


PROPERTIES OF PLASTIC MATERIALS



CHOICE OF MATERIAL

Material	Properties	Recommended application
Noryl	Extremely good mechanical, thermal and electrical properties. Good ageing stability and weathering resistance. High stability against chemicals.	Dimensionally stable, heat-resistant, self-extinguishing parts, mainly when exchanged with metal. Component parts and cases for entertainment industry and data processing units.
Polyamide	Thermoplastic with high temperature stability, extremely solid and tenacious. Good sliding properties and high capacity of resistance to wear. Contact with humidity may result in a change of properties.	Ideally suited for technical application, especially for machine elements with complicated geometry.
Polycarbonate	Thermoplastic with high temperature stability with excellent resistance to all kinds of temperature. On the whole, good resistance against chemicals and UV-light.	Recommended for cases housing instruments and general indoor and outdoor application. Not recommended for use with strong alkalis or for direct exposure to sunlight.
PC-ABS Blend	Good stability in case of high temperature combined with enormous impact strength as well as toughness at subzero temperature. On the whole, good resistance against chemicals. UV-light may have a negative effect.	Ideally suited for indoor use with moderate corrosive conditions. Limited outdoor suitability. Special materials comply with ball-thrust hardness test according to VDE 700 at 125°C.
ABS	Good resistance against medium temperature combined with good impact strength (only certain types) and antistatic adjustment. On the whole, good resistance against chemicals. UV-light may have a negative effect.	Cases and operating elements of all kinds. Indoor use, also suitable for low temperature. Limited outdoor application. Suitable for galvanic coating.
Polystyrene	Normally brittle and resistant to fairly low temperature. SB-types are impact resistant and less sensitive to tearing under pressure. Glossy surface. Metal-cutting is possible.	For cases and operating elements with working temperature of less than 65°C. Suitable for indoor use. Exposure to UV-light should be avoided.
PMMA (plexiglass®)	Good mechanical properties, slightly brittle. Superior from optical point of view. Permeable to light up to 92% for certain types.	Cases and front panels for infrared transmitters and receivers as well as transparent parts.

COMBUSTIBILITY TEST FOR PLASTICS ACCORDING TO UL SUBJECT 94

Fire classification	Test
 UL 94 V-0	The test samples are extinguished within 5 seconds average time (mean of 10 successive tests). None of the test sample burns longer than 10 seconds. None of the test sample emits burning particles.
UL 94 V-1	The test samples are extinguished within 25 seconds average time (mean of 10 successive tests). None of the test sample burns longer than 30 seconds. None of the test sample emits burning particles.
UL 94 V-2	Same Test as UL 94 V-1, but the test samples emits burning particles during the test. The test samples mentioned above are extinguished in all cases. If the test samples keeps burning after 30 seconds, a horizontal test can be carried out to reach the classification UL 94 HB.

ENVIRONMENT



The standard products available from OKW Gehäusesysteme, in particular the plastic parts and packaging, meet the statutory requirements with respect to the use of hazardous, polluting and critical substances, as well as heavy metals and flame proofing agents containing bromine, in accordance with the EC directives WEEE, RoHS. During development, our engineers and designers attach particular importance to the use of substances and materials that do not pollute our environment, that is, water, soil and air, and that allow easy recycling.

IMPORTANT REFERENCE

The plastic properties on pages 94/95 are exclusively applicable for the specified standard test pieces. This does not exempt you from carrying out your own tests. The application, utilisation and subsequent processing are beyond our control and the responsibility for this therefore rests solely with you. Up-to-date material data sheets are also available on the Internet at www.okw.com

Material groups			Modified Polyether PPE (PPO)		Polyamide PA		Polycarbonate
Abbreviation			PPE + PS		PA 6x	PA 6x	PC
Attribute			reinforced			reinforced	
Application for the following product groups	Abbreviation of product groups, see below this page.		NEG type A RT (base parts)	NEG type B	MG, Cable glands	Handle bar	RB DT (cover) RT (lid, top parts)
Mechanical properties	<i>Unit</i>	<i>Test method</i>					
Impact resistance	KJ/m ²	ISO 179; DIN 53 453	10		no fracture	40	no fracture
Notch resistance	KJ/m ²	ISO 179; DIN 53 453	12	9	5.5	6	30
Ball indentation hardness	N/mm ²	DIN 53 456	113	117	120	150	98
Ball-thrust hardness test at 125°C			fulfilled				fulfilled
Thermal properties	<i>Unit</i>	<i>Test method</i>					
Heat distortion temperature	°C	ISO 75-A; DIN 53 461			70	160	125
Application temperature approx.	°C		100	110	100	110	110
Cold distortion temperature	°C		- 40	- 40	- 40	- 40	- 40
UL combustibility test	Fire classif.	UL 94 (wall thickness)	V-0 (1.5 mm)	V-1 (1.5 mm)	HB	HB	(see product)
Electrical properties	<i>Unit</i>	<i>Test method</i>					
Tracking resistance KC/CTI	Stage	IEC 112			600	500	250
Specific volume resistivity	Ohm · cm	DIN 53 482; VDE 0303	10 ¹⁵	10 ¹⁵	10 ¹⁵	10 ¹⁵	10 ¹⁶
Resistance of material to							
Simultaneous exposure to different media may alter the resistive properties of a material! To be safe, it is advisable to test the cases for sufficient resistance of the material under the conditions of the specific application.	Gasoline		–	–	+	+	–
	Diesel oil		–	–	+	+	○
	Sea water		+	+	+	+	+
	Hydrochloric acid 10%		+	+	–	–	+
	Weak alkaline solutions		+	+	–	–	–
	Strong alkaline solutions		+	+	–	–	–
	Atmospheric influences		○	○	+	+	+
	Lactic acid		+	+	○	○	+
Acetone		–	–	+	+	–	

REFERENCE

The plastic properties are exclusively applicable for the specified standard test pieces. Variations may occur as far as cases and technical parts are concerned.

This does not exempt you from carrying out your own tests. The application, utilisation and subsequent processing are beyond our control and the responsibility for this therefore rests solely with you.

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ABBREVIATION OF PRODUCT GROUPS (CATALOGUE PAGE)

AC	ART-CASE (68-70)	PG	DESK CASE (46-47)
COM	COMTEC (44-45)	RB	ROBUST-BOX (36-39)
DC	DATEC-CONTROL (18-21)	RT	RAILTEC (72-73)
DKB	DATEC-KEYBOARD (48)	SG	SHELL-TYPE CASE (50-53)
DMB	DATEC-MOBIL-BOX (16-17)	SM	SMART-CASE (12-13)
DPB	DATEC-POCKET-BOX (14-15)	SNA	SNAPTEC (34-35)
DT	DATEC-TERMINAL (40-43)	StG	PLUG-CASE (71)
EG	EURO CASE (60-61)	TG	KEYBOARD HOUSING (49)
ERC	ERGO-CASE (24-25)	TT	TOPTEC (64-65)
FG	FLAT-PACK CASE (66-67)	UMB	HAND-HELD-BOX (26-27)
HT	HAND-TERMINAL (22-23)	VB	VARIO-BOX (28-31)
Kombi-PG	COMBI DESK CASE (46-47)	WG	WALL-MOUNTING CASE (32-33)
LG	LUX CASE (62-63)		
MED	MEDITEC (56-59)		
MG	POTTING BOXES (80-81)		
MOT	MOTEC (54-55)		
NEG	DIN-MODULAR CASE (74-79)		

THERMOPLASTS
DUROPLAST

Blends	Styrene-Polymerisate					PMMA plexiglass®	Phenolic resin
	Modified Polystyrene			ABS			
ABS/PC	SB	SB	SAN	ABS		PMMA	PF
flame-resistant V-0	flame-resistant V-2		transparent		flame-resistant V-0		
HT, StG (live parts)	StG (top parts)	WG	WG (cover) VB (cover)	AC, COM, DC, DKB, DMB, DPB, DT, EG, ERC, FG, Kombi-PG, LG MED, MG, MOT, PG 138/190/220, RB, SG, SM, SNA, TG, TT, UMB, VB	MOT	DPB SM	MG
no fracture	20	no fracture	18	80	80	80	6
35	6	10	2	11	11	3	1
100	115	95	165	97	100	105	250
fulfilled, 2 mm imprint							
110	80	84	99	85	74	89	125
100	65	65	70	70	65	70	100
- 40	- 40	- 40	- 40	- 40	- 40	- 40	
V-0 (1.6 mm)	V-2 (1.6 mm)	HB	HB	HB	V-0 (1.6 mm)	HB	V-0 (6.4 mm)
350	450	200	425	600	425	600	125
10 ¹⁶	10 ¹⁵	10 ¹⁶	10 ¹⁶	10 ¹⁴	10 ¹⁵	2x10 ¹⁴	10 ¹²
-	-	-	-	○	○	+	+
○	-	-	○	+	+	+	+
+	+	+	+	+	+	+	+
+	+	+	○	○	○	+	+
-	+	+	+	+	+	+	+
-	+	+	+	+	+	○	○
+	○	○	○	○	○	○	+
+	+	+	+	+	+	+	+
-	-	-	-	-	-	-	○

ABBREVIATION OF MATERIAL
DESCRIPTION TO RESISTANCES OF MATERIALS


ABS	Acrylnitrile-Butadiene-Styrene
PA	Polyamide
PC	Polycarbonate
PF	Phenol-formaldehyde resin
PMMA	Polymethylmethacrylate
PPE	Polyphenylene-Ether
PPO	Polyphenylene-Oxide
SAN	Styrene-Acrylnitrile-Copolymeride
SB	Styrene-Butadiene

Values at room temperature:

+ = constant

○ = conditionally constant

- = inconstant