

Phase insulation NMN 411 is an insulating laminate consisting of three layers of polyester with uncalendered aramid paper (Nomex) on both sides. An ideal material for phase insulation in electric motors and generators for applications with high working temperatures, NMN 411 is also used for transformers and other electrical applications.



## Typical applications

Electric insulation material used primarily as phase insulation in electric motors and generators, but also as insulation in dry transformers and other electrical apparatus. Ideal for applications requiring a combination of high flexibility and high absorbency of impregnating varnishes.

## Properties

- Approved for insulation Class F (+155°C) or for insulation systems which comply with IEC norms up to +180°C.
- Very good absorbency for impregnating varnishes thanks to its coarse, felt-like surface structure.
- The polyester film's good dielectric and mechanical properties combined with the aramid paper's (Nomex) high resistance to chemicals, solvents and high temperatures result in a very high class insulation material.
- Very good durability.

## Composition

NMN 411 is composed of a central layer of polyester film surrounded by a layer of uncalendered aramid paper (Nomex) on both sides. An adhesive bonds the laminate into a unit whilst retaining inherent properties even when used in the material's higher temperature range.

The product is manufactured in many thicknesses with Polyester film as the middle layer. See technical data.

## Colour

Usually pale white.

## Dimensions

NMN 411 manufactured in thicknesses 250–500 µm. Can be slit to desired widths up to max. 900 mm. Can be punched or cut to desired form or shape. In the case of die-cutting a die tool is required.

## Packaging

- Standard packaging width ca 470 mm depending on item in rolls of ca 6 kg.
- Standard packaging normal width ca 900 mm in rolls of ca 30 kg.
- Other slit-to-width dimensions MOQ (minimum order quantity) in kg on request.

## Article list

Item number	Name/Grade	Dimensions			Weight/roll ca (kg)	Weight g/m <sup>2</sup> (nom.)	Lengt/roll ca (m)
		Thickness (mm)	Width (mm)	Internal diam (mm)			
125525	NMN 411 5/1.5/5	0.27+/-20%	470	76	6	155	82
106268	NMN 411 5/1/5	0.25 +/-20%	470	76	30	145	218

## Tekniska data

NMN 411 properties								Unit
Thickness	250	270	300	330	350	380	510	µm
<b>Mechanical properties</b>								
Thickness tolerance	20	20	20	20	20	20	20	+/- %
Thickness Nomex (× 2)	130	130	130	130	130	130	130	µm
Thickness polyester film	23	36	50	75	100	125	250	µm
Name/thickness (grade)	5/1/5	5/1.5/5	5/2/5	5/3/5	5/4/5	5/5/5	5/10/5	N/M/N
Weight/m <sup>2</sup>	145	155	185	220	255	290	465	g/m <sup>2</sup>
Area/kg ca	6.9	6.45	5.4	4.5	3.9	3.4	2.15	m <sup>2</sup> /kg
Tensile strength MD	73	73	73	73	117	117	330	N/10 mm (min)
Tensile strength XD	73	70	73	73	117	117	330	N/10 mm (min)
Elongation MD	10	8	7	10	10	10	20	% (min)
Elongation XD	10	12	10	10	10	10	20	% (min)
<b>Thermal properties</b>								
Electrical insulation class	F/155	F/155	F/155	F/155	F/155	F/155	F/155	class/°C
<b>Electrical properties</b>								
Dielectric strength	4	6	6	6	10	14	23	kV (min)



### How to contact BEVI

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