FOCUS for gas turbine protection

Fuel oil cleaning unit solutions

FOCUS 18 - 200 (duplex unit)

Alfa Laval Fuel Oil Cleaning Unit Solutions (FOCUS) are automated modular systems for the purification of liquid fuel oils. The fuel cleaning process is designed to overcome the harmful effects of fuel oil contaminants, primarily the trace metals sodium and potassium, as well as water and solid particles.

The fuel cleaning modular solution extends to suit all capacity requirements.

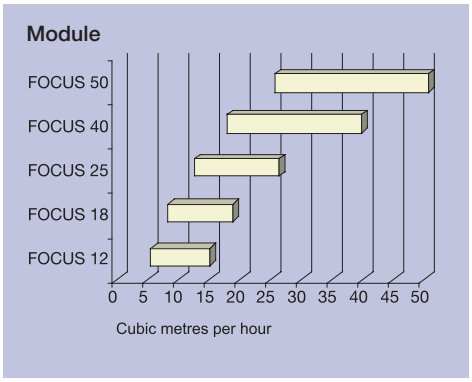


Fig. 1 Throughput capacities for Distillate No. 2, 30°C separation temperature. Capacity reduction factors may be applied for other fuel grades.

Application

High temperature corrosion, ash deposition and the clogging and erosion of fuel systems are costly operating problems attributed to fuel contaminants.

Liquid fuels vary substantially in physical properties and level of contaminants, but with correct treatment a wide range of liquid fuels can be used effectively in any modern gas turbine power plant.

Features and Benefits

- Enable full compliance with current standards of fuel quality at the turbine inlet
- Constant efficiency and highest separation efficiency of water and solids ensured
- Proven, reliable operation
- No pre-filtration necessary
- Environmentally friendly sludge disposal (no filter cartridges)
- Automatic, unattended operation
- Comparatively low operating cost
- Simple, compact and robust design

Process description

The FOCUS module will pump untreated fuel oil with centrifugal pumps via suction strainers to the separators. The centrifugal separator is the heart of the cleaning unit and provides a reliable and consistent method for the removal of solids and water simultaneously from fuel oils.

Fig. 2 GT Separator – the heart of the cleaning unit

Untreated fuel oil is fed continuously through the separator, where any water and solids are separated from the fuel oil by the action of centrifugal force.

Separation takes place in a rotating bowl. When the water seal has been established, the feed is introduced to the bowl inlet. The inlet is equipped with circular discs, the Optiflow inlet, which accelerates the feed before it enters the bowl disc stack.

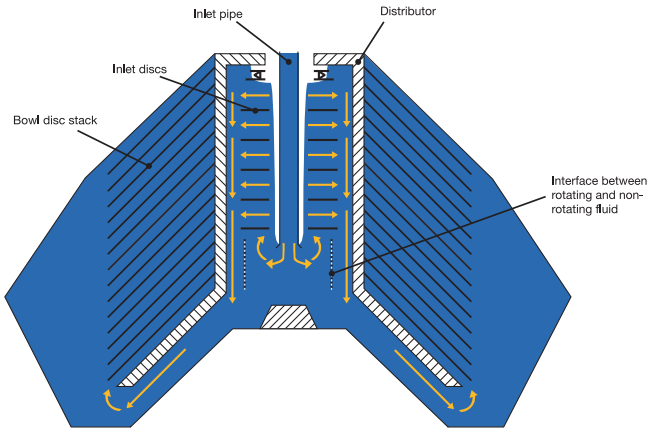


Fig. 3 Optiflow Disc Inlet Smooth acceleration. This feature is included in the FOCUS 25, 40 and 50 units.

The oil is forced towards the centre of the bowl through the disc stack. A built-in paring disc pump discharges cleaned oil continuously.

Separated water rises along the outside of the disc stack and is continuously discharged by a paring disc in the water outlet. Separated sludge and solid particles accumulate at the periphery of the bowl and are discharged periodically before they build-up to a point where they would interfere with the separation process.

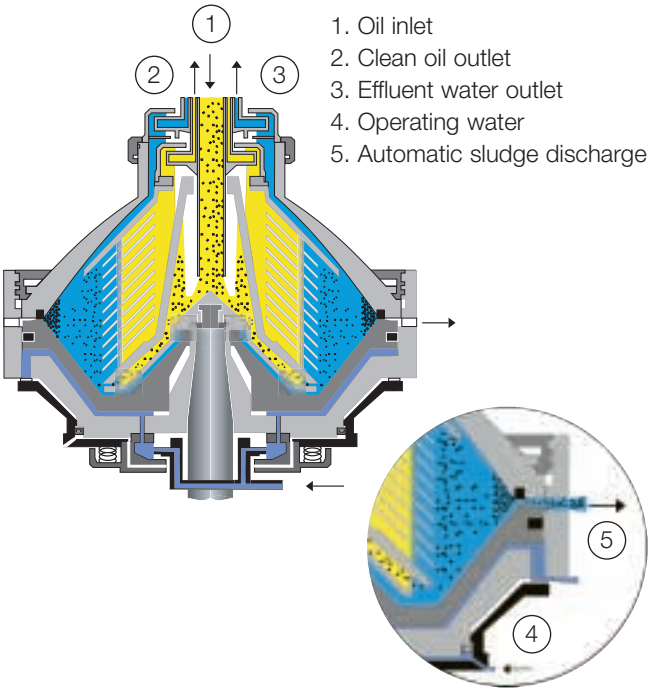


Fig. 4 Automatic discharging centrifuge bowl

The discharge cycle is initiated at the control panel by either pushbutton or automatically by the electronic program control system on completion of a set time cycle.
Water and sludge removed by the centrifugal separators collect in the centrifuge sludge tank and are pumped to the customer's waste treatment system by a pneumatic sludge pump controlled by level switches.

An oil and water monitor in the purified fuel oil discharge line checks the quality of the purified oil leaving the centrifugal separators. The system is specifically designed for accurate determination of the amount of water in the oil stream. During process alarm conditions, the divert valve switches the flow of the purified oil away from the day tank to the raw fuel storage tank.

The fuel oil cleaning unit is controlled, monitored, and supervised from a centralized control console. A state-of-the-art PLC-based control panel provide monitoring and control functions necessary for operation of the system.

The fuel oil treatment plant

As an important component in your fuel oil treatment plant, the cleaning unit prepares the fuel prior to being forwarded to the gas turbine. By ensuring consistent compliance with specific fuel oil purification requirements, your cleaning unit will contribute to a longer turbine service life and to a reduction in operating costs through less maintenance and downtime.

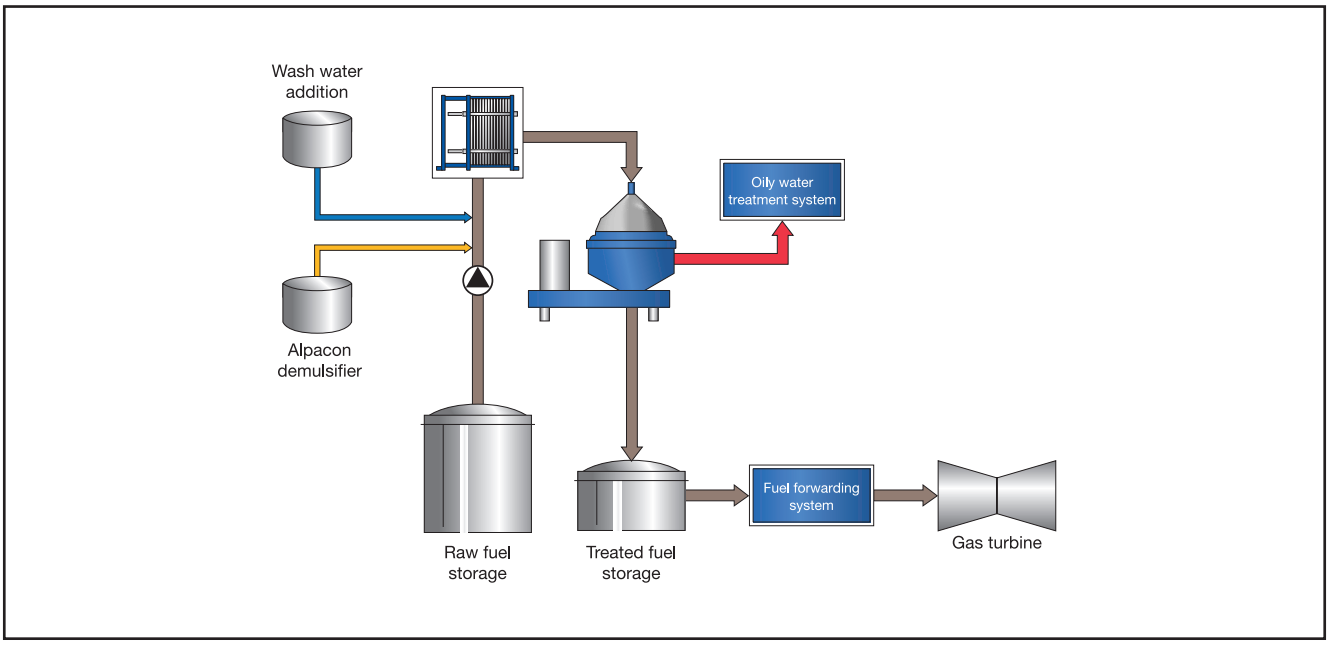


Fig. 5 The fuel oil treatment process

Optional equipment

- Ex-proof execution of unit
- Junction box for remote mounting of control panel
- Remote system start / stop
- Remote mounting of feed pump
- Water washing system
- Demulsifier dosing system
- Oil feed preheater
- Water monitor in purified oil outlet
- Containerized solution

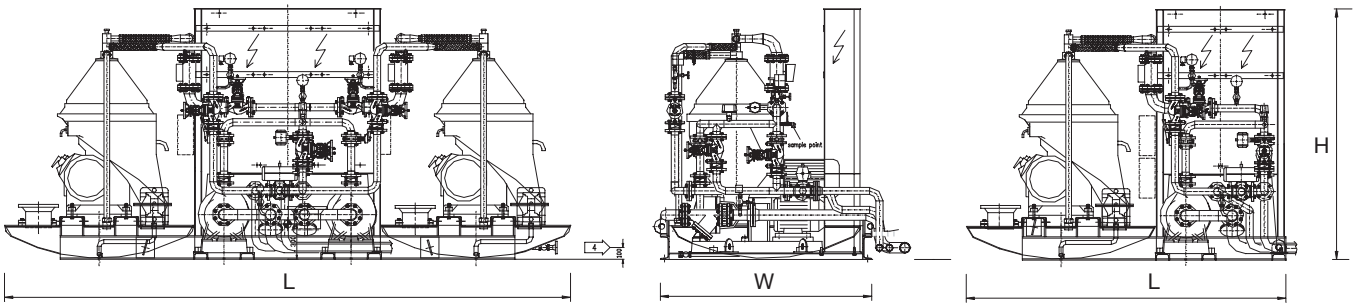
Above options may apply due to fuel oil specification or user preference.

Technical data and utilities consumption

Unit type	FOCUS 12	FOCUS 18	FOCUS 25	FOCUS 40	FOCUS 50
Main supply voltage	3-phase 400/ 440 / 480 V ± 10 %				
Control voltage	24 V DC / 230 V AC				
Frequency	50 or 60 Hz ± 5 %				
Water supply pressure	200 to 600 kPa				
Oil inlet pressure	Flooded suction				
Oil outlet pressure, max.	350 kPa	250 kPa	350 kPa	400 kPa	400 kPa
Instrument air pressure	500 kPa to 750 kPa				
Sludge outlet pressure, max.	300 kPa at 500 kPa air pressure				
Enclosure class, min.	IP 54				
Electric power consumption	14.0 KW	15.4 KW	19.5 KW	28.0 KW	28.5 KW
Water consumption (per discharge)	24 litres	40 litres	40 litres	40 litres	40 litres
Air consumption (per discharge)	Approximately 1 Nm^3, max. flow 150 Nl/min.				

The above data refers to base standard specifications and typical running conditions for the single unit option.

Dimensions



Shipping data (standard unit without optional equipment)

Separator type		FOCUS 12	FOCUS 18	FOCUS 25	FOCUS 40	FOCUS 50
Single unit (100)	Length (L) mm			2734		
	Width (W) mm			1907		
	Height (H) mm			2140		
	Dry weight kg	2629	3177	3352	3557	3660
	Operating weight kg	3049	3597	3772	3977	4180
Duplex unit (200) 100% duty and standby	Length (L) mm			4815		
	Width (W) mm			1907		
	Height (H) mm			2140		
	Dry weight kg	4547	5643	5993	6403	6610
	Operating weight kg	5387	6483	6833	7243	7610

Alfa Laval reserves the right to change specifications without prior notification.

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