

**ACOUSTICS,
AUDIOVISUAL & THEATRE
TECHNOLOGY, NOISE AND
VIBRATION CONTROL**

What you hear is how you feel. We perform good sound and better vibes.

Akukon is the leading expert in acoustics, noise control and audio-visual design services in Finland and the Baltic countries. Our independent consulting corporation was established in 1994. All Akukon's owners work for the company.

Our wide customer range includes builders and construction companies, architects and other designers, small local businesses and large international companies, the public sector, and cultural organisations. We serve a broad spectrum of sectors from residential buildings to business headquarters, day-care centres to universities, sports halls to stadiums, houses of prayer to cathedrals, product development

facilities to industrial sites, music clubs to operas, and underground lines to ports.

Our goal is to increase physical and mental well-being as well as improve productivity and work satisfaction by means of good design. We focus on functionality, stellar user experience and quality of life improvement through environmental noise control.

We have regional offices in Helsinki, Oulu, Tampere, Turku and Vaasa. Our subsidiaries are located in Estonia, Latvia, Lithuania, Georgia, and Jerusalem.

Our audited quality management system meets the requirements of the ISO 9001 standard. Most of our measurement services are accredited and meet the requirements of the EN ISO/IEC 17025 standard. Our central design areas are also RALA Competence certified by the Finnish Construction Quality Association (Rakentamisen Laatu RALA ry).





Well-being, efficiency and comfort

Building and room acoustics cover the entire building from its basic structures to the completed interiors. Acoustic design is required everywhere where people work or live. Acoustic design is regulated by construction regulations and standards as well as customer requirements.

Acoustic design can be a part of a new construction, renovation, or conversion, where for instance an old industrial facility is transformed into offices or apartments. Typical building types include business facilities, hospitals, schools, day-care centres, culture buildings, and residential buildings.

Both very noisy and extremely quiet environments are particularly challenging locations for acoustics. Performance venues, such as concert halls and theatres, require specialised acoustic design.

We start the design project by determining the acoustic requirements of the building or facility room by room, depending on their function. In addition, we have our say in the placement of different facilities in the building's layout and, when necessary, provide a suggestion for the placing of the most critical facilities in terms of sound insulation. By planning the layout of the rooms, significant cost savings can be achieved during construction.

In building acoustics design, we focus on the following aspects:

- airborne sound insulation between different spaces
- insulation of structure-borne noise between different spaces and from outside
- facade sound insulation from traffic noise
- HVAC noise control.

In room acoustic design, we determine the appropriate surface materials and their quantity, room by room, and, if necessary, identify the principle structures for acoustic elements. This may require either damping or controlling sound propagation.

Our services also include on-site supervision during the construction as well as accredited acoustic measurements, which ensure the correct implementation of the design.

“Good room acoustics, together with the control of natural light, are central when planning spaces. The acoustics create the atmosphere and identity of the room as much as great architecture. When both aspects fall into place, the result is even better.

Our cooperation with Akukon began in the 90s. Their personnel have a broad competence and are highly educated, which I have always found compelling. To me, reliability is the core of acoustic design.

Akukon also has the will to contribute and inspire to trying out new things. To this day, they have never turned down one of our ideas on the onset, not even when the assignment has seemed impossible to follow through. I have been delighted to follow the progress of their scientific and analytical work.”

Stefan Ahlman, architects Arkkitehtitoimisto Stefan Ahlman Oy



Functionality and risk management

By designing to minimise noise and vibration, we can provide good sound environment. When the adverse effects of noise and vibration are minimised, the quality of life improves. A successful survey of noise and vibration is a crucial part of risk management for projects large and small. In our planning, we collaborate closely with structural engineers, geo-engineers, and architects.

We provide accredited measurements using equipment calibrated in accordance with the national measurement regulations. We are also in possession of the most recent and commonly used tools and practices for modelling environmental noise.

Our services include:

- analyses of noise and vibrations for construction permits and zoning
- follow-up measurement of noise

- vibration measurement
- planning of noise and vibration control
- training in noise and vibration aspects
- product development projects.

ENVIRONMENTAL NOISE

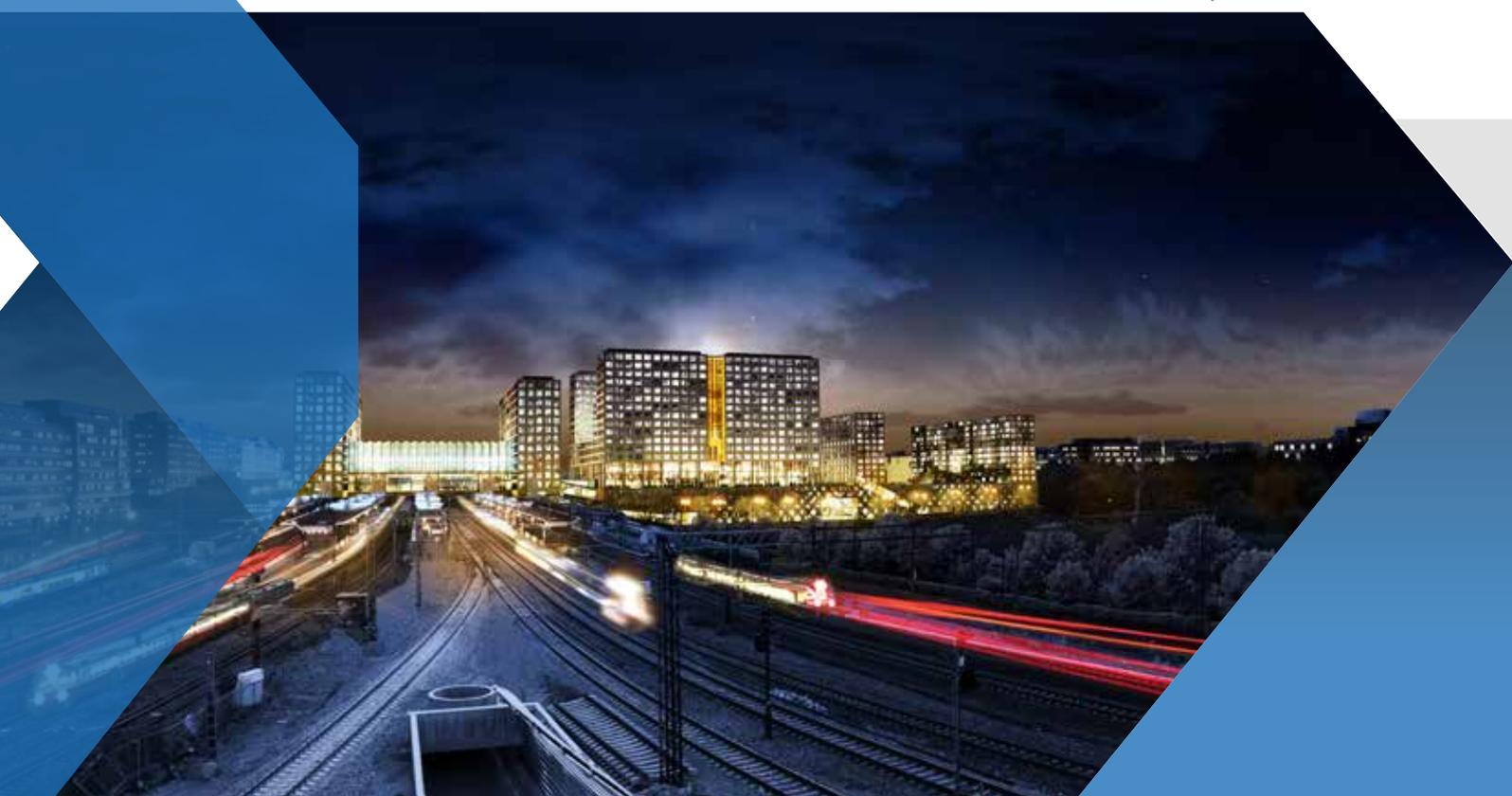
Environmental noise surveys are related to land-use planning, the construction of new buildings, renovations, supplementary construction, industrial environ-

mental permits, or the analysis of the environmental impact of a new road or rail traffic route. The importance of high-quality environmental noise surveys rises with tightly planned new urban environments and infilling.

For example, environmental noise reports are conducted when building near traffic routes, industrial facilities, and docks, but may also concern an entire city or district. Measurements and calculations are also conducted at shooting ranges, motor sports facilities, and outdoor event locations.

Surveys done well in advance often lead to significant cost savings enabling the most beneficial noise control, which can then be planned and constructed in conjunction with the project.

Tripla, YIT



VIBRATION AND STRUCTURE-BORNE NOISE

The most important task of a vibration and structure-borne noise survey is to establish the conditions for construction and, when necessary, suggest sufficient control solutions. The source of disturbance may be a large railway track or a small gushing piece of machinery. The goal of our design work is to enable undisturbed residency or vibration sensitive industrial operations.

We continuously develop our unique tools for vibration calculations. We have developed our own calculation model for estimating the propagation of structure-borne noise. The model enables, for instance, preliminary assessment of the impacts of structure-borne noise in large

railway projects well before the launch of rail traffic.

Special projects include devices that are extremely sensitive to vibration, where their undisturbed operational environment must be guaranteed prior to construction by means of vibration measurements and reports. Gyms and dance studios are challenging, and an acoustic expert should be involved already in the project planning phase.

EXPOSURE TO NOISE AND VIBRATION IN THE WORKING ENVIRONMENT

We offer expert services for analysis of noise and vibration also as a workplace survey. Noise and vibration are a source of physiological stress and should be considered when creating a healthy

and safe working environment. Stress from noise and vibrations can be significantly reduced with the help of measurements and evaluation of the results.

Our services include standardised:

- measurements of whole-body vibrations
- measurements of hand-arm vibrations
- measurements of noise exposure
- planning of noise and vibration control.

Toulkarem Court House, © AAU ANASTAS



“We have partnered with Akukon on several challenging projects over the past 20 years. The Culture and congress centre Verkatehdas in Hämeenlinna was a great success. The smooth cooperation between the architect, acoustic designer, and theatre technology designers was crucial to the project planning. Currently, we are planning a large expansion of Verkatehdas using the same team.

Our latest project together was the new headquarters of retail chain Kesko, inaugurated in summer 2019 at K-Campus in the Kalasatama area, Helsinki. The end-users have given us great feedback on the acoustics of the working spaces and the large glass-roofed atrium.”

Juha Mäki-Jyllilä, architect SAFA



Genuine experiences

A live performance venue can be a theatre, concert hall, or conference room, an entertainment arena, or auditorium, or a combination of some of the above. A performance venue can be situated almost anywhere. It can be a brand-new theatre, concert hall, or sports or entertainment arena. It can also be part of a shopping centre, educational institute, or an office building.

Our performance space projects have included both new buildings, renovations, expansion of existing buildings, and conversion of industrial sites for entertainment purposes. We often offer expert services for small-scale development of theatre technology or performance venues.

Central elements in performance venues include acoustics, theatre technology, functionality, the requirements of electronic media, and the logistics of the performance venue, which need to work seamlessly. This is closely related to the transport routes and storage units for theatre technology, instruments, and staging equipment.

Our performance venue services include:

- expert services for construction consultancy
- functionality and logistic design
- acoustic design

- design of stage and production technology, acquisition consultation, and project monitoring
- consultation for acquired theatre and production technology, and utilisation and maintenance services
- on-site supervision related to acoustics and technical supervision of theatre technology.

We have the competence to design performance spaces comprehensively with all these facets in mind, but are also happy to assist in individual sectors of performance venue projects. Good performance venues serve both the performers and the audience. By taking into account the special requirements of performing arts, we can minimise the amount of alterations throughout the planning, keeping the design work cost effective and on time.

AUDIOVISUAL DESIGN

Audiovisual design is needed in locations where image and/or audio is used for communication, performance, presentation, education, or decision-making purposes. Apart from performing arts and entertainment venues, the sites include company and government offices, meeting and conference halls, schools, sports arenas, and religious sites.

The audiovisual requirements, such as conference technology and sound systems, should be taken into account already in the concept design stage. We offer consultation related to planning of audiovisual technology and system acquisition for both new buildings and renovation sites. We also take part in projects where existing audiovisual systems are updated to better serve the new uses of the premises.

If the customer wishes, we set the requirements to building services (i.e. space reservations, electricity distribution, cabling). We also plan the audiovisual systems, consult in terms of acquisition and tendering, as well as supervise the contract for audiovisual construction.

“With performing arts it is of utmost importance that the functionality and acoustics of the venue are excellent, that the audience can hear and see properly, that equipment and personnel can move around freely, and that the technical equipment supports the performance. These requirements might seem self-explanatory, but they were exceptionally well met both at my previous workplace at Logomo in Turku and my current one at Verkatehdas in Hämeenlinna. In both places it is a pleasure both to give and enjoy performances.

When money is spent – be it your own or common funds – you should be prudent. In this case that means hiring the best possible competence when designing performance venues. This is why I always turn to Akukon and also recommend others to do the same.”

Janne Auvinen, CEO, Verkatehdas Oy



Logomo. photo Joni Rantasalo

AUDIO AND VIDEO PRODUCTION

Good acoustic design enables a sufficiently quiet environment for video, film and recording studios, control rooms and broadcasting units that do not disturb others and that are acoustically optimal, logistically functional, and pleasant to work with. We operate in webcasting, radio, TV, and education studios.

The scope of our services can include engineering, architect blueprint of the studio, interior design and furnishing, designing cabling and electricity distribution, system engineering, tendering and acquisition of equipment and systems, and in video studios also mechanical and lighting design. In addition, we supervise the construction if need be.

We have over 20 years of combined experience in the design of different studios. Our experts also have experience from actual studio work and music recordings.



Internationally acknowledged precision

Our measurement services include in-situ sound insulation measurements, room acoustic measurements, and noise measurements. We perform all measurements according to standardised and nationally approved methods with calibrated measurement equipment.

In order to guarantee measurement quality, we provide our personnel with regular measurement training, perform monitoring and comparative measurements and internal audits, maintain our measurement equipment, and develop our measurement methods.

As our measurement services are accredited, we can deliver legally and internationally qualified measurement reports often required by the inspection authorities.

Akukon Oy is a FINAS accredited test laboratory, identification code T229.

CALIBRATION SERVICE

Our calibration service offers accredited periodical calibration of sound-level meters, sound-level calibrators, and microphones. Our calibrations are traceable and provide an internationally approved certificate that the calibrated item works according to standard requirements.

Only an accredited calibration certificate is an internationally approved document, accepted by authorities in different countries.

Our calibration laboratory is FINAS accredited, identification code K061.





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