

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Pipe Couplings

with type designation(s)
24° Hydraulic Fittings

Issued to

Gem Engineering Industries India Private Limited
Hyderabad, Telangana, India

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
DNV GL class programme DNVGL-CP-0185 – Type approval – Mechanical joints

Application :

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

Temperature range: see page 2
Max. working press.: see page 2
Sizes: Tube OD 06 to 42 mm (see page 2)

Issued at **Høvik** on **2021-08-25**

This Certificate is valid until **2026-08-24**.

for **DNV**

DNV local station: **Mumbai NB & CMC**

Approval Engineer: **Maheshraja Venkatesan**

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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 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 300,000 USD.



Product description

Bite type compression fittings of Series L and S comprising of body, ferrule and nut with the following configurations:

Coupling type	Designation	Coupling type	Designation
Straight Coupling	S	Equal Tee	T
Straight Reducer Coupling	SR	Reducer Tee	RT
Straight Bulkhead	SB	Cross Connector	C
Tube End Coupling	TEC	Male Stud Branch/Run Tee	MBT / MRT
Straight Stud Connector	SS	Swivel Elbow	SL
Equal Elbow	L	Swivel Branch Tee	SBT
Elbow Stud Connector	LS	Swivel Run Tee	SRT
Elbow Bulkhead Coupling	LB	Weld Fitting	WF

Material of construction:

Description	Material Grades	
	Carbon steel (CS)	Stainless steel (SS)
Body	SAE 1018 / EN 1A BS 970 / SAE 1213 / 1.0715 EN 10277	SS304 / SS316
Ferrule (Cutting Ring)	EN 1A BS 970 / SAE 1213 / 1.0715 EN 10277	
Nut	SAE 1018	

O-rings (for configuration WF): NBR, Viton

Manufacturing location

Gem Engineering Industries India Private Limited,
Plot No.154/B & 165/C, Phase III, IDA, Cherlapally,
Hyderabad City, Pin Code / Zip Code - 500051, Telangana State, INDIA

Application/Limitation

Maximum working pressure (MAWP) and tube thickness:

Type L			Type S		
Tube O.D (mm)	MAWP (Bar)	Minimum wall thickness (mm)	Tube O.D (mm)	MAWP (Bar)	Minimum wall thickness (mm)
6	250	1.5	6	630	1.75
8	250	1.5	8	630	2
10	250	1.5	10	630	2.5
12	250	2	12	630	3
15	250	2.5	14	630	3
18	160	2.5	16	400	4
22	160	2.5	20	400	4.5
28	100	2.5	25	400	4.5
35	100	3	30	250	4
42	100	3	38	250	5

Materials and material protection chosen for the specific system shall be suitable for the intended medium and environmental conditions. Pipe couplings covered by this certificate are not allowed to be used in sea water applications.

Allowable temperature range based on the materials in couplings:

- NBR : -20°C to +100°C
- Viton : -20°C to +200°C
- Carbon steel : -20°C to +100°C.
- Stainless steel : -60°C to +200°C

For couplings at elevated temperatures, the maximum working pressure shall be reduced with the following factors:

Materials	Temperature °C				
	≤20	50	100	150	200
CS	1	1	1	0.89	0.81
SS	1	0.95	0.85	0.77	0.71

Couplings covered by this certificate are only to be used in piping classes I, II and III in below applications:

- | | |
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| 1) Flammable fluids (flash point ≤ 60°C) <ul style="list-style-type: none"> - Cargo oil lines ⁽³⁾ - Crude oil washing lines ⁽³⁾ - Vent lines ⁽²⁾ 2) Inert gas <ul style="list-style-type: none"> - Water seal effluent lines - Scrubber effluent lines - Main lines ⁽³⁾ - Distributions lines ⁽³⁾ 3) Flammable fluids (flash point > 60°C) <ul style="list-style-type: none"> - Cargo oil lines ⁽³⁾ - Fuel oil lines ⁽²⁾ - Lubricating oil lines ⁽²⁾ - Hydraulic oil ⁽²⁾ - Thermal oil ⁽²⁾ | 4) Fresh water <ul style="list-style-type: none"> - Cooling water system ⁽¹⁾ - Condensate return ⁽¹⁾ - Non-essential system 5) Sanitary/drains/scuppers <ul style="list-style-type: none"> - Deck drains (internal) ⁽⁴⁾ - Sanitary drains 6) Sounding/vent <ul style="list-style-type: none"> - Water tanks/dry spaces - Oil tanks (f.p. > 60°C) ⁽²⁾ 7) Miscellaneous <ul style="list-style-type: none"> - Starting/control air ⁽¹⁾ - Service air (non-essential) - Brine - CO₂ system ⁽¹⁾ - Steam |
|--|--|

- 1) Inside machinery spaces of category A - only approved fire resistant types.
- 2) 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.
- 3) Only in pump rooms and open decks - only approved fire-resistant types.
- 4) Only above bulkhead deck of passenger ships and freeboard deck of cargo ships.

The approval is only valid when the couplings are assembled with tubing of correct temper and tolerances as recommended by the manufacturer. These couplings should not be used on tubes in cold fabricated (hard temper) conditions.

The couplings are not approved for gases having an oxygen content exceeding 25% as per DNVGL-CP-0185 Sec.5 [8].

Pipe coupling where pressure-tight joints are made on the threads with parallel or tapered threads are not approved for piping systems conveying toxic or flammable media or services where fatigue, severe erosion or crevice corrosion is expected to occur as per DNV RU-SHIP Pt.4 Ch.6 Sec.9 [5.2.6]. Pipe coupling is limited to the following applications solely:

1. CO₂ systems inside of protected spaces and CO₂ cylinder rooms;
2. Threaded joints for direct connectors of pipe lengths with tapered thread shall be allowed for:
 - a. Class I, outside diameter not more than 33.7 mm;
 - b. Class II and class III;
3. Threaded joints with parallel thread shall be allowed for class III.

Type Approval documentation

Tests carried out

Tightness, repeated assembly, vacuum, burst pressure, tensile/ pull-out, fire, vibration & pressure pulsation tests

Marking of product

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

- Manufacturer's name or trademark
- Type designation
- Pressure rating

Periodical assessment



Job Id: **262.1-030719-1**
Certificate No: **TAP00002A6**

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 DNVGL-CP-0338.