

# TYPE APPROVAL CERTIFICATE

**This is to certify:****That the Flexible Hoses of Non-Metallic Material with Permanently Fitted Couplings**

with type designation(s)

**FLEX-PRO-VACUUM2, FLEX-PRO-GRAVITY**

Issued to

**Tubiflex S.P.A.  
Orbassano TO, Italy**

is found to comply with

**DNV GL rules for classification – Ships Pt.4 Ch.6 Piping systems  
DNVGL-OS-D101 – Marine and machinery systems and equipment, Edition January 2018****Application :****Product(s) approved by this certificate is/are accepted for installation on vessels classed by DNV GL.**

<b>Type:</b>	<b>Temperature range:</b>	<b>Max. working press.:</b>	<b>Sizes:</b>
<b>FLEX-PRO-VACUUM2</b>	<b>10° to 35°C</b>	<b>-0.4 to -0.55 bar</b>	<b>ID 40 and ID 50 mm</b>
<b>FLEX-PRO-GRAVITY</b>	<b>10° to 60°C</b>	<b>0.5 bar</b>	<b>ID 40 and ID 50 mm</b>

Issued at **Høvik** on **2020-12-07**for **DNV GL**This Certificate is valid until **2025-12-06**.DNV GL local station: **Italy/Malta CMC**Approval Engineer: **Renata Rossi****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 GL AS, its parent companies and subsidiaries as well as their officers, directors and employees ("DNV GL") 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

Two flexible PVC hoses FLEX PRO VACUUM2 and FLEX PRO GRAVITY with permanently attached couplings constructed according to EN 15749 for use in sanitary drain (internal) applications:

### FLEX PRO VACUUM2

Tube : reinforced PVC  
Cover : protection with squared locked austenitic stainless steel (AISI 304) wall thickness 0.3 mm  
Fitting : austenitic stainless steel (AISI 304/316) or multi-layer polypropylene or thermo-weldable polypropylene

### FLEX PRO GRAVITY

Tube : reinforced polyurethane  
Cover : protection with austenitic stainless steel (AISI 304) wire braid  
Fitting : austenitic stainless steel (AISI 316/316L) or multi-layer polypropylene or thermo-weldable polypropylene

## 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 to be used in non-essential sanitary drain systems (internal).

The hose assemblies are not tested with respect to Fire Endurance, Low Flame Spread and Smoke Generation & Toxicity characteristics.

Hose assemblies covered by this certificate are not allowed to be used in pipe systems carrying oily, chemically contained wastewater capable for forming flammable gas/oxygen mixtures.

The hose assemblies must only be fitted in places where they are always accessible.

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 DNVGL-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 DNVGL-RU-SHIP Pt.4 Ch.6 Sec.9, then they shall be separately type approved.

The flexible hoses covered by this certificate are non-conductive and hence not to be installed in gas hazardous area.

The scope of approval does not cover penetration through watertight bulkheads as well as fire divisions where separate type approval is required.

## Production testing

All hose assemblies delivered under the DNV GL type approval scheme shall be subject to a proof 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

Tube Flessibile 'FLEX-PRO-VACUUM2'	PS3770000
Tube Flessibile 'FLEX-PRO-GRAVITY'	PS3801000
Flexible hose 'FLEX-PRO-GRAVITY L.F.'	PS4212000
Qualification test program	QTP3770000/B

Job Id: **262.1-033264-1**  
Certificate No: **TAP0000286**

Qualification test program QTP3801000  
Qualification test report QTR3770000/B  
Qualification test report QTR3801000

### **Tests carried out**

Cycling (static) on minimum bending radius, proof pressure test, vacuum pressure test and vacuum pressure test on minimum bending radius.

### **Marking of product**

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

- hose manufacturer's name or trademark;
- date of manufacture (month/year);
- designation type reference;
- nominal diameter;
- pressure rating;
- temperature rating.

### **Periodical assessment**

For retention of the Type Approval, a DNV GL 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 DNVGL-CP-0338.