

International Paint supports the shipping industry with pioneering technology

International Paint Ltd. is part of Akzo Nobel, one of the world's leading industrial companies and the world's largest coatings manufacturer.

On Antifouling and Foul Release Systems, International Paint offers two principal fouling control methodologies – biocide containing antifouling, including the latest high solids product offer and the new advanced duplex system and biocide free foul release systems.

Biocide Containing Antifouling

According to Mr. Jim Brown of Akzo Nobel Group critical for biocidal antifouling is the biocide itself and the technology used to control its release, or leaching rate. Copper is the main biocide used in Tin-free antifouling together with rapidly degrading boosting biocides which do not bio-accumulate in the marine environment. Copper works well against animal (shell) fouling, but algal (weed) fouling is more resistant: hence the need for boosting biocides. Three technologies are available to control the release of the biocides. These are rosin-based; self-polishing copolymer (SPC) and a relatively new, self polishing combination of the two.

Rosin: Rosin-based antifouling works because they allow seawater to penetrate the paint film allowing biocide release by a process of diffusion. Rosin-based antifouling may have low or high quantities of rosin. Those with a low level are known as Contact Leaching Antifouling. They are mechanically tough, have no polishing characteristics and commonly have a maximum in-service lifetime of 24 months. The high rosin products are softer, dissolve slowly in seawater and are known as Controlled Depletion Polymer (CDP) antifouling. These products have in-service lifetimes of up to 36 months on the vertical sides and up to 60 months on the flat bottom.

Self-Polishing Copolymer: Self-Polishing Copolymer (SPC) antifouling release biocides by a hydrolysis or ion exchange reaction of an acrylic polymer with seawater. This reaction only occurs near the surface of the coating and unlike the Rosin systems, seawater penetration into the bulk of the film is prevented. This gives greatly increased control over biocide release.

Latest Innovation – reduced solvent emissions: Mr. Brown points out that International Paint offers a range of high solids antifouling to meet customer needs in a changing environment. Our latest innovation Intersmooth 7460/7465 High Solids SPC is a pure high solids self polishing copolymer antifouling with 54% volume solids. This means low levels of overspray, faster application, reduced paint consumption and, depending on vessel activity, less coats of paint applied. It is particularly suitable for use where reduced solvent emissions are required. These products have a proven 60 months in-service track record.

Self Polishing Antifouling: By carefully combining pure SPC technology with Rosin-based CDP technology, it has been possible to produce technology which combines the CDP features of surface tolerance and attractive volume solids, together with the SPC benefits of polishing rate control, control of biocide release and reduced leached layer size. International's product of this type is Interswift 655. The addition of a hydrolysable polymer to Rosin to form this new antifouling has been patented by International and performance has been enhanced by the use of a boosting biocide. In terms of performance this SPC/CDP antifouling is midway between the SPC and CDP technologies.

New Advanced Duplex System: The Advanced Duplex System has been especially designed for vessels that require cost effective



Aframax Tanker 'Prem Pride'. At corresponding engine speeds, the vessel was consuming up to 6% less fuel after the application of Intersleek 900

60 month performance. The first three years of the scheme are provided by Intersmooth High Solids SPC and the remaining two years by Interswift Self Polishing Antifouling technology.

Foul Release Systems

Mr. Brown explains that "Foul Release is the name given to technology which does not use biocides to control fouling but relies on a 'non-stick' principle to minimise fouling adhesion. They provide a slippery, low friction surface onto which fouling organisms have difficulty settling. Any that do settle, normally do so only weakly and can usually be easily removed by simple wiping / washing or by the vessel moving through the water at speed. Benefits include reduced fuel consumption, reduced CO2 emissions and no leaching of biocides into

the sea.

Fuel efficiency and environmental impact is an area where coatings have and will continue to have a significant role. With an estimated 350 million tons of fuel consumed annually by the world's fleet, there is an ever increasing focus on shipping's environmental footprint. At this level of consumption the industry currently emits some 1.1 billion tons of CO2 and over 10 million tons of SO2 annually. If ships didn't use antifouling coatings, fuel consumption could be increased by as much as 40% - with current fuel use consequently rising by 140 million tons per year to a total of almost 500 million tons per year. It is estimated that antifouling coatings provide the shipping industry with annual fuel savings of US\$30 billion and reduced emissions of 450 million tons and 4.2 million tons respectively for CO2 and SO2 annually".

Mr. Brown mentions that "International Paint has supported the shipping industry with pioneering antifouling technology since the introduction of the first self polishing copolymer (SPC) antifouling in 1974. Since then, our contribution to the fuel and emissions efficiency of the global fleet has been hugely significant. In 1996 we introduced Intersleek 425, the first commercially available biocide free foul release technology for fast craft and in 1999 introduced the revolutionary Intersleek 700 for deep sea, scheduled ships.

This 'Seatrade' Awards Winning and Queen's Awards winning, biocide free, silicone based technology works on a foul release basis by providing a very smooth, slippery, low friction surface onto which fouling organisms have difficulty attaching. Any which do attach, normally do so only weakly and can usually be easily removed. With proven average fuel savings of 4% and a corresponding reduction in emissions, Intersleek 700 has become firmly established as the industry benchmark in foul release technology. In 2007, we introduced the next generation of foul release technology, Intersleek 900. This is a new, unique patented biocide free fluoropolymer foul release coating. Fluoropolymer chemistry represents the very latest advances in foul release technology, significantly improving upon the performance of the best silicone based system, Intersleek 700".

He also notes that "Exceptionally smooth with unprecedented low levels of Average Hull Roughness combined with excellent foul release capabilities and good resistance to mechanical damage means that for the very first time, all vessels above 10 knots can now benefit from foul release technology e.g. Bulk Carriers, Tankers, General Cargo Vessels and Feeder Containers. Intersleek 900 also provides excellent performance on high speed / high activity scheduled ships. The low surface roughness, good coefficient of friction and advanced surface energy characteristics improves fuel efficiency and reduces slime build-up on Container Vessels, Reefers, LNG/LPG Carriers,

Cruise Liners, Ro Ro's and Vehicle Carriers.

In terms of reduced CO2 emissions and improved fuel efficiency, Intersleek 900 offers predicted savings of 2% in comparison to Intersleek 700 and 6% in comparison to biocide containing SPC antifouling, although in-service experience on a range of vessel types has shown savings considerably higher than this. The potential exists for even greater savings in comparison to controlled depletion antifouling. For a single 5000 TEU container ship currently coated with an SPC antifouling, the application of Intersleek 900 foul release technology could mean savings of over 12,000 tonnes of fuel, almost 40,000 tonnes of CO2 and \$3m over a five-year period. Significant reductions in NOx and SOx emissions would also be achieved".

According to Mr. Brown "A recent example on an Aframax tanker, the 'Prem Pride', belonging to Mumbai-based Mercator Lines, proves the 6% savings. "We had monitored the 'Prem Pride's' fuel consumption closely," explains Mercator Lines' Mr. Amit Agrawal, General Manager. "At corresponding engine speeds, the vessel was consuming up to

6% less fuel, depending on weather conditions, after the application of Intersleek 900. We originally calculated projected savings based on a bunker price of \$450 and found we were saving nearly three tonnes of fuel a day. And whilst bunker prices continue to climb, our pay-back period just gets shorter. The added advantages of no biocides, reduced drydocking times and lower CO2 emissions convinced us that this is the technology we need".

With a total Foul Release track record of over 500 ships burning some 13 million tons of fuel per year, a conservative estimate indicates that Intersleek technology is already delivering, in comparison to SPC antifouling, reduced CO2 emissions of almost 2.5 million tons per year. If every ship in the world was coated with Intersleek Foul Release technology the potential exists for additional, annual CO2 emission reductions of 60 Million tons. Other benefits of Intersleek 900 include reduced paint consumption at the next docking, reduced risk of fouling during loading delays and enhanced Corporate Social Responsibility through an improved environmental profile, concludes Mr. Brown.