Shut-off Nozzles Overview

presented by

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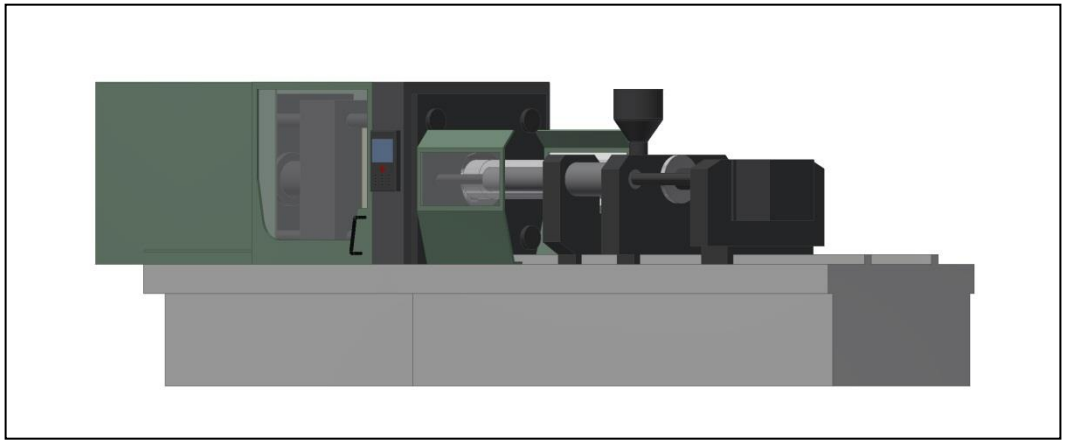
Shut-off Nozzles Overview



What are shut-off nozzles?

-Shut-off nozzles are used exclusively in plastic injection moulding processing
-Shut-off nozzles are installed at the crucial interface between heated injection unit and cooled mould
-Shut-off nozzles regulate the melt flow from cylinder to mould

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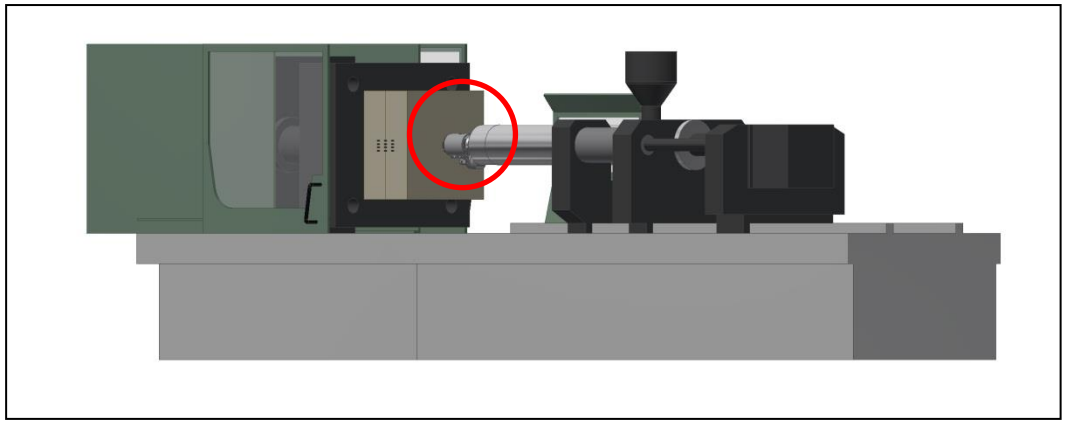

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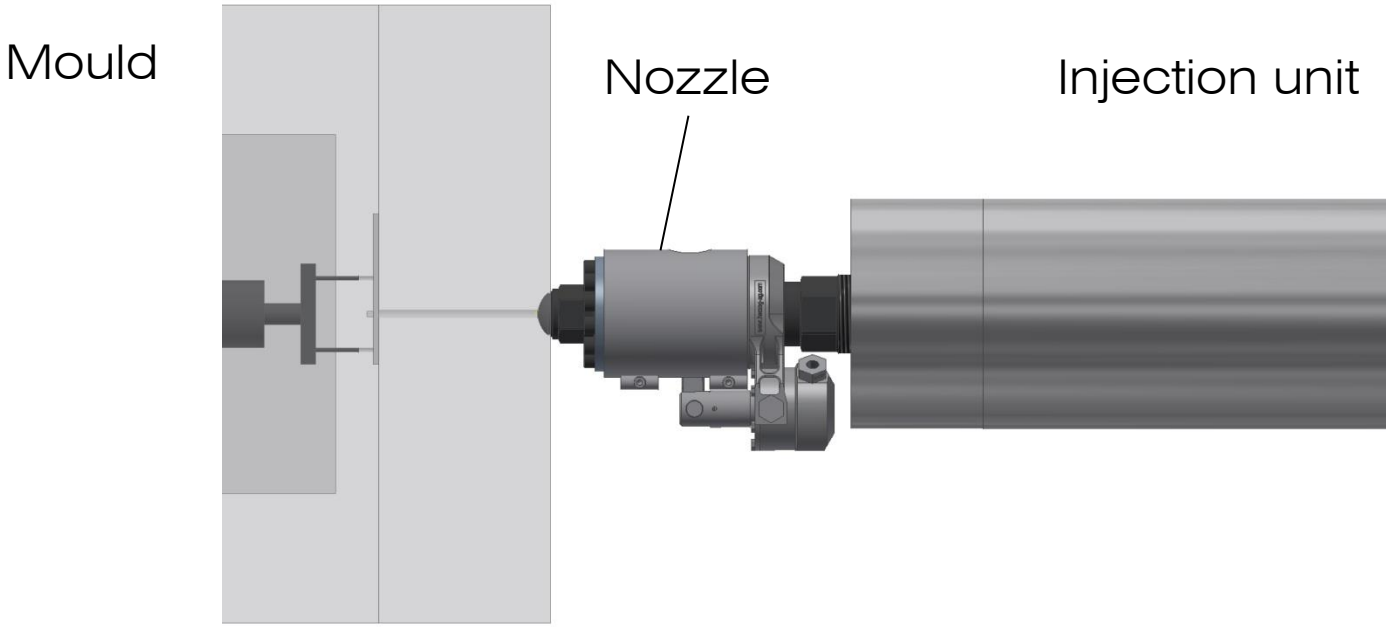

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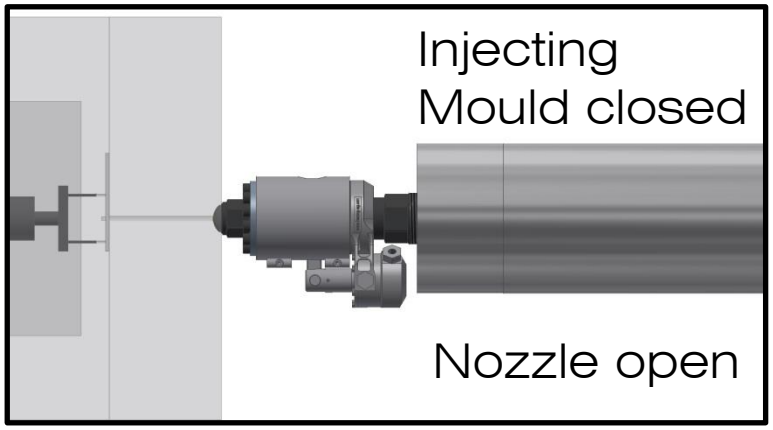

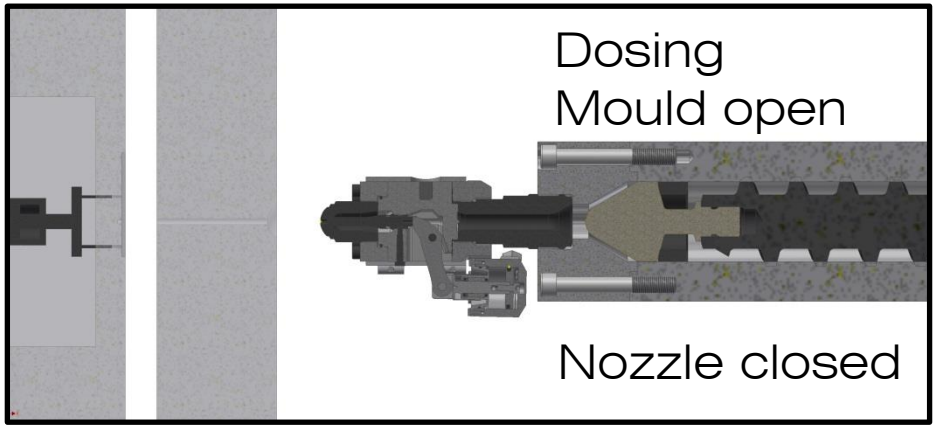

When are they used and what are the advantages?

-Shut-off nozzles prevent material drooling from the injection unit when it retracts from the mould

-Shut-off nozzles enable faster cycle times to be achieved by allowing dosing to begin immediately after injection (no need to wait for the mould to close)

-Shut-off nozzles help improve part consistency by ensuring each shot is loaded accurately (controlled back pressure / time)

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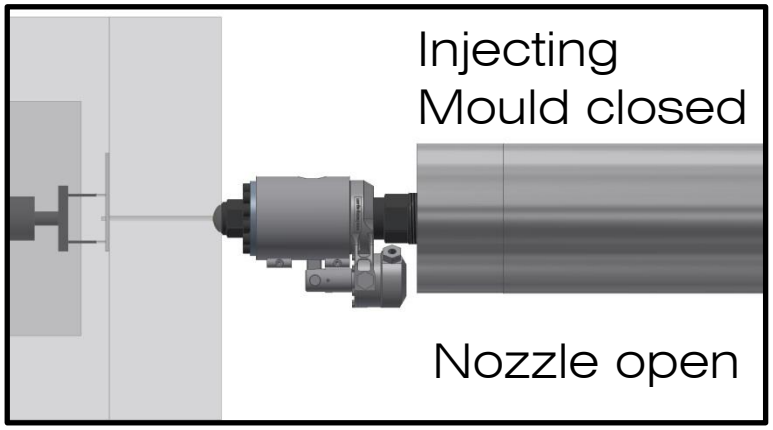

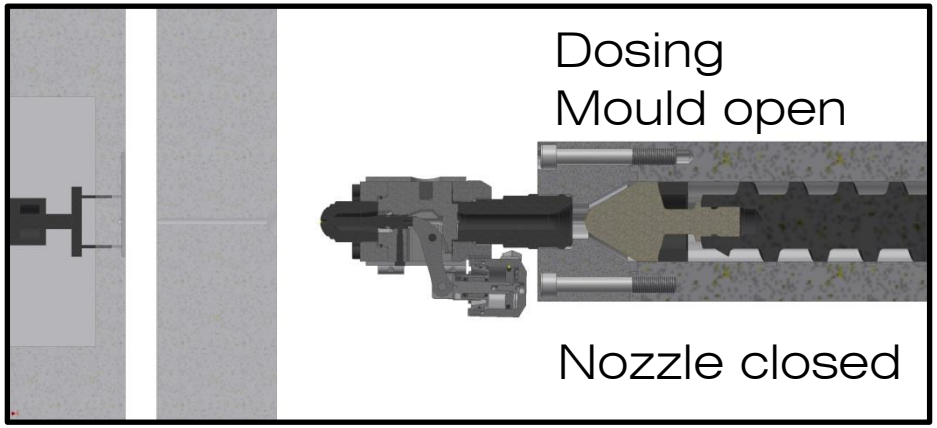

When are they used and what are the advantages?

-Shut-off nozzles facilitate advanced moulding techniques such as;

- physical foaming
- melt pre-compression
- multi component moulding

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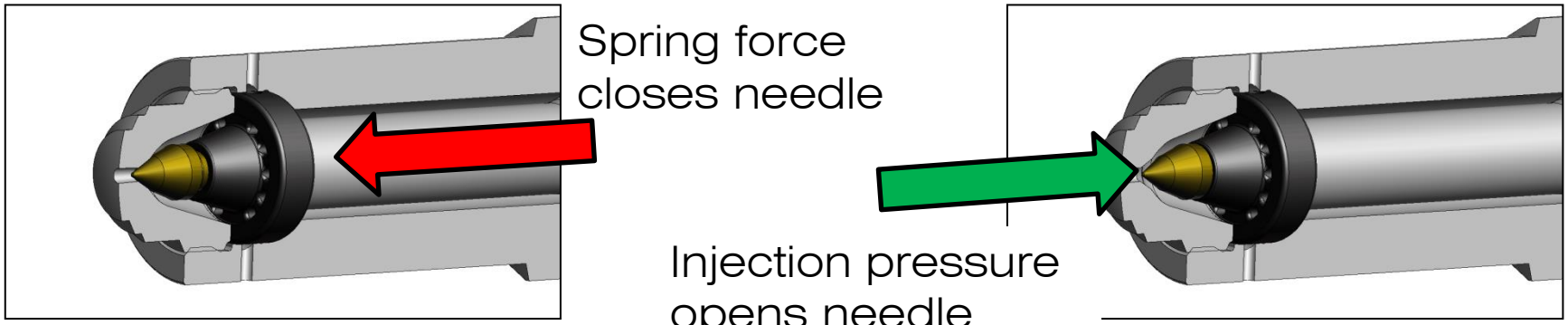

How do they work?

-There are two ways of operating shut-off nozzles;

- via injection pressure; the nozzle is closed in its standard state and opens once the injection pressure rises above a defined amount
- via hydraulic or pneumatic actuator; the nozzle is actively opened or closed through a command from the machine's control unit

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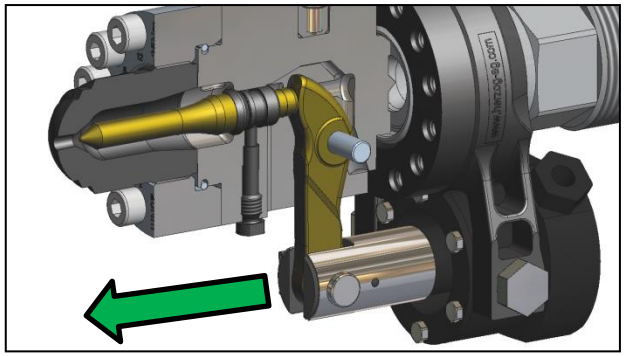
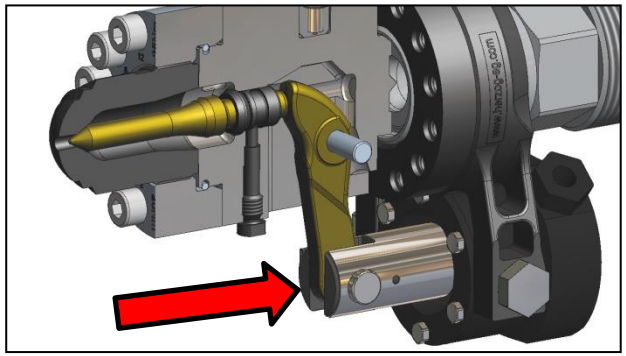


With actuator

two-way opening and closing



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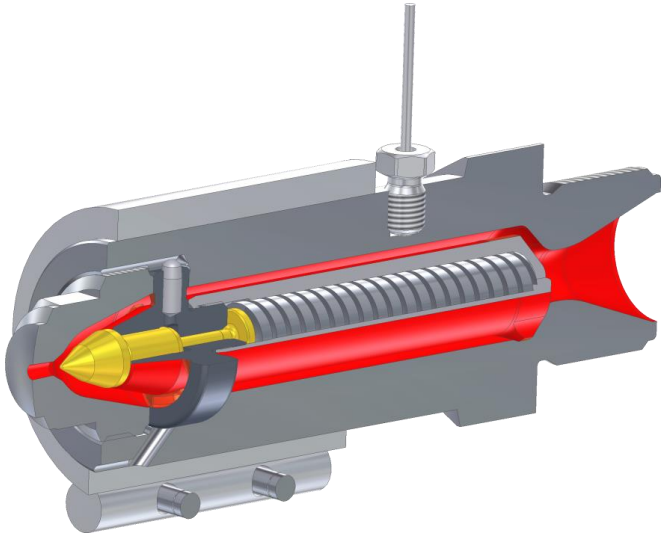

What are the different types?

-Needle shut-off with pressure dependent spring operation

- Shut-off needle positioned in-axis with the melt flow
- Spring force holds the nozzle closed
- Injection pressure overcomes the spring force to open the nozzle
- Used for standard applications to prevent drooling with retracted injection unit
- Requires regular cleaning and maintenance

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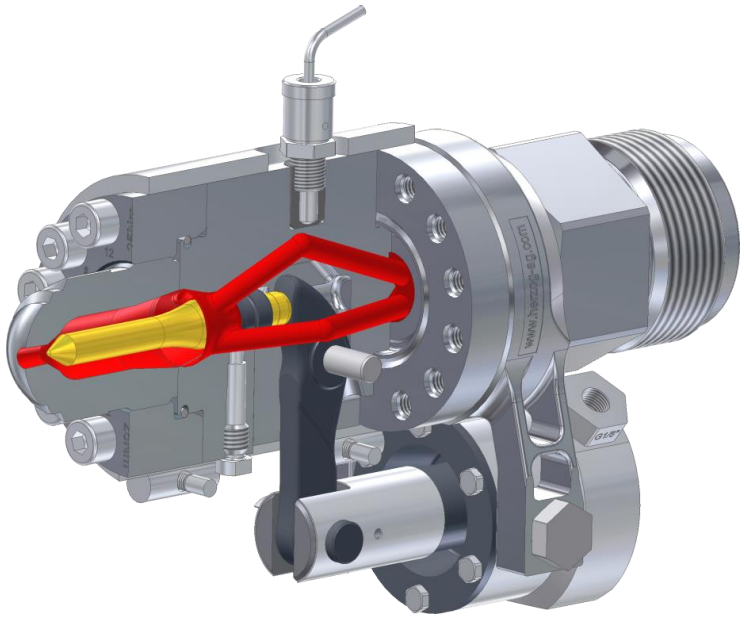

What are the different types?

-Needle shut-off with hydraulic or pneumatic actuator

- Shut-off needle positioned in-axis with the melt flow
- Hydraulic or pneumatic actively opens or closes the nozzle
- Precise flow control
- Operation independent of melt flow or pressue
- Used for advanced moulding techniques, engineering plastics and aggressive materials
- Self-cleaning function, low maintenance

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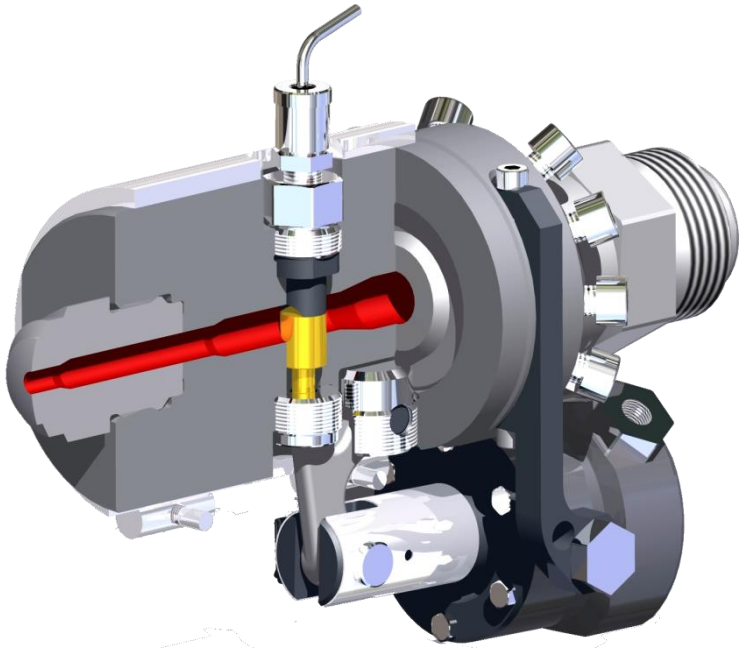

What are the different types?

-Bolt shut-off with hydraulic or pneumatic actuator

- Shut-off bolt positioned perpendicular to the melt flow
- Hydraulic or pneumatic actively opens or closes the nozzle
- Operation independent of melt flow
- Used for high-viscosity materials, large volume shots, very fast running machines
- Self-cleaning function, low maintenance

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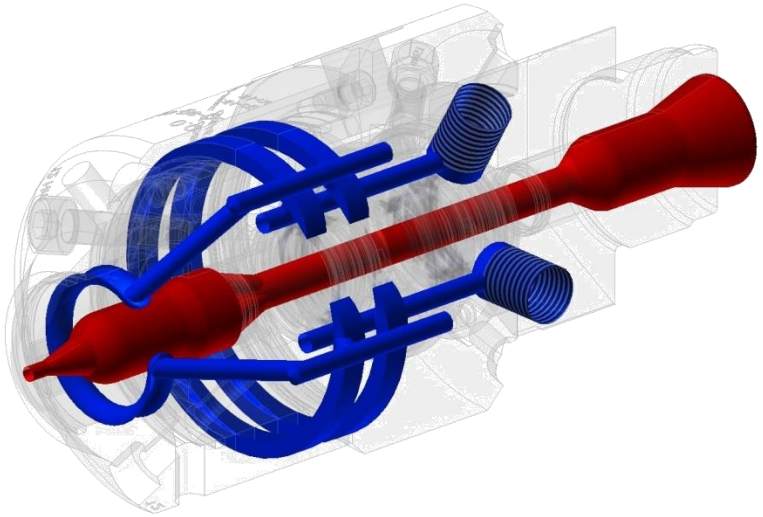

What are the different types?

-Needle shut-off with pneumatic actuator for elastomeric plastics

- Shut-off needle positioned in-axis with the melt flow
- Pneumatic actively opens or closes the nozzle
- Operation independent of melt flow
- Used for liquid silicone rubber
- Integrated cooling system; prevents material vulcanization in the nozzle

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What is the productivity improvement?

Example 1

	Cycle time	Cycles per day	Extra cycles per day	Percentage difference
Without shut-off nozzle	10 sec.	8640	-	-
With shut-off nozzle	9 sec.	9600	960	11.11%

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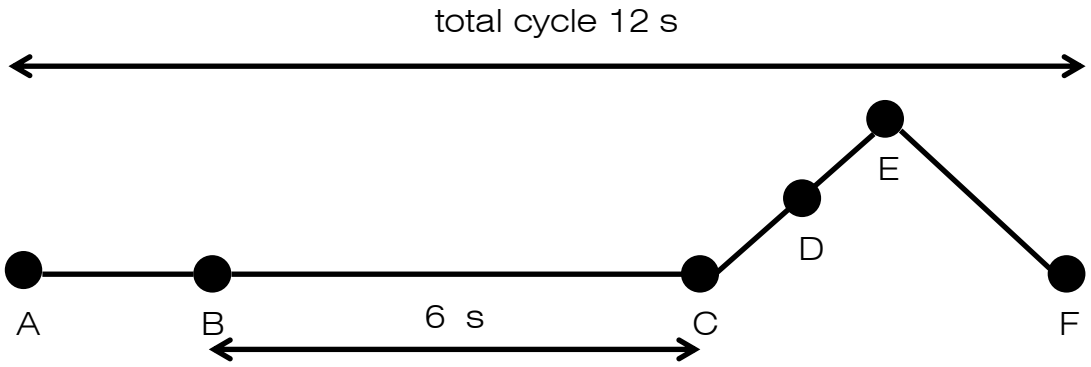
What is the productivity improvement?

Example 2 (without shut-off nozzle)



AB	Inject (and hold)
BC	Cooling cycle
CE	Mold opens
D	Ejection start
E	Ejection end
EF	Mold closes

Time available for plasticizing: 6 s (50%)

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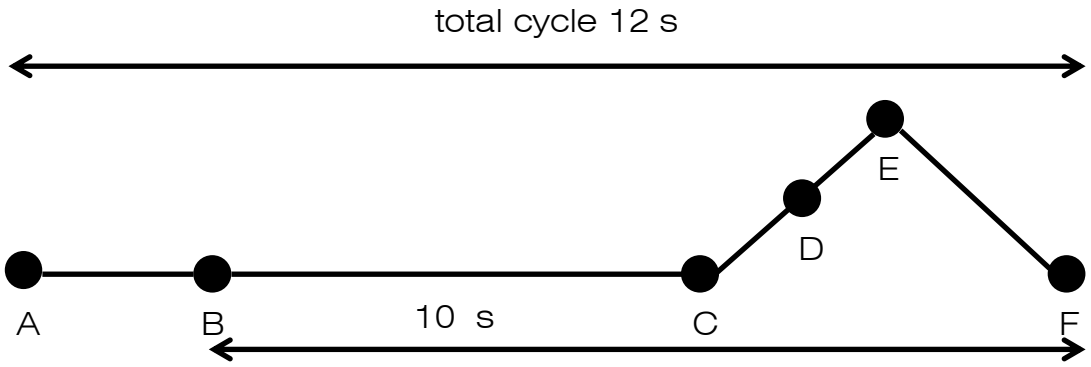
What is the productivity improvement?

Example 2 (with shut-off nozzle).



AB	Inject (and hold)
BC	Cooling cycle
CE	Mold opens
D	Ejection start
E	Ejection end
EF	Mold closes

Time available for plasticizing: 10 s (83%)