DNV·GL

Certificate No:
TAP00000BU

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Pipe Couplings, Bite and Compression Type

with type designation(s)
VOSSFormSQR and VOSSFormSQRVA

Issued to
VOSS Fluid GmbH
Wipperfürth, Germany

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 :

The VOSSForm SQR and VOSSFormSQRVA pipe couplings are type approved for application in piping systems as specified in Table 12 of the Rules for Ships, Part 4, Chapter 6 - Piping Systems - compression couplings - fire resistant type.
The pipe couplings specified in this type approval certificate are accepted for installation on all vessels classed by DNV GL.

Temperature range:	**-55°C up to 200°C (refer to remarks in following pages)**
Max. working press.:	**250 to 800 bar (depending on size)**
Sizes:	**6mm up to 42mm**

This Certificate is valid until **2021-05-12**.

Issued at **Hamburg** on **2016-05-13**

for **DNV GL**

DNV GL local station: **Essen**

Approval Engineer: **Hagen Markus**

Olaf Drews
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

Design

The pipe couplings consist of 4 parts:
Standard connecting piece - sealing ring - formed tube end - SQR-nut.
The tube is formed into a taper of 24°. Retaining function and sealing function are isolated from each other.
The clamping ring is pressed into the nut. The nut provides the retaining function. The cylindrical section of the coupling body serves as a tube guide element.
The fitting body is manufactured in accordance with ISO 8434-1
The nut is manufactured in accordance with ISO 8434-1

Materials

Fitting body	Carbon steel and stainless steel (1.4571) in accordance with DIN 3859-1, table 2 or of higher grades. C35, C35Pb, 38SMn28-mod
Sealing ring	FPM/FKM
Clamping ring	Carbon steel and stainless steel in accordance with DIN 3859-1, table 2 or of higher grades
Nut	SQR-nut, carbon steel and stainless steel in accordance with DIN 3859-1, table 2 or of higher grades

Recommended tube type and materials:

Steel pipes

Seamless, cold-drawn and normalized precision steel tubing as specified in DIN EN 10305-4, material E235+N, mat. no. 1.0308+N or E355, mat. no. 1.0580.

Stainless steel pipes

Seamless cold-drawn and solution-annealed, scale-free stainless-steel pipes in CFA or CFD delivery condition of dimensions and tolerances in accordance with DIN EN 10305-1 and all other delivery conditions as specified in DIN EN 10216-5, material X6CrNiMoTi17-12-2, mat. no. 1.4571.

The pipes shall be ordered by specifying the outer diameter and the inner diameter.

Approved metal forming machine: VOSSForm 100

Application/Limitation

Pressure range

The couplings are type approved for the following maximum static nominal pressures

Series	Tube OD [mm]	Nominal Pressure
L - series		
	6, 8 and 10	500
	12, 15 and 18	400
	22, 28, 35 and 42	250
S - series		
	6, 8 and 10	800
	12, 14 and 16	630
	20, 25, 30, 38	420

Temperature range
Temperature range for pipe coupling and sealing material:

VOSSFormSQRVA Stainless Steel	- 55 [°C] up to 200[1] [°C]
VOSSFormSQR Carbon Steel	- 20[3] [°C] up to 120[2] [°C]
NBR	- 35 [°C] up to 100 [°C]
HNBR	- 30 [°C] up to 140 [°C]
EPDM	- 40 [°C] up to 150 [°C]
PTFE	- 55 [°C] up to 200 [°C]
FPM / FKM	- 25 [°C] up to 200 [°C]

Notes
[1] For service temperatures above 50°C appropriate pressure derating factors according to VOSS Fluid catalogue to be observed.
[2] For service temperatures above 120°C appropriate pressure derating factors according to VOSS Fluid catalogue to be observed.
[3] Lowest medium temperature -20°C, Lowest environmental temperature -40°C

For combination of pipe couplings with different types of sealing materials, the limiting value of above mentioned minimum and maximum temperatures are applicable.
Examples:
Stainless steel pipe coupling with NBR sealing: - 35°C up to 100°C
Carbon steel pipe coupling with FPM sealing: - 20°C up to 120°C

Scope of type approved tube coupling types
Carbon Steel
This type approval includes coupling types as specified in VOSS Tube coupling technology catalogue (2015) with the exception of the following coupling types:
Male stud couplings
- Straight, Elbow, L, T/metric, imperial / tapered
Adjustable couplings with tube socket
- Stud standpipe adapters / NPT
Banjo and rotary couplings
- All types
Female stud and gauge couplings
- Straight female stud couplings / metric, imperial

Valves
In addition to pipe couplings the following hydraulic valves are type approved:
Non-return valves standard
- VNRO, VNROI, VNROPT, VNROTP
Non-return valve plug-in cartridges
- VNRCO
Shuttle valves with ball seats
- VST and with soft seat VSOT
High-pressure valves
- VNROHP, VNROPTHP, VNROTPHP
Internal valve part installation kits
- VNRIO

LIMITATION
Bulkhead tube couplings
Tube couplings of type BHSLN and BHELN are not approved through tank walls and watertight deck and bulkheads. For these applications bulkhead weld union of type WDBHS shall be used.

Manufacturing places
VOSS Fluid GmbH
51679 Wipperfürth
Germany

Marking of product
Nut: Manufacturer – Size – Supplier code – Country origin
VOSS-S16-95/86-DE
Tube coupling: Manufacturer – Material code – Supplier code
VOSS -20 - K

Stainless Steel
This type approval includes coupling types as specified in
PH Hydraulic catalogue, Pipe and Hose connectors / Stainless Steel, edition 2011, Section Cone Sealing Couplings according to DIN 2353/ DINENISO 8434-1, with the exception of the following coupling types:
- GE, WE, TE, LE couplings and further types with BSP tapered, NPT thread connection.
- Banjo and Rotary couplings
- Valves

LIMITATION
Bulkhead tube couplings
Tube couplings of type GSV-Couplings, WSV- Bulkhead Elbows are not approved through tank walls and watertight deck and bulkheads.

Manufacturing places
PH Industrie-Hydraulik GmbH&Co. KG

Marking of product
Tube coupling: Manufacturer – Code
PH-71

Type Approval documentation

Type Tests carried out
Visual inspection, Pressure test, Burst pressure test, Leakage test, repeated assembly, pullout, vacuum, fire resistant and combined pressure impulse and vibration test

Periodical assessment
For retention of the TA certificate in its validity period periodical assessments are to be carried out successfully.
Periodical assessments will be carried out bi-yearly.
The objective of the periodical assessment is to verify that the conditions for the TA have not been altered.
The main scope of the periodical assessment will normally include:
— verification of the TA applicant's production and quality system w.r.t. ensuring continued consistent production of the type approved products at the TA applicant's own premises and at other companies that are given the responsibility for manufacturing of the products
— review of the TA documentation and that this is still used as basis for the production
— review of possible changes to the design, the material and the performance of the product
— verification of the product marking