PRODUCT DATA

Classifier — Types 7842-A-N and 7842-B-N

Classifier is a PC-based software package for Laboratory (Type 7842-A-N) or Field (Type 7842-B-N) measurement of Building Acoustics using Brüel & Kjær's PULSE™ analyzer platform. Complete laboratory or field measurement tasks are made quickly and easily, and in accordance with a broad selection of national and international standards. An intuitive measurement job file structure ensures a full overview, even if the task at hand consists of many individual measurements.

Supporting techniques such as MLS, rotating microphone booms, and sound intensity methods make it possible to select the optimum setup for real-life measurements.

USES

- Measurement of:
  - Airborne sound insulation
  - Impact sound insulation
  - Reverberation time
  - Absorption coefficient

FEATURES

- Supports a comprehensive selection of national and international standards: ISO, JIS, SS, DIN, ÖNORM, BS, Sia, UNI, NF-S31, NBE, NEN, ASTM
- Support for 4-channel configuration (7842-A-N Laboratory version)
- Support for rotating microphone boom(s)
- Support for MLS
- Support for intensity methods (7842-A-N Laboratory version)
- Comprehensive validation features
- Very fast to obtain final results, including report/ documentation
- Loss factor measurements, DIN EN 140-3, Annex E
- Absorption coefficient measurement ISO 354 (7842-A-N, Laboratory version)
- Intensity Method ISO/FDIS 15186-1 and 2 (7842-A-N, Laboratory version)
- Report generation

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User Interface

Both versions of Type 7842 run on the well-known Brüel & Kjær PULSE platform. Depending on the number of channels and generators in the front-end configurations, it is possible for you to configure different measurement setups based on the same hardware.

The main differences between Laboratory version Type 7842-A-N and Field version Type 7842-B-N are how projects are managed in the user interface and the number of available channels.

Laboratory Version

Laboratory version Type 7842-A-N uses the definition of building elements (specimens) to create projects. You can assign up to four “reverberant rooms” as source and/or receiving rooms, respectively. One “anechoic room” can be used for measurement of sound reduction index based on sound intensity. See the example in Fig. 1.

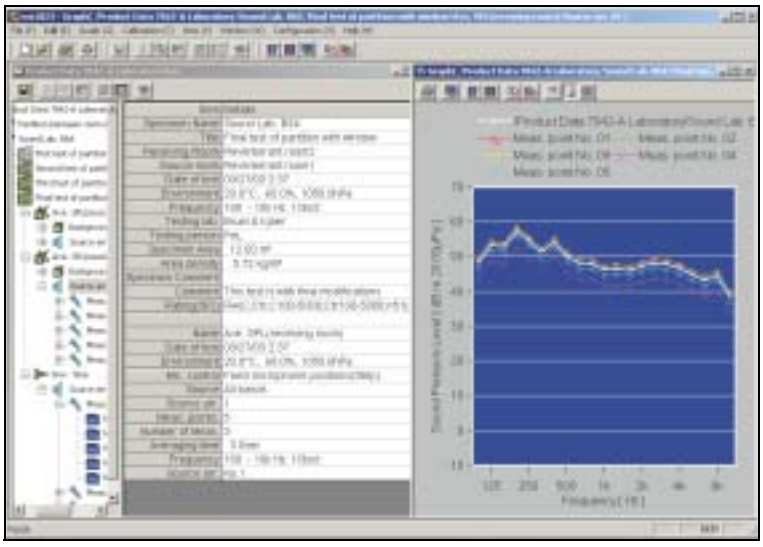


Fig. 1
A typical screen shot from Laboratory version Type 7842-A-N , showing the project tree structure to the left, the list area in the centre and a graph window on the right containing measurement data

In the Laboratory version, a project contains definitions and descriptions of the item under test, the measured data and calculated results. By selecting an item in the project tree, you can view detailed information in the list window. By right clicking on an item, a pop-up menu will give you access to view the current state of an item as well as actions applicable to the item.

Field Version

In Field version Type 7842-B-N, projects containing all the measurement data and site information are created by defining the rooms where the measurements are performed. You can assign a number of rooms to a project, thus facilitating measurements on partitions between these rooms.

As in the Laboratory version, the Field version holds projects containing definitions and descriptions of the item under test, the measured data and calculated results. By selecting an item in the project tree, you can view detailed information in the list window. By right clicking on an item, a pop-up menu will give you access to view the current state of an item as well as actions applicable to the item.

Data from one version can be viewed in the other and vice versa, but setting and (re-)execution of measurements can only be done in the version where the original measurements were made.

System Setup

The system setup dialogs, as shown in Fig. 2 and Fig. 3 for the two versions, are used to configure the system.

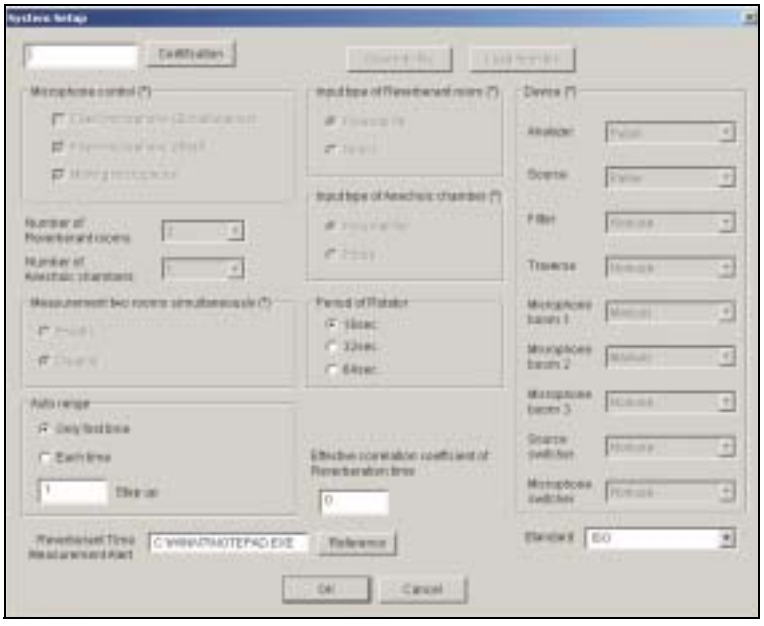


Fig. 2
System setup dialog for the Laboratory version

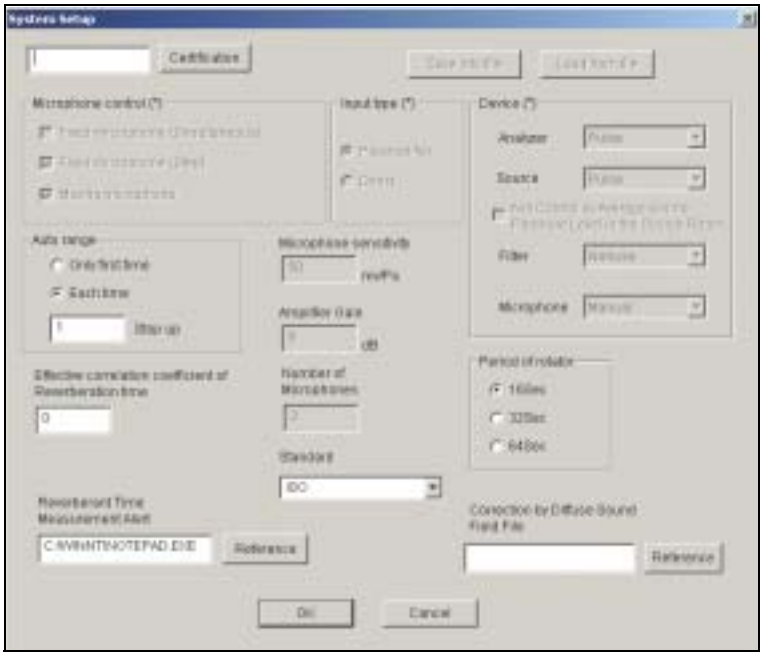


Fig. 3
System setup dialog for the Field version

The configuration specifies the microphone setup (i.e., the number of microphones in a multi-channel system), or how a rotating microphone boom is used (step or continuous movement). This is also where the measurement standard is selected. Other configuration tasks include room setup in Laboratory version Type 7842-A-N.

General

When either a specimen (Laboratory version Type 7842-A-N) or two rooms (Field version Type 7842-B-N) have been defined, you can select a measurement type in the project window according to the selected standard.

This will insert the required measurement in the project tree structure. You can now activate measurements using the measurement command, as shown in Fig. 4.

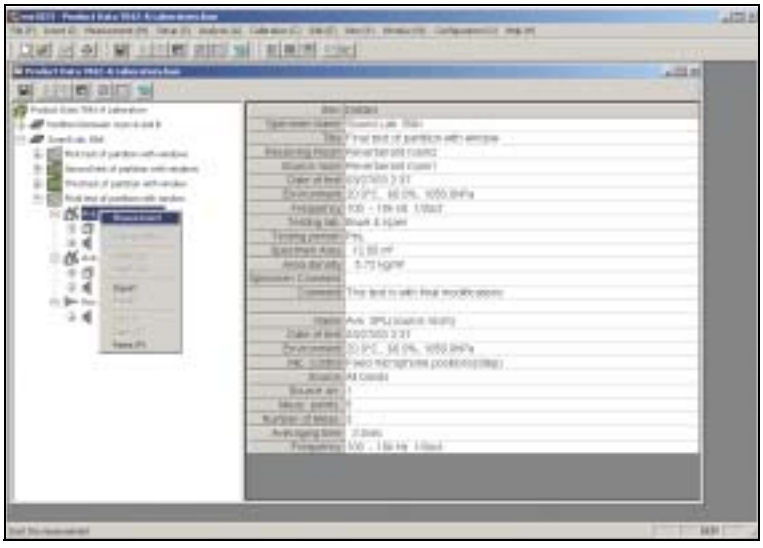


Fig. 4
A typical screen shot showing how to activate a measurement using the measurement command

Once you have activated the measurement command, the measurement window will become visible together with the PULSE analyzer display(s), as shown in Fig. 5.

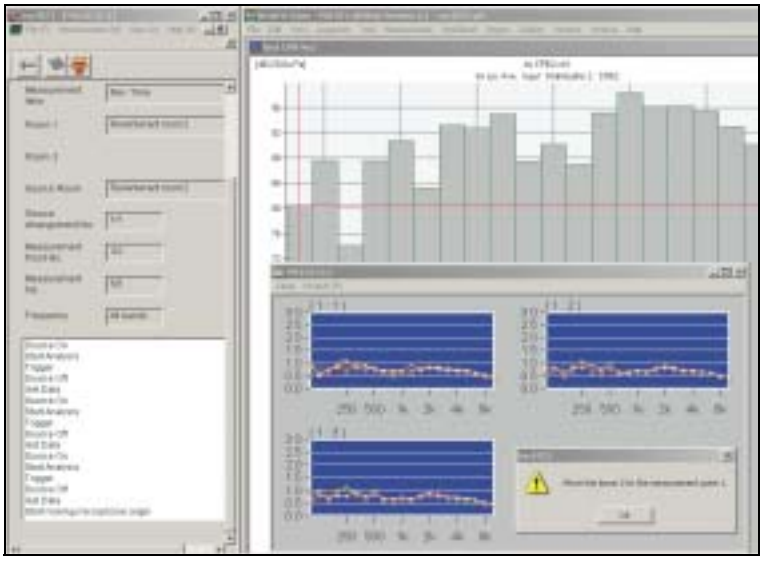
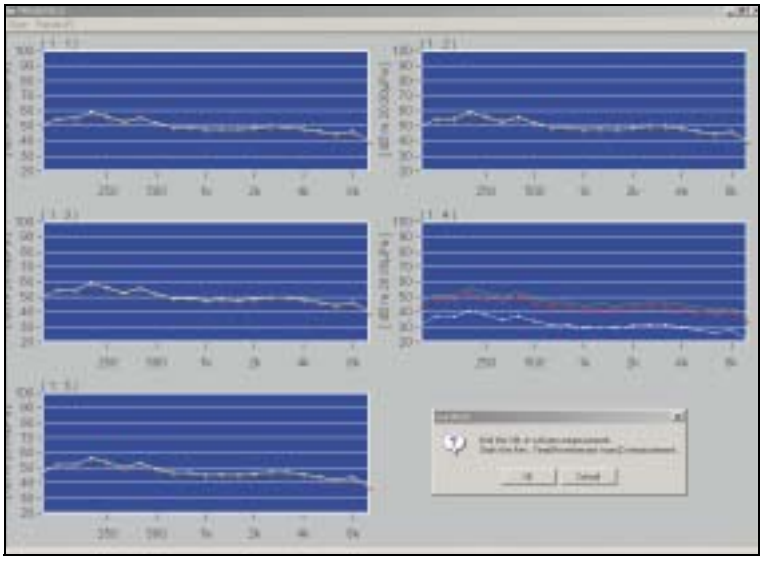


Fig. 5
A typical screen shot showing the measurement window together with the PULSE analyzer display

Information about the measurement progress is displayed, as well as instructions for operator involvement, if required (moving of microphones, etc.).

For the purpose of monitoring the progress of several measurements in several positions, you can maximise the monitor window as shown in Fig. 6.

Fig. 6
A typical screen shot showing the maximised monitor window



Sound Intensity Method

The Intensity method allows measurement of the corrected intensity sound reduction index, $R_{I,c}$. This enables you to gather extra information regarding the contribution of various flanking and leakage transmissions. In a traditional, pressure-based measurement, you get an apparent sound insulation index R´ which takes every type of transmission into account. However, traditional measurements cannot identify individual transmission paths. But by using the intensity technique, you can choose specific details of any particular segment of any given building element. If a compound building element is to be studied, for example a wall containing a window, the respective corrected intensity sound reduction index for both the wall material and the window can be found.

MLS (Maximum Length Sequence) Method

MLS-signals allow measurement of the impulse response using the correlation information between the source and the measured signal. From this Impulse response, the level difference and reverberation time can be calculated. This method is particular useful when high values of sound insulation are going to be measured. The correlation method will aid in obtaining a sufficient signal-to-noise ratio between a source and receiving room, without using an extensive amount of amplification power and an associated speaker system.

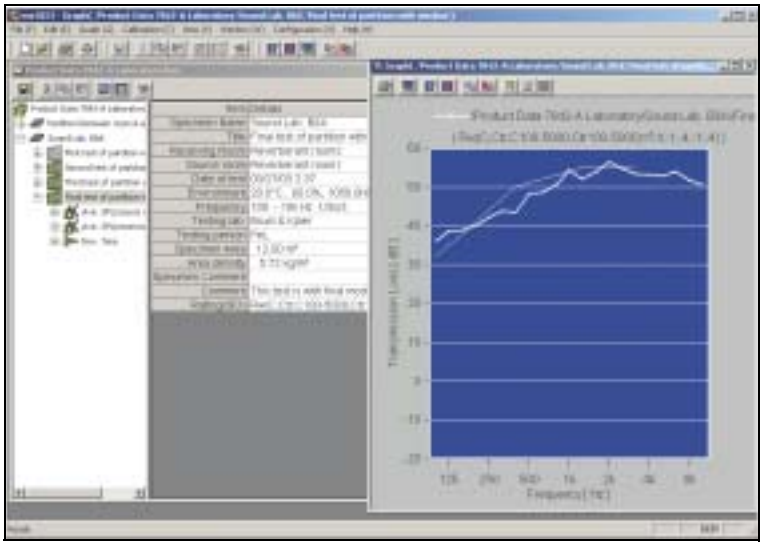
Import/Export

It is possible to export (measured) items from the project window to a file for later use in another project or as a starting point for specimen/room combination.

Presenting Results

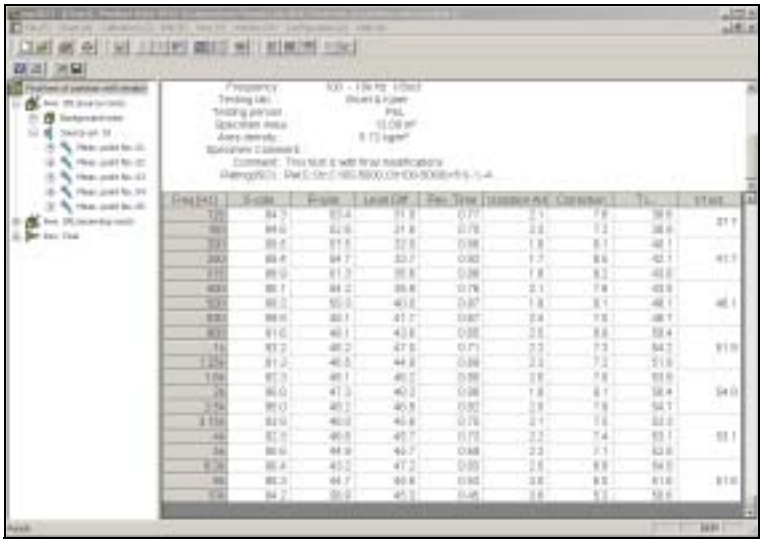
After the required measurements are done, you can select items in the project tree and detailed information for the specific item is shown in the list window. Results can be graphically presented, as shown in the display in Fig. 7.

Fig. 7
Results presented graphically



It is also possible to present results in tabular format, as shown in the display in Fig. 8.

Fig. 8
Results presented in tabular format

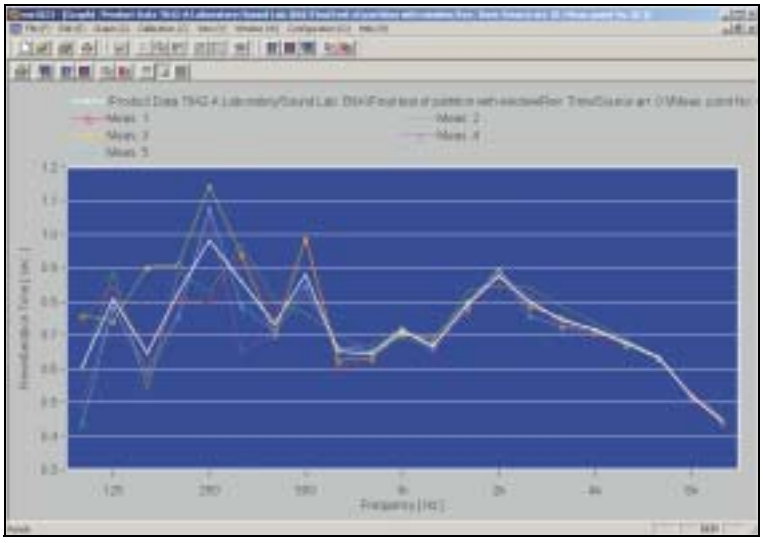


Evaluation of Results

It is possible to make detailed evaluations of the measurement of reverberation time, by inspecting the individual measurements, as shown in Fig. 9.

If some irregularities are found, you can mark specific reverberation times as “invalid” thus excluding them from the average value. This is particularly useful in field measurements, where an unsuccessful measurement can invalidate the final results.

Fig. 9
Reverberation time curves for evaluation purposes



The reverberation time values can be shown in tabular format and marked “valid” or “invalid”, as required. See Fig. 10.

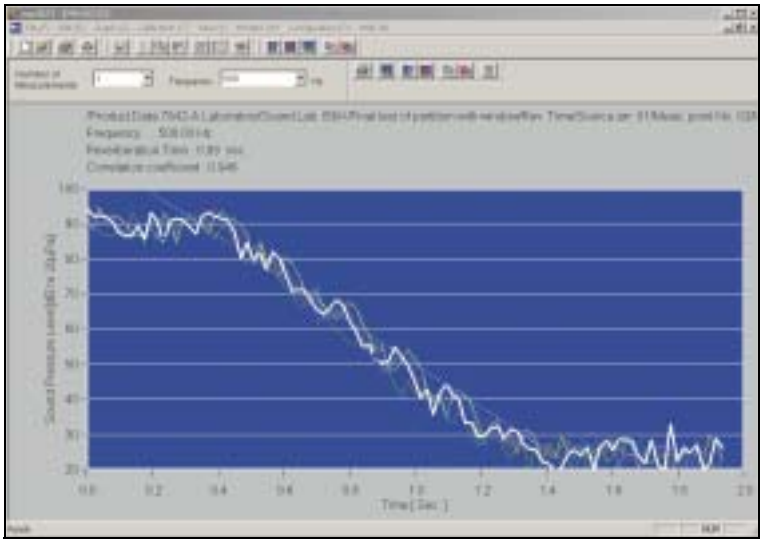
Fig. 10
Part of table showing reverberation times and the method of marking individual entries with Valid/ Invalid

Name :	Rev. Time		
of test :	03/27/03 2:37		
onment :	20.0°C, 60.0%, 1050.0hPa		
ontrol :	Fixed microphone positions(Step)		
ource :	All bands		
ce arr. :	1		
Meas. 1		Meas. 2	
Rev. Time	Correlation coefficient	Rev. Time	Correlation coeffici
0.75	0.902	0.59	0.8
0.84	0.820		0.8
0.64	0.959		0.9
0.81	0.948		0.9
0.80	0.960		0.9
0.95	0.952	0.97	0.9
0.75	0.965	0.80	0.9
0.98	0.946	0.77	0.9
0.61	0.983	0.70	0.9

✔ Valid
Invalid
Decay Curve

You can also make detailed evaluations of the associated decay curves as shown in Fig. 11.

Fig. 11
Decay curves for evaluation purposes



Reporting

By selecting an item in the project tree, which already contains measured data, and then selecting **Generate Report** from the **File** menu, a Microsoft® Excel spreadsheet will be generated with all the data from the selected item and its associated "sub measurements". This is a very fast way to generate a complete list of the performed measurements.

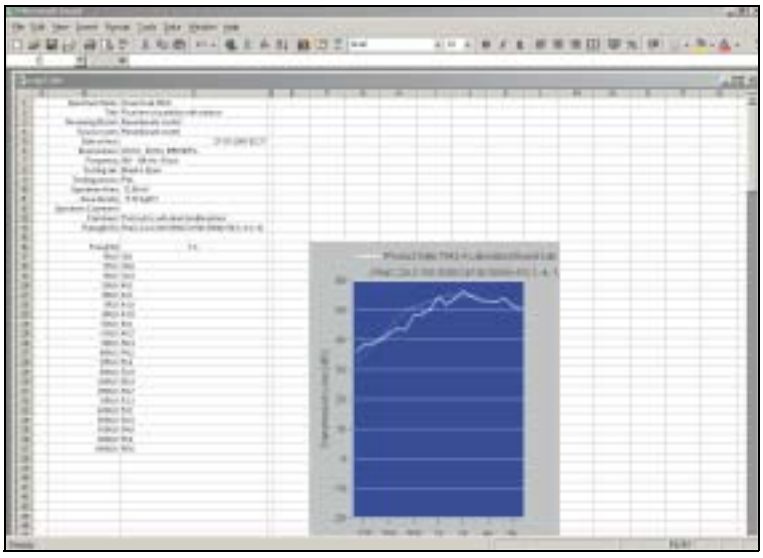


Fig. 12
How the measured data will appear in a Microsoft® Excel spreadsheet, after generating a report

Measurement Standards

The following standards are supported:

General definitions

L1:	Spectrum of level in source room
L2:	Spectrum of level in receiving room.
B2:	Spectrum of background noise level in receiving room
Averaging:	Levels (L1, L2 and B2) are averaged for a number (n) of positions using: $L = 10\log\frac{1}{n}\sum_{i=1}^{n} 10^{L_i/10}$
T2:	Spectrum of reverberation time in receiving room. Alternatively, T may be used as a symbol
Averaging:	Reverberation times for a number of positions may be averaged using arithmetical averaging. Alternatively, decay curves may be averaged for a number of positions (ensemble averaging)
To:	Reference reverberation time. For dwellings, normally 0.5s. Several standards have equations to calculate To as a function of V
Ao:	Reference equivalent absorption area. Ao=10m^2 is the value used in all standards
V:	Volume in m^3 of receiving room
S:	Surface area in m^2 of partition between transmitting and receiving room

ISO (Definitions identical to ISO are not listed)

D:	Level difference	D = L1– L2
Dw:	Weighted level difference	
Dn:	Normalized Level Difference	Dn = L1– L2+10log 10T/0.16V
DnT:	Standardized level difference	DnT = L1– L2+10log T/To
DnTw:	Weighted standardized level difference	
R′:	Apparent sound reduction index	R′ = L1– L2+10log ST/0.16V
R′w:	Weighted apparent sound reduction index	
R:	Sound reduction index	R = same as R′
Rw:	Weighted sound reduction index	
L′nT:	Standardized impact sound pressure level	L′nT = L2–10log T/To
L′n:	Normalized impact sound pressure level	L′n = L2+10log 0.016V/T
C:	Spectrum adaptation term (pink spectrum)	
Ctr:	Spectrum adaptation term (traffic spectrum)	

SS– Sweden (Definitions identical to ISO are not listed)

R'_{w8}:	Result of weighting calculation using 8dB-rule (see SS EN 20140). D_{w8}, D_{nTw8}, L'_{nTw8} and L'_{nTw8} are similarly calculated

DIN– Germany (Definitions identical to ISO are not listed)

Dnw:	Bewertete Norm-Schallpegeldifferenz

NF– France (Definitions identical to ISO are not listed)

DnAT:	= DnATrose, DnATroute. Isolement au bruit aérien normalisé exprimé en dB(A)
Rrose:	Indice d'affaiblissement acoustique exprimé en dB(A), pour un bruit rose
Rroute:	Indice d'affaiblissement acoustique exprimé en dB(A), pour un bruit de trafic routier
LnAT:	Niveau de bruit de choc normalisé exprimé en dB(A)
LnA:	Niveau de bruit de choc normalisé exprimé en dB(A)

NEN– Holland (Definitions identical to ISO are not listed)

Ilu:	Isolatie-index voor luchtgeluid
Ilu;k:	Karakteristieke isolatie-index voor luchtgeluid
Sz;vg:	Oppervlakte van het gemeenschappelijke deel van de inwendige scheidingsconstructie tussen de zendruimte en het verblijfsgebied, in m^2
Gi:	Partiële geluidwering van een scheidingsconstructie voor octaafband
G_A:	Geluidwering van een scheidingsconstructie
$G_{A;k}$:	Karakteristieke geluidwering van een scheidingsconstructie
Ico:	Isolatie-index voor contactgeluid

ASTM–USA (Definitions identical to ISO are not listed)

NR:	Noise Reduction (corresponds to D in ISO)
NIC:	Noise Insulation Class (corresponds to Dw in ISO)
NNR:	Normalized Noise Reduction (corresponds to DnT in ISO)
NNIC:	Normalized Noise Reduction Class (corresponds to DnTw in ISO)
FTL:	Field Transmission Loss (corresponds to R' in ISO)
FSTC:	Field Sound Tranmission Class (corresponds to R′w in ISO)
IIC:	Impact Insulation Class (corresponds to 110 dB minus L′nw in ISO)

JIS–Japan (Definitions identical to ISO are not listed)

TL:	Transmission Loss (corresponds to R in ISO)
ASIG:	Airborne Sound Insulation Grade
ASIC:	Airborne Sound Insulation Class
ISIG:	Impact Sound Insulation Grade
ISIC:	Impact Sound Insulation Class

Specifications – Classifier Types 7842-A-N and 7842-B-N

For detailed specifications of the recommended PULSE Generator, 4/2-ch. Input/Output Module Type 3109, please refer to the System Data Sheet for PULSE software, BU 0228

All measurements can be performed manually or semi-automatically. The level of automation depends on the channel configurations and on whether remotely controlled rotating microphone booms are used

Measurement and Calculation Standards

See Measurement Standards on page 8

Recommended Minimum Computer Configuration

- Pentium® III, 750 MHz, with min. 256 MB RAM
- 4 GB Hard Disk
- CD-ROM Drive
- Ethernet 10/100 Mbit Network Interface Card
- 1024 × 786 display, 16000 colours
- Microsoft® Windows® 2000 (Service Pack 3) or Microsoft® XP Professional
- Microsoft® Office 2000 (Service Release 2) or Microsoft® Office XP

Ordering Information

Type 7842-A-N	Classifier Laboratory version. 4-channel version optimised for Laboratory measurements
Type 7842-B-N	Classifier Field version. 2-channel version optimised for Field measurements

Services Available

Type 7842-A-MS1	1-year Software Maintenance & Support Agreement for Classifier Lab version
Type 7842-B-MS1	1-year Software Maintenance & Support Agreement for Classifier Field version

Suggested System Configurations

Laboratory Measurements

Type 7842-A-N	Classifier (four-channel up to 10 kHz in each channel)
Type 3560 C	Portable PULSE
Type 7533	LAN – Interface module
Type 3109	Generator, 4/2-ch. Input/Output Module
Type 7771-N4	CPB Analysis, 1–4 channel license

Field Measurements

Type 7842-B-N	Classifier (two-channel up to 10 kHz in each channel)
Type 3560 C	Portable PULSE
Type 7533	LAN – Interface module
Type 3109	Generator, 4/2-ch. Input/Output Module
Type 7771-N2	CPB Analysis, 1–2 channel license

Optional Accessories

Type 4190-L-001	Free-field ½″ Microphone with 2669 L, TEDS
Type 4188-A-021	Prepolarized Free-field ½″ Microphone with 2671, TEDS
Type 4943-L-001	Diffuse-field ½″ Microphone with 2669 L, TEDS
Type 4231	Sound Level Calibrator, 1 kHz, 94 dB and 114 dB, Class 1
Type 4228	Pistonphone, 250 Hz, 124 dB, Class 0
AO 0442	Microphone Extension Cable, 10 m
AR 0199	10-pin Flat Cable
Type 3923	Rotating Microphone Boom
UA 0587	Heavy Duty Tripod for Rotating Boom Type 3923, includes Extension Rods and UA-0588
UA 1317	½″ Microphone Holder
UA 0801	Lightweight Tripod
Type 4296	OmniPower (Omnidirectional) Sound Source with Tripod
Type 2716	Power Amplifier 300 W for OmniPower Sound Source Type 4296
KE 0358	Carrying Case for Amplifier Type 2716
KE 0365	Flight Case for OmniPower Sound Source with Tripod Type 4296
KE 0364	Carrying Bag for OmniPower Sound Source with Tripod Type 4296

When using the Sound Intensity Method

Type 3599	Sound Intensity Probe Kit
UA 1451	Telescopic Boom Kit
Type 4297	Sound Intensity Calibrator

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