



## Installation Story #10 Foamfrax® Insulation

Industry:	Steel
Location:	Northeast United States
Installation Date:	May 2001
Operating Temperature:	2300°F (1260°C)
Scope of Job:	Batch Forge Furnace Foamfrax Insulation Full Thickness Composite System, 13½" (343mm) 7" (178mm) Foamfrax Grade I Fiber, 8 PCF (128 kg/m <sup>3</sup> ) 6½" (165mm) Foamfrax Grade II Fiber, 8 PCF (128 kg/m <sup>3</sup> )



Due to repeated thermal cycling, the insulating firebrick sidewall of this batch forge furnace had begun to deteriorate. A new brick bench was installed and Foamfrax Insulation was selected for a 4' x 25' wall section below the sidewall burners. For full thickness Foamfrax Insulation applications, plastic "spider netting" is adhered to the furnace shell and "V" anchors welded in place through the netting. Note that alloy support plates were welded in place to carry the weight of the plastic refractory burner row above the Foamfrax Insulation.

Foamfrax Grade I Fiber was then gunned into the spider netting and around the anchors. The impact velocity and homogeneous consistency of Foamfrax Insulation allow it to flow/work around the "V" anchors without leaving pockets/voids in the lining system. The Foamfrax Grade I Fiber was installed to a 7" (178mm) thickness.



The balance of the wall section (6½", 165mm) was installed using Foamfrax Grade II Fiber. The transition from Foamfrax Grade I Fiber to Foamfrax Grade II Fiber took place at the machine where bags of Foamfrax Grade II Fiber were added.



For full thickness applications, the hot face surface must be troweled. A low density (foamy) surface coating of Foamfrax Grade II Fiber was applied and the hot face troweled smooth.



To control surface cracking of the Foamfrax Insulation, score marks were made on a 2' x 2' (610mm x 610mm) grid using a masonry "groover" trowel, similar to the type commonly used for concrete expansion joints.



Once the score marks were completed, the furnace was available for use. After the anchors had been welded in place, actual installation of this multi-layer, 1350 board foot application took less than two hours to complete.



This photograph was taken after 3 months of service at 2300° F (1260° C). Controlled cracking did occur at the score marks. The actual cracks were approximately  $\frac{1}{8}$ " wide and extended  $\frac{1}{4}$ " -  $\frac{1}{2}$ " into the lining. Taken cumulatively, this represents less than 1% shrinkage for the system installed.

With the installation of a Foamfrax Insulation Full Thickness Lining System, the following customer benefits were realized:

- **Turnkey Installation**
  - A specially trained Unifrax distributor/contractor was able to supply materials, equipment, and installation as a complete package.
- **Monolithic System**
  - A Foamfrax Insulation Full Thickness Lining System provides the customer a ceramic fiber lining system without joints and with all the inherent ceramic fiber thermal properties such as low heat loss and low heat storage.
- **Installation Speed**
  - The actual Foamfrax Installation took less than  $\frac{1}{2}$  day, and the furnace was available for immediate service.
- **Universal Compatibility**
  - This Foamfrax Insulation was installed in an existing furnace lining where the product was mated to existing brick, plastic, and ceramic fiber surfaces. Foamfrax Insulation provides universal compatibility with a wide range of existing refractory materials.