

Heat Cleaning Instructions

Nextel™ Ceramic Textiles 312, 440, 550, 610, and 720

Heat Cleaning

Heat cleaning is used to remove all of the organic coatings from the surface of the Nextel Fibers. This is important in applications where fabrics are going to be prepregged with resin for polymer composite applications. Heat cleaning is also used when Nextel materials are coated with silicone rubber since sizing will inhibit the cure of the silicone. Heat cleaning is recommended when Nextel Ceramic Fabric is to be used as electrical insulation, (thermocouples, heaters, etc.), under reducing atmosphere or vacuum conditions. Under these conditions the sizing decomposes to a conductive carbon and may cause electrical shorts. Fabricating cutting and sewing of Nextel parts is best done with the sizing left on the fabrics. The final parts can then be heat cleaned, if desired, with a simple heat cleaning cycle.

Heat cleaning Nextel Ceramic Fibers 312, 440, 550, 610 & 720 to remove the polymeric sizing and finishes generates thermal decomposition products which can be hazardous if inhaled at concentrations exceeding their recommended exposure limits. Carbon monoxide is the predominant decomposition product. By controlling carbon monoxide concentrations to the ACGIH Threshold Limit Value of 25 ppm (8 hr TWA), other decomposition products should also be adequately controlled. Control of carbon monoxide levels may be most effectively achieved through the use of exhaust ventilation such as an exhaust enclosure or hood.

Equipment Needed

1. Ventilated furnace or furnace equipped with an exhaust hood. For example, a quantity of fabric 10 yards x 36 inches (9,2 m x 0.92 m)

could be heat cleaned in a ventilated furnace capable of maintaining 1292°F (700°C) and equipped with an exhaust hood operating at 150 cubic feet (4,17 cubic meters) per minute capture velocity and not subject to disturbances by cross drafts.

2. Temperature measuring device, fitted with Type K thermocouple.

Procedure

1. Remove combustible packaging materials.
2. Place monitoring thermocouple in an area likely to require the longest time for heat penetration. Place bulk textiles in room temperature furnace and apply heat.
3. Follow the time/temperature chart on this page. Exceeding the recommended heating rate may cause the heat cleaning temperature to increase above the recommended maximum due to exothermic decomposition of the organic sizing. The maximum recommended rate of temperature increase for heat cleaning bulk textiles is 540°F (300°C) per hour. The baking time starts once the thermocouple reaches temperature.
4. Pigmented product will lose its color and appear white when sizing has been removed. Process should be repeated or extended until product is completely white.
5. Turn off furnace and let material and furnace cool to room temperature before handling.

Nextel Textiles	Heat Cleaning	
	Thermocouple Temperature	Time
Large Roll Fabric	1292°F ±27 700°C ±15	12 hours
Small Samples	1292°F ±27 700°C ±15	5 minutes

Heat Treating Instructions

Nextel™ Ceramic Textiles 312

Heat Treating

Heat treating, which changes the crystal structure of the fiber, is a higher temperature process than heat cleaning. This treatment improves the chemical resistance, anneals the stress from the fiber, and increases the modulus or stiffness of the fiber. This is used when the product is going to be used in hot wet environments or in areas where other chemicals are present. It is also used to reduce the stress of the fiber and minimize the unraveling in the cut ends of braided sleeving or fabrics.

Carbon monoxide is the predominant decomposition product. By controlling carbon monoxide concentrations to the ACGIH Threshold Limit Value of 25 ppm (8 hr TWA), other decomposition products should also be adequately controlled. Control of carbon monoxide levels may be most effectively achieved through the use of exhaust ventilation such as an exhaust enclosure or hood.

Equipment Needed

1. Furnace capable of maintaining 1652°F (900°C). Furnace may be the same one used to heat clean the fabric or it may be a second furnace which would not require ventilation if the fabric had already been heat cleaned.
2. Temperature measuring device, fitted with Type K thermocouple.

Procedure

1. Remove combustible packaging materials.
2. Place monitoring thermocouple in an area likely to require the longest time for heat penetration. Place bulk textiles in room temperature furnace and apply heat.
3. Follow the time/temperature chart on this page. Exceeding the recommended heating rate may cause the heat treating temperature to increase above the recommended maximum due to exothermic decomposition of the organic sizing. The maximum recommended rate of temperature increase for heat treating bulk textiles is 540°F (300°C) per hour. The baking time starts once the thermocouple reaches temperature.
4. Pigmented product will lose its color and appear white when sizing has been removed. Process should be repeated or extended until product is completely white.
5. Turn off furnace and let material and furnace cool to room temperature before handling.

Nextel Ceramic Textiles 312	Heat Treating	
	Thermocouple Temperature	Time
Large Roll Fabric	1652°F ±27 900°C ±15	12 hours
Small Samples	1652°F ±27 900°C ±15	4 hours