

**Material overview for sheets**

Grønlandsvej 197 +45 7642 8200  
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 VAT no.: DK20429488 [www.elektro-isola.com](http://www.elektro-isola.com)

Test method: IEC/EN 60893-2

Norm

Thickness of sample

Conditioning: IEC 60212

**Closest relevant standards**

Material designation	IEC 60893-3-1	NEMA	Reinforcement	Resin	Colour*
Etronit I	PF CP 202	XX	Paper	Phenol	●
Etronit II	PF CP 203	XX	Paper	Phenol	●
Etronit IIQ	PF CP 203	XX	Paper	Phenol	●
Etronit IIQ S	PF CP 203	XX	Paper	Phenol	●
Etronit IIQ S AL	PF CP 203	XX	Paper	Phenol	●
Etronit IIQR	PF CP 203	XX	Paper	Phenol	●
Etronit IS	PF CP 202	XXX	Paper	Phenol	●
Etronit MBM		-	Paper	Phenol/Melamine	●
Etronax MF	PF CC 201	C	Cotton fabric	Phenol	●
Etronax MMF	PF CC 203	L	Cotton fabric	Phenol	●
Etronax MMMF	PF CC 305	-	Cotton fabric	Phenol	●
Etronax MF G		-	Cotton fabric	Phenol	●
Etronax MFP G		-	Cotton/synthetic fabric	Phenol	●
Etronax P EP	EP PC 301	-	Polyester fabric	Epoxy	●
G-Etronax B	PF GC 201	G-3	Glass fabric	Phenol	●
G-Etronax EP 10	EP GC 201	G-10	Glass fabric	Epoxy	●
G-Etronax EP 11	EP GC 308	G-11	Glass fabric	Epoxy	●
G-Etronax EP 203	EP GC 203	G-11	Glass fabric	Epoxy	●
G-Etronax EP 215 S	EP GC 308	G-11	Glass fabric	Epoxy	●
G-Etronax EP 311 HC	EP GC 311	FR-5	Glass fabric	Epoxy	●
G-Etronax EP FR4	EP GC 204	FR 4&5	Glass fabric	Epoxy	●
G-Etronax PI	PI GC 301	-	Glass fabric	Polyimide	●
G-Etronax PM 953	UP GM 203	GPO 3	Glass mat	Polyester	●
G-Etronax PM GPO 3	UP GM 203	GPO 3	Glass mat	Polyester	●
G-Etronax PM GPO 3	UP GM 203	GPO 3	Glass mat	Polyester	●
G-Etronax PM H	UP GM 204	GPO 1	Glass mat	Polyester	●
G-Etronax SI	SI GC 202	G-7	Glass fabric	Silicone	●

**Conditioning**

- 1: 24h/23°C/50%RH
- 2: 24h/23°C/50%RH + 1h/ in oil at 90°C
- 3: 96h/105°C + 1h/23°C/20%RH
- 4: 24h/50°C/<20% RH + 24h in water at 23°C
- 5: 96h/105°C + 1h/ in oil at 90°C

**Notes**

- A: 1h/130°C / measured at 130°C
- B: 1h/150°C / measured at 150°C
- C: Halogen free
- D: 1h/180°C / measured at 180°C
- E: 1h/200°C / measured at 200°C

**Mechanical properties**

Bending strength		Modulus of elasticity	Compressive strength	Izod impact strength, parallel with layers	Shearing strength, parallel	Tensile strength
Room temperature	Elevated temperature					
6.1	6.1	6.2	6.3	6.4	6.5	6.6
ISO 178	ISO 178	ISO 178	ISO 604	ISO180/2A	IEC 60893-2	ISO 527-4
≥ 1,5 mm	≥ 1,5 mm	≥ 1,5 mm	≥ 5 mm	≥ 5 mm	≥ 5 mm	≥ 1,5 mm
1	1	1	1	1	1	1
MPa	MPa	MPa	MPa	kJ/m²	MPa	MPa
150	-	8000	300	3.5	35	110
160	-	8000	300	3.3	35	110
170	-	8000	320	3.5	35	140
170	-	8000	320	3.5	35	140
170	-	8000	320	3.5	35	140
160	-	8000	300	3.3	35	110
140	-	8000	300	3.5	35	110
120	-	10000	300	3.3	35	90
115	-	7000	320	10	40	80
130	-	7000	280	10	50	100
140	-	8000	280	6	50	90
135	-	7000	330	10	50	80
140	-	5000	320	10	50	85
150	-	4500	450	50	35	135
350	-	19000	500	55	50	250
450	250 <sup>(A)</sup>	22000	550	65	50	320
450	300 <sup>(B)</sup>	22000	550	65	55	320
450	280 <sup>(B)</sup>	22000	550	65	50	320
430	300 <sup>(B)</sup>	22000	550	60	55	320
375	280 <sup>(B)</sup>	20000	500	60	45	300
450	170 <sup>(B)</sup>	22000	550	65	55	320
450	360 <sup>(E)</sup>	25000	650	55	55	300
160	100 <sup>(A)</sup>	11000	300	50	20	100
160	70 <sup>(A)</sup>	10000	240	50	20	100
160	70 <sup>(A)</sup>	10000	240	50	20	100
250	100 <sup>(A)</sup>	11000	350	60	35	150
135	-	13000	330	45	15	160

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Etronit MBM		-	Paper	Phenol/Melamine	●
Etronax MF	PF CC 201	C	Cotton fabric	Phenol	●
Etronax MMF	PF CC 203	L	Cotton fabric	Phenol	●
Etronax MMMF	PF CC 305	-	Cotton fabric	Phenol	●
Etronax MF G		-	Cotton fabric	Phenol	●
Etronax MFP G		-	Cotton/synthetic fabric	Phenol	●
Etronax P EP	EP PC 301	-	Polyester fabric	Epoxy	●
G-Etronax B	PF GC 201	G-3	Glass fabric	Phenol	●
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**Electrical properties**

Electrical strength in 90°C oil		Permittivity		Dissipation factor		Insulation resistance after submersion in water	Comparative tracking index [CTI]
Perpendicular	Parallel	50HZ	1MHz	50HZ	1MHz	7.3	7.4
7.1.3.2	7.1.3.3	7.2		7.2		7.3	7.4
IEC 60243-1		IEC 62631-2-1		IEC 62631-2-1		IEC 62631-3-3	IEC 60112
3 mm	≥ 3 mm	≤ 3 mm	≤ 3 mm	≤ 3 mm	≤ 3 mm	All	≥ 3 mm
2 kV/mm	2 kV/25 mm	3	3	3	3	4 MΩ	1 V
13.3	60	5	-	0.03	-	50	100
10	30	5	-	0.04	-	50	100
5	20	5	-	0.05	-	50	100
4	15	5	-	0.05	-	100	100
4	15	5	-	0.05	-	100	100
7	25	5	-	0.04	-	50	100
14 <sup>(5)</sup>	80 <sup>(5)</sup>	5	-	0.02	-	50	100
5	15	6	-	0.04	-	100	500
1	5	-	-	-	-	1	100
2	12	-	-	-	-	1	100
2	12	-	-	-	-	1	100
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
20	70	4	-	0.01	-	100000	200
10	30	5	-	0.03	-	1000	100
16	60	4.5	4.5	0.008	0.01	500000	200
18	70	5	5	0.008	0.01	500000	200
16	60	4.5	4.5	0.008	0.01	500000	200
18	70	5	5	0.008	0.01	500000	200
15	70	4.5	4.5	0.005	0.008	500000	600
15	70	4.5	4.5	0.005	0.008	500000	200
20	60	4	-	0.01	-	500000	250
11.5	60	4	4	0.04	0.04	1000	600
12	60	4	4	0.04	0.04	1000	600
12	60	4	4	0.04	0.04	1000	600
10	60	4	4	0.01	0.01	1000	600
7	50	4	4	0.003	0.003	100000	400

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**Physical and thermal properties**

Temperature index 20,000 h (T.I.)	Fire class	Density	Water absorption	Smoke emission & toxicity	Oxygen Index (OI)	Smoke density (Ds max.)	Smoke density (Ds max.)	Toxicity (CIT <sub>NLP</sub> )
8.1	8.2	9.1	9.2	-	-	-	-	-
ISO 60216	IEC 60695-11-10	ISO 1183-A	ISO 62-1	EN 45545-2; R22, R23 & R24	EN ISO 4589-2	EN ISO 5659-2	EN ISO 5659-2	NF X 70-100-1/-2
≥ 3 mm	-	All	50x50x3 mm	-	3 mm	-	-	-
-	-	1	4	-	-	-	-	-
°C	Thickness in mm /Category	g/cm <sup>3</sup>	mg	Thickness in mm /Classification	%	Thickness in mm /Value	Thickness in mm /Value	-
120		1.35	120					
120		1.35	110					
120		1.35	200					
120		1.35	200					
120		1.35	200					
120		1.35	110					
120		1.35	100					
120	≥ 8 / V-0	1.4	100					
100		1.35	120					
100		1.35	100					
100		1.4	60					
100		1.35	120					
100		1.35	450					
130		1.35	20					
155	≥ 3 / V-0	1.95	40					
140		1.85	15					
180		1.85	15					
160		1.85	15					
180		1.85	15					
180	≥ 3 / V-0 <sup>c</sup>	1.9	20	≥ 3 / HL3	≥ 32	25 / 1	1 / 106	0.06
145	≥ 0.2 / V-0	1.9	10					
190	≥ 4 / V-0	1.95	25					
155	≥ 3 / V-0	1.9	30					
155	≥ 3 / V-0	1.85	30					
155	≥ 3 / V-0	1.85	30					
180		1.6	25					
220	≥ 3 / V-0	1.9	12					

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