Determining the Dryness of Makrolon® by the TVI Test

- Polycarbonate (PC)
- Drying

Introduction

Insufficiently dried material can be recognized by the fact that it causes the melt strand to swell and, depending on the level of moisture, leads to more or less extensive bubble formation in the molded part.

Both of these phenomena are particularly evident in the case of transparent material.

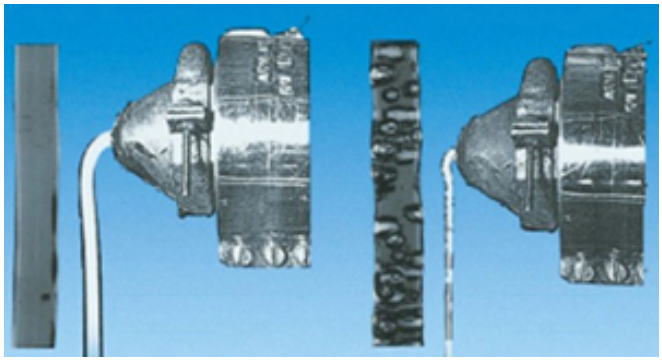


Fig. 1: Dry, moist

Several methods are available for determining the moisture content of molding compounds.

These include laboratory methods, which involve a high outlay on apparatus, and a simple method that can be employed in the production shop. This simple method, which provides sufficient information on the degree of dryness and requires only minimal apparatus and very little time, is referred to as the TVI method (Tomasetti's Volatile Indicator) in the literature.
It can suitably be used to monitor the drying of un-reinforced Makrolon®.

Method

The following simple items of equipment are required for the test:

– 1 hot plate with an adjustable surface temperature of 270 °C ± 5 °C (for Makrolon®)
– 1 pair of tweezers
– 1 small block of wood and a number of glass microscope slides (dimensions: 35 mm x 75 mm x 1 mm)



Fig. 2: Shows an (open) case which holds all the equipment necessary for the test. This is an easy-to-use test kit put together at Covestro

For the TVI test, two slides are heated to 270 °C on the hot-plate.

After heating for 1 to 2 minutes, three to four granules of the thermoplastic to be tested are placed on one of the slides using the tweezers. The second slide is then placed on top of the first and the two slides pressed together with the wooden block.

After 60 s residence time on the hot plate, without application of pressure, the specimens obtained are cooled in the air.

If small bubbles are visible in the specimens, then moisture was present in the test material (the bubbles also stand out well in colored Makrolon®).

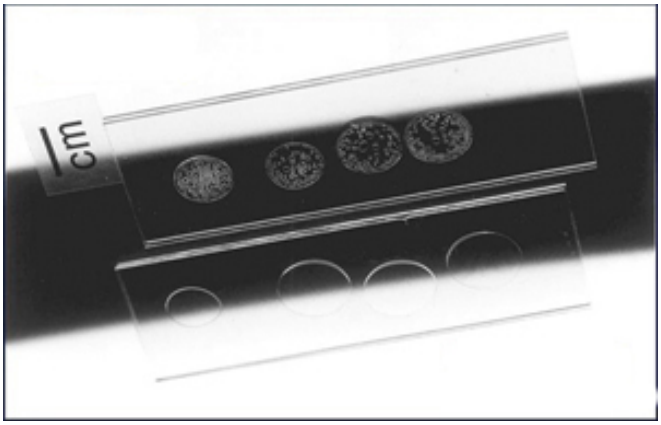


Fig. 3: Two glass slides. The top one contains specimens of moist Makrolon® granules and the bottom one, dry Makrolon® granules

In borderline cases, it can happen that a number of specimens display no bubbles, while others still contain small, isolated bubbles.

In cases such as this, the test should be repeated.

If specimens with bubbles are obtained a second time, then the necessary degree of dryness has not yet been attained.

The TVI test does not provide reproducible results for glass-fiber reinforced Makrolon®.

Since the drying procedure (drying time, drying temperature) is identical for un-reinforced and for glass-fiber reinforced grades, however, the results of a TVI test performed on un-reinforced granules can be applied to glass-fiber reinforced granules. This can be useful for checking that a drier is working correctly or for establishing drying times.

Typical value
These values are typical values only. Unless explicitly agreed in written form, they do not constitute a binding material specification or warranted values. Values may be affected by the design of the mold/die, the processing conditions and coloring/pigmentation of the product. Unless specified to the contrary, the property values given have been established on standardized test specimens at room temperature..

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