



## Phosphate Railcar Lining

### PROBLEM:

*Carbon Steel Railcars are used to transport wet, coarse Phosphate Rock from the mine separation plant to the Chemical Plant for processing into Phosphoric Acid. The existing railcars were lined with a 40 mil Urethane coating which was failing after a few years of service. The failure was from a combination of abrasion and the acids leaching from the course, wet Phosphate Rock.*

### SOLUTION:

**DUROMAR** was asked to supply a product which would resist both the abrasion and acidic conditions of this service. At the time, 1994, we were in the final test stage of our new, flexibilized epoxy lining product, **HPL 2221**. This product had demonstrated all the required performance characteristics required for this project. It has a pH tolerance of 1.5 to 14, excellent temperature resistance, and most importantly, a Tabor Abrasion Wear Index (ASTM 4060) of 12 milligrams/1000 cycles using a CS-17 wheel. This outperforms all other epoxy, vinyl ester, and urethane lining systems.

The **HPL-2221** was sprayed on in one coat as follows:

- a) Side Walls - 20 mils (450 microns)
- b) Sloping Walls and Braces - 40 mils (900 microns)

The lining was allowed to cure for 5 days @ 70° F (21°C) before returning the railcars to service.

### RESULTS:

This project was started in December 1994. A total of 120 cars have been lined, averaging about two per month. Each year, a selection of the cars previously lined were inspected for coating thickness, appearance, and evidence of sticking product.

### CURRENT STATUS:

To date, **NO CARS HAVE FAILED INSPECTION**. Lining thickness has remained constant, no pinholes or other failures have been noted, and the cars remain easy to empty with no significant "hang-up" reported.

### COMMENTS:

Since the introduction of the **HPL 2221**, it has found numerous applications both relating to it's unique abrasion resistance and it's resistance to concentrated Hydrochloric Acid. **HPL 2221** has been used as floor and secondary containment coatings, tank lining, and most recently, a UV resistant version is being applied on a large water slide at a major theme park in Florida.



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