

TYPE APPROVAL CERTIFICATE**This is to certify:****That the Flexible Hoses of Metallic Material with permanently fitted couplings**with type designation(s)
Model D12

Issued to

OLEODINAMICA TOSCANA SRL
SERRAVALLE PISTOIESE PT, 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 July 2015****DNV GL class programme DNVGL-CP-0184 – Type approval – Flexible hoses with permanently fitted couplings****Application :****Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.****Temperature range: -20°C to +350°C****Max. working press.: 25 bar to 180 bar size dependent****Sizes: 3/8", 1/2", 3/4", 1", 1 1/4", 1 1/2", 2", 2 1/2", 3", 4", 5" and 6"**This Certificate is valid until **2020-12-31**.Issued at **Høvik** on **2016-12-01**for **DNV GL**DNV GL local station: **Genoa**Approval Engineer: **Adel Samiei**

Marianne Spæren Marveng
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

Corrugated flexible metal hoses with 2 wire braids as reinforcement

Specification of the materials:

Hose: AISI316L/1.4436 according to EN10216-5 or EN10217-7
 AISI321/1.4541 according to EN10216-5 or EN10217-7
 Two reinforcement braids: AISI304/1.4301 according to EN10216-5 or EN10217-7
 Couplings: AISI304/1.4301 according to EN10222-5 or EN 10253-3
 AISI316/1.4404 according to EN10222-5 or EN 10253-3
 AISI321/1.4541 according to EN10222-5 or EN 10253-3
 ASTM B179-82 A413.1
 A105/A283/S355JR/S235JR
 Manufacturing location: OLEODINAMICA TOSCANA SRL. Serravalle Pistoiese PT, Italy

Application/Limitation

Hose assemblies covered by this certificate may be used in Lube oil, Cargo oil and Fuel oil, Compressed air, Steam and Condensate, Fresh water, Sanitary and fire fighting systems (with medium: Novec 1230, FM-200, Inergen, Halotron, CO2, NAF S 125) with the following working pressures:

DN	Code	O.D. (mm)	Max. working pressure, bar
3/8"	D12010	16	180
1/2"	D12012	22	180
3/4"	D12020	31	125
1"	D12025	37	100
1 1/4"	D12032	46	100
1 1/2"	D12040	54	80

DN	Code	O.D. (mm)	Max. working pressure, bar
2"	D12050	65	62
2 1/2"	D12065	85	50
3"	D12080	98	40
4"	D12100	124	30
5"	D12125	156	30
6"	D12150	179	25

Pressure reduction factors due to high temperatures:

Maximum temperature	-20°C	20°C	50°C	100°C	150°C	200°C	250°	300°C	350°C
Correction factor, (K)	1,000	1,000	0,950	0,880	0,835	0,785	0,735	0,680	0,650

Flexible hoses are only to be used in short lengths where it is necessary due to vibrations or flexible mounting of the machinery. The hose shall not be used to replace fixed piping.

The hoses must only be fitted on places where they are always accessible for inspection.

Coupling made of aluminium may be used under the same restrictions as for plastic pipes (Reference is made to DNV GL ship rules Pt.4 Ch.6 Sec.2 [1.1.2] and Table 1). Hoses made of steel can be considered fire safe.

Hoses made of austenitic stainless steel are not approved to be used in seawater systems.

Means shall be provided to isolate flexible hoses used in systems for fuel oil, lubricating oil and compressed air.

The hoses are to be mounted according to the manufacturer's instructions, and the hoses are to be supplied with end couplings from the manufacturer.

Each hose is to be hydraulically pressure tested to 1,5 times the maximum working pressure before installation and to be delivered with a test report with reference to this type approval certificate.

Type Approval documentation

Manufacturers brochure: "Project documentation" D12 Rev 1 and "Attachment of Project Documentation"
 Manufacturers impulse test reports nos 20110202-01/02/03 and 04 dated 2011-02-02
 Burst test report witnessed by DNV surveyor dated 2011-01-26

Job Id: **262.1-011224-4**
Certificate No: **TAP00000JO**

Bend test report witnessed by DNV dated 2011-01-26
Survey report number NCert A0304720 dated 2016-06-21
Burst test report number 160301B1 dated 2016-04-01 witnessed by DNV GL surveyor
Bend test report number 160301A dated 2016-04-01 witnessed by DNV GL surveyor
Impulse test report numbers 2016-06-08-01/02/03/04/05/06/07/08 dated 2016-06-08
Report number NCert A0304720 dated 2016-06-17

Tests carried out

Bend and fatigue test, burst test, impulse test

Marking of product

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

- Manufacturer's name or trade mark
- Type designation
- Maximum working pressure
- Size
- Additional marking at manufacturer's option

Periodical assessment

For retention of the Type Approval, DNV GL Surveyor shall perform a periodical assessment every second year, to verify that the conditions for the type approval are complied with and to witness the burst tests on every 3rd sizes.