

Advanced waste fuel recovery system introduced

PUREDRY Alfa Laval has announced it will officially launch of an innovative high-speed separator able to recover reusable fuel from waste fuel oil at this year's SMM in Hamburg. Called **PureDry**, the unconventionally designed separator has been developed to recover energy by recycling the heavy fuel oil fraction in the waste fuel oil tank, leaving only super-dry solids that can be landed as dry waste.

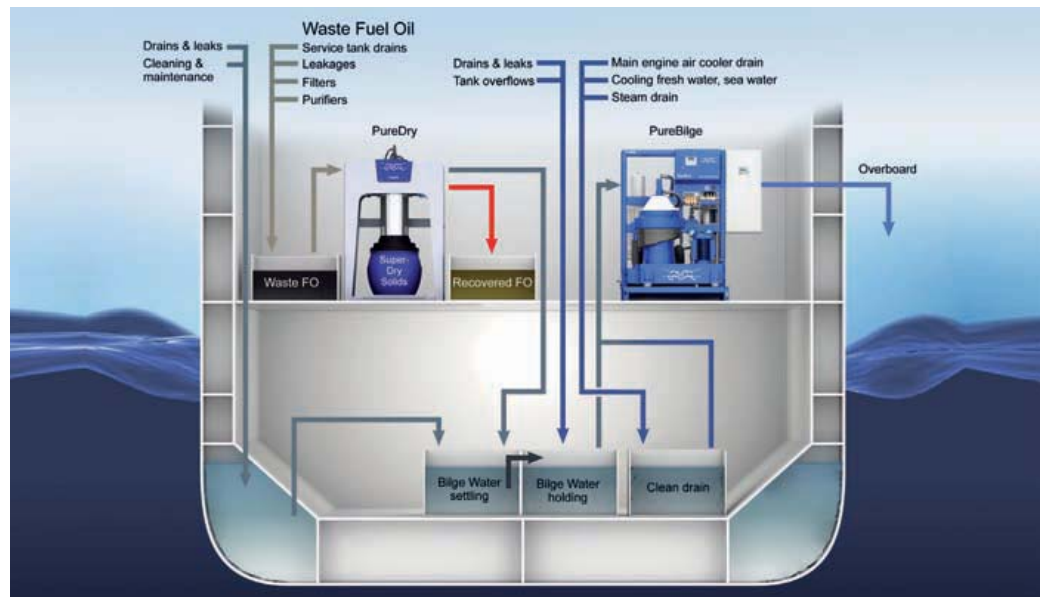
Alfa Laval sees waste fuel recovery (WFR) as a new, game-changing application that will bring the shipping industry huge fuel savings. With high oil prices, bunker fuel oil accounting for about 60% of a vessel's operating costs, and increasingly stringent emission controls, a fuel strategy and ways to cut fuel bills are at the top of the agenda for most shipowners and operators today. In addition to looking at technical measures to cut fuel bills, such as exhaust gas cleaning and other technologies, shipowners are being compelled to reduce speed, remove destinations from their itineraries, and so on.

However, it is now permissible to re-use waste fuel and, according to Alfa Laval, for the first time there is a technically and economically efficient method of recovering waste fuel from fuel oil residues. With waste fuel recovery, a direct saving of up to 2% on fuel bills can be achieved – an investment that pays for itself and gives a healthy profit in the first year.

Operability of WFR

Waste fuel oil comes from settling and day tank drainages, leakages, filters and purifiers and is collected today in the waste oil tank and subsequently landed or incinerated.

Alfa Laval's WFR concept involves installing two waste oil tanks, one for lube oil (LO) and the other for fuel oil (FO). Some vessels already have this arrangement. Although to the observer the waste fuel oil tank appears to contain just black oil, it is actually oil-polluted water con-



The PureDry and PureBilge integrated system

taining 20–30% energy in the form of recoverable fuel oil. The remaining 70–80% is oil-polluted water and, accumulating at the bottom, suspended solids making up about 1%.

Reusable FO returned to the bunker tank

Described by Alfa Laval as the first truly successful technology for waste oil treatment, the PureDry separator recovers the fuel oil from the oily water in the waste FO tank; it is then returned to the fuel oil bunker tank for re-use after normal treatment. For the shipowner, the result is a reduction of up to 2% in the total volume of fuel oil consumed and a corresponding reduction in the ship's fuel bill.

The process reduces the volume of waste oil by 99%, producing

typically 5–15 kg per day of non-pumpable "super-dry" solids that can be landed as dry waste and disposed of in the same way as oily rags and used filter cartridges. There are no oil losses, and no additional wastes are generated. The separated water, now with an oil content of less than 1,000 ppm, is pumped to the bilge water system.

Profit within the first year

Pauli Kujala, senior business manager, Oily Waste Treatment Systems, Alfa Laval Marine & Diesel Equipment: "A large container vessel or cruise ship, sailing 52 weeks per year, typically burns 1,000 tonnes of fuel per week. Now, with PureDry recovering fuel that would otherwise be treated as waste, it will be possible to cut the ship's fuel bill by up to 2%, which amounts to at

least USD 500,000 per annum at today's bunker prices."

Problems with full waste oil tanks eliminated

PureDry also solves the problem of the waste oil tank filling up. The waste oil is treated instead of being stored for subsequent incineration or landing. If the oily water separator (OWS) does not function properly, the bilge water goes into recirculation and fills up the bilge water tank. When this is full, it is usually pumped to the waste oil tank. When the waste oil tank has no more capacity, the ship has a problem. Incineration of the waste oil means burning up to 80% water, and to do this it is necessary to add costly diesel fuel. Alfa Laval's new waste oil treatment concept is said to solve the problem.

Landing waste oil can be costly

There are also problems today with landing of waste oils. In many ports, it is difficult. For instance, California is not prepared to handle waste oil. If landed, it has to be transported by road tanker to a neighbouring US state for disposal. This, of course, means the shipowner has to pay dearly for it.

In some places it is possible to sell waste oil, probably for about USD 110 per tonne, although the price depends on the water content. But in these cases, shipowners are getting paid for oil they once purchased at full price. In fact, they are selling it at a huge discount to someone else, when they could re-use it themselves.

Flows metered and recorded

The PureDry system has accurate flow metering in the EPC 60 control unit. The feed is monitored, recovered oil is



Alfa Laval's new waste fuel recovery unit

metered, the water is metered and a load cell registers when the dry solids container is full. All this is digitally recorded for presentation to the authorities during, for instance, port state controls. Fuel has been recycled, but no oily waste is missing from the ORB records because the recovered oil has been metered and logged.

Paradigm shift in separation

The new PureDry generation represents a paradigm shift in high-speed disc stack separator solids discharge design. With PureDry, there is no aperture in the bowl and no sensitive hydraulic system installed to actuate solids discharge.

A patented, spiral-shaped device, called the XCavator, transports the super-dry solids to the base of the machine, where they exit down into a container below the machine.

There are only two main moving/rotating parts – the separator insert including the XCavator, and the outer bowl shell. They move in the same direction but at different speeds, thus transporting the dry solids out of the machine.

The essence of the PureDry concept and the thinking behind the choice of name is that no water is added. The new design completely eliminates the need for displacement water prior to discharge, as well as water needed for conventional hydraulically controlled discharge mechanisms. And, as mentioned earlier, the solids are discharged in super-dry form.

'Maintenance and Service by Exchange'

Alfa Laval has also developed an innovative, module-based maintenance concept called Maintenance and Service by Exchange (MSE). PureDry is supplied with an exchange kit, which includes a new separator insert (rotor and disc stack), a new XCavator, and a consumables kit. After one year, the crew replaces the separator insert as simply as replacing the insert in a filter, along with the XCavator. The used parts are returned to the nearest Alfa Laval Service Centre, and the ship orders a new exchange (and consumables) kit. "The customer is not purchasing new parts – we supply the kit at an exchange price," says Pauli Kujala. "And the PureDry separator remains under continuous warranty. This is virtually all that needs to

be done to keep the equipment in good operating order. The aim is to give customers the opportunity to budget and maintain a fixed operating cost." For full operational security, PureDry is equipped with an advanced integrated condition-based monitoring (CBM) system that records temperature and vibration via the EPC 60 control unit. The system can give the crew an early alert or even shut down the machine if the running conditions should suddenly deviate from specifications. Action can then be taken based on recommendations from the CBM system – it may be a recommendation to run the cleaning-in-place (CIP) process or exchange a component using the exchange kit.

Integrated waste oil and bilge water system

Together, PureDry and Alfa Laval's PureBilge bilge water separator form an integrated waste oil and bilge water handling system. It recovers waste

FO that is returned to the fuel oil bunker tank, treats waste LO to reduce the volume, cleans the bilge water to 0-5 ppm for discharge overboard, and generates small volumes of super-dry solids for landing as dry waste. PureBilge is the first system of its type to pass the new, more stringent DNV 5 ppm type approval process for oily water separators. It provides a cleaning performance in real-life conditions of 0-5 ppm oil content in the water without chemicals, adsorption filter or membranes. PureBilge is delivered with the integrated tamper-proof BlueBox bilge data recording system.

Environmental benefits

If the world's merchant fleet cut its fuel bill by 2%, there would be a reduction in HFO consumption of approximately 10.4 million tonnes per year and the amount of CO₂ released annually would be reduced by 32 million tonnes, according to Alfa Laval.