Plamar Non-Shrink Polyester / Plamon Nomex Bolt Insulation

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Lamina
TUBULAR TECHNOLOGY

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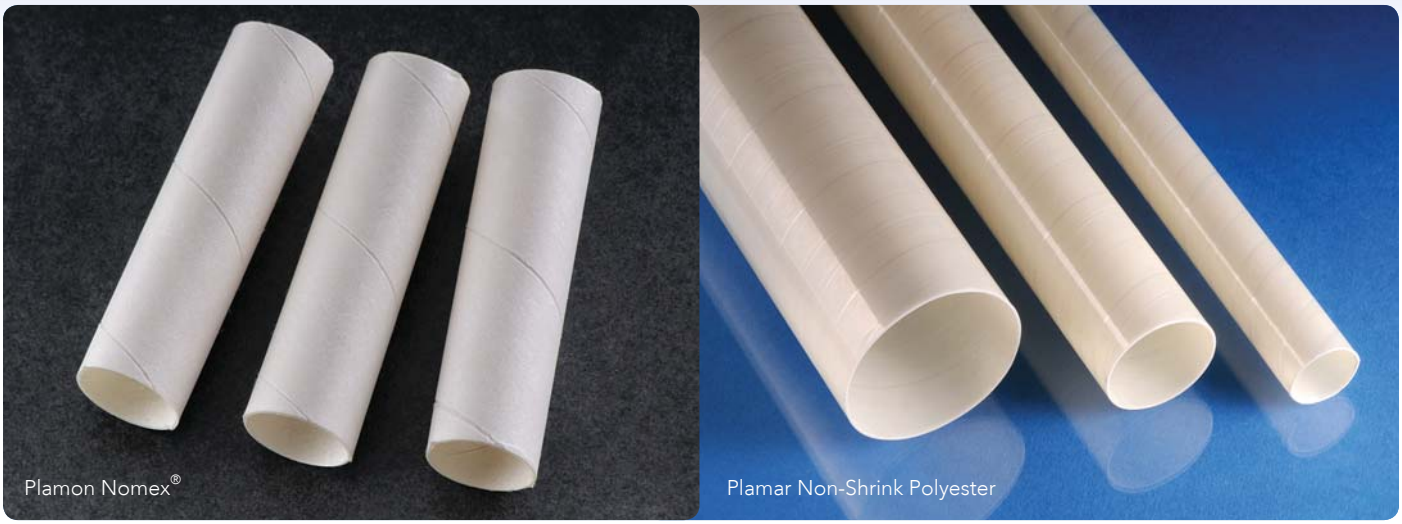


Lamina's Multi-layered spiral wound Bolt Insulation sleeve is designed to fit over Standard Metric and Imperial sized flange bolts. Lamina's sleeves are constructed from UL recognised Nomex® and Non-Shrink Polyester materials which are traceable under registration number E348131. Consistent characteristics and ease of application give manufacturers a cost efficient means to boost mechanical reliability. They offer unrivalled durability, toughness, protection and insulation and can be made in both Metric and Imperial diameter sizes.

Although designed for the pipe flange bolt insulation industry, these products find alternative uses in the insulation of retaining rods in transformers and other electrical apparatus.

Where for technical reasons the clearance between bolt and flange hole diameter is restricted, these products can also be supplied in a high shrink form to overcome assembly difficulties.

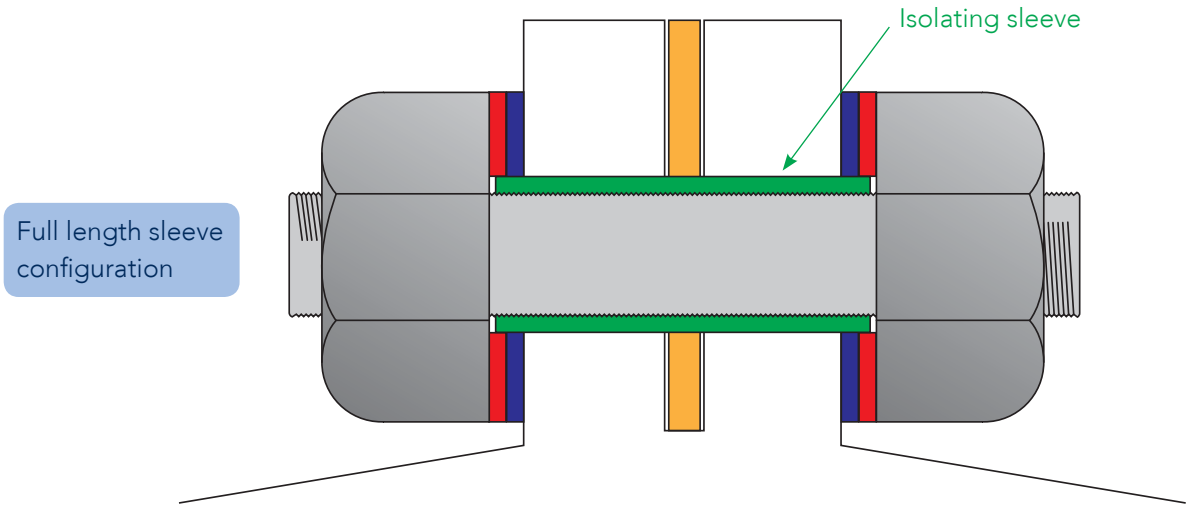
More features

Sizes availble in various wall thicknesses depending on either purchasing Imperial or Metric, supplied in 1 or 2 metre lengths.

- Imperial Wall thickness 1/32 inch (0.800m)
- Metric wall thicknesses 0.5mm (0.019")

Standard Metric Bolt diameter sizes range from 4mm (M4) to 100mm (M100) all are made applying industry standard internal diameter clearances. A blue stripe is added to the metric bolt to prevent identity confusion.

Imperial diameter sizes range from ½" to 3 ¾" and all are made applying industry standard internal diameter clearances.



Full length sleeve configuration

Technical Data

Electrical Properties - Plamon Nomex® Bolt Insulation

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, 9.1m except for electrode set up of 50mm.

Physical Properties - Plamon Nomex® Bolt Insulation

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

Mechanical Properties - Plamon Nomex® Bolt Insulation

Property of Base Material	50µm (2 mil)	75µm (3 mil)	125µm (5 mil)	Test Method
Tensile Strength (Newtons/cm)				
Along machine direction (MD)	39	65	137	ASTM D828
Across machine 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	

Electrical Properties - Plamar Non-Shrink Polyester Bolt Insulation

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^{16}	25°C, 30% relative humidity	ASTM D 257-78

Physical Properties - Plamar Non-Shrink Polyester Bolt Insulation

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 - Plamar Non-Shrink Polyester Bolt Insulation

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

Technical Data

Wall thickness 0.5mm
Supplied in standard lengths of 1000mm and 2000mm

Bolt Diameter	Minimum Internal Tube Diameter (mm)	Maximum External Tube Diameter (mm)
8	8.25	9.51
10	10.25	11.51
12	12.25	13.51
14	14.25	15.51
16	16.25	17.51
18	18.25	19.51
20	20.25	21.51
22	22.25	23.51
24	24.25	25.51
26	26.25	27.51
27	27.25	28.51
30	30.50	31.76
33	33.50	34.76
36	36.50	37.76
39	39.50	40.76
42	42.50	43.76
45	45.50	46.76
48	48.75	50.01
52	52.75	54.21
56	56.75	58.21
60	60.75	62.21
64	64.75	66.21
68	68.75	70.21
72	72.75	74.21
76	76.75	78.21
80	80.75	82.21
84	84.75	86.21
88	88.75	90.21
92	92.75	94.21
96	96.75	98.21
100	100.75	102.21

Wall thickness 1/32 inch (0.800m)
Supplied in standard lengths of 39.37 inch (1000mm) and 78.74 inch (2000mm)

Bolt Diameter	Minimum Internal Tube Diameter		Maximum External Tube Diameter	
	Inch	mm	Inch	mm
½	0.5156	13.10	0.589	14.96
⅝	0.6406	16.27	0.715	18.16
¾	0.7656	19.45	0.841	21.36
⅞	0.8906	22.62	0.963	24,46
1	1.0156	25.80	1.089	27.66
1 ⅛	1.1406	28.97	1.215	30.86
1 ¼	1.2656	32.15	1.341	34.06
1 ⅜	1.3906	35.32	1.463	37.16
1 ½	1.5156	38.50	1.589	40.36
1 ⅝	1.6406	41.67	1.715	43.56
1 ¾	1.7656	44.85	1.841	46.76
1 ⅞	1.8906	48.02	1.963	49.86
2	2.0156	51.20	2.097	53.26
2 ⅛	2.1406	54.37	2.223	56.46
2 ¼	2.2656	57.55	2.349	59.66
2 ⅜	2.3906	60.72	2.471	62.76
2 ½	2.5156	63.90	2.597	65.96
2 ⅝	2.6406	67.07	2.722	69.13
2 ¾	2.7656	70.25	2.847	72.32
2 ⅞	2.8906	73.42	2.972	75.48
3	3.0156	76.60	3.097	78.66
3 ⅛	3.1406	79.77	3.222	81.83
3 ¼	3.2656	82.95	3.347	85.01
3 ⅜	3.3906	86.12	3.472	88.18
3 ½	3.5156	89.30	3.597	91.36
3 ⅝	3.6406	92.47	3.722	94.53
3 ¾	3.7656	95.65	3.847	97.71

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