

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Pipe Couplings, Bite and Compression Type

with type designation(s)

Bite & Compression tube fittings (AHF), Double compression type of fittings (ACF)

Issued to

Arya Crafts & Engineering Pvt. Ltd.
Dist. Vadodara Gujarat, 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 July 2015

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

Application :

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

Type:	Temperature range:	Max. working press.:	Sizes:
Bite & Compression tube fittings (AHF)	Depending on material	Depending on size, type and material	6 to 42 mm
Double compression type of fittings (ACF)	Depending on material	4700 psi (325 bar)	1/8" to 1"

This Certificate is valid until **2021-06-30**.

Issued at **Høvik** on **2017-09-05**

DNV GL local station: **Mumbai**

Approval Engineer: **Adel Samiei**



for **DNV GL**

Digitally Signed By: Ragavendhra Rao, Vishnumurthi

Location: DNV GL Høvik, Norway

on behalf of

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

Two types of compression couplings:

- 1) Bite & Compression tube fittings (AHF): according to DIN 2353/DIN EN ISO 8434-1
- 2) Double compression couplings (ACF)

Materials in fittings: Stainless: SS316 / SS304
 Carbon steel: S20C / S48C
 Brass: ASTM B16 (C36010) / ASTM B283
 Selaing: NBR, FPM, PTFE

Application/Limitation

Couplings covered by this certificate are approved to be used in below applications ⁽⁵⁾ (as described in DNV GL ship rules Pt.4 Ch.6 Sec.9 Table 12 & 13):

- | | |
|---|---|
| <p><i>I.</i> Flammable fluids (flash point $\leq 60^{\circ}\text{C}$)</p> <ul style="list-style-type: none">- Vent lines ⁽¹⁾ <p><i>II.</i> Inert gas</p> <ul style="list-style-type: none">- Water seal effluent lines- Scrubber effluent lines <p><i>III.</i> Flammable fluids (flash point $> 60^{\circ}\text{C}$)</p> <ul style="list-style-type: none">- Fuel oil lines, Lubricating oil lines, Hydraulic Oil & Thermal Oil ^{(1) (2)} <p><i>IV.</i> Fresh water</p> <ul style="list-style-type: none">- Cooling water system ⁽³⁾- Condensate return ⁽³⁾- Non-essential system | <p><i>V.</i> Sanitary/drains/scuppers</p> <ul style="list-style-type: none">- Deck drains (internal) ⁽⁴⁾- Sanitary drains- Scuppers and discharge (overboard) <p><i>VI.</i> Sounding/vent</p> <ul style="list-style-type: none">- Water tanks/Dry spaces- Oil tanks (f.p. $> 60^{\circ}\text{C}$) ^{(1) (2)} <p><i>VII.</i> Miscellaneous</p> <ul style="list-style-type: none">- Starting/Control air ⁽³⁾- Service air (non-essential)- Brine ⁽³⁾- CO2 system- Steam |
|---|---|

⁽¹⁾ 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.

⁽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⁾ Not inside machinery spaces of category A.

⁽⁴⁾ Only above bulkhead deck of passenger ships and freeboard deck of cargo ships.

⁽⁵⁾ Austenitic stainless steels (e.g. grade 304 & 316) are not seawater resistant and shall not be used in direct contact with seawater.

Operating temperatures:

SS316: -46°C to +400°C

SS304: -46°C to +400°C

Carbon steel: -40°C to +120°C

Brass: -46°C to +170°C

For elevated temperatures the maximum allowable pressure have to be reduced according to DNVGL-CP-0185 Section 2 Table 1.

Bite & Compression tube fittings (AHF)

L (light duty series)			
Tube O.D. (mm)	Nominal Pressure (bar)		
	Carbon Steel	Stainless Steel	Brass
6	315	302	220
8			
10			
12			
15			
18	160	154	112
22			
28			

S (heavy duty series)			
Tube O.D. (mm)	Nominal Pressure (bar)		
	Carbon Steel	Stainless Steel	Brass
6	630	605	441
8			
10			
12			
16	400	384	280
20			
25			
30			

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38	250	240	175
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Double compression couplings (ACF):

Sizes: 1/8", 3/16", 1/4", 5/16", 3/8", 1/2", 5/8", 3/4", 7/8", 1"

Maximum working pressure for all sizes: 325 bar (4700 psi)

Double compression couplings (ACF) shall not be installed in systems subject to pressure below atmospheric or vacuum condition.

Carbon steel couplings with a wall thickness of more than 6mm that are to be used at design temperatures below -10°C shall have acceptable impact properties. When the wall thickness is less than 6mm, the charpy testing may be waived provided that the material is normalized.

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

Type Approval documentation

Manufacturer's catalogue Hydraulic Fittings DIN 2353 (Catalogue #04-R2/13)

Double Compression tube fittings catalogue (ACF)

Compression couplings:

Hydraulic proof pressure reports, Static gas pressure reports, Vacuum test reports

Burst test report numbers: DNV/012 dated 2012-07-25 ; DNV/016 dated 2012-08-07 ; DNV/017 dated 2012-08-07 ; DNV/018 dated 2012-08-07

Tightness test report numbers: DNV/04 dated 2012-07-12 ; DNV/07 2012-07-19 ; DNV/010 dated 2012-07-21

Repeated assembly test report numbers: DNV/05 dated 2012-07-13 ; DNV/08 dated 2012-07-20 ; DNV/011 dated 2012-07-23

Pullout test report numbers: DNV/06 dated 2012-07-14; DNV/09 dated 2012-07-16; DNV/013 dated 2012-07-26

Pressure pulsation test & Vibration test report number: DNV/03 dated 2012-03-21

Double compression couplings:

Burst pressure test reports: BST009,10,12,13 (dated 2008-03-04) & BST014,15 (dated 2008-02-13)

Hydraulic proof pressure test report HDP031,32,33,34,35,36 (dated 2008-03-04) & HDP025,26,27,28,29,30 (dated 2008-02-13)

Repeated assembly test report RA005 and RA006 dated 2008-03-04 Vibration and impulse test reports HDBV001,2 (dated 2007-02-13), HDVB003,4 (2007-05-16), HDVB005,6 (dated 2007-07-03), VB003,4 (dated 2007-12-23)

Renewal burst pressure test report numbers: DNV/0916/1,2,3,4 dated 2016-09-16

Tests carried out

Burst, leakage, static gas, repeated assembly, pull-out, Pressure pulsation & Vibration, vacuum

Marking of product

For traceability to this type approval, each product is at least to be marked with:

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

Periodical assessment

For retention of the Type Approval, a DNV GL Surveyor shall perform a survey - every second year and before the expiry date of this certificate - to verify that the conditions for the type approval are complied with and to witness burst testing of samples of couplings selected at random from stock or from the running production.