



Gas Assist Injection Molding Technology Guide

GAS ASSIST PROCESS

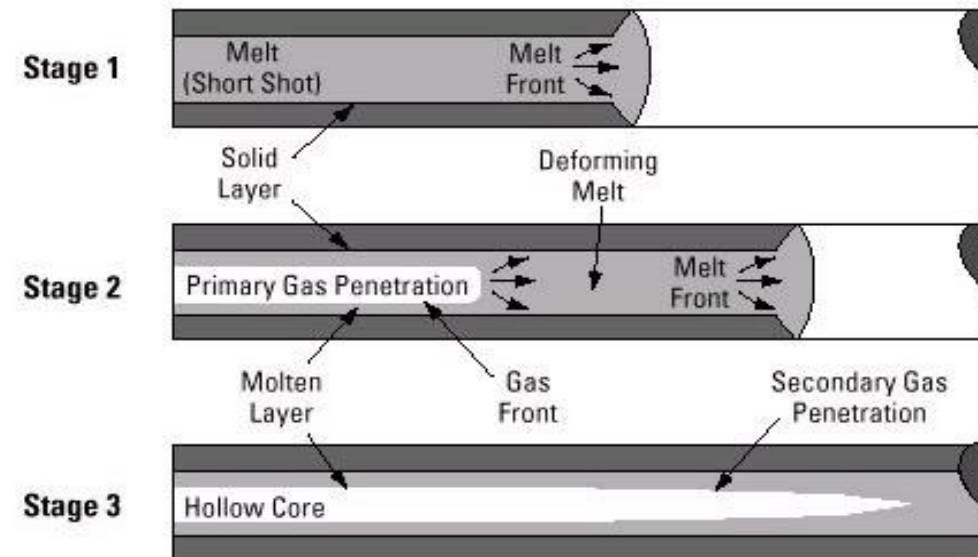
Gas assist injection molding is a variation of conventional injection molding that can be easily retrofitted to an existing injection press by the addition of an auxiliary gas system as shown in the **GAS INJECTION MACHINE REQUIREMENTS slide** Including shut off Nozzle.

The usual injection of the molten plastics is assisted by the introduction of the pressurized nitrogen (from our system) in to the mold, the gas produces the bubbles which pushes the plastic into the extremities of the mold surfaces creating the hollow section.

GAS INJECTION PHENOMENON

Gas assist molding can be divided into three stages

Stage 1	Resin injection,
Stage 2	1 st stage gas inj., and
Stage 3	2nd gas inj. And gas pack



Stages of Gas Assist Molding

PROCESS SEQUENCE

The gas assist molding sequence is similar to standard injection molding with the addition of the gas injection stages:

1. Mold closes and reaches clamp tonnage.
2. Resin is injected into the mold cavity as a short shot or with reduced packing (no cushion).
3. Gas is introduced into the hot melt.
4. Gas pressure is maintained during the cooling cycle.
5. Gas pressure is released.
6. Mold opens and part ejects.

Note: This sequence will not typically add cycle time to the process since the added steps occur simultaneously during the cooling cycle. Step 4 and 5 replaces or is coupled with the packing and holding phase of standard injection molding.

KEY BENEFITS

1

Cycle time and production cost reduction

- Lower clamp tonnage
- Reduce or no pack pressure
- Faster cycle time
- Product weight Reduction from 7% to 35%

2

Design Freedom

- Thick and thin ribs possible in the same part
- Effective, Longer flow lengths without multiple drops
- Undercut elimination Possible

Pros

- **Cycle time and production cost reduction**
 - ✓ Lower clamp tonnage
 - ✓ Reduce or no pack pressure
 - ✓ Faster cycle time
- **Design Freedom**
 - ✓ Thick ribs possible and effective
 - ✓ Longer flow lengths without multiple drops
- **Quality Improvement**
 - ✓ Lower stress within the part
 - ✓ Better dimensional stability and no part-to-part size variations
 - ✓ Elimination of sink marks, warpage and air voids
 - ✓ Reduced knit Lines (No multiple drops necessary)
- **Material Savings Through Weight Reduction**

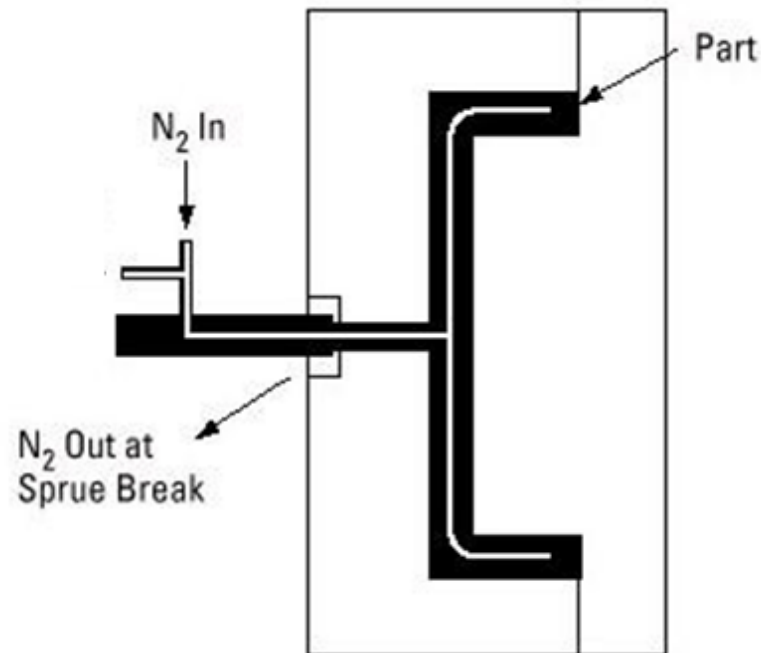
Hollow thicker cross section in the parts
- **Simplification of Tooling**

Elimination of lifters and undercuts

Cons

- Race Tracking of polymers through gas channels
- The Penetration of the gas from channel into thinner sections of the part
- Gas Blow-Through
- Not fully being able to control where gas goes
- Additional one time equipment cost compare to standard injection molding

GAS INJECTION THROUGH MACHINE NOZZLE



Depends upon the gas hold pressure sprue break will make blow out noise

Gas assist methods vary in the location along the melt stream in which the gas is introduced. Gas may be introduced to the melt at the machine nozzle into the mold cavity. Gas Injected through Special shut-off Nozzle connected to the machine barrel, is defined in the above figure 3. known as Through nozzle gas assist molding .

MACHINE SHUTT NOZZLE



Gas through single orifice One way
check Valve

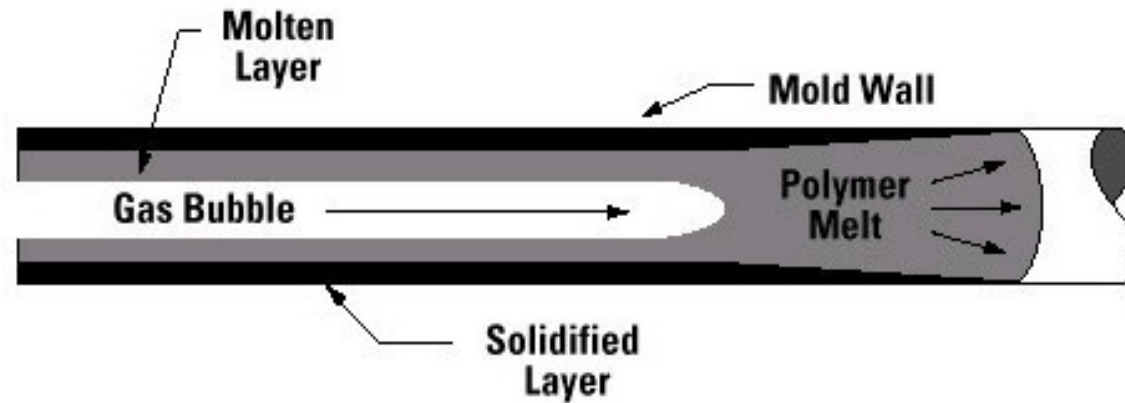


Gas through multi orifice progressive open
orifice check Valve

FINDD - SHUT-OFF NOZZLES

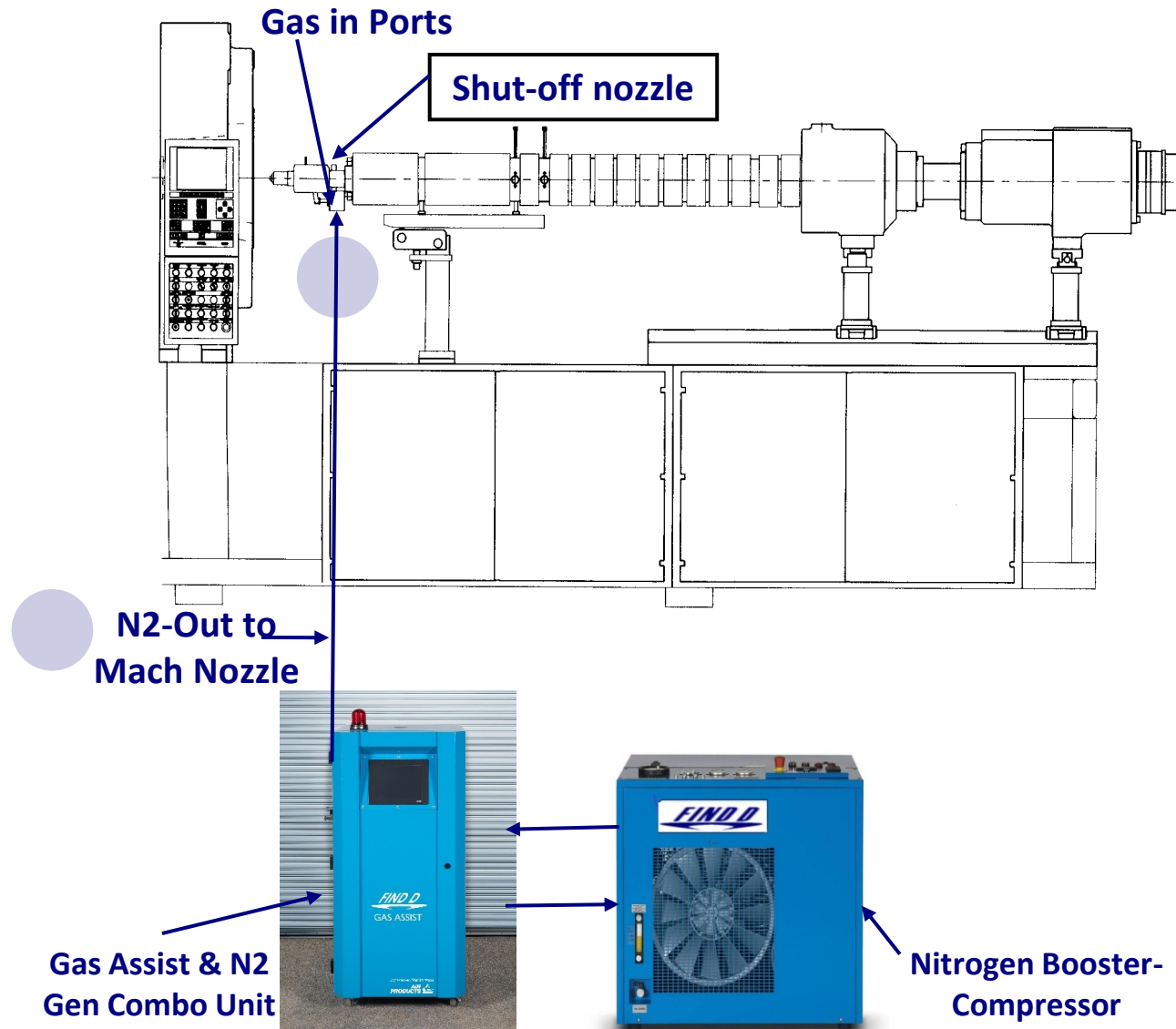
- Shut-off nozzles are suggested when using in-article or in-runner techniques (without valve gates).
- They will help prevent gas from entering the runner and pushing the Screw backward.
- Adding hold pressure can be used in case of a shut-off nozzle in some cases.
- The proximity of the gas channel to the polymer gate should determine the amount of hold pressure.
- Caution should be used when selecting shutoff Nozzle for shear sensitive material.
- Flow around these nozzles can induce splay in some cases.

GAS PENETRATION INTO THE MOLTEN POLYMER

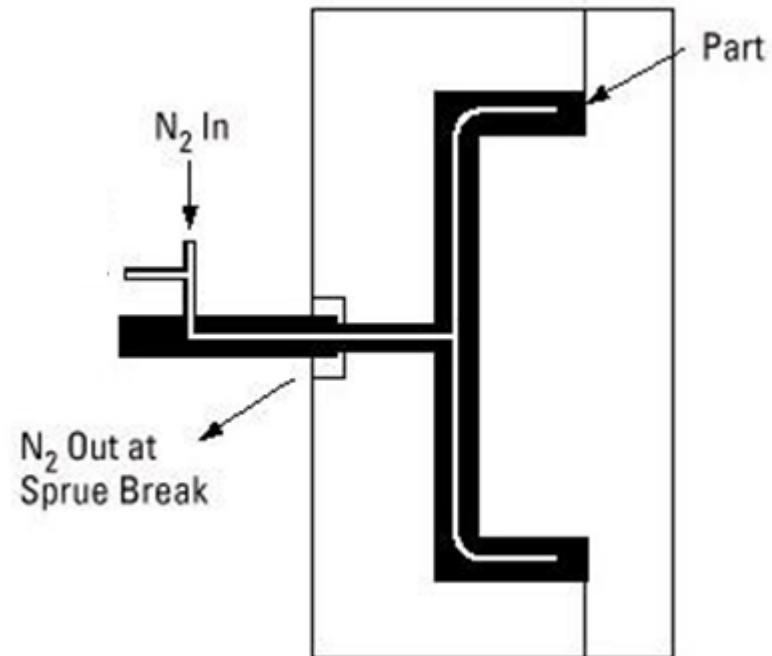


The extent of gas penetration and the part performance are influenced by the **thickness of the material** left surrounding the hollow core (wall thickness).

GAS INJECTION MACHINE REQUIREMENTS

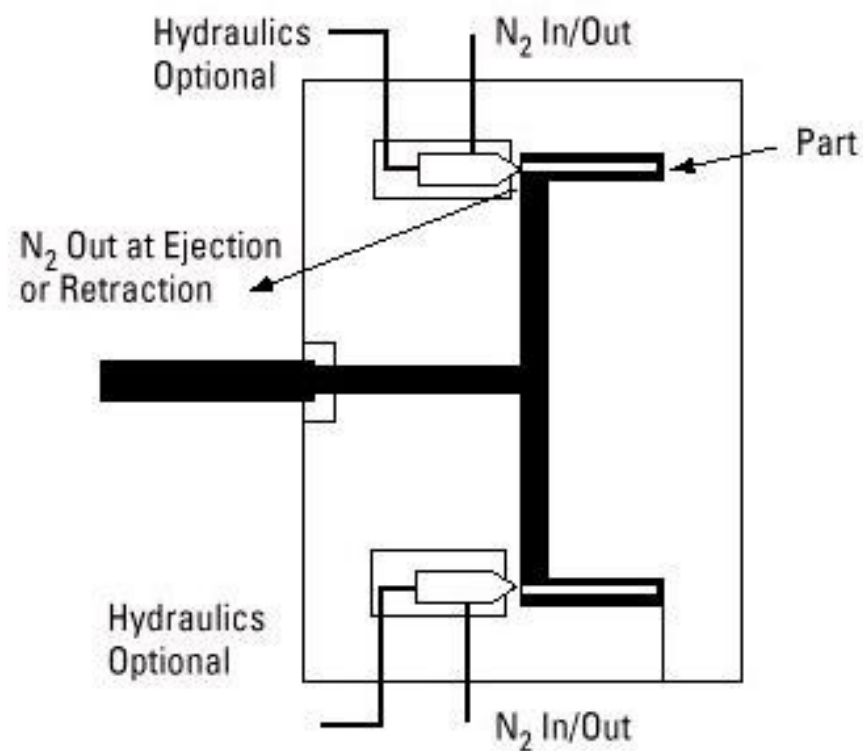


GAS INJECTION DIRECTLY INTO THE MOLD CAVITY



Through Gas Nozzle

GAS INJECTION DIRECTLY INTO THE MOLD CAVITY



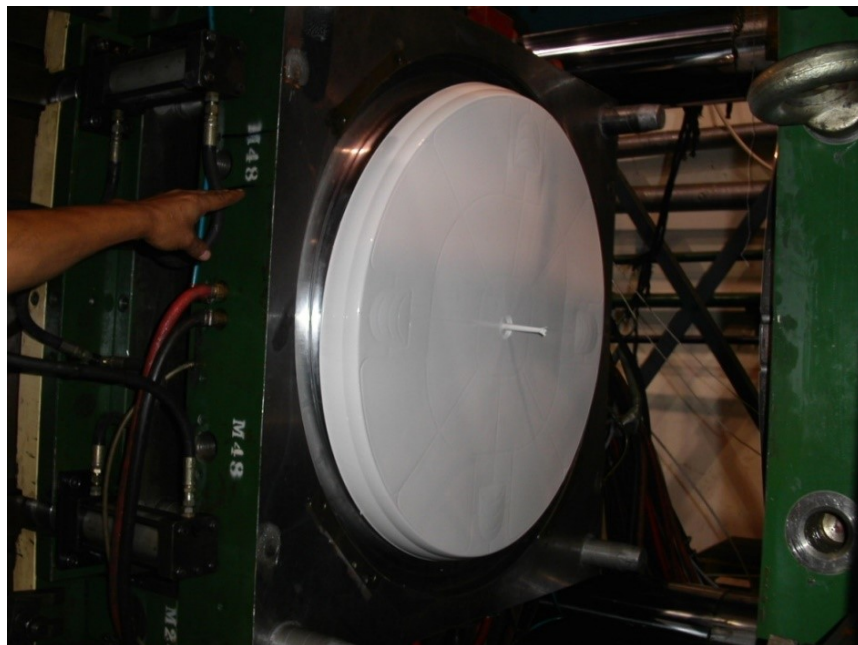
Through Gas Pin

GAS ASSIST MOLDING TECHNOLOGY

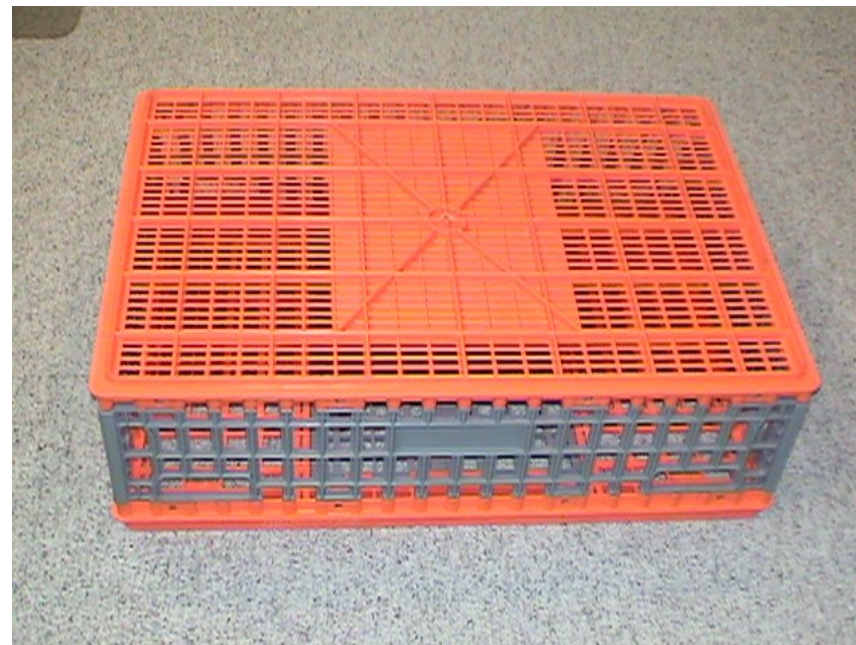
Shorter Cycle Times

- The Nitrogen Gas provides a cooler single phase solution by single mechanisms.
- Lower shot size allows for reduced injection time
 - Nylon reduced from 68 sec to 42
 - PP reduced from 120 sec to 75 sec
 - PS reduced from 100 sec to as low as 65 sec
- No environmental threat with the Nitrogen Gas, it is inert and environment friendly (atmosphere contains 78.2% nitrogen)

PP MOLDED FURNITURE PARTS



39" dia. Table Top



Chicken Cage

POLYPROPYLENE AUTO SIDE MAP COVER



12% TALC FILLED PP



Chair Arm



Cross Section

OUT DOOR PATIO TABLE TOP



**FEEL FREE TO GET IN TOUCH FOR ANY
HELP!**



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