TYPE APPROVAL CERTIFICATE

Certificate no.:
TAP00000KK
Revision No:
3

This is to certify:

that the Pipe Couplings

with type designation(s)
90° flared flange connections

issued to
I.M.M. Hydraulics S.p.A.
Atessa, CH, 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.

Temperature range:	**- 10 to + 300°C (see page 4)**
Max. working press.:	**up to 20 bar (see page 2 & 3)**
Sizes:	**1/2" to 10" (see page 2 & 3)**

Issued at **Høvik** on **2024-01-10**

This Certificate is valid until **2028-06-30**.
DNV local unit: **Italy/Malta CMC**

Approval Engineer: **Maheshraja Venkatesan**

for **DNV**
Digitally signed by Bosman van der Merwe

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.

Material of construction for flanges:
- Carbon steel: S235, ASTM A105, S355
- Stainless steel: AISI 316, 1.4462 (UNS S32205) from EN 10028-7
- ASTM B466 UNS C70600 (Temper condition H55 or H80)
- EN 12449 CuNi10Fe1Mn (material condition R310/ R380)
- ASTM B265 Gr.2 (UNS R50400)

Material of construction for flared tube:
- P235GH, ASTM A106 Gr. B and E235
- Stainless steel: AISI 316, 1.4462 (UNS S32205) from EN 10028-7
- ASTM B466 UNS C70600 (Temper condition H55 or H80)
- EN 12449 CuNi10Fe1Mn (material condition R310/ R380)
- ASTM B265 Gr.2 (UNS R50400)

Sealing materials: Klinger, AF-400 and PTFE

Application/Limitation

Maximum working pressure [MWP]:

Type		Size	Pipe OD (mm)		MWP [bar]
			'Schedule series'	'Metric size'	
SAE J518C	308N	½"	21.3	25	16
	312N	¾"	26.7	30	16
	316N	1"	33.4	38	16
	320N	1 ¼"	42.4	42	16
	124N	1 ½"	48.3	50	16
	132N	2"	60.3	60	16
	140N	2 ½"	73	73	16
	148N	3"	88.9	90	16
	164N	4"	114.3	115	16
	180N	5"	139.7	140	16
	196N	6"	168.3	165	16
	228N	8"	219.1	220	16
ASME B16.5		1 ½"	48.3	50	20
		2"	60.3	60	20
		2 ½"	73	73	20
		3"	88.9	90	20
		4"	114.3	115	20
		5"	139.7	140	20
		6"	168.3	165	20
		8"	219.1	220	20
EN 1092-1		1 ½"	48.3	50	PN10/16
		2"	60.3	60	PN10/16
		2 ½"	73	73	PN10/16
		3"	88.9	90	PN10/16
		4"	114.3	115	PN10/16
		5"	139.7	140	PN10/16
		6"	168.3	165	PN10/16
		8"	219.1	220	PN10/16
		10"	273	273	PN10/16
GSJIS-10-16K-DN32		DN32	42.4	42	16
GSJIS-10-16K-DN40		DN40	48.3	50	16
GSJIS-10K-DN50		DN50	60.3	60	10
GSJIS-10K-DN65		DN65	73	73	10
GSJIS-10K-DN80		DN80	88.9	90	10
GSJIS-10K-DN100		DN100	114.3	115	10
GSJIS-10K-DN125		DN125	139.7	140	10

Type	Size	Pipe OD (mm)		MWP [bar]
		'Schedule series'	'Metric size'	
GSJIS-10K-DN150	DN150	168.3	165	10
GSJIS-10K-DN200	DN200	219.1	220	10
GSJIS-16K-DN50	DN50	60.3	60	16
GSJIS-16K-DN65	DN65	73	73	16
GSJIS-16K-DN80	DN80	88.9	90	16
GSJIS-16K-DN100	DN100	114.3	115	16
GSJIS-16K-DN125	DN125	139.7	140	16
GSJIS-16K-DN150	DN150	168.3	165	16
GSJIS-16K-DN200	DN200	219.1	220	16

Couplings covered by this certificate are approved to be used according to the latest requirements of governing rules in following applications:

Systems		***Classification of Piping system***	***Approved fire resistant type[6)]***	***Non-fire resistant type***
Flammable fluids (flash point ≤ 60 °C)				
1.	Cargo oil lines	dry	+[1)]	+[1)]
2.	Crude oil washing lines	dry	+[1)]	+[1)]
3.	Vent lines	dry	+[2)]	+[2)]
Inert gas				
4.	Water seal effluent lines	wet	+	NP
5.	Scrubber effluent lines	wet	+	NP
6.	Main lines	dry	+[1)]	+[1)]
7.	Distribution lines	dry	+[1)]	+[1)]
Flammable fluids (flash point > 60 °C)				
8.	Cargo oil lines	dry	+[1)]	+[1)]
9.	Fuel oil lines	wet	+	+[2)]
10.	Lubricating oil lines	wet	+	+[2)]
11.	Hydraulic oil	wet	+	+[2)]
12.	Thermal oil	wet	+	+[2)]
Seawater[5)]				
13.	Bilge lines	dry/wet	+[3)]	+[3)]
14.	Water filled fire extinguishing systems, e.g. sprinkler systems	wet	+	+[2)]
15.	Non water filled fire extinguishing systems, e.g. foam, drencher systems	dry/wet	+[2)]	+[2)]
16.	Fire main (not permanently filled)	dry/wet	+[2)]	+[2)]
17.	Ballast system	wet	+	+[3)]
18.	Cooling water system	wet	+	+[3)]
19.	Tank cleaning services	dry	+	+
20.	Non-essential systems	dry, dry/wet, wet	+	+
Fresh water				
21.	Cooling water system	wet	+	+[3)]
22.	Condensate return	wet	+	+[3)]
23.	Non-essential systems	dry, dry/wet, wet	+	+
Sanitary/drains/scuppers				
24.	Deck drains (internal)	dry	+[4)]	+[4)]
25.	Sanitary drains	dry	+	+
26.	Scuppers and discharge (overboard)	dry	+	+
Sounding/vent				
27.	Water tanks/dry spaces	dry/wet	+	+
28.	Oil tanks (f.p > 60 °C)	dry	+[2)]	+[2)]

Systems		***Classification of Piping system***	***Approved fire resistant type[6)]***	***Non-fire resistant type***
Miscellaneous				
29.	Starting/control air	dry	+[3)]	+[3)]
30.	Service air (non-essential)	dry	+	+
31.	Brine	wet	+	+
32.	CO_2 system (outside protected space)	dry	NP	NP
33.	CO_2 system (inside protected space)	dry	NP	NP
34.	Steam	wet	+	+

Abbreviations

+ Application permitted (with limitations, if any, as in the footnotes below)
NP Application not permitted

Footnotes

1) Not permitted when mechanical joints are installed in pump rooms and open decks.
2) Not permitted 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) Not permitted when mechanical joints are installed in machinery spaces of category A.
4) Permitted only above bulkhead deck of passenger ships and freeboard deck of cargo ships.
5) Couplings made of specific material grade 1.4462 (UNS S32205) and ASTM B265 Gr.2 only are allowed in sea water systems, and only at room temperature conditions.
6) *Approved fire resistant types*: Couplings up to size 8" comprising of Klinger sealing with design pressure up to 16 bar made of carbon & stainless steel material grades

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

Klingersil	:	-10 to + 300 °C
AF-400	:	-10 to + 250 °C
PTFE	:	-10 to + 260 °C

Materials and material protection chosen for the specific system shall be suitable for the intended medium and environmental conditions. For elevated temperatures, pressure reduction factors as specified in DNV-CP-0185 Sec.2 shall be followed.

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-RU-SHIP 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.

Type Approval documentation

Catalogue 8990306602 'GS-FLANGE SYSTEM' Revision February 2016
Technical specification: Gasket sheet Gambit AF-400
Technical specification KLINGERsil C-4430
Technical Data Sheet GSJIS-90° Flanges – JIS B2220
Authorization letter QA016/18 for change of ownership from GS Hydro to IMM Hydraulics
'Statement of specimen tightness tests' from Eurofins Expert Services Oy dated 2019-01-11
'Statement' from DNV Surveyor related to witnessed tests dated 2019-01-17
Reports:

- Vibration & impulse test report VTT-S-03301-18
- Vibration & impulse test report PRCS003228-C
- Burst test for type 312N30x3 under drawing 2017-011-83 witnessed by DNV Surveyor dated 2023-12-04
- Burst test for type 312N30x3 under drawing 2017-011-83 witnessed by DNV Surveyor dated 2018-09-03
- 'Sprengtest-GS90°Flare-ASME B16.5#15WP 20 bar" witnessed by DNV surveyor dated 2012-02-13
- Tightness test report dated 2001-03-12
- Burst test dated 29.10.2008 witnessed by Surveyor
- Fire test report no. VTT-S-3335-09 dated 15th June 2009

- Pressure test after fire test dated 7.5.2009 for type DN200/220x6
- Fire resistance test on metallic I.M.M Hydraulics pipe components according to test method ISO 19921:2005 from Eurofins Expert Services with report no. EUFI29-19003645-T1 witnessed by DNV Surveyor dated 1 November 2019.

Burst test report with order no. 2023/A13473910 witnessed by DNV dated 2023-12-04

Tests carried out

Tightness, burst, fire, vibration and pressure pulsation

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 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.