TYPE APPROVAL CERTIFICATE

Certificate No:
TAP00001G7
Revision No:
1

This is to certify:

That the Pipe Couplings, Bite and Compression Type

with type designation(s)
EU, EBU, EBUW, EUR, EL, EBL, ET, ETR, EX, ELM-R/MK, EMC-N, EMC-R, EMC-GB, EMC-MK, EMC-MB, EMC-GE, EMC-ME, EMC-UF/MF, EFC-G/M, EFC-GG, EGA-GG, EAS, ELA, EBTA, ERTA, ER, EKOR, EA-GE/ME

Issued to
HSME Corporation
Busan, 11, **Korea, Republic of**

is found to comply with
DNV class programme DNV-CP-0185 – Type approval – Mechanical joints
DNV rules for classification – Ships Pt.4 Ch.6 Piping systems

Application :

Products approved by this certificate are accepted for installation on vessels classed by DNV.

Temperature range:	**-60° C to 400° C (See certificate)**
Max. working press.:	**100 to 630 bar (See certificate)**
Sizes:	**Tube OD 4 to 42 mm**

Issued at **Høvik** on **2023-09-13**

This Certificate is valid until **2028-06-30**.
DNV local unit: **Gimhae Station**

Approval Engineer: **Sarah Miller**

for **DNV**

Digitally Signed By: Zeinab, Sharifi
Location: DNV Høvik, Norway

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.

Product description

Cutting ring pipe couplings acc. to DIN 2353. O-ring on ends of some types.

Materials:
Stainless steel ASTM A276 316 / ASTM A182 F316

Design temperature range:
-60° C to 400° C

Designation	Description
EU	Straight Union
EBU	Bulkhead Union
EBUW	Weld Bulkhead Union
EUR	Reducing Union
EL	Union Elbow
EBL	Bulkhead Union Elbow
ET	Union Tee
ETR	Reducing Tee
EX	Union Cross
ELM-R	Male Elbow
ELM-MK	Male elbow
EMC-N	Male Connector (NPT Thread)
EMC-R	Male Connector(BSPT Thread)
EMC-GB	Male Connector(BSPP Parallel)
EMC-MK	Male Connector(Metric Tapered)
EMC-MB	Male Connector(Metric Parallel)
EMC-GE	Male Connector(BSPP Parallel)
EMC-ME	Male Connector(Metric Parallel)
EMC-UF	Male Connector(Unified Parallel)
EMC-MF	Male Connector(Metric Parallel)
EFC-G	Female Connector(BSPP Parallel)
EFC-M	Female Connector(Metric Parallel)
EFC-GG	Female Connector(BSPP Parallel)
EGA-GG	Standpipe Female Connector(BSPP Parallel)
EAS	Weld Connector
ELA	Adjustable Standpipe Elbow
EBTA	Adjustable Standpipe Branch Tee
ERTA	Adjustable Standpipe Run Tee
ER	Reducer
EKOR	Adjustable Standpipe Reducer
EA-GE	Adjustable Standpipe Male Adapter(BSPP Parallel)
EA-ME	Adjustable Standpipe Male Adapter(Metric Parallel)

Application/Limitation

Normal working pressures defined at 20°C:

Table 1: Pressure rating, general.

Product line	Tube O.D. (mm)	Pressure (Bar)
LL	4 –12	100
L	6 - 18 22 – 42	315 160
S	6 – 14 16 – 30 38	630 400 315

Table 2: Rating for EMC-R, EMC-MK, EMC-MB

Product line	Tube O.D. (mm)	Pressure (Bar)
LL	4 –12	100
L	6 - 18 22 – 42	315 160
S	6 – 14 16 – 25 30 - 38	630 400 250

At elevated temperatures, the maximum pressures are to be reduced according to following:

Temperature °C	20	50	100	150	200	250	300	400
Stainless steels	1,00	0,95	0,85	0,77	0,71	0,67	0,63	0,60

Working temperature range of couplings with sealing material is depending on sealing ring materials:

FKM:	-20 to 200°C
PTFE (Teflon):	-60 to 190°C
NBR	-25 to 100°C

Couplings covered by this certificate are approved to be used in class I, II, and III piping systems according to the latest requirements of governing rules in following applications:

1) Flammable fluids (flash point ≤ 60°C)
- Cargo oil lines [1]
- Crude oil washing lines [1]
- Vent lines [2]

2) Inert gas
- Water seal effluent lines
- Scrubber effluent lines
- Main lines [1]
- Distributions lines [1]

3) Flammable fluids (flash point > 60°C)
- Cargo oil lines [1]
- Fuel oil lines [2]
- Lubricating oil lines [2]
- Hydraulic oil [2]
- Thermal oil [2]

4) Fresh water
- Cooling water system [3]
- Condensate return [3]
- Non-essential system

5) Sanitary/drains/scuppers
- Deck drains (internal) [4]
- Sanitary drains
- Scuppers and discharge (overboard)

6) Sounding/vent
- Water tanks/dry spaces
- Oil tanks (f.p. > 60°C) [2]

7) Miscellaneous
- Starting/control air [3]
- Service air (non-essential)
- Brine
- CO_2 system (outside protected space)
- CO_2 system (inside protected space) [5]
- Steam

1) Couplings with O-rings are not allowed to be installed in pump rooms and open decks.
2) Couplings with O-rings are not allowed 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) Couplings with O-rings are not allowed to be installed in machinery spaces of category A.
4) Only above bulkhead deck of passenger ships and freeboard deck of cargo ships.
5) Couplings without O-rings are not allowed inside protected spaces

Couplings are not approved for use in systems exposed to vacuum.

The approval is only valid when the couplings are assembled with tubing of correct temper and tolerances as recommended by the manufacturer.

Threaded connections where pressure-tight joints are made on the threads with parallel or tapered threads, shall comply with requirements of a recognized national or international standard with considering below limitations:

- Comply with requirements of a recognized national or international standard.
- Shall not be used for piping systems conveying toxic or flammable media or services where fatigue, severe erosion or crevice corrosion is expected to occur.
- In CO2 systems shall be allowed only inside protected spaces and in CO2 cylinder rooms.
- Tapered threads may be used in class I piping systems when outside diameter is not greater than 33.7 mm

Parallel threads may be used only for class III piping systems.

No product certificate will be required.

Type Approval documentation

Reference documents:
- Manufacturer's catalogue No. DIN-2 July 2013
- Test witnessed by DNV
  Repeated assembly test & tightness test dated 2014.02.06; 2014.02.13; 2014.02.20 & 2012.08.27
  Burst pressure test dated 2014.02.27; 2012.10.15 & 2012.10.26
  Vibration test, pressure pulsation test and pull-out test dated 2014.03.27; 2014.03.06 & 2013.01.16
  Renewal burst test dated 2023.08.30

Tests carried out

Leakage test, repeated assembly test, burst pressure test, pullout test, vibration test, pressure pulsation test.

Marking of product

For traceability to this type approval the products are to be marked with:
- Manufacturer's name or trade mark
- Type designation and dimension

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.