

ANNEALING OF POLYPROPYLENE

Why Anneal Plastics?

If, during the machining process, significant material is removed, annealing is recommended to relieve machined-in-stress and minimize possibility of premature part failure.

All extruded stock shape plastics are compressed through a profile die when extruded. The compression that occurs in the material is not relieved because the plastic “sets up” as soon as it comes out of the die and it remains in this compressed or highly stressed state. This high state stress will cause four problems if not addressed:

1. Materials will tend to warp and distort
2. Physical properties will be different than published data (usually lower)
3. Material may crack
4. Finished part dimension may change.

In order to eliminate these problems extruded products are annealed. Annealing is a stress relief process, which occurs when the material is exposed to heat (air or fluid) above its glass transition point, which allows the material to “decompress” back to a relaxed state. Annealing is important if you want a quality, finished part out of your stock shape.

ANNEALING/STRESS RELIEVING PROCEDURES FOR POLYPROPYLENE

The following are general guidelines for annealing Polypropylene. Variation in the equipment used, rate of temperature rise per hour, part configuration, and degree of stress, preclude any exact predictions arising from these steps. Heavy cross sections and parts with high levels of stress may require longer holding times, or more than one intermediate annealing step. Thinner cross sections or lower stress parts can often be annealed in a faster cycle. These rates are to serve as a guideline only.

1. Place the material/parts in a hot air circulating oven on an open mesh platform at room temperature
2. Ramp the oven up, 50°F every hour, until you reach 185°F
3. Allow the material/parts to remain at 185°F for 2 hours per inch of thickness (under 1” should remain for 2 hours)
4. After the cycle time is complete, reduce the temperature by ramping the oven down to ambient temperature at 50°F every hour.
5. Remove material/parts only after they return to room temperature and are cool to the touch.

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