

# Applications for semi-automatic counter-fillers

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When it comes to tablet counting and bottle filling, sometimes smaller is better. No, this is not an economic doomsday article, and it is not about cutting your way to profitability. Rather, it describes semi-automatic counter-fillers and outlines their application.

Tablet counters aren't new. My company, for instance, began offering them when Nixon was in office. At that time and up until the late 1990s, most small tablet counters used light bulbs to shine a beam of light onto a photo sensor. When a tablet broke the beam, the device registered a count. But if two tablets passed through the beam simultaneously, the device could not differentiate them and counted only one tablet. The accuracy of those machines was less than 95 percent, but today's machines offer higher accuracy, are easier to use, operate more reliably, and perform additional functions. Some use panoramic optical sensors that "see" individual tablets better than ever. They also recognize fragments and chips and do not include them in the total count.

So where do semi-automatic counter-fillers fit in today? Almost anywhere tablets or capsules are packaged or counted by hand. Many times they work in tandem with full-scale filling lines. Applications include

1. Performing quality checks on the packaging line or in the R&D lab
2. Conducting inventory counts
3. Filling bottles in small- to medium-capacity operations, where a full-scale production line is impractical
4. Finishing off a bottling run from an automatic filling line
5. Packaging clinical trial materials.

The next sections discuss how the equipment functions in these applications.



This inexpensive, simple counter-filler handles all tablet shapes and sizes and operates at 15 to 18 tablets per second.

## Quality checks on the packaging line or in the R&D lab

Use a tablet counter to eliminate hand-counting. No matter whether you use a counting tray and spatula or a peg board, hand-counting is inherently inaccurate. A 2004 study found that hand-counting in which a counting tray and spatula were used is 95 percent accurate at best [1]. And that is under satisfactory conditions. When you factor in sub-standard lighting, distractions, and a heavy workload, that accuracy rate drops precipitously. A tablet counter, on the other hand, is nearly 100 percent accurate. It counts any size or shape of tablet or capsule. You just pour the bottle's contents into the hopper and, as they drop past an optical sensor, they're counted. Many tablet counters are small enough to be carted around the facility and are inexpensive enough to be placed near every bottling line. I know of one West Coast manufacturer of dietary supplements that compared hand-counting to semi-automatic machine counting. Hand-counting

100-count bottles resulted in inaccuracy as high as five capsules per bottle. Plus, hand-counting took more than 15 seconds longer than using the counter.

## Inventory counts

Using a tablet counter instead of hand-counting to conduct inventory checks allows a technician to multi-task while the machine works. This will shave hours or even days off the time you normally must devote to checking inventory; it will also relieve you of tedium and miscounts. One retail pharmacy chain in the Midwest sought to verify the benefits of tablet counters by comparing the results of two inventory checks. At one of the stores, two technicians hand-counted with a tray and spatula. The task took 32 man-hours. At the other pharmacy, two technicians used a semi-automatic counter-filler, and the job took only 8 man-hours.

## Low- to mid-volume bottling

Contract manufacturers often decline small-run business because they can't afford to disrupt their automated production lines. That's where a counter-filler with a capacity of 50 to 2,000 bottles per day can help. These machines are also ideal for clinical trial materials and other low-volume applications. Most of them handle any size and shape tablet, capsule, or gelcap and do not require calibration or change parts when switching products. Cleaning between runs on these simple machines takes less than 5 minutes. One West Coast contract manufacturer that routinely refused low-volume contracts installed a semi-automatic counter-filler and completed three low-volume contracts in 2008-2009.

## Finishing a bottling run

At the end of a bottling run in which an automatic slat filler is used, tablets or capsules may remain in the slats or elsewhere on the filling line.

Using a semi-automatic counter-filler, you can fill the remainders into bottles quickly and efficiently, eliminating waste and ensuring accuracy. A New England pharmaceutical manufacturer keeps a semi-automatic counter-filler at the end of its three slat filler lines. According to the company's quality officer, those machines reduce end-of-run bottling time by half compared to hand-counting. The quality officer also reports that count accuracy is 99.97 percent or better, which translates into three or fewer errors per 10,000.

### Clinical trial materials

Clinical trial organizations (CTOs) or contract manufacturers of clinical trial materials face the challenge of accurately and economically filling hundreds to thousands of vials. This is an ideal application for semi-automatic counter-fillers, which may enable CTOs to take on larger projects, such as those typically required for Phase I, II, or III trials. The machines also enable CTOs to verify the number of doses remaining in each patient's allotment during regular checkups or when patients drop out of the trial. One Midwest CTO expanded into Phase II trial preparation after it installed two semi-automatic counter-fillers, something it could not have done without that equipment.

### Additional information

Semi-automatic counter-fillers eliminate the inherent inaccuracy of hand-counting at a low price. A check-counter costs less than \$6,000, and machines that count and fill 800 to 1,900 tablets per minute cost \$8,000 to \$15,000. Plus, many counter-fillers have a very small footprint, less than 1.5 square feet. They rarely require facility remodeling, and they are frequently light enough to be wheeled around on carts to serve more than one filling line. Startup is quick, too, with no special wiring or other connections. They plug into standard electrical outlets. You can take them out of the box and begin working in less than 10 minutes. The machines clean in minutes using alcohol and water, and no calibration is required



This adjustable-speed counter-filler handles as many as 1,920 tablets or capsules per minute and is suitable for packaging and batch verification applications.

when changing to different sizes and shapes of tablets and capsules.

### What to look for

Here are some suggestions for selecting a semi-automatic counter-filler. The machine should have

- Counting accuracy of 99 percent or better
- Few or no moving parts. The less complex the device, the less chance of breakdown.
- Cleanup that requires only soapy water or isopropyl alcohol (not mandatory private-label cleaners)
- Cleanup that takes 5 minutes.

Beware of used devices, which usually come without a warranty. They may also be missing parts, accessories, or operating manuals. Plus, since accuracy is essential, the better option is a new or refurbished unit that carries the manufacturer's warranty. Likewise, beware of old devices that use outdated technology. Counter-fillers that use a light bulb or visible light beam to sense tablets are inherently inaccurate. You may also want to buy an annual ser-

vice contract, which offers peace of mind at a low price.

Finally, ask the manufacturers whether a trial machine is available. Some manufacturers will lend them for 1 or 2 weeks so you can see how well they work for your application. In most cases, the results are positive: faster production, fewer errors, and less labor. In some applications, semi-automatic counter-fillers pay for themselves in a few months. T&C

### Reference

1. "Automating the prescription filling and work flow process," The ThomsenGroup, Kansas City, MO, 2004.

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