

TECHNICAL APPENDIX 13.2: CALIBRATION CERTIFICATES

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1.1 Calibration Certificate nl52 01265434



CERTIFICATE OF CALIBRATION





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 Measurement System Certificate Number: UCRT22/1548

Page 1 of 2 Pages
Approved Signatory

K. Mistry

Customer

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

Order No. Description 26010406

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

Identification

Serial No. / Version Туре Manufacturer Instrument NL-52 01265434 Rion Sound Level Meter Rion Firmware 2.0 NH-25 65436 Pre Amplifier Rion Rion Microphone UC-59 13122 Brüel & Kjær 4231 2052327 Calibrator 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 Yes

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 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.

Previous Certificate

Dated

Certificate No.

Laboratory

27 May 2020

UCRT20/1451

0653

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		BRATION	Cer	tificat	e Nur T22/1		
JKAS Accredited Calib	ration Laboratory	No. 0653	Page	2	of	2	Pages
Sound Level Meter Inst	truction manual an	d data used to adjust	the sound lev	els ind	icated		
SLM instruction manual ti	tle NL-52/NL-42	Description for IEC 61	672-1				
SLM instruction manual re	ef / issue	No. 56034 21-03	Source	Rion			
ate provided or internet		19 March 2021			-		
	Case Corrections	- Control Control Control	ns Mic Pre	ssure to		Field C	Corrections
Incertainties provided otal expanded uncertain	Yes	Yes	2010 1450		Yes		
Specified or equivalent Ca	alibrator	Equivalent	:2013 YES	П			
Customer or Lab Calibrate		Customers Calibrato					
Calibrator adaptor type if	applicable	UC 0210					
Calibrator cal. date		20 April 2022					
Calibrator cert. number		UCRT22/1540					
Calibrator cal cert issued	by Lab	0653					
Calibrator SPL @ STP		94.11 dB					ssure level
Calibrator frequency		999.79 Hz	Calibration	check fi	requen	су	
Reference level range		Single dB		41.1	110		
Accessories used or corre	ected for during calib		Cable & Wind				
Note - The Extension Cat			CC341134.7+	T			
Invironmental conditions	Temperature	Start 23.68	24.32	±	0.30	°C	1
	Humidity	41.1	39.9	±		%RH	
	Ambient Pressure	100.33	100.28	±	0.03		1
ndication at the Calibration							
Initial indicated level	94.1	dB Adjuste	d indicated leve	1	94.1		dB
Incertainty of calibrator u	sed for Indication at	the Calibration Check F	requency ±		0.10		dB
Self Generated Noise			_				
Microphone installed -	Less Than 17	The state of the s			1		
Microphone installed - Microphone replaced with	electrical input devi	ce - UR = Unc	g ler Range indica	100	<u></u>	1	
Microphone installed - Microphone replaced with Weighting	A 3.1 dB UR	ce - UR = Unc C 17.4 dB UR	er Range indica	Z dB	UR a requi	rement	
Microphone installed - Microphone replaced with Weighting	A 3.1 dB UR	ce - UR = Unc C 17.4 dB UR	er Range indica	Z dB		rement	
Aicrophone installed - Aicrophone replaced with Weighting 1: Self Generated Noise rep The reported expanded ur coverage probability of a	A 3.1 dB UR orted for information	ce - UR = Unc C 17.4 dB UR only and not used to as	y multiplied by a	Z dB nce to a	a requii	ctor k =	2, providing nce with

Calibration Certificate nl52 01265412 1.2



CERTIFICATE OF CALIBRATION



Certificate Number: UCRT22/1552

Page

Approved Signatory

K. Mistry



0653

Date of Issue: 21 April 2022

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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

Type

Manufacturer Instrument Rion Sound Level Meter Rion Firmware

Serial No. / Version NL-52 01265412 2.0

Rion Pre Amplifier Rion Microphone Brüel & Kjær Calibrator

NH-25 65414 UC-59 10633 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 22 May 2020 UCRT20/1446 0653

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CERTIFICATE OF CALIBRATION Certificate Number UCRT22/1552 IKAS Accredited Calibration Laboratory No. 0653 Pages Sound Level Meter Instruction manual and data used to adjust the sound levels indicated SLM instruction manual title NL-52/NL-42 Description for IEC 61672-1 SLM instruction manual ref / issue No. 56034 21-03 Date provided or internet download date 19 March 2021 Case Corrections | Wind Shield Corrections Mic Pressure to Free Field Corrections Uncertainties provided Yes Yes Yes Total expanded uncertainties within the requirements of IEC 61672-1:2013 YES Specified or equivalent Calibrator Equivalent Customer or Lab Calibrator Customers Calibrator Calibrator adaptor type if applicable UC 0210 Calibrator cal. date 20 April 2022 Calibrator cert. number UCRT22/1540 Calibrator cal cert issued by Lab 0653 Calibrator SPL @ STP 94.11 dB Calibration reference sound pressure level Calibrator frequency 999.79 Hz Calibration check frequency Reference level range dB Single Extension Cable & Wind Shield WS-15 Accessories used or corrected for during calibration -Note - The Extension Cable was used between the SLM and the pre-amp for this calibration Environmental conditions during tests End 0.30 °C 3.00 %RH 24.30 Temperature 24.50 42.2 Humidity 40.6 0.03 kPa 100.20 100.24 Ambient Pressure Indication at the Calibration Check Frequency 94.1 Initial indicated level 94.2 dB Adjusted indicated level 0.10 dB Uncertainty of calibrator used for Indication at the Calibration Check Frequency ± Self Generated Noise Less Than 17.9 A Weighting dB Microphone installed -UR = Under Range indicated Microphone replaced with electrical input device -Weighting dB UR dB UR 20.8 dB 15.5 Self Generated Noise reported for information only and not used to assess conformance to a requirement 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. Additional Comments The results on this certificate only relate to the items calibrated as identified above. None R3 B. Giles Calibrated by:

1.3 Calibration Certificate nl52 01265413



CERTIFICATE OF CALIBRATION



Certificate Number: UCRT22/1693

Page

Approved Signatory

C. Mistry



Pages

Date of Issue: 25 May 2022

Calibrated at & Certificate issued by: ANV Measurement Systems

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Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Customer Wood Group St. Vincent Plaza (Floor 2)

319 St. Vincent Street

Glasgow G2 5LP

Order No. 26010406

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

Identification Manufacturer Instrument Serial No. / Version Rion Sound Level Meter NI -52 01265413 Rion Firmware 2.0 Rion Pre Amplifier NH-25 65414 Rion Microphone UC-59 10633 NC-74 34178103 Rion Calibrator

Calibrator adaptor type if applicable NC-74-002

Performance Class 1

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 Yes

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 23 May 2022 ANV Job No. UKAS22/05346

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 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.

Previous Certificate Dated Certificate No. Laboratory 22 May 2020 UCRT20/1448 0653

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CERTIFICATE OF CALIBRATION	Certificate Number	
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LIKAS Accredited Calibration Laboratory No. 0653	Page 2 of 2 Pages	

UKAS Accredited Calib	ration Laboratory	No. 0653		Page	2	of	2	Pages
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0.00							
Sound Level Meter Inst	truction manual an	d data used to adi	just the	sound level	s ind	cated.		
SLM instruction manual ti		Description for IEC						
SLM instruction manual re		No. 56034 21-			Rion			
Date provided or internet		19 March 202						
	Case Corrections	Wind Shield Corre	ections	Mic Press	sure to		ield C	orrections
Uncertainties provided	Yes	Yes		10 1150		Yes		
Total expanded uncertain			2-1:20	13 YES				
Specified or equivalent Ca Customer or Lab Calibrate		Specified Customers Calib	rator					
Calibrator adaptor type if		NC-74-002						
Calibrator cal. date	аррисавис	24 May 2022						
Calibrator cert, number		UCRT22/168						
Calibrator cal cert issued	by Lab	0653						
Calibrator SPL @ STP		94.02	dB	Calibration re	feren	ce sour	d pres	sure level
Calibrator frequency		1001.97	Hz	Calibration ch				
Reference level range		Single	dB			- qua	-,	
Accessories used or corre	ected for during calib	ration - Exten	sion C	able & Wind S	hield	WS-15		
Note - The Extension Cal	ole was used betwee	n the SLM and the	pre-am	p for this calib	ration			
Environmental conditions	during tests	Start		End				
	Temperature	24.15		24.31	±	0.30]
	Humidity	48.3		48.3	±		%RH	1
	Ambient Pressure	100.06		100.05	±	0.03	kPa	L
Indication at the Calibration								
Initial indicated level				dicated level		94.0		dB
Uncertainty of calibrator u	ised for indication at	the Calibration Che	eck Fre	quency ±		0.10		dB
Self Generated Noise Microphone installed -	Less Than 18	3.8 dB A Weig	htina	ı				
Microphone replaced with				Range indicat	hai	ī		
Weighting	A	C	Officer	Zarige mulcar		<u> </u>	1	
	2.5 dB UR	16.9 dB	UR		dB	UR		
The reported expended u			taint, a	nulfinlied by o		000 500	tor k	
a coverage probability of UKAS requirements.	ncertainty is based of	in a standard lincon						2 providing
Additional Comments	ncertainty is based of approximately 95%. The results on this	The uncertainty ev	aluation	has been ca	rried o	out in a	corda	nce with
Additional Comments Prior to calibration the ins	approximately 95%. The results on this	The uncertainty eva	aluation	has been ca	rried o	out in a	corda	nce with
	approximately 95%. The results on this strument was re-align	The uncertainty evacertificate only related.	aluation	has been ca	rried o	out in ac	corda	nce with

1.4 Calibration Certificate nl52 00175536



CERTIFICATE OF CALIBRATION





Date of Issue: 25 May 2022
Calibrated at & Certificate issued by:
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Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Certificate Number: UCRT22/1695

Page 1 of 2 Pages
Approved Signatory

K. Mistry

Customer Wood Group

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

Glasgow G2 5LP

Order No. 26010406

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

Identification Manufacturer Serial No. / Version Instrument Type Rion Sound Level Meter NL-52 00175536 Rion Firmware 2.0 Pre Amplifier NH-25 65638 Rion Rion Microphone UC-59 13128 Calibrator NC-74 34178103 Rion Calibrator adaptor type if applicable NC-74-002

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 Yes

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 23 May 2022 ANV Job No. UKAS22/05346

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 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.

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

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CERTIFICATE	OF CALI	BRATION				e Number
						T22/1695
UKAS Accredited Calib	ration Laboratory	No. 0653			Page 2	of 2 Pages
Sound Level Meter Inst SLM instruction manual til					d levels indi	cated
SLM instruction manual to SLM instruction manual re		2 Description for IE No. 56034 21		Source	e Rion	
Date provided or internet		19 March 20		Source	Klon	
Date provided of internet	Case Corrections			Mic	c Pressure to	Free Field Corrections
Uncertainties provided	Yes	Yes	1			Yes
Total expanded uncertain			72-1:20	13	YES	1 1 1
Specified or equivalent Ca		Specified				
Customer or Lab Calibrate Calibrator adaptor type if a		Customers Calil NC-74-002				
Calibrator cal. date	аррисавіе	24 May 202				
Calibrator cert, number		UCRT22/16				
Calibrator cal cert issued	by Lab	0653				
Calibrator SPL @ STP	-,	94.02	dB	Calibra	ation referen	ce sound pressure level
Calibrator frequency		1001.97	Hz		ation check for	
Reference level range		Single	dB			
Accessories used or corre		bration - Exter			Wind Shield	
Note - The Extension Cab			pre-am	p for thi	is calibration	
Environmental conditions		Start		End		
	Temperature	24.65		24.37	±	0.30 °C
	Humidity	48.5	+	48.7	±	3.00 %RH
Indication at the Calibratio	Ambient Pressure			100.05	±	0.03 kPa
			tinte d la		d lessed	04.0
Initial indicated level Uncertainty of calibrator u			usted in			94.0 dB 0.10 dB
Self Generated Noise	ised for indication at	the Galibration Chi	eck Fiel	quency	I	0.10 UB
Microphone installed -	Less Than 1	9.1 dB A Wei	ahtina	1		
Microphone replaced with				Range	indicated	Ī
Weighting	A	Ċ		<u> </u>	Z	
	3.1 dB UR	16.9 dB	UR	23	1.1 dB	UR
Self Generated Noise rep	orted for information	n only and not used	to asse	ss conf	formance to a	requirement
The reported expanded u a coverage probability of a UKAS requirements.						_
Additional Comments	The regulte on this	certificate only rela	te to the	items	calibrated as	identified above.
None	The results on this	33				



Calibration Certificate nC74 34178103 1.5



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

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Certificate Number: UCRT22/1682

pproved Signator K. Mistry

Wood Group Customer

St. Vincent Plaza (Floor 2)

319 St. Vincent Street

Glasgow G2 5LP

Order No. 26010406

Test Procedure Procedure TP 1 Calibration of Sound Calibrators

Acoustic Calibrator Description

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

Date Received 23 May 2022

Date Calibrated 24 May 2022

22 May 2020 Previous Certificate Dated

Certificate No. UCRT20/1440

0653 Laboratory

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CERTIFICATE OF CALIBRATION

Certificate Number UCRT22/1682

UKAS Accredited Calibration Laboratory No. 0653

age 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 ± 0.12 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

Initial Frequency N/A Hz

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

None

Calibrated by: B. Bogdan R 2