Aalborg XW-Superheater

For steam driven cargo pumps

The Aalborg XW superheater is based on the same characteristics as our well-known water tube, forced circulation exhaust gas economizer Aalborg XW -TG specially designed for heat recovery from auxiliary boilers.

When applied for heat recovery after auxiliary boilers, the heating surface and associated accessories are designed for the flue gas temperatures and flow rates of the Alfa Laval auxiliary boilers with focus on the operation efficiency and reliability, thus providing full benefit of the saved energy during operation of the cargo pumps.

Without changing the heating surface of the auxiliary boilers, the exhaust gas temperature will be sufficiently high for superheated steam productions. This ensures the same high efficient auxiliary boiler operation during saturated steam operation.

The temperature of both flue gas and steam will vary insignificantly with the load on the auxiliary boiler when the superheater is installed downstream of the boiler.

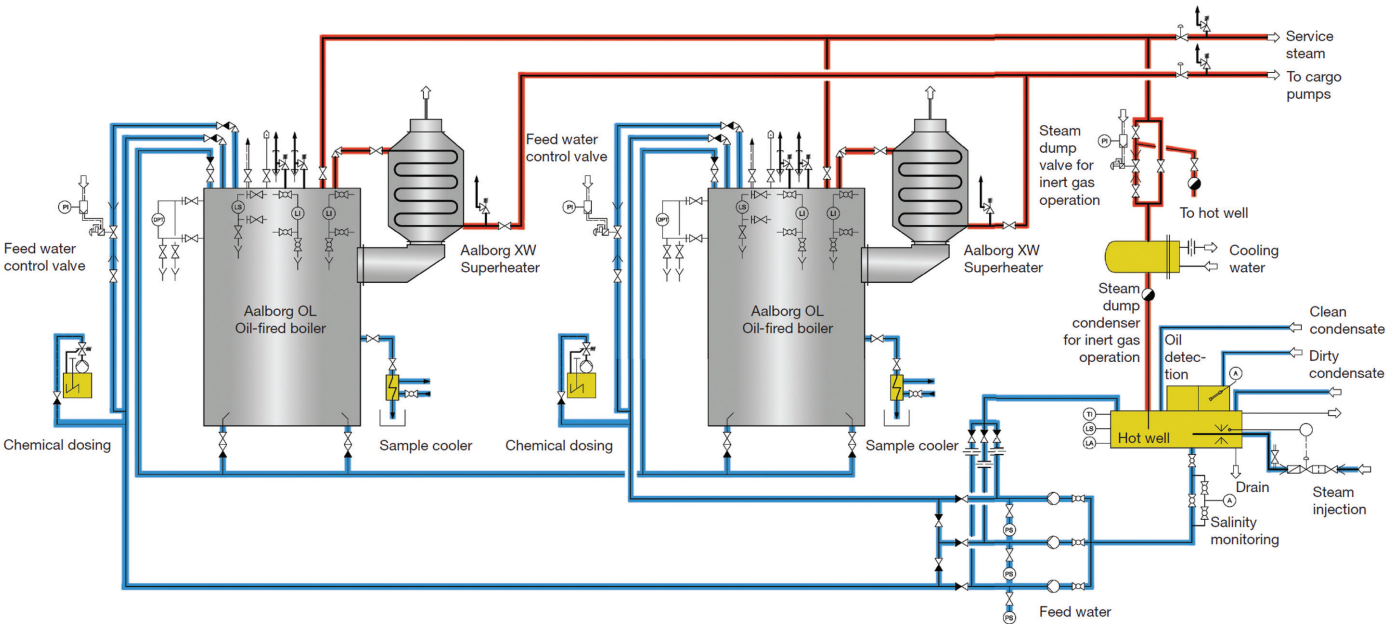
The superheater is supplied loose for installation in the flue gas pipe close to the outlet of the auxiliary boiler, and must be supported separately by the ship structure.

The superheater design allows dry running when only saturated steam is needed for general service purposes, i.e. a flue gas bypass is not mandatory.

The system has been developed in close cooperation with a reliable supplier of cargo pumps and steam turbines with a view to improving the overall total steam plant efficiency and thereby reducing emissions from our existing well proven products.

Naturally, the system operates equally well with other cargo pumps suitable for superheated steam operation.

With today's increased focus and further demands on reduced emissions of harmful exhaust gases like CO_2, SO_X, PM and NO_X into the environment, this system offers an attractive opportunity for new vessels. The system is also worth considering for existing tankers in service equipped with the new generation of cargo pumps suitable for operation with superheated steam.



When a waste heat recovery (WHR) system is installed on board the ship, the steam turbo generator can be operated also in port by means of the auxiliary boilers. In this case, the superheated steam will improve the turbine operation conditions and reduce the steam and fuel oil consumption.

Depending on the number of discharges per annum, the return on investment (ROI) can be as low as 1.5 year.

Superheater for auxiliary boilers

- Provides operational savings while improving the environmental profile of the ship
- Major improved efficiency on cargo pump turbine system
- Fuel savings can be as high as 10-15%
- Return on investment (ROI) can be as low as 1.5 year

Project case example

		Suezmax tanker		VLCC tanker	
		■ Cargo oil pump: KV450, 3500 m3/hr x 135 ■ Cargo oil pump turbine: RX2-2 or RVR-1, 1550 kW x 1390 rpm		■ Cargo oil pump: KV500, 5500 m^3/hr x 155 ■ Cargo oil pump turbine: RVR-2, 2680 kW x 1200 rpm	
Turbine model		RX2-2	RVR-1	RVR-2	RVR-2
Turbine Q'ty	Set	3	3	3	3
Inlet presseure	MPa	1.85	1.85	1.85	1.85
Inlet temperature	°C	Sat.	250	Sat.	250
Steam rate	Kg/h	49.292	40.827	68.342	64.242
Boiler capacity	t/h	2 x 30	2 x 25	2 x 40	2 x 40
Boiler load	%MCR	82.1	81.6	85.4	80.3
Efficiency	%	84.90	84.50	84.50	84.50
Fuel oil consumption	Kg/h	2 x 1836	2 x 1553	2 x 2545	2 x 2399
Fuel oil savings	Kg/h	N/A	2 x 303	N/A	2 x 146
Fuel oil savings	%		19		6

Alfa Laval has a reputation for being the trendsetter in the marine boiler industry and in the forefront when it comes to product development. Our latest initiatives focus on the development of new products that mitigate the impact of emissions from burning fossil fuels on board ships, besides working with related equipment suppliers towards improving the efficiency of the total plant rather than just the boilers.

MDD00259EN 1508