



Process Solutions

Optex Tips
Special NPE Edition

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Welcome to our second Optex Tips Newsletter. This is a quarterly publication dedicated to extrusion process improvement. We hope you find the tips useful and we welcome questions and suggestions for future issues.

Sincerely,
Andy and Beth
Optex Process Solutions, LLC

Optex Launches Updated Web Site

www.optexprocesssolutions.com



The Optex web site has been updated completely!! You can now download white papers, view newsletters and easily navigate through the screens.

Visit our new site and see how easy it is to use!

Why Not Replace a Perfectly Good Screw?

Evolution of Current Technology and Products

If you have an extruder that is more than 10 years old chances are that there are new materials that can enhance your products. The physical and rheological properties of these materials may be different than the original materials targeted for the current extruder. As you run these materials, you may see higher melt temperatures, higher motor amps, edge instability or various other indicators that these materials process differently. The choice of materials is always determined by product requirements, not processability. These process differences may have an impact on your run speed and productivity. You will need to evaluate how and where the best place to run these materials is.

The first step is to look at the product mix to be run on the extruder. What are the materials? What is the output range of each material? What is the target melt temperature? Where do you run today and is this the optimum condition to run these materials? For example, your extruder may be designed to run LDPE. You now run low melt index mLLDPE/PE blends and see high temperature. On the other end of the spectrum, you may have an extruder designed for low temperature, shear sensitive resins such as an acid copolymer that needs to run an extrusion coating grade of LDPE. The extruder won't likely get to 600F for the LDPE. If these are minor components of your product mix, this may be a perfectly acceptable situation. If the trend is away from your original design, it may be time to evaluate modifications to your system.

The easiest fix may be to move products around on your existing lines. For example, you could place all the low shear requirements on one line and all the high temperature materials on another. The differences for each extruder should be evaluated and quantified on one spreadsheet to better compare the options. You should examine temperature uniformity, output potential, mixing quality and limitations caused by process stability issues. One way to evaluate this is by process simulation. Process models can be developed that accurately reflect current system performance. These models can be easily used to evaluate changes such as running alternate conditions, alternate material or design modifications. An example of such simulation software is Compluplast VEL (Virtual Extrusion Laboratory). This software can be used for the complete extrusion modeling such as feed screws, feed pipes, Coextrusion adaptors, flat dies, round dies, cooling and haul off.

Depending on the available extruders and options, you may need to consider a design optimization. After going through the above exercise, you may be better off than before but still may have a number of extruders that can benefit from a feed screw redesign. You have identified an extruder that is not meeting your performance expectations. You need to go back to the list of materials and priorities that need to be run on this extruder. The benefit of having an existing extruder is that the existing design can be modeled and evaluated for the priorities that have been established for this extruder. It may be possible to optimize performance by making minor modifications to the existing screw. The demands of production may also dictate that the machine cannot be down waiting the 2-3 weeks needed for modification. In that case, we would recommend a new screw with the old screw to later be sent to be modified as a spare. If the new priority mix is significantly different than the original target, a complete new design may be required for best performance. It is not unusual to see 10-15% output improvement, better melt quality, reduced down time, reduced changeover and improved stability from the new design. Investment can be readily justified by these improvements.