

TYPE APPROVAL CERTIFICATE

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

with type designation(s)
90° flared flange connections

Issued to

GS-HYDRO OY
Hämeenlinna, Finland

is found to comply with

Det Norske Veritas' Rules for Classification of Ships Pt.4, Ch.6 "Piping Systems"
Offshore Standard DNV-OS-D101, Marine and Machinery Systems and Equipment

Application :

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

Temperature range: - 10 to + 400°C (see certificate)

Max. working press.: up to 20 bar (see certificate)

Sizes: 1/2" to 16" (see certificate)

Issued at **Høvik** on **2017-03-16**

This Certificate is valid until **2018-06-30**.

DNV GL local station: **Helsinki**

for **DNV GL**

Approval Engineer: **Maheshraja Venkatesan**

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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

Pipe couplings with 90° flared tubes connections.

Type	Size	Max. Working Pressure [bar]
SAE J518C	308N	1/2"
	312N	3/4"
	316N	1"
	320N	1 1/4"
	124N	1 1/2"
	132N	2"
	140N	2 1/2"
	148N	3"
	164N	4"
	180N	5"
	196N	6"
	228N	8"
ASME B16.5	1 1/2"	20
	2"	20
	2 1/2"	20
	3"	20
	4"	20
	5"	20
	6"	20
	8"	20
	10"	20
	12"	20
	14"	20
	16"	20
GSJIS-10-16K-DN32	DN32	20
GSJIS-10-16K-DN40	DN40	20

Type	Size	Max. Working Pressure [bar]
GSJIS-10K-DN50	DN50	20
GSJIS-10K-DN65	DN65	20
GSJIS-10K-DN80	DN80	20
GSJIS-10K-DN100	DN100	20
GSJIS-10K-DN125	DN125	20
GSJIS-10K-DN150	DN150	20
GSJIS-10K-DN200	DN200	20
GSJIS-16K-DN50	DN50	20
GSJIS-16K-DN65	DN65	20
GSJIS-16K-DN80	DN80	20
GSJIS-16K-DN100	DN100	20
GSJIS-16K-DN125	DN125	20
GSJIS-16K-DN150	DN150	20
GSJIS-16K-DN200	DN200	20
EN 1092-1	1 1/2"	PN10/ 16
	2"	PN10/ 16
	2 1/2"	PN10/ 16
	3"	PN10/ 16
	4"	PN10/ 16
	5"	PN10/ 16
	6"	PN10/ 16
	8"	PN10/ 16
	10"	PN10/ 16
	12"	PN10/ 16
	14"	PN10/ 16
	16"	PN10/ 16

Material of construction for flanges:

- Carbon steel: S235, ASTM A105
- Stainless steel: AISI 316, 1.4462 (UNS S32205) from EN 10028-7
- Copper: Cu Ni10Fe1Mn from EN 12449

Material of construction for flared tube:

- S235, ASTM A106
- Stainless steel: AISI 316, 1.4462 (UNS S32205) from EN 10028-7
- Copper: Cu Ni10Fe1Mn from EN 12449
- Titanium alloys: ASTM B265 Gr. 2

Other steels with equivalent or superior properties may also be used.

Application/Limitation

Maximum working pressure is 20 bar.

The temperature range is dependant on the sealing material as follows:

Klinger: -10 to + 400 °C
Dixo 400: -10 to + 250 °C
PTFE: -10 to + 260 °C

The couplings may be used according to latest requirements of governing rules in following applications:

- Flammable fluids (flash point $\leq 60^\circ\text{C}$)

- Cargo oil lines⁽⁴⁾
- Crude oil washing lines⁽⁴⁾
- Vent lines⁽³⁾
- b. Inert gas
 - Water seal effluent lines
 - Scrubber effluent lines
 - Main lines ^{(2), (4)}
 - Distributions lines ⁽⁴⁾
- c. Flammable fluids (flash point > 60°C)
 - Cargo oil lines⁽⁴⁾
 - Fuel oil lines^{(2),(3)}
 - Lubricating oil lines^{(2),(3)}
 - Hydraulic oil^{(2),(3)}
 - Thermal oil^{(2),(3)}
- d. Sanitary/drains/scuppers
 - Deck drains (internal) ⁽⁵⁾
 - Sanitary drains
 - Scuppers and discharge (overboard)
- e. Fresh water
 - Cooling water system ⁽¹⁾
 - Condensate return ⁽¹⁾
 - Non-essential system
- f. Sounding/vent
 - Water tanks/Dry spaces
 - Oil tanks (f.p.> 60°C) ^{(2), (3)}
- g. Miscellaneous
 - 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) 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) Only in pump rooms and open decks - only approved fire resistant types*

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

* only couplings with size range from 8" up to 16" with Klinger sealing & design pressure up to 16 bar are considered to be of fire resistant type

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.

For low temperature applications, impact testing requirements as given in relevant chapters of DNV GL Pt. 2 Ch. 2 shall be followed for the corresponding piping components (E.g., flanges & bolting)

The installation of mechanical joints is to be in accordance with the manufacturer's assembly instructions.

Austenitic stainless steel couplings (304/316/ 304L/ 316L) are not permitted in seawater systems.

Job Id: **262.1-021477-1**
Certificate No: **TAP00000KK**

Type Approval documentation

Tests carried out

Following tests are performed according to DNV TAP 5-792.20:
Burst test – fire test – vibration test

Marking of product

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

- Manufacturers name or trade mark
- Type designation
- Size

Periodical assessment

For retention of the Type Approval, a DNV GL Surveyor shall perform a periodical assessment – 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.