DNV·GL

Certificate No:
TAP00000F1

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Pipe Couplings, Bite and Compression Type

with type designation(s)
LL, L and S - Types: DU, DL, DT, DC, DMC-R, DMC-G, DMC-M, DMC-GFD, DMC-MFD, DMC-N, DLM-R, DLM-M, DBU, DBL, DBUW, DAS, DFC-G, DGA-G, DFC-M, DGC-G, DRED, DKOR, MFAD-GFD, MFAE-GFD, MFAD-G, MFAE-G, DTR, DUR, DAK, DAKR, DASK, DGMA, DEMA3, DN, DS, DFSR & DSRR

Issued to
Hy-Lok Corporation (Kangseo Factory)
Busan, Republic of Korea

is found to comply with
DNV GL rules for classification – Ships Pt.4 Ch.6 Piping systems
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.

Temperature range:	**-60°C to 400°C (see cert.)**
Max. working press.:	**100 to 630 bar (see cert.)**
Sizes:	**For tubes 4 - 42 mm (see cert.)**

This Certificate is valid until **2021-07-25**.

Issued at **Høvik** on **2016-07-26**

for **DNV GL**

DNV GL local station: **Pusan**

Approval Engineer: **Adel Samiei**

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.

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Product description

24° tube fittings according to DIN2353 & ISO8434-1:

- Very Light, LL
- Light, L
- Heavy, S

Designation	Description	Designation	Description
DU	Straight Union	DFC-M	Female Connector
DL	Union Elbow	DGC-G	Pressure Gauge Connector
DT	Union Tee	DRED	Reducing Swivel Adapter
DC	Union Cross	DKOR	Standpipe Reducer
DMC-R	Male Connector	MFAD-GED	Male Female Adapter
DMC-G	Male Connector	MFAE-GED	Male Female Adapter
DMC-M	Male Connector	MFAD-G	Male Female Adapter
DMC-GED	Male Connector	MFAE-G	Male Female Adapter
DMC-MED	Male Connector	DTR	Reducing Tee
DMC-N	Male Connector	DUR	Reducing Union
DLM-R	Male Elbow	DAK	Welding Nipple
DLM-M	Male Elbow	DAKR	Reducing Welding Nipple
DBU	Bulkhead Union	DASK	Welding Connector for Welding Nipple
DBL	Bulkhead Union Elbow	DGMA	Tee Test Coupling with Thr. Conn. M16
DBUW	Welding Bulkhead Union	DEMA3	Test Coupling with Thr. Conn. M16
DAS	Welding Connector	DN	Nut
DS	Sleeve	DFSR	Functional Soft sealing ring
DFC-G	Female Connector	DSRR	Soft sealing ring (with retaining ring)
DGA-G	Pressure Gauge Swivel Adapter		

Materials in body:

- Stainless steel ASTM A182 F316 (forged)
- Stainless steel ASTM 479 T316
- Carbon Steel S20C acc. to JIS G 4051

Application/Limitation

Maximum working pressure:

Series	Pipe OD (mm)	Max Working Press.
Very Light, LL (1)	4-6-8-10-12	100 bar
Light, L	6-8-10-12-15-18	315 bar
	22-28-35-42	160 bar
Heavy, S	6-8-10-12-14	630 bar
	16-20-25-30	400 bar
	38	315 bar

(1) Types DU, DL, DT, DC, DMC-R, DMC-MK, DMC-M, DMC-N, DLM-R/M, DN, DS

Temperature range:

Stainless Steel : -60 to 400°C
Carbon Steel : -40 to 120°C
O-ring Sealing Type : -30 to 90°C

For stainless steel couplings at elevated temperatures, the maximum working pressure has to be reduced with the following factors:

Temperature °C								
20	50	100	150	200	250	300	350	400
1,0	0,95	0,85	0,77	0,71	0,67	0,63	0,60	0,58

Couplings covered by this certificate are approved to be used in all piping classes in below applciations:

1) Flammable fluids (flash point ≤ 60°C) (*)
   - Cargo oil lines
   - Crude oil washing lines
   - Vent lines
2) Inert gas
   - Water seal effluent lines
   - Scrubber effluent lines
   - Main lines (*)
   - Distributions lines (*)
3) Flammable fluids (flash point > 60°C) (*)
   - Cargo oil lines
   - Fuel oil lines
   - Lubricating oil lines
   - Hydraulic oil
   - Thermal oil
4) Sanitary/drains/scuppers
   - Deck drains (internal) (*)
   - Sanitary drains
   - Scuppers and discharge (overboard)
5) Fresh water
   - Cooling water system (*)
   - Condensate return (*)
   - Non-essential system
6) Sea water (***)
   - Bilge lines (*)
   - Fire main and water spray (*)
   - Sprinkler system (*)
   - Ballast system (*)
   - Cooling water system (*)
   - Tank cleaning services
   - Non-essential systems
7) Sounding/vent
   - Water tanks/Dry spaces
   - Oil tanks (f.p.> 60°C) (*)
8) Miscellaneous
   - Starting/Control air (**)
   - Service air (non-essential)
   - Brine
   - CO2 system(**)
   - Steam

(*) Only fire resistant types. Couplings with o-ring sealing shall not be considered as fire resistant.
(**) Only inside Machinery spaces category A
(***) In seawater applications, used material shall be properly protected. Surface preparation and coating shall be approved by society. Stainless steel type 316 shall not be considered as seawater resistant material.

For installation in vessels with class notation of "tankers for liquefied gas", couplings covered by this certificate shall only be used for accessory lines and instrumentation lines with external diameters of 25 mm or less. Reference is made to DNV GL ship rules Pt.5 Ch.7 Sec.5 [8.2.1].

Couplings covered by this certificate shall not be installed in systems subject to pressure below atmospheric.

Type Approval documentation

- Test report and information attached to DNV Pusan letter 96TN9609GBW.001/ejs dated 1996-06-26
- Manufacturer's catalogue No. H–230TF dated May 2016
- Manufacturer's test report dated 1997-07-14
- Drawings 230TF-DWG rev.2
- Manufacturer's test report No. PTR-03J-14C, DNV witnessed 2003-10-15
- Test reports No. TR-DNV-DINLT-080701, -DINRAT-080701, -DINPOT-080701, -DINBT-080701, witnessed by DNV
- Test report number 14T-H230TF-01 dated 2014-07-28 (burst, leakage and impulse tests)
- Vibration and pulsation test report number TR-DNVGL-VPPT-16F25-001 witnessed by DNV GL surveyor dated 2016-07-14 (DFSR-DSRR 6L, 12L, 38S)
- Vibration and pulsation test report number TR-DNVGL-VPPT-16G07-001 witnessed by DNV GL surveyor dated 2016-07-14 (DFSR-DSRR 25S)
- Vibration and pulsation test report number TR-DNVGL-VPPT-16G01-001 witnessed by DNV GL surveyor dated 2016-07-14 (DFSR-DSRR 42L)
- Vibration and pulsation test report number TR-DNVGL-VPPT-16F23-001 witnessed by DNV GL surveyor dated 2016-06-24 (DFSR-DSRR 6S)
- Pullout test report number TR-DNVGL-PO-16F24-001 dated 2014-06-24 witnessed by DNV GL surveyor (6L, 12L, 42L, 6S, 25S, 38S)
- Document number 230TF-DR-01 revision 2 containing calculation of minimum wall thickness of each configuration

- Tightness test reports TR-DNVGL-TTW-16F15-001 (DFSR-DSRR L) & TR-DNVGL-TTW-16F15-002 dated 2016-06-15 witnessed by DNV GL surveyor (DFSR-DSRR S)
- Repeated assembly test reports TR-DNVGL-RAT-16F15-001 (DFSR-DSRR L) & TR-DNVGL-RAT-16F15-001 (DFSR-DSRR S) dated 2016-06-15 witnessed by DNV GL surveyor
- Burst pressure test report TR-DNVGL-BT-16F15-001 dated 2016-06-15 witnessed by DNV GL surveyor
- Tightness test reports TR-DNVGL-TTG-16F15-001 (DFSR-DSRR L) & TR-DNVGL-TTG-16F15-002 dated 2016-06-15 witnessed by DNV GL surveyor (DFSR-DSRR S)

Tests carried out

Leakage, Repeated Assembly, Burst, Vibration, Pressure pulsation, Pull out

Marking of product

For traceability to this type approval the couplings are marked:

- Manufacture’s name or trade mark
- Type designation
- Maximum working pressure
- Size

Periodical assessment

For retention of the Type Approval, DNV GL Surveyor shall perform a periodical assessment every second year, to verify that the conditions for the type approval are complied with and to witness burst tests on elbows and tees for selection of sizes.