**Applications**

The KRF backflush filter is a versatile self-cleaning, maintenance-free filter for water and conditioned process water, capable of filtering water process liquids from 25 µ – 2 mm.

**Notice:**
The compatibility between medium and vessel or sealing material is the responsibility of the operator.
The design of the pressure vessel is based on a quasi-static operation (load cycle number ≤ 1000 according to AD 2000 Merkblatt S1, section 1.4). Max. Differential pressure inlet - outlet 2 bar.

**Approvals**

3.1. Certificate, DGRL/TÜV, GL, LS, DNV, ABS, TR TF/TR CU Certificates (EAC), ASME U-Stamp, Lloyd's Register Type Approval Certificate No. 16/20086

Conformity evaluation according to 2014/68/EU and marking according the directive.
Brief description and operation

The electronic control monitors the differential pressure applied to the strainer by differential pressure switch. If the preset standard differential pressure of 0.3 bar (0.1–0.7 bar setting possible depending on the design and application) is reached, the cleaning function is triggered. In addition the cleaning function can be triggered by a timer or manually at the touch of a button, depending on the operating conditions (as optional).

The filter consists of an vessel with three different chambers. There is a coarse screen that is used as a prefilter in the first prefiltration chamber that coincides with the water inlet.

The water goes from outside to inside the filter. Once, the water gets inside the filter, it goes into the second chamber that is called “filtration chamber”. It is in this chamber where the filtering element is: the FILTRATION SCREEN.

In this case water runs from the filter interior into the exterior. The solids remain in on the filter insert surface.

The particles settle on the surface and enhance the filter mesh result. The filter backwashing bases on a third chamber, the backwashing chamber whose output is connected to the drainage valve that allows water evacuation when the backwashing process starts. The backwashing chamber is separated from the filtering by a special sealing.

the SUCTION SCANNER is part of this technology. This scanner is the same place as the filtering cartridge central shaft would be, and it is hydraulically connected to the backwashing chamber. At the same time, and in the filtering chamber area where it is, the SUCTION NOZZLES are installed perpendicularly. The nylon brushes nearly reach the screen. The situation of these nozzles in the suction scanner has been studied for getting into contact with the screen internal surface, thanks to the spiral movement that the electric motor provides to the scanner: when combining a longitudinal and rotation movement.

* Options differ from model to model (KRF with pre filter chamber). KRF-RL and KRF-C without chamber.
Performance

- Water gets into the filter through the prefiltration chamber, where thick particles are retained, as it was a strainer.
- Water gets into the filtering chamber, goes through from inside to outside the FILTERING SCREEN.
- Dust remains on the screen interior what produces head loss between the filter inlet and outlet gradually. Two analogic transducers will indicate the backwashing sequence when the DP becomes 0.3 bar.

There are other possibilities to make the filter backwashing: Time backwashing's, time and pressure combination, continuous backwashing option.

- When the pressure switch indicates 0.3 bar, the drain valve receive the opening order, then it generates a pressure difference between outside (atmospheric pressure) and the inside of the filter (working pressure) that is why fast running water which is produced, goes through the screen and then goes outside through the nozzles internal orifice. Besides this, at this very moment the starting order is also sent to the engine.

- The result of these actions is: the suction effect of the nozzles on the screen dust and the suction scanner spiral movement in the inside of the filter. The necessary working pressure at filter outlet is minimum 2–3 bar – see also point NOTE at “Brief description”. For fine filtering below 100 micron and depending on water quality the necessary working pressure shall be over 3.0 bar. Higher working pressure is positive for cleaning.

- During the backwashing process that lasts 25 seconds for most models, water is still being filtered and goes on flowing to the system or application. This fact whiz is due to the filters design allows that the backwashing water consumption is MINIMUM and the working system is CONTINUOUS.

Filtration is not interrupted during the backflush process in a system. After the set flushing period elapses the contaminant outlet valve closes automatically. Then the cleaning cycle ends.

Outlet

Inlet

Backflush outlet

Dirty water inlet

Dirty water pre- cleaning (score particle)

Dirt side

Cleaned side

Filtered water

Flush outlet
The cleaning effect

The filter cleaning effect is created by the described reverse of flow/backflush through from the clean side of the screen (filtered water side) through the SS mesh, the nozzle, the cleaning chambers finally to the drain. Therefore the cleaning effect is influenced by the working pressure – or the pressure at the OUTLET of the filter. The higher this pressure during backflush is – the better the cleaning will be. The minimum pressure during backflush is 2–3 bar at 125 micron (example). When the filter mesh gets finer the necessary backflush pressure has to be higher. This is a project individual requirement and also based on the water quality. Therefore a dimensioning of KRF filter shall be done/checked by Krone experience. If the pressure is not sufficient there are possible measures like; increase of pressure during backflush activity only (signal to a external pump by PLC (optional) or other measures like reducing flow in outlet for a short time during backflush by control valve.

Pressure chambers

1. Inlet
2. Outlet
3. Chamber dirt side
4. Chamber clean side
5. Suction-scanner
6. Suction chamber
7. Backflush outlet
Technical data

<table>
<thead>
<tr>
<th>Standard version</th>
<th>Special version or optional extras equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filter insert</td>
<td>Filter insert</td>
</tr>
<tr>
<td>Filter cover</td>
<td>Cover with bolts and nuts</td>
</tr>
<tr>
<td>Venting device</td>
<td>Plug</td>
</tr>
<tr>
<td>Drain unit</td>
<td>Plug</td>
</tr>
<tr>
<td>Connections</td>
<td>Flange in accordance with DIN 2632/Form C PN 10</td>
</tr>
</tbody>
</table>

**Materials**

- Housing: CS carbon steel (Epoxy + Polyester) SS304, SS316/SS316Ti, H II steel, CrNi, 1.0425
- Seals: NBR PTFE/FPM, other
- Perforated plate/mesh Cleaning nozzle: SS304/PVC SS316L/POM
- Drain valve: By client St, Ms, A, A4
- Electric gear motor: 3 x 400 V/50 Hz Schutzart IP 65 As specified by customer
- Control: Not attached Attached on the filter as specified by the customer
- Flush outlet valve: Hydraulic operated valve brass MOC Rg 5, A4 electro-pneumatic (230 V, 6 bar)/(24 V, 6 bar) protection class IP 65

**Surface treatment**

- Steel housing: Epoxy + Polyester Epoxy-resin paint, hard rubber
- Exterior: Epoxy
- Stainless steel: Glass bead blasted, pickled and passivated SS316/304 Duples SS

**Accessories**

We produce and deliver additional design and material variants on request. We solicit your request.
## Technical data and dimensions

**KRF-C**

<table>
<thead>
<tr>
<th>Model</th>
<th>In/Out Connect</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>Filtering surface</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>cm²</td>
</tr>
<tr>
<td>KRF-C GR 2</td>
<td>50</td>
<td>220</td>
<td>220</td>
<td>480</td>
<td>900</td>
<td>1.150</td>
<td>1.015</td>
</tr>
<tr>
<td>KRF-C GR 3</td>
<td>80</td>
<td>220</td>
<td>250</td>
<td>480</td>
<td>980</td>
<td>1.230</td>
<td>1.770</td>
</tr>
<tr>
<td>KRF-C GR 4</td>
<td>100</td>
<td>260</td>
<td>320</td>
<td>590</td>
<td>1.100</td>
<td>1.340</td>
<td>2.655</td>
</tr>
<tr>
<td>KRF-C GR 6</td>
<td>150</td>
<td>260</td>
<td>470</td>
<td>590</td>
<td>1.375</td>
<td>1.615</td>
<td>5.315</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>In/Out Connect</th>
<th>Backwashing water consumption</th>
<th>Weight</th>
<th>Max. flow rate</th>
<th>High quality water</th>
<th>Medium quality water</th>
<th>Low quality water</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN</td>
<td>L</td>
<td>kg</td>
<td>m³/h*</td>
<td>Flow rate m³/h*</td>
<td>Flow rate m³/h*</td>
<td>Flow rate m³/h*</td>
<td>Flow rate m³/h*</td>
</tr>
<tr>
<td>KRF-C GR 2</td>
<td>50</td>
<td>8</td>
<td>43</td>
<td>70</td>
<td>35</td>
<td>25</td>
<td>10</td>
</tr>
<tr>
<td>KRF-C GR 3</td>
<td>80</td>
<td>12.5</td>
<td>54</td>
<td>140</td>
<td>60</td>
<td>40</td>
<td>20</td>
</tr>
<tr>
<td>KRF-C GR 4</td>
<td>100</td>
<td>15.5</td>
<td>68</td>
<td>200</td>
<td>80</td>
<td>60</td>
<td>30</td>
</tr>
<tr>
<td>KRF-C GR 6</td>
<td>150</td>
<td>53</td>
<td>89</td>
<td>350</td>
<td>120</td>
<td>100</td>
<td>60</td>
</tr>
</tbody>
</table>

* Flow figures are based on 100/125 micron and depend on water quality and filter mesh. So the actual allowed flow may vary. Contact Krone for exact dimensioning.
Technical data and dimensions

KRF

<table>
<thead>
<tr>
<th>Model</th>
<th>In/Out Connect</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>Filtering surface</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DN</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>cm²</td>
<td></td>
</tr>
<tr>
<td>KRF GR 3</td>
<td>80</td>
<td>302</td>
<td>360</td>
<td>219</td>
<td>1.625</td>
<td>881</td>
<td>457</td>
<td>325</td>
<td>400</td>
<td>2.657</td>
</tr>
<tr>
<td>KRF GR 4</td>
<td>80, 100</td>
<td>315</td>
<td>770</td>
<td>220</td>
<td>2.140</td>
<td>1.305</td>
<td>457</td>
<td>325</td>
<td>690</td>
<td>5.383</td>
</tr>
<tr>
<td>KRF GR 6</td>
<td>80, 100, 150</td>
<td>340</td>
<td>1.000</td>
<td>240</td>
<td>2.415</td>
<td>1.580</td>
<td>457</td>
<td>325</td>
<td>970</td>
<td>7.997</td>
</tr>
<tr>
<td>KRF GR 8</td>
<td>100, 150, 200</td>
<td>367</td>
<td>1.100</td>
<td>388</td>
<td>2.690</td>
<td>1.855</td>
<td>457</td>
<td>325</td>
<td>1.240</td>
<td>10.608</td>
</tr>
<tr>
<td>KRF GR 10</td>
<td>150, 200, 250</td>
<td>446</td>
<td>1.370</td>
<td>314</td>
<td>2.965</td>
<td>2.130</td>
<td>457</td>
<td>325</td>
<td>1.520</td>
<td>13.215</td>
</tr>
<tr>
<td>KRF GR 12</td>
<td>200, 250, 300</td>
<td>430</td>
<td>1.100</td>
<td>325</td>
<td>2.707</td>
<td>1.855</td>
<td>660</td>
<td>450</td>
<td>1.240</td>
<td>16.509</td>
</tr>
<tr>
<td>KRF GR 14</td>
<td>250, 300, 350</td>
<td>433</td>
<td>1.370</td>
<td>327</td>
<td>2.982</td>
<td>2.130</td>
<td>660</td>
<td>450</td>
<td>1.520</td>
<td>21.304</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>In/Out Connect</th>
<th>Backwashing water consumption</th>
<th>Weight</th>
<th>Max. flow rate</th>
<th>High quality water</th>
<th>Medium quality water</th>
<th>Low quality water</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DN</td>
<td>L</td>
<td>kg</td>
<td>m³/h*</td>
<td>Flow rate m³/h*</td>
<td>Flow rate m³/h*</td>
<td>Flow rate m³/h*</td>
</tr>
<tr>
<td>KRF GR 3</td>
<td>80</td>
<td>35</td>
<td>265</td>
<td>120</td>
<td>60</td>
<td>48</td>
<td>34</td>
</tr>
<tr>
<td>KRF GR 4</td>
<td>80, 100</td>
<td>70</td>
<td>307</td>
<td>235</td>
<td>110</td>
<td>90</td>
<td>70</td>
</tr>
<tr>
<td>KRF GR 6</td>
<td>80, 100, 150</td>
<td>105</td>
<td>388</td>
<td>500</td>
<td>215</td>
<td>173</td>
<td>129</td>
</tr>
<tr>
<td>KRF GR 8</td>
<td>100, 150, 200</td>
<td>140</td>
<td>444</td>
<td>700</td>
<td>320</td>
<td>256</td>
<td>192</td>
</tr>
<tr>
<td>KRF GR 10</td>
<td>150, 200, 250</td>
<td>175</td>
<td>501</td>
<td>1.150</td>
<td>580</td>
<td>464</td>
<td>348</td>
</tr>
<tr>
<td>KRF GR 12</td>
<td>200, 250, 300</td>
<td>140</td>
<td>682</td>
<td>1.400</td>
<td>700</td>
<td>560</td>
<td>420</td>
</tr>
<tr>
<td>KRF GR 14</td>
<td>250, 300, 350</td>
<td>175</td>
<td>757</td>
<td>1.800</td>
<td>900</td>
<td>720</td>
<td>540</td>
</tr>
</tbody>
</table>

* Flow figures are based on 100/125 micron and depend on water quality and filter mesh. So the actual allowed flow may vary. Contact Krone for exact dimensioning.
Technical data and dimensions

**KRF-RL**

<table>
<thead>
<tr>
<th>Model</th>
<th>In/Out Connect</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>Filtering surface</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DN mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>cm²</td>
</tr>
<tr>
<td>KRF-RL 6</td>
<td>150</td>
<td>350</td>
<td>600</td>
<td>824</td>
<td>2,040</td>
<td>2,700</td>
<td>7,990</td>
</tr>
<tr>
<td>KRF-RL 8</td>
<td>200</td>
<td>350</td>
<td>900</td>
<td>824</td>
<td>2,320</td>
<td>2,975</td>
<td>10,600</td>
</tr>
<tr>
<td>KRF-RL 10</td>
<td>250</td>
<td>350</td>
<td>900</td>
<td>824</td>
<td>2,600</td>
<td>3,300</td>
<td>13,210</td>
</tr>
<tr>
<td>KRF-RL 12</td>
<td>300</td>
<td>400</td>
<td>900</td>
<td>1,025</td>
<td>2,320</td>
<td>2,975</td>
<td>16,500</td>
</tr>
<tr>
<td>KRF-RL 14</td>
<td>350</td>
<td>400</td>
<td>900</td>
<td>1,025</td>
<td>2,600</td>
<td>3,300</td>
<td>21,300</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>In/Out Connect</th>
<th>Backwashing water consumption</th>
<th>Weight kg</th>
<th>Max. flow rate m³/h*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DN L</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>KRF-RL 6</td>
<td>150 105</td>
<td></td>
<td>310</td>
<td>500</td>
</tr>
<tr>
<td>KRF-RL 8</td>
<td>200 140</td>
<td></td>
<td>365</td>
<td>700</td>
</tr>
<tr>
<td>KRF-RL 10</td>
<td>250 175</td>
<td></td>
<td>405</td>
<td>1,150</td>
</tr>
<tr>
<td>KRF-RL 12</td>
<td>300 140</td>
<td></td>
<td>550</td>
<td>1,400</td>
</tr>
<tr>
<td>KRF-RL 14</td>
<td>350 175</td>
<td></td>
<td>610</td>
<td>1,800</td>
</tr>
</tbody>
</table>

* Flow figures are based on 100/125 micron and depend on water quality and filter mesh. So the actual allowed flow may vary. Contact Krone for exact dimensioning.
Head loss graph

**KRF 50 µm**

- Pressure [bar]
- Flow [m³/h]

**KRF 80 µm**

- Pressure [bar]
- Flow [m³/h]
Head loss graph

**KRF 125 µm**

- Pressure [bar] vs. Flow [m³/h]
- Graph showing different KRF GR models (GR 3, GR 4, GR 6, GR 8, GR 10, GR 12, GR 14)

**KRF 1.500 µm**

- Pressure [bar] vs. Flow [m³/h]
- Graph showing different KRF GR models (GR 3, GR 4, GR 6, GR 8, GR 10, GR 12, GR 14)
Product range

Self cleaning filter

- KAF® Self cleaning Bernoulli®-filter
- KRF Backflush-filter
- SCF Scraper filter

Single filter

- KSF® Single basket filter (flanged)
- KMF Threaded basket filter
- KWF Welded/custom made basket filter
- KWF-Inline Inlet flange and outlet flange inline

Duplex filter

- KDF-K Duplex filter
- KDF-V Valve switch duplex filter
- KDF-VB Butterfly valve switch filter

Other filter solutions

- KBF Bag filter
- KOW Oil and water separator
- SEP Separator Centrifugal separator

Others / accessoires

- DeltaP Differential pressure indicator
- Contaminant level indicator
- Filterbags

Strainer inserts

- Basket strainers
- Ring strainers
- Wedged wire inserts
Type Approval Certificate

This is to certify that the undernoted product(s) has/have been tested with satisfactory results in accordance with the relevant requirements of the Lloyd’s Register Type Approval System.

This certificate is issued to:

**PRODUCER**  Krone Filter Solutions GmbH
Industriestrasse 19
28876 Oyten
Germany

**DESCRIPTION**  Single, duplex and self-cleaning automatic filter with several housing sizes and combinations made from standard materials spheroidal iron castings EN-GJS-500-7 (GGG 50)* or EN-GJS-400-15 (GGG 40), carbon steel optional rubber lined or stainless steel.

**TYPES**  KSF, KMF, KDF-K, KDF-V, KAF, KRF

**APPLICATION**  Filter depending on type for diesel oil, oil or water piping systems in ship and offshore installations classed or intended for Classification with Lloyd’s Register.

**RATINGS**

<table>
<thead>
<tr>
<th>Filter type:</th>
<th>Nominal pressures: [bar]</th>
<th>Size range:</th>
<th>Material:</th>
</tr>
</thead>
<tbody>
<tr>
<td>KSF</td>
<td>6, 10, 25</td>
<td>DN 15 – DN 600</td>
<td>Spheroidal iron casting</td>
</tr>
<tr>
<td>KMF</td>
<td>6, 10, 25</td>
<td>G ½” – 2 ½”</td>
<td>Spheroidal iron casting</td>
</tr>
<tr>
<td>KDF-K</td>
<td>6, 10, 25</td>
<td>DN 15 – DN 200</td>
<td>Spheroidal iron casting, carbon steel</td>
</tr>
<tr>
<td>KDF-V</td>
<td>6, 10, 25</td>
<td>DN 100 – DN 600</td>
<td>Spheroidal iron casting, carbon steel</td>
</tr>
<tr>
<td>KRF</td>
<td>6, 10</td>
<td>DN 32 – DN 400</td>
<td>Spheroidal iron casting, carbon or stainless steel,</td>
</tr>
<tr>
<td>KAF</td>
<td>6, 10</td>
<td>DN 50 – DN 1000</td>
<td>Spheroidal iron casting, carbon or stainless steel,</td>
</tr>
</tbody>
</table>

Certificate No.  16 / 20086

Issue Date  09 September 2016

Expiry Date  08 September 2021

Sheet  1 of 3

Lloyd’s Register EMEA
71 Fenchurch Street, London EC3M 4BS

Torsten Schröder
Hamburg Technical Support Office
Lloyd’s Register EMEA

Lloyd’s Register Group Limited, its affiliates and subsidiaries and their respective officers, employees or agents are, individually and collectively, referred to in this clause as the ‘Lloyd’s Register’. Lloyd’s Register assumes no responsibility and shall not be liable to any person for any loss, damage or expense caused by reliance on the information or advice in this document or howsoever provided, unless that person has signed a contract with the relevant Lloyd’s Register entity for the provision of this information or advice and in that case any responsibility or liability is exclusively on the terms and conditions set out in that contract.
### RATINGS, cont.

<table>
<thead>
<tr>
<th>Material:</th>
<th>Temperature range:</th>
<th>For fluids**:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spheroidal cast iron</td>
<td>-10 up to +300°C</td>
<td>MDO, oil, water, seawater</td>
</tr>
<tr>
<td>Austenitic stainless steel:</td>
<td>-196 up to +300°C</td>
<td>MDO, oil, nitrogen</td>
</tr>
<tr>
<td>1.4571, 1.4401, 1.4404, 1.4408,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.4539, 1.4301, 1.4541,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SA240-304L, SA240-316Ti, SA240-321,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SA240-316L, SA240-904L,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Duplex stainless steel:</td>
<td>-40 up to +250°C</td>
<td>seawater</td>
</tr>
<tr>
<td>1.4462, 1.4463, UNS S31803</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Super duplex: 1.4410,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>UNS 32750</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carbon steel: St 50, P235GH,</td>
<td>-40 up to +100°C</td>
<td>MDO, oil, water, seawater</td>
</tr>
<tr>
<td>P245GH, P250GH, P265GH,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SA516 Gr60, SA516 Gr70</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**) including fluids and mixture of similar evaluation class
Pressure reductions at elevated temperatures are to be considered.

**Media depending on type:** KAF, KRF: water, seawater
KSF, KMF, KDF-K and KDF-V: MDO, oil, nitrogen, water, seawater

**OTHER CONDITIONS**
The manufacturer’s installation instructions are to be sought.
*) Not to be used for applications with expected significant chock or vibration loads.

**STANDARD**
Lloyd’s Register Rules and Regulations for the Classification of Ships, July 2016

---

**Certificate No.** 16/20086

**Issue Date** 09 September 2016

**Expiry Date** 08 September 2021

**Sheet** 2 of 3

Torsten Schröder
Hamburg Technical Support Office
Lloyd’s Register EMEA

Lloyd’s Register EMEA
71 Fenchurch Street, London EC3M 4BS

Lloyd’s Register Group Limited, its affiliates and subsidiaries and their respective officers, employees or agents are, individually and collectively, referred to in this clause as the ‘Lloyd’s Register’. Lloyd’s Register assumes no responsibility and shall not be liable to any person for any loss, damage or expense caused by reliance on the information or advice in this document or howsoever provided, unless that person has signed a contract with the relevant Lloyd’s Register entity for the provision of this information or advice and in that case any responsibility or liability is exclusively on the terms and conditions set out in that contract.
The Type Approval does not eliminate the need for normal inspection and survey procedures required by the Rules and Regulations.

If the specified standards are amended during the validity of this certificate, the product is to be re-approved prior to it being supplied to vessels to which the amended standards apply.

The Design Appraisal Document No. HTS/ENS 34963-16 and its supplementary Type Approval Terms and Conditions form part of this Certificate.

Certificate No. 16/20086
Issue Date 09 September 2016
Expiry Date 08 September 2021
Sheet 3 of 3

Lloyd’s Register EMEA
71 Fenchurch Street, London EC3M 4BS
Design Appraisal Document

Lloyd's Register EMEA
Hamburg Technical Support Office
Am Sandtorkai 41
20457 Hamburg
Telephone +49 (0)40 328107-0 Fax +49 (0)40 328107-480
E-mail: hamburg-technical-support@lr.org

Date
09 September 2016

Please quote this reference number on all future communications
HPC1461050/34963-16/TS

THE LLOYD'S REGISTER'S TYPE APPROVAL SYSTEM, 2014
ISSUED TO: KRONE FILTER SOLUTIONS GMBH
FOR: SINGLE, DUPLEX AND AUTOMATIC FILTER
TYPES: KSF, KMF, KDF-K, KDF-V, KAF, KRF
TYPE APPROVAL CERTIFICATE NO. 16/20086

The undernoted documents have been reviewed for compliance with the requirements of the Lloyd's Register's Type Approval System Procedure TA14 and this Design Appraisal Document forms part of the Certificate.

APPROVAL DOCUMENTATION

- Application Form to LR Type Approval 26.11.2014
- Product Catalogue / general Data sheets for types KSF, KMF, KDF-K, KDF-V, KDF and KRF 2014
  - KSF LR Data sheet, Rev. 4 2016
  - KSF080.04.16.00.01, Rev. 0 22.04.2008
  - KSF080.04.16.01.01, Rev. 1 10.03.2006
  - KSF000.05.16.02.01, Rev. 0 25.03.2009
  - KMF LR Data sheet, Rev. 4 2016
  - KMF000.03.05.16.00.01, Rev 0 22.11.2013
  - KMF000.03.05.16.01.01, Rev 0 22.11.2013
  - KSF000.03.05.16.02.01, Rev.1 24.11.2011
  - KDFK LR Data sheet, Rev. 4 2016
  - KDFK080.06.05.10.00.01, Rev 0 24.02.2011
  - KDFK080.04.05.10.01.02, Rev.2 20.03.2014
  - KSF000.06.10.02.01, Rev. 0 31.03.2009
  - KDFV LR Data sheet, Rev. 2 2016
  - KDFV150.07.05.10.00.20, Rev 1 12.07.2012
  - KDFV150.07.05.10.01.20, Rev 1 27.04.2012
  - KDFV150.07.05.16.08.20, Rev 4 12.07.2012
  - KSF000.07.05.10.02.01, Rev. 0 24.02.2011

FINAL ACCEPTANCE OF ACTUAL ITEM(S) DEPEND(S) ON SATISFACTORY SURVEY AND TESTING

Lloyd's Register EMEA
Is a member of Lloyd's Register group

Lloyd's Register Group Limited, its affiliates and subsidiaries and their respective officers, employees or agents are, individually and collectively, referred to in this clause as 'Lloyd's Register'. Lloyd's Register assumes no responsibility and shall not be liable to any person for any loss, damage or expense caused by reliance on the information or advice in this document or howsoever provided, unless that person has signed a contract with the relevant Lloyd's Register entity for the provision of this information or advice and in that case any responsibility or liability is exclusively on the terms and conditions set out in that contract.

Form 6438MARREF (2016.05)
APPROVAL DOCUMENTATION, cont.

KAF LR Data sheet, Rev. 0  KAF 2016
KAF150.01.16.05.00.01, Rev. 0  KAF DN150 PNS JIS B 2220 K5 FF incl. Parts list 16.05.2014
KAF150.00.05.01.02, Rev. 0  Body KAF DN150 PN5 16.05.2014
KAF150.00.16.05.01.02, Rev. 0  Body KAF DN150 PN5 rubber lined incl. Parts list 16.05.2014
KAF150.00.10.02.01, Rev. 0  KAF Cover DN150 PN 19 / DNC-50 12.12.2013
KAF150.00.16.10.02.01, Rev. 0  KAF Cover DN150 PN 19 / DNC-50 incl. Parts list 12.12.2013
KRF LR Data sheet, Rev. 4  KRF-BF 2016

TEST REPORTS

HPC1461050/01  LR Works Inspection including hydrostatic burst pressure tests at 100 bar for type KSF: DN 50, size 2; KSF: DN 80, size 4 and KSF: DN 100, size 8 witnessed by LR Surveyor at Krone in Oyten 14.12.2015
HPC1461050/02  hydrostatic burst pressure tests at 100 bar for type KMF: 2 ½” size 4; type KDF-K: DN 80, size 6 and KDF-K: DN 20, size 2 witnessed by LR Surveyor at Krone in Oyten 17.12.2015
HPC1461050/03  at 64 bar for type KAF: DN 200, PN 10 and 21.12.2015
HPC1461050/04  hydrostatic burst pressure tests at 40 bar for type KAF: DN 200, PN 10 and 21.12.2015
HPC1461050/04  Visit of an existing installation with function test of KAF self-cleaning automatic filter at ‘Elbphilharmonie Hamburg’ 11.01.2016


Torsten Schröder
Senior Specialist
Engineering Systems
Hamburg Technical Support Office
Lloyd’s Register EMEA
T +49 (0)40 328107-463
E torsten.schroeder@lr.org

FINAL ACCEPTANCE OF ACTUAL ITEM(S) DEPEND(S) ON SATISFACTORY SURVEY AND TESTING

Lloyd’s Register EMEA
Is a member of Lloyd’s Register group

Form 6438MARREF (2016.05)
Supplementary Type Approval Terms and Conditions

Type Approval certifies that a representative sample of the product(s) referred to herein has/have been found to meet the applicable design criteria for the use specified herein. It does not mean or imply approval for any other use, nor approval of any product(s) designed or manufactured otherwise than in strict conformity with the said representative sample.

Type Approval is based on the understanding that the manufacturer’s recommendations and instructions and any relevant requirements of the Rules and Regulations are complied with.

Type Approval does not eliminate the need for normal inspection and survey procedures required by the Rules and Regulations.

Lloyd’s Register EMEA reserves the right to cancel or withdraw this Type Approval Certificate in accordance with the LR Type Approval System Procedure.

Form 6438MARREF (2016.05)