SOUND LEVEL METERS
AND VIBRATION METERS

Brüel & Kjær

BEYOND MEASURE

INTRODUCTION

Innovative Solutions

At Brüel & Kjær we have always set standards – from the first range of measurement microphones to the first transistorized and hand-held sound level meter, the first real-time acoustic holography system and the first battery-powered sound intensity analyzer. These technical developments have been driven by close collaboration with our customers. We focus on our customers' needs to supply the whole measurement chain – from a single transducer to complete turnkey systems. We maintain alliances with suppliers that enable us to deliver newer and more efficient ways for our customers to improve their products' quality and stay competitive. Technology has no limits – if our customers can imagine it, we will strive to develop it.

Top Quality

In all aspects of sound and vibration there are challenges to be met. For example, ensuring that the car, bus or train for your daily commute can withstand the mechanical shocks it will experience demands measurements of great accuracy and precision. This requires instruments with the performance and quality to match.

All our products are thoroughly tested, often in the harshest environmental conditions. Extremely high standards are met in all aspects of product and service provision, as reflected in our status as an ISO 9001 certified company. Thanks to their reliability, quality and robustness, our products usually come with a service period of at least 5 years after the end of production. This ensures that customer needs continue to be met. The same concept applies to legislation. This often means documented results that are traceable to established references, such as a national calibration laboratory. Brüel & Kjær service centres offer all the support required.

Training Courses

Educating and training customers is part of the Brüel & Kjær tradition. We focus on educating and equipping our course participants with the necessary sound and vibration knowledge and skills. Our global educational programme offers modular courses and training that cover theory, applications and instrumentation.
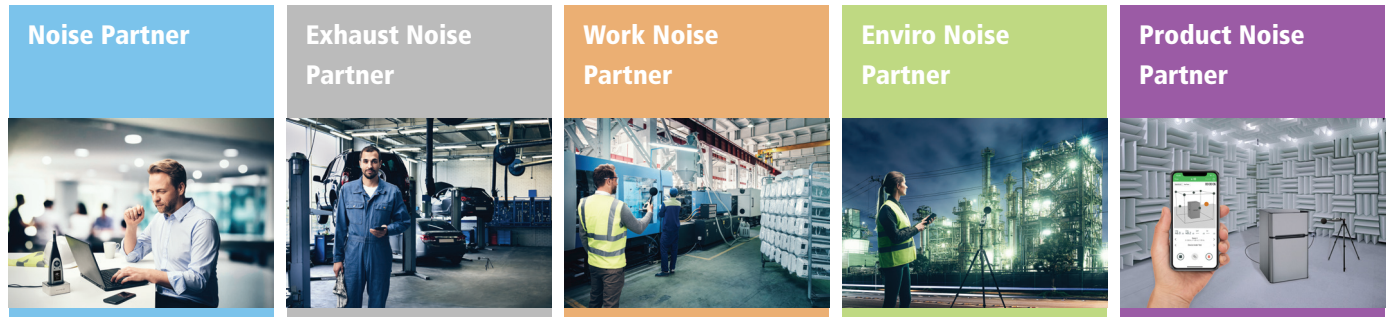
WE OFFER:

– Training courses at locations near the customer
– Experienced instructors from our company
– Latest high-quality training material
– In-house courses for larger numbers of participants

CONTENTS

SOUND LEVEL METER
B&K 2245

These easy-to-use sound level meters are designed to be focused tools for your specific jobs to do. They are easy-to-use point solutions for tasks that could otherwise be complicated and time-consuming. The ease of use is derived by targeted functionality and an app-based interface controlled remotely via a mobile phone or other smart device.

Uses

- Noise complaint investigations
- Environmental noise assessments
- Occupational noise exposure assessments
- Product noise level testing
- Stationary exhaust noise testing
- General purpose class 1 sound level measurements

Features

All variants of B&K 2245 include:

- Bright, easy-to-read colour display
- Robust, IP 55 body with rubberized grips
- Comfortable and secure single-handed operation
- Large, single measurement range from a typical noise floor of 15.8 dB(A) to over 140 dB
- Integrated Bluetooth® and Wi-Fi
- GPS for time and location
- 16 GB internal flash storage for measurement and annotation data
- Includes hard-shell carrying case with foam inlay

FAST, EASY AND PROBLEM-FREE:
TASK DONE – JOB DONE!

DESIGNED FOR YOUR JOB

B&K 2245 Sound Level Meter introduces a wealth of easy-to-use functionality through its range of specially created mobile apps, each tailored to assist a specific job-to-do. Each device can be licenced for more than one app, so switching tasks is as easy as switching apps.

SOUND LEVEL METER
B&K 2245

Noise Partner	Exhaust Noise Partner	Work Noise Partner	Enviro Noise Partner	Product Noise Partner

B&K 2245 with Noise Partner	A general-purpose broadband integrating sound level meter, with wireless remote control and annotation functionality using the included mobile app. • Two simultaneous broadband frequency weightings (A, B, C or Z) – L_{eq}, L_{peak}, L_{max}, L_{min}, L_{Aleq}
B&K 2245 with Exhaust Noise Partner	A targeted solution measuring just the parameters needed for stationary exhaust noise testing, minimizing any chance for error. • A-weighted broadband RMS measurements – L_{AFmax}, L_{AFmin}, L_{ASmax}, L_{ASmin}

B&K 2245 with Work Noise Partner	Everything you need to measure and assess occupational noise exposure. Remotely control B&K 2245, annotate measurements, and calculate full-day noise exposure easily with the included mobile app. Perform further analysis, and create reports, using the included PC app.
	• Two simultaneous broadband frequency weightings (A, B, C or Z)
	    – L_{eq}, L_{peak}, L_{max}, L_{min}, L_{Aleq}, $L_{E(SEL)}$, L_{avS4}, L_{avS5}
	• Broadband statistics based on L_{AS}, L_{AF} or L_{Aeq}
	• 1/1- or 1/3-octave band frequency analysis L_{eq}
	• Time-history logging (1, 5, 10, 30, 60 second intervals)
	    – All broadband and spectrum parameters
	• Audio recording (MP3)

B&K 2245 with Enviro Noise Partner	A powerful solution for environmental noise surveys, with frequency analysis, time-history logging and audio recording all included. Ensure procedures are followed with checklists and isolate sounds using markers.
	• Two simultaneous broadband frequency weightings (A, B, C or Z)
	    – L_{eq}, L_{peak}, L_{max}, L_{min}, L_{Aleq}, $L_{E(SEL)}$, L_{AFTeq}
	• Broadband statistics based on L_{AS}, L_{AF} or L_{Aeq}
	• 1/1- or 1/3-octave band frequency analysis L_{eq}, L_{max}, L_{min}
	• Time-history logging (1, 5, 10, 30, 60 second intervals)
	    – All broadband and spectrum parameters
	• Audio recording (MP3)

B&K 2245 with Product Noise Partner	A complete solution for determining sound power according to international standards. Includes a guided test process, wireless data transfer, instant analysis and results, smart data handling on your PC, and more. • Two simultaneous broadband frequency weightings (A, B, C or Z) – L_{eq}, L_{peak}, L_{max}, L_{min}, L_{Aleq}, $L_{E(SEL)}$ • Broadband statistics based on L_{AS}, L_{AF} or L_{Aeq} • 1/1- or 1/3-octave bands frequency analysis L_{eq}, L_{max} and L_{min}

HAND-HELD ANALYZERS – SOUND & VIBRATION
TYPE 2250, TYPE 2270 AND TYPE 2250 LIGHT

TYPE 2250

Our most powerful and flexible single-channel hand-held analyzer. Type 2250's capabilities can be easily extended with optional software modules and Brüel & Kjær's extensive range of microphones and accelerometers. From environmental noise to building acoustics, building vibration measurements to FFT analysis, Type 2250 has your needs covered.

Uses

- Advanced environmental, occupational and product noise assessments
- Room and building acoustics measurements
- Quality control measurements
- Harmonic distortion measurements
- Hand-held vibration measurements* (see page 10 vibration meters)
- General purpose class 1 sound level measurements

Features

- Type approved class 1 sound level meter
- > 120 dB dynamic range (without range switching)
- Bright, easy-to-read colour display
- Touch screen operation
- Context-sensitive built-in help
- Built-in USB and LAN interfaces
- Support for GPS and weather station accessories
- 1/1- or 1/3-octave band frequency analysis
- Time-history logging with markers*
- Analysis quality signal recording*
- FFT analysis with tolerance windows*
- FFT-based tonality assessment*
- Reverberation time measurements*
- Building acoustics measurements (airborne, impact and façade sound insulation)*
- Infrasound measurements with Type 4964*
- Remote monitoring and control via modem and Internet

*With optional module

TYPE 2270

The power and flexibility of Type 2250 multiplied by two, Type 2270 is our flagship hand-held analyzer. Two microphones, two accelerometers, or one of each – Type 2270 offers all the functionality of Type 2250 on two simultaneous channels in all applications except FFT. With tight phase-matching between channels, Type 2270 can also be configured as a hand-held sound intensity analyzer (see page 11)
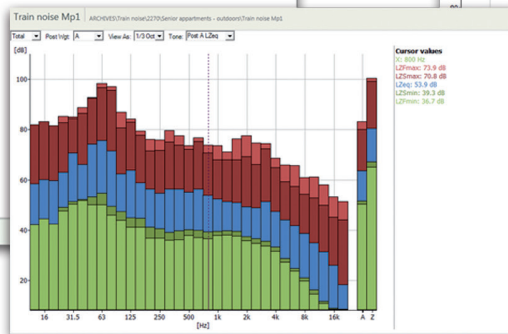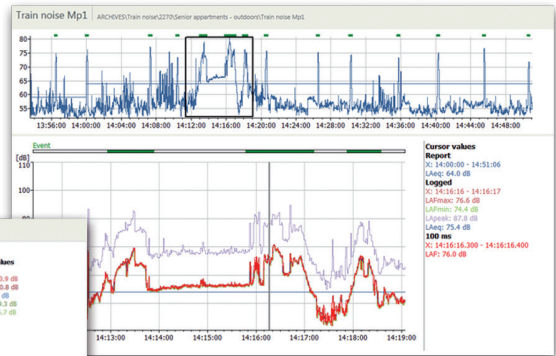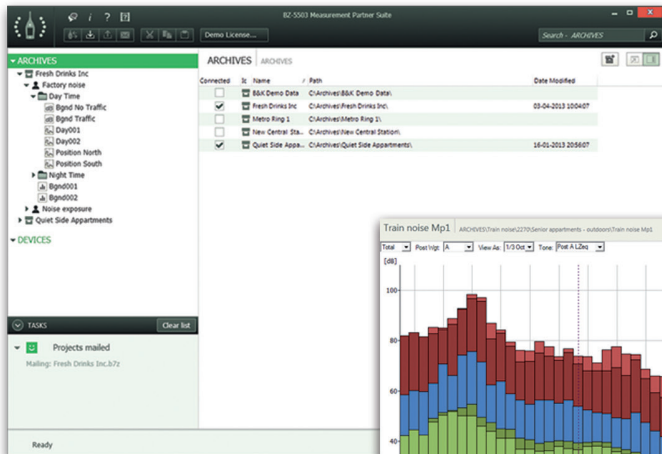
Additional uses

- Two-channel sound and vibration measurements
- Sound intensity measurements for sound power determination and noise source identification

Additional features

- Simultaneous sound and vibration measurement
- 2-channel 1/1- or 1/3-octave band frequency analysis
- 2-channel time-history logging with markers*
- 2-channel analysis quality signal recording*
- 2-channel building acoustics measurements* (see page 8 building acoustics)
- Sound intensity measurements* (see page 11 intensity analyzers)
- Built-in camera for measurement annotations

*With optional module

MEASUREMENT PARTNER SUITE

Measurement Partner Suite BZ-5503 is Brüel & Kjær's state-of-the-art, post-processing software for Hand-held Analyzer Types 2250, 2270 and 2250 Light. It offers a free basic configuration with generous features, and licenced options for post-processing that reduce the need to export your data to other programmes.

Uses
- PC software for Hand-held Analyzer Type 2250, 2250-L or 2270
- Archiving and sharing of data
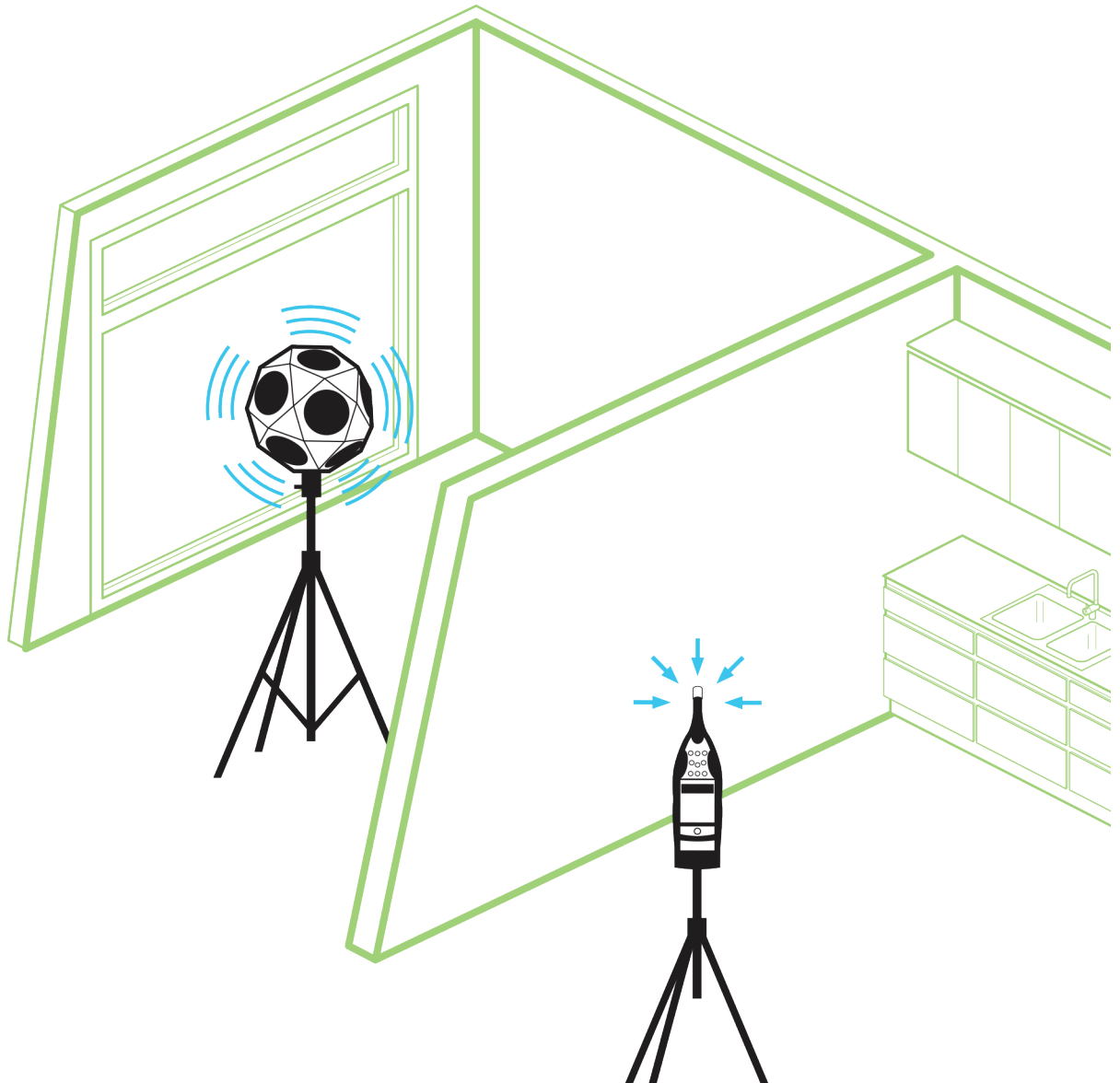- Post-processing of measurement data

Features (included):
- Download of data from the analyzer using USB cable or LAN network
- Viewing, analysis and archiving of data from the analyzer
- Export of data to other applications such as Microsoft® Excel®
- Remote control and viewing of the analyzer
- Playback of signal recordings

Licenced features:
- Marker wizard for marking of logging profiles
- Tone assessment (1/3-octave, or FFT based)
- Spectrum calculator including post-weighting of spectra and FFT to 1/3-octave conversion
- Dedicated support of selected local legislation (BS-4142, TA Lärm, Emergence)

TYPE 2250 LIGHT

A simpler hand-held analyzer based on Type 2250; ideal for environmental, occupational and product noise measurements.

Features
- Type approved class 1 sound level meter
- > 120 dB dynamic range (without range switching)
- Bright, easy-to-read colour display
- Touch screen operation
- Context-sensitive built-in help
- Built-in USB and LAN interfaces
- Support for GPS and weather station accessories
- 1/1- or 1/3-octave band frequency analysis*
- Time-history logging with markers*
- Analysis quality signal recording*

*With optional module

ARHITECTURAL ACOUSTICS MEASUREMENTS
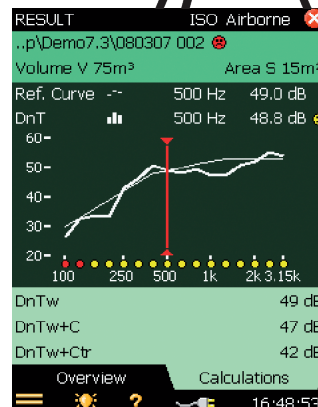## TYPE 2250 AND TYPE 2270 WITH BZ-7228

Uses
- Airborne sound insulation measurement
- Façade sound insulation measurement
- Impact sound insulation measurement
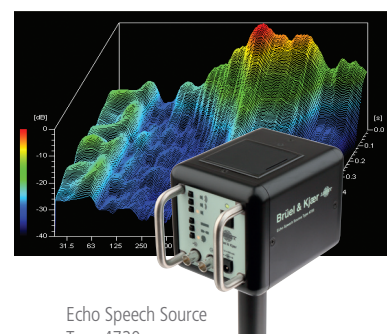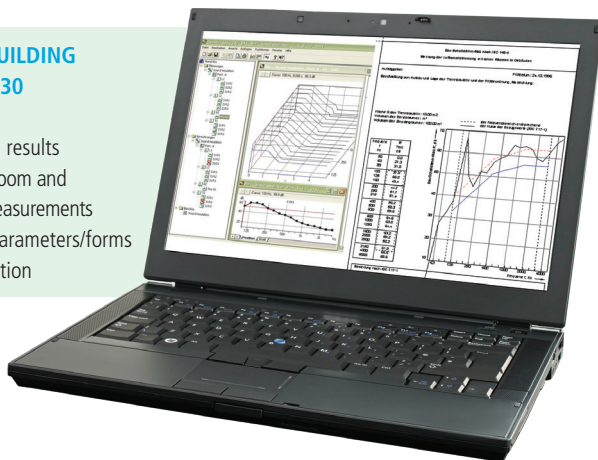- Reverberation time measurement

Features
- Complete hand-held building acoustics solution
- Calculates final results on the spot to verify measurement before leaving
- Indicators of measurement quality
- Impulse and Interrupted Noise methods with built-in noise generator
- Dual-channel measurements (Type 2270)
- Complete systems available, including airborne and impact sound sources

ARCHITECTURAL ACOUSTICS ACCESSORIES
AND SOFTWARE

QUALIFIER™ FOR BUILDING ACOUSTICS TYPE 7830

- Reporting measured results
- Detailed analysis of room and building acoustics measurements
- Building acoustics parameters/forms calculation presentation

Echo Speech Source Type 4720

OMNIPOWER™ SOUND SOURCE TYPE 4292-L

Uses

- Sound source for building and room acoustics

Features

- Part of a complete building acoustics system
- Optimized frequency response
- Omnidirectional
- Lightweight (8 kg)
- Carrying bag and tripod included
- Optional robust flight case
- Complies with national and international standards
- Max. sound power 122 dB re 1 pW (100 – 3150 Hz)

TAPPING MACHINE TYPE 3207

Uses

- Impact sound measurements

Features

- Type approved
- Complies with national and international standards
- Optional battery power for use on building sites
- Easily portable and lightweight
- Low inherent noise for precise impact noise measurement

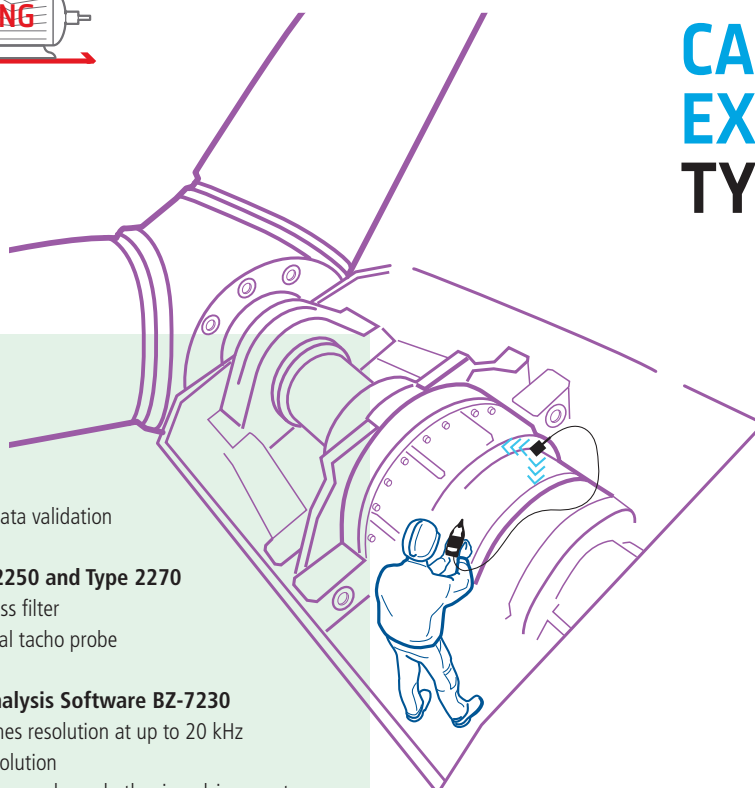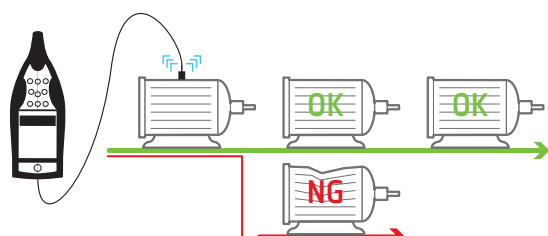### POWER AMPLIFIER WITH NOISE GENERATOR TYPE 2734-A/B

Uses

- Powers sound sources, such as 12-speaker OmniPower Type 4292-L

Features

- Lightweight and small (<7 kg)
- Class D amplifier with output power up to 500 W
- Manual or wireless remote control from Hand-held Analyzer Types 2250, 2270 and 2260
- Built into robust flight case
- Built-in noise generator (pink, white)
- Optimized frequency responses
- Two versions
  – 2734-A – standard
  – 2734-B – wireless signal transmission

DIRAC SOFTWARE FOR ROOM ACOUSTICS TYPE 7841

Uses

- PC Software for measuring room acoustical parameters according to ISO 3382 in:
  – Performance spaces
  – Ordinary rooms
  – Open plan offices
- Objective speech intelligibility rating to IEC 60268,16: STI, RASTI, STIPA,STITEL

Features

- Use your sound level meter as a front end
- Impulsive excitation (balloon, pistol)
- Sine sweep or MLS excitation
- Easy to operate
- Calibrated source (Type 4720) available for speech intelligibility
- Wireless operation with Type 4720
- Asynchronous (open-loop) measurements
- Source sound files included
- Auralization in any room
- Can measure very short reverberation times

VIBRATION ANALYZER
TYPE 2250 AND TYPE 2270
WITH BZ-7230 AND BZ-7234

CALIBRATION EXCITER
TYPE 4294

Uses
- Troubleshooting on machines
- Product development
- Production quality control
- Building vibration analysis
- Field recording with real-time data validation

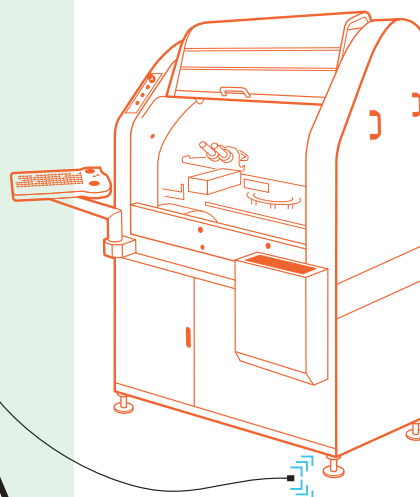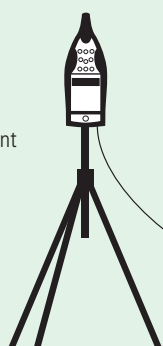**Features standard with Type 2250 and Type 2270**
- Crest factor with 1 kHz high-pass filter
- RPM measurement from external tacho probe

Features with optional FFT Analysis Software BZ-7230
- FFT analysis with up to 6400 lines resolution at up to 20 kHz
- Zoom analysis for increased resolution
- FFT on signal trigger to capture squeaks and other impulsive events
- Correct unit scaling for any task
  – Unit scaling (RMS, Pwr, PSD, ESD, Peak, P-P)
- Relate vibration or noise back to rotating components with simultaneous measurement of RPM with optional tacho probe
  – Harmonic and delta cursors help to identify rotational and mesh frequencies
- Tolerance windows with check against preset limits
- Capture transient events with signal level triggers, including pre-trigger

Features with optional Enhanced Vibration and Low Frequency Option BZ-7234
- Time domain integration to velocity and displacement
- RMS and true peak in acceleration, velocity and displacement
- Peak-to-peak in displacement
- 1/3-octave spectra in acceleration or velocity
- Standardized human vibration weighting filters and useful machinery test band limiting filters

Uses
- Quick, easy field calibration of vibration measurement and recording systems

Features
- Small, lightweight, and battery-driven
- Leather case for impact protection
- Designed for everyday use in harsh environments
- Acceleration, velocity and displacement calibration
- High-precision, crystal-controlled servo operating at 159.15 Hz (1000 rad s–1)
- Drop- and environment-tested according to IEC 60068
- Splash-proof according to IP 54 (IEC 60529)

SOUND INTENSITY SYSTEM
TYPE 2270-S WITH BZ-7233
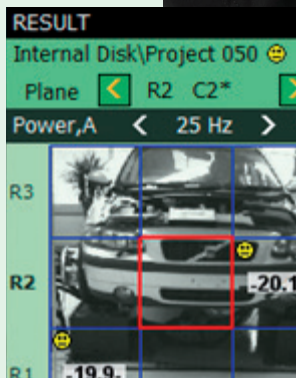

SOUND INTENSITY CALIBRATOR
TYPE 4297

Uses
- Hand-held system for in situ sound power determination without the need for expensive acoustic chambers
- Source location and mapping
- Building acoustics (for example, to measure flanking transmision)

Component parts
- Hand-held Sound Level Analyzer Type 2270-S
- Sound Intensity Software BZ-7233
- Intensity Probe Kit Type 3654
- Mapping Software Type 7752

Features
- The only hand-held system with on-board mapping
- Easy to use: Choose a probe, calibrate, measure
- No need for recalibration at the factory
- Cost-effective

Uses
- Measurement and verification of pressure-residual intensity index
- Phase matching of the sound intensity system to enhance the dynamic capability
  - For measurements in challenging acoustic environments
- Simultaneous sound pressure calibration of both input channels at 251.2 Hz (Class 1 IEC 60942)

Features
- No need to dismantle the probe for calibration
- Optimized for use with Hand-held Analyzer Type 2270-S
- A complete sound and sound-intensity calibrator in one unit
- Automatic adjustment of sound pressure for variations in atmospheric pressure
- Built-in broadband sound source for pressure-residual intensity index measurements to fulfil standards

NOISE DOSE METER
TYPE 4448

Uses
- Noise surveys in the workplace
- Evaluation of personal noise exposure
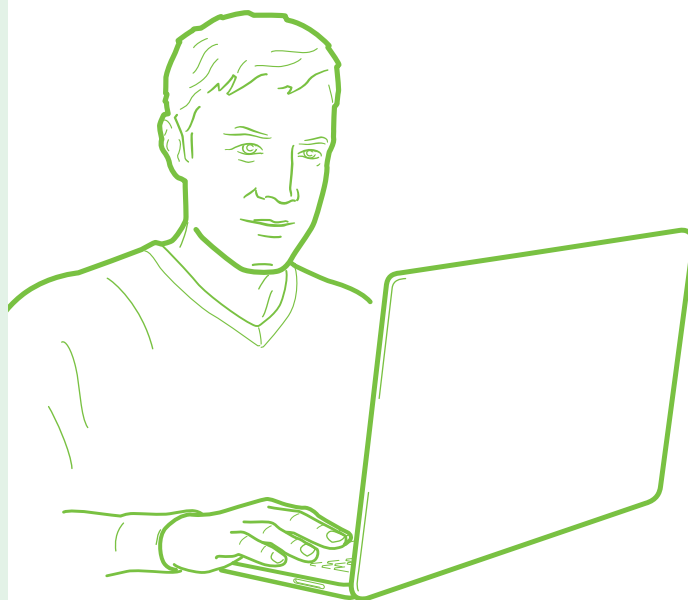- Logging noise profiles (180 hours with 1 minute logging period)

Features
- Easy to operate
- Easy to mount with compliance to standards
- Measurement range 65 – 140 dB (RMS)
- Battery with 28-hour operating time
- Preset measurement time capability
- Direct read-out of results
- Post-processing in Protector™ Type 7825 included
- Rugged design
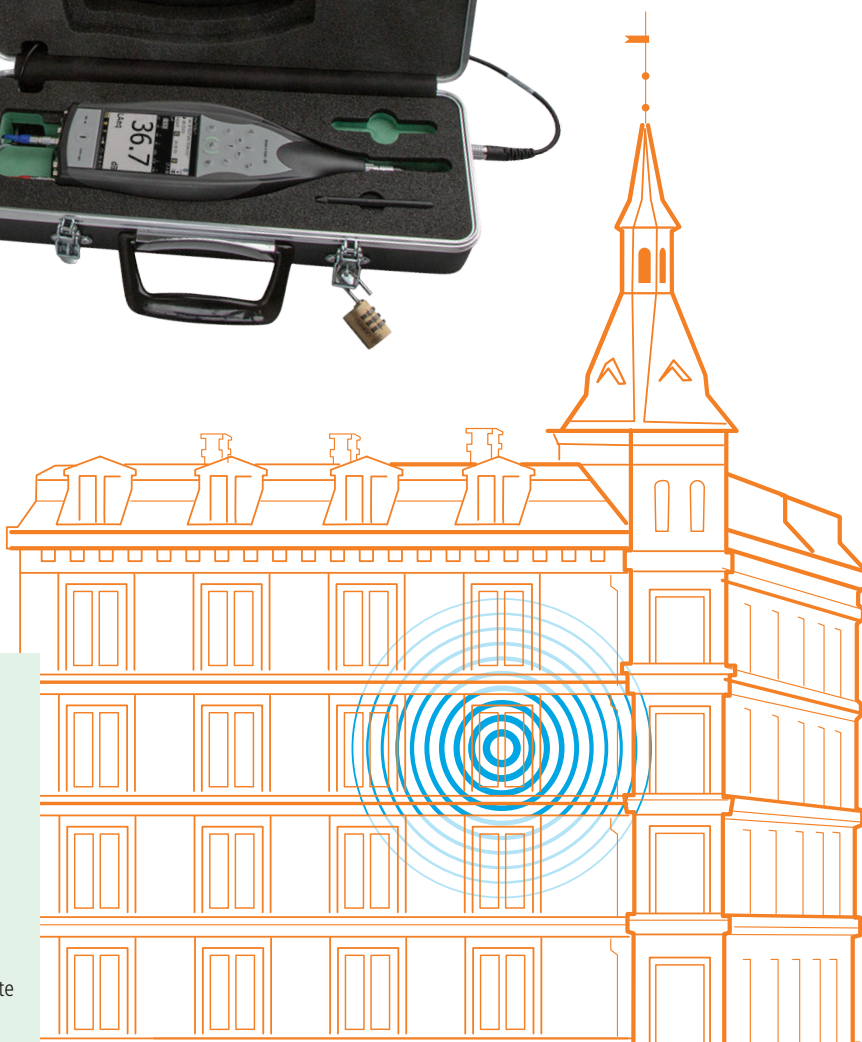- Lightweight
- Intrinsically safe model available

WORK NOISE PARTNER SOFTWARE

- Calculate working day noise exposures using measurement data to regional and international standards
- Identify high-exposure tasks and jobs, and select hearing protection to reduce exposure
- Import and work with measurement data from Type 4448 and sound level meter B&K 2245 in the same project
- Copy and paste measurement data and results to other applications such as Microsoft® Word
- Easily create presentation quality reports and export raw measurement data to Excel®

MATRON 4 NOISE NUISANCE RECORDER
TYPE 3668

Uses

- General indoor noise logging tasks
- Domestic noise assessments

Features

- Simple, preconfigured, ready-to-use MATRON 4 measurement template
- Lockable case
- 2 GB industrial quality SD card
- Power supply via mains (battery optional)
- Full analysis capability in Measurement Partner Suite
- Discreet transportation bag

ACCESSORIES

SOUND CALIBRATOR
TYPE 4231

Uses

- Calibration of sound level meters and other sound measurement equipment

Features

- Conforms to EN/IEC 60942 (2003) Class LS and Class 1 and ANSI S1.40 – 1984
- Highly stable level, built-in reference microphone
- Two calibration levels (94 and 114 dB, 1000 Hz)
- Simple operation
- Robust
- Type approved and verifiable
- Switches off automatically when removed from the microphone

WEATHER STATION KITS
MM-0316-A AND MM-0256-A

Uses

- Weather measurements with Types 2250, 2270 and 2250-L
- MM-0316-A
  - Log wind speed and direction, and show avg., max. and min. values
- MM-0256-A
  - Log wind speed and direction, and show avg., max. and min. values
  - Log pressure, temperature, humidity and rainfall

Features

- Portable lightweight kit including all necessary accessories
- Fully integrated solution – weather data collected on instrument and post-processed in Measurement Partner Suite
- Ultrasound wind measurement – no moving parts
- Low wind speed starting threshold (nearly 0 m/s)
- Maintenance free
- No need for calibration
- Low power consumption
- Silent operation

ALL-WEATHER CASE
TYPE 3535-A

Uses

- Unattended outdoor measurements of up to 3 days
- Measurements for area planning, noise control, complaint investigation, venue licencing

Features

- Weather protection to IP 43
- Easy to carry and transport
- Tamper protection
- Hot swap of batteries
- Flexible power options
- Supports simultaneous noise and weather data measurement

OUTDOOR MICROPHONES

TYPE 4952/TYPE 4952-A

Uses

- Sound measurements in all weather conditions

Features

- Class 1 microphone according to EN 61672 – 1
- Type approved and verifiable in connection with Hand-held Analyzer Types 2250-L, 2250 or 2270
- Innovative bird spike
- Charge Injection Calibration (CIC) for verification at remote sites
- Selectable reference sound incidence direction (0° or 90°)
- Easy acoustical calibration and maintenance
- No heating necessary
- Highly stable Falcon Range™ microphone and preamplifier
- Measurement range 25 to 140 dB(A)
- Type 4952-A includes Tripod Adaptor UA-1707

TYPE 4198/UA-1404

Uses

- Weatherproof sound measurements
- Unattended noise measurements

Features

- IEC 61672 Class 1 Type approved and verifiable in connection with Hand-held Analyzer Types 2250-L, 2250 or 2270
- Protected against rain, wind and birds
- Easily combined with standard sound level meters
- No heating necessary
- Economical – microphone and preamplifier of the existing sound level meter are used

SERVICE AND CALIBRATION

Protect your investment with our OEM calibration and maintenance services.

- Initial calibration of new equipment and re-calibration service compliant with international standards
- Legal verification for environmental legislation
- Calibration reminder service
- Free update of firmware (on request) and internal batteries with calibration
- Repair during calibration service, avoiding unnecessary delays from re-calibration
- Attractive Calibration Plus service contract offering:
  - Discount on multi-year contracts
  - Complimentary extended warranty
  - Discount on accessories and rental of equipment
  - Option for upfront replacement – with refurbished products – as an alternative to repair.

We have local Service Centres in many countries ensuring fast turnaround times and supporting local regulations.

TRAINING

We offer a comprehensive range of webinars, courses and seminars – including customized training to meet your specific business needs

We invite you to take a closer look at
www.bksv.com/training

Explore some of the ways Brüel & Kjær can help you attain the right balance between noise and vibration and the surrounding environment:
www.bksv.com/env

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Brüel & Kjær

BEYOND MEASURE