

## Injection-compression and compression molding process for 3D

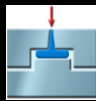
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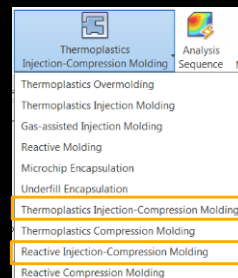
### Injection-compression and compression molding process for 3D

- For injection compression, some portion of the cavity is initially filled by injection before compression starts

#### Initial Injection Stage



#### Compression Phase



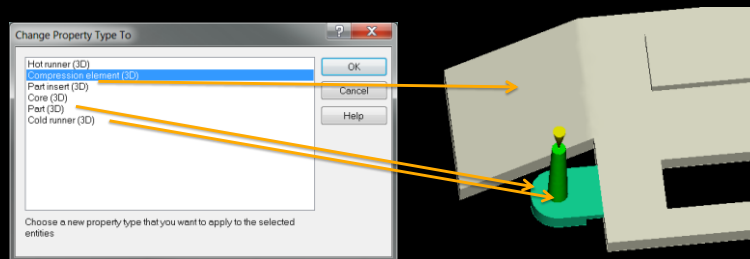
- Available for thermoplastics materials and reactive materials
- 3D mesh

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## Injection-compression and compression molding process for 3D General Element Type Assignment

- Assign non-compression regions as “part (3D)”
- Assign compression element as “compression element”

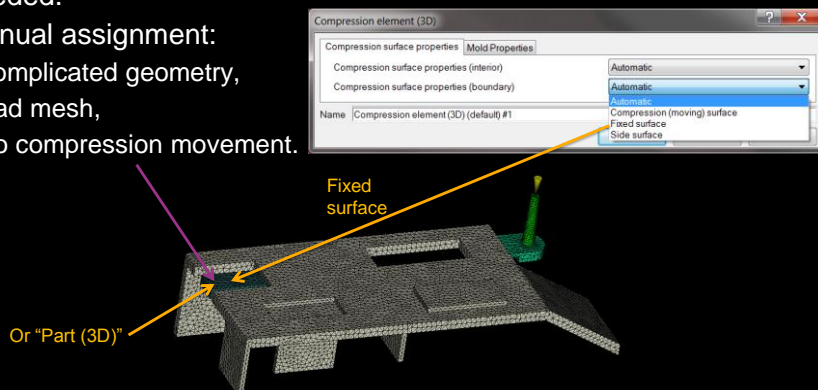


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## Injection-compression and compression molding process for 3D Compression Surface Type Assignment

- Most cases, “automatic” works OK, so no manual assignment is needed.
- Manual assignment:
  - complicated geometry,
  - bad mesh,
  - no compression movement.

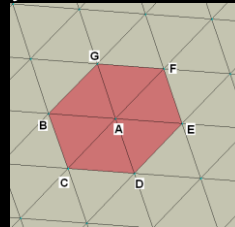
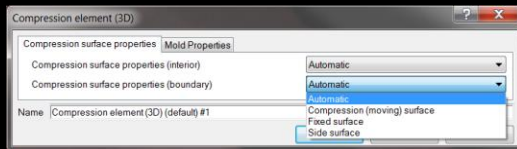


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## Injection-compression and compression molding process for 3D

- Automatic: The determination is done by the code (default)
- Compression (moving) surface: Assigned as compression surface
- Fixed surface: Assigned as fixed surface
- Side surface: Assigned as side surface
- Interior: only applies to nodes inside the selected elements (for example, A)
- Boundary: applies to nodes on the boundary of selected elements (for example, B – G)

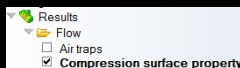


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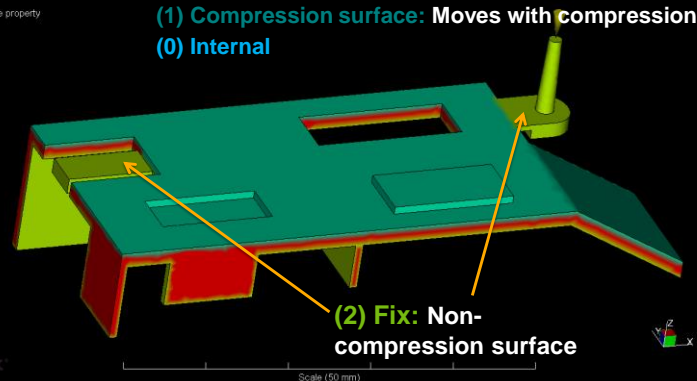
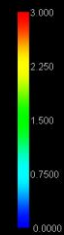
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## Injection-compression and compression molding process for 3D

### Compression Surface Property Plot (Simulation Result)



Compression surface property  
= 3.000



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## Injection-compression and compression molding process for 3D Process conditions

Process Settings Wizard - Fill+Pack Settings

Mold surface temperature: 43 C  
Melt temperature: 240 C

Process Settings Wizard - Compression Settings - Page 2 of 2

Press open distance: 1.5 mm (0.1000)

Press compression starts: At the end of packing

Press compression time: 10

Press compression speed vs distance (compression is along z axis)

	Distance	Press compression speed
	mm (0.100)	mm/s (0.1000)
1	0.1	1
2	1	1
3		
4		

Switch to press force control: By % node volume filled

Compression force after switch to press force control: Relative to the value at switch over

Press speed cap: 1000 mm/s (0.10000)

Press compression force cap: 150 tonne (0.70002)

Compression direction: +Z

By % volume filled (Note: % of the final part volume)

From the start of compression (When the press force reaches compression force cap)

Relative to the value at switch over (Absolute press force specification)

Relative to the value at switch over (Relative (relative to the press force at switch over))

Absolute value (Absolute value)

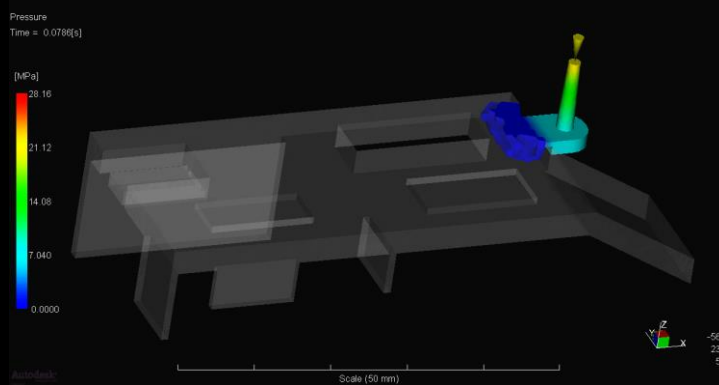
Maximum compression speed

Maximum compression force

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## Injection-compression and compression molding process for 3D Results

- Most time series (animation) results are shown at the actual compression position. The time series results should start at filling stage for this.

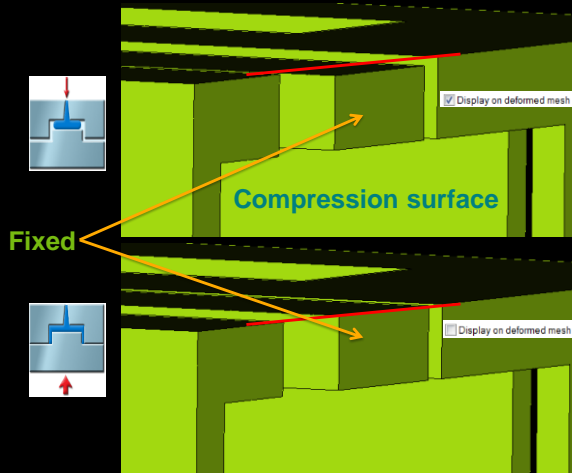
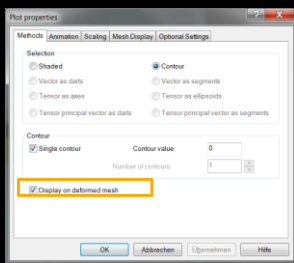


## Injection-compression and compression molding process for 3D

### Results

- Deformed mesh

#### Polymer fill region



- All other results are shown at the final part geometry (at the end of compression)

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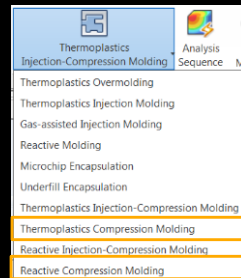
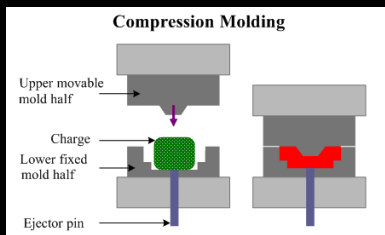
## Injection-compression and compression molding process for 3D

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## Injection-compression and compression molding process for 3D

- Compression molding is a method of [molding](#) in which the molding material, generally preheated, is first placed in an open, heated [mold](#) cavity. The mold is closed with a top force or plug member, pressure is applied to force the material into contact with all mold areas, while [heat](#) and [pressure](#) are maintained until the molding material has cured. \*



- Available for thermoplastics materials and reactive materials
- 3D mesh

\* WIKIPEDIA  
The Free Encyclopedia

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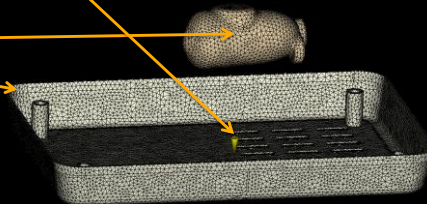
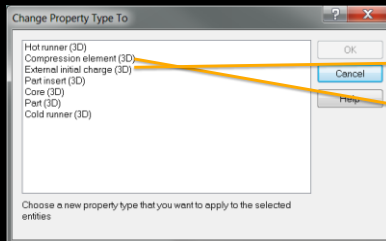
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### Injection-compression and compression molding process for 3D

#### General Element Type Assignment

- Assign as “compression element”
- Assign the center of the initially filled area in the “compression element” as injection location
- Assign as “external initial charge”



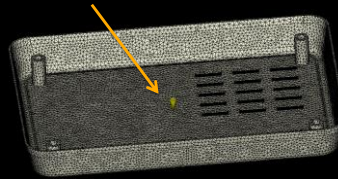
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## Injection-compression and **compression molding process for 3D**

### Injection Location

- 1 injection location assigned at the compression element node which is initially filled
- Assigned at the node which contacts the compression surface of the mold first
- If several nodes contact the compression surface at the same time, assigned at the center of those nodes
- No material enters through injection location in compression molding



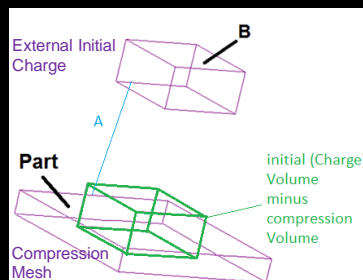
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## Injection-compression and **compression molding process for 3D**

### External Initial Charge Method

Create a mesh external to the compression mesh (as in B). At the start of the analysis the green volume in the compression mesh is considered as initially filled.



Representation of the simulation model  
(Part is for end of compression)

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## Injection-compression and compression molding process for 3D

### Process conditions

- Press open distance
  - Automatic (press opens to just touch the top of the initial charge)
  - Specified (manually specify the press open distance)
- Press compression time
- Press compression speed versus distance
- Switch to press force control
  - From the start of compression
  - At compression force cap
  - By %node filled
  - By time
- Compression force after switch over:
  - Absolute
  - Relative
- Compression speed cap
- Compression force cap
- Compression direction: +Z or -Z

	Distance mm (0-100)	Press compression speed mm/s (0-1000)
1	1	12.5
2	1	32.5
3		

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## Injection-compression and compression molding process for 3D

### Process conditions

- External initial charge option
  - Rigid charge with automatic offset \*
  - Rigid charge with specified offset
  - Flexible charge in compression surface with automatic offset
  - Flexible charge in fixed surface with automatic offset
- Extra initial compression volume percentage
  - Extra initial charge volume % for complete filling of the cavity (to account for the shrinkage and mass error)

(\* Usually, default can be used)

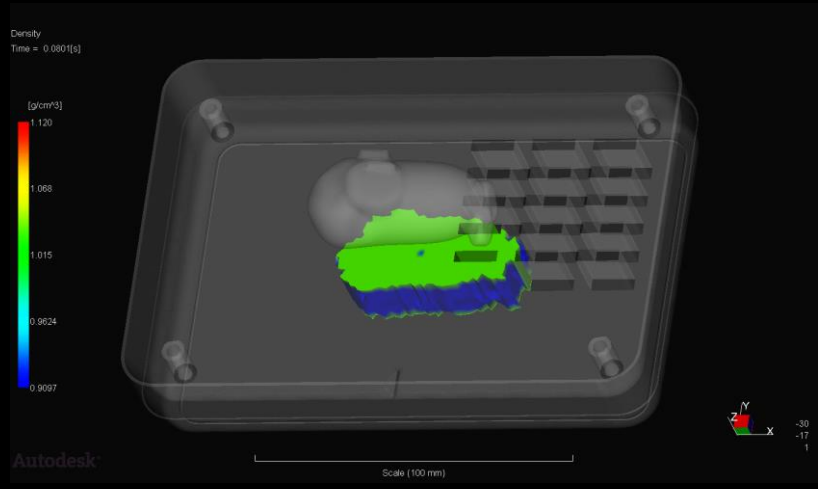
	Distance mm (0-100)	Press compression speed mm/s (0-1000)
1	1	12.5
2	1	32.5
3		

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# Injection-compression and compression molding process for 3D Results



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