

# TROUBLESHOOTING GUIDE FOR ROTOMOLDING



## **Powder flow problems / High content of threads in particles:**

- Sharpen the blades of the pulverizing mill.
- Increase the temperature during pulverization.

## **Elevated proportion of small (fine) powdered resin particles:**

- Increase the distance between the blades of the pulverizing mill.

## **Elevated proportion of large powdered resin particles:**

- Decrease the distance between the blades of the pulverizing mill.
- Select a smaller sieve.
- Sharpen the blades or increase the temperature during pulverization in order to reduce the proportion of threads or tailings in the particles.

## **Agglomerates in powdered resins:**

- Decrease the temperature or increase the cooling after the resin is pulverized.

## **Low flow of pulverized resin:**

- Establish the correct balance of load, temperature, distance between blades and size of the pulverizing mill sieve, in order to reach the optimal flow of the powdered resin, we recommend the use of experimental design, support from the pulverizing equipment and/or the resin supplier.

## **Bending or curving of the part:**

- Decrease the cooling speed.
- Maintain the rotation of the mold during the cooling cycle.
- Guarantee the use of resins whose properties (bulk density, size and shape of particles) are within the intervals defined as appropriate for rotomolding grade resins.
- Increase the temperature of the cooling means: air or cold water.
- Apply air pressure through a pin, during the cooling.
- Vary the ratio and rotating speed of the mold, depending on the size of the part to be molded and the equipment conditions, which enable to obtain a better coating of the resin.

- Supply suitable ventilation. Guarantee that the ventilation ducts are not cluttered. For thin wall parts ( $< 1/2''$ ) we suggest a 10 to 13 mm diameter of the ventilation areas per  $m^3$  of the mold volume.
- Decrease the amount of the unmolding agent.
- Reduce the pigment content.
- Consider alternate pigments.
- Carefully check the mold design in order to prevent excessive variations in the thickness of the wall.
- Avoid, if possible, long and flat panels in the design of the part.

## **Sticking parts to the mold:**

- Reapply or use a greater amount of the unmolding agent. It may be necessary to remove and apply a new one.
- Employ an effective unmolding agent to the temperature and resin used; apply according to the instructions of the supplier.
- Improve the inner superficial finish of the mold.
- Supply suitable ventilation. For thin wall parts ( $< 1/2''$ ) we suggest a 10 to 13 mm diameter of the ventilation areas per  $m^3$  of the mold volume.
- Periodically clean the mold.

## **Discoloration of the inner surface of the part:**

- Decrease the oven and/or heating cycle temperature, or purge the part with inert gas ( $N_2$ ).
- Use resin that has the suitable type and amount of antioxidant.

## **Irregularities or rough edges in the molded part on the partition line of the mold:**

- Supply a suitable amount of ventilation and guarantee that the ventilation ducts are not cluttered.
- Periodically adjust the closing pressure of the mold.
- Clean the edges of the mold in order to prevent leakage and/or accumulation, and apply the unmolding agent again.
- Reduce, if applied, the inner air pressure inside the mold.

# TROUBLESHOOTING GUIDE FOR ROTOMOLDING



## **Powder bridging:**

- Modify the mold by increasing the width / depth ratio along its opening. Design the corners of the mold with greater radii. Avoid arches that have a width 4 times lesser than the thickness of the wall.
- Verify the powder flow properties and ensure the use of resins with acceptable bulk density. The typical density of the powder for rotomolding is from 0.35 to 0.4 g/cm<sup>3</sup>.

## **(Vacuum) Holes in the part, around the insertions:**

- Correct the placement of insertions and the relief areas that allow the escape of trapped gases out of the mold.

## **Sub-cured parts (incomplete casting), with small bubbles on the wall of the part and/or with a particulate appearance inside the piece:**

- Increase the oven and/or heating cycle temperature.
- Apply a finer powder resin (smaller amount of particles).
- Increase the heat transfer with molds that have thinner walls or manufacture the mold with material that has a greater heat transfer rate.

## **Bubbles in the partition line:**

- Ventilate the mold at air pressure.
- Periodically adjust the closing pressure of the mold.
- Clean the edges of the mold in order to prevent leakage and/or accumulation, and apply the gun molding agent again.

## **Poor stiffness of the part:**

- Add more material to the initial load.
- Apply a resin with greater density.
- Increase the oven and/or heating cycle temperature.
- Check and modify, if necessary, the design of the mold.
- Increase the heat transfer with molds that have thinner walls or with material that has a greater heat transfer rate.

## **Long oven cycles:**

- Apply a finer powder resin (smaller amount of particles).
- Increase the oven temperature.
- Increase the heat transfer with molds that have thinner walls or manufacture the mold with material that has a greater heat transfer rate.

## **Color marks and sections in the mixed physical material (dry mixture):**

- Break the pigment sections before mixing. Apply a high intensity mixer. If the desired color balance cannot be achieved, apply a cast colored material.
- Only apply (humid free) dry powders – resin, pigment.

## **Non homogeneous thickness of the part:**

- Guarantee the use of resins whose properties (bulk density, size and shape of particles) are within the intervals defined as appropriate for rotomolding grade resins.
- Vary the ratio and rotating speed of the mold in order to obtain a better coating of the resin.
- Carefully check the mold design in order to prevent excessive variations in the thickness of the wall.

## **Poor impact resistance:**

- Use a lower density or lower index flow resin.
- Increase the cooling speed in order to maintain the resin density low.
- Check and modify, if necessary, the design of the mold, eliminating sharp edges and narrow ducts.
- Decrease the oven or heating cycle temperature, or purge the part with inert gas (nitrogen) if the wear of the properties is a consequence of resin degradation due to high temperatures.
- Increase the temperature and/or heating time in order to achieve a full casting of the resin (a high grade of sub-curing may cause a significant loss of impact resistance due to the high generation of bubbles).
- Select pigments that do not affect impact resistance.

# TROUBLESHOOTING GUIDE FOR ROTOMOLDING



- Apply pre-colored compounds (pigment incorporated to the resin by means of cast mixing).
  - Increase the heat transfer with molds that have thinner walls or manufacture the mold with material that has a greater heat transfer rate.
- Long-term problems of the part:**
- Decrease the oven or heating cycle temperature.
  - Apply an established anti-UV resin, with additives and/or pigments that protect it from degradation by UV light.
  - Apply carbon black of a fine particle size, well dispersed, for better protection.
  - Apply PE grades resistant to ESCR. Do not store an ESCR promoting agent in a container molded with low resistant resin to ESCR for long periods of time or at high temperatures.
  - Modify the area containing insertions. Examine the part in order to verify the design and the stress concentration points.
  - Check the type of antioxidant and the applied level.
  - Reduce the level of the unmolding agent, if it is used.
  - Use pigments that mixture well with a polymeric base. Apply pre-colored compounds (pigment incorporated to the resin by means of cast mixing).

*This bulletin has been made by the Marketing Department of Polinter with the support of the specialists of Investigación y Desarrollo, C.A. (INDESCA) and by the Technical Services Department of CORAMER. This is intended for all clients and users of the Venelene® resins and we trust that the information contained herein is helpful and useful.*

*Please contact us at the following email address, [info@polinter.com.ve](mailto:info@polinter.com.ve) or through our agent: Corporacion Americana de Resinas (CORAMER), with branch offices in Venezuela, Colombia, Peru, Ecuador and Chile (<http://www.coramer.com>), should you have any suggestions or comments regarding this issue.*

*The information described in this document is, to our best knowledge, accurate and truthful. However, since the particular uses and transformation conditions are completely out of our hands, the adjustment of the parameters in order to reach the maximum performance of our products for a specific application depends on and is the responsibility of the user.*

*In order to obtain more detailed information of the security aspects regarding the use and disposal of our products we invite you to consult the security pages (MSDS) of the Venelene® polyethylene.*