



DET NORSKE VERITAS

TYPE APPROVAL CERTIFICATE

CERTIFICATE NO. P-13083
This Certificate consists of 4 pages

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

**ES-V, W-V, GS-V, T-V, G-V, WS-V, K-V, WE-V, GE-V, TE-V,
LE-V, TR-V, EG-V, EW-V, ET-V, EL-V, MA-V, MA-EV, MA-
VD, EW-VD, ET-VD, EL-VD, EG-VD, KOR-V, RED-V, GAS-
V, GAI-V, GR-V, ETH-V, EWH-V, GDVV, GEDVV, DGWSV
and DGWESV**

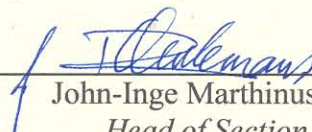
Manufactured by
Metric Fittings GmbH
Rottweil, Germany

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
May be used for: Hydraulic- and lubrication oil, fuel oi (not high pressure fuel injection),
compressed air, oxygen (see cert.), steam and condensate, fresh- and sea water

| | |
|----------------------|----------------------------|
| Temperature range: | (See cert.) |
| Max. working press.: | 100 to 800 bar (See cert.) |
| Sizes: | Tube O.D 4 to 42 mm |

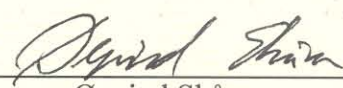
Place and date
Høvik, 2009-03-11
for DET NORSKE VERITAS AS


John-Inge Marthinussen
Head of Section



Local Office
DNV Essen

This Certificate is valid until
2013-06-30


Øyvind Skåra
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-13083
File No.: 792.21
Job No.: 262.1-005792-1

Product description

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

Materials:

Carbon steel: C15, C22, St.37-0, St37-2 and 9SMnPb28K acc. to DIN 3859

| | |
|--------|-------------------------------|
| ESV | Welding bulkhead |
| W-V | Equal elbow |
| GS-V | Threaded bulkhead |
| T-V | Equal tee |
| G-V | Straight coupling |
| WS-V | Bulkhead elbow |
| K-V | Equal cross |
| WE-V | Male stud elbow |
| GE-V | Male stud straight |
| TE-V | Male stud branch tee |
| LE-V | Male stud barrel tee |
| TR-V | Male stud branch tee |
| EG-V | Standpipe adaptor |
| EW-V | Adjustable barrel tee |
| ET-V | Adjustable barrel tee |
| EL-V | Adjustable barrel tee |
| MA-V | Manometer coupling |
| MA-EV | Adjustable manometer coupling |
| MA-VD | Adjustable manometer coupling |
| EW-VD | Adjustable W-coupling |
| ET-VD | Adjustable T-coupling |
| EL-VD | Adjustable L-coupling |
| EG-VD | Standpipe adaptor |
| KOR-V | Reducing standpipe |
| RED-V | Reducing standpipe |
| GAS-V | Straight welding coupling |
| GAI-V | Straight female adaptor |
| GR-V | Straight reducing |
| ETH-V | Adjustable T-swivel |
| EWV-V | Adjustable W-swivel |
| GDVV | Swivel coupling |
| GEDVV | Swivel coupling |
| DGWSV | Swivel coupling |
| DGWESV | Swivel coupling |

Adaptors available with conical or cylindrical thread.



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Application/Limitation

Normal working pressures defined at 20°C:

| Product line | Tube O.D. mm | Pressure Bar |
|--------------|-----------------|-----------------|
| LL | 4 – 8 | 100 |
| L | 6 - 10 | 500 |
| | 12 – 18 | 400 |
| | 22 – 42 | 250 |
| S | 6 – 10 | 800 |
| | 12 – 16 | 630 |
| | 20 - 38 | 420 |

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

| | | | | | |
|------------------|-----|-----|-----|-----|-----|
| Temperature, °C: | 50 | 100 | 200 | 300 | 400 |
| Reduction, %: | 4.5 | 11 | 20 | 29 | 33 |

Temperature range depending on sealing ring materials:

| | |
|----------------|--------------|
| FPM (Viton): | -25 to 200°C |
| PTFE (Teflon): | -60 to 200°C |
| NBR | -30 to 120°C |

Coupling series L and S may be used for gases having an oxygen content exceeding 21% at working pressure 250 bar respectively 360 bar.

Couplings used for low temperature gas may only be used for accessory lines and instrumentation lines with external diameters of 25 mm and less. DNV Rules Pt.5, Ch.5, Sec.6, C509

Threaded bulkhead couplings type GS-V and WS-V may not be used on watertight bulkheads.

Couplings with non-metallic components are not to be used for fire safe 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 are not to be used on tubes in cold fabricated (hard temper) conditions.

The wall thickness and material of the tubes to be in accordance with the current Rules of Det Norske Veritas.



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No product certificate will be required.

Type Approval documentation

Reference documents:

- Manufacturer's catalogue
- Test witnessed by DNV, 1995-03-02
- DNV test report no. 95-1017, Oxygen shock test, 1995-02-23
- MPA NRW Prüfzeugnis Nr. 12 0016 0 95, 1994-12-19
- Test witnessed by DNV 2004-04-02, Pruf-Nr 04/020
- Test witnessed by DNV 2004-04-30, Pruf- Nr 04/020-1
- Retention Survey Report Date: 28,04,2008
- SZMF Test Report D 048/2008 Date: 12,03,2008
- Flexitest test reports dated 2008-09-24
- Salzgitter Mannesmann Forschung test reports

Tests carried out

Leakage, Burst Pressure, Vacuum test, Pull-Out, Repeated assembly test, Vibration, Pressure Pulsation Test, Oxygen shock test

Marking of product

For traceability to this type approval, each coupling is at least to be marked with:

- Manufacturer's trade mark
- Type designation
- Size

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. The Surveyor shall perform the following tasks on samples selected at random from stock or from the running production:

- Verify that the dimensions of the couplings comply with Type Approved documentation.
- Verify that the material composition complies with Type Approved documentation.
- Witness burst testing.

END OF CERTIFICATE