ONE OF THE MOST ATTRACTION
INVESTMENT OPPORTUNITIES
IN SHIPPING TODAY!
On a typical vessel in a typical trade a 15% improvement in propulsion efficiency translates into an 8.5% fuel cost and GHG emission saving.
DETERIORATION IN HULL AND PROPELLER PERFORMANCE CAUSED BY BIOFOULING AND MECHANICAL DAMAGE ACCOUNTS FOR 1/10 OF THE WORLD FLEETS’ ENERGY CONSUMPTION!
The condition of a ship’s underwater hull surface has a substantial impact on its energy efficiency – both at the New Build stage and for the vessel in operation. Around 1/10 of the world fleet’s fuel consumption can be attributed to deterioration in hull and propeller performance*. This translates into around $30 billion in annual additional fuel cost and around 0.3% of all man-made carbon emissions.

Jotun’s Hull Performance Solutions have been designed to make it easy to maximize hull performance and thereby reduce both fuel cost and greenhouse gas emissions. The solutions combine state-of-the-art antifouling and application technologies with reliable performance measurements and high performance guarantees.

A Hull Performance Solution from Jotun can be expected to deliver a 15% propulsion efficiency gain and a 8.5% fuel cost and GHG emission saving as compared to a market average alternative. The pay-back period is usually less than 1 year. Since Jotun’s Hull Performance Solutions include reliable performance measurement and a no-cure-no-pay high performance guarantee, investment risk is limited as compared to typical investment alternatives.

*MEPC 63-4-8
Let us INTRODUCE YOU TO one of the most attractive INVESTMENT OPPORTUNITIES in SHIPPING TODAY!
Silyl Methacrylate
SeaQuantumX200 is the first of a new generation antifouling paints

The result of 20 years of Research & Development within Silyl Acrylate
Including >15 000 trial formulations and >9 000 full applications

Optimized for performance
No compromise approach to product development

BENEFITS

- **Improved initial performance** – as good as, or better than other low friction coatings and FRCs out-of-dock
- **Unrivalled performance** over docking interval – significant energy efficiency gain on average over lifetime as compared with other known products on the market
- **Fully compliant** with expected REACH regulation – relying on environmentally sustainable biocide package

SeaQuantum X200
The ultimate fuel saver
WE CAN LEAD THE WAY because nothing substitutes EXPERIENCE!
Jotun Hull Performance Application Procedure

Paint by itself is a semi-finished product, and hull performance is greatly influenced also by the quality of pre-treatment and application.

Our High Performance Application Procedures have been optimized for delivering the smoothest possible hull surface and include a comprehensive regime for measuring and documenting the solution’s contribution to reducing average hull roughness.

WHAT YOU GET

- **Maximized initial performance** – getting the most out of each and every step of pre-treatment and paint application

- **Minimized risk** of subsequent paint system failure – actionable advice

HOW WE DO IT

- **Purpose designed application procedure**

- **Handpicked** on-site Project Manager and increased manpower in dock

- **Improved** lines of communication with both customer and yard
We have never found a job well done to be a waste of time and money.
Jotun Hull Performance Measurement Method

Since we are in the business of delivering documented high performance we are dependent on being able to offer a reliable measurement methodology.

Jotun’s Hull Performance Measurement Method (JHPMM) isolates the impact of a ship’s underwater surfaces on its’ energy efficiency by tracking relative changes in the relationship between the power delivered to the propeller and speed through water over time.

Significant sources of random and systematic error are managed by collecting data with a very high frequency, by using a set of pre-defined data filters and normalization procedures, as well as a quality assurance protocol that includes monitoring of the correlation between different sensors.

**BENEFITS**

- **Accurate, reliable and fully transparent measurement** of the impact of the hull and propeller condition on ship efficiency – every day over the full dry docking interval

- **Purpose developed** to enable performance based contracting

**REASONS WHY**

- **Statistics based on** long time approach combined with high frequency data collection (typically more than 2,5 million data points per year)

- **All processing**, filtering and normalization is done in a fully transparent manner

- Proposed as starting point for work on **ISO standard** (ISO TC8)
IF YOU CAN NOT MEASURE A RETURN THE INVESTMENT HAS NO VALUE!

ESSENTIAL QUESTIONS TO ASK:

HOW IS IT MEASURED?

HOW MUCH ARE YOU SAVING?

COMPARSED TO WHAT?
Jotun Hull Performance Guarantee

By being able to reliably measure the extent to which high performance has been delivered, it is possible to also guarantee on it.

Jotun has developed a set-up for performance based contracting where Jotun either documents that high performance has been delivered or returns the additional investment in the hull performance solution.

Customers are in effect paying for delivered high performance - not for paint with the promise of high performance.

Our High Performance Guarantees have been designed to offer our customers as much flexibility as possible in terms of operation.

**BENEFITS**

- **Eliminates most investment risk;** much or all of the difference between solution cost and standard cost will, in the end, be paid back unless high performance has been delivered

- Strengthening Jotun’s incentive to do **whatever it takes** to deliver high performance – also in the face of unforeseen circumstances

- **Places responsibility** for assessing and managing antifouling risk where it belongs; with the antifouling maker

It is not yet possible to separate hull from propeller performance.
How can Jotun claim a ship performance increase:
We take responsibility for both!
That’s how confident we are!

We guarantee high performance, or pay-back sum equal to the difference in cost between a market average solution and high performance solution.
WHAT
WOULD YOU ATTEMPT
if you knew you could not fail?

Hull Performance Solutions
What is the expected energy efficiency gain (fuel saving) on average over the lifetime of the solution?

Energy efficiency gain (fuel saving) as compared to what?

Will it be possible to measure and document the actual energy efficiency gain (fuel saving) on the ship in question?

If so, will the measurements be done in a reliable and fully transparent manner?

If the expected energy efficiency gain (fuel saving) is delivered, what will be the return on the investment?

What happens if the expected energy efficiency gain (fuel saving) is not delivered?

How does the return and risk profile of this investment compare with other eco-technology investments?
**Key facts & figures**

### World-fleet energy cost & GHG emissions

- **Deterioration of hull & propeller performance**
  - ~10%

- **All other**

MEPC63-4-8: Deterioration of hull & propeller performance accounts for around 1/10 of world-fleet energy costs and GHG emissions

#### IMPLICATIONS:

- **$30 BILLION**
  - annual increase in energy cost

- **0.3% increase**
  - in man-made carbon emissions

### Alternative Solutions

**How willing would you be to consider the following “alternative” solutions for a new container ship design?**

<table>
<thead>
<tr>
<th>Ranking</th>
<th>Solution</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Advanced coating systems for reduced friction</td>
<td>4.26</td>
</tr>
<tr>
<td>2</td>
<td>Energy-saving devices, such as heat recovery systems</td>
<td>4.07</td>
</tr>
<tr>
<td>3</td>
<td>LNG for auxilliary in port and SECA area</td>
<td>3.83</td>
</tr>
<tr>
<td>4</td>
<td>Use of lightweight or composite materials in lashing girflashing rods</td>
<td>3.78</td>
</tr>
<tr>
<td>5</td>
<td>Dual fuel propulsion – diesel/LNG</td>
<td>3.72</td>
</tr>
<tr>
<td>22</td>
<td>Multihull concept, such as catamaran or trimaran</td>
<td>2.74</td>
</tr>
<tr>
<td>23</td>
<td>Wind power, such as sails and/or kites</td>
<td>2.72</td>
</tr>
<tr>
<td>24</td>
<td>Nuclear power for propulsion and auxilliary</td>
<td>2.06</td>
</tr>
</tbody>
</table>

© DNV Quantum project
**Are you asking the right questions?**

For an owner of a typical LNG carrier* about to dry-dock:

*Given underwater hull area of 11 000m², 50 tons per day, 256 trading days per year, $650 per ton of HFO and worldwide trade.*

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**By securing paint free of charge, you save $94,000!**

**Potential cost saving from securing a market average paint free of charge**

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**By investing in Jotun HPS, you reduce fuel consumption by 8.5%, and save $3.5 million in fuel cost.**

**Potential cost saving from securing a 8.5% reduction in fuel consumption**

---

) Shows $94,000 potential saving

1 sq = $ 5 000

) Shows 1% potential saving

1 sq = $ 5 000

) Shows 8.5% potential saving

1 sq = $ 5 000
JOTUN DOES NOT ONLY SELL THE VERY BEST PRODUCTS WORLD WIDE

WE DISCOVER NEEDS
WE INNOVATE
WE RESEARCH NEW POSSIBILITIES
WE DEVELOP CUTTING EDGE TECHNOLOGIES
WE CREATE SOLUTIONS

THE BOTTOM LINE IS THAT WE WORK HARD TO IMPROVE THE COMPETETIVENESS OF YOUR SHIP

DO YOU WANT TO WORK WITH US?

HPS Hull Performance Solutions

Invest in knowledge: jotun.com/hps