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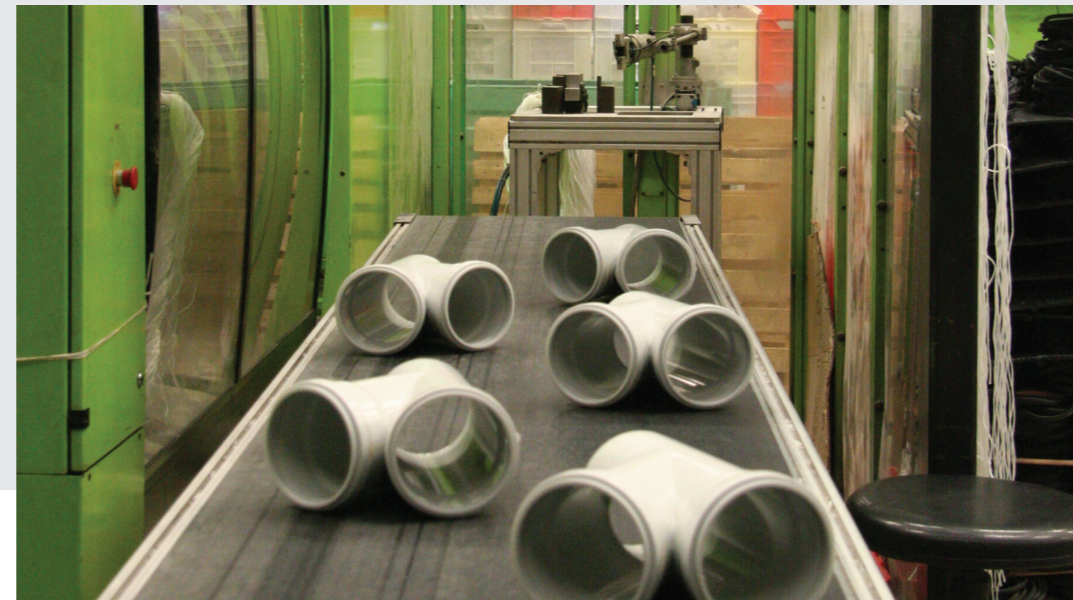
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FITTINGS

ELBOW (45°)	SINGLE BRANCH (45°)	ELBOW (87°)	T-PIECE
VERTICAL SOUNDPROOF PIPE CLAMP WITH NUTS	HORIZONTAL SOUNDPROOF PIPE CLAMP WITH NUTS	VERTICAL SOUNDPROOF PIPE CLAMP WITH TRIPHONE	HORIZONTAL SOUNDPROOF PIPE CLAMP WITH TRIPHONE
PLUG	SLIDING SOCKET	T BRANCH	CLEANOLT T-PIECE
REDUCER	S SIPHON	REA AIR SOCKET	LENGTHENING PIPE
S SIPHON WITH SOCKET			



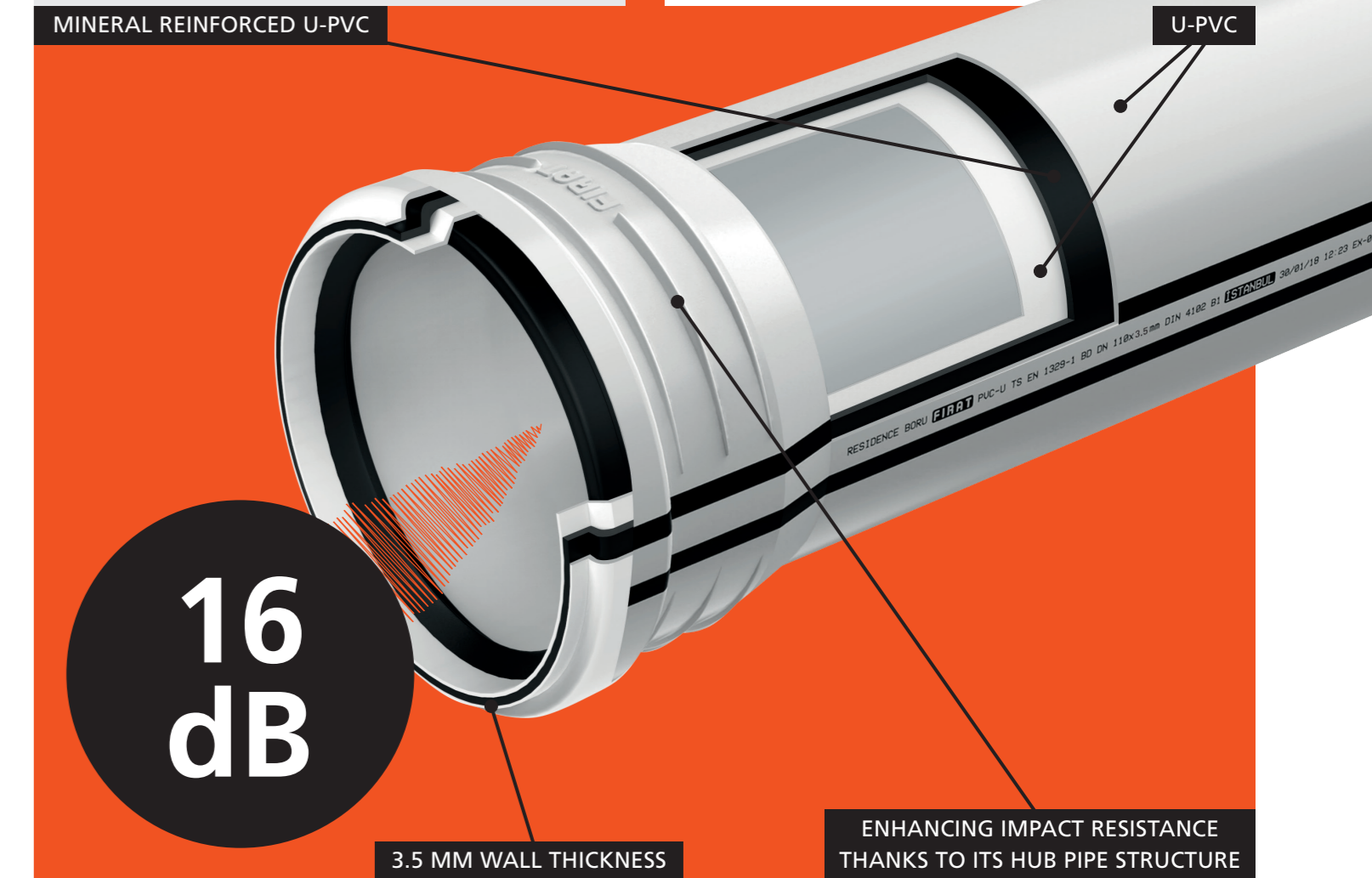
FUDEL ACCREDITED LABORATORY

The quality of plastic pipe systems used in infrastructure and superstructure investments is subject to international standards and compliances

to these standards is a significant input in relation to the export capability of the Turkish industry. Systems, which are awarded quality approvals without performance of the required tests, cause the country's resources to be wasted due to incurrence of much higher costs. Turkey's lack of accredited test laboratories with high testing capacity, in which plastic pipe systems tests could be performed independently and impartially, was an important drawback for the country. Now, there is a major laboratory in the country which is accredited by TÜRKAK, the only public institution in Turkey with international validity, which will eliminate this drawback and enable the national resources to be used more efficiently. FUDEL, which has the largest technological infrastructure in the country and the capability to deliver results to its customers in the shortest time possible, through an expert and competent staff, is the leading laboratory in the sector with a capacity for 22 different types of tests.



For your comfort
more soundproof,
for your safety
it is fireproof.



RESIDENCE II
SOUNDPROOF
RESIDENCE PIPES
& FITTINGS

FIRATPIPE

1181 - 4106001306 - A

GENERAL DESCRIPTION

Fluids passing through the pipes at different flow velocities result in vibrations by hitting the pipe sides and obstacles in the pipes which causes disturbing noises in buildings. The emerging modern developments in the construction sector expedite the housing delivery time. Construction firms need soundproof pipes in order to reduce additional labor and time costs regarding installations insulation.



USAGE AREAS OF SOUND-PROOF PIPES

Due to its characteristics of being ecological, economic and soundproof Residence II Pipe and Fittings is a preferable choice to be used in villas and multi-floor residences, hospitals, schools, hotels and industrial or sportive structures, etc. These products ensure for the sewage from the foundation and interior structures of the building to be drained in an ideal and safe way without any leakage for a long term use (50 years).

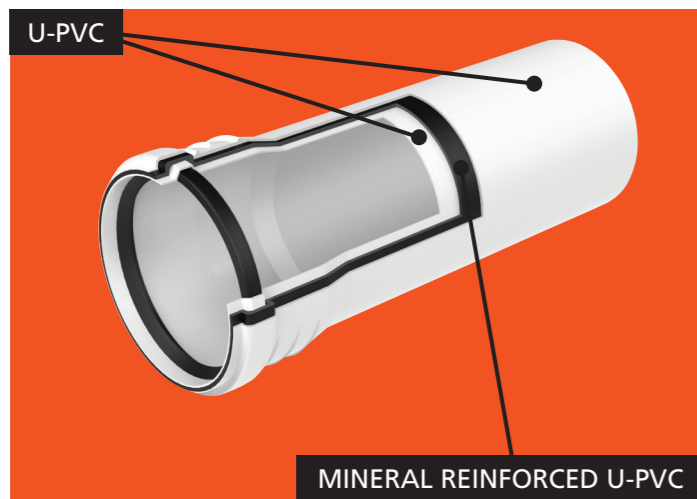
MATERIAL FEATURES

RESIDENCE II PIPES AND FITTINGS are produced three-layered with a mixture of U-PVC and vinyl-copolymer (FRvinyflex) raw materials.

Inner Layer: Made of U-PVC having smooth inner surface

Middle layer: FRvinyflex® is a mineral-based additive developed in Frirat R&D laboratories which provides Residence II Pipes with soundproof features.

Outer Layer: Made of U-PVC protecting the pipes against external impacts



GASKET

The O-ring seals used in Residence II Pipes and Fittings are made from EPDM and thanks to their unidirectional and special exterior shape they provide 100% leakproofing. Manufactured according to TS EN 681-1 standard.



100% LEAKPROOF THANKS TO UNIDIRECTIONAL EPDM SEAL AND ITS SPECIAL OUTSIDE SHAPE

APPEARANCE

→ Residence II Pipes and Fittings are manufactured in gray color.

→ Reinforcing are added in order to reinforce impact resistance of the pipe muff structure.



ENHANCING IMPACT RESISTANCE THANKS TO ITS REINFORCED STRUCTURE

PHYSICAL AND CHEMICAL PROPERTIES

Residence II Pipes and Fittings meets the mechanical and chemical properties mentioned in TS EN 1329-1 standard.

Serial	Test	Test Method	Test period	Test Temperature	Required Performance
1	Impact Resistance	ISO 3127	-	0°C	Max. 10%
2	Vicat Softening Temperature	ISO 2507-1	-	-	Min. 79°C
3	Lengthwise Dimensional Change	EN ISO 2505	30 min.	150°C	Max. 5%
4	Resistance to Dichloromethane	ISO 9852	30 min.	15°C	Any break downs must not be observed.
5	Temperature Influence Test (Fitting)	EN ISO 580	30 min.	150°C	Any break downs must not be observed.
6	Leakage Test (0,5 bar) (System)	TS EN ISO 13254	15 min.	23°C	Any leakage must not be observed.

DIAMETER AND WALL THICKNESS OF RESIDENCE II PIPES

Pipe outer diameter (mm)	Wall Thickness (mm)
50	3,0
75	3,0
110	3,5
125	3,6
160	4,3



STANDARDS AND TEST REPORTS OF RESIDENCE II PIPES AND FITTINGS

→ The products meet the mechanical and physical requirements of BD class of TS EN 1329-1 standards. BD application class; includes, The indoor surface-mounted applications, indoor under surface applications and the sewerage connections of the buildings.

→ Residence II Pipes and Fittings are categorized as Non-Flammable according to "Turkish Building Fire Safety Regulations" in the scope of 2007/12937 decision of the Ministry of public works and settlement.

→ As a result of the fire response performance test carried out at UL, an independent US-based product safety certification agency, Residence II Pipes and Fittings are categorized as V-0 NON-COMBUSTIBLE.

→ According to the INSPECTION AND TEST REPORT PREPARED BY TSI DIRECTORATE OF TESTING AND CALIBRATION LABORATORIES, the results from reaction to fire tests show that Residence II Pipes and Fittings are categorized as B S2 D0 in the scope of TS EN 13501-1 +A1:2013-04 Fire Classification of Construction Products and Building Elements: classification using data from reaction to fire tests. Fire class B, Smoke generation S2, Flaming droplets D0.

FIREPROOF PERFORMANCE CLASSES FOR THE BUILDING MATERIALS, OTHER THAN FLOORINGS

According to the EU Commission decision 2002/4390 the fire resistance classes of all construction materials, specified according to the flammability classes of the constructions materials, specified in the regulation on the protection of buildings from fires are as follows

Inflammability of the Materials	Europe Classification (According to TS EN 13501-1)
Non Combustible	A1
Not Easily Combustible	A2 - s1, d0
Non-Flammable	B, C - s1, d0
	A2 - s2, d0
	A2, B, C - s3, d0
	A2, B, C - s1, d1
	A2, B, C - s1, d2
(minimum)	A2, B, C - s3, d2
Normal Flammable	D - s1, d0
	D - s2, d0
	D - s3, d0
	E
	D - s1, d2
	D - s2, d2
	D - s3, d2
(minimum)	E - d2
Easily Flammable	F

RESIDENCE II PIPE AND FITTINGS ARE SOUNDPROOF.

According to the results of the sound level measurement test, done at the Fraunhofer Institut Bauphysik (Germany) Residence II Pipe and its fittings meet all national and international standard requirements.

Flow Rate (liters per second)	0,5	1,0	2,0	4,0
Characteristic Sound Level (Cimbel (dB (A)) (Clamp Pipe System)	2	7	11	16

Fraunhofer IBP

Institution for testing, supervision and certification, officially recognized by the building supervisory authority. Research of new building materials, components and types of construction.

Director: Prof. Dr. Ingo Lottner
Prof. Dr. Klaus Peter Seibauer

Test Report P-BA 183/2020e

Determination of the Acoustic Performance of a Wastewater Installation System in the Laboratory according to EN 14366

Client: Frirat Plastik Kaçuk San. ve Tic. A.Ş. Türkoba Mahallesi Frirat Plastik Caddesi No: 23, Büyükdere İstanbul, TÜRKİYE

Test object: Wastewater system "FRIRAT RESIDENCE PIPE, 110x3,5, PVC-U, 0307/20" (manufacturer: Frirat Plastik). The wastewater system consisted of straight plastic pipes and fittings and acoustic pipe clamps "Bimat 1000" (manufacturer: Walraven).

Content: Results sheet 1: Figures 1 to 3: Detailed results. Figures 4 and 5: Test set-up. Annex A: Measurement set-up, noise excitation, acoustic parameters. Annex F: Evaluation of measurements. Annex V: Description of the test facility. Assessment according to VDI 4100

Test date: The measurement was carried out on September 3, 2020 in the test facilities of the Fraunhofer Institute for Building Physics in Stuttgart.

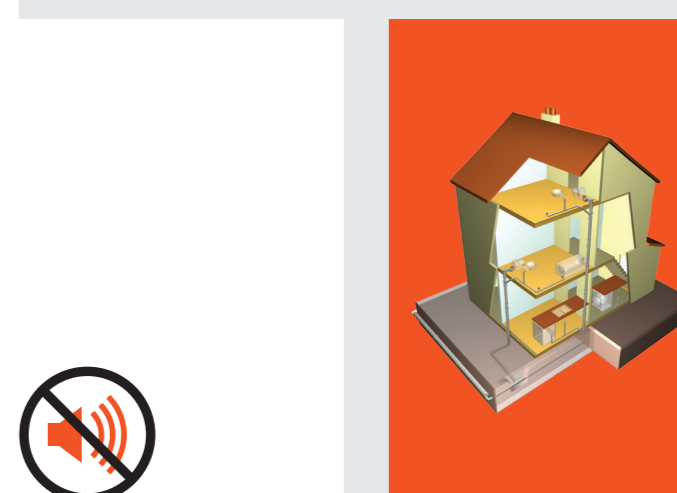
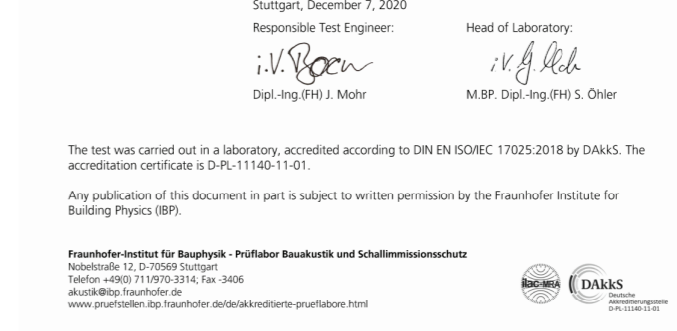
Stuttgart, December 7, 2020
Responsible Test Engineer: i.v. Boen
Dipl.-Ing./FHJ J. Mohr

Head of Laboratory: i.v. Boen
M.B.P. Dipl.-Ing./FHJ S. Oelner

The test was carried out in a laboratory, accredited according to DIN EN ISO/IEC 17025:2018 by DAkkS. The accreditation certificate is D-PL-11140-11-01.

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Determination of the Acoustic Performance of a Wastewater Installation System in the Laboratory according to EN 14366 P-BA 183/2020e Results sheet 1

Client: Frirat Plastik Kaçuk San. ve Tic. A.Ş. Türkoba Mahallesi Frirat Plastik Caddesi No: 23, Büyükdere İstanbul, TÜRKİYE

Test specimen: Wastewater system "FRIRAT RESIDENCE PIPE, 110x3,5, PVC-U, 0307/20" (manufacturer: Frirat Plastik). The wastewater system consisted of straight plastic pipes and fittings and acoustic pipe clamps "Bimat 1000" (manufacturer: Walraven). Test object no.: 11632-01; see Figure 4 and 5.

Test set-up: - The pipe system was mounted according to Figure 4 (see also Annex A). The system consisted of wastewater pipes (nominal size DN 110), three inlet tees (=B7), two 45°-bent bends and a horizontal drain section. The inlet tees in the basement and in the ground floor were closed by lids supplied by the manufacturer.
- Pipe system "FRIRAT RESIDENCE PIPE, 110x3,5, PVC-U, 0307/20": Three layer pipes: Material PVC-U, wall thickness 3.5 mm, weight 2.14 kg/m, density 1.8 g/cm³, values measured by IBP. One-layer fittings: Material PVC-U, wall thickness 3.5 mm, density 1.8 g/cm³, values measured by IBP. Plug connection of the pipes and fittings (shaped pipe sockets).
- Pipe clamps: Acoustic pipe clamps "Bimat 1000": Structure-borne sound insulating support attachment consisting of Bimat SL guidance clamps and Bimat SX socket clamps. In every stony (EG) and UG) respectively one double clamp (SL and SX) was installed at the lower wall area and one guidance clamp (SL) at the upper wall area. To prevent contact to the pipe, the guidance clamp (SL) was mounted with 15 mm space between the locking tabs of the clamp (two 7.5 mm spacers on each side). The Bimat 1000 clamps were fixed to the installation wall with an adjustable wall plate with dowels and thread rods (Figure 5).
- The wastewater installation system was mounted by a technician under the authority of Fraunhofer IBP.

Test facility: Installation test facility F12, mass per unit area of the installation wall: 220 kg/m², mass per unit area of the ceiling: 440 kg/m². Installation rooms: sub-basement (KG), basement (UG) front, ground floor (EG) front and top floor (DG), measuring rooms: UG front, UG rear (details in Annex P and DIN EN 14366: 2020-02)

Test method: The measurements were performed according to DIN EN 14366:2020-02; noise excitation by steady water flow with 0.5 l/s, 1.0 l/s, 2.0 l/s and 4.0 l/s. Additional evaluation for comparison with requirements following German standards EN 4109:2010-01 and VDI 4100:2012-10 (details in Annexes A, F and V).

Result:

Acoustic sound pressure level L _{p,eq} (dB(A)) according to EN 14366 for the basement test-room	UG front	UG rear	<10	<10	11	13
Structure-borne sound characteristic level L _{w,eq} (dB(A)) according to EN 14366 for the basement test-room	UG front	UG rear	<44	<48	51	53
Installation sound level L _{inst} (dB(A)) following DIN 4109 in the basement test-room	UG front	UG rear	<10	<10	13	18
Installation sound level L _{inst} (dB(A)) following VDI 4100 in the basement test-room	UG front	UG rear	<42	<46	48	51
	UG rear		<10	<10	<10	14

Flow rate [l/s]

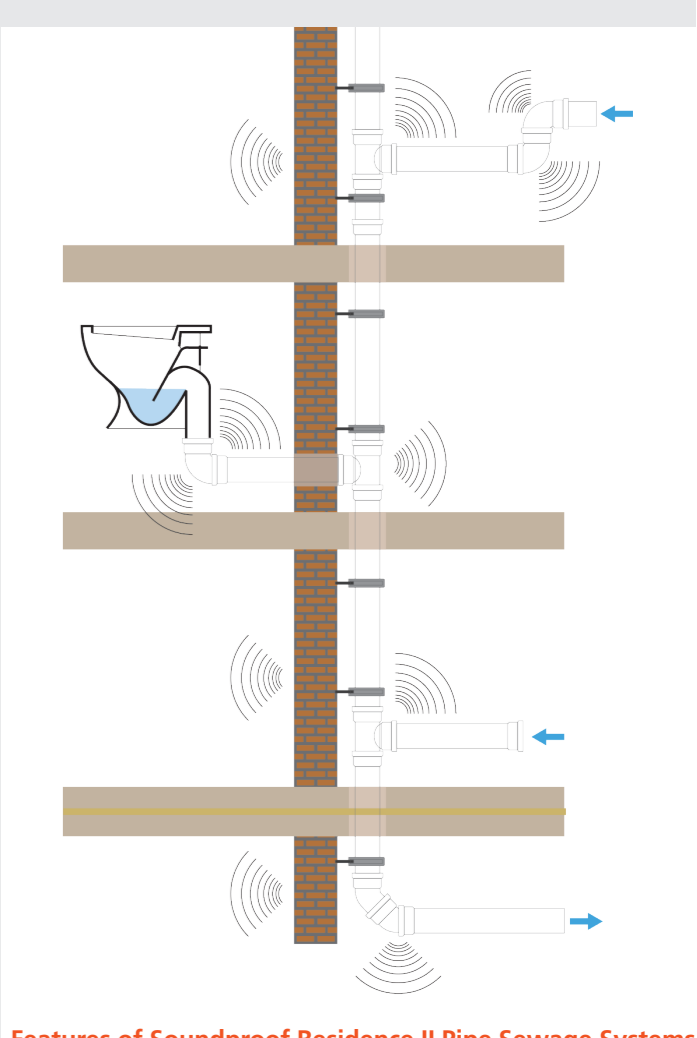
Flow rate [l/s]	0,5	1,0	2,0	4,0
Acoustic sound pressure level L _{p,eq} (dB(A)) according to EN 14366 for the basement test-room	44	48	51	53
Structure-borne sound characteristic level L _{w,eq} (dB(A)) according to EN 14366 for the basement test-room	<44	<48	51	53
Installation sound level L _{inst} (dB(A)) following DIN 4109 in the basement test-room	<10	<10	13	18
Installation sound level L _{inst} (dB(A)) following VDI 4100 in the basement test-room	<42	<46	48	51
	<10	<10	<10	14

Test date: September 3, 2020

Notes: - For comparing test results with requirements note Annex A.
- Sound levels below 10 dB(A) are not mentioned in the official test report, since they are subject to an increased measurement uncertainty and moreover are not noticeable in a normal living environment.
- The above-mentioned measurement results require careful assembly of the pipe clamps (see test set-up).

The test was carried out in a laboratory, accredited according to DIN EN ISO/IEC 17025:2018 by DAkkS. The accreditation certificate is D-PL-11140-11-01.

Stuttgart, December 7, 2020
Head of Laboratory: i.v. Boen



Features of Soundproof Residence II Pipe Sewage Systems