

TYPE APPROVAL CERTIFICATE

Certificate no.:
TAP0000167
Revision No:
1

This is to certify:

that the Pipe Couplings, Bite and Compression Type

with type designation(s)
2SVA, ES-4, ES-4VA

issued to

VOSS Fluid GmbH
Wipperfürth, Nordrhein-Westfalen, Germany

is found to comply with

DNVGL-OS-D101 – Marine and machinery systems and equipment, Edition January 2018
DNV-OS-D101 – Marine and machinery systems and equipment, Edition July 2021
DNV class programme DNV-CP-0185 – Type approval – Mechanical joints

Application:

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

Temperature range: **Refer to certificate.**
Max. working press.: **250bar up to 800bar**
Sizes: **6mm up to 42mm**

Issued at **Hamburg** on **2024-08-23**

This Certificate is valid until **2029-08-22**.

DNV local unit: **Essen**

Approval Engineer: **Hagen Markus**

for **DNV**



Digitally Signed By:
Sven Klinger
Location: **DNV Hamburg,**
Germany

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.



Product description

VOSS 24° DIN tube coupling system as specified in ISO 8434-1 and DIN 2353.

Reference:

- VOSS Fluid catalogue "Hydraulic connection technology, Edition 2018 - Section 9".

Components and Materials

Component	Coupling systems		
	2SVA	ES-4VA	ES-4
Cutting rings with O-Ring	1.4571		Carbon steel
	n.a.	FKM (standard)	FKM (standard)
Fittings	Stainless steel 1.4571		Carbon steel with VOSS coat corrosion protection
Union nut			
Tubes	Stainless steel		Carbon steel

Tubes

For selection of the tubes refer to VOSS catalogue "Hydraulic connection technology, Edition 2018 - Section 9".

In addition, the following sections of DNV-RU-SHIP Pt.4 Ch.6 Piping systems are to be observed:

Section 2 - Table 3 Material certificates

Section 9 - 1 Pipes, Table 2 Minimum wall thickness for steel pipes and

Table 3 Minimum wall thickness for stainless steel pipes

Scope of type approval

This type approval certificate includes coupling types and accessories as follows:

Coupling types, accessories	Type designation
Male stud connectors	SDS, SDE, SDL, SDT
Unions	S, E, T, K
Bulkhead unions, Welding bulkhead connectors	BHSLN, BHELN, BHSDSLN, WDBHS
Adjustable couplings with tube socket	SWE, SWT, SWL, SWSDS, SWS
Adjustable stud connectors with locknut	SDAE, SDAE45, SDAL, SDAT
Female and gauge connectors	S, PGS, SWPGS, SWOPGS
Double nipple	SD2S
Thread reducing couplings, Straight adapters ISO 6149 / DIN3852	SDS
Blanking plug for ports, caps, plugs, hexagonal nuts	PLIH/PLEH, PLB, PLO/PLOC, TBS, LN
Reinforcing sleeves	RS
Sealing rings	OR, PEFLEX

For the following coupling types limitations as specified in the DNV-RU-SHIP Pt.4 Ch.6 are to be observed:

Bulkhead couplings

Bulkhead coupling types BHLSN, BHELN, BHSDSLN (screwed type) are not approved through tank walls, watertight decks and bulkheads. For application through fire divisions a separate type approval is required.

Bulkhead coupling type WDBHS (welded) is approved through tank walls, watertight decks and bulkheads.

Through fire divisions the coupling and connected pipe is to be provided with same insulation material as used for the divisions. Total insulation length of 450mm.

Alternatively, For penetration through A – class bulkheads and decks (fire divisions), the wall thickness of the connected tube shall be at least 3mm. (Refer to SOLAS Chapter II-2, Regulation 9.3).

Pipe connectors where pressure -tight joints are made on the threads are limited in the application as follows:

Pipe connector design	Range of application ¹	
..with tapered or parallel thread	not approved for toxic or flammable media or services where fatigue, severe erosion or crevice corrosion is expected to occur.	
..with parallel thread	approved for pipe class III	up to outside diameter 60.3mm
..with tapered thread	approved for pipe class I	up to outside diameter 33.7mm
	approved for pipe class II, III	up to outside diameter 60.3mm

Note

¹ Refer to DNV-RU-SHIP Pt.4 Ch.6 – Section 9 – 5.2.6.

Overview of threaded pipe couplings with limitations

Type	Name
SDS, SDE, SDL, SDT	Male stud connector sealing types tapered thread
GP-SDS	Thread reducing couplings ISO 1179-2, 4
	Straight adapter ISO 6149/DIN 3852
SWSDS	Swivel connector sealing type tapered thread

All other fittings with thread connection not listed in the above table may be used without limitations

Application / Limitation

The VOSS Fluid ES-4, ES-4VA and 2SVA cutting ring system is type approved for application in pipe class I, II and III-piping systems. Reference DNV-RU-SHIP Pt. 4 Ch. 6, Sec. 9 Table 8 Examples of mechanical joints and Table 9 Application of mechanical joints.

Type of connection Compression couplings – Bite type. Confirmed Fire endurance test condition “30 min wet”.

Piping systems		Limitation
Flammable fluids (flash point ≤ 60°C)		
1	Cargo oil lines	Not approved for installation in pump rooms and open decks.
2	Crude oil washing lines	
3	Vent lines	Installation limited to 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.
Inert gas		
4	Water seal effluent lines	None
5	Scrubber effluent lines	
6	Main lines	Not approved for installation in pump rooms and open decks.
7	Distribution lines	
Flammable fluids (flash point > 60 °C)		
8	Cargo oil lines	Not approved for installation in pump rooms and open decks.
9	Fuel oil line.	Not approved for application in high pressure fuel injection systems of combustion engines.
10	Lubricating oil lines	None.
11	Hydraulic oil	None.
12	Thermal oil	None.
Seawater		
13	Bilge lines	Not approved for installation in machinery spaces of category A.
14	Water filled fire extinguishing systems (e.g., fire main, sprinkler)	None
15	Non water filled fire extinguishing systems, e.g., foam, drencher systems	Installation limited to 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.
16	Fire main (not permanently filled)	
17	Ballast systems	None
18	Cooling water systems	
19	Tank cleaning services	
20	Non-essential systems	
Fresh water		
21	Cooling water systems (ensuring main function)	None
22	Condensate return systems	None
23	Non-essential piping systems, e.g. cooling water for air condition, sanitary, technical water systems	None
Sanitary/drains/scuppers		
24	Deck drains (internal)	Only above bulkhead deck of passenger ships and freeboard deck of cargo ships.
25	Sanitary drains	None
26	Scuppers and discharge (overboard)	None
Sounding/vent		
27	Water tanks/dry spaces	None
28	Oil tanks (flash point > 60 °C)	
Miscellaneous		
29	Starting/control air	Not approved in machinery spaces of category A.
30	Service air piping systems (non-essential), e.g., sounding system	None
31	Brine	None
32	CO ₂ Systems (outside protected space)	None
33	CO ₂ Systems CO ₂ system (inside protected space)	Not approved.
34	Steam	Not approved

Sizes and pressure range

Tube O.D. mm	Nominal pressure PN in bar	
	Light Series	Heavy Series
6, 8, 10	500	800
12	400	630
14	n.a.	630
15	400	n.a.
16	n.a.	630
18	400	n.a.
20	n.a.	420
22	250	n.a.
25	n.a.	420
28	250	n.a.
30	n.a.	420
35	250	n.a.
38	n.a.	420
42	250	n.a.

The nominal pressure PN specified in the VOSS catalogue “Hydraulic connection technology, Edition 2018” may vary in individual cases to the above table.

Maximum working pressure of the piping system depend on the selected pipe material and pipe wall thickness.

Temperature range

The temperature range of the VOSS Fluid ES-4, ES4-VA and 2SVA compression coupling system is limited by the soft seal material of the fittings, if applicable.

Material	Lowest allowable Temperature	Maximum allowable Temperature
Carbon steel ²	- 20°C ¹	+ 250°C
Stainless steel ²	- 55°C	+ 400°C
NBR	- 35°C	+ 100°C
FKM	- 25°C	+ 200°C

Notes

¹ Lowest medium temperature -20°C and lowest environmental temperature -40°C. Refer to DIN 3859-1.

² For service temperatures above 120°C (Carbon steel) and above 50°C (Stainless steel) the pressure reductions factors specified in VOSS catalogue “Hydraulic connection technology”, Edition 2018 – Section 9 are to be observed.

Temperature range examples

Stainless steel pipe fitting with NBR sealing	- 35°C up to +100°C
Carbon steel pipe fitting with FKM sealing	- 20°C up to +200°C

Selection of materials

It shall be noted that the selection of the materials considers the applicable service condition with respect to type of media, flow velocity, media temperature and installation area of the piping system.

In particular, the resistance to corrosion, erosion, oxidation and other deterioration during projected service life are to be considered.

Sea water application

The term sea water application includes piping systems conveying sea water and piping systems installed on the open deck.

The stainless-steel materials 1.4571 (AISI 316Ti) are approved for sea water application.

Even the stainless-steel grade specified above cannot be considered immune to attack under all situations, avoidance of stagnant seawater conditions and removal of welding oxides after welding are some of the important factors to the successful use in piping systems for sea water and installation on open deck.

References:

- DNV – RU - SHIP Pt.4 Ch.6 – Section 2 – Materials
- DNV - OS-D101 Ch.2 – Sec. 2 – Materials
- DNV – CG - 0288 Corrosion protection of ships

Assembling and Installation

For the assembling and installation, Section 8 of the VOSS Fluid catalogue “Hydraulic connection technology, actual edition 2018”.

Type Approval documentation

TAP0000167, Rev. 1

Work scope: Standard renewal plus editorial update

Documents

- Assessment report production site Wipperfürth 2024-05-28
- Burst pressure test reports

VOSS Test Report 2024_456/1 “Reassembling, leak and burst pressure test on VOSSRing/ES-4/DKO, 2SVA/ES-4VA/DKOVA, BV-10 and VOSSLok40 couplings of the nominal size S 6 x 2 and S 38 x 6, S 6 x and S 38 x 6, L 6 x 1 and S 38 x 6, 6 x 2, 16 x 2,5, 22 x 2,5

Tests carried out

DNV CP-0185

Tightness test, repeated assembly test, burst test, pull-out test, vacuum test, combined pressure impulse and vibration test, fire resistance test (wet condition).

Marking of product

Component	Scope	Example
Pipe coupling	VOSS sign , manufacturer code, size, series	VOSS, 1K, 16S
Cutting ring	VOSS sign, manufacturer code	VOSS, 33
Nut	Size, manufacturer code	M24, 86

Periodical assessment

For retention of the Type Approval, a DNV Surveyor shall perform periodical assessment to verify that the conditions for the Type Approval are complied with. Refer to the Class Programme DNV-CP-0338, Section 4.

In addition, burst pressure testing on selected sizes to be carried out in the course of renewal of the certificate.

To check the validity of this certificate, please look it up in <https://approvalfinder.dnv.com>

End of certificate