PULS™ Sound Power Using Sound Intensity Type 7882 is software for determining sound power based on the standards ISO 9614-1, ISO 9614-2 and ISO 9614-3.

ISO 9614-1 uses sound intensity measurements at discrete points. ISO 9614-2 uses sound intensity measurements with a scanning method and ISO 9614-3 uses a precision sound intensity scanning method. The probe is moved manually in all cases.

The procedure for all methods requires measurement of the average sound intensity for each segment of the surface enclosing the device under test (DUT).

The advantage of using these sound intensity methods is that there are fewer demands on the test room and background noise, and with this technique it is possible to include location and ranking of noise sources.

Uses and Features

Uses
- To determine sound power levels according to ISO standards
- To determine whether a product complies with noise specifications (legislation, voluntary awards)
- To compare the noise emissions of machinery and equipment of the same and different types (for example, when benchmarking, or in engineering work, when developing quieter products)
- Mapping sound intensity and relevant parameters

Features
- Comprehensive solutions for determining sound power levels according to sound intensity based standards where background noise is too great to allow sound pressure based measurements
- Interactive measurement set-up and information windows guide you through the measurement process
- Measurement data and results can be conveniently saved to familiar Microsoft® Excel® workbooks for customized reporting and further post-processing
- PULSE LabShop platform ensures exceptional measurement accuracy
- Scalable solution
- High-frequency corrections to intensity spectra to enable measurements at 6.3 kHz, 8 kHz and 10 kHz 1/3-octave bands using 12 mm spacer

Description

Type 7882 is a PULSE LabShop application that enables sound power (using sound intensity) to be determined, stored and reported according to ISO 9614-1, ISO 9614-2 and ISO 9614-3.

The three standards are very similar and require the same hardware, see Fig. 1. To fulfil the requirements of the standards, Type 7882 contains a dedicated template for each standard that leads you through all the necessary steps by means of a task list. Tasks are arranged logically. For example, the main Setup task is divided into subtasks: Hardware Setup, Measurement Setup, Geometry Setup, Measurement Sequence and Field Indicator Setup.
Fig. 1
Typical set-up for determination of sound power using sound intensity according to ISO 9614

Graphical features, such as pop-up text, colour coding and warnings, allow quick updates on measurement status, determination of pending actions, and validation of specific parameters within the standard. The flexibility of the program allows you to skip repetitive tasks.

Measurement Surfaces
A tree structure allows the measurement surface geometry to be built up by adding new, user-defined, planar surfaces, and by segmenting previously defined surfaces. Surfaces can be sub-segmented up to seven times to obtain the desired accuracy. This is also possible between individual measurements during the measurement procedure.

For each measurement surface, the sound intensity level and the sound pressure are measured, the pressure-residual intensity index is calculated, and the dynamic capability index stored. The standard specific Field Indicators for the measurement surface are calculated and compared with the criteria in the standard. Based on the results, actions are suggested to attain the desired grade of accuracy. Field Indicators used in ISO 9614-1, -2 and -3 are shown in Table 1.

<table>
<thead>
<tr>
<th>Field Indicator</th>
<th>ISO 9614-1</th>
<th>ISO 9614-2</th>
<th>ISO 9614-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temporal variability indicator</td>
<td>✓</td>
<td>–</td>
<td>✓</td>
</tr>
<tr>
<td>Field non-uniformity indicator</td>
<td>✓</td>
<td>–</td>
<td>✓</td>
</tr>
<tr>
<td>Pressure intensity indicator</td>
<td>Unsigned</td>
<td>Surface pressure intensity indicator ✓</td>
<td>Negative partial power indicator ✓</td>
</tr>
<tr>
<td>Signed</td>
<td>Negative partial power indicator ✓</td>
<td>Sound field pressure-intensity index ✓</td>
<td>Signed pressure intensity indicator ✓</td>
</tr>
</tbody>
</table>

Measurements
The probe is moved from measurement point to measurement point manually or scanned over the measurement surface by a skilled operator. The measurements are recorded automatically, following the structure of the tree, or manually, and a display indicates the status of each measurement position.

The measurement data for ISO 9614-2 can be mapped in the form of contour plots. Results can be exported to Excel® for report generation as well as stored in a database.

Data Management
BK Connect Data Viewer (advanced) Type 8400-A enables data management for one user; PULSE Data Manager Types 7767-B and 7767-C enable data management for up to five and ten users, respectively. These applications allow you to add metadata (such as operator, location and test type) to your data, search your database, display and copy your data, perform statistical calculations (such as mean and standard deviation) and generate reports.

Scalable Solution, Common Platform
PULSE Sound Power Type 7882 is part of the powerful PULSE LabShop platform. It is possible to combine Type 7882 with other PULSE LabShop sound and vibration measurement applications for a complete and flexible product testing program aimed at standards compliance and non-conformance problem resolution.
The user interface clearly shows which criteria have been fulfilled and whether the standard is being followed or not.

**Fig. 2**
When one or more criteria “fail” (indicated by the red colour), you should apply the recommended action to improve the grade of accuracy of the measurement.

**Fig. 3**
Criterion 1 has passed, but as the minimum scanning time has not been exceeded, the message “Standard not followed” is shown.

**Fig. 4**
When the measurement is completed and all criteria are indicated as “passed”, then the sound power determination has been made according to the precision method ISO 9614-3. If one or more of the criteria “fail” and the suggested actions do not result in a “pass”, then you should use the ISO 9614-2 method.
Specifications – PULSE Sound Power Using Sound Intensity Type 7882

A Windows®-based application for use with PULSE LabShop. The software is delivered via DVD or USB

System

SYSTEM REQUIREMENTS

- Microsoft® Windows® 10 Pro or Enterprise (x64) with either Current Branch (CB) or Current Branch for Business (CBB) servicing model; or Windows® 7 Pro, Enterprise or Ultimate (SP1) (x64) operating systems
- Microsoft® Office 2016 (x32 or x64) or Office 2013 (x32 or x64)
- Microsoft® SQL Server® 2014 Express (SP2) (included in installation), SQL Server® 2014 (SP2), SQL Server® 2012 R2, SQL Server® 2008 or 2008 R2 Express Edition SP1

Minimum Licence Requirements:
- BK Connect™ Data Viewer Type 8400
- BK Connect™ Hardware Setup Type 8401
- BK Connect™ Data Processing Type 8403

RECOMMENDED SYSTEM CONFIGURATION
- Intel® Core™ i7, 3 GHz processor or better
- 32 GB RAM
- 480 GB Solid State Drive (SSD) with 20 GB free space, or better
- 1 Gbit Ethernet network
- Microsoft® Windows® 10 Pro or Enterprise (x64), CB
- Microsoft® Office 2016 (x32)
- Microsoft®SQL Server® 2014 (SP2)
- Screen resolution of 1920 x 1080 pixels (full HD)

Calibration

Use PULSE LabShop’s integrated Calibration Master, which initiates microphone calibration while you move the calibrator from one microphone to the next. The full calibration history for a transducer can be retained in the Transducer Database, which allows monitoring calibration data variations over a period of time

Sound Intensity Based Method (PULSE Templates)

Provides measurement and calculation procedures for the determination of the sound power of noise sources using sound intensity, as described in the following international standards

STANDARDS
- ISO 9614-1:1993 Discrete point method
- ISO 9614-2:1996 Scanning method
- ISO 9614-3:2009 Precision scanning method

SUITABLE TEST ENVIRONMENTS

The methods are applicable in situ or in special-purpose test environments

Ordering Information†

<table>
<thead>
<tr>
<th>Type 7882-X</th>
<th>PULSE Sound Power Using Sound Intensity</th>
</tr>
</thead>
<tbody>
<tr>
<td>HARDWARE FOR SOUND INTENSITY METHOD</td>
<td></td>
</tr>
<tr>
<td>Type 3599</td>
<td>Sound Intensity Probe Kit</td>
</tr>
<tr>
<td>Type 4297</td>
<td>Sound Intensity Calibrator</td>
</tr>
<tr>
<td>Type 3050-A-060</td>
<td>LAN-XI 6-ch. Input Module 51.2 kHz (Mic, CCLD, V)</td>
</tr>
<tr>
<td>UA-2104-031</td>
<td>Intensity Front Panel</td>
</tr>
<tr>
<td>SOFTWARE MAINTENANCE AND SUPPORT AGREEMENTS</td>
<td></td>
</tr>
<tr>
<td>M1-7882-X</td>
<td>Agreement for Type 7882</td>
</tr>
<tr>
<td>REQUIRED SOFTWARE</td>
<td></td>
</tr>
<tr>
<td>Type 8400-X</td>
<td>BK Connect Data Viewer</td>
</tr>
<tr>
<td>Type 8401-X</td>
<td>BK Connect Hardware Setup</td>
</tr>
</tbody>
</table>

Type 8403-X | BK Connect Data Processing

RECOMMENDED SOFTWARE

Type 8400-A-X | BK Connect Data Viewer (advanced)
Type 7767-B-X | PULSE Data Manager, up to five users
Type 7767-C-X | PULSE Data Manager, up to ten users

OTHER SOFTWARE AND ACCESSORIES

Type 8404-X | BK Connect Data Processing Specialist (instead of Type 8403)
Type 4204 | Reference Sound Source
UA-0801 | Lightweight Tripod

† X is licence type, either X = N, where the licence is node-locked to PC host ID or dongle; or X = F, where the licence is floating, i.e., shared via a licence server

Brüel & Kjær and all other trademarks, service marks, trade names, logos and product names are the property of Brüel & Kjær or a third-party company.