



DET NORSKE VERITAS

TYPE APPROVAL CERTIFICATE

CERTIFICATE NO. **P-13426**

This is to certify that the
Pipe Couplings, Flared or Welded Nipple Type

with type designation(s)
VOSS ZAKO system

Manufactured by
VOSS Fluid GmbH
WIPPERFÜRT, Germany


is found to comply with
Offshore Standard DNV-OS-D101, Marine and Machinery Systems and Equipment
Det Norske Veritas' Standards for Certification 2.9 No. 5-792.20
Det Norske Veritas' Rules for Classification of Ships

Application

The couplings may be used in the following: **Compressed air, hydraulic oil and sanitary systems**

Temperature range:	-30 °C to 100 °C
Max. working press.:	Standard series: 250 bar, High pressure series: 400 bar
Sizes:	Tube O.D.: Standard series: 16 to 80 mm, High pressure series: 16 to 65 mm


Høvik, 2010-06-23
for Det Norske Veritas AS


Marianne Spæren
Head of Section



DNV local office:
Essen

This Certificate is valid until
2013-12-31


Øyvind Skåra
Surveyor

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.



Certificate No.: P-13426
File No.: 792.22
Job Id.: 262.1-006565-1

Product description

The coupling consists of a conical ring (ZAKO-ring) which is pressed into the tube end. The ring flares the tube end 10 degrees. An O-ring in a groove on the front of the Zako-ring acts as sealing.

A loose flange with bolt hole dimensions to fit SAE flanges alternatively square flanges is fitted over the flared part of the tube.

Materials:

Flange:	C45 acc. to DIN EN 10277-5
ZAKO-ring:	42 CrMo4 or 25 CrMo4 acc. DIN EN 10277-5
O-ring:	NBR 90 Shore A
Bolts:	DIN EN ISO 4762 - 10.9
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) in the delivered state.

Sizes high pressure series:

Square Flange Size	Tube O.D.	Bolt dimension
11	16	M8x40
10	16	M8x40
14	20	M10x40
13	20	M10x45
19	25	M10x45
17	25	M10x45
22	30	M12x55
20	30	M12x55
28	38	M12x55
26	38	M12x55
38	50	M16x75
34	50	M16x75
49	65	M20x90
SAE Flange size	Tube O.D.	Bolt dimension
1/2"	16	M8x40
3/4"	20	M10x40
	35	M10x40
1"	30	M12x40
1 1/4"	38	M14x45
1 1/2"	50	M16x60
2"	65	M12x90

Sizes standard series:

SAE Flange Size	Tube O.D.	Bolt dimension
1/2"	16	M8x45
3/4"	20	M10x45
	25	M10x45
1"	30	M10x50
1 1/4"	38	M12x60
1 1/2"	50	M12x60
2"	65	M12x75
3"	80	M16x90



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Application/Limitation

The temperature range is limited by the O-ring material to: -30 °C to 100 °C.

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

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

Type Approval documentation

- 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.

Tests carried out

Leakage, burst, fire, pressure pulsation and vibration

Marking of product

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

- Manufacturer's name or trademark
- Type designation

Certificate Retention Survey

A DNV Surveyor shall perform a survey – every second year and 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.