

Acoustic Insulation Measurement

CASE STUDY: Acoustic insulation of single and double partition walls between dwellings in semi-detached two-family houses using SVAN 979

Measurement Operator:

Team from the Silesian University of Technology (Politechnika Śląska) - Faculty of Civil Engineering - under the supervision of Dr. Eng. Rafał Żuchowski

Challenge:

Meeting acoustic requirements in semi-detached two-family houses.

Measurement Equipment:

SVAN 979 - Class 1 Sound and Vibration Level Meter

Modern single-family housing increasingly takes the form of semi-detached developments, where two segments of one building each contain two independent residential units. While such solutions are economically advantageous, they pose challenges in terms of the acoustic insulation of partitions between units – particularly with regard to the standards applicable to multi-family buildings.

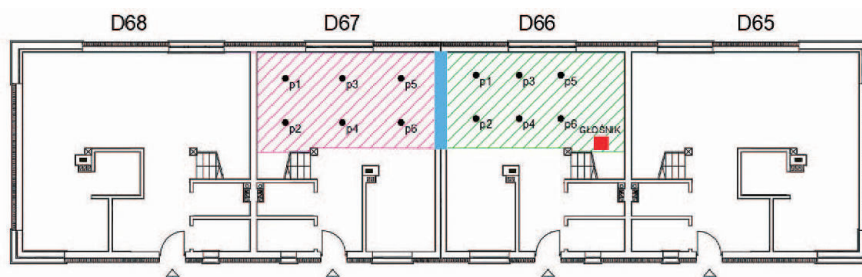


“Accurate acoustic measurements during the construction phase help verify the effectiveness of wall designs before interior finishing begins. By using advanced tools like the SVAN 979, designers and investors can ensure regulatory compliance and improve residential comfort.”

Rafał Żuchowski,
Silesian University of Technology



SVAN 979 during acoustic calibration process, using the SV 36 Sound Calibrator.



Research Contractor and Measurement Equipment

To verify compliance with normative requirements for acoustic insulation, field tests were carried out by a team from the Silesian University of Technology (Faculty of Civil Engineering), supervised by Dr. Eng. Rafał Żuchowski. The measurements used the **SVAN 979** Class 1 sound level meter from SVANTEK, known for its high precision and compliance with PN-EN ISO 717-1 and PN-EN ISO 16283-1 standards.

Design Solutions:

Single and double inter-unit partitions. In the examined building, two types of separating walls were used:

Single-layer wall

25 cm thick, made of Leier THERMOPOR® 25 AKU S acoustic ceramic blocks – separating two units within one segment.

Double-layer wall

Consisting of two 18.8 cm thick partitions made of Leier THERMOPOR® 18.8 P+W ceramic blocks, separated by a 2 cm air gap filled with EPS 100 polystyrene – separating two segments of the building.

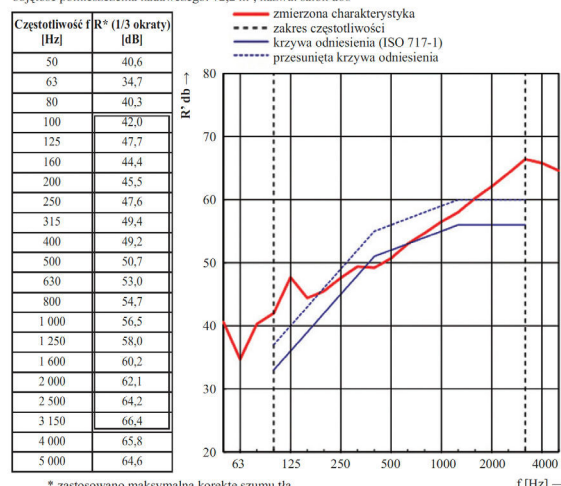
Measurement Procedure – Field Approach in Accordance with the Standard

The approximate acoustic insulation was measured in line with PN-EN ISO 16283-1:2014-05 and PN-EN ISO 717-1:2013-08 procedures. The test setup included a reference sound source, measurement microphones with windshields, an acoustic calibrator, and software for data recording and analysis.

The chart below shows the results of the acoustic measurement between rooms D67 and D66, which were separated by a double-layer wall with air gap.

The chart on the right shows the results of the acoustic measurement between rooms D66 and D65, which were separated by a single-layer wall.

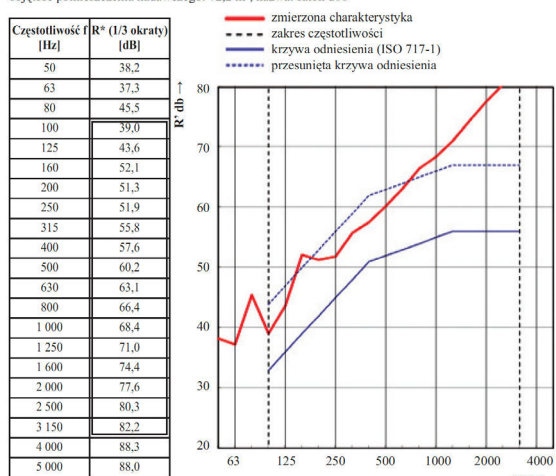
powierzchnia badanego elementu: 13,0 m²; notatka: ściana
objętość pomieszczenia odbiorczego: 86 m³; nazwa: salon d65
objętość pomieszczenia nadawczego: 72,2 m³; nazwa: salon d66



* zastosowano maksymalną korektę szumu tła

Wskaźniki wg ISO 717-1 $C_{50-500} = -1$ dB $C_{50-5000} = 0$ dB $C_{100-5000} = 0$ dB
 $R'_a(C; C_a) = 56 (-1; -4)$ dB $C_{n,50-500} = -5$ dB $C_{n,50-5000} = -5$ dB $C_{n,100-5000} = -4$ dB
 ocena na podstawie wyników pomiarów terenowych przeprowadzonych metodą inżynierską

powierzchnia badanego elementu: 13,0 m²; notatka: ściana
objętość pomieszczenia odbiorczego: 72,2 m³; nazwa: salon d67
objętość pomieszczenia nadawczego: 72,2 m³; nazwa: salon d66



* zastosowano maksymalną korektę szumu tła

Wskaźniki wg ISO 717-1 $C_{50-500} = -2$ dB $C_{50-5000} = -1$ dB $C_{100-5000} = 0$ dB
 $R'_a(C; C_a) = 63 (-1; -7)$ dB $C_{n,50-500} = -9$ dB $C_{n,50-5000} = -9$ dB $C_{n,100-5000} = -7$ dB
 ocena na podstawie wyników pomiarów terenowych przeprowadzonych metodą inżynierską

Measurements included:

Recording sound pressure levels in the source and receiving rooms,

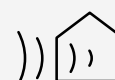
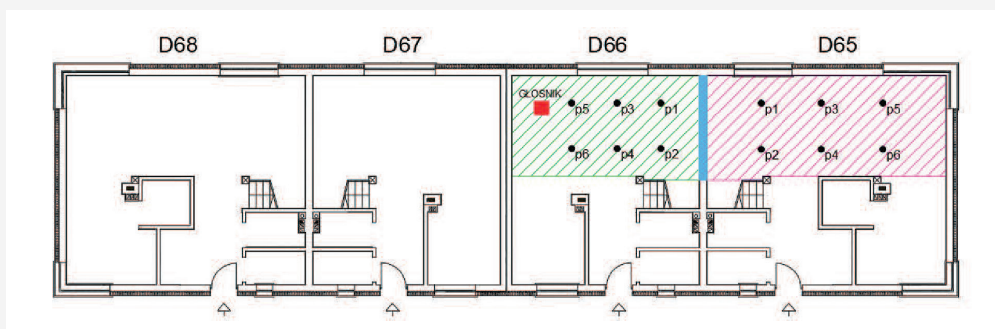
Determining reverberation time using the integrated impulse response method (with a starting pistol),

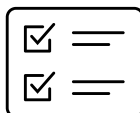
Correcting results for background noise levels.

The tests were performed at the finishing stage, before the installation of door joinery, which made it possible to assess the effectiveness of the building partitions themselves.

Results: Compliance with Standards and Confirmation of Solution Effectiveness

According to current regulations (ordinance of 27.10.2023), separating partitions in two-family houses must meet the same requirements as for multi-family buildings – i.e., minimum insulation of $R'_{A,1} \geq 52$ dB.





Measurement Results:

Single-layer wall

$R'w(C;Ctr) = 56 (-1; -4) \text{ dB}$

$R'A_1 = 55 \text{ dB}$

Double-layer wall with air gap

$R'w(C;Ctr) = 63 (-1; -7) \text{ dB}$

$R'A_1 = 62 \text{ dB}$



Conclusions for Designers and Investors:

Using properly designed partitions, such as acoustic ceramic block walls or double-layer systems with an air gap, ensures effective acoustic protection in two-family houses. Measurements taken with the **SVAN 979** meter from SVANTEK make it possible to precisely verify compliance with standards even before construction work is completed.

Thanks to these studies, it is possible to implement proven and effective solutions that guarantee acoustic comfort for residents while ensuring compliance with building regulations.



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