Applications

The KMF filter is a versatile strainer basket filter for gaseous and liquid media made from GGG-50 (nodular graphite) in accordance with EN-GJS-500-7 or from Rg 10, (special version). It is characterized by high performance, low weight and space-saving design, as well as an extremely easy, fast cleaning.

- Flexible combination of housing sizes, filter surfaces and connecting sleeves.
  Six housing sizes can be supplied with different connecting sleeves, which ensures adaptation to the operating requirements and dirt loads.

- Variable filter surface selection.

Approvals

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

CE conformity evaluation according 2014/68/EU and marking according the directive.
Brief description

The filter consists of a cast housing with opposing connecting sleeves of equal height. The filter cover is alternatively fastened with stud bolts and nuts or with a clamp. The venting device in the cover and drain device in the housing are included in the scope of supply.

- **Quick-acting clamp for cleaning the strainers.**

**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 1 bar.

Filter media

Alternatively the filter can be equipped with a basket strainer, ring or other inserts. For example the filter insert consists of perforated plate, which is optionally spanned with mesh of different widths. The medium to be filtered flows through the strainer insert from the inside to the outside. The particles remain in the strainer and can be removed with the strainer.

Safety instructions

Do not use the filter with clamp closure for filtering of hazardous media (e.g. toxic, flammable, or caustic media) and gases or vapors! In these cases select bolts and nuts for the cover closure. Prior to using the filter verify the intended use.

If there are changes in operating conditions or the medium then a conformity evaluation in accordance with PED EN 2014/68/EU must be carried out (for this please contact us as the manufacturer or execute a hazard analysis with conformity evaluation).

Installation

Installation in pipes is done by the means of sleeve connections. Ensure that the standard version of the filter is installed vertically and mechanically tension-free without additional loads. The medium must flow in the direction specified on the housing. Incorrect installation can cause filter malfunctions and damage the inserts.
Commissioning/operating instructions

1. Open the venting device until liquid escapes.
2. Close venting device.
3. Filter is ready for operation.

Attention:
Since this is a pressure vessel make absolutely sure that the filter is depressurized before starting maintenance tasks. Follow the safety and accident prevention guidelines required for the medium.

Cleaning

1. Relieve the pressure on the filter by means of the venting device and drain device.
2. Loosen the filter closure and lift off the cover.
3. Drain the filter via the drain device to a level that is at least below the strainer support.
4. Pull the strainer insert upward and out of the filter housing. The strainer can now be cleaned by careful blowing it out or blasting it with compressed air, steam, or water. If necessary the strainer must be soaked and cleaned in a suitable cleaning agent. In some circumstances optimum cleaning is achieved by means of ultrasonic bath. For all cleaning types ensure that the filter mesh is not damaged.
5. When assembling the filter in the reverse sequence, check the sealing elements for wear and replace them if necessary.

Maintanance & Inspections

A single basket filter does not have a high grade of maintenance. Nevertheless the filter shall regularly be visually inspected from the outside during regular shift maintenance on site. Recommendation for visual inspection is 1 time per month. The filter has to be cleaned acc. site requirements and present grade of impurities (see position: cleaning). During the removal of the basket the filter vessel and insert shall be visually inspected and both insert and vessel cleaned if necessary. Minimum 1 visual inspection from inside per year is mandatory in operation, an inspection every 6 months is recommended.

Recommendation:
All gaskets shall be replaced with new gaskets for safety in operation. Old gaskets can pose a danger of leakage and may damage equipment. Filter insert shall regularly be changed for a new one, recommended is a change after 3 years of operation as minimum. Optional rubberlined surfaces shall regularly be inspected for superficial damages, recommended is an inspection every 6 months, minimum 1 time per year. Damages shall immediately be repaired acc. manufacturer repair procedure for rubberlining. Operator shall handle rubberlined filters with care and avoid mechanical damage of lining. During special maintenance (Shutdown of plants or Yard stays) on heavy duty applications a spark test of rubberlining is recommended. The manufacturer shall be contacted for details before performing it to check suitability of test equipment.
Reparable ITEM’s of filter

The filter has no repairable items, damaged parts shall be replaced. Its recommended to change gaskets after disassembly of the gasket area.

Disposal Plan

No harmful substances or asbestos are used as material of construction.
The filter has stainless steel and therefore regenerable inserts which can be cleaned by appropriate means and following safety instructions of media retained in inserts. Operator shall follow safety instruction of filtered media during cleaning.

Damaged filter insert shall be disposed acc. local regulations for stainless steel metallic waste (fully recyclable) after cleaning. To high differential pressure dirty before cleaning may damage the fine mesh if installed. A dp over 0.5 bar is not recommended.

Rubber and synthetic materials (plastic) shall be disposed acc. local regulations, Gaskets are NBR or Aramid fibers reinforced NBR and shall be disposed acc. applicable local regulations.

Storage plan

Goods not installed shall be stored in dry place without UV radiation and protected from humidity from temperatures in a recommended range of +5 to +45°C. Recommended shelf time 5 years due to gasket lifetime. Goods stored shall be inspected visually acc. storage conditions on regular basis.

Minimum yearly visual inspection (outside/inside) is recommended.

Flanges and all openings shall be closed during storage.

Wrapping of items into plastic in storage is not environmentally recommended and also may lead to condensation on metal surface of filter and surface corrosion. Covering of goods is preferred in storage with breathable material (fabric).

Drying agent use is recommended.
## Technical data and dimensions

<table>
<thead>
<tr>
<th>Nom. diameter</th>
<th>Vessel design pressure</th>
<th>E</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>Flow rate</th>
<th>Volume</th>
<th>Filter surface area</th>
<th>Weight</th>
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<tbody>
<tr>
<td></td>
<td>Clamp</td>
<td>Bolts</td>
<td>Ø</td>
<td>Clamp</td>
<td>Bolts</td>
<td>2.5 m/s</td>
<td>Basket strainer</td>
<td>Ring strainer</td>
<td>approx. in kg</td>
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Technical data

<table>
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<tr>
<th>Technical data</th>
<th>Standard version</th>
<th>Special version or supplemental equipment</th>
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</thead>
<tbody>
<tr>
<td>Filter insert</td>
<td>Strainer insert</td>
<td>Ring type strainer insert, Double strainers, cartridges, slot wedge wire, star pleated strainer</td>
</tr>
<tr>
<td>Filter mesh</td>
<td>10–1,000 µm (microns) Stainless steel mesh, 1.0–10 mm perforated plate</td>
<td>5 µm, square perforation, braid, cartridges, pleated mesh</td>
</tr>
<tr>
<td>Filter cover</td>
<td>Bolts and nuts</td>
<td>Clamp. Housing with clamp already predrilled for stud bolts – modification by customer possible.</td>
</tr>
<tr>
<td>Venting device</td>
<td>Bolt</td>
<td>Ball valve/Flange</td>
</tr>
<tr>
<td>Draining device</td>
<td>Bolt</td>
<td>Ball valve/Flange</td>
</tr>
<tr>
<td>Connection</td>
<td>Pipe female thread, Withworth</td>
<td>With welded-on ends</td>
</tr>
</tbody>
</table>

Materials

| Housing and cover | GGG-50, DN 1693 DIN EN 1563 or EN GJS-500-07 | Rg 10, GGG-40.3 (EN GJS-400-18) |
| Cover seal        | NBR                                           | FPM, EPDM, MPQ, PTFE |
| Perforated plate/mesh | 1.4301/1.4401 | 1.4571/1.4401, Ms/Bz, Hastelloy C 4, various plastics |

Extras

| Additional filter | – | Magnetic filter insert |
| Heater           | – | Customized heating connections |
| Zinc protection  | – | For sea water filters |
| Differential pressure indicator | Connection possibility G ¼” | Optical, with electric contacts |

Housing surface treatment

| Inside          | Anti-corrosion primer | Untreated, anti-corrosion oil, epoxy resin, Chemonit 33 (rubberlined), E-CTFE, Levasynt |
| Outside         | Epoxy paint RAL 5010 blue | Epoxy resin, E-CTFE, Levasynt, RAL acc. specification |

Design/Certification

Declaration of Conformity
– Lloyds Register certified foundry acc. to DGRL 2014/68/EU
3.1. Certificate, DGRL/TÜV, GL, LS, DNV, ABS, LR TA type approval, TR TF/TR CU Certificates (EAC) or on request

Accessory

We produce and deliver additional design and material variants on request.
We solicit your request.

KMF with Dp indicator
KMF with clamp quick closure/opening
Differential pressure indicator
Magnetic inserts
Product range

Self cleaning filter

• KAF® Self cleaning Bernoulli®-filter
• KAF-G
• KAF-S
• KRF Backflush-filter
• KAS 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
• KCS 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 undersigned 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</td>
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<tr>
<td>KDF-V</td>
<td>6, 10, 25</td>
<td>DN 100 – DN 600</td>
<td>Spheroidal iron casting, carbon steel</td>
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<tr>
<td>KRF</td>
<td>6, 10</td>
<td>DN 32 – DN 400</td>
<td>Spheroidal iron casting, carbon 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>
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</table>

Certificate No. 16 / 20086

Issue Date 09 September 2016

Expiry Date 08 September 2021

Torsten Schröder
Hamburg Technical Support Office
Lloyd’s Register EMEA

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

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RATINGS, cont.

<table>
<thead>
<tr>
<th>Material:</th>
<th>Temperature range:</th>
<th>For fluids**:</th>
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</thead>
<tbody>
<tr>
<td>Spheroidal cast iron</td>
<td>-10 up to +300°C</td>
<td>MDO, oil, water, seawater</td>
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<tr>
<td>Austenitic stainless steel:</td>
<td>-196 up to +300°C</td>
<td>MDO, oil, nitrogen</td>
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<td>1.4571, 1.4401, 1.4404, 1.4408,</td>
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<td>Duplex stainless steel:</td>
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<td>seawater</td>
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<td>Super duplex: 1.4410,</td>
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<td>UNS 32750</td>
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<td>Carbon steel: St 50, P235GH,</td>
<td>-40 up to +100°C</td>
<td>MDO, oil, water, seawater</td>
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<tr>
<td>SA516 Gr70</td>
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</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
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

Torsten Schröder
Hamburg Technical Support Office
Lloyd’s Register EMEA
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 undenoted 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

<table>
<thead>
<tr>
<th>Application Form to LR Type Approval</th>
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<tr>
<td>Product Catalogue / general Data sheets for types KSF, KMF, KDF-K, KDF-V, KDF and KRF</td>
<td>2014</td>
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<td>KSF LR Data sheet, Rev. 4</td>
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<td>KSF080.04.16.00.01, Rev. 0</td>
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FINAL ACCEPTANCE OF ACTUAL ITEM(S) DEPEND(S) ON SATISFACTORY SURVEY AND TESTING

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APPROVAL DOCUMENTATION, cont.

KAF LR Data sheet, Rev. 0
KAF150.01.16.05.00.01, Rev. 0
KAF150.00.05.01.02, Rev. 0
KAF150.00.16.05.01.02, Rev. 0
KAF150.00.16.10.02.01, Rev. 0
KRF LR Data sheet, Rev. 4

KAF
KAF DN150 PNS JIS B 2220 K5 FF incl. Parts list
Body KAF DN150 PN5
Body KAF DN150 PN5 rubber lined incl. Parts list
KAF Cover DN150 PN 19 / DNC-50 incl. Parts list
KAF Cover DN150 PN 19 / DNC-50

KRF-BF

2016
16.05.2014
16.05.2014
16.05.2014
12.12.2013
12.12.2013

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 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 hydrostatic burst pressure tests at 40 bar for type KAF: DN 200, PN 10 and at 64 bar for type KDF-V: DN 150, size 7, PN 16 witnessed by LR Surveyor at Krone in Oyten 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

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