DIN EN 1329 â€“ 1 / Plastics Piping Systems for Soil and Waste Discharge (Low and High Temperature) within the Building Structure â€“ Unplasticized Poly(viny1 chloride) (PVC-U) / Testing Equipment

Description



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7 Mechanical characteristics

7.1 Mechanical characteristics of pipes

7.1.1 General requirements

When tested in accordance with the test method as specified in table 16, using the indicated parameters, the pipe shall have mechanical characteristics conforming to one of the requirements given in table 16.

Table 16 — Mechanical characteristics of pipes

Characteristics	Requirements	Test parameters		Test method
Impact resistance (Round-the-clock method)	TIR ≤ 10 %	Type of striker for d_n < 110 mm d_n ≥ 110 mm Mass of striker Fall height of striker Conditioning medium Conditioning and test temperature [1]	 d 25 d 90 see table 17 or 18, as applicable see table 17 or 18, as applicable water 0 °C	EN 744: 1995
Impact resistance (Stair-case method)	H 50 ≥ 1 m max. 1 break below 0,5 m	Conditioning and test temperature Mass of striker for: 32 mm ≤ d_n ≤ 43 mm 50 mm ≤ d_n ≤ 63 mm 75 mm ≤ d_n ≤ 82 mm 90 mm ≤ d_n ≤ 100 mm d_n =110 mm d_n =125 mm d_n =140 mm d_n =160 mm d_n =180 mm d_n =200 mm d_n ≥ 250 mm	0 °C 1,25 kg 2,00 kg 2,50 kg 3,20 kg 4,00 kg 5,00 kg 6,30 kg 8,00 kg 8,00 kg 10,00 kg 12,50 kg	EN 1411: 1996

1) If a manufacturer chooses to use indirect testing (see prEN 1329-2), the preferred temperature is (23 ± 2) °C.

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Table 17 — Fall heights and masses for impact strength (metric series)

Dimensions in millimetres

Nominal size DN/OD	Nominal outside diameter d_n	Mass of striker kg	Fall height of striker
32	32	0,5	600
40	40	0,5	800
50	50	0,5	1000
63	63	0,8	1000
75	75	0,8	1000
80	80	0,8	1000
82	82	0,8	1000
90	90	0,8	1200
100	100	0,8	1200
110	110	1,0	1600
125	125	1,25	2000
140	140	1,6	1800
160	160	1,6	2000
180	180	2,0	1800
200	200	2,0	2000
250	250	2,5	2000
315	315	3,2	2000

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Table 18 — Fall heights and masses for impact strength (series based on inch dimensions)

Nominal size DN/OD	Nominal outside diameter d_n	Mass of striker kg	Fall height of striker
36	36	0,5	600
43	43	0,5	800
56	56	0,5	1000

7.1.3 Mechanical characteristics of fittings

For application area BD the fittings shall have mechanical characteristics conforming to the

requirements as specified in EN 1401-1:1998 for fittings of SDR 41 or SDR 34, as applicable.

When a fitting conforming to this standard has the same wall thickness as the corresponding pipe, the stiffness of this fitting because of its geometry, is equal to or greater than the stiffness of that pipe.

Consequently fittings are classified with the corresponding pipe stiffness.

8 Physical characteristics

8.1 Physical characteristics of pipes

When tested in accordance with the test method as specified in table 19 using the indicated parameters, the pipe shall have physical characteristics conforming to the requirements given in table 19.

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Table 19 — Physical characteristics of pipes

Characteristic	Requirements	Test parameters		Test method
Vicat softening temperature (VST)	≥ 79 °C	Shall conform to EN 727:1994		EN 727:1994
Longitudinal reversion	≤ 5 % The pipe shall exhibit no bubbles or cracks	Temperature Immersion time	150 °C 15 min	Method A of EN 743:1994: liquid
		or		
		Temperature Immersion time	150 °C 30 min	Method B of EN 743:1994: air
Resistance to dichloromethane at a specified temperature	No attack at any part of the surface of the test piece	Temperature Immersion time	15 °C 30 min	EN 580:1994

8.2 Physical characteristics of fittings

When tested in accordance with the test method as specified in table 20 using the indicated parameters, the fitting shall have physical characteristics conforming to the requirements given in table 20.

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Table 20 — Physical characteristics of fittings

Characteristic	Requirements	Test parameters		Test method
Vicat softening temperature (VST)	≥ 79 °C	Shall conform to EN 727:1994		EN 727:1994
Effects of heating	1) and 2)	Temperature Heating time	150 °C 30 min	Method A of EN 763:1994: air

1) a) Within a radius of 15 times the wall thickness around the injection point, the depth of cracks, delamination or blisters shall not exceed 50 % of the wall thickness at that point.
b) Within a distance of 10 times the wall thickness from the diaphragm zone, the depth of cracks, delamination or blisters shall not exceed 50 % of the wall thickness at that point.
c) Within a distance of 10 times the wall thickness from the ring gate, the length of cracks shall not exceed 50 % of the wall thickness at that point.
d) The weld line shall not have opened more than 50 % of the wall thickness at the line.
e) In all other parts of the surface the depth of cracks and delaminations shall not exceed 30 % of the wall thickness at that point. Blisters shall not exceed a length 10 times of the wall thickness.

2) After cutting through the fitting, the cut surfaces shall show no foreign particles, when viewed without magnification.

9 Performance requirements

When tested in accordance with the test method as specified in table 21 using the indicated parameters, the joints and the system shall have characteristics conforming to the requirements given in table 21.

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Table 21 — Fitness for purpose requirements of the system

Characteristic	Requirements	Test parameters		Test method
Watertightness	No leakage	Shall conform to EN 1053:1995		EN 1053:1995
Airtightness	No leakage	Shall conform to EN 1054:1995		EN 1054:1995
Elevated temperature cycling for application area B	No leakage Sagging for: DN ≤ 50: ≤ 3 mm DN 50: ≤ 0,05d_n	Shall conform to EN 1055:1996		Test assembly a) (Figure 1 and/or 3 of EN 1055:1996) in accordance with EN 1055:1996
Elevated temperature cycling for application area BD	No leakage Sagging for: DN ≤ 50: ≤ 3 mm DN 50: ≤ 0,05d_n	Shall conform to EN 1055:1996		Test assembly b) (Figure 2 of EN 1055:1996) in accordance with EN 1055:1996
Combined tightness for application area BD		Test Temperature Spigot deflection Socket deflection Difference	(23 ± 5) °C ≥ 10 % ≥ 5 % ≥ 5 %	Condition B Method 4 in accordance with EN 1277:1996
	No leakage	Water pressure	0,05 bar	
	No leakage	Water pressure	0,5 bar	
	≤ –0,27 bar	Air pressure	–0,3 bar	
		Test temperature Angular deflection d_n ≤ 315 mm	(23 ± 5) °C 2°	Condition C Method 4 in accordance with EN 1277:1996
	No leakage	Water pressure	0,05 bar	
	No leakage	Water pressure	0,5 bar	
	≤ –0,27 bar	Air pressure	–0,3 bar	
Long term performance of TPE seals for application area BD	Sealing pressure: a) at 90 days: ≥ 1,3 bar b) using extrapolation to 100 years: ≥ 0,6 bar	Shall conform to prEN 1989		prEN 1989

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10 Requirements for application area code D

Pipes and fittings for application area D shall conform to the following requirements in addition to those necessary for application area B alone.

â€“ Material: for material for pipes and fittings used for application D, the requirements for resistance to internal pressure (long-term behaviour) are as specified in table 22 or table 23, as applicable.

â€“ Stiffness: the pipe and fitting shall have a nominal stiffness of not less than SN 4 in conformance with EN 1401-1:1998.
â€“ Combined tightness test: when tested in accordance with EN 1277:1996, the joints shall conform to table 21.

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Table 22 — Material characteristics of pipes

Characteristic	Requirements	Test parameters		Test method
Resistance to internal pressure	No failure during the test period	End caps Test temperature Orientation Number of test pieces Circumferential (hoop) stress Conditioning period Type of test Test period	Type a or b 60 °C Free 3 10,0 MPa 1 h Water-in-water 1000 h	EN 921: 1995

Table 23 — Material characteristics of fittings

Characteristic	Requirements	Test parameters		Test method
Resistance to internal pressure	No failure during the test period	End caps Dimensions Test temperature Orientation Free length for injection-moulded pipe Number of test pieces Circumferential (hoop) stress Conditioning period Type of test Test period	Type a or b 50 mm ≤ d_n ≤ 110 mm 60 °C Free ≥ 140 mm 3 6,3 MPa 1 h Water-in-water 1000 h	EN 921: 1995

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Summary of Testing Equipment

- Dimensional measurement equipment for pipes and fittings
- Vicat Softening Point EN 727
- Resistance to Dichloromethane EN 580
- MFI MFR Melt Flow Indexer ISO 1133
- DSC OIT Differential Scanning Calorimeter EN728
- Falling Weight Impact Tester EN 744
- Longitudinal Reversion (Hot Air Oven) EN 743
- Water Tightness Tester EN 1053
- Air Tightness Tester EN 1054
- Thermal Cycling tester EN 1055
- ISO Ring Stiffness Tester ISO 9969
- Hydrostatic Pressure Tester EN 921
- Hot Water Bath for Hydrostatic Pressure Tester EN 921
- SS304 End Caps
- Combinational Test for Seals EN 1277



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