FLUOROCARBON

CASE STUDY

ENGINEERING COLLABORATION FOR HIGH-LOAD PTFE BEARING APPLICATIONS

OVERVIEW

A leading EPC contractor in the offshore sector required a PTFE bearing solution for a recessed sliding application within a large infrastructure project. The bearing needed to withstand minimum compressive loads of 85MPa while maintaining a low and stable coefficient of friction against a stainless-steel counterface.

The application incorporated a non-standard recessed design with tight installation constraints, requiring a solution that could deliver high load capacity, predictable friction performance, and straightforward integration into the existing structure. Alongside the technical requirements, the customer also required robust testing data to support internal approvals, as well as rapid confirmation of pricing, lead times, and logistics.

THE ENGINEERING CHALLENGE

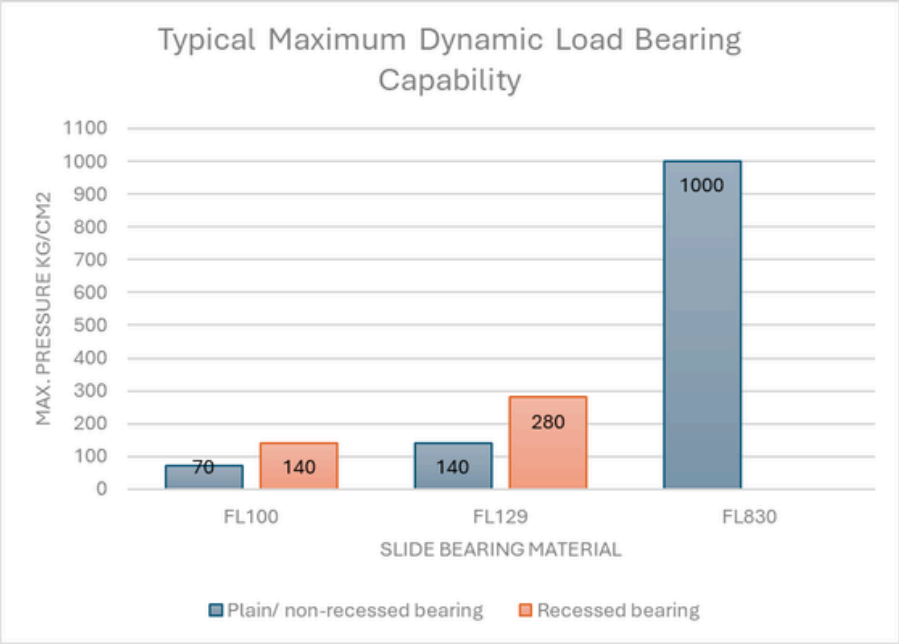
The application presented a combination of mechanical, installation, and commercial challenges that standard PTFE bearing solutions could not provide.

The bearing assembly needed to sustain compressive loads exceeding 85 MPa while maintaining a low, stable coefficient of friction under high-specific-load conditions.

At the same time, the solution needed to operate reliably within a recessed bearing configuration and fit within tight installation constraints without requiring structural modification.

Early evaluation showed that traditional PTFE bearing materials would not provide sufficient performance margin under the required loading conditions without introducing technical risk.

Our customer needed a solution that balanced load capacity, friction performance, manufacturability, and installation practicality in a non-standard application.



OUR APPROACH

Fluorocarbon adopted an engineering-led, collaborative approach, working closely with both the client and end customer to fully understand the design intent, loading conditions, and installation requirements.

Rather than assessing the material in isolation, the complete bearing assembly was reviewed to evaluate how geometry, backing support, material thickness, and counter surface design influenced performance. Alternative configurations and thickness options were explored to ensure the bearing could safely achieve the required load and friction targets.

Clear and transparent communication was maintained throughout the evaluation process, ensuring all stakeholders understood the technical possibilities, limitations, and commercial considerations at each stage. This collaborative approach enabled informed decision making while reducing both technical and commercial risk for the customer.

THE SOLUTION

To overcome the combined load and installation constraints, Fluorocarbon delivered a hybrid bearing assembly consisting of a Fluorinoid® FL830 material pad fastened to a steel backing plate. The backing plate ensured flatness across the bearing surface and was supplied in multiple sizes to suit the application.

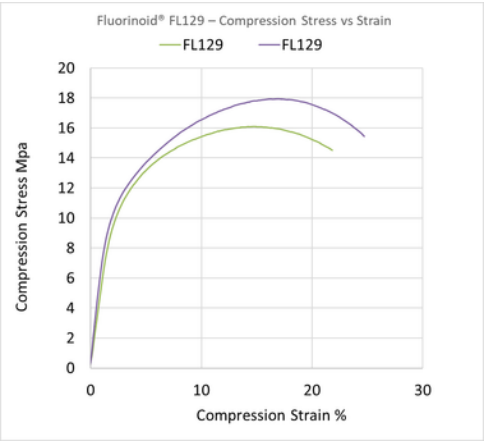
A purpose-made non-standard counter surface was also specified to further reduce friction performance under high load conditions. After installation and verification, the steel backing plate was welded directly into the existing structure, eliminating the need for structural modification.

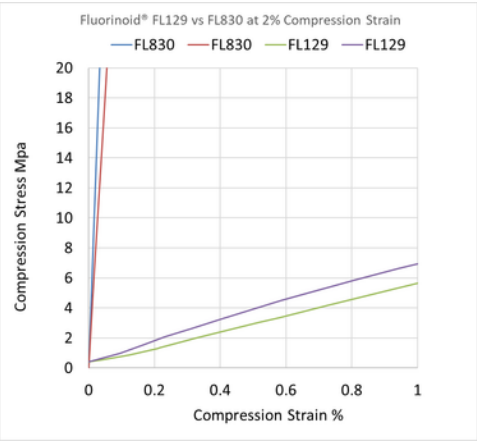
Performance validation was completed using EN 10204 3.1 testing, including both compressive and friction testing. Compressive testing demonstrated a repeatable stress–deformation response across the sheet, with Fluorinoid® FL830 comfortably exceeding the 85MPa compressive load requirement while maintaining very low strain.

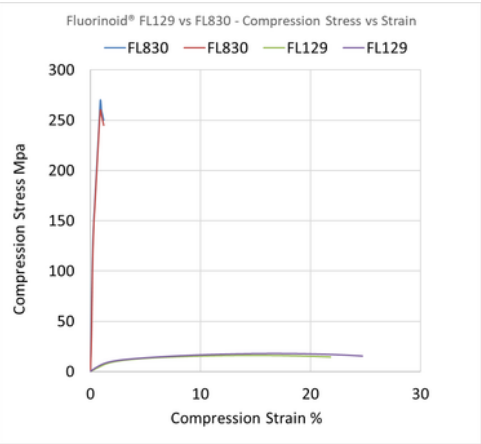
Compared with traditional PTFE bearing compounds, FL830 delivered significantly higher compressive strength and rigidity, making it suitable for demanding high-load applications.

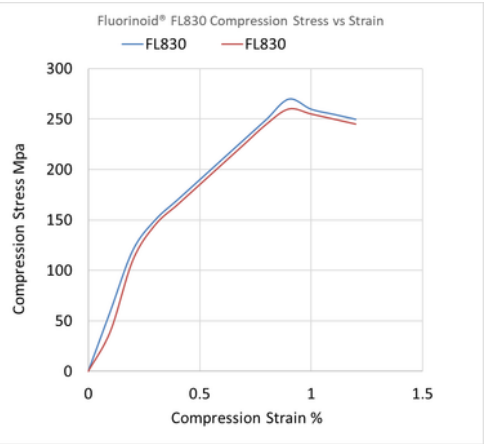
Stress-strain behaviour of traditional PTFE bearing compounds (FL129) against new high pressure bearing material (FL830) was compared. As shown, FL830 delivers exceptionally high compressive strength (~above 100MPa) at very low strain (<1%), far exceeding traditional PTFE materials. FL830 Clearly outperforms FL129 in strength, rigidity, and structural support, making it ideal for demanding, high-load applications.

Friction testing demonstrated a low and stable coefficient of friction under 90MPa specific load, with minimal variation over repeated cycles and negligible wear, indicating predictable long-term sliding performance against stainless steel.



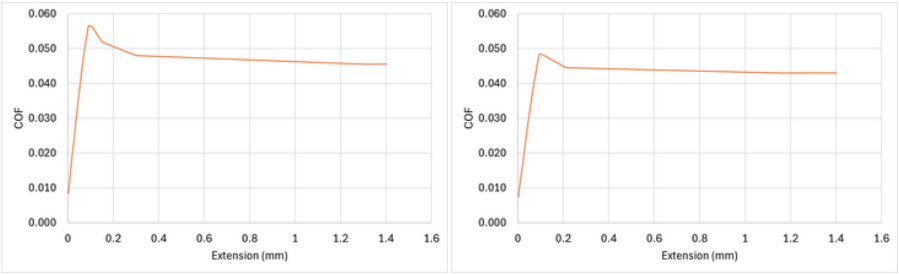




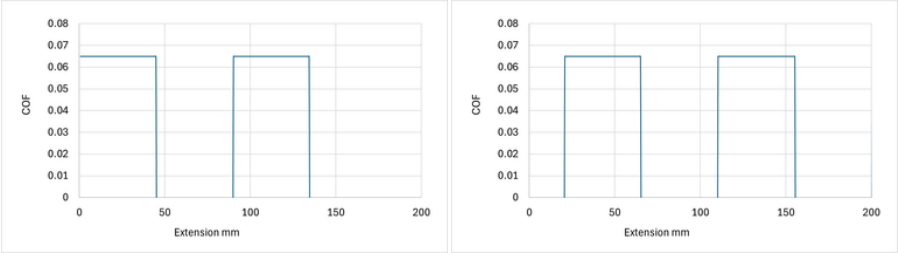


Compressive test results comparing stress-strain behaviour of comparing traditional PTFE compounds (Fluorinoid® FL129) against new high pressure bearing material (Fluorinoid® FL830).

Fluorinoid® FL129



Fluorinoid® FL830



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WHY FLUOROCARBON

Fluorocarbon combines deep fluoropolymer expertise with an engineering-led approach to problem-solving. This project demonstrated Fluorocarbon's ability to support complex, high-load applications where standard PTFE solutions are insufficient.

By focusing on application understanding, validated performance, and long-term reliability, Fluorocarbon helped the customer develop a safe and effective solution while reducing both technical and commercial risk.

The project also demonstrated Fluorocarbon's capability to integrate engineered fluoropolymer solutions within existing infrastructure constraints while maintaining clear communication and responsive technical support throughout the project lifecycle.