



Panel Sink Issues in Blow Molded Plastic Bottles

It can occur on any shape of bottle - rounds, squares, oblongs and ovals. There are several possible causes as to why this may happen to your package. There are two categories I will put this defect in, the pre-fill and the post-fill.

In the pre-fill category, meaning the bottles have been made by the supplier and have yet to be decorated or filled, three issues come to mind that can cause paneling. One, the bottle design, in some cases the shape of the bottle causes the panel to very close to flat. Having little to no panel radius to begin with can make it difficult to obtain a flat panel in molding. Typically you see this in large bottles with a big panel and squares, where the look is to be flat.

Two, wall distribution. In some instances while extrusion blowmolding the bottle, it can have a thicker section of plastic run down the panel. This causes shrink at this location more than other locations in the panel. The thicker section of plastic takes longer to cool, and plastic will continue to shrink while hot. This is a process problem that the molder can most times correct.

Three, carton packing. When bottles are still hot from the molding process they continue to shrink. If the cartons are being packed with these warm bottles, particularly if they are tumble packed, the carton can obtain some residual heat. The combination of heat and pressure from the bottles being placed on one another sometimes can cause adverse effects to the bottle panel. Oblongs and ovals are typically more at risk here.

Now the post-fill category, meaning after decoration and filling are complete. Again, three items as well jump out at me. First, hot filled packages. When a package is hot filled and then capped immediately, as the package cools a vacuum can form inside the bottle. If the vacuum is strong enough to overcome the panel, the result is sink. This may be corrected in a few ways. Adding plastic to the bottle to make the package more rigid has been known to be successful, although it does add cost. Another possible solution is venting the package, and in some cases achieves the same result. By venting I mean using a particular type of liner in the closure to allow the pressure inside the bottle to equal the outside environment it is in. Now the customer would need to do testing of the liner with their product to be sure it functioned as intended and work with their product on a compatibility level.

Second, compatibility. Some products have a tendency to want to egress through the wall of a bottle as time goes on. When this occurs, the removal or evaporation of some of the product's ingredients causes a vacuum to develop inside the package, thus the panel sink. Possible solutions may be as we described in the first issue.

Lastly, oxygen scavenging. When a bottle is filled there is usually some head space left above the product. Some products naturally consume oxygen, when this occurs the product takes the oxygen from the head space, thus pulling again a vacuum inside the bottle. In this case, a possible solution may be to use a post-filling nitrogen purge on top of the product prior to capping. Now some products may have to use other inert gases for the purge, but removing the oxygen above the product level is the main idea here. Also adding plastic to the package in some cases could result in improvement as well.