“Gear Pump Systems for Extrusion”

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Gear Pump Systems - Strengths
- Controls surging
- Reduces backpressure & increases output
- Volumetrically accurate metering

Gear Pump Systems - Weaknesses
- High cost system
- Relatively maintenance intensive
- Difficult to install
- Machine direction only, no traverse gauge control

What is a Gear Pump?

Tight Rotational Clearances

Bearings
Bearing Lubrication

Lubrication Return Grooves

Gear Designs - Pulsation

History

- Gear pumps used in the extrusion process over 85 years
- First processes were fiber spinning
- Modern extrusion gear pump systems date from the 1970s

Specialty Gear Pumps

Benefits of the Pump in the Extrusion Process

- Elimination of surging and surge related defects in extrudate quality, resulting in higher yield per pound
- Faster start-ups and repeatable linear output flow
- Ability to run higher concentrations of regrind and off-spec materials
- Multiple profiles from the same extruder
- Generation of pressure needed by downstream devices
Pressure Before and After Pump Installation

Payback

System Components
- Gear Pump
- Variable speed drive package
  - AC or DC…1 HP/100PPH
- Support cart/frame
- Process adapters
- Control system
  - Discrete instruments, PLC or combination

Pump on Extruder with Controls and Drive

Standard Control System
Gear Pump with extruder and controller

Control Packages - Basic
**Extruder Types**

- **Single Screw** - Fair mixing, good pumping, questionable metering abilities
- **Counter rotating twin screw** - Good pumping, poor mixing
- **Co rotating twin screw** - Good mixing, poor pumping
For co-rotating multiple screw extruders, the pump offers advantages over the single screw devices as a pressure generator:

- Better metering accuracy
- Better energy efficiency - uses less than 50% of power compared to single screw
- Lower temperature rise
- Smaller footprint
- Lower investment cost

**Application**

**Typical applications of extrusion gear pumps**

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<th>Gear Pump</th>
<th>Pump Sizing/Selection</th>
<th>Typical System Pricing</th>
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This selection of pumps can depend on the operating conditions. Dry running should be avoided.

**Extrusion Pump Suppliers**

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<tr>
<th>Company</th>
<th>Gear Pump Products</th>
<th>Location</th>
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<tr>
<td>CBS International</td>
<td>Pump Systems, Static Mixers, Screen Changers</td>
<td>Charlotte, NC</td>
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<tr>
<td>Dynisco Extrusion</td>
<td>Pump Systems, Static Mixers, Screen Changers</td>
<td>Hickory, NC</td>
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<tr>
<td>Keycorp Engineering</td>
<td>Pump Systems, Static Mixers, Screen Changers</td>
<td>Lawrenceville, GA</td>
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<tr>
<td>PSI-Polymer Systems, Inc.</td>
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