Fuel Oil Filter and Deaerator Combination

GS Pro-Fi 3

Deaeration Device with Filter and Quick-Acting Valve acc. to EN 12514-2

DIN Geprüft 2Y115/05

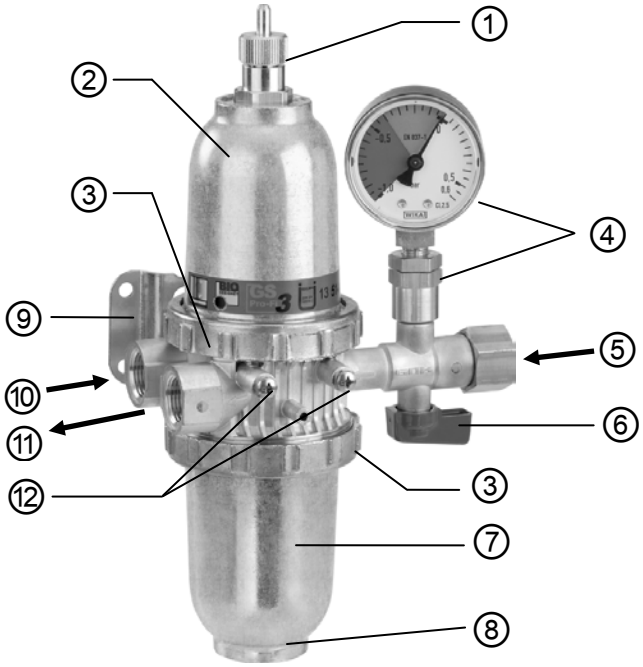
OFTEC www.oftec.org

GOK EN 12514-2

PROOFED BARRIER

Legend

① – Deaerator screw
② – Deaerator cover
③ – Retaining ring
④ – With or without Vacuum gauge (as a special version, optionally also available with rotating connection),
⑤ – Connection for tank line (suction line)
⑥ – Quick-acting valve
⑦ – Filter element
⑧ – Filter cover
⑨ – Fixing plate for wall installation
⑩ – Connection of burner return line
⑪ – Connection of burner flow line
⑫ – Screw heads for mounting the fixing panel
⑩ + ⑪ – optionally available with female thread



BIO SUITABLE

This deaerator can be used with fuel oil with bio-components (see OPERATING MEDIA)

CONTENT

GENERAL

The fuel oil filter-and-deaerator combination GS Pro-Fi 3 is a ***Pro***fessional ***Fi***lter deaeration system of the ***3***. generation. It is designed as a closed system (“Geschlossenes System” - GS). It corresponds to the requirements of EN 12514-2:2000 the code of practice for oil firing according to BS 5410-1 and ‘OFTEC Technical Book 3 chapter 2.2.
In the GS Pro-Fi 3, a deaeration device is combined with a filter and a quick-acting valve connected upstream. It filters the fuel oil while simultaneously discharging the gases released during the suction process. The gases are not “deaerated“ into the environment but within the “Closed System” via the burner nozzle into the combustion chamber. Thus, the system works odour-free.
It is intended only for installation into the suction line of supplying units which are designed in single-pipe system with return feed for suction drain operation.

For usage to the intended purpose and ensuring the warranty, please observe this Installation and Operating Manual and give it to the operator.

SAFETY NOTE:
Operating media as for example fuel oil pollute water! Any material leakage occurring during maintenance must be collected. Observe the respective legal regulations on water pollution control! The GS Pro-Fi 3 must be installed, commissioned, serviced and repaired by skilled craftsmen. It is imperative that you observe the following notes on installation and operation!

DESIGN

The GS Pro-Fi 3 consists of the following individual assemblies:

- Deaeration device within the deaerator cover and the housing
- Deaerator screw ① at deaerator cover ②, only used during start-up
- Filter ⑦ inside the filter cover ⑧, filter elements consisting of any of the following materials: felt, sintered plastic, stainless steel, easy-change filter, or micro-filter
- Filter cover and filter are available either in standard or in long version (with the exception of easy-change filter and micro-filter)
- Check valve in the input port ⑤
- Quick-acting valve ⑥ integrated in the housing
- Fixing panel ⑨ for wall mounting in both installation directions
- Connections ⑤, ⑩, and ⑪ for mounting of pipe or hose lines, depending on the design

OPERATING MEDIA	Kerosene C2 and Gas oil D	acc. to BS 2869
	Kerosene C2 and Gas oil D with max. 30 % FAME	acc. to EN 14213 or EN 14214
	FAME	acc. to EN 14213 or EN 14214
	Bio-Liquids for combustion purposes	acc. to OPS 24
	Diesel	acc. to EN 590

CONNECTIONS

Connection		Dimension	according to standard
④	Manometer blindscrew	Female thread G 1/8 with O-ring	EN ISO 228-1
⑤	Tank line (tank side)	Female thread G 3/8	EN ISO 228-1
		Cutting ring connection RVS 6 (RVS 8, RVS 10)	EN ISO 8434-1
		GOK universal connection fittings UA 6/8/10 mm Screwed clamping ring connection, brass	Initial testing of construction products by a notified body (ÜHP)
⑪	Burner flow line	Female thread G 3/8 or male thread G 3/8 A with A-KN (60° inside cone)	EN ISO 228-1 prEN 12514-4:2009
⑩	Burner return line		

LABELING

The GS Pro-Fi 3 bears the following labels:

Label	Significance	Explanation
GOK	Manufacturer's sign	GOK Regler- und Armaturen-Gesellschaft mbH & Co. KG
⇦	Tank line ⑤	Connection of the pipeline on container side, flow direction indicated
	Burner flow line ⑪	Connection for pipe/hose line, flow direction indicated
⇨	Burner return line ⑩	Connection for pipe/hose line, flow direction indicated
GOK EN 12514-2	The label on the upper filter cover shows the flow diagram and the version of the GS Pro-Fi 3 with the stated article number. The Ü sign is the evidence of initial testing of construction products by a notified body (ÜHP) pursuant to Construction Regulation List A Part 1. Test report no. **S 51 2005 Z2** by TÜV Immissionsschutz und Energiesysteme GmbH DIN CERTCO Certificate of Conformity, register number **2Y115/05** with EN 12514-2:2000 Certification Program Oil Supply Systems for Oil Burners	
PROOFED BARRIER	PA/4186/05 - Test report quality label "PROOFED BARRIER" by Fraunhofer-Institut Verfahrenstechnik und Verpackung of 2005-12-15 / see Annex 2	
	This device meets the requirements of the OFTEC OIL FIRING PRODUCT STANDARD OPS 23 :11-2007 / see Annex 1	

INSTALLATION

Check the GS Pro-Fi 3 for completeness and any transport damages before start of the installation.
A skilled person must be commissioned to install the unit. This requirement also applies to commissioning, maintenance and repairs.

Notes on installation

Expert installation under observation of the technical regulations for planning, construction and operation of the system as a whole is the precondition for faultless functioning of the fuel oil system.

Above all, make sure to observe the following:

- The pipeline from the tank must be installed in a frost-resisting manner; if necessary, provide for technical equipment for heating with installation in domes or in the open air.
- For installation, use only open-end spanners of corresponding width. No gas wrenches may be used.
- Mount the device free of any tensile, bending, or torsion stress
- Before installation, check the connections visually for metal chips or other matter. Be sure to remove any such matter (e.g. by blowing out) to avoid malfunctioning.
- The bleeder line dimensions should provide for a mean fuel flow rate of 0.2 to 0.5 m/s. If the diameter of the pipes is too large, low flow rates occur which can result in formation of undesirable gas bubbles.

Calculation of the flow rate w in m/s

Installation in a ⇒	single-pipe system	two-pipe system	flow system	Calculation
$\dot{V}$ = - volume flow of operating medium in l/h	≈ combustion capacity in kW / 10	= Gearwheel capacity of oil burner pump	= flow rate of the feed pump	$w = 0{,}3537 \bullet \dot{V} / ID^2$ *ID* – inside diameter of pipe (mm)

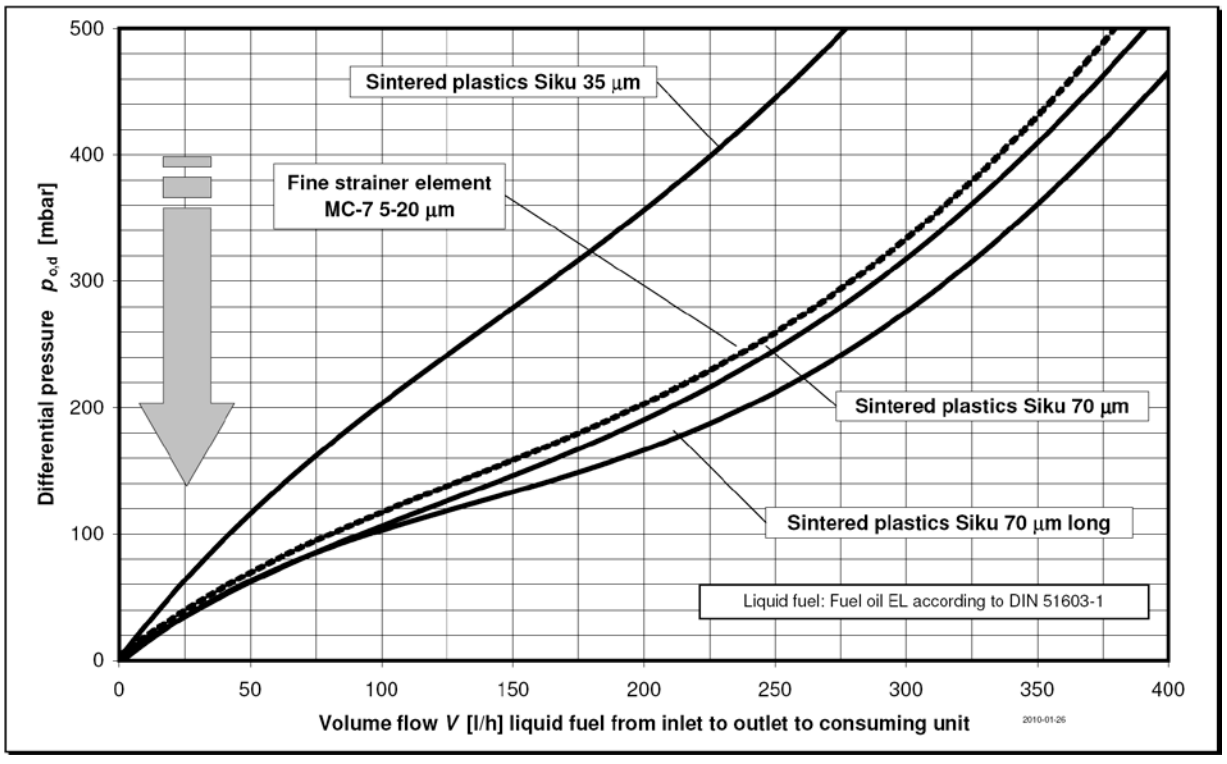
For fuel oil appliances, the following mean flow rate applies:

Suction drain operation: 0.2 ÷ 0.5 m/s		Pressure operation: 1.0 ÷1.5 m/s	
Under observation of suction line length, geodesic height, suction height and fuel oil volume flow rate, the following approximate values are recommended for selecting a pipeline ⇒	$\dot{V}$ **fuel oil**	**ID** Cu pipe	• Lower flow rates in suction operation cause formation of undesirable gas bubbles. • Pipelines with inside diameters smaller than 4 mm are not recommended!
	1 ÷ 10 l/h	4 mm	
	8 ÷ 45 l/h	6 mm	
	25 ÷ 130 l/h	8 mm	
	90 ÷ 170 l/h	10 mm	

Or see **acc. OFTEC Technical Book 3 chapter 2.2.6**

Maximum total pressure loss of all components in the suction line **= 0.4 bar**

See the diagram for pressure loss of the GS Pro-Fi 3 as a function of fuel oil volume flow and filter element used.



The installation of the GS Pro-Fi 3 is permitted:

- in single-pipe oil-fired installations with return feed (suction line)
- above and below the oil tank top height

Installation position and fixing

The installation position is always vertical: filter cover ⑧ with filter element ⑦ below, deaerator cover ② on top.

The GS Pro-Fi 3 is supplied with a pre-mounted fixing panel ⑨ for wall mounting. It can optionally be mounted at the opposite side of the housing. You do not need to remove the screws ⑫. Simply pull the fixing panel down, take it off, attach it at the opposite side of the housing and push it back up again.

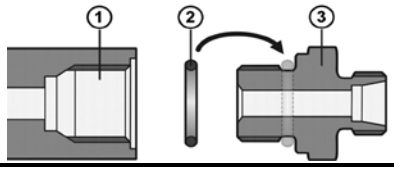
Installation of the connections of individual components

The connections for the tank line ⑤, the burner flow line ⑪ and the burner return line ⑩ differ in accordance with the selected option.

Connections with female threads are not designed for flat packings. Please always use the enclosed O-rings for this option - see **Installation of the connections female thread G3/8**

In all installation work, hold up with open-end spanner SW 24 at the integrally cast connecting branch, or with the appropriate open-end spanner at the respective screwed connection. Avoid any twisting or torsion of the device. Be careful with the plastic parts!

Installation of the connections with female thread G 3/8



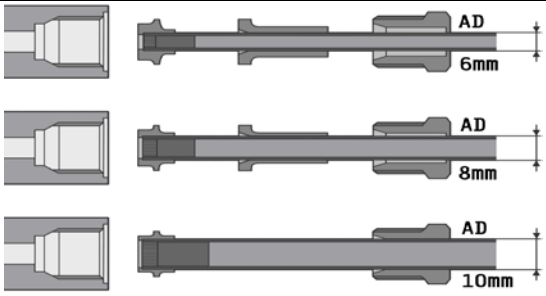
① Female thread G 3/8 acc. to EN ISO 228-1
② O-ring (enclosed) = seal!
③ Single-screw connection, e.g. screwed plug EN ISO 1179-4 or prEN 12514-4:2009 shape

Installation of a screwed connection with brass or steel cutting ring (for your information)

Component	Connection via	Explanations
GS Pro-Fi 3	Connecting branch in RVS 6, 8, 10, or 12, optionally available as factory-mounted version	Screwed connection with brass or steel cutting ring acc. to EN ISO 8434-1
Connection	Pipe or socket piece of the connecting hose line with 6, 8, 10, or 12 mm outside diameter	• copper pipe, e.g. according to EN 1057 • Aluminum pipe, e.g. according to EN 1746 • Precision steel pipe, e.g. according to EN 10305-1, steel cutting ring recommended!

IMPORTANT: Always use a reinforcing insert for copper and aluminum pipe!
Installation pursuant to the **GOK Installation Manual** for screwed connections with cutting rings according to EN ISO 8434-1. Available for download from www.gok-online.de under "Service".

Installation of the GOK Universal connection fitting type UA



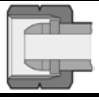
The female thread can also take the GOK universal connection set type UA, which corresponds to a compression joint type G acc. to prEN 12514-4:2009 Annex D.

Piping used:

Copper pipe with outer diameter 6, 8 or 10 mm, e.g. acc. to EN 1057

Installation acc. to **Installation Manual for GOK clamp ring connection:** UA Universal connection fittings. Available for download from www.gok-online.de under "Service".

Installation of male thread G 3/8 A with KN (60 ° inside cone) Recommended tightening torque: 10 Nm

Component	Connection via		Explanations
GS Pro-Fi 3	Connecting branch to housing, with inside cone KN		Pipe thread: cylindrical male thread G 3/8 in tolerance class A according to EN ISO 228-1 with 60° inside cone
Connection	Hose fitting with ball nipple connection and union nut		Union nut with female thread G 3/8 according to EN ISO 228-1, hose nozzle with ball seal

Optional installation of metal filter cover PS = 16 bar

- Turn retaining ring anti-clockwise ③ to loosen it, hold and remove filter cover ⑧
- Take care not to damage the O-ring. Replace it if necessary (a new O-ring must be oiled!)
- Hold the metal filter cover and the O-ring in position and tighten by hand by turning the retaining ring ③ clockwise.
- Check for existing leaks, make sure no leaks will occur!

START-UP

If a pressure test is required before starting up the oil-fired installation, e.g. according to OFTEC Technical Book 3 section 5, the GS Pro-Fi 3 can be subjected to a test pressure of a maximum of 6 bar with plastic cover, or 16 bar with metal cover. Avoid any pressure increase beyond 6 bar or 16 bar caused by heating of the test medium. Higher test pressures can damage the GS Pro-Fi 3.
Before start-up, the GS Pro-Fi 3 and all the connections must be checked for leaks. This test can be included in the pressure, leak, or function test of the oil-fired installation. Any leaks must be sealed, e.g. by re-assembly of the connections with new conical nipples or tightening of the screwed connections.
Observe the safety information under **MAINTENANCE**!

Unless defined otherwise in the start-up instructions of the burner/furnace manufacturer, proceed as follows:
Deaerate the installed oil lines (burner flow and return lines) and the deaerator with a suction pump and fill them with fuel. To this end, open the quick-acting valve ⑥ and the deaeration screw ①. Connect the suction pump directly at the deaeration screw by means of the enclosed adapter, Art. no. 13610-60. We recommend continuing the suction process until the upper cover is filled with oil as well. After that, re-tighten the deaeration screw.

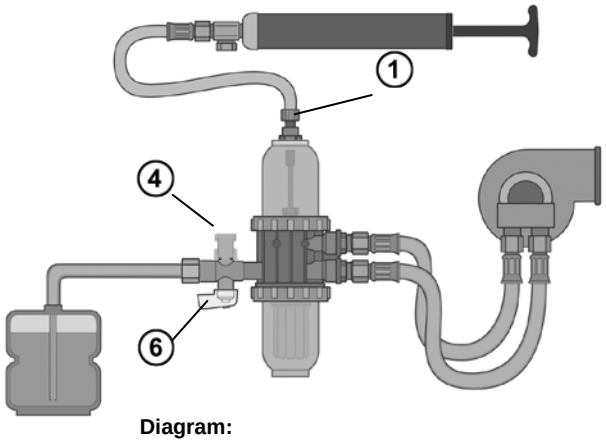


Diagram:
Fuel oil filter-and-deaerator combination GS Pro-Fi 3

OPERATION

In ongoing operation of the oil-fired installation, the GS Pro-Fi 3 does not require any attendance. Set the integrated quick-acting valve ⑥ - a ball valve - to the 'open' position by turning the handle in flow direction, as shown in the figure on Page 1.
Turn the handle of the quick-acting valve to 'closed' position – vertical to the flow direction – for longer standstill periods or MAINTENANCE measures.
Due to the intelligent design of the GS Pro-Fi 3, the full fuel oil column will be available on burner start-up without any noticeable air particles.

INFORMATION ON THE FILTER ELEMENT ⑦:
There is no universal filter element. Select a filter element according to the specification of the burner manufacturer, taking into account filter fineness and the respective operating conditions. The IWO Institute for Economically Efficient Fuel Oil Heating Systems recommends filter elements of sintered plastic of a mesh width of 30 to 75 µm. For oil-fired installations with so-called "low NO_x burners" and burners of lower thermal output, GOK filter elements FEINFILTERUNG of a mesh width of < 35 µm are recommended.

SAFETY FUNCTION

In case of hose rupture in the flow ⑪ or return line ⑩, the aspired ambient air will cause the burner to go to "lock out" state.

For pressure testing, unscrew the manometer blind screw ④ and screw in the manometer G 1/8.
Make sure that the O-ring remains in the manometer blind screw.
After testing, unscrew the manometer and screw in the manometer blind screw with O-ring.

PERFORMANCE CHECK

Provided the construction and the pipeline dimensioning are correct, the air cushion formed in the upper cover during start-up will disappear fast. If, after longer period of operation, air is released in the deaerator cover ②, or if the burner goes to lock out state, there is a leak in the oil line. More air is aspired than can be handled by addition of air to the fuel oil. The leak must be repaired to avoid any risk of fuel oil leakage while the installation is at standstill.

A clearly audible noise from the burner pump can be a sign of a clogged-up filter element ⑦. See MAINTENANCE for replacing the filter element.

Filter cover ⑧ not filled to the top

Air and lightly volatile oil components may outgas from the operating medium and collect before the moistened filter element. This applies in particular to single-pipe filters and low flow volumes. However, the invisible interior of the filter element is completely filled with the operating medium, so that safe operation is not affected if the filter cover is not filled to the top.

Should the filter cover level drop or should the cover fall dry, there is a leak in the system.

MAINTENANCE

The following checks are recommended in the course of annual maintenance or after prolonged standstill:

- Check the deaerator and the connections for leaks
- Visually check the plastic filter cover ⑧ and the deaerator cover ② for damage: tears or deformation
- Replace the filter element ⑦

A damaged or destroyed plastic filter cover ⑧ must be replaced for a new one. Steps to take when changing the filter element:

The deaerator cover ② can only be replaced as a complete assembly, i.e. together with deaerator screw ①.

If the system has been submerged, any outside soiling of the filter should be cleaned off with a commercially available household cleaning agent.

Do not use cleaning agents containing solvents as they might damage the plastic filter cover or other plastic parts, e.g. the handle. For spares, see **List of spare parts**

Replacing the filter element ⑦

Switch the burner off and stop the oil column from returning into the oil storage container - close the stop valves. Use the collecting device!

Type 500	Type 500 with easy-change filter
Turn retaining ring anti-clockwise ③ to loosen it, hold and remove filter cover ⑧	Loosen the easy-change filter by turning it anti-clockwise Hold up the adapter with open-end spanner SW 70.
Take care not to damage the O-ring. Replace it if necessary (a new O-ring must be oiled!) Only use red GOK O-rings!	
Unscrew the old filter element	
Clean the sealing area and the O-ring	Oil the O-ring of the new easy-change filter
Insert new filter element ⑦, ensure tight fit.	
Hold the filter cover ⑧ and the O-ring in position and tighten by hand by turning the retaining ring ③ clockwise.	Hold the new easy-change filter in position and tighten it by turning it clockwise.

Check for existing leaks, make sure no leaks will occur!

Take special care to clean lengths of line to be installed downstream of the filter thoroughly before mounting.

To continue, see START-UP and OPERATION

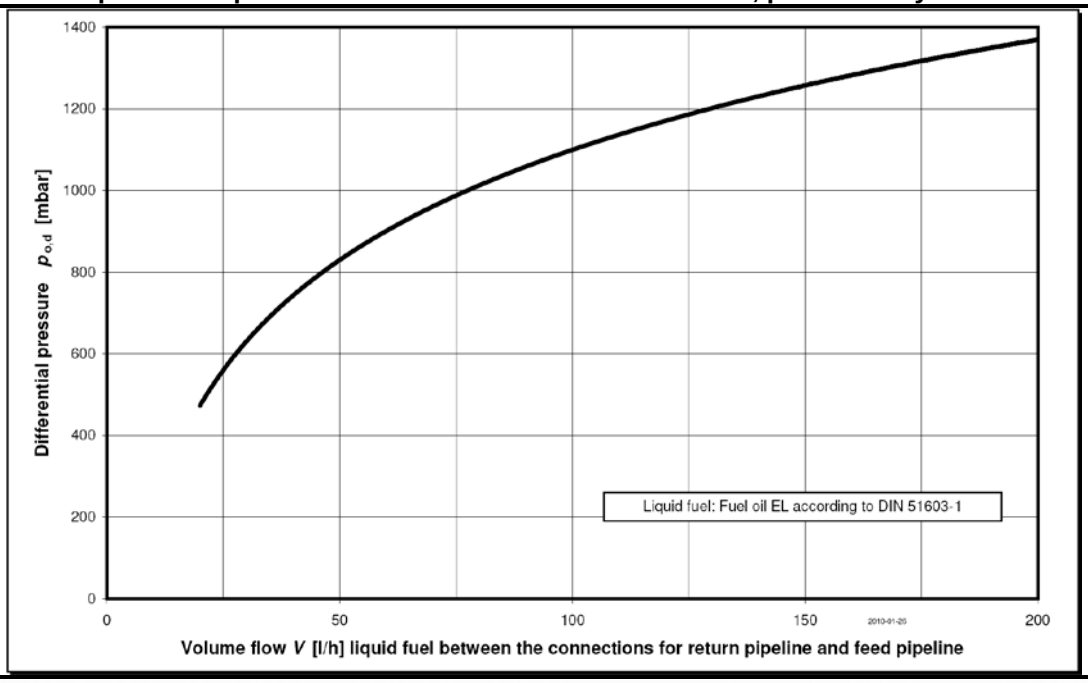
OVERHAUL / REPAIR

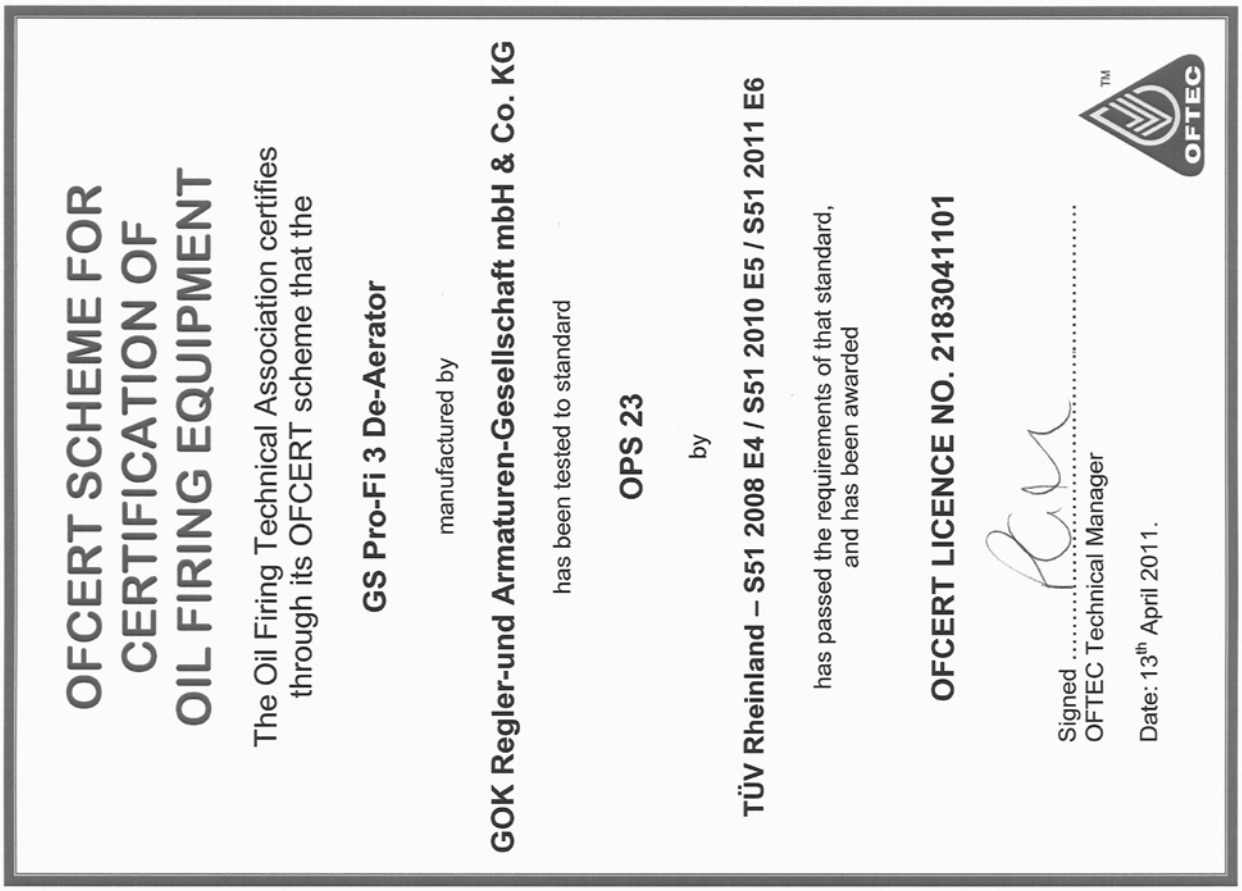
If the measures explained under the headings START-UP, OPERATION and MAINTENANCE fail to achieve regular re-START, and provided the construction and dimensions are correct, the GS Pro-Fi 3 must be removed and sent to the manufacturer's for a check-up. Any unauthorized handling will result in loss of the qualification approval and any warranty claims.

ADDITIONAL TECHNICAL DATA

Minimum/maximum permissible temperature TS	-10 °C ÷ +60 °C	(operating medium and environment)	
Maximum permissible pressure	PS = 6 bar with plastic cover PS = 10 bar with easy-change filter element PS = 16 bar with metal cover	Material of housing Metal	ZP0410
Normal flow ratings	110 l/h		
Venting copacity	10 l/h according to prEN 12514-3		

WARNING **For pressure operation and as internal deaerator device, please always use metal covers!**





DIN CERTCO
Gesellschaft für Konformitätsbewertung mbH

CERTIFICATE

The company

GOK Regler- und Armaturen-Gesellschaft mbH & Co. KG
Obernbreiter Straße 2 - 16
97340 Marktbreit

hereby receives the confirmation that the product/s

Installations for oil supply systems for oil burners; fuel oil filter and de-aerator combination

of the type

GS Pro-Fi 3

conforms to

DIN EN 12514-1:2000-05
DIN EN 12514-2:2000-05
Certification scheme Installations for oil supply systems (Edition: 2007-01)

and is granted the licence to use the mark

in conjunction with the Registration No. below.

Registration No.: 2Y115/10

This Certificate is valid until 2015-06-30.

2011-02-18
Dipl.-Ing. (FH) Dipl.-Wi.-Ing. Sören Scholz
- Head of Certification Body -

See annex for further information.
DIN CERTCO Gesellschaft für Konformitätsbewertung mbH
Alboinstraße 56, 12103 Berlin

Page 1 of 1

Annex

to the Certificate with Registration No. 2Y115/10, dated 2011-02-18

Technical data

Type series: Deculator for heating oil with integrated filter and quick-closing shutt-off valve for the operation in front of a burner pump of single pipe filter for automatic ventilation. The system is closed.

- Working medium: Heating oil EL, liquid fuel class A, B, C according to prEN 12514-1:2009; Kerosene C2 and Gas oil D according to BS 2869, FAME (fatty acid methyl ester) according to DIN EN 14213 and DIN EN 14214, Kerosene C2 and Gas oil D with max. 30 % FAME (fatty acid methyl ester) according to DIN EN 14213 and DIN EN 14214
- Temperature range: - 10 °C to 60 °C
- Working overpressure [bar]: Plastic cup max. 6 bar; Easy-change filter max. 10 bar; Metal cup max. 16 bar
- Nominal flow rate: 110 L/h
- Venting capacity according to prEN 12514-3:2009: 10 L/h air
- Nominal width / connection type: Internal thread G 3/8-UA-O or 24° cone connector or compression type mechanical joint clamped joint type G and external thread G 3/8 with internal cone 60° (connection types according to prEN 12514-4:2009)

Testing laboratory / Inspection body

TÜV Rheinland
Energie und Umwelt GmbH
Testzentrum Energietechnik
Am Grauen Stein
51105 Köln

Test report(s)

S51 2005 Z2 dated 2005-06-10
S51 2007 E3 dated 2007-05-09
S51 2008 E4 dated 2008-04-21
S51 2010 E5 dated 2010-08-02

Notes

This Fuel Oil Filter and De-aerator Combination GS Pro-Fi 3 fulfills also the requirements according to the OFTEC standard OPS 23 clauses 4.3; 4.4; 6.1; 7.1; 7.2; 7.3

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