

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Pipe Couplings, Flared or Welded Nipple Type**with type designation(s)
ZAKO

Issued to

VOSS Fluid GmbH
Wipperfürth Nordrhein-Westfalen, 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 ZAKO flange coupling system is type approved for application in pipe class I, II and III piping systems, fire resistant type.**
Refer to DNV GL Ship Rules Pt. 4, Ch. 6, Sec. 9 Table 12 & 13 / compression coupling.
The products approved by this certificate are accepted for installation on all vessels classed by DNV GL.**Temperature range: - 35°C up to + 100°C. Refer to certificate.**
Max. working press.: Standard series: 250bar, High pressure series: 400bar
Sizes: Tube O.D. 16mm up to 114,3mm. Refer to certificate.Issued at **Hamburg** on **2017-03-10**for **DNV GL**This Certificate is valid until **2022-03-09**.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.



Product description

The ZAKO flange coupling system consist of the following elements:

- ZAKO ring with O-ring
- SAE or Square flanges
- Connection screws

For assembling of the ZAKO-ring the VOSS pre-assembling device Typ 85 shall be used.
 Refer to "VOSS Tube coupling technology catalogue", Section 4 and 7.

Materials

Element	Material designation
Flange	C45 acc. to DIN EN 10277-5
ZAKO-ring	42 CrMo4 or 25 CrMo4 acc. to DIN EN 10277-5
O-ring	NBR 90 Shore A
Screws	DIN EN ISO 4762 - 10.9 Dimensions acc. to "VOSS Tube coupling technology catalogue"
Tubes	Seamless precision steel tubes acc. to EN 10305-1 - 1.0255+N or EN 10305-1 - 1.0581+N (St 37.4 or St 52.4 acc. to DIN 1630 NBK)

Size range

High pressure series – PN 400 bar

Square flanges - DN	Tube O.D. ¹
10, 11, 12	16
13, 14, 15	20
17, 19	25
20, 22	30
26, 28, 30	38
32, 34, 38, 40, 45	50
40, 50, 54	60
49	65
50	75
60, 64, 74	80
60	88
SAE flanges - inch	Tube O.D. ¹
1/2"	16
3/4"	20, 25
1"	30, 38
1 1/4"	38
1 1/2"	50
2"	50, 65

Size range
Standard series – PN 250bar

SAE flanges - inch	Tube O.D. ¹ - mm
1/2"	16
3/4"	20, 25
1"	25, 30, 38
1 1/4"	30, 38, 42
1 1/2"	50
2"	50, 65
3"	80

Notes

¹ For selection of the tube wall thickness the "VOSS Tube coupling technology catalogue", Section 4 is to be observed

Application/Limitation

The ZAKO flange coupling system is type approved for application in pipe class I, II and III-piping systems, fire resistant type, as listed in DNV GL Ship Rules Pt. 4, Ch. 6, Sec. 9 Table 12 & 13 / compression coupling.

For selection of the ZAKO flange coupling system the applicable specific service conditions in view of media and installation location are to be observed.

Refer to instructions of the "VOSS Tube coupling technology catalogue", Section 8 - General technical notes and DNV GL Rules Pt.4, Ch.6, in particular Section 2 - Materials and Section 9.

Pressure range

ZAKO System	Flange type	Nominal pressure PN ¹	Pip O.D. (mm)
Standard	SAE Flanges	PN 250	Up to 80
High Pressure	SAE Flanges	PN 400	Up to 65
	Square Flanges	PN 400	Up to 88

¹ PN according to burst pressure test carried out acc. to DNVGL CP-0185

Temperature range of the ZAKO flange coupling system

According to temperature range of carbon steel and soft seal material VOSS NBR the temperature of the ZAKO flange coupling is limited to:

-30 °C up to +80 (100°C) ¹

Temperature range of individual elements

Rubber seals

VOSS NBR - 35 [°C] up to 80 (100)¹ [°C]

Flange coupling material

Carbon Steel - 30 [°C] up to 250 [°C]

Note

¹ Refer to "VOSS Tube coupling technology catalogue", Section 8.

Type Approval documentation

Legacy DNV Type Approval Certificate P-13426

Manufacturer's catalogue "VOSS Katalog" production no. 9177003101/200909/03/05.0/15.
Manufacturer's test report dated 20.12.89.
Manufacturer's test report witnessed by DNV AEL 092/04/1, dated 2004-04-24.
DNV Retention survey report dated 2004-07-26, ESN-04-1866.
WTD 71 fire test reports dated 2010-05-26.
DNV Retention survey report dated 2009-03-25.

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- Test Report Nos.: UB: ET 072/97/1, UB: EZV 001/93/1, UA.-Nr.: 4275
 - Test Report No.: 12028 1192, MPA NRW, WTD 71 R1/000 000 7439
 - Catalogue 9177003102/200805/03/05.0/2
 - Drwg. Nos.: 5 754 1028/1029, 0513171986, 0513181900 and 9117005059
- DNVGL Assessment report dated 2016-12-16
- VOSS Tube coupling technology catalogue – 03.0/15

Tests carried out

Leakage test, burst test, fire endurance, pressure pulsation and vibration test

Marking of product

For traceability with this type approval the products are at least to be marked with:

Coupling element	Marking
Zako ring	VOSS, pipe size and short sign of manufacturer
Flanges	VOSS, short sign of manufacturer
Screws	Quality grade 10.9, short sign of manufacturer

Periodical assessment

For retention of the type approval certificate periodical assessments shall be carried out at production places by DNVGL surveyor.
The objective of the periodical assessment is to verify that the design and production conditions for the type approval have not been altered.

Main scope of the assessment:

- verification of the production and quality control system
- review of quality control documentation of recent deliveries
- review of drawings in production to verify any design changes which may have an impact on data specified in the type approval certificate, performance and range of application
- verification of the product marking

Periodical assessment is to be performed after 2 years and after 3.5 years. A renewal assessment will be performed at renewal of the certificate.

End of certificate