

REDUXCO® Marine:

Clearly and significantly improves the efficiency of the combustion process of all diesel engines (4 stroke, 2 strokes, high rpm, low rpm) running on diesel or heavy oil. Lower consumption and lower pollutant discharge allows a more ecological exploitation of powertrains

Benefits:

- Average Fuel saving: 4,55%
- Reduction of fuel consumption during manoeuvres: 6,22%
- Fuel savings during stable movement: 3,5%
- Reduction of greenhouse gas emissions (CO, CO₂, NO_x, SOF, PM)
- Complete disappearance of failure of fuel injection systems
- Reduction of black smoke and particles
- Simple implementation



Additional Benefits:

- Improved engine efficiency and engine protection
- Limited fouling
- Anti-corrosive and antibacterial
- Extends the lifetime of the engine and parts
- Less and easier maintenance
- Allows for longer intervals between maintenance phases
- Reduces maintenance cost and manhour cost

REDUXCO catalyst has undergone several trials of testing in laboratory and in real time conditions, in accordance with ISO standards and Annex VI of MARPOL 73/78 on the following brands;

MAN, MTU, Deutz, Caterpillar, Iveco Aifo, Volvo, Wartsila, Nanni, Hyundai and DAF



Tests conducted

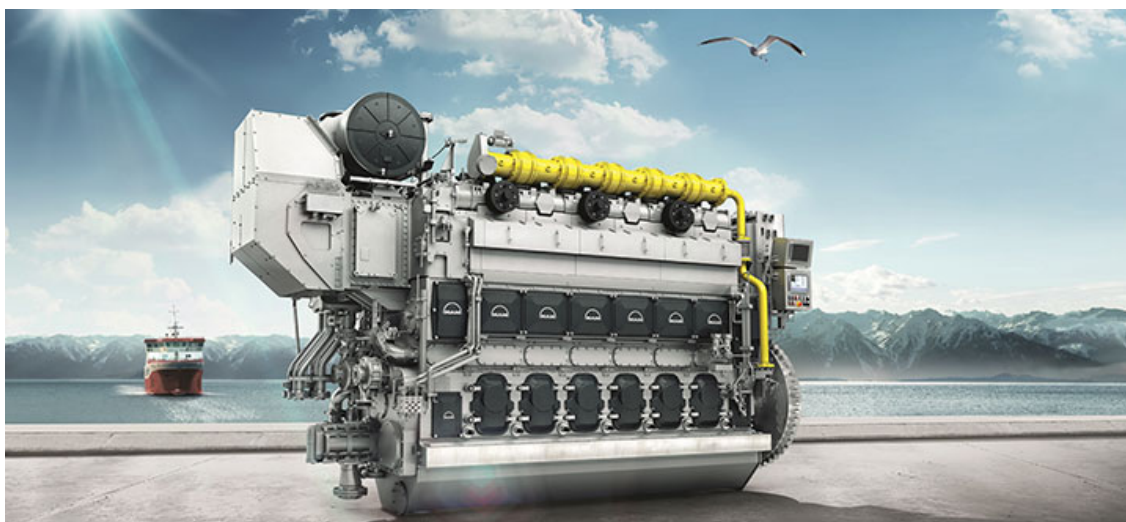
After several laboratory tests made by the Vehicle Institute, Warszawa and Maritime University in Szczecin it was possible to determine the impact of catalyst REDUXCO on reducing pollutant emissions for the following engines:

SULZER 6AL20/24 engine	
Application	Main or auxiliary engine
Maker	Sulzer H. Ciesielski Poznan
Type	6AL20/24 4-stroke
Power output	397 kW turbocharged
Revolution speed	720 rev/min

PERKINS 1104C-44 engine	
Application	Main or auxiliary engine
Maker	Perkins Engines
Type	1104C-44
Power output	64 kW
Revolution speed	2400 rev/min

REDUCTION OF POLLUTANT EMISSIONS	
CO	Up to 90 % depending on engine speed
NOx	5 to 10 %
SOOT	53 to 73 %
PM	40 to 62 %
SOF	35 to 62 %
THC	19 to 40 %



All tests were made in accordance with ISO-8178 standard and Annex VI of MARPOL 73/78.



Case Studies Marine

Trial results of Polish steam ship company – PZM & Polsteam

First trials were conducted for 2 years (from September 2009 to August 2011) on the PZM & POLSTEAM company bulk carrier, M/S Giewont

	rok budowy	typ	miejsce budowy	bandera	DWT
	2010	Panamax	New Times Shipbuilding, Jingjiang	 Bahamas	79649
Name			M/S GIEWONT		
Type			Panamax 2 Bulk carrier		
Weight			80.000 DWT		
Main engine			MAN 7S50MC {11.620 Kw}		
Auxiliary engine			3 Wartsila 645W4L20 {645 Kw}		
Main engine consumption			34.4 MT/day		
Auxiliary engines consumption			2.15 MT/day		
Boiler consumption			1.99 MT/day		
Average consumption savings (%)			3 to 4 %		

First trial period conclusion

- In similar service conditions and with the same load on main engine, the fuel consumption is 3 to 4% lower when REDUXCO combustion catalyst is added – with a volume of 12 ml of catalyst per metric ton (MT) of fuel.
- The test led to a saving of more than 580 MT of fuel on a total of 19,500 MT used
- **USD 348,000 were saved**
- No negative impact on the elements tested
- Highly positive impact during maintenance phases

Savings calculations include the cost of Reduxco catalyst but do not consider cost savings from reduced maintenance

Second trials where performed (from September 2010 to January 2014) on five Handy size bulk carrier vessels, also owned by the company PZM & POLSTEAM

Names	M/S Irma, Isa, Iryda, Isolda, Isadora
Type	Handy size bulk carrier
Weight	35.000 DWT
Main engine	MITSUI MAN B&W 5S50MC5 {6730 Kw}
Auxiliary engines	3 MAN B&W L16/24 {545 Kw}
Daily consumption	20 MT/day
Average consumption savings (%)	4,45 to 5,93 %

Second trial period conclusion:

- No incident occurs during more than 24,000 hours of testing on these 5 vessels
- In similar service conditions and with the same load on main engine, the fuel consumption is 4,45 to 5,93% lower when REDUXCO combustion catalyst is added – with a volume of 12 ml of catalyst per MT of fuel.
- The test led to a saving of more than 890 MT of fuel on a total of 20,000 MT used
- **USD 535,000 were saved**
- Highly positive impact on the injectors, pistons and rings during maintenance phases
- Savings calculations include the cost of Reduxco catalyst and are from fuel savings only

REDUXCO® catalyst does Not change the Physical and Chemical Properties of Fuel