

MDE Top Ten Design Tips for Nylons

Gating:

Gate location and sizing are critical to the processing, part appearance, warpage and physical properties. Gate size should equal 70%- 90% of wall thickness for cold runner systems. Gate location should be in the thickest section of the part and located so that an even fill of the part will occur.

Runners:

A round runner is recommended. This allows the most efficient material flow and tends to induce the least chilling effect on the material. Runners should be balanced for multi cavity tools to ensure that each cavity receives equal flow and pressure simultaneously. Venting and cold slugs incorporated into your runner system will give you a higher quality finished part.

Barrel:

Barrel size should be sufficient to ensure proper mixing and residence time. The barrel capacity should not be below 30%, or above 75% of the total shot size. Total shot size equals all parts including runners.

Wall Thickness:

Uniformity in wall thickness is critical to minimize warpage, distortion, internal stresses, uneven shrinkage across part and cycle times. When non-uniform wall thicknesses are unavoidable, gradual blending should be used between sections.

Draft Angles:

Draft angles should equal 1° per side to facilitate part ejection. In general, larger draft angles make it easier to eject the part from the mold, especially parts with deep pockets, tall ribs, or heavy textures.

Screws:

General Purpose screws are sufficient for nylon processing in most cases. The recommended L/D ratio is 20:1 as a minimum. The recommended compression ratio is 3:1.

Nozzles:

Reverse taper nozzles are recommended for unreinforced nylons and may be used with reinforced nylons. However, nozzle bore diameters are recommended to be 25% larger with reinforced nylons. A reverse taper nozzle will help minimize drool and stringing. Temperature control on the nozzle should be separate from other barrel zones. Nozzle length should be minimized to prevent temperature loss.

Clamp Force:

Clamp force should be 3 – 5 tons/in²

Sprue Design:

A minimum taper of 1.5° to 3.5° is recommended over the length of the sprue. For best results, ensure the nozzle orifice diameter is less than the sprue-bushing diameter by .005" - .030". This ensures a smooth transition as the material enters the tooling, therefore not creating an additional shear condition or pressure drop. It is also suggested that the minimum diameter of the opening of the sprue bushing at the nozzle interface be at least .118".

Venting:

Venting is a very important aspect of producing quality parts. The following dimensions are recommended.

Unfilled:	L	0.03" – 0.06"	W	.375" – .500"	D	.0005" – .001"
Mineral Filled:	L	0.03"	W	.375" – .500"	D	.001" - .002"
Glass Filled:	L	0.03"	W	.375" - .500"	D	.001" - .002"