Lightweight, resilient solutions for heavy-duty offshore applications

Independent pressure, pull and age testing confirm polymer-based hang-off clamp performance, demonstrating corrosion resistance, sealing integrity and long-term suitability for offshore environments.

Offshore infrastructure demands equipment that is not only robust but also reliable over the long-term, particularly when it comes to the deployment and management of risers, pipelines and subsea cables. Hang-off clamps (HOCs) play a crucial role in safeguarding these assets, managing loads and preventing damage during installation and throughout operational life.

Traditionally, HOCs have been constructed from metal, incorporating resin sealing solutions and requiring earthing to ensure safety. While effective, conventional metallic designs have several limitations, including high weight, complex installation, susceptibility to corrosion, hydrogen degradation and environmental concerns associated with resin use.

Our engineered polymer-based hang-off clamp, the Nyla-HOC, is designed to surpass these limitations while maintaining the performance standards required by the offshore wind and subsea industries. Developed to provide exceptional durability, ease of installation and cost-efficiency, Nyla-HOC uses advanced polymer technology and innovative design principles to deliver tangible benefits to operators, contractors and engineers.

Hydrogen embrittlement

Hydrogen exposure, particularly in high-pressure environments, can significantly degrade the mechanical properties of many metals. This is a critical consideration for monopiles, where the presence of corrosive seawater and oxygen ingress over time further intensifies material vulnerability.

By contrast, hydrogen embrittlement is not a concern for engineered polymers. CF110 has been proven to deliver reliable performance in corrosive, high-pressure and long-duration operating environments. Its resistance to hydrogen-induced degradation reinforces the advantages of adopting polymer-based HOCs within monopiles, offering a more durable and future-ready solution.

It is within this environment that metallic components are prone to corrosion, particularly when resin sealing is compromised during installation or maintenance. With Nyla-HOC, corrosion concerns are eliminated. The use of industrial-grade Nylon CF110 ensures that the clamp material itself is resistant to chemical and environmental degradation. Unlike metals, the polymer does not require coatings, periodic integrity checks or protective maintenance, ensuring lasting performance even in harsh offshore conditions.

Earthing in cable installations

In medium- to high-voltage environments, cable clamping plays a critical role in both safety and performance. Traditionally, earthing has been required to ensure compliance with BS 7430: 2011 + A1:2015, BS EN 50522: 2022 standards, protecting against static build-up, lightning strikes and maintaining structural integrity.

The HOC, as an insulator, creates a protective sleeve that isolates any errant current flows due to faults in the cable within its envelope, from the transition piece of the wind turbine, and by extension, any components contained therein. This eliminates the need for earthing the HOC to bring it to the same electrical potential as said components, preventing a potential difference in the case of a fault.

The elimination of earthing also reduces material and tool requirements. There is no need for earth straps, bonding clamps, or extra copper cabling. Each Nyla-HOC can be mounted and secured without additional grounding steps, improving installation efficiency and minimising time spent.

Removing the need for earthing significantly lowers post-installation verification efforts, where normally every grounding connection must be individually tested for continuity and integrity, generating additional time, paperwork and administrative approvals, while maintaining compliance and safety standards.

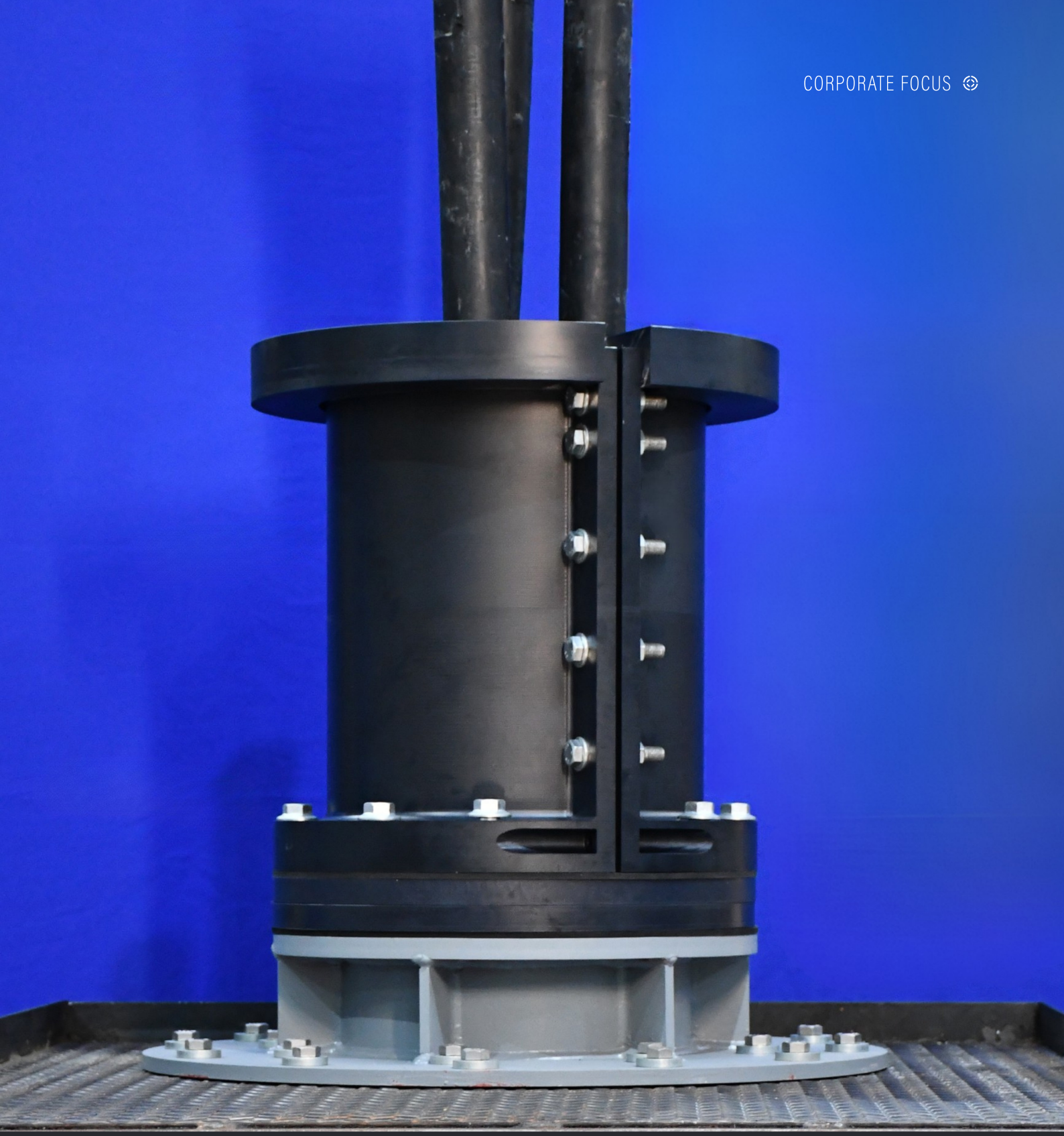
Industrial nylon CF110

The choice of material is fundamental to the performance of the Nyla-HOC. Nylon CF110, developed exclusively by Nylacast, is an ultra-creep-resistant cast nylon with a proven project case history. As a high-performance polymer with a track record exceeding 35 years across multiple global sectors, including renewable energy and subsea applications, CF110 stands out as a unique material within Nylacast's portfolio. Its properties make it exceptionally well-suited for offshore environments; it is structurally compliant, can withstand substantial mechanical stresses, resist hydrogen degradation and offer a higher coefficient of friction for clamping than comparable metal solutions.

Nylon CF110 delivers mechanical reliability while avoiding the operational challenges inherent to metallic parts, while its exclusive formulation reinforces its position as a trusted, field-proven solution in demanding industrial applications.

Cost savings and commercial advantages

Adopting Nyla-HOC offers significant commercial benefits. By replacing heavy metallic parts with polymer components, operators can achieve cost savings through reduced transport weight, increased deck load and lower installation requirements.



Feature	Current HOC	Nyla-HOC
Assembly times	Heavier material requires care to be taken during installation to avoid coating damage. Proper installation of earthing protection required.	Installation requires fewer fasteners, composed of lightweight materials, with shorter cable prep times.
Metallic parts	Parts are heavier and require both coating and earthing.	Lightweight, offering handling and safety advantages
Resin vs Resin-free solution	Resin systems take up to 2 days to cure upon initial installation. Reapplication of resin sealing solution required over time. Resin seals have an increased chance of failure. They don't require complex sealing, but there is a chance of failure if the resin (a viscous fluid) does not flow properly into all cavities of the assembly.	Installation is immediate. Proven resin-free seal aids in environmental and personnel safety. No resin curing timeframe upon installation.
Corrosion of exposed metallic surfaces	Parts require coating to prevent corrosion. Careful handling of parts essential to prevent damage to coating.	Corrosion-free performance. No coating required. Reduced need for replacement/repair due to scrapes and scratches
Earthing requirement	Earthing is a long process which adds to increased installation times, documentation and safety standards. Process requires qualified personnel for installation.	No earthing required.
Hydrogen degradation	Metallic components suffer from hydrogen degradation. Extra steps such as coating required. Additional care taken during the installation process.	Not a concern for Nyla-HOC material.
Coating	Coating required which abides by relevant standards (Norsok).	No coatings required.

Secondary operations, such as earthing, coating, and resin sealing maintenance, are prevented and reduce the overall lifecycle costs involved. The streamlined manufacturing process and fasteners used allow for a scalable product without reliance on costly alternatives, further aiding in suppliers' wishes for increased deployment efficiency and lowered commercial risk.

Sustainable development

The transition to polymer-based hang-off clamps also represents a meaningful step toward sustainable development in offshore infrastructure. By eliminating the need for resin sealing solutions, the design avoids both the use and eventual disposal of harmful marine resins, reducing environmental impact across the product's lifecycle. Likewise, because the engineered polymer material requires no protective coatings, there are no emissions or safety concerns associated with traditional coating processes, creating a cleaner and safer working environment for installation teams.

Beyond these material advantages, the inherent lightweight properties of nylon reduce the energy required to transport and handle components, cutting emissions associated with moving heavy metallic loads. Together, these benefits highlight how polymer HOCs offer a more environmentally responsible alternative for offshore applications without compromising on technical performance.

Verification through testing and certification

The Nyla-HOC performance was verified through rigorous testing and certification processes during in-house verification testing procedures. The application has undergone comprehensive validation to confirm the integrity of the seals under environmental exposure, the system's ability to withstand operational pressures, ensuring mechanical robustness under load, demonstrating reliability in demanding conditions and confirming no external earthing is necessary for the structure, aiding in simplification of installation and safety protocols.

The externally controlled IP Protection Testing, and Earthing Requirement Assessment tests collectively demonstrate that Nyla-HOC not only meets but exceeds the operational and safety standards expected in offshore wind and subsea applications.

Why nylon excels in renewable energy applications

Material selection is critical to optimising the performance and longevity of renewable energy systems. Unlike metals, high-performance Nylon CF110 exhibits excellent stress tolerance and structural compliance, allowing it to absorb dynamic loads and resist permanent deformation under sustained tension and creep conditions. Its inherent insulating properties improve earthing performance and reduce the risk of electrical faults, a key advantage in wind turbines, solar arrays and other high-voltage environments.

The Nylacast custom formulation maintains high mechanical reliability under harsh offshore and industrial conditions, offering superior friction and clamping performance compared with metallic counterparts. The Nyla-HOC represents a significant step forward in offshore clamp technology. By combining lightweight polymer materials with innovative design, proven sealing capabilities, corrosion-free performance and enhanced safety, Nyla-HOC addresses the key limitations of traditional metallic hang-off clamps.

Installation times are reduced, environmental and personnel safety are improved and lifecycle costs are lowered, all without compromising the durability or reliability required in demanding offshore conditions.

As offshore wind projects and subsea infrastructure continue to expand globally, products like Nyla-HOC offer operators a competitive advantage, providing long-term operational security while supporting sustainable and cost-efficient deployment. By rethinking traditional metallic approaches and embracing advanced polymers, Nyla-HOC sets a new benchmark for performance, safety and efficiency in the offshore industry.

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