



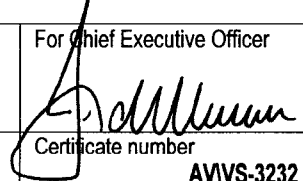
## Certificate of Calibration

<b>Calibration of:</b>	An Accelerometer
<b>Manufacturer:</b>	PCB
<b>Model number:</b>	393B31
<b>Serial number:</b>	11935
<b>Calibrated for:</b>	BUSINESS ENTERPRISES AT UNIVERSITY OF PRETORIA Pretoria
<b>Calibration procedure:</b>	AVVS-0006
<b>Period of calibration:</b>	19 June 2015

### 1 PROCEDURE

The accelerometer was calibrated using the back to back method (in compliance with ISO 16063-21) against a reference accelerometer. The results of the calibration are traceable to the relevant national measurement standards. The following equipment was used:

- 1.1 Laboratory Standard:**  
 PCB 301M19 Accelerometer (VS-WSTD-05)
- 1.2 Other Equipment:**  
 SPEKTRA CS18 Calibration System (VS-85)  
 APS 113 LF Exciter (VS-46)
- 1.3 Vibration Calibration Software**  
 Version number: 2.13.8.0
- 1.4 Mounting Conditions and Considerations**  
 Mounting Torque : Stud  
 Mounting Orientation : Vertical  
 Cable : Gentle bend supported on exciter  
 Reference Level : At the bottom of the accelerometer  
 $g$  : 9,807 m/s<sup>2</sup>

Calibrated by <b>M L Temba</b> Metrologist (Technical Signatory) 	Checked by <b>R Nel</b> Metrologist 	For Chief Executive Officer 
Date of Issue <b>22 June 2015</b>	Page 1 of 3	Certificate number <b>AVVS-3232</b>

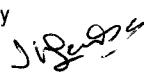

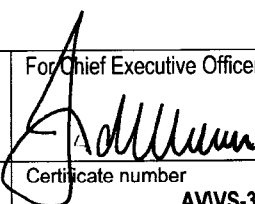
**2 RESULTS**

**2.1 Sensitivity**

The sensitivity of the accelerometer was found to be 965,1mV/(m/s<sup>2</sup>); (9,46 V/g) with an applied vibration level of 1,0 m/s<sup>2</sup><sub>(pk)</sub> at a reference frequency of 80 Hz. The uncertainty of measurement was found to be 1,0 %.

**2.2 Frequency response:**



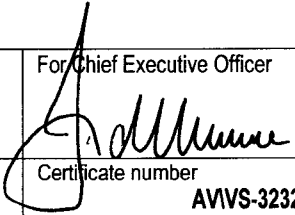
Nominal Frequency (Hz)	Acceleration (m/s <sup>2</sup> ) <sub>(pk)</sub>	Sensitivity (mV/(m/s <sup>2</sup> ))	Sensitivity (V/g)	Uncertainty (%)
3	0,5	963,6	9,45	1,5
4	0,5	961,8	9,43	1,5
5	0,5	960,2	9,42	1,5
6,3	0,5	958,9	9,40	1,5
8	0,5	958,6	9,40	1,5
10	1,0	956,7	9,38	1,0
12,5	1,0	956,7	9,38	1,0
16	1,0	957,0	9,39	1,0
20	1,0	959,1	9,41	1,0
25	1,9	951,7	9,33	1,0
31,5	2,0	944,9	9,27	1,0
40	2,0	949,6	9,31	1,0
50	2,0	951,5	9,33	1,0
63	2,0	955,3	9,37	1,0
80	2,0	955,1	9,37	1,0
100	3,0	957,0	9,39	1,0
125	3,0	981,2	9,62	1,0
160	3,0	984,4	9,65	1,0
200	3,0	944,8	9,27	1,0

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**3 REMARKS**

- 3.1 The reported uncertainties of measurement were calculated and expressed in accordance with the BIPM, IEC, ISO, IUPAP, OIML document entitled "A Guide to the Expression of Uncertainty in Measurement" (International Organisation for Standardisation, Geneva, Switzerland, 1993).
- 3.2 The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by a coverage factor of  $k = 2$ , which for a normal distribution approximates a level of confidence of 95,45 %.
- 3.3 Certain of the NMISA certificates are consistent with the capabilities that are included in Appendix C of the MRA (Mutual Recognition Arrangement) drawn up by the CIPM. Under the MRA, all participating institutes recognise the validity of each other's calibration and measurement certificates for the quantities and ranges and measurement uncertainties specified in Appendix C. For details see <http://www.bipm.org>.
- 3.4 The calibrations were carried out at an ambient temperature of  $23\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$  and a relative humidity of  $50\text{ \%RH} \pm 15\text{ \%RH}$ .

----- *end of certificate* -----

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