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PW Technology Watch By Bernie Miller from Plastics World

If you are forced to run small-shot jobs on a big press - say a 20-ounce shot on a 50-ounce press - you have the potential for material degradation due to the long residence time. The risk varies, of course, with the specifics of the job and type of plastic, but the extended thermal exposure certainly won't improve the material's properties. The usual solution for this small-shot problem is to downsize the machine - that is, install a smaller-bore barrel, mating screw, tip assembly, endcap and drive adapter. This "fix" will increase the injection pressure. Also, if the length/diameter ratio is to be maintained, the barrel and screw will have to be shortened. The net result is an expensive, one-of-a-kind press with reduced capacity.

"A much simpler and less expensive way to shorten residence time is with a reduced-volume screw," says Randy Conner, president of Concor Tool & Machine Co, Hayward, WI, a firm specializing in molding machine screws, barrels and components. To cut residence time, Concor makes a new screw whose plasticating capacity and, therefore, its throughput, is reduced by means of wider screw flights. Since the reduced-volume screw has the same overall dimensions as the original, substitution is simple. Concor has made screws with up to 60% volume reductions for many types of thermoplastics at a small extra cost over standard screws - and they have worked well, Conner says. Screws have the compression ratio and other geometry recommended for the intended service. If, for some reason, the molder changes his mind, the screw can be recut as a general-purpose screw. Concor normally uses tool steel for these screws, so they do not require replating or renitriding if remachined. Phone number: (715) 462-3756.

Be careful about how you sample a new compound for lab tests. One thing to keep in mind is the "scale of scrutiny." The phrase refers to the proper sample size for checking the composition of a batch of material. The sample

should be scaled to the application. So, if the job will require a 10-gram shot, your test samples should be no bigger than 10 grams. Logical, but often overlooked.

Electron-beam processing provides a novel way to upgrade the properties of molded parts or modify polymers. Its crosslinking capabilities also have been used to counteract the loss in properties of polyethylene blends containing regrind. One such blend is post-consumer regrind (PCR) HDPE in LLDPE for rotomolding applications. Though 100% LLDPE is the resin of choice, reflecting the public pressure for recycling, the industry is eyeing the use of LLDPE/PCR HDPE blends in large rotomolded products as an outlet for the HDPE. However, the differences in molecular weight and crystallinity of the two resins reduce the stress crack resistance (ESCR) and impact strength of the blend below usable levels.

In a project sponsored by Quantum Chemical Co., Cincinnati, E-Beam Services Inc., Cranbury, NJ, showed that the electron-beam treatment could improve the ESCR and impact properties of parts rotomolded from blends of LLDPE and several grades of PCR HDPE at 10-25% loadings. The results varied with the type of PCR, but "in most cases, the treated blend equalled the properties of virgin LLDPE," says Phil Dodge at Quantum's Allen Research Center. Electron beam produces these benefits by cross-linking the polymers, according to Paul Edgecomb, process specialist at E-Beam Services. "Peroxide crosslinking is not feasible with recycled resins," Edgecomb adds. Part of his firm's business is upgrading the critical properties of tanks and other structures using electron-beam energy. Call (609) 655-7460.

Reduced-volume screws avoid excessive residence time when running small shots on a large capacity press.