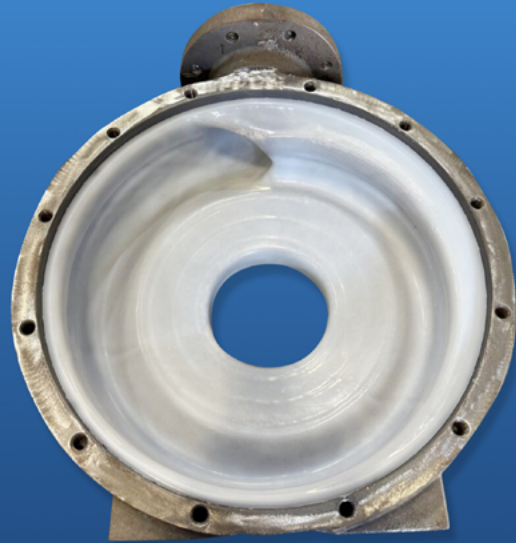
**BEFORE****AFTER**

Moving from Crisis to Success

Emergency Rotational
Lining Repair Helps
Chemical Processor

A specialty chemical processor and provider in Canada, one of the leading carbon-negative materials companies, acquired a pump from an original equipment manufacturer (OEM) designated for a new processing line. This company not only transforms biomass into useful materials to help eliminate the need for fossil fuels and their associated resources, but it also captures carbon while doing so. The company was opening a new processing line, with the pump being a critical component to commence operations.

Challenge: Unexpected pump damage and repair delays threaten new project

The pump was lined with perfluoroalkoxy (PFA) and intended for use in a critical processing stream. While commissioning the pump, it sustained internal damage, cutting through its PFA liner down to the metal substrate.



The OEM was unable to supply a replacement pump without a significant two- to three-month lead time. The pump's absence delayed the startup and disabled the processing capabilities at the facility. Each day of delay could result in lost revenue.

The company urgently needed to address the damaged pump housing. While searching for alternative solutions, the chemical processor decided to replace the lining instead of the entire pump. However, the first supplier the processor approached declined the project, explaining that from their point of view, the pump's nonstandard flanged end would make it too difficult to complete the lining process in the timeframe needed due to the requirement of customized fixturing.

Specifications: Unusual dimensions and specialized materials

The chemical processor was also seeking clarification regarding the maximum recommended temperature for the PFA lining under anticipated operating conditions. The application for its use involved a slightly acidic aqueous brine at pH 5.0 and potential temperatures up to 279° F (137.2° C).

PFA is a high-performance fluoropolymer that offers excellent chemical resistance, is non-flammable, low friction, and UV resistant. It also offers low moisture absorption.

Furthermore, the processor needed confirmation that the specific dimensions of the pump casing, including its large casing bowl connection, would not pose an insurmountable obstacle to the company charged with its repair.

Solution: Reverse engineering supplied the key to relining

RMB Products began the project with open and frequent communication, which proved critical to the project's success. When the processor approached RMB, interactive meetings between the engineers at RMB and the processor's installation and engineering teams supplied the necessary information to work out the project parameters.

During these meetings, RMB engineers meticulously documented critical dimensions and pivotal aspects of the pump relining project. Unlike a pipe, which has a single purpose of directing fluid flow through a pipeline to a given destination, the pump housing had to contain working equipment.



RMB needed to install a new lining that would adhere to the specific dimensions of the original pump housing and lining supplied by the OEM. Only the exact dimensions could facilitate the smooth operation of the equipment inside the pump housing, such as free movement for the impeller.

Because the team had no access to the OEM drawings, RMB engineers had to reverse-engineer the pump housing. A series of meetings helped coordinate accurate measurements with the processor's engineering team.

Finally, RMB also had to account for grooves in the casing and supply a cap for the end flange. This would ensure an even and binding layer of PFA that would supply the necessary performance and lifespan required by this project.

Why do grooved surfaces present a challenge for rotational lining?

Grooves, uneven surfaces, and even the porosity of the metal can impact the rotolining process, causing unequal distribution of the melted resin. For this project, the team needed to verify that the resin application would be successful before project completion. When the metal substrate lacks smooth transitions or exhibits significant variations, such as sharp protrusions, this will impede the even spread of the melted resin, potentially resulting in thin or incomplete lining coverage.

Another challenge to rotational lining success can be the presence of deep porosity or grooved areas. These surface depressions can entrap air during the lining process, leading to the formation of undesirable bubbles or surface irregularities. It takes a skilled operator and partner with a depth of experience in rotational lining to help select the proper resin to match the project specifications and achieve a smooth and consistent liner.

Pumps with an end flange require specialized tools to seal these components and prevent resin leakage. Armed with an array of specialized tools and a fully equipped machine shop, RMB can



provide end closures and address the unique challenges of rotolining unconventional surfaces. RMB has the requisite rings and tools to effectively seal end flanges and extend the raised bed dimension as needed. This enables the team to swiftly adapt to unique end configurations, seamlessly incorporating special closure plates when necessary.

RMB initiated the essential repair processes, encompassing precise machining and relining procedures, culminating in the complete restoration of the damaged pump housing. RMB accomplished this intricate repair within the same week the damaged component arrived at its repair and relining facilities.

The chemical processor completed the commissioning process and installed the pump to get the new processing line up. The client thanked RMB for their hard work on this project.

Process: Assessing the options and determining the best approach

Repairing or replacing a damaged PFA lining typically involves specific processes to ensure the lining's integrity and the equipment's functionality. The specific approach can vary depending on the extent of the damage and the equipment design. Common steps involved in repairing or replacing a damaged PFA lining might include:

1. **Assessment.** A comprehensive evaluation of the extent of the damage is critical to determine the most appropriate course of action. In this case, it was evident that the lining had been cut through to the metal underneath.
2. **Removal.** In situations where repair is feasible, the damaged portion of the PFA lining is carefully removed without compromising the substrate.
3. **Surface preparation.** Proper preparation of the underlying surface requires a few steps. One is meticulous cleaning. Another involves the removal or correction of any surface irregularities. As a final step, the team conducts a thorough inspection to eliminate any remaining contaminants that could hinder the adhesion of the new lining material.
4. **Quality assurance.** Rigorous quality control measures are implemented to ensure proper adhesion and prevent inconsistencies.
5. **Testing and inspection.** Comprehensive testing and inspection procedures are conducted to verify the repaired or replaced lining's functionality and reliability.

Result: The value of expertise and tailored solutions

In summary, RMB successfully replaced the PFA lining to help the specialty chemical processor commission and start its new processing line. Frequent communication and meticulous planning helped RMB successfully reverse-engineer the project to achieve a lining that exactly fit the measurement of the pump supplied by the OEM, ensuring the smooth operation of critical equipment.



This project underscores the importance of choosing a partner with the expertise and capabilities needed to adapt to unique situations and deliver a custom solution with a swift turnaround.

Looking for a rotational lining company with decades of experience handling specialized circumstances? [Request a quote](#) for your next corrosion protection project.

ABOUT RMB PRODUCTS

RMB provides highly engineered polymers and corrosion protection technology for demanding, mission-critical applications in aerospace, chemical processing, semiconductor, and biopharmaceutical industries. The company offers a variety of superior rotational molding and additive manufacturing technologies that have proven reliable and indispensable to customers around the world. RMB's unique rotational lining capability provides seamless, bonded linings that offer superior corrosion protection for pipes, fittings, tanks, and vessels — compared with competitive lining materials and methods.

Looking for more information or a quote? Call us at [719.382.9300](tel:719.382.9300).