Coating and Wrapping in Keyholes

Evaluation update and discussions
Poly Set Foam - horizontal cracking
New Polyurethane Foams for Keyholes

> Having identified these two problems (cracking and high temperature of curing) GTI contacted two manufacturers for their help in producing a new system.

> **Terrathane** – NCFI Polyurethanies developed a new low exotherm system 24-131066

> **Advanced Tec Materials** (presented product to group at WGL keyhole meeting) a company that produces fly ash filled polyurethane foam for pipeline coating also submitted their system for Evaluation
Terrathane NCFI 24-131066

This system was said to be designed for slow reactivity and low exothermic heat.

There are 3 parts to the system:

- Part R the polyurethane resin
- Part A, the isocyanate
- Low density polyethylene powder which must be mixed into part R before it in turn is mixed with part A. The function of the PE powder is to melt when parts A and R react, pulling heat out.
Terrathane 24-131066 Temperature Test

To test the maximum temperature reached when a keyhole is filled with foam a test setup was made in a 18” diameter Sonotube.

- A 2” pipe was placed through the tube and a service tee was bolted to the center of the pipe.
- A ½” MDPE line was fitted to the tee with a thermocouple attached.
- The temperature at the surface of the PE line was logged for ~3 hrs after the foam mixture was mixed and poured into the tube.
Foam Test Set-up
GTI test of Terrathane 24-131066 - max temperature of 215°F is 30 degrees below any previous foam test result.
Terrathane 24-131066

> After casting a 3 cubic foot cylinder of foam, the cylinder was cut up to inspect for cracks that would allow water to enter.

> Relatively few splits were found, but corrosion testing will have to be performed to validate its performance.
Advanced-Tec Materials

> This foam contains powdered fly-ash mixed into its resin component

> Temperature test results on this foam were disappointing, reaching as high as 273F
Advanced Tec Materials

Advanced Tec Foam Degrees F vs. Elapsed Time

DEGREES F

ELAPSED TIME IN MINUTES
Advanced-Tec Materials