

THE SVITZER ECOTUG® **THE TUG OF THE FUTURE**



SVITZER



SVITZER ECOTUG® – AN IMPORTANT FIRST STEP

The SVITZER ECOTUGs are an industry revolution and an important step in SVITZER's continuous efforts to minimise emissions. The ECOTUGs feature both diesel-electric propulsion and fully electrical winches. In order to save fuel without compromising a high level of performance, three smaller engines make it possible to run the ECOTUG at maximum efficiency at all times. The result is a 10% CO₂ reduction and up to 80% NO_x reduction, thereby meeting IMO Tier 3 requirements well before they come into effect in 2016.

This is only the first but very important step in SVITZER's effort to minimise emissions while at the same time providing environmental and economical advantages for our clients.

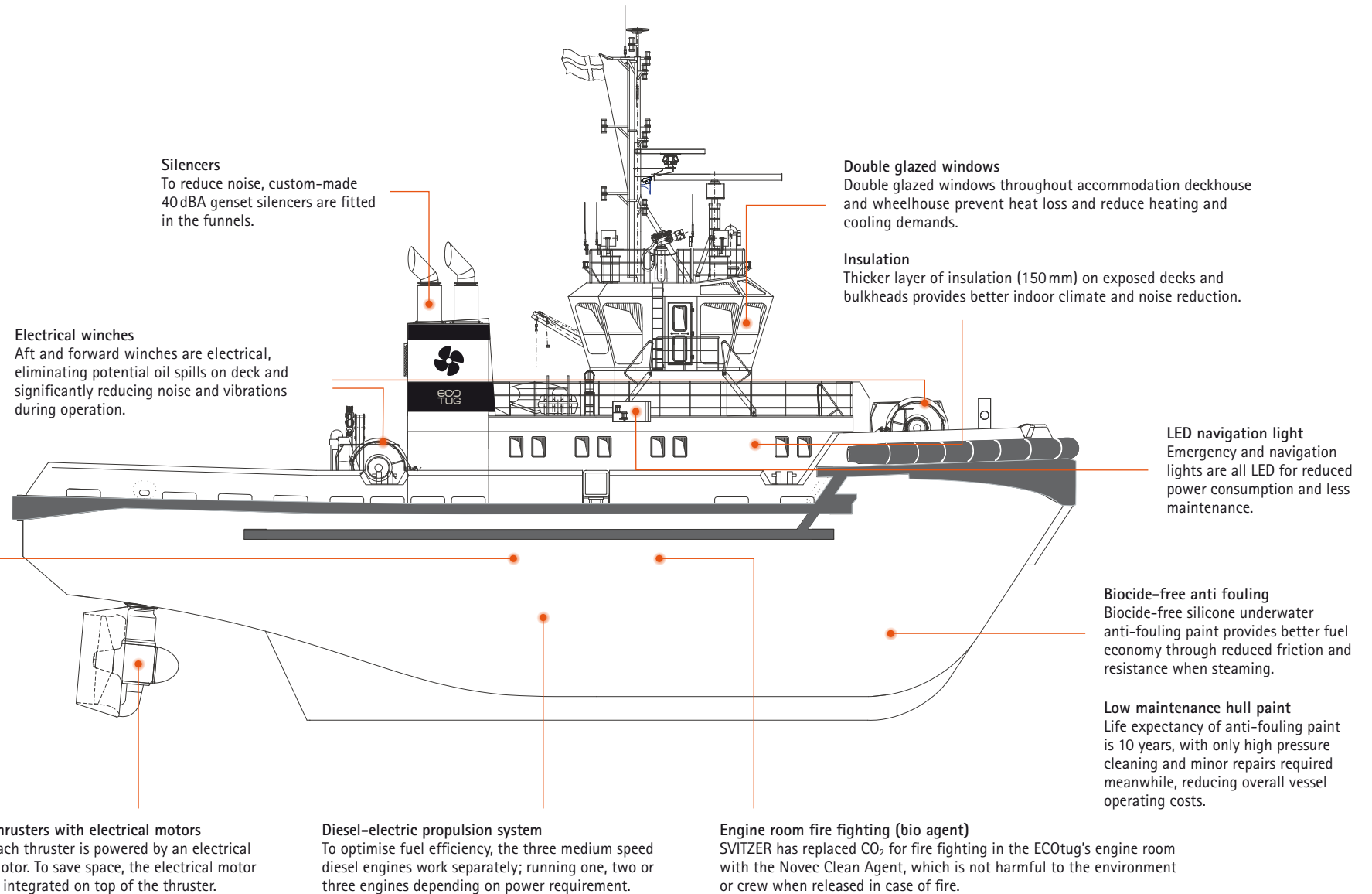
ECOTUG FEATURES AND BENEFITS

- Diesel-electric propulsion that significantly reduces CO₂ emissions
- 10% less fuel consumption compared to traditional tugs
- 2-5% less fuel consumption compared to optimised tugs
- Fully electrical winches reducing noise, vibrations and avoiding potential oil spills on deck
- Three medium speed diesel engines run alternators that power the entire vessel
- Efficient SCR plant (selective catalyst reaction) that significantly reduces emissions of SO_x, NO_x and particulate matters to ensure compliance with IMO Tier 3 requirements
- Heat exchange (heat from engine room used for heating in the accommodation)
- To reduce noise, custom-made 40 dBA genset silencers are fitted in the funnels
- Biocide-free anti-fouling paint provides better fuel economy through reduced friction
- Silicone-based underwater paint provides a smoother surface for reduced friction and resistance resulting in better fuel economy when steaming
- Double glazed windows throughout accommodation deckhouse and wheelhouse to prevent heat loss and reducing heating and cooling demands
- Thicker insulation (150 mm) on exposed decks and bulkheads provides better indoor climate and noise reduction
- Five different operational modes are designed for the vessel from the flexible power management system to ensure optimal use of the engines in all situations

For further information on the SVITZER ECOTUG, please visit www.svitzer.com/ecotug

SIGNIFICANT FEATURES

eco TUG



SCR (Selective Catalyst Reactor)
Genset exhausts are fitted with SCR to ensure emissions meet IMO Tier 3 requirements, significantly reducing emissions of NO_x and particulate matters (PM).

Particulate filter
The SCR of the middle engine is integrated with an additional particulate filter property to further reduce PM emissions.

SO_x
All SVITZER tugs run on low sulphur diesel, thus minimising SO_x emissions and meeting requirements for operating in emission controlled areas.

Thrusters with electrical motors
Each thruster is powered by an electrical motor. To save space, the electrical motor is integrated on top of the thruster.

Diesel-electric propulsion system
To optimise fuel efficiency, the three medium speed diesel engines work separately; running one, two or three engines depending on power requirement.

Engine room fire fighting (bio agent)
SVITZER has replaced CO₂ for fire fighting in the ECOtug's engine room with the Novec Clean Agent, which is not harmful to the environment or crew when released in case of fire.

Silencers
To reduce noise, custom-made 40 dBA genset silencers are fitted in the funnels.

Electrical winches
Aft and forward winches are electrical, eliminating potential oil spills on deck and significantly reducing noise and vibrations during operation.

Double glazed windows
Double glazed windows throughout accommodation deckhouse and wheelhouse prevent heat loss and reduce heating and cooling demands.

Insulation
Thicker layer of insulation (150 mm) on exposed decks and bulkheads provides better indoor climate and noise reduction.

LED navigation light
Emergency and navigation lights are all LED for reduced power consumption and less maintenance.

Biocide-free anti fouling
Biocide-free silicone underwater anti-fouling paint provides better fuel economy through reduced friction and resistance when steaming.

Low maintenance hull paint
Life expectancy of anti-fouling paint is 10 years, with only high pressure cleaning and minor repairs required meanwhile, reducing overall vessel operating costs.



DEVELOPING AN INDUSTRY REVOLUTION

As part of SVITZER's overall strategy to minimise emissions and our environmental footprint in general, the first environmentally friendly ECOtugs have now been delivered. The ECOtug is modeled on the renowned M-class and is an example of our environmental focus, which is anchored in a fuel efficiency programme, new tug design initiatives and research on alternative fuels. The ECOtug is the world's first IMO Tier 3 tug and is targeted at clients and harbours who have been looking for an environmentally friendly solution. We will continue to develop environmentally friendly tugs and we are already now in the process of developing the next generation of the ECOtug.

For two years, all components of the M-class have been analysed and optimised in order to make the ECOtugs as eco-efficient as possible. Applying the latest technology to minimise fuel consumption and emissions without compromising the high level of performance has been key.

OPTIMISING ENGINE EFFICIENCY

International research shows that medium-speed engines are most efficient when they operate at around 80-85 percent of their capacity, so the goal was to make the engines work as close to 80 percent as possible at all times during operation. The ECOtug's three-part engine is designed with this in mind.

"When we don't need full power, we only run on the necessary engine or engines. When we need more, we simply activate more. That way, we can stay close to the engine's most efficient load zone at all times – regardless of what tasks we are solving. And that makes all the difference."

Esben H. Grundtvig, Head of Group New Building.

WHAT IS ECO-EFFICIENCY?

To SVITZER, eco-efficiency is an aspiration to go beyond legislative compliance and at the same time achieve a competitive advantage. To reach that level, we have been systematically identifying potentials for a more efficient use of resources, thereby lowering total emissions and optimising costs. Since 2009 the SVITZER Group's overall CO₂ emissions per tug job have been reduced by 1% each year, thereby reaching our target for 2009–2012.

When discussing emissions, there are two categories to consider: one that pollutes the environment (SO_x, NO_x and PM) and one that affects the climate (CO₂). Reduction of CO₂ is only achievable through the reduction of fuel consumption, as the burning of fossil fuels creates CO₂.

Sulphur oxides (SO_x)

The most effective way of reducing sulphur oxide emissions from the fuel combustion is to use fuel with low sulphur contents. Low-sulphur fuel is used throughout our towage operations.

Nitrogen oxides (NO_x)

Nitrogen oxides are byproducts of the combustion process. The most common way of reducing them is by fitting a catalyst that converts NO_x into nitrogen and water by adding ammonia. SCR's (Selective Catalyst Reaction) are an integral part of the ECOtug in order to meet the IMO Tier 3 requirements.

Particulate matter (PM)

Particulate matter comes from the fuel combustion. The SCR of the ECOtug's middle engine is integrated with an additional particulate filter property to further reduce PM emissions.



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