

Properties* of insulating and sheath materials

	Designation			electrical					thermal						
	VDE des.	Code	Material	Density	Electr. Strength	Specific insulation resistance	Dielectr. Coefficient	Tangent of loss angle	Service temperature		Meltingpoint	Burning behav.	Oxygen LOI	Heating value Ho	
				g/cm ³	kV/mm	Ω·cm 20 °C	50 Hz/ 20 °C	tan α	contin. °C	short °C	+ °C		(% O ₂)	MJ·kg ⁻¹	
Thermoplastics	Y	PVC	Polyvinyl chloride mixtured	1,35-1,5	25	10 ¹³ -10 ¹⁵	3,6-6	4x10 ⁻² - 1x10 ⁻¹	- 30 + 70	+ 100	> 140	selfexting- uishing	23-42	17-25	
	Yw	PVC	temperature resistance 90 °C	1,3-1,5	25	10 ¹² -10 ¹⁵	4-6,5		- 20 + 90	+ 120	> 140		23-42	16-22	
	Yw	PVC	temperature resistance 105 °C	1,3-1,5	25	10 ¹² -10 ¹⁵	4,5-6,5		- 20 + 105	+ 120	> 140		23-42	16-20	
	Yk	PVC	low temperature resistance	1,2-1,4	25	10 ¹² -10 ¹⁵	4,5-6,5		- 40 + 70	+ 100	> 140		23-42	17-24	
	2Y	LDPE	PE (low density)	0,92- 0,94	70	10 ¹⁷	2,3	2x10 ⁻⁴	- 50 + 70	+ 100	105-110	combust- tible	≤ 22	42-44	
	2Y	HDPE	PE (high density)	0,94- 0,98	85	10 ¹⁷	2,3	3x10 ⁻⁴	- 50 + 100	+ 120	130		≤ 22	42-44	
	2X	VPE	Cross-linked polyethylene	0,92	50	10 ¹² -10 ¹⁶	4-6	2x10 ⁻³	- 35 + 90	+ 100	-		≤ 22	42-44	
	02Y		Polyethylene foam	~0,65	30	10 ¹⁷	~1,55	5x10 ⁻⁴	- 40 + 70	+ 100	105		18-30	42-44	
	3Y	PS	Polystyrene	1,05	30	10 ¹⁶	2,5	1x10 [?]	- 50 + 80	+ 100	> 120		≤ 22	40-43	
	4Y	PA	Polyamide	1,02-1,1	30	10 ¹⁵	4	2x10 ⁻² - 1x10 ⁻³	- 60 + 105	+ 125	210		≤ 22	27-31	
	9Y	PP	Polypropylene	0,91	75	10 ¹⁶	2,3-2,4	4x10 [?]	- 10 + 100	+ 140	160		≤ 22	42-44	
	11Y	PUR	Polyurethan	1,15-1,2	20	10 ¹⁰ -10 ¹²	4-7	23x10 [?]	- 55 + 80	+ 100	150		20-26	20-26	
	TPE-E (12Y/ 13Y)		Polyester elastomer	1,2-1,4	40	>10 ¹⁰	3,7-5,1	18x10 ⁻²	- 50 + 100	+ 140	190		≤ 29	20-25	
TPE-O (18Y)		Polyolefin elastomer	0,89-1,0	30	>10 ¹⁴	2,7-3,6	18x10 ⁻²	- 50 + 100	+ 130	150	≤ 25		23-28		
Elastomers	G	NR SBR	Natural rubber styrene-butadiene rubber mixtures	1,5-1,7	20	10 ¹² -10 ¹⁵	3-5	1,9x10 ⁻²	- 65 + 60	+ 120	-		combust- tible	≤ 22	21-25
	2G	SIR	Sillicone rubber	1,2-1,3	20	10 ¹⁵	3-4	6x10 ⁻³	- 60 + 180	+ 260	-		low flamm- ability	25-35	17-19
	3G	EPR	Ethylene propylene mixed polymer mixtures	1,3-1,55	20	10 ¹⁴	3-3,8	3,4x10 ⁻³	- 30 + 90	+ 160	-		combust- tible	≤ 22	21-25
	4G	EVA	Ethylene vinyl acetate copolymer mixture	1,3-1,5	30	10 ¹²	5-6,5	2x10 ⁻²	- 30 + 125	+ 200	-	≤ 22	19-23		
	5G	CR	Polychloroprene mixtures	1,4-1,65	20	10 ¹⁰	6-8,5	5x10 ⁻²	- 40 + 100	+ 140	-	selfexting- uishing	30-35	14-19	
	6G	CSM	Chlorosulfunated polyethylene mixtures	1,3-1,6	25	10 ¹²	6-9	2,8x10 ⁻²	- 30 + 80	+ 140	+ 160	30-35	19-23		
Hightemp. materials	10Y	PVDF	Polyvinylidene fluoride Kynar!/ Dyflor!	1,7-1,9	20	10 ¹⁴	9-7	1,4x10 ⁻²	- 40 + 135	+ 160	> 170	non combus- tible	40-45	15	
	7Y	ETFE	Ethylentetrafluor- ethylene Tefzel!	1,6-1,8	36	10 ¹⁶	2,6	8x10 ⁻⁴	- 100 + 150	+ 180	> 265		30-35	14	
	6Y	FEP	Perfluorethylen- propylene Teflon!	2,0-2,3	25	10 ¹⁸	2,1	3x10 ⁻⁴	- 100 + 205	+ 230	> 225		≤ 95	5	
	5YX	PFA	Perfluoralkoxy Teflon!	2,0-2,3	25	10 ¹⁸	2,1	3x10 ⁻⁴	- 190 + 260	+ 280	> 290		≤ 95	5	
	5Y	PTFE	Polytetrafluor- ethylene Teflon!	2,0-2,3	20	10 ¹⁸	2,1	3x10 ⁻⁴	- 190 + 260	+ 300	> 325		≤ 95	5	
halogen-free mixtures	H	Cross- linked	Halogen-free polymer mixture	1,4-1,6	25	10 ¹² -10 ¹⁴	3,4-5	~10 ⁻³	- 30 + 70	+ 100	> 130	selfexting- uishing	≤ 40	17-22	
	HX	Cross- linked	Halogen-free polymer mixture	1,4-1,6	25	10 ¹³ -10 ¹⁴	3,4-5	10 ⁻² -10 ⁻³	- 30 + 90	+ 150	-	≤ 40	16-25		

* Properties apply to unprocessed material

Power cables
1 up to 30 kV

Building Wires

Flexible Cables

Telecommunication
Cables and Cords

Control and
Electronic Cable

Cable with
circuit integrity

LAN cables

Conductor ropes

Technical Appendix

Properties* of insulating and sheath materials

	Designation			thermal			mechanical					free from halogens	Weathering	
	VDE des.	Code	Material	Thermal conductivity W·K ⁻¹ ·m ⁻¹	corrosive gases in case of fire	Radiation resist. max. Mrad	Tensile strength N/mm ²	Breaking strain %	Shore-hardness	Abrasion performance	Water absorption %	halogen free	Weathering resist.	Low temp. performance
Thermoplastics	Y	PVC	Polyvinyl chloride mixtured	0,17	Hydrogen chloride	80	10 - 25	130 - 350	70 - 95 (A)	average	0,4	no	moderate, good in black	mod.-good
	Yw	PVC	temperature resistance 90 °C											
	Yw	PVC	temperature resistance 105 °C											
	Yk	PVC	low temperature resistance											
	2Y	LDPE	PE (low density)	0,3	no	100	10 - 20	400 - 600	43 - 50 (D)	average	0,1	yes	good	good
	2Y	HDPE	PE (high density)	0,4			20 - 30	500 - 1000	60 - 63 (D)	good				
	2X	VPE	Cross-linked polyethylene	0,3			12,5 - 20	300 - 400	40 - 45 (D)	average				
	O2Y		Polyethylene foam	0,25			8 - 12	350 - 450	-	-				
	3Y	PS	Polystyrene		80	55 - 65	300 - 400	35 - 50 (D)	good	0,4		moderately good	moderately good	
	4Y	PA	Polyamide	0,23	10	50 - 60	50 - 170	-	very good	1,0-1,5		good	good	
	9Y	PP	Polypropylene	0,19	100 (500)	30 - 45	500 - 700	70 - 100 (A)	very good		0,1	yes	moderate	
	11Y	PUR	Polyurethan	0,25	10	30	> 300	85 (A) 70 (D)	good	1,5		very good	very good	
TPE-E (12Y/13Y)		Polyester elastomer	0,5	20	55 (A) 70 (D)									
TPE-O (18Y)		Polyolefin elastomer	1,5											
Elastomers	G	NR SBR	Natural rubber styrene-butadiene rubber mixtures	-	no	100	5 - 10	300 - 600	60 - 70 (A)	mod.	1,0	yes	good	very good
	2G	SIR	Sillicone rubber	0,22		50		300 - 600	40 - 80 (A)					
	3G	EPR	Ethylene propylene mixed polymer mixtures	-		200	200 - 400	65 - 85 (A)						
	4G	EVA	Ethylene vinyl acetate copolymer mixture	-		100	8 - 12	250 - 350	70 - 80 (A)					
	5G	CR	Polychloroprene mixtures	-	Hydrogen chloride	50	10 - 20	400 - 700	55 - 70 (A)	average	1,0		moderately good	moderate
	6G	CSM	Chlorosulfonated polyethylene mixtures	-				350 - 600	60 - 70 (A)		1,5			
Hightemp. materials	10Y	PVDF	Polyvinylidene fluoride Kynar/Dyflor!	0,17	Hydrogen fluoride	10	50 - 80	150	75 - 80 (D)	very good	0,01	no	very good	very good
	7Y	ETFE	Ethylentetrafluor-ethylene Tefzel!	0,24	yes	10	40 - 50	150	70 - 75 (D)		0,02			
	6Y	FEP	Perfluorethylen-propylene Teflon!	0,26	yes	1	15 - 25	250	55 - 60 (D)		0,01			
	5YX	PFA	Perfluoralkoxy Teflon!	0,21	yes	0,1	25 - 30	250	55 - 60 (D)					
	5Y	PTFE	Polytetrafluorethylene Teflon!	0,26	yes	0,1	80	50	55 - 60 (D)					
halogen-free mixtures	H	Cross-linked	Halogen-free polymer mixture	0,17	no	100	8 - 13	150 - 250	65 - 95 (A)	average	0,2-1,5	yes	moderate, good in black	average
	HX	Cross-linked	Halogen-free polymer mixture	0,20	no	200	8 - 13	150 - 250						

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¹⁾ Propellants, for example, may consist of or contain fluoriated hydrocarbons (HCDCs)

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