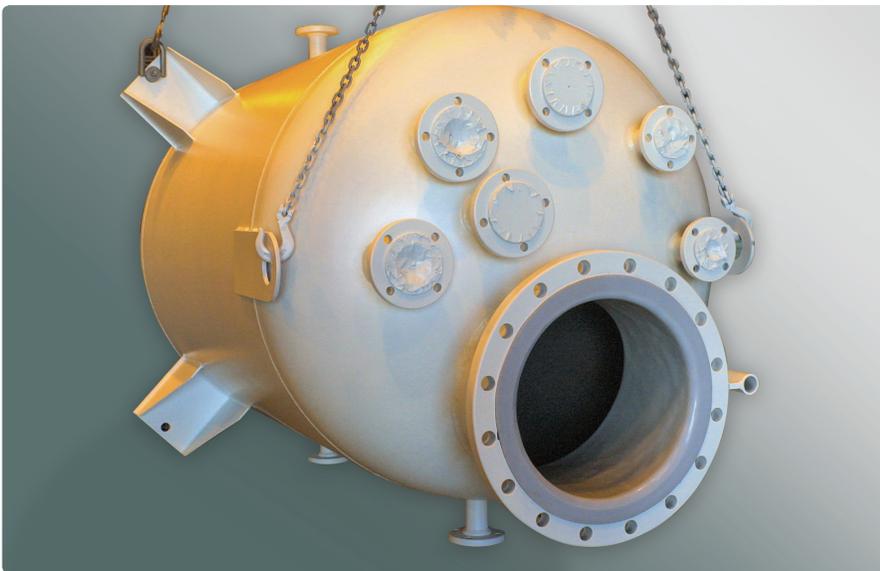


CHEMICAL PROCESSING

RMB Products' ETFE Rotationally Lined Process Drum Solves Global Chemical Producer's Bromine Corrosion Problem



ETFE rotationally lined condensed bromine processing drum

Bromine is used in the manufacture of a wide variety of consumer and industrial products including pharmaceuticals, flame retardants, water treatment chemicals, insect repellents, photographic chemicals, perfumes, dyes, oilfield completion fluids and other chemicals. In 2005, one of the world's leading suppliers of bromine and bromine-based products contacted RMB Products, looking for a better way to combat the destructive effects of corrosion in its bromine processing equipment.

Challenge

Bromine is less reactive than chlorine, more reactive than iodine and reacts vigorously with metals—especially in the presence of water—to produce corrosive bromide salts. Bromine is also reactive with most organic compounds, bonds easily with many elements and has a strong bleaching action. The element is highly soluble in organic solvents such as carbon disulfide, carbon tetrachloride, aliphatic alcohols and acetic acid.

Some of the chemical producer's processing drums—specifically those used for handling toxic and highly corrosive condensed bromine—needed to be upgraded to eliminate corrosion, extend the service life of the equipment and improve the company's return on its capital investment.

At a Glance

Client (end user): A leading supplier of bromine and bromine-based products

Industry: Chemical Processing

Manufacturing solution: Rotational lining with ETFE

PROJECT GOAL

- Identify corrosion problem in existing processing equipment
- Work with client's engineers to design new bromine process drum
- Extended service life of drum

REQUIREMENTS

- Provide superior corrosion resistance to condensed bromine
- Supply complete turnkey solution: engineering, fabrication, testing, lining, assembly and painting
- Deliver within 3 months of receipt of purchase order
- Meet ASME BPV Code Section VIII, Division 1 standards for pressure vessel construction

HIGHLIGHTS

- 48" diameter × 60" length (500gal) ASME vessel rotationally lined with thick (3/16") monolithic layer of ETFE
- Pressure-rated at 130psig/full vacuum at 300°F
- No leaks or failures through 9 years of service
- Met delivery deadline with 2 weeks to spare
- RMB Products provided complete turnkey solution: engineering, fabrication, testing, lining, assembly and painting

To solve the corrosion problem the company was experiencing with its bromine processing drums required a whole new processing design—and a proven, high-performance alternative to utilizing expensive metal alloys or the inferior corrosion protection of powder coating and sheet lining.

Solution

Rotational lining with a plastic polymer is well-suited to lining simple or complex metal structures, including vessels with diameter changes, multiple outlets, nozzles or other unique requirements. RMB Products worked with the chemical company's plant engineers and operators to analyze part geometries and determine the most appropriate design, lining strategy and material selection to deliver the bromine-drum service life the plant required.

The best solution for the bromine corrosion problem required the construction of an ASME vessel lined with the fluorine-based plastic ethylene tetrafluoroethylene (ETFE). ETFE provides high resistance to chemical corrosion and excellent strength over a wide temperature range. Although the operating temperature of the bromine drum would be 50°F to 100°F, for safety reasons the design temperature of the drum needed to be 300°F. Rugged ETFE met all the requirements.

In March 2005, the chemical company contracted with RMB Products to fabricate, test, line, assemble and paint an ETFE rotationally lined carbon steel drum (48" diameter × 60" length) with ANSI standard flanges. The plant required delivery of the drum within a short three months, by the end of June 2005.

RMB Products constructed the vessel to meet ASME Boiler and Pressure Vessel Code Section VIII, Division 1 standards. The vessel was RT-1 X-rayed, hydrotested at 130psig, and spark-tested at 18,000 volts DC in accordance with NACE standard RP0274. All stages of the project were completed at RMB Products' manufacturing facility in Fountain, CO.

Results

RMB Products custom-designed and manufactured the drum specifically for extended use with condensed bromine and delivered the drum to the plant in mid-June 2005—two weeks in advance of the company's deadline. RMB Products' ETFE liner has been tested and can withstand vacuum. The customer was confident the new liner would not collapse—even at full vacuum—as other types of liners can do. RMB Products' fully bonded ETFE lining was 3/16" thick, greatly exceeding the liner thickness produced from powder coating (a few thousandths on an inch) and sheet lining (about half the thickness of the ETFE liner).



On-site construction of steel vessel to ASME code

The chemical plant has kept the vessel in service since June 2005—a full 9 years—without experiencing any performance problems requiring it to be taken out of service for repairs or relining.

Citing exceptional product performance, cost reduction and on-time delivery, the chemical company expressed a high level of customer satisfaction partnering with RMB Products on the condensed-bromine drum solution. The project is indicative of what RMB Products does best for companies of all sizes throughout the chemical processing industry: Provide a complete turnkey solution to solve a difficult corrosion problem, both economically and within a short lead time.

About RMB Products

RMB Products is a leading supplier of engineered polymer products for critical applications in the aerospace, chemical processing, semiconductor and biopharmaceutical industries. Our success is based on helping every customer lower capital cost and operating expenses through innovative manufacturing processes and high-performance materials.



To learn more about how our innovative solutions help you extend the service life of your infrastructure, visit our website at rmbproducts.com.

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