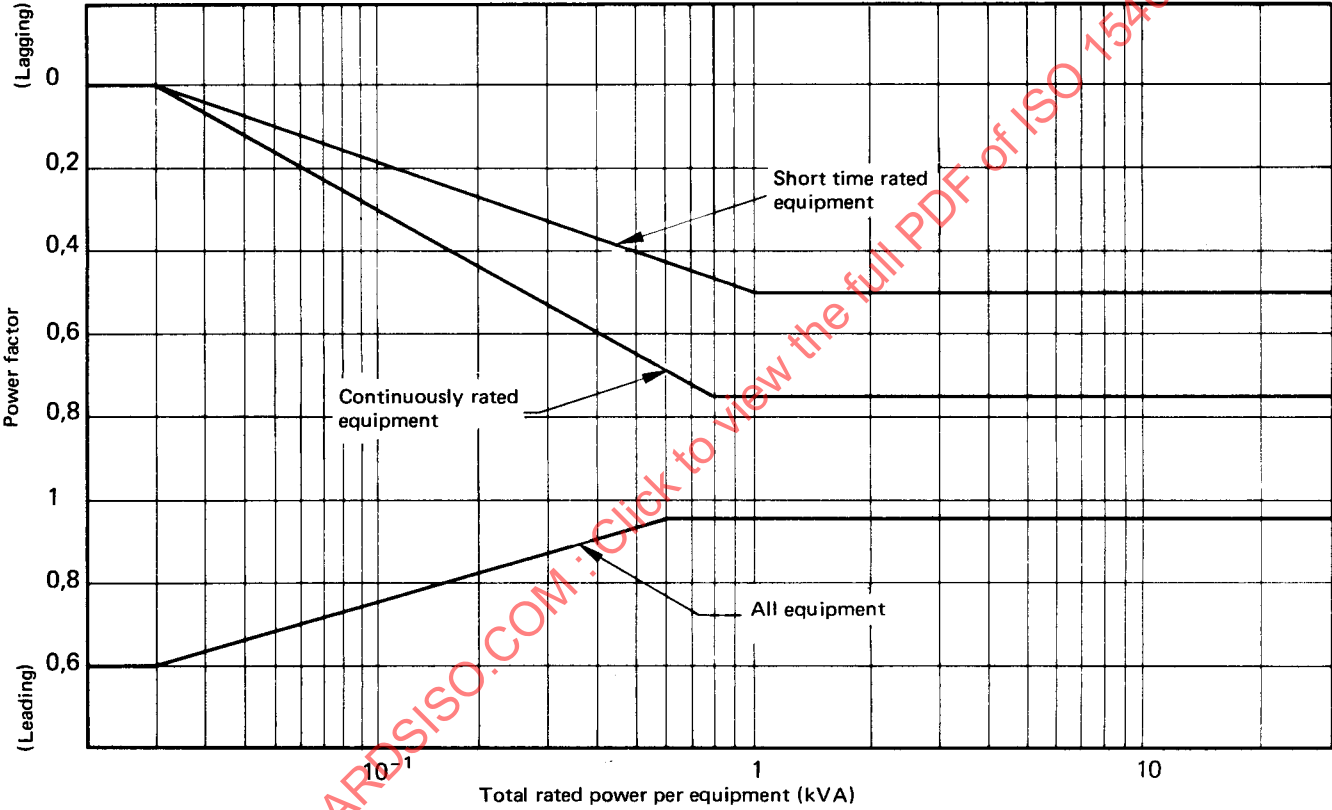


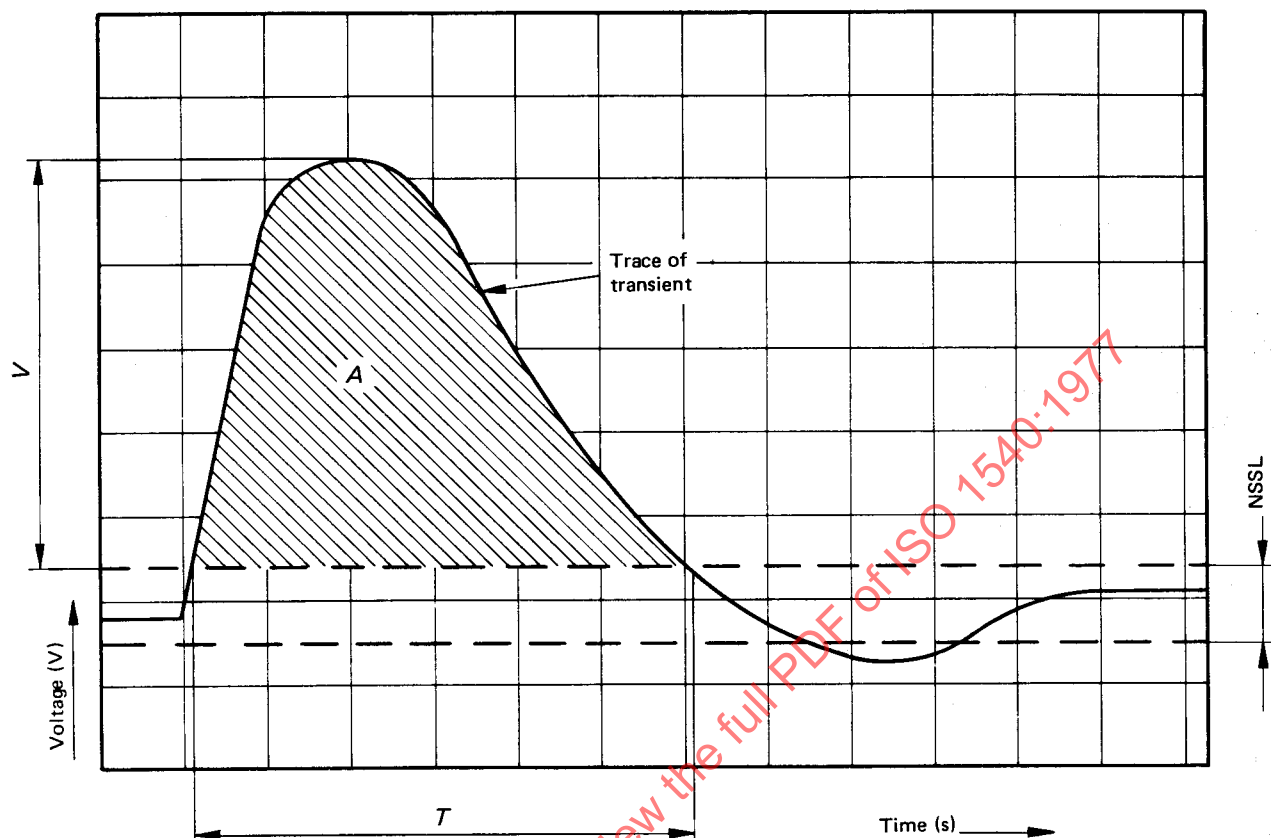












ANNEX A

VOLTAGE WAVE-FORM MEASUREMENTS

A.1 As guidance for design and test purposes, the following load is suggested as being to a large extent representative of the mixed loading in aircraft.

Where C is the system capacity (kW), the system shall supply power to loads 1), 2) and 3) together.

ANNEX B

TRANSIENT VOLTAGE CHECK TESTS

The following are the recommended type tests to check whether the transient voltage requirements have been met. Owing to the impracticability of testing equipment by applying a large number of different voltage levels at varying durations, tests at one surge value and one spike value shall be made as indicated below. Tests B.1 shall be applied to all electrical or electronic equipment and test B.2 shall be applied, in addition, to any equipment containing a semi-conductor or other voltage sensitive device. During these tests the voltage appearing across critical components shall be monitored to verify that these components are not electrically overstressed during the application of the transient. Tests shall be conducted at laboratory normal ambient