



MOCOM

Alcom® TC Processing Guide Injection Molding

Alcom® TC compounds are thermoplastic materials with increased thermal conductivity compared to standard plastics.

Different filler systems allow different behavior of the compounds:

- **Alcom® TCD:** electrically insulating materials, mainly featuring low anisotropy of thermal conductivity
(ratio in-plane / through-plane $\approx 1 \dots 2$)
- **Alcom® TCE:** electrically conductive materials with highest thermal conductivities, usually high anisotropy of thermal conductivity
(ratio in-plane / through-plane > 2)

Filler loading and increased thermal conductivity require special processing conditions. Basically, higher thermal conductivity results in accelerated cooling of the melt and hence reduces flowability. Please refer to the “Spiral Flow” data given on the respective product technical datasheet.

Processing temperatures

Please always refer to the processing temperatures and drying guidelines given in the respective product's technical datasheet. Processing temperatures vary with regards to different polymers and different type of filler systems.

Melt temperature: Melt temperatures must be at the upper range of the respective polymer in general. Low residence times (< 5 minutes) are recommended when using such conditions and final parts should be inspected for signs of material degradation (e.g. smell, streaks or discoloration). The melt temperature has to be measured directly (for example inside the hot melt cake) using a probe thermometer. Please also consider additional shear stress caused by thin gates or hot runner systems. Adjust processing parameters if temperatures exceed recommended maximum temperatures of the respective material.

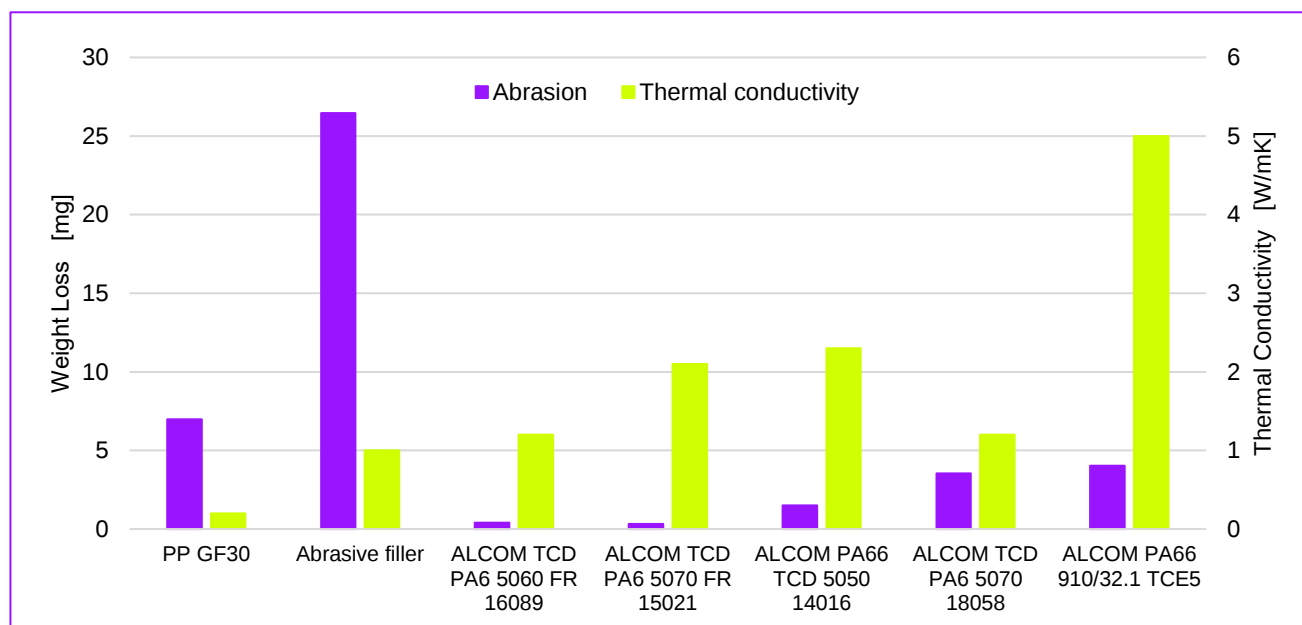


Figure 1: Abrasion of standard fillers and Alcom® TC compounds

Mold temperature: Especially in case of long flow paths high mold temperatures are necessary to enable proper cavity filling. Due to the melt's high thermal conductivity it cools down fast and melt flow might stop. Higher mold temperatures also allow improved surface quality within the bounds of what is feasible using highly filled compounds. Please refer to the technical datasheet of each compound for recommended processing temperatures.

Gate design

A direct feed (sprue bar) is preferred to pinpoint gating. Gate location should be at central area with high wall thickness to enable short flow paths and proper effect of filling and holding pressure. Avoid large volume cold runner systems.

Hot runner

The use of hot runners is possible and allows better gate location and improved filling while maintaining melt temperature at a high level. Please refer to your hot runner producer's recommendations for suitable hot runner systems that can manage compounds with high filler loadings.

Screw design

Standard three-zone screws with a non-return valve are suitable to process Alcom® TC materials. Even though Alcom® TC materials are tested for low abrasion (see fig. 1) we recommend using a hard-plated screw. Use an

injection unit with a screw diameter fitting the shot size of the part. Dosing stroke should be within 1D – 3D to limit residence time and allow for proper melt homogenization.

Injection speed

Typically, high injection speeds are used to allow proper mold filling. If the injection speed is too low, the part will not be filled properly due to fast cooling of the melt.

Switch over and holding pressure

Switch over point should be set so that a smooth cavity pressure profile without excessive peaks is achieved. However, depending on gate and melt distribution design holding pressure might not have a sufficient effect in part areas far away from the gate. In this case consider shifting switch over point or increase the holding pressure.

Design Support

MOCOM's Technical Service Center offers support in material choice, tool design, filling and structural simulation as well as on site assistance to adjust processing conditions to the final production quality level. Feel free to contact our experienced engineers:

Technical@mocom.eu

MOCOM Compounds GmbH & Co. KG

Mühlenhagen 35 | 20539 Hamburg

T +49 40 78105-720 | sales@mocom.eu

T +49 40 78105-710 | technical@mocom.eu

www.mocom.eu

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