
# Major Advances in Fouling Protection deliver significant increase in fuel efficiency

After five years of hull protection excellence using Hempel coating systems, Hyundai recently opted for HEMPAGUARD®, Hempel's new fouling defence system for the HYUNDAI GENERAL container vessel. HEMPAGUARD® promises an absolute minimum of fouling over an entire docking period.

The HYUNDAI GENERAL is a 68,363 DWT container ship sailing in the warm waters of the Middle East Gulf and the Indian Ocean. The risk of fouling impact on fuel efficiency represents a major challenge.In February of 2009, the HYUNDAI GENERAL was fully blasted to the bare steel at Sembawang Shipyard in Singapore. Hempel's 2nd generation Fouling Release system HEMPASIL 77500 was applied on top of an anti-corrosion system.

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**Perfect adhesion**
The HEMPASIL 77500 system utilised Hempel's advanced NEXUS tie-coat. NEXUS is a three-component tie-coat with both an epoxy and a silicone part. Over the last 10 years NEXUS has proved itself as probably the most advanced tie-coat for silicone systems in the Marine market, providing perfect adhesion to the underlying anti-corrosion system and a silicone-based, non-stick top coat.

**Lower friction**
During a docking in 2011, the HYUNDAI GENERAL received a standard repair of the coating system to repair damage from the anchor and on fender areas. This time Hempel's third generation silicone-based Fouling Release coating HEMPASIL X3 was used as the topcoat and applied directly on top of the existing second-generation coating.
HEMPASIL X3 differs from second-generation coatings in that it is hydrophilic owing to an advanced hydrogel that creates a very smooth surface exceptionally low friction to the surrounding seawater. The lower friction compared to antifouling, for example, means that vessels with intact HEMPASIL systems use 5 to 10 per cent less fuel.

**Perfect adhesion and higher productivity**
The repair yard used HEMPASIL NEXUS X-TEND, a special repair tie-coat developed to extend the lifetime of silicone systems. In addition to binding epoxy and silicone coatings, however, NEXUS X-TEND also ensures perfect adhesion between old and new silicone coatings. In addition, it increases productivity at repair yards as no masking is required. Many contractors have expressed the wish that other manufacturers' repair systems were just as easy to work with.

**Excellent performance over five years**
In January 2014, HYUNDAI GENERAL docked again. The silicone system applied five years earlier and the repair coating two years later had performed superbly. After high pressure fresh water washing at the Chengxi Shipyard (CSSC) in China, the coating looked glossy, fine, shiny and almost brand new.

During this docking the areas damaged by mooring and anchors were repaired using the HEMPASIL NEXUS X-TEND repair tie-coat. This time, however, the entire underwater area was coated with HEMPAGUARD X7 Fouling Defence, Hempel's latest development in silicone coatings.


**Major advance in Fouling Control**
HEMPAGUARD is a major advance in the field of Fouling Control hull coatings. Consisting of a unique fusion of silicone hydrogel based coatings such as HEMPASIL X3 and antifouling systems containing biocides, HEMPAGUARD X7 combines the best of both worlds. A low-friction silicone hydrogel together with ActiGuard® technology enabling controlled release of biocides over the docking interval delivers more effective fouling prevention and higher fuel savings compared with conventional antifouling systems.

Controlled release of biocides in the hydrogel means that HEMPAGUARD X7 uses just five per cent of the amount of biocides typically released by an antifouling system. HEMPAGUARD X7 represents a new product type known as Fouling Defence as the biocide puts up an active defence against fouling.

**Acclaimed by customers**
At Hempel, we are proud to have developed and patented the ActiGuard® technology that enables the kind of solution of which HEMPAGUARD® X7 is the first on the market. More importantly, however, is the way our customers have welcomed this new technology achievement. HYUNDAI GENERAL is the 72nd vessel to receive a full HEMPAGUARD coating system as a defence against fouling that makes a huge difference to fuel efficiency.

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