

# Characteristics\* of insulating and sheath materials

Designation		Electrical				Thermic				Mechanical				Halogen		Weather		Designation						
VDE Abbr.-Inhalt.-Vat.-Code	Materials	Density	Break-down-voltage	Specific volume-resistivity	Dielectric-constant	Dielectric-loss factor	Working temperature	Melt-temperature	Flame-resistance	Oxygen index	Heating value	Thermal-conductivity	Corrosive-gases	Radiation-resistance	Tensile-strength	Elongation-at-break	Shore hardness	Abrasion-resistance	Water-absorption	halogen-free	Weather-resistance	Cold-resistance	Material	
Y	PVC	g/cm <sup>3</sup>	kV/mm	Ohm-cm	50 Hz/20°C	tan δ	°C	°C	self-extinguishing	% O <sub>2</sub>	MJ-tq <sup>3</sup>	W-t <sup>3</sup> m <sup>2</sup>	case of fire	Mrad	N/mm <sup>2</sup>	%	IR	mm <sup>3</sup>	%	no	moderate-good	moderate-good	Abbr.-Inhalt.-Vat.-Code	
Y	PVC	1,35-1,5	25	10 <sup>12</sup> -10 <sup>13</sup>	3,6-6	3,6-6	+100	>140		23-32	17-25	0,17	Hydrogen chloride	80	10-25	130-350	70-95 (A)	medium	0,4	no	moderate-good	moderate-good	Y	Polyvinylchloride compounds
Yw	PVC	1,3-1,5	25	10 <sup>12</sup> -10 <sup>13</sup>	4-6,5	4x10 <sup>-3</sup> to 1x10 <sup>-1</sup>	+70	>140	self-extinguishing	23-32	16-22	0,17	Hydrogen chloride	80	10-25	130-350	70-95 (A)	medium	0,4	no	moderate-good	moderate-good	Yw	PVC Heat-resistant 90°C
Yw	PVC	1,3-1,5	25	10 <sup>12</sup> -10 <sup>13</sup>	4,5-6,5	1x10 <sup>-1</sup>	+120	>140	self-extinguishing	24-47	16-20	0,17	Hydrogen chloride	80	10-25	130-350	70-95 (A)	medium	0,4	no	moderate-good	moderate-good	Yw	PVC Heat-resistant 105°C
Yk	PVC	1,2-1,4	25	10 <sup>12</sup> -10 <sup>13</sup>	4,5-6,5		+100	>140	self-extinguishing	24-47	17-24	0,17	Hydrogen chloride	80	10-25	130-350	70-95 (A)	medium	0,4	no	moderate-good	moderate-good	Yk	PVC Cold resistant
ZV	LDPE	0,92-0,94	70	10 <sup>11</sup>	2,5	2x10 <sup>-4</sup>	+100	105-110	flamable	18-30	42-44	0,3	no	100	10-20	400-600	43-50 (D)	medium				ZV	LDPE Low density Polyethylene	
ZV	HDPE	0,94-0,98	85	10 <sup>11</sup>	2,5	5x10 <sup>-4</sup>	+120	130	flamable	≥22	40-45	0,23	no	80	20-30	500-1000	60-65 (D)	good	0,1	yes	moderate-good	ZV	HDPE High density Polyethylene	
ZK	VPE	0,92	50	10 <sup>12</sup> -10 <sup>13</sup>	4-6	2x10 <sup>-1</sup>	+100	-	flamable	18-30	27-31	0,23	no	10	12,5-20	300-400	40-45 (D)	medium				ZK	VPE Cross-linked Polyethylene	
OZY	Foamed Polyethylene	~0,65	30	10 <sup>11</sup>	~1,55	5x10 <sup>-1</sup>	+70	105	flamable	18-30	40-45	0,23	no	80	8-12	350-450	-	-		conditional <sup>1)</sup>	moderate-good	OZY	Foamed Polyethylene	
3Y	PS	1,05	30	10 <sup>9</sup>	2,5	1x10 <sup>-4</sup>	+80	>120	flamable	≥22	27-31	0,23	no	10	50-60	50-170	-	very good	1,0-1,5	yes	moderate-good	3Y	PS Polystyrene	
4Y	PA	1,02-1,1	30	10 <sup>11</sup>	4	2x10 <sup>-1</sup> to 1x10 <sup>-1</sup>	+105	270	flamable	≥22	42-44	0,19	no	10	20-35	300	55-60 (D)	medium	0,1			4Y	PA Polyamid	
9Y	PP	0,91	75	10 <sup>10</sup>	2,5-2,4	4x10 <sup>-4</sup>	+100	160	flamable	20-26	20-26	0,23	no	100/500	30-45	500-700	70-100 (A)	very good	1,5	yes	moderate-good	9Y	PP Polypropylene	
11Y	PU	1,15-1,2	20	10 <sup>10</sup> -10 <sup>11</sup>	4-7	2,5x10 <sup>-2</sup>	+80	150	flamable	20-26	20-26	0,23	no	100/500	30-45	500-700	70-100 (A)	very good	1,5	yes	moderate-good	11Y	PU Polyurethane	
TPE-E (117N)	Polyester Elastomer	1,2-1,4	40	>10 <sup>10</sup>	3,7-5,1	1,8x10 <sup>-2</sup>	+140	190	flamable	≥29	20-25	0,5	no	10	30	85 (A) 70 (D)	good	1,5	yes	very good	very good	TPE-E (117N)	Polyester Elastomer	
TPE-O	Polyolefine Elastomer	0,89-1,0	30	>10 <sup>10</sup>	2,7-3,6	1,8x10 <sup>-2</sup>	+130	150	flamable	≥25	23-28	1,5	no	10	20	55 (A) 70 (D)	good	1,5	yes	very good	very good	TPE-O	Polyolefine Elastomer	
G	Natural rubber	1,5-1,7	20	10 <sup>12</sup> -10 <sup>13</sup>	3-5	1,9x10 <sup>-1</sup>	+65	+120	flamable	≥22	21-25	-	no	100	300-600	60-70 (A)	moderate				moderate	G	Natural rubber	
NR	Styrol-butadiene rubber	1,2-1,3	20	10 <sup>11</sup>	3-4	6x10 <sup>-1</sup>	+60	+180	high flash point	25-35	17-19	0,22	no	50	5-10	40-60 (A)	moderate				good	NR	Styrol-butadiene rubber compounds	
SR	Silicone rubber	1,3-1,55	30	10 <sup>14</sup>	3-5,8	3,4x10 <sup>-1</sup>	+30	+160	flamable	≥22	21-25	-	no	200	200-400	65-55 (A)	moderate	1,0	yes	very good	very good	SR	Silicone rubber	
EPR	Ethylen-propylene rubber compounds	1,3-1,5	30	10 <sup>12</sup>	5-6,5	2x10 <sup>-2</sup>	+125	+200	flamable	≥22	19-23	-	no	100	250-350	70-80 (A)	moderate				good	EPR	Ethylen-propylene rubber compounds	
EVA	Ethylen-vinylacetate copolymer-compounds	1,4-1,65	20	10 <sup>8</sup>	6-8,5	5x10 <sup>-1</sup>	+40	+140	self-extinguishing	30-35	14-19	-	Hydrogen chloride	50	400-700	55-70 (A)	medium				moderate-good	EVA	Ethylen-vinylacetate copolymer-compounds	
CR	Polychloroprene compounds	1,3-1,6	25	10 <sup>9</sup>	6-9	2,8x10 <sup>-1</sup>	+30	+140	self-extinguishing	30-35	19-23	-	Hydrogen chloride	50	350-600	60-70 (A)	medium				moderate-good	CR	Polychloroprene compounds	
CSM	Chlorosulfonated Polyethylene compounds	1,3-1,9	25	10 <sup>11</sup>	9-7	1,4x10 <sup>-2</sup>	+60	+155	self-extinguishing	40-45	15	0,17	Hydro-fluoride	10	150	75-80 (D)	very good	0,01	no	very good	very good	CSM	Chlorosulfonated Polyethylene compounds	
PDF	Polyethylene fluoride Kynar Dylar	1,6-1,8	36	10 <sup>18</sup>	2,6	8x10 <sup>-4</sup>	+180	>265	self-extinguishing	30-35	14	0,24	yes	10	150	70-75 (D)	very good	0,02			very good	PDF	Polyethylene fluoride Kynar Dylar	
ETFE	Ethylen-tetrafluor-ethylen	2,0-2,3	25	10 <sup>18</sup>	2,1	3x10 <sup>-4</sup>	+200	>290	self-extinguishing	>95	5	0,25	yes	1	250	55-60 (D)	very good	0,01			very good	ETFE	Ethylen-tetrafluor-ethylen	
FEP	Fluoride ethylen-propylene	2,0-2,5	25	10 <sup>18</sup>	2,1	3x10 <sup>-4</sup>	+260	>325	self-extinguishing	>95	5	0,27	yes	0,1	250	55-60 (D)	very good	0,01			very good	FEP	Fluorine ethylen-propylene	
PFA	Perfluoralkoxy polymer	2,0-2,5	20	10 <sup>18</sup>	2,1	3x10 <sup>-4</sup>	+260	>325	self-extinguishing	>95	5	0,28	yes	0,1	50	55-60 (D)	very good	0,01			very good	PFA	Perfluoralkoxy polymer	
PTE	Polyetrafluorethylen	1,4-1,6	25	10 <sup>12</sup> -10 <sup>14</sup>	3,4-5	~10 <sup>-1</sup>	+70	>130	self-extinguishing	≥40	17-22	0,17	no	100	150-250	65-95 (A)	medium				moderate	PTE	Polyetrafluorethylen	
not. cross-linked	halogen-free polymer-compounds	1,4-1,6	25	10 <sup>12</sup> -10 <sup>14</sup>	3,4-5	10 <sup>-1</sup> -10 <sup>-1</sup>	+70	>130	self-extinguishing	≥40	17-22	0,17	no	100	150-250	65-95 (A)	medium				moderate	not. cross-linked	halogen-free polymer-compounds	
cross-linked	halogen-free polymer-compounds	1,4-1,6	25	10 <sup>12</sup> -10 <sup>14</sup>	3,4-5	10 <sup>-1</sup> -10 <sup>-1</sup>	+70	>130	self-extinguishing	≥40	16-25	0,20	no	200	150-250	65-95 (A)	medium				moderate	cross-linked	halogen-free polymer-compounds	

\* The characteristics valid for unprocessed material

<sup>1)</sup> The propellant may be e.g. Fluor-Chlor-Hydrocarbon

<sup>2)</sup> depend on the type compound