

Steel producer repeats unique corrosion solution for multi-acid containment area



LOCATION
Southeast USA



COMPLETION
October 2024



OPERATION
Steel Production



PRODUCTS
[PENNTROWEL™ Epoxy Primer](#)
[TUFCEM™ II Membrane](#)
[FURALAC™ Green Panel Mortar](#)
[Armor™ Graphite Tile](#)

Challenge: Protect concrete floors, trenches and perimeter curbing against multiple corrosive acids and fumes at a cost-effective price point

Solution: Graphite tiling system using TUFCEM II Membrane over PENNTROWEL Epoxy Primer and FURALAC Green Panel Mortar for the bed and side joints

Looking to repeat more than 15 years of success protecting an acid pit from corrosion, a southeastern US specialty steel producer chose a similar lining for a new containment area. The new area, a curbed 3,200 square foot floor, would collect effluent from the acid recovery unit above. Persistent fumes and periodic 10% hydrofluoric acid, 15% nitric acid spills could reach the floor at up to 120°F.

Designing corrosion protection systems for nitric-HF service is exceptionally challenging. Hydrofluoric acid is incompatible with silica-based materials like quartz fillers, glass fiber reinforcement, and shale or fireclay bricks. Epoxy resins commonly used for corrosion protection don't stand up to nitric acid, a strong oxidizer.

The time-tested brick and membrane system in the bottom of the pit was a unique Armor design. In place of the usual carbon brick, the lining featured specially fabricated 6 by 12-inch graphite tiles of roughly 1-inch thickness. The 1-inch tile provided the membrane with plenty of protection for low traffic, and the tile's larger format allowed faster installation for quicker return to service.

In the new area, PENNTROWEL Epoxy Primer was applied first to seal the concrete. This important step prevents outgassing from causing blisters or pinholes in the membrane. Next, a 1/8-inch layer of TUFCEM II Membrane was troweled over the primer to provide a flexible chemical barrier under the tile. Last, the graphite tile was installed over the membrane with FURALAC Green Panel Mortar in the side, head, and bed joints.

Though the mill considered a less expensive and much thinner resin and synthetic laminate lining, it was so pleased with the performance of the graphite tile system installed in 2008 that it opted to use it again. A carbon brick and membrane lining might protect the floor as long as a graphite tile lining in this service, but at a higher initial cost. For this application, the graphite tile and membrane lining delivered superior value.



Tile Installation – Graphite tile on floor and curbing

For complex corrosion problems, Armor offers several unique solutions to assist in keeping facilities operating while enduring the harshest chemistries.