

# TYPE APPROVAL CERTIFICATE

Certificate No:  
**TAK00000U2**  
Revision No:  
**4**

## 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 :

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

Issued at **Hamburg** on **2022-01-05**

for **DNV**

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

DNV local station: **Essen**

Approval Engineer: **Hagen Markus**

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**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.

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 300,000 USD.



## 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-Contur  
 Pressing machines and tools released by VIEGA<sup>1</sup>

### Note

<sup>1</sup> Refer to the 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
Nominal external pressure rating	Up to 4bar						
Dimensions D x Wall thickness (mm)	16x2.2	20x2.8	25x2.7	32x3.2	40x3.5	50x4.0	63x4.5
Temperature range according to ISO 21003	0°C up to 80°C						

Press fitting		
Materials	Body	Silicon bronze CUSi4Zn9MnP (CC246E)
	Insert	PPSU
Types <sup>1</sup>	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.: 16, 20, 25, 32, 40mm
Becker Plastics GmbH, Am Bahnhof 3, 45711 Datteln, Germany Pipes O.D.: 50, 63mm
Fittings
Viega GmbH & Co. KG, 57439 Ennest – Attendorn, Germany

## Responsibility

Viega GmbH & Co. KG, Attendorn takes the responsibility that both design and production are in compliance with the Rules, Standards and Regulations listed on page 1 of this Certificate.

### Application/Limitation

The Raxofix piping system is type approved for application in piping systems as listed in the table below. Reference DNV 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 area.

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)

### 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.

In addition DNV Rules Pt.4 Ch 6, Section 10 – 4 Joining of plastic pipes

### Bulkhead and Deck 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 Rules Pt.4 Ch.6 Section 3 – 1.4 Fittings on watertight bulkheads.

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

## Type Approval documentation

### Actual TAP00000U2, Rev.4

- DNV Assessment report at production place Viega GmbH & Co. KG Niederwinkling, 2021-11-30

### Previous TAP00000U2, Rev.3

#### Test reports

- Excel spread sheet "Test report overview", 2021-02-02
- Summarised test report issued by Kiwa, report 191101052-1, 2021-01-08
- Individual test reports issued by Kiwa, MPA NRW, SKZ Würzburg and IMA Dresden
- Document "Modification Viega Raxofix"
- ISO 9080 Long-term hydrostatic strength test reports for pipe and fitting materials

#### Miscellaneous documents

- DNV GL Assessment report, 2020-11-03

### Previous type approval certificates TAP00000U2

- Type Approval documentation, DNV GL Ref.-No.: 11-027981
- Flame spread test report issued by SKZ Würzburg:
  - Test report 122170/16, 2016-09-21 (Raxofix size 63x4.5)
  - Test report 125468/17, 2017-05-24 (Raxofix PE-RT/Al/PE-RT sizes 16x2.2, 63x4.5)
- External pressure test report IMA Dresden V142/18.1A, 2018-04-23
- Test report acc. to CP-072 "Enclosure to DNVGL Assessment report dated 2017-10-26" - Raxofix PE-RT/Al/PE-RT witnessed by DNV GL.
- Test reports acc. to ISO 21003
  - 170201283-2, Viega pipes PE-RT/Al/PE-RT, Dim. 16-20-25-32 (ISO 21003-2)
  - VA KU 27323-1, Becker pipes PE-RT/Al/PE-RT, Dim. 40-50-63 System (ISO 21003-1)
  - 120005074-1, Viega system test, Dim. 16-20-25-32-40-50-63 (ISO 21003-5)
- Thermal stability under internal pressure acc. to ISO22391-2 (proof of Vicat softening temp.)
  - KIWA reports LC12792 (PE-Xc), LC12473-2 (PE-RT)
- VIEGA "Raxofix Gebrauchsanleitung ab 02/2010" and VIEGA "Raxofix Sortiment"

### 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

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

### 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, Sec.4.

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

### End of certificate