

Extrusion Screw Wear

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Often when there is a sudden increase in a processors rate of screw wear the cause is related to a change in operating conditions. Some of the operating conditions that can accelerate screw wear are:

- **Increasing Screw Speed** — Screw speed affects wear in two ways. First, there is the additional number of revolutions in a given period of time. Secondly, the forces acting on the screw are increased which affect the conditions of loading between the screw flight and the barrel wall. These increasing forces cause more aggressive contact between the two components and hence increased wear on one or both surfaces.
- **Increasing Head Pressure** — Head pressure also affects screw wear in several ways. One of the most significant is a reduction in rate which requires greater screw speed to maintain output. At higher pressures, the effect of column pressure on the discharge end of the screw causes flexing of the screw about its axis resulting in greater and more localized contact forces between the screw flight and barrel wall.
- **Improper Barrel Temperature Settings** — If adequate barrel cooling is available, temperatures can be held so low that excessive screw wear results. This happens due to the effect that over cooling has on decreasing the melting rate there by essentially plugging the screw with solid polymer. When plugging occurs, the forces become extreme and greatly accelerated (if not catastrophic) wear will occur. A second effect of over cooling will be to reduce the normal barrel/screw flight clearance by not letting the barrel expand at the same rate as the screw.
- **Changes In Resin** — When the feeding, melting or pumping efficiency changes in the screw due to changes in the resin, screw wear may accelerate. Changes from lower to higher bulk density and decreasing melt index are the most likely causes of increased screw wear. Naturally, when using filled resins any change in the filler, how it's added or its quantity can have an effect. Preheat, or lack of it, can change the screw performance as well, and thereby affect wear life.

Although these are some of the most prevalent operating conditions affecting screw wear, there are others of a more subtle nature that are harder to detect. The main point is to only compare screw wear life under as near identical conditions as possible.

— Jim Franklin

See also:

- [Barrel and screw wear](#)
- [On/off barrel cooling control](#)
- [Screw and barrel wear](#)
- [Two stage extrusion](#)
- [Where's the wear](#)
- [Where's the wear? Part II](#)

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