Certificate no.:
TAP00002W4

TYPE APPROVAL CERTIFICATE

This is to certify:

that the Filter

with type designation(s)
BFD-C/-P, BFB-C/-P

issued to
Boll & Kirch Filterbau GmbH
Kerpen, Nordrhein-Westfalen, Germany

is found to comply with
DNV rules for classification – Ships Pt.4 Ch.7 Pressure equipment
DNV rules for classification – Ships Pt.5 Ch.7 Liquefied gas tankers
DNV rules for classification – Ships Pt.6 Ch.2 Sec.5 Gas fuelled ship installations – Gas fuelled LNG
DNV-OS-E201 – Oil and gas processing systems, Edition July 2022

Application:

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

Type:	Max. working temp.:	Working media:	Design pressure:
BFD-C/-P	see ´Product description´ for details		
BFB-C/-P	see ´Product description´ for details		

Issued at **Hamburg** on **2025-01-20**
This Certificate is valid until **2030-01-19**.
DNV local unit: **Essen**

for **DNV**

Approval Engineer: **Astrid Caschube**

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 USD 300 000.

Product description

A series of filter with the following technical data:

Type	Fitting size	Cover bolts	Pressure rating [bar] for housing material and maximum design temperature		
			316/316L		304/304L
			150°C	200°C	150°C
BFD/B-C/P HD (M) 100	02	SA-193 B8M Cl.2	96	96	96
		SB-446	96	96	96
BFD/B-C/P HD (M) 115	02	SA-193 B8M Cl.2	144	144	144
		SB-446	144	144	144
BFD/B-C/P HD (M) 140	02	SA-193 B8M Cl.2	144	144	144
		SB-446	144	144	144
BFD/B-C/P HD (M) 140	04	SA-193 B8M Cl.2	135	135	135
		SB-446	135	135	135
BFD/B-C/P HD (M) 170	02	SA-193 B8M Cl.2	100	100	100
		SB-446	100	100	100
BFD/B-C/P HD (M) 170	04	SA-193 B8M Cl.2	100	100	100
		SB-446	100	100	100
BFD/B-C/P HD (M) 170	05	SA-193 B8M Cl.2	100	100	100
		SB-446	100	100	100
BFD/B-C/P HD (M) 220	05	SA-193 B8M Cl.2	80	80	80
		SB-446	80	80	80
BFD/B-C/P HD (M) 220	06-1	SA-193 B8M Cl.2	24	24	24
		SB-446	24	24	24
BFD/B-C/P HD (M) 220	06-2	SA-193 B8M Cl.2	72	72	72
		SB-446	72	72	72
BFD/B-C/P HD (M) 220	08	SA-193 B8M Cl.2	72	72	72
		SB-446	72	72	72
BFD/B-C/P HD (M) 270	10	SA-193 B8M Cl.2	69	69	69
		SB-446	69	69	69
BFD/B-C/P DBB (M) 115	02-1	SA-193 B8M Cl.2	117	117	117
BFD/B-C/P DBB (M) 115	02-2	SA-193 B8M Cl.2	117	117	117
BFD/B-C/P DBB (M) 115	02-3	SA-193 B8M Cl.2	210	210	210
BFD/B-C/P DBB (M) 140	02-1	SA-193 B8M Cl.2	117	117	117
BFD/B-C/P DBB (M) 140	02-2	SA-193 B8M Cl.2	117	117	117
BFD/B-C/P DBB (M) 140	02-3	SA-193 B8M Cl.2	210	210	210
BFD/B-C/P DBB (M) 140	04-1	SA-193 B8M Cl.2	117	117	117
BFD/B-C/P DBB (M) 140	04-2	SA-193 B8M Cl.2	117	117	117
BFD/B-C/P DBB (M) 140	04-3	SA-193 B8M Cl.2	210	210	210
BFD/B-C/P DBB (M) 170	05	SA-193 B8M Cl.2	60	60	60

BFD/B-C/P DBB (M) 220	05	SA-193 B8M Cl.2	60	60	60
BFD/B-C/P DBB (M) 220	08	SA-193 B8M Cl.2	60	60	60
BFB-CY/CYD (M) 140	02	SA-193 B8M Cl.2	135	-	135
		SB446	135	-	135
BFB-CY/CYD (M) 170	02	SA-193 B8M Cl.2	100	-	100
		SB446	100	-	100
BFB-CY/CYD (M) 220	02	SA-193 B8M Cl.2	72	-	72
		SB446	72	-	72
BFB-CY/CYD (M) 220	04	SA-193 B8M Cl.2	72	-	72
		SB446	72	-	72
BFD-P DBB M 115	02	SA-193 B8M Cl.2	135	135	135
BFD-P DBB M 140	02	SA-193 B8M Cl.2	135	135	135
BFD-P DBB M 140	04	SA-193 B8M Cl.2	135	135	135
BFD-P DBB M 170	02	SA-193 B8M Cl.2	87	87	87
BFD-P DBB M 170	04	SA-193 B8M Cl.2	87	87	87
BFD-P DBB M 170	05	SA-193 B8M Cl.2	87	87	87
BFD-P DBB M 220	05	SA-193 B8M Cl.2	24	24	24
BFD-P DBB M 220	06	SA-193 B8M Cl.2	24	24	24
BFD-P DBB M 220	08	SA-193 B8M Cl.2	24	24	24

Media: LNG, LEG, LPG, LNH3, LH2, Carbon Natural Gas (CNG), Dimethylether (DME), Methanol, Ethanol, Ammonia, other non-corrosive gases (like air, nitrogen), fuel, lubrication oil, water, steam, flammable gas

Minimum design temperature: -273°C

For details of the filters (e.g. dimensions and material particulars) see approved type approval documentation.

Place of production

Boll & Kirch Filterbau GmbH
Siemensstr. 10-14, 50170 Kerpen, Germany

BOLLFILTER China Manufacturing Ltd.
No. 1233, XinXingSan Road Pinghu Economic-Technological Development Zone Jiaxing City Pinghu
Jiaxing City, Zhejiang Province, P.R. of China

Application/Limitation

The pressure equipment shall be classified in pressure equipment classes (PEC) acc. to DNV-RU-SHIP Pt.4 Ch.7 Sec.1 Table 2.

The applicable pressure equipment class defines the scope of the certification requirements for the materials used (see DNV-RU-Rule Pt.4 Ch.7 Sec.1 Table 5, 6 or 7, respectively). They shall conform to DNV-RU-SHIP Pt.2 Ch.2 Sec.3 [4], for example, the test temperature for impact testing shall be -196°C for minimum design temperature below -105 °C.

The materials used for the design and fabrication of the pressure equipment shall be suitable for the environmental and specific service conditions, the applicable fluids and shall be resistant to corrosion and wear during the intended service lifetime.

The materials for PEC I and II shall be delivered by a material manufacturer holding a valid certificate acc. to:

- DNV-CP-0346 ‘DNV approval of manufacturer scheme’.

The corrosion allowance is 0 mm (stainless steel).

It has been noted that the pressure and temperature ratings for the flanges and valves are chosen according to ASME standards. Such piping components are subject of DNV-RU-SHIP Pt.4 Ch.6.

The minimum nozzle distance to the shell ends (top and bottom) shall be conducted as shown in the housing drawing.

The sealing rings (O-rings) shall be suitable for the design parameters, especially for the temperature and the intended media.

Manufacturing, workmanship and testing shall be done according to DNV-RU-SHIP Pt.4 Ch.7 Sec.7.

The manufacturing work for pressure equipment graded as PEC I and II shall be carried out by a workshop holding a valid certificate acc. to following DNV class programs:

- DNV-CP-0261 'Approval of manufacturers – Pressure equipment´.

This approval is related to the strength of the parts of the filter bodies subjected to pressure. The pressure equipment function has not been assessed.

System requirements, such as the need for a secondary barrier for specific media, and system safety measures specified in the latest applicable edition of the Rules, shall be evaluated on a case-by-case basis.

The installation of alternative fuels gas filter on board gas fueled ships shall be subject to an individual approval of the entire ship arrangement and system in accordance with DNV-RU-SHIP Pt.6 Ch.2 Sec.5. Additional Flag State requirements might be applicable.

For the installation, the requirements of DNV-RU-SHIP Pt.4 Ch.6 "Piping systems" (e.g. limitations for threaded joints connections depending on the media) and Pt.4 Ch.9 "Control and monitoring systems" shall be observed additionally. The installation on board the ship shall be performed in such a way that for possible forced vibrations on the filters and their nozzles resulting from e.g. the engine or the propulsion chain will be adequately taken care for.

Each pressure equipment is to be:

- Constructional tested and hydraulic pressure tested with 1.5 times the design pressure or the test pressure corresponding to the "Type Approval documentation",)
- Certified by DNV and delivered with a product certificate.

Type Approval documentation

Tests carried out

Calculations.

Marking of product

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

a. Name and domicile of the manufacturer
b. Manufacturer's type designation and serial number
c. Year of manufacture
d. Maximum allowable working pressure
e. Design temperature in °C
f. Hydrostatic test pressure
g. DNV's identifying mark

Periodical assessment

The objective of periodical assessments 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 with relation to ensuring continue 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.

Periodical assessments for TA with a validity period of five years will be required after two years (+/- 90 days) and after 3.5 years (+/- 90 days).

Unscheduled assessments for retention of the TA may be carried out when there is reason to believe that the TA applicant has not adhered to the obligations stipulated in the TA certificate or in the applicable requirements.

END OF CERTIFICATE