Certificate No:
TAP00002NS

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Pipe Couplings, Bite and Compression Type

with type designation(s)
L-Series Adapter DIN 2353 24°, S-Series Adapter DIN 2353 24°

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-0185 – Type approval – Mechanical joints

Application :

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

Type:	Temperature range:	Max. working press.:	Sizes:
L-Series Adapter DIN 2353 24°	**-55°C to +400°C (see page 3)**	**see page 3**	**Tube OD: 6 to 42mm (see page 3)**
S-Series Adapter DIN 2353 24°	**-55°C to +400°C (see page 3)**	**see page 3**	**Tube OD: 6 to 38mm (see page 3)**

Issued at **Høvik** on **2023-05-11**

This Certificate is valid until **2028-05-10**.
DNV local unit: **Italy/Malta CMC**

Approval Engineer: **Sarah Miller**

for **DNV**

Digitally Signed By: Zeinab, Sharifi
Location: DNV Høvik, Norway

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.

Product description

Compression type couplings with designation 'Adapter DIN 2353 24°' comprising of body, ferrule/ ring, nut and O-rings* with two different series:

1. L Series (light duty)
2. S Series (heavy duty)

** Please refer to the list of Type designations below towards various couplings with or without O-ring combinations.*

Designations based on Coupling body configuration:

Type	Designation
Nut	DL..DS
Cutting Rings	ADTL; ADTS; ADTLS
Welding Bulkhead Conn.	APME.LS.W.1
Male Stud Couplings	AME.LS.MG.1; AME. LS.MG EL.1; AME.LS.MGK.1; AME.LS.MN.1;AME.LS.MMK.1
Welding Bosses	AME.LS.W.1
Male Stud Fitting Type A	AME.LS.MG.SV.1
Stud Elbows	LME.LS.MGK.1; LME.LS.MN.1; LME.LS.MMK.1; LME.LS.MG.1
Male Stud UNF/UN male	AME.LS.MU.1
Stud Branch Tees	TME.LS.MGK.P; TME.LS.MN.P.1;TME.LS.MG.P;TME.LS.MM.P.1
Stud Barrel Tees	TME.LS.MGK.B; TME.LS.MN.B.1;TME.LS.MG.B;TME.LS.MM B.1
Equal Tees	TME.LS.1
Straight Coupling	AME.LS.1
Equal Crosses	CME.LS.1
Equal Elbow	LME.LS.1
Bulkhead Elbows	LPPME LS.1
Angulary Rotary Fitting	LME.LS.TLS.1
Rotary L-fittings	TME.LS.TLS.B.1
Banjos	TME.LS.BFGP.1; TME.LS.BFMP.1
Rotary T-fittings	TME.LS.TLS..P.1
Double orientable Fitting	LME.LS.BFG.1; LME.LS.BFM.1
Standpipe/Tube Red.	AME. LS.TLS.1
Stud Standpipe Adapt	AMG.EL.TLS.1
Guage Couplings	AME. LS.MAN.1
Male/Female Stud Adapt	AMG.ELFFG.1; APMG.ELFFG.1; ARMG..ELFFG.1
Female Stud couplings	AME.LS.FFG.1; AME.LS.FFM.1
Bulkhead Connections	APPME.LS.1
Weld on nipple	TL..W; TS..W; TLS..W
Swivel Stud Straight adapter with O.	AFE..LSMG..EL; AFE..LSMM..EL
Swivel Elbow with O-ring	LME..LSFE..LS.1
Swivel Branch Tee with O-ring	TME..LSFE..LSP.1
Swivel Run Tee with O- ring	TME..LSFE..LSB.1
Reducing swivel straight adapters with O-ring	AFE..LSME..LS.1
Plug with O-ring	ATFGE..LS

* Comprises of non-metallic O-rings

Material of construction:

Part	*Carbon Steel Coupling*	*Stainless Steel coupling*
Body	11SMnPb37 (or) 1.0737 with treatment: Zinc Chromium (III) and/or Zinc Nickel	1.4571 (AISI 316Ti) Manufactured by Vitillo SpA and Bijuk
Nut	1.0214 (C 10C)	1.4571 (AISI 316Ti) Manufactured by Vitillo SpA and Bijuk
Ring	11SMnPb37 (or) 1.0737 with treatment: Zinc Chromium (III) and/or Zinc Nickel	1.4571 (AISI 316Ti) Manufactured by Vitillo SpA and Bijuk
O-ring	NBR (or) FKM/FPM or PTFE	

* BIJUK (for stainless steel fittings) - Vrbovec Samoborski 1/A, HR - 10430 Samobor

Application/Limitation

Couplings covered by this certificate are approved to be used in class I, II, and III piping systems according to the latest requirements of governing rules in following applications:

1) Flammable fluids (flash point ≤ 60°C)
- Cargo oil lines (1)
- Crude oil washing lines (1)
- Vent lines (2)

2) Inert gas
- Water seal effluent lines
- Scrubber effluent lines
- Main lines (1)
- Distributions lines (1)

3) Flammable fluids (flash point > 60°C)
- Cargo oil lines (1)
- Fuel oil lines (2)
- Lubricating oil lines (2)
- Hydraulic oil (2)
- Thermal oil (2)

4) Fresh water
- Cooling water system (3)
- Condensate return (3)
- Non-essential system

5) Sanitary/drains/scuppers
- Deck drains (internal) (4)
- Sanitary drains
- Scuppers and discharge (overboard)

6) Sounding/vent
- Water tanks/dry spaces
- Oil tanks (f.p. > 60°C) (2)

7) Miscellaneous
- Starting/control air (3)
- Service air (non-essential)
- Brine
- CO_2 system (outside protected space)
- CO_2 system (inside protected space) (5)
- Steam

1) Couplings with O-rings are not allowed to be installed in pump rooms and open decks.
2) Couplings with O-rings are not allowed 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.
3) Couplings with O-rings are not allowed to be installed in machinery spaces of category A.
4) Only above bulkhead deck of passenger ships and freeboard deck of cargo ships.
5) Couplings without O-rings are not allowed inside protected spaces

The approval is only valid when the couplings are assembled with tubing of correct temperature and tolerances as recommended by the manufacturer.

Maximum allowable pressures:

Series	*Type*	*Max. allowable pressure (bar)*
L	6L	500
	8L	
	10L	
	12L	400
	15L	
	18L	
	22L	250
	28L	
	35L	
	42L	

Series	*Type*	*Max. allowable pressure (bar)*
S	6S	800
	8S	
	10S	
	12S	630
	14S	
	16S	
	20S	420
	25S	
	30S	
	38S	

These couplings shall not be used on tubes in cold fabricated (hard temper) conditions.

Design temperature for couplings of the following materials:

Carbon steel	-40 °C to +120 °C
Stainless steel	-55 °C to +400 °C

In addition, design temperature range limited for couplings with O-rings:

Seal material	**Operating temperature range**	**Dry storage temperature**
NBR/Nitrile Rubber	-30°C to 100°C	Up to +25°C
FKM/FPM/ Fluorinated rubber	-25°C to +200°C	Up to +25°C
PTFE	-60°C to +200°C	Up to +25°C

At elevated temperatures, the maximum working pressure should be reduced with the following factors:

Temperature (°C)	20	50	100	120	150	200	250	300	350	400
Stainless Steel	1	0.95	0.85	0.81	0.77	0.71	0.67	0.63	0.60	0.58
Carbon Steel	1	1	1	0.97	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.

Threaded joints (having pipe threads where pressure-tight joints are made on the threads with parallel or tapered threads) may be used for outside diameters as stated below except for piping systems conveying toxic or flammable media or services where fatigue, severe erosion or crevice corrosion is expected to occur:

- Tapered thread: class I, outside diameter not more than 33.7 mm
- Tapered thread: class II and class III, outside diameter not more than 60.3 mm
- Parallel thread: Just for class III, outside diameter not more than 60.3 mm

All our fittings and adapters are available in Zinc Chromium (III) and/or Zinc Nickel and/or Stainless steel and the resistance corrosion of materials is according to ISO 8434-1 and ISO 9227 with the following values:

Zinc Chromium (III)	White Rust ≥ 144h Red Rust ≥ 360h
Zinc Nickel	Red Rust ≥ 1000h
Stainless steel	Red Rust not appears

Materials chosen for the specific system shall be suitable for the intended medium and environmental conditions. Mechanical joints covered by the approval are not considered a seawater resistant material and shall not be used in direct contact with seawater.

Pipe minimum wall thickness shall be as per DNV-RU-SHIP Pt.4 Ch.6 Sec.9 [1.2.1]. Requirements for pipe material are further defined in DNV-RU-SHIP Pt.4 Ch.6 Sec.2 [1.8.1].

Threaded connections where pressure-tight joints are made on the threads with parallel or tapered threads shall not be used for piping systems conveying toxic or flammable media or services where fatigue, severe erosion or crevice corrosion is expected to occur. For other applications threaded connections with pressure-tight joints on threads may be used for outside diameters:

- In CO_2 systems shall be allowed only inside protected spaces and in CO_2 cylinder rooms
- Threaded joints for direct connectors of pipe lengths with tapered thread shall be allowed for class I applications only when the outside diameter not more than 33.7 mm
- Threaded joints with parallel thread shall be allowed only for class III systems

Type Approval documentation

Application and product description; Adapters DIN 2353 24°
Assembly operation and installation instructions
Adapter SIN 2353 24° - Product test report with Annexes (212 pages) covering type testing including fire resistance test reports with references:

- Conducted by LAPI with reference NO.1408.2IS0182/22
- Conducted by LAPI with reference NO.1408.2IS0182/21
- Conducted by LAPI with reference NO.1410.2IS0182/22
- Conducted by LAPI with reference NO.1410.2IS0182/21
- Conducted by LAPI with reference NO.1409.2IS0182/22
- Conducted by LAPI with reference NO.1409.2IS0182/21
- Conducted by LAPI with reference NO.1180.2IS0182/22
- Conducted by LAPI with reference NO.1180.2IS0182/21
- Conducted by LAPI with reference NO.1407.2IS0182/22
- Conducted by LAPI with reference NO.1407.2IS0182/21
- Conducted by LAPI with reference NO.1406.2IS0182/22
- Conducted by LAPI with reference NO.1406.2IS0182/21

Couplings catalogue Adapters_DIN 2353 24°

Tests carried out

Tightness test, Repeated Assembly test, Burst test, Pullout test, vacuum test, combined vibration and pressure impulse test, Fire Resistance test and Salt Spray Test.

Marking of product

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

- Manufacturer's name or trademark
- Type designation and dimension

Periodical assessment

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.