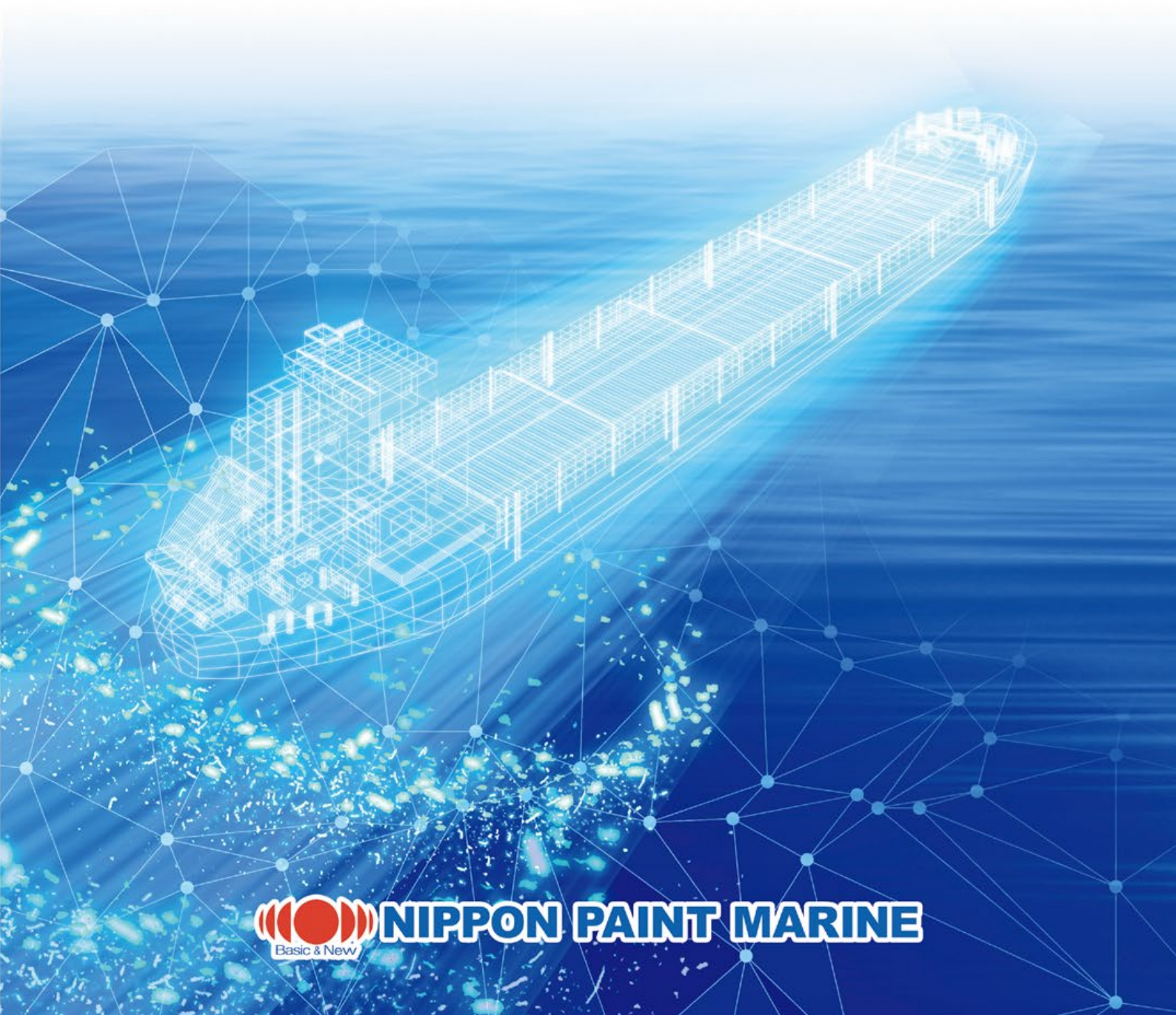




Nanodomain structured self polishing antifouling paint

# FASTAR



**NIPPON PAINT MARINE**



# Precise – Predictable – Performance

FASTAR will sell better A/F performance from its nano-domain technology.

Because the nano-domain delivers biocide ions more accurately than current SPC's. **Therefore PRECISE**  
FASTAR's A/F performance is less affected by seawater temperature and by the ship's speed. **Therefore PREDICATABLE**  
FASTAR has excellent A/F performance. **Therefore PERFORMANCE**

## Current SPC

Chemical reaction  
with sea water

Elution of biocides

- Global warming
- Operation diversification
- Changes of sea water temperature
- Changes in operating conditions

nano  
technology

# FASTAR

Over  
**50%**  
reduction

**Drastic reduction  
of biocide elution**

- Hydrophilic & Hydrophobic Nanodomain structure
- High Solid
- Water Trapping technology

PATENTED ( only XI, XII )

**Support  
for your ESG**

Max  
**37%**  
reduction

**Drastic reduction  
of painting workload**

Max  
**45**  
days

**Lay-up period /  
idoling period**

Approximately  
**8%**

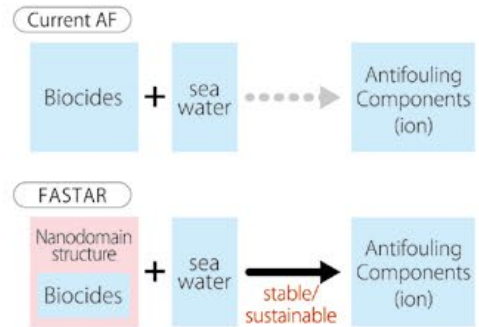
**Fuel Saving**



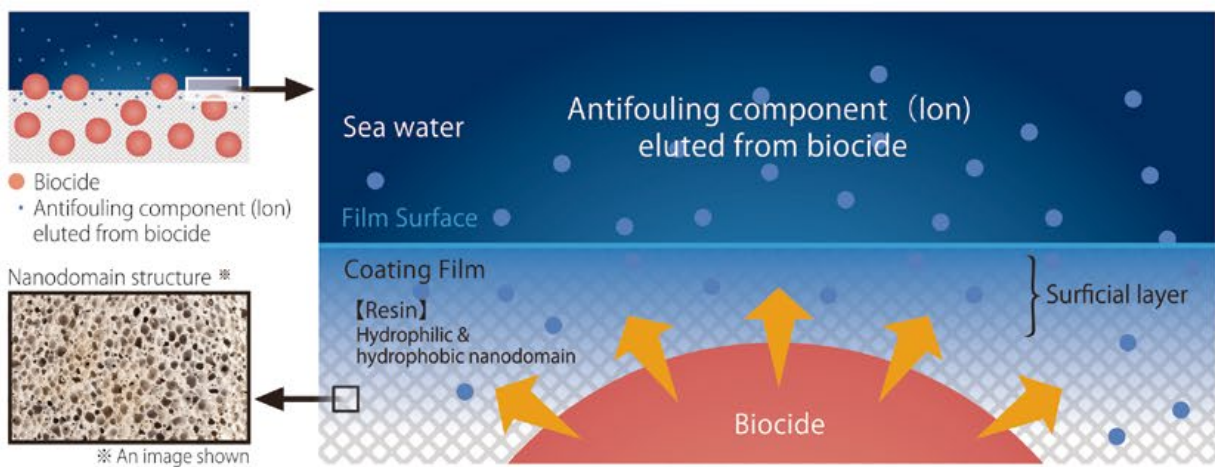
## Unique nanodomain structure

For many years, antifouling paints have performed by elution of antifouling components (ions) when the biocides come into contact with seawater.

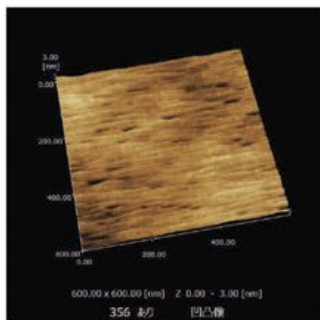
In order to control the elution of antifouling components, we focused on the "hydrophilic and hydrophobic domain". FASTAR resin is formed with nano-level hydrophilic and hydrophobic domains (Nanodomain structure). Nanodomain structured resin makes antifouling components **diffuse & retain** in surficial layer of coating film.



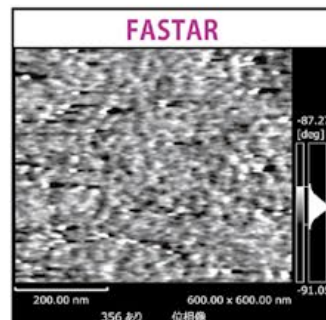
As a result, the antifouling components derived from the biocides in the coating film elutes more stably and continuously from the hydrophilic domain and are consumed together with the hydrophobic domain. This delivery of antifouling performance allows more exact control of the copolymer's polishing, even under increasing seawater temperatures.



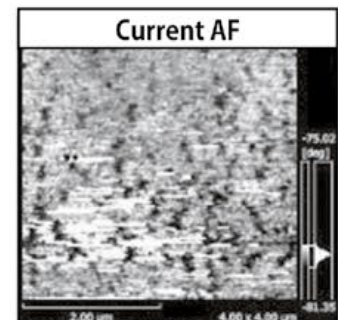
## Scanning probe microscope (SPM) magnified photograph



No difference on surface roughness

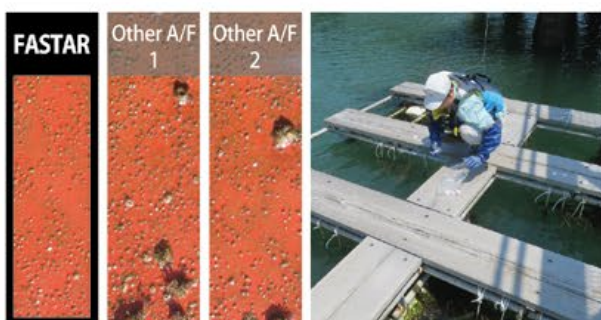


However, the domain structure at nano scale was observed, seen using a Scanning Probe Microscope.

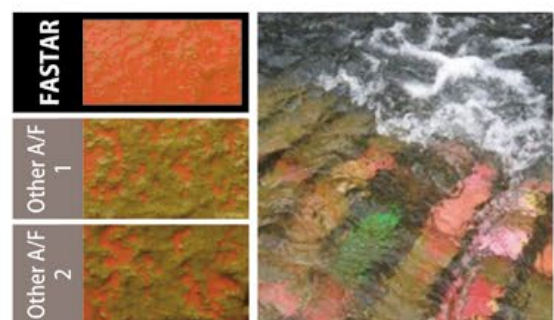


No domain structure confirmed within antifouling paints of current technology, using the same Scanning Probe Microscope.

## Field Test



Static condition after 9 months

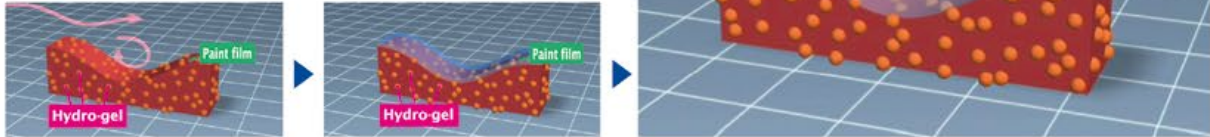


Dynamic condition after 9 months

## Water Trapping Technology

Our unique and patented water trapped layer formed by hydrogel helps to lower the hull's frictional resistance and contributes approx. 8% to the reduction of fuel consumption.

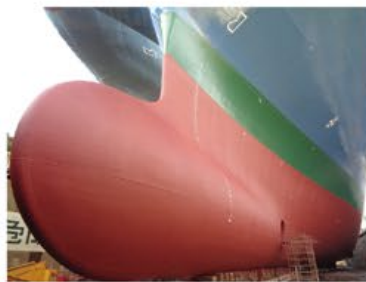
This special technology is standard in FASTAR XI and FASTAR XII.



## Application Image



36 months spec Bulk Carrier



36 months spec General Cargo



30 months spec Bulk Carrier

## Line Up

Suitable ship	Type	
	Self Polishing	Advanced fuel saving
Ocean-going vessels	<b>FASTAR I</b>	<b>FASTAR XI</b>
Specific ocean-going vessels	<b>FASTAR II</b>	<b>FASTAR XII</b>

To aid sustainable environmental protection, Nippon Paint Marine developed "water trapping" technology and incorporated it in our self-polishing antifouling paints to provide low friction and reduce fuel consumption.

Ten years later, we became the first to develop a biocide free self-polishing antifouling paint with a "micro domain structure" with further innovative technologies.

Inspired by the technologies cultivated with these antifouling paints, "FASTAR" aims to boost marine conservation and assist practical operation of ships in our changing world

## SUSTAINABLE DEVELOPMENT GOALS



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