

Melt Pump Design Tips

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Trouble-free operation of melt pump systems can be obtained by incorporating some of the following design features into the initial installation.

1. High melt pressure can damage melt pumps. The following can be done to protect the pump from over-pressure. To protect the pump from high discharge pressure due to a cold start up or other obstructions to the discharge, a pressure transducer should be located immediately downstream of the melt pump. Its pressure readout should be set up with dual alarms, the first to warn, the second to shut down the pump.

- To further protect against high pressure, rupture discs should be located immediately before and after the melt pump. Generally, a 3,000 psi (205 bar) disc before the pump and a 4,000 psi (275 bar) disc after the pump are used. Consult with your melt pump supplier to determine maximum operating limits.

2. Extruders using two stage screws may experience pressure fluctuations when operated under a broad range of bulk densities and screw speeds. This may require some additional design features to operate properly.

- Lowering the bulk density of the feed or changing to a polymer that is more difficult to melt can result in the second stage running with less than full flights. This results in random pressure changes and, if large enough, can confuse the pressure controller. Increasing the suction pressure may help, but the suction pressure should not be higher than the discharge pressure because a higher suction pressure will not allow the bearings to be properly lubricated. In this case, a pressure control valve installed before the melt pump can be used to build pressure, to keep the second stage screw flights full.
- When designing a valve, make sure the downstream bore diameter going into the pump is equal to the melt pump's inlet diameter for a minimum distance of 6" (150mm). A smaller bore close to the pump can result in starving the melt pump feed when running medium to high viscosity polymers.

3. In extreme cases, surges of polymer can overdrive the melt pump, resulting in an unstable output. The use of a regenerative drive will eliminate this possibility.

- Walt Virginski, Davis-Standard

See also:

- [Gear pumps - answers to questions](#)
- [More on gear pumps](#)
- [Performance of twin screw extruders](#)

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