



# **FUSION** Smart Sound & Vibration Analyzer

Tests report, according to the IEC 61672-3 : 2013

01dB.com



**01dB**

ACOEM Group

## Tests report

TR-DTE-L-19-PVE-71342

ISSUED FOR :

SPEVI LTDA  
Malaquias Concha 086  
PROVIDENCIA  
  
750-1552 SANTIAGO  
Chile

### Name and location of the laboratory of tests:

**01 dB-Metravib** - 200, Chemin des Ormeaux 69578 Limonest

Accredited for compliance with ISO/IEC 17025.

### TESTED INSTRUMENT

Designation : Integrator Sound Level Meter

Manufacturer : 01dB

Type : FUSION 40CD Serial number : 12223

Identification number :

Date of issue : 04/10/2019

This report includes 7 pages

The measurements are performed according to the IEC 61672-3 : 2013, Electroacoustics, - Sound level meters – Part 3: Periodic tests.

HEAD OF THE METROLOGY LAB  
**François MAGAND**

04/10/2019

X

Signé par : MAGAND François

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Identification :

	Sound level meter	Microphone	Accessories
Manufacturer	01dB	GRAS	
Type	FUSION 40CD	40CD	Windscreen
Serial number	12223	367026	
Firmware version	Application: 2,47 Metrology: 2,12		
Calibrator	01dB CAL31 N° 88150 +		

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\*


\* Tests not covered by the COFRAC accreditation

Method:

The instrument is tested in an air conditioned room. The other characteristics are verified 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 : 2013). 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	04/10/2019
Operator Name	X  <small>Signé par : LEROY Bertrand</small>
Tests instruction	MET.18.INS.083
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	Type	Serial number	Identification number
Waveform generator	Hewlett-Packard	33120A	US36028927	APM 1153
Programmable Attenuator	01dB-Metravib	OUT1694	17-10-207	APM 5955
Electrostatic actuator	Gras	14AA+RA0014	181068	APM 5423
Thermometer, hygrometer, barometer	COMET	T7511	18960232	APM 5858

All the measuring instruments are calibrated to national standards with COFRAC certificate of calibration.

Results:

Mentioned expanded uncertainties correspond to two standard uncertainty types (  $k=2$  ). The measurement value and the associated expanded uncertainty represent the interval which contains the value of measured quantity with a probability of approximately 95 %.

Standard uncertainties are calculated including different uncertainty components, reference standards, instruments used, environmental conditions, calibrated instrument contribution, repeatability, according to ISO/IEC Guide 98-3 (GUM).

Mentioned Maximum Permissible Errors ( M.P.E. ) are the ones defined in the IEC 61672-1 : 2013 for a class 1 sound level meter.

Associated calibrator

See the calibration certificate n°CE-DTE-L-19-PVE-71342

Indication at the calibration check frequency\*

Initial indication	Correction	Adjusted indication	Tolerance
( dB )	( dB )	( dB )	( dB )
93,4	-0,5	93,3	+/- 1,0

Self-generated noise\*

0° + windscreen

Microphone replaced by the electrical input-signal device	Nominal value	Displayed value
	( dB )	( dB )
Leq dBA	< 18	9,0
Leq dBB	< 18	8,2
Leq dBC	< 19	9,1
Leq dBZ	< 22	12,8

Microphone installed	Nominal value	Displayed value
	( dB )	( dB )
Leq dBA	< 21	17,8

Acoustical signal tests of a frequency weightings

0° + windscreen	Measurement error		Uncertainty (dB)	Maximum Permissible Error (dB)
	C	(dB)		
125 Hz	-0,2		0,3	+/- 1,0
1000 Hz	0,0		0,3	+/- 0,7
8000 Hz	-0,6		0,5	-2,5 ; +1,5

Electrical signal tests of frequency weightings

0° + windscreen	Measurement error			Uncertainty (dB)	Maximum Permissible Error (dB)
	Z	A	C		
	(dB)	(dB)	(dB)		
63 Hz	-0,3	-0,3	-0,3	0,4	+/- 1,0
125 Hz	-0,2	-0,4	-0,2	0,4	+/- 1,0
250 Hz	-0,2	-0,3	-0,2	0,4	+/- 1,0
500 Hz	0,0	-0,1	0,0	0,4	+/- 1,0
1000 Hz	0,0	0,0	0,0	0,4	+/- 0,7
2000 Hz	0,3	0,4	0,4	0,4	+/- 1,0
4000 Hz	0,4	0,4	0,4	0,4	+/- 1,0
8000 Hz	0,3	-0,2	-0,2	0,7	-2,5 ; +1,5
16000 Hz	-1,1	-6,5	-6,5	0,7	-16,0 ; +2,5

Frequency and time weightings at 1 kHz\*

0° + windscreen	Displayed value ( dB )	Measurement error ( dB )	Uncertainty (dB)	M.P.E. (dB)
Lp 94 dBA / 1000 Hz	93,8	Reference		
Lp 94 dBA / 1000 Hz	93,8	0,0	0,1	+/- 0,2
LEQ 94 dBA / 1000 Hz	93,8	0,0	0,1	+/- 0,2
Lp 94 dBC / 1000 Hz	93,8	0,0	0,1	+/- 0,2
Lp 94 dBZ / 1000 Hz	93,8	0,0	0,1	+/- 0,2

Long-term stability\*

0° + windscreen

Displayed value ( dB )		Measured deviation ( dB )	Uncertainty ( dB )	Maximum Permissible Error (dB)
Initial indication	Final indication			
93,9	93,9	0,0	0,1	+/- 0,1



Level linearity\*

0° + windscreen

Nominal value	Displayed value	Measurement error	Uncertainty	Maximum Permissible Error (dB)
( dB )	( dB )	( dB )	( dB )	
94,0	94,0	0,0	0,3	+/- 0,8
99,0	99,1	0,1	0,3	+/- 0,8
104,0	104,0	0,0	0,3	+/- 0,8
109,0	109,0	0,0	0,3	+/- 0,8
114,0	113,9	-0,1	0,3	+/- 0,8
119,0	118,9	-0,1	0,3	+/- 0,8
124,0	123,8	-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	130,9	-0,1	0,3	+/- 0,8
132,0	131,8	-0,2	0,3	+/- 0,8
133,0	132,8	-0,2	0,3	+/- 0,8
134,0	133,9	-0,1	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	0,0	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	49,1	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	29,1	0,1	0,3	+/- 0,8
27,0	27,1	0,1	0,3	+/- 0,8
26,0	26,2	0,2	0,3	+/- 0,8
25,0	25,2	0,2	0,3	+/- 0,8
24,0	24,2	0,2	0,3	+/- 0,8
23,0	23,3	0,3	0,3	+/- 0,8

Toneburst response\*

0° + windscreen

Description	Displayed value ( dB )	Measurement error ( dB )	Uncertainty ( dB )	Maximum Permissible Error (dB)
135 dB 4000 Hz A Slow 200 ms	127,6	0	0,1	+/- 0,5
135 dB 4000 Hz A Slow 2 ms	108	0	0,1	-3,0 ; +1,0
135 dB 4000 Hz A fast 200 ms	134	0	0,1	+/- 0,5
135 dB 4000 Hz A fast 2 ms	117	0	0,1	-1,5 ; +1,0
135 dB 4000 Hz A fast 0,25 ms	107,9	-0,1	0,1	-3,0 ; +1,0
135 dB 4000 Hz A 1000 200 ms	128	0	0,1	+/- 0,5
135 dB 4000 Hz A 1000 2 ms	108	0	0,1	-1,5 ; +1,0
135 dB 4000 Hz A 1000 0,25 ms	98,9	-0,1	0,1	-3,0 ; +1,0

C-weighted peak sound level\*

0° + windscreen

Description	Displayed value ( dB )	Measurement error ( dB )	Uncertainty ( dB )	Maximum Permissible Error (dB)
8000 Hz Complete cycle	135,9	0,5	0,1	+/- 2,0
500 Hz Positive one-half-cycle	135,4	0,0	0,1	+/- 1,0
500 Hz Negative one-half-cycle	135,4	0,0	0,1	+/- 1,0

Overload indication\*

0° + windscreen

Displayed value ( dB )		Measured deviation ( dB )	Uncertainty ( dB )	Maximum Permissible Error (dB)
Positive one-half-cycle	Negative one-half-cycle			
106,1	106,2	0,0	0,2	+/- 1,5

High-level stability\*

0° + windscreen

Displayed value ( dB )		Measured deviation ( dB )	Uncertainty ( dB )	Maximum Permissible Error (dB)
Initial indication	Final indication			
136,6	136,6	0,0	0,1	+/- 0,1

Conclusion

IEC 61672-3 : 2013 Chapter:	Tests	Results
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

\* Tests and declarations of compliance not covered by the COFRAC accreditation

FUSION user manual	DOC1131 version K August 2017
Type-approval certificate	France: LNE-27092 revision 2 dated 04/04/2017 Deutschland: DE-16-M-PTB-0006 dated 09/28/2016

End of tests report