

## Pilot furnace construction

First remove all old bottom lining and clean the bottom of the furnace.



Apply coal tar to the bottom of the furnace to ensure contact between the bottom electrode and lining (probably not strictly necessary).



The bottom lining/electrode is made of carbon cold lining



The lining should be built stepwise, by adding a small amount of lining material, and then compressing it with a hammer. The lining should be as hard as possible, and should not deform when being hit. Build the lining so that is almost flush with the refractory bricks surrounding the bottom.



It is convenient to now put the electrode in the electrode holder. Make sure that the electrode is long enough, and not how much the electrode can be moved up and down during the experiment. The electrode height must probably be adjusted by moving it up or down in the electrode holder after the furnace has been built. Remember to place the plastic feet under the furnace.



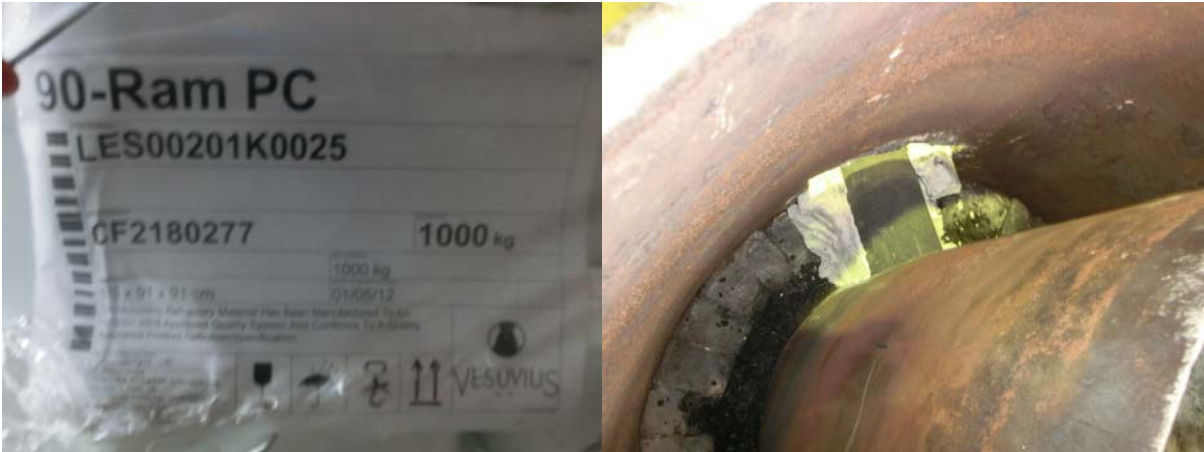
The template for the inner lining can now be placed inside the furnace. Centre the template inside the furnace, and centre the furnace under the electrode. The front of the furnace can now be put in place and secured with bolts. The electrode can be used to hold the template in position for the next steps.



Use a carbon crucible as a tapping hole. Around 7cm of the crucible should be inside the furnace. A thin layer of coke (Around 2 cm) is place in the bottom of the furnace, inside the template. This should make the inner part of the furnace easier to remove after the experiment.



Alumina lining paste is now used to hold the tap hole crucible in place.



Carbon lining paste is used to finish up the bottom lining. The lining should be compact just as the first layer of bottom lining. Use a rod, or a hammer, or your feet to compress the lining material. Make sure that the bottom is slightly tilted towards the tap hole, and that the bottom is flush with the tap hole.



The next step is to make sure that the furnace won't leak when sand is filled in the gap between the template and the outer mantle. Finish up the lining around the tap hole, and use tape to fill all the gaps in the outer mantle and the template. Sand can now be filled in the space between the template and the mantle.





When the sand has been filled the electrode can be raised as the template is held in place by the sand. The inner lining can now be built. Cut the lining into manageable pieces, and use a hammer to compress the lining. Two layers of lining (a total of approx 7cm) are used in the bottom 30 cm of the furnace.





Cover the top of the furnace and use some kind of heating device to dry and harden the lining 48 hours or more.



Even after drying the lining will contain moisture and the area around the tap hole can be dried with a propane burner.

