

# TYPE APPROVAL CERTIFICATE

## This is to certify:

**That the Flexible Hoses of Non-Metallic Material with Permanently Fitted Couplings**

with type designation(s)  
**FR5T**

Issued to  
**ZEC S.p.A.**  
**Colorno, PR, Italy**

is found to comply with  
**DNV rules for classification – Ships Pt.4 Ch.6 Piping systems**  
**DNV-OS-D101 – Marine and machinery systems and equipment, Edition July 2021**  
**DNV class programme DNV-CP-0183 – Type approval – Flexible non-metallic hoses**

## Application :

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

**Temperature range:** -40°C to +120°C  
**Max. working press.:** 120 to 130 bar (size dependant, see page 2)  
**Sizes:** 1/12", 5/32" and 5/16"

Issued at **Høvik** on **2023-10-16**

This Certificate is valid until **2028-10-15**.

for **DNV**

DNV local unit: **Italy/Malta CMC**

Approval Engineer: **Maheshraja Venkatesan**

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**Zeinab Sharifi**  
**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

Thermoplastic flexible hoses with permanently fitted couplings comprising of smooth bore co-extruded textile braid capillary hoses constructed in accordance with ISO 13971 while fittings are made of carbon steel grade 11SMnPb37 or aluminium alloy (refer to table below).

Hoses and couplings manufacturing location: ZEC S.p.A., Colorno PR, Italy.

### Application/Limitation

This certificate is valid for the specific assembly of hose and coupling type as specified, assembled and delivered by the holder (named as manufacturer) of this certificate.

Hose assemblies covered by this certificate are approved for use in refrigeration systems excluding flammable refrigerants.

Hose assemblies covered by this certificate are not fire safe & shall not be used in systems conveying sea water and flammable fluids.

Maximum working pressure:

Hose designation	Size (ID)		Ferrule		Maximum working pressure (bar)	Minimum bend radius (mm)
	Inch	DN	Designation	Material of construction		
FR5T170*	1/12"	2	BP112FR5AA	Aluminum alloy	130	15
FR5T270*	5/32"	4	BP532FR5	Carbon steel	130	30
FR5T490N	5/16"	6	BP14R7	Carbon steel	120	75
			BP14FR5AA	Aluminum alloy		

\* to include color code R: red, N: black, B: blue

Flexible hoses are only to be used in short lengths where it is necessary due to vibrations or flexible mounting of the machinery. The hoses shall not replace/be used where permanent piping is possible/required and must only be fitted in places where they are always accessible.

The hoses shall be pin pricked according to manufacturer's written procedure.

The outer end of the pipe coupling (performing the connection to the fixed piping) is not covered by this certificate and shall follow the below requirements:

- Flanged ends shall be according to a recognized standard
- Slip-on threaded joints having pipe threads where pressure-tight joints are made on the threads with parallel or tapered threads, shall comply with requirements of a recognized standard. Limitations stated in DNV-RU-SHIP Pt.4 Ch.6 Sec.9 [5.2.6] to be followed.
- If these outer ends are going to be part of a mechanical joint as covered by Table 10 DNV-RU- SHIP Pt.4 Ch.6 Sec.9, then they shall be separately type approved.

### Production testing

All hose assemblies delivered under the DNV type approval scheme shall be subject to a pressure test at 1.5 times the maximum working pressure and shall be delivered with the pressure test report with reference to this type approval certificate.

### Type Approval documentation

#### Tests carried out

Dimensional check, Change in length, Cold flexibility, Vacuum, Permeability, Impulse test, Burst (at ambient and at -40°C), Pin pricking & Endurance test

#### Marking of product

For traceability to this Type Approval, the products are at least to be marked with:

- Manufacturer's name or trademark;
- Date of manufacture (month/year);
- Designation type designation;
- Maximum working pressure;
- Temperature rating;
- Nominal diameter.

### Periodical assessment



Job Id: **262.1-039435-1**  
Certificate No: **TAP00002T5**

For retention of the Type Approval, a DNV Surveyor shall perform periodical assessment after two years (+/- 90 days) and after 3.5 years (+/- 90 days) to verify that the conditions for the approval are complied with. Reference is made to DNV-CP-0338.