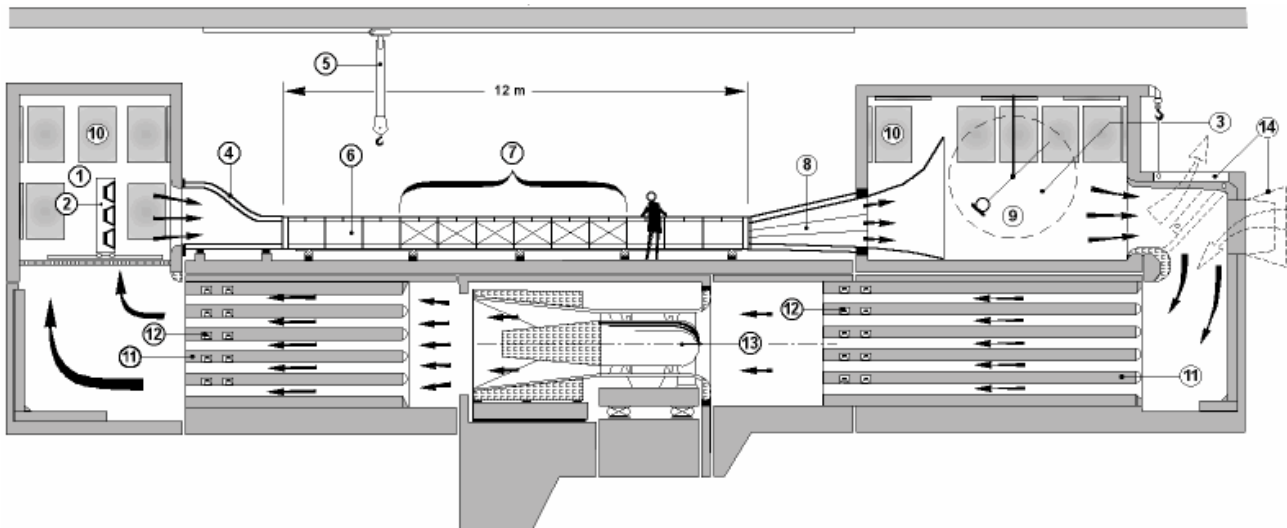


Silencer Test Facility



Technical Data

measurement section (6)

length: 12 m

width: 1000 mm; variable in the middle section (6 m length) from 500 to 1300 mm
in 50 mm-steps

height: 500 mm

source reverberation room (1)

length: 4 m

width: 6,25 m

height: 4,25 m

volume: 106 m³

acoustic equipment: loudspeaker wall: 2800 W, amplifier power: 1500 W

receiving reverberation room (9)

length: 6,5 m

width: 6,4 m

height: 4,5 m

volume: 187 m³

acoustic equipment: rotary microphone (3)

inlet nozzle (4)

length: 2 m

inlet cross section: 2,8 m x 1,4 m

outlet cross section: 1 m x 0,5 m

contraction: 8:1

air flow reversible[Ⓢ]

diffuser (8)

length: 5,5 m

inlet cross section: 1 m x 0,5 m, outlet cross section: 3 m x 5 m

fan (13)

length: 6,7 m

maximum diameter of inlet nozzle: 3,3 m, external diameter of the impeller: 1,6 m

hub percentage: 0,69

axial fan, two-stage, rotating direction reversible

rotational speed, infinitely variable: ≤ 989 U/min.

input power: ≤ 130 kW

flow rate: ≤ 35 m³/s

increasing of total pressure: ≤ 2500 Pa

specimen (7)

length normal: ≤ 6 m, maximum: ≤ 10 m (with 1 m width of duct)

height: 497 ± 3 mm

The IBP silencer test facility offers manufacturers of silencers and other fluid mechanic components the testing and further development of their products according to the exactly defined test conditions of standard DIN EN ISO 7235. The substitution method, used to measure insertion loss, determines the passing sound power in the receiving room with and without specimen in the measurement section.

If a silencer or other components are mounted in a flow duct, three parameters have to be determined, which can be measured by means of the silencer test facility according to the standards:

- Insertion loss of the component with and without flow
- Sound power of the flow noise of the component
- Pressure loss of the component

The 12 m long measurement section (6) of the test facility is coupled to a reverberation room at one end by an inlet nozzle (4) and at the other by a diffuser (8). A sound field is generated in the source reverberation room (1) by means of a loudspeaker wall (2), where at the beginning of the duct a plane wave prevails. The share of sound, which is transmitted through the measurement section, reaches the receiving reverberation room (3), where a diffuse sound field is generated. By means of a rotary microphone (9), which is mounted on the ceiling, the respective average spatiotemporal sound levels can be determined in the receiving room. Compound Panel Absorbers (10) with sealed edges are installed in the room angles in both reverberation rooms to smooth the modal sound field at very low frequencies. Heavy specimens may be lifted on the measurement section by means of a crane (5). Measurements of pressure losses are carried out between the two reverberation rooms. Air supply is provided by a two-stage axial fan (13) in the basement with a power of 130 kW allowing flow rates of up to 70 m/s in the 1 m wide duct. The rotating direction of the fan is reversible allowing a flow through the specimen in the direction of the incident sound as well as in the reverse direction. The measurement section has a clear cross section of 500 mm x 1000 mm over the total length. But the duct width may be varied in the middle section (7) over a length of 6 m within a range of 500 mm and 1300 mm in 50-mm-steps, allowing considerable flexibility for the arrangement of silencers and components. Air-borne sound permeating from outside and structure-borne sound transmitted along the measurement section is minimized by means of the module construction. Each module has a highly effective external sound insulation as well as an axial structure-borne sound insulation by means of rubber gaskets at the joints.

Careful sound insulation measures secure that only a negligible amount of the sound generated by the fan penetrates into the reverberation rooms. The fan is located between splitter silencers (11) with a thickness of 400 mm and air gaps of 340 mm. These are arranged over a length of 6 m behind and 8 m in front of the fan. For an additional attenuation at low frequencies, active absorber cassettes (12), which can be switch on, are integrated in the splitters.

To minimize interference caused by structure-borne noise from the fan, it is decoupled from the building unit by a double-elastic bearing on a heavy pedestal. In addition, the most important building parts of the unit are flexibly decoupled.