

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Filter**

with type designation(s)

Simplex filter type 1.03.2, 1.03.2.4, 1.12.2, 1.65.1, 1.66.0, 1.78.0, 1.78.1, 1.78.2, 1.89.2

Issued to

**Boll & Kirch Filterbau GmbH
Kerpen, Nordrhein-Westfalen, Germany**

is found to comply with

DNV GL rules for classification – Ships Pt.4 Ch.7 Pressure equipment**Application :****Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.****see 'Product description' on page 2**Issued at **Hamburg** on **2019-05-22**This Certificate is valid until **2021-12-31**.DNV GL local station: **Essen**for **DNV GL**Approval Engineer: **Matthias Schmidt**

**Harald Pauli
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

Single filter with the following technical data:

Type	Diameter/ cartridge length	In- /Outlet	Materials	Fluid	Max. pressure	Max. temperature	
1.03.2.		DN65	5.3106	Fuel, lubrication oil, water, sea water, glycol	16 bar	160°C	
	195.500	DN80					
		DN100					
	265.500	DN125	5.3106, 1.0425			10 bar	120°C
	265.500	DN125	5.3106				
	340.500	DN150					
	420.500	DN200					
	520.500	DN250					
	520.750	DN300					
1.03.2.4.		DN65	5.3106	Fuel, lubrication oil, water, sea water, glycol	16 bar	160°C	
		DN80					
	265.500	DN100					
	265.500	DN125	5.3106, 1.0425			10 bar	120°C
	265.500	DN125	5.3106				
		DN150					
		DN200					
	520.750	DN300					
1.12.2.	100.210	DN40	5.3105	Fuel, lubrication oil, water, steam	40 bar	160°C	
	100.260	DN50			32 bar		
	140.406	DN65			40 bar		
	155.508	DN80					
	85.95	DN25	1.4408	Fuel, lubrication oil, water, steam	32 bar		
	85.145	DN32					
	100.260	DN50					
	140.406	DN65					
	155.508	DN80					
1.65.1	355.500	DN125	1.0425, 1.0460	Fuel, oil, water, sea water	10 bar	-10/120°C	
	355.500	DN150					
	355.750	DN150					
	420.750	DN200					
	420.750	DN250					
	520.750	DN250					
	520.750	DN300			6 bar	45°C	
	520.750	DN350			10 bar	-10/120°C	
	800.750	DN400			6 bar	-10/80°C	
1.66.0.	270.500	DN150	1.0345, 1.0425, 1.0460	Lubrication oil	10 bar	120°C	
	355.500	DN200			6 bar		
	355.500	DN250			10 bar		
	420.500	DN250			6 bar		
	420.500	DN300			10 bar		

	520.750	DN300			6 bar	
1.78.0.	160.500	DN100	1.0345, 1.0425, 1.0460	Lubrication oil	10 bar	80°C
	270.500	DN125				
	270.500	DN150				
	355.500	DN200				
1.78.1.	160.500	DN65	1.0345, 1.0425, 1.0460	Flammable gas	10 bar	60°C
1.78.2.	160.250	DN50	1.0345, 1.0425, 1.0460	Flammable gas	16 bar	60°C
	220.500	DN80				
	270.500	DN100				
	270.500	DN100	1.0345, 1.0425, 1.0460		25 bar	
	420.500	DN150	1.0345, 1.0425, 1.0460		16 bar	
1.89.2.	600.1000	DN450	1.0425, 1.0460	Seawater	6 bar	60°C
	800.1000	DN500			10 bar	
	900.1800	DN600			6 bar	

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

Location of manufacture:

- Boll & Kirch Filterbau GmbH, Kerpen, Germany

Application/Limitation

Applied Rules and Design Codes:

- DNV GL SHIP Pt.4 Ch.7 'Pressure Equipment' (Edition January 2018)
- AD2000-Merkblatt
- ASME VIII Dev.1 UG-101 and UCD-101

The pressure equipment shall be classified in pressure equipment classes (PEC) according to the following table:

Fluid	PEC I	PEC II	PEC III
Liquefied gases (propane, butane etc.), flammable gases, harmful fluids (toxic or corrosive)	all		
Liquid fuels, oils, flammable hydraulic fluids	$p_d > 16 \text{ bar}$ or $t_d > 150^\circ\text{C}$	$p_d \leq 16 \text{ bar}$ and $t_d \leq 150^\circ\text{C}$	$p_d \leq 7 \text{ bar}$ and $t_d \leq 60^\circ\text{C}$
Thermal oils	$p_d > 16 \text{ bar}$ or $t_d > 300^\circ\text{C}$	$p_d \leq 16 \text{ bar}$ and $t_d \leq 300^\circ\text{C}$	$p_d \leq 7 \text{ bar}$ and $t_d \leq 150^\circ\text{C}$
Water, non-flammable hydraulic fluids	$p_d > 40 \text{ bar}$ or $t_d > 300^\circ\text{C}$	$p_d \leq 40 \text{ bar}$ and $t_d \leq 300^\circ\text{C}$	$p_d \leq 16 \text{ bar}$ and $t_d \leq 200^\circ\text{C}$
Steam	$p_d > 16 \text{ bar}$ or $t_d > 300^\circ\text{C}$	$p_d \leq 16 \text{ bar}$ and $t_d \leq 300^\circ\text{C}$	$p_d \leq 7 \text{ bar}$ and $t_d \leq 170^\circ\text{C}$

The materials used for the design and fabrication of the filters 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 life time.

The materials of filters, heating chambers etc. for Pressure equipment Class I and II shall be delivered by a material manufacturer holding a valid certificate according to DNVGL CP-0346 'DNV GL approval of manufacturing scheme'..

The welding work for pressure equipment of class I and II shall be carried out by a welding workshop holding a valid certificate according to DNVGL CP-0261 'Approval of manufacturers – Pressure equipment' and CP-0352 'Approval of manufacturers – Manufacture of welded products – Welding workshop'.

Areas of flat plates which are additionally loaded by residual welding stresses perpendicular to the plate shall be ultrasonically tested for the absence of laminar imperfections before welding.

All used materials as well as pressure equipment which form part of the filter assembly shall be delivered with product and material certificates according to DNV GL Ship Rules Pt.4 Ch.7 Sec.1:

Component	PEC I	PEC II	PEC III
Filter assembly	VL product certificate		
Filter body	VL	W	TR
Filter cover	VL	W	TR
Heating chamber	VL	W	TR
Bolts and nuts	W	W	TR
Forgings and castings	W	W	TR

Remarks/limitation for special filter types:

- 1.03.2.4, 1.12.2: heating media: steam, maximum pressure 14 bar @ 200°C

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. diesel engine or the propulsion chain will be adequately taken care for.

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

Each filter assembly is to be

- constructional tested and hydraulic pressure tested to minimum 1.5 times design pressure.
- certified by DNV GL and delivered with a product certificate.

Type Approval documentation

Tests carried out

Calculations and burst pressure tests.

Marking of product

For traceability to this type approval 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. Design pressure
- e. Design temperature(s) in °C
- f. Hydraulic test pressure
- g. DNV GL identifying mark

Periodical assessment

The objective of the periodical assessment is to verify that the conditions for the type approval (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 TA products at the TA applicant's own premises and at other companies that are given the responsibility for manufacturing of the products
- Review of TA documentation and that this is still used as basis for the production
- Review of possible changes in the design, the materials and the performance of the product
- Verification of the product marking.

For retention of the TA certificate in its validity period the periodical assessment will be carried out bi-yearly.

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