





SPECIAL TYPES

Tubes made from industrial laminated materials

Designation DIN EN 61212	Characteristic property Applications	Flexural strength perpendicular to laminations	Compressive strength axial	Cohesion between layers	Dielectric strength perpendic. (3) thickness 3 mm	Dielectric strength parallel (3)	Insulation resistance	Fire test Railway	Fire test Railway	CTI	Glow wire ignition temperature	Thermal endurance	Water absorption	Density	Combustibility
Test standard		ISO 178	ISO 604	IEC 61212-2	IEC 60243-1	IEC 60243-1	IEC 60167-1	EN 45545-2	DIN 5510-2	IEC 60112-1	EN 60695-2	IEC 60216-1	ISO 62	ISO 1183	UL 94 (5)
Unit		MPa	MPa	MPa	kV/mm	kV	MΩ				GWIT	TI	mg/cm ²	g/cm ³	cat.
min/max		min	min	min	min	min	min			min		min	max		zero- halogen
EP GC 22.15	High dielectric strength in air, very fine weave	300	175	200	7,7	40 (4)	1.000			180		180	1,5	1.7-1.9	-
EP GC 23 HFS	Tracking-resistant, TC 155, UL 94 V-0	 300	175	200	7,7	40	1.000	R22/R23	S4/SR2/ ST2	600	> 960/3.0	155	1,5	1.7-1.9	V-0
EP GC 23 HFD	Tracking-resistant, TC 180, UL 94 V-0	 300	175	200	7,7	40	1.000	R1/R22/ R23	S4/SR2/ ST2	600	> 960/3.0	180	1,5	1.7-1.9	V-0
EP GC 26	Highly tracking-resistant, CTI 600M, TC 155, UL 94 V-0	 300	175	200	7,7	40	1.000		S4/SR2/ ST2	600 M	930/3.0	155	1,5	1.7-1.9	V-0
PF CC 21 K	For precision ball-bearing cages, > 30x30 threads/cm	90	160	150	1,6	25	20	-	-	-	-	120	5	1.15-1.35	
PF AC 22	+ PTFE, plain bearing, very low water absorption	35	100	160	3	40	20	-	-	-	-	-	1	1.05-1.20	
PF CC 22	+ PTFE as dry lubricant, anti-seizure property	60	90	100	1	5	2	-	-	-	-	-	10	1.15-1.35	
PF CC 22	+ graphite as dry lubricant, anti-seizure property	60	90	100			2	-	-	-	-	-	5	1.15-1.35	
PF CC 22	+ MoS ₂ as dry lubricant, anti-seizure property	60	90	100			2	-	-	-	-	-	10	1.15-1.35	

(1) The flexural strength measured at 150°C ± 3K must not be less than 50% of the defined value
 (2) After 96 h pretreatment in air at 105°C ± 5K directly prior to testing and immediate immersion in the hot oil
 (3) At 90 °C in oil
 (4) 20 kV/3mm wall thickness in air
 (5)  UL-listed file E307596 under respective sheet designation

xxxx Minimum requirements of DIN EN 61212
 xxxxx Typical values, general recommended values, which must not be used as standard values

Resin	Substrate	Weave types for cotton substrate materials		
EP Epoxy	CC Woven cotton cloth	Very coarse weave	Mass per unit area > 200 g/m ²	No. of threads < 18 per cm
MF Melamine	CP Cellulose paper	Coarse weave	> 130 g/m ²	18-29 per cm
PF Phenolic	GC Woven glass cloth	Fine weave	≤ 130 g/m ²	30-37 per cm
	MP Mica paper	Very fine weave	≤ 125 g/m ²	> 37 per cm