

Tech Bulletin: **INSTALLING UTILITIES in
Amvic Insulating Concrete Forms (ICF)**



- 1) Install frameworks for the entrance panel before setting block.
- 2) After block is stacked, but *before* the concrete is poured, install sleeves (PVC pipe) *through* the block so that a pathway is in place for later installation of wire, pipe, etc. to the exterior.
- 3) All sleeves should be inclined downward toward the outside by approximately 15 degrees so that any unplanned water penetration will drain to the exterior.
- 4) All wire and pipe is generally run **AFTER** the walls are poured.
- 5) All wire and piping are *run on the inside* of the structure (obviously except for exterior fixtures such as porch lights, hose bibs, etc.), within the space of the foam not in the concrete.
- 6) Boxes, wire (and conduit if required) and piping are installed by cutting into the foam, (not the concrete) and imbedding them there. You have 2 ½ inches of foam to cut into, more than enough room (vent pipe being one special exception)
- 7) In residential, standard Romex is used and placed in channels in the foam.
- 8) Boxes are installed most easily by use of a special hot knife tool (available from Amvic Pacific) that melts a recess into the foam exactly the right depth and width for either single duplex or four square boxes.
- 9) Either plastic or metal boxes can be used. (Stick with mid size boxes, the extra large 22.3 cuin boxes are too deep for the foam)
 - a. Boxes are either glued into the foam, or fastened in with screws.
 - b. If a plastic box with a nail flange is used, the nail flange is screwed into the adjoining web of the ICF block. If a steel block is used, it can be attached with glue or screws (such as Tapcon brand concrete screws) used *through existing holes* into the concrete to hold it in place.
 - c. The most common choice is to use shallow depth steel 4 square boxes, with a plastic grommet at the side holes, and then top it with a duplex receptacle mud ring. That allows plenty of room for wiring, plus GFCI receptacles if required.
- 10) Wire is laid and planned pretty much the same as in conventional construction.
- 11) Internal walls are frame and cavities within that can be used for wiring as normal.

STILL HAVE QUESTIONS?

Call us 800-296-1971 or 530-265-9085

We've got answers.

12) Installing Electrical and Plumbing

BEFORE CONCRETE IS POURED:

Electric main entrance panels.

If the entrance panel is to be installed flush to the exterior, then build the equivalent of a door buck that is the width of the planned entrance panel. If power is entering underground, install sweeps up through the foundation so as to enter the wall within the buck cavity.

Leave 12-18" open above the panel to allow easy access for the electrician to pull wire out of the top and swing it over to be imbedded in the ICF foam of the block above.

Once the wiring is over into the foam, it can be carried up from there into the attic or floor system above.

PENETRATIONS: The electrician, plumber, HVAC installer, etc. need to block out for their penetrations through the walls after the block is stacked and before the concrete is poured.

The typical way to do this is by making a hole through the block and inserting PVC pipe all the way through both sides of the block and that provides a sleeve for subsequent installation of wiring, hose bibs, etc. Foam 2 Foam adhesive foam can be used to seal the gaps around the holes where the pipe goes through.

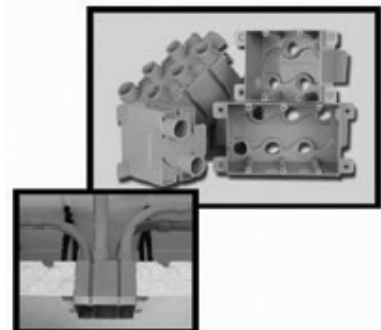
Important: All penetration sleeves should be installed at an angle of at least 15 degrees angling *downward* toward the exterior of the building so that if any water ever does penetrate the outer cladding, gravity will carry it outside rather than to the interior of the building. After wiring is installed through the sleeves, the sleeves should be sealed with a weather tight caulk or foam.



Electric wiring. Wiring is installed in the ICF walls after the walls are poured by cutting channels in the ICF foam, and imbedding the Romex wire into the channel. The channel can be cut by several means, but the quickest and most satisfactory is to use an electric chainsaw with a depth stop installed. The channel it cuts is just the right width to firmly push Romex into. Foam can be used with occasional spots of glue in the same manner that staples would be used in conventional framing. If wiring is stacked up such that it could be hit by a drywall screw, then protective nail plates should be installed as they would in conventional construction.

Conduit. Conduit is most easily installed by cutting a channel in the foam after the walls are poured. Alternatively, if installation within the concrete is desired, then the conduit, boxes and sweeps need to be installed as the block is being stacked. Single, double and triple gang PVC electric boxes are available that have flanges to easily be cut, attached and imbedded in the foam.

Amvic Pacific 800-296-1971



Electric outlet boxes. The best way to install electric boxes is to cut out the recess with a hot knife tool (*see last page*). It cuts plugs that can be adjusted to be just the right depth for mounting medium sized boxes. **Note that extra deep 22.5 cu in boxes are too deep to be cut into the foam after the wall is poured.**

If extra deep boxes are required, for example for installing GFCI outlets, then

- 1) Plugs of ICF can be cut before the walls are poured and the plugs pushed into the foam so that a recess in the concrete is formed or alternatively,
- 2) Double gang outlet boxes can be installed and then adapted with a single duplex mud ring. This provides additional wiring space within the box.



ATTACHING THE BOXES to the wall

Boxes are held in place in ICF with

- 1) friction and foam glue, or
- 2) by using boxes with flanges on the front and screwing through the flanges into the polypropylene webs or,
- 3) in the case of steel boxes, with concrete screws (Tapcon brand or similar) that are drilled through into the concrete.

(Note: it is a violation of building codes to drill additional holes in a plastic box as that voids the UL rating for the box. Steel boxes on the other hand conveniently have lots of holes in the back).



Metal boxes have the additional advantage in that the knockouts for wiring are in the sides rather than the back in the case of plastic boxes. The side entry with a plastic grommet makes it easy to install the boxes first and then run the wire to them.

Plumbing. Generally, plumbing is easily installed in the same manner, by cutting channels in the foam and imbedding the supply lines within the foam. Foam adhesive is used to fill in and secure the lines in place.

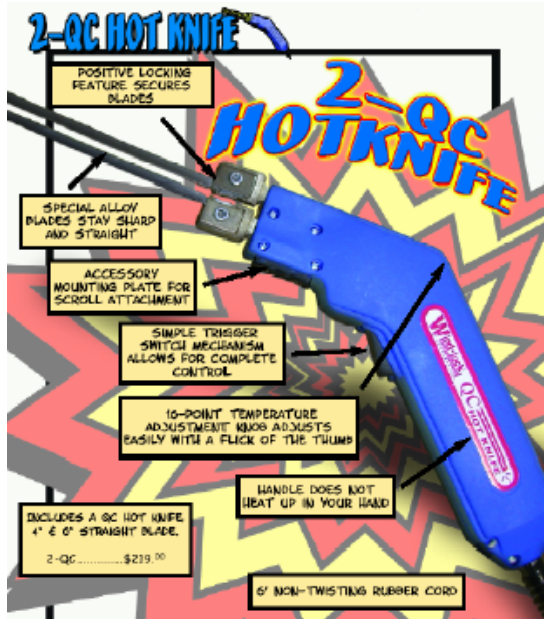
If brackets for fixtures are required, such as for shower control valves, concrete screws can be installed back into the concrete of the wall.



Plumbing vents and or drains can require some special consideration. If possible, run vents in interior wall cavities. If it will be necessary to run vents (3" or larger) in exterior ICF walls then either the wall needs to be fired out to accommodate the vents or a dimpled channel within the concrete needs to be created. For example, a 4" vent can be accommodated by cutting a 1 ½ inch thick strip of foam and gluing it on the *inside* of the block such as to create a dimple in the concrete sufficient to route out a 4" deep recess after the pour.

Specialty Tools For Installers Available from Amvic Pacific (800-296-1971)

- **ICF Hot Knife Kit** – includes a 110v Hot Knife, 6” sled base, ½” by 3” square blade, 4” and 6” straight blades, Single and Double Electric box Cutter Blades and 3 pieces of 12” Flat Blade Material.



Foam Gun and foam.

<p>Foam2Foam Plus™ A multi-purpose, low expansion construction adhesive and filler for use in ICF applications. It's a one component polyurethane foam that cures by absorbing water vapor from the air.</p>
<ul style="list-style-type: none"> • Used for filling, sealing and insulating joints, cracks and cavities • Professional quality • Accurately controlled application • Moisture-curing • Fast application rate • Excellent adhesion to most surfaces • Temperature, water and chemical resistant • CFC and HCFC free (zero ozone depletion) • Paintable • Can be plastered over • Not UV - resistant • UL Approved • Controlled Expansion



Foam guns are available at a variety of price levels.

Call Amvic Pacific for current pricing and options. 800-296-1971