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## **NATIONAL TECHNICAL ASSESSMENT ITB-KOT-2017/0167, 3<sup>rd</sup> edition**

This National Technical Assessment is issued pursuant to the Regulation of the Minister of Infrastructure and Construction of 17 November 2016 on national technical assessments (Dz.U. 2016.0.1968) by Instytut Techniki Budowlanej (the Building Research Institute) in Warsaw at the request of:

**MAGNAPLAST Sp. z o.o.,  
Sieniawa Żarska 69, 68-213 Lipinki Łużyckie, Poland**

National Technical Assessment ITB-KOT-2017/0167, 3<sup>rd</sup> edition, is a positive assessment of the performance of the following construction products for the intended use:

**Ultra dB system of polypropylene (PP) pipes and fittings for  
indoor low-noise sewage systems**

This National Technical Assessment is valid until:

**19 February 2024**



**BUILDING RESEARCH INSTITUTE**

**DIRECTOR**  
of the Building Research Institute

*dr inż. Robert Geryło*

Warszawa, 19 February 2019

The original document of National Technical Assessment ITB-KOT-2017/0167, 3<sup>rd</sup> edition, consists of 18 pages and includes 2 Attachments. National Technical Assessment ITB-KOT-2017/0167, 3<sup>rd</sup> edition, supersedes National Technical Assessment ITB-KOT-2017/0167, 2<sup>nd</sup> edition. The text of this document may only be copied in its entirety. Publishing or transmission of any part of this Technical Approval in any other form requires a written agreement with BRI (the Building Research Institute).



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## 1. TECHNICAL DESCRIPTION OF THE PRODUCT

The subject of this BRI National Technical Assessment is the Ultra dB system (product type designation) of polypropylene (PP) pipes and fittings for indoor low-noise sewage systems.

The pipes and fittings of Ultra dB system are manufactured by: Magnaplast Sp. z o.o., Sieniawa Żarska 69, 68-213 Lipinki Łużyckie, Gebr. Ostendorf Kunststoffe GmbH & Co. KG, Rudolf Diesel Strasse 6-8, 49377 Vechta, Germany and Gebr. Ostendorf Kuststoffe GmbH Wilhelm, Bunsen, Strasse 6, 49685 Emstek, Germany, at the production plants located in Poland and Germany.

The authorised representative of the manufacturers in Poland is Magnaplast Sp. z o.o., Sieniawa Żarska 69, 68-213 Lipinki Łużyckie.

This National Technical Assessment applies to S16 series bell and socket pipes shown in Fig. A1 and with the design specified in PN-EN 1451-1:2018 and PN-EN 14758-1:2012, with nominal diameters (DN) of DN 50, 75, 110, 125, and 160 mm and lengths of 150, 250, 315, 500, 1,000, 1,500, 2,000, 3,000 and 5,000 mm, as well as fittings, with dimensions as specified in Attachment A.

The Ultra dB system pipes are laminated bell and socket pipes made by co-extrusion. The pipe external wall (layer) is made from blue polypropylene (PP) while the internal layer is made of white polypropylene (PP) with a mineral filler.

The bell and socket fittings with a uniform wall structure are made from blue polypropylene (PP) with a mineral filler by injection moulding.

The Ultra dB pipes and fittings feature elastomer lip seals installed by the manufacturer.

This National Technical Assessment applies to the following sort of Ultra dB fittings:

- 15°, 30°, 45°, 67° and 87° elbows (see Fig. A2);
- reducers (see Fig. A3);
- 45°, 67° and 87° tee pipes (see Fig. A4);
- sliding couplings (see Fig. A5);
- Plugs (see Fig. A6);
- double socket unions (see Fig. A7);
- cleanouts (see Fig. A8);
- cross pipes (see Fig. A9);
- angle cross pipes (see Fig. A10).

The dimensions of the products this National Technical Assessment applies to are specified in Attachment A. The raw materials, materials, appearance and markings of the products this National Technical Assessment applies to are specified in Attachment B.

## 2. INTENDED USE OF THE PRODUCT

The Ultra dB pipes and fittings are intended for non-pressure discharge of soil and waste at a temperature up to 90°C (up to 95°C during a short time) in indoor sewerage systems.

The Ultra dB pipes and fittings are intended for application area “BD” area specified in PN-EN 1451-1:2018, i.e. the indoor building plumbing systems or installed on building external walls, or in underground systems buried under building structures and not extending beyond the building envelope, or embedded in concrete.

Piping sections shall feature bell and socket joints with elastomer lip seals.

The piping shall be fixed using steel clamping rings with an elastomer soundproofing lining or “BISMAT 1000” clamping rings marketed by Walraven according to applicable regulations.

The Ultra dB pipes and fittings shall be fastened with “BISMAT 1000” clamping rings, with two such fixtures installed per each building storey along the riser, and with each being a stationary fixture. Fixing the system with the use of “BISMAT 1000” clamping rings permits the acoustic performance shown in Table 2.

The Ultra dB pipes and fittings shall be fastened with steel clamping rings with an elastomer soundproofing lining, with two such fixtures installed per each building storey along the riser, where one is a stationary fixture and the other is a sliding fixture. Installing the system with steel clamping rings lined with an elastomer soundproofing liner permits the acoustic performance shown in Table 3.

The Ultra dB pipes and fittings can be applied for roof drainage with an overall installation height up to 45 m.

The products covered by this National Technical Assessment shall be used in accordance with:

- the engineering design developed for the building and in compliance with the applicable Polish standards and civil and engineering regulations, including the Regulation of the Minister of Infrastructure of 12 April 2002 and concerning the technical requirements for buildings and locations thereof (Dz.U. 2015.0.1422, as amended);
- the provisions of this National Technical Assessment,
- the instructions for use developed by the manufacturer and delivered to customers.

### 3. PERFORMANCE OF THE PRODUCT AND PERFORMANCE ASSESSMENT METHODS

The performance of the Ultra dB pipes and fittings and the performance assessment methods are described in Table 1.

Table 1.

Item #	Essential characteristics	Performance	Assessment methods
1	2	3	4
1	Dimensions of pipes and fittings	ref. PN-EN 1451-1:2018 and PN-EN 14758-1:2012	PN-EN ISO 3126:2006
2	Longitudinal reversion of pipes, %	< 2 free of damage, e.g. blisters, delamination or cracks	PN-EN ISO 2505:2006 test conditions: temp. 150°C; duration: 60 min; method B; air
3	Mass flow rate, MFR (230°C/2.16 kg), g/10 min.	MFR variation due to raw material processing: ≤0.2	ref. PN-EN ISO 1133-1:2011

**Table 1, cont'd.**

Item #	Essential characteristics	Performance	Assessment methods
1	2	3	4
4	Variations due to heating of fittings	ref. PN-EN 1451-1:2018	PN-EN ISO 580:2006 or PN-EN ISO 9852:2017 test conditions: temp. 150°C, duration: 30 min., method A, air
5	Pipe impact strength, %	TIR < 10	PN-EN ISO 3127:2017 test conditions: temp. 23 ± 1°C, duration > 60 min.; type, mass and height of drop ref. PN-EN 1451-1:2018
6	Impact resistance (staircase method)	H50 > 1 m max. 1 crack below 0.5 m	PN-EN ISO 11173:2017 test conditions: temp. -20 ± 1°C; duration: > 120 min.; Type, mass and height of weight drop per PN-EN 1451-1:2018
7	Joint tightness in a hydraulic test (water)	free of leaks	PN-EN ISO 13254:2017
8	Joint tightness in a pneumatic pressure test (air)	free of leaks	PN-EN ISO 13255:2017
9	Tightness of bell and socket joints with elastomer ring seals	ref. PN-EN 1451-1:2018	PN-EN ISO 13259:2018 or PN-EN 1277:2005 test conditions: Method 4, conditions B and C
10	Resistance to elevated temperature cycling	ref. PN-EN 1451-1:2018	PN-EN ISO 13257:2017
11	Circumferential rigidity of pipes, kN/m <sup>2</sup>	SN 4 > 4 kN/m <sup>2</sup>	PN-EN ISO 9969:2016
12	Circumferential rigidity of fittings, kN/m <sup>2</sup>		PN-EN ISO 13967:2011 (applies to: DN 110, DN 125, DN 160)
13	Resistance of fittings to external impact (weight drop method)	free of damage	PN-EN ISO 13263:2017 test conditions: ref. PN-EN 14758-1:2012
14	Sound performance	ref. Tables 2 & 3	PN-EN 14366:2006

**Table 2.**

Measured value	Ultra dB system with "BISMAT 1000" clamping rings			
	0.5	1.0	2.0	4.0
Flow rate, l/s	0.5	1.0	2.0	4.0
A-weighted airborne sound level, L <sub>a,A</sub> dB <sup>1)</sup>	44	48	52	54
A-weighted level of structure-borne sound, L <sub>sc,A</sub> dB <sup>1)</sup>	< 10	< 10	13	16

<sup>1)</sup>Determined according to PN-EN 14366:2006 for systems with DN 110 pipes

**Table 3.**

Measured value	Ultra dB w/steel clamping rings and elastomer soundproofing lining			
	0.5	1.0	2.0	4.0
Flow rate, l/s	0.5	1.0	2.0	4.0
A-weighted airborne sound level, L <sub>a,A</sub> dB <sup>1)</sup>	43	47	49	52
A-weighted level of structure-borne sound, L <sub>sc,A</sub> dB <sup>1)</sup>	11	14	16	20

<sup>1)</sup> Determined according to PN-EN 14366:2006 for systems with DN 110 pipes

#### **4. PACKAGING, TRANSPORT, STORAGE AND MANNER OF MARKING THE PRODUCT**

The Ultra dB pipes up to 500 mm long and the Ultra dB fittings shall be packed in cardboard boxes. Pipes of 750 mm and longer shall be placed in wooden frames.

The products shall be protected against humidity, contamination and direct sunlight. The storage conditions shall not cause deformations of pipe sockets and ends.

The products shall be transported secured against damage or failure and as regulated by the transport instructions of the product manufacturer.

The manner of marking the products with the construction mark should be in accordance with the Regulation of the Minister of Infrastructure and Construction of 17 November 2016 on the methods of declaring conformity of construction products and marking them with the construction mark (Dz.U. 2016.0.1966, as amended).

In addition to the construction mark, the following information should be provided:

- the last two digits of the year in which the construction mark was first applied on the construction product;
- name and address of the registered office of the manufacturer or an identification mark which allows unambiguous identification of the manufacturer's name and the address of their registered office;
- name and type of the construction product;
- reference number and year of issue of the National Technical Assessment in accordance with which the performance is declared (ITB-KOT-2017/0167, 3rd edition);
- reference number of the Declaration of Performance, and the level / class of declared performance;
- the address of the manufacturer's website, if the National Declaration of Performance is made available on the website;

Together with the National Declaration of Performance, a safety data sheet should be provided or made available as applicable, and/or such data concerning dangerous substances included in the construction product that are specified under Article 31 or 33 of the Regulation (EC) No. 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency.

Furthermore, marking of construction products deemed as dangerous mixtures as per the said Regulation should be compliant with Regulation (EC) No. 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures (CLP), amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No. 1907/2006.

#### **5. ASSESSMENT AND VERIFICATION OF THE CONSTANCY OF PERFORMANCE**

##### **5.1 National system of the assessment and verification of the constancy of performance**

System 4 of assessment and verification of the constancy of performance applies in accordance with the Regulation of the Minister of Infrastructure and Construction of 17 November 2016 on the methods of declaring conformity of construction products and marking them with the construction mark (Dz.U. 2016.0.1966, as amended).

## 5.2 Type test

The assessment of the performance in Section 3 is the product type test until changes concerning raw materials, components, production line or production plant occur.

## 5.3 Factory production control

The manufacturer should have the factory production control system implemented in the production plant. All components of the system as well as requirements and provisions adopted by the manufacturer should be systematically documented in the form of rules and procedures, together with records of the tests conducted. Factory production control should be adequate for the production technology and ensure that the declared product performance is maintained in serial production.

Factory production control includes specification and checking of raw materials and components, inspection and tests during the manufacturing process and control tests (according to point 5.4) carried out by the manufacturer in accordance with the established testing program and according to the rules and procedures set out in the factory production control documentation.

The factory production control shall be systematically recorded. The factory production control records should prove that the products meet the criteria of the assessment and verification of the constancy of performance. The individual product pieces or lots and the related manufacturing data shall be fully identifiable and traceable.

## 5.4 Control tests

### 5.4.1 Test program

The test program shall include:

- a) continuous testing;
- b) periodic testing.

### 5.4.2 Continuous testing:

The continuous testing includes the following checks:

- a) external appearance;
- b) dimensions;
- c) longitudinal reversion;
- d) mass flow rate, MFR;
- e) variations due to heating of fittings;
- f) impact strength
- g) ring stiffness of pipes and fittings;
- h) resistance of fittings to external impact.

### 5.4.3 Periodic testing:

The periodic testing includes the following checks:

- a) tightness of socket joints with elastomer sealing rings,
- b) joint tightness (in pneumatic pressure and hydraulic tests)
- c) resistance of connections to cyclic exposure to increased temperature.

## 5.5. Testing intervals

The continuous tests should be done according to an established testing plan and at least on each product batch. The product batch size should be specified in the factory production control documentation.

The periodic tests shall be done at least every 3 years.

## 6. ADVICE

**6.1** National Technical Assessment ITB-KOT-2017/0167, 3<sup>rd</sup> edition, supersedes National Technical Assessment ITB-KOT-2017/0167, 2<sup>nd</sup> edition.

**6.2** National Technical Assessment ITB-KOT-2017/0167, 3<sup>rd</sup> edition, is a positive assessment of the performance of these basic characteristics of the Ultra dB pipes and fittings, which, in accordance with the intended use resulting from the provisions of the Assessment, affect the fulfilment of basic requirements by the buildings in which the product will be used.

**6.3** National Technical Assessment ITB-KOT-2017/0167, 3<sup>rd</sup> edition, is not a document authorizing to mark a construction product with the construction mark.

Pursuant to the Polish Construction Product Act of 16 April 2004 (Dz.U. 2016.0.1570, as amended), the products covered by this National Technical Assessment may be marketed or made available on the domestic market, if the manufacturer has assessed and verified the constancy of performance, prepared the national declaration of performance in accordance with National Technical Assessment ITB-KOT-2017/0167, 3<sup>rd</sup> edition, and marked the products with the construction mark, in accordance with the applicable regulations.

**6.4** National Technical Assessment ITB-KOT-2017/0167, 3<sup>rd</sup> edition, shall not prejudice the rights resulting from the provisions of industrial property protection, in particular the Act of 30 June 2000 – Industrial Property Law (uniform text: Dz.U. 2017.0.776). The assurance of these rights is the responsibility of the users of this BRI National Technical Assessment.

**6.5** Having issued this National Technical Assessment, BRI shall not be liable for any possible breach of exclusive or acquired rights.

**6.6** The National Technical Assessment shall not release the manufacturer of the products from the responsibility for proper quality of the products. The National Technical Assessment shall not release the building contractors from the responsibility for proper use of the products.

**6.7** This National Technical Assessment can be extended for subsequent periods, none of which shall be longer than 5 years.



## 7. LIST OF DOCUMENTS USED IN THE PROCEDURE

### 7.1 Reports, test reports, assessments and classifications

1. Test Report No. DWF/116/2018. Ultra dB DN 125 pipes and fittings. Institute for Engineering of Polymer Materials and Dyes. Coating and Plastics Division. Laboratory of Research & Analysis. Toruń 2018.
2. Test Report No. DWF/128/2018. Ultra dB DN 125 pipes and fittings. Institute for Engineering of Polymer Materials and Dyes. Coating and Plastics Division. Laboratory of Research & Analysis. Toruń 2018.
3. Expert Survey Report EJ-2/TM/2137/18, dot. Ultra dB system of polypropylene (PP) pipes and fittings for indoor low-noise sewage systems, Laboratory of Thermal Physics, Acoustics, and Environment, ul. Ksawerów 21, 02-656 Warszawa (Warsaw). March 2018.
4. Prüfbericht P-BA 351/2017. Report on acoustic testing of Ultra dB sewerage system. Fraunhofer-Institut für Bauphysik Laboratory. Stuttgart, Germany, January 2018
5. Test Report No. 9/2016. Testing of sewage system fittings. Institute for Engineering of Polymer Materials and Dyes. Coating and Plastics Division. Laboratory of Research & Analysis. Toruń 2016.
6. Test Report No. 82/2016. Testing of Ultra dB sewage system fittings. Institute for Engineering of Polymer Materials and Dyes. Coating and Plastics Division. Laboratory of Research & Analysis. Toruń 2016.
7. Technical Review no. 133/16. Compliance of the application conditions of the Ultra dB pipes and fittings in building drainage. Material Engineering Department of the Central Mining Institute (GIG), Katowice, 2016.
8. Test Report No. 133/16/SM1 Control testing of the Ultra dB pipes and fittings in building drainage. Material Engineering Department of the Central Mining Institute (GIG), Katowice, 2016.
9. Test Report No. 169/14/SM1 Control testing of Ultra dB PP-MD fittings in reference to PN-EN 4758-1:2012. Central Laboratory of Plastic Pipes Research. Material Engineering Department of the Central Mining Institute (GIG), Katowice, 2014.
10. Prüfbericht P-BA 165/2014. Report on acoustic testing of Ultra dB sewerage system. Laboratory: Fraunhofer-Institut für Bauphysik, Stuttgart, Germany, June 2014
11. NA/05012/JN/14. Expert Survey Report on the BRI Technical Approval expansion by the acoustic properties of the Ultra dB low-noise indoor PP pipe and fitting system from Test Report P-BA 165/2014. BRI Acoustics Department, October 2014.
12. Test Report No. 151/14/SM1 Control testing of Ultra dB PP pipes and fittings in reference to PN-EN 1451-1:2001. Central Laboratory of Plastic Pipes Research. Material Engineering Department of the Central Mining Institute (GIG), Katowice, August 2014.

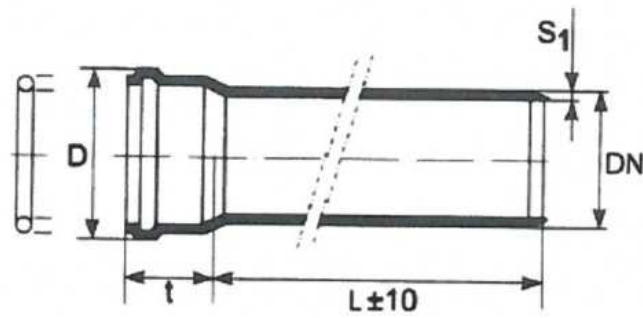
## 7.2. Reference standards and documentation

PN-EN ISO 580:2006	<i>Plastics piping and ducting systems. Injection-moulded thermoplastics fittings. Methods for visually assessing the effects of heating.</i>
PN-EN 681-1:2002/A3:2006	<i>Elastomeric seals. Material requirements for pipe joint seals used in water and drainage applications. Part 1: Vulcanized rubber.</i>
PN-EN 681-2:2003/A2:2006	<i>Part 2: Thermoplastic elastomers</i>
PN-EN ISO 1133-1:2011	<i>Plastics. Determination of the melt mass-flow rate (MFR) and melt volume-flow rate (MVR) of thermoplastics. Standard method.</i>
PN-EN 1451-1:2018	<i>Plastic piping systems for soil and waste discharge (low and high temperature) within the building structure. Polypropylene (PP). Part 1: Specifications for pipes, fittings and the system</i>
PN-EN ISO 2505:2006	<i>Thermoplastics pipes. Longitudinal reversion. Test methods and parameters.</i>
PN-EN ISO 3126:2006	<i>Plastics piping systems. Plastics components. Determination of dimensions</i>
PN-EN ISO 3127:2017	<i>Thermoplastics pipes. Determination of resistance to external blows. Round-the-clock method</i>
PN-EN ISO 9852:2017	<i>Unplasticized poly(vinyl chloride) (PVC-U) pipes. Dichloromethane resistance at specified temperature (DCMT). Test method</i>
PN-EN ISO 9969:2016	<i>Thermoplastics pipes. Determination of ring stiffness</i>
PN-EN ISO 13254:2017	<i>Thermoplastics piping systems for non-pressure applications. Test method for watertightness.</i>
PN-EN ISO 13255:2017	<i>Thermoplastics piping systems for soil and waste discharge inside buildings. Test method for airtightness of joints</i>
PN-EN ISO 13257:2017	<i>Thermoplastics piping systems for non-pressure applications. Test method for resistance to elevated temperature cycling</i>
PN-EN ISO 13259:2018	<i>Plastics piping systems. Thermoplastics piping systems for buried non-pressure applications. Test methods for leaktightness of elastomeric sealing ring type joints</i>
PN-EN ISO 13263:2017	<i>Thermoplastics piping systems for non-pressure underground drainage and sewerage. Thermoplastics fittings. Test method for impact strength</i>
ITB-KOT-2017/0167, 2 <sup>nd</sup> edition	<i>Ultra dB system of polypropylene (PP) pipes and fittings for indoor low-noise sewage systems</i>

## ATTACHMENTS

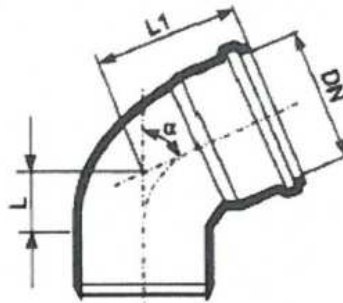
<b>Attachment A.</b> Shape and dimensions.....	12
<b>Attachment B.</b> Raw materials and materials, appearance and markings .....	18

## Attachment A:



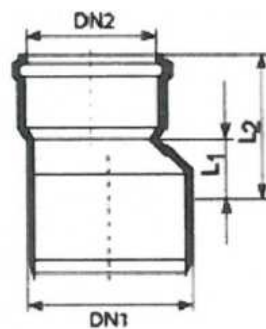
DN	Si, mm	D, mm	t, mm	L, mm
50	2.0	64	56	150
50	2.0	64	56	250
50	2.0	64	56	315
50	2.0	64	56	500
50	2.0	64	56	1000
50	2.0	64	56	1500
50	2.0	64	56	2000
50	2.0	64	56	3000
50	2.0	64	56	5000
75	2.3	89	61	150
75	2.3	89	61	250
75	2.3	89	61	315
75	2.3	89	61	500
75	2.3	89	61	1000
75	2.3	89	61	1500
75	2.3	89	61	2000
75	2.3	89	61	3000
75	2.3	89	61	5000
110	3.4	128	72	150
110	3.4	128	72	250
110	3.4	128	72	315
110	3.4	128	72	500
110	3.4	128	72	1000
110	3.4	128	72	1500
110	3.4	128	72	2000
110	3.4	128	72	3000
110	3.4	128	72	5000
125	3.9	145.8	80	150
125	3.9	145.8	80	250
125	3.9	145.8	80	315
125	3.9	145.8	80	500
125	3.9	145.8	80	1000
125	3.9	145.8	80	1500
125	3.9	145.8	80	2000
125	3.9	145.8	80	3000
125	3.9	145.8	80	5000
160	4.9	186.6	95	150
160	4.9	186.6	95	250
160	4.9	186.6	95	315
160	4.9	186.6	95	500
160	4.9	186.6	95	1000
160	4.9	186.6	95	1500
160	4.9	186.6	95	2000
160	4.9	186.6	95	3000
160	4.9	186.6	95	5000

Fig. A1. Ultra dB pipes



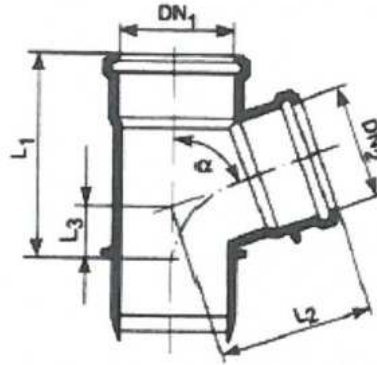
DN	Angle, °	L, mm	L1, mm
50	15	10	70
50	30	9	68
50	45	17	87
50	67	28	77
50	87	28	84
75	15	23	91
75	30	11	80
75	45	18	92
75	67	29	86
75	87	42	94
110	15	9	77
110	30	17	85
110	45	26	94
110	67	41	109
110	87	59	127
125	15	10	99
125	30	19	107.5
125	45	29	116
125	67	44	134
125	87	66	152
160	15	13	102
160	30	24	113
160	45	37	126
160	67	59	142
160	87	84	173

Fig. A2. Ultra dB elbows



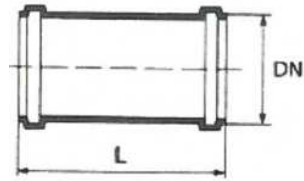
DN1/DN2	Li, mm	L2, mm
75/50	19	73
110/50	37	93
110/75	22	87
125/110	15	95
160/125	26	106
160/110	34	135

Fig. A3. Ultra dB reducer



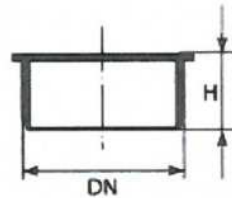
DN1/DN2	Angle, °	L <sub>1</sub> , mm	L <sub>2</sub> , mm	L <sub>3</sub> , mm
50/50	45	133	116	12
75/50	45	147	145	1
75/75	45	183	159	18
110/50	45	150	158	17
110/75	45	186	186	50
110/110	45	134	134	26
125/75	45	171	153	45
125/110	45	171	151	81
125/125	45	232	160	29
160/125	45	257	179	10
160/110	45	162	168	2
160/160	45	194	194	37
50/50	67	19	40	40
75/50	67	14	53	45
75/75	67	27	59	59
110/50	67	8	71	51
110/110	67	40	85	85
50/50	87	117	91	28
75/50	87	158	115	40
110/50	87	150	125	23
110/75	87	186	126	36
110/110	87	64	62	59
125/110	87	171	73	81
125/125	87	232	73	29
160/125	87	257	125	10
160/110	87	140	141	15
160/160	87	91	91	81

**Fig. A4.** Ultra dB tee pipes



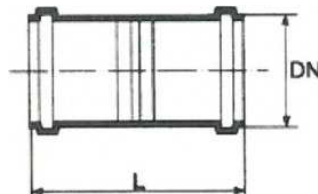
DN	L, mm
50	103
75	109
110	136
125	152
160	185

**Fig. A5.** Ultra dB sliding couplings



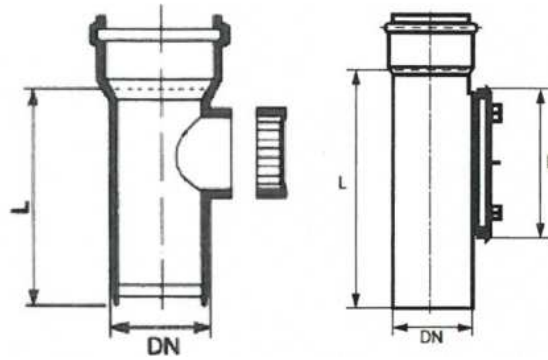
DN	H, mm
50	39
75	39
110	46
125	55
160	70

**Fig. A6.** Ultra dB plugs



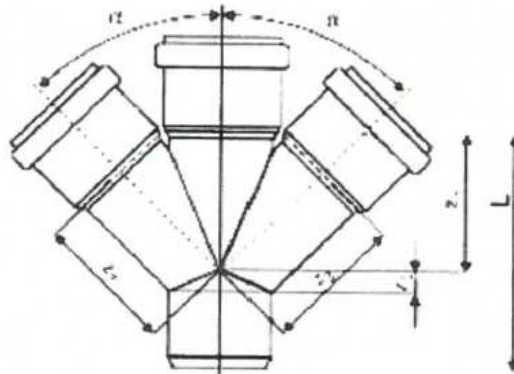
DN	L, mm
50	112
75	118
110	136
125	152
160	185

**Fig. A7.** Ultra dB double socket unions



DN	L, mm	D, mm
50	115	-
75	142	-
110	308	230
125	313	250
160	380	280

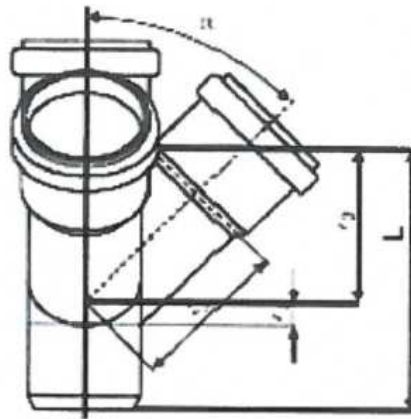
Fig. A8. Ultra dB cleanouts



DN	a, °	Z <sub>1</sub> , mm	Z <sub>2</sub> , mm	Z <sub>3</sub> , mm	L, mm
50/50/50	67	20	41	41	124
75/75/75	67	28	59	59	153
110/50/50	67	8	73	54	135
110/110/110	67	40	86	86	201
125/110/110	67	35	113	115	231

Fig. A9. Ultra dB cross pipes





DN	a, °	Z <sub>1</sub> , mm	Z <sub>2</sub> , mm	Z <sub>3</sub> , mm	L, mm
110/110/110	67	40	86	86	202
125/110/110	67	50	97	95	217

**Fig. A10.** Ultra dB angle cross pipes

**Attachment B:****B.1. Raw materials and materials**

Polypropylene (PP-H) granulate standardized per PN-EN 1451-1:2018 shall be used as the material for production of the external wall (layer), while the inner layer shall be made of polypropylene (PP-M) granulate with mineral modifiers, standardized per PN-EN 14758-1:2012.

The raw material for the Ultra dB pipes and fittings shall be virgin and supplied in vendor's original containers with certificates. Recycled material of the same type, obtained from reworking of the manufacturer's pipes and fittings may be added, provided that its properties are not inferior to the virgin raw material.

The lip seals which the Ultra dB pipes and fittings are provided with shall be made from a thermoplastic elastomer and meet the requirements of PN-EN 681-1:2002 and PN-EN 681-1:2002/A3:2006.

**B.2. Appearance**

The inner and outer surfaces of the Ultra dB system pipes and fittings shall be smooth and free of defects such as material heterogeneity, bubbles and foreign bodies; the colour of the pipes and fittings shall be uniform over the entire surface.

**B.3. Marking**

Marking on Ultra dB pipes shall be permanently printed at intervals not longer than 1 m. The colour of marking on the pipes and fittings shall be in contrast with the colour of the product.

The marking applied on Ultra dB pipes shall include as minimum:

- Manufacturer's name or logo,
- System name,
- Material code,
- Area of use,
- Nominal diameter,
- Production date.

The marking applied on Ultra dB fittings shall include as minimum:

- Manufacturer's name or logo,
- System name,
- Area of use,
- Material code,
- Nominal diameter and angle,
- Production date.