



Foamfrax



for
Power & Boiler Applications

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save energy, reduce pollution and improve fire safety*

Foamfrax for Power



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Overview

- Technology
- Foamfrax Process
- Product Forms
- Benefits
- Target Applications
- Case Studies

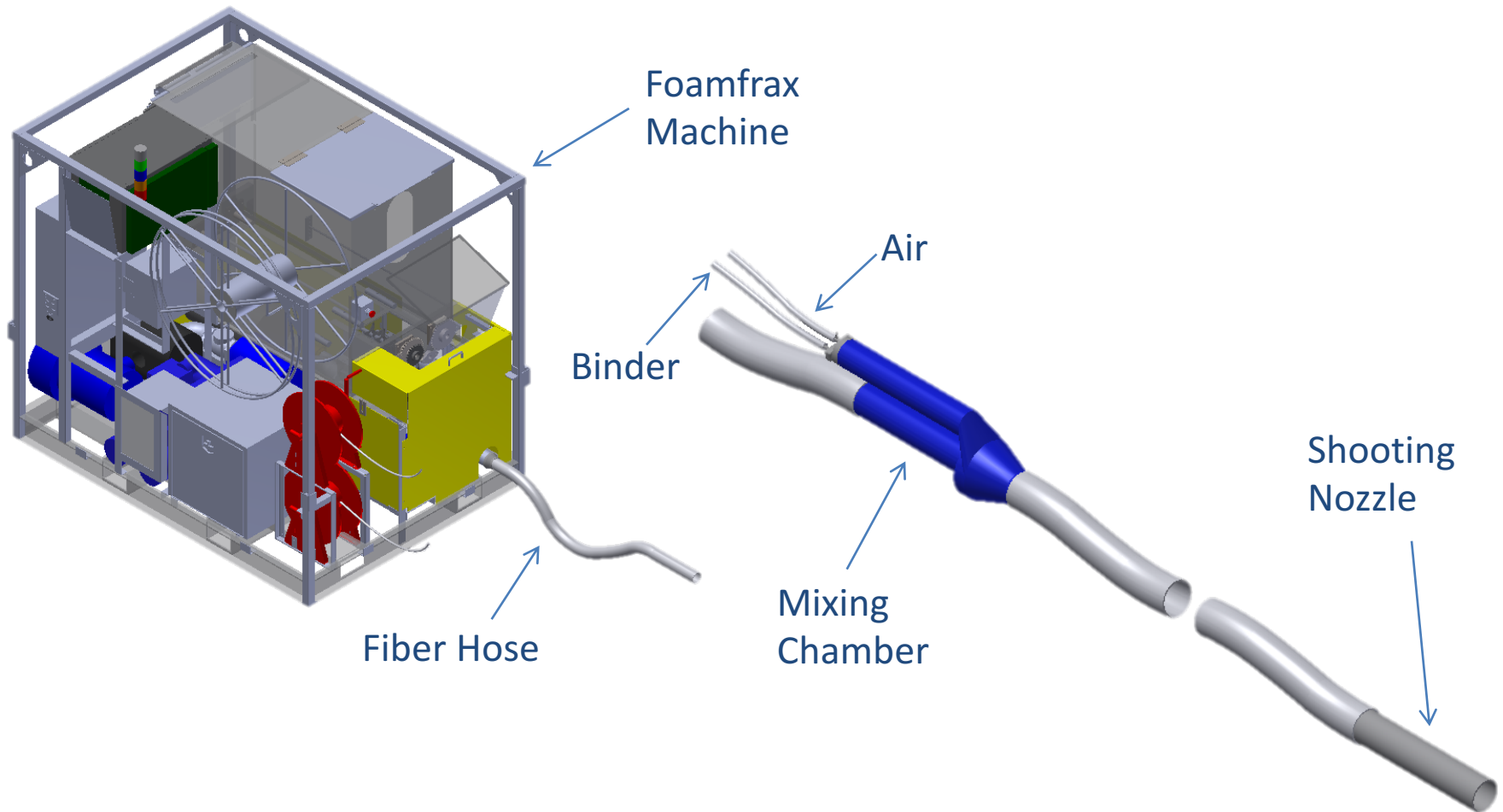




Technology

- **Proprietary Technology Encapsulates Fibers in Foam Binder Matrix**
- **Unifrax Holds the Technology License for the Refractory Market, Global Agreement**
- **Foamfrax Utilizes Proprietary Binders and Equipment.**
- **Installed by Unifrax Licensed Distributor/Contractors**

Foamfrax Process



Product Forms

- **Foamfrax Grade I (2300° F)**
- **Foamfrax Grade II (2600° F)**
- **Foamfrax Grade III (3000° F)**
- **Foamfrax RG (1800° F)**
- **Foamfrax RG+ (2300° F)**
- **Foamfrax HD (2300°, 2600° & 3000°)**
- **Isofoam (2300° F) Low Bio-Persistent Fiber**
- **Isofoam RG (1800° F) Low Bio-Persistent Fiber**





Benefits

- **Speed of installation**
- **Low airborne fiber levels**
- **Fuel/Energy efficiency**
- **Lining upgrades over existing hard refractory and RCF linings.**
- **Backup lining for gunnite and rammed plastics**
- **Lighter (8pcf – 25pcf) than dense refractories**
- **Monolithic ceramic fiber lining system, not subject to over compression or joint air gaps**
- **Well suited for intricate geometries**



Benefits cont.

When casing burn through occurs on unit externally lined with Foamfrax, burn through area remains small, not much larger than the casing leak itself and is easily identifiable.

Foamfrax & Foamfrax RG remain in place over time as a monolithic system and do not settle causing gaps below the buck stays.

Foamfrax & Foamfrax RG form a solid insulation system against the shell which often has variable wall flatness from warping during unit operation.



Applications

- **Power Boiler Exterior Walls – CFB ...**
- **Roof Areas – Replacing Cal-Sil ...**
- **Steam Turbines**
- **Gas Turbines**
- **Co-Generation**

Case Study (Bio-Mass Power)

- Operating temperature: 1800°F
- Scope: 6" & 10" Foamfrax RG backup to gunnite.
- Anchoring System
 - 304 SS studs with threaded ends for "V"
- Installation Date: February 2012 (Bio-mass power)
- Minimize cold face temp to minimize external insulation.





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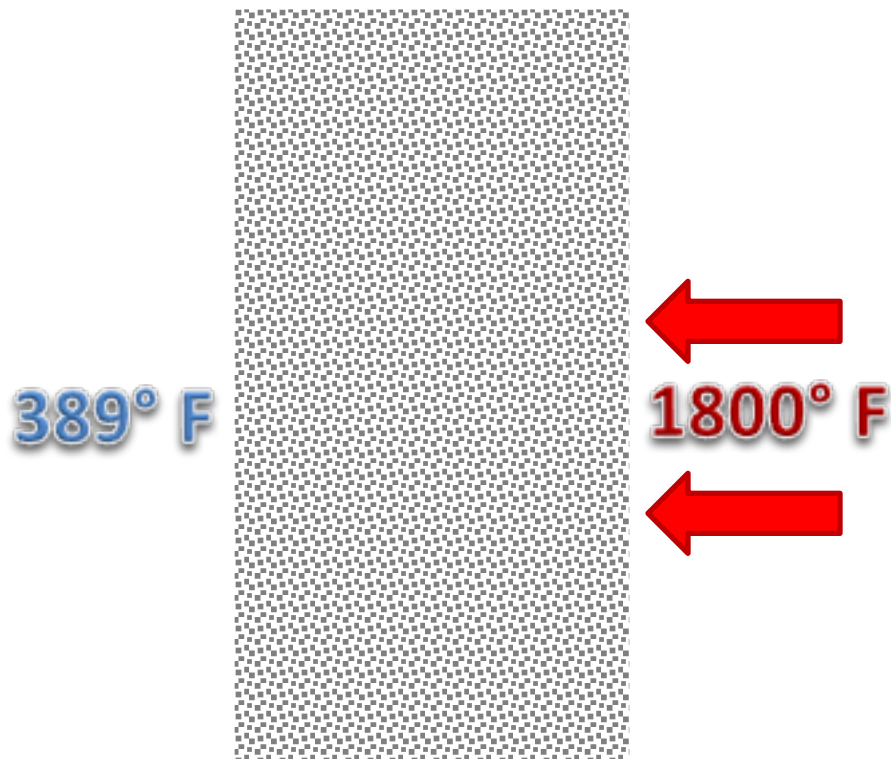






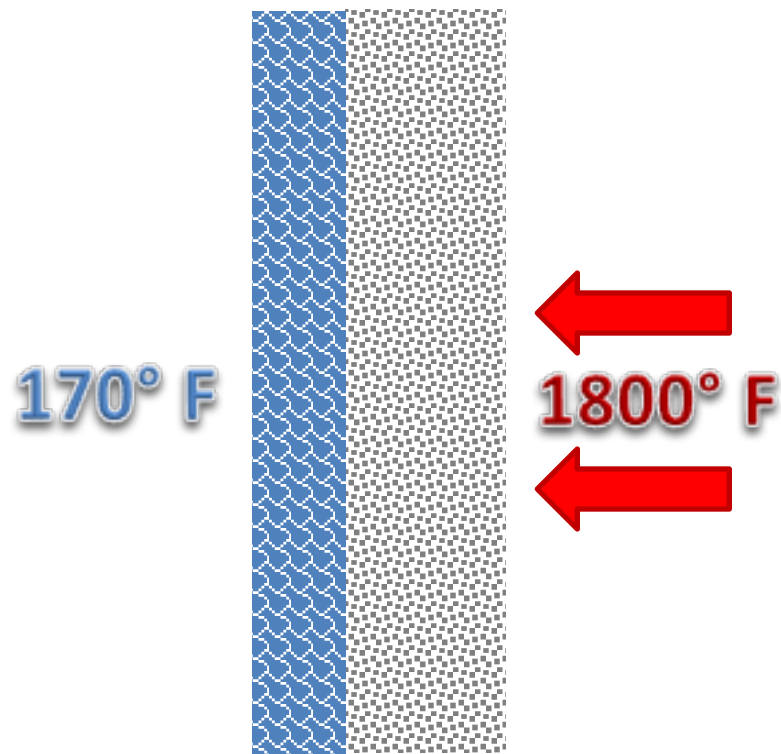
Results

20" Gunnite



Heat Loss = 989.9 BTU/(ft²*hr)

6" Foamfrax RG + 10" Gunnite



Heat Loss = 182.5 BTU/(ft²*hr)



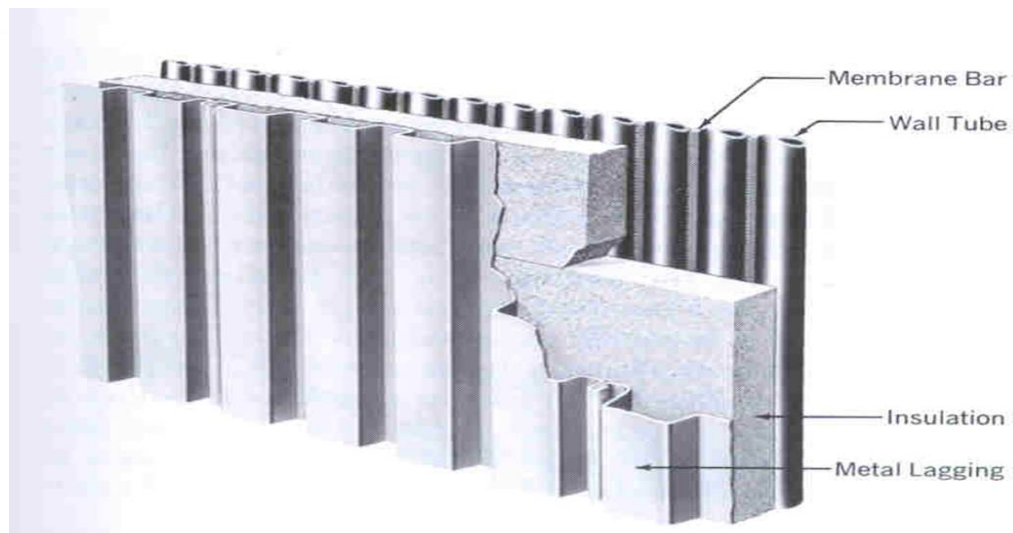
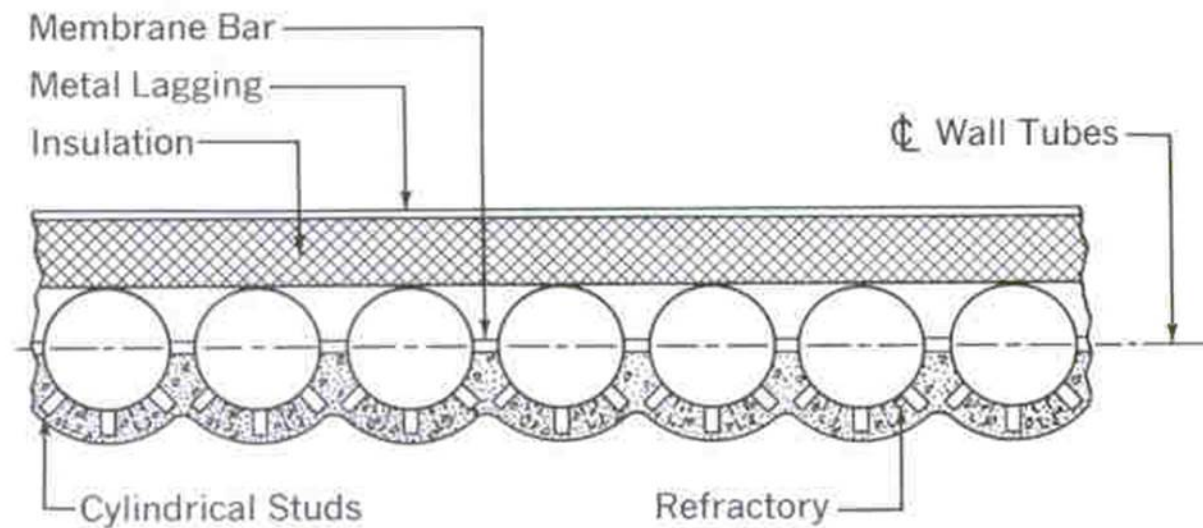
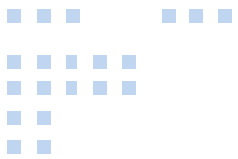
Results

- Increased hopper volume due to decreased lining thickness.
- 18.4% of the Heat Loss of a traditional gunnite system.
- Increased overall heat recovery of the system.
- Increase in installation rate.
- Minimal scrap (1%-3%) rebound loss.
- Reduced risk of reportable injury.
- Eliminated need to shut down other trades during Foamfrax install.
- Prolonged life of exterior mineral wool insulation.

Case Study (Boiler Tube Walls)

- Operating temperature: 1600°F to 2000°F
- Scope: 2" & 6" Foamfrax
- Anchoring System
 - Mesh with pins
 - Existing anchoring system
- Maximize heat storage and reduce fuel consumption
- Minimize cold face temp to minimize external insulation.





Foamfrax on Boiler Side Wall





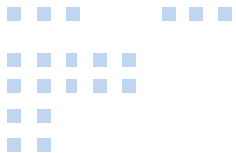


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Steam Boiler Exterior





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Results

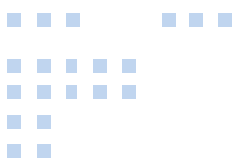
- Reduced Heat loss, elimination of chimney effect
- Improved efficiency.
- Improved installation safety. (Run a hose vs. carting board)
- Improved operational safety (due to lower cold face temperatures).
- Downtime for installation reduced by 75%.
- Eliminated need for periodic maintenance due to fiber settling or insulation sag.

Case Study (Fan Housing)

- **Operating Temperature: 1100-1400F**
- **Scope: 2"-4" Grade I Installation on Fan Housing Exterior**
- **Anchors: 2 x 4 CS Mesh**
- **Results: Working Fine, Installation Time Cut in One Third Compared to Traditional Methods**







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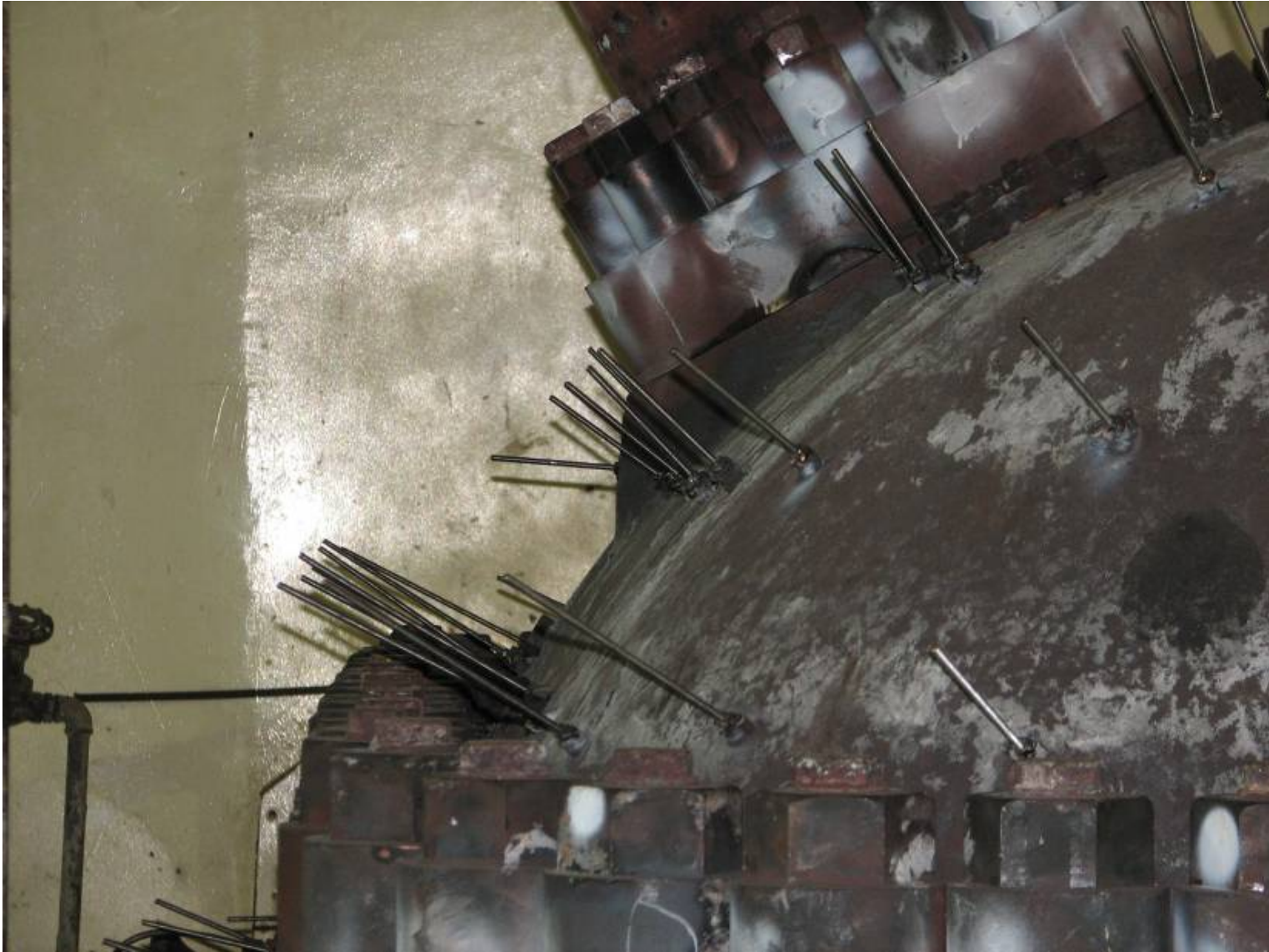
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Case Study (Turbine)

- **Operating Temperature: 1000-1200F**
- **Scope: 6"-10" Grade I or RG on Turbine exterior**
- **Anchors: Steel rod and Mesh**
- **Results: 1/3 installation and cure time vs. Mineral Wool**





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Target Markets



- **Power**

- **Steam Boiler Tubewall Exteriors**
- **Co-Gen and Turbines**
- **Bio-Mass Steam Generation**
- **Molten Salt Storage Tanks**



Foamfrax vs. Mineral Board

- **Mineral Board Insulation Advantages**
 - **Inexpensive Product (\$1.00/BF)**
- **Mineral Board Disadvantages**
 - **Labor intensive to install (material logistics, cutting/fitting)**
 - **Non-Conforming to tube wall geometries**
 - **Binder burnout results in degradation and settling due to vibration**
 - **Steam leaks from tubes rapidly spread and destroy the insulation.**
 - **Design can trap ash, leading to hot spots and lining failure.**



Foamfrax University



You Tube



QUESTIONS ?

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Thank You For Considering Foamfrax & Foamfrax RG as a Heat Management Solution

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