

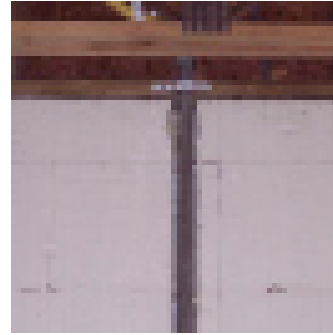
## 3.23 INSTALLATION OF SERVICE PENETRATIONS

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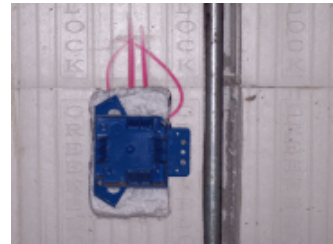
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### Service Penetrations

Electricians, plumbers, HVAC installers etc. will be required to block out for service penetrations through the walls. This is done after the ICF forms have been stacked and before the concrete is placed. Blocking out for service penetrations is typically carried out by cutting a hole through the ICF forms and inserting a PVC pipe all the way through. The PVC pipe serves as a sleeve for subsequent installation of wiring, hose bibs, cables and other service utilities required for the structure.



Typical wall penetrations include:



- Utilities (water, sewer, gas, electric, phone, television)
- Vents (fireplace, water heater, furnace, A/C, dryer, central vacuums, range)
- Electrical (outdoor lighting, doorbells, outlets)
- Piping for outdoor water spigots
- Audio & video, alarm systems

Use lengths of PVC pipe cut somewhat longer than the width of the wall, with diameters large enough for its purpose. When possible, try to cut all penetrations through the block between the webs; as cutting a web weakens that wall area. Insert the pipe sleeves into the holes and glue them to hold them securely. After utilities have been installed the sleeve can be filled with foam and a screen may be installed over the exterior or interior opening.



TIP: It is a good idea to follow a checklist for needed penetrations.



## ELECTRICAL INSTALLATION:

### Main Entrance Panel:

The main electrical panel for a building is typically located internally in an independent room or enclosure. If the main electrical panel is to be installed flush with an exterior wall, build the equivalent of a door buck with the appropriate dimensions.

The buck height should be enough to leave a gap of approximately 12-18 inches above the panel to allow easy access for the electrician to pull wire out of the top and swing it over to be embedded in the ICF EPS above. Wiring can then be carried to the upper floors and attic. If power is entering from underneath the electrical panel, install sweeps through the foundation/SOG allowing it to enter within the opening formed by the buck.

### Electrical Wiring:

Wiring is installed in Greenblock ICF walls after the concrete is placed by cutting channels in the EPS panels in which the Romex wires are embedded. One efficient method to cut the channels is to use a chainsaw with a depth stop installed.

The Romex wires stay embedded in the EPS panels by friction. In addition, use foam adhesive to glue the wires to the EPS on occasional spots in the same manner staples are used with wiring and conventional framing. Use protective nail plates over the wiring in places where it could be hit by

drywall screws.

Conduit:

Conduit is installed in Greenblock ICF walls in the same manner as wiring by cutting a channel in the EPS after the concrete has been placed. If the conduits are to be embedded in the concrete cavity, then it is installed prior to the concrete placement including the electrical boxes and sweeps to which the conduit will be attached.

Electric Outlet Boxes:

Electric outlet boxes are installed in Greenblock walls after the concrete is placed by cutting out a recess in the EPS panel using a hot knife adjusted for the right depth. The EPS panels on Greenblock ICF are 2 5/8" thick, which is enough depth for most electrical boxes. If electrical boxes of more than 2 5/8" depth are required, then installation should be carried out before the concrete is placed as follows:

1. Cut a foam plug in the EPS panel and push it back into the wall cavity. This will create a deeper void within which the electrical box will be installed.
2. Use foam adhesive to glue the foam plug in place. This will prevent the plug from moving during concrete placement.
3. After the concrete is placed, break out the foam plug embedded in the concrete wall and install the electrical box in place.

### **Attaching the Electrical Box to the Wall:**

Electrical boxes are held in the ICF wall by:

1. Friction with the EPS foam
2. Foam adhesive
3. Using boxes with flanges on the front and screwing through the flanges into the polypropylene webs. For metal boxes with flanges, use concrete screws (Tapcon or equivalent) and drill through the concrete.

**PLUMBING:**

Plumbing is installed in the same manner as conduit and wiring, by cutting channels in the EPS foam after concrete placement and embedding the

pipes. Foam adhesive is used to secure the pipes in place.

If brackets for fixtures are required, concrete screws can be used to secure the brackets to the concrete. Larger diameter plumbing pipes e.g. 3 inch or larger vents can be installed by furring out the ICF wall to accommodate them or chases made of wood or metal in which the pipes are hidden and easily accessed for maintenance.

It is not recommended to place plumbing pipes in the concrete cavity of ICF walls because it creates a weak spot. If it is essential to run the pipes in the concrete cavity for architectural aesthetics, a local licensed/registered engineer should design and/or approve such a detail.

[~ Back to Top ~](#)