

Appendix E – Utility Service Installations

E1.0 – ICF Wall Penetrations

The electrician, plumber, HVAC installer etc. should block out for service penetrations through the walls. This is done after the ICF forms have been stacked and before the concrete is poured. 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. Foam adhesive can be used to seal the gaps between the PVC pipe and the Amvic ICF EPS panels.



Important Note!

All penetration sleeves should be installed at an angle pointing downward towards the exterior of the building. This is to ensure that if any water accumulates or is trapped in, it will be drained to the outside.

Sleeves should be sealed with a weather tight caulk or foam after all wiring has been installed.



E2.0 – Electrical Installation

E2.1 – 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 (30 – 45 cm) 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.



Figure E1.1 – Main electrical panel installed flush with exterior wall



E2.2 – Electrical Wiring

Wiring is installed in Amvic ICF walls after the concrete is poured by cutting channels in the EPS panels in which the Romex wires are embedded. The most efficient way of cutting the channels is by using a chainsaw with a depth stop installed.



Figure E1.2 – Cutting a channel in the EPS panel using a chainsaw

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.





Figure E1.3 – Embedding Romex into the EPS panels

E2.3 – Conduit

Conduit is installed in Amvic ICF walls in the same manner as wiring by cutting a channel in the EPS after the walls are poured in which the conduit is embedded.

If the conduits are to be embedded in the concrete cavity, then it is installed prior to the concrete pour including the electrical boxes and sweeps to which the conduit will be attached.

E2.4 – Electric Outlet Boxes

Electric outlet boxes are installed in Amvic ICF after the concrete is poured by cutting out a recess in the EPS panel using a hot knife adjusted for the right depth. The EPS panels on the Amvic ICF are 2.5 inches (63.5 mm) thick, which is enough depth for most electrical boxes.

If electrical boxes of more than 2.5 inches (63.5 mm) depth are required, then installation should be carried out before the concrete is poured 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 the concrete pour.
3. After the concrete is poured, break out the foam plug embedded in the concrete wall and install the electrical box in place.

E2.4.1 – 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.



Figure E1.4 – Electric box with flange attached to the webs



Important Note!

DO NOT drill additional holes than what is provided in plastic electric boxes. This will void the UL/ULC rating.



E3.0 – Plumbing

Plumbing is installed in the same manner as conduit and wiring, by cutting channels in the EPS foam after the concrete pour and embedding the pipes. Foam adhesive is used to secure the pipes in place.



Figure E1.5 – Vent pipe embedded in the EPS foam

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 (76 mm) 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.

