



TYPE APPROVAL CERTIFICATE

Certificate No:
TAP00000F1
Revision No:
1

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, DFRS & DSRR

Issued to

Hy-Lok Corporation
Busan, Republic of Korea

is found to comply with

DNV GL rules for classification – Ships Pt.4 Ch.6 Piping systems
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: -60°C to 400°C (see page 2)
Max. working press.: 100 to 630 bar (see page 2)
Sizes: For tubes 4 - 42 mm (see page 2)

Issued at **Høvik** on **2021-10-26**

for **DNV**

This Certificate is valid until **2026-07-25**.

DNV local station: **Busan**

Approval Engineer: **Renata Rossi**

Zeinab Sharifi
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.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.



Form code: TA 251

Revision: 2021-03

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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

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

Application/Limitation

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 only to be used in piping classes I, II and III in below applications:

<p>1) Flammable fluids (flash point $\leq 60^{\circ}\text{C}$)</p> <ul style="list-style-type: none"> - Cargo oil lines ⁴⁾ - Crude oil washing lines ⁴⁾ - Vent lines ²⁾ <p>2) Inert gas</p> <ul style="list-style-type: none"> - Water seal effluent lines - Scrubber effluent lines - Main lines ⁴⁾ - Distributions lines ⁴⁾ <p>3) Flammable fluids (flash point $> 60^{\circ}\text{C}$)</p> <ul style="list-style-type: none"> - Cargo oil lines ⁴⁾ - Fuel oil lines ²⁾ - Lubricating oil lines ²⁾ - Hydraulic oil ²⁾ - Thermal oil ²⁾ 	<p>4) Fresh water</p> <ul style="list-style-type: none"> - Cooling water system ¹⁾ - Condensate return ¹⁾ - Non-essential system <p>5) Sanitary/drains/scuppers</p> <ul style="list-style-type: none"> - Deck drains (internal) ³⁾ - Sanitary drains <p>6) Sounding/vent</p> <ul style="list-style-type: none"> - Water tanks/dry spaces - Oil tanks (f.p. $> 60^{\circ}\text{C}$) ²⁾ <p>7) Miscellaneous</p> <ul style="list-style-type: none"> - Starting/control air ¹⁾ - Service air (non-essential) - Brine - CO₂ system ¹⁾ - Steam
<p>(1) Inside machinery spaces of category - only type designations without O-ring (2) Only type designations without O-ring acceptable when installed on exposed open decks and not used for fuel oil lines (3) Only above bulkhead deck of passenger ships and freeboard deck of cargo ships. (4) Only in pump rooms and open decks – only type designations without O-ring</p>	

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

Materials and material protection chosen for the specific system shall be suitable for the intended medium and environmental conditions. Pipe couplings covered by this certificate are not allowed to be used in sea water applications.

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.

The minimum wall thickness and material of the tubes shall be in accordance with the latest Rules of DNV Pt.4 Ch.6 Sec.9.

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 surveyor dated 2016-07-14 (DFSR-DSRR 6L, 12L, 38S)
- Vibration and pulsation test report number TR-DNVGL-VPPT-16G07-001 witnessed by DNV surveyor dated 2016-07-14 (DFSR-DSRR 25S)
- Vibration and pulsation test report number TR-DNVGL-VPPT-16G01-001 witnessed by DNV surveyor dated 2016-07-14 (DFSR-DSRR 42L)
- Vibration and pulsation test report number TR-DNVGL-VPPT-16F23-001 witnessed by DNV surveyor dated 2016-06-24 (DFSR-DSRR 6S)
- Pullout test report number TR-DNVGL-PO-16F24-001 dated 2014-06-24 witnessed by DNV 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 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 surveyor
- Burst pressure test report TR-DNVGL-BT-16F15-001 dated 2016-06-15 witnessed by DNV surveyor
- Tightness test reports TR-DNVGL-TTG-16F15-001 (DFSR-DSRR L) & TR-DNVGL-TTG-16F15-002 dated 2016-06-15 witnessed by DNV surveyor (DFSR-DSRR S)
- Renewal burst test report no. TR-BTR-21H20-S01 dated 2021-08-20 witnessed by DNV surveyor.

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, 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 DNVGL-CP-0338.