EM Plastic & Electric Products Ltd.

Helpful Tips To Take the Stress Out of Your Work - Annealing Components

Engineering and mechanical grade plastics can be difficult to work with at times. Due to the stresses that can naturally occur when the material is produced or develop during the machining process, the component that you spent your time and effort creating could easily fracture or warp if the internal stresses exceed the strength of the material.

By working with EM Plastic, you can be sure that the materials that you receive are top quality and have been treated to minimize internal stresses. However, if you notice undesirable changes in the shape of the machined component, it may be necessary to anneal the component after the machining process has been completed.

The annealing process is composed of several elements. The first is the incremental temperature increase over time. For most plastics, this temperature is between 10-20 ºC per hour. The next component is the hold temperature and hold time. This is the prescribed temperature that the material should maintain for a given period of time to ensure that all stresses are removed.

Also of importance is the “cool-down” rate. Similar to the heating rate, the “cool-down” rate is the prescribed rate at which the material should cool down.

It should also be noted that there are a number of environments in which various materials can be annealed. The chart below details some of the most common materials and their prescribed annealing requirements.

Materials	Heat up	Hold temperature	Hold-time (T2)	Cool Down	Environment(*)
PA	10-20 °C/h	150°C	10 min/mm	5-10°C/h	air, nitrogen or oil
POM	10-20 °C/h	150°C	10 min/mm	5-10°C/h	air, nitrogen or oil
PET	10-20 °C/h	150°C	10 min/mm	5-10°C/h	air, nitrogen or oil
PE-(U)HMW	10-20 °C/h	80°C	10 min/mm	5-10°C/h	air, nitrogen or oil
PC	10-20 °C/h	130°C	10 min/mm	5-10°C/h	air or nitrogen
PEEK	10-20 °C/h	250°C	10 min/mm	5-10°C/h	air, nitrogen or oil
PPS	10-20 °C/h	200°C	10 min/mm	5-10°C/h	air, nitrogen or oil
PPSU	10-20 °C/h	200°C	10 min/mm	5-10°C/h	air or nitrogen
PEI	10-20 °C/h	200°C	10 min/mm	5-10°C/h	air or nitrogen
PSU	10-20 °C/h	170°C	10 min/mm	5-10°C/h	air or nitrogen
PVDF	10-20 °C/h	140°C	10 min/mm	5-10°C/h	air, nitrogen or oil

(*): when annealing in air, a more or less pronounced colour change of the outer surface is to be expected (particularly with nylons) – the thin oxidised surface-layer involved, however, is most of the time removed during further machining operations.

For more helpful tips, contact your local EM Plastic representative.

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