PROCESSING

Luranyl®-grades can be processed by all common processing methods known for thermoplastics. The most impor tant techniques are injection molding and extrusion. Some grades, however, are also particularly suitable for blow molding and foaming.

GENERAL NOTES

PRE-DRYING
Luranyl® pellets do not change when stored in dry rooms. However, under adverse conditions Luranyl® absorbs moisture at its surface. Although this does not change the properties of the product, depending on the moisture content, it can rise to streaks, stripes or bubbles at processing.

Therefore we recommend that Luranyl® should be predried at 80-100°C for about 2-4 hours in advance before processing.

INJECTION MOLDING
Due to a broad processing range, good thermal stability, low molding shrinkage and low warp tendency smooth injection molding is possible.

Processing temperature
Luranyl® compounds can generally be processed at melt temperatures between 260 and 300°C. The upper temperature limit is applicable to glassfiber-reinforced products. Upper limit temperature for flame retardant grades is 290 °C.

Mold temperature control
The effective mold surface temperature exercises a decisive effect on surface quality (luster, weld line marking), weld line strength, warpage, shrinkage and the tolerances of moldings. Mold surface temperatures between 60 and 100 °C should be selected for Luranyl® molding compounds.

Demolding
Luranyl® is easily demoldable so complex shapes are also possible.
Draft angles of 0.5 to 0.9 degree are generally sufficient.

Shrinkage and post-shrinkage
Shrinkage at Luranyl® PPE+PS-I compounds are substantially lower than semi crystalline plastics.

Molding shrinkage of unreinforced grades is normally between 0.5 and 0.7%, in exceptional cases even below 0.5%. At the gate area, in which high dwell pressure is affected, values can be close to 0%. Depending on glass fiber concentration shrinkage is between 0.2 and 0.5%. In most applications post-shrinkage is Insignificant; it´s approximately 1/10 of total shrinkage.

Reprocessing and recycling of scrap
It is possible to add up to 30% of sprue waste from correctly processed Luranyl® to fresh starting material provided it is clean and of the same grade and used for moldings in which this is appropriate. The normal grinding or cutting mills can be used for regrinding. As a general rule, however, virgin material should be used for parts meeting high quality requirements.

EXTRUSION
Luranyl® is highly suitable for sheet extrusion, solid & hollow profiles and tubes.

The optimum melt temperature for the production of semi-finished products lies in the range between 240 and 270°C. Extrusion should ensue at a melt temperature of 250 to 260°C. In most cases maximum flow-rate of high mechanical quality is achieved at a melt temperature of approximately 280°C.

SAFETY NOTES

Safety precautions at processing
When the products are correctly processed in well ventilated work areas, no harmful effects on health of those engaged in processing have been observed.

The MAK values (maximum allowable concentrations) of 200 ml/m³ for methanol and 20 ml/m³ for styrene have to be observed (TRGS 900; MAK Values List, 2015).

Experience affirms that when Luranyl® is correctly processed and suitable activity for ventilation are in place, the concentrations are well below the aforementioned threshold values. The determination and evaluation of the concentrations of hazardous substances in the air and in work areas have to be carried out in accordance with the specifications in TRGS 402 and TRGS 100.

LURANYL® AND ENVIRONMENT

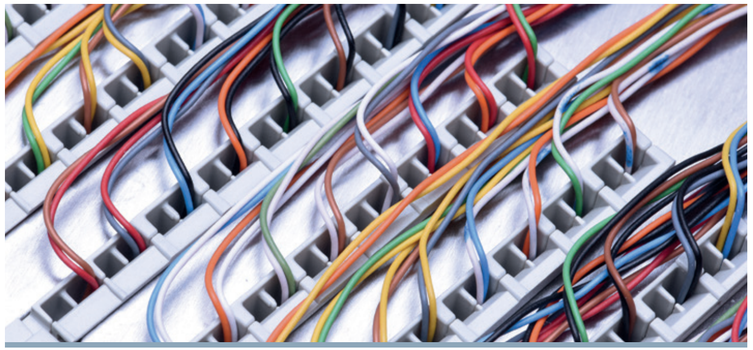
Waste disposal
Luranyl® PPE+PS-I waste has assigned waste code 57108, polystyrene waste and Luranyl® PPE+PA code 57111. As fully cured plastic wastes they do not have to be handled in accordance with the "German Waste and residues monitoring ordinance" which imposes special requirements for disposal.

Normally Luranyl® waste can be disposed at landfill sites (see Luranyl® safety data sheet). Luranyl® waste is inert in landfills and it is classified in the lowest possible German Water Pollution Class.

LURANYL®

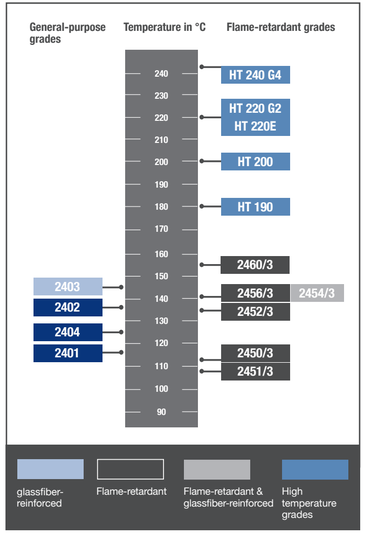
PROPERTIES PROCESSING APPLICATION

ROMIRA
Precolored Resins &
Technical Compounds



MARKET SUCCESS BY INNOVATIVE MATERIAL PROPERTIES

Under the trade name of Luranyl® Romira provides blends based on polyphenylene ether (PPE), impact resistant polystyrene (PS-I) and polyamide (PA). The product range includes grades with general purpose, glassfiber-reinforced, halogen-free, flame-retardant and high temperature resistance.



The Luranyl® portfolio

HEAT RESISTANCE

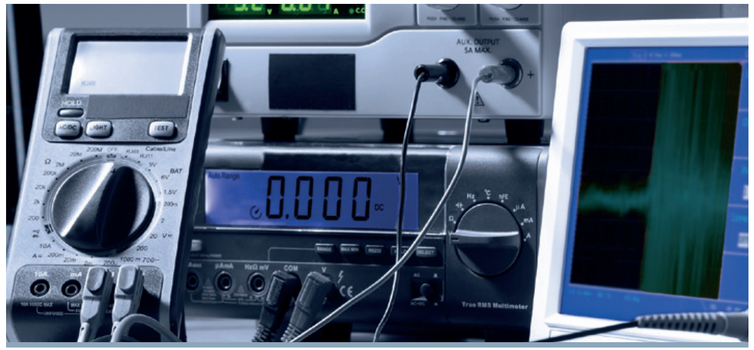
Luranyl® PPE+PS-I has Vicat softening point of up to 160°C, so material can be exposed to a long-term service temperature of 110 °C.

Among the amorphous thermoplastics Luranyl® is distinctly higher than ABS or ABS/PC blends and bridges the heat resistance gap to the high temperature thermoplastics like PSU and PES.

Luranyl® HT PPE+PA has Vicat softening point temperature of up to 240°C, so powder coating at 200°C is no problem. Heat resistant level is comparable to PSU and PES but chemical resistance is much better.

Coefficient of linear expansion

The coefficient of linear expansion (23–28°C) of Luranyl® KR 2403 G6 is $3 \cdot 10^{-5}\ K^{-1}$ to $4 \cdot 10^{-5}\ K^{-1}$ and is slightly above level of aluminum. The value obtained for Luranyl® HT 220 G6 is, $5 \cdot 10^{-5}\ K^{-1}$.



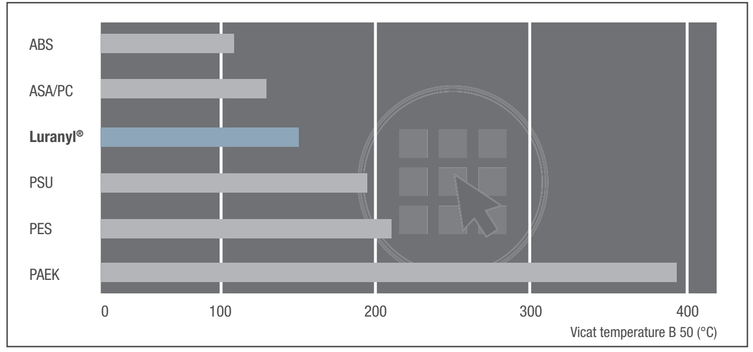
FLAME-RESISTANCE WITHOUT HALOGEN COMPOUNDS

Depending on the flame retardant level, Luranyl® products achieve FV1 or FV0 class (according to IEC 707) or V-1, V-0 or 5VA/5VB according to UL 94. The Luranyl® flame-retardant range includes easy-flowing and very high flowing grades with good heat resistance, high heat resistant injection molding grades, used for e.g. energized parts extending up to very high heat resistant products (Vicat B/50 = 160°C).

Flame resistant Luranyl® grades typically have good toughness and low density (approx. 1.09 g/cm³ for unreinforced products).

The grades can be processed even at higher temperatures, without mechanical degradation or liberation of corrosive gases.

Flame resistant Luranyl® grades contain a specially developed flame retardant system. This avoids the stress cracking (edge cracking) of thin-walled moldings or parts having unfavorable ratio of wall thickness and flow path, which often occurs at PPE+PS blends. That´s why Luranyl® grades are recommended for use in electrical engineering area, especially in electrical devices e.g. small transformer and chargers.



Comparison of heat resistance of amorhous thermoplastics

RESISTANCE TO HOT WATER AND LOW WATER ABSORPTION

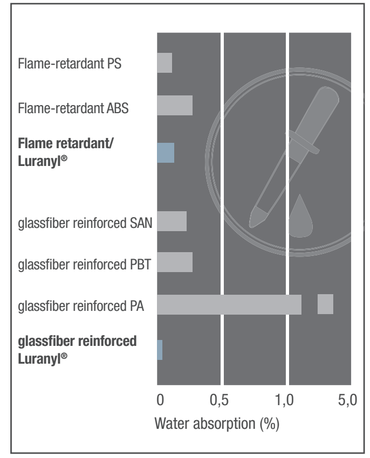
Whenever resistance to hydrolysis and hot water, acids and bases is required (high rigidity and dimensional stability) glassfiber-reinforced Luranyl® products are your first choice. Hardly any other thermoplastic allows the production of most complex parts with minimum warpage and narrowest tolerances. Moisture absorption compared to alternative glassfiber-reinforced thermoplastics is significantly lower.

Resistant to hydrolysis up to 90°C

Key requirement for application use in hot water is excellent resistance to hydrolysis also at high temperatures. The upper limit for glassfiber-reinforced Luranyl® product is 90°C. The tensile creep test is a great help for the designer in estimating lifetime of a component, particularly in critical cases.

Chemical resistance

Luranyl® PPE+PS-I is resistant to cold and hot water detergents, alkalis and acids as well as to alcohol. Luranyl® HT PPE+PA is resistant to a series of organic compounds.



Water absorption for 24h at 23°C (according with DIN 53 495)

APPLICATIONS

Due to its outstanding engineering properties and easy processing Luranyl® is used extensively in the construction and automotive sectors. Glassfiber-reinforced grades are used for precision parts in plumbing and sanitary engineering. Flame retardant grades are applicable in the office and communications sectors as well as in electrical engineering and consumer electronics.

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