DNV·GL

Certificate No:
TAK000007W

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Plastic Pipes, Thermoplastic

with type designation(s)
TORO 25 PP-R Pipes and Fittings

Issued to
A.T.P. AVANZATE TECNOLOGIE PLASTICHE SRL
BARLETTA BA, Italy

is found to comply with
DNV GL rules for classification – Ships
DNV GL class programme CP-0072 – Type Approval of non-metallic materials – Thermoplastic piping systems

Application :

For use in non-essential and essential systems for water with maximum allowable working pressure from 10 bar up to 20 bar. Service temperature 0ºC to 70ºC (shorter periods up to 95ºC). For installation according to DNV GL 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 ASTM D635-06 (accepted as an alternative to IMO Resolution A.653(16)). (IMO Resolution A.753(18) adopted on 04-Nov-1993 as amended by Resolution MSC.313(88) adopted on 26-Nov-2010, except fire endurance, flame spread, toxicity and smoke generation test).

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.

This Certificate is valid until **2021-02-14**.

Issued at **Høvik** on **2016-02-15**

for **DNV GL**

DNV GL local station: **Genoa**

Approval Engineer: **Gisle Hersvik**

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.

Product description

TORO 25 PP-R Pipes and Fittings

Made from PP-R (Polypropylene, Random Copolymer)

Pipes PN10 - Series S5 SDR11:

	Outside diameters and minimum wall thickness								
OD [mm]	20	25	32	40	50	63	75	90	110
t [mm]	1,9	2,3	2,9	3,7	4,6	5,8	6,8	8,2	10,0

External Pressure *:
Buckling Pressure (SF=3.0)
Ø250/14,8 4,1 bar

	Outside diameters and minimum wall thickness								
OD [mm]	20	25	32	40	50	63	75	90	110
Buckling Pressure (SF=3.0) [bar]	6,4				3,6				

Pipes PN16 - Series S3,2 SDR7,4:

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

External Pressure *:
Buckling Pressure (SF=3.0)
Ø250/22,7 8,2 bar

	Outside diameters and minimum wall thickness								
OD [mm]	20	25	32	40	50	63	75	90	110
Buckling Pressure (SF=3.0) [bar]	13,8				13,5				

Pipes PN20 - Series S2,5 SDR6:

	Outside diameters and minimum wall thickness								
OD [mm]	20	25	32	40	50	63	75	90	110
t [mm]	3,4	4,2	5,4	6,7	8,4	10,5	-	-	-

External Pressure *:

	Outside diameters and minimum wall thickness								
OD [mm]	20	25	32	40	50	63	75	90	110
Buckling Pressure (SF=3.0) [bar]	19,5					19,0			

* For external/buckling pressure properties for other dimensions, please consult the manufacturer.

Fittings: nickel-plated brass/PP
Bends, tees, crosses, reducers, flanges, couplers, end caps, unions, stubs, nipples, adaptor sockets, transition fittings.

Joining technique:
Welding by socket welding, electric socket welding, butt-welding, threaded connections.

Application/Limitation

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

The approval covers application such as non-essential and essential systems in Marine and Offshore applications, Potable water, sanitary drains (internal), hot water heating, hot and cold water systems chilled and brine water systems, cooling systems (air condition), black and grey water systems, water-treatment fresh and waste water, osmosis systems and evaporation, fresh water bunker lines, sounding air pipes of water tanks or dry spaces, bilge and ballast water systems, etc.

Maximum service pressure 20 bar. Service temperature range 0ºC to 70ºC (shorter periods up to 95ºC).

The piping system is tested to Low Flame Spread in accordance with ASTM D635-10 (accepted as an alternative to IMO Resolution A.653(16)).

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

Approved installation locations
- Within tanks, cofferdams, void spaces, pipe tunnels, ducts and further locations where Fire Endurance tests according to IMO Resolution A.753(18) is not required. Refer to DNV GL Rules for Ships Pt.4 Ch.6 Sec.2, 1.75, Table 1 Fire endurance requirement matrix.
- Within accommodation, service and control spaces the pipes are to be installed behind B-Class or fully closed C-Class ceilings and linings.

(IMO Resolution A.753(18) adopted on 04-Nov-1993 as amended by Resolution MSC.313(88) adopted on 26-Nov-2010, except fire endurance, flame spread, toxicity and smoke generation test).

Type Approval documentation
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*: **A.T.P. AVANZATE TECNOLOGIE PLASTICHE SRL, 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 2.5 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 the DNV GL Type Approval Certificate.

END OF CERTIFICATE