

Translation from Finnish
Legally binding only in Finnish and Swedish

10/19

Decree of the Ministry of the Environment

on the Type Approval of Polypropylene Drainage Pipes and Pipe Fittings Intended for Waste Water Installations of Buildings

By decision of the Ministry of the Environment, the following is enacted pursuant to section 6, subsection 3; section 9, subsection 2; and section 10, subsection 3 of the Act on the Type Approval of Certain Construction Products (954/2012):

Section 1

Scope of application

This Decree applies to the requirements of type approval of polypropylene (PP) drainage pipes and pipe fittings intended for waste water installations in a building and on property. This Decree applies also to drainage pipes and pipe fittings manufactured of mineral modified polypropylene (PP-MD).

This Decree covers drainage pipes with the nominal size of DN 32 - DN 160 that are used in the gravity drainage of household waste water and storm water and pipe fittings with socket joints.

Section 2

Definitions

In this Decree:

1) *Mineral-modified polypropylene* (PP-MD) means polypropylene to which minerals are added during the manufacturing process.

2) *H₅₀-value* means the height from which a hammer of a pre-determined weight is dropped in the impact resistance test of the pipe causing 50 percent of the samples from the manufacturing batch of the pipe to break.

Section 3

Establishment of conformity

Type approval can be used to demonstrate that the polypropylene (PP and PP-MD) drainage pipes and pipe fittings comply with the essential technical requirements laid down in section 117 c of the Land Use and Building Act (132/1999), as amended by Act (958/2012), and thereunder.

Section 4

Material

An accredited testing laboratory shall inspect the material and composition data submitted by the manufacturer on the polypropylene and its additives in the basic material of the pipes and pipe fittings as well as on any mineral modification substance.

An accredited testing laboratory shall test the melt flow rate (MFR value) of the PP basic material before modification of the raw material.

An accredited testing laboratory shall test the oxidation resistance time of the material.

An accredited testing laboratory shall test the pressure resistance of the material of the pipes and pipe fittings.

Section 5

Outer appearance

An accredited testing laboratory shall examine the inner and outer surfaces of the pipes and pipe fittings visually without magnification.

The dyeing of pipes and pipe fittings shall be inspected from surfaces and cross-sections.

Section 6

Dimensions

An accredited testing laboratory shall inspect the dimensions of the pipes and pipe fittings.

Section 7

Types of pipe fittings

An accredited testing laboratory shall include all pipe fitting types that are manufactured in the testing of the pipe fittings. The most common fitting types are presented in Table 1.

Table 1. Common fitting types.

Fittings	Type of fitting	Nominal angle
Bends	Unrounded or rounded bend	15°, 22.5°, 30°, 45° 67.5°, 80°, 87.5-90°
Branches and reducing branches	insert end/socket and socket/socket	45°, 67.5°, 87.5-90°
Joint fittings	double socket and insert fitting	-
Other fittings	reducers, caps and clean-outs	

Section 8

Mechanical properties of the pipes

Of the mechanical properties of the pipes, an accredited testing laboratory shall test the impact resistance and ring stiffness.

The impact resistance shall be tested using the staircase method. The pipes shall meet the requirement provided in Table 2. When testing the ring stiffness of a pipe with the test values provided in Table 3, it shall meet the requirement provided in Table 3.

Table 2. Impact resistance of a pipe.

Property	Test values				Requirement			
Impact resistance (staircase method)	conditioning temperature,	(23 ±			H ₅₀ ≥ 1 m, At most one breakage below 0.5 metres			
	Test temperature	(-10 ±						
	Type of hammer	d 90						
	Mass of hammer:	a)						
a)	d _n	32, 40	50	75	90	110	125	160
	Mass of hammer (kg)	1.25	2.0	2.5	3.2	4	5	8

Table 3. Ring stiffness of a pipe.

Property	Test values		Requirement ¹⁾
Ring stiffness	Test temperature	(23±2) C°	SN 4: ≥ 4 kN/m ² or SN 8: ≥ 8 kN/m ²
	Degree of deflection	3 %	
	Compression rate:	mm/min	
	75 mm ≤ d _n ≤ 110 mm	2±0.4	
	110 mm < d _n ≤ 160 mm	5±1.0	
¹⁾	Ring stiffness classes: SN 4 and SN 8		

Section 9

Mechanical properties of the pipe fittings

An accredited testing laboratory shall test the impact resistance of the pipe fittings with a drop test using the test values presented in Table 4. The pipe fittings shall meet the requirement presented in Table 4.

Without testing, a pipe fitting corresponding to a pipe with regard to its wall thickness belongs to the same stiffness class as the pipe.

Table 4. Impact resistance of a pipe fitting

Property	Test values		Requirement
Impact resistance (drop test)	Test/conditioning temperature	(0 ± 1) °C	No breakage
	Drop height:	mm	
	d _n = 110 mm	1,000	
	d _n = 125 mm	1,000	
	d _n = 160 mm	500	

Section 10

Physical properties

An accredited testing laboratory shall test the longitudinal dimensional stability of the pipes. The dimensional stability shall meet the requirement presented in Table 5.

An accredited testing laboratory shall test the melt-flow rate of the material of a pipe manufactured of a compound.

An accredited testing laboratory shall test the thermal resistance of the pipe fittings using the test values in accordance with Table 6. The pipe fitting shall meet the requirement presented in Table 6.

Table 5. Longitudinal dimensional stability of a pipe.

Property	Test values		Requirement
Longitudinal Dimensional stability	Test temperature	(150 ± 2) °C	≤ 2 % The pipe may not show bubbles or cracks
	Immersion time in liquid (A) or air	30 min 60 min	

Table 6. Thermal resistance test of a pipe fitting.

Property	Test values		Requirement
Thermal resistance test	Test temperature	(150 ± 2) °C	No damage ^{a)}
	Immersion time in liquid	30 min	
<p>a) The size of cracks, fractures or blisters around the spraying area may not exceed 20 % of the wall thickness. The depth of the opening of the weld line may not exceed 20 % of the wall thickness.</p> <p>If the pipe fittings are manufactured of pipes, the pipes shall meet the requirements set in sections 7 and 8.</p>			

Section 11

Functional properties

An accredited testing laboratory shall test the properties given in Table 7 of the joints and the piping system. They shall meet the requirements given in Table 7.

Table 7. Functional properties.

Property	Test values		Requirement
Watertightness (Usage range B and BD)	Angle change to the joint	2°	No leakage
	Test pressure	water 50 kPa	
	Test period	15 minutes	
Air tightness (Usage range B and BD)	Angle change to the joint	straight-line and 4 x 2°	No leakage
	Test pressure	air 10 kPa	
	Test period	5 and 4 x 1 min.	
Underpressure test (Usage range B)	Angle change to the joint	0°	≤ -27kPa
	Test pressure	air -30 kPa	
	Test period	15 minutes	
Tightness of a joint with seal (Usage range BD)	Angle change to the joint	2°	≤ -27kPa No leakage No leakage
	Test pressure	air -30 kPa water 5 kPa water 50 kPa	
	Socket compression	10 %	
	Insert end compression	15 %	
	Test period	15 minutes	
Temperature variation (Usage range B and BD)	Test values in Table 8. Piping system assembled of pipes and pipe fittings, total length 8-11 m, height 3 m comprising an upper horizontal pipe, a vertical riser and a bottom horizontal pipe		No leakage before and after the test. Deflection: $d_n \leq 50 \text{ mm}; \leq 3 \text{ mm}$ $d_n > 50 \text{ mm}; \leq 0,05d_n$

Table 8. Temperature variation test.

Phases of the cycles of a temperature variation test ¹⁾	Water temperature °C
Hot water flow rate (0.5±0.05) l/s, (60±2) s	93±2
Pause (60±2) s	-
Cold water flow rate (0.5±0.05) l/s, (60±2) s	15±5
Pause (60±2) s	-
¹⁾ Cycles (length 4 min) repeated 1,500 times, duration 100 h	

Section 12

Seals

An accredited testing laboratory shall check from the markings and the information on materials of ring seals that they have been tested to be suitable for pipes and pipe fittings for household waste water.

Section 13

Marking

An accredited testing laboratory shall inspect the markings of the pipes and pipe fittings.

Section 14

Type testing

For type approval, an accredited testing laboratory shall type test the pipes and pipe fittings in accordance with the extent of testing presented in Table 1.1 of Appendix 1. For testing, the pipes and fittings are grouped in accordance with Tables 9 and 10. For type approval, the manufacturer shall, in addition to samples, submit product designs and material information and certificates.

Table 9. Size grouping of pipes and pipe fittings.

Nominal size DN/OD	Size group
32–50	1
75–160	2

Table 10. Type-specific grouping of pipe fittings.

Type	Fitting group
Bend	1
Branch	2
Other fittings	3

Section 15

Quality control relating to type approval

The certifying body for quality control shall verify that the polypropylene drainage pipes and pipe fittings comply with the requirements of type approval and also meet the conditions set in the decision on type approval.

The certifying body for quality control shall carry out an initial inspection of the production, an on-going control of the internal production quality control as well as the selection of random samples of products and their testing once annually or more frequently if the products do not meet the type-approval requirements. The extent of testing of the random samples is presented in Table 1.2 of Appendix 1.

The manufacturer's internal production quality control shall cover at least the inspections and tests presented in Appendix 2.

Section 16

Entry into force

This Decree enters into force on 1 January 2020.

Helsinki, 11 April 2019

Minister of the Environment, Energy and Housing Kimmo Tiilikainen

Senior Specialist Tomi Marjamäki

Type testing of polypropylene drainage pipes and pipe fittings and the tests used in the verification of quality control

Table 1.1. The properties, extent of testing and the samples to be tested in the type tests of polypropylene drainage pipes and pipe fittings.

Property	Extent of testing ¹⁾				Samples to be tested Number of replicate samples, pcs
	N	D	M	E	
PIPES					
Melt flow rate	+	-	+	-	1 / material / layer
Oxidisation resistance	+	-	+	-	1 / material
Internal pressure resistance	+	-	+	-	3 / material / size group
Outer appearance (surface quality, colour)	+	+	+	+	All pipes from which the samples to be tested are taken
Dimensions	+	+	+	+	
Impact resistance in test temperature - 10 °C	+	-	+	+	One size ²⁾ , at least 20
Ring stiffness	+	-	+	+	3 / material / stiffness class
Longitudinal dimensional stability	+	-	-	+	3 / size/size group, minimum 2 sizes
Change of the melt flow rate	+	-	+	-	1 / material
Seals	+	-	+	-	Inspection of documents
FITTINGS					
Melt flow rate ³⁾	+	-	+	-	1 / material / layer
Oxidisation resistance ³⁾	+	-	+	-	3 / material
Internal pressure resistance ³⁾	+	-	+	-	1 / material
Outer appearance (surface quality, colour)	+	+	+	+	1 / size / fitting group
Dimensions	+	-	+	+	
Impact resistance (drop test)	+	+	+	+	3 / elective size, DN/OD ≥ 110
Thermal resistance test	+	+	+	+	3 / size group / fitting group
Seals	+	-	+	-	Inspection of documents
SYSTEM					
Watertightness	+	+	-	+	1 / size / fitting group / material
Air tightness	+	+	-	+	1 / size / fitting group
Temperature variation test	+	+	+	-	1/ fitting type / material
Tightness of joints, usage range "BD" ³⁾	+	+	-	+	1 / size / fitting group
Temperature variation resistance and external load resistance, usage range "BD" ³⁾	+	+	+	+	One pipe and branch, of pipes DN/OD ≥ 110 lowest stiffness/ material
<p>1) N new system D change of structure M change of material: change of polypropylene fraction, increase of mineral filler by 3 % or change of filler. E expansion of product range (with the exception of products already covered by the chart of minimum selection).</p> <p>2) If the manufacturer produces only one size group, at least two sizes shall be tested.</p> <p>3) Testing is not required if the pipes are made of identical material.</p>					

Table 1.2. The properties to be tested in the verification of production quality control of polypropylene drainage pipes and pipe fittings and their testing frequency.

Property	Minimum testing frequency
PIPES	
Melt flow rate	once/year
Oxidisation resistance ¹⁾	once/year
Internal pressure resistance ²⁾	Once/year/size group
Outer appearance (surface quality, colour)	Once/year/size group
Dimensions	Once/year/size group
Impact resistance (test temperature -10 °C)	Once/production batch
Longitudinal dimensional stability	Once/year/size group
Seals	Inspection of documents / material
Marking	Once/year/size group
FITTINGS	
Melt flow rate ³⁾	Once / year / raw material
Oxidisation resistance ^{1,3)}	Once / year / raw material
Internal pressure resistance ^{2,3)}	Once / year / raw material
Outer appearance (surface quality, colour)	Once/year/size group
Dimensions	Once/year/size group
Impact resistance (drop test)	Once / 2 years / size group / fitting type / stiffness class
Thermal resistance test	Once/year/size group
Seals	Inspection of documents / material
Marking	Once/year/size group
SYSTEM	
Watertightness	Once/year/size group
Air tightness	Once/year/size group
Temperature variation test	Once / 2 years / joint type
Tightness of joints ⁴²⁾	Once / year / one size / joint type
¹⁾ Performed only on butt-welded joints if not performed on a pipe of identical material. ²⁾ Performed only on pipes and fittings with an elastomeric seal. ³⁾ All raw materials shall be tested within five-year period.	

Testing by the manufacturer's internal quality control

Table 2.1. The properties to be tested in the internal quality control of the manufacture of polypropylene drainage pipes and pipe fittings and the minimum number of tests.

Property	Inspection/test frequency
PIPES	
Oxidisation resistance	Once / year / raw material
Outer appearance (surface quality, colour)	Once / shift / machine
Dimensions	At the beginning and continuously or once every 8 hours
Impact strength (test temperature -10 °C)	Once / production batch
Longitudinal dimensional stability	At the beginning and once a week
Tightness of joints, usage range "BD" ¹⁾	Once / 2 years / size group / joint type
Airtightness, usage range "B"	Once / 2 years / size group / joint type
Watertightness, usage range "B"	Once / 2 years / size group / joint type
Internal pressure resistance	Once / year / raw material
Ring stiffness	Once/year/size group/ assembly of pipes
Markings ²⁾	Once / shift / machine and at the start of a production cycle
FITTINGS	
Internal pressure resistance ^{3, 4)}	Once / year / raw material
Oxidisation resistance ⁴⁾	Once / year / raw material
Outer appearance (surface quality)	Once / shift / machine
Colour	Once / shift / machine
Dimensions	Once / shift / fitting type / machine At least once / production batch
Flexibility test	Once/year/size group/ fitting group
Melt flow rate	Once / year / raw material
Tightness of joints ⁴⁾	Once / 2 years / size group / joint type
Airtightness, usage range "B"	Once / 2 years / size group / joint type
Watertightness, usage range "B"	Once / 2 years / size group / joint type
Markings ⁴⁾	Once / fitting type and machine as well as at the start of a production phase
¹⁾ To be performed only on pipes with an elastic compression ring. ²⁾ The beginning of a production cycle means an entirely new start or the start after a shut-down of at least two hours. ³⁾ Raw-material testing which requires a sample in pipe form. ⁴⁾ To be performed only if the material of the fitting has not already been tested in connection with the testing of the pipe.	