

Wärtsilä Voyage Emission Reduction System

Fuel Version

PRODUCT LEAFLET



The Wärtsilä Voyage Emission Reduction System (VER™), fuel version is suitable for LNG fueled oil tankers. The VER™ fuel version can save up to 20% of fuel for these tankers by mixing VOC with LNG fuel in a tested and approved mixing process.

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

Assuming the VLCC operates laden voyages for 20 weeks every year, the cargo loss will be 5,400 tons per year. With Wärtsilä VER™ fuel version, 80% of these emissions or approx. 4,320 tons can be turned into valuable fuel for the vessel. As well as being a major contributor to increased revenues the VER™ will help to save our environment.

The VOC recovery and mixing technology are patent pending. The technology has been tested at our test facilities for both 4-stroke and 2-stroke engines and is currently being installed on North Sea shuttle tankers at Samsung Heavy Industries (SHI).

LADEN AND BALLAST

The Wärtsilä VER™ fuel version will contribute to fuel reduction both at Laden voyage and at ballast voyage. During the laden voyage, non-condensed VOC will be

provided to the engines at required pressure, using a two-stage compressor. The condensed VOC can be vaporized and used as fuel during the ballast voyage. The fuel mixing system will continuously control the mixing ratio between VOC and LNG in order to maintain the correct Methane number.

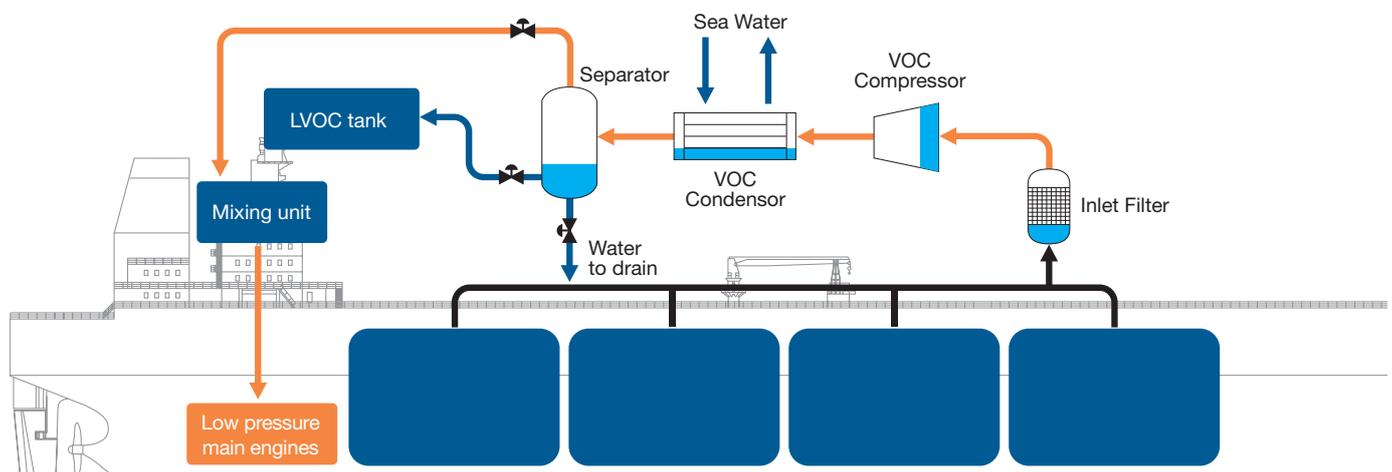
SIMPLE OPERATION

The Wärtsilä VER™ fuel version is fully automatic operated and will not need any human intervention during operation. A control panel will be provided on the bridge, CCR and ECR. The system will communicate with the engines in order to compute the correct MN at any given load.

ENVIRONMENT

VOC emissions from cargo tanks contain both methane and non-methane hydrocarbons. A reduction of 5,400 tons of VOC per year translates to approximately 20,000 tons CO₂-equivalents. Local pollution is reduced by 80%.

Fig.1 SIMPLE OPERATION – fuel gas mixing with SVOC and LG



INSTALLATION

VER™ Fuel is a patent pending process with compression and condensation in two stages.

We suggest to install all fuel related equipment in a small deckhouse, consisting of:

- VOC plant
- VOC vaporizer
- LNG heater and vaporizer skid
- Mixing valve unit

In addition one LVOC tank and one LNG tank must be installed on deck.

VER™ Fuel will be available in two sizes:

- Up to 160,000 DWT
 - 400 Sm³ VOC compressor capacity
 - 150 m³ LVOC tank
- From 160,000 to 320,000 DWT
 - 800 Sm³ VOC compressor capacity
 - 300 m³ LVOC tank

CONTROL PHILOSOPHY

A fuel mix controller controls the mixing ratio based on:

- Methane number calculation based on input from a gas analyzer
- Engine load – MN requirement reduced at lower load

The fuel mix controller also controls the sea water valve based on cargo tank pressure:

- If cargo tank pressure is increasing, we want to condensate more VOC to increase consumption – sea water flow is increased
- If cargo tank pressure is decreasing we want to decrease condensation in order to utilise as much VOC as possible as fuel – sea water flow is decreased

Fig.2 LADEN VOYAGE – fuel gas mixing with SVOC and LG

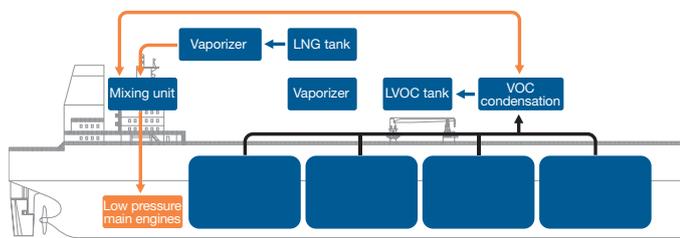


Fig.3 BALLAST VOYAGE – fuel gas mixing with LVOC and LG

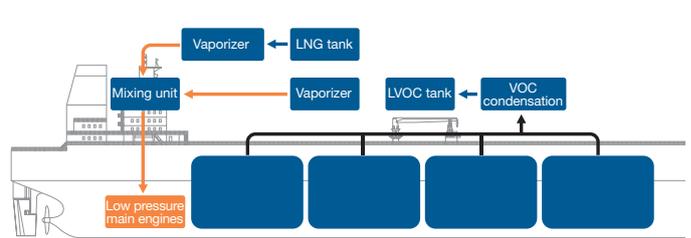


Fig.4 Process flow diagram

