



DET NORSKE VERITAS

TYPE APPROVAL CERTIFICATE

CERTIFICATE NO. P-12865
This Certificate consists of 4 pages

This is to certify that the
Pipe Couplings, Bite and Compression Type
with type designation(s)

Series 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 and DS

Manufactured by
Hy-Lok Corporation (Kangseo Factory)
Pusan 618-270, Republic of Korea


is found to comply with
Det Norske Veritas' Rules for Classification of Ships
Det Norske Veritas' Standards for Certification 2.9 No. 5-792.20


Application
The couplings may be used in: hydraulic, compressed air, steam, condensate, fresh water, sea water, fuel and lubricating oil (see cert.) and sanitary systems.



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.)

Place and date
Høvik, 2008-08-18
for DET NORSKE VERITAS AS

This Certificate is valid until
2012-12-31

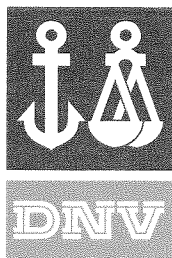

Hanne Anita Hjerpetjønn
Head of Section


Local Office
DNV Pusan Station


Carl Ulrik Simonsen
Surveyor 

Notice: 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.

If any person suffers loss or damage which is proved to have been caused by any negligent act or omission of Det Norske Veritas, then Det Norske Veritas shall pay compensation to such person for his proved direct loss or damage. However, the compensation shall not exceed an amount equal to ten times the fee charged for the service in question, provided that the maximum compensation shall never exceed USD 2 million. In this provision "Det Norske Veritas" shall mean the Foundation Det Norske Veritas as well as all its subsidiaries, directors, officers, employees, agents and any other acting on behalf of Det Norske Veritas.



Cert. No.: P-12865
 File No.: 792.21
 Job No.: 262.1-005909-1

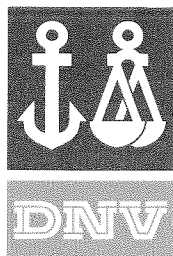
Product description

Single ferrule bite type couplings series:

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

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

CUSI



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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	Max Working Press.
Very Light, LL	4 - 12 mm	100 bar
Light, L	6 - 18 mm	315 bar
	22 - 42 mm	160 bar
Heavy, S	6 - 14 mm	630 bar
	16 - 30 mm	400 bar
	38 mm	315 bar

Temperature range:

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

Couplings used for low temperature lines may only be used for accessory lines and instrumentation lines with external diameters of 25 mm and less. Reference is made to the Ship Rules Pt. 5, Ch. 5, Sec. 6, C509 point 3.

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

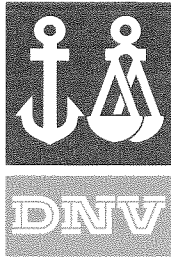
<i>Temperature °C</i>								
20	50	100	150	200	250	300	350	400
1,0	0,95	0,85	0,77	0,71	0,67	0,63	0,60	0,58

Couplings with o-ring sealing may not be used in hydrocarbon service.

Tube materials:

- Seamless, fully annealed, also welded and redrawn type suitable for bending. Max. hardness: Rockwell B72.
- Carbon steel Precision Tube for Hydraulic Line Service, JOHS-102, OST-2 (The Oil Hydraulic Association Standards) or equivalent.
- Seamless, fully annealed and welded redrawn suitable for bending. Max. hardness: Rockwell B90.

CVS1



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- Seamless coils, soft or light annealed, maximum hardness Rockwell F55. Straight lengths, light drawn and general purpose, maximum hardness of 60 on Rockwell 30T scale.
- The wall thickness and the material of the tubes to be in accordance with the current Rules of Det Norske Veritas.

For other purposes than listed approval has to be obtained in each case.

Type Approval documentation

The approval is based on the following documentation:

- Booklet with test report and information as received with DNV, Pusan's letter 96TN9609GBW.001/ejs dated 1996.06.26
- Manufacturer's catalogue No. H - 230TF dated Jan. 2007
- Manufacturer's test report dated July 14, 1997.
- Manufacturer's test report No. PTR-03J-14C, DNV witnessed 2003-10-15
- DNV retention survey report dated 2008-07-01
- Test reports No. TR-DNV-DINLT-080701, -DINRAT-080701, -DINPOT-080701, -DINBT-080701, witnessed by DNV

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:



Certificate retention survey

For retention of the Type Approval, a DNV Surveyor shall perform a survey - before the expiry date of this certificate - to verify that the conditions for the type approval are complied with and to witness the following tests on a selection of sizes:

- Leakage test
- Repeated Assembly test
- Burst test

END OF CERTIFICATE

CL51