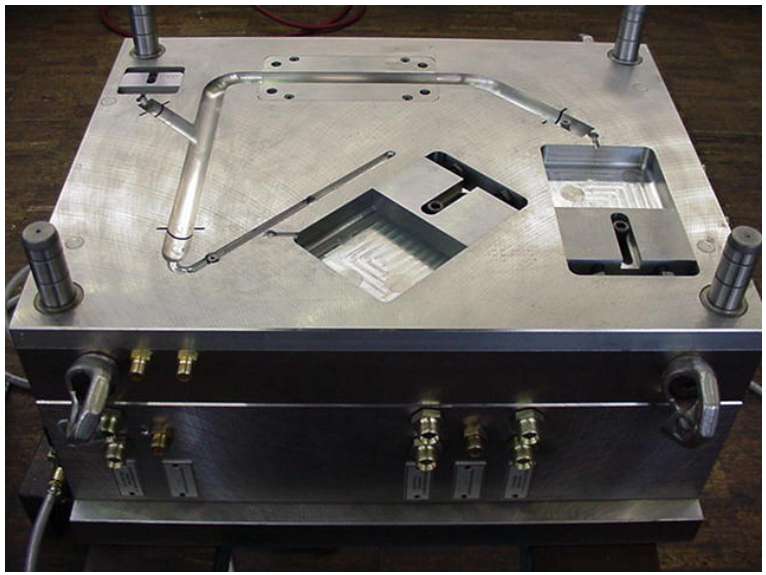
Gas Injection Molding (GIT)



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Introduction of GIT

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Introduction - What is GIT?

- Gas Injection Technology (GIT) is a process offering elegant means of producing thick-walled injection moldings with smooth outside surfaces through the selective injection of gas into the melt during the molding process.

- GIT involves pre-filling the cavity and then injection gas into the cavity in order to fill out the molded part.

- The gas employed is generally nitrogen or less frequently carbon dioxide, at a pressure of 200 to 300 bar.

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Introduction – Why GIT?

- Allow greater design freedom
- Allow high rigidity through larger cross-sectional profiles
- Offer more uniform shrinkage, less inherent force and less warpage
- Reduce the number of sink marks
- Allow lower clamping force required on the machine
- Achieve long flow paths
- Avoid weld lines (especially for long, rod-shaped parts)
- Allow lower demolding forces
- Allow shorter cycle time for thick-walled moldings

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Introduction – Drawbacks of GIT

- Required additional costs for license, tooling and gas
- Uncertainty including formation of gas bubbles and voids
- More difficulties during the startup of the process
- Higher outlay on quality assurance
- Restrictions on material selection
- Restrictions on part design
- Difficult to achieve multi-cavity moulds
- Precise rheological calculation is only possible for the pre-filling phase
- Difficult to change the gate and gas channel position

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Introduction – Comparison with other methods

Comparison with structural foam molding

- Provides higher mechanical strength
- Better surface finishing

Comparison with co-injection molding

- Lower machine costs and material costs
- Shorter cycle times
- Provide parts with lower weight

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Principles of GIT

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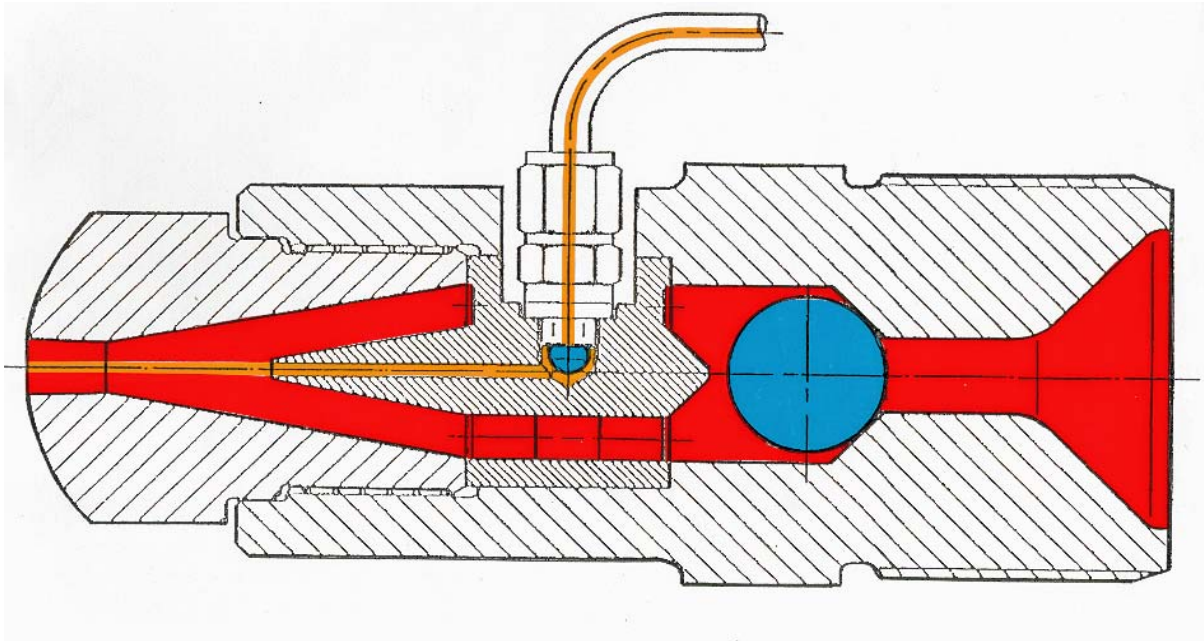
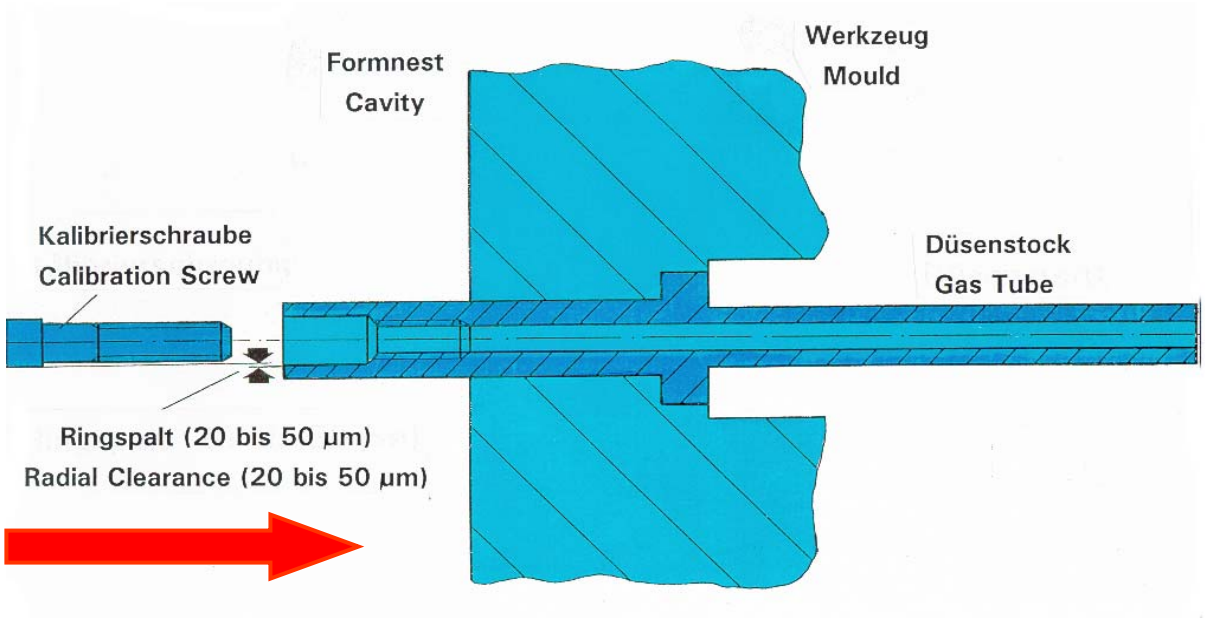
Principles – Sprue break GIT

- Once the cavity has been pre-filled, the gas is injected in through the machine nozzle. The gate and the gas injection orifice are located at the same point.



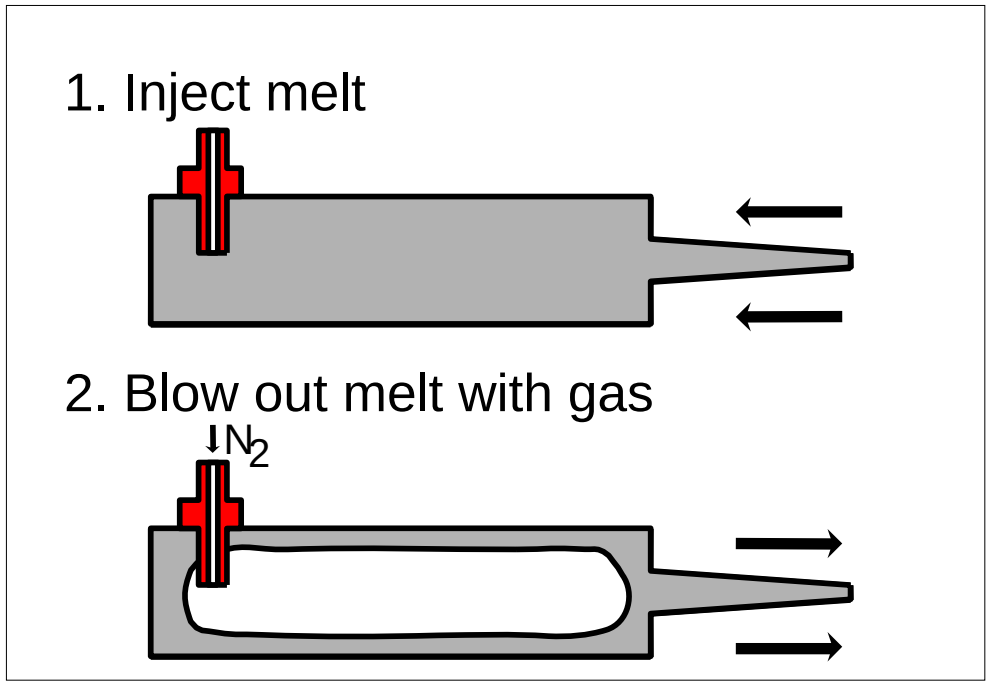
Principle – In-runner/In-article GIT

- The gas is injected either into the runner or into the article (generally close to the gate) so that once the specified pre-filling level has been attained the parts can be “blown up”.



Principle – GIT blow-out process

- The cavity is first completely filled. When the outside skin starts to solidify, gas void will be created through the selective injection of gas into the cavity. Melt from the molten core will be forced back into the screw or a separate overflow cavity.



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Processing – Moulding Shrinkage

- Experience has shown that the shrinkage values are clearly influenced by the processing parameters of gas holding pressure and gas pressure action time.

- With glass fiber reinforced material and comparable conditions, shrinkage can only be influenced to a very limited extent via the processing parameters.

- For GIT blow-out process, the shrinkage is characterized by the combination of gas pressure and also the holding pressure.

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Processing – Moulding Shrinkage