



MULTI-TIP TOOLING: A GUIDE

In this piece, Dale Natoli, Vice-President, Natoli Engineering Company, Inc, provides a brief overview of multi-tip tooling for tablet presses, and provides some guidelines for selecting the most appropriate equipment.

Multi-tip tooling isn't new to the pharmaceutical industry; the unique tool configuration has been used for more than 150 years. At the start of the tablet compression industry, single-station tablet presses were used in production and were commonly outfitted with multi-tip tooling to increase tablet production and reduce labour, maintenance, energy, space requirements and the number of presses. When the high-speed 16-station rotary tablet press was introduced in the late 1800s, the single-station press and multi-tip tooling lost popularity.

Soon after the introduction of the rotary tablet press, the industrial, confectionery, and food industries implemented multi-tip tooling, and today the pharmaceutical industry is following suit.

Multi-tip tooling is available in two common configurations: assembly (or multi-piece), and solid. When choosing the configuration, consider the tool type, tablet size, and the number of tips per punch. Also consider tool handling practices, cleaning, and inspection. The supplier will help you decide which configuration is best. Most tooling suppliers have selection guidelines for each tool type.

The assembly configuration consists of the punch body, cap, and individual punch tips (see Figure 1). The biggest advantage of the assembly is the removable punch tips. If one of the punch tips is damaged, it can easily be replaced so the punch can return to service. If a punch tip on the solid configuration (Figure 2) is damaged, the entire tool must be replaced, which is costly.

Cleaning and sanitising the assembly configuration requires disassembling the punch tips from the punch body, cleaning and drying each component, and reassembling. Although reassembly should be quick and easy, if any of the mating parts become damaged or even nicked, or if a slight amount of debris or corrosion interferes, the punch tips won't align. If the punch tips don't align properly and the punch is returned to service, the tooling may fail prematurely or damage the press.

The solid multi-tip configuration (Figure 2), which is machined from a single piece, is becoming more popular. It requires no disassembly for cleaning, eliminating reassembly and ensuring proper alignment of punch tips in the die. However, it allows fewer punch tips in relation to tablet size.

Before investing in multi-tip tooling, verify that your tablet press has turret punch guides and die sockets that are in good condition, with no excessive wear. Worn guides and/or worn die pockets can create punch-tip misalignment, which in turn causes premature tip wear, excessive head and cam wear, and tool binding in the punch guide and tip binding in the die. You can easily check the condition of the turret with a turret inspection kit, which is available from most tooling manufacturers. Inspect the turret for wear periodically, regardless whether single-tip or multi-tip tools are used. Inspection will alert you to premature tool wear and tooling failure.

For tablet presses with tablet rejection systems, many companies use validation punches, which are identical to the other punches except for a slight deviation in their working and overall lengths. The validation punch verifies the operation of the reject system by producing tablets of different hardness, thickness, and weight. While some pharmaceutical companies are turning to multi-tip tooling, other companies are more reticent, investigating the effect on product flow, compression and ejection forces, and tablet reject systems, among others.

But multi-tip tooling can definitely pay off. For example, a US pharmaceutical company I worked with produced approximately 8,540 pellets per minute using single-tip tooling. When they switched to nine-tip tooling, production reached approximately 76,860 pellets per minute. That's an 800 percent increase without additional personnel or equipment!

Is your product a candidate for multi-tip tooling? Check with your supplier. In today's economy, increasing tablet production while cutting operating costs is especially attractive.

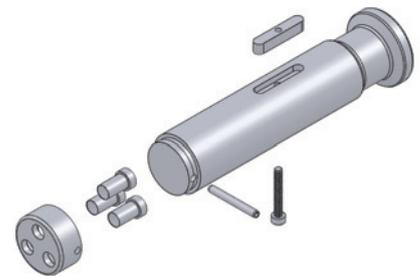


Figure 1: Assembly configuration comprising the punch body, cap, and individual punch tips.



Figure 2: Solid configuration, machined from a single piece.



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