

Alfa Laval PureNOx LS

EGR bleed-off water treatment system

Alfa Laval PureNOx technology is the proven choice for water treatment in Exhaust Gas Recirculation (EGR) systems, a leading solution for Tier III NOx compliance on marine vessels. PureNOx LS (Low Sulphur), which is optimized for EGR engines that operate on low-sulphur fuel, is available in two sizes. PureNOx LS 50 is for smaller vessels with engines up to 16 MW, while PureNOx LS 100 handles engine capacities up to 60 MW (45 MW on LNG).

Application

PureNOx technology was developed with MAN Energy Solutions and was the first of its kind on the market. PureNOx LS meets the WHS-2/WH3 specifications for EGR water handling systems and fulfills IMO resolution MEPC.307(73), Guidelines on Exhaust Gas Recirculation (EGR) bleed-off water. With an optional sensor package, it can also enable discharge in more sensitive areas according to MEPC.259(68).

PureNOx LS uses proven and highly efficient separator technology, rather than costly filters or sensitive membranes. It provides:

- Cleaning of EGR bleed-off water in Tier III areas
- Cleaning of Eco EGR bleed-off water in Tier II areas

Eco EGR is an engine mode that reduces fuel oil consumption during Tier II operation. By recirculating a portion of the exhaust gas, it minimizes the engine's specific fuel oil consumption without increasing NOx emissions. Because it places high demands on equipment, Eco EGR demands a system like PureNOx LS that is optimized for continuous operation.

Benefits

- The EGR water cleaning solution with most time at sea
- Compact and robust separator with high efficiency
- Designed for continuous operation
- Low operating costs – no filters to replace
- Connectivity-ready and supported 24/7 worldwide
- Compliant with MEPC.307(73) and optionally with MEPC.259(68)



Design

PureNOx LS has a robust and reliable design, involving no filters or membranes. It comprises only a pump unit (PU) and a water treatment unit (WTU).

The PU is equipped with a VFD-controlled centrifugal pump and a priming system. It should be installed close to the EGR drain tank.

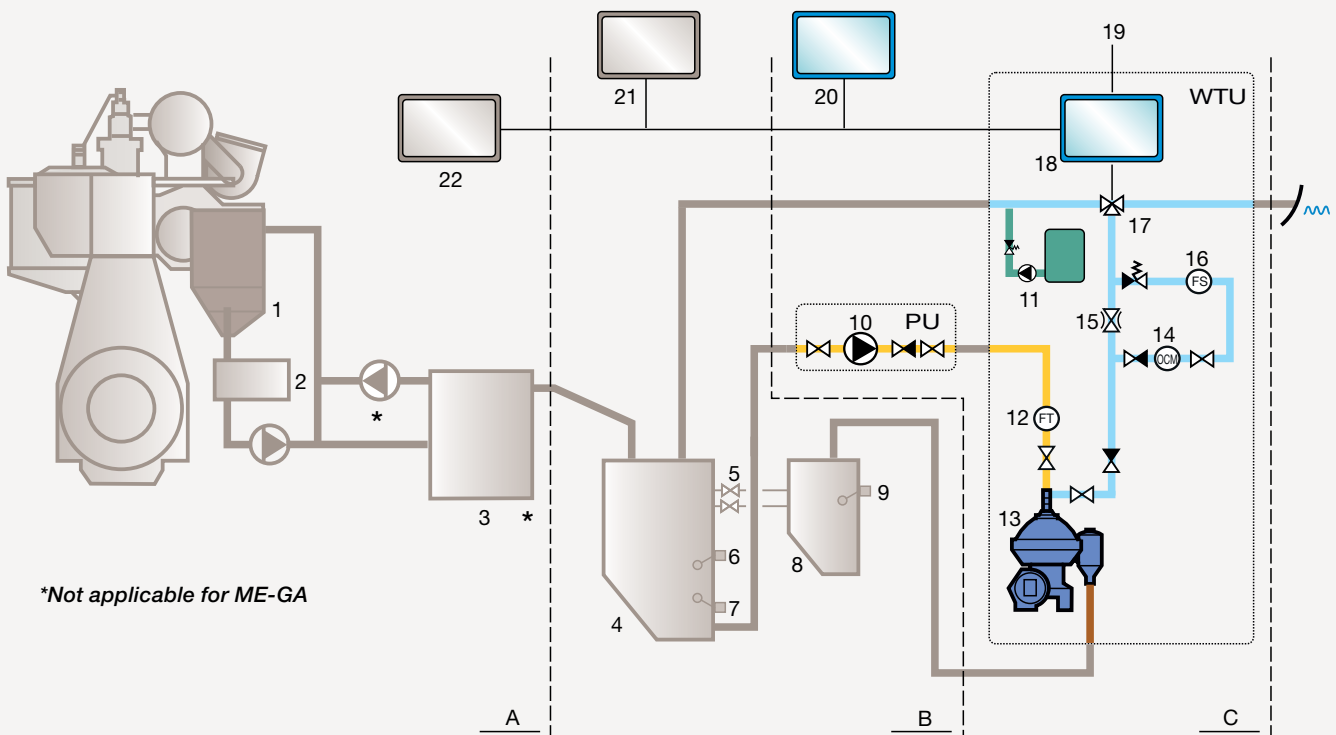
The WTU consists of a high-speed separator with a control panel, a quality control system and an overboard valve. It also features a coagulant tank for optimizing separation performance. Adding a coagulant to effective separation removes the need for further cleaning steps, which means PureNOx LS avoids filters and the high costs associated with their exchange and disposal.

The complete system combines a small footprint with easy service access. All connections are accessible to the installer from one side.

Working principle

In the EGR process (1), water is used to remove soot particles from the exhaust gas being redirected back into the engine. This process produces a certain amount of condensate water, called EGR bleed-off water. The exact amount of depends on the fuel type, ambient air temperature and humidity level.

EGR bleed-off water is led from the buffer tank (3) to the drain tank (4) by gravity. The PU (10) then forwards the water to the separator (13), where the water is cleaned. After the separator, a PPM sensor checks the quality of the water, which is either sent overboard via a three-way valve (20) or returned to the drain tank for further treatment. If the water is returned, coagulant is added with a dosing pump (11) to improve the process. No filtration is needed.



**Not applicable for ME-GA*

General flow chart for PureNOx LS. Details may differ slightly between specific systems.

- A. Engine manufacturer scope
- B. Shipyards scope
- C. Alfa Laval scope

1. EGR unit with pre-spray
2. Receiving tank unit (RTU)
3. EGR buffer tank
4. EGR drain tank
5. Drain valves
6. High level switch
7. Low level switch
8. EGR sludge tank

9. High level switch
10. Feed pump
11. Coagulant pump
12. Flow transmitter
13. Separator
14. Oil content monitor
15. Pressure control valve
16. Flow switch

17. Three-way valve
18. Alfa Laval Touch Control panel
19. GPS connection
20. Remote Alfa Laval Touch Control panel
21. Vessel's integrated automation system
22. EGR control

Technical data, PureNOx LS 50

Engines up to 16 MW

Performance data

Unit	WTU	PU
Power consumption	≤10 kW	≤1 kW
Air consumption (avg)	200 NI/h	–
Main supply voltage	According to order	According to order

Material data

Unit	WTU	PU
Piping	AISI 316L	AISI 316L
Separator bowl	Stainless steel AL 1112398	–
Module frame	Steel AL 1111312	Steel AL 1111312
Gaskets & O-rings	Nitrile (NBR)	–

Connections

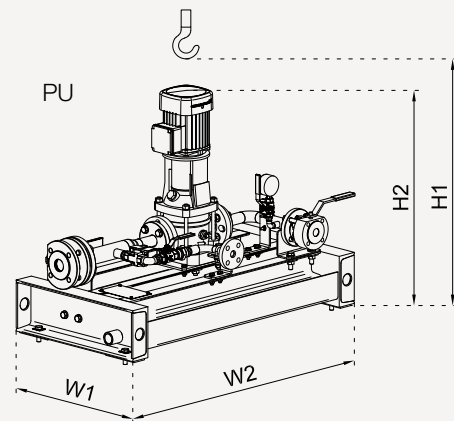
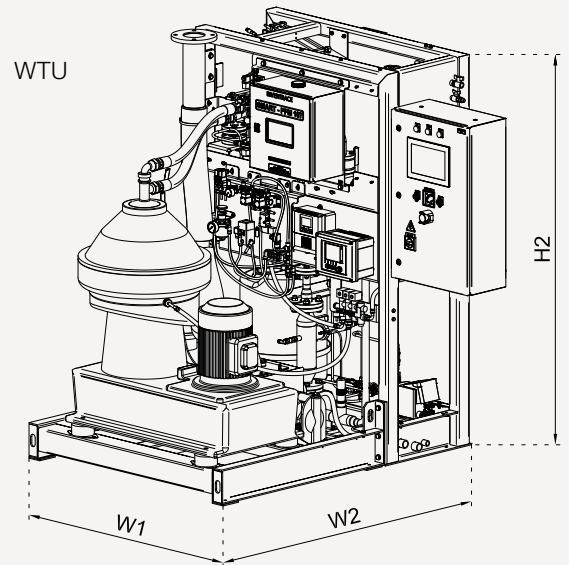
Unit	WTU	PU
Type	EN-1092-1	EN-1092-1
Main inlet connections	<ul style="list-style-type: none"> • Process inlet • Fresh water • Compressed air • Power supply 	<ul style="list-style-type: none"> • Feed pump inlet • Priming water
Main outlet connections	<ul style="list-style-type: none"> • Outlet to EGR tank • Outlet overboard • SRK ventilation 	<ul style="list-style-type: none"> • Feed pump outlet

Weights and volumes (dry)

Unit	WTU	PU
System weight (net/gross)	1100 ± 100 kg	100 ± 30 kg
Bowl weight	137 kg	–
Bowl volume	6.2 L	–
Sludge volume	1.9 L	–

Dimensions

Measurement	WTU	PU
W1	1190 mm	1005 mm
W2	1625 mm	500 mm
H1	–	900 mm
H2	1855 mm	692 mm



Dimensions, PureNOx LS 50

Technical data, PureNOx LS 100 Engines up to 60 MW (45 on LNG)

Performance data

Unit	WTU	PU
Power consumption	≤22 kW	≤2 kW
Air consumption (avg)	140 NI/h	–
Main supply voltage	According to order	According to order

Material data

Unit	WTU	PU
Piping	AISI 316L	AISI 316L
Separator bowl	Stainless steel AL 1112398	–
Module frame	Steel AL 1111312	Steel AL 1111312
Gaskets & O-rings	Nitrile (NBR)	–

Connections

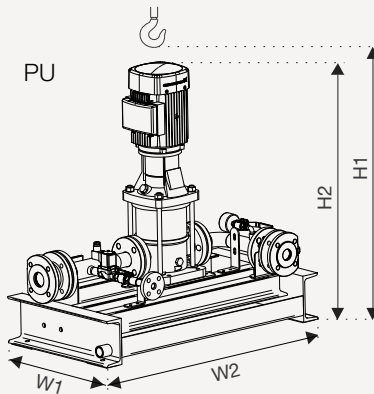
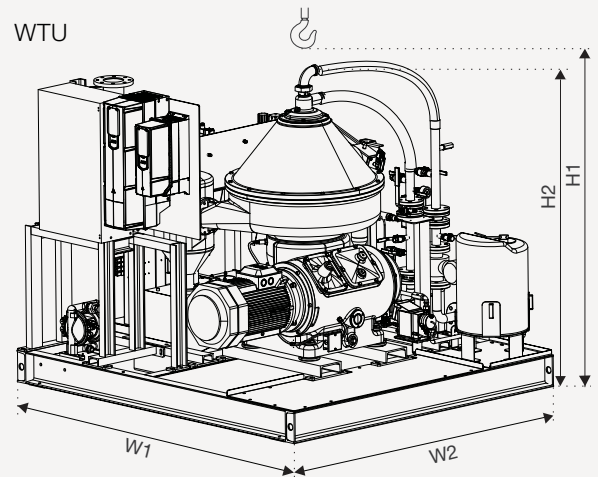
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Weights and volumes (dry)

Unit	WTU	PU
System weight (net/gross)	3080 ± 500 kg	150 ± 50 kg
Bowl weight	271 kg	–
Bowl volume	15 L	–
Sludge volume	6.6 L	–

Dimensions

Measurement	WTU	PU
W1	2000 mm	500 mm
W2	2240 mm	885 mm
H1	2300 mm	1300 mm
H2	1850 mm	887 mm



Dimensions, PureNOx LS 100

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