Selektope in antifouling fast lane

UK HSE notification that Selektope meets EU Biocide Product Directive evaluation, approval in Japan and South Korea, plus a supply agreement with Chugoku Marine Paints means a vital, environmentally responsible ingredient is ready for next generation antifouling coatings

While laudable in its intent, the EU's Biocide Product Directive (98/8/EC) led to a decade and a half of doubt for marine coatings suppliers, reflecting both the number of potential 'active substances' falling under the Directive's oversight, and that expectations for the approved list changed over time. From the early 2000s, paint makers knew that the biocides used to keep hulls free of fouling would be subject to scrutiny as never before, but the list of substances approved for dispersal in the marine environment was a matter for conjecture.

By 2002, the coatings industry had accepted it would have to withdraw organotin as an antifouling substance after International Maritime Organization action. It also believed that it was only a matter of time before regulators would place copper, zinc and possibly other commonly used marine biocides in their sights for phase-out.

FRONT CRAWL

With the EU's approved list process subsequently working in slow motion, established paint suppliers concentrated on practical action, and on optimising the performance and lifespan of marine antifouling coatings allowed by law.

Copper remained an effective biocide, although the high concentration required left the substance exposed to the vagaries of the commodities market. Even so, after some manoeuvring from the copper industry, copper had emerged on the EU's approved biocide list by 2006. The latest derogation to covering biocidal products containing copper was published in the Official Journal of the EU on 26 June 2014.

In the background, research continued to find effective biocides that would provide an enduring answer to commercial and environmental imperatives. One early candidate for further study proved to be the biocide medetomidine, whose impact on barnacle fouling was first identified by researchers at the University of Gothenburg.

These studies led to the establishing of I-Tech in 2000, with further development funded by the Swedish Foundation for Strategic Environment Research project MISTRA, through a multi-year Marine Paint project. In 2006, I-Tech initiated work for regulatory approvals, having registered its development commercially under the marine biocide brand Selektope.

STIMULATED THINKING

Selektope was found to affect the behaviour of the barnacle larvae in such a way that they would not settle on prepared surfaces. Its antifouling effect is exerted through stimulation of the barnacle larvae's swimming behaviour, effectively making them unable to attach to a surface painted. As soon as the barnacle leaves the surface the effect disappears, i.e. it is reversible.

Barnacles are a particular feature of vessels that spend the greater part of their time in port as part of normal operations, but also attach themselves to ships that are laid up due to commercial factors, or indeed generally operate at low speeds.

I-Tech Managing Director Philip Chaabane acknowledged that the road to the marine market has required patience, but emphasised afresh that from the outset the performance of Selektope was never in doubt. Its attractions were clearly apparent to all who cared to give it consideration.

In 2008, for example, I-Tech attracted new investment from Volvo Group Venture Capital to support a co-operation with Volvo Penta and the industrialisation of Selektope for the global shipping industry.

"From the environmental point of view, contact with Selektope is not toxic towards the target organisms in the dosages used in paint formulations, but

rather stimulates a reaction to a repellent technology," said Chaabane. "The name is derived from the agent's highly selective action, while the biocide itself is biodegradable and features neither metals nor any harmful metabolites or other questionable compounds."

Chaabane was speaking after two landmark events demonstrated that both regulators and the wider marine coatings market, have finally caught up. Having already secured regulatory approval in Japan and South Korea, and in the final stages of approval in China, I-Tech received notification from UK HSE that Selektope had passed the EU evaluation criteria for marine biocides. It has therefore been authorised for approval in the EU. Final EU approval is expected by the end of 2014, documenting Selektope as not posing a risk to humans or the environment when used as an antifouling biocide.

Then, in April, I-Tech entered a first of its kind supply agreement with Chugoku Marine Paints Ltd (CMP) for use of Selektope, in commercial antifouling paints.

TURNING POINT

The agreement with one of the three largest companies in the marine paint industry is certainly a coup for I-Tech, a company with only five employees. However, I-Tech holds all proprietary rights to Selektope or using medetomodine in the marine antifouling application, as well as all regulatory rights to commercialise Selektope. Furthermore, the company already has a production partnership arrangement in place with global life science company Cambrex Corporation.

"CMP's decision marks not only an important milestone for I-Tech but also sets the starting point for antifoulings using biocides that only target the species of concern, with a minimal use of natural resources and a minimal environmental footprint," said Chaabane.

"The marine coatings suppliers have had to be as patient as we have, and they are as aware as we and our backers have been that this has been an industry-wide issue." In a commercial context, Chaabane adds that the agreement with CMP envisages using Selektope with a co-biocide in order that anti-fouling costs can be kept in check.

"Selektope is a key technology to formulate copper-free, high performance antifouling paints, but it may very well also be used in combination with competing alternatives as a means of adding value. Either way, Selektope is an enabling technology which acts as a means of re-optimising the marine biocides market."

One attribute of Selektope that was identified early and has proved persuasive all along has been its effectiveness on barnacles in concentrations of about 0.1 percent w/w (percentage weight/weight); to achieve the same effect, the concentration of copper needs to be around 40 percent Chaabane said.

Due to the low concentration needed, Selektope does not compromise the paint's chemical structure, colour or other cooperative biocides involved, he added. Instead it opens up new formulation

possibilities for the active ingredients used in controlling antifouling performance.

PUSH AND GLIDE

Chaabane said he is focusing on the logistics management that will bring Selektope to the wider marine audience, with a view to claiming a substantial slice of the marine sector's $2bn a year market for antifouling coatings.

"Ship owners are already receptive to hull coatings that can help them with their fuel bills and thus their ship emissions, and so antifouling is already a hot industry topic," said Chaabane. "In some ways, then, our timing is advantageous for this reason, but I would add that the industry has also been struggling with the whole ballast water issue, and the fact is that 30-40 percent of invasive species transfer takes place as a result of hull fouling.

The formal announcement of the CMP deal follows the successful conclusion extensive testing of Selektope by the paint manufacturer, in the first instance focusing on coastal vessels operating in harsh environments.

Chaabane expects CMP to come to market with a working coating system using Selektope in 2014. He added that the coatings envisaged will be based on known polymer technology and will present newbuild and repair yards with no issues related to application. Nor does Selektope degrade its performance over time, with its efficacy driven by how well the coating is formulated in terms of its leaching rate, polishing rates etc, Chaabane said.

"We are pleased to start commercialising on our dedicated efforts in developing formulations using Selektope as principal biocide. It is well aligned with our core values and we look forward to be able to introduce this technology to our customers", said CMP's Managing Director Masashi Ono.

In light of the patience demonstrated in bringing the product to market, Chaabane also emphasised that Selektope as a marine biocide is here to stay. "Our options are open regarding co-operation with all of the major marine coatings suppliers, with whom we have developed very good relations," he said. "The same is true of the more established marine biocide players." ■