

Technology Brief

USING RECYCLED PLASTIC FLAKE IN AN EXTRUSION MOLDING PROCESS

Background

This technical assistance project provided support to a manufacturer in using recycled plastic flake as a substitute for pellets, with the aim of helping to develop and expand the potential market for locally produced clean-washed HDPE flake; most, if not all manufacturers in Colorado are currently only manufacturing with pellets.

Recycled Plastic Products, Inc., and Plastics Design and Manufacturing (PDM) were selected for this technical assistance project. Recycled Plastic Products, Inc., manufactures and distributes a line of recycled plastic fencing products, and PDM is a custom molder, which provides molding services to Recycled Plastic Products.

Product Testing

The product and process for the technical assistance project was a hollow profile extrusion for 1" x 6" and 1" x 8" fence pickets. The extrusion process used an extruder with a water-filled vacuum tank and a pulley. The product was originally manufactured with 100% reclaimed HDPE pellets (Dupont™), with a color and ultraviolet (UV) inhibitor additive.

Testing was performed on two different dates at PDM's extrusion molding department. Materials selected for testing included Talco's™ 100% post-consumer HDPE washed flake, and EcoPlast's™ 100% post-consumer HDPE washed flake. It was determined that both products were

Key Words

Materials: Clean HDPE flake.

Technologies: Extrusion Molding.

Applications: Using recycled plastic flake in a minority ratio with pellets in a specific extrusion molding process.

Market Goals: Expand the market for locally produced clean HDPE flake.

Abstract: Assist a selected manufacturer in using recycled plastic flake as a substitute for pellets.

the same in quality and composition, and therefore, only the Talco product was used for testing purposes.

On the first testing date, samples of 20%, 40%, 60%, and 80% flakes, mixed with the Dupont pellets, were prepared and extruded, both with and without the color additive. The extrusion process and processing parameters were monitored, samples of the extruded pickets were taken for each sample mix, and the quality of each sample mix was observed. The test samples were collected and sent to a testing lab to perform physical property testing.

Based on the preliminary test results, Recycled Plastic Products requested a second testing with samples of 25%, 30%, and 35% flakes mixed with the Dupont pellets, to better determine the upper threshold of flake content.

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Test Results

Test results indicated that a blend of 25% flake provided a product of acceptable physical and visual quality, and the mix of flakes and pellets could be processed on the existing equipment without any modifications in equipment or process parameters. Some additional equipment would be required to mix the flakes and pellets at a higher ratio.

The economic benefits of using recycled flake at a 25% ratio are substantial. At current pricing, including transportation of the flake material from out of state, the flake could provide a \$0.05 to \$0.10 per pound discount from pellets. While this discount could vary, depending on recycled plastic feedstock pricing fluctuations, at 25% recycled flake feedstock, and a typical processing volume of 80,000 pounds per month, the use of flake could save \$1,000 to \$2,000 per month in materials costs. These savings, or the discount of flake from pellets, could be even greater if the flakes were locally produced, assuming that locally prepared materials would have a reduced transportation cost. From a local market development standpoint, this one particular manufacturer, using clean flake at the suggested levels, could create a demand for up to 240,000 pounds per year for locally-produced, clean washed HDPE flake.

Conclusions/Survey Results

This project demonstrated the economic and technical feasibility of using recycled plastic flake in a minority ratio with pellets in a specific extrusion molding process. With several plastic extrusion molding companies located in Colorado, there is a potential for a significant increase in the use

of locally-generated and produced recycled plastic flake material. This increased usage could provide a new market for recycled plastic bottles in Colorado, create new jobs in recycling and processing the flake, and offer a superior cost alternative to more distant national markets for recycled plastic bottles.

As part of this project, extrusion molders were surveyed and asked a series of questions regarding the current and potential use of recycled resins in their manufacturing processes, and the potential for the use of clean flake as a substitute for pellets.

The survey indicated that there could be additional market potential for the use of clean flake. One-third of the respondents used HDPE in injection or extrusion molding, and about the same percentage used washed flake or clean industrial regrind on a regular basis. Most of the respondents used clean industrial regrind from their own in-house scrap. The major concerns with the use of flake from outside sources were consistency of materials, quality of materials, and supply of materials. A little less than half of the respondents indicated that they would use technical assistance program services in using new materials such as recycled flake in their manufacturing operations.

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For More Information

For a copy of the report, *Plastics Recycling Technical Assistance Report*, use the CWC Publication Order Form. For more information call CWC at (206) 443-7746, email info@cw.org, or visit the CWC Internet Website at www.cw.org.

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