

Customized furnace insulation solutions for maximum efficiency

3M™ Nextel™ Ceramic Fabrics and Textiles



Trends in industrial furnaces market such as technological advancements, increasing industrialization, and the need for energy-efficient solutions pose challenges to costs, quality and efficiency.

Maintenance cycles may be longer, and efforts to avoid unplanned shutdowns should be made. Meeting demand for cleaner, more sustainable operations worldwide is also crucial. That means lower emissions and reduced waste. Meeting these big challenges often comes down to the smallest components. For industrial furnaces, the material used for interior surface linings, zone dividers and tube seals must be able to handle the heat.

3M can support

A broad range of ceramic fibers and textiles can help keeping industrial furnaces operating at peak capacity, meeting those challenges where solutions from other refractory textiles may not. 3M™ Nextel™ Ceramic Fabrics and Textiles can withstand temperatures well over 1093°C (2000°F) while protecting furnace surfaces and equipment for long, cost-effective life cycles. The unique combination of flexibility and durability at high temperatures sets them apart from other high-temperature textiles like aramids, carbon, quartz and glass and enables them to provide long lasting solutions for furnace components like process heaters, reformers, linings and insulation panels, tube seals, heat shields, doors/gates.

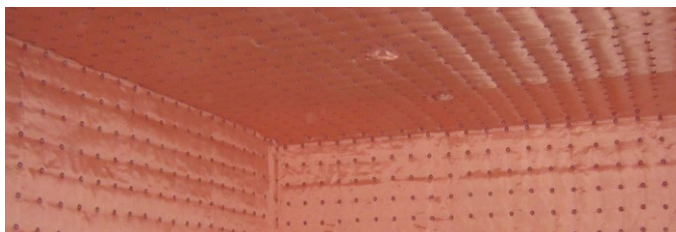
Advanced Solutions for Furnace Maintenance

Oxide-oxide ceramic matrix composites (O-CMC) with 3M™ Nextel™ Ceramic Fibers and Textiles

3M™ Nextel™ Ceramic Fibers and Textiles are used in various furnace applications. These include the protection hot gas pipes and butterfly valves, inert product carriers, and furnace doors, gates, and linings.

Linings

A 3M Nextel furnace lining system will help reduce dust, avoid product contamination and extend the lifetime of the furnace insulation. It is oxidation resistant, chemically resistant, lightweight and flame resistant and minimizes erosion in ceramic bulk fiber modules and other insulating materials, which helps to get reliable, long-lasting furnace linings reducing maintenance costs.



Heat shields and insulation

Nextel Ceramic Fabrics serve a wide variety of high-temperature heat shielding applications in and around furnaces.

Lightweight, flexible and featuring excellent resistance to thermal shock, they can be sewn into countless forms:

- Heat shields to protect specific areas, i.e. radiant coils
- Pads for transporting high temperature materials
- Ties for securing an object within a high temperature location.

Tube Seals – Multi Tube Bellows

Tube seals made with Nextel Ceramic Fabrics are used as long-term solutions at temperatures of 482–1300°C (900–2372°F). They maintain their sealing ability and integrity against the intense heat found in process heaters and furnace reformers. By stopping excess air from entering the system they help prevent harmful NOx emissions.



Multi Tube Bellows (MTB) in furnace crackers with 3M™ Nextel™ Fabrics are designed and pre-fabricated by specialized converters for the specific application and needs, depending on the type of cracking furnace, the nature of the media in use, the geometry and the process temperature. By creating a flexible and high temperature sealing solution around tube penetrations through furnace walls and ceilings, MTB with Nextel can contribute to saving energy by decreasing fuel consumption, reducing heat loss and controlling excess oxygen.

Key Benefits:

Extended furnace lifetime:

A 3M Nextel furnace lining system will help reduce dust, avoid product contamination providing reliable and long-lasting lining.

Energy and Cost Savings:

Fast maintenance and reduced shut-down time, saving energy and costs.

Enhanced Process Control:

Better control of process parameters with high temperature and thermo-shock tolerance.

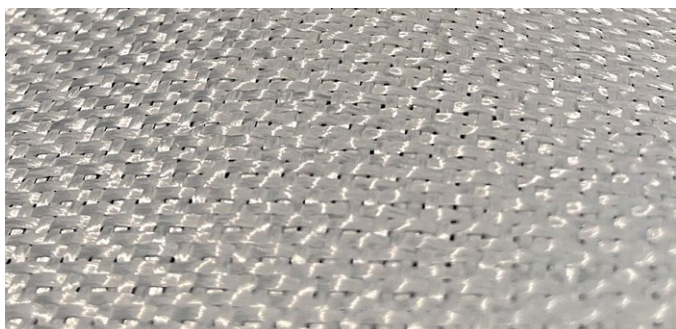
Durability:

Damage-tolerant material that is no longer brittle ceramic, with relatively low density for weight reduction.

High Performance:

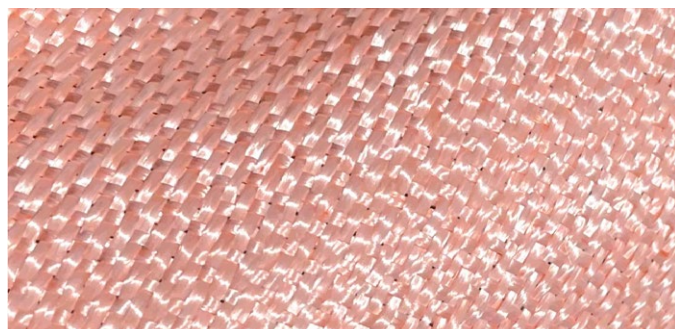
Excellent corrosion resistance, chemical inertness, and unique electrical properties.

Our product recommendations



3M™ Nextel™ Fabric AF-29

Is made from 3M™ Nextel™ 312 continuous oxide ceramic yarn, which is designed to maintain its strength and flexibility under a variety of extremely high temperature conditions. It is heat resistant to temperatures of 1300°C (2372°F). It exceeds the performance characteristics of other high temperature textiles, providing higher performance in demanding applications.



3M™ Nextel™ Fabric BF-30

Is made from 3M™ Nextel™ 440 continuous oxide ceramic yarn and is designed to meet the toughest thermal, mechanical and electrical performance requirements. It outperforms the useful limits of other high temperature textiles and is oxidation resistant, chemically inert, lightweight, electrically insulating, flexible, and fire, flame and heat resistant to temperatures of 1300°C (2372°F).



Challenge

Technological advancements, increasing industrialization, and the need for energy-efficient solutions in the industrial furnaces market pose challenges to costs, quality, and efficiency, including the need of longer maintenance cycles, and efforts to avoid unplanned shutdowns.



Solution

Long-lasting protection of furnaces surfaces, zone dividers, tube seals, process heaters, reformers and door/gates extending the lifetime of furnace insulation.



Insight

The unique combination of flexibility and durability at high temperatures sets 3M™ Nextel™ Ceramic Fabrics and Textiles apart from other high-temperature textiles. 3M™ Nextel™ products contribute to meeting demand for cleaner, more sustainable operations worldwide which means lower emissions and reduced waste.



Why Nextel?

Nextel™ 312 and 440 fiber products include AF-29 and BF-30 fabrics. They offer exceptional performance due to their unmatched flexibility and temperature resistance. They can withstand temperatures well over 1093°C (2000°F) while protecting furnace surfaces and equipment for extended life cycle and can contribute to reducing debris, avoid product contamination to optimize yield and costs.



Industry

Industrial furnaces manufacturing and maintenance including applications such as

- process heaters
- reformers
- linings and insulation panels
- zone dividers
- tube seals
- heat shields and furnace doors/gates

Want to learn more about
3M™ Nextel™ Ceramic Fabrics
and Textiles?

[YOUR LINK TO 3M](#)



© 3M 2024. All rights reserved.
3M and Nextel are trademarks of 3M Company.

Technical information: Technical information, recommendations, and other statements contained in this document or provided by 3M personnel are based on tests or experience that 3M believes are reliable, but the accuracy or completeness of such information is not guaranteed. Such information is intended for persons with knowledge and technical skills sufficient to assess and apply their own informed judgment to the information. No license under any 3M or third-party intellectual property rights is granted or implied with this information. As a result, customer is solely responsible for evaluating the product and determining whether it is appropriate and suitable for customer's application.