General Installation Instructions

For Steel Stud Framing or Furring Construction

INSTALLATION MATERIALS NEEDED

- Screws ELCO Dril-Flex or equal.
- Shims: full bearing high impact plastic. We prefer Korolath shims. Grove also makes shims that can be used. Typically, we don't recommend **"**horseshoe**"** shims because they can fall out if not oriented correctly.
- Shim Thickness by 2x the fastener diameter maximum, unless confirmed by TerraCORE Panels Engineer/Consultant.
- Spray bottles with 25% dish soap, 75% water.
- Aluminum rails provided by TerraCORE Panels.
- Masking tape.
- Various gauge aluminum wire, aluminum shims or hard plastic shims no more than 1/8 inch-thick to shim inside aluminum rails.
    - **NOTE:** This shimming inside the rails is only allowed at the bearing clip, usually located at the top of the panels. Clips must remain engaged into rails a minimum of 1/2 inch.

RECOMMENDED TOOLS

- Drill with bits
- 48 inch Level & 24 inch Level
- Snips or linesman pliers to cut shims
- Circular saw with dry cut diamond tipped blade (continuous rimmed blade)
- Dead blow hammer
- Small paint brush (or spray air) to clean debris from aluminum rails
- Story poles (see description below)

JOBSITE STORAGE

Panels must be stored in a clean dry area, free from contamination. In adverse weather conditions, it is important to protect the panels and not leave them exposed to the elements, if possible. Inclement weather and low temperatures can lead to the potential for bowing, especially if the panels are left in their crates unprotected for a long period of time. We recommend storing the panels in a temperature controlled environment (approximately 60-70°F) if they are not going to be installed immediately.

When removed from the packaging crate, they must be placed on shock absorbent support such as expanded polystyrene (Styrofoam) for edge protection. Also, when removed from the crate, be sure that there is sufficient protection between each panel. Never lean panels on other panels, or on hard surfaces with no protection. Stone is strong, but stone touching stone, or stone touching metal can cause damage. Be sure that panels are always stored standing up. It is recommended that panels be placed so that identification numbers are easily readable when they are removed from the crates. This will minimize the amount of time required to search for panels as they are needed for installing. Reduced handling will also reduce labor cost and the possibility of any damage caused by bumping and dropping panels. TerraCORE Panels are durable and impact resistant. However, the natural stone facing can be chipped at edges, and the face surfaces of softer stones can be marred. Softer stones including limestones and some marbles can also be stained by dirt, mud, and other contaminates.

STAGING

Material handling is a very important factor for the installer to consider. The majority of installation labor is used for moving panels from the delivered pallet/crate to the final location on the building. That said, it is strongly recommended that panels should be staged in advance and moved to their appropriate locations to minimize labor during installation. The first panel needed should be located on the outside of an upright sloping rack. All panels should be arranged in the order needed for installing.

INSTALLATION

NOTE: The following suggested instructions are intended for vertical wall panels only. If a horizontal soffit or sill is included, modifications to these instructions will be necessary. The location for all aluminum rails will be specified on the shop drawings.

Following the shop drawings, measure the wall to determine exact panel locations and mark the positions of panel edges at the base of the wall. Check vertical panel edge locations relative to framing locations for assurance that aluminum rail sections will have framing support. Use a laser or level to establish a fixed elevation for the total construction area. From that elevation, mark on the framing, or existing wall, the exact location of all bottom panel lower edges. The shop drawings will indicate the location of the aluminum rails.

1. Using a transit or laser, check the elevation for alignment to find the most outward point(s). This will determine the installing "plane" and the amount of shimming required. Drop a string line (piano wire is recommended for this) from the top of the elevation to the bottom of the elevation. This string line should be set at least 2 inches from the most outward point of the elevation. This will be your reference line from where you will measure back from to establish the plane for all of the aluminum rail sections and panel faces.
2. Drop a plumb line at the location where installing will begin. Position the vertical edge of the aluminum rail section at the beginning vertical edge as indicated by shop drawings, flush with the line. Clamp the aluminum rail sections in place, then fasten the aluminum rail sections to the framing using two (2) fasteners at each vertical member and at 16 inches on-center maximum or as specified by TerraCORE Panels shop drawings. Excess aluminum rail length should be cut off and used where possible.
3. Use a "story-pole" to locate aluminum rail sections above the bottom row of extrusions. Rail sections will be located near the top and near the bottom of every horizontal panel joint and spaced at a maximum of 30 inches or as shown on the shop drawings. Set aluminum rail

extrusions using string lines or a laser to achieve a flat plane. Locate shims between the rail section and the backup as necessary to obtain a flat plane. Clamp the aluminum rails in place, then fasten rail sections at each end and at 30 inches on-center maximum or as specified by TerraCORE Panels shop drawings. Excess aluminum rail length should be cut off and used wherever possible.

4. Spray aluminum rail sections on wall with soapy water or rub a small bar of soap over them for lubrication to assist with panel installation. Set panels above and against the rail sections, and then slide them down so that the section on the panel engages with the section on the wall. On polished or honed stones, suction cups are very helpful in handling the panels. If the panel has a slight amount of bow (not a defect), it will be necessary to flatten or support it until the aluminum rail section engagement is complete. This should be fairly quick and simple.
5. Installation may progress horizontally or vertically depending on how the panels have been staged. Continue applying a small amount of soap film onto sections for lubrication and to assist with engagement. Careful attention should be paid to properly align panel joints as the panels are installed. It may be desirable to leave shims in the joints until they are caulked to ensure that the panels do not move. All shims should be removed prior to caulking.

CAULKING EXTERIOR JOINTS

NOTE: It is recommended that testing should be conducted by the sealant manufacturer for assurance that neither sealant nor primer will "bleed" into the stone and cause staining. Allow sufficient time for this testing.

1. At caulk joints around panel perimeters push round **open-cell** polyurethane foam backer rod between panels well into the joint to expose the veneer stone edge plus approximately 3/16 inch width of honeycomb. This should provide for approximately 3/8 inch bond width of sealant to panel, and a 1/4 inch sealant thickness at the center of the joint width.
    a. **CAUTION**: Open cell backer rod must be used with stone panels. Closed cell backer rod can emit gas into the joint when the coating is scratched by the honeycomb causing the caulking to bubble at the surface.

2. Apply primer if recommended by the sealant manufacturer. This primer attaches itself to the stone edge surface, and the sealant then adheres to the primer. Primer will not stick to a dirty surface and it is not a substitute for cleaning.
    a. **CAUTION**: Primers are moisture sensitive and will deteriorate quickly when exposed to moisture. They should be purchased in pint containers and stored with caps tightly closed. When exposed to moisture, they form a cloudy white precipitate and must be discarded.

3. Pour only a ten-minute supply of primer into a clean container, and then replace the cap on the primer can. Dip a clean, dry, lint-free cloth into the primer and gently wipe a thin film onto the stone edge surface.
    a. **CAUTION**: Application of a thick layer of primer can cause severe loss of adhesion between the sealant and primer. A powdery white film will form on the surface if too

much primer has been applied. This film should be removed with a clean, dry, lint-free cloth.

4. Allow primer to dry. The surface is now ready for application of sealant. If the sealant cannot be applied immediately, the surface must be protected to avoid contamination. Some sealants cannot be completely removed from some stones. It may be necessary for adjacent surfaces to be carefully masked or taped to prevent sealant from getting on the surface.

5. Sealant should be applied in a continuous operation from a caulking gun. A positive pressure, adequate to fill the entire joint width, should be used. This can be done by "pushing" the sealant bead ahead of the application nozzle. Within 10 minutes after application, tool sealant into the joint. This spreads the sealant against the back-up material and the joint surfaces to obtain compaction to the panel edges. This also fills voids in the aluminum honeycomb and provides a secure bond to the honeycomb. Do not use liquid tooling aids such as water, soap or alcohol as they may interfere with the curing or adhesion of the sealant. It is critical that the sealant fill the entire joint or cavity and that it firmly contact the panel surfaces. If this is not done, poor adhesion will result and sealant performance could be weakened. Avoid the technique of scraping off excess sealant, which pulls sealant out of the joint and prevents bond to the panel edges.

6. Masking or taping must be removed within ten minutes after tooling. If a solvent will be used for cleaning, consult the sealant manufacturer or TerraCORE Panels for recommendations to avoid staining the stone surface and/or adversely affecting the sealant.

STORY POLES

Story poles can be very helpful when working on large exteriors where interlocking channel sections or other continuous rows of clips are used. Story poles are basically long pieces of wood or metal with notches cut into them to position the extrusions on the wall. They are usually worked with in pairs, one for each side of the extrusion. When dealing with high walls it may be necessary to have several story poles to reach the top of the building. Care should be taken when making multiple story poles to make sure they match. Even a little variation can cause problems as work progresses up the building. For this reason, it is recommended to use aluminum or another metal to make the story poles. At a minimum, the elevation of the extrusions should be checked at each floor line to ensure errors have not occurred. When possible it is best to anchor the story poles to the wall and feed the extrusions through the slots. This eliminates errors introduced from movement of the story poles. The less movement in the story poles the more accurate the extrusions will be placed. To make a story pole, cut a notch in a piece of wood or metal so that the pole will sit on top of the first row of extrusions. The additional notches (1 inch x 3 inches) should be cut so that the bottom of the extrusions above will sit on the bottom of the notch.

FIELD CUTTING TERRACORE PANELS

Recommended tools and materials:

- Circular saw with continuous rim, dry cut diamond blade (or skill saw, table saw or grinder…with same blade)
- Masking tape
- Straight edge

- Angle grinder with 4 1/2 inch continuous rim dry cut diamond tipped blade
- Jig saw

NOTE: Continuous rim dry cut diamond tipped blades are available at most hardware or masonry supply stores. It might be necessary to get an adapter to make a dry cut diamond tipped blade fit a 4 1/2 inch angle grinder depending on brand.

STRAIGHT CUTS

With proper care, field cutting TerraCORE Panels is no more difficult than cutting a sheet of plywood. The main concern while cutting a panel is to protect the stone from being scratched.

IMPORTANT NOTE: The line to be cut and any area in contact with the saw should be covered with masking tape prior to cutting.

It may also be helpful to mask or otherwise cover the bottom of the saw to prevent scratching. Once the area to be cut has been properly covered with masking tape, the lines to be cut can be marked on the masking tape. Marks should never be made directly on the stone as some inks may bleed or otherwise stain the stone. When making long straight cuts, it is often helpful to clamp a straight edge such as an angle to the panel to act as a guide for the saw. Again masking tape should be placed under the straight edge to prevent scratching. Panels should be cut – stone side first.

All marks for cutting should be double checked, as it is very expensive to replace a panel once it has been cut incorrectly. Care should be taken to note on which side of the line the saw blade will be traveling so the panel is not cut too small.

The panel is now ready to be cut. Place the circular saw with a dry cut diamond tipped blade against the straight edge, if used, and proceed slowly along the previously marked line. On certain stones, especially marbles, a fast cutting rate will chip the edges of the panels. If excessive chipping occurs, try slowing down the rate at which you push the saw blade through the panel. Once finished with the cut, remove all masking tape from the face of the stone. Remove any glue residue by lightly rubbing the panel with a soft cotton cloth soaked with MEK (Methyl Ethyl Ketone) available at most hardware stores. A razor blade can also be helpful when removing glue residue as long as care is taken not to scratch the stone.

CUT-OUTS & IRREGULAR SHAPES

Cut-outs such as for electrical outlets are best done with a 4 1/2 inch dry cut diamond tipped blade on an angle grinder. The panel should be masked and marked as noted above. To start a cut at the middle of the panel, start the angle grinder/saw at the center of the cut-out and push the saw blade straight down along the line just through the stone. Now proceed cutting down the line to the stopping point, reverse directions cutting down to the stopping point at the other end of the line. Repeat for the other three sides of the cut out.

Once the face stone has been cut, a jig saw can be used to cut the back skin of the panel. From the stone side of the panel, force the jigsaw blade though the cut in the stone penetrating the back skin. It may be necessary to start the jig saw while the blade is through the stone against the back skin to get it to penetrate the back skin. Now cut the back skin and remove the cut-out portion of panel. Remove the

masking tape as noted above. If a jig saw is not available to cut the back skin of the panel, the angle grinder with the diamond tipped blade can be used to cut the back skin. After cutting the face of the stone, turn the back of the panel over. The outline of the cut on the other side should show through the skin. Cut the skin around the outline and then punch out the cut-out from the front side. The honeycomb will tear very easily once the stone and skin on the front and the skin on the back are cut. Irregular shapes and curves can also be easily cut with a 4 1/2 inch dry cut diamond tipped blade on an angle grinder. Mask and mark the panel as noted previously. Carefully layout the shape and cut with the diamond tipped blade in an angle grinder. Cut the back skin as noted previously. If the edges are left ragged or chipped, they may be smoothed with a belt sander with a medium to course grit sanding belt. Since most marbles and limestones are very soft, care should be taken not to remove too much material with the belt sander.

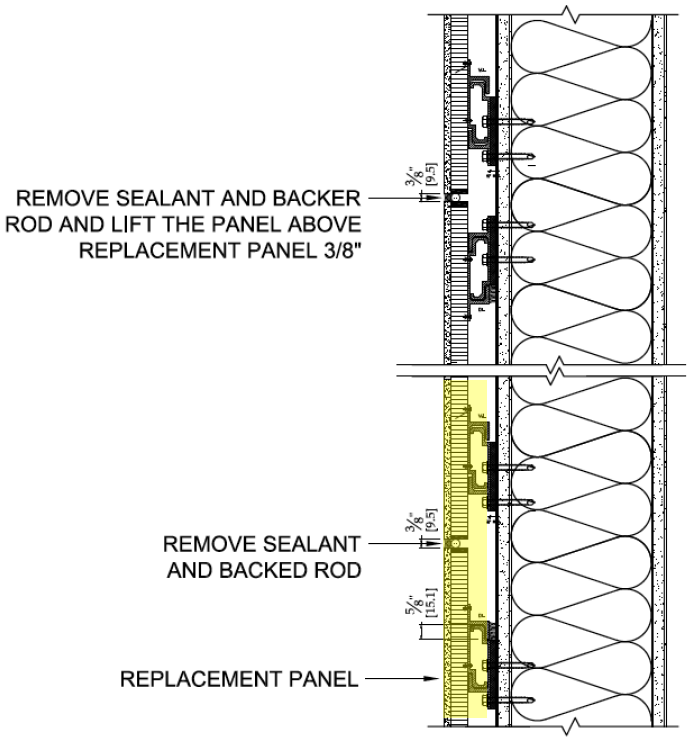
GENERAL INSTALLATION NOTES

- Installation is simple, and can be done by a carpenter, glazier, mason or stone setter.
- Expect a 3-man crew (2 installers and a helper) to be able to install 2,000 SF to 5,000 SF of panels per week. The more crews you have, the more panels that can be installed per week. More experienced installers can surely install even more per crew.
- The installer is normally responsible for supplying: specified fasteners, anchors, structural silicone, plastic or other shims, furring, girts, backer rod and caulk (if needed) and any tools necessary for installation. We supply our panels with our attachment system.
- If the joints are to be sealed, we recommend a silicone based caulk such as DOW 795, Dow 755 or Pecora. Always test a small area first.
- Joints may also be filled with grout (and a backer rod). But again, test a small inconspicuous area first.

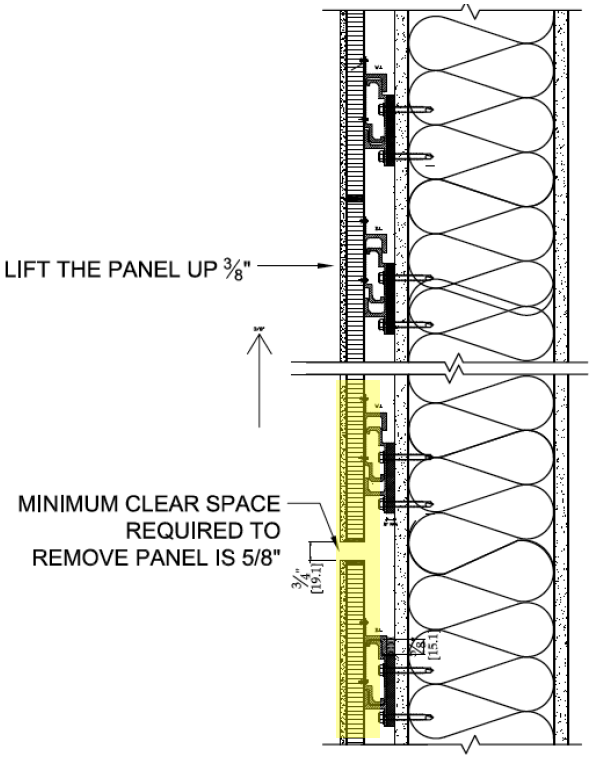
REPAIR / REPLACEMENT OF PANELS

- Since the surface of our panels is natural stone, repairing minor chips, gouges and scratches is very simple.
- <u>For large chips, gouges and similar</u>: Simply mix a 2-part non-yellowing stone epoxy (such as Akemi Platinum or similar) with a bit of tint to match and a little stone dust from a scrap panel. Apply into the damaged area and clean and smooth with a putty knife. If the stone has natural markings, a permanent marker can add in a little accenting to prevent the repair from standing out. This procedure normally makes repairs virtually invisible.
- <u>For small chips, scratches and similar</u>: Smooth out the small area with a diamond file, buffer or sandpaper.
- If you are installing our panels and notice some damage, please take good pictures and call us immediately (even before those panels are installed), so we can guide you on how best to handle.

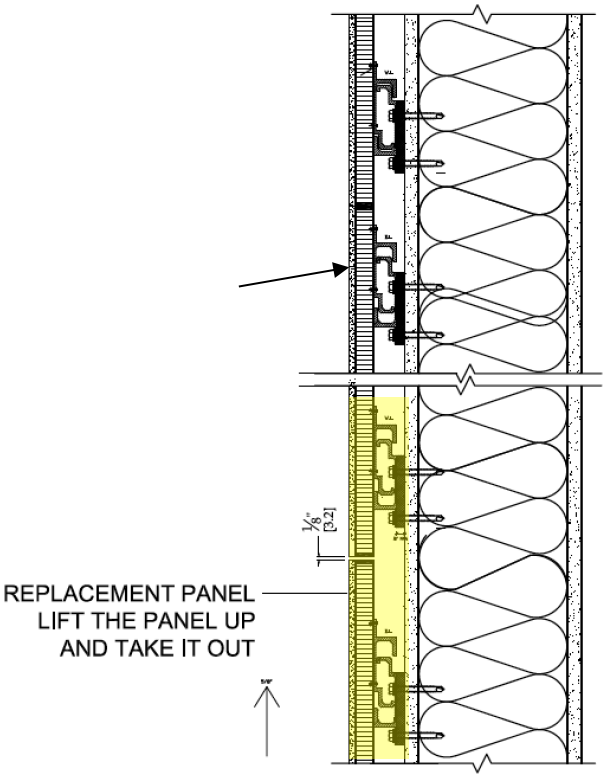
Existing Condition (Highlighted Panel to be Replaced)



Step 1: Move Panel Above Panel to be Replaced



Step 2: Remove Replacement Panel



IMPORTANT: Our panels are extremely strong, but like any stone product (slab, countertop, tile, lightweight stone panel, etc.) the surface or corners may occasionally pick up minor chips during shipping, unloading the crates, or installation. After detailed quality checks on every panel, TerraCORE does everything in its power to protect the panels in shipment, however we cannot guarantee there will be no damage. It is important to note that in construction some chipping is expected; and repair of small chips is *not* normally required if it does not detract from the overall appearance of the work, or impair the effectiveness of the system. This is in accordance with the guidelines outlined in Indiana Limestone Institute's handbook, one of the largest stone institutes in the world.

Most stone institutes and stone organizations actually recommend that small chips be left alone. Usually they will not detract from the appearance of the finished work, especially if they are not at or near eye-level. Remember – our panels are made to replace dimensional stone which has natural flaws.

However, if a panel is beyond repair or needs to be replaced for any reason, then let us know ASAP. If that panel is installed already, use a grinder with a diamond blade to cut the panel out. You will quickly be left with a clean opening, where the replacement panel should be able to drop right in.