The perfect tablet, if such a thing exists, originates in the development lab and terminates on the tablet press. That’s where I work, so I focus on compressing the best tablet possible. How is that done? Well, ask 10 people you’ll get 20 different answers, and they could all be correct because we all rely on our experience, what’s worked for us.

Plus, each tablet press works differently and each formulation—even each batch—is unique. As a result, what worked during a previous batch sometimes doesn’t work on the next. What follows is a brief description of what has worked for me in terms of finding the right compression force and adjusting tablet ejection.

**Pre-compression**

I always start by adjusting the press to obtain the target weight. Once the press is reliably producing tablets at the target weight, I focus on the pre-compression force. To start, I remove all the main compression force so that the upper punches are not entering the die. If your press can measure pre-compression force, begin by setting it to 1.0 kilonewton (kN). If your press doesn’t display the pre-compression force, then adjust the pre-compression roller so that it makes a formed tablet. This formed tablet should easily break apart when you rub it lightly between your finger and thumb. If you don’t get that kind of tablet, increase or decrease the pre-compression force until you do.

**Main compression**

You can now adjust the main compression force until you achieve the tablet hardness specified in the batch record. As you do so, keep in mind that any change to the press speed will require you to also adjust the pre-compression force. It’s important to get this right because, when optimized, pre-compression will force interstitial air from the formulation, defusing it around the band before it reaches main compression. Without proper pre-compression, the air gets trapped and will often migrate to the face of the tablet, which causes it to become the weakest part of the tablet. That can lead to picking and sticking (as can a number of other factors). Trapped air can also lead to trouble during tablet ejection.

**If tablet ejection is set properly, there should be no need to use a vibrator on the chute.**

**Ejection**

Optimized tablet ejection reduces damage to tablets, decreases backups on the turret, and helps tablets cleanly slide down the ejection chute. The goal is to minimize any resistance when the tablet is ejected. Even a slight loss of velocity during ejection can have a negative effect.

Here’s my approach: Install the lower tooling to extend above the die table at the ejection site. Some presses allow this to be done easily, and others require shims. Set the punch tip to extend approximately 1 millimeter above the die table, 1.5 to 2.0 millimeters for larger tablets. Next, set the take-off arm so that it clears the height of the extended tooling by approximately 1.0 millimeter. In this way, the arm will slightly lift—not push—the tablet from the die. (Pushing it increases the risk of tablet damage, especially if there is air trapped in the face of the tablet.)

The last step is to fine-tune the angle of the take-off arm. Not all presses have adjustable take-off arms, but when they do and I’m making a large tablet, I set the take-off arm as close to perpendicular to the turret as possible. This lifts the tablet out of the die and quickly sends it down the chute. It decreases the likelihood that the tablets will collide and cause problems. For small tablets, I do the opposite. I adjust the take-off arm to an oblique angle so that it slowly sweeps the tablets off the die table. This causes the tablets to form a single line that steadily feeds from the press. If tablet ejection is set properly, I have not needed to use air assistance or a mechanical vibrator on the chute. My methods may or may not work for you and your specific situation. I welcome your questions and suggestions.

**Bill Maschinot, an independent consultant, has held a variety of positions at several pharmaceutical companies, primarily in manufacturing solid dosage forms as a Six Sigma black belt, process engineer, process scientist, equipment maintenance engineer, and manufacturing manager. Tel. 937 545 9821. E-mail: maschinot@gmail.com.**