

# Plamaron Non-Shrink Tube

Non-Shrink Tube with flexible technology options for Class F insulation in electric motors



- Superb dielectric and cut through strength across operating temperatures
- Robust DuPont™ Mylar® and DuPont™ Nomex® grade 410 construction
- Suitable for Class F applications and operating temperatures of 155°C in continuous use
- Flexible technology can be applied to almost any insulation problem
- Constructed from UL approved material



## Flexible technology for robust insulation

Plamaron Non-Shrink Tube prevents line failures in electric motors by securing and insulating wiring and electrical connections. Easy, slide-on fitting provides robust mechanical and electrical protection, both in production and in use.

Plamaron Non-Shrink Tube maintains high dielectric strength and cut through resistance in the most demanding Class F applications. Consistent characteristics and ease of application give manufacturers a proven, cost efficient means to boost the mechanical and electrical reliability of a wide range of products.

## More features

- Available with internal diameters from 2.0mm to 200mm
- A comprehensive range of wall thicknesses is available to match virtually any insulation application
- Tight manufacturing tolerances and product resilience suits bulk process engineering environments

## Flexible Technology

Plamaron Non-Shrink Tube is a supremely flexible technology, available in a range of variants to address virtually any insulation problem. It can be supplied with;

- DuPont™ Nomex Grade 410 as an interior, exterior or sandwiched lamina to suit the individual application
- Lamina Varnish EnCapsure wicking technology and DuPont™ Nomex® grade 411 to enhance the resilience of varnish impregnated electric motors in overload conditions.
- Sonic welded end closure



For more information or to order contact us:  
email: [sales@lamina.uk.com](mailto:sales@lamina.uk.com)  
tel: +44 (0) 1403 78 31 31

[www.lamina.uk.com](http://www.lamina.uk.com)

**Lamina**  
TUBULAR TECHNOLOGY



## Technical Data

### Performance data for DuPont™ Nomex® Grade 410

#### Electrical Properties

Property of Base Material	50µm (2 mil)	75µm (3 mil)	125µm (5 mil)	Test Method
Dielectric strength (AC Rapid Rise) (V/mil)	430	550	680	ASTM D149*
Dielectric constant at 60Hz	1.6	1.6	2.4	ASTM D3426

\*Corresponds with IEC 243-1, except for electrode set up of 50mm.

#### Physical Properties

Property of Base Material	50µm (2 mil)	75µm (3 mil)	125µm (5 mil)	Test Method
Weight g/m <sup>2</sup>	41	63	116	ASTM D646
Density [g/cc]	0.72	0.08	0.13	

#### Mechanical Properties

Property of Base Material	50µm (2 mil)	75µm (3 mil)	125µm (5 mil)	Test Method
Tensile Strength (Newtons/cm)				
Machine direction (MD)	39	65	137	ASTM D828
Transverse direction (TD)	18	32	66	
Elongation Before Failure (%)				
MD	9	11	15	ASTM D828
TD	6	8	12	
Elmendorf Tear (N)				
MD	0.8	1.2	3.4	TAPP1-414
TD	1.6	2.3	5.2	
Initial Tear Strength (Newtons)				
MD	11	16	33	TAPP1-414
TD	6	8	17	
Shrinkage at 300°C (%)				
MD	2.2	1.1	0.9	ASTM D1004
TD	0.1	0.0	0.0	

### Effects of humidity on performance of DuPont™ Nomex® Grade 410

Electrical Properties	Oven Dry	50%	96%	Test Method
DuPont™ Nomex® grade 410 - 0.25mm				
Dielectric Strength (AC Rapid Rise) kV/mm (V/mil)	33.5 (850)	32.1 (815)	30.7 (780)	ASTM D149
Dielectric Constant				
at 60Hz	2.5	2.7	3.2	ASTM D150
at 1KHz	2.3	2.6	3.1	
Dissipation Factor				
at 60Hz(x10 <sup>-3</sup> )	6	6	11	
at 1KHz (x10 <sup>-3</sup> )	13	14	25	
Volume Resistivity (ohm/cm)	6x10 <sup>16</sup>	2x10 <sup>16</sup>	2x10 <sup>14</sup>	ASTM D257

Physical Properties	Oven Dry	50%	65%	95%
DuPont™ Nomex® grade 410 - 0.08mm				
Expansion (%)				
MD	0	0.4	0.6	0.9
TD	0	0.5	0.8	1.6
Moisture Regain (%)	0	2.9	4.9	7.7
DuPont™ Nomex® grade 410 - 0.08mm				
Expansion (%)				
MD	0	0.4	0.6	1.1
TD	0	0.5	0.9	1.8
Moisture Regain (%)	0	3.5	5.1	8.4



## Technical Data

### Performance data for DuPont™ Mylar® A polyester film

#### Electrical Properties

Property of Base Film	Typical Value	Test Condition	Test Method
Dielectric strength (v)	6400	25°C, 50Hz and 50mm electrode	ASTM D 149-64
Film thickness (mm)	0.0254	25°C, 7500v, 150°C, 5000v	
Surface Resistivity ohms per square	10 <sup>6</sup>	25°C, 30% relative humidity	ASTM D 257-78

#### Physical Properties

Property of Base Film	Typical Value	Test Condition	Test Method
Tensile Mpa (Machine Direction)	200	25°C	ASTM D 882-80
Elongation % (MD)	130	25°C	ASTM D 882-80
Stress to produce 5% elongation Mpa (MD)	105	25°C	ASTM D 882-80
Moisture absorption	less than 8%	24hrs at 25°C immersion	ASTM D 570-63

#### Thermal Properties

Property of Base Film	Typical Value	Test Method
Melt Point	(526-528K) 253-255°C	ASTM D 3148-82

# Plamaron Non-Shrink Tube

Non-Shrink Tube with flexible technology options for Class F insulation in electric motors



For more information or to order contact us:  
email: [sales@lamina.uk.com](mailto:sales@lamina.uk.com)  
tel: +44 (0) 1403 78 31 31

[www.lamina.uk.com](http://www.lamina.uk.com)

**Lamina**  
TUBULAR TECHNOLOGY