MR-1 LANGMUIR SYSTEMS

CONCRETE POUR REFERENCE GUIDE

Step 0: Double Check Your Supplies and Equipment

- Qty 8 x 60lbs concrete bags (alternatively Qty 6 x 80lb bags), 4,000psi, not quick curing. **Double check for correct concrete!**
- Concrete mixing tub (or concrete mixer if you have one!)
- Large measuring cup that has volume in pints labeled on the side
- Rubber Mallet
- Tape measure
- Shovel, Scraper, or Hoe, etc. to mix concrete
- Gloves and Dust Mask for PPE
- Small steel trowel
- Block of wood for smoothing
- Shop towels or old fabric towel to absorb top bleed water
- Painter's tape
- MR-1 baseplate assembly and Y axis stiffeners
- All required fasteners

Step 1: Prep the machine

A. Remove mesh cover drain covers **x2**
B. Seal coolant drain holes with painter's tape

Step 2: Mix and Add the Concrete

A. Get another person to help you with the concrete mixing and adding to ensure a smooth, quick process.
B. ***Add the suggested starting amount of water for each bag of concrete.***
    a. **5 pints** of water per **60 lb** bag **OR**
    b. 6.7 pints of water per **80 lb** bag
C. It is critical to obtain the correct consistency of mixed concrete before pouring. *Please see the video in the MR-1 Assembly Manual for a demonstration of this consistency.*
D. Mix and pour one bag of concrete at a time into the chip tray. We have found that it helps to have one person mixing concrete while the other is spreading it out into the tray simultaneously. **Using the block of wood**, spread the concrete evenly throughout

the chip tray to remove high spots and fill in low ones. After each bag, use the rubber mallet to tamp the chip tray on the bottom and sides so that the concrete settles evenly. **Stop at 7 x 60lb bags or 5 x 80lb bags for now.**

a. The block of wood is used to spread concrete so that water is free to bleed up through the top and ensure a smooth, strong surface. A steel trowel will seal the surface and lock water in and it should not be used at this stage!
b. The block can also be tipped upright and used to tap in concrete in hard to reach gaps and corners.

Step 3: Add Stiffeners and Baseplate

A. Wipe any dust from the contact surfaces
B. Line the stiffener up with the Y axis rail and sink into the concrete with a sawing motion back and forth along the rail lengthwise
C. Align slots with the threaded holes in the Y-axis rails and secure with 2 fasteners to hold in place. Repeat for the 3 other stiffeners
    a. The rest of the fasteners can be added once all stiffeners are secure
D. Use the steel trowel to scribe a line in the wet concrete **8 - 9/16”** from the outside front edge of the chip tray (running parallel to the chip tray edge).
E. Place the baseplate assembly on top of the concrete with the bolts facing down into the concrete, **do not push down yet,** and align the front of the baseplate with the scribe line. Make sure that the alignment tabs of the two baseplate positioners are in the correct position so that they will fit into the Y axis rail slots once the assembly is lowered.
F. Clear Y axis rail slots of dust and debris.
G. Push the baseplate assembly down into the concrete using a sawing motion back and forth while maintaining its position to the scribe line and Y axis rail slots. Push the plate down until the alignment tabs rest on the bottom of the slots in the two Y axis rails.
H. Measure the distance from the outside front edge of the chip tray to the front of the baseplate. Adjust the baseplate until it measures **8 - 9/16”**
I. Thoroughly tamp the top of the baseplate and bottom of the chip tray to eliminate air pockets and settle concrete so that it interlocks into the underside of the assembly.
J. Use the **wood block** to smooth the concrete moved by the baseplate assembly and Y axis stiffeners

Step 4: Final Concrete and Finishing Details

A. **Mix the last bag of concrete and evenly disperse concrete around the base so that the aluminum baseplate is protruding above the surrounding concrete level by approximately ¼".**
    a. Fill concrete up flush to the top of the coolant drains if you did not purchase the separate epoxy coating.You want to have a smooth level of concrete so that coolant will flow freely to the **side** drains without any low spots.
    b. If you plan to perform the Epoxy Top Coat step later, be sure to leave the concrete level approximately **1/8" below the side drains top surface.**
B. Fill in any low spots and level the concrete surface.
    a. This step doesn't need to be perfect, you're just looking to make a good surface for coolant flow.
C. If **there are gaps between the alignment tabs in the baseplate positioners and the Y axis rail slots** that is fine as long as 2 diagonal tabs are touching. Using the rubber mallet, tap down the corners of the baseplate until you have at least 2 diagonal tabs touching the slot. Then tap the non-touching corners of the baseplate until the gaps between the tabs are even. This will center the baseplate stock enough for final decking later when the machine is running.
    a. These gaps are from minor variations in the baseplate and will not affect performance once the baseplate has been re-faced in a later assembly step.
D. Tamp the chip tray to remove the excess bleed water from the top of the concrete and dab dry with shop towels or old towels/clothing. When finished the concrete top surface should be very dry with no standing water anywhere. ***NOTE: Performing this step is critical to ensure that the top surface of concrete solidifies. If too much bleed water is left on the top surface, it will create a powdery finish.***
E. Wipe the outside surfaces of the machine clean to remove concrete residue while it is still wet.
F. Wait for the concrete surface to dry until a thumb press will sink no more than **1/8"** into it with moderate pressure. The key to troweling a good surface is making sure that it is adequately dry and cured first. You may need to wait 1-2 hours before troweling can be performed. For reference, concrete can be walked on before it is ready to trowel so don't do it too early if you want a good, tight surface!
G. Hold the steel trowel at a very slight angle and use sweeping motions to smooth the concrete surface
    a. Leaving hard to reach concrete unsmoothed in this step is acceptable
H. **Leave the machine assembly and concrete to sit for 5 days. This is very important for concrete strength and stability. After this, you can continue on to either the Epoxy Top Coat step or you can begin machine assembly.**