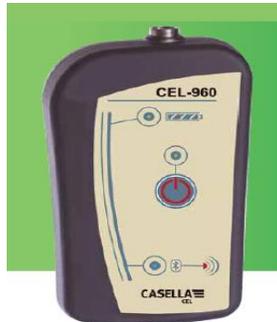


## ESPECIFICACIONES TÉCNICAS DE EQUIPO



Medidor de Vibraciones o Acelerómetro CASELLA CEL 960.

<b>Analizador de la vibración de cuerpo entero y mano-brazo: CEL-960</b>	<ul style="list-style-type: none"> <li>• Mide y registra los niveles de vibración de los ejes X, Y, Z, RMS y Pico</li> <li>• Calcula y almacena datos generales y de historial cronológico de suma de vectores, exposición diaria A(8) y VDV</li> <li>• Grabación de espectro de 1/3 de octava y señal de entrada de vibración</li> <li>• Detector de presencia y luz de aviso (WB, cuerpo entero)</li> </ul>
<b>Aplicaciones</b>	<ul style="list-style-type: none"> <li>• Análisis de la exposición a la vibración de mano-brazo conforme a ISO 5349 y ANSI 2.70</li> <li>• Análisis de la exposición a la vibración de cuerpo entero conforme a ISO 2631 y ANSI 3.44</li> <li>• Grabación de señal de vibración y 1/3 de octava</li> <li>• Mediciones generales de la vibración</li> </ul>
<b>Normas</b>	ISO 8041 (2005), ISO 5349 (2001), ISO 2631 (1997)

<b>MEDICIONES DE HIGIENE INDUSTRIAL</b>	
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# CASSELLA

## CEL

### Certificate of Conformity and Calibration

CEL-DTE-T-12-PVE-63482



Designation	Vibration meter
Manufacturer	Casella CEL
Type	CEL- 960
Serial number	20147
Identification number	

**Applicable standards:**

ISO 8041 (2005)

**Declaration of conformity**

This test certificate confirms that the instrument specified above has been successfully tested to comply with the manufacturer's published specifications.

Tests are performed using equipment traceable to national standards (E.A.) in accordance with Casella's ISO 9001:2000 quality procedures.

This product is certified as being compliant to the requirements of the EC Directive.

This certificate includes **5** pages

HEAD OF TECHNICAL SERVICES



**Stephen Tearle**

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**Casella CEL**

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CEL-DTE-T-12-PVE-63482

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**TEST SUMMARY:**

*Level linearity  
Frequency weighting response  
Overload indicator*

**CALIBRATION METHOD**

Prior to calibration, the instrument was left in an air-conditioned room.

An adapter is used to apply the electrical signal to the vibration meter. The level of the input signal is adjusted to obtain the same indication as that of the vibration calibration.

**CALIBRATION CONDITIONS**

Date of Calibration	12/05/2017 15:14:45
Operator Name	Olivier Hiesse
Calibration instruction	P118-NOT-01
Static pressure	995.3 hPa
Temperature	25.8 °C
Relative humidity	47.5 %RH

**INSTRUMENTS USED FOR CALIBRATION**

Designation	Manufacturer	Type	Serial number	Identification number
Waveform generator	Hewlett-Packard	HP 33120 A	US 36028927	1153
Attenuator	01 dB-Metravib	---	---	1325
Attenuator	01 dB-Metravib	---	---	1114
Atténuateur/ Attenuator	01 dB-Metravib	---	---	1270
Générateur de fonction/ Waveform generator	Hewlett-Packard	HP 33120 A	US36035784	1318
Calibreur acoustique	01 dB-Metravib	Cal21	50441936	1388
Atténuateur/ Attenuator	01 dB-Metravib	---	---	1114

**RESULTS**

Conformity decision is granted according to tolerance descriptions of the following standard ISO 8041 (2005)

**MEDICIONES DE HIGIENE  
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**Level linearity**

Calibration description and nominal value	Displayed value (ms <sup>-2</sup> )	Expanded uncertainty (%)
Wd: Linearity – Channel X (105ms <sup>-2</sup> ; 15.85Hz)	105.9	0.59
Wd: Linearity – Channel Y (105ms <sup>-2</sup> ; 15.85Hz)	105.8	0.59
Wd: Linearity – Channel X (90ms <sup>-2</sup> ; 15.85Hz)	91.15	0.59
Wd: Linearity – Channel Y (90ms <sup>-2</sup> ; 15.85Hz)	90.44	0.59
Wd: Linearity – Channel X (60ms <sup>-2</sup> ; 15.85Hz)	60.55	0.59
Wd: Linearity – Channel Y (60ms <sup>-2</sup> ; 15.85Hz)	60.85	0.59
Wd: Linearity – Channel X (30ms <sup>-2</sup> ; 15.85Hz)	30.41	0.59
Wd: Linearity – Channel Y (30ms <sup>-2</sup> ; 15.85Hz)	30.2	0.59
Wd: Linearity – Channel X (10ms <sup>-2</sup> ; 15.85Hz)	10	0.73
Wd: Linearity – Channel Y (10ms <sup>-2</sup> ; 15.85Hz)	10	0.73
Wd: Linearity – Channel X (0.10ms <sup>-2</sup> ; 15.85Hz)	0.1	2.94
Wd: Linearity – Channel Y (0.10ms <sup>-2</sup> ; 15.85Hz)	0.1	2.94
Wd: Linearity – Channel X (3000ms <sup>-2</sup> ; 79.43Hz)	3000.21	0.59
Wd: Linearity – Channel Y (3000ms <sup>-2</sup> ; 79.43Hz)	2998.4	0.59
Wd: Linearity – Channel Z (3000ms <sup>-2</sup> ; 79.43Hz)	2997.05	0.59
Wd: Linearity – Channel X (2250ms <sup>-2</sup> ; 79.43Hz)	2248.79	0.59
Wd: Linearity – Channel Y (2250ms <sup>-2</sup> ; 79.43Hz)	2248.62	0.59
Wd: Linearity – Channel Z (2250ms <sup>-2</sup> ; 79.43Hz)	2246.7	0.59
Wd: Linearity – Channel X (1500ms <sup>-2</sup> ; 79.43Hz)	1498.41	0.59
Wd: Linearity – Channel Y (1500ms <sup>-2</sup> ; 79.43Hz)	1497.11	0.59
Wd: Linearity – Channel Z (1500ms <sup>-2</sup> ; 79.43Hz)	1491.14	0.59
Wd: Linearity – Channel X (750ms <sup>-2</sup> ; 79.43Hz)	749.26	0.59
Wd: Linearity – Channel Y (750ms <sup>-2</sup> ; 79.43Hz)	749.43	0.59
Wd: Linearity – Channel Z (750ms <sup>-2</sup> ; 79.43Hz)	748.54	0.59
Wd: Linearity – Channel X (10ms <sup>-2</sup> ; 79.43Hz)	10	0.73
Wd: Linearity – Channel Y (10ms <sup>-2</sup> ; 79.43Hz)	10	0.73
Wd: Linearity – Channel Z (10ms <sup>-2</sup> ; 79.43Hz)	10	0.73
Wd: Linearity – Channel X (0.65ms <sup>-2</sup> ; 79.43Hz)	0.67	0.73
Wd: Linearity – Channel Y (0.65ms <sup>-2</sup> ; 79.43Hz)	0.67	0.73
Wd: Linearity – Channel Z (0.65ms <sup>-2</sup> ; 79.43Hz)	0.66	0.73
Wd: Linearity – Channel Z (105ms <sup>-2</sup> ; 15.85Hz)	105.2	0.59
Wd: Linearity – Channel Z (90ms <sup>-2</sup> ; 15.85Hz)	91.13	0.59
Wd: Linearity – Channel Z (60ms <sup>-2</sup> ; 15.85Hz)	60.54	0.59
Wd: Linearity – Channel Z (30ms <sup>-2</sup> ; 15.85Hz)	30.4	0.59
Wd: Linearity – Channel Z (10ms <sup>-2</sup> ; 15.85Hz)	10	0.73
Wd: Linearity – Channel Z (0.10ms <sup>-2</sup> ; 15.85Hz)	0.1	2.94
Wd: Linearity – Channel Z <sup>2</sup> (3000ms <sup>-2</sup> ; 15.85Hz)	2982.53	0.59
Wd: Linearity – Channel Z <sup>2</sup> (2250ms <sup>-2</sup> ; 15.85Hz)	2245.48	0.59
Wd: Linearity – Channel Z <sup>2</sup> (1500ms <sup>-2</sup> ; 15.85Hz)	1496.56	0.59
Wd: Linearity – Channel Z <sup>2</sup> (750ms <sup>-2</sup> ; 15.85Hz)	749.29	0.59
Wd: Linearity – Channel Z <sup>2</sup> (10ms <sup>-2</sup> ; 15.85Hz)	10	0.73
Wd: Linearity – Channel Z <sup>2</sup> (0.75ms <sup>-2</sup> ; 15.85Hz)	0.75	0.73

Level linearity Hand Arm (Wh)	Conformity
X-Axis; from 0.65 to 3000 ms <sup>-2</sup> at 79.43 Hz	Compliant
Y-Axis; from 0.65 to 3000 ms <sup>-2</sup> at 79.43 Hz	Compliant
Z-Axis; from 0.65 to 3000 ms <sup>-2</sup> at 79.43 Hz	Compliant
Level linearity Whole-body (Wd)	Conformity
X-Axis; from 0.10 to 105 ms <sup>-2</sup> at 15.85 Hz	Compliant
Y-Axis; from 0.1 to 110 ms <sup>-2</sup> at 15.85 Hz	Compliant
Level linearity Whole-body (Wd)	Conformity
Z-Axis; from 0.10 to 105 ms <sup>-2</sup> at 15.85 Hz	Compliant
Z <sup>2</sup> -Axis; from 0.6 to 3000 ms <sup>-2</sup> at 15.85 Hz	Compliant

**Frequency weighting response**

Calibration description	Nominal factor	Displayed factor	Expanded uncertainty (%)
Weighting aw – Channel X – Frequency 1.585 Hz	0.9707	1	0.59
Weighting aw – Channel Y – Frequency 1.585 Hz	0.9707	1.01	0.59
Weighting aw – Channel X – Frequency 6.31 Hz	0.3226	0.32	0.59
Weighting aw – Channel Y – Frequency 6.31 Hz	0.3226	0.33	0.59
Weighting aw – Channel X – Frequency 15.85 Hz	0.1266	0.13	0.59
Weighting aw – Channel Y – Frequency 15.85 Hz	0.1266	0.13	0.59
Weighting aw – Channel X – Frequency 79.43 Hz	0.0213	0.02	0.59
Weighting aw – Channel Y – Frequency 79.43 Hz	0.0213	0.02	0.59
Weighting aw – Channel X – Frequency 1.585 Hz	0.06314	0.0644	0.59
Weighting aw – Channel Y – Frequency 1.585 Hz	0.06314	0.0654	0.59
Weighting aw – Channel Z – Frequency 1.585 Hz	0.06314	0.0653	0.59
Weighting aw – Channel X – Frequency 3.981 Hz	0.3754	0.3797	0.59
Weighting aw – Channel Y – Frequency 3.981 Hz	0.3754	0.3788	0.59
Weighting aw – Channel Z – Frequency 3.981 Hz	0.3754	0.3788	0.59
Weighting aw – Channel X – Frequency 12.59 Hz	0.9576	0.9525	0.59
Weighting aw – Channel Y – Frequency 12.59 Hz	0.9576	0.962	0.59
Weighting aw – Channel Z – Frequency 12.59 Hz	0.9576	0.9575	0.59
Weighting aw – Channel X – Frequency 63.1 Hz	0.256	0.2544	0.59
Weighting aw – Channel Y – Frequency 63.1 Hz	0.256	0.257	0.59
Weighting aw – Channel Z – Frequency 63.1 Hz	0.256	0.2557	0.59
Weighting aw – Channel Z – Frequency 1.585 Hz	0.4935	0.51	0.59
Weighting aw – Channel Z – Frequency 6.31 Hz	1.054	1.07	0.59
Weighting aw – Channel Z – Frequency 15.85 Hz	0.7743	0.78	0.59
Weighting aw – Channel Z – Frequency 79.43 Hz	0.1339	0.13	0.59
Weighting aw – Channel Z <sup>2</sup> – Frequency 0.2512 Hz	0.1832	0.21	0.59
Weighting aw – Channel Z <sup>2</sup> – Frequency 1.995 Hz	0.5308	0.54	0.59
Weighting aw – Channel Z <sup>2</sup> – Frequency 15.85 Hz	0.7743	0.77	0.59
Weighting aw – Channel Z <sup>2</sup> – Frequency 31.62 Hz	0.4031	0.4	0.59

Frequency Weighting	Conformity
<b>Wd</b>	<b>Compliant</b>
<b>Wh</b>	<b>Compliant</b>
<b>Wk</b>	<b>Compliant</b>

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**Overload indicator**

Level test of overload trigger	Detected overload	Expended uncertainty (%)
Wh: Channel X (3500 ms <sup>-2</sup> F=79.43 Hz)	Yes	-
Wh: Channel X (3500 ms <sup>-2</sup> F=79.43 Hz)	Yes	-
Wh: Channel X (3500 ms <sup>-2</sup> F=79.43 Hz)	Yes	-
Wh: Channel X (125 ms <sup>-2</sup> F=15.85 Hz)	Yes	-
Wh: Channel X (125 ms <sup>-2</sup> F=15.85 Hz)	Yes	-
Wh: Channel X (125 ms <sup>-2</sup> F=15.85 Hz)	Yes	-
Wh: Channel X (3500 ms <sup>-2</sup> F=15.85 Hz)	Yes	-

Over Indicator	Conformity
Overload indicator on hand arm (Wh)	Compliant
Overload indicator on whole-body (Wd)	Compliant
Overload indicator on whole-body (Wk)	Compliant

**Calibration result**

Vib008	Conformity
The result of this checking is	Compliant

*End of the certificate of conformity and calibration*

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