

Determination the oxygen permeability

Plastics piping systems with an oxygen barrier layer



Test report No. LC 14439

Certificate/project No. 170600624

Date of report 26-07-2017

Total number of pages 5

Requested by RELIANCE WORLDWIDE CORPORATION EUROPE S.L.
Granada (Spain)

Performed request Determination of the oxygen permeability of the barrier pipe

Reference document(s)	ISO 17455: 2005	Plastics piping systems – Determination of the oxygen permeability of the barrier pipe
	EN ISO 21003-2: 2008	Multilayer piping systems for hot and cold water installations inside buildings; Part 2: Pipes
	DIN 4726: 2008	Warm water surface heating systems and radiator connecting systems - Plastics piping systems and multilayer piping systems

Tested product(s) PE-Xa/EVOH pipe 16 x 2,2 mm

Conclusion(s)* The products investigated meet the requirements for all tested and evaluated aspects as detailed in this report.

Authorised by

A handwritten signature in black ink, appearing to read "H. Pauw", is written over a horizontal line.

Henk Pauw, Laboratory Coordinator

Kiwa Nederland BV
Lab C

Postbus 137
7300 AC Apeldoorn
The Netherlands

Telephone +31 (0)88 998 3393
E-mail LabC@kiwa.nl
Internet www.1kiwa.com

Determination the oxygen permeability

Plastics piping systems with an oxygen barrier layer



Overview test results

Characteristic	Test method	Requirement	Measured	Passed*
Pipe or piping system				
Oxygen permeability	ISO 17455	@80°C: $F_{ox, day} \leq 3,6$ mgO ₂ /m ² ·day (ISO 21003-2)	@80°C: $F_{ox, day} = 0,25$ mgO ₂ /m ² ·day	Yes
Oxygen permeability	DIN 4726	@80°C: $F_{ox, day} \leq 3,6$ mgO ₂ /m ² ·day	@80°C: $F_{ox, day} = 0,25$ mgO ₂ /m ² ·day	Yes

* The conclusions are not part of the accreditation scope

Sample description

Pipe(s) :

Manufacturer	:	RELIANCE WORLDWIDE CORPORATION EUROPE S.L.
Production location	:	Granada (Spain)
Type of material/construction	:	PE-Xa/EVOH
Nominal dimensions	:	16 × 2,2 mm

Other aspects	:	PQ-10877-v1
---------------	---	-------------

Appearance

Colour inside	:	natural
Surface	:	smooth
Defects/damage	:	none
Discolorations	:	none
Remarks	:	none

Sampling information

Sampled by	:	sent by manufacturer
Date of sampling	:	not specified
Received at Kiwa lab	:	13-06-2017
Registered by	:	Mr H. El Hazmioui

Assembly

Length of pipe(assembly)	:	(20 ± 0,5) m
Number of fittings in assembly	:	none

Oxygen permeability – DIN 4726 pre conditioning

Test Method

DIN 4726: 2008

Warm water surface heating systems and radiator connecting systems -
Plastics piping systems and multilayer piping systems

Sample preparation, conditioning and apparatus

The sample preparation, conditioning, used measuring devices and test equipment are all in accordance with ISO 17455 and DIN 4726.

DIN 4726 pre conditioning

Bending pre conditioning(1)

Bending radius : $8 \times d_h$ (applied on 10% of the assembly length)

Environment : Air in air

Conditioning temperature : $(23 \pm 2) ^\circ\text{C}$

Conditioning time : 24 h

Water pre conditioning (2)

Environment : Water in water

Water temperature : $(20 \pm 1) ^\circ\text{C}$

Conditioning time : 24 h

Drying pre conditioning (3)

Environment : Water in air

Air conditions : $(23 \pm 2 ^\circ\text{C}, 50 \pm 5\% \text{ humidity})$

Conditioning time : 28 days

Date of test : 21-06-2017

Test performed by : Mr B. Bonekamp

Determination the oxygen permeability

Plastics piping systems with an oxygen barrier layer

Oxygen permeability

Test Method

ISO 17455: 2005

Plastics piping systems – Determination of the oxygen permeability of the barrier pipe

Sample preparation, conditioning and apparatus

The sample preparation, conditioning, used measuring devices and test equipment are all in accordance with ISO 17455.

Test parameters

Used method (ISO 17455) : Dynamic test method (method I)
 Test temperature : $(80 \pm 0,5)^{\circ}\text{C}$
 Conditioning period : 1 h ($\varnothing_{\text{in}} < 3 \text{ mm}$)
 Number of test assemblies : 1
 Length of pipe(assembly) : $(20 \pm 0,5) \text{ m}$
 Number of fittings in assembly : none
 Free pipe length of assembly : $(20 \pm 0,5) \text{ m}$
 Internal diameter of the pipe : 16,2 mm
 External diameter of the pipe : 11.6 mm
 Oxygen detection limit : $0,1 \mu\text{g O}_2/\text{l}$
 Test run O_2 measuring time : 1 h + 6 h
 Date of test : 25-07-2017
 Test performed by : Mr R. Boonstoppel

Test results

Test run No.	Oxygen uptake (ppb/h)	Atmospheric pressure (mbar)		(Corrected) Oxygen permeation $F_{\text{ox, day}}$ ($\text{mgO}_2/\text{m}^2 \cdot \text{day}$)
		Initial	End	
4	4,57	1002,0	1002,0	0,24
5	4,81	1002,0	1003,0	0,26
6	4,75	1003,0	1003,0	0,25
Avg. Oxygen permeation ($\text{mgO}_2/\text{m}^2 \cdot \text{day}$)				0,25

Remarks

None