International Standard 5344

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Electrodynamic test equipment for generating vibration — Methods of describing equipment characteristics

Moyens d'essais électrodynamiques utilisés pour la génération des vibrations — Méthodes de description des caractéristiques

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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 5344 was developed by Technical Committee ISO/TC 108, *Mechanical vibration and shock*, and was circulated to the member bodies in March 1978.

It has been approved by the member bodies of the following countries :

Australia	France	Sweden
Austria	Germany, F.R.	Turkey
Belgium	Italy	United Kingdom
Brazil	Japan	USA
Bulgaria	Mexico	USSR
Chile	Netherlands	Yugoslavia
Czechoslovakia	South Africa, Rep. of	
Denmark	Spain	

No member body expressed disapproval of the document.

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0 Introduction

This International Standard concerns the characteristics to be standardized for test equipment used to generate vibration by electrodynamic means and serves as a guide to the selection of such equipment.

In the context of this International Standard, the term "electrodynamic" means that the vibratory force created by the generator results from the interaction of a constant magnetic field and an alternating current in a built-in coil.

This International Standard applies to the following :

a) electrodynamic vibration generators (see clauses 3 to 7, and annexes);

b) power amplifiers (see clauses 3, 4, 5, 6 and 8, and annexes);

c) vibration generator and associated power amplifiers (see clauses 3 to 9, and annexes).

A test equipment system comprises : vibration generators and amplifiers combined as in this International Standard, and control consoles, auxiliary tables (see ISO 6070) and other test equipment to be standardized later.

The division into separate classes, a), b) and c) above, has been made to permit the performance of vibration generators and their associated amplifiers to be predicted from the characteristics of separate portions of the test equipment. Classes a) and b) are provided primarily to permit a prospective user to calculate the performance of a vibration generator from one manufacturer with a power amplifier from another manufacturer. Class c) may be all that a prospective user requires if both the vibration generator and the power amplifier are from the same manufacturer.

1 Scope and field of application

The test equipment used for the electrodynamic generation of vibration possesses many characteristics which can be evaluated in many very different ways.

To permit comparison of test equipment from different sources, this International Standard establishes the following :

a) a list of the characteristics;

b) the standard method of obtaining certain characteristics.

This International Standard provides three levels of description to be used in describing test equipment, as follows :

a) minimum level of description;

b) medium level of description;

c) high level of description.

This International Standard gives, for each level of description, a list of the characteristics to be specified by the manufacturer in his tender and in his literature.

2 References

ISO/R 468, *Surface roughness.*

ISO 2041, *Vibration and shock — Vocabulary.*

ISO 3744, *Acoustics — Determination of sound power levels of noise sources — Engineering method for free-field conditions over a reflecting plane.*

IEC Publication 268-3, *Sound system equipment — Part 3 : Sound system amplifiers.*

3 Symbols

a Acceleration

a_b rms acceleration in random mode

b Damping coefficient of the moving element suspension

d Total harmonic distortion (see 5.9)

F Maximum sinusoidal force (see 5.2)

F_b Maximum random force, broad band

F_o Rated sinusoidal force (see 5.3)

F_{ob} Rated random force, broad band (see 5.4)

F_{omt} Rated sinusoidal force (see 7.2.3) (subscript t represents the various loads)

f Frequency

f_{max} Maximum frequency for which the value of a specified parameter is never less than a specified or rated value of this parameter

f_{min} Minimum frequency for which the value of a specified parameter is never less than a specified or rated value of this parameter

f_{mt} First mechanical resonance frequency of the moving element (subscript t represents the various loads) (see 5.7)

f_{st} Resonance frequency of the moving element suspension (subscript t represents the various loads) (f_{s0} is the particular case for no load) (see 5.5)

$H_i(f)$ Acceleration per unit current in the moving element coil

$H_v(f)$ Acceleration per unit voltage across the moving element coil terminals

I Current

I_b Available effective current under random conditions

I_o Complex output current

I_{so} Rated effective current under sinusoidal conditions

K Dynamic stiffness of the moving element suspension

m_e Effective mass of the moving element

m_t Masses of test loads ($t = 0$, $t = 1$, $t = 2$, $t = 3$, $t = 4$)

P Maximum apparent sinusoidal power

P_b Apparent random power, broad band

P_{so} Rated apparent sinusoidal power (see 5.8)

P_{ob} Rated apparent random power

P_{obc} Rated apparent peak random power

R_{so} Resistive test load

U_E Complex input voltage

U_o Complex output voltage

V_g Overall output noise voltage

V_o Rated output signal voltage

V_{so} Rated sinusoidal voltage

v_s Velocity of moving element

Z_b Generator impedance in the random vibration mode

Z_{so} Inductive test load

γ_i Acceleration/current response

Δf Frequency bandwidth

Φ_a Acceleration power spectral density

Φ_F Maximum force power spectral density

Φ_{Fo} Rated force power spectral density

Φ_P Power spectral density for maximum random power

Φ_{Po} Power spectral density for rated random power

Ψ Force or acceleration crest factor

φ Phase shift (phase angle)

4 Units and quantities

When the manufacturer or the user gives the values for the parameters required by this International Standard, he should clearly define the units that have been used, and state whether the quantities are given as rms, peak or peak-to-peak values.