

TYPE APPROVAL CERTIFICATE**This is to certify:****That the Plastic Pipes, Thermoplastic**with type designation(s)
PVC-C Piping System (Pipes, Fittings, Valves)

Issued to

F.I.P. FORMATURA INIEZIONE POLIMERI SPA
CASELLA GE, Italy

is found to comply with

DNV GL rules for classification – Ships
DNV GL class programme DNVGL-CP-0072 – Type approval – Thermoplastic piping systems
IMO Resolution A.753(18). Guidelines for the Application of Plastic Pipes on Ships**Application :****For use in non-essential and essential systems for water up to 16 bar. Service temperature 0°C to 80°C. For installation according to DNV Rules and Manufacturer's Specifications. The piping system is not tested w.r.t. Fire Endurance. The piping system is tested to Low Flame Spread in accordance with IMO Resolution A.653(16).****Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.**Issued at **Høvik** on **2018-02-26**for **DNV GL**This Certificate is valid until **2023-02-21**.DNV GL local station: **Genoa**Approval Engineer: **Stefan Marion****Rikard Törnqvist**
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.



Job Id: **262.1-014986-2**
Certificate No: **TAK0000156**
Revision No: **1**

Product description

PVC-C PN10 and PN16 Pipes & Fittings and Valves.

- PVC-C Pipes in accordance with DIN 8079/8080 and ISO 15493.
- PVC-C fittings and valves in accordance with ISO 15493
- Pipe dimensions: DN10/d16 to DN150/d160 for PN16
DN100/d110 to DN150/d160 for PN10

Pipes PN16 - Series S6.3 SDR13.6:

Outside diameters and minimum wall thickness											
OD [mm]	16	20	25	32	40	50	63	75	90	110	160
t [mm]	1,4	1,5	1,9	2,4	3,0	3,7	4,7	5,6	6,7	8,2	11,8

Pipes PN10 - Series S10 SDR21:

Outside diameters and minimum wall thickness		
OD [mm]	110	160
t [mm]	5,3	7,7

Fittings:

Bends, tees, crosses, reducers, flanges, couplers, end caps, unions, stubs, nipples, adaptor sockets, transition fittings.

Valves:

Type	Designation	Nominal internal diameter [mm]	Maximum working pressure [bar]
VXE PVC-C	Easyfit 2-way ball valve	10-100	16
VKD PVC-C	Dual block 2-way ball valve	10-100	16
TKD PVC-C	Dual block 3-way ball valve	10-50	16
FK PVC-C	Butterfly valve	40-400	16-6
SXE PVC-C	Easyfit check valve	10-100	16
VM PVC-C	Diaphragm valve	15-100	10
DK PVC-C	2-way diaphragm valve	15-65	10
CM PVC-C	Compact diaphragm valve	12-15	6
RV PVC-C	Sediment strainer	10-50	16

Note: Nominal internal diameter and maximum working pressure shall be in accordance with Manufacturer's Specifications.

Joining technique:

Solvent jointed, threads, flanges

Manufactured by

FIP Formatura Iniezione Polimeri S.p.A., Localita' Pian di Parata, Casella, GE, Italy

DNV GL local office: Genoa

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FRIATEC AG, Steinzeugstraße 50, 68229 Mannheim, Germany

DNV GL 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

Approved only for installation of piping systems onboard ships which will not be exposed to vacuum inside the pipes and not exposed to external pressure outside the pipes.

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

The piping system is non-conductive, not for installation in gas hazardous areas.

The approval covers application such as non-essential and essential systems, hot and cold water systems chilled and brine water systems, cooling systems (air condition), black and grey water systems, watertreatment fresh and waste water, osmosis systems and evaporation, fresh water bunker lines, etc.

Maximum service pressure 16 bar. Service temperature range 0°C to 80°C.

Fire Endurance

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

Low Flame Spread

The piping system is tested with respect to Low Flame Spread performance in accordance with IMO Resolution A.653(16) (accepted as alternative to IMO FTP Code, Annex 1, Part 5).

Smoke Generation & Toxicity

The piping system is not tested w.r.t. Smoke Generation & Toxicity characteristics.

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

Type Approval documentation

1. Previous Type Approval Certificate K-5764
2. Type Approval Assessment Report from DNV GL Italy of 2017-12-15
3. Survey Report ESN-13-31924 regarding production site in Germany
4. Type Approval Renewal Survey witnessing of tests by DNV GL Italy of 2017-12-15
5. FIP document no QA OP 008 Rev.09
6. Test Report No 2014CS011270/3 from Rina Services of 2014-06-16 regarding:
 - "Test of the determination of rate, extent and time of burning of self-supporting plastics in a horizontal position"
7. Test Report No 2014CS011270/1 from Rina Services of 2014-06-16 regarding:
 - "Test of the determination of rate, extent and time of burning of self-supporting plastics in a horizontal position"

Tests carried out

Type Testing carried out according to **Type Approval documentation**.

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Marking of product

The product is to be marked with the *manufacturer's name*: **F.I.P. Formatura Iniezione Polimeri SPA, Casella, Italy**, *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 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 3.5 years (Certificate Retention) and at renewal after 5 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 DNV GL Type Approval Certificate.

END OF CERTIFICATE