



Installation Manual



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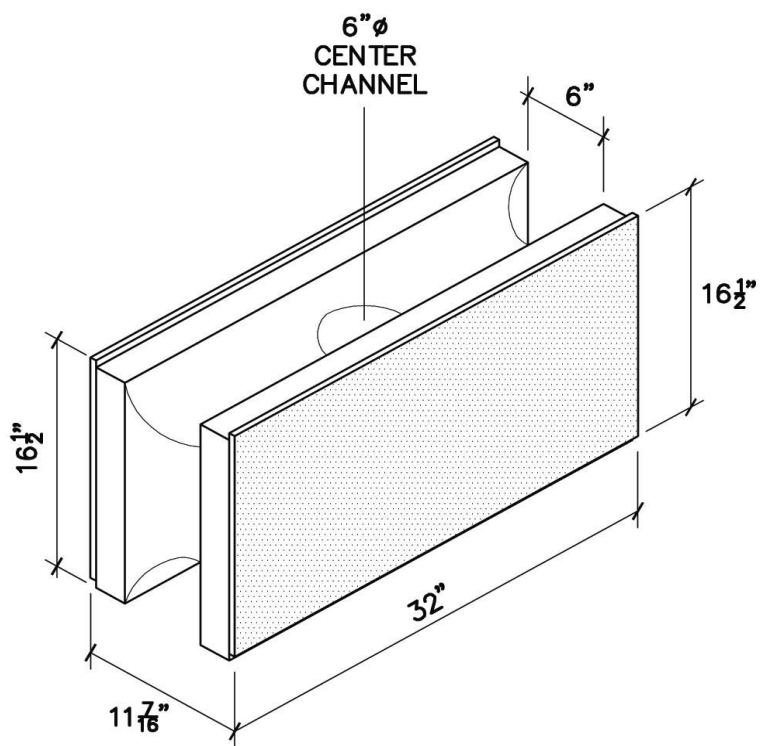
Tech Block® Installation Manual Chapter 1

Tech Block® Insulating Concrete Forms:

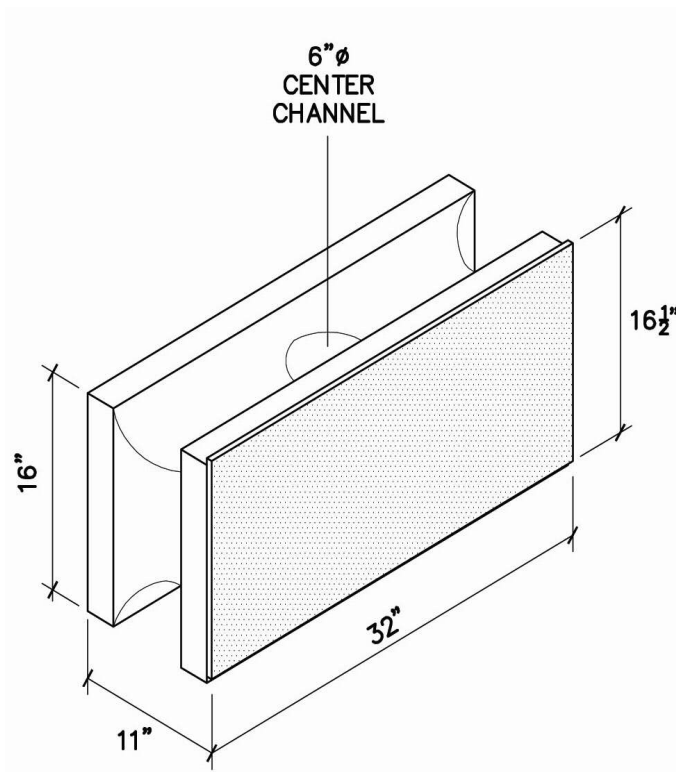
Tech Block is a stay-in-place, Composite-Insulating Concrete Form (ICF). The insulation is a composite of recycled polystyrene, cement, water, and admixtures. Standard Tech Block units are faced on both sides by 7/16" oriented strand board.

Tech Block forms, when filled with steel reinforced concrete, create a post and beam structure within the insulated wall. The columns and beams are 6 inches in diameter, and located 16 inches on center in each direction.

The facing on each block is offset from the insulating core by 1/2" to provide a tongue-in-groove fit between block.



Standard Tech Block Unit
7/16 Facing Each Side

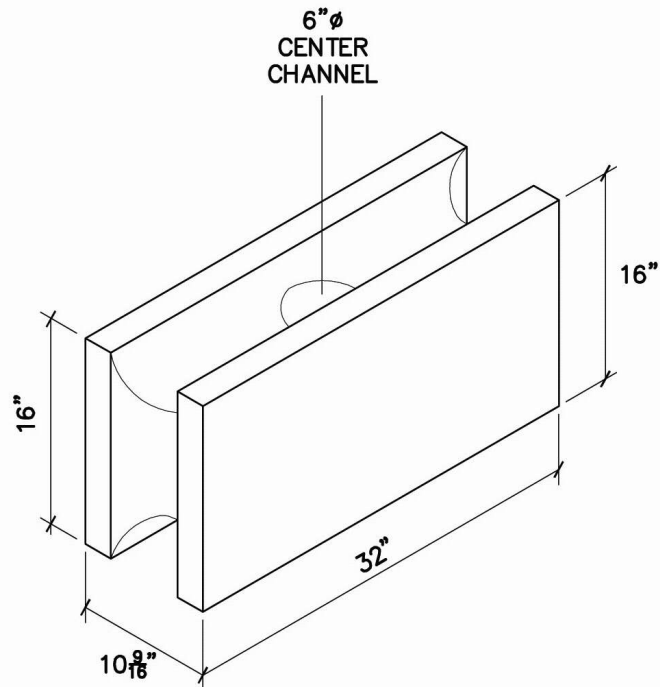


Unfaced and One-Sided Tech Block forms may be used below grade for stem wall or basement applications, with proper waterproofing.

In some locations unfaced block may be suitable for direct application of elastomeric stucco, brick or stone veneer, or interior plaster. Local conditions and codes will determine requirements for vapor barriers and moisture protection.

7/16" Facing on One Side

Unfaced Tech Block



Tech Block® Installation Manual Chapter 2

Tools, Planning, and Working with Blocks:

Tech Block insulating concrete forms may be installed with common carpentry tools including: circular saw, reciprocating saw, drill, level, and framing square.

Additional materials required for most projects include: Polyurethane foam adhesive and sealant, rebar and tie wire, lumber for ledgers, window and door bucks, anchor bolts, screws for bracing to block connections, and bracing materials. Scaffolding, ladders, and turnbuckles for plumbing and bracing walls, or ICF specific bracing may also be used.

Pallets of Tech Block will require a flat area with forklift access for offloading. While the core of Tech Block forms are impervious to water, the osb facing can be damaged by prolonged, repeated exposure to moisture. Please protect forms if they are stored outside for prolonged periods prior to use.

Standard Tech Block forms can be cut as follows: (1) Mark a cut line on the facing on both sides of the form with a framing square. (2) Cut through the facing on each side with a circular saw. (3) Finish the cut using a reciprocating saw with a 12" blade or a handsaw. (4) Add a half channel to the cut end of the form using the reciprocating saw to cut the composite material, and the claw end of a hammer to pull material out. The composite material can also be cut with a keyhole saw.

Unfaced Tech Block forms may be scored with a sharp, hard object to make a line, and cut with a reciprocating saw, keyhole saw or handsaw. Cut from each side of the block to ensure accurate cuts. Add a half channel to the cut end of each block, as needed, using the same tools for cutting and the claw end of a hammer to pull material out.

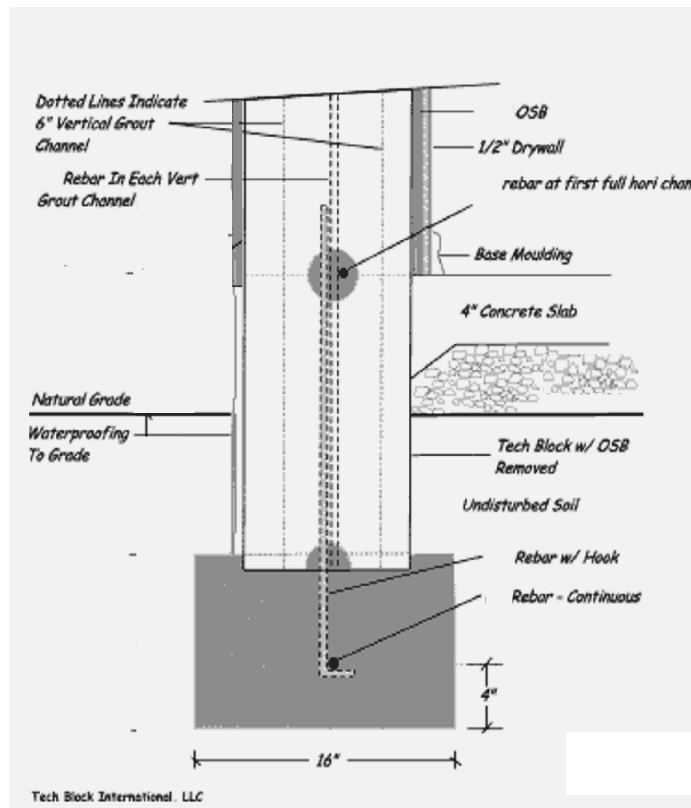
[Detail 5]



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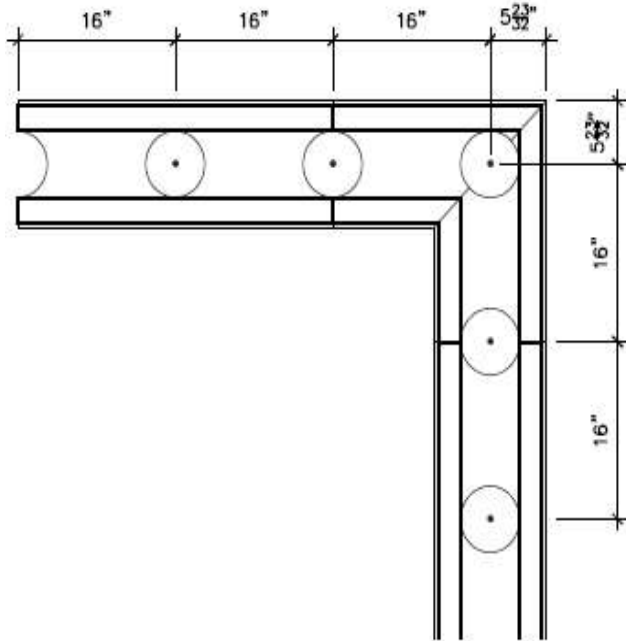
Foundation and First Course of Block:

The size and reinforcement of the foundation will be determined by design, codes, local soil conditions and other factors.



Tech Block walls are normally anchored with rebar dowels matching the size of the vertical steel reinforcement. They should extend above the foundation far enough to meet lap splice requirements, and hook under the reinforcing steel in the footing.

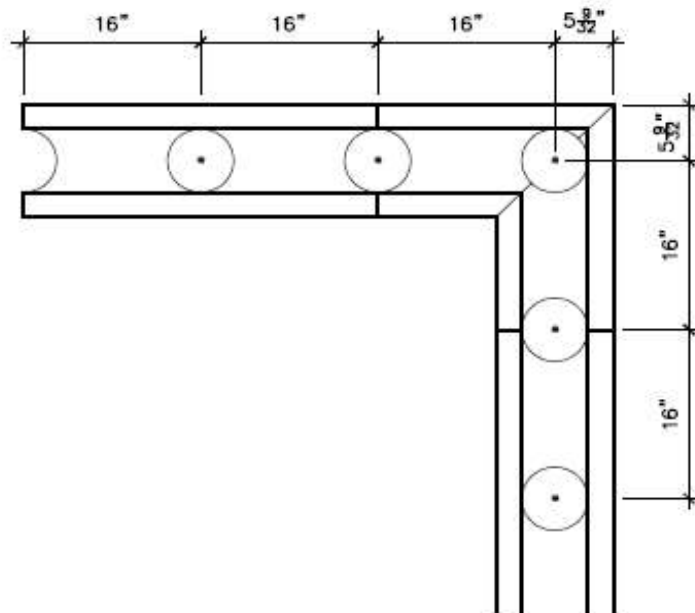
For basement applications, use One-Sided Tech Block forms with the facing to the interior. For stem wall applications, use Unfaced Tech Block forms. Unfaced blocks must be waterproofed on the exterior below grade. Use a solvent free masonry, concrete or ICF waterproofing system.



To layout vertical reinforcement for a wall using standard Tech Block forms, begin at the corners. Place dowels $5 \frac{3}{4}$ inches in from each side at a corner (actual distance to center is $5 \frac{23}{32}$ "). Then space dowels every 16" on center, $5 \frac{3}{4}$ " from the outside face of the wall.

STANDARD
 $\frac{7}{16}$ " FACING
 EACH SIDE

When using unfaced block, place the corner dowel $5 \frac{1}{4}$ " in from the outside faces of the block. Then place dowels 16" on center, $5 \frac{1}{4}$ " in from the outside of the wall.

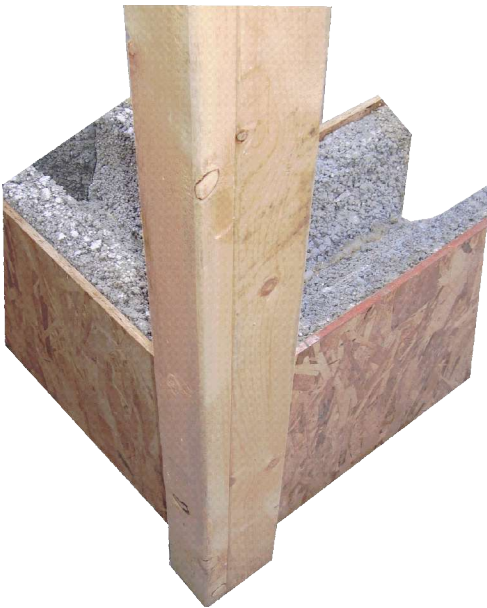


UNFACED

Tech Block® Installation Manual Chapter 4

Corners:

Corners may be fabricated by cutting regular block across the middle channel at a 45 degree angle. Cut and remove the facing overlap from one of the pieces and flip over to create the corner. The overlap must be removed to ensure the insulation rests properly on the block or concrete below it. Seal the joint with polyurethane foam sealant. Please note, there will be a 1/2" gap in the facing material, where the overlap has been removed. The insulation should be even across all blocks, the gap will be in the facing material only. Fill this area with polyurethane foam sealant.



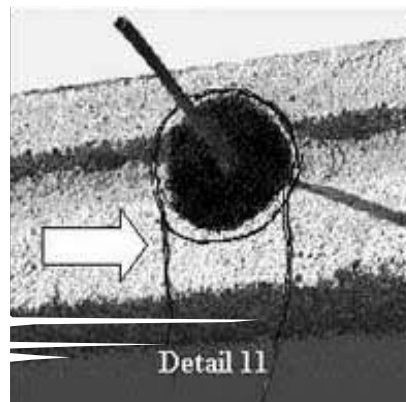
The outside of corners must be braced. A corner brace made out of dimensional lumber can be screwed to the blocks facing. Also, horizontal walers can be used to support corners and tie them to adjacent blocks.

Tech Block® Installation Manual Chapter 5

Steel Reinforcement:

The size of steel reinforcement can vary with design. Lap splice requirements are based on code.

To tie vertical reinforcement to dowels: Install a loop of tie wire over each grout channel in the first row of block. (See detail, unfaced, stem wall application shown) The loop should make a complete circle and a half, have a 6" diameter, and have ends long enough to hang outside the exterior edge of the forms. Higher courses of block can then be stacked without vertical rebar in place. Prior to grouting, vertical reinforcement can be placed in each column from the top, and the tie wire loop can be pulled tight to cinch the vertical bar to the dowel in the center of the grout channel.



Horizontal reinforcement may be raised from the bottom of the channel and held in place by a 3" nail laid across the bottom of the channel perpendicular to the rebar. Rebar place holders for masonry may also be used.

Rebar design for lintels may also vary with design. See Windows and Doors section for examples.

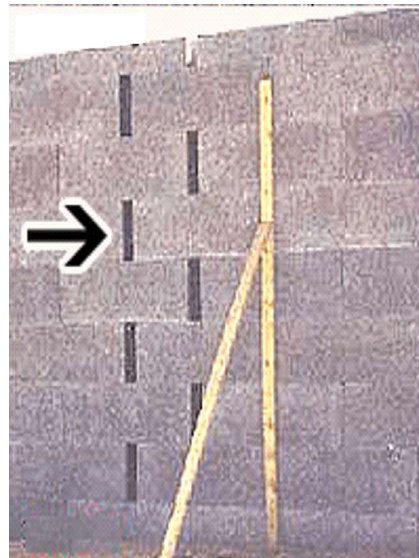
Tech Block® Installation Manual Chapter 6

Installing Additional Courses:

Tech Block forms are best installed in a running bond. Staggering the block allows the tongue-in-groove facing to help align the wall both horizontally and vertically. Use half blocks as needed to establish the running bond. Place horizontal reinforcement in channels before installing additional courses. Vertical channels must be placed over the channel below to allow the grout to make a continuous column.



To reduce cutting, layout walls from each corner working toward the middle. If possible, have the two sections meet at a wall opening. Otherwise, use cut pieces to fill in openings from inside and outside wall as needed. Do not obstruct the vertical grout channel.



Tech Block forms may be placed vertically as well. When joining vertical forms to horizontal forms, the facing overlap must be removed to maintain the correct block spacing and allow the insulation in the forms to meet.

Tech Block® Installation Manual Chapter 7

Bracing:

Tech Block's patented facing allows almost any bracing system to be used for wall alignment and support. Screw braces to the blocks facing to hold them in place as you install the forms. ICF bracing systems are available which include turnbuckles and scaffolding, but are not specifically required. Leave enough bracing in place to support the wall until the concrete has reached strength.



When using one-sided, or unfaced block, use OSB or plywood to temporarily brace forms where needed on the unfaced sides by screwing through the block with 12" screws.

Areas that frequently require additional support include around windows, doors and block which have been cut.

Blocks which have been cut and are missing part of the web may be reinforced with 1/4" x 12" or 14" screws, screwed through one side of the facing to the facing on the other side. When screwed through the block's web, these screws may be removed and re-used after grout placement. Metal angles or 2 x 4 dimensional lumber can be used to tie bucks and block-outs to the block's facing.



Brace window block outs or bucks as needed to support them during grout placement.



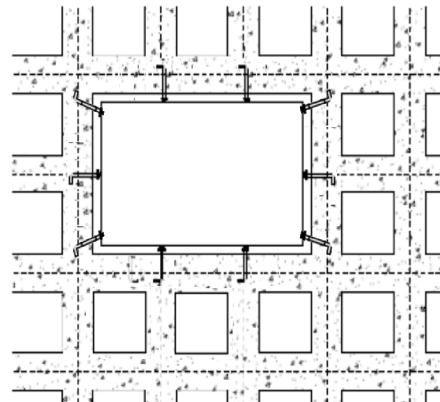
Tech Block® Installation Manual Chapter 8

Window and Door Openings:

Wall openings for windows and doors may be formed a number of ways. Temporary plywood and lumber block-outs may be used to leave an opening for later use.



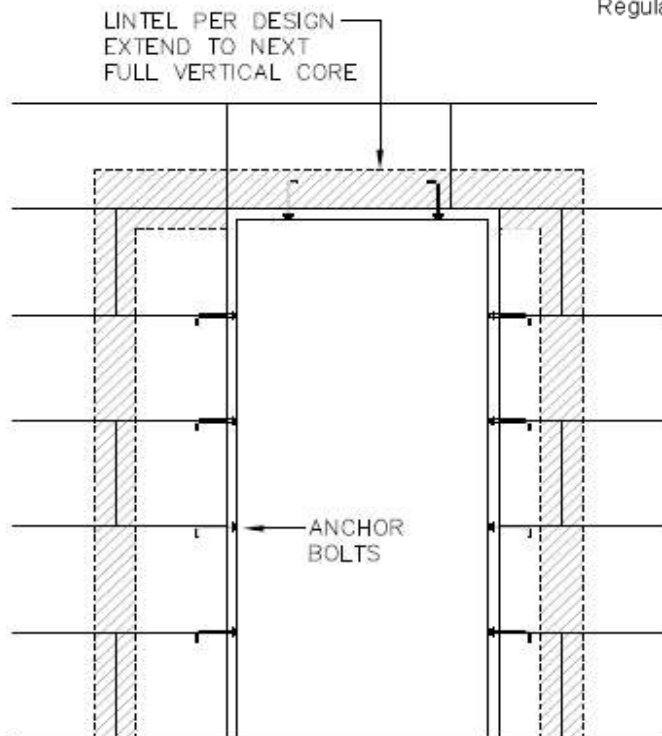
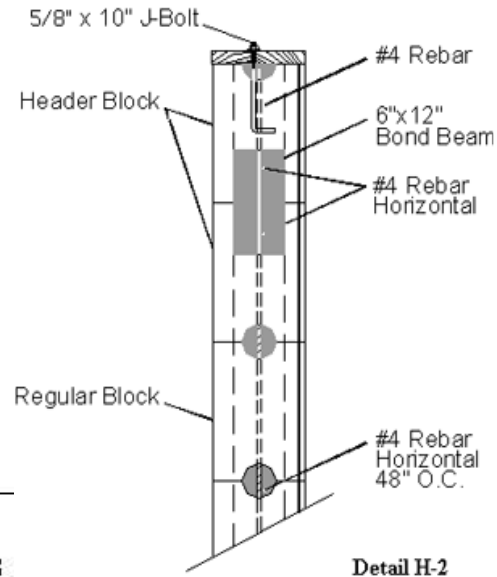
Permanent window bucks may be placed prior to grouting. Bucks may be drilled for anchor bolts which should be placed at each grout channel both horizontally and vertically. Alternatively, Lag screws may be screwed into the back of the buck at each channel. Place anchors at each horizontal core as the forms are installed. Do not place all of the anchors in the buck ahead of time, as they will make it more difficult to fit blocks into place.



If needed, the cut end of blocks may be channeled out to form a grout column along the side of any opening. Use polyurethane foam sealant between the window bucks and the block. Additional support for the window bucks may be provided using metal angles or strap to attach the bucks to the block's face.

Brace bucks or block outs as needed to prevent sagging or blow-outs during grout placement.

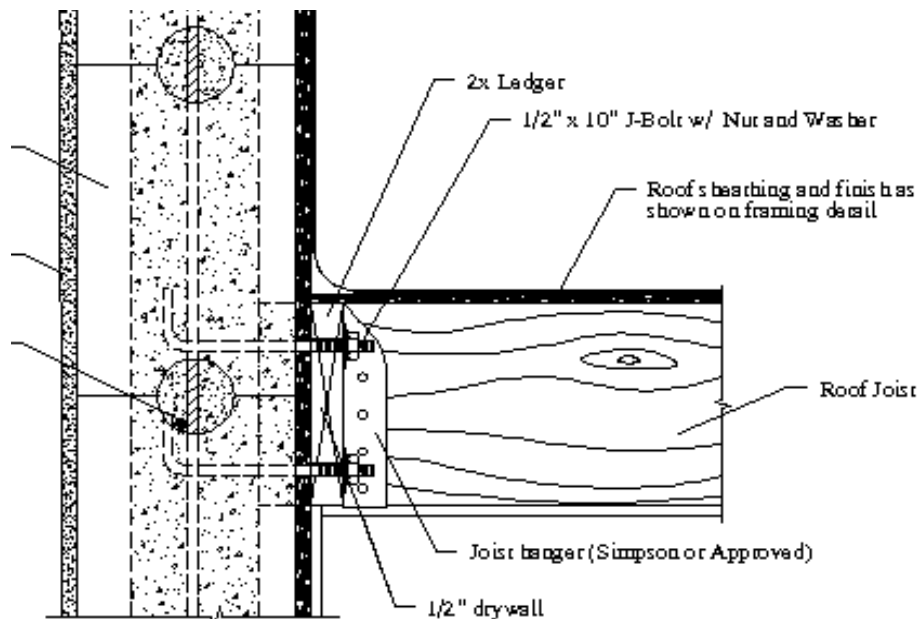
Some openings will require a lintel, or header, to support the load above. The size and reinforcement of lintels is per design. To create a space for the lintel within a block use a reciprocating saw to cut and remove material with the claw of a hammer. To the right is a detail for a 6" x 12" lintel. The horizontal channel in two different blocks have been increased to 6" x 6". When placed together they form the 6"x12" opening for the concrete and reinforcement. Lintels should be continued laterally to the next full 6" column on either side of the opening.



Tech Block® Installation Manual Chapter 9

Installing Ledgers:

Ledgers must be placed per design and per local building codes. Anchor bolts are typically placed at each vertical grout channel. A 6"x6" area of the block is removed to allow grout to flow directly to the ledger, encasing the bolt. Drill holes in the ledger at each anchor bolt's location, and place the bolts in the ledger board. Then put the ledger board in place, with the anchor bolts installed. Screw the ledger board to the facing to hold it in place until grout placement. When the grout has cured, tighten the nuts on each anchor bolt.

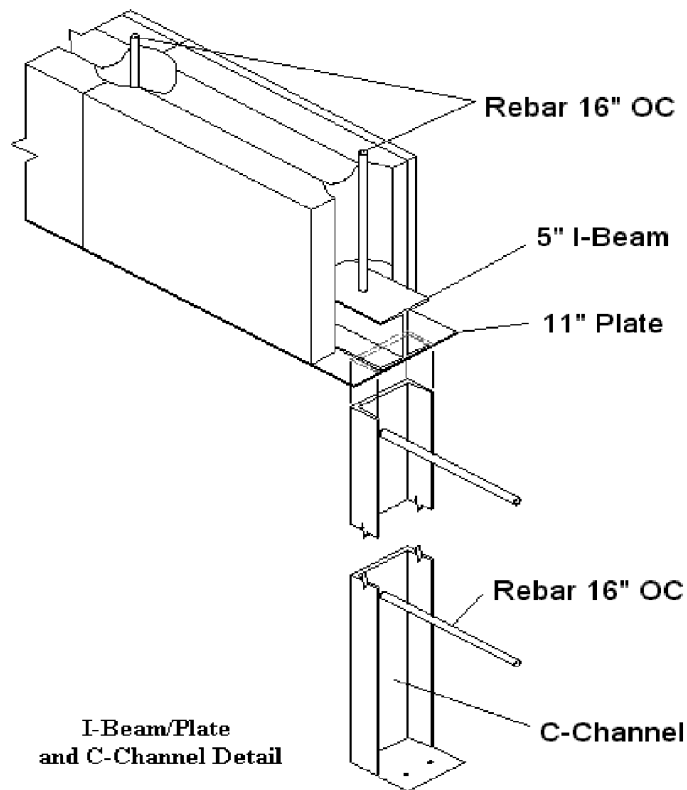


Tech Block® Installation Manual Chapter 10

Connecting to Structural Steel:

Steel beams may be used to carry the load across very large openings, or to support Tech Block walls where there is no load bearing wall underneath. Tech Block forms may also be used for infill in between steel members.

To connect Tech Block walls to structural steel, reinforcing steel may be welded to the steel members at each grout channel. Blocks may be channeled out with a reciprocating saw and hammer to allow space for steel beams and columns within the forms. Dimensional lumber or other plate material may be used as a buck over openings.



Tech Block® Installation Manual Chapter 11

Grout Placement:

Prior to grout placement, be sure all steel reinforcement has been placed per design. Make certain all building inspections are complete. Check all walls for plumb and complete any necessary bracing. Make certain all required anchor bolts are on site, as well as trowels for finishing the top of the wall. The building's floor may be protected during grout placement with plastic sheeting or cardboard.

Grout mix design should be a minimum of 3000 psi, but may be higher per design. Aggregate size should be a maximum of 3/8" pea gravel. An 8" slump is recommended. Water reducing admixtures may be useful to achieve the correct slump. Self-consolidating mixes are available from some batch plants and may be appropriate.

Grout may be placed with either a line pump or a boom pump. Line pumps may be preferable due to the reduced pressure. When using a boom pump, reduce the line to slow the speed and pressure of the grout, or use an "ess" fitting to reduce the pressure. Tech Block recommends lifts of four blocks (5'4") maximum.

Place grout under windows by cutting a hole in the form, bucks, or block-outs under the window opening, at the top of a vertical grout channel. Pump grout directly into the wall through the hole.

Consolidate the concrete by rodding the grout in the vertical channels with a piece of rebar.

Check that grout has flowed correctly with a thin, long piece of steel pushed through the block seams (a long reciprocating saw blade, for example). Check around door and window bucks and block-outs. To fill any voids, make a hole in the forms at the top of the area to be filled by plunge cutting with a circular saw. Keep the cut-out piece, and glue it back into place after the pour with polyurethane foam sealant.

Tech Block® Installation Manual Chapter 12

Plumbing and Electrical:

Tech Block forms can be cut to create plumbing and electrical chases. To create a chase, cut along each side of the desired opening and pull the block material out to the desired depth with the claw of a hammer. The



concrete columns and beams are at a depth of 2 ¾ inches from the face of the block. Chases deeper than this may require block outs prior to pouring the grout. If beams or columns are interrupted, lintels may be required to support the load.

Polyurethane foam sealant may be used to seal around pipes and electrical boxes, and glue wires to the back of a chase.



Tech Block® Installation Manual Chapter 13

Wall Finishes:

Tech Block walls must be covered with interior and exterior wall finishes which meet the requirements of code. Vapor barriers, retarders, or weather resistive membranes may be attached to Tech Block's facing using fasteners for wood structural panel sheathing.

Interior Walls:

Gypsum wallboard may be attached to Tech Block's facing using screws and in accordance with code. Seal around any wall penetrations with polyurethane foam sealant prior to attaching wall coverings.

Gypsum and Portland cement plasters may be used over gypsum lath, attached to Tech Block's facing in accordance with the manufacturer's recommendations. In some locations, plaster may be applied directly to unfaced Tech Block on the interior.

Exterior Walls:

Tech Block walls should be covered on the exterior with an approved, water-resistive barrier, such as weather-resistant sheathing paper. Siding material may be attached with the manufacturer's recommended fasteners for wood structural panel sheathing.

Brick or Stone veneers may be anchored to Tech Block walls with metal ties placed into the channels before the grout is placed. Attach in accordance with the manufacturer's recommendations for installation over wood backing. Tech Block's exterior surface must have an appropriate weather-resistive barrier, and weep holes and proper flashing must be used to ensure moisture is not trapped behind the veneer. Veneers may also be attached to unfaced Tech Block forms with proper waterproofing, air space, weep holes, flashing, and per manufacturer's recommendations.

Stucco may be applied over standard Tech Block forms in accordance with code, using two layers of water-resistant, Grade D paper. Flashing, expansion or control joints and lath may be attached to Tech Block's facing. In some locations, stucco may be applied to unfaced Tech Block forms. The stucco system must meet all requirements for providing the building with a weather-resistive envelope.

Below-Grade Walls:

Use One-Sided Tech Blocks for basement applications, with the facing to the interior. Use unfaced Tech Block forms for below grade stem walls. The exterior unfaced side must be dampproofed or waterproofed in accordance with code. Parging or a base coat of stucco may be used to give the exterior a protective

layer, with a bituminous coating to provide for damproofing. Unfaced Tech Block's may also be waterproofed with a standard masonry water-proofing, then protected with polystyrene board or sheet water-proofing products.

To provide additional support for exterior finishes, if required:

Steel angles providing support for exterior veneers may be attached to the grout channels prior to grout placement. Long screws (12" or 14") may be used to provide additional support by attaching exterior supports through the entire wall to the inside facing.

