

PRESS DESIGN ELEMENTS THAT AFFECT MAINTAINING PARALLELISM UNDER OFF-CENTER LOADING



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What are the main press-design elements that affect maintaining press parallelism under off-center load conditions?

The two main press-design elements that counteract off-center loading through the forming stroke

are the connection points and the slide-guide systems. Both play an important role in maintaining parallelism throughout the entire working stroke—not just at bottom dead center—which is critical for consistent part quality and tool life.



How does the number and positioning of the slide-connection points affect parallelism?

Slide connections provide the best resistance to off-center loads. Typically, presses are designed with either one, two or four suspension points.

In general, presses will switch from one to two points when exceeding 1.5 m left-to-right, and from two to four points when exceeding 2 m front-to-back. While single-point presses, specifically gap-frame presses, are relied on extensively in the metal-stamping industry for smaller and less-complex tooling, two- and four-point presses provide an opportunity to center forming loads between connection points in larger progressive and transfer dies. This can reduce the negative effects of off-center loading. The distance between connection points is of major importance; the greater the distance between them, the greater the resistance the press will have to off-center loads. Wide connection spacing places much of the load between the points and eliminates "cantilevered" loads around one connection.



What are the different slide-guide systems available in the market?

Slide-guide systems typically are equipped with either four-, six- or eight-point guide surfaces. Historically, these guides have been fitted with bronze gib liners with recirculating lubrication as part of the press-lubrication system. Newer innovations include roller-guide systems, which eliminate the clearances and the lubrication required in a bronze gib liner system. Remember that die guideposts and bushings are meant to be used during construction, maintenance and setting of the die. They are not of sufficient size to act as the primary guiding system for a stamping operation and soon will need replacement if not supported by a good press slide-guide system.



Besides the number of points of slide guiding, what are other specifications of the guides that affect parallelism?

Off-center loads try to tip the slide and thereby exert increased pressure at the bottom of the guides on the incoming (high-load) side and the top of

the guides on the exit (low-load) side. To provide the greatest resistance, it is important to have decreased/zero clearance in the system. Additionally, increased distance between the top and bottom of the slide guides increases torsional resistance to the loads.



What are some features and benefits of roller-guide systems?

The benefit provided by a zero-clearance system is the resistance to off-center loads and improved part quality and tool life. Roller guides also eliminate press lubrication from the guide surfaces in the

die-space area. This results in the elimination of cross-contamination of the press and die lubricants. Elimination of cross-contamination can prevent significant press-maintenance issues including bearing and bushing failures. The elimination of lubrication used for slide-guide systems also can prove beneficial when stamping stainless steel, brushed and polished aluminum, and precoated materials, where contamination could result in costly scrapped parts.