OROS Sound Power

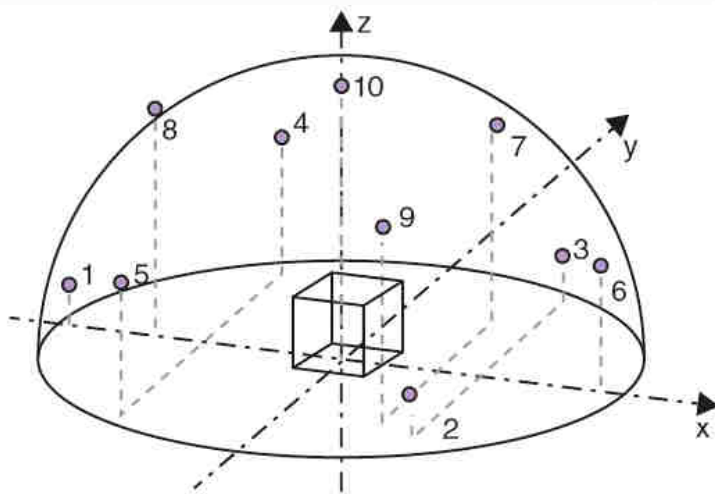## Sound power from sound pressure measurements

Fig.1: A typical Sound Power test set-up as defined by ISO Standards

"The Sound Power software provides sound power determination in free/semi free field environments. It is ideal for test bench: indoor (laboratory anechoic environments) or outdoor".

Introduction

The OROS **Sound Power** software module is a dedicated tool for your sound power **measurements**. It is designed to allow for **accurate and efficient sound power tests based on sound pressure level measurements**. Based on the main international standards, it allows for a flexible setup of the measurement installation and test procedure. During the measurement itself, the successive steps are clearly specified by the measurement panel as defined by the user in the setup. Finally the Sound Power report can be automatically printed in a user-customized form using Microsoft Excel[®].

Industries	Machines	Applications
> **Consumer goods** > **Ground Transportation** > **Aerospace**	> **HVAC and fans** > **Disk and drives** > **Domestic equipments** > **Earth moving machinery** > **Jet engines**	> Efficient products Sound Power labeling > Sound Power reduction R&D > Free Field environment > Equipment for use outdoors: Directive 2000/14/EC > Office equipment > Domestic appliance equipment: IEC704-2

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Main Features

> **User friendly for all**
- User friendly set up browser
- Measurement panel for easy and repeated operation

> **Gain time**
- All microphone positions measured at once
- Overall and Spectra real time display
- Direct Sound Power determination
- Automatic standard criteria check:
  - Background, environmental
  - Repeatability, directivity
- Automatic report with a custom Microsoft Excel template

> **Be accurate**
- Fulfils international standards
- Type-1 precision results in dBA
- Advanced analysis tools for R&D studies

Description

Sound power test on a mine excavator

Sound power test on a air compressor

A flexible test set up following the standards

Sound Power measurements are based on a well-defined procedure described by international standards. Sound Power is calculated by integrating the Sound Pressure Level measured over a virtual surface surrounding the source.

The Sound Pressure Level is measured at discrete microphone positions over this surface. The international standards define the test setup; the test environment, the measurement procedure, the type of instrumentation used and the way Sound Power should be calculated.

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A guided measurement procedure

In addition, eventual corrections that should be considered, a number of validity checks that should be undertaken and the list of results that should be presented in the report are described in detail. In this frame, and taking into account the parameters specific to the tested product, the Sound Power measurement procedure can be setup.
For example, the dimensions of the measurement surface are defined and the coordinates of the microphone positions edited. In addition, the number of microphones used can be specified, and several measurement cycles can be defined.

Especially if the application is product labeling, Sound Power actual data acquisition should be undertaken with efficiency. For this reason, the setup previously defined by the user can be simply reloaded, making the instrument ready to operate in a glimpse. A measurement panel appears as a simple interface to the operator where only operation commands are available. Before starting, the calibration of the microphones can be achieved with the specific calibration interface.
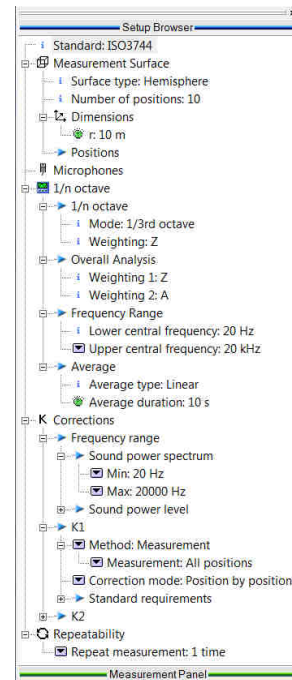
Sound Power settings

An accurate and efficient measurement

The first step is the measurement of the background noise. The second step is the measurement of the source sound pressure. As an example, if a repeatability test was setup as required, the operator will be prompted and guided along a procedure including 3 runs to check the repeatability of the measurement. The third step is the results preview and report fill up for complementary information required by the standards (operator name, product reference etc…). The final step is the automatic report generation in a customized form.

Measurement Panel showing the 4 main steps of the test:

> Background Noise acquisition
> Test source noise acquisition
> Results and standards conformity
> Report

All positions at once: efficiency

Typically the number of microphone positions is 5, 6, 9, 12, 17 or even 20 and sometimes even more. The instrument hardware, featuring multiple inputs and high embedded computing power allows measuring all microphone channels at once and in real time meaning that all sound power results are available right away after the last second of the test cycle.
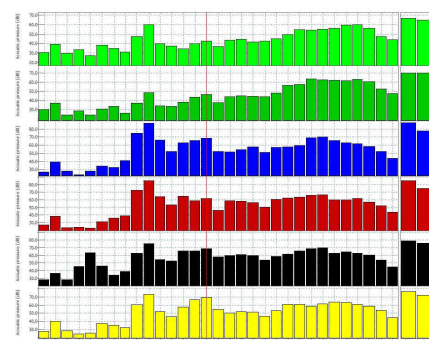
Precision

Result metrology quality is fully secured as the microphone signals are processed by the instrument itself giving a result with type-1 accuracy. During the measurement, both overall and spectra results can be visualized in real- time for all microphone positions.
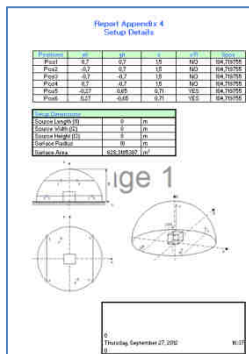

Real time acquisition of the 1/3 octave band spectrum

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Results

Sound Power results

Sound Power Results can be previewed before report printing or saving and this right away after the last second of test has gone. Sound Power results are corrected (K1, K2) as defined in the setup for the background noise influence or for environmental conditions. Among a number of validity checks imposed by the standard: the directivity of the measured machine is checked in order to determine if the number of microphone positions is sufficient. In addition, the repeatability of the test is also verified.
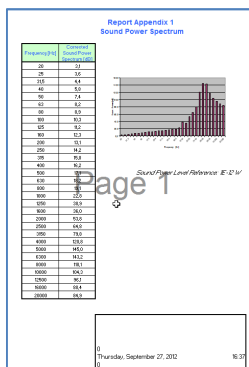
Customized Sound Power reports

Finally the report can be generated. It integrates all Sound Power results including the corrected Sound Power level and the corrected Sound Power spectrum. All additional results are integrated. In parallel all measurement results can be exported to Microsoft Excel® and can be further post processed as desired. The report is generated based on a Microsoft Excel® template that can be customized by the user.

A typical report printing

Specifications

Measurement standards

Features	Description
ISO 3744, 3745, 3746	Software assistance along the listed standards
IEC 704-2-4	Extensions

Measurement configurations

Features	Description
ISO 3744 / Parallelpiped	Against floor (5, 9, 17), wall (6), corner (4)
ISO 3744 / Hemisphere	Against floor (6, 10, 12, 19, 24), wall (9)
ISO 3745 / Sphere	Free field (20)
ISO 3746 / Hemisphere	Against floor (4,7)
ISO 3746 / Parallelpiped	Against corner (3)
Other configurations	Consult OROS

Standards criteria validity

Features	Description
Background noise	Check and K1 correction (File, Manual, Measurement)
	Position by position, Average
Reverberation	Check and K2 correction (Reverberation time (RT60), Approached method, Reference source, file, manual)
Repeatability	3 run check
Directivity	Check according to the standard

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Analysis: 1/n octave constant percentage band filter analysis (OCT)

Real Time 1/3 Octave and Overall analysis up to 20 kHz

The OCT plug-in analyzer features multiple acoustic results depending on applied setting. This plug-in analyzer computes real-time signal (on-line or post-processing analysis) based on digital filters (CPB) and detectors.

Settings

Bandwidths	Center of **highest 1/3rd** band = **20 kHz** Center of **lowest 1/3rd** band = **20 Hz**	
Resolution	1/3 Octave	
Averaging	Linear	
Standards	Detectors	Complies with **IEC 651, IEC 804, IEC 61-672 class 1**
	CPB filters	Complies with **IEC 1260 class 1**
Channels	OR36 & OR38 analyzers	**32 channels** for **on line** and **post-analysis**
	OR34 & OR35 analyzers	**8 channels** for **on line** and **post-analysis**
Overall	Detectors	**2 parallel overall detectors** linear and weighted (time domain)
	Weighting	**A** or **Z** (none) applicable in **10 kHz - 20 kHz** bandwidth

Results

The following results are available for real time or post-analysis display, report and saving.

Spectra	1/n Octave spectra	**Continuously averaged** spectra
Overall	Linear	**Digital** & **analog** view meter of time domain overall detector,
	Weighted	**Digital** & **analog** view meter of **A** weighted overall levels computed in time domain

Report & results

Features	Description
Report type	Excel
Test information	Operator name, Date, Time, Location, Report reference
Environment	Temperature, Relative humidity, Barometric pressure, Comments
Source	Dimensions (L1, L2, L3), Type, Manufacturer, Model reference, Serial Number, Manufacturing year
Operating conditions	Comments
Results	Sound Power (dBZ, dBA), Source sound pressure leve (dBA), K1A (dBA), K2A (dBA), DeltaLA (dBA).
Standard conformity (Passed / Failed)	Background noise test, Environmental test, Directivity test, Repeatability test

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A Powerful and Flexible Range for Your Needs

OROS Sound Power software module can run on or analyze results from all Teamwork instruments providing flexible choices of the hardware platform size. The OROS Teamwork instruments offer flexible connection and configuration: mobile analyzer, distributed configuration, remote access or large channel count systems. Based on the same platform, same technology and same software, the OROS instruments are portable, rugged and real-time.

> OR38: 8, 16, 24, 32 channels
> OR36: 4, 8, 12, 16 channels
> Mobi-Pack: 4, 8, 12, 16 channels
> OR35 : 6, 10 channels
> OR34 : 2, 4 channels

OROS Sound Power software module belongs to the comprehensive OROS product line. Other software modules such as FFTDiag, Turbomachinery vibration (ORBIGate), Balancing, Modal and Acoustics (multi-channel Sound Level Meter, 1/n Octave, Sound Intensity) are provided on the same hardware platform.

Ordering Information

The Sound Power software module can be ordered as an option of an analyzer package. In that case the following reference should be used.

ORNVS-SP

Sound Power software module that can be added to any analyzer configuration

> Comes with one dongle for reporting without hardware

It can also be ordered as a stand-alone Sound Power package (Hardware and software).

ORNVS-SP20B

Up to 20 positions

ORNVS-SP12B

Up to 12 positions

ORNVS-SP6B

Up to 6 positions

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OROS, Leadership through Innovation

About Us

30-years in business, OROS' designs and manufacturing have been renowned for providing the best in noise and vibration analyzers as well as in specific application solutions.

Our Philosophy

Reliability and efficiency are our ambition everyday. We know you require the same for your measurement instruments: comprehensive solutions providing performance and assurance, designed to fit the challenges of your demanding world.

Our Emphasis

Continuously paying attention to your needs, OROS collaborates with a network of proven scientific affiliates to offer the latest of the technology, always based on innovation.

Worldwide Presence

OROS solutions are marketed in more than 35 countries, through our authorized network of representatives, offices and accredited maintenance centers.

Want to know more?

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