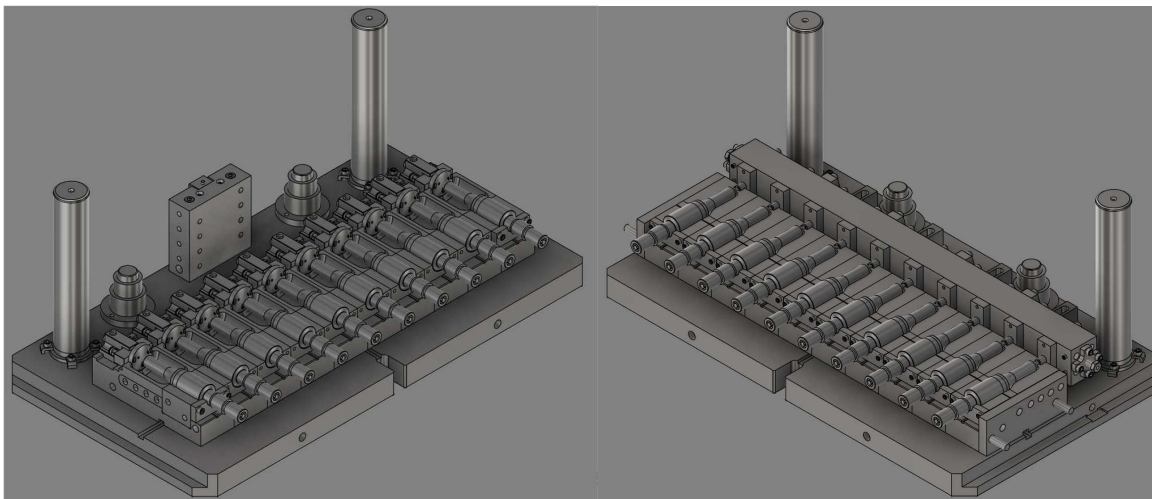


Injection-blow Molding 101



Background



- 30 years + around IBM
 - Plastiques Appalaches Inc.
 - Founded by my father
 - 4 IBM machines, 3 made by my father
 - Fully autonomous (mold making)
 - Stop business in 2014
- 10 years around CNC machines

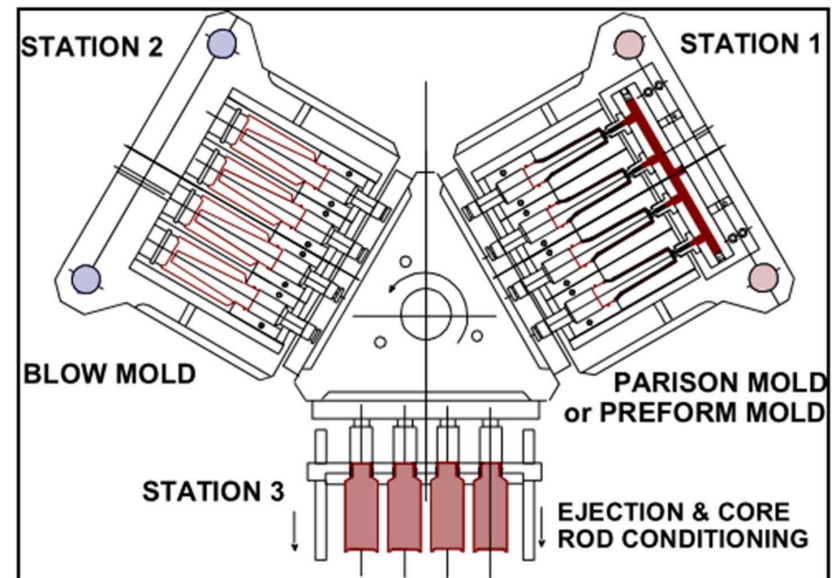
Companies we have assisted :

Consultant/technical service for :

IBM (Injection-blow molding)	CNC Machining
• Optimization (% reject rate, cycle time, molds) • Training (setup, process) • Fine tune/troubleshooting • Mold design revision	• Fine tune/troubleshooting • Training • Optimization (tooling, machining strategy) • Programming • PC-CNC Communication



Injection-blow Molding 101



Topics



- Concept

- Machine Setup
- Top view
- Cycle def
- Preform making
- Vertical and horizontal
- Blow
- Mold Details
- Core rod detail
- Hot runner details and technology

- Application

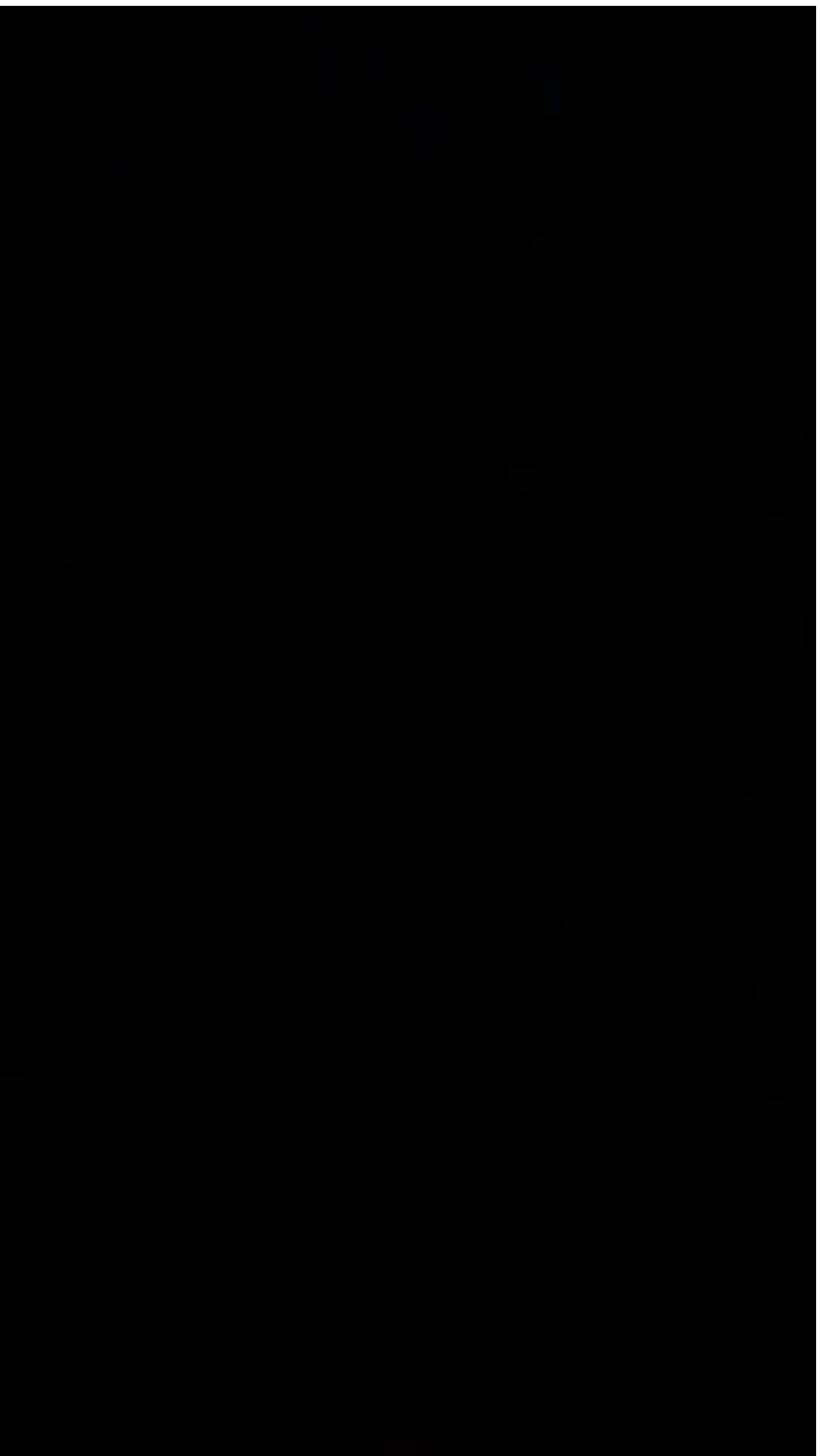
- Resin
- Working cell

- IBM VS EBM

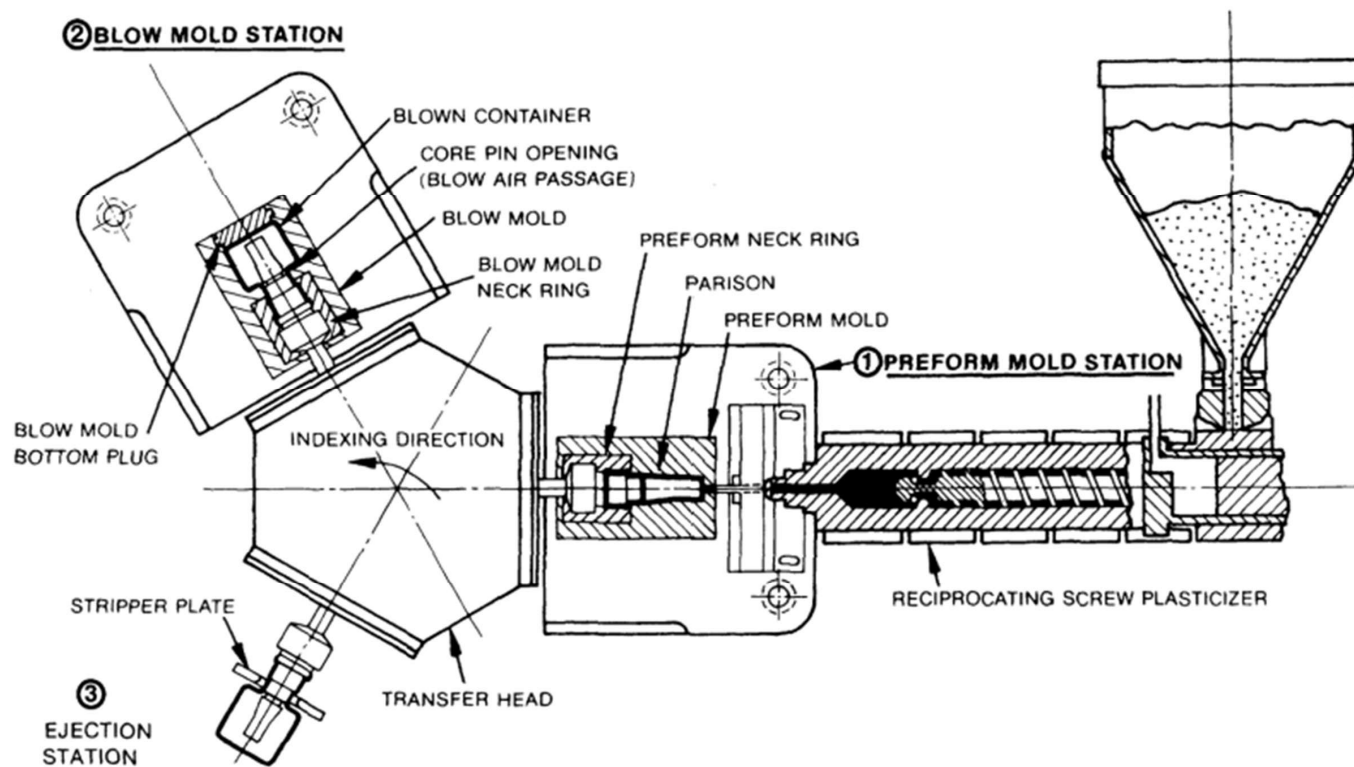
- Limits

Concept

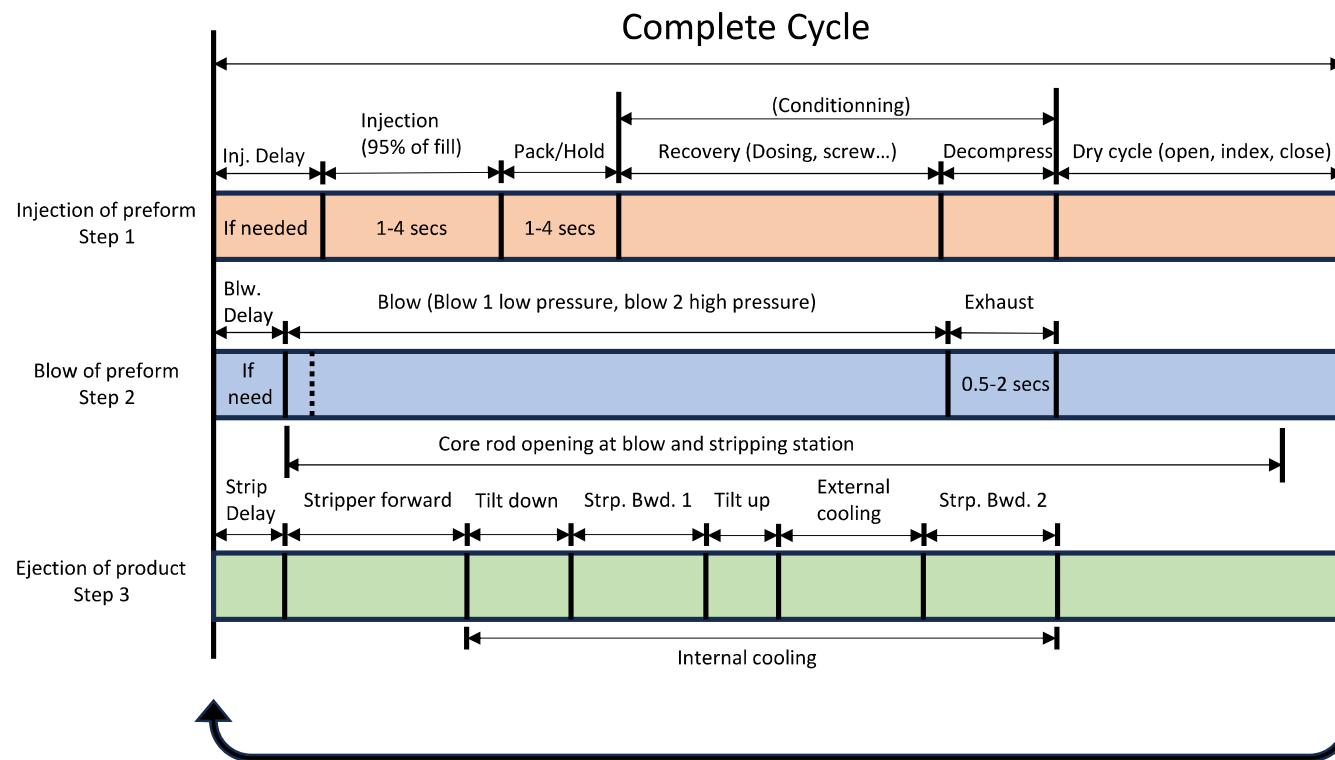
Video



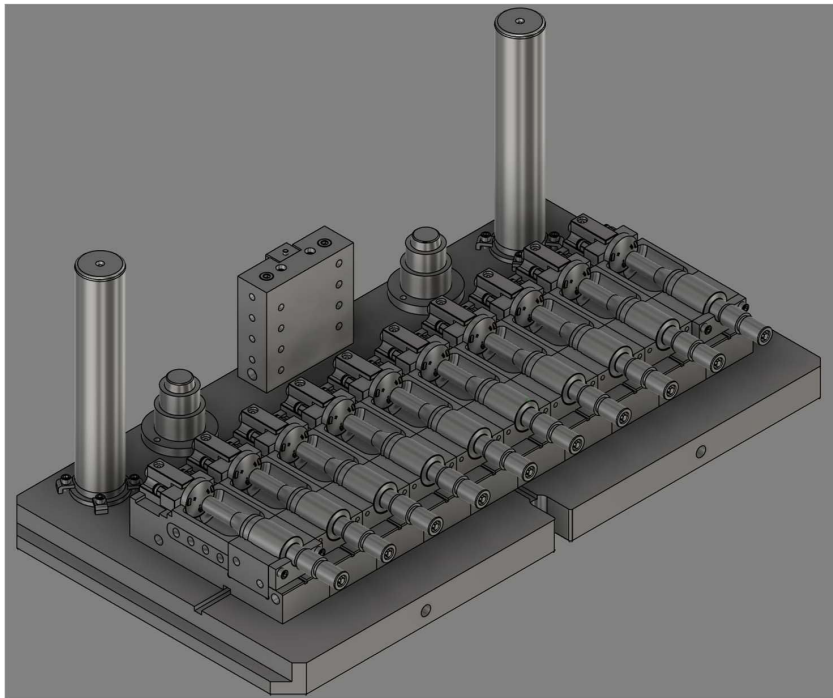
Concept



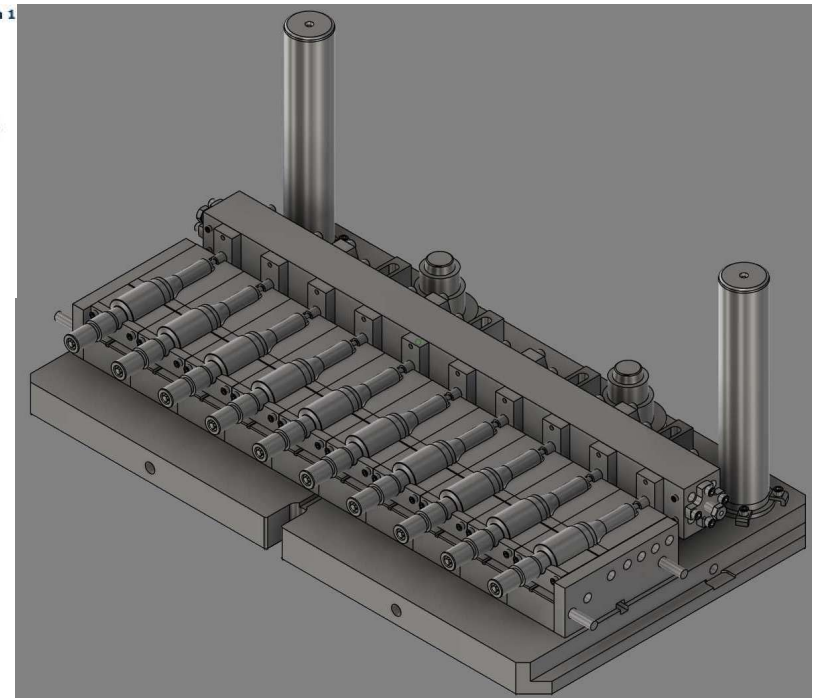
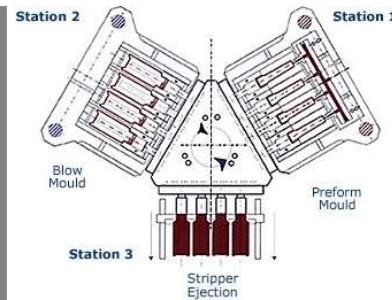
Concept



Concept

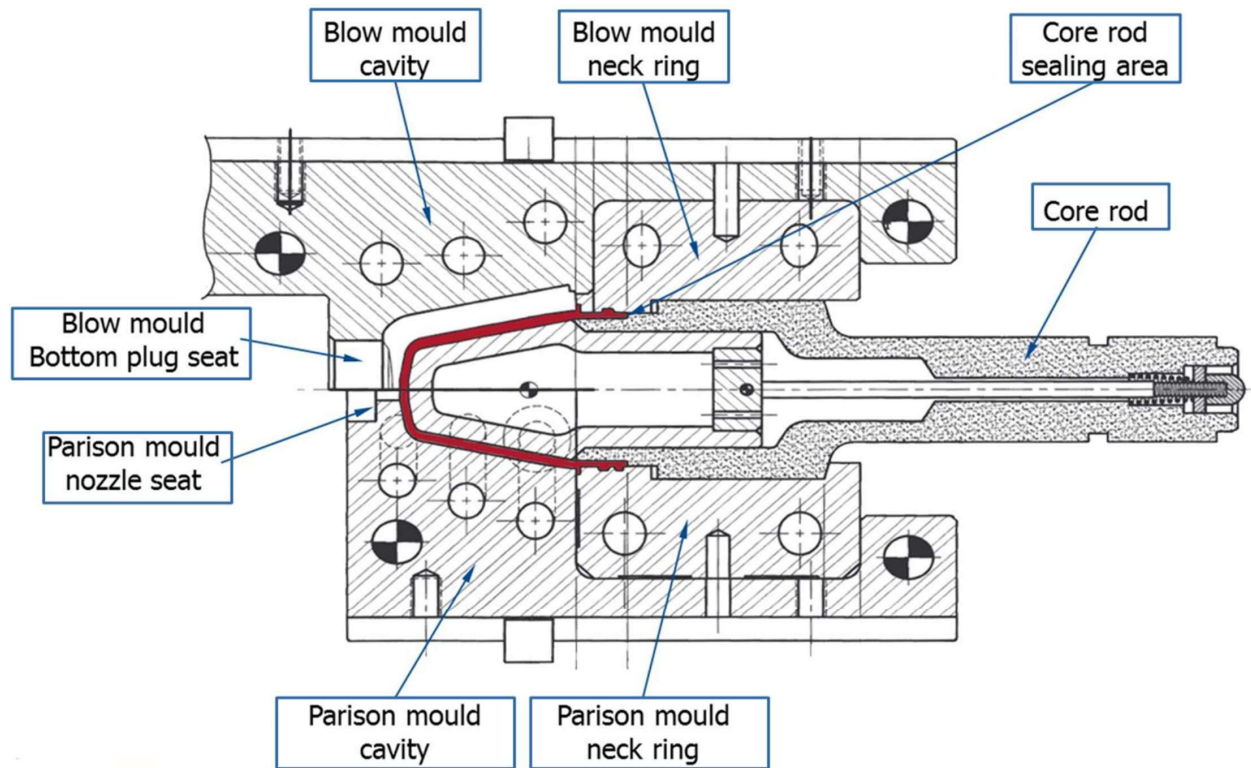


Blow mold



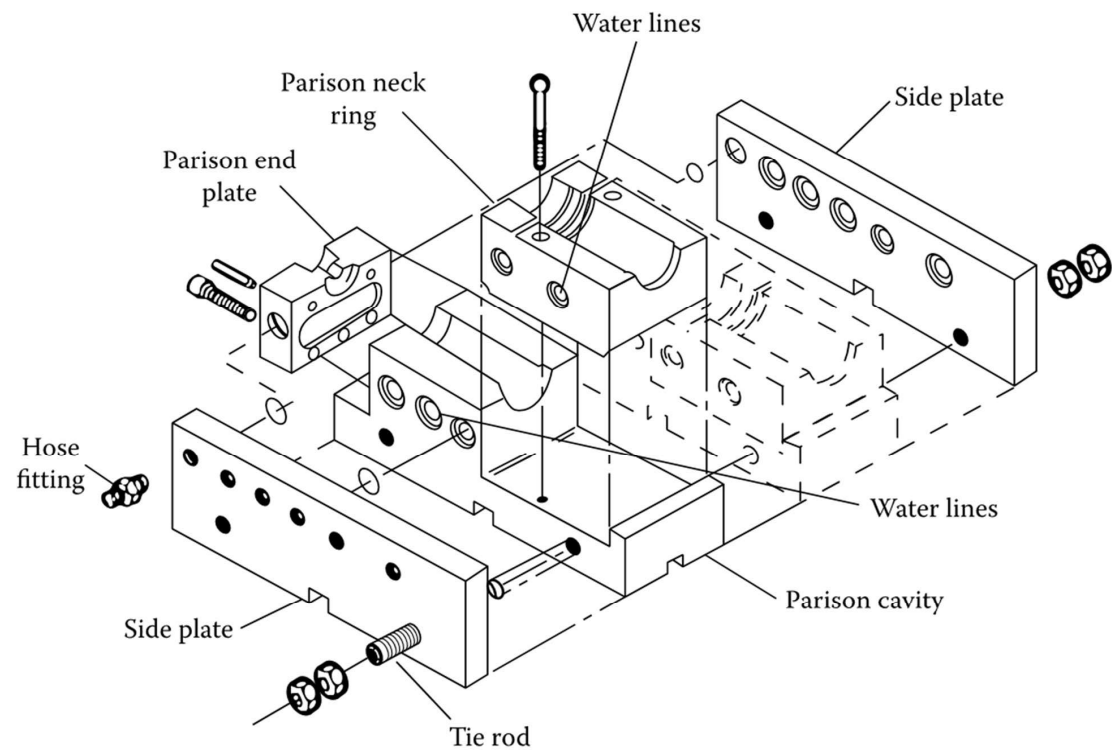
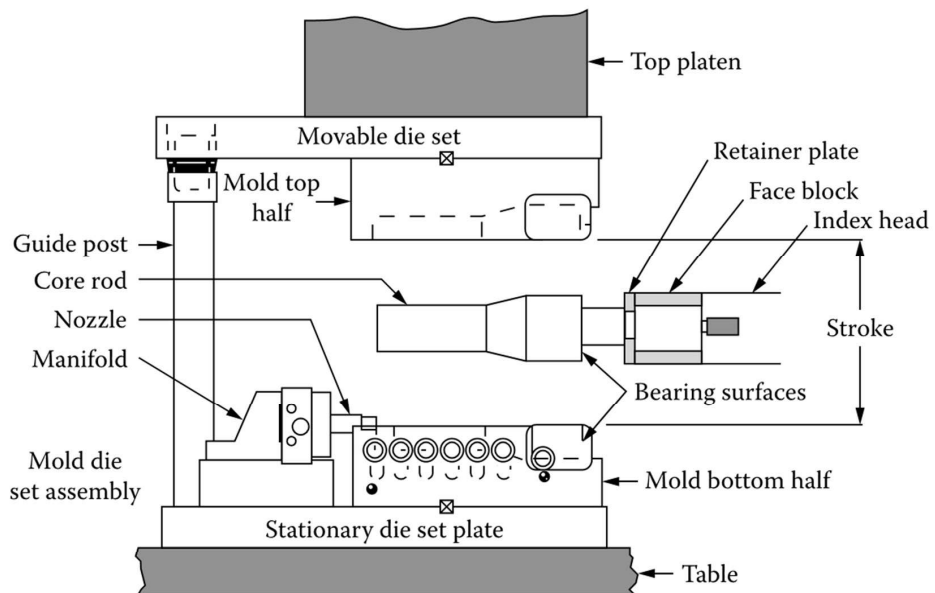
Injection, Preform or Parison mold

Concept



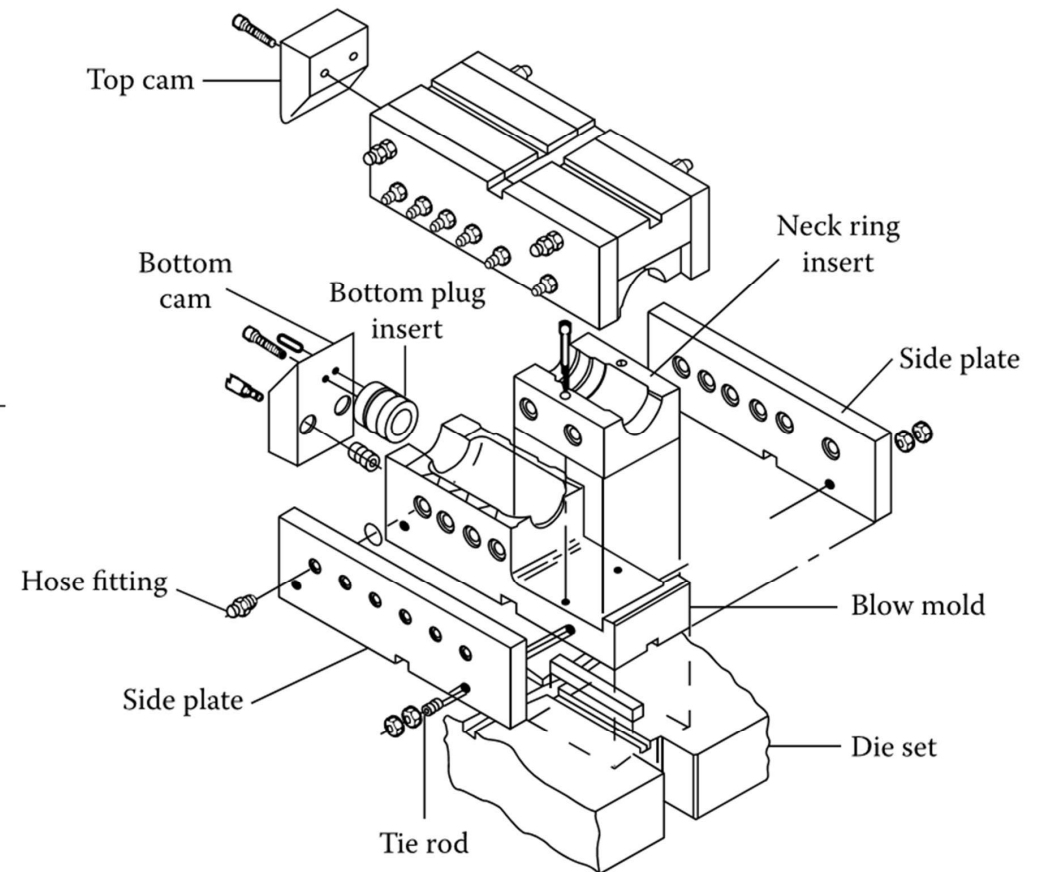
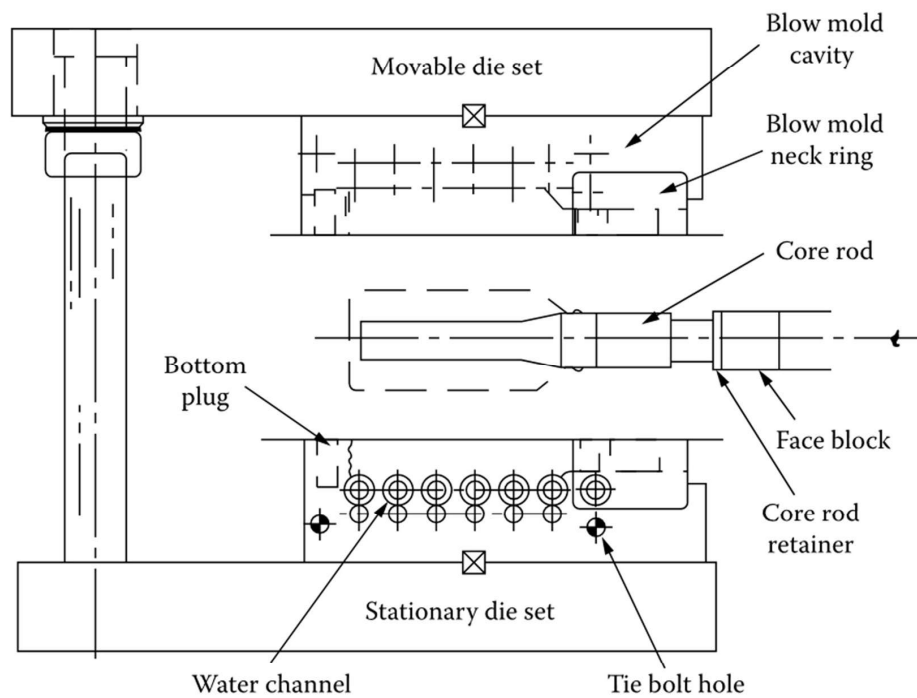
Concept

- Preform or injection mold (some call it parison mold)



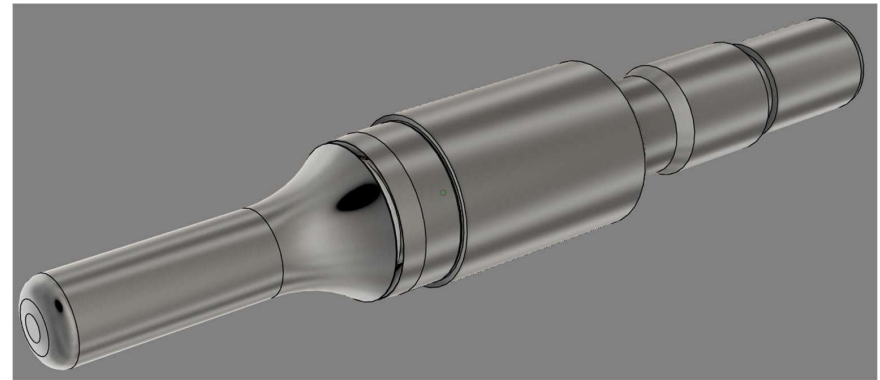
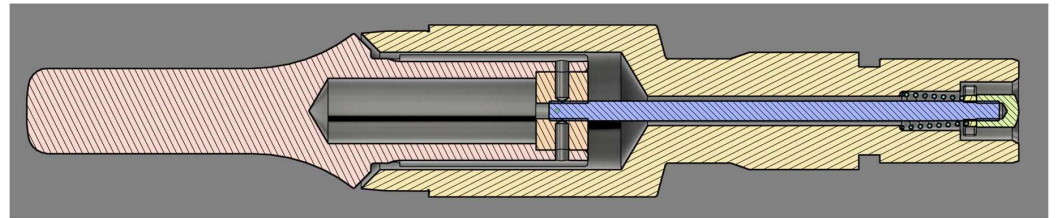
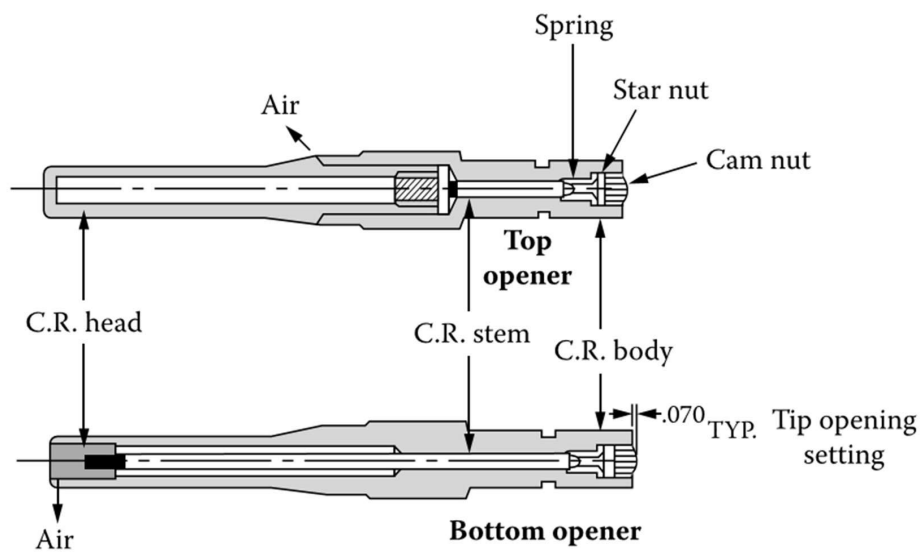
Concept

- Blow mold



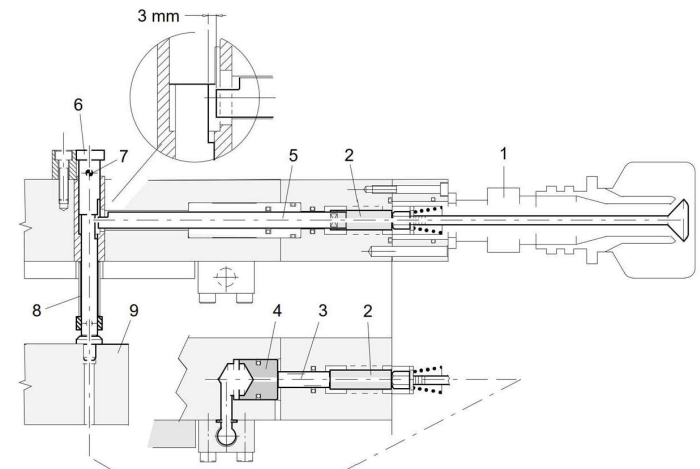
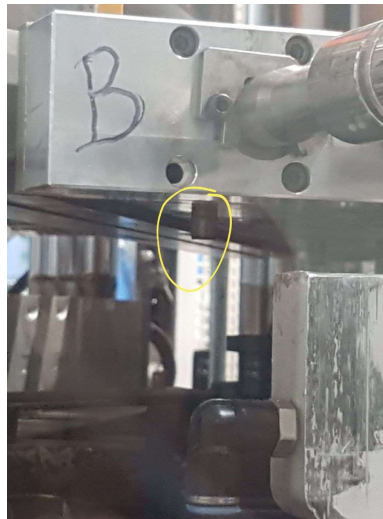
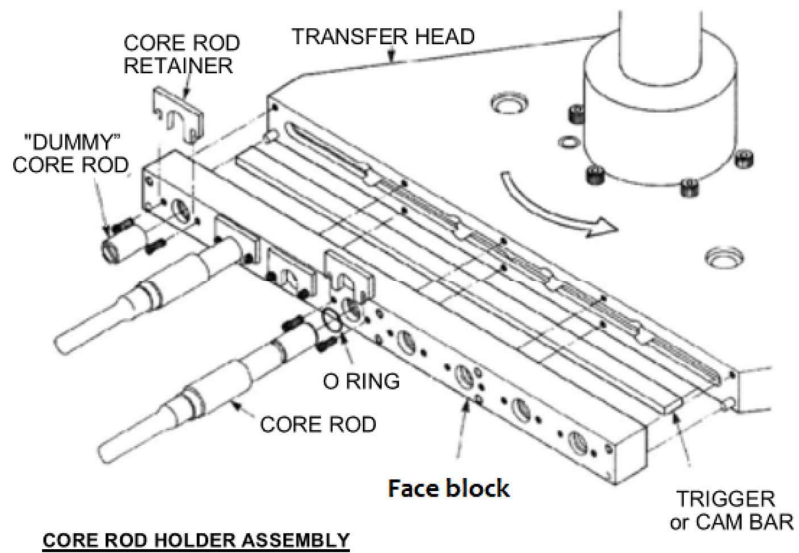
Concept

- Core rods components & Adjustments



Concept

- Transfer or indexing head
 - Trigger bar



Concept

- Stripper plate
Functions :
 - Extract bottle from core rods
 - Core rod cooling (tip)
 - Hold bottle until dropped on the conveyor

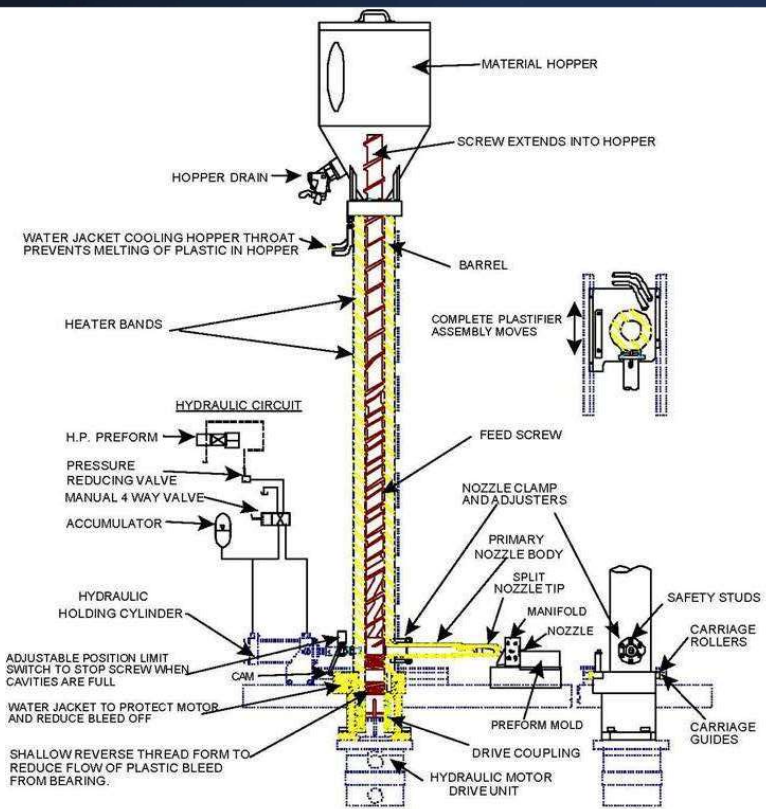


(Video)



(Video)

Concept



Vertical plastifier

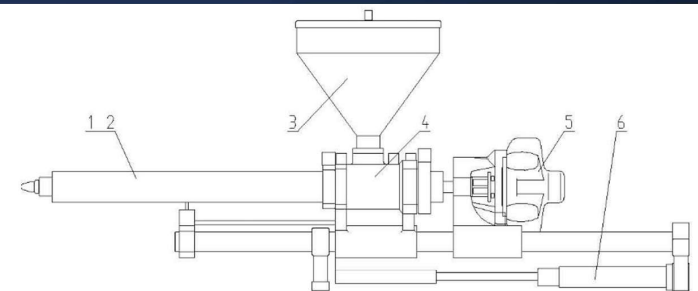


Fig.1-4 Injection parts

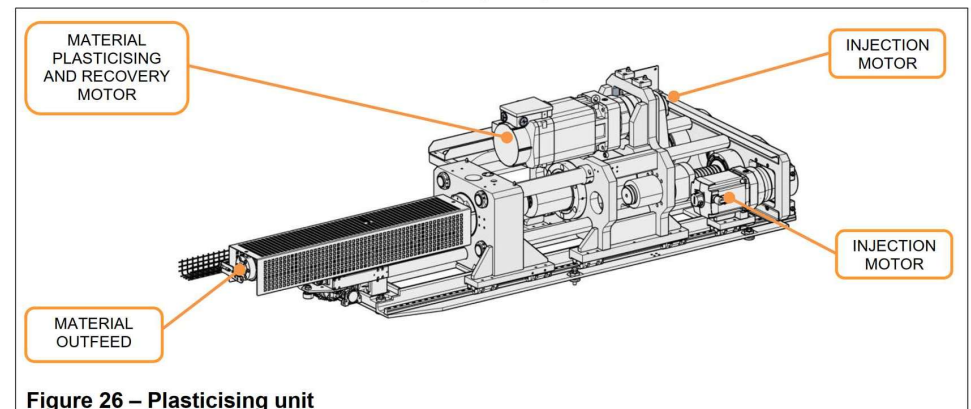
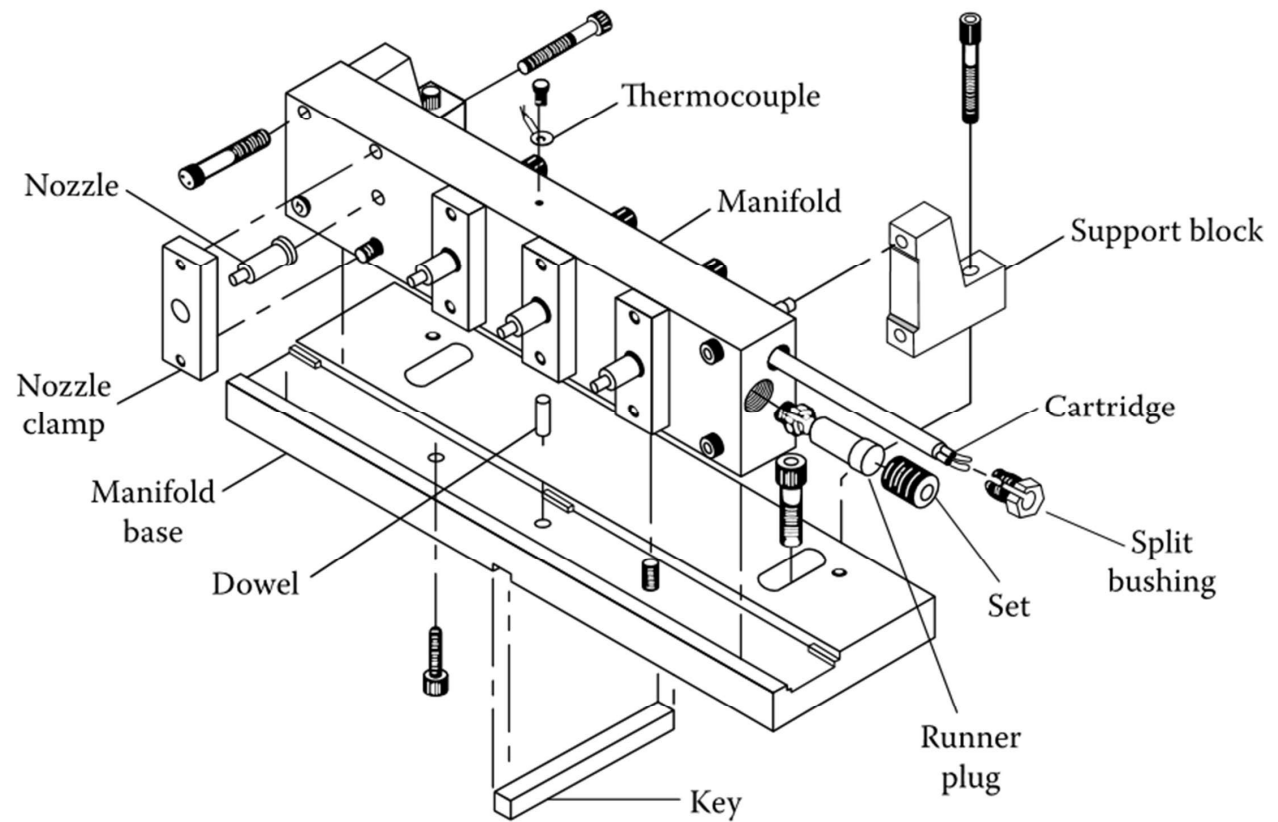
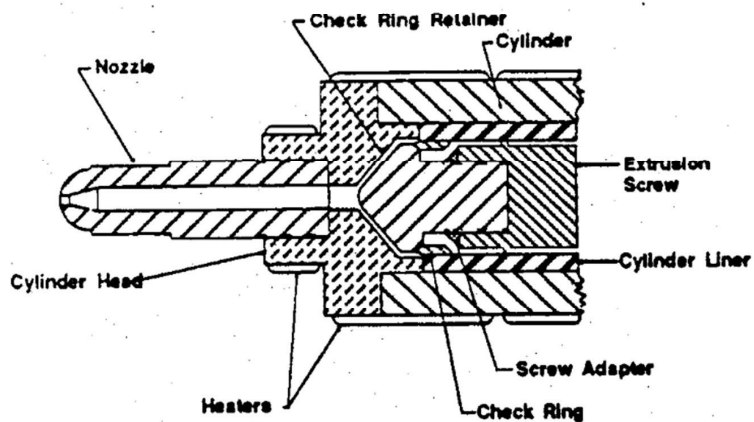


Figure 26 – Plasticising unit

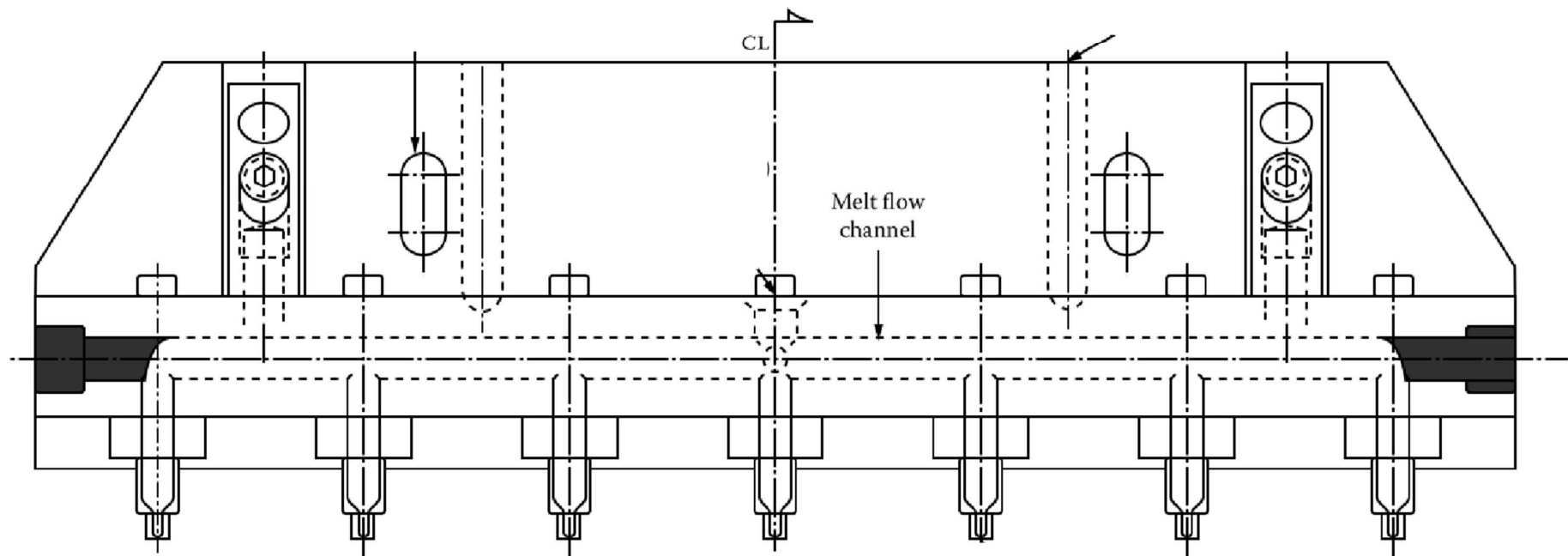
Horizontal plastifier

Concept

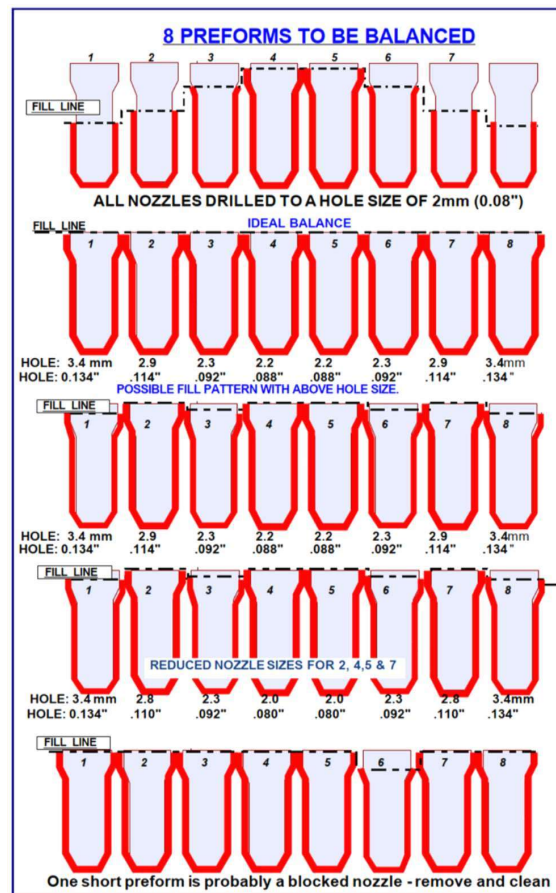
- Injection nozzle
- Manifold
- Gates, tips or nozzles



Concept

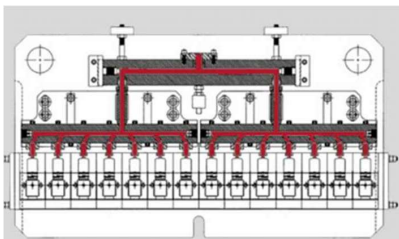


Concept

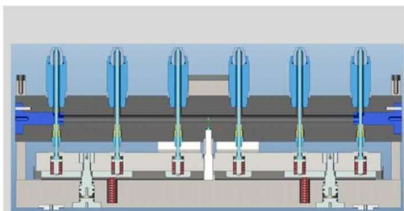


Concept

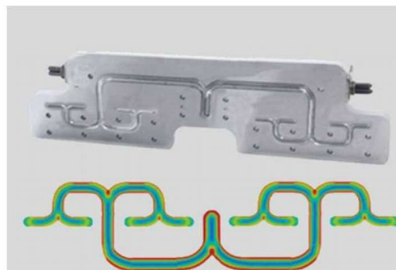
- Injection nozzle
- Manifold
- Gates, tips or nozzles



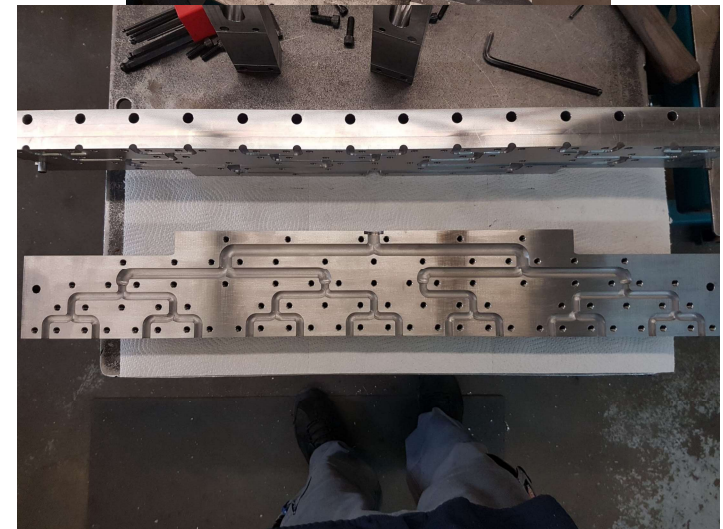
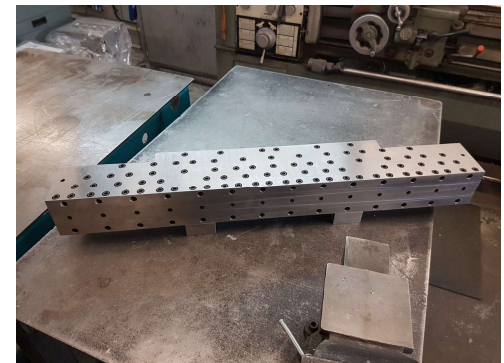
STANDARD



VALVES GATE

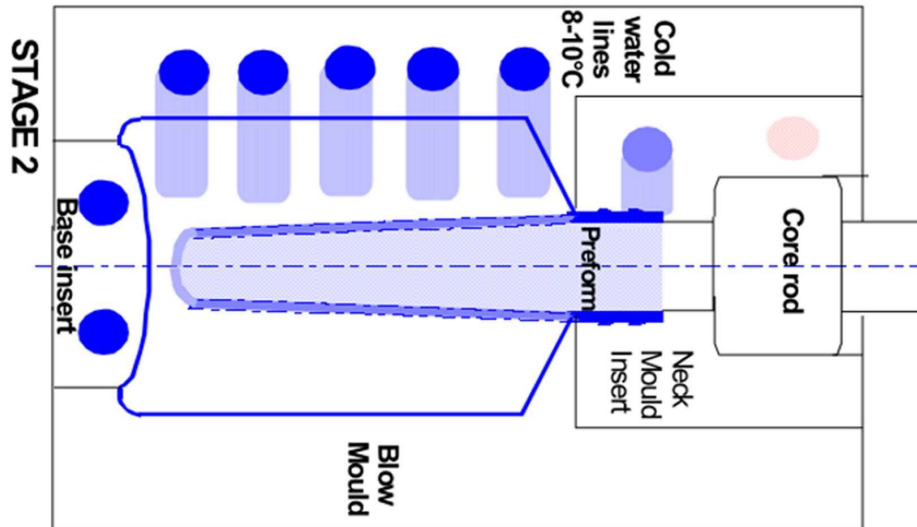
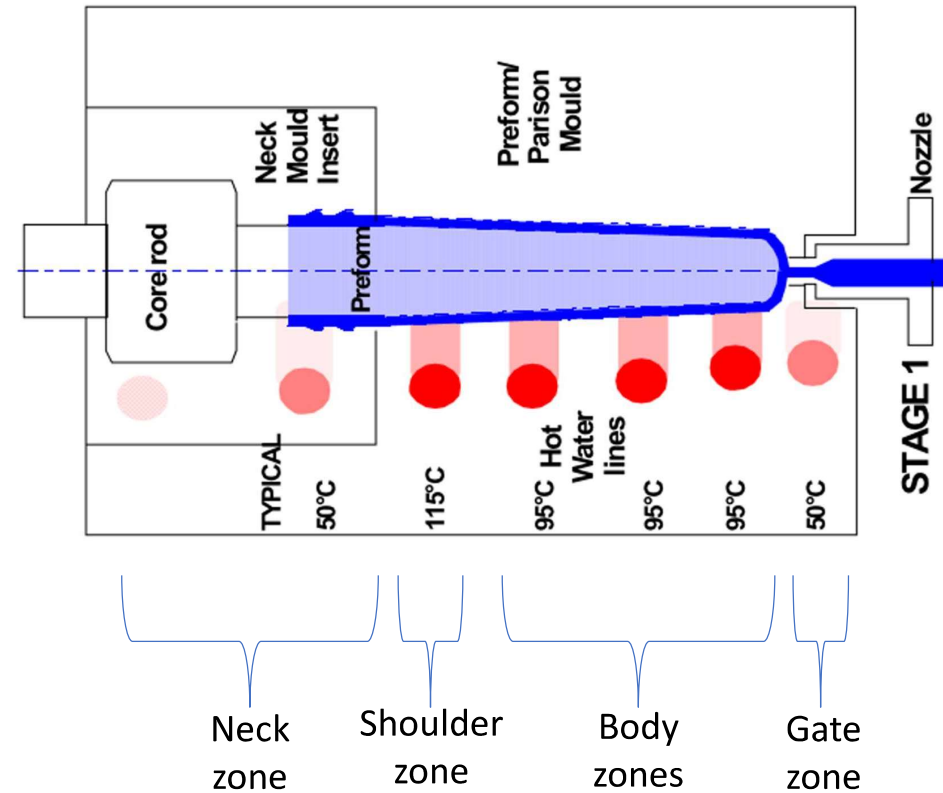


**ADVANCE FLOW
BALANCED**



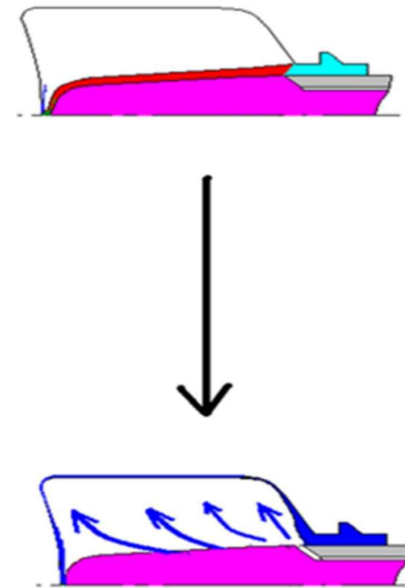
Concept

- Preform and blow mold
 - Heating and cooling

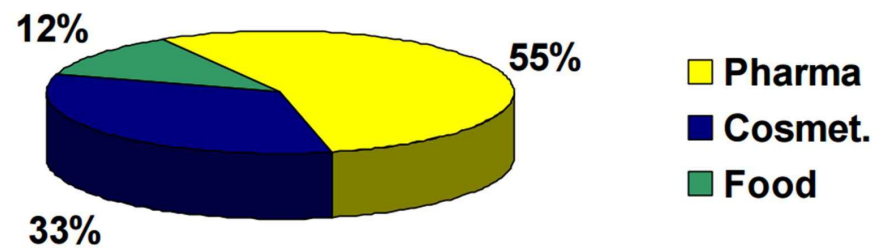


Concept

From preform to final shape



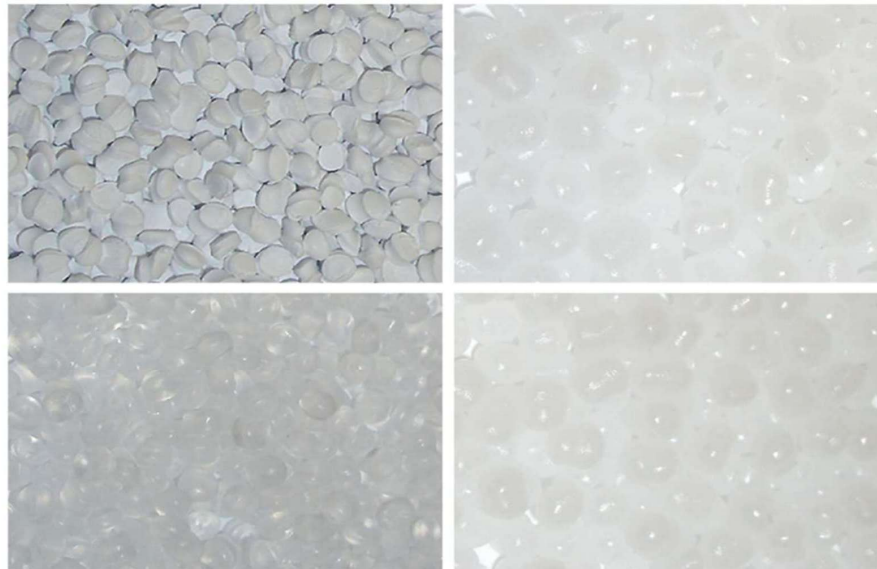
Applications



Resins

Resins

Basically all materials can be processed with IBM technology, of course this will determinate screws profile type and molds construction methods.



PET

PE

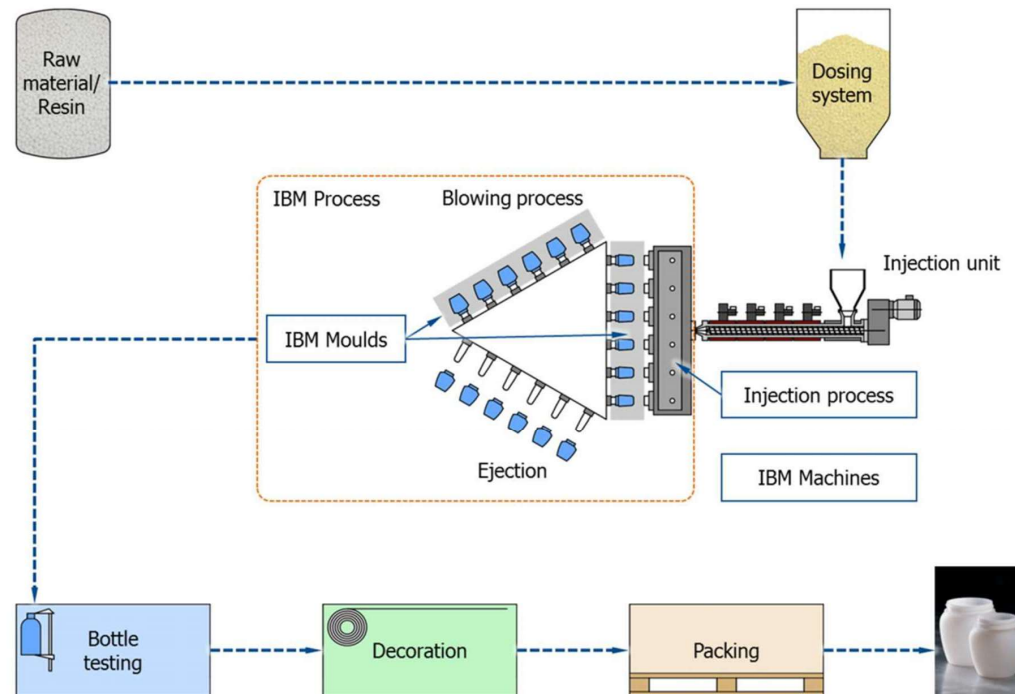
PVC

PP

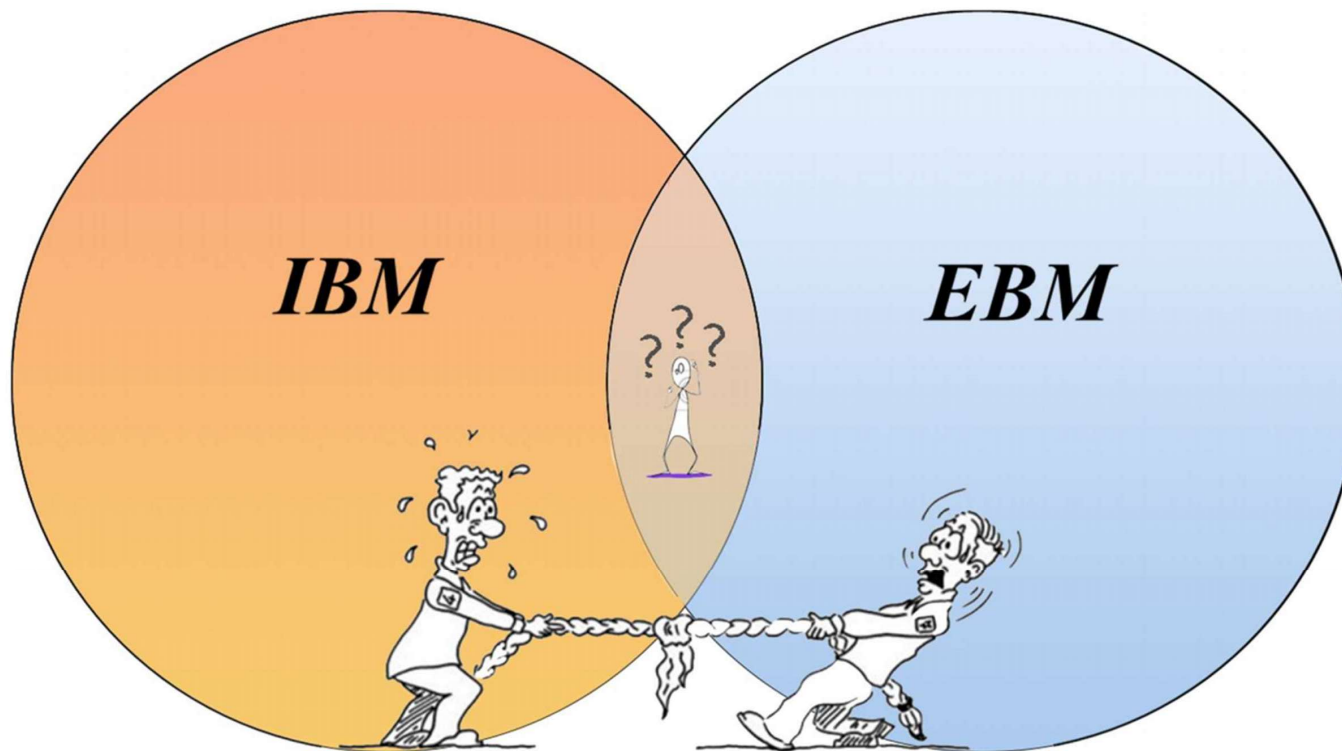
PS

Working Cell

Working Cell



IBM VS EBM



IBM VS EBM



In general, IBM becomes very attractive at the level of +1M units per year, for containers of 12 ounces (350ml) or smaller.

IBM

- No pinch-off to regrind and reprocess
- Less possibilities of contaminations
- Faster color changeover procedure
- Less noise in production area
- Less energy

EBM

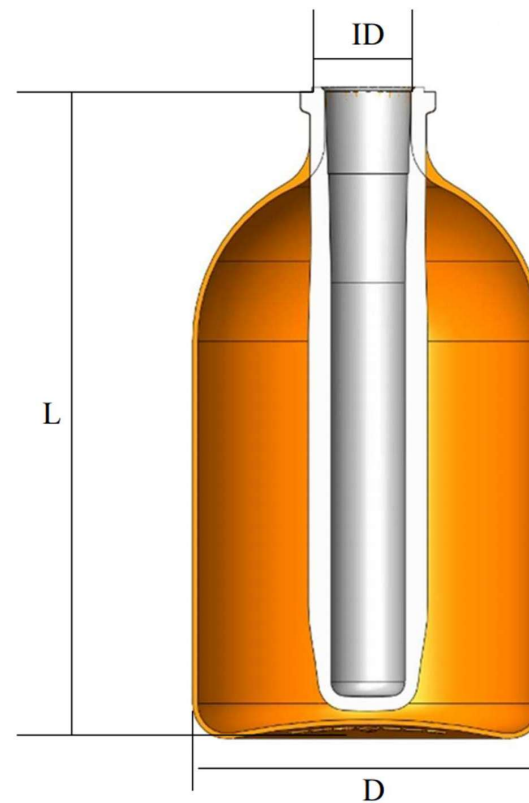
- Pinch-off to regrind and to remix with virgin material
- Regrind can bring contaminations
- Color changeover can be long to clear barrel and head
- Noise coming from blow pins
- Bigger plastifier (extruder), grinder,

Limits and constraints

Geometry

Geometry Limitations

- *Blow up limit ($ID : D$) = 1 : 2.5*
- *Length to ID ($L : ID$) = 1 : 11*
- *Ovality ratio = 1 : 2.5*



Limits and constraints

Machine Limitations



- 1) Trigger Bar Length
- 2) Swing Radius

Projected Area = Tonnage

Questions/Comments?



Thank you!

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