

SURE CURE Cylinder Mold System: Operation and Maintenance Procedures

If the SURE CURE Cylinder Mold is operated and maintained properly, it will provide consistent results indefinitely. Products Engineering strongly recommends that before anyone uses the SURE CURE equipment, they carefully read the following Operation and Maintenance procedures.

Preparing Mold for Casting

With the mold in the open position, inspect all machined surfaces, making sure they are free of any foreign materials. Next, coat all surfaces with a form release agent. Wipe off any excess release agent with a clean rag that has been dampened with release agent. Also make sure a light film of release agent coats the exposed surfaces of the hinge. Regularly lubricate the working points of the hinge with a light machine oil.

Inspect the O-ring that surrounds the mold's casting area. It should remain undamaged if the mold is to be watertight and conform to the ASTM specification. Replace the O-ring if damaged. Close the mold. Swing the threaded studs in 90 degrees and then tighten both wing nuts simultaneously. Wipe any excess release agent from the joint of the matching surfaces.

Casting and Finishing

Cast the test specimen in accordance with ASTM C192 or ASTM C31. Use only the tamping rod supplied with the cylinder molds as this rod is made from an alloy that is softer than the mold's castings. If a steel rod is used, each time it strikes the casting it will "ding" the surface of the mold.

Use only the rod supplied, a nylon mallet, or a rubber mallet to tap the mold's sides for settling the concrete in the mold. Also, the molds can be clamped to a vibrating table for casting purposes if desired.

After striking off the finished test specimen, wipe off excess residue from the mold's top. Place a thin vapor barrier (polyfilm or a SURE CURE cylinder cover) over the top of the casting.

The mold should be placed in its final curing position as soon after casting as possible. If the mold is placed outside, protect it from direct wind, particularly if the temperature is below 50 degrees Fahrenheit.

Do not place the mold in water. Water can cause the mold's electrical heaters to short circuit.

Place the molds such that each mold is exposed to the same environment. For example, do not place one mold in the sun and the rest in the shade. In most cases, the temperature of a single mold is used for temperature control, and the remaining molds are assumed to be at the same temperature.

Do not place the mold in a relatively warm location for curing. The mold may need to lose heat during the curing cycle. It can only dissipate its heat to the surrounding air. Therefore, the surrounding air must be cooler than the mold.

Controllers and Connections

For the mold to match the curing temperatures of a concrete product, it must be properly connected to one of three types of SURE CURE controllers:

- a Cylinder Controller,
- a Micro Controller, or
- a Computer Controller.

Connect one twist-lock power cord from the controller to each cylinder mold to be cured. The Cylinder Controller has built-in power cords, while the Micro Controller requires a twist-lock extension cord to connect the I/O Cabinet to a mold. If controlling molds with a Computer Controller, use the cords from a Cylinder Interface Box to connect to the cylinder molds. (A Cylinder Interface Box can also be used to expand the capacity of a Micro Controller.)

A “Y” cord can be used to run two molds from a single controller output, but a “Y” cord should **never** be plugged into another “Y” cord that is connected to a Cylinder Controller or a Micro Controller. However, multiple “Y” cords can be used together when plugged into a Cylinder Interface Box.

Plug the thermocouple extension cord from the controller into the thermocouple jack in one of the molds. Be sure the contacts on these cords and in the mold are kept clean (polish with steel wool if necessary).

Cut a length of type “T” (copper/constantan) thermocouple wire that will reach from the product to the controller. For a Computer Controller, the thermocouple wire will be hard-wired into the Thermocouple Cabinet. For the Micro and Cylinder controllers, install a thermocouple plug and cable clamp on the end of the thermocouple wire at the controller. If using a Cylinder Controller, plug the thermocouple extension wire into the jack on the controller labeled “REF.” If using a Micro Controller, plug the thermocouple wire into the thermocouple jack for the channel that will be used to monitor the product.

On the end of the thermocouple extension wire at the product, twist the copper and constantan wires together to form a thermocouple. Cover the thermocouple with electrical tape or shrink tube. *The controller will function correctly only if the thermocouple is electrically isolated from the concrete.* Carefully place the thermocouple in the freshly poured concrete. Locate the thermocouple in the part of the product that the test specimen is to represent.

A permanent reusable thermocouple can be mounted on the outside surface of the form to monitor the temperature of the product. This thermocouple must be insulated from the outside air if it is to provide an accurate representation of the product temperature. The specifications of the insulation covering the thermocouple must be established by trial and error, using a temperature recorder to correlate the external thermocouple with the actual temperature of the concrete inside the form. A reusable thermocouple of this type will not only end up saving time each day, but will also provide more consistent daily results.

Caution: the thermocouple lead wires from the referenced product and the cylinder mold should not run close to or parallel with any power conductors as the voltage carried by these conductors will distort the thermocouple readings.

Stripping

If more than one cylinder mold has been cast for the same product but only one specimen is to be tested initially, select a mold that does not have a thermocouple extension cord plugged into it. This will allow the remaining test specimens to continue curing without interruption.

After selecting the appropriate test specimen, unplug the twist-lock power cord (and thermocouple cord, if any) from the mold. Remove the vapor barrier from the top of the mold. Loosen both wing nuts simultaneously and swing out the threaded studs 90 degrees. If necessary, use a straight screwdriver to help break open the mold. Open the mold to the full open position.

The concrete test specimen will stay on one half of the mold. Remove the test specimen by hand or by tapping the top of it with a rubber mallet. (With new molds the concrete cylinders will want to “stick” to the mold. After a few uses the cylinders will be noticeably easier to remove.) When the last cured cylinder is ready to be stripped from its mold, temperature control is no longer needed. At this point a Cylinder Controller can be switched “off.” Because the Micro and Computer controllers are programmable, there is no need to turn anything off.

Cleaning

The importance of properly cleaning the mold cannot be overstated. With the mold in the full open position loosen any residue from the top and matching surfaces of the two sides of the mold using a putty knife or plastic scraper. Also loosen any residue from the hinge area. Brush the residue off the top and matching surfaces and sweep out the hinge joint using the joint cleaning brush. Re-inspect the surfaces and hinge area and continue scraping and brushing until they are clean.

Close the mold, swing the threaded studs in, and tighten the wing nuts. Clean the bore of the mold using a 4" diameter cleaning brush. This type of brush works best when the wire stem is inserted into the chuck of a drill. Scour the walls and bottom of the bore thoroughly with the brush. If necessary, further scour the walls and bottom with steel wool until all residue comes loose.

Turn the mold upside down and dump out the loose residue. While in this position, loosen the wing nuts and swing out the threaded studs. Clap the two halves of the mold together to further remove any remaining residue.

Turn the mold upright and sweep all the machined surfaces and hinge joint using the hinge cleaning brush. Re-inspect all surfaces of the mold, re-clean, and sweep as necessary until all the working surfaces of the mold are free of residue.

Oil the mold as outlined in Step 1.