

## About Calibration

### Why Calibration is Important

Calibration is important to ensure the instrument is performing as it was designed to, and measures accurately the true ground vibration and air overpressure. The recommended interval for calibration of most measuring equipment including seismographs is one year. Across most of North America and many parts of Europe regulatory authorities actually require vibration monitors to be calibrated on an annual basis. This requirement has been or is being adopted by several other countries around the world and some specific projects even require that seismographs be calibrated every three or six months.

### What the Calibration Certificate Means

Should an authority question your vibration records, a Calibration Certificate is the document that provides proof of professional calibration. When your vibration monitor is calibrated at Instantel, a Calibration Certificate is issued. To ensure the validity of each calibration, the reference equipment used is also calibrated and is traceable to a nationally recognized standard, such as the National Institute of Standards and Technology (NIST) in the United States, or the National Research Council (NRC), in Canada. The calibration certificate also contains the

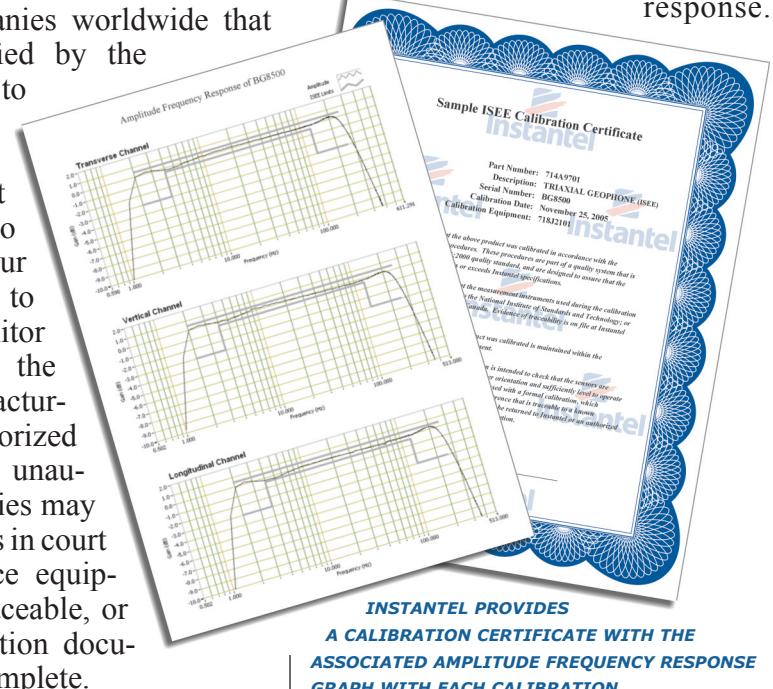
model, serial number, and date the instrument was calibrated, and who performed the calibration.

### Importance of Manufacturer Certified Calibration

Using a manufacturer certified facility ensures that proper procedures are followed when calibrating your vibration monitor. This removes any uncertainty associated with the reliability and measurement accuracy of your monitor, and ensures the integrity of the measured record if it is ever called up as evidence in a court of law. There are individuals and companies worldwide that are not certified by the manufacturer to perform vibration monitor calibration, yet continue to do so. It is in your best interest to have your monitor calibrated by the specific manufacturer or their authorized agents. Using unauthorized facilities may cause problems in court if the reference equipment is not traceable, or if the certification documents are incomplete.

### Instantel SensorCheck

The only purpose of the SensorCheck function on Instantel vibration monitors, is to ensure that the sensors have been connected and installed correctly. If a sensor was not level, or was upside down, the monitor would indicate a failed SensorCheck. The SensorCheck is NOT a calibration check and cannot replace the annual calibration process. SensorChecks do not compare the measured result against an external traceable reference sensor, nor does it test the entire electronic circuit that is integral to the sensors response.



# Calibration Guide

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## Calibration at the Instantel Factory

### 1 Measuring the "As Found" Condition

The "As Found" condition of each channel of a geophone is determined by attaching the sensor to a shake table and measuring the amplitude frequency response. Determining the condition of a linear microphone is a similar process, using a microphone calibration chamber. The "As Found" condition provides the customer information on how much out of calibration, if at all, the unit was when it arrived – this information is provided to the customer along with the calibration certificate.



COMPUTERIZED CALIBRATION SYSTEM

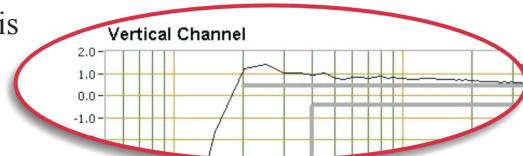
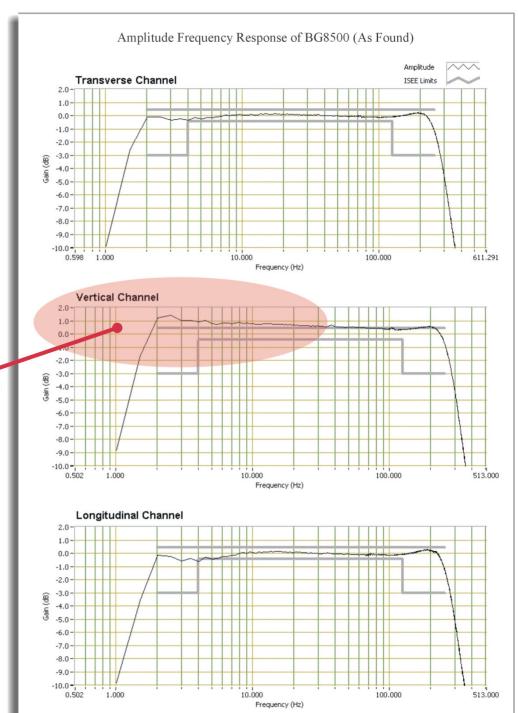


FIGURE 1:  
SAMPLE OF THE "AS FOUND"  
AMPLITUDE FREQUENCY  
RESPONSE MEASUREMENT  
OF AN ISEE GEOPHONE



### 2 Geophone Calibration Station

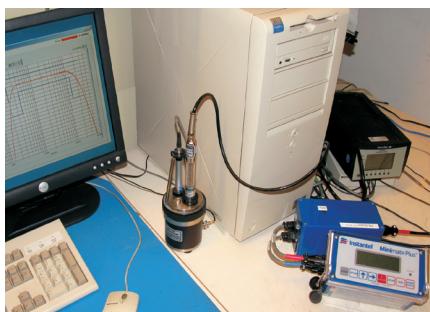
After the geophone is attached to the shake table and the "As Found" condition is determined, it is calibrated by adjusting the frequency response to meet either the ISEE or DIN standard.



GEOPHONE MOUNTED ON SHAKE TABLE  
WITH REFERENCE ACCELEROMETERS

### 3 Microphone Calibration Chamber

The linear microphone is inserted into the microphone calibration chamber, and the frequency response is adjusted.



MICROPHONE CALIBRATION CHAMBER

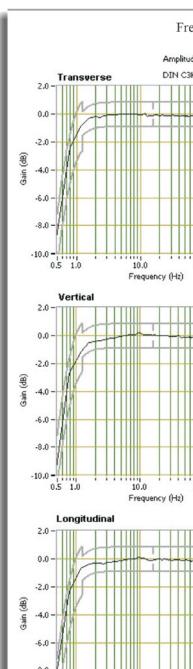


FIGURE 2:  
CALIBRATED ISEE (2-250Hz) GEOPHONE,  
FROM FIGURE 1

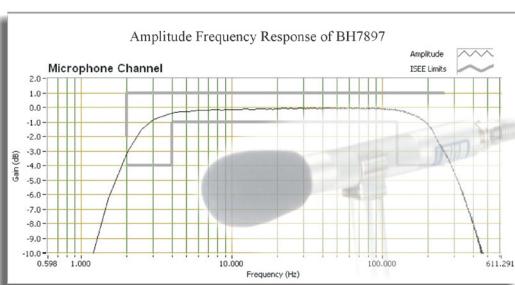
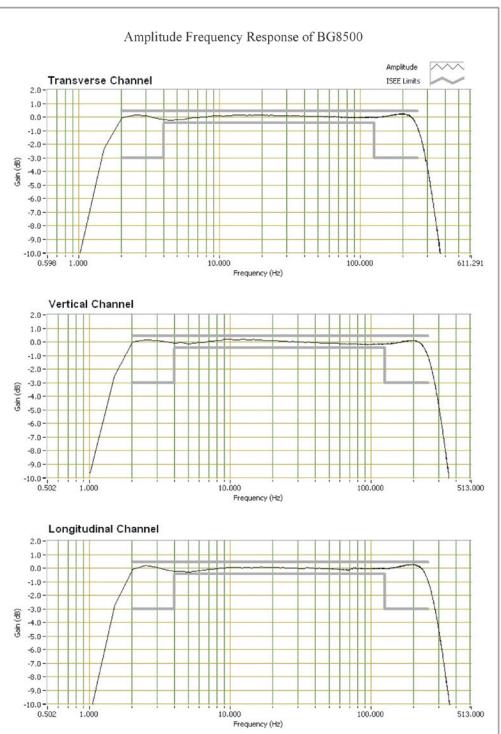


FIGURE 4:  
LINEAR MICROPHONE AMPLITUDE FREQUENCY RESPONSE

FIGURE 3:  
CALIBRATED DIN (1-315Hz) GEOPHONE AMPLITUDE  
FREQUENCY AND PHASE RESPONSE GRAPH

