

3M Advanced Materials Division

# 3M™ Nextel™ Ceramic Fabrics 312 and 440

## Introduction

3M™ Nextel™ Ceramic Fabrics 312 and 440 are designed to meet the toughest thermal, mechanical and electrical performance requirements. These fabrics can perform beyond many use limits of other high temperature textiles such as aramids, carbon, quartz or glass.

Nextel fabrics are woven from true ceramics. They are oxidation resistant, chemically inert, lightweight, electrically insulating at high temperatures, flexible, and fire, flame and heat resistant.

## Features and Benefits

- Non-oxidizing
- Non-hygroscopic
- Good chemical resistance
- Low thermal conductivity
- Good abrasion resistance
- Fire and flame resistant

## Typical Applications

Application	3M™ Nextel™ Ceramic Fabrics	
	312	440
Continuous Use Temperature*	2192°F (1200°C)	2372°F (1300°C)
<b>Aerospace</b> Flame barrier, thermal shields, gaskets, seals, micrometeorite debris shields		
<b>Industrial</b> Furnace curtains and linings, door seals, tube seals, gaskets, expansion joints, flexible couplings		
<b>Composites</b> Ceramic Matrix Composites (CMC), Polymer Matrix Composites (PMC)		

\*40% fiber strength retention tested at room temperature after 100 hours soak.

## Important Processing Information

**Heat Cleaning:** Nextel ceramic fabrics 312 and 440 are coated during manufacture with sizings or finishes to serve as aids in textile processing. The sizings or finishes consist of organic polymers which, when first heated, may ignite and/or decompose to potentially hazardous byproducts or process contaminants. See Safety Data Sheet or contact 3M for more information.

**Heat Treating:** If Nextel ceramic fabrics 312 are to be subjected to hot humid environments for extended

periods of time (e.g., 95°C @ 100% relative humidity for ten days), heat treating is necessary. Heat treatment changes the crystal structure of the fiber preventing physical degradation in these conditions.

Heat cleaning or heat treating of Nextel ceramic fabrics are services offered by 3M.

## Additional Information

For additional information about 3M Nextel ceramic fabrics, please call **1-800-367-8905**, or contact your local 3M representative.

## Typical Properties (Not for specification purposes.)

								3M™ Nextel™ Ceramic Fabrics 312 and 440					
								Sized		Heat Cleaned			
Style	Target thread count per in. (cm)		Input fiber		Weave	Permeability* (Heat cleaned)	Width in. (cm)	Weight oz./yd <sup>2</sup> (g/m <sup>2</sup> )	Thickness in. (mm)	Weight oz./yd <sup>2</sup> (g/m <sup>2</sup> )	Thickness in. (mm)	Breaking strength lbs/in. (kg/cm)	
	Warp	Fill	Yarn type	Denier (Tex)								Warp	Fill
<b>Nextel 312</b>													
AF-8	20 (8)	10 (4)	Served Roving	600 (67)	10 Mesh Leno	N/A	38 (97)	3.3 (110)	0.015 (0.38)	2.4 (81)	0.009 (0.23)	30 (5)	20 (4)
AF-10	46 (18)	46 (18)	Served Roving	600 (67)	5 Harness Satin	Med	38 (97)	8.6 (290)	0.016 (0.41)	7.2 (240)	0.011 (0.28)	140 (25)	140 (25)
AF-12	25 (10)	25 (10)	Roving	1200 (133)	5 Harness Satin	Med	42, 58 (107, 147)	8.0 (270)	0.014 (0.36)	7.9 (270)	0.011 (0.28)	120 (21)	130 (23)
AF-14	20 (8)	17 (7)	½ Yarn	900 (100)	Plain Weave	High	38 (97), 59 (150)	9.0 (310)	0.015 (0.38)	8.8 (300)	0.014 (0.36)	120 (21)	120 (21)
AF-20	30 (12)	26 (10)	Roving	1800 (200)	5 Harness Satin	Low	36 (91), 63 (160)	13 (440)	0.021 (0.53)	13 (440)	0.020 (0.51)	140 (25)	140 (25)
AF-29	17.5 (7)	17.5 (7)	Roving	3600 (400)	4 Harness Satin	Med	50 (127)	16 (540)	0.030 (0.76)	16 (542)	0.028 (0.71)	170 (30)	160 (29)
AF-30	19 (7)	18 (7)	½ Yarn	1800 (200)	4 Harness Satin	High	36 (91)	18 (610)	0.032 (0.81)	18 (610)	0.030 (0.76)	160 (29)	170 (30)
AF-40	32 (13)	20 (8)	½ Yarn	1800 (200)	5 Harness Satin	Med	36 (91)	24 (810)	0.038 (1.0)	24 (810)	0.038 (0.97)	170 (30)	150 (27)
AF-62	40 (16)	20 (8)	½ Yarn	1800 (200)	Plain Double Layer	High	4, 12, 30 (10, 30, 76)	29 (980)	0.055 (1.4)	29 (980)	0.055 (1.4)	190 (34)	140 (25)
<b>Nextel 440</b>													
BF-20	30 (12)	26 (10)	Roving	2000 (222)	5 Harness Satin	Low	36 (91), 63 (160)	15 (510)	0.021 (0.53)	15 (510)	0.020 (0.51)	230 (41)	230 (41)
BF-30	21 (8)	20 (8)	½ Yarn	2000 (222)	4 Harness Satin	Med	63 (160)	20 (680)	0.032 (0.81)	20 (680)	0.031 (0.79)	160 (29)	160 (29)
BF-40	32 (13)	20 (8)	½ Yarn	2000 (222)	5 Harness Satin	Med	30 (76)	26 (880)	0.038 (0.97)	26 (880)	0.035 (0.89)	230 (41)	200 (36)

\*Permeability (cfm/ft<sup>2</sup>): Low <20; Med 20–70; High >70 A-Nextel 312 B-Nextel 440

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