JSP Technical Bulletin
General Product and Processing Guidelines for ARPRO® EPP

1. Incoming Material

Consult the applicable ARPRO® EPP Product Description, Density Selection, and Grade Selection Guidelines.

2. Delivery and Handling

ARPRO® EPP is typically delivered in bulk trucks to the customer location. Delivered volumes depend on the size of the bulk truck trailer. Transfer to the local net bags and/or storage silos is done using a non-contact suction blower, provided by the customer. Unloading time depends on product density, blower power, distance, and pipe size. Typical unloading times are 3 to 4 hours for a full truckload. For optimal unloading time, transfer piping/ducting at suction end should be ~ 8" to 10" (~ 200 to 250 mm) in diameter, and piping/ducting at blower end should be around 6" (150 mm). Radii should be 5D minimum. The air to material ratio should be adjustable to optimize material flow. Special blower equipment is recommended to avoid mechanical damage to the beads, especially for high-density grades and when working in a low temperature environment. All transfer piping, hoses, net bags, and silos should be adequately grounded to minimize electrostatic buildup and to prevent excessive bead 'clinging'. Atmospheric conditions (temperature and humidity level) can also effect the level of electrostatic buildup.

If no storage silos are available, the material can also be delivered in super sacks, of about 42 ft^3 (~ 1.2 m^3) each. A typical super sack delivery consists of ~ 48 to 52 cartons depending on the size of trailer. Super sacks can be stacked, and are easily moved with a fork truck with either a hanging or clamping attachment depending on material density.

ARPRO® EPP should be protected from adverse weather. If the material storage temperature is considerably lower than in the molding plant, sufficient customer inventory is recommended to avoid moisture condensation that could cause material transport problems. It is recommended that ARPRO® EPP be stored at the ambient molding plant temperature for a minimum of 24 hours to allow for temperature equalization prior to molding. ARPRO® EPP has no shelf life provided that it is protected from extreme temperature extremes and maintained are ambient [manufacturing plant] temperatures.

3. Processing Recommendations

ARPRO® EPP is processed using standard EPP molding equipment. The information below is provided as general information, and for illustration purposes only. For detailed information ARPRO® EPP molding parameters, pre and post treatment, or other processing information, contact the JSP Technical Service Group. JSP also offers complete training for all phases of ARPRO® EPP processing.

Filling:

ARPRO® EPP does not contain any blowing agent. For that reason, the material needs to be compressed during the filling step, to allow subsequent expansion and fusion. Two filling technologies can be used: crack [a.k.a. 'criush') fill and pressure fill (or counter-pressure fill).

Using crack fill, the material is conveyed by a low silo pressure (and/or venturi air), while the tool remains slightly open (crack position). Compression of the beads is achieved by closing the crack. The crack value essentially determines the molded part density. Mold settings vary with nominal part thickness.

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Using pressure fill, the material is conveyed using a higher pressure against a certain pressure in the chest (back-pressure). The back-pressure essentially determines the molded part density.

A pre-treatment step can be used to build an internal pressure in the beads, which allows molding of lower density parts. Pre-treatment consists in impregnating the material in a pressure tank for a number of hours under air pressure. The optimal pre-treatment cycle depends on the ARPRO® EPP grade, molded density, filling technique, and part geometry. For details on recommended pre-treatment ramps, contact the JSP Technical Service Group.

Steaming:

The beads are fused together using steam as the heat/energy carrier. A saturated steam pressure in the molding steam chests of 35 to 60 psi (~ 2.5 to 4.0 bar) is required to properly fuse ARPRO® EPP.

Cooling and Stabilizing:

To remove excess heat, and to evacuate excess foam pressure after the steaming step, the tool cavity is cooled with water. It is essential that cooling is homogeneous, to avoid ejection problems and variances in part shrinkage. The duration of the cooling step depends upon the part density and geometry. A stabilizing (after-cooling) step, using vacuum or air can follow the water-cooling. Final tool temperature depends on the equipment, number of cavities, part density and environmental conditions. Typical tool ejection temperatures range from 175 to 210 (~75 to 100°C).

Ejection:

The parts are ejected using air or mechanical ejectors. AZA ejection may be used to eject complex parts.

Oven Curing or Tempering:

During this step, the molded ARPRO® EPP parts are cured in an oven at a temperature ranging from 171 to 185°F (~ 77 to 85°C). Curing times depend on oven capacity, air exchange, heat load, part volume and part density. Oven curing is used to eliminate residual molded part moisture and to restore atmospheric air pressure inside the beads to allow for post-molding dimensional stabilization and recovery. Parts with molded densities below 2.8 pcf (45 g/l) generally require oven curing to achieve full dimensional and shape recovery. At higher densities (> 2.8 pcf or 45 g/l) the molded parts generally recover at ambient temperature. Again, recovery time depends on ambient conditions, curing configuration, part volume and part density.

Shrinkage:

Parts molded with ARPRO® EPP shrink between 1.8 and 2.4%, depending on material grade, molded density, pre and post treatment, part geometry, and molding conditions. For details on recommended tool shrink guidelines, contact the JSP Technical Service Group.

For more information, contact your JSP Sales or Technical Group Representative.