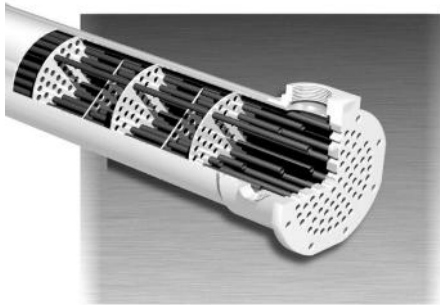
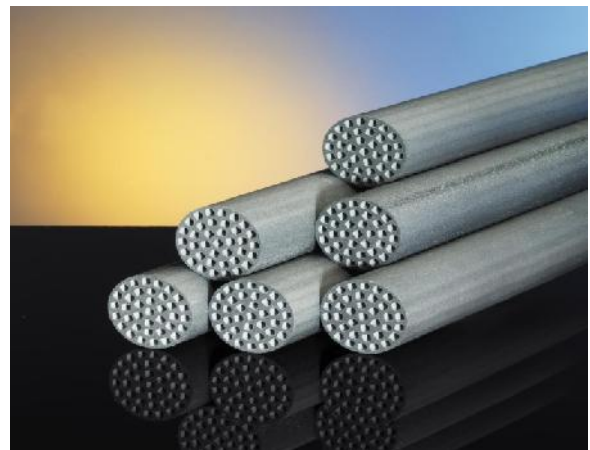
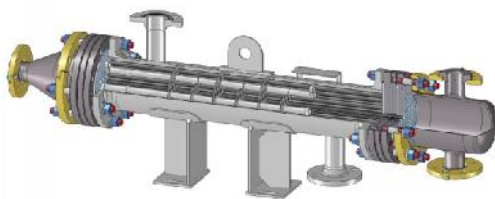


**We are dealing in, Saint-Gobain's products as under,**

**Hexoloy® SE sintered silicon carbide (Si C) heat exchanger tubes from Saint-Gobain**



**Crystar® FT ceramic membrane filters from Saint-Gobain for filtration applications-Sic membrane**



# 1. Sintered Si C Heat Exchanger Tubes

Hexoloy® SE silicon carbide heat exchanger tubes provide the most reliable choice for high-temperature, high-pressure chemical processing applications.

Upgrade your shell or tube heat exchanger system to the industry's most high-performance, efficient tubing option: Saint-Gobain's [Hexoloy® SE](#) sintered silicon carbide (Si C) heat exchanger tubes. [Hexoloy® SE](#) tubes feature unmatched reliability, strength, high thermal conductivity, ultra-high purity and virtually universal corrosion resistance.

Too often, heat exchanger tubes made from other materials such as graphite and glass have to be replaced due to fouling or breakage.

Lower your manufacturing costs increase your operating efficiency and maximize profits by insisting on heat exchanger systems made with [Hexoloy® SE](#) tubes, which are non-fouling and strong with ultra-long life even in the harshest conditions.

- Saint-Gobain is the only source for sintered Si C heat exchanger tubing, with more than 25 years of experience in the chemical industry.
- Hexoloy® SE heat exchanger tubes are available in outer diameters of 0.75" (19mm), 0.55" (14mm) and 0.50" (19mm) at lengths up to 15 feet (4.6m).

## **Features & Benefits:**

Benefits of Hexoloy® SE Sintered Silicon Carbide include:

- Non-fouling
- High strength
- Ultra-long life
- Excellent thermal conductivity
- Universal corrosion resistance
- Extreme hardness and wear resistance
- Lowers operating and maintenance costs over the life of the product
- Improves efficiency by reducing down time and maintenance
- Meets tough chemical industry standards worldwide

## **Product Line Description**

### **Hexoloy® Silicon Carbide Heat Exchanger Tubes gives you a distinct advantage over other materials**

Saint-Gobain offers Hexoloy silicon carbide chemical process heat exchanger tubing as a superior alternative to tubes made of metals, glass and other materials. Hexoloy SiC is a single-phase, sintered alpha silicon carbide offering high purity, fine grain size and extremely low porosity. Hexoloy SiC tubes offer distinct advantages to enhance the performance of shell and tube heat exchangers used in demanding applications from chemical processing to refineries

### **Hexoloy® Silicon Carbide Chemical Process Heat Exchanger Tubing**

A superior alternative to metals, glass and other tube materials for enhanced heat exchanger efficiency, uptime and reliability:

- High Thermal Conductivity
- Virtually Universal Corrosion Resistance
- Extreme Hardness and High Strength

#### **Sic Material**

- High Hardness

Can withstand high velocity of the Fluid

- Strong Chemical Resistance

Can withstand Br, H<sub>2</sub>SO<sub>4</sub>, HF and HNO<sub>3</sub>, HCL etc. Strong Alkali halogenated compound, saline solution and other organic compound.

- High Thermal Conductivity

The Thermal conductivity of the Sic is much higher than graphite, tantalum, meanwhile it can work at the temperature above 1000°C.

## 2. Crystar FT<sup>®</sup> silicon carbide membranes for filtration applications

Crystar<sup>®</sup>FT ceramic membrane filters from Saint-Gobain offer longer life, corrosion and erosion resistance and the highest flux of any membranes on the market.

Advanced silicon carbide membranes from Saint-Gobain can remove total suspended solids, hydrocarbons (oil) and bacteria. Crystar<sup>®</sup> FT filters offer the highest flux of any membrane materials.

Advanced Silicon Carbide Membranes are chemically robust, and abrasion and erosion resistant. These membranes can be run in high temperature conditions and exhibit minimal fouling. Membranes can be cleaned in place to maintain consistent flux. This results in consistent output, reduced maintenance, and lower equipment and labor costs.

Saint-Gobain Performance Ceramics & Refractories manufactures recrystallized silicon carbide (R-SiC) microfiltration membranes in crossflow and dead-end configurations with several membranes pore sizes, for a wide range of demanding applications. Using advanced R-SiC membranes from Saint-Gobain significantly increased the productivity of filtration processes, reduces the equipment footprint and operating costs and decreases chemical and water usages.

### Features & Benefits:

- Excellent corrosion resistance vs. concentrated lyes and acids
- Ability to withstand high frequency back pulsing cycles
- Thermal stability up to 1000°C in air
- High chemical and pH compatibility
- Excellent permeability and ability to handle high solid concentration, e.g. SiC slurries with up to 75% solid content
- Easy cleaning by a variety of methods, e.g. thermal and chemical treatment or back pressure pulses
- High pressure stability
- High flux
- Long operational life

## Crystar® FT recrystallized SiC membranes

Saint-Gobain Ceramic Materials is an institution in the field of advanced engineered materials, providing unmatched expertise when it comes to ceramics technology. More specifically, Saint-Gobain Performance Ceramics & Refractories have been providing unique and high added value silicon carbide-based solutions for decades, including the first-to-market recrystallized silicon carbide (R-SiC) product. This outstanding ceramic forms the basis of our Crystar® filtration technology (FT).

### Products

	<p><b><u>Crystar® Dead-End Technology</u></b> Crystar® dead-end filtration components are monolith components with a unique honeycomb structure allowing great compactness and efficient operation. They are certified for swimming pool and drinking water according to USA norm NSF 50/61.</p>
	<p><b><u>Crystar® FT Cross-Flow Technology</u></b> Crystar® crossflow filtration components comprise tubular components fabricated from multiple layers of recrystallized silicon carbide. They have the most permeable carriers on the market, which enables high permeate transfer and very effective backwash or back flush operations. They are certified for food contact according to EU regulation 1935-2004.</p>

## **Crystar FT® silicon carbide membranes for filtration applications**

Crystar® FT membranes, using porous re-crystallized silicon carbide (R-SiC), have everything a liquid filtration membrane needs. They are chemically robust and withstand high corrosive solvents, such as strong acids, lye or concentrated NaOH solutions (pH 0 to pH 14), they endure high temperatures with excellent thermal shock resistance and exhibit low fouling behavior, especially to organic matter.

Thanks to these outstanding properties, Crystar® FT filters are optimal for a wide range of filtration applications, including wine and beer clarification, municipal drinking water treatment, oil and gas produced water cleaning, industrial wastewater purification, swimming pool water preparation, as well as other liquid treatment processes.

Crystar® FT membranes can withstand harsh clean in place (CIP) chemical cleaning to fully recover their initial permeability. The cleaning cycles, typically at 40° C to 80° C, can be performed with fast temperature ramp-up and cool down so as to reduce the filtration system downtime. Following cleaning, the filters are practically in an “as new” state. This results in consistent output, reduced maintenance and lower equipment and labor costs. Back flushing or backwashing with air or permeate can also be efficiently carried out thanks to very high permeability of the carrier. These intermediated cleaning operations allow extending the filtration cycles in between CIP’s.

Saint-Gobain manufactures Crystar® FT filters via a multi-step process where the membrane is applied onto the channel walls of a porous R-SiC carrier structure. The carrier material is extruded to form honeycombs or multi-channel tubular shapes. The tailored, multi-layer membrane on top of the carrier consists of R-SiC as well, and serves as the functional layer in the filtration process. Two configurations are available.

#### **Cross flow filtration:**

Tubular crossflow filters are used for the clarification of wine and for the treatment of industrial effluents, among other applications. Source: Saint-Gobain Performance Ceramics & Refractories

- Crossflow filtration uses a selective porous membrane that filters highly loaded liquids for purification or clarification. Tubular crossflow filters have been used for the clarification of wine, along with the filtration of dairy, fruit juices and water, for chemical recovery and for the treatment of challenging industrial effluents.
- Crossflow filtration gets its name because the majority of the feed flow travels longitudinally along the surface of the filter channels, whereas the filtered permeate flows radially through the carrier porosity. The structure of the traditional crossflow filters is tubular and consists of a carrier that is the base material, and on top of it is the filtration membrane, which is a thin, porous layer applied on the carrier.

The efficiency of crossflow filtration technology to treat highly loaded and high fouling streams, makes it widely used in industries around the globe. Crystar® FT ceramic membranes are the next generation of ceramic microfiltration.

#### **Dead end filtration:**

In dead end filtration, all the water that enters the channels of the filter is pressed through the membrane. The filters developed by Saint-Gobain consist of multiple parallel channels that are alternately open and closed at the inlet and outlet faces. The water enters through the inlet channels, is filtered by a membrane with fine pores, passes through the wall of the channel and leaves the filter through the outlet channels. Dead end filters have parallel channels that are alternatively open and closed.