

Methods of measurement for minidisc recorders/players

The European Standard EN 62121:2001 has the status of a
British Standard

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National foreword

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The UK participation in its preparation was entrusted to Technical Committee EPL/100, Audio, video and multimedia systems, which has the responsibility to:

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- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

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Methods of measurement for minidisc recorders/players
(IEC 62121:2001)

Méthodes de mesure des appareils
de lecture et d'enregistrement pour
les minidisques
(CEI 62121:2001)

Messverfahren für MiniDisc-
Recorder/Wiedergabegeräte
(IEC 62121:2001)

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Foreword

The text of document 100B/392/FDIS, future edition 1 of IEC 62121:2001, prepared by IEC TC 100, Audio, video and multimedia systems and equipment, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 62121 on 2001-12-01.

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with the EN have to be withdrawn (dow) 2004-12-01

Annexes designated "normative" are part of the body of the standard.

Annexes designated "informative" are given for information only.

In this standard, annexes A and ZA are normative and annexes B and C are informative.

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 62121:2001 was approved by CENELEC as a European Standard without any modification.

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METHODS OF MEASUREMENT FOR MINIDISC RECORDERS/PLAYERS

1 Scope and object

This International Standard specifies the measuring methods for recording and reproducing equipment for MiniDiscs that conform to the specifications of IEC 61909.

NOTE 1 For convenience, this recording and reproducing equipment will be referred to as “MD recorder” hereinafter. The reproducing part of this equipment or equipment with only a reproducing function will be referred to as “MD player” throughout the text of this standard. If there is no risk of misunderstanding, the term “MD recorder” will be generally used.

NOTE 2 This standard does not include specifications for listening tests (see IEC 60268-13).

The object of this standard is to list and define the characteristics affecting the performance of MiniDisc recorders or players, to establish conditions and methods of measurement of those characteristics, and to standardize the presentation of the results.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 60065:1998, *Audio, video and similar electronic apparatus – Safety requirements*

IEC 60068-2-27:1987, *Environmental testing – Part 2: Test – Test Ea and guidance: Shock*

IEC/TR 60268-13:1998, *Sound system equipment – Part 13: Listening tests on loudspeakers*

IEC 60651:1979, *Sound level meters*

IEC 60721-3-5:1997, *Classification of environmental conditions – Part 3: Classification of groups of environmental parameters and their services, – Section 5: Ground vehicle installations*

IEC 60958:1989, *Digital audio interface*

IEC 61606:1997, *Audio and audiovisual equipment – Digital audio parts – Basic methods of measurement of audio characteristics*

IEC 61909:2000, *Audio recording – MiniDisc System.*

ISO 532:1975, *Acoustics – Methods for calculating loudness levels*

ISO 1996 (all parts), *Acoustics – Description and measurement of environmental noise*

ISO 3740:1980, *Acoustics – Determination of sound power levels of noise sources – Guidelines for the use of basic standards and for the preparation of noise test codes*

ISO 3741:1999, *Acoustics – Determination of sound power levels of noise sources – Precision methods for broad band sources in reverberation rooms*

ISO 3743-1:1994, *Acoustics – Determination of sound power levels of noise sources – Engineering methods for small, movable sources in reverberation fields – Part 1: Comparison method for hard walled test rooms*

ISO 3743-2:1994, *Acoustics – Determination of sound power levels of noise sources using sound pressure – Engineering methods for small, movable sources in reverberant fields – Part 2: Methods for special reverberation test rooms*

ISO 3744:1994, *Acoustics – Determination of sound power levels of noise sources using sound pressure – Engineering method in an essentially free field over a reflecting plane.*

ISO 3745:1977, *Acoustics – Determination of sound power levels of noise sources – Precision methods for anechoic and semi anechoic rooms*

3 Terms and definitions

For the purpose of this International Standard, the terms and definitions given in the relevant clauses pertaining to measurement (see clauses 6 and 7) and the following definitions apply.

3.1

meaning of the expression “designated xxxxx”

the item or value that is designated by a manufacturer based on the reference item or value

EXAMPLE:

Designated recording level: This is the recording level designated by a manufacturer based on the reference recording level which is indicated on an attached level meter

3.2

reference frequency

the value is 1 kHz

3.3

reference recording level

the reference for measurements and corresponds to the average music level

It is equal to –12 dB of the full scale signal level of the MiniDisc (= 0,5 V)

3.4

maximum recording level

this level is specified as the maximum in the test disc.

It is equal to the full scale signal level of the MiniDisc (= 2,0 V)

3.5

reference source impedance

the impedance designated as the source impedance for the input terminal. An equivalent resistor should terminate the input terminal as the source impedance during the measurements

3.6

reference input level

the input level of the reference frequency signal at the input terminal to attain the reference recording level at a designated attenuation of the recording volume control

3.7

reference load impedance

the impedance designated as the load impedance for the output terminal. An equivalent resistor should terminate the output terminal as the load impedance during the measurements

3.8

reference output level

the output level at the output terminal that is terminated by the designated load impedance during the reproduction of the reference recording level signal

3.9

full-scale output level

the output level at the output terminal, terminated by a designated load impedance, during the reproduction of the maximum recording level signal of the test disc. It corresponds to +12 dB of the reference or designated output level

3.10

minimum input level

the level of the reference frequency signal at the input terminal to obtain the designated recording level at the maximum level position of the recording volume control

4 Information required from manufacturers of MD recorders

4.1 Introduction

This information falls into two distinct categories:

- a) mandatory information that shall be clearly shown on the MD recorder. The requirements are indicated by the letter "A" on the right-hand side of the page;
- b) optional information which may be given separately, for example, in an instruction manual relating to and supplied with the MD recorder.

It is essential that mandatory information outside the scope of this standard be given in the correct location as specified in other relevant standards (for example, for aspects of safety, see IEC 60065).

4.2 Identification

4.2.1 Name of manufacturer and/or trade mark **A**

4.2.2 Model or type and serial number (variants, if any, to be stated) **A**

4.3 Mechanical characteristics

4.3.1 Dimensions

(inclusive of knobs, connectors and plugs at front and rear sides)

Height mm

Width mm

Depth mm

4.3.2 Total mass kg or g

4.3.3 Special facilities

Operating positions horizontal, vertical or other

System single, multi disc player or recorder,
 combination player or recorder, car
 portable

Remote control

Programming

4.4 Electrical characteristics

4.4.1 Power supply Volts (V) **A**

4.4.2 Power frequency Hertz (Hz) **A**

4.4.3 Power consumption Volt-amperes (VA) for a.c. or W for d.c. **A**

4.4.4 Output facilities (digital, analogue, optical or others)

4.5 Environmental conditions

4.5.1 Temperature range °C

4.5.2 Relative humidity %

4.5.3 Air pressure kPa

4.6 Mechanical performance requirements

	Units	For methods of measurement, see subclauses:
Tolerable shock level	m/s ²	6.1
Tolerable acceleration level	m/s ²	6.1
Maximum acoustic noise	dB(A), sones or NR	6.2

4.7 Electrical performance requirements

	Units	For methods of measurement, see subclauses:
Maximum power consumption	VA for a.c. or W for d.c.	7.1
Frequency response	dB	7.2
Signal to noise ratio	dB	7.3
Dynamic range	dB	7.4
Distortion and noise	%	7.5
Channel separation	dB	7.6
Emphasis deviation	dB	7.7
Modulation distortion	%	7.8
Phase difference between channels	°	7.9
Minimum input level	V	7.10
Output voltage	V	7.11
Pitch deviation	%	7.12
Access time	s	7.13
Trackability	mm	7.14

4.8 Results of measurement

The results shall be reported with reference to this standard.

An example is shown in Table B.1.

5 Measuring conditions

5.1 Introduction

To conveniently specify how MD recorders are to be set up for measurement or verification, it is necessary to define certain conditions under which the measurements shall be made. Furthermore, these conditions shall be related to specific test discs, specified in annex A.

The following are the basic parameters for the methods of measurement specified in this standard:

- environmental conditions;
- power supply;
- interface information.

For the guidance of MD recorder manufacturers, preferred values or ranges are given in square brackets following each parameter listed below:

5.2 Environmental conditions

Ambient temperature	[20 °C ± 2 °C]
Relative humidity	[65 % ± 15 %]
Air pressure	[96 kPa ± 10 kPa]
Minimum stabilization time of MD recorder at ambient temperature after switching on	[5 min]

5.3 Power supply

Type of supply	[a.c. or d.c.]
Voltage	[within ±1 % of rated value]
Frequency for a.c.	[50 Hz or 60 Hz with a relative tolerance of ±2 %]
Waveform for a.c.	[harmonic distortion <2 %]
Waveform for d.c.	[ripple <0,1 %]

5.4 Input conditions

5.4.1 Reference frequency

Measuring frequencies for each measurement are selected from:

4 Hz, 8 Hz, 16 Hz, 31,5 Hz, 63 Hz, 125 Hz, 250 Hz, 500 Hz, 1 kHz, 2 kHz, 4 kHz, 8 kHz, 10 kHz, 12,5 kHz, 16 kHz, 18 kHz and 20 kHz.

The reference frequency is 1 kHz unless otherwise specified. 60 Hz and 7 kHz are also used for the measurement of intermodulation distortion.

The frequency of 400 Hz may also be used for the measurement of trackability.

5.4.2 Reference input level

500 mV r.m.s.

5.4.3 Reference source impedance

Resistor of 1 kΩ with a relative tolerance of ±5 %

5.5 Output condition

5.5.1 Reference load impedance

Resistor of 10 kΩ with a relative tolerance of ±5 %

5.5.2 Reference output level

500 mV r.m.s. on reproducing a test disc that has recorded the reference frequency signal of the reference recording level.

The designated output level of the MD recorder is applicable if this value is not attainable.

5.5.3 Digital output (see IEC 60958)

5.6 MD recorder setting

5.6.1 Designated setting for recording

The recording volume control of the MD recorder under test shall be adjusted to attain the designated recording level on applying the reference frequency signal of the designated input level to the input terminal.

5.6.2 Designated setting for reproducing

The output volume control of the MD recorder shall be adjusted to obtain the designated output level at the output terminal, which is terminated by a designated load impedance, on reproducing a test disc that has recorded the reference frequency signal of the reference recording level.

5.6.3 Setting of other controls

The emphasis function(s) and the noise reduction function shall be turned-off (inactive) unless otherwise specified.

5.7 Other conditions

5.7.1 Recording level

The recording shall be made under the specified setting described in 5.6.1. If recording level adjustment is needed, the applied signal level itself shall be adjusted at the input without moving the recording volume control.

5.7.2 Condition for silence signal (no signal) recording

The input terminal of the MD recorder to which no signal is applied shall be terminated by a resistor equivalent to the designated source impedance for the measurement of signal to noise ratio, etc.

5.7.3 Measured channel

The measurement of the overall characteristics of the recording and reproducing shall be made for each channel separately.

The input terminal of the channel that is not under measurement shall be terminated by a resistor equivalent to the designated source impedance.

5.8 Test disc

The test disc used in the measurement shall conform to annex A.

The blank disc used in the measurement shall conform to IEC 61909.

Available test disks are listed in annex C.

5.9 Performance claims

The performance claims shall be based on the MD recorder operating under the conditions specified in clause 5. Unless otherwise specified in 5.2 or 5.3 (for example maximum or minimum value), a tolerance shall be allocated to each parameter.

If the manufacturer claims power supply voltage tolerances exceeding $\pm 1\%$, the characteristics to be specified shall also be stated for the upper and lower limits of these tolerances.

If variations in the frequency of the power supply, within the tolerances specified by the manufacturer, have any significant influence on the characteristics to be measured, these characteristics shall also be stated for the upper and lower limits of the claimed frequency tolerances.

If harmonics in the a.c. power supply or ripple in the d.c. power supply, within the limits specified by the manufacturer, have any significant influence on the characteristics to be measured, those characteristics shall also be stated for the upper limit of the claimed tolerances of harmonic or ripple content.

5.10 Measuring equipment

5.10.1 Voltmeter

This meter shall measure the true root mean square voltage of an a.c. waveform. But an a.c. voltmeter with the scaling of the root means square value that measures the average value of the rectified voltage is applicable for the measurements of sinusoidal waveform voltage.

Accuracy	within $\pm 2\%$ in the frequency range of 4 Hz to 20 kHz
Range	-100 dB(V) to +20 dB(V)

5.10.2 Oscillator

Frequency range	4 Hz to 20 kHz in sinusoidal waveform
Output voltage	not smaller than 2 V
Total harmonic distortion	less than 0,001 % in the frequency range of 20 Hz to 20 kHz

5.10.3 Low-pass filter

Pass band	4 Hz to 20 kHz within $\pm 0,3$ dB
Attenuation	more than 60 dB above 24,1 kHz
Input and output impedance	10 k Ω with a relative tolerance of $\pm 5\%$

5.10.4 Band-pass filter

Bandwidth	more than $\pm 10\%$ of centre frequency within 6 dB attenuation
Attenuation	more than 50 dB outside of $\pm 20\%$ of centre frequency
Input and output impedance	10 k Ω with a relative tolerance of $\pm 5\%$