5 MYTHS ABOUT PLASTIC INJECTION MOULDED PARTS

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There are some common, frequently heard myths about plastic injection moulded parts. This whitepaper will discuss some of these myths and what the actual situation is about these issues, based on many years of experience with plastics.

Myth #1

"If I get cosmetic defects on the parts like sink or weldlines or splay, I can hide them by texturing the mould."

Reality - in many cases texturing will actually make these defects more visible especially on light coloured parts viewed at low angles to the part surface in bright light.
Texturing creates a uniform shadow / light level across the part, and any variation caused by the defects mentioned is often more noticeable on textured surfaces than glossy surfaces that reflect more light. On a reflective glossy surface tiny defects distract human vision by other stray light reflections.

Myth #2

"I can fix any warped part by packing out the part harder during injection".

Reality - sometimes if warp occurs it can be reduced a little by packing during injection. However there are many factors that contribute to warp, such as gate size and location, mould cooling layout and flow / temperature parameters, melt temperature and timing, part geometry, and the resin type. Some types of resins do warp more than others. Larger and flatter parts tend to warp. Deep ribs in a part, while adding strength, can sometimes induce warp as the rib itself shrinks during cooling. Better to start with a shallower rib at first to reduce this type of warp, then increase depth if need be.

Myth #3

"Thin walled tall bosses for screws will work fine, and won't split when screws are driven, in engineering grade plastics."

Reality - thin walled tall bosses are very risky for splitting during screw driving. For common screw sizes on small to medium size plastics, say 2 to 5 mm diameter screws, at least 2.5 mm thick boss walls at the screw entry end are recommended for minimal risk of splitting. A small chamfer at the screw entry hole will reduce stress as the screw starts.

Trilobular self-threading screws work very well in many plastics. They create less stress in boss walls while being driven, and resist back-out after they are driven, and are easily available in many sizes at no higher cost than other self threading screw types. It is true that a 2.5 mm thick wall may increase the risk of sink defects on the part face opposite side to the boss, but this type of sink is easily dealt with by using "pie plate" style sink hiding features and / or local wall thickening. Most of the time a perfect surface opposite the boss can be designed in.

A note about tall bosses - Tall bosses should be avoided if possible, but if they must be done they should be made with a core to allow consistent wall thickness up to the boss itself, or made as a cored tower with a boss on top, or cored under the boss with a slide or lifter. In this way boss split

risk can be minimized, and a strong mechanical connection can be made with minimal risk of cosmetic defects. The core holes under tall bosses can be hidden if necessary with a product label or by the use of an infill part snapped in place. Tall bosses should never be made with heavy thickness solid uncored plastic below them.

Myth #4

"I can get away with using smaller angles than 5 degrees on sealoff surfaces."

Reality - If a sealoff angle of less than 5 degrees is used, rapid and severe tool wear of these surfaces will occur. Period. Lower sealoff angles may be physically possible and may do a few cycles without visible damage.

It will not take long though for these surfaces to become damaged. 5 to 10 degree sealoffs are well proven to work with minimal wear and will last a very long time. Most firms want their tooling to be trouble free and to work well for a very long time. Welding and refinishing repairs for damaged mould sealoffs are very costly needing highly skilled repair staff, and they delay production.

Myth #5

"I can get away with less than 3 degrees draft angle on textured cosmetic surfaces."

Reality - You may get away with less than 3 degrees draft on a very light textured (with shallow texture peaks and valleys) surface on a light coloured part. However on deep textured surfaces (and especially on dark coloured parts) there will likely be visible scuffing and whitish mark defects where the texture peaks on the tool surface abrade the parts during ejection.

Parts may stick to the cavity half of the mould where there is no ejection system to eject the parts. If this happens the parts must be pried off the cavity half by hand, with the mould open, which is a production nightmare and very hazardous and unpleasant for moulding press operators.

Pry bar mark defects or bending-of-part stress white mark defects are almost inevitable doing this. If 3 degrees draft angle (or more) is used in the design phase of textured parts, risk of scuffing defects is minimized, and parts will stay on the core side where they can be safely and automatically ejected, reducing risks.

If you are hearing these kind of myths at your firm and need help with design for plastic injection moulded parts, please contact me.

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