English version

ULTIMHEAT® MUSEUM

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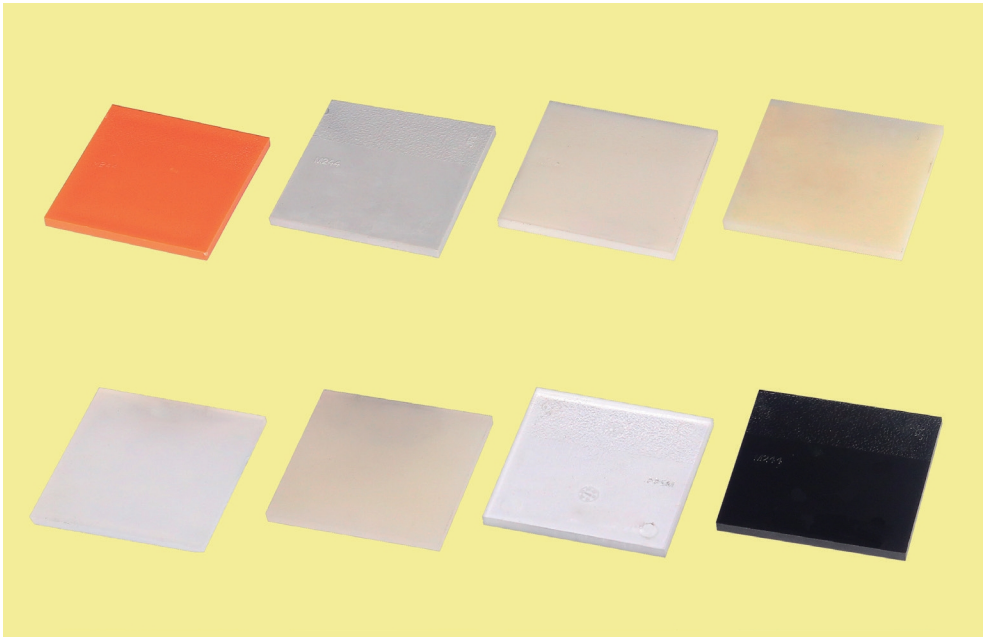
Technology of components used in heating.

Chapter 31

Comparative table of plastics and gaskets used in connection boxes



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A technical choice: Raw materials

The classic housings, with only 5 sides and a lid, require a long and costly layout, most of the time ignoring the application needs: security, fire resistance, water penetration, shocks, UV, temperature, etc.

With rare exceptions these universal boxes are made of cheap materials, with low wall thicknesses and they are mostly designed according to the sale price rather than to the customer's technical application.

Our Y6, Y7 and Y8 boxes have resolutely turned their backs on this concept: they provide the maximum possibilities, the minimum installation time, and unmatched specifications.

A technical choice: an exceptional environmental and electrical resistance of the housing

Ingress resistance: > IP65 (IEC 60529). Withstands immersion for 24 hours under 150 mm of water, which corresponds to an IP67class. The IP65 limitation is solely due to cable glands and their correct tightening by the users.

Impact resistance: IK10 (IEC, EN50102). Highest class of the standard.

Vibration resistance: equipped with Ultimheat terminals and a temperature control, the enclosures withstand a 48 hours repetitive vibratory sequence with 10 minutes sinusoidal vibration variable sequence cycles covering the range from 1.7 Hz to 5 Hz with variable accelerations of 0.3 to 2.6 G without any damage or loosening.

Salt spray resistance: EN 600832-2-11 test Ka (4 weeks with a 5% salt content).

Resistance to chlorine corrosion: ASTM G48, tests A: 96 h accelerated corrosion at 70°C, in 5.25% solution of sodium hypochlorite. Test B: 1000 hours at 60°C in a 200 mg/l diluted sodium hypochlorite solution.

UV resistance: (IS04892-1), wavelength 315 ~ 400nm, black body temperature 55°C, 1000 hours: no noticeable fading on the housings and a slight yellowing on the polycarbonate lids, loss of notched impact resistance below 15% . Meets UL 746C for UV resistance, exposure to rain and immersion.

Fire resistance: the case body is UL94VO and / or UL94 5VA according to thickness.

Temperature: Temperature of deflection under load (RTI) is above 125°C.

Rohs: the materials used in the boxes comply with the European Directive 20220/95/CE.

Reach: the materials used in the boxes comply with the REACH European Directive.

• **Window and cover seals:** silicone foam, high temperature resistance, flexibility, elasticity, no degradation over time.

• **Threaded Inserts:** the locking of lids and windows uses metal inserts, not plastic threads. Allowing multiple openings without damaging the threads.

A technical choice: the boxes raw material materials

Unlike most manufacturers of cabinets and enclosures, the material used was not chosen because of its price or ease of molding, but to meet the technical requirements of its use in electro-thermal applications.

Comparison chart of common materials used by the plastic housing moldersv

Material	Temperature of deformation under load (ISO 75, method A)	Resistance to impact on a 3mm thick plate @ 25°C (EN50102)	Resistance loss after UV test 1000h (ISO4892-1)*	Fire resistance (UL94)	Mechanical breakage resistance ISO 527 / ASTMD638	GWFI Glow-wire test (IEC 60695-2-12)	Other features	Use in Y housings
ABS (UV resistant)	92°C	9.4 (IK08)	Bad: A 80% loss of mechanical strength after 1000H	UL94- HB	50 Mpa	650°C	The cheapest one, good surface finish	Used on the entry-level housings (Y0) without any particular constraint
PS (High impact, UV resistant, flame retardant)	75°C	9.8 (IK08)	Medium: A 25% loss of mechanical strength after 1000H	UL94-HB	23 to 32 Mpa	750 to 960°C	Good surface finish, cheap	The lowest mechanical resistance and the lowest temperature resistance. Not used for the Y range
PC (Transparent)	135°C	21.2 (IK10)	Medium: A 11% loss of mechanical strength after 1000H	UL94-5V	70 Mpa	850	Bad resistance to oils. Do not withstand self-tapping screws	Transparent lids, offering a good impact resistance covering its whole temperature range and the best light transmission (85 to 90%)
PC-ABS	80°C	11.6 (IK09)	Bon: Perd 18% de sa résistance mécanique après 1000 heures Good: A 18% loss of mechanical strength after 1000H	UL94-VO	60 MPA	960	Le meilleur état de surface The best surface finish	Good mechanical resistance, good finish, used for the domestic room thermostats Y1 series
PC-ABS+20%FG	120°C	9.1 (IK08)	Good: A 15% loss of mechanical strength after 1000H	UL94-VO	77 MPA	960	Few molding deformation	The best surface finish, with a very good mechanical resistance: Room thermostat housing for domestic use
PA66	100°C	2.9 (IK06)	Medium: A 22% loss of mechanical strength after 1000H	U94-VO	80-85 Mpa	650 to 750	Insufficient mechanical resistance and distortions after molding	Not used for the Y series, except for some knobs
PA66, 20% FG box and terminal block housings	250°C (continuous use at 120°C)	IK10 (maximum class)	Excellent: A 7% loss of mechanical strength after 1000H	UL94 – VO and UL94-5V (the most serious range)	150 Mpa	850	The second most expensive material in this chart	The best compromise, impact resistance, temperature resistance and flame class. Used on housings of Y7, 8, 9 boxes and terminal blocks

Note on IK Classes: to be IK rated, a material must withstand a shock greater than or equal to the following values: 1 joule = IK06, IK07 = 2 Joules, IK08 = 5 Joules, 10 Joules = IK09, IK10 = 20 Joules. Therefore, an IK10 box is on average 2 times stronger than IK09, 4 times more than IK08, 10 times more than IK07 and 20 times more than IK06.

* UV resistance is improved by the addition of black pigment (carbon black), and it is the main reason for the black coloration of the Y-line boxes intended for outdoor use.