



**XBEE**

ENZYME FUEL TECHNOLOGY

[www.XBEE.com](http://www.XBEE.com)



BETTER FUEL,  
BETTER PERFORMANCE.

BETTER CONSUMPTION,  
BETTER EMISSIONS.

**XBEE**: NATURALLY BETTER.

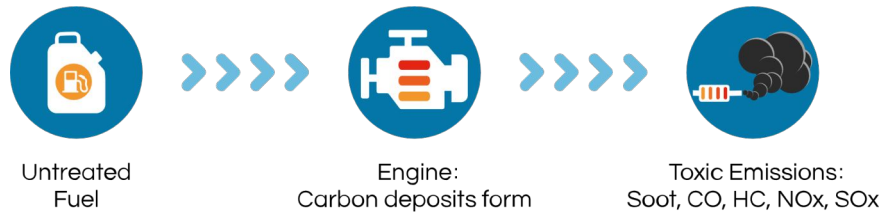
## Three good reasons to use XBEE Enzyme Fuel Technology

- 1 **XBEE** naturally improves fuel quality and solves all problems related to organic contaminants
- 2 **XBEE** reduces your fuel consumption and quickly pays for itself
- 3 **XBEE** improves your environmental footprint and reduces all gas emissions

# Why use XBEE Enzyme Fuel Technology?

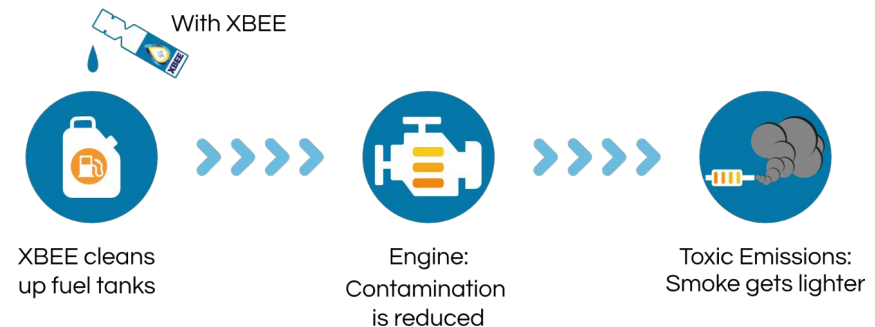
## 🔥 Protect your fuel and engine

Standard fuel is often contaminated and does not burn correctly, building up soot and carbon deposits in engines.



## 🔥 **STAGE 1:** Easy to use, natural and safe

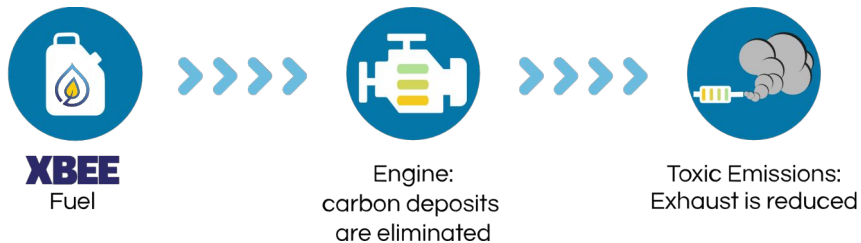
Adding **XBEE** to any type of fuel safely removes water, sludge, and the organic debris that contaminate fuel and damage fuel systems.



# How does XBEE Enzyme Fuel Technology work?

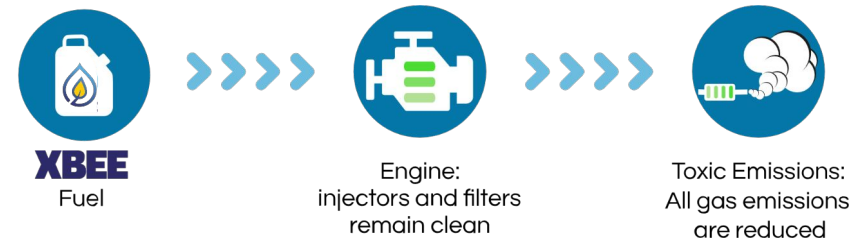
## 🔥 STAGE 2: Oxygenation and Combustion

**XBEE** hyper-oxygenates the fuel during combustion, reducing soot in the exhaust and gradually eliminating carbon deposits.

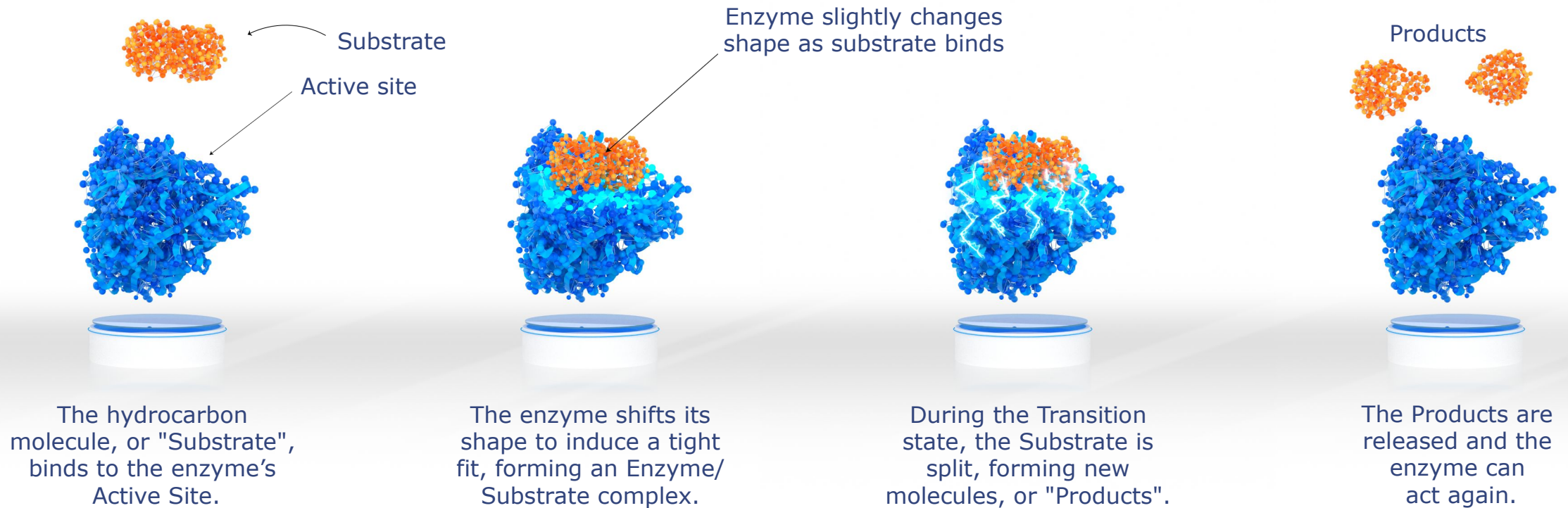


## 🔥 STAGE 3: Reducing pollution

With regular use of **XBEE**, both fuel system and engine are kept clean. This optimizes the combustion performance of your engine and lowers wasted fuel, and exhaust pollution.



# How does an enzyme work?





**WARRANTIES**

# XBEE fuels in compliance with all standards



**XBEE** contains natural enzymes extracted from tree leaves, in a highly purified petroleum carrier.

**XBEE** itself is a chemical-free, pure fuel.

Fuels treated with **XBEE** remain in compliance with all liquid fuel standards, even if overdosed.

Date	Laboratory	Country	Fuel standard
Mar. 26, 2019	Bureau Veritas	France	<a href="#">HFO 180 ISO 8217</a>
Dec. 26, 2018	Bureau Veritas	France	<a href="#">HFO 380 ISO 8217</a>
Oct. 22, 2018	Saybolt	Singapore	<a href="#">Diesel Oil 10 ppm</a>
Aug. 17, 2018	Bureau Veritas	France	<a href="#">MGO DMA ISO 8217</a>
Apr. 10, 2018	Bureau Veritas	France	<a href="#">Diesel Oil B7 EN 590</a>



# XBEE fuels are compatible with all engines



**XBEE** is an ashless product that contains no chemicals, no alcohols, no metals, etc. Thanks to its natural composition, it is harmless and completely safe to all alloys in engines.

## **DNV (Norway) and VPS (Netherlands)**

These laboratories analyzed pure **XBEE** and determined that our technology is completely safe for all engines.

## **Wärtsilä Finland Oy**

The engine manufacturer issued a letter of "No-Objection" to the use of the technology in their engines.

## **Mak/ Caterpillar (Germany)**

The OEM conducted diesel engine combustion tests with **XBEE** at their Department of Motor Development and Testing. Consequently, they issued a letter of recommendation noting **XBEE's** safety and efficacy, as well as its positive effects on the environment.



Date	Laboratory	Country	Engine standard
Nov. 14, 2022	Wärtsilä	Finland	<a href="#">Letter of no-objection</a>
Jan. 4, 2008	Det Norske Veritas	Norway	<a href="#">Composition analysis</a>
Oct. 29, 2018	Veritas Petroleum	the Netherlands	<a href="#">Composition analysis</a>
Jul. 18, 2005	Prodrive	United Kingdom	<a href="#">Diesel CEC F-23-A-01</a>
Aug. 4, 2005	Prodrive	United Kingdom	<a href="#">Gasoline CEC F-05-A-93</a>
May 19, 2003	Mak / Caterpillar	Germany	<a href="#">Letter of recommendation</a>







# BENEFITS

# XBEE cleans fuel tanks and engines



**XBEE** Enzyme Fuel Technology is detergent-free, yet cleans the entire fuel system, including tanks, piping, filters, and water separators, and by improving combustion, carbon deposits are eliminated, cleaning up the engine and exhaust system.

As **XBEE** breaks down organic contaminants into small, combustible particles, fuel filters last longer and water separators function more efficiently.

The same catalytic function that cleans the fuel also breaks down large fuel molecules, particularly Polynuclear Aromatic Hydrocarbons (PAH). This reduces soot. Combustion chamber deposits are reduced, and less soot enters the lube oil through blow-by.

**XBEE** naturally removes fuel-derived contaminants (water, sludge, etc.)



**XBEE** eliminates abrasive carbon and soot deposits in engines.

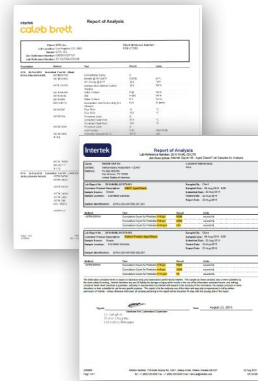
# XBEE removes impurities and stabilizes fuels



When fuel is in motion, **XBEE** acts as a mild surfactant, slowly dispersing water bottoms as microscopic drops without forming harmful emulsions or damaging fuel lubricity.

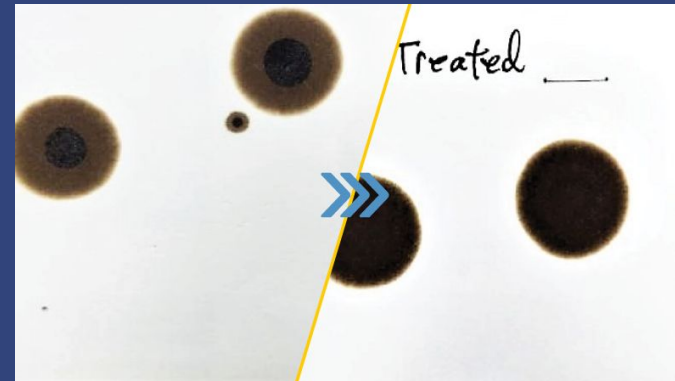
Corrosion is reduced as fuel remains dry and free from water-related problems.

**XBEE** disperses fuel-derived organic debris, including oxidative gums and asphaltenes that precipitate from aged or contaminated fuel, which forms gums and corrosive sludge. Reducing asphaltenes also improves the compatibility of fuel oils from mixed-sources, stabilizing fuel oils with low aromatic reserves.



**XBEE** reduces particles and water droplets in fuels  
ASTM D7619  
By Intertek, Canada

Test	Units	Neat aged diesel	XBEE aged diesel	Difference
≥ 4 μm	counts/ml	9 339	7 022	-24.81%
≥ 6 μm	counts/ml	2 280	1 608	-29.47%
≥ 14 μm	counts/ml	141	75	-46.81%



**XBEE** improves heavy fuel oil stability and compatibility ratings  
ASTM D4740  
By Intertek, USA

# XBEE reduces maintenance costs and fuel consumption



Cleaner fuel and better combustion result in:

- Less frequent or even no need for tank cleaning
- Less down time for engine maintenance and repairs
- Extended life of fuel filters, injectors, pumps, exhaust valves, pistons, and rings
- Lower oil and oil filter consumption

	Reduction	Savings (1,000 m <sup>3</sup> MGO)
Based on a price of \$900/ton of MGO, break-even point of <b>XBEE</b> is as low as a 0.75% reduction of fuel oil consumption.	0.5 %	-\$2,528.59
	1.0 %	\$2,563.01
	2.5 %	\$17,837.81
	3.0 %	\$22,929.41
	4.0 %	\$33,112.62
	5.0 %	\$43,295.82

	Reduction	Savings (10,000 m <sup>3</sup> HFO)
Based on a price of \$700/ton of VLSFO, break-even point of <b>XBEE</b> is as low as a 0.97% reduction of fuel oil consumption.	0.5 %	-\$36,515.91
	1.0 %	\$3,170.10
	2.5 %	\$122,228.13
	3.0 %	\$161,914.13
	4.0 %	\$241,286.15
	5.0 %	\$320,658.17

# XBEE reduces smoke and Greenhouse Gas Emissions



**XBEE** Enzyme Fuel Technology improves both fuel cleanliness and combustion, resulting in significant reductions of all exhaust gases and particles, such as toxic soot, unburned hydrocarbons, CO<sub>2</sub>, NO<sub>x</sub> and SO<sub>x</sub>.

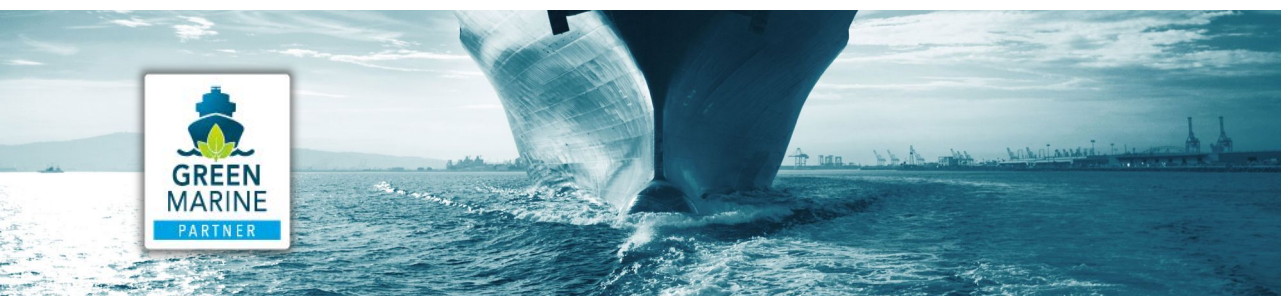
Reducing fuel consumption is the easiest way to reduce emissions of carbon dioxide. When you use **XBEE** you are reducing CO<sub>2</sub> and your energy footprint, and saving money at the same time.

MGO	Without XBEE	With XBEE	Difference
Fuel consumption (g/kWh)	254.10	229.10	-9.83%
CO <sub>2</sub> (g/kWh)	788.00	716.00	-9.14%
CO (g/kWh)	1.81	0.58	-67.96%
NO <sub>x</sub> (g/kWh)	10.20	7.60	-25.49%

Source: [Envirotech Consultancy WLL and Boskalis, dredger Coastvay](#)

HFO 380	Without XBEE	With XBEE	Difference
Particulates (mg/Nm <sup>3</sup> )	121.70	63.94	-47.46%
CO <sub>2</sub> ( %)	6.10	5.53	-9.33%
CO (mg/Nm <sup>3</sup> )	98.43	66.35	-32.59%
NO <sub>x</sub> (ppmv)	2 310.33	2 221.90	-3.83%
VOC (mg/Nm <sup>3</sup> )	41.17	33.45	-18.73%

Source: [Ascal and Brittany Ferries, ferry Mont Saint-Michel](#)



# XBEE is easy to use and pays for itself

**ONE** solution to **ALL** your fuel-related problems:

- Standard dosage ratio is 1 litre of XBEE for 4 000 litres of fuel
- Treat fuel directly in the storage tanks
- Treat fuel at EACH and EVERY bunkering operations for optimum performance

XBEE products	Treat up to
1 040-litre IBC [XBEE1IBC]	4 160 000 litres
208-litre drum [XBEE20800]	832 000 litres
20-litre jerrycan [XBEE2000]	80 000 litres
1-litre bottle [XBEE0100]	4 000 litres



**XBEE SA** · Schifflange, Luxembourg

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**XBEE Ltd.** · London, United Kingdom

