

AIDAnova is one of the first vessels to be coated with the new solvent-free universal primer Jotacote Universal S120, which helped to reduce VOC emissions dramatically compared to standard universal primers during newbuilding.



Photo courtesy of AIDA Cruises.

## Revolutionary New Coating by Jotun

IT STARTED WITH A CHALLENGE: TO DEVELOP A SOLVENT-FREE, ONE-COAT UNIVERSAL PRIMER. IT HAS TAKEN THIRTEEN YEARS OF RESEARCH, tests, and more tests, but Jotun is now ready to release its innovative Jotacote Universal S120.

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Jotun has developed a new type of marine paint that reduces solvent emissions by more than 90% compared to other universal primers used today. Jotacote Universal S120 is a solvent-free, one-coat primer that can be used over an entire ship, including ballast tanks. The new universal primer reduces solvent (VOC) emissions into the air from approximately 250 grams per litre to just eight grams per litre. "Jotun focuses heavily on research and development of products with reduced environmental impact", says Dr Erik Risberg, Global Marketing Director of Jotun Marine Coatings and one of the scientists behind the new paint. "Universal primer is used to paint as much as 60% to 80% of a vessel during newbuilding, and normal universal primers contribute heavily to the total VOC

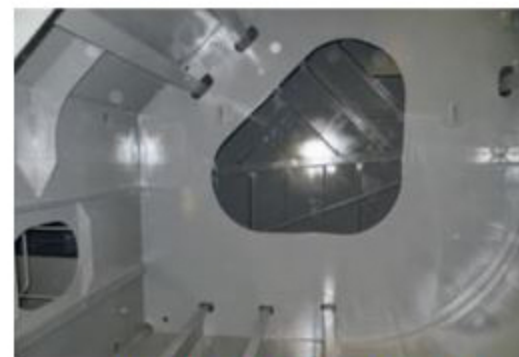
emissions. So, if you're going to target a product to reduce emissions, the universal primer is the one to choose."

### Reducing the Need for Maintenance

Jotun wanted to develop a single-coat product that was as good, if not better, than existing two-coat systems. To do so, they spent thirteen years developing a new type of marine paint. The project was a collaboration with Samsung Heavy Industries (SHI) Shipyard in South Korea. "They asked us to develop a product that was solvent-free and could be applied in one coat, including in the ballast tanks. When the product was ready, we tested it and it was good," says Dr Risberg. "However, it was developed for two-component spray

equipment and the shipyard workers preferred to use one-component spray machines (where epoxy and curing agent are mixed ahead of application) instead of the more complicated two-component spray machines, where the two components are pumped individually to a mixing block. The product fulfilled the performance expectations, but not those for the application equipment. So, it was back to the drawing board."

For a single-component spray, the biggest challenges were the viscosity and the pot life of the primer. The paint often has to travel through hoses that are, at times, 120m to 200m long to get the paint to all locations on the vessel including ballast tanks at the hull erection stage, when spray pumps are located at the bottom of the dock. Those areas are impossible to reach when the viscosity is too high. So Jotun had to find a way to reduce the viscosity of the primer without an increase in VOC emissions. And it had to do so without shortening the pot life too much. "In solvent-based coatings, the solvents help extend the pot life. Our primer has a slightly shorter pot life than solvent-based primers and a slightly longer drying time. But because you only need one coat, you still end up saving time", states Dr Risberg. "In addition, the product has better corrosion protection than previous systems,



A water ballast tank section with a single coat of the solvent-free Jotacote Universal S120.

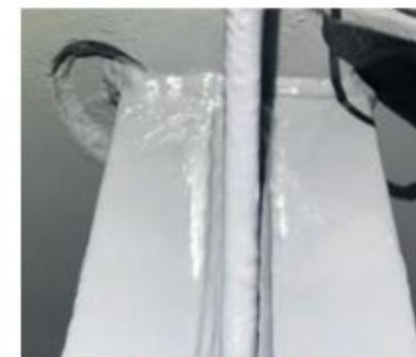
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which helps extend the life of the vessels and reduces the need for maintenance. Something which is very attractive to shipowners."

### Better than Expected

"The research team ran every test imaginable and each time the primer exceeded expectations", says Dr Risberg. "The product almost seemed too good to be true. During the salt-spray test, you usually run products on a six-month cycle. We did a 38-month cycle. We took pull-off values in the range of 20MPa before and after exposure and we could see no difference. This suggests that there is no significant ageing of the coating over time and that the elasticity of the coating is maintained." An extensive corrosion-creep test was carried out, where a 2mm cut was made in the coating right down to the metal underneath to see how quickly and how far the corrosion would spread. Dr Risberg: "Usually, when you get water to travel to the interface between the paint and the metal, you get disbondment and the paint loses its adhesiveness. In the first two months some rust developed, but after that, it stayed exactly the same for the given duration of 38 months. There was little corrosion-creep and no disbondment. We couldn't believe it."



A concern with single-coat systems may be edge retention, but Jotacote Universal S120 has demonstrated good edge retention.



Dr Erik Risberg, Global Marketing Director of Jotun Marine Coatings and one of the scientists behind the new Jotacote Universal S120 paint.

Despite the positive test results, Jotun decided to take the time to test the product on newbuild projects. In the past few years, they have applied it on a limited number of vessels, including the ballast tanks. "Corrosion in the ballast tanks is one of the biggest issues for ship owners and one that could compromise the safety of the vessel", says Dr Risberg. "Corrosion often starts on the ceiling of the ballast tanks and on the welding seams. There is tremendous tension as the metal expands and shrinks with changes in temperature, so you need a coating that remains flexible over the lifetime of the ship. Tests so far show that Jotacote Universal S120 can meet those requirements without a problem." The new product is currently available for Korean shipyards and selected shipbuilders in Europe who have experience in applying single-coat primers that require careful application techniques. A wider release of the product is expected in 2020.

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