

Some dos and don'ts for injection molding

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Eastman Tritan™ copolyester is a thermoplastic material that is ideally suited for a variety of injection molding applications because of its outstanding clarity, toughness, and chemical resistance. Some dos and don'ts that should be helpful in processing this material follow.

Drying

Do

- Keep drying system clean to prevent contamination of Eastman Tritan™ copolyester.
- Dry thoroughly with a dehumidified drying system to prevent
 - Bubbles or appearance problems on finished product.
 - Degradation due to hydrolysis, which causes loss of toughness.
- Use air with a dew point of -30° to -40°C (-20° to -40°F).
- Check dehumidifying system with a dew point tester.
- Use air temperatures of 82° to 88°C (180° to 190°F). Air temperatures below 65°C (150°F) will substantially increase drying time. Air temperatures above 108°C (226°F) may cause pellets to stick together.
- Dry material for a minimum of 4 hours.
- Keep desiccant bed clean.
- Check heater circuits and elements.
- Control temperature precisely.
- Use air-drying volume of 1.0 cfm/lb [$0.06\text{ (m}^3\text{/min)/kg}$] of material processed per hour.

Don't

- Attempt to decrease drying time by raising temperature above 108°C (226°F). This may cause pellets to stick together.
- Remove dried material from the drying system until just prior to processing. The moisture level increases rapidly when Eastman Tritan™ copolyester is exposed to ambient conditions. Even in the hopper, the material will begin to absorb moisture. It is good practice to keep the material in the hopper as dry as possible.

Injection molding

Do

- Keep the material free from contamination to produce tough, clear parts.
- Purge the machine thoroughly, preferably with Eastman Tritan™ copolyester.
- Use standard molding equipment.
- Use conventional mold-design engineering to include full-round, large runners, large gates, and generously radiused corners.
- Use slow screw speeds of between 30 and 60 rpm, or even slower if recovery is erratic.
- Use slow injection speed to reduce streaking and gate splay. If injection speed is programmable, a slow/moderate/slow profile may be used to produce the best appearance and a reasonable fill time.
- Use an actual melt temperature near the recommended 282°C (540°F) when at the recommended 5–6 minutes or less melt residence time. Cooler melt may contribute to residual stress or screw recovery issues. In cases of longer residence time (big barrel and small shot), consider and test parts from lower melt temperatures approaching 260°C (500°F).
- Plan shot size to be at least 40% and preferably 75% to 80% of machine capacity.
- Expect properties to be dependent on the interplay of temperature, time, and moisture.
- Maintain mold surface temperature around 38° to 66°C (100° to 150°F).

Don't

- Use high-back pressures except when including regrind material or color concentrates.
- Use large mold vents since excessive gas is not produced. Small, conventional vents of 0.001 to 0.0015 in. (0.025 to 0.038 mm) are adequate.
- Discard scrap material. If scrap material is initially dried and processed properly and is free of contamination, it may be blended with virgin material up to a level of 25%.
- Rely on visual inspection to judge the physical properties and quality of a molded piece. Test it under exacting conditions.



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**Eastman Chemical Company
Corporate Headquarters**

P.O. Box 431
Kingsport, TN 37662-5280 U.S.A.

Telephone:
U.S.A. and Canada, 800-EASTMAN (800-327-8626)
Other Locations, (1) 423-229-2000
Fax: (1) 423-229-1193

Eastman Chemical Latin America

9155 South Dadeland Blvd.
Suite 1116
Miami, FL 33156 U.S.A.

Telephone: (1) 305-671-2800
Fax: (1) 305-671-2805

Eastman Chemical B.V.

Fascinatio Boulevard 602-614
2909 VA Capelle aan den IJssel
The Netherlands

Telephone: (31) 10 2402 111
Fax: (31) 10 2402 100

**Eastman (Shanghai) Chemical
Commercial Company, Ltd. Jingan Branch**

1206, CITIC Square
No. 1168 Nanjing Road (W)
Shanghai 200041, P.R. China

Telephone: (86) 21 6120-8700
Fax: (86) 21 5213-5255

Eastman Chemical Japan Ltd.

MetLife Aoyama Building 5F
2-11-16 Minami Aoyama
Minato-ku, Tokyo 107-0062 Japan

Telephone: (81) 3-3475-9510
Fax: (81) 3-3475-9515

Eastman Chemical Asia Pacific Pte. Ltd.

#05-04 Winsland House
3 Killiney Road
Singapore 239519

Telephone: (65) 6831-3100
Fax: (65) 6732-4930

www.eastman.com

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