

ROOM ACOUSTICS REVERBERATION TIME - ABSORPTION COEFFICIENT.

Determine the acoustic properties of rooms and calculate the absorption of materials - simple and easy.



INTRODUCTION

The acoustic properties of a room design should ensure that it is easy to both speak and listen with a high degree of intelligibility. Reverberation Time is the single most important parameter used to evaluate room acoustics.

The Dewesoft RT60 solution is the perfect tool for making reverberation time measurements. A combination of flexible hardware and easy to setup software provides reliable results for effective design and modification of room parameters.

APPLICATIONS

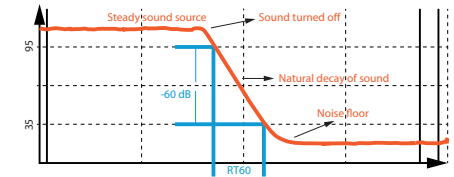
Room acoustic quality – sound comfort and intelligibility – of enclosed spaces such as domestic rooms, offices, workshops, factory halls, classrooms, lecture rooms, auditoria, concert halls, restaurants, sports halls, stairways, railway and airport terminals, vehicle cabins etc.

FUNCTIONALITY

Reverberation time (RT) is a measure for the time it takes sound to decay in an enclosure. Sound waves in a room will repeatedly bounce off reflective surfaces. When these reflections mix with each other, reverberation is created. Reverberation reduces when the reflections hit absorbent surfaces such as curtains,

chairs, and tables.

RT60 plugin calculates the RT in different octave bands using integrated response or interrupted noise method with different evaluation ranges possible. The impulse response may be measured directly by using an impulse source, e.g. a pistol shot or balloon burst.



Reverberation Time (RT60)

RT60 is defined as the time it takes for the sound pressure level to reduce by 60 dB, measured after the sound source is abruptly switched off. RT60 provides an objective reverberation time measurement.

Sound absorption coefficient of materials (Alpha)

The absorption (alpha) coefficient of a material indicates the proportion of sound absorbed by a surface compared to the proportion reflected. It is calculated by two principles; Sabine equation (consistent with ISO 354:2004) or Eyring equation. Used in sound insulation measurements according to ISO 140 (all parts) and sound power measurements according to ISO 3740.



KEY FEATURES



T20, T30 AND T60

Different evaluation ranges for reverberation time estimation (T20, T30 and T60).

COMPLIES TO STANDARD

RT60 measurement compliant with ISO 354 using integrated response method.

LUNDBY METHOD

Estimation of modal decay parameters using Lundby method.

ABSORPTION COEFFICIENT

Absorption coefficient calculation - report template.

BASE FOR SOUND POWER MEASUREMENTS

Preliminary measurements to describe room properties.

FREE SOFTWARE

Free lifetime software support and upgrades.

OPTIONAL

Octave filter and fractional octave filter calibration according to IEC 61260 and IEC 61672 for sound level meters.

SPECS

DAQ SYSTEM - SIRIUS ACC TYPE INPUT		
Inputs		
Input types	Voltage, IEPE	
ADC Type	24bit delta-sigma dual core with anti-aliasing filter	
Sampling Rate	Simultaneous 200kS/sec	
Ranges (Dual Core Low Range)	±10V (±500mV)	±500mV (NA)
Input Accuracy (Dual Core)	±0.1% of reading ±10(1)mV	±0.1 of reading ±1(NA)mV
Dynamic Range@10kS (Dual Core)	140 dB (160 dB)	135 dB (NA)
Typ. SNR@50kS (Dual Core)	107 dB (125 dB)	100 dB (NA)
Typ. CMR @ 50Hz/1kHz	140/120 dB	140/120 dB
Gain Drift	Typical 10 ppm/K, max. 30 ppm/K	
Offset Drift	Typical 0.5 μV/K + 2 ppm of range/K, max 2 μV/K + 10 ppm of range/K	
Gain Linearity	<0.02%	
Inter Channel Phase-mismatch	0.02° * fin [kHz] + 0.1° (@ 200 kS/sec)	
Channel Cross talk	>160 dB @ 1kHz	
Input Coupling	DC, AC 0.1 Hz,1Hz	
Input Impedance	1 MΩ (270kΩ for AC coupling ≥ 1Hz) in parallel with 100pF	
Overvoltage Protection	In+ to In-: 50 V continuous; 200V peak (10msec)	
IEPE mode		
Excitation	2, 4, 8, 12, 16 or 20mA	
Compliance voltage	25 Volt	
Output Impedance	>100 kΩ	
Sensor detection	Shortcut: <4Volt; Open: > 19Volt	
Counters (ACC+ type only)		
Inputs	1 digital counter input, 3 digital inputs, Fully synchronized with analog data	
Counter Modes	counting, waveform timing, encoder, tacho, gear-tooth sensor	
Additional Specifications		
Input connector BNC	BNC	
TEDS support	IEPE mode only	

RELATED PRODUCTS

- Sound Power
- Sound Quality
- Sound Intensity
- Sound Level Meter

SOFTWARE: DEWESoft X3

Recommended

Processor:	Intel Core i7 with 4 Cores (3rd generation or higher)
RAM:	8 gigabyte (GB)
Hard drive:	Solid-state drive (SSD)
Graphic card:	Compatible with DirectX 11
Display	1280x720 (HD Ready)
Operating system:	Windows 10 64-bit
*Actual requirements may be different due to specific setup configuration.	

TYPICAL CONFIGURATIONS

DEWESoft G.R.A.S. BASIC

- DEWESoft SI: sound intensity plugin
- SIRIUSm-4xACC: Sirius mini, 4 Channels
- 50GI-R CCP: Sound intensity probe incl. preamplifier, remote control, G.R.A.S.
- 42AG: G.R.A.S. Multifunction Sound Calibrator, Class 1
- Meteo: SPARC meteo (Temp., humidity and static pressure)
- CPB-CAL: Filter calibration according to IEC 61260
- UC-232A: USB to RS-232 Adapter (35cm)

DEWESoft G.R.A.S. ADVANCED

- DEWESoft SI sound intensity plugin
- SIRIUSi-8XACC, 8XAO: Sirius, 8 Channels, 8 Analog outputs
- 12AB: G.R.A.S. 12AB 2-Channel Power Module
- 42AG: G.R.A.S. Multifunction Sound Calibrator, Class 1
- 51AB: Sound intensity calibrator, G.R.A.S.
- Meteo: SPARC meteo (Temp., humidity and static pressure)
- CPB-CAL: Filter calibration according to IEC 61260
- UC-232A: USB to RS-232 Adapter (35cm)

DEWESoft KIT (SUPPORTS B&K PROBE)

- DEWESoft SI: sound intensity plugin
- SIRIUSm-4xACC - Sirius mini, 4 Channels
- 12AB: G.R.A.S. 12AB 2-Channel Power Module
- Adapter LEMO: 18 pin LEMO to 12 pin & RS232 adapter
- Meteo: SPARC meteo (Temp., humidity and static pressure)
- CPB-CAL: Filter calibration according to IEC 61260
- UC-232A: USB to RS-232 Adapter (35cm)

OPTIONAL ACCESSORIES

- 42AA G.R.A.S. Pistonphone, Class 1
- 50GI-CAL: Microphone calibration IEC 1043 Class 1 accredited
- 42AG-CAL: Calibrator calibration IEC 60952 accredited
- 51AB-CAL: Calibrator calibration IEC accredited



LEARN MORE:

<https://dewesoft.com/applications/acoustics/reverberation-time>

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