Molds for ceramic pieces must be accurate to within 1/16" so they will fit properly. radial accuracy is most important.
24 ga mild steel is arbitrary thickness, but circumference of inside and outside mold pieces must be accurate. For example: to insure 27.5" O.D. ceramic, calculate for mid-thickness of metal, adding 0.039" to 27.5" = 27.539, which gives C = pi*r2 = 3.14159*189.599 = 595.64". Now add 0.75" overlap for small #6X.25" bolts & nuts (spaced every 3") to hold the metal in a tight cylinder. Grind down the nut heads so they penetrate minimally into the ceramic. YOU WILL NEED TO REMOVE THE SHEET-METAL FROM THE CASTING WITHOUT EXPANDING THE INSIDE PIECE. Otherwise, you could crack the ceramic piece.

DESCRIPTION - NOTES			
<double-click ~ description - notes>			
SIZE A	DATE 12/29/11	DWG NAME ceramic molds.icd	REV
SCALE	drawn by Larry Dobson		SHEET

All 4 cylindrical ceramic molds can be created sequentially from these 2 sheetmetal and 3 plywood pieces, by assembling and casting the largest piece first, disassembling the mold, recutting the plywood pieces and drilling new bolt and nail holes in the sheet-metal pieces to create an accurate mold for the next casting. (see calculation formula on sheet-1)

CASTABLE REFRACTORY CERAMICS:

New formulations of castable refractory ceramics are being offered by various companies, so we need to communicate the properties of these offerings and choose the most promising ones for our purpose. I have had the best success with high-alumina, low water (2-5% by weight), low cement castable mix for at least 2800°F operating temperature. These are mixed thoroughly with the proper amount of water in a small paddle-mixer, at which point they appear far too dry and stiff. This mix is then dropped into the mold in 6" layers and vibrated with a small concrete stinger evenly on all surfaces until air bubbles all escape. Two or 3 times during the operation, it would be important to remove the top plywood disk to vibrate the inner sheetmetal shell. Do not leave the vibrator too long in one place, as the agregate will loose its homogeneity. THESE ARE VERY THIN CASTINGS relative to what is normally done, so they must be well compacted, with no voids, then finished off level and smooth on the top and let thoroughly set before removing from the mold.

DESCRIPTION - NOTES			
<double-click ~ description - notes>			
SIZE A	DATE 12/29/11	DWG NAME ceramic molds.icd	REV
SCALE	drawn by Larry Dobson		SHEET