PPG SIGMAGLIDE® 1290 fouling release coating

Industry leading power reduction and carbon emissions savings.

We create products that reduce speed loss, improve power and minimize environmental impact.



PPG SIGMAGLIDE® 1290

Up to 10% power reduction. Up to 25% CO_2 savings.

STAR PRINCESS

Better performance, greener credentials

Maintaining a smooth, clean underwater hull has an important part to play in optimizing ship performance. Choosing the right fouling protection coating is essential and with PPG this choice could not be simpler.

Vessels around the world have benefitted from PPG's SIGMAGLIDE 1290 fouling release coatings which reduce frictional drag, and prevent the settlement, growth and spread of invasive marine species. This enables ships to reach optimum speed whilst lowering power and fuel consumption and minimizing CO₂ emissions, contributing to the carbon emission reduction requirements.

Additionally, the silicone material elasticity minimizes mechanical damages and ship operators benefit from reduced maintenance and operational costs.



PPG SIGMAGLIDE 1290 - breakthrough performance

As PPG's ultra-premium fouling release coating system, PPG SIGMAGLIDE 1290 has been used on over hundreds of vessels worldwide, including cruise liners, tankers, bulk carriers, container ships, gas carriers and FPSO's.

PPG SIGMAGLIDE 1290 provides the unique benefits of minimal speed loss of 1.0-1.5% average over the period (ISO19030) as well as 60 days of static protection, contributing to industry leading CO₂ savings of up to 25%.

These benefits are the result of two unique properties:

- 100% pure silicone binder
- Dynamic surface regeneration for constant surface smoothness

Based on a unique 100% pure silicone binder system, PPG SIGMAGLIDE 1290 fouling release coating utilizes breakthrough surface regeneration technology to maintain constant surface smoothness and eliminate slime problems. Keeping the hull completely smooth from the outset, it enables the ship to glide seamlessly through the water while the ultra smooth surface of 100% silicone density prevents fouling organisms from settling resulting in proven static protection of up to 60 days.

Solves the challenges faced by traditional fouling release technologies

Traditional fouling release coatings are created using organo-modified or silicate hardeners and so do not contain a 100% pure silicone binder (illustration 1). As a result, the silicone density at the surface is much lower, thereby allowing fouling to penetrate and settle on the surface.

Illustration 1:



▲ Traditional fouling release systems have a lower density of silicones thereby allowing fouling to adhere to the surface.



100% pure silicone binder achieves industry leading fouling control properties

Careful chemical engineering has allowed PPG to develop a 100% pure silicone binder system.

This significantly increases the silicone density at the surface (illustration 2) to the extent that slime organisms do not perceive it as a surface substrate at all and are not inclined to settle on it. The clean, smooth hull surface is therefore retained.



▲ The principle of a 100% pure silicone binder ensures a higher silicone density at the surface; therefore, it is not possible for organisms to settle at the surface.



A further drawback of traditional fouling release coatings is that their effectiveness diminishes over time. This is often seen at the waterline where the impact of sunlight, dirt and UV radiation has a negative effect and leads to the gathering of slime and increased receptivity of mechanical damages (illustrations 3 and 4).

Illustration 3:

Traditional fouling release products, without surface regeneration



• Fouling

▲ The environmental conditions to which the coating is exposed will change the configuration at the surface. However, these changes cannot be reversed with traditional fouling release products.

Illustration 4:

Traditional fouling release products without surface regeneration (immersed)





▲ Once the substrate is immersed in water, fouling buildup will progress.

PPG SIGMAGLIDE 1290 with dynamic surface regeneration achieves reliable long-term performance

Our research and development team has engineered PPG SIGMAGLIDE 1290 to overcome common challenges of fouling release products by including dynamic surface regeneration properties. The 100% pure silicone binder system allows like-for-like molecules to reconnect and rearrange to regenerate the smooth surface of a ship's hull. Water then acts as a catalyst to return the surface energy of the coating back to its original state, thus enabling beneficial configuration properties to be regenerated (illustrations 5 and 6). As a result, customers experience excellent static performance, minimal receptivity on mechanical damages and minimal speed loss of 1.0-1.5% over the vessel operational period.

Illustration 5:

PPG SIGMAGLIDE 1290 – dynamic surface regeneration



▲ The environmental conditions to which the coating is exposed will change the configuration of the surface.

Illustration 6:

PPG SIGMAGLIDE 1290 - dynamic surface regeneration (immersed)

Exposur



▲ Once the substrate is immersed, the 100% pure silicone binder system regenerates itself and returns to its optimal configuration.

Tankers, bulkers, gas carriers, container ships and cruise ships are all currently benefiting from PPG SIGMAGLIDE 1290 fouling release coating. Fouling not being able to adhere to surfaces, even at lower speed, also makes PPG SIGMAGLIDE 1290 an ideal solution for the offshore industry where assets are static, yet still require a high level of fouling protection such as slow steaming or static vessels like FPSOs.

PPG SIGMAGLIDE 1290 - verified performance

The benefits of the 100% pure silicone binder system and the subsequent regeneration properties provided by PPG SIGMAGLIDE 1290 have been proven by rigorous tests carried out both in-house and by third parties.

Static raft testing

Below are the results of static raft testing which took place in California (illustration 7). The images show that after 9 months of raft exposure, the panel with PPG SIGMAGLIDE 1290 coating on still had a very clean surface. This supports the effectiveness of the 100% pure silicone binder, when compared to the traditional fouling release systems that were exposed to the same conditions. These tests also show that the panels coated with the traditional release began to pick up fouling after 9 months of static raft exposure.

Illustration 7:

9 months' static raft panel performance in California

PPG SIGMAGLIDE 1290 fouling release - static performance





1 month

3 months

Traditional fouling release - static performance





1 month

3 months



9 months



9 months



No cleaning costs





Self-cleaning dynamic simulation test

A self-cleaning dynamic simulation test (illustration 8) was performed at a Dutch research institute, Endures B.V. (a TNO company), to illustrate how the high silicone density at the surface translates into effectiveness of slime resistance and release. The test showed that the 100% pure silicone binder ensured the product returned to its clean initial state at low speeds, while the traditional fouling release continued to collect slime fouling.

Illustration 8:

Proof of performance - self-cleaning dynamic simulation

PPG SIGMAGLIDE 1290 fouling release: Best-in-class performance





Traditional fouling release: Slime fouling remains after dynamic simulation



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Regeneration test

In-house testing (illustration 9) also confirmed that the surface of the PPG SIGMAGLIDE 1290 product did regenerate and was returned to its original state. In contrast, traditional fouling release products were irreversibly affected, which resulted in a loss of performance. PPG, in cooperation with world leading 3rd party institutes and following ITTC standards, performed model testing, CFD predictions and hull performance studies comparing PPG SIGMAGLIDE 1290 to other fouling control technologies. The results proved the unique benefits of up to 10% power reduction and 1.0-1.5% speed loss performance, contributing to up to 25% CO₂ savings.



Features	Benefit
100% pure silicone binder Low surface energy	Ultra lov
Dynamic surface regeneration Constant surface smoothness	1.0 - 1.5º capabili
Unique high density silicone properties	Minima
Biocide free	Friendly
Ultra high volume solids	87% vo

Illustration 9:

Regeneration test

PPG SIGMAGLIDE 1290 fouling release – surface regeneration: Return to original low surface energy properties



Durable performance

Traditional fouling release – without surface regeneration: surface irreversibly affected



PPG SIGMAGLIDE 1290 is a 100% silicone coating. Silicone has a very low surface free energy. Surface energy is the force of attraction between two surfaces; the coating and the water. Since the silicone coating has lower surface energy than the water, the water cannot wet the surface, leading to unique benefits of reduced frictional drag and power reduction.

The low surface free energy of the silicone coating results in:

- Up to 10% reduced power further to ultra low friction
- Up to 60 days of static protection further to lower adhesion forces between the surface and the fouling organisms



Speed-Power for PPG SIGMAGLIDE 1290 vs Premium AF for a Newcastlemax BC



Speed-Power for PPG SIGMAGLIDE 1290 vs Premium AF for a VLCC



Speed-Power for PPG SIGMAGLIDE 1290 vs Premium AF for an LNG



its

- ow friction and up to 60 days of static protection
- 5% speed loss, improved fuel saving ilities and up to 25% CO₂ savings
- al mechanical damages during operation
- ly for the aquatic environment, sustainable solution
- olume solids, improved sustainability and reduced waste





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