Step-by-Step Molding Instructions

Foundry Sand/Greensand

In commercial foundries the sand is used over and over thousands of times. Between uses, the sand is rejuvenated by adding water and mulling (mixing and smashing). If you do not let the sand dry out all the way, you do not have to mull, just add water. Sand grit is determined just like sandpaper. 150 is very fine and 50 grit is coarse. Fine sand will give good detail, coarse sand will give a pebbly or rough texture. If you look at the sand through a microscope there are gaps and spaces like a sponge. Any moisture that turns to gas during pouring can escape out the pores (gaps). Other materials like plaster do not have gaps for the gas to escape. The sand used in greensand is silica, common/ordinary sand. You can use beach sand, desert sand.....it's all good as long as it is clean and fine. The sand is held together with bentonite, a powdered clay. Bentonite is also used for wine-making, well drilling, patching dry lake beds, cosmetics, farm-feed additive and milkshake thickener. Bentonite is also sold in health food stores for colon problems. You can purchase bentonite locally at well-drillers or well-drilling suppliers.

Helpful Hints:
1. Start casting with aluminum (low brass or bronze. Practice with easy metals.
2. Finish molding before you start your furnace. DO NOT light the furnace then start molding.
3. Greensand is about 6% moisture. DO NOT let your sand dry out! Keep it covered or in a sealed container when not in use.
4. DO NOT melt aluminum cans. Can metal is covered in vinyl to protect the aluminum is good.

Molding tools needed:
Riddle (Sieve/screen), large hole cutter (1/2" copper pipe), dowels (1/4" and 1/8"), rammer/striker (wood 10"x1.5"x1"), runner bar pattern, spoon, trowel and parting dust (in the black sock).
Civil War Plaque

1. Place iron pattern in flask with enough room for gating. In this mold we use a wood pattern for "runner" and "gate".

2. Dust pattern with parting dust to keep it from sticking. Parting dust is a hydrophobic material, it repels moisture. Most powders (baby, talcum) absorb moisture.
3. Use a fine riddle to cover **just the pattern**, then fill up the flask with sand, level (flush) with the top. There is no need to riddle all the sand, just make sure there is no lumps. The riddle fluffs the sand up so it can be packed properly, the same way a flour sifter works.

4. Use paddle first. Hold the
5. Use the butt side of rammer east to west (lightly to protect pattern), then north and south (harder to pack mold tight).

6. Fill it up with sand to about 2 inches above flask.
7. Use rammer again North to South, then East to West pattern. Hold the flask with your hand, hard, to pack the sand very tight. Then strike off drag section with rammer, then spread a small amount of sand (handful) out to cushion the bottom board.
9. Place bottom board on top of your mold.

10. Holding bottom board and flask together, flip it over.

12. Use your spoon and smooth the edges of the pattern and any rough areas.
11. Remove the cope and pattern board.
13. Replace cope and apply parting dust. WAIT! Make sure hinges and latches are on the SAME side! This cope needs to be flipped the other way.
14. Strike off cope level with the rammer/striker. Use your trowel to smooth.

15. Take cope off and set it aside.

16. Form sprue hole with copper pipe, place hand against opposite side to prevent excess breakage.

17. Form pop-up against opposite
Make sprue hole at one end and the pop-up in the middle somewhere. Do not make the pop-up at the end.

18. When molten flows into the mold, erosion eats away at sharp edges. Round sharp or rough areas with your finger. Do not rub with your finger, push gently.

19. For areas you can't reach with finger, use the dowel to smooth inside holes. Clean pop-up hole also!

20. Carve pouring cup into the sprue hole on the top of the mold. Like a small cup. Slick what you can with the spoon.
21. Clean rough areas around sprue and pop-up with your finger and dowel.

22. Tap runner pattern to loosen, then remove.

23. Remove wood gate pattern.

24. Tap pattern lightly to loosen.
25. Put a screw partially into the pattern for a handle. Remove pattern.

26. Smooth any molten metal with the gate and where the runner meets the gate and where the gate meets the pattern. Your finger is the most useful molding tool.
27. **Is your sand too wet?** Torch the casting area for about a minute, this will dry out excess moisture. This small mold was torched less than a minute, sand will blacken.

28. Replace
Most molds have the flask remain on the mold. If this mold were to be poured with brass or bronze, we would leave the flask on the mold. And clamp it!

29. A "snap flask" has hinges and clasps, allowing it to be removed after molding. This mold is going to be poured with aluminum.

30. Fill crucible with metal, place the crucible in the furnace and light. **Light furnace** by releasing gas and dropping a wooden match into the furnace in front of burner (blue area), AT THE SAME TIME! There should be no flame inside the metal burner tube, only in the
refractory area.

**Is the furnace running properly?**

**Look**......inside the burner for flame.  
**Listen**.....to the sound. A high pitched gurgling or a misfiring engine sound indicates flame in the burner tube.

**A steady roaring sound indicates proper burning, like a jet!** If your furnace is not operating correctly, relight and release the propane faster with more pressure. **Releasing the gas too slowly will allow it to go in the burner tube.**

31. Replace lid. Turn gas all way up. Feed metal into the exhaust hole.

32. Feed metal into the exhaust hole as fast as it will take it until the crucible is full.

Do not operate furnace with lid plug in.

33. After the last molten (liquid), let it reach pouring minutes.  
DO NOT overheat steel crucibles.

**Aluminum pouring temp is 1325 to 1400F.**
34. Turn off furnace, remove lid, scoop off dross (slag) that is floating on top. Remove dross with a slotted steel spoon, a cheap kitchen one will do.

Remove crucible. Pronounced: crew-sybil
36. Pour extra metal into a steel muffin pan to make ingots. When using a brand new pan, pre-heat in the furnace exhaust before using. Pre-heating will burn off any teflon coating and keep the ingots from sticking.

37. Allow mold to cool for at least 5 minutes.

38. Shake-out mold into sand container. Sprinkle about 2 cups of water on the crunchy parts of sand. Cover your sand, do not let it dry out.

For more molding tips read through our project pages and foundry facts.