How Strong Is Your Blister Pack?

Allergy Medications

Most of us living in the Northeast are eager to put away snow shovels for gardening tools. However, not everyone welcomes spring as this brings other kinds of problems. For some individuals, spring means itchy eyes, sneezing, and a runny nose from an allergic reaction to pollen. To make matters worse, some allergy medications in blister packs can be difficult and frustrating to open. Sore fingers can result if the blister pack is too hard to break and the pill might accidentally end up on the floor when it finally pops out, sometimes getting stepped on and crushed in the process.

As blister packages for pharmaceutical drugs become more popular because of their many benefits, such as protecting drugs over long shelf-life, portability, and being tamper resistant, we wish this packaging was easier to open. Some blister packs require more force to open than others, even though they are in the same box! It would be helpful if these blister packs were manufactured with consistency, such that the force/load required to pop the pill out for consumption was always the same. Therefore, measuring the required force to push the tablet or capsule out of a blister pack is a necessary QC test method.

Now, manufacturers can use a physical test instrument, like the Brookfield CT3 Analyzer, to develop and qualify blister pack strength that meets customer needs. It must be strong enough to withstand rupture during shipping/distribution, while providing easy extraction by adults and remaining significantly difficult for young children to open. The CT3 Tester with Blister Pack Support Fixture (TA-BPS) utilizes a compression test that takes the guesswork out of packaging design and gives quality control the necessary tool to guarantee compliance with R&D specifications.

The TA-BPS is a device designed to measure the force required to push a tablet or capsule out through the foil side of a blister pack. The blister pack containing the tablet is placed foil side down on the TA-BPS base. Then the ½ inch radius Finger Probe, simulating a human finger, is driven down onto the tablet at a constant rate of speed, forcing it out through the foil. This process mimics a person extracting a tablet or capsule from the blister pack.

The primary information from this test is the peak load, which is the maximum force recorded during the probe descent on the packaging. This is an indication of “hardness” or resistance; the higher the value, the harder the foil or “cardboard” side of the blister pack, which means it requires more finger force to push the pill out. The other important data point is the “work done” value, calculated in milli-joules, which quantifies the work performed by the instrument extracting the tablet from the blister pack. It gives an objective value for the effort required to deform or overcome the strength of the blister pack.

The graph in Figure 1 shows the blister pack for a soft gel capsule and a hard tablet responded differently during the test with the CT3 Analyzer, fitted with a finger probe. The blister pack for the hard tablet registered a higher peak load than the soft gel capsule. A higher peak load means...
users need to use more force to push the tablet through the blister pack. The higher the force to expel the tablet from the blister pack, the harder the packaging material.

The testing described above is quick, easy, repeatable, and clearly detects different forces to open the blister pack samples. Similar testing can also be used to quantify the rupture strength, resilience, and relaxation properties of thin films and similar products. The ability to measure packaging strength that correlates to human sensory perception makes the CT3 Analyzer an important tool in quality control for establishing and maintaining product consistency. Customer satisfaction depends no longer on just tablet/capsule color and attractive packaging, but also on the protection afforded and ease of extraction. All of these physical properties make the product stand out in the competitive market.

FIGURE 1: Comparing forces required to extract a hard tablet and a soft gel capsule from a blister pack