

Wärtsilä Voyage Emission Reduction System

Re-absorption Version

PRODUCT LEAFLET



The Wärtsilä Voyage Emission Reduction System (VER™) can save 2 million US dollars worth of cargo a year. The system effectively eliminates VOC emission problems from oil tankers during laden voyages. A simple plug-in unit re-circulates the VOC back to the cargo tanks, protects the environment, and eliminates cargo losses of up to 270 tons per week for a VLCC.

On average, an oil tanker will emit 0.085% of its contained cargo every week. For a 320,000 DWT VLCC, this amounts to 270 tons of lost cargo per week.

Assuming the VLCC operates laden voyages for 20 weeks in a year, the cargo loss will be 5,400 tons per year. With the Wärtsilä VER™, 80% of these emissions will be absorbed back into the cargo, thus making a major contribution to increased revenues while, at the same time, notably reducing the ship's environmental impact.

PLUG AND PLAY

The Wärtsilä VER™ has been designed for easy installation, operation and maintenance. It comes in two versions; either with a capacity of up to 400m³/h (tankers up to 160 kTDW), or a capacity of up to 800m³/h (tankers up to 320 kTDW). Both versions are delivered in containers outfitted with all the equipment needed to run the system. The only utility required from the ship is electrical power. The container will be connected to the cargo tank vent line for the inlet of vapour, and to the cargo stripping line for returning the VOC to the cargo tanks. A simple installation for gas absorption

is located at the stripping pipe inlet in one or more of the cargo tanks to distribute the gas for re-absorption into the cargo.

The operation is carried out automatically without manual intervention. The plant runs within a certain cargo tank pressure range with an automatic stop at low pressure, and an automatic vent at high pressure.

The inlet filter needs to be changed at high differential pressures, while lube oil will need to be added when it reaches a low level. Routine maintenance will typically be carried out after the compressor and glycol pump have accumulated 5,000 running hours.

KEY BENEFITS

- Easy installation
- Suitable for retrofit
- Automatic operation
- Little maintenance required
- Significant increase in the amount of delivered cargo
- Payback time of less than 1 year
- Environmentally friendly

Fig.1 System overview

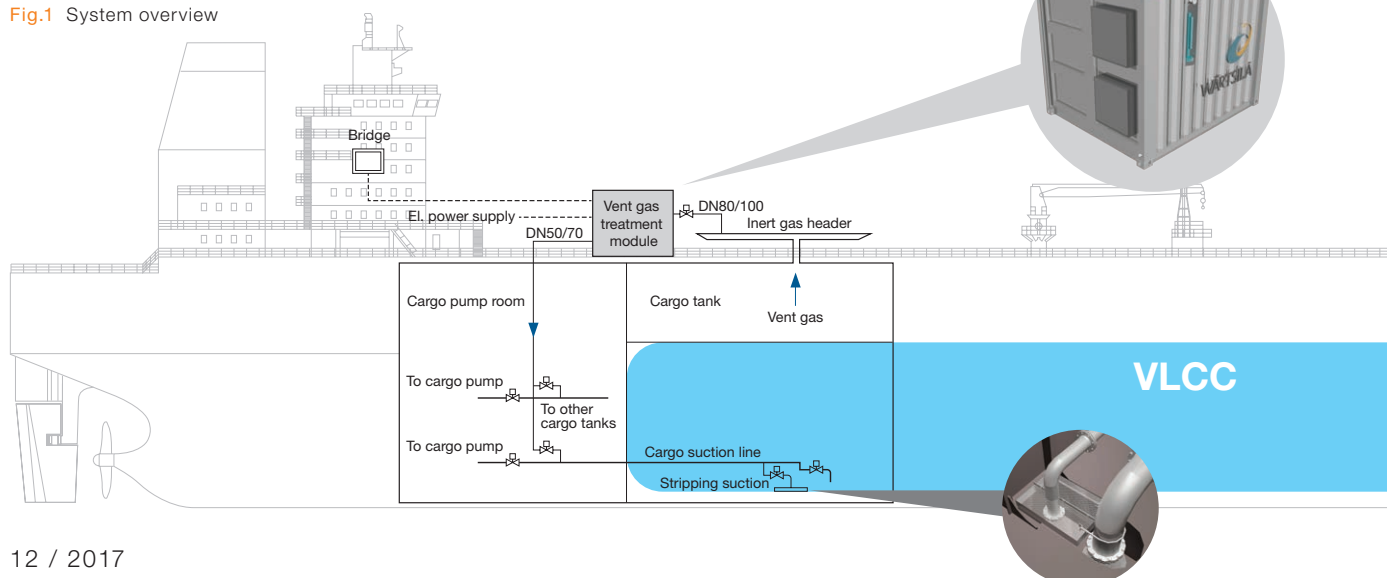


Fig.2 Typical fully equipped container

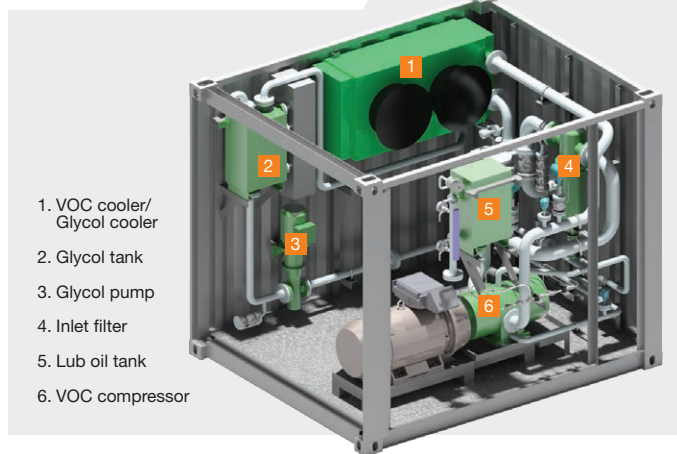
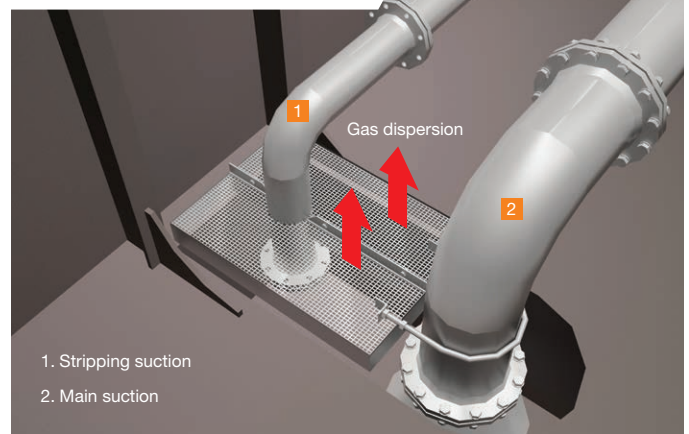


Fig.3 Re-absorption unit in cargo tanks



The system's innovative features are shown below, and together they make the VER™ a simple and efficient plug and play solution.

ROTARY VANE COMPRESSOR

The rotary vane compressor is glycol cooled with oil lubrication. The oil consumption amounts to less than 0.5 l/day of operation. The air cooled electrical motor power requirement is 35 kW.

HEAT EXCHANGER

The air cooled heat exchanger serves 3 purposes for the compact VOC system:

1. Cooling the compressed VOC to air temperature + 5°C.
2. Cooling the glycol.
3. Creating ventilation for the container

AUXILLIARY EQUIPMENT

- Glycol pump
- Inlet filter
- Re-absorption units in 3 or 4 cargo tanks

SIMPLE OPERATION

The system is automatically operated and can run without manual intervention. A control panel is provided to be installed on the bridge and will monitor the plant with the following alarms:

- Low level lubrication oil
- Low level glycol
- High temperature gas outlet
- Low suction pressure
- High bearing temperature on motor and compressor.

Filling of the lube oil can be carried out from outside of the container. Gauges

located outside the container indicate the lube oil levels. Alarms indicate when the levels of lube oil and glycol are low, and when there is high differential pressure across the inlet filter.

ENVIRONMENT

VOC emissions from cargo tanks contain both methane and non-methane hydrocarbons. A reduction of 5400 tons of VOC per year translates to approximately 20,000 tons CO₂-equivalents. Local pollution is reduced by 80%.

TECHNICAL SPECIFICATION

	VER 400	VER 800
Power requirement	34 kW	48 kW
Compressor capacity	400 Sm ³ /h	800 Sm ³ /h
Delivery pressure	2.5 barg	2.5 barg
Weight	8.5 mT	9.5 mT
Size (L x W x H)	3.05m x 2.44m x 2.59m	6.10m x 2.44m x 2.59m
Vessel size	max 160000 TDW	max 320000 TDW

Fig.4 Process flow diagram

