NorPower software package
for Sound Power detection
Nor1035

Sound power levels according to ISO/DIS 3743-1:2006
Engineering methods for small, movable sources in reverberant fields - Comparison method for hard-walled test rooms

Date of test: 26 January 2007

| Client: | Prime Manufacturer Ltd. |
| Object: | Cooling Machine for oil-turbin HX5-6B |

Mounting conditions: Flat mounting on free air

Operating conditions: Normal reference operating condition according to specifications

Barometric Pressure:	.018.0	kPa
Temperature:	24.0	°C
Relative humidity:	68.0	%

Dimensions of the test room:		
Length:	8.5	m
Width:	6.1	m
Height:	3.7	m
Volume:	191.8	m³

Reference Box:		
L1 (Length):	3.0	m
L2 (Width):	3.0	m
L3 (Height):	3.0	m
Volume:	27.0	m³

Frequency f [Hz]	Lw 1/3 octave [dB]
100	82.4
125	89.3
160	94.2
200	94.4
250	93.5
315	90.2
400	90.0
500	89.7
630	87.6
800	82.6
1,000	80.5
1,250	78.3
1,600	76.8
2,000	75.3
2,500	75.5
3,150	74.4
4,000	73.2
5,000	72.7
6,300	72.4
8,000	72.5
10,000	73.3

Sound power level $L_W(A)$: 94.3 dB

Test laboratory:
No. of test report:
Signature:
Date: 26.01.2007

NorPower software package

The NorPower software is a complete package for sound power measurements. It includes the required tools for sound power calculations both in free field and in reverberant acoustical environments. The user may choose to set all required calculation parameters manually, or, just pick one from the list of Standards and all parameters will be preset. Report sheets are available in Word or Excel formats, and the software may even control the instruments during the measurement phase using the optional Ctrl-Power feature.

Norsonic

Introduction

Today, noise emission values are important marketing tools for machines, equipment and appliances. Before a new machine is purchased, both private and corporate customers make an evaluation of the noise emission on the different products.

Sound Power is the quantity to measure when determining product noise emissions. The sound power is normally indicated as a L_w, or L_{wA}, value. Sound Power is an absolute quantity, dependent only on the noise source itself. It is independent of the acoustic environment. Sound Pressure, on the other hand, is dependent both of the noise source itself and on the acoustic environment it is placed in. Hence, by placing the same noise source in two different acoustical environments, the sound pressure levels measured in the two environments will show different results although the sound power levels measured will be identical.

EU-Directive 2000/14/EC

In 2003, a new directive was adopted in the EU in order to protect the environment against noise from machinery used outside. The rules within this new directive, named 2000/14/EC, applies to a wide range of product types from simple handheld hobby equipment to heavy construction equipment used by professional building companies. All such products must get a CE-mark stating the guaranteed sound power level and the declaration of conformity before they can be sold within the EU market.

The guaranteed sound power level is the sound power level as defined in ISO 3740 series of Standards including relevant uncertainties. All manufacturers must confirm that the stated sound power level will not be exceeded. Failure to comply with the rules of the Directive 2000/14/EC may result in products being banded within the EU market.

The ISO 3740 series of Standards

The ISO 3740 series of Standards for detecting the sound power values are currently being revised. Hence, measurement procedures laid down in the current version will be different when the new revised version becomes valid, presumably within 2008. The NorPower type 1035 software package for calculation of the sound power values contains the measurement procedures according to both the old and new ISO 3740 series of Standards.

List of preset Standards

The list of available preset Standards is continuously updated as new Standards are available. The current version includes the following Standards:
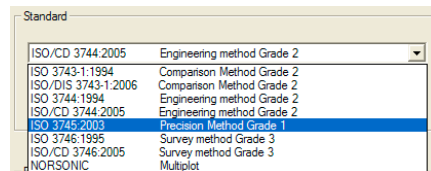
List of preset standards.

Frequency range and bandwidth

Most Standards for sound power detection require a frequency range from 100Hz to 10kHz. The filter bandwidth are normally 1/3-octave or 1/1-octave. The user may, however, set these parameters independently if special test conditions require so.
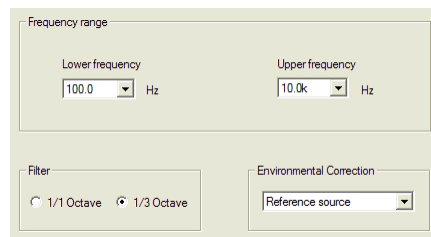

Selection menu for userdefined Frequency range and Filter bandwidth and Environmental Correction

Acoustical environments

The NorPower software performs the calculations based on different acoustical environments. The corresponding corrections are made in accordance with the selected environment which the user may choose in the setup menu. Available environmental corrections are based on Reference source, Room absorption, or Free field (K2=0) calculation procedures.

Measurement Surfaces

The noise source for test may be placed in different measurement surfaces. The calculation of the correct sound power level will be made accordingly. To choose the desired surface, simply click the corresponding figure in the *Surface Setup* dialogue box, and key-in the corresponding geometric lengths and sizes in the following *Geometry Setup* dialogue.
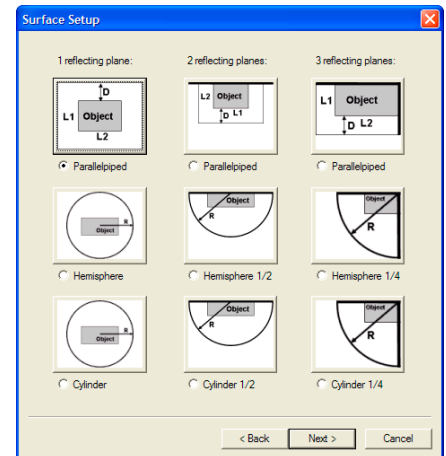
Surface Setup menu.
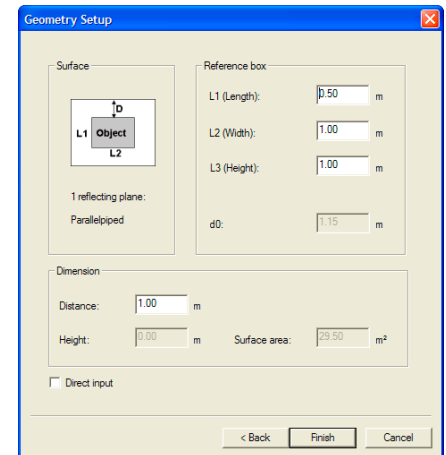
Geometry Setup menu

Easy user interface

The NorPower is easy to use and offers an unique project overview during all steps of the sound power evaluation process. Thanks to the *Project Tree* structure showing all measurement files, all result tables and graphical views, the operator may easy switch through the different tables and graphs. Even additional documents such as pictures and project documents may be added to the overall project tree. Of course, the entire set of measurements, tables, graphs and other documents may be stored in one single folder for re-visits at a later date.

Use of existing measurement files

Measurement files from any Norsonic instrument are entered into the calculation by dragging the files directly from the instrument memory using the NorXfer 1020 software package. This software comes free of charge with all Norsonic instruments. Alternatively, old measurement files stored on the hard disc may be used in a similar way, or, the user may enter data manually.

Report sheets

As soon as all relevant data from the microphone positions placed around the source under investigation, for the background noise level, and from the possible reference sound source are entered into the project tree data structure, the NorPower will produce the relevant report sheets (see below). The operator will find both tabular and graphical report sheets containing both the actual measured data as well as the calculated sound power level.

Project data entry

Important project data such as measurement room volume, description of the source, name of the client, etc. are entered directly into the final report sheet. Hence, the operator see on the screen exactly how the final printed report will look like. The actual date is entered manually, and the operator just have to sign the report after printing it out on the PC printer.

Finally, the Test Report may be printed out, even including the logo of the laboratory.
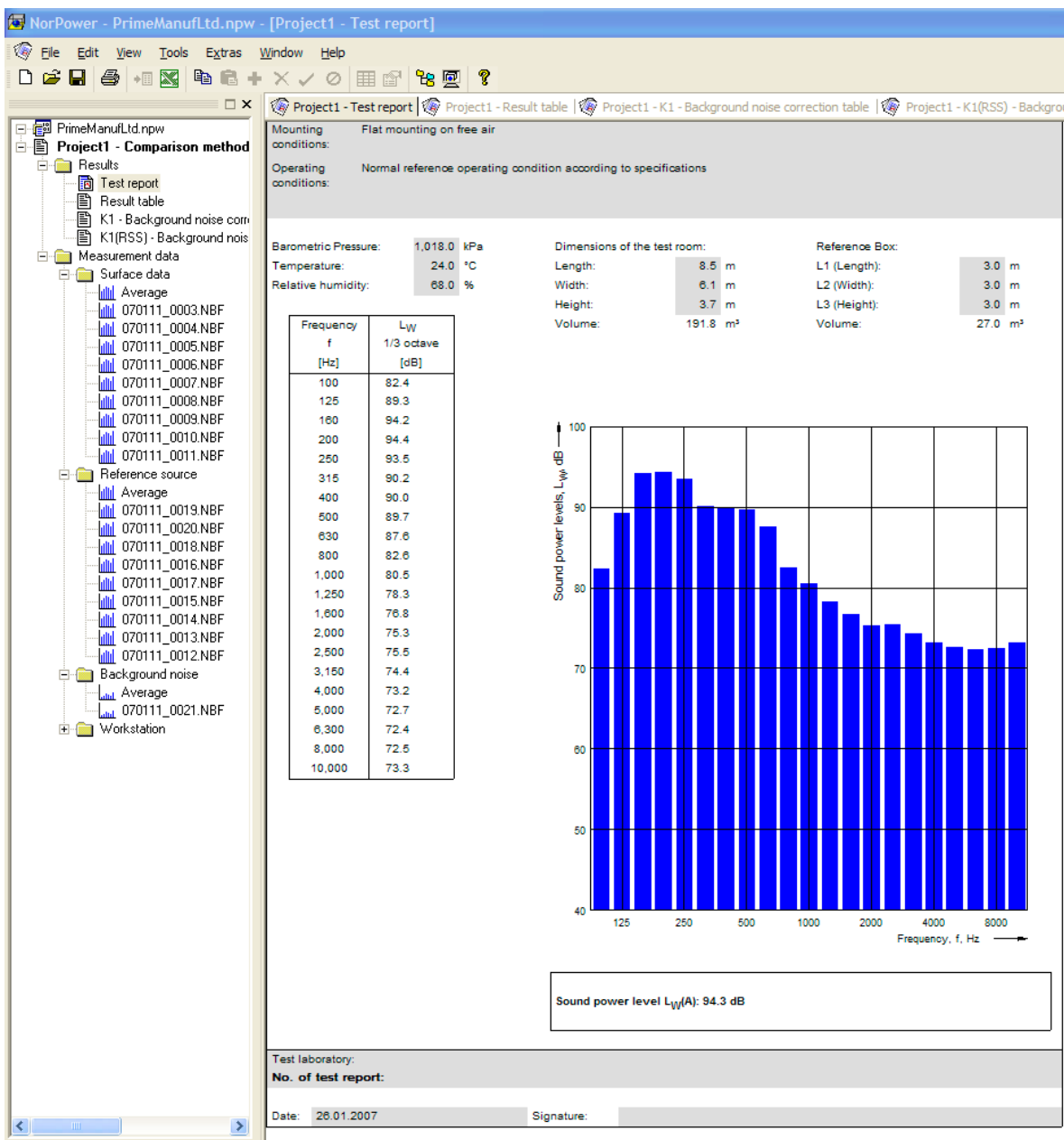
Final Test Report with Project Tree on the left

Reference Sound Sources

Any reference sound source, such as the Norsonic Nor261, may be used with the NorPower software package. The calibrated levels from each frequency band are entered manually in the table once, and these levels are automatically stored for easy access on the next sound power project.

Nor261 Reference Sound Sources

Multiplot project comparisons

For comparison of the last measurement with older measurements, the NorPower package offers a *Multiplot* feature. In a normal graphical view, several sound power spectra may be viewed simultaneously and differences between the tests are easily found. This feature is particularly interesting for product development measurements where the effect of small improvement to product can be evaluated step by step.
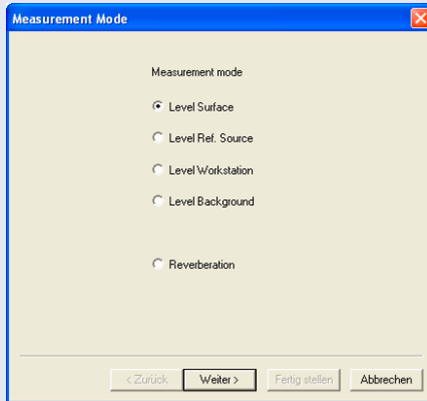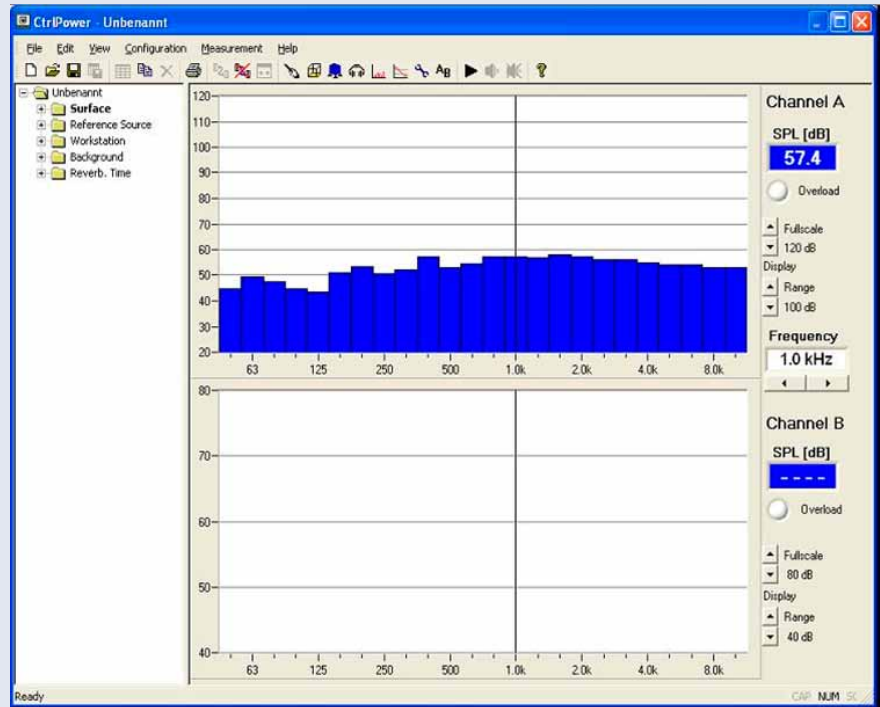

Measurement Mode selection menu

CtrlPower measurement control

For easy measurement control, or, when measurement have to be performed repetively, the NorPower offer an optional measurement control feature named CtrlPower. The operator will then control the entire measurement process directly from the PC. Most Norsonic instruments may be used as remotely controlled measurement units, and the measurement results are automatically transferred to the active project at the end of every single measurement.

Even the Nor265 Microphone Boom mey be controlled from the Ctrl-Power feature.

Real time display during measurements

Ordering information

Type No.	Description
Nor1035	NorPower.NorPower. PC-software for calculating and presenting graphically the Sound Power indices according to the measurement Standards in the ISO374x series. Results are based on measurement files from Nor132/131, Nor110, Nor118, Nor121, Nor140, Nor840 or Nor843 instruments which are stored on the PC itself (Nor1020 NorXfer Transfer Software must be ordered separately). Alternatively, Nor118, Nor121, Nor140 or Nor843 results are imported using the Nor1035/3 CtrlPower feature. (Windows XP/Windows7 compatible.) Includes MS-Excel export and multiplot features. (NB: Single user licence using USB-key!))
Nor1035/03	Opt. 3: CtrlPower. Control module for use with Nor1035 to control the entire measurement procedure in Nor118, Nor121, Nor140 and Nor843 instruments.

Distributor: