klöckner pentaplast
tips&tricks

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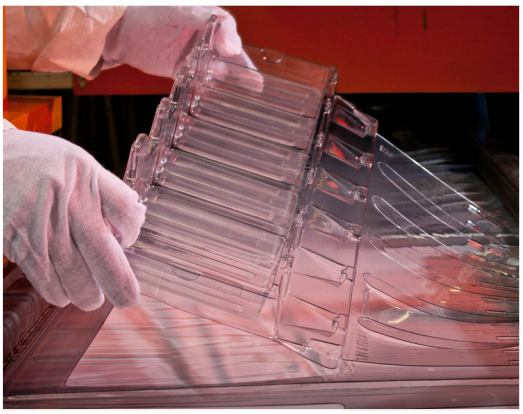
DOWN GAUGING – POSITIVES AND PITFALLS

New product package designs often require quick development for a launch. Due to the resultant time crunch, initial studies of the minimum thickness of thermoform material needed to meet the toughness and rigidity requirements of the distribution cycle are frequently bypassed. Consequently, the decision to use some sort of safety factor in extra thickness is not uncommon when the time from design-to-launch is compressed. Whenever this is the case, it creates a natural cost savings potential post launch, even when that comes a year or two later. In this edition of Tips and Tricks we will review the most obvious benefits of such a move and some tricks on how to manage the process, while pointing out some of the pitfalls to be avoided. We will treat positives as tips and pitfalls (or how to avoid them) as tricks.



tip 1:

Down gauge benefits are generally one for one with material thickness reduction. For example, if you reduce thickness by 10% or 15%, you will have reduced the material weight and cost by the same percentage. And while this will not reduce your machine time or labor by the same percentage, you will likely see some benefits there as well which we will cover in a later section of this brief.

tip 2:

Once the decision is made to down gauge, a good starting point and minimum target for thickness reduction is 10%, as this amount of reduction should make the effort worthwhile economically. Equally important, a minimum 10% reduction in package weight is one of the compliance options if the package in question requires compliance with the California Rigid Plastic Packaging Container (RPPC) regulations. Full package performance should keep focus on product integrity and security throughout the distribution cycle from the day of manufacture to the day the consumer opens the package. No one wants a "Good packaging idea gone wrong song" in the market place unless you're a starving songwriter at a Nashville SPE Thermoforming Conference.

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tip 3:

Reduced material thickness means you will have less film mass to pre-heat and less formed part mass to chill. So run a DOE to optimize and improve cycle times, while checking for and assuring that part stress is not negatively affected. This should bring down overall machine time and the labor to run it. Also remember to run trials at the end of a standard production run so that you can minimize additional machine set up time for running tests.

trick 1:

If you are making a flanged blister that will have to seal on auto fed lines, rigidity of the flange and thickness consistency around the flange will be key limiting factors. Understand your minimum flange thickness needed for both feeding and the seal. If this becomes a problem on your formed parts, consider altered package or tooling designs that deliver more material to the flange and/or sidewalls. This option will be most viable if you already have excess material in the base of the cavity, as is often the case when using male tools. Excess material in one area can usually be moved elsewhere in the part with plug and or form tool modifications. Remember that these are one time tooling modification costs, which bring permanent material cost savings.

trick 2:

Snap locks are either defined by the tool (male tools) or by the film thickness (female tools) and in many tooling layouts, by both. Whether using a round peg in a square hole or negative draft corner locking mechanisms (hinged or not), fit is the key function and down gauging will throw off the original tolerances. Determine the material loss where the film defines the snap tolerance as it is shaped on the tool, and consider tooling modifications to compensate once you confirm the thickness reduction was too great to allow a tight snap feature. On tools where the tool defines the snap tolerance, the main test will be to ensure that both round peg and square hole retain sufficient rigidity to perform the snap locking function.

trick 3:

Sidewall thickness will be reduced which may cause either flimsy sidewalls or even blowouts while forming, especially on deeper parts. In some cases, ribbing may be allowed which can help sidewall rigidity with relatively minor tooling modifications. On female tools, where the film defines the inner product fit, milling ribs into the tool may be possible if back drilling for temperature control water or air channels are not too close to the surface. Ribs should ideally not be so significant that they make the product fit too loose in the cavity. If using ribs when working with male tooling, a new tool may be required, as the rib peaks will define the new product cavity, thereby reducing the interior product space and causing a forced fit (if the product even still fits in the cavity). If the product is a high volume

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item, a new tool may still be worthwhile, as the goal is permanent material savings. Sidewall rigidity may also simply be managed by plug material, shape and timing. So if ribs are not an option, the forming process may still allow desired down gauging while maintaining sufficient formed part rigidity.

ACCOUNTING TRICKS:

As you calculate your savings, remember that your trim skeleton is now 10% lighter than before, so your reclaim or regrind revenue stream will drop directly by the down gauge percentage. Since trim percentage is normally in the 20 to 30% range if you are not forming rounds, overall savings of the full web width will much more than make up for the slight loss (i.e.10%) in reclaim sales revenue. Example: 10% thickness/ weight reduction with 30% reclaim = 3% of original material weight. If we assign a value of roughly 35% of the prime film, the effect this has on the original 10% gauge reduction savings is about 1% unfavorable, or an overall material cost savings of 9%, before assessing machine and labor savings.

The long and the short of it is that down gauge efforts are worthwhile especially on long run jobs where the savings in pounds add up. Whether it helps you meet regulatory compliance options for the California RPPC laws or not, it will certainly help you be more competitive and meet your cost-out goals.

SUMMARY:

Know the tips and try the tricks!

Future topics TIPS & TRICKS will address:

- Part design and material selection
- Draw ratios and draft angles

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