



DET NORSKE VERITAS

TYPE APPROVAL CERTIFICATE

CERTIFICATE NO. **K-5816**

This is to certify that the
Plastic Pipes, Thermoplastic

with type designation(s)
JRG Sanipex MT® Pipes

Issued to
Georg Fischer JRG AG
Sissach, Switzerland

is found to comply with
Det Norske Veritas' Rules for Classification of Ships
Det Norske Veritas' Type Approval Programme 1-501.2, 2011, Thermoplastic Pipes

Application

For use in systems for water and sea water up to 16 bar. Service temperature 0°C to 70°C, max. 95°C for shorter intervals. For installation in accordance with DNV Rules and Manufacturer's Specifications. The piping system is approved to Low Flame Spread in accordance with ASTM D635. The piping system is not tested w.r.t. Fire Endurance characteristics.


This Certificate is valid until **2017-12-31**.

Issued at **Høvik** on **2014-03-12**

DNV local station: **Essen CMC Southern Germany**

Approval Engineer: **Gisle Hersvik**

for **Det Norske Veritas AS**

 Digitally Signed By: **Strande, Martin**
Location: **DNV Høvik, Norway**
Signing Date: **2014-03-27**

Martin Strande
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.

If any person suffers loss or damage which is proved to have been caused by any negligent act or omission of Det Norske Veritas, then Det Norske Veritas shall pay compensation to such person for his proved direct loss or damage. However, the compensation shall not exceed an amount equal to ten times the fee charged for the service in question, provided that the maximum compensation shall never exceed USD 2 million. In this provision "Det Norske Veritas" shall mean the Foundation Det Norske Veritas as well as all its subsidiaries, directors, officers, employees, agents and any other acting on behalf of Det Norske Veritas.

Product description

JRG Sanipex MT® Pipes. Multilayer Composite Pipes (PE-Xc/AL/PE-Xb) / (PE-Xc/AL/PE-Xc),
- inner PE-X pipe (white) and outer PE-X layer (bars are in black; d16-d63) / PE-X layer (coils are in white; d16-d32) made of crosslinked polyethylene (PE-X) with support pipe in aluminium, laser butt welded.

Pipes:

Dimensions: d16 to d63 (as per JRG Sanipex MT® Product Catalogue), manufactured by:

- *Hewing GmbH, Ochtrup, Germany: d16 to d40 mm*
- *Georg Fischer PfcI Srl, Valeggio, Italy: d16 to d40 mm*
- *Uponor GmbH, Zella-Mehlis, Germany: d50 and d63 mm*

	Outside diameters and minimum wall thickness						
	PN16				PN13		
OD [mm]	16	20	26	32	40	50	63
DN [mm]	12	15	20	25	32	40	50
t [mm]	2,25	2,5	3,0	3,0	3,5	4,0	4,5

Fittings: - Manufactured by: *Georg Fischer JRG AG, Sissach, Switzerland*

d16-d40: PPSU/PA, PPSU/Gunmetal/PA
d50-d63: PPSU/PA, PPSU/Gunmetal/PA

Valves:

Body material: Gunmetal, CuSn5Zn5Pb2C (CC499K)

Seal: EPDM

Types:

1. 5200 – 5225, 5350 – 5371
2. 5262 – 5281
3. 6320
4. 1025
5. 1610 – 1615
6. 1830 – 1846

Seal: none

Types:

1. 3400, 3410

Seal: NBR

Types:

1. 1300 – 1363

Joining technique:

Flaired pipe with mechanical joint.

Manufactured by

Hewing GmbH, Waldstrasse 3, 48607 Ochtrup, Germany

DNV local office: Essen

Georg Fischer PfcI Srl, Via Degli Imprenditori, 24/26, 37067 Valeggio Sul Mincio (VR), Italy

DNV local office: Venice

Uponor GmbH, Am Köhlersgehäu 17, D-98544 Zella-Mehlis, Germany

DNV local office: Essen

Responsibility

The Company (stated on the front page of this Certificate) takes the responsibility that both design and production are in compliance with Rules, Standards and/or Regulations listed on page 1 of this certificate.

Application/Limitation

For installation according to DNV Rules and Manufacturer's Specification.

The approval covers application such as non-essential system, hot and cold water systems chilled and brine water systems, cooling systems (air condition), osmosis systems and evaporation, fresh water bunker lines, etc. and may be used in locations not restricted by Fire Endurance requirements.

Maximum service pressure 16 bar. Service temperature range 0°C to 70°C, max. 95 °C for shorter intervals.

Not for use in systems subject to any external pressure.

The piping system is approved to Low Flame Spread, in accordance with ASTM D635-06 (accepted as an alternative to IMO Resolution A.653(16)).

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

Type Approval documentation

1. Previous Type Approval Certificate Nos. K-4549 and K-4550.
2. Emails from +GF+ JRG AG of 2013-07-03 and 2013-09-30, incl. renewal documentation.
3. Email from +GF+ JRG AG of 2011-02-09, incl. SKZ Test Report No. 96069/10 of 2010-07-28.
4. Emails from +GF+ JRG AG of 2010-05-05, incl. Test Reports on valves.
5. Emails from +GF+ JRG AG of 2010-02-26, incl. Test Report, drawings of fittings, photos of spools and broken test samples.
6. Letter from DNV Essen of 2010-02-11, including:
 - Survey Report for Georg Fischer JRG AG of 2010-02-03, Survey Report for Hewing GmbH of 2010-02-07, and
 - JRG Sanipex MT® Technical Specification (Edition 2008) and information leaflets.
7. Letter from DNV Essen of 2010-03-23, including Survey Report for Uponor GmbH of 2010-03-16.

Tests carried out

Type Testing carried out in accordance with **Type Approval documentation**.

Marking of product

The product is to be marked with the *manufacturer's name/logo*: **+GF+ / JRG Sanipex MT®**, *material/type designation, nominal pressure, dimensions and production date*.

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 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 (2) years (Certificate Retention) and at renewal after four (4) years (Certificate Renewal).

The main elements of the Periodical Assessment are to:

- Ensure that **Type Approval documentation** is available.
- Review design, materials, production process, and performance with respect to possible changes, in order to ensure compliance with **Type Approval documentation** and/or referenced material specifications.
- Ensure traceability between manufacturer's product marking and the DNV Type Approval Certificate.

END OF CERTIFICATE