



Cycletime Tips - General

Volume 45: Uniform Nominal Wall

One of the most important criteria in designing a plastic part is establishing and maintaining a uniform wall thickness throughout the entire part. Our part designers are taught that uniform walls must be maintained to insure consistent shrinkage to prevent stress and warpage. However, in our automotive arena, this rule is often overlooked. Our job in technical service is to stress to our customers that part design rules must be adhered to in order to achieve optimum physical properties within the molded part.

In my day-to-day travels while troubleshooting issues relating to part failure and warpage; the answer often points to failure in maintaining the basic rule of uniform wall thickness. Designing parts in this fashion produces parts that will fail during assembly or may disappoint in the field. Both of these scenarios will have a cost associated with them.

Some of the effects of designing non-uniform walls can be traced to surface defects, weak areas, and differential shrinkage creating warp. Exceeding recommended wall thickness-to-projection ratios on semicrystalline or amorphous materials can create internal voids and this affect will greatly reduce the strength of the part. Weld line strength can also be affected by non-uniform walls. Especially when the weld line exists in the thinner area of the part. Interruption of the flow and the inability to deliver pressure to the flow front in this area can hamper the strength of the area where the flow fronts collide.

Before the steel is cut we suggest that all design prints be reviewed to see that all plastic design rules are met especially as it pertains to uniform wall thickness. Every individual attending the meeting has a responsibility, whether it be projections, radii, nominal wall, etc. This will help in making the notation of design deficiencies second nature to the engineer. Remember, as the custom molder, you are forced to defy proven laws surrounding thermoplastic part design in order to produce an acceptable part. In reality, you have failed because you are using materials and methods that are inefficient when compared to the ideally designed part.