DNV·GL

Certificate No:
TAK00000U2

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Plastic Pipes, Thermoplastic

with type designation(s)
RAXOFIX; RAXOFIX PE-Xc (flexible) / RAXOFIX PE-Xc/Al/PE-XC (inherently stable)

Issued to
Viega Technology GmbH & Co. KG
Attendorn Nordrhein-Westfalen, Germany

is found to comply with
DNV GL rules for classification – Ships
DNV GL class programme DNVGL-CP-0072 – Type approval – Thermoplastic piping systems

Application :

Products approved by this certificate are accepted for installation on all vessels classed by DNV GL.

Issued at **Hamburg** on **2017-04-28**

This Certificate is valid until **2022-01-11**.
DNV GL local station: **Essen**

Approval Engineer: **Peter Gierhan**

for **DNV GL**
Digitally Signed By: Drews, Olaf
Location: DNVGL Hamburg
Signing Date: 2017-04-28

Olaf Drews
Head of Section

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid.
The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

Product description

Raxofix PE-Xc (flexible): Polyethylene pipes.

Pipes:	RAXOFIX PE-Xc
Size range [mm]:	16x2.2, 20x2.8
Fittings:	Red brass body with fixed stainless steel pressing ferrules
Max. operating pressure:	10 [bar] Max. operating temperature: 70 [°C] (short periods up to 95 [°C])

Application: Potable and wash water systems (internal)

Raxofix PE-Xc/AL/PE-Xc (dimensionally stable): Aluminium-reinforced polyethylene pipes, which consist of 5 layers, a PE-Xc internal pipe, adhesive layer, a butt welded aluminium layer, adhesive layer and a PE-Xc externalcoating.

Pipes:	RAXOFIX PE-Xc/Al/PE-XC
Size range [mm]:	16x2.2, 20x2.8, 25x2.7, 32x3.2, 40x3.5, 50x4.0, 63x4.5
Fittings:	Red brass body with fixed stainless steel pressing ferrules
Max. operating pressure:	10 [bar] Max. operating temperature: 70 [°C] (short periods up to 95 [°C])

Application: Potable-, wash water-, warm water heating- and service air (non essential) systems (internal)

Raxofix Fittings: Approved/tested **Raxofix** gun metall bronze fittings from Viega Supply Chain GmbH & Co. KG

Pipes:

	Outside diameters and minimum wall thickness						
OD (mm)	16	20	25	32	40	50	63
t (mm)	2.2	2.8	2.7	3.2	3.5	4.0	4.5

Manufactured by

Pipes:

- Viega Supply Chain GmbH & Co. KG, D-Niederwinkling- Germany
  Pipes PE-Xc, Dim. 16-20

- Viega Supply Chain GmbH & Co. KG, D-Niederwinkling- Germany
  Pipes PE-Xc/Al/PE-Xc, Dim. 16-20-25-32

- Becker Plastics GmbH, Am Bahnhof 3, D-45711 Datteln, Germany
  Pipes PE-Xc/Al/PE-Xc, Dim. 40-50-63

Fittings:

- Viega Supply Chain GmbH & Co. KG, D-Großheringen- Germany
- Viega Supply Chain GmbH & Co. KG, D-Elspe- Germany
- Viega Supply Chain GmbH & Co. KG, D-Ennest- Germany

Responsibility

The Holder of Certificate takes the responsibility that both design and production are in compliance with Rules, Standards and Regulations listed on page 1 of this Certificate.

Application/Limitation

Approved for unprotected installation in locations where "0" or "NA" is specified in Table 1- Fire endurance requierements matrix of DNVGL Rules Pt.4, Ch.6, Section 2.

The piping system is not approved:
- for installation within tanks and vacuum applications (service pressure below - 0.1bar gauge).
- for installation in gas hazardous area.

For application on passenger vessels additional requierements specified in the Rules and Regulations of the appropriate flag state authority may have to be observed.

The installation and application of the pipes shall be in accordance with the Manufacturer's recommendations.
Test standard IMO Resolution A.753 (18) except fire endurance, flame spread, smoke generation and toxicity test. The Fire Endurance and Low Flame Spread characteristic of the piping system have not been determined.

Installation:

The installation of the piping system is to be carried out in acc. with the instructions of the manufacturer respectively the installation requirements of the IMO Resolution as applicable.
If necessary, pipes and plastic fittings are to be protected against ultraviolet radiation.
Cold water piping systems are to be adequately protected against heat sources and condensation.
Hot water piping systems are to be adequately protected against heat loss, including circulation pipes.
The handling instructions for fittings and pipes and the manufacturer`s chemical resistance list for pipes and fittings are to be observed. Through watertight bulkheads and fire divisions DNV GL type approved pipe penetrations are to be used. The use of the products outside the range of application underlies the special consideration by DNV GL each individual case.
The piping system is not approved for installation within tanks and open decks.

Type Approval documentation
Tests carried out

Type Testing carried out according to **Type Approval documentation**
DNV GL Ref.-No.: 11-027981

Marking of product

The pipes and fittings shall be marked with:
- Trade name
- Maximum working temperature (Tmax=70ºC in DNV GL classified objects)
- Maximum working pressure
- Dimensions, outer diameter and wall thickness
- Material designation
- Production code

The marking is to be carried out in such a way that it is visible, legible and indelible. The marking of product is to enable traceability to the DNV GL Type Approval Certificate.

Periodical assessment

The scope of the Periodical Assessment is to verify that the conditions stipulated for the Type Approval is complied with and that no alterations are made to the product design or choice of materials.

Periodical Assessment to be performed after two and a half year (2.5 years, certificate retention) and prior to renewal after five (5 years, certificate renewal).
The objective of the periodical assessment is to verify that the design and production conditions for the hose assemblies covered by this type approval have not been altered.
Main scope of the assessment:

— verification of the production and quality control system
— review of quality control documentation of recent deliveries
— review of the type approval documentation and that this is still the basis for the production
— review of design changes , pre- material and performance of the product
— verification of the product marking

END OF CERTIFICATE