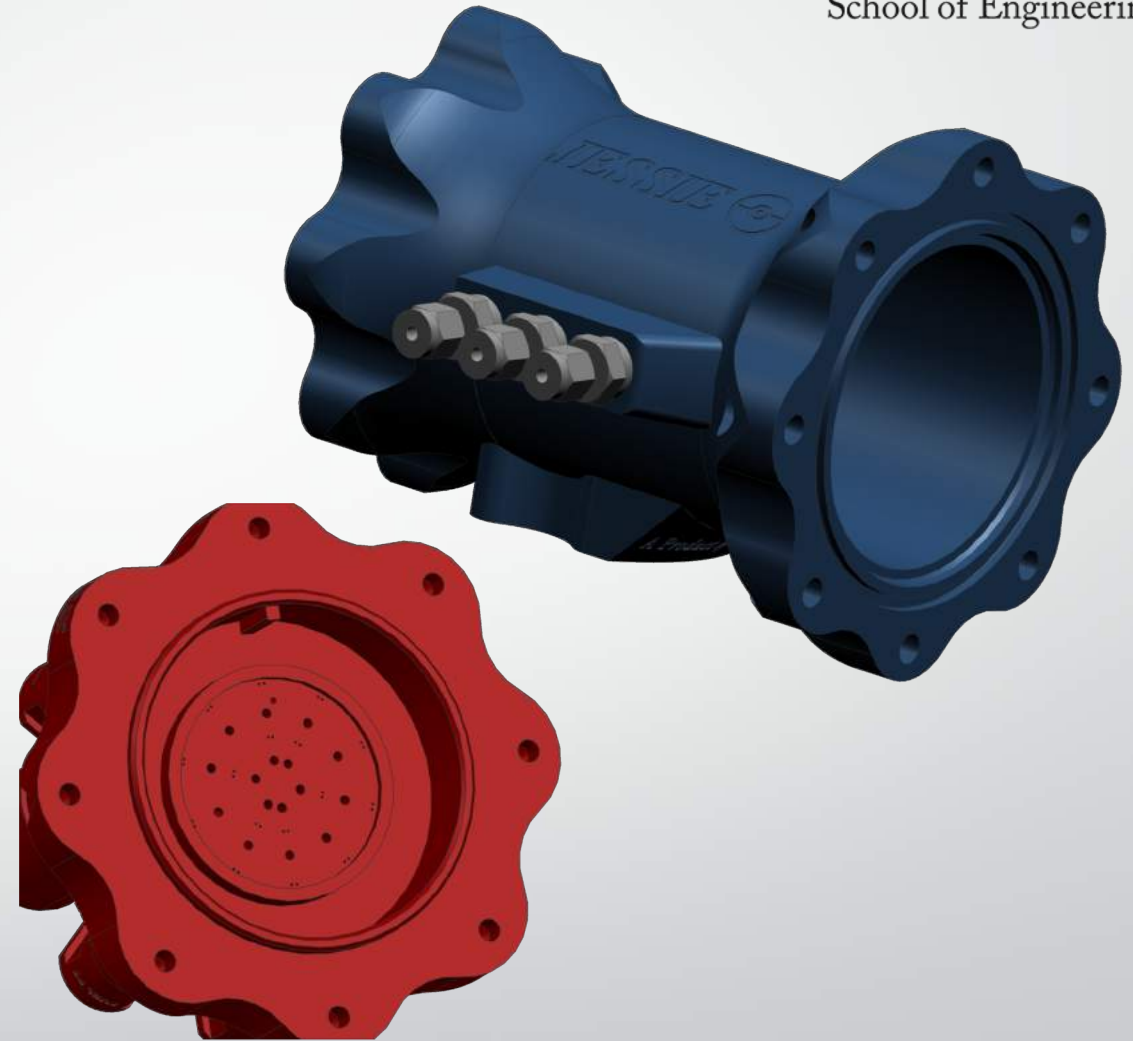


# J&J 3D Print

## *Printed Pieces*

Each engine will be made up 4 printed pieces:

1. Injector
2. Chamber
3. Nozzle Retention Ring 1/2
4. Nozzle Retention Ring 2/2



# J&J 3D Print

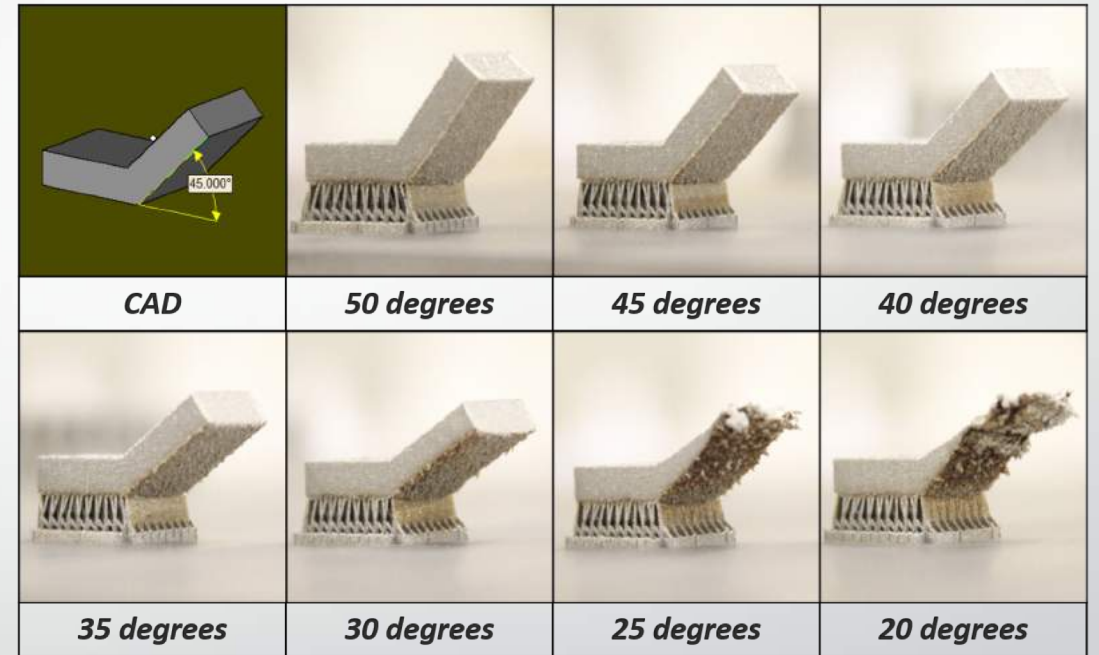
Printer: EOS M290

## Design Constraints:

Max Print Height: 325 mm (12.8 inch)

Must avoid  $45^\circ$  overhangs

Features should be above  $150 \mu\text{m}$  (0.006 inch)



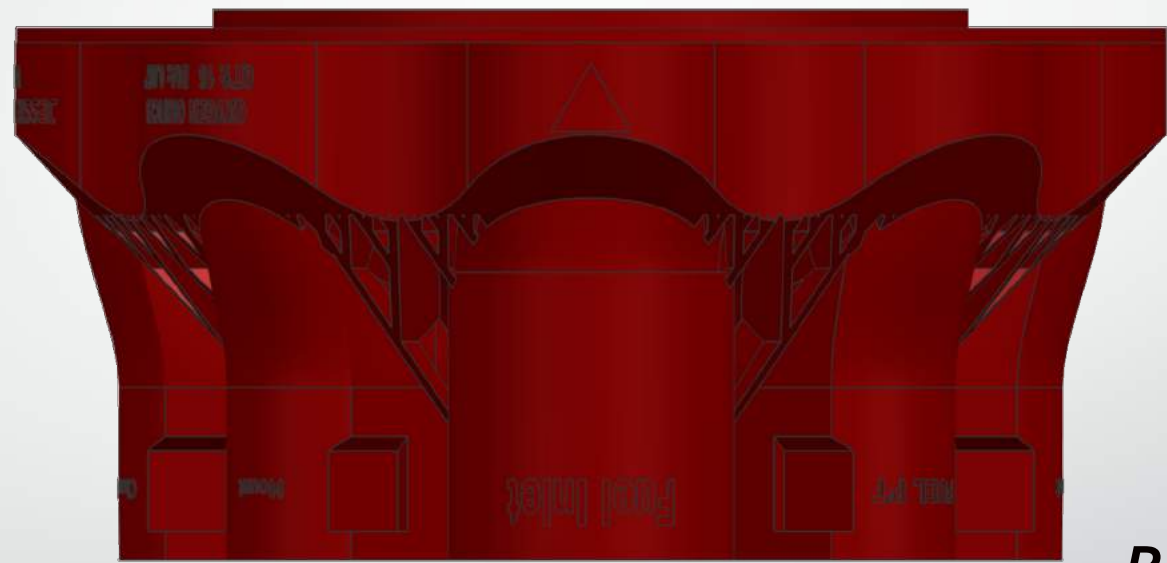
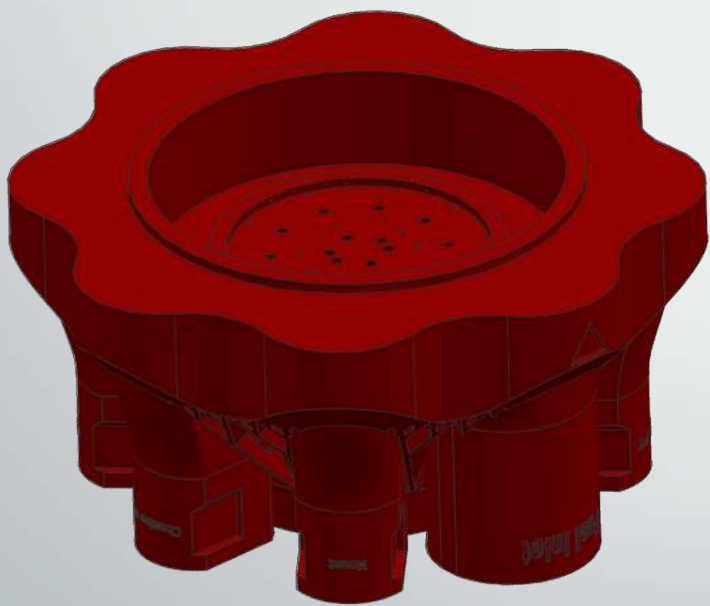
All J&J are designed with “built in” support structure to:

- Increase print success probability
- Decrease post-processing operations

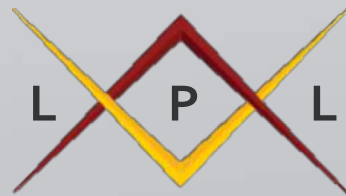


# J&J 3D Print

*Injector Print Direction*

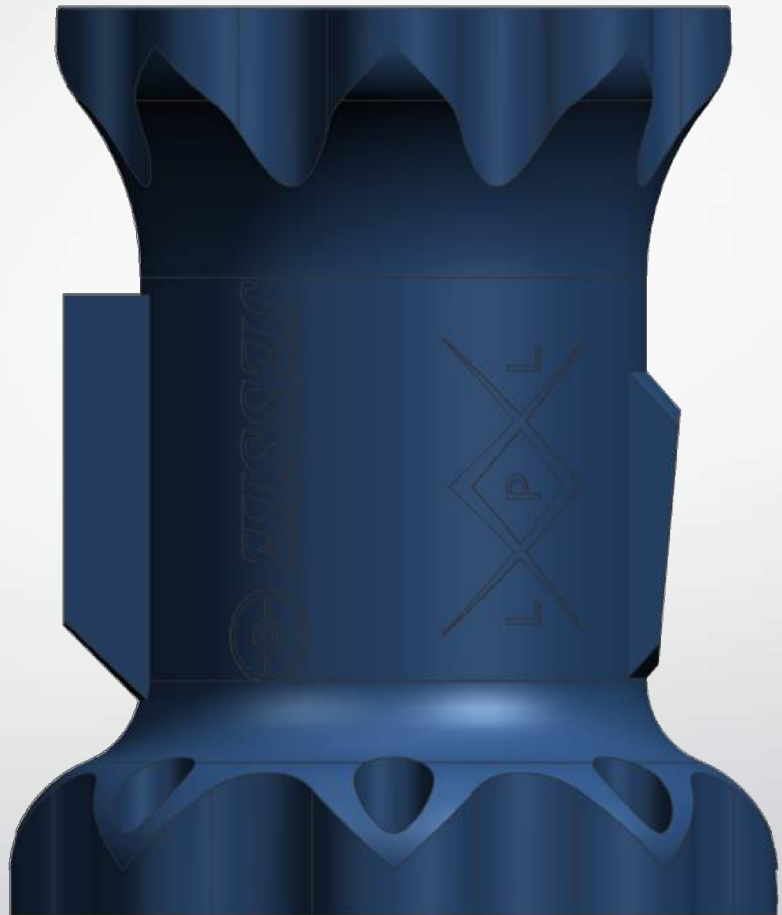
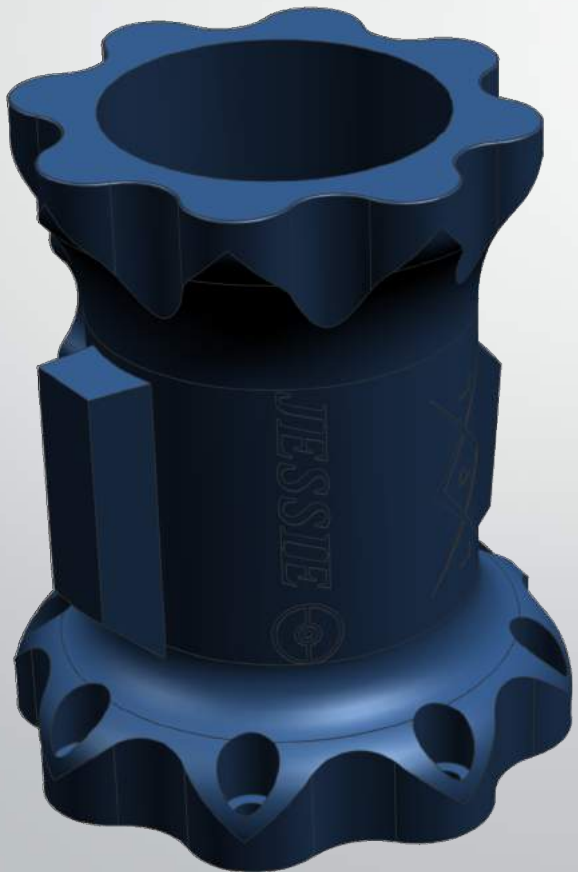


*Print Direction*

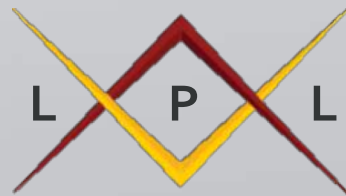


# J&J 3D Print

*Chamber Print Direction*

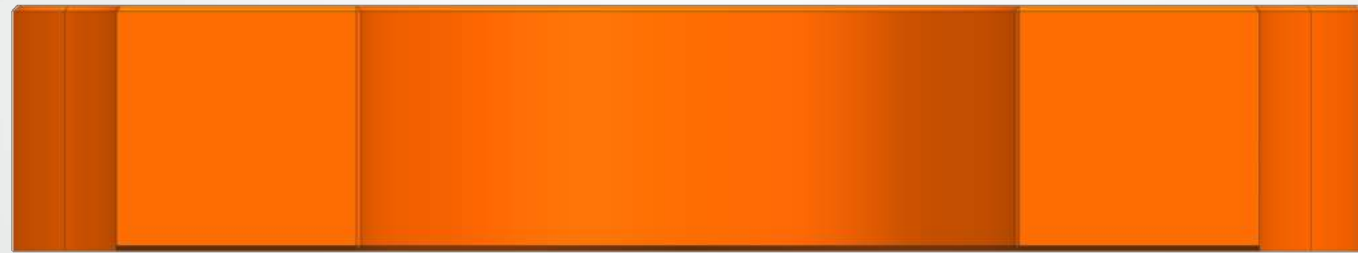


*Print Direction*

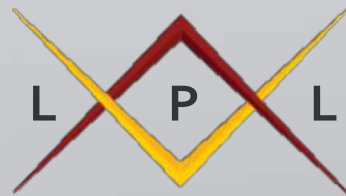


# J&J 3D Print

*Retention Ring Print Direction*



*Print Direction*



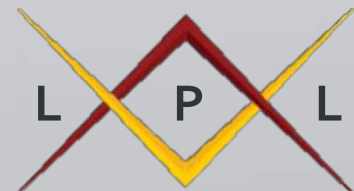
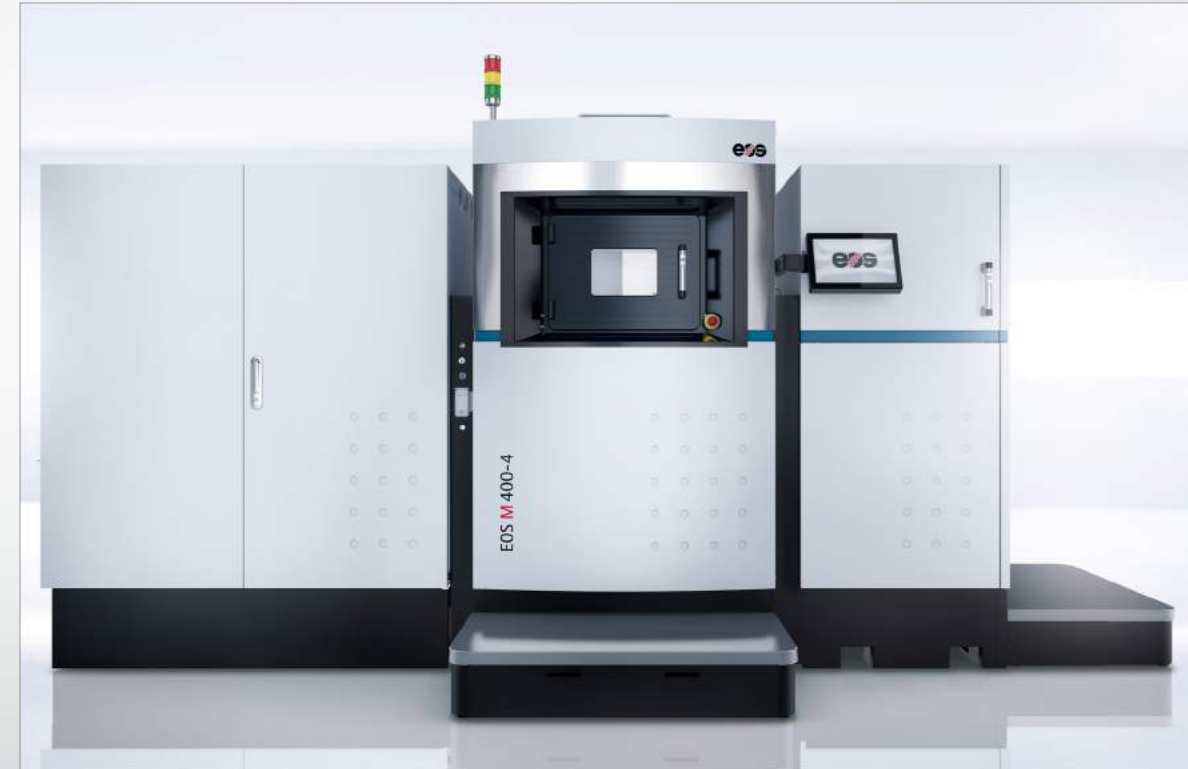
# J&J 3D Print

## *Printer Info*

**Printer:** EOS M 290

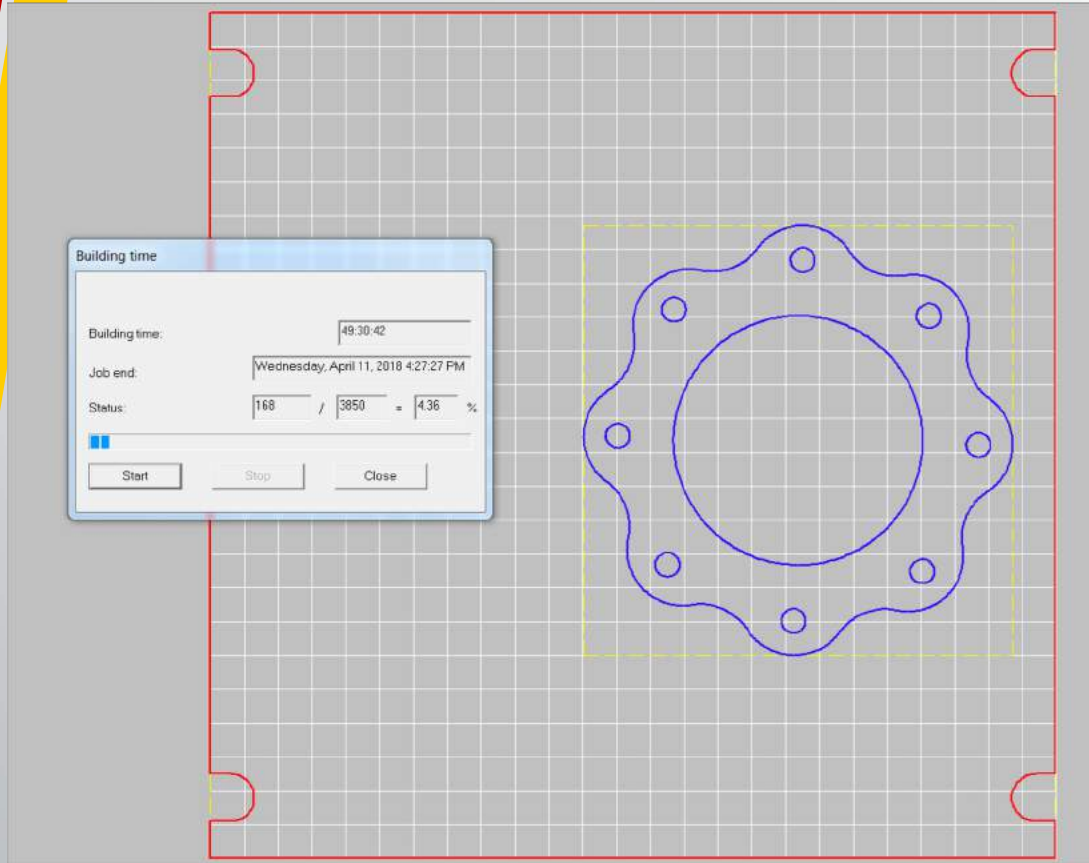
**Type:** Powder Based that manufactures alloys using full-melt direct metal laser sintering, DMLS

**Max Build Volume:** 9.85" x 9.85" x 12.8"

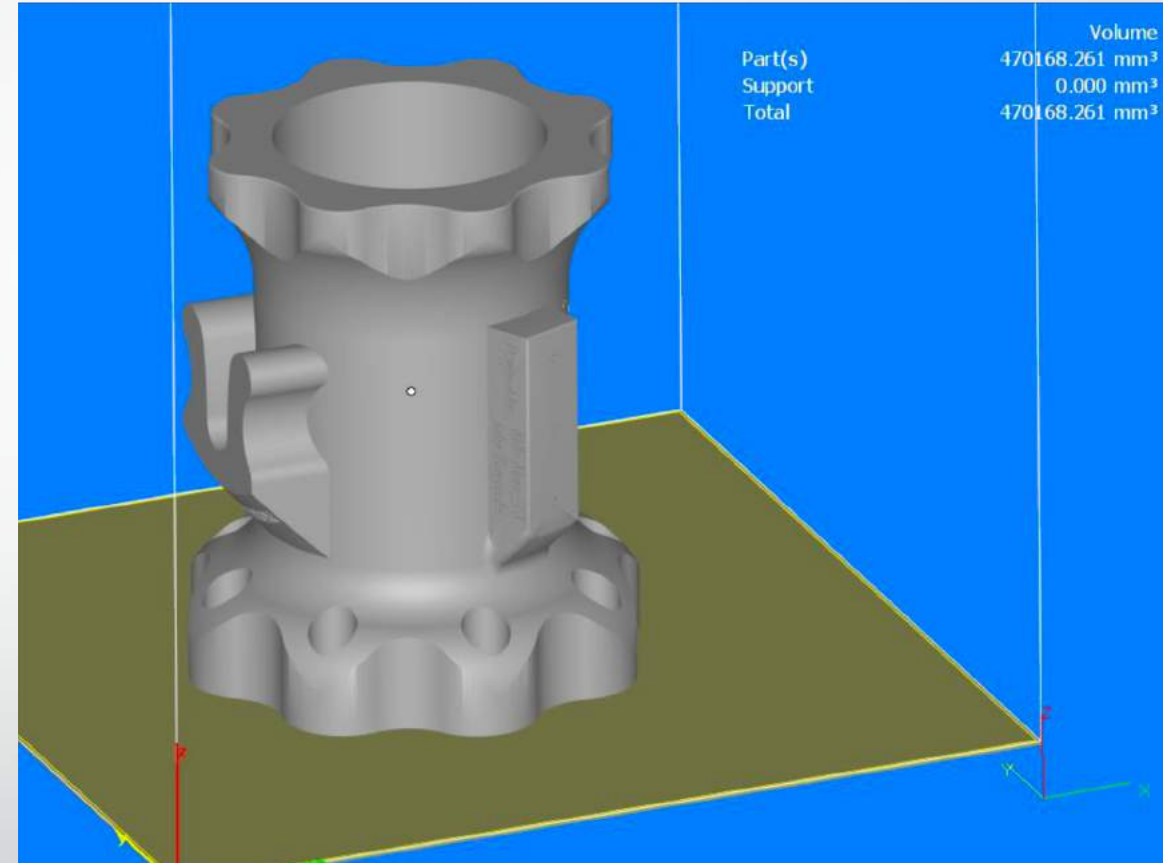


# J&J 3D Print

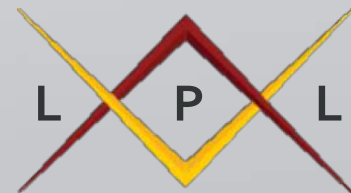
## Jessie Chamber Print



Build Time – 49 hours 30 minutes

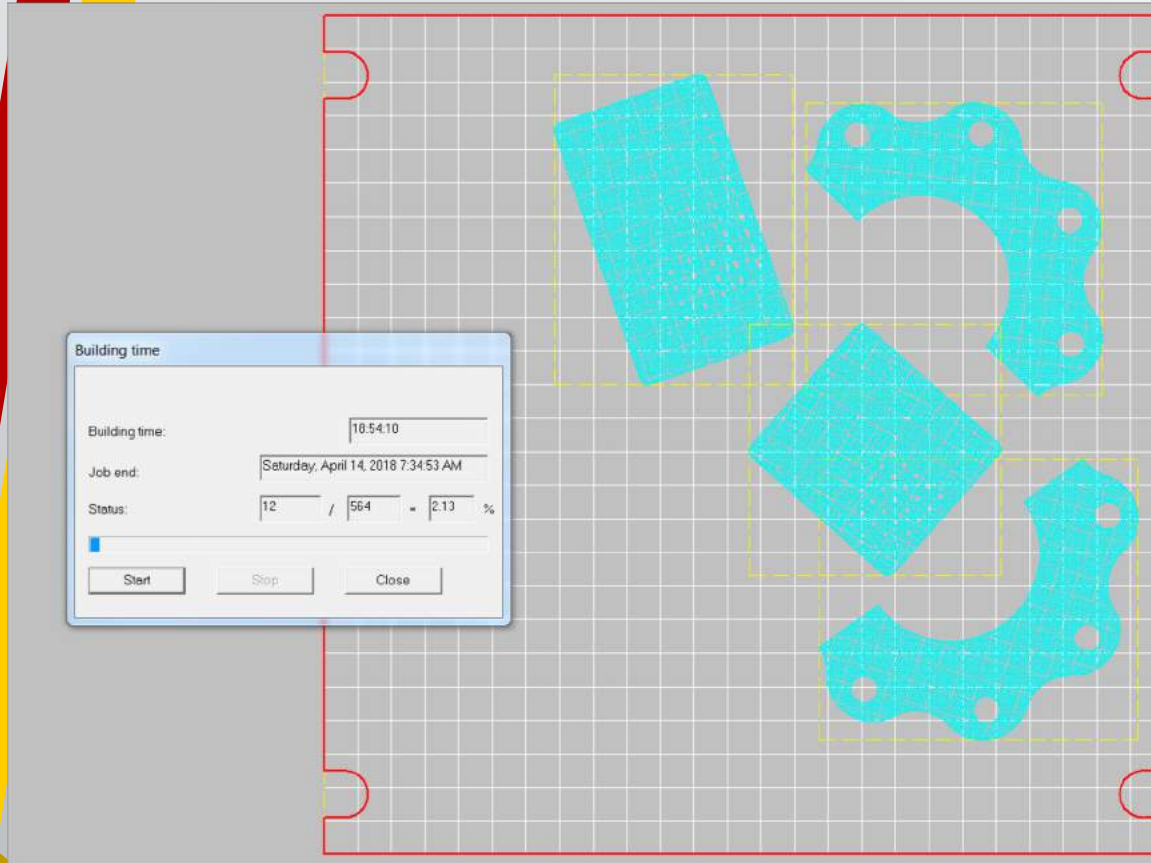


Build & Building Volume



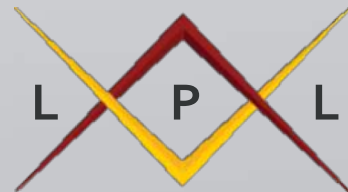
# J&J 3D Print

## Jessie Retention Ring & Orifice Blocks Print



Build Time – 18 hours 54 minutes

Build & Building Volume





# J&J 3D Print

## *Jessie & James Injector Print*

The screenshot displays a 3D printing software interface. On the left, a 'Building time' dialog box is open, showing a building time of 62:26:33, a job end date of Monday, April 16, 2018 3:32:13 AM, and a status of 30 / 1517 = 1.98%. Below the dialog box, two blue wireframe outlines of gear-like parts are shown on a grid. On the right, a 3D perspective view of the two parts is shown. A table in the top right corner provides volume information:

| Part(s) | Volume                     |
|---------|----------------------------|
| Support | 0.000 mm <sup>3</sup>      |
| Total   | 748566.389 mm <sup>3</sup> |

Build Time – 62 hours 26 minutes

Build & Building Volume

