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## Test Report P-BA 245/2019e

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


- Client:** Dizayn Teknik Boru ve Elemanları San. Ve Tic. A.Ş.  
Atatürk Mah. Adnan Menderes Cad. No:6  
Kıraç 34522 Esenyurt / İstanbul –  
Turkey
- Test object:** Wastewater system "DIZAYN, Nanotek, 110x3.4, 24/07/19"  
(manufacturer: Dizayn). The wastewater system consisted of straight plastic pipes and fittings and standard steel pipe clamps with elastomer inlay "DIZAYN, 120" (manufacturer: Dizayn).
- Content:**
- |                  |   |
|------------------|---|
| Results sheet 1: | Summary of test results   |
| Figures 1 to 3:  | Detailed results  |
| Figures 4 and 5: | Test set-up   |
| Annex A:         | Measurement set-up, noise excitation, acoustic parameters, compliance with requirements |
| Annex F:         | Evaluation of measurements  |
| Annex P:         | Description of the test facility  |
| Annex V:         | Assessment according to VDI 4100  |
- Test date:** The measurement was carried out on January 10, 2020 in the test facilities of the Fraunhofer Institute for Building Physics in Stuttgart.

Stuttgart, February 03, 2020

Responsible Test Engineer:

Head of Laboratory:

  
B.Sc.(FH) O. Born

  
M.BP. Dipl.-Ing.(FH) S. Öhler



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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Results sheet 1

- Client:** Dizayn Teknik Boru ve Elemanları San. Ve Tic. A.Ş., Atatürk Mah. Adnan Menderes Cad. No:6, Kiraç 34522 Esenyurt / İstanbul, Turkey
- Test specimen:** Wastewater installation system "DIZAYN, Nanotek 110x3.4, 24/07/19" (manufacturer: Dizayn). The wastewater system consisted of straight plastic pipes and fittings and acoustic pipe clamps (double clamps) "DIZAYN, 120" (supporting and guidance clamp) and "DIZAYN, 110, 105-112" (fixing clamp). Test object no.: 11484-01; see figure 4 and 5.
- Test set-up:**
- The pipe system was mounted according to figure 1.
  - The system consisted of plastic wastewater pipes "DIZAYN, Nanotek 110x3.4, 24/07/19", three inlet tees (88°), two 45°-basement 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 "DIZAYN, Nanotek 110x3.4, 24/07/19". Three-layer pipes: Material inner layer PP, middle layer PP-MD, outer layer PP, wall thickness 3.6 mm, weight 1.51 kg/m, density 1.30 g/cm<sup>3</sup>, values measured by IBP. One-layer fittings: Material PP, wall thickness 3.4 mm, density 1.45 g/cm<sup>3</sup>, values measured by IBP. Plug connection of the pipes and fittings (shaped pipe sockets).
  - Pipe clamps: Acoustic double clamps consisting of "DIZAYN, 120" supporting and guidance clamp and "DIZAYN, 110, 105-112" fixing clamp. In each storey (EG and UG) one double clamp (supporting clamp below and fixing clamp above) was installed in the lower wall area and one guidance clamp was installed in the upper wall area. The fixing clamps "DIZAYN, 110, 105-112" were closed with a tightening torque of 3 Nm. The clamps were fixed to the installation wall with an adjustable wall plate with dowels and thread rods.
- The wastewater installation system was mounted by a technician under the authority of Fraunhofer IBP.
- Test facility:** Installation test facility P12, mass per unit area of the installation wall: 220 kg/m<sup>2</sup>, mass per unit area of the ceiling: 440 kg/m<sup>2</sup>. 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 EN 14366: 2005-02)
- Test method:** The measurements were performed according to EN 14366; 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 DIN 4109-1:2018 and VDI 4100:2012-10 (details in Annexes A, F and V).

**Result:**

Test specimen: Wastewater installation system "DIZAYN, Nanotek 110x3.4, 24/07/19" (manufacturer: Dizayn). The wastewater system consisted of straight plastic pipes and fittings and acoustic pipe clamps (double clamps) "DIZAYN, 120" (supporting and guidance clamp) and "DIZAYN, 110, 105-112" (fixing clamp).	Flow rate [l/s]				
	0.5	1.0	2.0	4.0	
Airborne sound pressure level $L_{a,A}$ [dB(A)] <b>according to EN 14366</b> for the basement test-room	UG front	43	48	50	53
Structure-borne sound characteristic level $L_{sc,A}$ [dB(A)] <b>according to EN 14366</b> for the basement test-room	UG rear	<10	<10	13	18
Installation sound level $L_{AFeq,n}$ [dB(A)] <b>following DIN 4109</b> in the basement test-room	UG front	43	48	50	53
	UG rear	<10	11	15	21
Installation sound level $\overline{L}_{AFeq,nT}$ [dB(A)] <b>following VDI 4100</b> in the basement test-room	UG front	40	45	48	50
	UG rear	<10	<10	12	17

**Test date:** January 10, 2020

- Notes:**
- For comparing test results with requirements note Annex A.
  - The above-mentioned measurement results require careful assembly of the pipe clamps (see test set-up).
  - 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.



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Stuttgart, February 03, 2020  
Head of Laboratory

