



TYPE APPROVAL CERTIFICATE

Certificate no.:
TAK00000U2
Revision No:
5

This is to certify:

that the **Plastic Piping System, Thermoplastic**

with type designation(s)
Raxofix

issued to

Viega GmbH & Co. KG
Attendorn, Germany

is found to comply with

DNV rules for classification – Ships Pt.4 Ch.6 Piping systems

DNV class programme DNV-CP-0072 – Type approval – Thermoplastic piping systems

ISO 21003-2:2008 "Multilayer piping systems for hot and cold water installations inside buildings – Part 2: Pipes"

ISO 21003-3:2008 "Multilayer piping systems for hot and cold water installations inside buildings – Part 3: Fittings"

ISO 21003-5:2008 "Multilayer piping systems for hot and cold water installations inside buildings – Part 5: Fitness for purpose of the system"

Application:

Surface flame spread characteristics is confirmed by ASTM D635-06, class HB.
External pressure resistance up to 4bar.

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

Issued at **Hamburg** on **2024-11-18**

This Certificate is valid until **2027-01-04**.

for **DNV**

DNV local unit: **Essen**

Approval Engineer: **Hagen Markus**

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.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to USD 300 000.

Product description

The Raxofix composite plastic piping system consists of :
 Polyethylene multilayer pipes made of PE-RT/Al/PE-RT (rigid)
 Press fittings of type Raxofix with Viega SC-Contour
 Pressing machines and tools released by VIEGA

Reference: VIEGA "Raxofix Sortiment" and "Raxofix Gebrauchsanleitung"

Technical data

Pipes Raxofix - PE-RT/Al/PE-RT

Nominal internal pressure bar	PN16					PN12.5		
	Nominal diameter	DN12	DN15	DN20	DN25	DN32	DN40	DN50
Dimensions D x Wall thickness (mm)	16x2.2	20x2.8	25x2.7	32x3.2	40x3.5	50x4.0	63x4.5	

Nominal external pressure rating	Up to 4bar
Temperature range according to ISO 21003 and DNV CP-072	-15°C ¹ up to 80°C

Notes

¹ Refer to application table on page 3

Press fittings

Materials

Body	Silicon bronze CUSi4Zn9MnP (CW246E) Silicon bronze CUSi4Zn9MnP-C (CC246E)
Insert	PPSU

Types

Couplings, T-pieces, Bends, Adapters/-bends and connecting fittings (press fitting - screwed connection), Socket plugs, Caps.

Permissible service pressure and temperature limits

According to standard ISO 21003 series – Multilayer piping systems for hot and cold-water installations inside buildings

Classes	Class 1	Class 2	Class 4	Class 5
Service pressure	10bar	10bar	10bar	10bar
Max. service temperature	60°C	70°C	60°C	80°C

Applications	
Class 1	Hot water supply
Class 2	
Class 4	Underfloor heating and low temperature radiators
Class 5	High temperature radiators

Production places

Pipes

Viega GmbH & Co. KG, 94559 Niederwinkling, Germany
 Pipes O.D.: 16mm, 20mm, 25mm, 32mm, 40mm

Becker Plastics GmbH, Am Bahnhof 3, 45711 Datteln, Germany
 Pipes O.D.: 50mm, 63mm

Press fittings

Viega GmbH & Co. KG, 57439 Ennest – Attendorn, Germany

Responsibility

The company Viega GmbH & Co. KG, Attendorn takes the responsibility for the design and the production procedures with relation to ensuring continued consistent production of the type approved products.
 Reference DNV CP-0338 Type approval scheme, Section 4.

Application/Limitation

The Raxofix piping system is type approved for application in piping systems as listed in the table below. Reference RU SHIP Rules Pt.4 Ch.6, Section 2 – 1.7 Plastic pipes “Table 1- Fire endurance requirements matrix”. Approved installation locations where “0” is specified, appropriate footnotes are to be observed. Not approved for installation locations where “NA” or “X” is indicated and not approved for installation in gas hazardous areas.

Reference heading to Table 1	Item	Piping system
Freshwater	22	Non-essential systems: - Potable water generating and treatment systems - Potable hot and cold water, wash water systems (internal) - Cooling and heating system of air condition systems
Sanitary and drains and scuppers	24	Sanitary drains (internal): - Condensate from air conditioning systems
Miscellaneous	29	Service air (non-essential)
	30	Water Glycol mixture max. 50% Lowest service temperature: -15°C

Extent of Type Tests applicable to piping system dependent on application

Fire endurance Level

The Raxofix piping system is not tested with respect to Fire Endurance characteristics.

Flame spread

Surface flame spread characteristics is confirmed by ASTM D635-06, class HB.

Smoke and toxicity

The Raxofix piping systems is not tested with respect to smoke and toxicity characteristics.

Electrical conductivity

Not applicable.

Passenger vessels

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

Installation

For installation of the piping system the instructions and list of released pressing tools specified in the VIEGA “Raxofix Gebrauchsanleitung” are to be observed.

Guidance notes:

Pipes of the dimension 40x3.5mm and larger are offered as bar goods. The tubes can be bent, considering the recommended bending radius.

It should be noted that pipes with dimension $D \geq 40$ mm must be bent before installation and before pressing.

Subsequent bending of the pipes on the installed press connector is not permitted.

In addition, RU-SHIP Rules Pt.4 Ch 6 Section 10 – 4 Joining of plastic pipes are to be observed.

Bulkhead penetration

Pipe penetration through watertight bulkheads or decks as well as through fire divisions shall be type approved unless the penetration pipe is welded into the bulkhead/deck.

When plastic pipes pass through watertight bulkheads or decks which are also a fire division, and a fire may cause flooding of watertight compartments, the watertight integrity of the bulkhead or deck is to be maintained by a metallic shut-off valve fitted at the bulkhead or deck. The operation of this valve shall be provided from above the freeboard deck.

Refer to DNV RU-SHIP Pt.4 Ch.6 Sec.3 - 1.4 Fittings on watertight bulkheads.

On passenger vessels, where the watertight bulkhead is also a fire division, the requirements of SOLAS Chapter II - 1, Regulation 13.2.3. are to be observed.

Type Approval documentation

Tests carried out

- Internal pressure test short term
- Type tests acc. to ISO 21003-1, -2, -5
- Resistance to internal pressure at elevated temperatures acc. to ISO 22391-2 and ISO 15875-2
- External pressure test acc. to ASTM D 2924, Figure 1
- Vicat softening temperature and Impact resistance
- Flame spread test acc. to ASTM D 635
- Type tests for release of application water-glycol mixture with service temperature down to -15°C

Production Testing

According to "Viega Quality Plans" based on CEN ISO/TS 21003-7 "Guidance for the assessment of conformity".

Marking of product

Component	Scope	Example
Pipes (grey colour)	<ul style="list-style-type: none"> - Manufacturer name and or trademark - Nominal outside diameter and wall thickness - Composition - Application class with design pressure - Manufacturer information 	<ul style="list-style-type: none"> - Viega Raxofix - 16x2.2 - PE-RT/Al/PE-RT - Klasse 1,2,4,5/10bar - batch + gt → Viega or BPD → Becker
Fittings	<ul style="list-style-type: none"> - Manufacturer name - Nominal outside diameter - Manufacturer information 	<ul style="list-style-type: none"> - Viega - 16 - batch number

Periodical assessment

For retention of the Type Approval, a DNV Surveyor shall perform periodical assessment to verify that the conditions for the Type Approval are complied with. Refer to the Class Programme DNV-CP-0338, Section 4.

In addition, burst pressure testing on pipe spools made of different pipe/fitting sizes and fitting types to be carried out during renewal of the certificate.

To check the validity of this certificate, please look it up in <https://approvalfinder.dnv.com>

End of certificate