

 <small>35030 CASELLE DI SELVAZZANO PADOVA - ITALY</small>	DOCUMENT: PERIODIC TESTS ACCORDING TO IEC 61672-3 OF DELTA OHM SOUND LEVEL METERS	Page:1/12 Rev. 3.0 Attachments: 0
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Compliance to specifications of

Delta Ohm Sound Level Meters and Calibrators

HD 2010UC sound level meter satisfy class 1 or 2 specifications of IEC 61672 standard. Model compliance to standard specifications was certified by the italian primary metrological laboratory (I.E.N. "Galileo Ferraris" now I.N.RI.M.) on 04/16/2007 with the compliance statement n. 07-0124-02. Model HD2010UC/A is a version equipped with spectrum analyser by octave and third octave bands.

HD 2010 sound level meter satisfy class 1 specifications of IEC 61672 standard. Model compliance to standard specifications was certified by the italian primary metrological laboratory (I.E.N. "Galileo Ferraris" now I.N.RI.M.) on 12/30/2005 with the compliance statement n. 37312-01C.

HD 2110 sound level meter satisfy class 1 specifications of IEC 61672 standard. Model compliance to standard specifications was certified by the italian primary metrological laboratory (I.E.N. "Galileo Ferraris" now I.N.RI.M.) on 07/29/2005 with the compliance statement n. 37035-01C. Model HD 2110L is a modular version with spectrum analyser by octave and third octave bands and reverberation time calculation available as options.

HD 2020 acoustic calibrator satisfy class 1 specifications of IEC 60942 standard. Model compliance to standard specifications was certified by the italian primary metrological laboratory (I.E.N. "Galileo Ferraris" now I.N.RI.M.) on 01/30/2009 with the compliance statement n. 09-0003-01.

General specifications of Delta Ohm Sound Level Meters

Some sound level meter can be equipped with different microphone models, either polarized or prepolarized, and different microphone protections. The acoustic responses and the parameters needed to execute sound level meter periodic tests, according to IEC 61672-3, are given in this document.

Technical specifications of Delta Ohm sound level meters are given in the user manuals. In this document are the specifications needed for periodic tests according to IEC 61672-3.

In the following table the general specifications, useful for periodic tests according to IEC 61672, are set out.

TAB 1

Fonometro	HD2010UC	HD2010	HD2110	HD2110L
IEC 61672 class	1 o 2	1	1	1
Measurement channels	1	1	1	1
FF Microphones	UC52	MK221 MK223 377B02 377C41	MK221 MK223 377B02 377C41	MK221 MK223 377B02 377C41
DF Microphones	Not available	MK231	MK231	MK231
Windshield	SAV: \varnothing 70mm WME: external ¹	SAV: \varnothing 70mm WME: external ¹	SAV: \varnothing 70mm WME: external ¹	SAV: \varnothing 70mm WME: external ¹
Frequency weightings	A, C, Z	A, C, Z	A, C, Z	A, C, Z
Time weightings	FAST SLOW IMPULSE	FAST SLOW IMPULSE	FAST SLOW IMPULSE	FAST SLOW IMPULSE
Integrated parameters	Leq, LE, Lmax, Lmin	Leq, LE, Lmax, Lmin	Leq, LE, Lmax, Lmin	Leq, LE, Lmax, Lmin
Maximum measurable level	140 dBA	140 dBA	140 dBA	137 dBA
Maximum peak level	143 dBZ	143 dBZ	143 dBZ	140 dBZ
Reference level	94 dBA – 1kHz – 0°	94 dBA – 1kHz – 0°	94 dBA – 1kHz – 0°	94 dBA – 1kHz – 0°
Reference level range	130 dBA	130 dBA	130 dBA	127 dBA
Suggested calibrator model	HD 2020			
Self generated noise Sound level meter + capacitive adaptor K65 with short circuited input	A: 21 dB C: 27 dB Z: 30 dB	A: 18 dB C: 23 dB Z: 26 dB	A: 19 dB C: 23 dB Z: 27 dB	A: 18 dB C: 22 dB Z: 26 dB
Self generated noise Sound level meter + microphone	22 dBA	19 dBA	20 dBA	19 dBA

¹ Microphone protection combined with a heated preamplifier to be installed in external environment, completed with rain-shield, wind-shield and bird spikes.

In order to execute IEC 61672 tests with electrical signals, the microphone capsule must be replaced by a capacitive adaptor, as specified in the following table.

TAB 2

MICROPHONE	UC52	MK221/MK223/MK231	377B02	377C41
CAPACITIVE ADAPTOR	K65-UC52	K65-MK221	K65-377B02	K65-377C41
MAXIMUM INPUT ELECTRICAL SIGNAL	± 20V	± 30V	± 30V	± 30V
MAXIMUM EQUIV. SOUND LEVEL	150 dBA	146 dBA	146 dBA	146 dBA
START UP DELAY AFTER INSTRUMENT TURN ON FOR SOUND MEASUREMENT EXECUTION	10 s	60 s	10 s	60 s

TAB 2: Global specifications for microphones UC52, MK221/MK223/MK231, 377B02 and 377C41

Linearity tests on level ranges

Level range linearity limits are set out in the following tables.

TAB 3A

Level range upper limit	100 dB	110 dB	120 dB	130 dB	140 dB
Maximun input voltage	0.03 Vrms	0.1 Vrms	0.3 Vrms	0.95 Vrms	2.95 Vrms
31.5 Hz					
A	27 dB ÷ 61 dB	30 dB ÷ 71 dB	40 dB ÷ 81 dB	50 dB ÷ 91 dB	60 dB ÷ 101 dB
C	32 dB ÷ 97 dB	33 dB ÷ 107 dB	40 dB ÷ 117 dB	50 dB ÷ 127 dB	60 dB ÷ 137 dB
Z	35 dB ÷ 99 dB	36 dB ÷ 109 dB	40 dB ÷ 119 dB	50 dB ÷ 129 dB	60 dB ÷ 139 dB
1 kHz					
A, C, Z	27 dB ÷ 100 dB	30 dB ÷ 110 dB	40 dB ÷ 120 dB	50 dB ÷ 130 dB	60 dB ÷ 140 dB
4 kHz					
A	27 dB ÷ 100 dB	30 dB ÷ 110 dB	40 dB ÷ 120 dB	50 dB ÷ 130 dB	60 dB ÷ 140 dB
C	32 dB ÷ 99 dB	33 dB ÷ 109 dB	40 dB ÷ 119 dB	50 dB ÷ 129 dB	60 dB ÷ 139 dB
Z	35 dB ÷ 100 dB	36 dB ÷ 110 dB	40 dB ÷ 120 dB	50 dB ÷ 130 dB	60 dB ÷ 140 dB
8 kHz					
A	27 dB ÷ 99 dB	30 dB ÷ 109 dB	40 dB ÷ 119 dB	50 dB ÷ 129 dB	60 dB ÷ 139 dB
C	32 dB ÷ 97 dB	33 dB ÷ 107 dB	40 dB ÷ 117 dB	50 dB ÷ 127 dB	60 dB ÷ 137 dB
Z	35 dB ÷ 100 dB	36 dB ÷ 110 dB	40 dB ÷ 120 dB	50 dB ÷ 130 dB	60 dB ÷ 140 dB
12.5 kHz					
A	27 dB ÷ 95 dB	30 dB ÷ 105 dB	40 dB ÷ 115 dB	50 dB ÷ 125 dB	60 dB ÷ 135 dB
C	32 dB ÷ 94 dB	33 dB ÷ 104 dB	40 dB ÷ 114 dB	50 dB ÷ 124 dB	60 dB ÷ 134 dB
Z	35 dB ÷ 100 dB	36 dB ÷ 110 dB	40 dB ÷ 120 dB	50 dB ÷ 130 dB	60 dB ÷ 140 dB

TAB 3A: Level range linearity limits of **HD2010UC** sound level meter

TAB 3B

Level range upper limit	100 dB	110 dB	120 dB	130 dB	140 dB
Maximum input voltage	0.085 Vrms	0.27 Vrms	0.83 Vrms	2.6 Vrms	8.2 Vrms
31.5 Hz					
A	24 dB ÷ 61 dB	30 dB ÷ 71 dB	40 dB ÷ 81 dB	50 dB ÷ 91 dB	60 dB ÷ 101 dB
C	29 dB ÷ 97 dB	30 dB ÷ 107 dB	40 dB ÷ 117 dB	50 dB ÷ 127 dB	60 dB ÷ 137 dB
Z	31 dB ÷ 99 dB	32 dB ÷ 109 dB	40 dB ÷ 119 dB	50 dB ÷ 129 dB	60 dB ÷ 139 dB
1 kHz					
A, C, Z	24 dB ÷ 100 dB	30 dB ÷ 110 dB	40 dB ÷ 120 dB	50 dB ÷ 130 dB	60 dB ÷ 140 dB
4 kHz					
A	24 dB ÷ 100 dB	30 dB ÷ 110 dB	40 dB ÷ 120 dB	50 dB ÷ 130 dB	60 dB ÷ 140 dB
C	29 dB ÷ 99 dB	30 dB ÷ 109 dB	40 dB ÷ 119 dB	50 dB ÷ 129 dB	60 dB ÷ 139 dB
Z	31 dB ÷ 100 dB	32 dB ÷ 110 dB	40 dB ÷ 120 dB	50 dB ÷ 130 dB	60 dB ÷ 140 dB
8 kHz					
A	24 dB ÷ 99 dB	30 dB ÷ 109 dB	40 dB ÷ 119 dB	50 dB ÷ 129 dB	60 dB ÷ 139 dB
C	29 dB ÷ 97 dB	30 dB ÷ 107 dB	40 dB ÷ 117 dB	50 dB ÷ 127 dB	60 dB ÷ 137 dB
Z	31 dB ÷ 100 dB	32 dB ÷ 110 dB	40 dB ÷ 120 dB	50 dB ÷ 130 dB	60 dB ÷ 140 dB
12.5 kHz					
A	24 dB ÷ 95 dB	30 dB ÷ 105 dB	40 dB ÷ 115 dB	50 dB ÷ 125 dB	60 dB ÷ 135 dB
C	29 dB ÷ 94 dB	30 dB ÷ 104 dB	40 dB ÷ 114 dB	50 dB ÷ 124 dB	60 dB ÷ 134 dB
Z	31 dB ÷ 100 dB	32 dB ÷ 110 dB	40 dB ÷ 120 dB	50 dB ÷ 130 dB	60 dB ÷ 140 dB

TAB 3B: Level range linearity limits of **HD2010** sound level meter

TAB 3C

Level range upper limit	130 dB	140 dB
Maximum input voltage	2.6 Vrms	8.2 Vrms
31.5 Hz		
A	25 dB ÷ 91 dB	33 dB ÷ 101 dB
C	28 dB ÷ 127 dB	33 dB ÷ 137 dB
Z	31 dB ÷ 129 dB	37 dB ÷ 139 dB
1 kHz		
A, C, Z	25 dB ÷ 130 dB	33 dB ÷ 140 dB
4 kHz		
A	25 dB ÷ 130 dB	33 dB ÷ 140 dB
C	28 dB ÷ 129 dB	33 dB ÷ 139 dB
Z	31 dB ÷ 130 dB	37 dB ÷ 140 dB
8 kHz		
A	25 dB ÷ 129 dB	33 dB ÷ 139 dB
C	28 dB ÷ 127 dB	33 dB ÷ 137 dB
Z	31 dB ÷ 130 dB	37 dB ÷ 140 dB
12.5 kHz		
A	25 dB ÷ 125 dB	33 dB ÷ 135 dB
C	28 dB ÷ 124 dB	33 dB ÷ 134 dB
Z	31 dB ÷ 130 dB	37 dB ÷ 140 dB

TAB 3C: Level range linearity limits of **HD2110** sound level meter

TAB 3D

Level range upper limit	127 dB	137 dB
Maximun input voltage	2.1 Vrms	6.6 Vrms
31.5 Hz		
A	24 dB ÷ 88 dB	30 dB ÷ 98 dB
C	28 dB ÷ 125 dB	31 dB ÷ 135 dB
Z	32 dB ÷ 127 dB	35 dB ÷ 137 dB
1 kHz		
A, C, Z	24 dB ÷ 128 dB	30 dB ÷ 138 dB
4 kHz		
A	24 dB ÷ 129 dB	30 dB ÷ 139 dB
C	28 dB ÷ 127 dB	31 dB ÷ 137 dB
Z	32 dB ÷ 128 dB	35 dB ÷ 138 dB
8 kHz		
A	24 dB ÷ 126 dB	30 dB ÷ 136 dB
C	28 dB ÷ 125 dB	31 dB ÷ 135 dB
Z	32 dB ÷ 128 dB	35 dB ÷ 138 dB
12.5 kHz		
A	24 dB ÷ 123 dB	30 dB ÷ 133 dB
C	28 dB ÷ 121 dB	31 dB ÷ 131 dB
Z	32 dB ÷ 128 dB	35 dB ÷ 138 dB

TAB 3D: Level range linearity limits of **HD2110L** sound level meter

Level range limits of C weighted peak level measurements are set out in the following tables.

TAB 4A

Level range upper limit	100 dB	110 dB	120 dB	130 dB	140 dB
31.5 Hz	44 dB ÷ 100 dB	44 dB ÷ 110 dB	44 dB ÷ 120 dB	51 dB ÷ 130 dB	61 dB ÷ 140 dB
500 Hz	44 dB ÷ 103 dB	44 dB ÷ 113 dB	44 dB ÷ 123 dB	51 dB ÷ 133 dB	61 dB ÷ 143 dB
8 kHz	44 dB ÷ 99 dB	44 dB ÷ 109 dB	44 dB ÷ 119 dB	51 dB ÷ 129 dB	61 dB ÷ 139 dB

TAB 4A: C-weighted Lpk level range limits for **HD2010UC** sound level meter

TAB 4B

Level range upper limit	100 dB	110 dB	120 dB	130 dB	140 dB
31.5 Hz	41 dB ÷ 100 dB	42 dB ÷ 110 dB	42 dB ÷ 120 dB	50 dB ÷ 130 dB	60 dB ÷ 140 dB
500 Hz	41 dB ÷ 103 dB	42 dB ÷ 113 dB	42 dB ÷ 123 dB	50 dB ÷ 133 dB	60 dB ÷ 143 dB
8 kHz	41 dB ÷ 99 dB	42 dB ÷ 109 dB	42 dB ÷ 119 dB	50 dB ÷ 129 dB	60 dB ÷ 139 dB

TAB 4B: C-weighted Lpk level range limits for **HD2010** sound level meter

TAB 4C

Level range upper limit	130 dB	140 dB
31.5 Hz	41 dB ÷ 129 dB	43 dB ÷ 140 dB
500 Hz	41 dB ÷ 133 dB	43 dB ÷ 143 dB
8 kHz	41 dB ÷ 129 dB	43 dB ÷ 139 dB

TAB 4C: C-weighted Lpk level range limits for **HD2110** sound level meter

TAB 4D

Level range upper limit	130 dB	140 dB
31.5 Hz	41 dB ÷ 128 dB	43 dB ÷ 138 dB
500 Hz	41 dB ÷ 131 dB	43 dB ÷ 141 dB
8 kHz	41 dB ÷ 128 dB	43 dB ÷ 138 dB

TAB 4D: C-weighted Lpk level range limits for **HD2110L** sound level meter

Reference levels for the linearity test of the reference level range are set out in the following table.

TAB 5

Sound level meter	HD2010UC	HD2010	HD2110	HD2110L
Reference Level Range	130 dBA	130 dBA	130 dBA	130 dBA
Reference level at 8 kHz	92.9 dBA	92.9 dBA	92.9 dBA	92.9 dBA

TAB 5: Reference levels for the linearity test at 8 kHz of the reference level range.

FREQUENCY RESPONSE OF MICROPHONE-PREAMPLIFIER-SOUND LEVEL METER CHAIN

HD2010UC SOUND LEVEL METERS WITH UC52 MICROPHONES

For the frequency response test of the measurement chain microphone-preamplifier-sound level meter, a multi-frequency acoustic calibrator B&K 4226 can be used to measure the pressure frequency response and applying the corrections needed to get the free field response.

In the following tables frequency response corrections to be added to the frequency response obtained with multi-frequency calibrator B&K 4226 in "Pressure" mode, with manual frequency control are set out. Configurations including an extension cable (CPA), between the preamplifier and the sound level meter case, and a windshield (SAV or WME) are considered. When the extension cable is not used the sound level meter case influences the microphone frequency response.

TAB 6

Frequency [Hz]	Pressure – Free Field Corrections ¹		
	With CPA cable	Without CPA cable	Uncertainty U (k=2)
31.5 ÷ 500	0.0	0.0	0.25
1k	0.1	0.1	0.2
2k	0.4	0.6	0.2
4k	1.0	1.0	0.2
8k	3.4	3.9	0.3
12.5k	6.6	6.7	0.45
16k	5.5	5.6	0.45

¹ The sound level in free field conditions is calculated adding the values given in the table column, corresponding to the configuration of the device under test, to the sound level meter indication measured with the B&K 4226 calibrator.

In the following table the corrections needed to calculate the free field frequency response of the microphone, preamplifier and sound level meter chain, in presence of a windshield, are given.

TAB 7

Frequency [Hz]	Windshield Frequency Response Corrections ²		
	SAV	WME	Uncertainty U (k=2)
31.5 ÷ 500	0.0	0.0	0.2
1k	0.1	0.0	0.2
2k	0.3	0.1	0.2
4k	0.3	0.2	0.2
8k	0.3	0.4	0.3
12.5k	-0.1	0.4	0.3
16k	-2.5	0.6	0.3

² The sound level meter indication in free field conditions can be calculated adding the reported values to the indication of the sound level meter, coupled to the B&K 4226, corrected for the acoustic field by table TAB 6 corrections.

HD2010, HD2110 AND HD2110L SOUND LEVEL METERS WITH MK221, MK223 AND MK231 MICROPHONES

For the frequency response test of the measurement chain consisting of microphone, preamplifier and sound level meter, either the *electrostatic actuator* method (only for microphone model equipped with an insulated protection grid) or the *multi-frequency calibrator B&K 4226* can be used, applying corrections to sound level meter indications to get the free field (MK221 and MK223) or the diffused field (MK231) response.

Corrections are given in the following tables for configurations including an extension cable (CPA), connecting the preamplifier to the sound level meter, and a windshield (SAV or WME). When the extension cable is not used the sound level meter case influences the microphone frequency response.

For the microphone capsules equipped with the special insulated grid for the electrostatic direct coupling the electrical signal to be applied should have the following characteristics:

- polarization level 400V;
- signal gain for insulated grid microphones 0.5mV/V corresponding to 0.01 Pa/V.

The sensitivity allows to get a measurement level of about 74dB applying a 10Vac input signal.

In the following tables, the frequency response corrections to be applied to the electrostatic actuator response, are given.

TAB 8

Frequency [Hz]	Actuator – Free Field Corrections (MK221 and MK223) ¹ [dB]	
	With CPA cable	Without CPA cable
31.5 ÷ 500	0.0	0.0
1k	0.0	0.0
2k	0.2	0.3
4k	1.0	0.3
8k	3.1	2.1
12.5k	6.0	5.0
16k	8.5	7.8

TAB 9

Frequency [Hz]	Actuator – Diffused Field Corrections (MK231) ¹ [dB]	
	With CPA cable	Without CPA cable
31.5 ÷ 500	0.0	0.0
1k	0.0	0.0
2k	-0.1	0.0
4k	0.1	-0.6
8k	0.7	-0.3
12.5k	1.8	0.8
16k	3.4	2.7

¹ The sound level in free field or diffused field conditions can be calculated adding the values given in the table column, relative to the configuration of the device under test, to the indication of the sound level meter coupled to the electrostatic actuator.

When the frequency response test of the measurement chain is executed measuring the pressure field response by a multi-frequency acoustic calibrator B&K 4226, the microphone protection grid

must be replaced with the specific ring suitable for pressure calibration of MG microphone capsules (code **MK021**).

In the following tables frequency response corrections, to be added to the frequency response obtained with multi-frequency calibrator B&K 4226 in "Pressure" mode, with manual frequency control, are given.

TAB 10

Frequency [Hz]	Pressure – Free Field Corrections (MK221 and MK223) ¹ [dB]		
	With CPA cable	Without CPA cable	Uncertainty U (k=2)
31.5 ÷ 500	0.0	0.0	0.25
1k	0.0	0.0	0.2
2k	0.2	0.3	0.2
4k	1.1	0.4	0.2
8k	3.3	2.3	0.3
12.5k	6.0	5.0	0.45
16k	8.0	7.3	0.45

TAB 11

Frequency [Hz]	Pressuree –Diffused Field Corrections (MK231) ¹ [dB]	
	With CPA cable	Without CPA cable
31.5 ÷ 500	0.0	0.0
1k	0.0	0.0
2k	0.0	0.1
4k	0.2	-0.5
8k	0.9	-0.1
12.5k	1.8	0.8
16k	2.9	2.2

¹ The sound level in free field or diffused field conditions can be calculated adding the values given in the table column, relative to the configuration of the device under test, to the indication of the sound level meter coupled to the B&K4226 calibrator.

In the following table the corrections needed to calculate the free field frequency response of the microphone, preamplifier and sound level meter chain, in presence of a windshield, are given.

TAB 12

Frequency [Hz]	Windshield Frequency Response Corrections (MK221 and MK223) ² [dB]		
	SAV	WME	Uncertainty U (k=2)
31.5 ÷ 500	0.0	0.0	0.2
1k	0.1	0.0	0.2
2k	0.3	0.0	0.2
4k	0.1	0.2	0.2
8k	-0.3	0.3	0.3
12.5k	-0.7	0.7	0.3
16k	-1.0	0.3	0.3

² The sound level meter indication in free field conditions can be calculated adding the reported values to the indication of the sound level meter, coupled to the electrostatic actuator or to the B&K 4226 calibrator, corrected for the acoustic field by TAB 8 or TAB10 table.

TAB 13

Frequency [Hz]	Windshield Frequency Response Corrections (MK231) ¹ [dB] SAV
31.5 ÷ 500	0.0
1k	0.1
2k	0.3
4k	0.1
8k	-0.3
12.5k	-0.7
16k	-1.0

¹ The sound level meter indication in diffused field conditions can be calculated adding the reported values to the indication of the sound level meter, coupled to the electrostatic actuator or to the B&K 4226 calibrator, corrected for the acoustic field by TAB 9 or TAB11 table.

HD2010, HD2110 AND HD2110L SOUND LEVEL METERS WITH 377B02 MICROPHONES

For the frequency response test of the microphone-preamplifier-sound level meter measurement chain, a multi-frequency acoustic calibrator B&K 4226 can be used to measure the pressure frequency response and applying the corrections needed to get the free field response.

In the following tables frequency response corrections to be added to the frequency response obtained with multi-frequency calibrator B&K 4226 in "Pressure" mode, with manual frequency control are set out. Configurations including an extension cable (CPA), between the preamplifier and the sound level meter case, and a windshield (SAV or WME) are considered. When the extension cable is not used the sound level meter case influences the microphone frequency response.

TAB 14

Frequency [Hz]	Pressure – Free Field Corrections ¹		
	With CPA cable	Without CPA cable	Uncertainty U (k=2)
31.5 ÷ 500	0.0	0.0	0.25
1k	0.2	0.3	0.2
2k	0.5	0.6	0.2
4k	1.3	0.6	0.2
8k	3.3	2.4	0.3
12.5k	6.5	5.7	0.45
16k	7.7	7.0	0.45

¹ The sound level in free field conditions can be calculated adding the values given in the table column, relative to the configuration of the device under test, to the indication of the sound level meter coupled to the B&K4226 calibrator.

In the following table the corrections needed to calculate the free field frequency response of the microphone, preamplifier and sound level meter chain, in presence of a windshield, are given.

TAB 15

Frequency [Hz]	Windshield Frequency Response Corrections ²		
	SAV	WME	Uncertainty U (k=2)
31.5 ÷ 500	0.0	0.0	0.2
1k	0.1	-0.1	0.2
2k	0.3	-0.2	0.2
4k	0.1	-0.6	0.2
8k	-0.3	-0.8	0.3
12.5k	-0.7	-2.0	0.3
16k	-1.0	-2.0	0.3

² The sound level meter indication in free field conditions can be calculated adding the reported values to the indication of the sound level meter, coupled to the B&K 4226 calibrator, corrected for the acoustic field by TAB 14 table.

HD2010, HD2110 AND HD2110L SOUND LEVEL METERS WITH 377C41 MICROPHONES

For the frequency response test of the microphone-preamplifier-sound level meter measurement chain, a multi-frequency acoustic calibrator B&K 4226 can be used to measure the pressure frequency response and applying the corrections needed to get the free field response.

In the following tables frequency response corrections to be added to the frequency response obtained with multi-frequency calibrator B&K 4226 in "Pressure" mode, with manual frequency control are set out. Configurations including an extension cable (CPA), between the preamplifier and the sound level meter case, and a windshield (SAV or WME) are considered. When the extension cable is not used the sound level meter case influences the microphone frequency response.

TAB 16

Frequency [Hz]	Pressure – Free Field Corrections ¹		
	With CPA cable	Without CPA cable	Uncertainty U (k=2)
31.5 ÷ 500	0.0	0.0	0.25
1k	0.2	0.3	0.2
2k	0.4	0.4	0.2
4k	1.0	0.3	0.2
8k	3.6	2.7	0.3
12.5k	6.7	5.9	0.45
16k	8.4	7.7	0.45

¹ The sound level in free field conditions can be calculated adding the values given in the table column, relative to the configuration of the device under test, to the indication of the sound level meter coupled to the B&K4226 calibrator.

In the following table the corrections needed to calculate the free field frequency response of the microphone, preamplifier and sound level meter chain, in presence of a windshield, are given.

TAB 17

Frequency [Hz]	Windshield Frequency Response Corrections ²		
	SAV	WME	Uncertainty U (k=2)
31.5 ÷ 500	0.0	0.0	0.2
1k	0.1	0.0	0.2
2k	0.3	0.2	0.2
4k	0.1	-0.3	0.2
8k	-0.3	-0.7	0.3
12.5k	-0.7	-1.7	0.3
16k	-1.0	-2.2	0.3

² The sound level meter indication in free field conditions can be calculated adding the reported values to the indication of the sound level meter, coupled to the B&K 4226 calibrator, corrected for the acoustic field by TAB 16 table.