



A New Generation Silyl Antifouling Coatings

# *TAKATA QUANTUM X-mile*

Ultimate Smoothness, Ultimate Fuel Saving

**KANSAI PAINT MARINE CO.,LTD.**

# A New Generation Silyl Antifouling Coatings

## TAKATA QUANTUM *X-mile* 10.5% Fuel Saving Possible

**TAKATA QUANTUM** and its series, based on silyl acrylate technology, have long been recognized as the best performing antifouling coating on the market. During the past 15 years more than 6000 vessels have been coated with our silyl acrylate technology.

Kansai Paint Marine, under our previous company title, was the first manufacturer of silyl acrylate TBT-free antifouling coatings. **TAKATA QUANTUM** has for years benefited our customers with its excellent long-term antifouling performance that ensures a smooth, hydrodynamic hull for fuel saving efficacy.

There is no doubt that **TAKATA QUANTUM** has become the benchmark antifouling amongst high-end performance products. Since this technology has proven by far the most effective, other coating manufacturers have recently launched their own silyl acrylate antifoulings, which they promote as their premium products.

As the leader in this technology, Kansai Paint Marine deeply

understand the advantages of the silyl acrylate polymer. However, there are some instances where a combination of application and environmental factors combine to cause cracks or flaking as the hydrolysing reaction occurs.

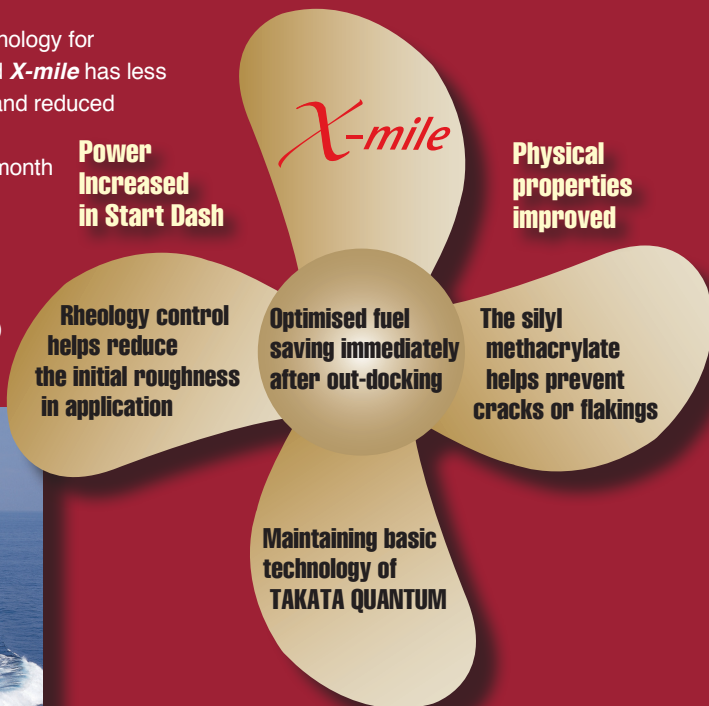
By maintaining outstanding antifouling performance whilst improving physical properties to prevent cracks or flaking, Kansai Paint Marine Coatings has taken a giant step forward with the development of a new silyl methacrylate binder. Furthermore, rheological technology for better coating levelling/flow-out that was originally developed by Kansai Paint for automotive coatings has been utilised for greater smoothness of the coating film immediately after application.

The optimised fuel saving of new generation silyl methacrylate antifouling **TAKATA QUANTUM *X-mile*** is ready to be introduced.

**TAKATA QUANTUM *X-mile***, with its improved fuel saving performance for reduced CO<sub>2</sub> emissions, "goes the extra mile to deliver an eco-smile".

## Characteristics of **TAKATA QUANTUM *X-mile*** :

- 1) Having maintained the 'backbone' silyl technology of **TAKATA QUANTUM**, ***X-mile*** provides long-term, unrivalled antifouling performance.
- 2) Introducing the next generation silyl polymer, silyl methacrylate, ***X-mile*** reinforces physical properties to remove negative factors for fuel saving such as cracks or flaking.
- 3) Utilising Kansai Paint Marine's unique rheological technology for smoothness during coating application, freshly applied ***X-mile*** has less frictional resistance for improved hull hydrodynamics and reduced fuel consumption immediately after undocking.
- 4) Like **TAKATA QUANTUM**, ***X-mile*** can achieve a 60-month service life and possibly longer! Please contact Kansai Paint Marine for more information about extending service life beyond 60 months.
- 5) Continuing in the environment-friendly direction, ***X-mile*** has a lower VOC (volatile organic compounds) content than **TAKATA QUANTUM**.



**Reliable Results of Long Term Antifouling Performance**

# Zebra saves the earth!

Only the extreme surface of **TAKATA QUANTUM** is polished by the hydrolysis reaction.  
After long-term uniform erosion, a beautiful polishing pattern - the zebra pattern - appears.  
This pattern is a proof that **TAKATA QUANTUM's** self-activating hydrolysis property is working to prevent the build up of leach layer, keeping the hull smooth, clean and hydrodynamic. (Dry-up photo)

## TAKATA QUANTUM in-docking condition *before washing*

[ Ocean-going vessel ]



LNG

[ Coastal vessel ]



TANKER



VLCC



RORO



PCC

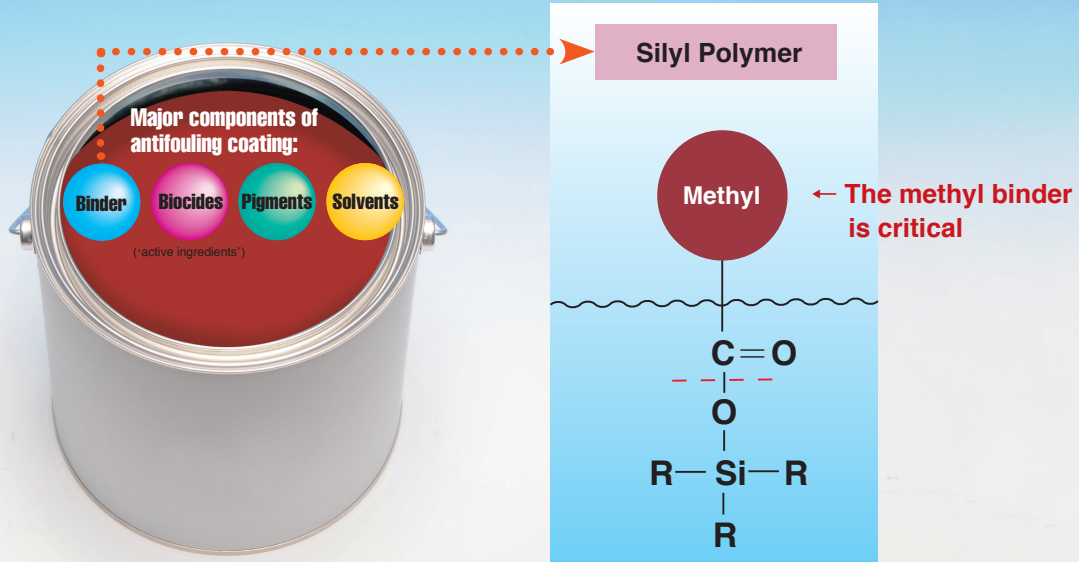


BULK



# Next generation silyl polymer: silyl methacrylate

## What is silyl methacrylate?



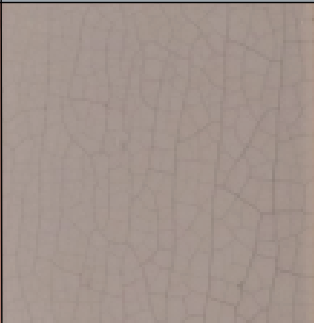

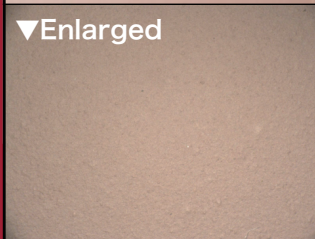
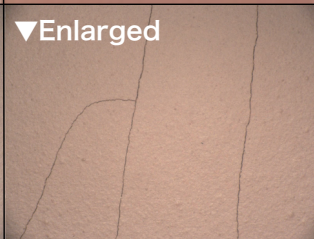
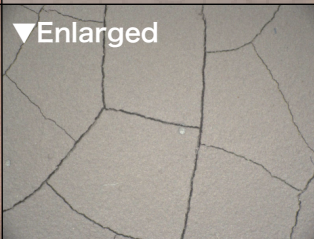
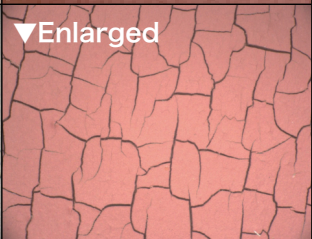


Use of a silyl methacrylate binder minimizes volume contraction of the coating film during the hydrolysing process.

This stops cracking and flaking.

## Physical properties of silyl antifouling products:

Accelerated testing for 22 months (equivalent to 60 months of actual ship operation)

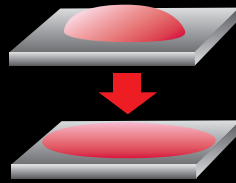
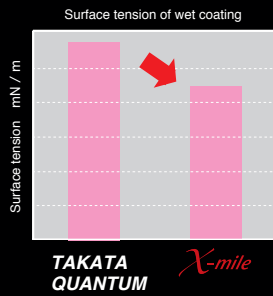
Kansai Paint Marine		Market products	
<i>TAKATA QUANTUM X-mile</i> Silyl methacrylate	<i>TAKATA QUANTUM</i> Silyl acrylate	Silyl acrylate	Copper silyl acrylate
			
▼Enlarged 	▼Enlarged 	▼Enlarged 	▼Enlarged 

*TAKATA QUANTUM X-mile* with silyl methacrylate technology brings ultimate fuel saving in the long-term, not only during one sailing period, but over repeated dry dockings for the duration of the coating life. This is only possible because of the consistently stable physical properties of the silyl methacrylate binder.



# Increased Surface Smoothness by Rheology Control Technology

## Improved flow properties



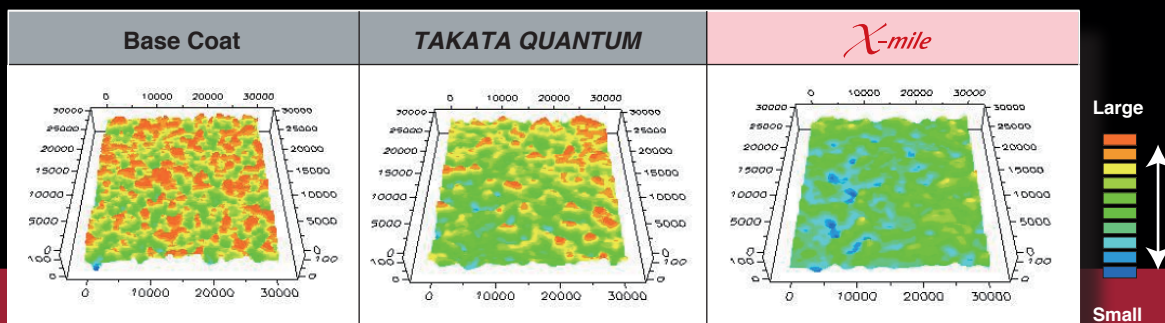
## Surface condition in airless spray



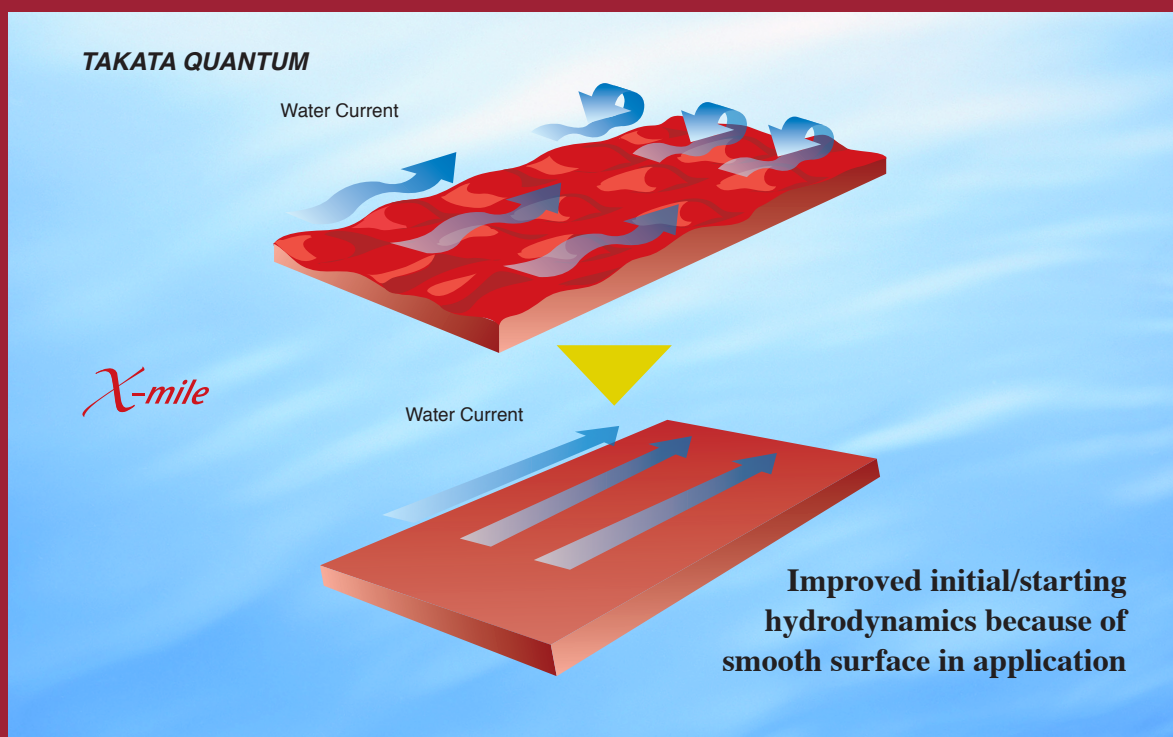
New rheology control technology contributes to increased surface smoothness during application

Minimised initial/starting surface roughness.

## Comparison of surface roughness in airless spray



## Minimized in-water frictional resistance



Transferring rheology control technology, originally developed by Kansai Paint for automotive coatings, to **TAKATA QUANTUM**, has improved smoothness of the paint film surface just after application. This contributes to optimised fuel saving.

# Maintaining the excellent antifouling performance of *TAKATA QUANTUM*

*X-mile* maintains the basic technology of *TAKATA QUANTUM*.  
Therefore, it provide excellent long-term protection from fouling.

## Comparison in antifouling performance

### 1 ) Static immersion for 11 months



*X-mile*

*Quantum*

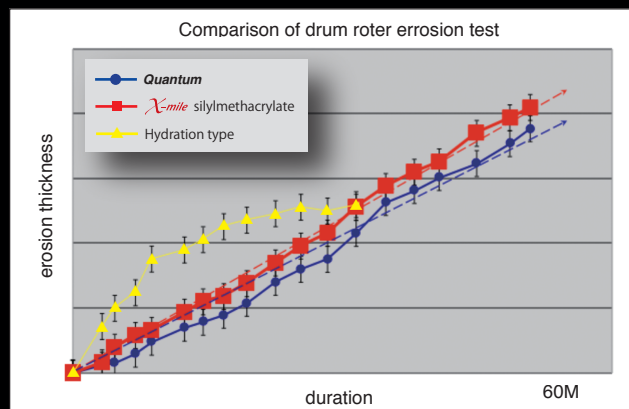
Copper-free A/F

Blank

Same antifouling level with *Quantum*

Excellent performance at static condition:  
beneficial for vessels with prolonged stoppages

### 2 ) Erosion data

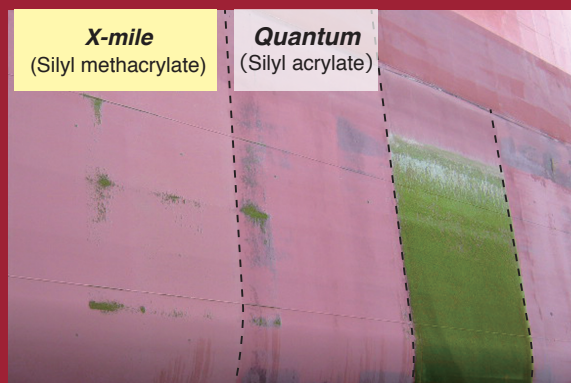


Long lasting stable erosion:  
same or better than *TAKATA QUANTUM*.  
It enables *X-mile* to give longer service life

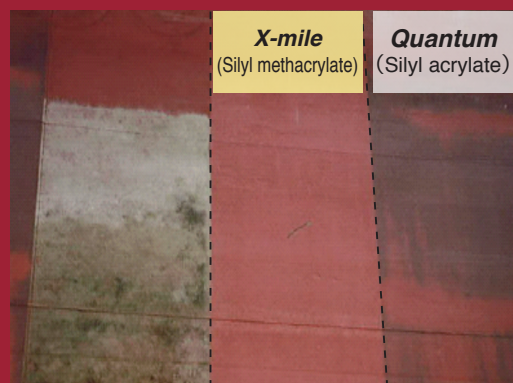
### 3 ) Real world performance results:

#### [Ocean going vessel]

Kind : LPG  
Sailing Route : Japan—PG  
Dock Interval : 29 Months



Kind : LNG  
Sailing Route : Japan—Brunei  
Dock Interval : 27 Months

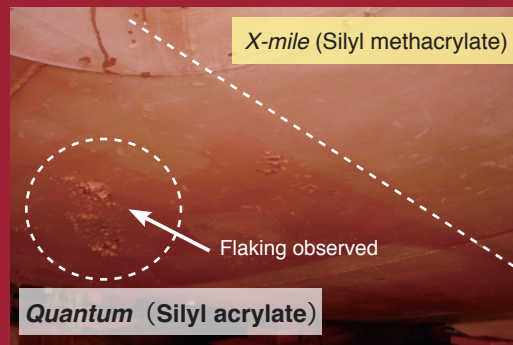


#### [Coastal vessel]

Tanker 12months operation Whole vessel applied



Tugboat 18months operation



Excellent fouling protection and improved physical properties!



TAKATA

QUANTUM

X-mile

Performance summary

Silyl Methacrylate

Silyl Acrylate

1. Initial surface smoothness	X-mile	better than	Takata Quantum
2. Physical properties	X-mile	better than	Takata Quantum
3. Antifouling property	X-mile	same or better than	Takata Quantum
4. Film erosion	X-mile	same or better than	Takata Quantum
5. Eco-freidly	X-mile	better than	Takata Quantum

Correct application equipment and techniques are very important for X-mile to show its rheology control properties. Please refer to the *X-Mile* Application Management Guide.

### Effect on fuel cost

Based on the data released by independent technical consultant Marintek (Norway), the average speed loss during a 60-month sailing period of a typical ship is in the range of 5%. The resultant increase in fuel consumption is typically 3 times the speed loss. Thus, 5% average speed loss results in approximately 15% fuel consumption increase.

After field testing *X-mile*, it was confirmed that *X-mile* maintains hull hydrodynamics to such an extent that there is less than 1.5% loss in speed. When converted to fuel consumption, this equated to less than 4.5% increase consumption over 60 months.

#### X-mile effect in reduction of fuel consumption

Average of  
all vessels

X-mile applied result

conversion  
coefficient

X-mile fuel saving rate

( 5% – 1.5% ) × 3 = 10.5%

Speed loss by MARINTEK data Note: speed loss data supplied by Marintek  
IMO MEPC(60/4/21) / MARINTEK Trond Larsen SOPRAN Report

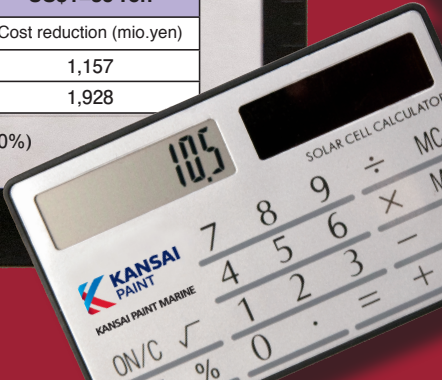
### Fuel cost estimation

Ratio of frictional resistance against total resistance	
VLCC 300k DWT (ballasted 85%, fully laden 95%)	90%
Large container 8000TEU	60%
Large Bulker 18k DWT	80%
Small Bulker 5k DWT	70%
Coastal Ferry	75%
Average	75%

60 month spec

		Fuel cost US \$600/ton		US\$1=85 Yen
	Fuel Consumption ton/day	Fuel cost in 60 months	10.5% × X/75 reduction rate	Cost reduction (mio.yen)
VLCC	100	108.0	12.6%	1,157
Large Container	250	270.0	8.4%	1,928

(Voyage rate = 100%)





**TAKATA**  
**QUANTUM** *X-mile* Product line up

Product name	Color	Package	Type
Takata Quantum <i>X-mile</i> 001	Maroon and Brick	20kg · 18L	Ocean-going Slow erosion
Takata Quantum <i>X-mile</i> 002	Maroon and Brick	20kg · 18L	Ocean-going Moderate erosion
Takata Quantum <i>X-mile</i> 003	Maroon and Brick	20kg · 18L	Ocean-going Fast erosion
Takata Quantum <i>X-mile</i> 005	Maroon and Brick	20kg	Coastal vessel Slow erosion
Takata Quantum <i>X-mile</i> 006	Maroon and Brick	20kg	Coastal vessel Moderate erosion
Takata Quantum <i>X-mile</i> 007	Maroon and Brick	20kg	Coastal vessel Fast erosion

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