MI INDUSTRIES

PANELING
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Rigid Packaging Failure 201
PANELING - CAUSES AND CORRECTION

By Mike Mercatante

What is paneling?

When the pressure inside a bottle is lower than the ambient pressure, it creates a vacuum which can then cause the bottle to collapse in on itself. This phenomenon is also known as paneling and creates a whole host of problems.

What causes paneling?

There are many instigators of paneling. Here are a few:

1. Ingredients in the bottle.

- Products containing essential oils are naturally aromatic and very potent, making them popular in today's market. But they also eat up oxygen in bottle, causing it to panel.
- Orange/citrus cleaners are extremely effective on grease and have a nice scent, but also scavenge oxygen, which can create a paneling effect.
- Highly concentrated cleaning formulas sometimes create negative pressure in their container, which then will contract.
- Some industrial cleaners contain very strong and highly concentrated chemicals that consume oxygen, resulting in collapsing of the container.
- Automotive products such as biodiesels, motor oil, and engine cleaners can scavenge oxygen as well, creating an ideal environment for package failure.

2. Environmental Issues

Altitude: When a product is bottled in a mountainous region and shipped to a lower altitude, it can contract.

Temperature: Similarly, when a product is bottled in a hot location and shipped to a cooler one, the molecules in the bottle contract, which creates negative pressure.

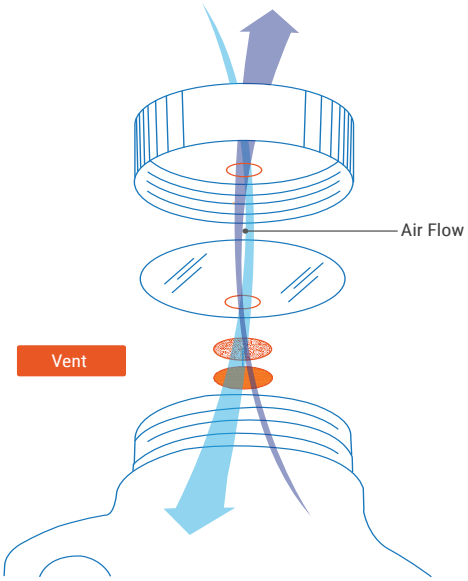
3. E-commerce

Products that are shipped via air transportation are particularly susceptible to packaging failure since they often undergo sudden and extreme altitude and temperature changes. Containers that previously never experienced packaging problems are now being affected because of e-commerce – in fact, 20% of all e-commerce purchases are returned due to package damage.

4. Hotfilling

This is a common filling method for viscous liquids such as shampoos, conditioners, and soaps.

But if the bottle is capped before it's sufficiently cooled, paneling can occur.



To discover more about package failure and how to correct it, contact the venting experts at M Industries at www.mindustries.com or 616.682.4642.

Why is paneling so bad?

- First and foremost, if your bottle looks bad, it's a negative reflection on your company and your brand.
- Your package is meant to contain, protect and communicate its contents. Paneling can compromise any and/or all of those objectives.
- A label can pull away from a paneled bottle, or even fall off. If this happens, at best your product's information is unreadable and at worst, the product itself is effectively rendered useless.
- Increased returns – No one wants a bottle that looks distorted or as if it's been tampered. At the shipping dock, if only one case on a pallet has failed (or even one bottle in that one case), the entire skid will often be rejected. E-commerce returns are costly and a huge hassle as well. Replacing an e-commerce product that has been returned due to damage costs on average 17 times more than shipping the original.
- Leaks – if the product collapses enough due to lack of oxygen, the contents can leak out. This creates its own set of problems, including costly cleanup, returns, contamination to the environment and even potential harm to the handler/user.
- Increased expenses, reduced revenue, and reduced profits – this all leads to lower bottom line for your company.

Don't let it happen to your product.

What not to do.

There are various ways to prevent paneling, but all have their downside
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- Fluorinate. This process is extremely expensive and not always effective. In fact, fluorination can cost up to ten times more than venting.
- Add resin to bottle. However, a thicker walled bottle is counter to every environmental effort to reduce plastics usage. It also usually requires retooling and/or bottle redesign - which has huge time and cost implications, and obviously necessitates more raw material, which also raises the cost.
- Reformulate or dilute. But this lessens the effectiveness of your product and lowers the effective ingredient to package ratio. It also increases costs to you and reduces the value to your customer.
- Tape caps and double bag bottles for e-commerce. This may (but doesn't necessarily) reduce leakage and/or contamination but doesn't prevent bloating. And it reflects poorly on your brand image.

What Is Venting?

It is the most effective and affordable method of preventing paneling and package failure!

- Rather than fight the natural process of the effects of your ingredients or environment, go with the flow by allowing your bottle to breathe via an M Industries vented liner in the cap. Our vented liners are made with the best materials and the most intelligent and effective manufacturing processes in the industry. And we work alongside our customers to determine the precise type and amount of venting needed for their particular contents, bottles and closures... to ensure exactly the correct amount of airflow for every product.