Desktop Metal Shop: Prepping a Sinter Run

Learn how to prepare Desktop Metal Shop parts for a sintering run in the Desktop Metal furnace

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Introduction

The sintering process takes parts from a “green” state to their final, fully solid metal forms. Preparing parts to sit in the graphite retort properly for the 40+ hours that they will be in the furnace is important to achieving good parts without damaging the (very expensive) graphite retort.

Images by: Terrapin Works

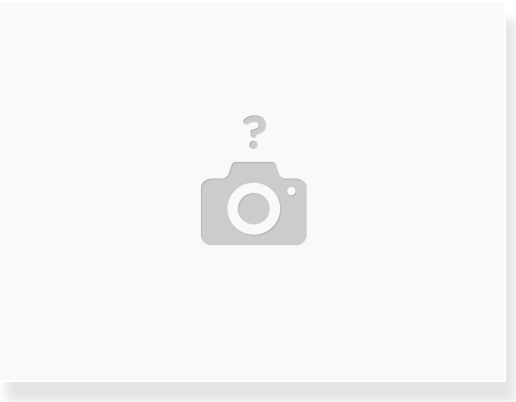
TOOLS:

- Scale (1)
- Water Bottle (1)
- Roll of Shop Towels (1)
- Anti-static Gloves (2)
- Cotton Jacket (1)
- PAPR System (1)
- Protective Booties (2)

PARTS:

- Ceramic Setter Plates (1)

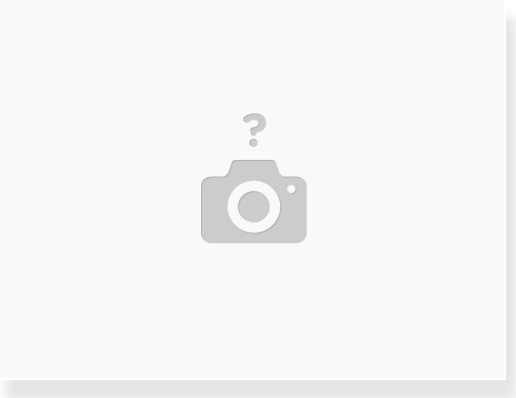
Step 1 — Basics of Sintering Process



Before sintering, parts are in a "green" state and must be handled with care

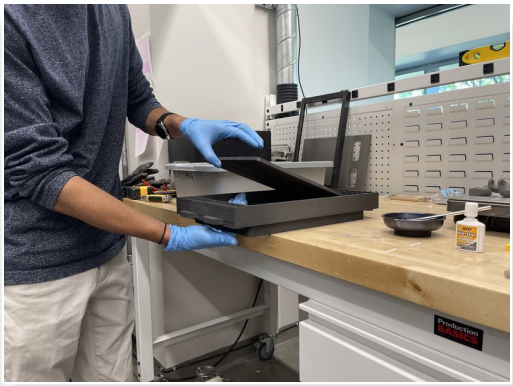
- Parts would fuse to the graphite retort without a layer of separation
  - Setter plates are made of ceramic and serve this purpose
  - Always maintain a 5-10mm margin to the boundaries of plates to minimize risk
- All parts involved in this process are fragile, so take great care and patience

Step 2 — Preparing Work Area



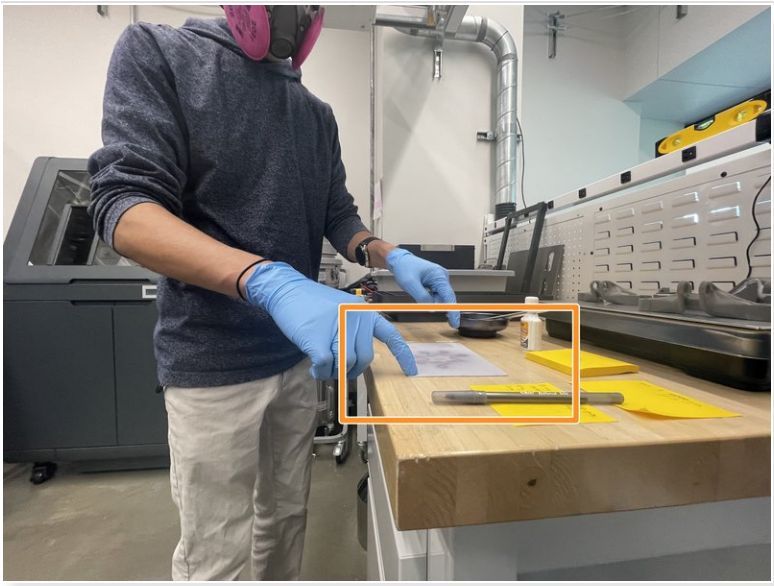
- Clear a decent area on a powder processing worktable
- Wipe down the area with DI water and dry thoroughly
- Connect and power on a parts scale
- Prepare to track object weights on a sticky note or similar

Step 3 — Preparing a Retort Ring I


- Retrieve a graphite retort ring
- Inspect the retort ring for any solidified metals
- Carefully set in a graphite base plate:
  - Place the retort ring over the edge of a table or tilt up the ring with one hand
  - Set one edge of the graphite base plate into the ring
  - While supporting the base plate, lower it into the ring gently

Step 4 — Checking Setter Plates



- Retrieve setter plates - 4 per base plate
  - ⓘ Setter plates are also fragile, handle with care
- Check setter plates for warping
  - ⓘ Setter plates can be reused but also can warp - these should not be used
    - Place the plate on a flat, clean surface (ideally stone or resin)
    - Using two fingers, alternatively tap each pair of diagonal corners
    - Feel and listen for any up or down movement - any movement indicates that the plate should not be used

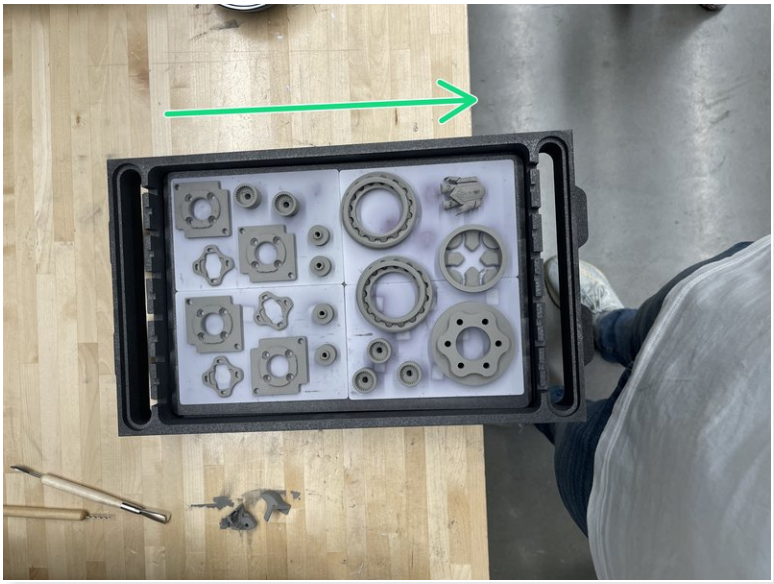
Step 5 — Laying Setter Plates

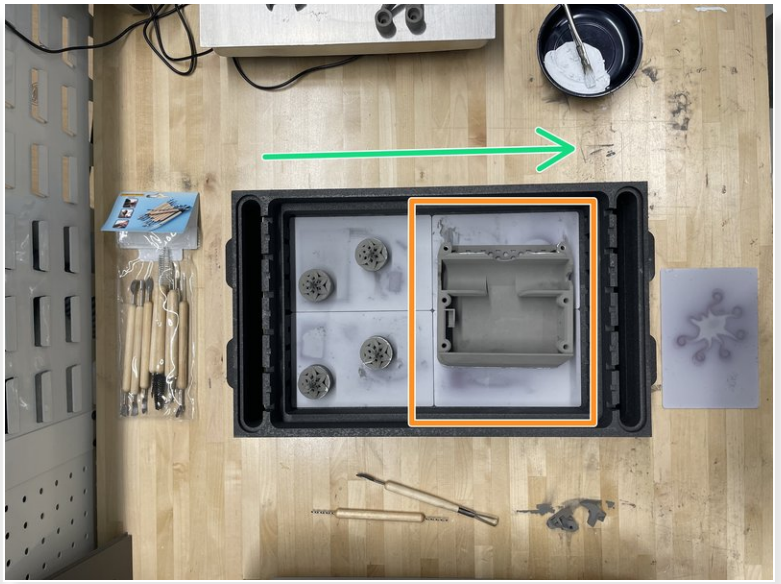
- Place 4 setter plates in the base plate
- Butt each plate right up to each other
- Center all setter plates on the base plate

Step 6 — Weighing Parts

- Tare the scale and ensure it is displaying in kg or grams
- Place a batch of parts on the scale
  - Ideally, all parts in each ring should be weighed together to minimize mistakes
  - The rings should each be as balanced as possible - evenly distribute large parts between each ring
- Take note of the weight and quantity of parts

Step 7 — Placing Parts





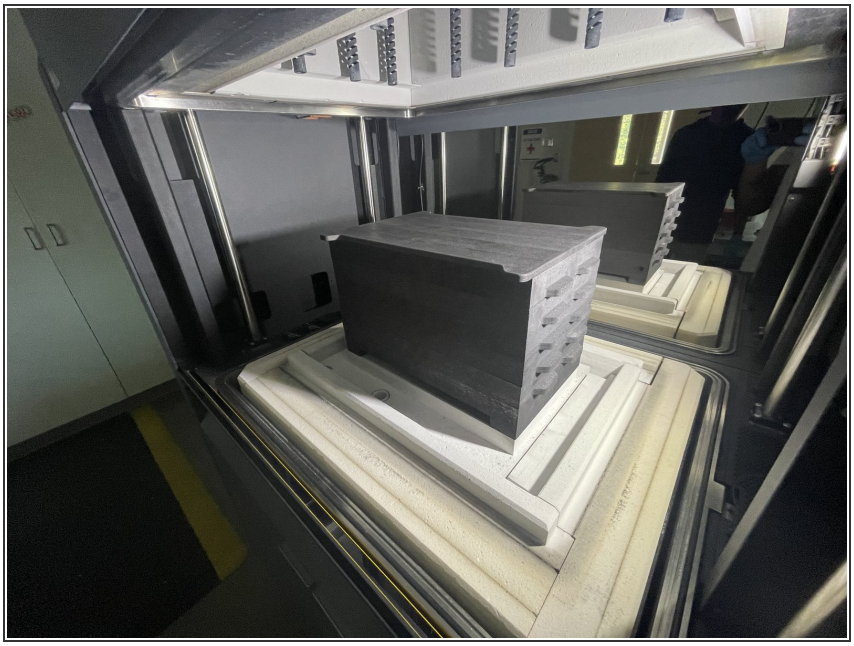
Parts that are weighed can be transferred from the scale to the prepared retort ring

- Place large parts towards the right side (when the retort is in the furnace)
  - Large parts should only 'span' multiple setter plates if absolutely necessary, but be careful to ensure there is no gap
- Try not to place parts 'behind' each other
  - Forming gas is flowing through the retort in this direction, so each part creates a gas 'shadow'
- Leave about 10 mm of space between larger parts - smaller parts can be slightly closer
- Leave about 10 mm of space from the parts to the edge of the setter plates

Step 8 — Finishing a Retort Ring

- Check to see if parts are taller than where the next base plate will sit
- If parts inside the ring are too tall to safely put a base plate on the next ring in the stack:
  - Retrieve another graphite retort ring
  - Slowly lower it on the prepared ring
  - Ensure that the next ring and baseplate will be clear of the parts
- Follow the instructions (see separate guide) to place the prepared retort ring into the furnace

Step 9 — Prepare the Rest of the Rings



- Repeat the previous steps to build all rings
  - There will be total of 6 rings and a maximum of 6 base plates

⚠ EACH RING MUST go into the furnace, regardless of how many parts are inside

Remember to weigh parts

⚠ Avoid accidently reweighing parts that have already been tracked

- The retort layers will be loaded into the furnace following directions in this guide