



# Protecting the groundbreaking O2 tidal energy turbine

A significant milestone for not just the tidal sector, but for the development of renewable energy technology, Scottish engineering company Orbital Marine Power, Ltd. (Orbital) will soon launch the Orbital O2 – the world's most powerful tidal turbine – in the waters off the Orkney Islands.

We have been involved in the project since Orbital's prototype SR2000 turbine was built in 2015, proving their technology and leading the way for the further optimised O2. As well as high-performance anti-corrosion coatings to protect the steel structure, we supplied Hempaguard X7 for the turbine rotor blades. Developed specially for marine vessels, Hempaguard X7 prevents the build-up of biofouling, such as algae and barnacles. On a ship, this keeps the hull smooth to reduce drag and lower fuel consumption and associated emissions. On the O2, the coating performs a similar role, keeping the rotor blades free from biofouling so they can deliver full power with each rotation.

We're proud to be playing a part in the development of O2, a groundbreaking project with the potential to help make tidal energy a viable source of energy in the UK and overseas.

"We rely heavily on our supply chain to help deliver our pioneering technology such that it exceeds expectations, and in that regard we are delighted to continue our relationship with Hempel for our novel coating applications."

- Andrew Scott, CEO, Orbital Marine Power Ltd

# Coatings partner to an ambitious renewable energy project

The Orbital O2 tidal energy turbine will operate off the coast of the Orkney Islands at the European Marine Energy Centre (EMEC), where tidal currents can reach over 4 metres per second, making them some of the strongest in the world. To harness this energy, Orbital’s O2 comprises two 1 MW turbines, which together can generate 2MW of clean, predictable energy.

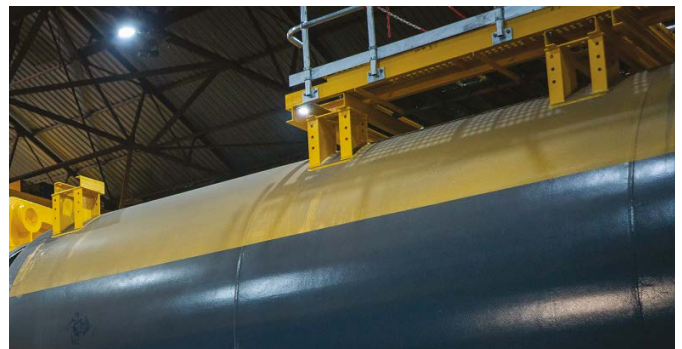
At a glance	
Customer	Orbital Marine Power, a privately held company dedicated to helping make the transition to renewable energy
Project	Orbital O2, the world’s largest tidal energy turbine
Coating systems	<b>External steel:</b> Hempadur Multi-Strength GF 35870 (two coats) <b>Internal steel:</b> Hempadur Easy (two coats) <b>Blades:</b> Hempadur 15570 (two coats), Hempasil 27310, Hempaguard X7
No. of litres	5,000

### The challenge

Turbines of this type present two distinct coating challenges. The steel structure requires tough anti-corrosion coatings to protect it from the harsh sea conditions. At the same time, the rotors are susceptible to marine biofouling. If biofouling builds up, it can increase drag in the water, significantly reducing the rotors’ power-generating ability.

### The solution

Our Protective team took on the task of designing a coating system for the O2, in close collaboration with our Technical Service specialists, who performed inspections at each stage of the build. During the prototyping stage, we worked closely with Orbital to design and test the best coating systems for the O2. When construction of the full-scale turbine began, we worked with the coating application company Rybay Corrosion Services to ensure the coatings were applied correctly and would perform as required over the long term. On the external steel, we used Hempadur Multi-Strength GF 35870, a high-build coating designed for extremely corrosive conditions, such as areas partially submerged in seawater.



Hempadur Multi-Strength GF 35870 is also highly abrasion resistant and is often used on vessels and structures in icy waters, where ice floes can cause significant damage.

For the rotors, we specified a system based on our Hempaguard X7 hull coating, which uses unique Actiguard technology to prevent the build-up of biofouling. Since its launch in 2013, Hempaguard X7 has been applied to a wide range of marine vessels and has been proven to perform in all sea conditions. On the O2, it will ensure the rotors remain smooth and fouling-free – and so capable of generating full power in every rotation.

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