Annex B Material Polyethylen (PE 100-RC) for the manufacture of pressure pipes and fittings for alternative installation techniques according to PAS 1075

(Edition: 2020-06)

B 1 Testing and certification specifications (also refer to section B 2):

DIN 8074	Polyethylene (PE) pipes – PE 80, PE 100
DIN 8075	Polyethylene (PE) pipes – PE 80, PE 100 – General quality specifications
DIN EN 1555-1	Plastics piping systems for the supply of gaseous fuels – Polyethylene (PE) – Part 1: General
DIN CEN/TS 1555-7	Plastics piping systems for the supply of gaseous fuels – Polyethylene (PE) – Part 7: Guidance for assessment of conformity
DIN EN 12201-1	Plastics piping systems for water supply, and for drainage and sewerage under pressure – Polyethylene (PE) – Part 1: General
DIN CEN/TS 12201-7	Plastics piping systems for water supply, and for drainage and sewerage under pressure – Polyethylene (PE) – Part 7: Guidance for the assessment of conformity
DIN EN ISO 15494	Plastics piping systems for industrial applications – Polybutene (PB), polyethylene (PE), polyethylene of raised temperature resistance (PE-RT), crosslinked polyethylene (PE-X), polypropylene (PP) – Metric series for specifications for components and the system
ISO 4427-1	Plastics piping systems for water supply and for drainage and sewerage under pressure – Polyethylene (PE) – Part 1: General
ISO 4437-1	Plastics piping systems for the supply of gaseous fuels – Polyethylene (PE) – Part 1: General
DVGW GW 335-A2	Plastics piping systems for gas and water distribution – Requirements and tests – Part A2: PE 80 and PE 100 pipes
DVGW GW 335-B2	Plastics piping systems for gas and water distribution – Specifications and tests – Part B2: PE 80 and PE 100 fittings
UBA KTW-BWGL	Evaluation basis for plastics and other organic materials in contact with drinking water
UBA	Recommendation - Assessment of conformity of the drinking water hygiene suitability of products
PAS 1031:2004-09	Material Polyethylene (PE) for the manufacture of pressure pipes and fittings – Requirements and tests
PAS 1075:2009-04	Pipes made from Polyethilene for alternative installation techniques – Dimensions, technical requirements and testing

B 2 General

Annex B of this certification scheme applies to all molding compounds of the material type polyethylene (PE 100-RC) for the production of pressure pipes and fittings for alternative installation techniques according to PAS 1075 in the application areas TW, G, DA and AW. The certification scheme includes in association with sections 1 to 8 (main part) all the requirements for the award of the "DINplus" quality mark for materials.

The quality enhancement is summarized in Table B 1.

Compliance with the requirements specified in this certification scheme (BRT, Table B 3) shall be confirmed to the customer by a certificate according to DIN EN 10204 Type 3.1 for each delivery.

Tabelle B 1 Quality enhancement

Requirements	Annex B	DIN 8074	DIN 8075	DIN EN 1555	DIN EN 12201	DVGW GW 335-A2	See section
Daily updated publication of the certified materials	+	/	/	/	/	/	B 3
Materials are listed in the KRV material list	+	/	/	/	/	/	B 3
Certificate according to DIN EN 10204 type 3.1 for each delivery	+	/	/	/	/	x	B 1
Stress cracking test of the raw material > 8,760 h, at 80 °C, 4 N/mm2, 2 % Arkopal N-100 (Accelerated procedures allowed)	+	/	/	/	/	/	PAS 1075, Table 1a, 2
Stress crack test of the pipe > 3,300 h, at 80 °C, 4 N/mm2, 2 % Arkopal N-100 (Accelerated procedures allowed)	+	/	/	/	/	/	PAS 1075, Table 3, 4
Point load test on solid wall pipe 8,760 h, at 80 °C, 4 N/mm2, 2 % Arkopal N-100 (Accelerated procedures allowed)	+	/	/	/	/	/	PAS 1075, Table 3, 4
Thermal ageing test > 100 a at 20 °C	+	/	/	/	/	/	PAS 1075, Table 1a
Notch test on solid wall pipe > 8,760 h at 80 °C (Accelerated procedures allowed)	+	/	/	/	/	/	PAS 1075, Table 1a, 2

Requirements	Annex B	DIN 8074	DIN 8075	DIN EN 1555	DIN EN 12201	DVGW GW 335-A2	See section
Penetration test After 9,000 h residual wall thickness ≥ 50 %	+	/	/	/	/	/	PAS 1075, Table 3
Protective layer scratch test Penetration depth ≤ 75 % of the protective jacket thickness	+	/	/	/	/	/	PAS 1075, Annex A6

The certification according to Annex B is to be understood as an "add-on" to the certification according to Annex A material polyethylene (PE 80 and PE 100) for the production of pressure pipes and fittings for gas, drinking water, waste water and industrial applications.

Within the scope of the certification scheme, correlating test methods are permitted (see also PAS 1075). Requirements for this are:

- Verification of the correlation of the test procedure, whereby the target value (e.g. 8760 h) must be included. The correlation coefficient must be > 0.9. The minimum requirement must be demonstrated with a "lower confidence limit" of 2.5 %.
- Accreditation of the testing laboratory and recognition by DIN CERTCO.
- Recognition of the test procedure by DIN CERTCO.

The minimum requirement of correlating test procedures have to be regularly adapted to the current state of knowledge from the existing test series. The current correlations are available to DIN CERTCO. The minimum requirements for test methods recognized by DIN CERTCO with proven correlation independent of material type are laid down in the certification scheme.

B 3 Product Groups

The certification is conducted separately for each material designation and production site.

In addition to the initial inspection of each production site and type testing per molding compound and production site, the prerequisite for certification is the conclusion of a monitoring contract between the raw material manufacturer or certificate holder, DIN CERTCO and a testing laboratory recognized by DIN CERTCO. The molding compound manufacturer or certificate holder thus undertakes to carry out regular factory production control (BRT/PVT) and regular audit test (AT) in accordance with Table B 3.

In order to maintain the certificate, an annual monitoring audit per factory site by DIN CERTCO is also required, during which an inspection of production, laboratory, factory production control and quality management takes place.

All materials approved by DIN CERTCO are published daily in the DIN CERTCO certification database at www.dincertco.tuv.com. This means that they meet the requirement to be included in the material list of the Plastic Pipe Association at www.krv.de.

Table B 1 Material List / Material list (example)

Manufacturer	Production Site	Material Designation	Material type	Colour	Weathering Verification 7 GJ/m²	Proven Rapid Crack Propagation (RCP) S4- or FS-test				Application			
						Application also for pipes ≥ 32 mm wall thickness			Application for pipes up to ... mm wall thickness				
						DA	TW	AW	G	DA	G	TW	AW
…	…	…	…	…	…	…	…	…	…	…	…..	…	…

B 4 Material test

The material tests (TT, BRT/PVT, AT) are summarized in Table B 3. The TT and AT are carried out by test laboratories recognized by DIN CERTCO. For the regular factory production control (BRT / PVT) the material manufacturer or certificate holder is responsible.

Table B 3 Material tests (per molding compound)

	Properties	Requirements according to or based on	Specification/Reference Value(s)		Testing Standard/Testing Method	Field of application				Scope of tests			
						TW	G	AW	DA	TT	FPC BRT	FPC PVT	AT
Table B 3 Material tests (per molding compound)	**Physical properties:**												
	Stress crack resistance	PAS 1075	No failure on 6 samples from orientation-free processing methods (e.g. press plate)	FNCT > 8.760 h at 80°C/4MPa/2%Arkopal N100 or correlating test method (2)	PAS 1075 Annex A1	x	x	x	x	x	x	/	/
	Point Load Resistance	PAS 1075	No failure on 3 samples (solid wall pipe DN 110 SDR 11 or solid wall pipe with minimum wall thickness at the choice of the raw material manufacturer)	PLT > 8.760 h at 80°C/4MPa/2%Arkopal N100 or correlating test method (2)	PAS 1075 Annex A3	x	x	x	x	x	/	/	1x / 3 years / PS
	Thermal ageing resistance under point load	PAS 1075	Verification in the thermal ageing test with point loads on pipe sections with a total length of at least 5 m	> 100 years at 20°C Testing at elevated temperature and determination of the activation energy	In accordance with PAS 1075 Annex A5	x	x	x	x	x	/	/	/
	Resistance to slow crack growth (SCG)	PAS 1075	No failure in the notch test on 3 samples (solid wall pipe DN 110 mm SDR 11)	NPT > 8.760 h at 80°C / 9,2 bar or correlating test method (2)	DIN EN ISO 13479	x	x	x	x	x	/	/	1x / 3 years/PS

	Properties	Requirements according to or based on	Specification/Reference Value(s)		Testing Standard/Testing Method	Field of application				Scope of tests			
						TW	G	AW	DA	TT	FPC BRT	FPC PVT	AT
Table B 3 Material tests (per molding compound)	Density	PAS 1075	Indication of the minimum density of the base material (base density)	≥ 945 kg/m³ at 23 °C ± 2 °C	DIN EN ISO 1183-1 DIN EN ISO 1183-2 DIN EN ISO 1183-3 DIN EN ISO 17855-1	x	x	x	x	x	x	/	2x / year
	Melt index (MFR)	PAS 1075	Indication of the MFR range	0,15 up to 0,40 g / 10 min at 190 °C / 5 kg (nominal value) (1)	DIN EN ISO 1133-1 or DIN EN ISO 1133-2	x	x	x	x	x	x	/	2x / year
	(1) The nominal MFR value is to be specified by the manufacturer of the molding compound. The measured MFR value may deviate from the nominal MFR value by a maximum of ± 20 %, whereby the smallest measured MFR value may not be less than 0.15 g / 10 min at 190 °C / 5 kg. (2) Minimum requirements for correlating test methods (tests raw material manufacturers): Stress crack test (FNCT > 8760 h; 80 °C; 4 N/mm²; 2 % Arkopal N-100; orientation-free processing method): * 400 h in ACT test procedure (90 °C; 4 N/mm²; 2 % NM5) [D-PL-11080-01-00; PA FNCT 2.1-3 in conjunction with PA ACT 2.1-9]. * 400 h in 2NCT+ test procedure (90 °C; 4 N/mm²; 2 % NM5) [D-PL-11080-01-00; PA 2NCT 2.1-2 in conjunction with PA ACT 2.1-9]. * 150 h in ACT+ test procedure (90 °C; 5 N/mm²; 2 % NM5) on 2 samples, additional 400 h in ACT test procedure (90 °C; 4 N/mm²; 2 % NM5) on 2 samples [D-PL-11080-01-00; PA FNCT 2.1-3 in conjunction with PA ACT 2.1-9], batch release after the ACT+ requirement has been met Point load test (PLT > 8760 h; 80 °C; 4 N/mm²; 2 % Arkopal N-100; solid wall pipe Da 110 SDR 11): * 450 h in PLT+ test procedure (90 °C; 4 N/mm²; 2 % NM5) [D-PL-11080-01-00; PA PLP+ 2.2-4].								

B 5 Changes and start of validity

The following changes have been made:

Edition 2020-06:
First Edition.

Edition 2020-06 Rev. 01:
Reissue as a separate document.

This annex to the certification scheme “Materials for plastic pipe systems” is valid from 2020-06-30.