ESTIMATING

Although ECO-Block has an on-line estimator available for download, it is still important to know how to mathematically estimate the number of forms needed. The estimator can be downloaded from the ECO-Block website at [www.eco-block.com](http://www.eco-block.com). Instructions for using the ECO-Block estimator are included.

THE DIMENSIONS ON THIS DRAWING ARE USED TO CALCULATE THE NUMBER OF FORMS, CONNECTORS, AMOUNT OF CONCRETE, AND REBAR IN THE FOLLOWING ESTIMATES
NUMBER OF COURSES

Divide wall height in inches by height of form (144” / 16”) = 9 courses

NOTE: If unable to divide evenly, add one more course
EXAMPLE: 132” ÷ 16” = 8.25 courses + one additional course = 9 courses total.

NUMBER OF FORMS

- Exterior lineal feet x wall height
  - 380’ x 12’ = 4,560 wall s/f
- Width x height of each opening added together
  - 15+15+24+120+120 = 294 openings s/f
- Wall s/f – openings s/f
  - 4,560 – 294 = 4,266 s/f
- Total wall s/f ÷ 5.33 (s/f per block)
  - 4,266 ÷ 5.33 = 801 total forms
- Building corners x Courses
  - 6 x 9 = 54 corners
- Total forms - corners
  - 801 – 54 = 747 standard forms
- Standard forms + Corner forms
  - 747 + 54 = 801 total forms (should match)

WASTE PERCENT

Add 1% - 3% for waste, depending on your experience. Minimal waste is accomplished by placing cut pieces larger than one web and two foam bars back into the wall. If desired, use window & door opening s/f as the waste factor and do not deduct opening s/f from wall s/f. Your RSM or distributor can assist you in estimating this.

TECHNICAL TIP

When shipped, the corner forms will be packaged 6 to a bundle, 50% Left Hand & 50% Right Hand. This will automatically stagger the joints 16” on center.
NOTE: First course typically requires connectors at 1, 3, & 5 Tee connections (from top). Second course & above typically require connectors at 2 and 5 Tee connections (from top). Standard blocks have 6 horizontal connection point; 90° corner blocks have 4 horizontal connection points; 45° corner block have 6 horizontal connection points.

CONNECTOR ESTIMATE

1. FIRST COURSE CONNECTORS
   • Lineal feet ÷ 4' (standard block length)
     ○ 380' ÷ 4 = 95 block per course
   • Block per course – corners
     ○ 95 – 6 = 89 standard block and 6 corner block
   • Standard block Tee connections x required connections
     ○ 6 x 3 = 18 connectors per block
   • Connectors per standard block x number of first course standard block
     ○ 18 x 89 = 1,602 connectors
   • Corner block Tee connections x required connections
     ○ 4 x 3 = 12 connectors per corner
   • Connectors per corner block x number of first course corner block
     ○ 12 x 6 = 72 connectors
   • Standard connectors (1,602) + corner connectors (72)
     ○ 1,602 + 72 = 1,674 connectors for FIRST COURSE

2. SECOND COURSE & ABOVE CONNECTORS
   • Lineal feet ÷ 4' (standard block length)
     ○ 380 ÷ 4 = 95 block per course
   • Number of block x second course & above courses
     ○ 95 x 8 = 760 block
   • Number of corners x second course & above courses
     ○ 6 x 8 = 48 corners
   • Number of block – number of corners
     ○ 760 – 48 = 712 standard block
   • Standard block connection points x required Tee connections
     ○ 6 x 2 = 12 connectors per block
   • Connectors per standard block x number of second course & above standard block
     ○ 12 x 712 = 8,544 connectors
   • Corner block connection points x required Tee connections
     ○ 4 x 2 = 8 connectors per corner
   • Connectors per corner block x number of second course & above corner block
     ○ 8 x 48 = 384 connectors
   • Standard block connectors + corner block connectors
     ○ 8,544 + 384 = 8,928 connectors for SECOND COURSE & ABOVE

3. TOTAL CONNECTORS NEEDED FOR ALL COURSES
   • First course connectors + second course & above connectors
     ○ 1,674 + 8,928 = 10,602 TOTAL CONNECTORS NEEDED FOR ALL COURSES
NOTE: If building wide wall, make sure to include splice connectors and additional connectors, as needed, in your estimate

4. **BRICK LEDGE CONNECTORS**
   - If brick ledge forms are required on the project, connectors are placed at 1, 3, and 5 Tee connections, regardless of course number.
   - Brick ledge rail is **REQUIRED** when stacking next course above a brick ledge block. Order an amount equal to the number of brick ledge ordered.

<table>
<thead>
<tr>
<th>SIZE OF CONNECTOR</th>
<th>NUMBER OF CONNECTORS</th>
</tr>
</thead>
<tbody>
<tr>
<td>4”</td>
<td>1,000 per box</td>
</tr>
<tr>
<td>6”</td>
<td>500 per box</td>
</tr>
<tr>
<td>8”</td>
<td>500 per box</td>
</tr>
<tr>
<td>10”</td>
<td>500 per box</td>
</tr>
<tr>
<td>Bridge ledge rail (4’ length)</td>
<td>50 per box</td>
</tr>
<tr>
<td>Splice connectors</td>
<td>1,000 per box</td>
</tr>
<tr>
<td>Tie anchors</td>
<td>500 per box</td>
</tr>
</tbody>
</table>

**TECHNICAL TIP**

If total connector count cannot be divided evenly by number of connectors in box, include an additional box when placing order.

<table>
<thead>
<tr>
<th>FORM TYPE</th>
<th># OF CONNECTORS PER BLOCK*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard form, 1st course</td>
<td>18</td>
</tr>
<tr>
<td>Standard form, 2nd course &amp; above</td>
<td>12</td>
</tr>
<tr>
<td>Corner form, 1st course</td>
<td>12</td>
</tr>
<tr>
<td>Corner form, 2nd course &amp; above</td>
<td>8</td>
</tr>
<tr>
<td>Brick ledge block, all courses</td>
<td>18</td>
</tr>
<tr>
<td>24” block, 1st course</td>
<td>18</td>
</tr>
<tr>
<td>24” block, 2nd course &amp; above</td>
<td>18</td>
</tr>
<tr>
<td>24” block, bridge ledge</td>
<td>Not Available</td>
</tr>
<tr>
<td>45° Corner Block, first course</td>
<td>18</td>
</tr>
<tr>
<td>45° Corner Block, 2nd course &amp; above</td>
<td>12</td>
</tr>
</tbody>
</table>

*NOTE: These are typical connector patterns. Actual connector location and/or number of connectors may vary from the above chart, depending on project engineering specifications or code requirements.
CONCRETE ESTIMATE

The total number of forms (not including waste) divided by the number of blocks filled per cubic yard according to block type and core size, will give you an estimate of the amount of concrete needed for your project.

One cubic yard of concrete will fill:

<table>
<thead>
<tr>
<th>BLOCK TYPE</th>
<th>CORE SIZE</th>
<th># OF BLOCKS FILLED WITH ONE CUBIC YD</th>
<th>CUBIC YD NEEDED PER BLOCK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>4”</td>
<td>15.0</td>
<td>.066</td>
</tr>
<tr>
<td>Standard</td>
<td>6”</td>
<td>10.0</td>
<td>.099</td>
</tr>
<tr>
<td>Standard</td>
<td>8”</td>
<td>7.5</td>
<td>.131</td>
</tr>
<tr>
<td>Standard</td>
<td>10”</td>
<td>6.0</td>
<td>.164</td>
</tr>
<tr>
<td>24” Block</td>
<td>4”</td>
<td>10.0</td>
<td>.099</td>
</tr>
<tr>
<td>24” Block</td>
<td>6”</td>
<td>6.75</td>
<td>.143</td>
</tr>
<tr>
<td>24” Block</td>
<td>8”</td>
<td>5.0</td>
<td>.197</td>
</tr>
<tr>
<td>24” Block</td>
<td>10”</td>
<td>4.0</td>
<td>.246</td>
</tr>
</tbody>
</table>

Example based on 8” core wall:

1. Standard forms + corners
   a. $747 + 54 = 801$ total forms required (without waste factor)

2. Total number of forms ($801$) ÷ # blocks filled with one cubic yd from above chart
   a. $801 ÷ 7.5 = 106.80$ yards of concrete (round up to 107)
REBAR ESTIMATE

Amount, size and position of rebar in the wall will be specified by the project engineer, building official, and/or code requirements.

Based on using #4 rebar, let's assume the following installation, **AS AN EXAMPLE ONLY**:

1. Horizontal rebar on bottom, middle, and top courses of the wall (1/3 points of the wall)
2. Vertical rebar every 2’ on center
3. Vertical rebar along either side of each opening
4. Horizontal rebar above each opening extended 18” beyond each side of opening
5. Three extra horizontal bars over each opening same length as above. These will be placed:
   a. 1 bar in first connector above the opening in center rebar placement location
   b. 2 bars in third connector above 1st bar on inside and outside rebar placement locations
6. Diagonal rebar (36”) at the top corners of each opening
7. These are the dimensions of our estimating plan:
   a. Exterior lineal feet = 380’
   b. Wall height = 12’
   c. Footing depth – 12”

---

**IMPORTANT NOTE:** Rebar overlaps are typically 40 bar diameters on each end (d̄ × 40), based on the diameter of the smaller bar, if two different bar sizes are used. Example: #4 rebar is ½” diameter. ½” x 40 = 20” overlap. (See the chart on the following page for rebar sizes). Dowel length should be calculated using the same as overlap.

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1. **HORIZONTAL BAR** (Using 20’ rebar with a 20” overlap, each bar reaches a length of 18’4”)
   a. Number of horizontal courses x Exterior lineal feet = total length required
      i. 3 x 380 = 1,140 total length required
   b. Required length ÷ bar length with overlap = required number of 20’ rebar
      i. 1,140 ÷ 18’4” = 26 required number of 20’ rebar
   c. Each opening requires two 3’ bars diagonally (5 openings in plan)
      i. (5 x 3’) x 2= 30’ rebar required for diagonal openings (2 bar)
   d. Each opening requires one horizontal bar that extends 18’ past each side of opening
      i. Plan has three openings 3’ and two openings 10’
      ii. 3(openings) + 3(openings) = 6’ x 3 = 18’ of rebar for 3’ openings (1 bar)
      iii. 10(openings) + 3’ = 13’ x 2 = 36’ of rebar for 10’ openings (2 bar)
      iv. 18’ + 36’ = 54’ of horizontal rebar needed (3 bars)
   e. 26 bar (exterior lineal feet) + 2 bar diagonal + 3 bar horizontal = 31 20’ length bars
2. **VERTICAL BAR** (spaced 2' on center)
   a. Exterior lineal feet ÷ on center spacing = vertical bar required
      i. $380 \div 2 = 190$ 12' pieces needed
   b. Number of openings x 2 vertical bars per opening = additional bars needed for openings
      i. $5 \times 2 = 10$ 12' additional bars for openings
   c. 190 verticals (2' o/c) + 10 verticals (openings) = 200 vertical bars
   d. **Footing Dowels**
      i. One dowel must extend 20" from top of footing at each vertical bar position.
      ii. Each dowel must also extend in footing concrete to depth of footing (12" for plan)
      iii. 200 (dowels) x 32" (12" in concrete/20" above) = 6,400" (27 bars 20')
   e. 31 (horizontal bars) + 200 (vertical bars) + 27 (dowel bars) = **258** 20' length bars

3. **WASTE** - Add 3% to number (258 x .03 = 7.74 = 8 additional bars 20' length

4. 258 (20' length bars) + 8 (20' waste bars) = **266** total 20' length bars required for plan
TECHNICAL TIP

Corner bar can be ordered pre-bent to save time and can be formed in any configuration needed.

Horizontal rebar provides temperature and crack control, while vertical rebar provides for side loads like wind and vertical superimposed loads, such as heavy clay backfill.

REBAR PLACEMENT OPTIONS (SECOND COURSE & ABOVE)

1. Wet Set Dowels - Length must include necessary amount of bar to meet overlap requirements above lower level and be extended into lower level concrete to meet specification requirements.
2. Continuation From Lower Wall – Increase perimeter vertical bar length on lower level to meet overlap requirements for next level.
3. Drill & Epoxy – Drill holes for rebar into top of lower wall. Insert rebar of specified length to meet overlap requirements and set with epoxy.

<table>
<thead>
<tr>
<th>BAR SIZE DESIGNATION</th>
<th>NOMINAL DIAMETER (INCHES)</th>
</tr>
</thead>
<tbody>
<tr>
<td>#3</td>
<td>.375</td>
</tr>
<tr>
<td>#4</td>
<td>.500</td>
</tr>
<tr>
<td>#5</td>
<td>.625</td>
</tr>
<tr>
<td>#6</td>
<td>.750</td>
</tr>
<tr>
<td>#7</td>
<td>.875</td>
</tr>
<tr>
<td>#8</td>
<td>1.0</td>
</tr>
<tr>
<td>#9</td>
<td>1.128</td>
</tr>
<tr>
<td>#10</td>
<td>1.270</td>
</tr>
</tbody>
</table>
LABOR ESTIMATE

“How much labor is required to install ECO-Block?” is a frequently asked question. After carefully monitoring many past projects, the following labor rate guidelines have been developed.

These guidelines assume that footings or concrete slab are in place and ready to accept the first course of forms. These rates also assume a standard height of 8 feet but also work walls with up to 11 feet.

The labor rates include erecting the forms, setting and bracing opening bucks, placing rebar, erecting the alignment system, and pouring concrete.

Guidelines vary from .07 to .09 man hours per square foot of wall area. These costs may be higher on upper levels due to the fact that there are usually more window and door openings, as well as more climbing required. These rates are offered as guidelines only, and may vary depending on the complexity of the project and experience of the installer.

EXAMPLE:

Man hours per sq ft (.07) x total crew hourly labor rate* ($50) = Cost per sq ft ($3.50)

*Includes all workers on crew

To achieve optimum results when building an ECO-Block structure, the ideal crew would consist of:
- One experienced person (who understands level, plumb, and square)
- Two laborers