When The Blister Pack Works Too Well . .

What's A Customer To Do?

Maintaining capsule integrity is an important requirement for established pharmaceutical manufacturers who want happy customers. Ensuring delivery of capsules and tablets to the recipient in tact and good condition is a primary concern. Consumers, however, know from experience that some tablets and capsules can be difficult to extract from the blister pack. Is this a manufacturing problem? Or has R&D neglected to implement a fool proof test methodology for evaluating tablet and capsule removal from the blister pack? Chances are that protection during shipment was the overriding objective for the manufacturer's engineering team. The challenge of extracting the tablet or capsule from the blister pack may have been overlooked.

How does a manufacturer test for extraction of a tablet or capsule from the blister pack? You can use human testers and base design decisions on their subjective judgment. However, you will need testers of different ages to assess the variety of tablets and capsules that pertain to children, teens, adults, senior citizens, etc. It may even make sense to consider male vs. female strength and the relative dexterity and agility of each sex.

Compression testing with a Texture Analyzer (see Figure 1), an axial load measurement instrument, provides a useful technical approach that can be used to simulate the extraction process. Using a probe shaped like the human finger, the Texture Analyzer can push the tablet or capsule out of its pack and quantify precisely the amount of force needed for extracting the item. Movement of the probe at different rates of travel can simulate end users who range from slow and deliberate in their extraction effort to those who are quick and like to punch out tablets and capsules as rapidly as possible.

Figure 1 shows a typical Texture Analyzer which has the capability to test materials in compression or tension. In the case of the blister pack, the test approach is to measure the force needed to push the protective blister housing down onto the tablet or capsule and then penetrate the tablet or capsule through the bottom substrate that seals the blister to the package. This test is straightforward to set up using the special purpose fixture shown in Figure 2. The capsule or tablet sits atop a pillar with a hole underneath. As the probe makes contact, the plastic housing collapses and the content inside the blister is pushed out the hole underneath.

Figure 1: Brookfield CT3 Texture Analyzer

Figure 2: Blister Pack Support Fixture Used for Tablet/Capsule Extraction Test

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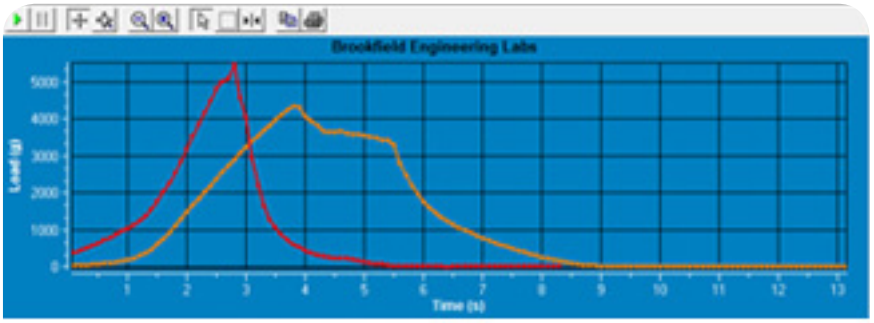
Figure 3 shows a graph for two different extraction tests. The purpose is to illustrate the variable range of forces for achieving removal of different size tablets and capsules, depending on the blister design. The graph shows force vs. time as the finger probe makes contact with the housing and pushes the tablet out the bottom. Note that the force increases gradually to a maximum value, then decreases as the blister collapses. Data Set #1 characterizes a tablet which has a blister that fits closely around it, while Data Set #2 has a larger and looser fitting blister.

There is a longer time interval in Data Set #2 that the force is applied while the blister collapses before it makes contact with the tablet and pushes it through the substrate. In both cases, once the substrate is penetrated, the force drops off to zero and the tablet drops out the bottom. The observation is that a tightly designed blister which fits snugly around the tablet may require a slightly higher force for the extraction process, but a significantly lower time interval. In addition, the overall amount of work to extract the tablet is less.

Based on this test information, tablet and capsule manufacturers can work with packaging companies to refine specifications for blister design to better suit end user needs for easy removal.

Figure 3: Graph Shows Extraction Force Curve for Removal of Capsule from Blister Pack.



Data Set #1 Low Profile Blister Design
Data Set #2 High Profile Blister Design

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