

ENVIROPEEL OFFSHORE

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THERMOPLASTIC SYSTEMS

An early impetus in the development of the Enviropeel system was the need for better ways to protect equipment on offshore production platforms. The devastating effects of the marine environment on such structures has attracted many potential solutions but, where the deterioration is greatest, in bolted systems such as valves and flanges suffering from galvanic and pitting corrosion - Enviropeel offers the only real hope of complete protection, especially where corrosion already exists.

The whole question of bolted system design and the effects of corrosion has been jointly reviewed by DNV for ConocoPhillips and BP - companies that spend a great deal of money every year on preventative and remedial work in these areas. Every year, around the world, more than \$20 billion (DNV JIP Summary) is spent on bolts and fasteners alone and an internal study for BP showed costs running between £150,000 and £250,000 a year for retrospective preservation on each of their North Sea assets.



Some reports indicate that many bolts are corroding before an installation has even been commissioned, with cadmium-plated bolts failing after only a year and

PTFE coated bolts failing within a few weeks.

DNV invited Enviropeel representatives to join the committee for this testing programme as they felt the need to be able to offer remedial solutions where material selection and design had either failed, or were unable or too costly to provide sufficient protection on their own.

Enviropeel's own experience with offshore facilities has shown that it can offer protection to whole systems - bolts, nuts, valves and flanges. Instead of seized nuts and rusting joints, every component is maintained and ready for use, with flanges free from the tell-tale staining caused by streaming rust - and from the danger of failure that such corrosion brings.

Applications in the North Sea, the Middle East, South-East Asia and the USA have shown that Enviropeel offers cost-effective and long-lasting solutions with a system that is reliable, flexible and simple to use.

Enviropeel equipment is specifically designed for use in Zone 2 areas with either a 10 or 19-metre hose, allowing it to reach the most inaccessible areas.



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The flange assembly on the left shows all the problems typical of a bolted system. Aware of potential problems, engineers have used rubber caps to protect bolt heads and nuts but, typically, access is not possible to some areas because the flanges are too close together .

Attempts to use a caulking material have failed, as it is shrinking away from the surfaces, trapping moisture and making the situation worse. Rust streaming down the entire structure, accumulating at the base is making it very unlikely that the allen bolts at the bottom of the picture could ever be undone.

The complete breakdown of the coating on the flanges, and all the other problems outlined above, threaten the integrity of this entire assembly. Clearly, immediate remedial action is required, yet all previous attempts have failed. A new approach is needed, which is exactly what Enviropeel offers.

Nuts, bolts, flange faces and allen bolts would all be completely protected with one easy to apply coating. Difficulties of access, preventing the use of other methods, present no problem for Enviropeel - these areas could be just as easily protected as the rest of the assembly.



Above: Enviropeel Zone 2 equipment being prepared for use offshore in Vietnam.

Below: an Enviropeel application engineer gets down to work on an offshore substrate.



10,000 HOUR ASTM HOT SALT FOG TEST

How well the Enviropeel system protects is demonstrated in these pictures from a recently completed 10,000 hr ASTM B117 hot salt fog test - ten times the average length of most hot salt fog testing. The contrast between the unprotected control and the Enviropeel-protected test piece is stark. On the control piece, the coating has failed and the bolt is severely rusted but, within the Enviropeel cocoon, no rusting has taken place. Nuts and bolts on the protected sample could be turned by hand, with no corrosion on any thread or flange surfaces.





Above, left and right: Flanges in the North Sea, UK sector. The platform initially undertook a pilot programme for all flanges on 4" nominal bore pipes. Subsequently, a full flange maintenance programme using Enviropeel was implemented.

Below and right: Enviropeel can be used to remedy quite extreme cases of neglect.



THE ZONE 2 APPLICATION UNIT

Every Enviropeel unit is custom-built to the highest standards. The Zone 2 applicator, like the base units, can be supplied in a variety of capacities and hose lengths. The equipment consists of a heating and pumping unit fitted with an ATEX certified temperature-controlled hose and a spray gun. All components are housed in a purpose-built mobile trolley and protected by a gas detection system, incorporating EXD electrical enclosures and an Emergency Stop Station. They are DNV certified for use within a flammable atmosphere and a safety system that is designed to isolate the entire unit if any potential risk is detected.



Above: The CA 18 Z2 unit
Left: The MA-Ex 25 unit