

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Environmental testing –
Part 2-86: Tests – Test Fx: Vibration – Multi-exciter and multi-axis method**

**Essais d'environnement –
Partie 2-86: Essais – Essai Fx: Vibrations – méthode par excitateurs multiples et
axes multiples**



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CONTENTS

FOREWORD.....	4
1 Scope.....	6
2 Normative references	7
3 Terms and definitions	8
4 Background	9
4.1 General.....	9
4.2 Multi-axis and/or multi-exciter testing to achieve an improved distribution of dynamic responses	9
4.3 Multi-exciter testing for large equipment.....	10
4.4 Multi-axis testing for reliability growth	10
4.5 Multi-axis testing to reduce test durations	10
5 Test apparatus and control strategy.....	11
6 Test severities and tolerances	11
6.1 Test severities	11
6.2 Tolerances.....	11
6.3 Excitations outside the specified test frequency range	11
6.4 Cross-axis motions	12
7 Mounting of specimen and installation of measurement systems.....	12
8 Precursor testing	13
9 Vibration response investigation	13
10 Pre-conditioning	13
11 Initial measurement and functional performance test.....	14
12 Low level excitation for equalisation prior to testing	14
13 Testing	14
14 Intermediate measurement and functional performance	14
15 Recovery	14
16 Final measurement and functional performance and vibration response investigation	15
17 Test verification	15
18 Information to be specified in the relevant specification	15
19 Information to be given in the test report.....	16
Annex A (informative) Guidance on multi-axis and multi-exciter test control systems	18
A.1 General.....	18
A.2 Multi-exciter control strategies	18
A.3 Determined and over determined control strategies	19
A.4 Quantifying the inter-relationship between exciters for vibration testing	20
A.5 Quantifying the inter-relationship between exciters for time history replication testing.....	21
Annex B (informative) Additional testing guidance	23
B.1 Fixing, monitor, control and reference points.....	23
B.2 Control equalisation	23
B.3 Cross-axis motion, signal distortion and out of test frequency range responses	24
B.4 Precursor testing	25
B.5 Vibration response investigation	25

B.6	Temperature conditioning and stabilization	25
B.7	Performance evaluation	26
B.8	Verification of test procedure	26
Annex C (informative)	Guidance on the application of multi-axis / multi-vibrator tests	28
C.1	General.....	28
C.2	Advice on using multi-exciter systems for the testing of large specimens	28
C.2.1	General	28
C.2.2	Data measurements.....	28
C.2.3	Multi-exciter test fixture	28
C.2.4	Test control	29
C.2.5	Testing	29
C.3	Advice on using multi-axis systems for multi-degree of freedom testing	29
C.3.1	General	29
C.3.2	Data measurements.....	30
C.3.3	Multi-exciter test fixture	30
C.3.4	Test control	30
C.3.5	Testing	30
C.4	Advice on using multiple shakers attached directly to the specimen via flexible couplings	31
C.4.1	General	31
C.4.2	Data measurements.....	31
C.4.3	Multi-exciter test fixture	32
C.4.4	Test control	33
C.4.5	Interrelationship in testing.....	34
Annex D (informative)	Guidance on the use of measured data for multi-axis/multi-vibrator tests.....	35
D.1	General.....	35
D.2	Use of measured data to derive test severities.....	35
Annex E (informative)	Guidance on the selection of test tolerances	37
E.1	General.....	37
E.2	Test tolerances associated with measured data	37
E.3	Test tolerances applicable to different parameters	37
Bibliography.....		39
Figure A.1	– Power Spectral Density (PSD) and Cross-Spectral Density (CSD) for a two exciter system	20
Figure A.2	– Power Spectral Density (PSD) and Cross-Spectral Density (CSD) for a six exciter system.....	20
Figure C.1	– Examples of spherical bearings	33
Table E.1	– Test tolerances applicable to different parameters	38

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ENVIRONMENTAL TESTING –

Part 2-86: Tests – Test Fx: Vibration –
Multi-exciter and multi-axis method

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The text of this International Standard is based on the following documents:

Draft	Report on voting
104/1035/FDIS	104/1043/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

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ENVIRONMENTAL TESTING –

Part 2-86: Tests – Test Fx: Vibration – Multi-exciter and multi-axis method

1 Scope

This document provides a test procedure for use with multi-exciter and multi-axis vibration test systems. The vibration test is intended for general application to components, equipment, and other products, hereinafter referred to as "specimens", subjected to dynamic environments that could arise during an equipment life cycle. Although this document is mainly intended for vibration testing, the procedure is also applied to certain types of shock and transient tests.

The test procedure set out in this document is applicable where a specimen is required to demonstrate its adequacy to resist specified vibration, shock and transient conditions, without unacceptable degradation of functional or structural performance. This test procedure has significant similarity to test procedures of other IEC 60068-2 documents and encompasses the same range of vibration and shock excitation types.

This document is applicable to specimens subjected to vibration, shock and transient conditions resulting from transportation and/or operational environments, for example in aircraft, space vehicles and land vehicles. It is primarily intended for unpacked specimens. It is applicable to specimens in their transportation container when the latter are considered as part of the specimen itself.

The test method and associated techniques addressed within this document are primarily intended for use with multiple electrodynamic or servo-hydraulic vibration generators along with an associated computer-based digital control system to control of the specimen excitations.

This document encompasses two testing approaches, commonly referred to as multi-exciter single-axis (MESA), and multi-exciter multi-axis (MEMA). These are:

- a) Utilising fixed base shakers either in a single axis or a selected combination of fixed X, Y, Z configurations, also allowing for rotations dependent upon fixture coupling design.
- b) Utilising multiple shakers attached directly to the specimen via flexible couplings or similar methods. Here the shakers are attached at any point and in any direction on the specimen. This approach is quite similar to that used for modal testing, but using environmental test severities.

It is emphasised that MESA and MEMA testing currently requires a high degree of engineering judgement and relevant experience, and both test specifier and tester are fully aware of this fact. Generally, MESA and MEMA testing requires greater resources to set up an appropriate test but potentially provides a more accurate outcome.

For the purpose of this document, the creator of the relevant testing specification, the test specifier, is expected to select the procedure and the values of severity appropriate to the specimen and its use. Precursor testing is included within the procedure of this document, as an option, to permit the test specifier to establish the practicality of the test specification and severities with the specimen. A separate specimen is usually provisioned for such precursor testing.