

How to determine if a gear pump is right for you

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In the early days of gear pump assisted extrusion, it was at times thought that gear pumps would eventually be supplied on all extruders. As the application of gear pumps matured, it became clear that this was not the case and that there are specific criteria that can be evaluated to determine the suitability of a gear pump for any specific application. The primary benefits of the use of a gear pump in the extrusion process are as follows:

- Elimination of surging and surge related defects in extrudate quality. A properly designed gear pump system will filter pressure variations from the screw at 95% or better.
- Reduction in target gauge thickness. A properly designed gear pump system will allow a reduction in machine direction gauge variation of 50% or more provided that there are no significant inconsistencies with the downstream equipment. This means that more usable product can be produced from each pound of resin. For instance, if machine direction gauge variations now $\pm 5\%$, then variation should be reduced to $\pm 3\%$ or better. Variations of only $\pm 1.5\%$ is common in gear pump assisted applications. At 1,000 lbs./hr. at 6,000 hrs./yr. with \$.50/ lb. material, the savings would be \$75,000/yr. Since a pump system costs about \$40,000 for this application, the payback would be a little over six months.
- A gear pump system may also allow higher throughput, higher percentage use of regrind materials, reduction and/ or better control of melt temperature, faster start ups, and a reduction in screw and barrel wear.

Based on the above benefits, we can now look at some of the characteristics of individual extrusion lines that may help predict whether or not a gear pump system should be recommended.

A gear pump is recommended when:

- Dimensional requirements for the extruder product are tight.
- Rates are relatively high and/or material cost per pound is high.
- Significant amounts of regrind material are used.
- Same screw is used for a wide variety of materials and rates.
- Extruder head pressure is relatively high and/or screw will not develop required head pressure.
- Multiple dies heads on same extruder.

A gear pump may not be recommended when:

- Dimensional requirements of the extruded part are not critical.
- Extrusion rates are relatively low and/or material cost is low.
- Virgin pelletized material is used exclusively.
- Screw is designed exclusively for the application.
- Material is abrasive, degradable, or corrosive.

The above criteria may be used to begin your analysis to determine if the gear pump is right for your application.

- Dan Smith LCI Corp.

See also:

- [Causes of extruder surging](#)
- [Gear pumps - answers to questions](#)
- [More on gear pumps](#)

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