

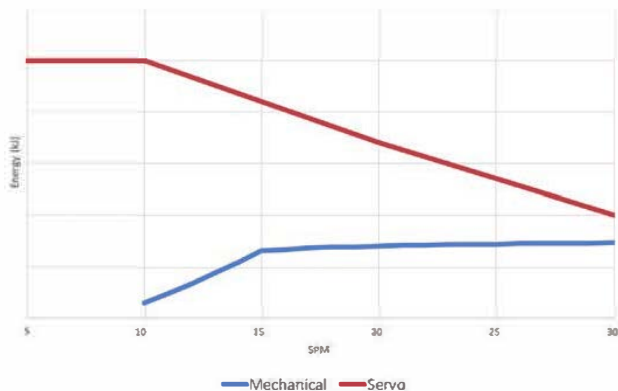
# Servo vs. Mechanical Presses: Understanding Available Tonnage and Energy



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## 1 How does available tonnage from a servo-drive press differ from that of a mechanical-drive press?

Since the motion of a servo press is programmable, some users wrongly believe that the tonnage available through the full stroke of the press is like that of a hydraulic press. However, servo presses have a mechanical drivetrain (eccentric gear or shaft); therefore, the tonnage curve basically will be the same as with a mechanical press. Stampers must review the press' tonnage curve vs. the specific applications in regard to loads higher in the stroke.



## 2 How does available energy relate to speed on a mechanical press?

The available energy of a mechanical press relates to the square of flywheel velocity. Typically, at one-half of the maximum press speed, available energy will begin to drop dramatically (as a square root of velocity). This is the “Achilles Heel” of a mechanical press drive, as applications that require lower speeds usually are deep draw and forming applications, which require higher energy for forming. As a result, the flywheel will begin to slow and eventually stall. Some stampers mistake this as lacking sufficient press tonnage, but in reality the application is exceeding the available energy at the current stroke rate.

## 3 How does available energy relate to speed on a servo press?

With a servo press, energy does not relate to press speed, since energy is not stored in a mechanical flywheel. Instead, a servo press draws energy either from the main line or from a separate energy-management system (EMS) that supplies the additional required energy for the application.

As press speed decreases, the available energy drops rapidly on a conventional mechanical press and increases with a servo press, as displayed on the accompanying graph.

## 4 What types of EMSs are available for servo presses?

As noted above, without an EMS, the stamper can establish oversized electrical service to the press and draw the required energy directly from the power grid (low initial investment/high operational cost). One type of EMS employs an external flywheel/flywheel-motor-based system that stores energy mechanically (similar to a mechanical press) and then is tapped for the additional energy required (medium initial investment/medium operational cost). The second option: a capacitor-based system that stores energy electrically from the main line and then is drawn to supplement the managed draw from the electrical supply (higher initial investment/low operational cost).

## 5 How can a stamper best evaluate EMSs from different suppliers?

Start by understanding which type of EMS is being offered and be sure to get apples-to-apples comparisons. Understand the total energystorage capacity of the EMS, the required main-line service to the press (the more robust the EMS, the lower the required service), and the preventive and long-term lifecycle of the EMS.