DNV·GL

Certificate No:
TAK000010T

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Plastic Pipes, Thermoplastic

with type designation(s)
+GF+ AQUASYSTEM® (PP-R SDR11 (PN10) and SDR6 (PN20) Pipes and Fittings)

Issued to
George Fischer (M) Sdn Bhd
Shah Alam, Malaysia

is found to comply with
DNV GL class programme DNVGL-CP-0072 – Type approval – Thermoplastic piping systems
DNV GL rules for classification – Ships

Application :

For use in systems for water and sea water up to 10 and 20 bar. Service temperaure 0ºC to 70ºC (short interval up to 95ºC). For installation in accordance with DNV GL Rules and Manufacturer's Specifications. The piping system is tested to Low Flame Spread in accordance with ASTM D635. The piping system is not tested w.r.t. Fire Endurance characteristics.

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

Issued at **Høvik** on **2017-11-10**
This Certificate is valid until **2017-12-31**.
DNV GL local station: **Kuala Lumpur**

Approval Engineer: **Gisle Hersvik**

for **DNV GL**

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.

© DNV GL 2014. DNV GL and the Horizon Graphic are trademarks of DNV GL AS.

Product description

SDR11 (PN10) and SDR6 (PN20) PP-R (Random Polypropylene) **+GF+ AQUASYSTEM® Pipes and Fittings**.

Dimensions: DN20 to DN110 (as per +GF+ AQUASYSTEM® Product Catalogue).

Pipes – SDR11 (S 5, PN10):

	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

Pipes – SDR6 (S 2.5, PN20):

	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	8,3	10,5	12,5	15,0	18,3

Fittings:
PP-R Fittings: DN20 to DN110.
Pipes to be joined with +GF+'s PP-R Fittings.

Joining technique:
Fusion/electrofusion.

Application/Limitation

The approval covers applications such as essential and non-essential systems for hot and cold fresh and seawater up to 10 and 20 bar. Service temperature 0ºC to 70ºC (short periods up to 95°C).

For installation in accordance with DNV GL Rules and Manufacturer's Specification.

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

The piping system is not tested w.r.t. Fire Endurance characteristics.

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

Maximum allowable pressure to be reduced as a function of operating temperature when service temperature is above 20°C.

Type Approval documentation

Tests carried out

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

Marking of product

Product shall be marked with *manufacturer's name;* **(+GF+),** *production site* **(reference/code)** and *type designation* **AQUASYSTEM®**.

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 (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 GL Type Approval Certificate.

END OF CERTIFICATE