

BRÜEL & KJÆR® Acoustic transducers

Road Surface Absorption Measurement System Type 9740

Road Surface Absorption Measurement System Type 9740 is state-of-the-art in normal incidence absorption measurement technology. Affixed directly to the surface of an ISO 10844 and ISO 13472 regulated test track, the system is used to measure the absorption coefficient of the asphalt without drilling a core sample, based on ISO 13472.

Type 9740 is a lightweight, compact, robust and user-friendly system, suitable for research and production quality control with absorption and impedance measurements up to 155 dB SPL. It allows extraction of key acoustic parameters, such as impedance spectra versus overall SPL, and acoustic resistance versus acoustic velocity.



Uses and features

Uses

- Research and quality control absorption measurements
- Measurement of the acoustic properties of ISO test track based on ISO 10844 and ISO 13472
- Measurement of:
 - Acoustic absorption coefficient
 - Acoustic reflection coefficient
 - Normalized impedance
- Measurements on complex or composite materials
- Measurements on orientation-sensitive materials

Features

- Turnkey system for ease of operation during calibration, measurement and data export
- Measure at overall SPL (OASPL) up to 155 dB
- Measurement parameters and routines include:
 - Absorption and reflection coefficients
 - Normalized impedance and admittance
- Measurements viewable in real time for ease of monitoring
- Measure with broadband, pure-tone, or user-defined source
- Based on two-microphone transfer function test method, allowing fast data measurement
- Employs LAN-XI data acquisition and PULSE LabShop analysis system, providing high speed and accuracy
- Continuing customer support to ensure system longevity
- Compact: Length 619 mm (24.37 in), max. diameter 110 mm (4.33 in)
- 100 mm (3.94 in) inner diameter tube sized for optimum performance between 220 Hz and 1800 Hz with narrow-band analysis and 250 Hz to 1600 Hz with 1/3-octave analysis
- One carrying case for complete system
- Flat flange designed for optimized sealing: flange removable for replacement with custom-built curved flanges, for maximized sealing to contoured panels

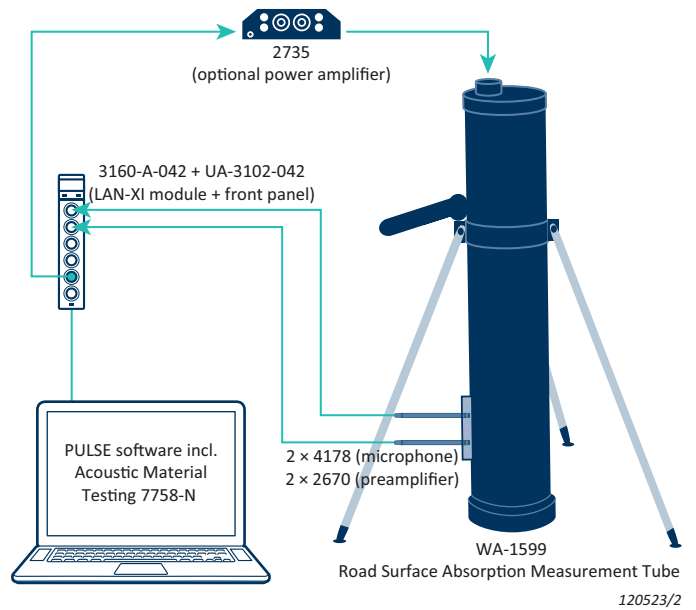
A versatile and modern measurement system

Road Surface Absorption Measurement System Type 9740 can be used for in situ measurement of the quality assurance acoustic properties of test track asphalt, which is regulated by ISO 10844 and ISO 13472.

The system is based on the two-microphone transfer function test method, which means that measurements take only a fraction of the time required by traditional, standing-wave ratio systems. Using two fixed microphones, the test system makes simultaneous measurements at all frequencies of interest.





PULSE Acoustic Material Testing in a Tube Type 7758 works in conjunction with a LAN-XI data acquisition unit and Road Surface Absorption Measurement Tube WA-1599. As a result, all the benefits of the PULSE LabShop platform are available, including advanced features for calibration, measurement, display and reporting, the PULSE LabShop task-oriented user-interface, and extreme accuracy. The system also contains all the functionality of the standard material testing software, which is a complete and fully integrated system for making acoustic measurements in the frequency range 220 Hz to 1.8 kHz with narrow-band analysis, and 250 Hz to 1.6 kHz with 1/3-octave band analysis.

Fig. 1 Road Surface Absorption Measurement System (PC not included)



Compliance with standards

NOTE: The equipment is not suitable for operation in residential areas as it complies with Class A emission requirements.

   	<p>The CE marking is the manufacturer's declaration that the product meets the requirements of the applicable EU directives. RCM mark indicates compliance with applicable ACMA technical standards – that is, for telecommunications, radio communications, EMC and EME in Australia.</p> <p>China RoHS mark indicates compliance with administrative measures on the control of pollution caused by electronic information products according to the Ministry of Information Industries of the People's Republic of China.</p> <p>WEEE mark indicates compliance with the EU WEEE Directive.</p>
Safety	EN/IEC 61010-1 (2010): Safety requirements for electrical equipment for measurement, control and laboratory use.
EMC Emission	<p>EN/IEC 61000-6-4: Generic standards – Emission standard for industrial environments.</p> <p>EN 61326-1 (2013): Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 1: General requirements. Class A equipment.</p> <p>This device complies with part 15 of the FCC Rules.</p> <p>This ISM device complies with Canadian ICES-001 (interference causing equipment standard).</p>
EMC Immunity	<p>EN/IEC 61000-6-1: Generic standards – Immunity for residential, commercial and light industrial environments.</p> <p>EN/IEC 61000-6-2: Generic standards – Immunity for industrial environments.</p> <p>EN/IEC 61326-1 (2013): Electrical equipment for measurement, control and laboratory use – EMC requirements.</p> <p>Note: The above is only guaranteed using accessories listed in this document.</p>
Temperature	<p>EN 60068-2-1: Environmental testing - Part 2-1: Tests - Test A: Cold</p> <p>EN 60068-2-2: Environmental testing - Part 2-2: Tests - Test B: Dry heat</p> <ul style="list-style-type: none"> Operating Temperature: -10 to +55 °C (15 to 131 °F) Storage Temperature: -25 to +70 °C (-13 to +158 °F)
Humidity	EN 60068-2-78: Damp Heat: 93% RH (non-condensing at 40 °C (104 °F)).
Mechanical	<p>Non-operating:</p> <p>EN 60068-2-6: Vibration: 0.15 mm, 20 m/s², 10 – 500 Hz</p> <p>EN 60068-2-27: Shock: 500 m/s²</p> <p>EN 60068-2-29: Bump: 1000 bumps at 150 m/s²</p>
Enclosure	EN 60529: Protection provided by enclosures: IP 20

FREQUENCY RANGE

Tube: 220 Hz to 1.8 kHz (narrow-band analysis)

ZERO ABSORPTION

250 Hz to 1.6 kHz: <4% (calculated in 1/3-octave bands)

¼-INCH CONDENSER MICROPHONE CARTRIDGE TYPE 4187

To optimize the measurement accuracy, the microphones have a non-removable protection grid that forms an airtight front cavity. This gives a coupling between the tube and the microphones that is well-defined with respect to phase.

Open-circuit sensitivity (250 Hz): 4 mV/Pa (–48 ± 3 dB re 1 V/Pa)

Capacitance (250 Hz): 6.4 pF, typical

Frequency response characteristic (flush-mounted) ±1 dB:

1 Hz to 8 kHz

Polarization voltage: 200 V

PREAMPLIFIER

Type 2670-W-012

ENVIRONMENTAL SENSORS

Integrated sensors measure temperature, pressure and relative humidity

LOUDSPEAKER

Max. average power: 10 W at 20 °C (68 °F)

Max. pulsed power: 50 W for 2 s (limited by protection circuit)

Impedance: 4 Ω

Diameter: 80 mm (3.2 in)

OPERATION

Sound source activation and status indicator integrated in handle

DIMENSIONS

Tube inner diameter: 100 mm (3.94 in)

Tube length: 619 mm (24.37 in)

Max. diameter: 110 mm (4.33 in)

WEIGHT (WITHOUT ACCESSORIES)

4.2 kg (9 lb 4 oz)

Specifications – PULSE Acoustic Material Testing in a Tube Type 7758

PULSE Acoustic Material Testing Type 7758 is a PULSE LabShop software application for use with LAN-XI data acquisition hardware and Road Surface Absorption Measurement Tube WA-1599-W-003

SYSTEM REQUIREMENTS

- Microsoft® Windows® 10 Pro or Enterprise (x64) with either Current Branch (CB) or Current Branch for Business (CBB) servicing model
- Microsoft® Office 2016 (x32 or x64) or Office 2019 (x32 or x64)
- Microsoft® SQL Server® 2017

Ordering information

Due to the variety of options, systems are ordered via Project Sales.

A typical Road Surface Absorption Measurement System Type 9740 may include the following:

- Type 7758-N: PULSE Acoustic Material Testing Program (node-locked licence)
- Type 8400-N: BK Connect Data Viewer (node-locked licence)
- Type 8401-N: BK Connect Hardware Setup (node-locked licence)
- Type 8403-N: BK Connect Data Processing (node-locked licence)
- Type 3160-A-042: LAN-XI Generator, 4/2-ch. Input/Output Module 51.2 kHz (Mic, CCLD, V)
- UA-3102-042: LAN-XI Front Panel, generator for 200 V microphone
- WA-1599-W-003: Road Surface Absorption Measurement Tube (220 Hz – 1.8 kHz, max. 155 dB SPL) including:
 - Power cable, 10 m (32.8 ft)
 - 2 × ¼-inch Condenser Microphone Type 4187
 - 2 × Preamplifier Type 2670-W-012
 - WE-0252: Carrying case
- Type 2735: 2 × 35 Watt Measurement Power Amplifier (optional)

Related products and services

SOFTWARE MAINTENANCE AND SUPPORT AGREEMENTS

M1-7758-N	Agreement for Type 7758-N
M1-8400-N	Agreement for Type 8400-N
M1-8401-N	Agreement for Type 8401-N
M1-8403-N	Agreement for Type 8403-N

ADDITIONAL HARDWARE

Type 4228	Pistonphone
Type 4231	Sound Calibrator
DP-0775	Adapter for ¼-inch microphones (for Type 4231)
WC-0015	Microphone Fixing Knob

Skodsborgvej 307 · DK-2850 Nærum · Denmark
Telephone: +45 77 41 20 00 · Fax: +45 45 80 14 05
www.bksv.com · info@hbkworld.com
Local representatives and service organizations worldwide

To learn more about all HBK offerings, please visit hbkworld.com

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