# 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 Polyurethanes 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

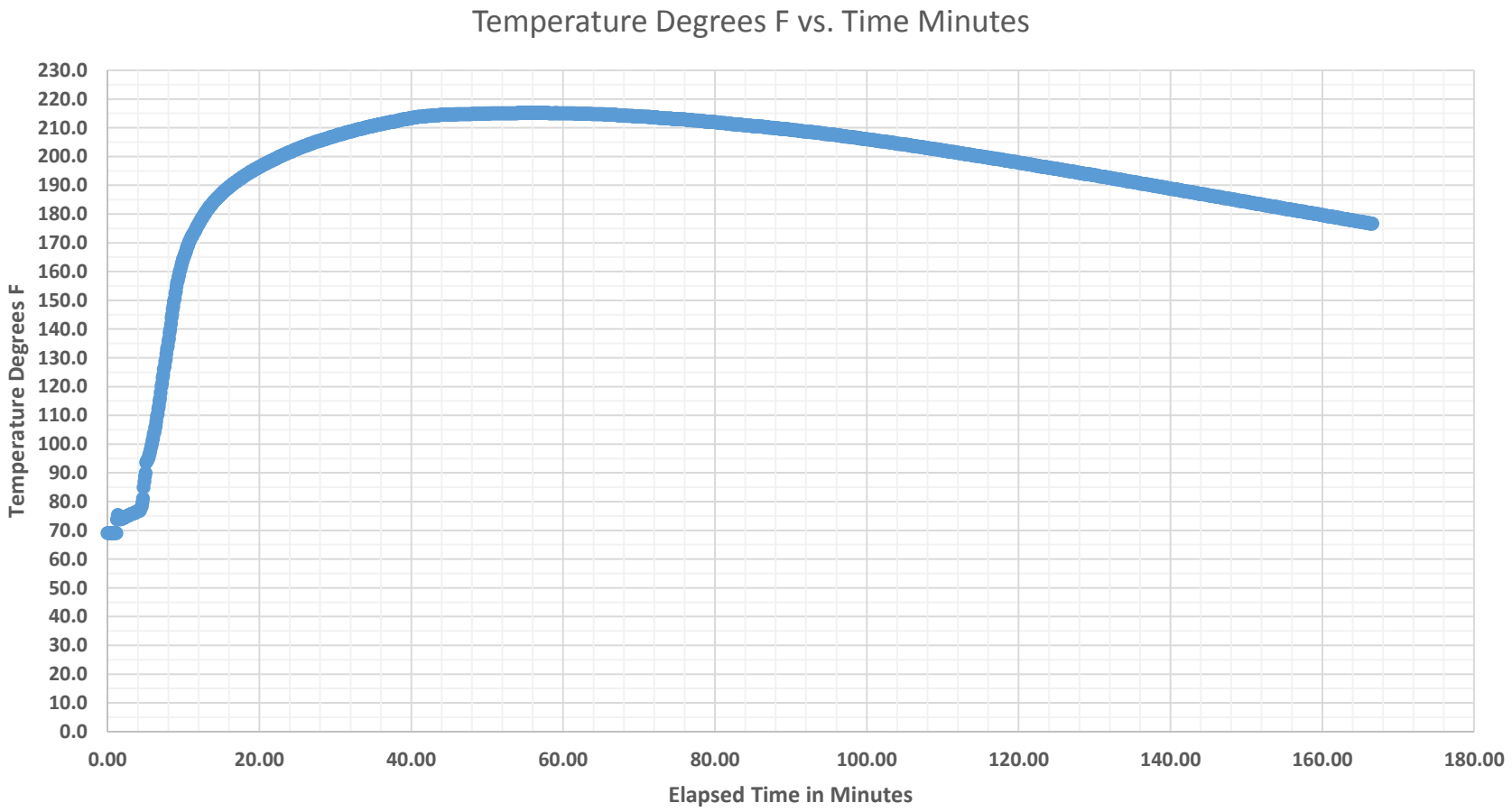
- This system was said to be designed for slow reactivity and low exothermic heat.
- There are 3 parts to the system:
  - Part R the polyurethane resin
  - Part A, the isocyanate
  - Low density polyethylene powder which must be mixed into part R before it in turn is mixed with part A. The function of 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 215F is 30 degrees below any previous foam test result



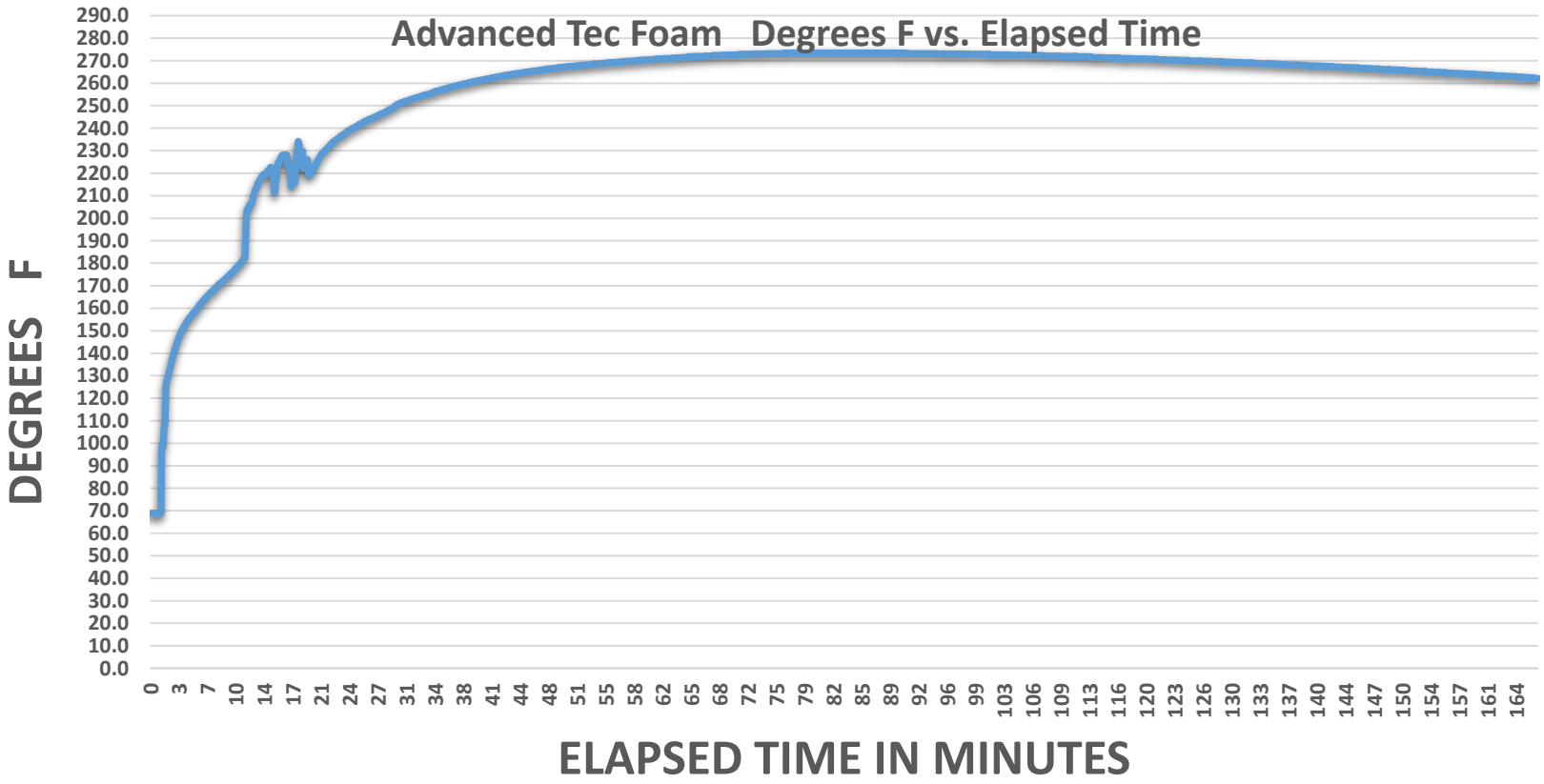
# Terrathane 24-131066

- 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 Materials