

TECHNICAL APPENDIX 13.2: CALIBRATION CERTIFICATES

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A.1 CALIBRATION CERTIFICATE NL52 01265434



CERTIFICATE OF CALIBRATION

Approved Signatory



Certificate Number: UCRT22/1548



0653

Date of Issue: 21 April 2022

Calibrated at & Certificate issued by:

ANV Measurement Systems

Beaufort Court 17 Roebuck Way

Milton Keynes MK5 8HL

Telephone 01908 642846 Fax 01908 642814

E-Mail: info@noise-and-vibration.co.uk Web: www.noise-and-vibration.co.uk

Acoustics Noise and Vibration Ltd trading as ANV Me

Wood Group UK Ltd St Vincent Plaza St Vincent Street

Glasgow G2 5LD

Order No.

Customer

26010406

Description Identification Sound Level Meter / Pre-amp / Microphone / Associated Calibrator Serial No. / Version Manufacturer Instrument

Type

K. Mistry

01265434 Rion Sound Level Meter NL-52 2.0 Rion Firmware

Rion Pre Amplifier NH-25 65436 Rion Microphone UC-59 13122 Brüel & Kjær Calibrator 4231 2052327 Calibrator adaptor type if applicable UC 0210

Performance Class

Test Procedure

TP 10. SLM 61672-3:2013

Procedures from IEC 61672-3:2013 were used to perform the periodic tests.

Type Approved to IEC 61672-1:2013

If YES above there is public evidence that the SLM has successfully completed the

applicable pattern evaluation tests of IEC 61672-2:2013

Date Received

19 April 2022 ANV Job No. UKAS22/04276

Date Calibrated 21 April 2022

The sound level meter submitted for testing has successfully completed the periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed. As evidence was publicly available, from an independent testing organisation responsible for approving the results of patternevaluation tests performed in accordance with IEC 61672-2:2013, to demonstrate that the model of sound level meter fully conformed to the class 1 specifications in IEC 61672-1:2013, the sound level meter submitted for testing conforms to the class 1 specifications of IEC 61672-1:2013.

Previous Certificate Dated Certificate No. Laboratory 27 May 2020 UCRT20/1451 0653

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		BRATION		Certificat UCF	te Numb RT22/154	
JKAS Accredited Calib	ration Laboratory	No. 0653		Page 2	of	2 Pages
Sound Lovel Motor Inst	ruotion					
Sound Level Meter Inst	tle NI 52/NI 4	2 Description for IEC 61	the sound	d levels inc	dicated.	
LM instruction manual re	ef / issue	No. 56034 21-03	Source	Rion		
ate provided or internet		19 March 2021	Source	Rion		- 20-11-11
ato providos or internoc		Wind Shield Correctio	ns Min	Pressure to	o Free Fie	ld Corrections
ncertainties provided	Yes	Yes	15 WIIC	1 1633016 0	Yes	
otal expanded uncertaint	ties within the requi		2013	YES	-	
pecified or equivalent Ca	alibrator	Equivalent				
Customer or Lab Calibrate	The state of the s	Customers Calibrato	r			
alibrator adaptor type if	applicable	UC 0210				
alibrator cal. date		20 April 2022				
alibrator cert. number		UCRT22/1540				
alibrator cal cert issued	by Lab	0653	1			
Calibrator SPL @ STP		94.11 dB				pressure level
Calibrator frequency		999.79 Hz	Calibra	tion check t	requency	
deference level range	anta d for d wine and	Single dB	Coble 9 1	Vind Shield	WS-15	
occessories used or correlate - The Extension Cab						
nvironmental conditions		Start	End	, canbration		N. Control of the Con
orimonial conditions	Temperature	23.68	24.32	±	0.30 °C	
	Humidity	41.1	39.9	±	3.00 %	
	Ambient Pressure	100.33	100.28	±	0.03 kF	Pa
dication at the Calibration						
Initial indicated level	94.1	dB Adjusted	indicated		94.1	dB
ncertainty of calibrator u	sed for Indication a	t the Calibration Check F	requency:	t	0.10	dB
elf Generated Noise		a Lin turiti	_			
licrophone installed -		7.9 dB A Weighting			1	
Microphone replaced with		ice - UR = Und	er Kange i			
Weighting	A 3.1 dB UR	17.4 dB lUR	22.	Z 8 IdB	TUR	
elf Generated Noise rep						nent
he reported expanded un coverage probability of a IKAS requirements. dditional Comments one	approximately 95%.	The uncertainty evaluate certificate only relate to	ion has be	en carried	out in acco	ordance with



A.2 CALIBRATION CERTIFICATE NL52 01265412



CERTIFICATE OF CALIBRATION





Date of Issue: 21 April 2022

Calibrated at & Certificate issued by: ANV Measurement Systems

Beaufort Court

17 Roebuck Way

Milton Keynes MK5 8HL

Telephone 01908 642846 Fax 01908 642814

E-Mail: info@noise-and-vibration.co.uk Web: www.noise-and-vibration.co.uk

Certificate Number: UCRT22/1552

Page Approved Signatory K. Mistry

Customer

Wood Group UK Ltd St Vincent Plaza St Vincent Street Glasgow G2 5LD

Order No.

26010406

Description Identification Sound Level Meter / Pre-amp / Microphone / Associated Calibrator

Manufacturer Instrument Type Serial No. / Version Rion Sound Level Meter NL-52 01265412 Rion Firmware 2.0 Rion Pre Amplifier NH-25 65414 Rion Microphone UC-59 10633 Brüel & Kjær Calibrator 4231 2052327 Calibrator adaptor type if applicable UC 0210

Performance Class

Test Procedure

TP 10. SLM 61672-3:2013

Procedures from IEC 61672-3:2013 were used to perform the periodic tests.

Type Approved to IEC 61672-1:2013

If YES above there is public evidence that the SLM has successfully completed the

applicable pattern evaluation tests of IEC 61672-2:2013

Date Received Date Calibrated

19 April 2022 21 April 2022

ANV Job No.

UKAS22/04276

The sound level meter submitted for testing has successfully completed the periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed. As evidence was publicly available, from an independent testing organisation responsible for approving the results of patternevaluation tests performed in accordance with IEC 61672-2:2013, to demonstrate that the model of sound level meter fully conformed to the class 1 specifications in IEC 61672-1:2013, the sound level meter submitted for testing conforms to the class 1 specifications of IEC 61672-1:2013.

Previous Certificate

Dated 22 May 2020 Certificate No. UCRT20/1446 Laboratory 0653

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CERTIFICATE OF CALIBRATION OF THE PROPERTY NO. 0653				Certificate Number UCRT22/1552			
(AS Accredited Calib	ration Laboratory N	No. 0653	Page	2	of	2	Pages
				5.2		-	
und Level Meter Ins	truction manual and	d data used to adjust	the sound lev	els ind	icated		
M instruction manual to	itle NL-52/NL-42	Description for IEC 61	672-1	010 1110	icated.		
M instruction manual r	ef / issue	No. 56034 21-03	Source	Rion			
te provided or internet	download date	19 March 2021					
	Case Corrections	Wind Shield Correctio	ns Mic Pre	ssure to	Free F	Field C	orrections
ncertainties provided	Yes	Yes			Yes		
otal expanded uncertain	nties within the require	ements of IEC 61672-1	:2013 YES		-		
ecified or equivalent C		Equivalent					
stomer or Lab Calibra		Customers Calibrato	r				
alibrator adaptor type if	applicable	UC 0210					
alibrator cal. date		20 April 2022					
alibrator cert. number	Zenana -	UCRT22/1540					
calibrator cal cert issued	by Lab	0653				100000	Court outside
alibrator SPL @ STP		94.11 dB					ssure level
Calibrator frequency		999.79 Hz	Calibration	check t	requen	су	
Reference level range		Single dB			1445		1
ccessories used or cor	rected for during calib	oration - Extension	Cable & Wind	Shield	WS-15		
		en the SLM and the pre-		bration	,		
invironmental condition	-	Start	End		0.30	°C	1
	Temperature	24.50	24.30	±		%RH	
	Humidity	40.6	42.2 100.20	±	0.03		
ndication at the Calibra	Ambient Pressure		100.20	1 =	0.03	Na	
10 1 1 1 1	1 71 4	70 Jan A Weightig					
Microphone replaced w	vith electrical input dev		ng der Range indic		1	1	
Microphone installed - Microphone replaced w Weighting Self Generated Noise r	ith electrical input dev A 11.7 db UR		der Range indic	Z dB	UR a requi	rement	
Microphone replaced w Weighting Self Generated Noise r The reported expande a coverage probability UKAS requirements.	d uncertainty is based of approximately 95%	on a standard uncertain. The uncertainty evalue	der Range indic R 20.8 ssess conforma htty multiplied by ation has been	Z dB ance to	erage fa	ctor k=	=2, providing ance with
Microphone replaced w Weighting Self Generated Noise r The reported expande a coverage probability	d uncertainty is based of approximately 95%	on a standard uncertain	der Range indic R 20.8 ssess conforma htty multiplied by ation has been	Z dB ance to	erage fa	ctor k=	=2, providing ance with



A.3 CALIBRATION CERTIFICATE DUO 10510





Tests report

ISSUED FOR: Wood Group

319 St Vincent St

G2 7EA Glasgow

Name and location of the laboratory of tests:

Acoustic1 - Overdale Manordeilo, Llandeilo Carmathenshire UK SA19 7BD

TESTED INSTRUMENT

Designation: Integrator Sound Level Meter

Manufacturer: 01dB

Type: DUO + DMK Serial number : 10510

Identification number:

Date of issue : 28/03/2023

This report includes 10 pages

The measurements are performed according to the IEC 61672-3, Electroacoustics, - Sound level meters - Part 3: Periodic tests.

Steve THOMAS

Head of calibration laboratory at Acoustic 1

THIS REPORT IS compliant with THE FD X 07-012 STANDARD DOCUMENTATION

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01dB-Metravib SAS - Head Office; 200 chemin des Ormeaux - F-69578 Limonest Cedex - France // Phone; +33 4 72 52 48 00 - Fax; +33 4 72 52 47 47 // accemproup.com A simplified joint stock company with a capital of 7,331,296 EUR - SIRET: 409 869 708 00019 - Lyon Trade Register: 409 869 708 - European VAT number: FR 82 409 869 708 01dB • ECOTECH • METRAVIB • ONEPROD • FIXTURLASER • MEAX



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Identification:

	Sound level meter	Microphone	Accessories
Manufacturer	01dB	GRAS	PRE22 # 10275
Туре	DUO + DMK	40CD	Short windscreen + RA0208 noise cone
Serial number	10510	154425	RAL135 - 10M
Firmware version	See Tests report of [DUO without DMK	
Calibrator	Cal	ibrator of the Laborator	у

Program:

The Sound level meter has been tested on the following characteristics:

- Self-generated noise
- · Acoustical signal tests of a frequency weightings
- · Electrical signal tests of frequency weightings
- . Frequency and time weightings at 1 kHz
- · Long-term stability
- · Level linearity
- Toneburst response
- · C-weighted peak sound level
- Overload indication
- · High-level stability

Method:

The instrument is tested in an air conditioned room. The characteristics are tested with multimeter and generator calibrated in amplitude and in frequency. Some manufacturer's corrections have been applied to account the acoustical effect from the case of the sound level meter and his accessories (IEC 61672-3). These corrections are available in the sound level meter user manual.

The reference frequency of the sound level meter is 1000 Hz. The reference sound pressure level of the sound level meter is 94 dB. The sound level meter possesses a single level range.

Tests conditions:

 Date of tests
 3/28/2023

 Operator Name
 Steve Thomas

Tests instruction MET.15.INS.001_D_Fr

Static pressure >95,5; <105 kPa

Temperature 23 ± 3 °C

Relative humidity >25; <70 %HR

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Instruments used for tests:

Designation	Manufacturer	Туре	Serial number	Identification number
Insulated Chamber	SKC Acoustic	-	-	-
Waveform generator	KEYSIGHT	33500B	MY57301384	-
Progammable Attenuator	ACOEM	OUT1694000	17-10-208	-
Electrostatic actuator	GRAS	14AA	288498	-
Thermometer, hygrometer, barometer	TESTO	622	39517641/806	-
Calibrator	ACOEM	CAL 21	34675324	-

Results:

Mentioned expanded uncertainties correspond to two standard uncertainty types (k=2). Standard uncertainties are calculated including different uncertainty components, reference standards, instruments used, environmental conditions, calibrated instrument contribution, repeatability...

The indicated Maximum Permissible Errors (M.P.E.), are the ones defined in the standard 61672-1 for a class 1 sound level meter.

Indication at the calibration check frequency

Initial indication	Correction	Adjusted indication	Tolerance
(dB)	(dB)	(dB)	(dB)
0.0	0.0	0.0	+/- 1,0

Self-generated noise

0° RA208 + short windscreen

Microphone replaced by the electrical input-signal	Nominal value	Displayed value
device	(dB)	(dB)
Leq dBA	< 14	9.6
Leq dBB	< 15	9.8
Leq dBC	< 20	12.0
Leq dBZ	< 21	15.7

Microphone installed	Nominal value	Displayed value
	(dB)	(dB)
Leq dBA	< 20	15.6

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Acoustical signal tests of a frequency weightings

90° RA208 + short windscreen	Measurement error <i>C</i> (dB)	Uncertainty (dB)	Maximum Permissible Error (dB)
125 Hz	0.0	0.3	+/- 1,0
1000 Hz	0.0	0.3	+/- 0,7
8000 Hz	-1.0	0.5	-2,5; +1,5
0° RA208 + short windscreen	C (dB)	Uncertainty (dB)	M.P.E. (dB)
125 Hz	0.0	0.3	+/- 1,0
1000 Hz	0.0	0.3	+/- 0,7
8000 Hz	-0.2	0.5	-2,5; +1,5

Electrical signal tests of frequency weightings

	Meas	urement en	or		Maximum
90° RA208 + short windscreen	Z (dB)	A (dB)	C (dB)	Uncertainty (dB)	Permissible Error (dB)
63 Hz	-0.1	-0.1	-0.1	0.4	+/- 1,0
125 Hz	-0.1	-0.2	-0.1	0.4	+/- 1,0
250 Hz	-0.1	-0.2	-0.1	0.4	+/- 1,0
500 Hz	-0.1	-0.2	-0.1	0.4	+/- 1,0
1000 Hz	0.0	0.0	0.0	0.4	+/- 0,7
2000 Hz	-0.1	-0.1	-0.1	0.4	+/- 1,0
4000 Hz	0.7	0.6	0.6	0.4	+/- 1,0
8000 Hz	-0.7	-1.2	-1.2	0.6	-2,5;+1,5
16000 Hz	-6.6	-11.9	-12.0	0.6	-16,0;+2,5
0° RA208 + short windscreen	Z (dB)	A (dB)	(dB)	Uncertainty (dB)	M.P.E. (dB)
63 Hz	-0.1	0.0	-0.1	0.4	+/- 1,0
125 Hz	0.0	-0.2	0.0	0.4	+/- 1,0
250 Hz	0.0	-0.1	0.0	0.4	+/- 1,0
500 Hz	0.0	0.0	0.0	0.4	+/- 1,0
1000 Hz	0.0	0.0	0.0	0.4	+/- 0,7
2000 Hz	-0.1	0.0	0.0	0.4	+/- 1,0
4000 Hz	0.7	0.6	0.7	0.4	+/- 1,0
8000 Hz	0.3	-0.2	-0.2	0.6	-2,5;+1,5
16000 Hz	-4.5	-9.8	-9.9	0.6	-16,0; +2,5

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Frequency and time weightings at 1 kHz

90° RA208 + short windscreen	Displayed value (dB)	Measurement error (dB)	Uncertainty (dB)	M.P.E. (dB)
Lp dBA / 1000 Hz Fast	93.8	Reference	0.1	
Lp dBA / 1000 Hz Slow	93.8	0.0	0.1	+/- 0,1
LEQ dBA / 1000 Hz	93.8	0.0	0.1	+/- 0,1
Lp dBC / 1000 Hz Fast	93.8	0.0	0.1	+/- 0,2
Lp dBZ / 1000 Hz Fast	93.8	0.0	0.1	+/- 0,2
0° RA208 + short windscreen	Displayed value (dB)	Measurement error (dB)	Uncertainty (dB)	M.P.E. (dB)
				M.P.E. (dB)
+ short windscreen	(dB)	(dB)	(dB)	M.P.E. (dB)
+ short windscreen Lp dBA / 1000 Hz Fast	(dB) 94.1	(dB) Reference	(dB) 0.1	
+ short windscreen Lp dBA / 1000 Hz Fast Lp dBA / 1000 Hz Slow	(dB) 94.1 94.1	(dB) Reference 0.0	(dB) 0.1 0.1	+/- 0,1

Long-term stability

90° RA208 + short windscreen

Displayed value	ue	Measured deviation	Uncertainty	Maximum
(dB) Initial indication	Final indication	(dB)	(dB)	Permissible Error (dB)
94.0	94.0	0.0	0.1	+/- 0,1

0° RA208 + short windscreen

Displayed valu	Displayed value		Uncertainty	Maximum
(dB) Initial indication	Final indication	(dB)	(dB)	Permissible Error (dB)
93.9	93.9	0.0	0.1	+/- 0,1

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Level linearity

90° RA208 + short windscreen

Nominal value	Displayed value	Measurement error	Uncertainty	Maximum Permissible
(dB)	(dB)	(dB)	(dB)	Error (dB)
94.0	94.0	0.0	0.3	+/- 0,8
99.0	99.1	0.1	0.3	+/- 0,8
104.0	103.9	-0.1	0.3	+/- 0,8
109.0	108.9	-0.1	0.3	+/- 0,8
114.0	113.8	-0.2	0.3	+/- 0,8
119.0	118.8	-0.2	0.3	+/- 0,8
124.0	123.7	-0.3	0.3	+/- 0,8
128.0	127.8	-0.2	0.3	+/- 0,8
129.0	128.8	-0.2	0.3	+/- 0,8
130.0	129.8	-0.3	0.3	+/- 0,8
131.0	130.7	-0.3	0.3	+/- 0,8
132.0	131.8	-0.3	0.3	+/- 0,8
133.0	132.7	-0.3	0.3	+/- 0,8
94.0	94.0	0.0	0.3	+/- 0,8
89.0	89.1	0.1	0.3	+/- 0,8
84.0	84.1	0.1	0.3	+/- 0,8
79.0	79.1	0.1	0.3	+/- 0,8
74.0	74.0	0.0	0.3	+/- 0,8
69.0	69.1	0.1	0.3	+/- 0,8
64.0	64.1	0.1	0.3	+/- 0,8
59.0	59.1	0.1	0.3	+/- 0,8
54.0	54.0	0.0	0.3	+/- 0,8
49.0	49.0	0.0	0.3	+/- 0,8
44.0	44.1	0.1	0.3	+/- 0,8
39.0	39.1	0.1	0.3	+/- 0,8
34.0	34.1	0.1	0.3	+/- 0,8
29.0	29.3	0.3	0.3	+/- 0,8
26.0	26.3	0.3	0.3	+/- 0,8
25.0	25.2	0.2	0.3	+/- 0,8
24.0	24.5	0.5	0.3	+/- 0,8
23.0	23.1	0.1	0.3	+/- 0,8
22.0	22.2	0.2	0.3	+/- 0,8

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0° RA208 + short windscreen

Nominal value	Displayed value	Measurement error	Uncertainty	Maximum Permissible
(dB)	(dB)	(dB)	(dB)	Error (dB)
94.0	94.0	0.0	0.3	+/- 0,8
99.0	99.1	0.1	0.3	+/- 0,8
104.0	103.9	-0.1	0.3	+/- 0,8
109.0	108.9	-0.1	0.3	+/- 0,8
114.0	113.8	-0.2	0.3	+/- 0,8
119.0	118.8	-0.2	0.3	+/- 0,8
124.0	123.8	-0.2	0.3	+/- 0,8
128.0	127.8	-0.2	0.3	+/- 0,8
129.0	128.8	-0.2	0.3	+/- 0,8
130.0	129.8	-0.2	0.3	+/- 0,8
131.0	130.8	-0.2	0.3	+/- 0,8
132.0	131.8	-0.2	0.3	+/- 0,8
133.0	132.7	-0.3	0.3	+/- 0,8
94.0	94.0	0.0	0.3	+/- 0,8
89.0	89.1	0.1	0.3	+/- 0,8
84.0	84.1	0.1	0.3	+/- 0,8
79.0	79.1	0.1	0.3	+/- 0,8
74.0	74.0	0.0	0.3	+/- 0,8
69.0	69.0	0.0	0.3	+/- 0,8
64.0	64.1	0.1	0.3	+/- 0,8
59.0	59.1	0.1	0.3	+/- 0,8
54.0	54.0	0.0	0.3	+/- 0,8
49.0	49.0	0.0	0.3	+/- 0,8
44.0	44.1	0.1	0.3	+/- 0,8
39.0	39.1	0.1	0.3	+/- 0,8
34.0	34.0	0.0	0.3	+/- 0,8
29.0	29.0	0.0	0.3	+/- 0,8
26.0	26.1	0.1	0.3	+/- 0,8
25.0	25.3	0.3	0.3	+/- 0,8
24.0	24.4	0.4	0.3	+/- 0,8
23.0	23.5	0.5	0.3	+/- 0,8
22.0	22.5	0.5	0.3	+/- 0,8

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Toneburst response

90° RA208 + short windscreen

Description	Displayed value	Measurement error	Uncertainty	Maximum Permissible
	(dB)	(dB)	(dB)	Error (dB)
Lpmax 134 dB 4000 Hz A Slow 200 ms	126.7	0.1	0.1	+/- 0,5
Lpmax 134 dB 4000 Hz A Slow 2 ms	107	0	0.1	-3,0;+1,0
Lpmax 134 dB 4000 Hz A fast 200 ms	133.1	0.1	0.1	+/- 0,5
Lpmax 134 dB 4000 Hz A fast 2 ms	116	0	0.1	-1,5; +1,0
Lpmax 134 dB 4000 Hz A fast 0,25 ms	108.7	-0.3	0.1	-3,0;+1,0
Leq 134 dB 4000 Hz A 1000 200 ms	127.1	0.1	0.1	+/- 0,5
Leq 134 dB 4000 Hz A 1000 2 ms	107	0	0.1	-1,5; +1,0
Leq 134 dB 4000 Hz A 1000 0,25 ms	97.8	-0.2	0.1	-3,0; +1,0

0° RA208 + short windscreen

Description	Displayed value	Measurement error	Uncertainty	Maximum Permissible
	(dB)	(dB)	(dB)	Error (dB)
Lpmax 134 dB 4000 Hz A Slow 200 ms	128.6	0	0.1	+/- 0,5
Lpmax 134 dB 4000 Hz A Slow 2 ms	107	0	0.1	-3,0;+1,0
Lpmax 134 dB 4000 Hz A fast 200 ms	133	0	0.0	+/- 0,5
Lpmax 134 dB 4000 Hz A fast 2 ms	115.9	-0.1	0.0	-1,5 ; +1,0
Lpmax 134 dB 4000 Hz A fast 0,25 ms	106.8	-0.2	0.0	-3,0;+1,0
Leq 134 dB 4000 Hz A 1000 200 ms	127	0	0.0	+/- 0,5
Leq 134 dB 4000 Hz A 1000 2 ms	107	0	0.0	-1,5; +1,0
Leq 134 dB 4000 Hz A 1000 0,25 ms	97.9	-0.1	0.0	-3,0;+1,0

C-weighted peak sound level

90° RA208 + short windscreen

Description	Displayed value	Measurement error	Uncertainty (dB)	Maximum Permissible Error (dB)
8000 Hz Complete cycle	133.6	1.2	0.1	+/- 2,0
500 Hz Positive one-half-cycle	134.3	-0.1	0.1	+/- 1,0
500 Hz Negative one-half-cycle	134.3	-0.1	0.1	+/- 1,0

0° RA208 + short windscreen

Description	Displayed value	Measurement error	Uncertainty	Erreur Maximale
	(dB)	(dB)	(dB)	Tolérée (dB)
8000 Hz Complete cycle	131.3	1.8	0.1	+/- 2,0
500 Hz Positive one-half-cycle	133.8	-0.6	0.1	+/- 1,0
500 Hz Negative one-half-cycle	133.9	-0.5	0.1	+/- 1,0

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Overload indication

90° RA208 + short windscreen

Displayed value	Measured deviation	Uncertainty	Maximum
(dB) Positive one-half-cycle Negative one-half-cycle	(dB)	(dB)	Permissible Error (dB)
109.4 109.6	-0.2	0.1	+/- 1,5

0° RA208 + short windscreen

10-200 - Short Wildsdreen				
Displayed value		Measured deviation	Uncertainty	Maximum
Positive one-half-cycle	IB) Negative one-half-cycle	(dB)	(dB)	Permissible Error (dB)
108.2	108.4	-0.1	0.1	+/- 1,5

High-level stability

90° RA208 + short windscreen

00	RAZUG + SHOIT WINGSC	ieen			
Г	Displayed value		Measured deviation	Uncertainty	Maximum
	(d Initial indication	B) Final indication	(dB)	(dB)	Permissible Error (dB)
Г	135.6	135.6	0.0	0.1	+/- 0,1

0° RA208 + short windscreen

	10A200 - Short Wildscreen				
ı	Displayed value		Measured deviation	Uncertainty	Maximum
	(d Initial indication	(dB) ndication Final indication (dB)		(dB)	Permissible Error (dB)
	135.8	135.8	0.0	0.1	+/- 0,1

ACCEM Group OUGB

Tests report: TR-REP-10564.xls Page 10 of 10

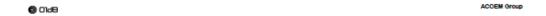
Conclusion

CEI 61672-3 CEI:2013 Chapter:	Tests	Results
5	Preliminary inspection	Compliant
7	Environmental conditions	Compliant
10	Indication at the calibration check frequency	Compliant
11	Self-generated noise	Compliant
12	Acoustical signal tests of a frequency weighting	Compliant
13	Electrical signal tests of frequency weightings	Compliant
14	Frequency and time weightings at 1 kHz	Compliant
15	Long-term stability	Compliant
16	Level linearity on the reference level range	Compliant
18	Toneburst response	Compliant
19	C-weighted peak sound level	Compliant
20	Overload indication	Compliant
21	High-level stability	Compliant

DUO user manual	DOC1112 version K August 2017
Type approval cortificate	France: LNE-21674 revision 4 dated 04/04/2017
Type-approval certificate	Deutschland: DE-16-M-PTB-0007 dated 28/09/2016

The sound level meter submitted for testing successfully completed the periodic tests of IEC 61672-3:2013, for the nvironmental conditions under which the tests were performed. As evidence was publicly available, from an independent testing organization responsible for approving the results of pattern-evaluation tests performed in accordance with IEC 61672-2:2013, to demonstrate that the model of sound level meter fully conformed to the class 1 specifications in IEC 61672-1:2013, the sound level meter submitted for testing conforms to the class 1 specifications of IEC 61672-1:2013.

End of tests report





A.4 CALIBRATION CERTIFICATE NL52 00175536



CERTIFICATE OF CALIBRATION

K. Mistry



Certificate Number: UCRT22/1695



Date of Issue: 25 May 2022

Calibrated at & Certificate issued by: ANV Measurement Systems Beaufort Court 17 Roebuck Way Milton Keynes MK5 8HL Telephone 01908 642846 Fax 01908 642814 E-Mail: info@noise-and-vibration.co.uk

Web: www.noise-and-vibration.co.uk

oustics Noise and Vibration Ltd trading as ANV Measurement Systems

St. Vincent Plaza (Floor 2) 319 St. Vincent Street

Wood Group Customer

> Glasgow G2 5LP

26010406 Order No.

Sound Level Meter / Pre-amp / Microphone / Associated Calibrator Description

> Manufacturer Instrument Type Serial No. / Version Rion Sound Level Meter NL-52 00175536 Rion Firmware 2.0 Rion Pre Amplifier NH-25 65638 Rion UC-59 13128 Microphone NC-74 Calibrator 34178103 Rion

Calibrator adaptor type if applicable

NC-74-002

Performance Class

Identification

TP 10. SLM 61672-3:2013 Test Procedure

Procedures from IEC 61672-3:2013 were used to perform the periodic tests.

Type Approved to IEC 61672-1:2013

If YES above there is public evidence that the SLM has successfully completed the

applicable pattern evaluation tests of IEC 61672-2:2013

UKAS22/05346 Date Received 23 May 2022 ANV Job No.

Date Calibrated 25 May 2022

The sound level meter submitted for testing has successfully completed the periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed. As evidence was publicly available, from an independent testing organisation responsible for approving the results of patternevaluation tests performed in accordance with IEC 61672-2:2013, to demonstrate that the model of sound level meter fully conformed to the class 1 specifications in IEC 61672-1:2013, the sound level meter submitted for testing conforms to the class 1 specifications of IEC 61672-1:2013.

Previous Certificate Dated Certificate No. Laboratory 26 May 2020 UCRT20/1449 0653

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.



CERTIFICATE OF CALIBRATION					Certificate Number UCRT22/1695					
										UKAS Accredited Calibration Laboratory No. 0653
Sound Level Meter Inst					d level	ls indi	cated.			
SLM instruction manual tit		Description for								
SLM instruction manual re		No. 5603		Sourc	е	Rion				
Date provided or internet	Case Corrections	19 March 2021 ions Wind Shield Corrections			Mic Pressure to Free Field Corrections					
Uncertainties provided	Yes	Yes			Yes					
Total expanded uncertainties within the requirements of IEC 61672-1:20					YES					
Specified or equivalent Ca										
Customer or Lab Calibrate										
Calibrator adaptor type if a Calibrator cal. date	pe if applicable NC-74-002 24 May 2022									
Calibrator cert. number		UCRT2								
Calibrator cal cert issued	by Lab	065								
Calibrator SPL @ STP	.,	94.02	dB	Calibr	ation re	eferenc	e sour	d pres	sure level	
Calibrator frequency		1001.97	Hz		ation ch					
Reference level range		Single	dB							
Accessories used or corre			Extension C				NS-15			
Note - The Extension Cab Environmental conditions			the pre-an		is calib	ration.				
Environmental conditions	Temperature	Start 24.65	-+	End 24.37		±	0.30	°C.	1	
	Humidity	48.5	\dashv	48.7		±		%RH	1	
	Ambient Pressure	100.05	\neg	100.05	5	±	0.03		1	
Indication at the Calibratio	n Check Frequency		•		<u> </u>					
Initial indicated level		dB	Adjusted i				94.0		dB	
Uncertainty of calibrator u	sed for Indication at	the Calibration	n Check Fre	quency	±		0.10		dB	
Self Generated Noise Microphone installed -	Less Than 19	9.1 dB A	Weighting	1						
Microphone replaced with			UR = Under	Range	indicat	ed	ì			
Weighting	· · · · · · · · · · · · · · · · · · ·					7				
	3.1 dB UR	16.9	dB UR	23	3.1	dB	UR			
Self Generated Noise rep	orted for information	only and not u	ised to asse	ess con	forman	ce to a	requir	ement		
The reported expanded u	ncertainty is based o	n a standard ι	incertainty r	nultiplie	ed by a	covera	age fac	tor k=	2, providing	
a coverage probability of a	approximately 95%.	The uncertain	ty evaluatio	n has b	een ca	rried o	ut in a	corda	nce with	
UKAS requirements.										
Additional Comments	The results on this	certificate only	relate to th	e items	calibra	ted as	identif	ied ab	ove.	
None										
		EN	D							
Calibrated by: B. Bo		EIN	J						R	
Camprated by. D. DO	yuan								IX.	



A.5 CALIBRATION CERTIFICATE NC74 34178103



CERTIFICATE OF CALIBRATION





Date of Issue: 24 May 2022

Calibrated at & Certificate issued by: ANV Measurement Systems

Beaufort Court 17 Roebuck Way

Milton Keynes MK5 8HL

Telephone 01908 642846 Fax 01908 642814 E-Mail: info@noise-and-vibration.co.uk

Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Certificate Number: UCRT22/1682

Page Approved Signatory K. Mistry

Customer Wood Group

Web: www.noise-and-vibration.co.uk

St. Vincent Plaza (Floor 2) 319 St. Vincent Street

Glasgow

G2 5LP

26010406 Order No.

Test Procedure Procedure TP 1 Calibration of Sound Calibrators

Description Acoustic Calibrator

Identification Manufacturer Instrument Model Serial No. Rion Calibrator NC-74 34178103

The calibrator has been tested as specified in Annex B of IEC 60942:2003. As public evidence was available from a testing organisation (PTB) responsible for approving the results of pattern evaluation tests, to demonstrate that the model of sound calibrator fully conformed to the requirements for pattern evaluation described in Annex A of IEC 60942:2003, the sound calibrator tested is considered to conform to all the class 1 requirements of IEC 60942:2003.

ANV Job No. UKAS22/05346

23 May 2022 Date Received

Date Calibrated 24 May 2022

22 May 2020 Previous Certificate Dated

UCRT20/1440 Certificate No.

0653 Laboratory

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.



CERTIFICATE OF CALIBRATION

Certificate Number UCRT22/1682

UKAS Accredited Calibration Laboratory No. 0653

Page 2 of 2 Pages

Measurements

The sound pressure level generated by the calibrator in its WS2 configuration was measured five times by the Insert Voltage Method using a microphone as detailed below. The mean of the results obtained is shown below. It is corrected to the standard atmospheric pressure of 101.3 kPa (1013 mBar) using original manufacturers information.

Test Microphone Manufacturer Type

Brüel & Kjær 4134

Results

The level of the calibrator output under the conditions outlined above was

94.02 ± 0.10 dB rel 20 μPa

Functional Tests and Observations

The frequency of the sound produced was $1001.97 \pm 0.12 \text{ Hz}$

The total distortion was 1.61 ± 0.11 % Distortion

During the measurements environmental conditions were

 Temperature
 23
 to
 24
 °C

 Relative Humidity
 44
 to
 51
 %

 Barometric Pressure
 99.4
 to
 99.5
 kPa

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

The uncertainties refer to the measured values only with no account being taken of the ability of the instrument to maintain its calibration.

A small correction factor may need to be applied to the sound pressure level quoted above if the device is used to calibrate a sound level meter which is fitted with a free-field response microphone. See manufacturers handbook for details

..... END

Note:
Calibrator adjusted prior to calibration? NO

Initial Level N/A dB

Initial Frequency N/A Hz

<u>Additional Comments</u> The results on this certificate only relate to the items calibrated as identified above.

None

Calibrated by: B. Bogdan R 2