



## TRIVOLTHERM N

*Slot insulation Trivoltherm N is a three-ply insulating laminate consisting of polyester film with calendered aramid paper (Nomex) on both sides. An ideal material for slot insulation in electric motors and generators for applications with high working temperatures, Trivoltherm N is also used for transformers and other electrical applications.*

- Thickness range 140 – 630 µm
- Available in widths up to ca 900 mm, cut and trimmed widths and stamped parts available on request
- Very good electrical and mechanical properties and high resistance to chemicals and solvents
- Approved for insulation class F (+155°C) or for insulation systems which comply with IEC norms up to +180°C

## PRODUCT INFORMATION

Slot insulation Trivoltherm N is a three-ply insulating laminate consisting of polyester film with calendered aramid paper (Nomex) on both sides. The structure provides a combination of good electrical, mechanical, thermal and chemical properties.

### Typical applications

Electrical insulation primarily slot insulation of electric motors and generators, but also suitable for use as insulation in dry transformers and other electrical apparatus.

### Properties

- Approved for insulation Class F (+155°C) or for insulation systems which comply with IEC norms up to +180°C
- Withstands short-term temperature peaks up to +200°C without major impact on the breakdown voltage or dielectric resistance
- Very suitable for rational production of Class F motors
- Very good adhesion to impregnation varnishes despite the material's smooth 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
- Can be punched or cut

### Composition

- Trivoltherm N is composed of a central layer of polyester film surrounded by a layer of calendered aramid paper (Nomex) on both sides. A specially developed synthetic 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 three variants. Trivoltherm N50 with a Nomex layer thickness of 2 x 50 µm, Trivoltherm N80 with a Nomex layer

thickness of 2 x 80 µm and Trivoltherm N130 with a Nomex layer thickness of 2 x 130 µm. The products are also available with various thicknesses of polyester film (see technical data).

### Colour

- Usually pale white

### Dimensions

- Trivoltherm N is manufactured in thicknesses 140 – 630 µm
- Can be slit to desired widths up to max 900mm
- Can be punched or cut to desired form or shape. In the case of die-cutting a die tool is required (tools available at low costs)

### Packaging

- Standard packaging width 900 mm depending on item in rolls of 25-30 kg\* (depending on item, certain thicknesses held in stock) (see item list)
- Standard packaging width ca 450 mm depending on item in rolls of 6kg alt. ca 15 kg\* (depending on item, certain thicknesses held in stock) (see item list)
- Other slit-to-width dimensions on MOQ in kg on request
- Punched and die-cut items: volume MOQ by agreement (with die tool or cut)
- \* Other weights on request

*Product information for which Carbex bears no responsibility is provided by the manufacturer.*



## TRIVOLTHERM N



Item Number	Name /Grade	Dimensions			Weight ca (kg)/ rulle	Weight g/m <sup>2</sup> (nom.)	Length ca (m)/ roll	Stock item (usually)
		Thickness mm	Width (ca mm)	Internal diam. (mm)				
030630017	Trivoltherm N50 / 2/2/2	0.17 +/- 15%	900	76	25	170	163	
030630022	Trivoltherm N50 / 2/4/2	0.22 +/- 15%	900	76	25	240	115	
030630024	Trivoltherm N50 / 2/5/2	0.24 +/- 15%	900	76	30	270	123	X
030630031	Trivoltherm N50 / 2/7,5/2	0.31 +/- 15%	900	76	25	360	77	X
030630037	Trivoltherm N50 / 2/10/2	0.37 +/- 10%	900	76	25	450	62	X
030630047	Trivoltherm N50 / 2/14/2	0.47 +/- 10%	900	76	25	580	48	

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### Technical data

#### Trivoltherm N

Properties	Standard	Value	Value	Value	Value	Value	Value	Value	Value	Unit mm
<b>Trivoltherm N /variant</b>		N50	N50	N50	N50	N50	N50	N50	N50	
<b>Nominal thickness</b>		140	170	220	240	310	370	420	470	µm
<b>Mechanical</b>										
Thickness tolerance		15	15	15	15	15	10	10	10	+/- %
Thickness Nomex (x 2)		50	50	50	50	50	50	50	50	µm
Thickness polyesterfilm		23	50	100	125	190	250	300	350	µm
Name/thickness (Grade)		2/1/2	2/2/2	2/4/2	2/5/2	2/7,5/2	2/10/2	2/12/2	2/14/2	N/M/N
Weight/m <sup>2</sup> (nom.)		140	170	240	270	360	450	520	580	g/m <sup>2</sup>
ca Area / kg		7,1	5,9	4,2	3,7	2,8	2,2	1,9	1,7	m <sup>2</sup> /kg
Weight/m <sup>2</sup> (nom.)		12	12	12	12	12	12	12	12	%
Tensile strength MD		100	160	190	225	280	330	ej spec.	420	N/10mm (min)
Tensile strength XD		80	120	150	200	220	300	ej spec.	400	N/10mm (min)
Elongation MD		15	15	15	15	15	15	ej spec.	15	% (min)
Elongation XD		20	25	25	25	25	25	ej spec.	25	% (min)
Shrinkage MD		1,5	1,5	1,5	2	2	2	ej spec.	2	% (max)
Shrinkage XD		1,5	1,5	1,5	2	2	2	ej spec.	2	% (max)
<b>Thermal</b>										
Electrical insulation class		F / 155	F / 155	F / 155	F / 155	F / 155	F / 155	F / 155	F / 155	klass /°C
<b>Electrical</b>										
Dielectric strength		6	10	12	15	16	20	ej spec.	23	kV (min)

Properties	Standard	Value	Value	Value	Value	Value	Value	Value	Unit mm	
<b>Trivoltherm N /variant</b>		N80	N80	N80	N80	N80	N80	N130		
<b>Nominal thickness</b>		220	250	300	360	430	480	630	µm	
<b>Mechanical</b>										
Thickness tolerance		15	15	15	15	10	10	10	+/- %	
Thickness Nomex (x 2)		80	80	80	80	80	80	130	µm	
Thickness polyesterfilm		50	75	125	190	250	300	350	µm	
Name/thickness (Grade)		3/2/3	3/3/3	3/5/3	3/7,5/3	3/10/3	3/12/3	5/14/5	N/M/N	
Weight/m <sup>2</sup> (nom.)		220	255	325	420	500	570	730	g/m <sup>2</sup>	
ca Area / kg		4,5	3,9	3,1	2,4	2,0	1,8	1,4	m <sup>2</sup> /kg	
Weight/m <sup>2</sup> (nom.)		12	12	12	12	12	12	12	%	
Tensile strength MD		210	240	300	330	380	430	670	N/10mm (min)	
Tensile strength XD		170	190	250	300	300	375	560	N/10mm (min)	
Elongation MD		15	15	20	20	20	20	15	% (min)	
Elongation XD		20	20	25	25	25	25	20	% (min)	
Shrinkage MD		1,5	1,5	2	2	2	2	2	% (max)	
Shrinkage XD		1,5	1,5	2	2	2	2	2	% (max)	
<b>Thermal</b>										
Electrical insulation class		F / 155	F / 155	F / 155	F / 155	F / 155	F / 155	F / 155	klass /°C	
<b>Electrical</b>										
Dielectric strength		10	12	16	20	23	25	20	kV (min)	

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