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## Ten tips on troubleshooting tableting

When things go wrong in the compression department, they can go wrong very quickly. Identifying the root cause can be difficult unless certain things have been done upfront.

**1.** Inspect the working length of each set of tooling and maintain very close tolerances. New tooling varies by as much as 0.002 inch (0.05 millimeter), and any greater variation may cause or exacerbate weight, thickness, hardness, and friability problems. Match the working lengths of the upper and lower punches to balance the compression forces. For example, a long upper should be matched with a short lower.

**2.** Inspect dies for wear rings, and note that dies wear at different rates than the punches. Install dies so they all face the same direction and they wear at the same rate. Then turn them all over to double their life expectancy.

**3.** Set punch penetration as high in the die as possible. That allows air to release more quickly during compression, which improves hardness and reduces the chance of sticking.

**4.** Replace lubricant on the press after cleaning, which strips lubricant from the die table and tooling. Think of the lubricant as a mold-release agent, kind of like butter or cooking spray in a fry pan. If you forget to add it, the food will stick. Thus, season the press and tooling by rubbing the lubricant over the die table and punch cups before introducing the powder. Any excess lubricant will be eliminated in the first few revolutions of the press and be used up in tablets that you normally rejected anyway.

**5.** Replace the scraper blade as needed. It must scrape filled dies evenly, as weight control becomes impossible when the scraper is worn.

**6.** Know when the product was blended. With few exceptions, freshly blended powders cannot be tableted because they're too "fluid." Let the powder settle for several hours. On the other hand, don't let the powder get "stale" by settling too much. Sometimes, even 5 days is too long. Most, but not all, powder blends have a window when they are best tableted. Start tracking press performance and blend age for each of your formulas to discover the optimal range. Often, the window ranges from 1 to 4 days.

**7.** Lubricate the punches properly to prevent most black specks from appearing in your tablets. Many modern presses lubricate automatically as they operate. Yet some batches are dustier than others, and that may not suffice. Some operators can hear when the press is running harder from handling drier, finer powders. Monitor the punches and adjust the frequency of punch lubrication for each batch. Don't change the timing. Instead, activate or override the lubricant cycle based on the amount of fine dust you encounter.

**8.** Check weight control accuracy first when you encounter problems or defects (hardness, thickness, friability, capping, laminating, splitting, or sticking). Also, stop taking average weights and begin taking many samples to observe the actual variation. Slightly reducing weight (fill volume) reduces tablet hardness and vice versa. The greater the variation

in tablet weights, the greater the likelihood of one or more of these defects.

**9.** Reduce press speed to improve tablet weight, hardness, capping, lamination, friability, and sticking. If there is no change, then powder compressibility is in question, not the press. After all, if you cannot make great tablets at slow speed, why try to make them at higher speed? You risk compromising the entire batch.

**10.** Understand how to use pre-compression. Usually, it is best to start with low-force pre-compression and gradually increase it as you study tablet quality. Too many operators tend to over-compress at pre-compression, which can cause capping, lamination, sticking, and picking.

In our business, no batch is ever identical to another, so eliminate variation wherever you can, be it in raw materials, punch working length, setup, cleaning, or lubrication. T&C

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