

# Calibration Certificate

Issued By: Castle Group Ltd

Date Of Issue : 14/06/17

Certificate No : 00000/00000

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All instruments are tested to check compliance with particular specifications. These specifications may be appropriate British Standards, or if the instrument was not originally designed to meet any British Standard, or when the instrument was originally manufactured a relevant British Standard did not exist, the instrument will be tested to the manufacturer's original specification.

Absolute acoustic calibration of acoustic calibrators and sound level meters is checked at one or more standard frequencies against an independent sound source with calibration directly traceable to the National Physical Laboratory (NPL) in the United Kingdom. The NPL reference applicable for the calibration of the test equipment is shown below.

The performance of the instrument was determined by comparison with the manufacturers' specification as found in the instrument handbook or other technical publication. Any significant uncertainty of the measuring system will also be included.

The instrument was allowed to stabilise for a period of 30 minutes prior to measurements made.

The ambient temperature and relative humidity throughout calibration were  $25 \pm 2$  °C and 50% RH respectively.

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**Instruments used to carry out this calibration are as follows: -**

Multifunction Calibrator 4226 Serial No: 1551589

Applicable Reference: S6645.

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**Subject of Calibration:** GA117

**Instrument:** Integrating 1/1 + 1/3 Octave Band SLM

**Serial No:** 00000

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**Preamplifier Data**

**Preamplifier Type:** SV18

**Preamplifier Serial No:** 00000

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**Microphone Data**

**Microphone Type:** ACO 7052E

**Microphone Serial No:** 00000

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**Basis Of Test:** Compliance to IEC 61672-1 : 2002 Class 1, & IEC 61260: 1995 Class 1

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**Calibrated By:**

A N Engineer

*(Approved Signatory)*

**Date of Calibration:** 14 Jun 2017

**Completed Status:** Pass

**Checked By:**

A N O Engineer

*(Approved Signatory)*

**Recalibration Due:** 01 Jul 2018

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**Client:** End User Company Name

**Address:** Place

Street

Location

Town

County

Postcode

Client Reference: If Applicable

**Castle Group Ltd**

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# CALIBRATION RESULTS

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## ACOUSTICAL RESPONSE TO SUPPLIED CALIBRATOR

The following reading was obtained from the supplied calibrator. Type: Serial Number:

Frequency	Reference	Indicated SPL	Adjusted SPL
1kHz	94.0 dBA	dBA	dBA *

\*Includes microphone cavity correction at 1kHz. Calibrate to this level when used with supplied calibrator.

## ACOUSTICAL REFERENCE

The method of calibration employed was a direct-coupled acoustic reference source.

Frequency	Reference	Indicated SPL	Adjusted SPL
1kHz	94.0 dBA	dBA	94.0dBA

## ACOUSTICAL SCALING

The method of calibration employed was a direct-coupled acoustic reference source.

SPL ( 1KHz)	HIGH RANGE	TOLERANCE
94 dBA	dBA	± 0.7dB
104 dBA	dBA	± 0.7dB
114 dBA	dBA	± 0.7dB

## ACOUSTICAL RANGE

The method of calibration employed was a direct-coupled acoustic reference source.

SPL (1KHz)	Low Range	High Range	TOLERANCE
94 dBA	dBA	dBA	± 0.5 dB

## FREQUENCY WEIGHTING

The method of calibration employed was a direct-coupled acoustic reference source.

FREQ (Hz)	1K	2K	4K	8K	12.5K	500	250	125	63	31.5
A (dB)										
C (dB)										
Z (dB)										
TOL ±	1.0 dB	1.0 dB	1.0 dB	+1.5, -3dB	+3.0, -6dB	1.0 dB	1.0 dB	1.0 dB	1.5 dB	1.5 dB

## INVERSE A-WEIGHTING

The method of calibration employed was a direct-coupled acoustic reference source

FREQ (Hz)	1K	2K	4K	8K	12.5K	500	250	125	63	31.5
Reading										

## INFERRED MICROPHONE RESPONSE

Pressure correction factor. To be added to acoustic response.

FREQ (Hz)	1K	2K	4K	8K	12.5K	500	250	125	63	31.5

\* Notes

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**LINEARITY RESPONSE** The method employed was a direct electrical signal injection on the reference range.

SPL (8KHz) 10 dB Steps WRT scale		SPL (8KHz) 10 dB Steps WRT scale +5		SPL (8KHz) 1 dB Steps WRT MSD for 10dB		SPL (8KHz) 1 dB Steps WRT FSD for 10dB	
Target	Reading	Target	Reading	Target	Reading	Target	Reading
35.0		40.0		36.0		126.0	
45.0		50.0		37.0		127.0	
55.0		60.0		38.0		128.0	
65.0		70.0		39.0		129.0	
75.0		80.0		40.0		130.0	
85.0		90.0		41.0		131.0	
95.0		100.0		42.0		132.0	
105.0		110.0		43.0		133.0	
115.0		120.0		44.0		134.0	
125.0		130.0					
135.0							

**LINEARITY RESPONSE** The method employed was a direct electrical signal injection on the reference range.

LEQ (8KHz) 10 dB Steps WRT scale		LEQ (8KHz) 10 dB Steps WRT scale +5		LEQ (8KHz) 1 dB Steps WRT MSD for 10dB		LEQ (8KHz) 1 dB Steps WRT FSD for 10dB	
Target	Reading	Target	Reading	Target	Reading	Target	Reading
35.0		40.0		36.0		126.0	
45.0		50.0		37.0		127.0	
55.0		60.0		38.0		128.0	
65.0		70.0		39.0		129.0	
75.0		80.0		40.0		130.0	
85.0		90.0		41.0		131.0	
95.0		100.0		42.0		132.0	
105.0		110.0		43.0		133.0	
115.0		120.0		44.0		134.0	
125.0		130.0					
135.0							

\* Notes

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## TIME WEIGHTING

**TONE BURST** The method employed was a direct electrical signal injection on the reference range.

Time Weighting Tone Burst	Reference Level (dBA) -3dB WRT FSD	Response	Tolerance
Fast (200 ms)	131.0dBA (Ref -1dB)	dBA	± 0.8dB
Fast (2 ms)	114.0dBA (Ref -18 dB)	dBA	+1.3, -1.8 dB
Fast (0.25 ms)	105.0dBA (Ref -27 dB)	dBA	+1.3, -3.3 dB
Slow (200 ms)	124.6dBA (Ref -7.4 dB)	dBA	± 0.8dB
Slow (2 ms)	105.0dBA (Ref -27 dB)	dBA	+1.3, -3.3 dB

## TIME AVERAGING

**TONE BURST** The method employed was a direct electrical signal injection on the reference range.

Tone Burst Duty Factor	Target Level (dBA)	Response	Tolerance
1/1000 (60 Seconds)	105.0dBA (FSD-30)	dBA	± 1.0dB
1/10,000 (6 Minutes)	95.0dBA (FSD-40)	dBA	± 1.0dB

## OCTAVE FILTER

**INSERTION LOSS** The method employed was a direct electrical signal injection

TESTED AGAINST 1/1 OCTAVE MODE

FREQUENCY (Hz)	SPL (dBlin)	OCTAVE (dBlin)	TOLERANCE (dB)
31.5			+0.5 / -1.0
63			+0.5 / -1.0
125			+0.5 / -1.0
250			+0.5 / -1.0
500			+0.5 / -1.0
1,000			+0.5 / -1.0
2,000			+0.5 / -1.0
4,000			+0.5 / -1.0
8,000			+0.5 / -1.0

Linear response tested electrically without microphone 'pressure correction' for reference purposes.

\* Notes

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**1/1 OCTAVE RESPONSE** The method employed was a direct electrical signal injection  
ATTENUATION:

FREQUENCY CENTRE (Fm)	REFERENCE (dB)	Fm x 2 (dB)	Fm/2 (dB)	TOLERANCE (dB)
31.5Hz				≥18
63Hz				≥18
125Hz				≥18
250Hz				≥18
500Hz				≥18
1,000Hz				≥18
2,000Hz				≥18
4,000Hz				≥18
8,000Hz				≥18

**1/3 OCTAVE RESPONSE** The method employed was a direct electrical signal injection  
ATTENUATION:

FREQUENCY CENTRE (Fm)	REFERENCE (dB)	Fm x '1.3'	Fm x '1.6'	Fm x 2	Fm/'1.3'	Fm/'1.6'	Fm/2
31.5Hz							
63Hz							
125Hz							
250Hz							
500Hz							
1,000Hz							
2,000Hz							
4,000Hz							
8,000Hz							

'Abridged' test of 1/3 octave function conducted to confirm filter response

**Uncertainties of the measurement**

The uncertainties in the table of results correspond to an estimated confidence probability of not less than 95%.

\* Notes