Extrusion Processing Guide

To remain competitive in today’s demanding global economy, manufacturers face increasing pressure to produce quality products at the lowest possible cost. Optimizing your internal processes and systems can help boost output and minimize costly waste.

Flexible PVC extrusion can be a particularly challenging and complex process requiring the careful alignment of several variables including speed, temperature and equipment. However, using best practices and making conscious efforts to reduce waste can result in significant efficiency improvements and cost reductions.

The following guidelines can help you optimize your extrusion process.

**Use the Proper Equipment**

Be sure your equipment is well-maintained and part of a comprehensive preventive maintenance program. The following equipment is recommended for processing flexible pvc:

- **Extruder** - Length to diameter ratio should be 24 to 1. Sizes include 1.5 to 4.5 inch machines.
- **Barrel** - Lined with a wear and chemical resistant layer of Xaloy 101.
- **Screw** - Compression ratio of 2.5 to 1 or 3.0 to 1. Flights should be flame hardened and then a layer of Colmonoy 56 added. Finish with chrome plating.
- **Breaker Plate** - Should be hardened and polished. Entrance and exit should be chambered.
- **Screens** - Stainless steel with mesh sizes ranging from 20 - 200. Starting point would be 20, 40, 40. Put 20 mesh against breaker plate.
- **Die** - Stainless Steel or chrome plated steel and streamlined for long production runs.
- **Cooling** - Extrudate is generally cooled in a water trough.

**Determine Optimal Processing Settings**

Establishing these parameters takes time, but finding the right combination is critical to output.

- **Feed Zone Temperature** - This controls the amount of material sticking to the barrel wall, and is also known as bite. Too much bite will lead to overheating of the compound. Too little will lead to poor output.
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- **Die Temperature** - Impacts output and will have an effect on the dimensions of the extrudate as well as the finished product. A cold die will restrict flow and an overly hot die will effect dimensions.
- **The temperature profile** is the term for the group of optimized temperatures in each zone listed above.
- **Screw RPMs** - To increase output, RPMs should be set as high as possible provided consistent quality results occur.

**Use Efficiency-Boosting Best Practices**

- **Record your settings.** “Tweaking” of machines by setters and operators causes more lost time and energy than any other cause. Get the machines set right, record the settings, and do not change them unless absolutely necessary.
- **Minimize waste.** Take measures to reduce scrap, especially if the extrusion line is used for short runs. Turn off unused components between runs. Barrel heaters and cooling fans may be turned off between runs, reducing electric consumption and thereby saving costs.
- **Optimize timing** - Aligning your start-up and shutdown procedures with peak demands can boost efficiency. Startup times can be scheduled to have a cascade effect, and shutdown can be timed to switch off the most energy guzzling areas of the machine as quickly as possible.
- **Data is your friend.** Use a data collection system to take real-time measurements throughout the extrusion process. Chart the data to see trends and to streamline your efforts.
- **Integrate efficiency efforts into all operations.** Establish efficiency goals and communicate them to all departments. Train processors on any new procedures and measure results.

These efficiency tips are only a starting point - by implementing internal systems and continuing to measure and optimize, it is possible to maximize output and reduce operating costs.

If you would like additional processing information, or if you have specific technical questions, don’t hesitate to contact us at 800.462.4781 or csdenver@alphagary.com.