



## Kiwa Nederland B.V.

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# European Technical Assessment

# ETA-17/1013 of 15/03/2018

## General Part

**Technical Assessment Body issuing the European Technical Assessment:**

**[Kiwa Nederland B.V.](#)**

**Trade name of the construction product**

**Eneflex 5 layer piping system [EU]**

**Product family to which the construction product belongs**

**Plastics piping kits for heating systems, made of PE-RT Type 0 or PE-RT Type I or PE-RT Type II with an oxygen barrier layer**

**Manufacturer**

Enetec Plastics GmbH  
Kalkarer Str. 81, Halle 26  
47533 KLEVE,  
Germany  
[www.enetec.info](http://www.enetec.info)

**Manufacturing plant(s)**

*Pipes:*  
Enetec Plastics GmbH  
Kalkarer Str. 81, Halle 26  
47533 KLEVE,  
Germany  
[www.enetec.info](http://www.enetec.info)

*Fittings:*  
IPA Produktions- und Vertriebsges.m.b.H.  
Betriebsstraße 4  
A-3163 ROHRBACH  
Austria  
[www.ipa-fitting.com](http://www.ipa-fitting.com)  
14 pages

**This European Technical Assessment contains**

**This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of  
This version replaces**

European Assessment Document  
EAD 280009-00-0802, edition 12/2015

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## 1. Technical description of the product

### Pipes made of PE-RT Type I or PE-RT Type II

Table 1: Nominal outside diameter ( $d_n$ ) and nominal wall thickness:

Class 4 / 6 bar		Class 5 / 6 bar			
PE-RT Type 1 and PE-RT Type 2		PE-RT type 1		PE-RT type 2	
Nominal outside diameter (mm)	Wall thickness (mm)	Nominal outside diameter (mm)	Wall thickness (mm)	Nominal outside diameter (mm)	Wall thickness (mm)
10	1,3	10	1,3	10	1,3
12	2,0	12	2,0	12	2,0
14	1,25				
14	2,0	14	2,0	14	2,0
15	1,5				
16	2,0	16	2,0	16	2,0
17	2,0	17	2,0	17	2,0
18	2,0			18	2,0
20	2,0			20	2,0
25 <sup>1)</sup>	2,3				

construction type: 5-Layer

type of barrier layer for 5 layer pipe: EVOH

### Metal fittings according to EN 1254-3

#### Type 1) press:

- type of metal : brass; CW614N
- type of compression ends : B, Press contour TH
- type of elastomeric sealing elements (EN 681-1) : - material : EPDM  
- type : WD  
- hardness (IRHD) : 80
- Types : 1 (Elbows and tees)  
2 (Reducers, couplers, end caps)  
3 (Adapters)

#### Type 2) clamp:

- type of metal : brass; CW614N
- type of compression ends : A
- type of elastomeric sealing elements (EN 681-1) : - material : EPDM  
- type : WD  
- hardness (IRHD) : 80
- Types : 1 (Elbows and tees)  
2 (Reducers, couplers, end caps)  
3 (Adapters)

Piping system, combinations of fittings with the pipes per dimension:

Pipe dimension (mm)	Fitting type 1 "press"	Fitting type 2 "clamp"
10 – 20 mm	X	X
25 mm	X	

## 2. Specification of the intended use(s) in accordance with the applicable European Assessment Document (hereinafter EAD)

Plastics piping kits are used for the conveyance of water (not intended for human consumption) for heating systems according to class 4 and/or class 5 of ISO 10508.

The design pressure ( $p_D$ ) shall be 4 or 6 bar and is depending on the PE-RT type and the wall thickness of the pipe as defined in table 1.

The provisions made in this ETA are based on an assumed intended working life of 50 years for the plastics piping kits. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a mean for choosing the right product in relation the expected reasonable working life of the works.

## 3. Performance of the product and references to the methods used for its assessment

### 3.1 Composition and manufacturing process

The composition and the manufacturing process of the pipe and fitting correspond to the product subject to the assessment testing.

Details of the composition and manufacturing process are deposited at Kiwa Nederland B.V.

### 3.2 Safety in case of fire (Clause 2.2.7 of EAD 15-28-0009-08.2)

#### 3.2.1 Reaction to fire on the pipe

Euroclass F according to EN 13501-1, no performance determined.

#### 3.2.2 Reaction to fire on the fitting

For all press fittings: Euroclass A1 according to EN 13501-1, no performance determined.

For all clamp fittings: Euroclass A1 according to EN 13501-1, no performance determined.

### 3.3 Release of dangerous substances (Clause 2.2.8 of EAD 15-28-0009-08.2)

Not assessed

### 3.4 Raw materials of the pipe

#### 3.4.1 PE-RT material of the stress bearing layer

##### 3.4.1.1 Melt mass flow rate (Clause 2.2.1.1.1 of EAD 15-28-0009-08.2)

Not assessed

##### 3.4.1.2 Oxidation induction time (Clause 2.2.1.1.2 of EAD 15-28-0009-08.2)

Not assessed

3.4.1.3 Density(Clause 2.2.1.1.2 of EAD 15-28-0009-08.2)

Not assessed

3.4.1.4 Long-term hydrostatic strength

The tested long-term hydrostatic strength of the PE-RT material is performed according EN ISO 9080 and LPL values according EN ISO 22391

3.4.2 Thermal stability EVOH oxygen barrier layer (Clause 2.2.1.2.1 of EAD 15-28-0009-08.2)

Not assessed

3.4.3 Peak melting point adhesive layer(s) (Clause 2.2.1.4.1 of EAD 15-28-0009-08.2)

The peak melting temperature is greater than 120°C.

3.4.4 Outer layer made of PE-RT (Clause 2.2.1.5.1 of EAD 15-28-0009-08.2)

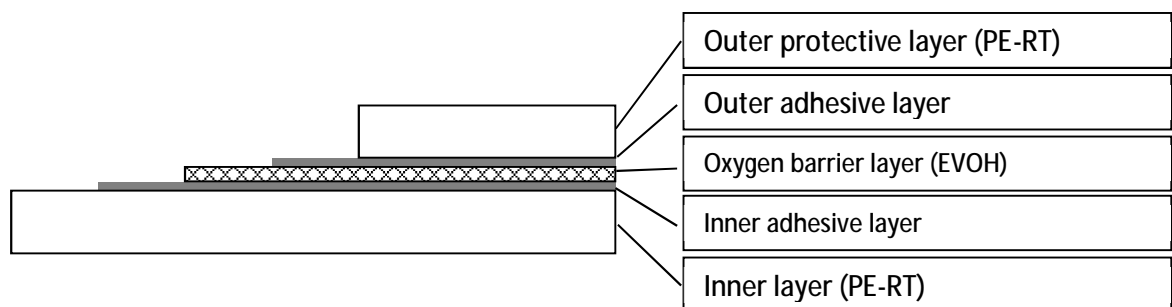
The outer layer is made from the same PE-RT material as used for the inner stress bearing layer and therefore covered by clause 3.3.1.4 of this ETA.

3.5 Extruded pipe

3.5.1 Build up of the pipe

For the build up of the pipes a schematic representation of the cross section of the wall of the PE-RT pipe with an outer layer is depicted in the figure below. The cross section is made downwards from outer till inner layer of the pipe.

5 layer pipe:



The inner and outer adhesive layers are of the same material as are the inner stress bearing layer and the outer layer.

The colour of the inner and/or outer layer of the pipes is dependent on the market driven choices of the customer.

The presented thickness of the layers in the drawings are an example.

3.5.2 Geometrical characteristics

The dimensions of the extruded pipes are measured in accordance with EN-ISO 3126. Manufacturing time is more the 24h before measuring. Conditioning time at  $(23\pm 2)^{\circ}\text{C}$  is 4 hours. Measuring temperature is identical to conditioning temperature.

For the nominal outside diameters the tolerances of the mean outside diameter ( $d_{em}$ ), out-of-roundness (ovality) and wall thickness ( $e$ ) see table 2 and 3.

Table 2. Tolerances of the mean outside diameter ( $d_{em}$ ), out-of roundness (ovality)

DN/OD (mm) $d_n$ (mm) $d_{em, min}$ (mm)	tolerance $d_{em}$ (mm)	ovality (mm)
$6 \leq DN/OD \leq 32$	- 0 - + 0.3	$\leq 1.0$

Table 3. Tolerances of the wallthickness (e)

wall thickness $e_{min, overall}$ (mm)	tolerance e (mm)	wall thickness $e_{outer}$ layer (mm)
$0,5 \leq e_{min} \leq 1$	- 0 - + 0.2	0.1 - 0.5
$1 < e_{min} \leq 2$	- 0 - + 0.3	0.1 - 0.5
$2 < e_{min} \leq 3$	- 0 - + 0.4	0.1 - 0.5
$3 < e_{min} \leq 4$	- 0 - + 0.5	0.1 - 0.5
$4 < e_{min} \leq 5$	- 0 - + 0.6	0.1 - 0.5
$5 < e_{min} \leq 6$	- 0 - + 0.7	0.1 - 0.5
$6 < e_{min} \leq 7$	- 0 - + 0.8	0.1 - 0.5
$7 < e_{min} \leq 8$	- 0 - + 0.9	0.1 - 0.5
$8 < e_{min} \leq 9$	- 0 - + 1.0	0.1 - 0.5

Calculations are made in accordance with Miner's rule (EN-ISO 13760), based on the total wall thickness of the stress designed layer(s) of PE-RT material and taken in account the overall service design coefficients in Table 4.

Table 4. The overall (service) design coefficients for class 4 and class 5 in accordance with EN-ISO 10508:

Temperature coefficient for the design temperature	$T_D$	over service (design) coefficient
maximum temperature	$T_{max}$	1.50
malfunction temperature	$T_{mal}$	1.30
cold water temperature	$T_{cold}$	1.00
		1.25

For the minimum calculated  $S_{calc, max}$  value at a design pressure ( $P_D$ ) see table 5:

Table 5.  $S_{calc, max}$  value at a design pressure ( $P_D$ )

Class	$S_{calc, max}$ value			
	PE-RT Type I		PE-RT Type II	
	4	5	4	5
Design pressure ( $P_D$ )				
4 bar	6.7	6.0	7.6	7.6
6 bar	5.4	4.0	6.4	5.2

- 3.5.3 Longitudinal reversion(Clause 2.2.2.3 of EAD 15-28-0009-08.2)  
The longitudinal reversion is smaller than 2.0%.
- 3.5.4 Elongation at break (Clause 2.2.2.4 of EAD 15-28-0009-08.2)  
Not assessed
- 3.5.5 Thermal stability (Clause 2.2.2.5 of EAD 15-28-0009-08.2)  
The testing time exceeds the 8760 hours at 110°C.
- 3.5.6 Melt mass flow rate (Clause 2.2.2.6 of EAD 15-28-0009-08.2)  
The deviation of the melt mass flow rate of the PE-RT pipe with the MFR of the PE-RT raw material is smaller than 20% of the initial value.
- 3.5.7 Hydrostatic strength(Clause 2.2.2.7 of EAD 15-28-0009-08.2)  
The testing time exceeds the 1000 hours at 95°C.
- 3.6 Raw materials of the fittings
  - 3.6.1 Metal fittings
    - 3.6.1.1 Pressure test (Clause 2.2.3.1.1 of EAD 15-28-0009-08.2)  
The testing time without leakage, determined during testing at 7.5 bar at 95°C temperature exceeds 1000 hours.
    - 3.6.1.1 Dezincification resistance(Clause 2.2.3.1.2 of EAD 15-28-0009-08.2)  
Not assessed
  - 3.6.2 Elastomeric sealing elements(Clause 2.2.3.2 of EAD 15-28-0009-08.2)  
The test results are stated in the DOP of the manufacturer of the elastomeric sealing element
- 3.6 Fitting characteristics
  - 3.6.1 Geometrical characteristics (Clause 2.2.4.1 of EAD 15-28-0009-08.2)  
All fittings are in accordance with EN 1254-3 clause 4.3.  
The relevant construction drawings of the fittings are deposited at Kiwa Nederland B.V..
- 3.7 Tightness of the jointing
  - 3.7.1 Internal pressure test(Clause 2.2.5.1 of EAD 15-28-0009-08.2)  
The testing time without failure exceeds the 1000 hours at 95°C/ 7.5 bar
  - 3.7.2 Bending test(Clause 2.2.5.1 of EAD 15-28-0009-08.2)  
Not assessed
  - 3.7.3 Pull-out test(Clause 2.2.5.2 of EAD 15-28-0009-08.2)  
The minimum pull-out force is stated in table 8.

Table 8. Minimum pull out force per diameter

Nominal dimension (mm)	Minimum pull out force (N)
10	118
12	170

14	230
15	265
16	301
17	340
18	382
20	471
25	736

3.7.4 Thermal cycling test(Clause 2.2.5.3 of EAD 15-28-0009-08.2)  
The number of cycles without failure is greater than 5000 cycles.

3.7.5 Leaktightness under vacuum(Clause 2.2.5.4 of EAD 15-28-0009-08.2)  
The testing time without failure, is greater than 1 hour. The change in vacuum is less than 0.05 bar.

3.8 Oxygen permeability of the system

The oxygen permeation of the piping system is tested in accordance with ISO 17455 and expressed as oxygen permeation flux in g/m<sup>2</sup>.h (F<sub>ox</sub>) or mg/m<sup>2</sup>.day (F<sub>ox,day</sub>) with the following parameters:

	Application Class Class 5
PE-RT type material	1 and 2
Method type	I
Test temperature, T <sub>test</sub> (°C)	80

The oxygen permeation flux (F<sub>ox,day</sub>) for PE-RT type 1 and 2 at 80°C is smaller than 1.8 mg/m<sup>2</sup>.day.

#### 4. Assessment and verification of constancy of performance (hereinafter AVCP) system applied, with reference to its legal base

For the products covered in this ETA the applicable European legal act is:

1999/472/EC and letter from the commission to EOTA (ENTR/G/5/GB/si D(2004) – 790051, No 001250 dated 13.02.2004)

Product	Intended use	Level or class	System
Plastics piping kits for heating systems, made of PE-RT Type 0 or PE-RT Type I or PE-RT Type II with an oxygen barrier layer	Plastics piping kits to be used for the conveyance of water (not intended for human consumption) for heating systems according to class 4 and/or 5 of ISO 10508.	-	4

**5. Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD**

**5.1 Tasks of the manufacturer; factory production control (FPC)**

All the elements, requirements and provisions adopted by the manufacturer are documented in a systematic manner in the form of written policies and procedures.

The FPC system has to ensure that the products are in conformity with the declarations in this European Technical Assessment.

In the framework of FPC the manufacturer shall carry out tests and controls with the prescribed control plan which is part of this European Technical Assessment.

In this control plan are detailed extent, nature and frequency of testing and controls to be performed.

The control plan shall address at least the following items/characteristics and (minimum) frequencies:

**Pipes**

- raw materials  
- PE-RT every delivery
- control of dimensions continuous/ every hour per machine
- longitudinal reversion every start-up and production batch
- MFR every start-up and PE-RT batch change
- hydrostatic strength every production batch per machine

**Fittings**

- raw materials
- metal every incoming batch
- elastomeric sealing elements every incoming batch

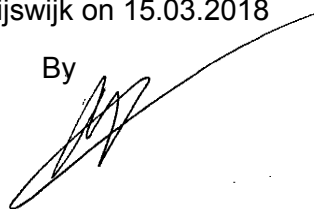
Criteria on acceptance and rejection are laid down in the FPC system of the manufacturer.

**5.2 Tasks of the approved bodies**

The attestation of conformity system is 4, therefore the approved body is not involved.

Issued in Rijswijk on 15.03.2018

By



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