

TYPE APPROVAL CERTIFICATE

This is to certify:

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

with type designation(s)

ALPI 3300, ALPI 4000, EVEREST 4000, EVEREST 5000, PREMIER ONE, PREMIER

issued to

VITILLO S.p.A.

Ariano Irpino AV, AV, 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.

Type:	Temperature range:	Max. working press.:	Sizes:
ALPI 3300	-40°C to +100°C (see page 4)	225 bar	DN06 to DN25 (see page 3)
ALPI 4000	-40°C to +100°C (see page 4)	280 bar	DN06 to DN25 (see page 3)
EVEREST 4000	-40°C to +121°C (see page 4)	280 bar	DN10 to DN38 (see page 3)
EVEREST 5000	-40°C to +121°C (see page 4)	350 bar	DN12 to DN38 (see page 3)
PREMIER ONE	-40°C to +120°C (see page 4)	135 to 290 bar (see page 3)	DN06 to DN25 (see page 3)
PREMIER	-40°C to +120°C (see page 4)	230 to 450 bar (see page 3)	DN06 to DN25 (see page 3)

Issued at **Høvik** on **2024-12-13**

for **DNV**

This Certificate is valid until **2029-12-12**.

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

Approval Engineer: **Maheshraja Venkatesan**



Digitally Signed By:
Bosman van der Merwe
Location: **DNV Høvik, Norway**

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 USD 300 000.



Product description

Six types of non-metallic hoses with permanently attached fittings with following design:

1. **ALPI 3300** constructed according to SAE J517 type 100R17 or ISO 11237 type R17:
 - Inner tube : Oil resistant synthetic rubber
 - Reinforcement : One high-tensile steel wire braid (DN06-12); two high-tensile steel wire braids (DN16-25)
 - Cover : Special synthetic rubber
 - End fittings : Standard fittings (refer catalogue)
2. **ALPI 4000** constructed according to SAE 100 type R19 or ISO 11237 type R19:
 - Inner tube : Oil resistant synthetic rubber
 - Reinforcement : One high-tensile steel wire braid (DN6); two high-tensile steel wire braids (DN8-25)
 - Cover : Special synthetic rubber
 - End fittings : Standard fittings (refer catalogue)
3. **EVEREST 4000** constructed according to ISO 18752 or SAE 100 type R12:
 - Inner tube : Synthetic rubber resistant to oil and biodegradable hydraulic fluids
 - Reinforcement : Four high-tensile steel spirals.
 - Cover : Special synthetic rubber
 - End fittings : Standard & Hyper Spiral fittings (refer catalogue)
4. **EVEREST 5000** constructed according to ISO 18752 or SAE 100 type R13:
 - Inner tube : Synthetic rubber resistant to oil and biodegradable hydraulic fluids
 - Reinforcement : Four high-tensile steel spirals (DN12-31); six high-tensile steel spirals (DN38)
 - Cover : Special synthetic rubber
 - End fittings : Standard, Hyper Spiral & Interlock fittings (refer catalogue)
5. **PREMIER ONE** constructed according to UNI EN 857 type 1SC:
 - Inner tube : Oil resistant synthetic rubber
 - Reinforcement : One high-tensile steel wire braid
 - Cover : Special synthetic rubber
 - End fittings : Standard fittings (refer catalogue)
6. **PREMIER** constructed according to UNI EN 857 type 2SC:
 - Inner tube : Oil resistant synthetic rubber
 - Reinforcement : Two high-tensile steel wire braids
 - Cover : Special synthetic rubber
 - End fittings : Standard fittings (refer catalogue)

Fittings materials:

Carbon steel: 1.0737 or 11SMnPb37

Stainless steel: 1.4571 or AISI 316Ti

Hose manufacturing location:

Vitillo S.p.A., Via Cardito - SS 90 Km 20,500 - 83031 - Ariano Irpino (AV), Italy

Coupling manufacturing locations:

Vitillo S.p.A., Via Camporeale zona PIP snc - 83031 - Ariano Irpino (AV), Italy

BIJUK HPC D.O.O. (for stainless steel fittings) - Vrbovec Samoborski 1/A, HR - 10430 Samobor

Hose assembling location:

Vitillo Industrial srl, Via Camporeale zona PIP snc - 83031 - Ariano Irpino (AV), 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.

Design data:

Type Designation	Size		Maximum Working Pressure (bar)	Ferrule designation
	Inch	DN		
ALPI 3300-THAP304	1/4"	6	225	X/Z-B1SC04
ALPI 3300-THAP305	5/16"	8	225	X/Z- B1SC05
ALPI 3300-THAP306	3/8"	10	225	X/Z- B1SC06
ALPI 3300-THAP308	1/2"	12	225	X/Z-B1SC08
ALPI 3300-THAP310	5/8"	16	225	X/Z-B1SC10
ALPI 3300-THAP312	3/4"	19	225	X/Z-B1SC12
ALPI 3300-THAP316	1"	25	225	X/Z-B1SC16
ALPI 4000 -THAP404	1/4"	6	280	X/Z-B1SC04
ALPI 4000 -THAP405	5/16"	8	280	X/Z-B12T05N
ALPI 4000 -THAP406	3/8"	10	280	X/Z-B12T06N
ALPI 4000 -THAP408	1/2"	12	280	X/Z-B12T08N
ALPI 4000 -THAP410	5/8"	16	280	X/Z-B12T10N
ALPI 4000 -THAP412	3/4"	19	280	X/Z-B12T12N
ALPI 4000 -THAP416	1"	25	280	X/Z-B12T16N
EVEREST 4000 - TSER406	3/8"	10	280	X/Z-B9R06
EVEREST 4000 - TSER408	1/2"	12	280	X/Z-B9R08
EVEREST 4000 - TSER410	5/8"	16	280	X/Z-B9R10
EVEREST 4000 - TSER412	3/4"	19	280	X/Z-HB4NS12
EVEREST 4000 - TSER416	1"	25	280	X/Z-HB4NS16
EVEREST 4000 - TSER420	1" 1/4'	31	280	X/Z-HB4NS20
EVEREST 4000 - TSER424	1" 1/2'	38	280	X/Z-HB4NS24
EVEREST 5000 - TSER508	1/2"	12	350	X/Z-HB4NS08
EVEREST 5000 - TSER510	5/8"	16	350	X/Z-HB4NS10
EVEREST 5000 - TSER512	3/4"	19	350	X/Z-HB4NS12
EVEREST 5000 - TSER516	1"	25	350	X/Z-HB4NS16
EVEREST 5000 - TSER520	1" 1/4'	31	350	X/Z-KBH1320
EVEREST 5000 - TSER524	1" 1/2'	38	350	X/Z-KBH1324
PREMIER ONE - TH1SC04PRE1	1/4"	6	290	X/Z-B1K04
PREMIER ONE - TH1SC05PRE1	5/16"	8	270	X/Z-B1K05
PREMIER ONE - TH1SC06PRE1	3/8"	10	260	X/Z-B1K06
PREMIER ONE - TH1SC08PRE1	1/2"	12	240	X/Z-B1K08
PREMIER ONE - TH1SC10PRE1	5/8"	16	210	X/Z-B1K10
PREMIER ONE - TH1SC12PRE1	3/4"	19	170	X/Z-B1K12
PREMIER ONE - TH1SC16PRE1	1"	25	135	X/Z-B1K16
PREMIER - TH2SC04PRE	1/4"	6	450	X/Z-B12T04N
PREMIER - TH2SC05PRE	5/16"	8	425	X/Z-B12T05N
PREMIER - TH2SC06PRE	3/8"	10	390	X/Z-B12T06N
PREMIER - TH2SC08PRE	1/2"	12	350	X/Z-B12T08N
PREMIER - TH2SC10PRE	5/8"	16	350	X/Z-B12T10N
PREMIER - TH2SC12PRE	3/4"	19	300	X/Z-B12T12N
PREMIER - TH2SC16PRE	1"	25	230	X/Z-B12T16N

Hose assemblies covered by this certificate are approved to be used in the following media and temperature range:

Hose types	ALPI 3300 & ALPI 4000,	EVEREST 4000 & EVEREST 5000	PREMIER & PREMIER ONE
Petroleum based hydraulic fluids	-40°C to +100°C	-40°C to +121°C	-40°C to +120°C
Water based hydraulic fluids and Air	0°C to +70°C	-40°C to +70°C	-40°C to +70°C
Fresh Water	0°C to +70°C	0°C to +70°C	0°C to +70°C

Materials and material protection chosen for the specific system shall be suitable for the intended medium and environmental conditions.

The hoses are to be mounted in accordance with the manufacturer's instructions.

Flexible hoses are only to be used 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.

Flexible hoses of these types are not to be used in boiler fronts.

The cover of hoses for gaseous applications shall be pin-pricked.

Hose assemblies covered by this certificate shall not be used in systems subject to pressure below atmospheric or vacuum conditions (except - PREMIER & PREMIER ONE Hose types).

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 DNV-RU- SHIP Pt.4 Ch.6 Sec.9 [Table 10], 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

Document	Rev	Title
Drawing_HOSES	-	Drawing_HOSES
Drawing_press-en	-	Drawing_press-en_catalogue
Drawing_spiral_20	-	Drawing_spiral_20_catalogue
1456-23	-	Fire test report
1235-24	-	Fire test report
1442-23	-	Fire test report
1451-23	-	Fire test report
1458-23	-	Fire test report
1459-23	-	Fire test report
1461-23	-	Fire test report
1446-23	-	Fire test report
1457-23	-	Fire test report
1460-23	-	Fire test report
1455-23	-	Fire test report
1454-23	-	Fire test report
1465-23	-	Fire test report
1447-23	-	Fire test report

1464-23	-	Fire test report
1449-23	-	Fire test report
1234-24	-	Fire test report
1448-23	-	Fire test report
1236-24	-	Fire test report
1453-23	-	Fire test report
2165-23	-	Fire test report
1450-23	-	Fire test report
1463-23	-	Fire test report
1462-23	-	Fire test report
DIM_PREMIER ONE	-	Report
DIM_EVEREST 4000	-	Report
DIM_ALPI 4000	-	Report
DIM_ALPI 3300	-	Report
DIM_PREMIER	-	Report
DIM_EVEREST 5000	-	Report
CHANGE_PRE	-	Report
CHANGE_PREO	-	Report
CHANGE_E4000	-	Report
CHANGE_E5000	-	Report
CHANGE_A3300	-	Report
CHANGE_A4000	-	Report
ATT.IMP_ALPI4000	-	Report
ATT.FLEX_EVEREST 5000	-	Report
ATT.BURST_ALPI3300	-	Report
SAE J1273_2014_scansione	-	SAE J1273_2014_scansione
ASSEMBLY GUIDE_ENG	-	ASSEMBLY GUIDE_ENG
Tab._press	a4	Crimping Parameters Chart
ATT.OZONE_EVEREST 4000	-	Report
ATT.OZONE_PREMIER	-	Report
ATT.FLEX_ALPI 4000	-	Report
ATT.FLEX_EVEREST 4000	-	Report
ATT.OZONE_EVEREST 5000	-	Report
ATT.OZONE_ALPI 3300	-	Report
ATT.ADHE_ALPI 3300	-	Report
ATT.RES-LIQ_ALPI3300	1	Report
ATT.OZONE_PREMIER ONE	-	Report
ATT.ADHE_EVEREST 4000	-	Report
ATT.FLEX_PREMIER ONE	-	Report
ATT.FLEX_ALPI 3300	-	Report
ATT.FLEX_PREMIER	-	Report
ATT-RES-LIQ_EVEREST 4000	1	Report
ATT.ADHE_PREMIER ONE	-	Report
ATT.ADHE_PREMIER	-	Report
ATT.OZONE_ALPI 4000	-	Report
ATT.RES-LIQ_PREMIER ONE	-	Report
ATT.RES-LIQ_PREMIER	-	Report
ATT.LEAK_PREMIER ONE	-	Report
ATT.LEAK_EVEREST4000	-	Report
ATT.ADHE_EVEREST 5000	-	Report
ATT.LEAK_ALPI3300	-	Report

ATT.BURST_EVEREST5000	-	Report
ATT.LEAK_PREMIER	-	Report
ATT.RES-LIQ_ALPI4000	1	Report
ATT-RES-LIQ_EVEREST 5000	1	Report
ATT.ADHE_ALPI 4000	-	Report
ATT.LEAK_EVEREST5000	-	Report
ATT.VAC_PREMIER	-	Report
ATT.IMP_PREMIER	1	Report
ATT.BURST_PREMIER ONE	-	Report
ATT.IMP_ALPI3300	-	Report
ATT.IMP_PREMIER ONE	1	Report
ATT.BURST_PREMIER	-	Report
ATT.BURST_ALPI4000	-	Report
ATT.LEAK_ALPI4000	-	Report
ATT.IMP_EVEREST4000	-	Report
ATT.IMP_EVEREST5000	-	Report
ATT.BURST_EVEREST4000	-	Report
ATT.VAC_PREMIER ONE	-	Report
ATT.BURST_EVEREST4000 1.1-2	-	Report
ATT-RES-LIQ_EVEREST 4000	-	Report

Tests carried out

Dimensional check, Impulse, Ozone resistance, Cold flexibility, Cover adhesion, Change in length, Fluid resistance, Burst, Leakage, Fire resistance and vacuum (only for PREMIER & PREMIER ONE hose types) tests.

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

This certificate is only valid if required periodical assessments are carried out with satisfactory results.

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.

To check the validity of this certificate, please look it up in <https://approvalfinder.dnv.com>.