# TYPE APPROVAL CERTIFICATE

Certificate no.:
**TAP00000KM**
Revision No:
**3**

## This is to certify:

**that the Pipe Couplings**

with type designation(s)
**37° flared flanged 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:** | **-40°C to +200°C (see page 2)** |
| **Max. working press.:** | **50 bar to 420 bar (see page 2)** |
| **Sizes:** | **1/2" to 10" (see page 2)** |

Issued at **Høvik** on **2024-01-11**

This Certificate is valid until **2028-06-29**.
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

37° Flared Flange Connection – compression coupling flared type.

Material of construction for flanges:
- Carbon steel: S355, P355NL1
- Stainless steel: 1.4401, 1.4404, 1.4462 (UNS S32205) from EN 10028-7

Material of construction for flared tube:
- P235GH, ASTM A106 gr. B, E235 and E355
- Stainless steel: AISI 316, 1.4462 (UNS S32205) from EN 10028-7

Sealing material: NBR & FKM90

## Application/Limitation

Maximum working pressure (MWP) details:

| Type | Size [“] | Pipe OD (mm) | | MWP [bar] |
|---|---|---|---|---|
| | | ‘Schedule series’ | ‘Metric size’ | |
| 308F | ½ | 21.3 | 25 | 350 |
| 608F | ½ | 21.3 | 25 | 350 |
| 312F | ¾ | 26.7 | 30 | 350 |
| 612F | ¾ | 26.7 | 30 | 420 |
| 316F | 1 | 33.4 | 38 | 350 |
| 616F | 1 | 33.4 | 38 | 420 |
| 320F | 1 ¼ | 42.4 | 42 | 280 |
| 620F | 1 ¼ | 42.4 | 42/46 | 420 |
| 124F | 1 ½ | 48.3 | 50 | 50 |
| 324F | 1 ½ | 48.3 | 50 | 280 |
| 624F | 1 ½ | 48.3 | 50/56 | 420 |
| 132F | 2 | 60.3 | 60 | 50 |
| 332F | 2 | 60.3 | 60 | 280 |
| 432F | 2 | 60.3 | 60/66 | 350 |
| 632F | 2 | 60.3 | 60/66 | 420 |
| 140F | 2 ½ | 73 | 73 | 50 |
| 340F | 2 ½ | 73 | 73 | 210 |
| 440F | 2 ½ | 73 | 73 | 350 |
| 148F | 3 | 88.9 | 90 | 50 |
| 348F | 3 | 88.9 | 90 | 210 |
| 448F | 3 | 88.9 | 90 | 350 |
| 156F | 3 ½ | 101.6 | 100 | 50 |
| 164F | 4 | 114.3 | 115 | 50 |
| 164-64F | 4 | 114.3 | 115 | 64 |
| 456F | 4 | 114.3 | 115 | 350 |
| 180F | 5 | 139.7 | 140 | 50 |
| 180-64F | 5 | 139.7 | 140 | 64 |
| 196F | 6 | 168.3 | 165 | 50 |
| 196-64F | 6 | 168.3 | 165 | 64 |
| 228F | 8 | 168.3 | 165 | 50 |
| 228-64F | 8 | 168.3 | 165 | 64 |
| 260F | 10 | 273 | 273 | 50 |

| Type | Size [“] | Pipe OD (mm) | | MWP [bar] |
|---|---|---|---|---|
| | | ‘Schedule series’ | ‘Metric size’ | |
| GS210SH15F | ½ | 21.3 | 25 | 210 |
| GS210SS15F | ½ | 21.3 | 25 | 210 |
| GS280K15F | ½ | 21.3 | 25 | 280 |
| GS350K15F | ½ | 21.3 | 25 | 350 |
| GS210SH20F | ¾ | 26.7 | 30 | 210 |
| GS210SS20F | ¾ | 26.7 | 30 | 210 |
| GS280K20F | ¾ | 26.7 | 30 | 280 |
| GS350K20F | ¾ | 26.7 | 30 | 350 |
| GS210SH25F | 1 | 33.4 | 38 | 210 |
| GS210SS25F | 1 | 33.4 | 38 | 210 |
| GS280K25F | 1 | 33.4 | 38 | 280 |
| GS350K25F | 1 | 33.4 | 38 | 350 |
| GS210SH32F | 1 ¼ | 42.4 | 42 | 210 |
| GS210SS32F | 1 ¼ | 42.4 | 42 | 210 |
| GS280K32F | 1 ¼ | 42.4 | 42/46 | 280 |
| GS350K32F | 1 ¼ | 42.4 | 42/46 | 350 |
| GS210SH40F | 1 ½ | 48.3 | 50 | 210 |
| GS210SS40F | 1 ½ | 48.3 | 50 | 210 |
| GS280K40F | 1 ½ | 48.3 | 50/56 | 280 |
| GS350K40F | 1 ½ | 48.3 | 50/56 | 350 |
| GS210SH50F | 2 | 60.3 | 60 | 210 |
| GS210SS50F | 2 | 60.3 | 60 | 210 |
| GS280K50F | 2 | 60.3 | 60/66 | 280 |
| GS350K50F | 2 | 60.3 | 60/66 | 350 |
| GS210SH65F | 2 ½ | 73 | 73 | 210 |
| GS210SS65F | 2 ½ | 73 | 73 | 210 |
| GS280K65F | 2 ½ | 73 | 73 | 280 |
| GS350K65F | 2 ½ | 73 | 73 | 275 |
| GS210SH80F | 3 | 88.9 | 90 | 210 |
| GS210SS80F | 3 | 88.9 | 90 | 210 |
| GS280K80F | 3 | 88.9 | 90 | 280 |
| GS350K80F | 3 | 88.9 | 90 | 350 |

The temperature range is dependant on the sealing material as follows:
NBR : -25 to +100 °C
Viton : -40 to +200 °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 installation of mechanical joints is to be in accordance with the manufacturer’s assembly instructions.

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)] |
| **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.

| ***Systems*** | ***Classification of Piping system*** | ***Approved fire resistant type[6)]*** | ***Non-fire resistant type*** |
|---|---|---|---|

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) only are allowed in sea water systems, and only at room temperature conditions.
6) *Approved fire-resistant types* as per this certificate are those couplings of various sizes and types as provided in Table 1 below that are allowed to be used in wet piping systems fulfilling fire testing at '30 min wet' conditions as per DNV-RU-SHIP Pt.4 Ch.6 Sec.9 Table 9.

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).

## Type Approval documentation

Catalogue 8990306602 'GS-FLANGE SYSTEM' Revision February 2016
Technical data sheet for: GS-JIS F7806 280K 37° flare flanges, GS-JIS F7806 350K 37° flare flanges, GS-JIS B2291 SH/SS 37° flare flanges, ISO 6162-1 64 bar 37° flare flanges & ISO 6164 GS-37° flare flange connections
Material data sheet for gasket FKM90: M01010000056-en_08.04.2016
Test reports:
Test Report No . VTT-S-10268-10
Tightness and pull-out test no. S-04482-18
Impulse & vibration test report no. VTT-S-03301-18
Test report dated 31.03.2011 witnessed by DNV Helsinki
Burst test report dated 31.03.2011 witnessed by DNV Helsinki
Burst test for type 456F under drawing 2017-011-88 witnessed by DNVGL Surveyor dated 2018-09-04
Burst test for type GS350K65F73 under drawing 2017-011-85 witnessed by DNVGL Surveyor dated 2018-09-04
Burst test for type 196-64F under drawing 2017-011-86 witnessed by DNVGL Surveyor dated 2018-09-03
Burst test for type 260F under drawing 2017-011-90 witnessed by DNVGL Surveyor dated 2018-09-19
Fire test report nos. VTT-S-2789-11, VTT-S-4647-09, VTT-S-3335-09
Burst test report for 612F under drawing no. 2017-011-92 witnessed by DNV GL Surveyor dated 2018-12-19
Burst test report for 424F under drawing no. 2017-011-91witnessed by DNV GL Surveyor dated 2018-12-19
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 GL Surveyor related to witnessed tests dated 2019-01-17
Renewal burst test reports 2023-008-01, 2023-006-01 and 2023-007-01 witnessed by DNV dated 2023-12-05

## Tests carried out

Tightness, burst, fire, Pull out, impulse and vibration.

## Marking of product

For traceability to this type approval, the couplings are at least to be marked with:
- 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.