Description for IEC 61672-1

Sound Level Meter

NL-52 / NL-42

RION CO., LTD.

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https://www.rion.co.jp/english/

GREEN

NL-52/NL-42 Description for IEC 61672-1

Standard paragraph	Description	See also	Remark	
			NL-52	NL-42
4	**Reference environmental conditions**		Ambient temperature: 23°C Static pressure:101.325 kPa Relative humidity: 50%	Ambient temperature: 23°C Static pressure:101.325 kPa Relative humidity: 50%
5	**Performance specifications**			
5.1	**General**			
5.1.3	The classification for specifying the emission and the immunity	9.2.1 a)	Group X, Class 1	Group X, Class 2
5.1.4	Configuration & normal mode of operation	9.2.1 b)	Configuration • NL-52 • WS-10 → Controls and Functions, Preparations	Configuration • NL-42 • WS-10 → Controls and Functions, Preparations
5.1.6	Models of microphone Appropriate procedures for use the sound level meter	9.2.1 c) 9.2.6 b)	UC-59 → Measurement	UC-52 → Measurement
5.1.7	Mounting of microphone	9.2.1 b)	→ Controls and Functions, Preparations	→ Controls and Functions, Preparations
5.1.8	Identification of computer software	9.2.2 j)	N/A	N/A
5.1.10	Description of frequency weightings that are provided	9.2.2 c)	A, C, Z	A, C, Z
5.1.12	Description of Nominal range (@A-weighted SPL @1 kHz) Instruction manual of the level range controls and function. Recommendation for selecting the optimum level range.	9.2.2 e) 9.2.2 f)	25 dB to 138 dB N/A N/A	25 dB to 138 dB N/A N/A
5.1.13	Reference SPL reference level range, The reference direction for the microphone and the location of the microphone reference point	9.2.6 a) 9.3 a), b), c)	94 dB N/A Reference incidence direction and reference point position (Fig. 1)	94 dB N/A Reference incidence direction and reference point position (Fig. 1)
5.1.14	Operating of the hold facility and the means for clearing a display that is held.	9.2.6 h)	→ Measurement	→ Measurement
5.1.15	Dummy microphone: Design goal and tolerance	9.3 h)	Capacitance of capacitor: 13 pF Tolerance: ±1.5 pF Resistance value: approx. 3 GΩ	Capacitance of capacitor: 18 pF Tolerance: ±1.5 pF Resistance value: approx. 3 GΩ
5.1.17	Highest SPL and Peak-Peak input voltage without causing damage.	9.3 j)	148 dB 11 Vp-p	150 dB 11 Vp-p
5.1.18	Characteristics of each independent channel to be described	9.2.1 e)	N/A	N/A
5.1.19	Initial time interval after switching on power	9.2.6 d)	Less than 90 seconds	Less than 90 seconds
5.2	**Adjustment to indicated levels**			
5.2.1	Model of sound calibrator(s)	9.2.4 a)	NC-75/NC-74 (RION) NC-72B/NC-72A (RION)	NC-75/NC-74 (RION) NC-72B/NC-72A (RION)

Standard paragraph	Description	See also	Remark	
			NL-52	NL-42
5.2.3	Procedure for calibration & adjustment with sound calibrator	9.2.4 c)	→ Calibration	→ Calibration
5.3	**Corrections to indicated levels**			
5.3.1	**General**			
5.3.1.1	The correction data and the expanded uncertainty of the measurement	9.2.5 a)	Refer to IEC 61672-1 (JIS C 1509-1) frequency response	Refer to IEC 61672-1 (JIS C 1509-1) frequency response
5.3.2	Reflections and diffraction			
5.3.2.1	The correction data for the effects of reflections from, and diffraction around, the case of the sound level meter	9.2.5 b)	N/A Refer to the Influence of body reflection (Fig. 4).	N/A Refer to the Influence of body reflection (Fig. 4).
5.3.3	**Windscreen**			
5.3.3.1	Typical correction data for the effects of the windscreen	9.2.5 c)	Fig. 11 / Fig. 13 / Fig. 15	Fig. 11 / Fig. 13 / Fig. 15
5.3.3.2	The correction data in a configuration which may or not may contain the windscreen		Fig. 8 / Fig. 12 /Fig. 14	Fig. 8 / Fig. 12 / Fig. 14
5.3.5	**Corrections for use during periodic testing**			
5.3.5.1	The correction data of the multi-frequency sound calibrator	9.2.5 d)	Not recommended	Not recommended
5.3.5.3	Adjustment data for sound calibrator or electrostatic actuator (for A-weighted sound levels)	9.3 d)	Tab. 3	Tab. 3
5.4	**Directional Characteristics**			
5.4.5	Detailed tables of relative directional response		N/A	N/A
5.5	**Description of the frequency weightings**			
5.5.5	The tables of directivity indexes applicable to the normal configuration of the sound level meter	9.3 e)	Tab. 5 / Tab. 6	Tab. 5 / Tab. 6
5.5.8	Frequency response & tolerances of optional frequency responses	9.2.2 k)	N/A	N/A
5.6	**Level linearity**			
5.6.10	A, C and Z weighted levels for the lower and upper limit of the linear operating range.	9.3 f)	Tab. 4	Tab. 4
5.6.11	Starting point for the level linearity error	9.3 g)	Tab. 4	Tab. 4
5.7	**Self generated noise**			
5.7.1	Self-noise at the more sensitive ranges (including microphone)	9.3 i)	Maximum value A: <17 dB C: <25 dB Z: <30 dB Typical value A: 13 dB C: 20 dB Z: 25 dB	Maximum value A: <19 dB C: <27 dB Z: <32 dB Typical value A: 15 dB C: 22 dB Z: 27 dB

Standard paragraph	Description	See also	Remark	
			NL-52	NL-42
5.7.3	Self-noise at the more sensitive ranges with dummy microphone	9.3 i)	Dummy microphone (13 pF) Maximum value Equal to 5.7.1 Typical value A: 13 dB C: 20 dB Z: 25 dB	Dummy microphone (18 pF) Maximum value Equal to 5.7.1 Typical value A: 13 dB C: 18 dB Z: 24 dB
5.7.5	Instruction to measure low level sounds with consideration of influence of self-noise	9.2.6 c)	→ Influence of background noise	→ Influence of background noise
5.8	**Time weighting F and S**			
5.8.1	Description of time weightings that are provided	9.2.2 d)	F (Fast), S (Slow)	F (Fast), S (Slow)
5.11 - 5.12	**Overload and Under-range indication**			
5.11.1	Operation & interpretation of overload indicators	9.2.6 j)	→ Controls and Functions	→ Controls and Functions
5.12.1	Operation & interpretation of under-range indicators	9.2.6 j)	→ Controls and Functions	→ Controls and Functions
5.13	**Peak C sound level**			
5.13.1	Nominal range of L_{Cpeak} at for each level range	9.2.2 i)	Tab. 4	Tab. 4
5.17	**Operation of user-selectable thresholds**	9.2.6 k)	N/A	N/A
5.18	**Display**			
5.18.1	Description of the indication of displayed quantities	9.2.2 g)	→ Controls and Functions	→ Controls and Functions
5.18.2	Description of the display	9.2.2 g)	→ Controls and Functions	→ Controls and Functions
5.18.3	Description of the displayed quantities	9.2.2 g) 9.2.2 a)	N/A	N/A
5.18.4	Statement of the display update rate	9.2.2 g)	1 second	1 second
5.18.5	Description of method for transferring data to PC	9.2.6 l)	N/A Refer to serial interface manual	N/A Refer to serial interface manual
5.19	**Analogue and digital outputs**			
5.19.1	Electric output connector	9.2.6 n)	• AC output Frequency weighting: A, C, Z Output voltage: 1 Vrms (at output level range upper) Output range: 4 Vrms or less Output impedance: 600 Ω Load impedance: >10 kΩ • DC output Frequency weighting: A, C, Z Output voltage: 2.5 V (at output level range upper), 25 mV/dB Output range: 0 V to 5 V Output impedance: 50 Ω Load impedance: >10 kΩ	• AC output Frequency weighting: A, C, Z Output voltage: 1 Vrms (at output level range upper) Output range: 4 Vrms or less Output impedance: 600 Ω Load impedance: >10 kΩ • DC output Frequency weighting: A, C, Z Output voltage: 2.5 V (at output level range upper), 25 mV/dB Output range: 0 V to 5 V Output impedance: 50 Ω Load impedance: >10 kΩ

Standard paragraph	Description	See also	Remark	
			NL-52	NL-42
5.20	**Timing facilities**			
5.20.1	Procedure to preset the integration time & time of the day	9.2.6 f)	→ Preparations	→ Preparations
5.20.2	Statement of the minimum & maximum integration time	9.2.6 g)	Minimum: 1 second Maximum: 24 hours	Minimum: 1 second Maximum: 24 hours
5.21	**RF emissions and power supply disturbance**			
5.21.1	Length & type of interface cable and characteristics of connected devices	9.2.6 m)	Microphone extension cable EC-04 series (up to 35 m) Output cable CC-24 (2.5 m) All cables shielded	Microphone extension cable EC-04 series (up to 35 m) Output cable CC-24 (2.5 m) All cables shielded
5.21.2	Operating mode or highest radio frequency emissions	9.3 n)	Operation mode: normal operation Connection pattern: AC adapter NC-98 Output cable CC-24 Communication cable CC-42R USB cable (with ferrite cores) Microphone extension cable EC-04 series 35 m	Operation mode: normal operation Connection pattern: AC adapter NC-98 Output cable CC-24 Communication cable CC-42R USB cable (with ferrite cores) Microphone extension cable EC-04 series 35 m
5.23	**Power supply**			
5.23.1	How to check if the power supply voltage is sufficient to operate	9.2.3 b)	N/A → Reading the Display	N/A → Reading the Display
5.23.2	Maximum and minimum power supply voltage	9.3 k)	Maximum: 7 V Minimum: 4 V	Maximum: 7 V Minimum: 4 V
5.23.3	Acceptable internal battery types	9.2.3 a)	N/A	N/A
5.23.4	Continuous operating time expected for the normal mode of operation when full capacity batteries are installed	9.2.3 a)	→ Specifications	→ Specifications
5.23.5	Operation from an external power supply	9.2.3 c)	→ Connection	→ Connection
5.23.6	Public power supply voltage	9.2.3 d)	100 V to 240 V AC (tolerance range 90 V to 264 V), 50/60 Hz (±3 Hz)	100 V to 240 V AC (tolerance range 90 V to 264 V), 50/60 Hz (±3 Hz)
6	**Environmental, electrostatic and radio frequency criteria**			
6.1.2	Time interval for needed to stabilize after environmental changes	9.3.l)	Temperature change: < 1 hour Humidity change: < 1 hour Static pressure change: < 5 minutes	Temperature change: < 1 hour Humidity change: < 1 hour Static pressure change: < 5 minutes
6.2.2 (Note)	Procedures to use the sound level meter at locations or under conditions where the static pressure is more than 65 kPa and less than 85 kPa	9.2.6 e)	Calibration and measurement performed in this environment using Sound Calibrator NC-75/NC-74 or Pistonphone NC-72B/NC-72A	Calibration and measurement performed in this environment using Sound Calibrator NC-75/NC-74 or Pistonphone NC-72B/NC-72A
6.3.2	Components intended for operation in controlled environment	9.2.8 a)	None	None
6.5.2	Degradation of functions by electrostatic discharge	9.2.8 b)	Measurement value affected temporarily by electrostatic discharge	Measurement value affected temporarily by electrostatic discharge

Standard paragraph	Description	See also	Remark	
			NL-52	NL-42
6.6.1	Operating mode with least immunity to AC power frequency fields and RF fields	9.3 o)	Fig. 16 Operation mode: normal operation Connection pattern: AC adapter NC-98 Output cable CC-24 Communication cable CC-42R USB cable (with ferrite cores) Microphone extension cable EC-04 series 35 m	Fig. 16 Operation mode: normal operation Connection pattern: AC adapter NC-98 Output cable CC-24 Communication cable CC-42R USB cable (with ferrite cores) Microphone extension cable EC-04 series 35 m
6.6.5 (Note)	Electric field strength that can operate beyond the stated electric field strength values.	9.3 m)	N/A	N/A
6.6.10	Statement for conformance to AC power frequency fields and RF fields	9.2.8 c)	Tab. 2	Tab. 2
6.7	Mechanical vibration	9.2.1 f)	Do not vibrate the sound level meter during measurement.	Do not vibrate the sound level meter during measurement.
7	**Provisions for use with auxiliary devices**			
7.1	Correction for use of microphone cable	9.2.7 b)	N/A	N/A
7.2	Effect of optional accessories (windscreen)	9.2.7 a)	Fig. 10	Fig. 10
7.3	Statement of conformance with optional accessories (windscreen)	9.2.1 d)	Compliant with IEC 61672-1 (JIS C 1509-1), with Windscreen WS-10 mounted	Compliant with IEC 61672-1 (JIS C 1509-1), with Windscreen WS-10 mounted
7.4	Operation of 1/1 - 1/3 octave band filters	9.2.7 c)	N/A	N/A
7.5	Details about connection & effects of auxiliary devices	9.2.7 d)	→ Connection	→ Connection
9	**Instruction manual**			
9.2.1	**General**			
9.2.1 a)	Description of type, classification (X, Y, Z) and class	5.1.3	Refer to 5.1.3	Refer to 5.1.3
9.2.1 b)	Overall configuration, Normal operation configuration (including windscreen)	5.1.4 5.1.7	Refer to 5.1.4 Refer to 5.1.7	Refer to 5.1.4 Refer to 5.1.7
9.2.1 c)	Models of microphones	5.1.6	Refer to 5.1.6	Refer to 5.1.6
9.2.1 d)	Standards that the sound level meter conforms to only when the extension cable is installed.	7.3	Refer to 7.3	Refer to 7.3
9.2.1 e)	Characteristics & operation each channel	5.1.18	Refer to 5.1.18	Refer to 5.1.18
9.2.1 f)	Influence of mechanical vibration and advice on means to minimize the influence	6.7	Refer to 6.7	Refer to 6.7
9.2.2	**Design features**			
9.2.2 a)	Description of quantities which can be measured	5.18.3	L_p, L_{eq}, L_{max}, L_{min}, L_E, L_N, L_{peak}, L_{Atm5}	L_p, L_{eq}, L_{max}, L_{min}, L_E, L_N, L_{peak}, L_{Atm5}
9.2.2 b)	Directional Characteristics		Fig. 17 / Fig. 18 / Tab. 5 / Tab. 6	Fig. 17 / Fig. 18 / Tab. 5 / Tab. 6
9.2.2 c)	Description of the frequency weightings	5.1.10 5.5.8	Refer to 5.1.10 Refer to 5.5.8	Refer to 5.1.10 Refer to 5.5.8
9.2.2 d)	Description of the time weightings	5.8.1	Refer to 5.8.1	Refer to 5.8.1

Standard paragraph	Description	See also	Remark	
			NL-52	NL-42
9.2.2 e)	The level ranges by the nominal A-weighted sound levels at the lower and upper boundaries of the linear operating ranges at 1 kHz	5.1.12	Refer to 5.1.12	Refer to 5.1.12
9.2.2 f)	Operation of the level range control	5.1.12	Refer to 5.1.12	Refer to 5.1.12
9.2.2 g)	Description of the display and update rates	5.18.1-2-3-4	Refer to 5.18.1-2-3-4	Refer to 5.18.1-2-3-4
9.2.2 h)	Total range of A- weighted SPL (@ 1 kHz)		25 dB to 138 dB	25 dB to 138 dB
9.2.2 i)	Nominal range of L_{Cpeak} at for each level range	5.13.1	Refer to 5.13.1	Refer to 5.13.1
9.2.2 j)	Computer software to operate the SLM	5.1.8	Refer to 5.1.8	Refer to 5.1.8
9.2.2 k)	Design goals and tolerances for quantities which are not in the standard (T-weight 10 ms, L_{AIeq})	5.5.8	Refer to 5.5.8	Refer to 5.5.8
9.2.3	**Power supply**			
9.2.3 a)	Recommendations for acceptable battery types and the nominal duration of continuous operation for the normal mode of operation under reference environmental conditions when full capacity batteries are installed	5.23.3 5.23.4	Refer to 5.23.3 Refer to 5.23.4	Refer to 5.23.3 Refer to 5.23.4
9.2.3 b)	Description of the function of battery check	5.23.1	Refer to 5.23.1	Refer to 5.23.1
9.2.3 c)	Operation from an external power supply	5.23.5	Refer to 5.23.5	Refer to 5.23.5
9.2.3 d)	Public power supply voltage	5.23.6	Refer to 5.23.6	Refer to 5.23.6
9.2.4	**Adjustments at the calibration check frequency**			
9.2.4 a)	Model of sound calibrator(s)	5.2.1	Refer to 5.2.1	Refer to 5.2.1
9.2.4 b)	Calibration check frequency		1 kHz (NC-75/NC-74) 250 Hz (NC-72B/NC-72A)	1 kHz (NC-75/NC-74) 250 Hz (NC-72B/NC-72A)
9.2.4 c)	Procedure for calibration & adjustment with sound calibrator	5.2.3	Refer to 5.2.3	Refer to 5.2.3
9.2.5	**Corrections to indicated levels**			
9.2.5 a)	Correction data and the expanded uncertainties	5.3.1.1	Refer to 5.3.1.1	Refer to 5.3.1.1
9.2.5 b)	Microphone characteristics (free-field, chassis refraction effects,etc.)	5.3.2.1	Refer to 5.3.2.1	Refer to 5.3.2.1
9.2.5 c)	Effects of a windscreen	5.3.3.1	Refer to 5.3.3.1	Refer to 5.3.3.1
9.2.5 d)	Corrections to a multi-frequency sound calibrator	5.3.5.1	Refer to 5.3.5.1	Refer to 5.3.5.1
9.2.6	**Operating the sound level meter**			
9.2.6 a)	The reference direction and the reference point	5.1.13	Refer to 5.1.13	Refer to 5.1.13
9.2.6 b)	Procedure to measure sound, Influence of the instrument case and operator	5.1.6	Refer to 5.1.6	Refer to 5.1.6

Standard paragraph	Description	See also	Remark	
			NL-52	NL-42
9.2.6 c)	Instruction to measure low level sounds with consideration of influence of self-noise	5.7.5	Refer to 5.7.5	Refer to 5.7.5
9.2.6 d)	Initial time interval after switching on power	5.1.19	Refer to 5.1.19	Refer to 5.1.19
9.2.6 e)	Guidance and procedures for measuring sound levels at locations where the static pressure is from 65 kPa up to, but not including, 85 kPa	6.2.2	Refer to 6.2.2	Refer to 6.2.2
9.2.6 f)	Procedure to preset the integration time and time of the day	5.20.1	Refer to 5.20.1	Refer to 5.20.1
9.2.6 g)	Statement of the minimum & maximum integration time	5.20.2	Refer to 5.20.2	Refer to 5.20.2
9.2.6 h)	Operating of the hold facility and the means for clearing a display that is held	5.1.14	Refer to 5.1.14	Refer to 5.1.14
9.2.6 i)	Operation of the reset function or L_{eq}, L_E, L_{peak} and overload		Measurement results (measurement values, overload indication, under-range indication) are reset when a new measurement is started. Time required for measurement initialization: < 1 second	Measurement results (measurement values, overload indication, under-range indication) are reset when a new measurement is started. Time required for measurement initialization: < 1 second
9.2.6.j)	Operation & interpretation of overload indicators	5.11.1 5.12.2	Refer to 5.11.1 Refer to 5.12.2	Refer to 5.11.1 Refer to 5.12.2
9.2.6 k)	Operation of user-selectable thresholds	5.17	Refer to 5.17	Refer to 5.17
9.2.6 l)	Description of method for transferring data to PC	5.18.5	Refer to 5.18.5	Refer to 5.18.5
9.2.6 m)	Length & type of interface cable and characteristics of connected devices	5.21.1	Refer to 5.21.1	Refer to 5.21.1
9.2.6 n)	For electrical outputs, recommended range of each electrical characteristic	5.19.1	Refer to 5.19.1	Refer to 5.19.1
9.2.7	**Accessories**			
9.2.7 a)	Effect of windscreen (directional response and frequency weighting)	7.2	Refer to 7.2	Refer to 7.2
9.2.7 b)	Corrections for microphone cable	7.1	Refer to 7.1	Refer to 7.1
9.2.7 c)	Use of bandpass filters	7.4	Refer to 7.4	Refer to 7.4
9.2.7 d)	Connection of auxiliary devices	7.5	Refer to 7.5	Refer to 7.5
9.2.8	**Influence of environmental conditions**			
9.2.8 a)	Components intended for operation in controlled environment	6.3.2	None	None
9.2.8 b)	Degradation of functions by electrostatic discharge	6.5.2	Refer to 6.5.2	Refer to 6.5.2
9.2.8 c)	Statement for conformance to AC power frequency fields and RF fields	6.6.10	Refer to 6.6.10	Refer to 6.6.10
9.3	**Information for testing**			
9.3 a)	Reference sound pressure level	5.1.13	Refer to 5.1.13	Refer to 5.1.13
9.3 b)	Reference level range	5.1.13	Refer to 5.1.13	Refer to 5.1.13
9.3 c)	Microphone reference point	5.1.13	Refer to 5.1.13	Refer to 5.1.13

Standard paragraph	Description	See also	Remark	
			NL-52	NL-42
9.3 d)	For A-weighted sound levels: Adjustment data for multi-frequency sound calibrator and/or electrostatic actuator	5.3.5.1	Refer to 5.3.5.1	Refer to 5.3.5.1
9.3 e)	Directivity indexes for determining relative random-incidence response	5.5.5	Refer to 5.5.5	Refer to 5.5.5
9.3 f)	The upper and lower boundaries of the linear operating range of the A-weighted sound level	5.6.10	Refer to 5.6.10	Refer to 5.6.10
9.3 g)	Start point on reference level range for linearity error testing	5.6.11	Refer to 5.6.11	Refer to 5.6.11
9.3 h)	Dummy microphone: Design goal and tolerance	5.1.15	Refer to 5.1.15	Refer to 5.1.15
9.3 i)	Self-noise at the more sensitive ranges with microphone and with dummy microphone	5.7.1 5.7.3	Refer to 5.7.1/5.7.3	Refer to 5.7.1/5.7.3
9.3 j)	Highest SPL and Peak-Peak input voltage to accommodate	5.1.17	Refer to 5.1.17	Refer to 5.1.17
9.3 k)	Maximum and minimum power supply voltage	5.23.2	Refer to 5.23.2	Refer to 5.23.2
9.3 l)	Time interval for needed to stabilize after environmental changes	6.1.2	Refer to 6.1.2	Refer to 6.1.2
9.3 m)	Electric field strength value	6.6.5	Refer to 6.6.5	Refer to 6.6.5
9.3 n)	Operating mode or highest radio frequency emissions	5.21.2	Refer to 5.21.2	Refer to 5.21.2
9.3 o)	Operating mode with least immunity to AC power frequency fields and RF fields	6.6.1	Refer to 6.6.1	Refer to 6.6.1

IEC61672-1 (JIS C 1509-1) frequency response

Tab. 1 IEC 61672-1 (JIS C 1509-1) frequency response

Nominal Frequency (Hz)	Exact Frequency (Hz)	UC-59 Frequency Response (dB)	UC-52 Frequency Response (dB)	NL-42/52 Frequency Response (dB)	NL-42/52 Electrical Response (dB)	Windscreen (WS-10) Effect (dB)	Windscreen (WS-10) Correction (dB)	Total Expanded Uncertainty (dB)
63	63.10	0.1	0.0	-0.1	0.0	0.0	0.0	0.3
80	79.43	0.1	0.0	-0.1	0.0	0.0	0.0	0.3
100	100.0	0.1	0.0	-0.1	0.0	0.0	0.0	0.3
125	125.9	0.1	0.0	0.0	0.0	0.0	0.0	0.3
160	158.5	0.1	0.0	-0.1	0.0	0.0	0.0	0.3
200	199.5	0.1	0.0	0.0	0.0	0.0	0.0	0.2
250	251.2	0.1	0.0	0.0	0.0	0.0	0.0	0.2
315	316.2	0.0	0.0	0.0	0.0	0.1	0.0	0.2
400	398.1	0.0	0.0	0.0	0.0	0.1	0.0	0.2
500	501.2	0.0	0.0	0.1	0.0	0.1	0.0	0.2
630	631.0	0.0	0.0	0.1	0.0	0.1	0.0	0.2
800	794.3	-0.1	0.0	0.1	0.0	0.1	-0.1	0.2
1000	1000	0.0	0.0	0.0	0.0	0.1	-0.1	0.2
1250	1259	0.0	0.0	-0.2	0.0	0.2	-0.1	0.3
1600	1585	0.0	0.1	-0.4	0.0	0.2	-0.2	0.3
2000	1995	0.0	0.2	0.0	0.0	0.3	-0.3	0.3
2500	2512	0.0	0.3	0.2	0.0	0.4	-0.3	0.3
3150	3162	0.1	0.4	0.1	0.0	0.5	-0.4	0.3
4000	3981	0.1	0.4	-0.1	0.0	0.3	-0.4	0.4
5000	5012	0.1	0.3	0.4	0.0	0.0	-0.4	0.4
6300	6310	0.1	0.0	-0.1	0.0	-0.2	-0.3	0.4
8000	7943	0.0	-0.5	0.0	0.0	0.0	-0.1	0.4
10000	10000	-0.1		0.2	0.0	-0.2	0.1	0.6
12500	12589	-0.3		-0.1	0.0	-0.5	0.3	0.6
16000	15849	-0.8		-0.2	0.0	-0.7	0.4	0.6

Reference incidence direction and reference point position

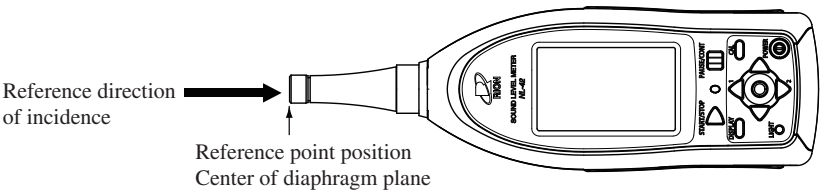

Fig. 1 Reference incidence direction and reference point position

Frequency response

The frequency response of a sound field microphone is expressed as the frequency response in the reference direction of incidence (0º).
The diagram below shows an example for the frequency response of the microphone UC-59 and UC-52.

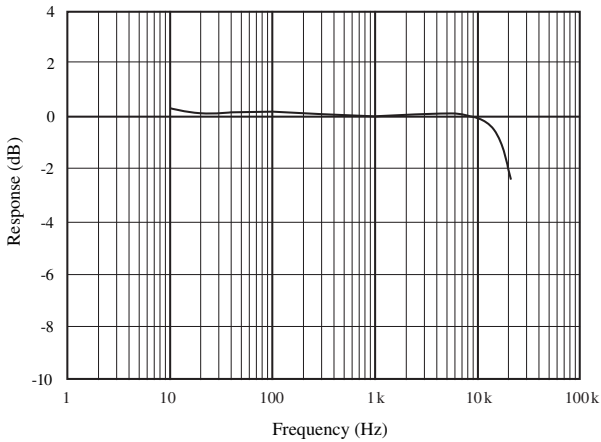

Fig. 2 Frequency response of the microphone UC-59

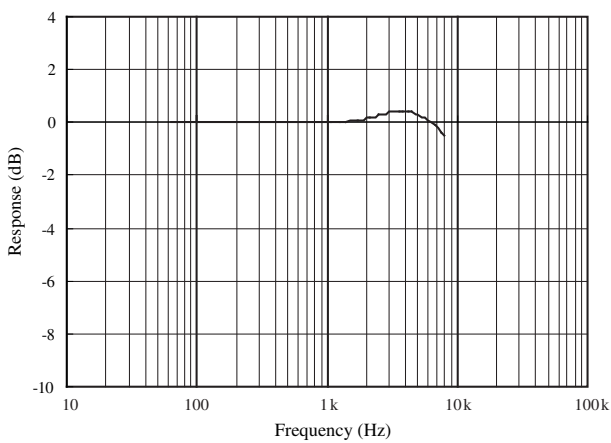

Fig. 3 Frequency response of the microphone UC-52

Influence of body reflection

The NL-52/NL-42 is designed to minimize reflections caused by the body of the unit.
The chart below shows the influence on the measurement.

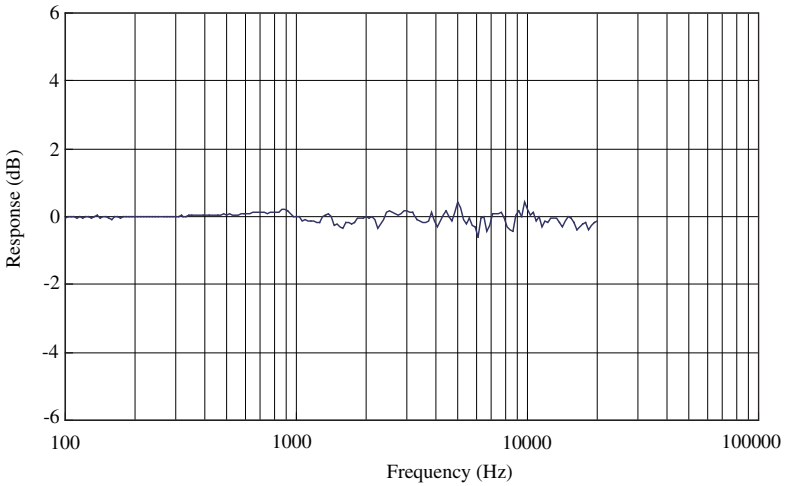

Fig. 4 Influence of Body reflection

Acoustical influence of operator

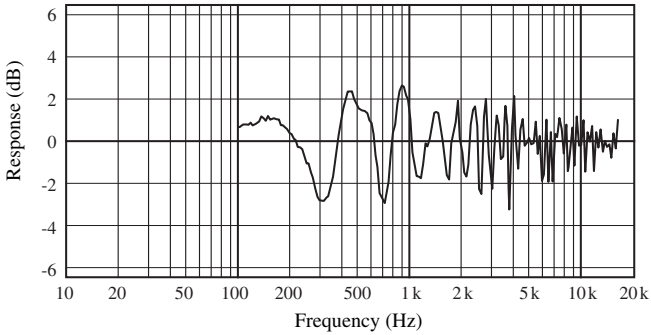

Fig. 5 Acoustical influence of operator (the distance from the top of the microphone to the operator is approx. 40 cm)

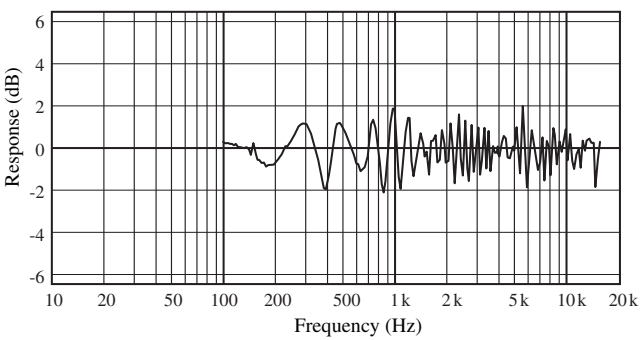

Fig. 6 Acoustical influence of operator (the distance from the top of the microphone to the operator is approx. 70 cm)

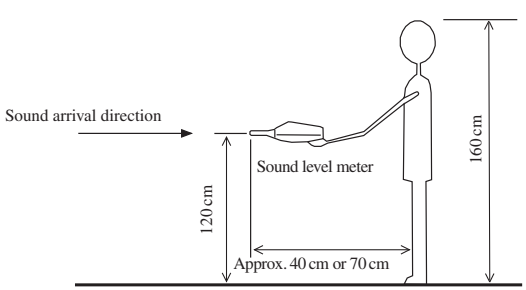

Fig. 7 Measurement conditions for acoustical influence of operator

Reduction of wind noise by windscreen

During outdoor measurements or measurement of ventilation devices, wind noise can falsify measurement results. To counter such problems, the supplied windscreen WS-10 should be mounted on the microphone. The characteristics of the WS-10 are shown below. The attenuation of wind noise produced by the windscreen is about 25 dB with frequency weighting A and 15 dB with frequency weighting C.

The influence of the windscreen WS-10 on the acoustic performance of the microphone is within ±1.0 dB up to 12.5 kHz, as shown in the diagram on the next page.

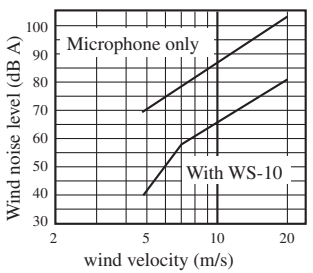

Fig. 8-1 Frequency weighting A

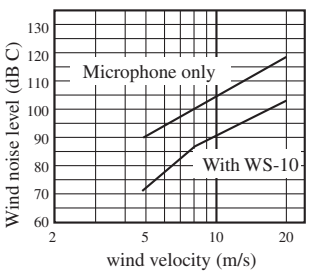

Fig. 8-2 Frequency weighting C

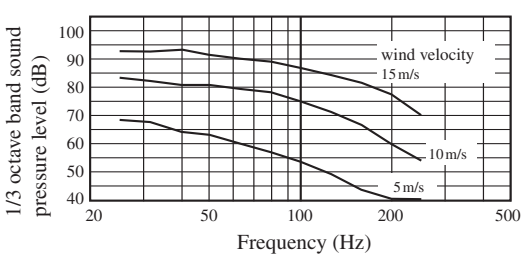

Fig. 9 Frequency response of wind noise measured with windscreen WS-10 mounted microphone

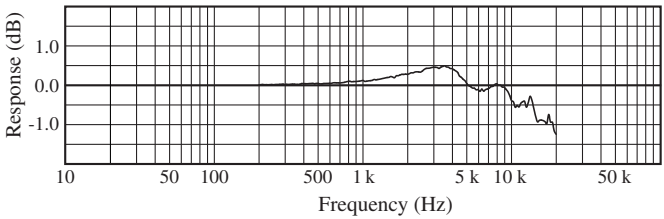

Fig. 10 Influence of windscreen WS-10 on acoustical properties of microphone (referred to microphone response without windscreen)

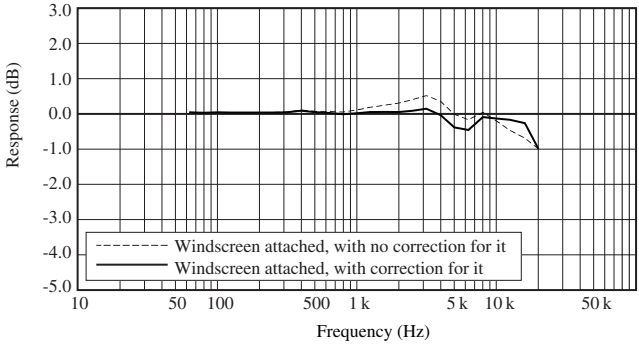

Fig. 11 Frequency response with windscreen correction (WS-10)

Effect of Windscreen for outdoor WS-15

The windscreen WS-15 not only reduces measurement errors due to wind noise, it also protects the microphone from rain.
The WS-15 characteristics are shown below.

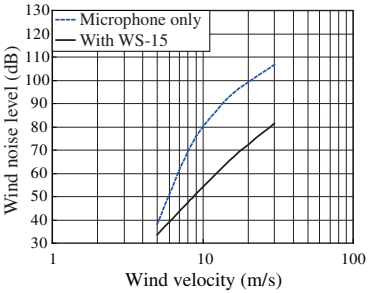

Fig. 12-1 Frequency weighting A

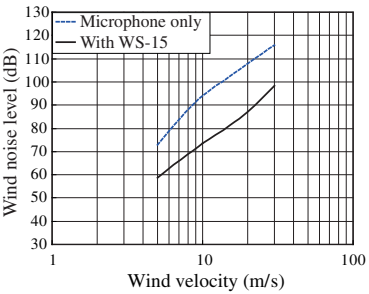

Fig. 12-2 Frequency weighting C

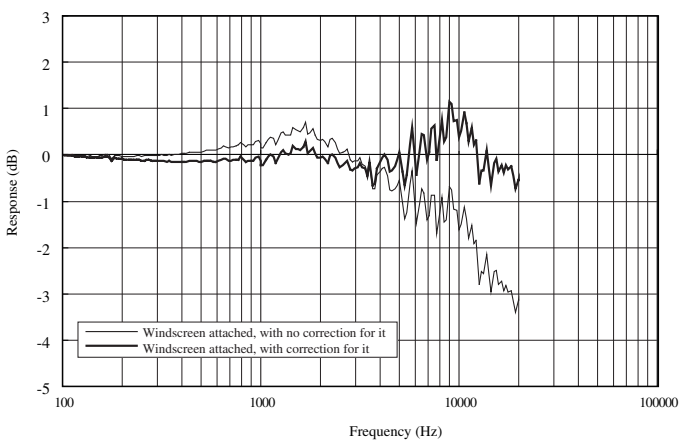

Fig. 13 Frequency response with windscreen correction (WS-15)

Effect of Rain-protection Windscreen WS-16

The windscreen WS-16 not only reduces measurement errors due to wind noise, it also protects the microphone from rain.
The WS-16 characteristics are shown below.

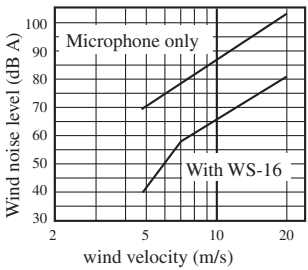

Fig. 14-1 Frequency weighting A

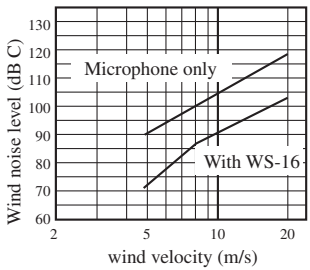

Fig. 14-2 Frequency weighting C

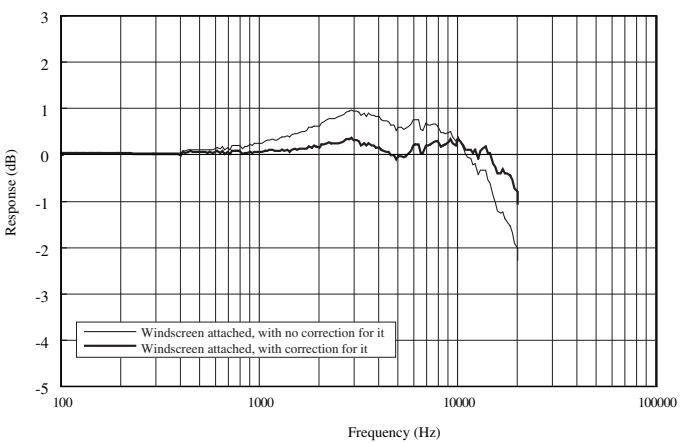

Fig. 15 Frequency response with windscreen correction (WS-16)

The greatest susceptibility configuration for radio frequency fields

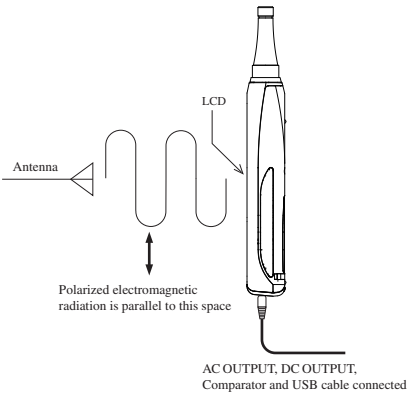

Fig. 16 The greatest susceptibility configuration for radio frequency fields

Statement of conforming to the basic statement

Tab. 2 Statement of conforming to the basic statement

	NL-52	NL-42
Immunity (AC power frequency magnetic field)	The specification of IEC 61672-1 Class 1 is satisfied	The specification of IEC 61672-1 Class 2 is satisfied
Immunity (Radio frequency electromagnetic field)	The specification of IEC 61672-1 Class 1 is satisfied	The specification of IEC 61672-1 Class 2 is satisfied
Emissions	The specification of IEC 61672-1 Class 1 is satisfied	The specification of IEC 61672-1 Class 2 is satisfied

Adjustment data for sound calibrator

Tab. 3 Adjustment data for sound calibrator

Frequency (Hz)	NL-52 Correction (dB)	NL-42 Correction (dB)
31.5	0.0	0.0
63	0.0	0.0
125	0.0	0.0
250	0.0	0.0
500	0.0	0.0
1000	0.0	0.1
2000	0.2	0.3
4000	0.9	1.3
8000	3.0	3.2
12500	5.9	6.5
16000	7.3	6.7

The lower and upper limits of the linear operating range

Tab. 4 The lower and upper limits of the linear operating range

A weighting

	31.5 Hz	1 kHz	4 kHz	8 kHz	12.5 kHz
Upper	98.0	138.0	138.0	136.0	133.0
Start	94.0	94.0	94.0	94.0	94.0
Lower	25.0	25.0	25.0	25.0	25.0

C weighting

	31.5 Hz	1 kHz	4 kHz	8 kHz	12.5 kHz
Upper	135.0	138.0	137.0	135.0	131.0
Start	94.0	94.0	94.0	94.0	94.0
Lower	33.0	33.0	33.0	33.0	33.0

Z weighting

	31.5 Hz	1 kHz	4 kHz	8 kHz	12.5 kHz
Upper	138.0	138.0	138.0	138.0	138.0
Start	94.0	94.0	94.0	94.0	94.0
Lower	38.0	38.0	38.0	38.0	38.0

Measurement range

	L_A (dB)	L_C (dB)	L_Z (dB)	L_{Cpeak} (dB)	L_{Zpeak} (dB)
Upper	138.0	138.0	138.0	141.0	141.0
Lower	25.0	33.0	38.0	55.0	60.0

Directional Characteristics

The directional characteristics of a microphone is a measure of its differing sensitivity for sound waves arriving from various angles. Since the prepolarized condenser microphone used in the NL-52/NL-42 is a pressure-sensitive type, it should be equally sensitive in all directions. However, refraction and cavity effects cause a certain microphone directional response at high frequencies.

The diagrams below shows the directional characteristics for the NL-52/NL-42.

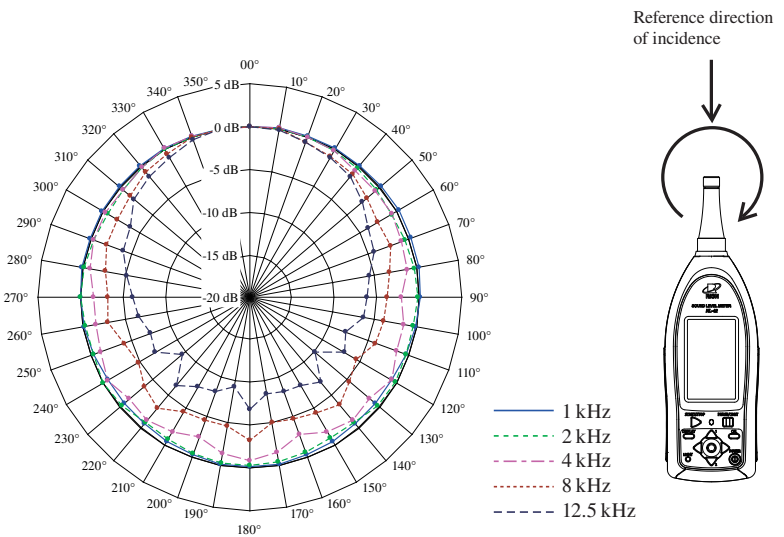

Fig. 17 Directional Characteristics of NL-52/NL-42 (Rotated horizontal)

Tab. 5 Directional Characteristics of NL-52/NL-42 (Rotated horizontal)

Angle	Frequency (Hz)				
	1 k	2 k	4 k	8 k	12.5 k
0°	0.00	0.00	0.00	0.00	0.00
10°	0.12	-0.02	0.05	-0.07	-0.20
20°	0.09	-0.09	0.01	-0.67	-0.79
30°	0.17	-0.16	-0.13	-0.94	-1.17
40°	0.16	-0.28	-0.66	-1.13	-1.59
50°	0.25	-0.50	-0.72	-1.96	-2.73
60°	0.26	-0.72	-0.54	-2.52	-3.89
70°	0.27	-0.58	-1.07	-2.23	-4.35
80°	0.21	-0.30	-1.19	-3.29	-5.64
90°	0.10	-0.18	-2.09	-3.83	-6.23
100°	-0.23	-0.44	-1.53	-3.87	-6.47
110°	-0.42	-0.51	-1.57	-4.17	-7.93
120°	-0.66	-0.22	-0.69	-5.48	-7.19
130°	-0.76	-0.36	-1.56	-4.61	-9.92
140°	-0.68	-0.87	-1.11	-3.51	-6.97
150°	-0.49	-1.04	-1.91	-4.34	-7.94
160°	-0.29	-0.73	-2.98	-4.72	-8.22
170°	-0.18	-0.45	-1.60	-5.04	-8.48
180°	-0.13	-0.32	-0.87	-3.24	-6.93
190°	-0.11	-0.32	-1.41	-4.66	-9.42
200°	-0.25	-0.61	-2.55	-4.61	-8.24
210°	-0.45	-0.91	-1.83	-4.51	-7.85
220°	-0.67	-0.82	-1.18	-3.07	-6.65
230°	-0.78	-0.30	-1.44	-3.85	-9.49
240°	-0.73	-0.07	-0.61	-4.76	-7.16
250°	-0.49	-0.28	-1.28	-4.16	-7.54
260°	-0.20	-0.36	-1.55	-2.90	-6.68
270°	0.03	-0.04	-1.57	-3.28	-6.24
280°	0.14	-0.14	-0.86	-2.70	-5.22
290°	0.15	-0.48	-0.38	-1.96	-4.06
300°	0.18	-0.65	-0.32	-1.92	-3.59
310°	0.14	-0.43	-0.41	-1.63	-2.10
320°	0.13	-0.20	-0.19	-0.88	-1.56
330°	0.08	-0.07	0.08	-0.63	-1.11
340°	0.07	-0.04	0.13	-0.01	-0.50
350°	0.02	-0.06	-0.10	0.02	-0.03

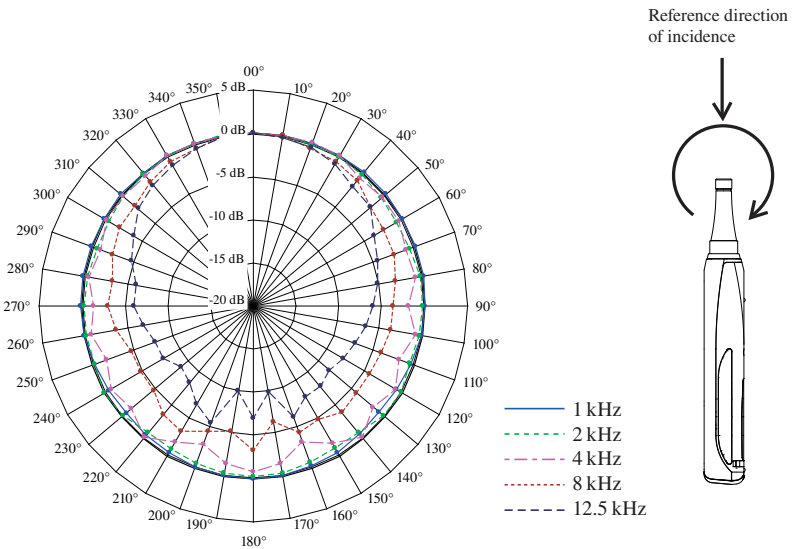

Fig. 18 Directional Characteristics of NL-52/NL-42 (Rotated vertical)

Tab. 6 Directional Characteristics of NL-52/NL-42 (Rotated vertical)

Angle	Frequency (Hz)				
	1 k	2 k	4 k	8 k	12.5 k
0°	0.00	0.00	0.00	0.00	0.00
10°	0.06	0.01	0.06	-0.03	-0.20
20°	0.05	-0.04	0.15	-0.46	-0.42
30°	0.08	-0.11	0.06	-0.64	-1.06
40°	0.13	-0.26	-0.61	-1.03	-1.90
50°	0.16	-0.49	-0.43	-2.12	-2.23
60°	0.23	-0.70	-0.39	-2.40	-3.64
70°	0.23	-0.49	-1.11	-2.51	-4.54
80°	0.12	-0.25	-0.76	-3.22	-5.22
90°	0.05	-0.27	-1.91	-3.66	-6.06
100°	-0.07	-0.32	-0.78	-3.77	-6.73
110°	-0.35	-0.51	-1.91	-4.17	-7.28
120°	-0.61	-0.12	-0.85	-4.46	-7.85
130°	-0.76	-0.23	-1.79	-4.31	-8.37
140°	-0.67	-0.89	-0.23	-3.99	-7.78
150°	-0.45	-1.06	-1.68	-4.75	-7.90
160°	-0.19	-0.79	-3.29	-4.38	-6.31
170°	-0.05	-0.37	-1.51	-6.40	-9.85
180°	-0.02	-0.27	-0.81	-3.23	-7.07
190°	-0.10	-0.33	-1.52	-5.28	-10.12
200°	-0.18	-0.66	-3.07	-4.54	-5.65
210°	-0.41	-0.97	-1.78	-3.34	-6.85
220°	-0.56	-0.87	-0.25	-3.53	-8.46
230°	-0.67	-0.30	-1.50	-4.77	-8.89
240°	-0.56	0.15	-0.86	-4.80	-7.81
250°	-0.26	-0.19	-1.83	-4.81	-7.86
260°	0.01	-0.22	-0.81	-3.77	-6.99
270°	0.16	-0.32	-1.40	-3.02	-6.00
280°	0.20	-0.41	-0.58	-3.30	-6.02
290°	0.21	-0.53	-1.01	-2.44	-4.74
300°	0.16	-0.57	-0.24	-1.93	-3.83
310°	0.14	-0.31	-0.25	-1.91	-2.44
320°	0.06	-0.09	-0.39	-1.25	-1.82
330°	0.02	-0.03	-0.02	-0.62	-1.23
340°	0.07	-0.02	0.06	-0.73	-0.64
350°	0.04	0.12	-0.03	-0.02	-0.17

Random incidence response

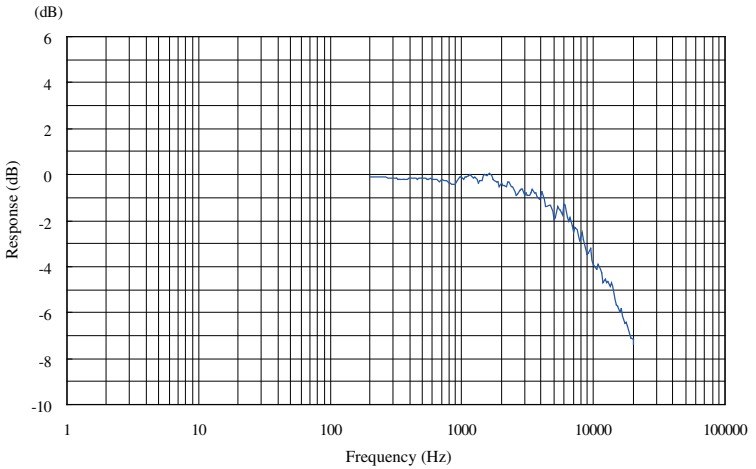

Fig. 19 Random incidence response

This product is environment-friendly. It does not include toxic chemicals on our policy.
No.56034 21-03