is part of UK-based Spectris plc, a specialist process technology company that focuses on industrial electronic, process instrumentation and filtration systems.

Since 1942, Brüel & Kjær, with its Headquarters in Denmark, has been the industry pioneer and leading innovator in sound and vibration measurement, offering a full range of hardware and software products covering almost every application in the field. With a 1000 employees, more than 90 sales offices or local agents in 55 countries, and eight accredited calibration centres worldwide, Brüel & Kjær provides immediate customer support.

Brüel & Kjær calibration is accredited by DANAK, the Danish Accreditation body controlled by the National Agency of Industry and Trade, thus fulfilling the requirements of ISO and other standards. In addition, Brüel & Kjær Denmark has been appointed the Danish Primary Reference Laboratory for vibration and acoustical parameters by the Danish government.

The key to our success is the combination of our innovative and talented employees and effective knowledge management. We set ambitious goals and meet our commitments and maintain our high standards through dedicated teamwork and effective delegation of responsibility.

Brüel & Kjær is an ISO9001 certified company, and houses over 100 engineers involved in research and development. A considerable part of our sales profits is re-invested in new R&D projects, keeping us at the forefront of technological development.

Continuous Dialogue
We understand that ours is not just a manufacturing but a service business. Our commitment does not end when you buy a product from us. We value your custom and feedback and feel responsible for keeping you up-to-date and up and running!

Software Maintenance Agreement: As manufacturers of PC-based measurement systems, we know that software is of prime importance. As a result, we are continuously improving our software and including these improvements in new releases.

Service: Our products come with a service period of at least 5 years after the end of production, such is their reliability, quality and robustness. Our Service Centres around the world are staffed by highly skilled technicians who have the ability and expertise to help you whenever a problem occurs.

Calibration: Increasing focus on quality standards such as ISO 9001 has forced a strong market demand for calibration and test services. We offer a comprehensive range of calibration services at our eight, professionally staffed, accredited calibration laboratories around the world. Our calibration procedures are developed by experienced engineers with extensive knowledge of Brüel & Kjær products. The resulting services guarantee fast and efficient calibration that is traceable to national and international standards. We also have the expertise to calibrate not only Brüel & Kjær equipment, but also instruments and transducers from other vendors.

Support: Our commitment to you also includes on-site installation, customer specific on-site training based on your particular application, and access to our Hotline where all your queries are dealt with. One of our most valuable assets is the knowledge and expertise provided by our staff. This allows us to offer a customer support philosophy that mirrors our total solution product strategy with development and support function to cover every link in the support chain.
Back to the Beginning

Our Mission is to help our customers improve the quality of sound and vibration and human comfort. In this way, we enhance the environment, the quality and the joy of life.

Our Vision is to be the preferred partner and solution provider to all leading companies and institutions who care about sound and vibration, and be the global competence centre for sound and vibration.

It all started back in the early 1940s, when two enterprising young Danish engineers, Per V. Brüel and Viggo Kjær, laid the foundation for a company that would not only come to lead the world in precision instrumentation for acoustics and vibration measurement, but indeed would play a very major role in the development of acoustics and vibration sciences themselves.

Since the beginning we have been in the business of innovation from the Heterodyne Analyzer to the first Multi-Analyzer and the first Non-stationary STSF system. We are proud of this tradition and continue to develop and face the challenges posed to us by our customers. Keeping the momentum of innovation going is a challenge. Our success in this area is a combination of our R&D team’s successful efforts in keeping abreast of the latest technology, and our working closely with customers and partners in research projects that develop new technologies and models to improve the quality of sound and vibration.

We are part of the Sound Quality Research Unit (SQRU) and study the way sound is perceived by the human brain and how this knowledge can be used to improve the environment and quality of products. We’re also working alongside major global automotive suppliers and European aerospace companies, in projects such as the EU Silencer project to reduce jet engine noise levels.

By actively getting involved, and broadening our own outlook, knowledge and understanding, we strive to remain our customers’ preferred partner and contribute in the way we know best to improving the quality of life.

Our ever growing Analyzer PULSE PLATFORM was designed back in 1996 and today more than 6000 units have been sold worldwide PULSE™, developed as an advanced solution for sound and vibration measurement, is the analyzer platform of the future. With its vast range of software applications and hardware configurations, PULSE is today the most popular analyzer solution in the world.

Real-time
The real-time capability of PULSE means that there is the closest possible link between cause and effect. You see your analysis results instantaneously on-screen as they are measured, thus enabling you to validate your data immediately.

Multi-analysis
The multi-analysis side of PULSE means that you can perform FFT, 1/n-octave (CPB), order, and overall analyses simultaneously on the same or different channels/signals while displaying real-time results on screen.

PC-based – Your PC is Your Analyzer!
PULSE gives you the freedom to make measurements in the field and process your data wherever you want. PULSE makes your PC your personal analyzer by leveraging rapidly growing PC-processor performance for real-time signal processing.

Solid Foundation
PULSE’s flexibility, combined with industry-specific solutions, has made PULSE the best-selling analyzer platform in a wide range of industries, including:
- Automotive
- Electroacoustics and Telecommunications
- Aerospace & Defence
- Consumer Products

PULSE Dyn-X Technology
Based on state-of-the-art, new technology, and with a useful analysis capacity exceeding 160 dB in one range, Brüel & Kjær introduces a new, revolutionary set of input modules. These will not only save you time and work, but will also allow you to make measurements not previously possible. Gone are the days of trial runs, overloads and under range situations. Gone are the days of repeating measurements, and setting input ranges. This new range of modules covers all signal levels from 0 to 10 V in one range – and there are no technical drawbacks. In fact, with these new modules all you have to worry about is choosing the right transducer.
PULSE Source Path Contribution

In today’s competitive automotive industry, it is crucial to quickly and accurately evaluate noise and vibration perceived by vehicle occupants. Today, based on customers’ expectations, automotive engineers are taking NVH investigations from concept to actual development. The PULSE Source Path Contribution system, a Multiple Model Management system, helps automotive engineers and managers improve the engineering decision process and allows parallel evaluation of design alternatives and product variants, throughout the vehicle development process.

Source Path Contribution Type 7798 is a complete solution, supporting dedicated transducers for operational and body characteristic measurements, instrumentation and signal processing platforms, contribution analysis and target management.

It provides NVH automotive engineers with a tool to understand how noise and vibration is transmitted through different paths in and around an automobile and rank any contribution using various NVH methods (mount stiffness and impedance matrix methods for structure-borne, and source substitution for airborne).

Environmental

Brüel & Kjaer offers the widest range of instruments and software for measuring environmental noise, monitoring of noise, assessment of noise and vibration at work, calculation of environmental noise, and measurement and calculation of building and room acoustics.

Brüel & Kjaer offers a wide range of Hand-held Sound Level Meters, the latest being the fourth generation Hand-held Analyzer Type 2250.

Designed by You, for You

Development of Type 2250 was instigated and greatly inspired by the requirements of customers participating in extensive workshops around the world. These concluded that the instrument should be easy and safe to use, while at the same time incorporating clever features. The hardware has been designed to meet the specific ergonomic requirements defined by users, and the application software covers everything expected of a sound and vibration analyzer in this class. The application software can be licensed separately, so you can get what you need when you need it and won’t get left behind if your requirements change. This way, Type 2250 ensures the safety of your investment now and in the future. Created, built and made for you personally, you’ll find it will make a difference to your work and all your measurement tasks.

Modular Precision Sound Analyzer Investigator Type 2260

2260 Investigator™ is programmable. Based on a standard PC architecture and file system, you change 2260 Investigator’s current role as easily as swapping from using a word processor to a spreadsheet. One acoustics engineer, equipped with a 2260 Investigator and a full set of application software, can highlight most sound problems and find effective solutions to them. A group of engineers can share one 2260 Investigator, each using their preferred application package as required. 2260 Investigator is cost-effective because you invest in one hardware platform that does it all. 2260 Investigator has an uncomplicated user interface with menu driven software available in several languages. This makes using 2260 Investigator very easy, saving a lot of time when learning to use it and when setting it up from job to job, thus eliminating wrong measurement setups. 2260 Investigator is all you need to unravel your sound problems.

2260 Investigator Platform

The following applications are available for 2260 Investigator:
- BZ 7210 Basic Sound Analysis (included in every 2260)
- BZ 7203 Noise Profile
- BZ 7204 Building Acoustics
- BZ 7205 Sound Intensity
- BZ 7206 Enhanced Sound Analysis
- BZ 7207 Room Acoustics
- BZ 7208 FFT Analysis
- BZ 7226 Sound Recording

Noise and Vibration at Work

Occupational safety and health are major concerns throughout the world. Problems such as broken limbs, the loss of an eye, or persistent backache have to be dealt with and measures taken to minimise the risk of these things happening at work. However, it comes as a surprise to many that loss of hearing caused by noise at work is second only to the broad category “disorders of the locomotor system” on the list of occupational diseases. Millions of people suffer from noise-induced hearing loss (NIHL), resulting in a reduced quality of life.
Unattended Noise Monitoring
For a quick, on the spot estimate nothing beats a competent operator having the equipment to measure and describe the noise situation. However, to assess the noise in an area for a week, a month or a year, you need a monitoring system that measures and logs data 24 hours a day with a number of Noise Monitoring Terminals (NMTs) placed strategically. The system ensures automatic, round-the-clock data transfer and post-processing including noise parameters as well as meteorological data. Reliable measurement data, secure communication between the NMTs and the server, database integrity and openness are key to a successful system.

Data from noise monitoring is useful also to support noise maps made by modelling and calculation. Such maps are required under the EU Directive 2002/49/EC, including noise from major roads, railways, airports and industrial activities. Guidelines are under way for the integration of noise monitoring and noise mapping, to ensure the quality and credibility of the maps.

Roadside Noise Testing
The noise from road vehicles – cars, trucks and motorcycles – is a nuisance to many city dwellers, and the exhaust systems of some vehicles are too noisy due to wear, maladjustment or modification. EU Directive 70/157/EEC and ISO standard ISO 5130 describe how to check the exhaust noise of a stationary vehicle at the roadside.

A microphone is placed at a well-defined position close to the exhaust; the engine speed is gradually increased from idle to a specified engine speed, and briefly held constant at that speed. The throttle control is then quickly released and the engine speed returned to idle. During the entire cycle, the sound level is measured and the maximum reading recorded. The maximum level is then compared to the level permitted for the vehicle in question, and suitable action taken if the level is exceeded. The basic instrumentation for acoustical measurement is a Class 1 Sound Level Meter and a sound calibrator. In addition, the engine speed must be measured accurately.

Environmental Noise Calculation and Modelling
Calculations are made using a computer model of the environment with defined noise sources, topography and features that affect the propagation of the noise to (receiver) points of interest. Input data for the model can be available from various sources, for example:
- GIS or AutoCAD® files for buildings and topography
- Databases of traffic flow data
- Airborne laser scanners for topographic height information
- Sound level measurements for source levels and levels at receiver points used for calibration

Room and Building Acoustic Measurements
Sound energy does not remain in the room where it is produced, but propagates throughout the building by any available path, intruding into other rooms as noise. Each country has its own standards of sound insulation in buildings, but it is measured in the same way all over the world.

In a concert hall, lecture room or control room, the sound produced by an orchestra, speaker or loudspeaker not only reaches the listener directly, but also through reflections. The listener’s judgment of the acoustic quality depends on the temporal and geometrical sound energy distribution as well as the spectral changes the sound is objected to. Room acoustics focuses on the impact of sound reflections on the perceived acoustic quality of a room. The oldest room acoustic parameter is reverberation time, defined by Sabine in 1898 as the time for residual sound to decay by 60 dB. It relates to the perceived liveliness of a room. Over the past decades, many quality measures have been added. This makes it possible to measure the acoustical quality of a room.

Modelling Sound in Rooms
Eminent concert halls, ships and bridges were built in the past without modelling. However, failures that could have been avoided if a model had been built and tested were, and still are, common. However, modern computers have the power to simulate the acoustics of a virtual model, and can even simulate sound that is hard to distinguish from the sound in the actual room when built. Modelling using computers is no longer an exotic form of art. It is used for offices, fac-
tory halls, classrooms, foyers, airport terminals, train stations and stadiums. It predicts the acoustics of new designs and evaluates planned improvements in existing buildings.

On January 15th, 2005, the $440 million, new Copenhagen Opera House opened with a Royal Command Performance and the tones of Carl Nielsen, Donizetti, and Rossini. Likening the sound to “the gift of a Stradivarius”, the Royal Theatre’s musical director was thrilled. “It is a world class acoustics” he commented, “that at the same time is analytical, warm and round. Every subtlety, even the very quietest, reaches out towards the rear seating rows with a clear and golden character. This opera house balances the intimate and the very loud.” The guest conductors, opera directors, music staff and the chairman of the orchestra were equally delighted with the sound achieved. English consulting company Arup Acoustics, responsible for the design of the new opera house’s acoustics, chose ODEON modelling software for this and for many of its other major projects within architectural acoustics since 1991.

Experience, Knowledge and Innovation
Our experience and knowledge, acquired over more than 60 years, are inseparable – they go arm-in-arm. At Brüel & Kjær, we don’t just design and manufacture transducers. We are in the business of innovation and always have been. Many of our employees are world-renowned experts, frequently speaking at conferences, presenting papers at seminars, and advising on new Standards. However, our expertise doesn’t only come from within; it also comes from working closely together with our customers and suppliers.

Please visit us at Forum Acusticum and we’ll show you our complete solutions to your applications within sound and vibration measurement and analysis.

Brüel & Kjær Sound & Vibration Measurement A/S
– for outstanding quality, reliability and accuracy –