

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Pipe System with Couplings**

with type designation(s)

TURBO INOX, TURBO CuNi

Issued to

RUBINETTERIE BRESCIANE BONOMI SPA
Gussago BS, Italy

is found to comply with

DNV GL rules for classification – Ships Pt.4 Ch.6 Piping systems**DNV GL class programme DNVGL-CP-0185 – Type approval – Mechanical joints****Application :****Products approved by this certificate are accepted for installation on all vessels classed by DNV GL.**

Type:	Temperature range:	Max. pressure:	Design:
TURBO INOX	-20°C up to +120°C	16bar	Compression coupling - Press type
TURBO CuNi	-20°C up to +120°C	16bar	Compression coupling - Press type

Issued at **Høvik** on **2017-11-29**This Certificate is valid until **2022-11-28**.for **DNV GL**DNV GL local station: **Milan**Approval Engineer: **Hagen Markus**

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Olaf Drews
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

Press fitting system with O-ring seal for stainless steel pipes - Turbo Inox System and for CuNiFe pipes - Turbo CuNi System.
Pipes and fittings shall be assembled by pressing tool with M profiled clamps, approved by the manufacturer acc. to the internal instruction no. I-010.03-27/001.

Materials, Size range

System	Fitting, Pipe ¹	Soft seal	Fitting sizes
Turbo INOX	Stainless steel 1.4404, AISI316L or equivalent	FKM/FPM or EPDM Perox ²	15, 18, 22, 28, 35, 42, 54, 76.1, 88.9, 108
Turbo CuNi	CuNi10Fe1,6Mn or equivalent		

Notes

¹ Stainless steel annealed. Pipe tolerances as specified by the manufacturer. Refer to data sheet art. 52T001 for Turbo Inox and art. 5NT000 for CuNiFe.

² EPDM rubber is not to be used for hydrocarbon and steam application.

Temperature range: -20°C up to +120°C

Maximum pressure at elevated temperatures

Tube INOX System

For service temperatures above 50° the pressure reduction factors specified by DNVGL CP-0185 are to be observed.

Service temperature	Up to 20°C	Up to 50°C	Up to 100°C	Up to 120°C
Pressure reduction factor	1.0	0.95	0.85	0.82

Application/Limitation

The press fitting systems of type Turbo INOX and Turbo CuNi are type approved for application in piping systems of pipe class III as follows:

Systems	PN	Note	Systems	PN	Note
Flammable fluids (Flash point ≤ 60 °C)			Fresh water		
1 Cargo oil lines	7	+ ⁴	21 Cooling water system	16	+ ¹
2 Crude oil washing lines	7	+ ⁴	22 Condensate return	16	+ ¹
3 Vent lines	7	+ ³	23 Non-essential system	16	+
Inert gas			Sanitary/Drains/Scuppers (not approved for Turbo INOX)		
4 Water seal effluent lines	16	+	24 Deck drains (internal)	16	+ ⁶
5 Scrubber effluent lines	16	+	25 Sanitary drains	16	+
6 Main lines	16	+ ^{2,4}	26 Scuppers and discharge (overboard)	16	+
7 Distribution lines	16	+ ⁴			
Flammable fluids (Flash point > 60°C)			Sounding/ vent		
8 Cargo oil lines	7	+ ⁴	27 Water tanks/Dry spaces	16	+
9 Fuel oil lines	7	+ ^{2,3}	28 Oil tanks (flash point > 60°C)	7	+ ^{2,3}
10 Lubrication oil lines	7	+ ^{2,3}			
11 Hydraulic oil	7	+ ^{2,3}			
12 Thermal oil	7	+ ^{2,3}			

Systems	PN	Note	Systems	PN	Note
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Sea Water (not approved for Turbo INOX) ⁵				Miscellaneous			
13	Bilge lines	16	+ ¹	29	Starting/control air	16	+ ¹
14	Water filled fire extinguishing systems, e.g. sprinkler systems	16	+ ³	30	Service air (non-essential)	16	+
15	Non water filled fire extinguishing systems, e.g. foam, drencher systems	16	+ ³	31	Brine	16	+
16	Fire main (not permanently filled)	16	+ ³	32	CO ₂ system	16	+ ¹
17	Ballast system	16	+ ¹	33	Steam	1	+
18	Cooling water system	16	+ ¹				
19	Tank cleaning services	16	+				
20	Non-essential system	16	+				

Notes

Fire resistance capability

- ¹ Inside machinery spaces of category A - only approved fire resistant types
- ² Not inside machinery spaces of category A or accommodation spaces.
May be accepted in other machinery spaces provided the joints are located in easily visible and accessible positions.
- ³ Approved fire resistant types except in cases where such mechanical joints are installed on exposed open decks, as defined in SOLAS II-2/Reg. 9.2.3.3.2.2(10) and not used for fuel oil lines.
- ⁴ In pump rooms and open decks – only approved fire resistant types.

General

- ⁵ PREN of stainless steel 1.4404, AISI316L <30. Refer to Rules Pt.4, Ch.6, Sec.1 - Materials
- ⁶ Only above bulkhead deck of passenger ships and freeboard deck of cargo ships.

Remarks

Press fitting systems are not approved for:

- installation in ballast tanks or fuel oil tanks
- air overflow and sounding pipes of structural tanks
- penetrating enclosed spaces below the freeboard deck (e.g. watertight - or fire bulkheads)

Minimum pipe wall thickness

For application in piping systems subject to main class, main function respectively, the minimum wall thickness of the pipes shall be in compliance with the applicable Rules. Refer to Rule Pt.1, Ch.1, Sec.1.

Example

For application in piping systems as listed in Pt.4, Ch.6 Piping Systems, Section 1 - Table 2, the minimum wall thicknesses of pipes shall be acc. to Section 9 – Table 2 and 4.

In addition Rule requirements according to additional class notation or specific ship type are to be observed.

Undersized pipe wall thickness may be accepted for:

- Sanitary piping systems such as potable water supply (hot and cold), grey and black water
- Drainage piping systems (not related to main function, i.e. ensuring stability)
- Technical water systems, service air (not related to main function, i.e. ensuring propulsion)
- Cooling water for air conditioning of accommodation spaces

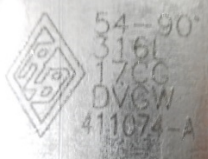
Job Id: **262.1-011242-3**
Certificate No: **TAP0000127**

Type Approval documentation

Tests carried out

Marking of product

For traceability to this type approval the products are to be marked with:

	Marking scope	Example
Pipes	- Manufacturers name or trade mark - Dimensions	RUINETTERIE BRESCIANE, ® TURBO INOX ® - DN 15 - 1mm
Fittings	- Manufacturers name or trade mark - Size - Type	
O - Ring	FKM/FPM EPDM Perox	Colour: green Colour: black

Periodical assessment

For retention of the type approval certificate periodical assessments shall be carried out at production places by DNV GL surveyor.

The objective of the periodical assessment is to verify that the design and production conditions for the type approval have not been altered.

Main scope of the assessment:

- verification of the production and quality control system
- review of quality control documentation of recent deliveries
- review of drawings in production to verify any design changes which may have an impact on data specified in the type approval certificate, performance and range of application
- verification of the product marking

In addition to the above at renewal assessment burst pressure tests on selected sizes are to be carried out.

Periodical assessment is to be performed after 2 years and after 3.5 years. Prior to renewal of the certificate a renewal assessment will be performed.

End of certificate