

# PRODUCT DATA

## Brüel & Kjær Accelerometer Calibration UKAS Accredited Calibration

*Brüel & Kjær has been active in the calibration business for more than 25 years. Combined with the experience of the former Endevco UK calibration laboratory, we now form the absolute market leader in calibration of S & V transducers and instrumentation. Brüel & Kjær offers a comprehensive range of calibration services so that there will nearly always be a standard service which covers your needs.*

*Depending on the application, a vibration transducer may need a high-end accredited calibration, a factory standard calibration (FSC), or just a plain verification. Verification can, in many cases, be performed at the local Brüel & Kjær Service Centre.*

### USES

- Accelerometers
- Reference Accelerometers
- Shock Transducers

### FEATURES

- Maintain and prove traceability to PTB, DPLA, and NIST
- Compliance with standards
- Assists with fulfillment of ISO 900x requirements
- Customer defined calibrations



*The Brüel & Kjær/Endevco UK Service Centre*

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## Accredited Calibration

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The Brüel & Kjær Service Centre in the UK offers a full range of UKAS accredited calibration services (United Kingdom Accreditation Services, certificate No. 0151). The Service Centre offers accredited calibration for a comprehensive range of accelerometers, not only Endevco/Brüel & Kjær, but also from 3rd party vendors.

This accreditation means that the laboratory and its personnel meet the requirements of UKAS. The Calibration services are in accordance with the requirements of UKAS and EA (European Accreditation).

Due to multilateral agreements, these certificates will be accepted in all major European countries and in most countries outside of Europe.

This Product Data contains information on our comprehensive range of services, including Brüel & Kjær's secondary calibration, factory standard calibrations, and verifications. Information regarding primary calibration at the Danish Primary Laboratory of Acoustics is also included.

## Secondary Calibration Services Offered by Brüel & Kjær

**Fig. 1**  
Monitoring of High end automatic calibration system in the UKAS accredited Brüel & Kjær UK Calibration Centre



Secondary calibration is performed as a comparison calibration in accordance with ISO 5347-2, using highly advanced technology. On request, the complete measurement chain (consisting of transducer plus conditioning amplifier) can be calibrated in customer defined-settings.

Types	Frequency Range	Best Measurement Capability (b.m.c.)	Frequencies Used (Hz)
PE, PR, IEPE	20 Hz to 5 kHz	± 1%	20, 31.5, 40, 63, 80, 125, 160, 200, 315, etc.
PE, PR, IEPE	6.3 and 8 kHz	± 1.5%	6.3 and 8 kHz

Our recommended standard service is calibration in the 20 Hz to 5 kHz range. However, for a specific accelerometer, a somewhat higher b.m.c. might be stated than listed above.

As an additional service, we can offer calibration up to 10 kHz for most accelerometers. The b.m.c. is ±2%, although certain environmental factors may result in a higher uncertainty.

## Special Calibrations

### *Calibration at High Temperatures*

Calibration at customer-specified temperatures in the range -60 to +265°C. and the frequency range 20 Hz to 630 Hz. The b.m.c. is ±3%, and the calibration is under our UKAS accreditation.

### *Shock Calibration*

Shock calibration can be performed in the range 20g to 10000g. Although the calibration is currently outside our scope of accreditation, the results are traceable and fully documented. For further information contact your local Brüel & Kjær Service Centre.

### *Low-frequency Calibration*

An optional low-frequency calibration service in the range 1 to 20 Hz is available upon request. This service is under our UKAS accreditation.

### *Factory Standard Calibration*

In some cases it is most convenient to reproduce the same calibration as the one originally performed at the factory. This can be done for both Endevco and Brüel & Kjær transducers at headquarters in Denmark. Presently, these services are outside our scope of accreditation. The results are a Calibration Chart with the same content as the one which originally came with the new transducer.

*Calibration of Transducers with TEDS*

Calibration data for transducers with TEDS (Tranducer Electronic Data Sheet) can be updated with new sensitivity, calibration date, etc.

*Verification*

Verification is a non-accredited service, resulting in a verification report with individual information (sensitivity and frequency response) for the transducer. The main difference between verification and a 'real' calibration is that the verification does not state detailed uncertainty information.

Please ask your local Service Centre for information about their verification capabilities.

### Technical Data

Frequency range 10 Hz to 5 kHz

Traceability to DPLA

Typical uncertainty (estimated): 5%

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## Calibration, What and How Often?

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The calibration interval depends very much upon the application. However, an interval of 12 months has traditionally been used. New techniques, e.g., MRT (Mounted Resonance Test) or the use of a hand-held calibrator give even tighter control over measurements.

The calibration interval is, on the one hand, a balance between the consequences/cost of faulty measurements and the cost of calibration, and, on the other, the necessity to fulfil quality standards like ISO 900x/QS 900x.

*Which Transducers need Calibration?*

It might not be necessary to calibrate all transducers. In many cases, calibration can be limited to transducers that are used for measurements have a direct impact on the quality of a product or service delivered to a customer.

*What about new Transducers?*

Most new transducers come with an individual calibration chart, based on the Factory Standard Calibration. In most cases this is sufficient. However, there are some applications where the FSC must be supplemented with an accredited calibration. This is what we call 'initial calibration'. This additional accreditation will serve as another aid in satisfying your ISO 900x requirements. It also means that the transducer can be put into service from day one.

*What is Pre-calibration?*

Pre-calibration involves calibration of the transducer/instrument upon receipt and once more after any repair/adjustment is performed. This gives an unbroken record of the quality of your measurements. If no repair/adjustment is carried through then only one calibration is performed.

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## Ordering Information (secondary calibrations).

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Accelerometer Calibration	Instruments	Frequency	
		20 Hz to 5 kHz	6.3 kHz and 8 kHz
EE 5330	Piezoelectric Accelerometers	± 1%	± 1.5%

## Calibration of Reference Standard Accelerometers

DPLA can perform primary calibration of accelerometers using the laser interferometry method. DPLA is operated by Brüel & Kjær in cooperation with the Technical University of Denmark. The DPLA is accredited by DANAK, the Danish accreditation body. This is calibration at the highest international level and is intended for Reference Standard Accelerometers.

Examples of Brüel & Kjær and Endevco Reference transducers: Brüel & Kjær Type 3506 (including Type 8305), Endevco 2270. The calibration is in accordance with ISO 16063-11 (formally ISO 5347-1), using a Michelson type interferometer and a low-power HeNe laser.

## Specifications ET

### DPLA Capabilities

Measured Quantity/Measured Unit	Measured Range	Measurement Capability	Method Used
Vibration Sensitivity: $S_{v,a}^*$ (V/ms <sup>-2</sup> )	$\geq 4 \times 10^{-6}$ V/ms <sup>-2</sup> /2/6/98, 20 Hz to 5 kHz	$5 \times 10^{-3} \times S_v$	ISO 5347 Laser Interferometry HeNe Laser
Vibration Sensitivity: $S_{v,v}^*$ (V/ms <sup>-1</sup> )	$\geq 4 \times 10^{-3}$ V/ms <sup>-1</sup> , 20 Hz to 5 kHz	$5 \times 10^{-3} \times S_v$	
Vibration Sensitivity: $S_{v,d}^*$ (V/m)	$\geq 4$ V/m, 20 Hz to 5 kHz	$5 \times 10^{-3} \times S_v$	
Vibration Sensitivity: $S_{c,a}^\dagger$ (C/ms <sup>-2</sup> )	$\geq 1 \times 10^{-15}$ C/ms <sup>-2</sup> , 50 Hz to 5 kHz	$5 \times 10^{-3} \times S_c$	
Vibration Sensitivity: $S_{c,v}^\dagger$ (C/ms <sup>-1</sup> )	$\geq 1 \times 10^{-12}$ C/ms <sup>-1</sup> , 50 Hz to 5 kHz	$5 \times 10^{-3} \times S_c$	
Vibration Sensitivity: $S_{c,d}^\dagger$ (C/m)	$\geq 1 \times 10^{-9}$ C/m, 50 Hz to 5 kHz	$5 \times 10^{-3} \times S_c$	

\*.Voltage Output

†.Charge Output

## Ordering Information (primary calibrations)

Accelerometer Calibration	Instruments	Frequency/Level
ET 2000	Vibration Calibration Set Type 3506. Six gain settings and accelerometer charge sensitivity are calibrated. Includes instrument check	159.2 Hz/50 m/s <sup>-2</sup>
ET 2001	Standard Reference Accelerometer Type 8305. Includes accelerometer check	159.2 Hz/50 m/s <sup>-2</sup>
ET 2002	Vibration Calibration Set Type 3506 or similar. Six gain settings and accelerometer charge sensitivity are calibrated. Includes instrument check	Customer-defined
ET 2003	Standard Reference Accelerometer Type 8305 or similar. Includes accelerometer check	Customer-defined
ET 2004	Pre-calibration of Type 8305 or 3506	159.2 Hz/50 m/s <sup>-2</sup>
ET 2005	Additional calibration point for ET2002, ET 2003, ET2009 or ET2010	Customer-defined
ET 2007	Vibration Calibration Set Type 3506. Six gain settings and accelerometer charge sensitivity are calibrated. No instrument check	159.2 Hz/50 m/s <sup>-2</sup>
ET 2008	Standard Reference Accelerometer Type 8305 or 3506 in only one gain position. No instrument check	159.2 Hz/50 m/s <sup>-2</sup>
ET 2009	Vibration Calibration Set Type 3506 or similar. Six gain settings and accelerometer charge sensitivity are calibrated. No instrument check	Customer-defined
ET 2010	Standard Reference Accelerometer Type 8305 or similar. No accelerometer check	Customer-defined

Brüel & Kjær reserves the right to change specifications and accessories without notice.