28” BLOCK SERIES
Reinforced Soil Walls
with 28” wide blocks and the Type 1 AT Geogrid Connection

See www.redi-rock.com for:
- Interface shear test reports
- Geogrid connection test reports
- Section drawings for conditions shown in preliminary design charts

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Charlevoix, MI 49720
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info@redi-rock.com
www.redi-rock.com

Check with your local authorized Redi-Rock® Manufacturer for Product Availability

Every Redi-Rock distributor/manufacturer is independently owned and operated. Patents pending on various design criteria. We reserve the right to modify design or specifications without incurring obligation.
### CHART FOR MIRAFI MIRAGRID

#### Silty Sand, Clayey Sand - Internal Angle of Friction ($\phi$) = 28°

Load Condition A - No Back Slope, No Surcharge

Geogrid Walls - 28" Wide Geoconnector Blocks

Geogrid Connection Type 1AT

<table>
<thead>
<tr>
<th>Wall Height</th>
<th>Bury Depth</th>
<th>Level Pad</th>
<th>VP</th>
<th>GT</th>
<th>L</th>
<th>Est. Geogrid Qty. (Syd/Lf of Wall)</th>
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<tbody>
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<td>3XT</td>
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<td>3XT</td>
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<td>1.5</td>
<td>3XT</td>
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<td>20.44 1.61</td>
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**18" HIGH BOTTOM BLOCK**

1. Unit weight of 28°, 30°, 34° and 40° soils is assumed to be 120pcf.
2. Minimum factors of safety are 1.5 for sliding, 2.0 for overturning and 2.0 for bearing capacity.
3. Designs are in general accordance with NCMA's Design Manual for Segmental Retaining Walls (3rd ed.).
4. Global stability has not been addressed in these charts.
5. The wall design shall address both internal and external drainage and shall be evaluated by the Professional Engineer who is responsible for the final wall design.
6. Backfill material to be compacted to 95% standard proctor.
7. All Redi-Rock™ International Wall System Specifications are to be followed.

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**Other Notes:**

1. Minimum factors of safety are 1.5 for sliding, 2.0 for overturning and 2.0 for bearing capacity.
2. Designs are in general accordance with NCMA's Design Manual for Segmental Retaining Walls (3rd ed.).
3. Global stability has not been addressed in these charts.
4. The wall design shall address both internal and external drainage and shall be evaluated by the Professional Engineer who is responsible for the final wall design.
5. Backfill material to be compacted to 95% standard proctor.
6. All Redi-Rock™ International Wall System Specifications are to be followed.
Silty Sand, Clayey Sand - Internal Angle of Friction ($\phi$) = 28°
Load Condition B - No Back Slope, 250psf Live Load Surcharge
Geogrid Walls - 28" Wide Geocomposite Connectors
Geogrid Connection Type 1AT

<table>
<thead>
<tr>
<th>Wall Height</th>
<th>Bury Depth</th>
<th>Level Pad</th>
<th>(VP) = Geogrid Vertical Placement, (GT) = Grid Type, (L) = Geogrid Length</th>
<th>Est. Geogrid Qty. (Syst/L of Wall)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3' 0&quot;</td>
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<td>GT 3XT</td>
<td>L 7.5 0.00</td>
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<td>6&quot; 6&quot;</td>
<td>VP 1.5</td>
<td>GT 3XT</td>
<td>L 6 3XT 0.00</td>
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<tr>
<td>6' 0&quot;</td>
<td>6&quot; 6&quot;</td>
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<td>GT 3XT</td>
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<td>GT 3XT</td>
<td>L 3XT 3XT 6.00</td>
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<td>GT 3XT</td>
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<td>GT 3XT</td>
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<td>GT 3XT</td>
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<td>GT 3XT</td>
<td>L 3XT 3XT 9.00 7.00 9.00 10.5 12.00 0.00</td>
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</table>

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1. Unit weight of 28°, 30°, 34° and 40° soils is assumed to be 120pcf.
2. Minimum factors of safety are 1.5 for sliding, 2.0 for overturning and 2.0 for bearing capacity.
3. Designs are in general accordance with NCMA's Design Manual for Segmental Retaining Walls (3rd ed.).
4. Global stability has not been addressed in these charts.
5. The wall design shall address both internal and external drainage and shall be evaluated by the Professional Engineer who is responsible for the final wall design.
6. Backfill material to be compacted to 95% standard proctor.
7. All Redi-Rock™ International Wall System Specifications are to be followed.
CHART FOR MIRAFL MIRAGRID

<table>
<thead>
<tr>
<th>Wall Height</th>
<th>Bury Depth</th>
<th>Level Pad</th>
<th>(VP) = Geogrid Vertical Placement, (GT) = Grid Type, (L) = Geogrid Length</th>
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<tbody>
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<td>6' 6&quot;</td>
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</table>

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Other Notes:
1. Unit weight of 28°, 30°, 34° and 40° soils is assumed to be 120pcf.
2. Minimum factors of safety are 1.5 for sliding, 2.0 for overturning drainage and shall be evaluated by the Professional Engineer who is responsible for the final wall design.
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4. Global stability has not been addressed in these charts.
5. The wall design shall address both internal and external drainage and shall be evaluated by the Professional Engineer who is responsible for the final wall design.
6. Backfill material to be compacted to 95% standard proctor.
7. All Redi-Rock™ International Wall System Specifications are to be followed.
### Chart for MIRAFI Miragrid

**Silty Sand, Fine to Medium Sand - Internal Angle of Friction (ϕ) = 30°**

**Load Condition A - No Back Slope, No Surcharge**

**Geogrid Walls - 28” Wide Geconnector Blocks**

**Geogrid Connection Type 1AT**

<table>
<thead>
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<th>Wall Height</th>
<th>Bury Depth</th>
<th>Level Pad</th>
<th>(VP) = Geogrid Vertical Placement, (GT) = Grid Type, (L) = Geogrid Length</th>
<th>Est. Geogrid Qty.</th>
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**Other Notes:**

1. Unit weight of 28°, 30°, 34° and 40° soils is assumed to be 120pcf.
2. Minimum factors of safety are 1.5 for sliding, 2.0 for overturning and 2.0 for bearing capacity.
3. Designs are in general accordance with NCMA’s Design Manual for Segmental Retaining Walls (3rd ed.).
4. Global stability has not been addressed in these charts.
5. The wall design shall address both internal and external drainage and shall be evaluated by the Professional Engineer who is responsible for the final wall design.
6. Backfill material to be compacted to 95% standard proctor.
7. All Redi-Rock™ International Wall System Specifications are to be followed.
**Silty Sand, Fine to Medium Sand - Internal Angle of Friction (\(\phi\)) = 30°**

**Load Condition B - No Back Slope, 250psf Live Load Surcharge**

**Geogrid Walls - 28" Wide Geoconnector Blocks**

**Geogrid Connection Type 1AT**

<table>
<thead>
<tr>
<th>Wall Height</th>
<th>Bury Depth</th>
<th>Level Pad</th>
<th>(VP) = Geogrid Vertical Placement, (GT) = Grid Type, (L) = Geogrid Length</th>
<th>Est. Geogrid Qty. (Sys/Lf of Wall)</th>
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**Other Notes:**

1. Unit weight of 28°, 30°, 34° and 40° soils is assumed to be 120pcf.
2. Minimum factors of safety are 1.5 for sliding, 2.0 for overturning and 2.0 for bearing capacity.
3. Designs are in general accordance with NCMA's *Design Manual for Segmental Retaining Walls* (3rd ed.).
4. Global stability has not been addressed in these charts.
5. The wall design shall address both internal and external drainage and shall be evaluated by the Professional Engineer who is responsible for the final wall design.
6. Backfill material to be compacted to 95% standard proctor.
7. All Redi-Rock™ International Wall System Specifications are to be followed.
Silty Sand, Fine to Medium Sand - Internal Angle of Friction (\(\phi\)) = 30°

Load Condition C - 2.5:1 Back Slope, No Surcharge

Geogrid Walls - 28" Wide Geoconnector Blocks

Geogrid Connection Type 1AT

<table>
<thead>
<tr>
<th>Wall Height</th>
<th>Bury Depth</th>
<th>Level Pad</th>
<th>Est. Geogrid Qty. (Syd/Lf of Wall)</th>
</tr>
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<tbody>
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<td>3'0&quot;</td>
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<tr>
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<td>6'0&quot;</td>
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<td>19'6&quot;</td>
<td>1'6&quot;</td>
<td>1'0&quot;</td>
<td></td>
</tr>
<tr>
<td>21'0&quot;</td>
<td>1'6&quot;</td>
<td>1'0&quot;</td>
<td></td>
</tr>
</tbody>
</table>

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Other Notes:
1. Unit weight of 28°, 30°, 34° and 40° soils is assumed to be 120pcf.
2. Minimum factors of safety are 1.5 for sliding, 2.0 for overturning and 2.0 for bearing capacity.
3. Designs are in general accordance with NCMA's Design Manual for Segmental Retaining Walls (3rd ed.).
4. Global stability has not been addressed in these charts.
5. The wall design shall address both internal and external drainage and shall be evaluated by the Professional Engineer who is responsible for the final wall design.
6. Backfill material to be compacted to 95% standard proctor.
7. All Redi-Rock™ International Wall System Specifications are to be followed.
Dense Well Graded Sand, Sand and Gravel - Internal Angle of Friction ($\phi$) = 34°

Load Condition A - No Back Slope, No Surcharge

Geogrid Walls - 28" Wide Geoconnector Blocks

Geogrid Connection Type 1AT

<table>
<thead>
<tr>
<th>Wall Height</th>
<th>Bury Depth</th>
<th>VP Pad Level</th>
<th>GT Pad Level</th>
<th>(VP) = Geogrid Vertical Placement, (GT) = Grid Type, (L) = Geogrid Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>3' 0&quot;</td>
<td>6&quot;</td>
<td>6&quot;</td>
<td>None</td>
<td>(L) is Measured in Feet from the Top of the Leveling Pad (Bottom of the Bottom Block)</td>
</tr>
<tr>
<td>4' 6&quot;</td>
<td>6&quot;</td>
<td>6&quot;</td>
<td>None</td>
<td>0.00 0.00</td>
</tr>
<tr>
<td>6' 0&quot;</td>
<td>6&quot;</td>
<td>6&quot;</td>
<td>None</td>
<td>0.00 0.00</td>
</tr>
<tr>
<td>7' 6&quot;</td>
<td>6&quot;</td>
<td>6&quot;</td>
<td>None</td>
<td>0.00 0.00</td>
</tr>
<tr>
<td>9' 0&quot;</td>
<td>6&quot; 1' 0&quot;</td>
<td>1.5 3XT 3XT 3XT 3XT</td>
<td>4.5 6 7.5 8</td>
<td>4.50 0.00</td>
</tr>
<tr>
<td>10' 6&quot;</td>
<td>6&quot; 1' 0&quot;</td>
<td>1.5 3XT 3XT</td>
<td>4.5 6 7.5 9</td>
<td>6.00 0.00</td>
</tr>
<tr>
<td>12' 0&quot;</td>
<td>7&quot; 1' 0&quot;</td>
<td>1.5 3XT 3XT</td>
<td>4.5 6 7.5 9</td>
<td>7.72 0.00</td>
</tr>
<tr>
<td>13' 6&quot;</td>
<td>8&quot; 1' 0&quot;</td>
<td>1.5 3XT 3XT</td>
<td>4.5 6 7.5 9</td>
<td>9.67 0.00</td>
</tr>
<tr>
<td>15' 0&quot;</td>
<td>9&quot; 1' 0&quot;</td>
<td>1.5 3XT 3XT</td>
<td>4.5 6 7.5 9</td>
<td>11.17 0.00</td>
</tr>
<tr>
<td>16' 6&quot;</td>
<td>10&quot; 1' 0&quot;</td>
<td>1.5 3XT 3XT</td>
<td>4.5 6 7.5 9</td>
<td>13.33 0.00</td>
</tr>
<tr>
<td>18' 0&quot;</td>
<td>11&quot; 1' 0&quot;</td>
<td>1.5 3XT 3XT</td>
<td>4.5 6 7.5 9</td>
<td>15.72 0.00</td>
</tr>
<tr>
<td>19' 6&quot;</td>
<td>12&quot; 1' 0&quot;</td>
<td>1.5 3XT 3XT</td>
<td>4.5 6 7.5 9</td>
<td>16.83 1.50</td>
</tr>
<tr>
<td>21' 0&quot;</td>
<td>12&quot; 1' 0&quot;</td>
<td>1.5 3XT 3XT</td>
<td>4.5 6 7.5 9</td>
<td>19.57 2.50</td>
</tr>
</tbody>
</table>

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Other Notes:
1. Unit weight of 28°, 30°, 34° and 40° soils is assumed to be 120pcf.
2. Minimum factors of safety are 1.5 for sliding, 2.0 for overturning and 2.0 for bearing capacity.
3. Designs are in general accordance with NCMA's Design Manual for Segmental Retaining Walls (3rd ed.).
4. Global stability has not been addressed in these charts.
5. The wall design shall address both internal and external drainage and shall be evaluated by the Professional Engineer who is responsible for the final wall design.
6. Backfill material to be compacted to 95% standard proctor.
7. All Redi-Rock™ International Wall System Specifications are to be followed.
### Dense Well Graded Sand, Sand and Gravel - Internal Angle of Friction (φ) = 34°

Load Condition B - No Back Slope, 250psf Live Load Surcharge

Geogrid Walls - 28" Wide Geconnector Blocks

Geogrid Connection Type 1AT

<table>
<thead>
<tr>
<th>Wall Height</th>
<th>Bury Depth</th>
<th>Level Pad</th>
<th>(VP) Geogrid Vertical Placement</th>
<th>(GT) Grid Type</th>
<th>(L) Geogrid Length</th>
<th>Est. Geogrid Qty.</th>
</tr>
</thead>
<tbody>
<tr>
<td>3' 0&quot;</td>
<td>6&quot; 6&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.00 0.00</td>
</tr>
<tr>
<td>4' 6&quot;</td>
<td>6&quot; 6&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.00 0.00</td>
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<tr>
<td>6' 0&quot;</td>
<td>6&quot; 6&quot;</td>
<td>1.5 3XT 5</td>
<td>3XT 6</td>
<td>4.5 3XT 7</td>
<td></td>
<td>2.50 0.00</td>
</tr>
<tr>
<td>7' 6&quot;</td>
<td>6&quot; 6&quot;</td>
<td>1.5 3XT 7</td>
<td>3XT 6</td>
<td>4.5 3XT 7</td>
<td></td>
<td>3.33 0.00</td>
</tr>
<tr>
<td>9' 0&quot;</td>
<td>6&quot; 1' 0&quot;</td>
<td>1.5 3XT 6</td>
<td>3XT 6</td>
<td>4.5 3XT 7</td>
<td></td>
<td>4.50 0.00</td>
</tr>
<tr>
<td>10' 6&quot;</td>
<td>6&quot; 1' 0&quot;</td>
<td>1.5 3XT 7</td>
<td>3XT 6</td>
<td>4.5 3XT 7</td>
<td></td>
<td>6.00 0.00</td>
</tr>
<tr>
<td>12' 0&quot;</td>
<td>7&quot; 1' 0&quot;</td>
<td>1.5 3XT 8</td>
<td>3XT 6</td>
<td>4.5 3XT 7</td>
<td></td>
<td>7.72 0.00</td>
</tr>
<tr>
<td>13' 6&quot;</td>
<td>8&quot; 1' 0&quot;</td>
<td>1.5 3XT 9</td>
<td>3XT 6</td>
<td>4.5 3XT 7</td>
<td></td>
<td>9.67 0.00</td>
</tr>
<tr>
<td>15' 0&quot;</td>
<td>9&quot; 1' 0&quot;</td>
<td>1.5 3XT 9</td>
<td>3XT 6</td>
<td>4.5 3XT 7</td>
<td></td>
<td>11.17 0.00</td>
</tr>
<tr>
<td>16' 6&quot;</td>
<td>10&quot; 1' 0&quot;</td>
<td>1.5 3XT 10</td>
<td>3XT 10</td>
<td>4.5 3XT 7</td>
<td></td>
<td>12.17 1.28</td>
</tr>
<tr>
<td>18' 0&quot;</td>
<td>11&quot; 1' 0&quot;</td>
<td>1.5 3XT 11</td>
<td>3XT 10</td>
<td>4.5 3XT 7</td>
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<td>14.56 1.39</td>
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<td>3XT 12</td>
<td>4.5 3XT 7</td>
<td></td>
<td>16.83 1.50</td>
</tr>
<tr>
<td>21' 0&quot;</td>
<td>1' 0&quot;</td>
<td>1.5 3XT 13</td>
<td>3XT 12</td>
<td>4.5 3XT 7</td>
<td></td>
<td>19.67 1.61</td>
</tr>
</tbody>
</table>

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Other Notes:
1. Unit weight of 28°, 30°, 34° and 40° soils is assumed to be 120pcf.
2. Minimum factors of safety are 1.5 for sliding, 2.0 for overturning and 2.0 for bearing capacity.
3. Designs are in general accordance with NCMA's Design Manual for Segmental Retaining Walls (3rd ed.).
4. Global stability has not been addressed in these charts.
5. The wall design shall address both internal and external drainage and shall be evaluated by the Professional Engineer who is responsible for the final wall design.
6. Backfill material to be compacted to 95% standard proctor.
7. All Redi-Rock™ International Wall System Specifications are to be followed.
### CHART FOR MIRAFI MIRAGRID

**Dense Well Graded Sand, Sand and Gravel - Internal Angle of Friction \(\phi\) = 34°**

**Load Condition C - 2.5:1 Back Slope, No Surcharge**

**Geogrid Walls - 28" Wide Geoconnector Blocks**

**Geogrid Connection Type 1AT**

#### Wall Bury Level

<table>
<thead>
<tr>
<th>Height Depth</th>
<th>Pad</th>
<th>(VP) = Geogrid Vertical Placement, (GT) = Grid Type, (L) = Geogrid Length</th>
<th>Est. Geogrid Qty. (Sys/Lf of Wall)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3' 0&quot;</td>
<td>6&quot;</td>
<td>6&quot;</td>
<td>0.00 0.00</td>
</tr>
<tr>
<td>4' 6&quot;</td>
<td>6&quot;</td>
<td>6&quot;</td>
<td>0.00 0.00</td>
</tr>
<tr>
<td>6' 0&quot;</td>
<td>6&quot;</td>
<td>6&quot;</td>
<td>2.50 0.00</td>
</tr>
<tr>
<td>7' 6&quot;</td>
<td>6&quot;</td>
<td>6&quot;</td>
<td>3.56 0.00</td>
</tr>
<tr>
<td>9' 0&quot;</td>
<td>1' 0&quot;</td>
<td>1.5 3 XT 3 XT 4.5 3 XT 6</td>
<td>4.83 0.00</td>
</tr>
<tr>
<td>10' 6&quot;</td>
<td>1' 0&quot;</td>
<td>1.5 3 XT 3 XT 4.5 3 XT 6</td>
<td>6.33 0.00</td>
</tr>
<tr>
<td>12' 0&quot;</td>
<td>1' 0&quot;</td>
<td>1.5 3 XT 3 XT 4.5 3 XT 6</td>
<td>8.06 0.00</td>
</tr>
<tr>
<td>13' 6&quot;</td>
<td>1' 0&quot;</td>
<td>1.5 3 XT 3 XT 4.5 3 XT 6</td>
<td>10.11 0.00</td>
</tr>
<tr>
<td>15' 0&quot;</td>
<td>1' 0&quot;</td>
<td>1.5 3 XT 3 XT 4.5 3 XT 6</td>
<td>10.67 1.17</td>
</tr>
<tr>
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<td>1' 0&quot;</td>
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<td>12.94 1.28</td>
</tr>
<tr>
<td>18' 0&quot;</td>
<td>1' 0&quot;</td>
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<td>15.44 1.39</td>
</tr>
<tr>
<td>19' 6&quot;</td>
<td>1' 0&quot;</td>
<td>1.5 3 XT 3 XT 4.5 3 XT 6</td>
<td>18.17 1.50</td>
</tr>
<tr>
<td>21' 0&quot;</td>
<td>1' 0&quot;</td>
<td>1.5 3 XT 3 XT 4.5 3 XT 6</td>
<td>21.00 1.60</td>
</tr>
</tbody>
</table>

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**Other Notes:**

1. Unit weight of 28°, 30°, 34° and 40° soils is assumed to be 120pcf.
2. Minimum factors of safety are 1.5 for sliding, 2.0 for overturning drainage and shall be evaluated by the Professional Engineer who is responsible for the final wall design.
3. Designs are in general accordance with NCMA’s Design Manual for Segmental Retaining Walls (3rd ed.).
4. Global stability has not been addressed in these charts.
SPECIFICATIONS FOR REDI-ROCK® 28” SERIES WALL SYSTEM

PART 1: GENERAL

1.1 Scope
Work includes furnishing and installing concrete retaining wall units to the lines and grades designated on the construction drawings and as specified herein.

1.2 Reference Standards
ASTM C94 Ready-Mixed Concrete
ASTM C1372 Segmental Retaining Wall Units

1.3 Delivery, Storage, and Handling
A. Contractor shall check the materials upon delivery to assure proper material has been received.
B. Contractor shall prevent excessive mud, wet cement and like materials from coming in contact with the SRW units.
C. Contractor shall protect the materials from damage. Damaged material shall not be incorporated in the project.

PART 2: MATERIALS

2.1 Wall Units
A. Wall units shall be Redi-Rock® as produced by a licensed manufacturer.
B. Wall units shall be made with Ready-Mixed concrete in accordance with ASTM C94, latest revision, and per the following chart:

<table>
<thead>
<tr>
<th>Climate</th>
<th>Air Content</th>
<th>28 Day Compressive Strength, psi</th>
<th>Slump*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negligible</td>
<td>1½%-4½%</td>
<td>4000</td>
<td>5” ±1 ½”</td>
</tr>
<tr>
<td>Moderate</td>
<td>3%-6%</td>
<td>4000</td>
<td>5” ±1 ½”</td>
</tr>
<tr>
<td>Severe</td>
<td>4½%-7½%</td>
<td>4000</td>
<td>5” ±1 ½”</td>
</tr>
</tbody>
</table>

*C Higher slumps are allowed if achieved by use of appropriate admixtures.

Notwithstanding anything stated above, all material used in the wall units must meet applicable ASTM and local requirements for exterior concrete.

2.2 Leveling Pad and Free Draining Backfill
A. Leveling pad shall be crushed stone. See detail sheet defining Leveling Pad options for drain placement in the bottom of the foundation leveling pad.
B. Free Draining Backfill material shall be washed stone and shall be placed to a minimum of 1' width behind the back of the wall and shall extend vertically from the Leveling Pad to an elevation 4" below the top of wall.
C. Backfill material shall be approved by the geotechnical engineer. Site excavated soils may be used if approved unless otherwise specified in the drawings. Unsuitable soils with a PL>6, organic soils and frost susceptible soils shall not be used within a 1 to 1 influence area.
SPECIFICATIONS FOR REDI-ROCK® 28” SERIES WALL SYSTEM

D. Non-woven geotextile cloth shall be placed between the Free Draining Backfill and retained soil if required.
E. Where additional fill is needed, Contractor shall submit sample and specifications to the Engineer for approval.

2.3 Drainage
A. Internal and external drainage shall be evaluated by the Professional Engineer who is responsible for the final wall design.

2.4 Geogrid Connection (Type 1AT)
A. Fiberglass rod used in the Type 1AT Geo-Grid connection shall be 7/16” diameter. Only fiberglass rod obtained from an authorized Redi-Rock® dealer shall be used.

PART 3: CONSTRUCTION OF WALL SYSTEM

3.1 Excavation
A. Contractor shall excavate to the lines and grades shown on the construction drawings.

3.2 Foundation Soil Preparation
A. Native foundation soil shall be compacted to 95% of standard proctor or 90% of modified proctor prior to placement of the Leveling Pad material.
B. In-situ foundation soil shall be examined by the Engineer to ensure that the actual foundation soil strength meets or exceeds assumed design strength. Soil not meeting the required strength shall be removed and replaced with acceptable, compacted material.

3.3 Leveling Pad Placement
A. Leveling Pad shall be placed as shown on the construction drawings.
B. Leveling Pad shall be placed on undisturbed native soils or suitable replacements fills.
C. Leveling Pad shall be compacted to 95% of standard proctor or 90% of modified proctor to ensure a level, hard surface on which to place the first course blocks. Pad shall be constructed to the proper elevation to ensure the final elevation shown on the plans.
D. Leveling Pad shall have a 6 inch minimum depth for walls under 8 feet in height and a 12 inch minimum depth for walls over 8 feet. Pad dimensions shall extend beyond the blocks in all directions to a distance at least equal to the depth of the pad or as designed by Engineer.
E. For steps and pavers, a minimum of 1” - 1 ½” of free draining sand shall be screeded smooth to act as a placement bed for the steps or pavers.

3.4 Unit Installation
A. The first course of wall units shall be placed on the prepared Leveling Pad with the aesthetic surface facing out and the front edges tight together. All units shall be checked for level and alignment as they are placed.
B. Ensure that units are in full contact with Leveling Pad. Proper care shall be taken to develop straight lines and smooth curves on base course as per wall layout.
C. The backfill in front and back of entire base row shall be placed and compacted to firmly lock them in place. Make sure to infill the triangular space between blocks with Free Draining Backfill. Check all units again for level and alignment. All excess material shall be swept from top of units.
D. Install next course of wall units on top of base row. Position blocks to be offset from seams of blocks below. Blocks shall be placed fully forward so knob and groove are engaged. Check each block for proper alignment and level. Backfill the triangular space between adjacent blocks and at least 12 inches behind the blocks with Free Draining Backfill. Spread backfill in uniform lifts not exceeding 9 inches. Employ methods using lightweight compaction equipment that will not disrupt the stability or batter of the wall. Hand-operated plate compaction equipment shall be used around the block and within 3 feet of the wall to achieve consolidation. Compact backfill to 95% of standard proctor (ASTM D 698, AASHTO T-99) density within 2% of its optimum moisture content.
E. Install each subsequent course in like manner. Repeat procedure to the extent of wall height.
F. Allowable construction tolerance at the wall face is 2 degrees vertically and 1 inch in 10 feet horizontally.
G. All walls shall be installed in accordance with local building codes and requirements.

3.5 Geogrid Installation
A. See Wall Installation instructions.

PART 4: AVAILABILITY

Redi-Rock® International
05481 South US-31,
Charlevoix, MI 49720
1-866-222-8400
www.redi-rock.com
info@redi-rock.
Typical Gravity Wall
with 28" Blocks
No Scale

Note:
Load Condition A Shown
(No Backslope - No Surcharge)

Swale As Needed and Grade to Drain Away From Wall

SETBACK = 1 1/2"
(5" Batter Angle on Wall)

28" Top Block

Ground Level

Move Blocks Forward During Installation to Engage Shear Knobs (Typical)

Free Draining Backfill to Extend at Least 12" Behind Wall

Non-Woven Geotextile Fabric (If Specified)

28" Bottom Block

Perforated Sock Drain (As Specified by Engineer)

Leveling Pad

Exosed Wall

Ground Level

Bury Depth

Wall Height

Crushed Stone Leveling Pad

See Redi-Rock.com for Detailed Section Drawings of Each Condition Shown in the Design Charts
Typical Geogrid Wall with 28" Geoconnector Blocks

No Scale

(VP) = Vertical placement of geogrid layers. Measurements are from the base elevation.

(L) = Length of geogrid. Measurements are from the face of the block.

SETBACK = 1 5/8
(5° Batter Angle on Wall)

Swale As Needed and Grade to Drain Away From Wall

28" Top Block

Ground Level

Geogrid Layer (Typical)

(L) (Length of Geogrid - Typical)

Free Draining Backfill to Extend at Least 12" Behind Wall

Move Blocks Forward During Installation to Engage Shear Knobs (Typical)

Non-Woven Geotextile Fabric (If Specified)

28" Middle Block

28" Bottom Block

Base Elevation

Crushed Stone Leveling Pad

Exposed Wall

Wall Height

Ground Level

Bury Depth

Leveling Pad

See Redi-Rock.com for Detailed Section Drawings of Each Condition Shown in the Design Charts
# 28" SERIES BLOCKS

## Top - 28"
Volume = 8.55 cft  
Weight = ±1223 lbs  
C of G = 15.06"

## Half Top - 28"
Volume = 4.13 cft  
Weight = ±591 lbs

## Middle - 28"
Volume = 11.40 cft  
Weight = ±1630 lbs  
C of G = 14.18"

## Half Middle - 28"
Volume = 5.34 cft  
Weight = ±764 lbs

## Bottom - 28"
Volume = 12.36 cft  
Weight = ±1768 lbs  
C of G = 14.23"

## Half Bottom - 28"
Volume = 5.79 cft  
Weight = ±827 lbs

## 23" End Block
Volume = 6.79 cft  
Weight = ±970 lbs  
C of G = 12.29"

## 9" Bottom Block
Volume = 6.40 cft  
Weight = ±915 lbs  
C of G = 14.20"

### NOTES:
- Volume and Center of Gravity (C of G) calculations are based on the blocks as shown.
- Center of Gravity is measured from the back of the block.
- Half blocks may include a fork lift slot on one side.
- Actual weights and volumes may vary.
- Weight shown is based on 143 pcf concrete.

---

Redi-Rock® International, LLC  
Redi-Rock International  
June 2011
### STEPS

**3-Sided Straight Step**  
Volume = 4.58 cft  
Weight = ±655 lbs

**4-Sided 6" Cap Block**  
Volume = 4.81 cft  
Weight = ±688 lbs

### FREESTANDING CORNER BLOCKS

**Garden Corner**  
Volume = 8.26 cft  
Weight = ±1182 lbs

**Half Garden Corner**  
Volume = 4.25 cft  
Weight = ±607 lbs

**Top Corner**  
*(Smooth or Textured)*  
Volume = 10.44 cft  
Weight = ±1493 lbs

**Half Top Corner**  
*(Smooth or Textured)*  
Volume = 5.18 cft  
Weight = ±741 lbs

**Middle Corner**  
Volume = 10.73 cft  
Weight = ±1534 lbs  
*(Bottom Corner Block does not have groove)*

**Half Middle Corner**  
Volume = 5.28 cft  
Weight = ±755 lbs  
*(Half Bottom Corner Block does not have groove)*

### NOTES:

Architectural faces on the blocks have varying texture.  
Volumes are based on the blocks as shown.  
Actual weights and volumes may vary.  
Weight shown is based on 143 pcf concrete.
Typical Block Setbacks

SETBACK = 1 5/8" (5° Batter Angle on Wall)

Move Blocks Forward During Installation to Engage Shear Knobs (Typical)

One Degree (1°) Setback Wall Using 7 1/2" Shear Knob (SPECIALTY OPTION)

SETBACK = 3/8" (1° Batter Angle on Wall)

Move Blocks Forward During Installation to Engage Shear Knobs (Typical)
**Type 1AT Connection**  
(Anchored Tail)

**INSTALLATION STEP 1**  
Place geogrid on block over the groove. Leave about 3'-6" extending over the block past the groove to provide for the tail.

**INSTALLATION STEP 2**  
Place the fiberglass rod on top of geogrid.

**TIP FOR STEP 3**  
A steel angle can be used to hold the geogrid and rod in position.

**INSTALLATION STEP 3**  
Fold the geogrid over the fiberglass rod. Pull to tighten rod snug with the back of the groove. Extend the geogrid tail behind the block to provide a minimum of 3'-0" embedment behind the back of the block.

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Redi-Rock® International, LLC

Redi-Rock International

5.18  
June 2011
28" Middle Block with Soil Infill

**CENTER OF GRAVITY CALCULATIONS**

**CONCRETE**
- Design Unit Weight = 143pcf
- Volume (Vc) 11.40 cft (Data from CAD Model)
- Center of Gravity (COGc) 14.16 in from Back of Block (Data from CAD Model)
- Concrete Block Weight (Wc) \( Wc = 11.40 \text{ cft} \times 143 \text{ pcf} = 1,630 \text{ lbs} \)

**INFILL SOIL**
- Design Unit Weight = 120pcf
- Volume (Vs) \( \frac{1}{2} \times 3.06 \times 22.625 \times 18 \times \left(18/12\text{ in}\right)^3 \times 2 \text{ Sides} = 0.72 \text{ cft} \) (Includes Area Between Blocks)
- Center of Gravity (COGs) \( \frac{1}{2} \times 22.625 = 7.54 \text{ in} \) from Back of Block
- Infill Soil Weight (Ws) \( Ws = 0.72 \text{ cft} \times 86 \text{ pcf} = 62 \text{ lbs} \)

**COG CALCULATIONS**

<table>
<thead>
<tr>
<th>Weight (lb)</th>
<th>COG (in)</th>
<th>Weight x COG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Block 1,630</td>
<td>14.16</td>
<td>23,113 lb*in</td>
</tr>
<tr>
<td>Soil 86</td>
<td>7.54</td>
<td>648 lb*in</td>
</tr>
<tr>
<td>Totals 1,716</td>
<td>7.54</td>
<td>23,761 lb*in</td>
</tr>
</tbody>
</table>

Weighted COG = \( \Sigma \text{Weight} \times \text{COG} / \Sigma \text{Weight} \) = 23,761 \( \text{lb} \times \text{in} / 1,716 \text{ lb} \) = 13.8 in (From Back of Block)

**INFILLED UNIT WEIGHT CALCULATIONS**

**DESIGN VOLUME**
- 28.0 in x 46.125 in x 18 in = 23,247 in\(^3\) = 13.45 cft

**WEIGHT**
- Concrete Block = 1,630 lb
- Infill Soil = 86 lb
- Total Weight = 1,716 lb

**INFILLED UNIT WEIGHT**
\( \gamma_{\text{INFILL}} = \frac{1,716 \text{ lb}}{13.45 \text{ cft}} = 127 \text{ pcf} \)

**FOR WALL STABILITY CALCULATIONS, INFILLED UNIT WEIGHT, \( \gamma_{\text{INFILL}} = 127 \text{ pcf} \)**

FOR WALL STABILITY CALCULATIONS, COG = 14.2" FROM THE FRONT FACE OF BLOCK

Redi-Rock International, LLC
Check with your local authorized Redi-Rock® Manufacturer for Product Availability.
Dense Well Graded Sand, Sand and Gravel - Internal Angle of Friction (φ) = 34°
Load Condition A - No Back Slope, No Surcharge
Geogrid Walls - 28" Redi-Rock Positive Connection Blocks
Geogrid Connection Type PC

<table>
<thead>
<tr>
<th>Wall Height</th>
<th>Bury Depth</th>
<th>Level Pad</th>
<th>Geogrid Vertical Placement Block (BLK), Grid Type (MG-Miragrid), and Lengths (L)</th>
<th>Est. Geogrid Qty. (Syd/LF of Wall)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3' 0&quot;</td>
<td>1' 0&quot;</td>
<td>6&quot;</td>
<td>BLK Bot None None 5XT 5XT 5XT 5XT 5XT 5XT 5XT 5XT 5XT 5XT 5XT 5XT 5XT 5XT 5XT</td>
<td>0.00 0.00 0.00</td>
</tr>
<tr>
<td>4' 6&quot;</td>
<td>1' 0&quot;</td>
<td>6&quot;</td>
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</tr>
<tr>
<td>6&quot;</td>
<td>1' 0&quot;</td>
<td>6&quot;</td>
<td>BLK Bot 2 Top 5XT 5XT 5XT 5XT 5XT 5XT 5XT 5XT 5XT 5XT 5XT 5XT 5XT 5XT 5XT</td>
<td>0.00 0.00 0.00</td>
</tr>
<tr>
<td>7' 6&quot;</td>
<td>1' 0&quot;</td>
<td>6&quot;</td>
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<td>1' 0&quot;</td>
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<tr>
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<td>1' 0&quot;</td>
<td>1' 0&quot;</td>
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<tr>
<td>16' 0&quot;</td>
<td>1' 0&quot;</td>
<td>1' 0&quot;</td>
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<td>0.00 0.00 0.00</td>
</tr>
<tr>
<td>18' 0&quot;</td>
<td>1' 0&quot;</td>
<td>1' 0&quot;</td>
<td>BLK Bot 2 Top 5XT 5XT 5XT 5XT 5XT 5XT 5XT 5XT 5XT 5XT 5XT 5XT 5XT 5XT 5XT</td>
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</tr>
<tr>
<td>19' 0&quot;</td>
<td>1' 0&quot;</td>
<td>1' 0&quot;</td>
<td>BLK Bot 2 Top 5XT 5XT 5XT 5XT 5XT 5XT 5XT 5XT 5XT 5XT 5XT 5XT 5XT 5XT 5XT</td>
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</tr>
<tr>
<td>21' 0&quot;</td>
<td>1' 0&quot;</td>
<td>1' 0&quot;</td>
<td>BLK Bot 2 Top 5XT 5XT 5XT 5XT 5XT 5XT 5XT 5XT 5XT 5XT 5XT 5XT 5XT 5XT 5XT</td>
<td>0.00 0.00 0.00</td>
</tr>
</tbody>
</table>

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Other Notes:
1. Unit weight of 28°, 30°, 34° and 40° soils is assumed to be 120pcf.
2. Designs are in general accordance with AASHTO LRFD Bridge Design Specifications. Some DOT’s may specify select backfill in reinforced zone.
3. Global stability has not been addressed in these charts.
4. The wall design shall address both internal and external drainage and shall be evaluated by the Professional Engineer who is responsible for the final wall design.
5. Backfill material to be compacted to 95% standard proctor.
6. All Redi-Rock™ International Wall System Specifications are to be followed.
Dense Well Graded Sand, Sand and Gravel - Internal Angle of Friction (\( \phi \)) = 34°

Load Condition B - No Back Slope, 250psf Live Load Surcharge

Geogrid Walls - 28" Redi-Rock Positive Connection Blocks

Geogrid Connection Type PC

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5. Backfill material to be compacted to 95% standard proctor.
6. All Redi-Rock™ International Wall System Specifications are to be followed.
### CHART FOR MIRAGRID

**12” Wide Geogrid Strips**

Dense Well Graded Sand, Sand and Gravel - Internal Angle of Friction (ϕ) = 34°

Load Condition C - 2.5:1 Back Slope, No Surcharge

Geogrid Walls - 28” Redi-Rock Positive Connection Blocks

Geogrid Connection Type PC

<table>
<thead>
<tr>
<th>Wall Height</th>
<th>Bury Depth</th>
<th>Level Pad</th>
<th>Geogrid Vertical Placement Block (BLK), Grid Type (MG-Miragrid), and Lengths (L) (Dimensions Measured in Feet from Back of Block)</th>
<th>Est. Geogrid Qty. (Syd/LF of Wall)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3’ 0”</td>
<td>1’ 0”</td>
<td>6”</td>
<td>BLK Bot Top MG None None</td>
<td>0.00 0.00 0.00</td>
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<td>4’ 6”</td>
<td>1’ 0”</td>
<td>6”</td>
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<td>6”</td>
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<td>1’ 0”</td>
<td>6”</td>
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<tr>
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<td>1’ 0”</td>
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<td>1’ 0”</td>
<td>6”</td>
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<td>1’ 0”</td>
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<tr>
<td>19’ 6”</td>
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<td>6.30 3.60 1.80</td>
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<tr>
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<td>1’ 0”</td>
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</tr>
</tbody>
</table>

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5. Backfill material to be compacted to 95% standard proctor.
6. All Redi-Rock™ International Wall System Specifications are to be followed.
### Chart for Miragrid

**Silty Sand, Fine to Medium Sand - Internal Angle of Friction (ϕ) = 30°**

**Load Condition A - No Back Slope, No Surcharge**

**Geogrid Walls - 28" Redi-Rock Positive Connection Blocks**

**Geogrid Connection Type PC**

<table>
<thead>
<tr>
<th>Wall Height</th>
<th>Bury Depth</th>
<th>Level Pad</th>
<th>Geogrid Vertical Placement Block (BLK), Grid Type (MG-Miragrid), and Lengths (L) (Dimensions Measured in Feet from Back of Block)</th>
<th>Est. Geogrid Qty. (Syd/LF of Wall)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3' 0&quot;</td>
<td>1' 0&quot;</td>
<td>6&quot;</td>
<td>BLK Bot Top MG 9 L 8</td>
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<td>6' 0&quot;</td>
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<td>6&quot;</td>
<td>BLK Bot Top MG 2 L 8</td>
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<td>7' 0&quot;</td>
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<td>6&quot;</td>
<td>BLK Bot Top MG 2 L 8</td>
<td>0.00 0.00 0.00</td>
</tr>
</tbody>
</table>

**GEOGRID POSITIVE CONNECTION**

Length (L) = Geogrid (Continuous Strip)

Geogrid Cut Length = 2 x L + 3'

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6. All Redi-Rock™ International Wall System Specifications are to be followed.
### CHART FOR MIRAGRID

**Silty Sand, Fine to Medium Sand - Internal Angle of Friction (φ) = 30°**

**Load Condition B - No Back Slope, 250psf Live Load Surcharge**

**Geogrid Walls - 28" Redi-Rock Positive Connection Blocks**

**Geogrid Connection Type PC**

<table>
<thead>
<tr>
<th>Wall Height</th>
<th>Bury Depth</th>
<th>Level Pad</th>
<th>Geogrid Vertical Placement Block (BLK), Grid Type (MG-Miragrid), and Lengths (L) (Dimensions Measured in Feet from Back of Block)</th>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
</tr>
<tr>
<td>3' 0&quot;</td>
<td>1' 0&quot;</td>
<td>6&quot;</td>
<td>BLK</td>
<td>Top</td>
</tr>
<tr>
<td>4' 0&quot;</td>
<td>1' 0&quot;</td>
<td>6&quot;</td>
<td>BLK</td>
<td>Top</td>
</tr>
<tr>
<td>6' 0&quot;</td>
<td>1' 0&quot;</td>
<td>6&quot;</td>
<td>BLK</td>
<td>Top</td>
</tr>
<tr>
<td>7' 0&quot;</td>
<td>1' 0&quot;</td>
<td>6&quot;</td>
<td>BLK</td>
<td>Top</td>
</tr>
<tr>
<td>9' 0&quot;</td>
<td>1' 0&quot;</td>
<td>6&quot;</td>
<td>BLK</td>
<td>Top</td>
</tr>
<tr>
<td>10' 0&quot;</td>
<td>1' 0&quot;</td>
<td>6&quot;</td>
<td>BLK</td>
<td>Top</td>
</tr>
<tr>
<td>12' 0&quot;</td>
<td>1' 0&quot;</td>
<td>6&quot;</td>
<td>BLK</td>
<td>Top</td>
</tr>
<tr>
<td>13' 0&quot;</td>
<td>1' 0&quot;</td>
<td>6&quot;</td>
<td>BLK</td>
<td>Top</td>
</tr>
<tr>
<td>15' 0&quot;</td>
<td>1' 0&quot;</td>
<td>6&quot;</td>
<td>BLK</td>
<td>Top</td>
</tr>
<tr>
<td>16' 0&quot;</td>
<td>1' 0&quot;</td>
<td>6&quot;</td>
<td>BLK</td>
<td>Top</td>
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<tr>
<td>18' 0&quot;</td>
<td>1' 0&quot;</td>
<td>6&quot;</td>
<td>BLK</td>
<td>Top</td>
</tr>
<tr>
<td>19' 0&quot;</td>
<td>1' 0&quot;</td>
<td>6&quot;</td>
<td>BLK</td>
<td>Top</td>
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<tr>
<td>21' 0&quot;</td>
<td>1' 0&quot;</td>
<td>6&quot;</td>
<td>BLK</td>
<td>Top</td>
</tr>
</tbody>
</table>

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5. Backfill material to be compacted to 96% standard proctor.
6. All Redi-Rock™ International Wall System Specifications are to be followed.
### CHART FOR MIRAGRID

<table>
<thead>
<tr>
<th>Wall Height</th>
<th>Bury Depth</th>
<th>Level Pad</th>
<th>Geogrid Vertical Placement Block (BLK), Grid Type (MG-Miragrid), and Lengths (L)</th>
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<td></td>
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<td></td>
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</tr>
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<td>1' 0&quot;</td>
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3. All Redi-Rock™ International Wall System Specifications are to be followed.
**Silty Sand, Clayey Sand - Internal Angle of Friction (\(\phi\)) = 28°**

**Load Condition A - No Back Slope, No Surcharge**

**Geogrid Walls - 28" Redi-Rock Positive Connection Blocks**

**Geogrid Connection Type PC**

<table>
<thead>
<tr>
<th>Wall Height</th>
<th>Bury Depth</th>
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<td>3' 0&quot;</td>
<td>1' 0&quot;</td>
<td>6&quot;</td>
<td>BLK Bot 2 3 4 Top MG 9 8 8 8 8 8 8 8 8 8</td>
<td>0.00 0.00 0.00</td>
</tr>
<tr>
<td>4' 6&quot;</td>
<td>1' 0&quot;</td>
<td>6&quot;</td>
<td>BLK Bot 2 3 4 Top MG 9 8 8 8 8 8 8 8 8 8</td>
<td>0.00 0.00 0.00</td>
</tr>
<tr>
<td>6' 0&quot;</td>
<td>1' 0&quot;</td>
<td>6&quot;</td>
<td>BLK Bot 2 3 4 Top MG 5XT 8 8 8 8 8 8 8 8 8</td>
<td>2.20 0.00 0.00</td>
</tr>
<tr>
<td>7' 8&quot;</td>
<td>1' 0&quot;</td>
<td>6&quot;</td>
<td>BLK Bot 2 3 4 Top MG 5XT 8 8 8 8 8 8 8 8 8 8</td>
<td>2.76 0.00 0.00</td>
</tr>
<tr>
<td>9' 0&quot;</td>
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<td>10&quot;</td>
<td>BLK Bot 2 3 4 5 Top MG 9 10 10 10 10 10 10 10 10 10</td>
<td>3.31 0.00 0.00</td>
</tr>
<tr>
<td>10' 6&quot;</td>
<td>1' 0&quot;</td>
<td>10&quot;</td>
<td>BLK Bot 2 3 4 5 6 Top MG 9 10 10 10 10 10 10 10 10 10</td>
<td>3.86 0.00 0.00</td>
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<td>10&quot;</td>
<td>BLK Bot 2 3 4 5 6 7 Top MG 9 10 10 10 10 10 10 10 10 10</td>
<td>3.66 1.22 0.00</td>
</tr>
<tr>
<td>13' 8&quot;</td>
<td>1' 0&quot;</td>
<td>10&quot;</td>
<td>BLK Bot 2 3 4 5 6 7 8 Top MG 9 10 10 10 10 10 10 10 10 10</td>
<td>4.00 2.00 0.00</td>
</tr>
<tr>
<td>15' 0&quot;</td>
<td>1' 0&quot;</td>
<td>10&quot;</td>
<td>BLK Bot 2 3 4 5 6 7 8 9 Top MG 9 10 10 10 10 10 10 10 10 10</td>
<td>4.35 2.90 0.00</td>
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<tr>
<td>16' 6&quot;</td>
<td>1' 0&quot;</td>
<td>10&quot;</td>
<td>BLK Bot 2 3 4 5 6 7 8 9 10 Top MG 9 10 10 10 10 10 10 10 10 10</td>
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</tr>
<tr>
<td>18' 0&quot;</td>
<td>1' 0&quot;</td>
<td>10&quot;</td>
<td>BLK Bot 2 3 4 5 6 7 8 9 10 11 Top MG 9 10 10 10 10 10 10 10 10 10</td>
<td>5.05 3.37 1.68</td>
</tr>
<tr>
<td>19' 6&quot;</td>
<td>1' 0&quot;</td>
<td>10&quot;</td>
<td>BLK Bot 2 3 4 5 6 7 8 9 10 11 12 Top MG 9 10 10 10 10 10 10 10 10 10</td>
<td>5.40 3.60 2.70</td>
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<tr>
<td>21' 0&quot;</td>
<td>1' 0&quot;</td>
<td>10&quot;</td>
<td>BLK Bot 2 3 4 5 6 7 8 9 10 11 12 13 Top MG 9 10 10 10 10 10 10 10 10 10</td>
<td>5.74 6.70 0.96</td>
</tr>
</tbody>
</table>

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**Other Notes:**
1. Unit weight of 28°, 30°, 34° and 40° soils is assumed to be 120pcf.
2. Designs are in general accordance with AASHTO LRFD Bridge Design Specifications. Some DOT’s may specify backfill in reinforced zones.
3. Global stability has not been addressed in these charts.
4. The wall design shall address both internal and external drainage and shall be evaluated by the Professional Engineer who is responsible for the final wall design.
5. Backfill material to be compacted to 95% standard proctor.
6. All Redi-Rock™ International Wall System Specifications are to be followed.
### 12" Wide Geogrid Strips

**Silty Sand, Clayey Sand - Internal Angle of Friction (\(\phi\)) = 28°**

**Load Condition B - No Back Slope, 250psf Live Load Surcharge**

**Geogrid Walls - 28" Redi-Rock Positive Connection Blocks**

**Geogrid Connection Type PC**

<table>
<thead>
<tr>
<th>Wall Height</th>
<th>Bury Depth</th>
<th>Level Pad</th>
<th>Geogrid Vertical Placement Block (BLK), Grid Type (MG-Miragrid), and Lengths (L)</th>
<th>Est. Geogrid Qty. (Syd/LF of Wall)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3' 0&quot;</td>
<td>1' 0&quot;</td>
<td>6&quot;</td>
<td>BLK Bot Top MG 5XT 5XT L 11.5 11.5</td>
<td>1.51 0.00 0.00</td>
</tr>
<tr>
<td>4' 0&quot;</td>
<td>1' 0&quot;</td>
<td>6&quot;</td>
<td>BLK Bot Top MG 5XT 5XT L 12 12</td>
<td>2.12 0.00 0.00</td>
</tr>
<tr>
<td>6' 0&quot;</td>
<td>1' 0&quot;</td>
<td>6&quot;</td>
<td>BLK Bot Top MG 5XT 5XT L 14 14</td>
<td>2.79 0.00 0.00</td>
</tr>
<tr>
<td>7' 0&quot;</td>
<td>1' 0&quot;</td>
<td>6&quot;</td>
<td>BLK Bot Top MG 5XT 5XT L 14 14</td>
<td>3.45 0.00 0.00</td>
</tr>
<tr>
<td>9' 0&quot;</td>
<td>1' 0&quot;</td>
<td>6&quot;</td>
<td>BLK Bot Top MG 5XT 5XT L 14 14</td>
<td>3.68 0.61 0.00</td>
</tr>
<tr>
<td>10' 0&quot;</td>
<td>1' 0&quot;</td>
<td>6&quot;</td>
<td>BLK Bot Top MG 5XT 5XT L 14 14</td>
<td>3.97 1.33 0.00</td>
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<tr>
<td>12' 0&quot;</td>
<td>1' 0&quot;</td>
<td>6&quot;</td>
<td>BLK Bot Top MG 5XT 5XT L 14 14</td>
<td>4.21 2.18 0.00</td>
</tr>
<tr>
<td>13' 0&quot;</td>
<td>1' 0&quot;</td>
<td>6&quot;</td>
<td>BLK Bot Top MG 5XT 5XT L 14 14</td>
<td>4.50 2.35 0.78</td>
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<tr>
<td>15' 0&quot;</td>
<td>1' 0&quot;</td>
<td>6&quot;</td>
<td>BLK Bot Top MG 5XT 5XT L 14 14</td>
<td>4.61 0.00 3.92</td>
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<tr>
<td>16' 0&quot;</td>
<td>1' 0&quot;</td>
<td>6&quot;</td>
<td>BLK Bot Top MG 5XT 5XT L 14 14</td>
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<tr>
<td>18' 0&quot;</td>
<td>1' 0&quot;</td>
<td>6&quot;</td>
<td>BLK Bot Top MG 5XT 5XT L 14 14</td>
<td>5.08 5.40 0.90</td>
</tr>
<tr>
<td>19' 0&quot;</td>
<td>1' 0&quot;</td>
<td>6&quot;</td>
<td>BLK Bot Top MG 5XT 5XT L 14 14</td>
<td>5.37 5.74 1.91</td>
</tr>
<tr>
<td>21' 0&quot;</td>
<td>1' 0&quot;</td>
<td>6&quot;</td>
<td>BLK Bot Top MG 5XT 5XT L 14 14</td>
<td>5.66 6.09 3.05</td>
</tr>
</tbody>
</table>

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Other Notes:
1. Unit weight of 28°, 30°, 34° and 40° soils is assumed to be 120pcf.
2. Designs are in general accordance with AASHTO LRFD Bridge Design Specifications. Some DOT’s may specify select backfill in reinforced zone.
3. Global stability has not been addressed in these charts.
4. The wall design shall address both internal and external drainage and shall be evaluated by the Professional Engineer who is responsible for the final wall design.
5. Backfill material to be compacted to 96% standard proctor.
6. All Redi-Rock™ International Wall System Specifications are to be followed.
Silty Sand, Clayey Sand - Internal Angle of Friction (φ) = 28°
Load Condition C - 2.5:1 Back Slope, No Surcharge
Geogrid Walls - 28” Redi-Rock Positive Connection Blocks
Geogrid Connection Type PC

<table>
<thead>
<tr>
<th>Wall Height</th>
<th>Bury.depth</th>
<th>Pad</th>
<th>Geogrid Vertical Placement Block (BLK), Grid Type (MG-Miragrid), and Lengths (L)</th>
<th>Est. Geogrid Qty.(Syd/LF of Wall)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3' 0&quot; 1' 0&quot; 6'</td>
<td>0&quot;</td>
<td>BLK</td>
<td>MG SXT SXT 5XT</td>
<td>1.10 0.93 0.93</td>
</tr>
<tr>
<td>4' 0&quot; 1' 0&quot; 6'</td>
<td>0&quot;</td>
<td>BLK</td>
<td>MG SXT SXT 5XT</td>
<td>1.65 0.00 0.00</td>
</tr>
<tr>
<td>6' 0&quot; 1' 0&quot; 6'</td>
<td>0&quot;</td>
<td>BLK</td>
<td>MG SXT SXT 5XT</td>
<td>2.20 0.00 0.00</td>
</tr>
<tr>
<td>7' 0&quot; 1' 0&quot; 6'</td>
<td>0&quot;</td>
<td>BLK</td>
<td>MG SXT SXT 5XT</td>
<td>2.76 0.00 0.00</td>
</tr>
<tr>
<td>9' 0&quot; 1' 0&quot; 6'</td>
<td>0&quot;</td>
<td>BLK</td>
<td>MG SXT SXT 5XT</td>
<td>4.00 0.00 0.00</td>
</tr>
<tr>
<td>10' 0&quot; 1' 0&quot; 6'</td>
<td>0&quot;</td>
<td>BLK</td>
<td>MG SXT SXT 5XT</td>
<td>3.63 1.45 0.00</td>
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<tr>
<td>12' 0&quot; 1' 0&quot; 6'</td>
<td>0&quot;</td>
<td>BLK</td>
<td>MG SXT SXT 5XT</td>
<td>3.92 2.35 0.00</td>
</tr>
<tr>
<td>13' 0&quot; 1' 0&quot; 6'</td>
<td>0&quot;</td>
<td>BLK</td>
<td>MG SXT SXT 5XT</td>
<td>4.79 3.83 0.00</td>
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<tr>
<td>15' 0&quot; 1' 0&quot; 6'</td>
<td>0&quot;</td>
<td>BLK</td>
<td>MG SXT SXT 5XT</td>
<td>5.66 0.00 5.66</td>
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<tr>
<td>16' 0&quot; 1' 0&quot; 6'</td>
<td>0&quot;</td>
<td>BLK</td>
<td>MG SXT SXT 5XT</td>
<td>6.24 0.00 7.48</td>
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<tr>
<td>18' 0&quot; 1' 0&quot; 6'</td>
<td>0&quot;</td>
<td>BLK</td>
<td>MG SXT SXT 5XT</td>
<td>6.82 8.18 1.36</td>
</tr>
<tr>
<td>19' 0&quot; 1' 0&quot; 6'</td>
<td>0&quot;</td>
<td>BLK</td>
<td>MG SXT SXT 5XT</td>
<td>7.40 8.88 2.96</td>
</tr>
<tr>
<td>21' 0&quot; 1' 0&quot; 6'</td>
<td>0&quot;</td>
<td>BLK</td>
<td>MG SXT SXT 5XT</td>
<td>8.15 10.76 4.61</td>
</tr>
</tbody>
</table>

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Other Notes:
1. Unit weight of 28°, 30°, 34° and 40° soils is assumed to be 120pcf.
2. Designs are in general accordance with AASHTO LRFD Bridge Design Specifications. Some DOT's may specify backfill in reinforced zone.
3. Global stability has not been addressed in these charts.
4. The wall design shall address both internal and external drainage and shall be evaluated by the Professional Engineer who is responsible for the final wall design.
5. Backfill material to be compacted to 95% standard proctor.
6. All Redi-Rock™ International Wall System Specifications are to be followed.
SPECIFICATION FOR REDI-ROCK® 28” & 41” PC BLOCK WALL SYSTEM

PART 1: GENERAL

1.1 Scope
Work includes furnishing and installing concrete retaining wall units to the lines and grades designated on the construction drawings and as specified herein.

1.2 Reference Standards
ASTM C94 Ready-Mixed Concrete
ASTM C1372 Segmental Retaining Wall Units

1.3 Delivery, Storage, and Handling
A. Contractor shall check the materials upon delivery to assure proper material has been received.
B. Contractor shall prevent excessive mud, wet cement and like materials from coming in contact with the SRW units.
C. Contractor shall protect the materials from damage. Damaged material shall not be incorporated in the project.

PART 2: MATERIALS

2.1 Wall Units
A. Wall units shall be Redi-Rock® as produced by a licensed manufacturer.
B. Wall units shall be made with Ready-Mixed concrete in accordance with ASTM C94, latest revision, and per the following chart:

<table>
<thead>
<tr>
<th>Climate</th>
<th>Air Content</th>
<th>28 Day Compressive Strength psi</th>
<th>Slump*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negligible</td>
<td>1½%-4⅔%</td>
<td>4000</td>
<td>5” ± 1 ½”</td>
</tr>
<tr>
<td>Moderate</td>
<td>3%-6%</td>
<td>4000</td>
<td>5” ± 1 ½”</td>
</tr>
<tr>
<td>Severe</td>
<td>4⅔%-7⅓%</td>
<td>4000</td>
<td>5” ± 1 ½”</td>
</tr>
</tbody>
</table>

*Higher slumps are allowed if achieved by use of appropriate admixtures.

Notwithstanding anything stated above, all material used in the wall units must meet applicable ASTM and local requirements for exterior concrete.

2.2 Leveling Pad and Free Draining Backfill
A. Leveling pad shall be crushed stone. See detail sheet defining Leveling Pad options for drain placement in the bottom of the foundation leveling pad.
B. Free Draining Backfill material shall be washed stone and shall be placed between adjacent blocks and a minimum of 1’ width behind the back of the wall and shall extend vertically from the Leveling Pad to an elevation 4” below the top of wall.
C. Backfill material shall be approved by the geotechnical engineer. Site excavated soils may be used if approved unless otherwise specified in the drawings. Unsuitable soils with a PL>6, organic soils and frost susceptible soils shall not be used within a 1 to 1 influence area.
D. Non-woven geotextile cloth shall be placed between the Free Draining Backfill and retained soil if required.
E. Where additional fill is needed, Contractor shall submit sample and specifications to the Engineer for approval.

2.3 Drainage
A. Internal and external drainage shall be evaluated by the Professional Engineer who is responsible for the final wall design.
SPECIFICATION FOR REDI-ROCK® 28” & 41” PC BLOCK WALL SYSTEM

2.4 Geogrid Connection (Type PC)
A. A positive connection between the blocks and the geogrid strips is achieved by threading a continuous length of geogrid through the Redi-Rock PC Block and extending the top and bottom geogrid layers to the specified length measured from the back of the block.

PART 3: CONSTRUCTION OF WALL SYSTEM

3.1 Excavation
A. Contractor shall excavate to the lines and grades shown on the construction drawings.

3.2 Foundation Soil Preparation
A. Native foundation soil shall be compacted to 95% of standard proctor or 90% of modified proctor prior to placement of the Leveling Pad material.
B. In-situ foundation soil shall be examined by the Engineer to ensure that the actual foundation soil strength meets or exceeds assumed design strength. Soil not meeting the required strength shall be removed and replaced with acceptable, compacted material.

3.3 Leveling Pad Placement
A. Leveling Pad shall be placed as shown on the construction drawings.
B. Leveling Pad shall be placed on undisturbed native soils or suitable replacement fills.
C. Leveling Pad and drainage fill shall be compacted using vibratory compactors to not less than 90% relative density determined in accordance with ASTM D-4253 and D-4254. In place density of the stone fill shall be confirmed using the method of ASTM D-2922 Pad shall be constructed to the proper elevation to ensure the final elevation shown on the plans.
D. Leveling Pad shall have a 6 inch minimum depth for walls under 8 feet in height and a 12 inch minimum depth for walls over 8 feet. Pad dimensions shall extend beyond the blocks in all directions to a distance at least equal to the thickness of the pad or as designed by Engineer.

3.4 Unit Installation
A. The first course of wall units shall be placed on the prepared Leveling Pad with the aesthetic surface facing out and the front edges tight together. Thread geogrid strips through the blocks. Pull bottom layer of geogrid into place and anchor. All units shall be checked for level and alignment as they are placed.
B. Ensure that units are in full contact with Leveling Pad. Proper care shall be taken to develop straight lines and smooth curves on base course as per wall layout.
C. The backfill in front and back of entire base row shall be placed and compacted to firmly lock them in place. Make sure to infill the triangular space between blocks with Free Draining Backfill before installing next course of blocks. Pull the top layer of geogrid into place, pull tight and anchor. Fill PC slot with drain stone before installing next course of blocks. Check all units again for level and alignment. All excess material shall be swept from top of units.
D. Install next course of wall units on top of base row. Position blocks to be offset from seams of blocks below. Blocks shall be placed fully forward so knob and groove are engaged. Check each block for proper alignment and level. Thread geogrid strip through blocks and pull bottom layer into place, tighten and anchor. Backfill the triangular space between adjacent blocks and at least 12 inches behind the blocks with Free Draining Backfill. Spread backfill in uniform lifts not exceeding 9 inches. Employ methods using lightweight compaction equipment that will not disrupt the stability or batter of the wall. Hand-operated plate compaction equipment shall be used around the block and within 3 feet of the wall to achieve consolidation. Compact backfill to 95% of standard proctor (ASTM D 698, AASHTO T-99) density within 2% of its optimum moisture content. Pull top layer of geogrid into place, tighten and anchor. Fill PC slot with drain stone before installing next course of blocks.
E. Install each subsequent course in like manner. Repeat procedure to the extent of wall height.
F. Allowable construction tolerance at the wall face is 2 degrees vertically and 1 inch in 10 feet horizontally.
G. All walls shall be installed in accordance with local building codes and requirements.

PART 4: AVAILABILITY
Redi-Rock® International
05481 South US-31, Charlevoix, MI 49720
1-866-222-8400
www.redi-rock.com , info@redi-rock.com
Typical Gravity Wall with 41" Positive Connection (PC) Blocks

No Scale

- SETBACK = 1 5/6" (5° Batter Angle on Wall)
- Exposed Wall
- Grade to Drain Surface Water Away From Wall
- 28" PC Top Block
- Non-Woven Geotextile Fabric If Specified
- Move Blocks Forward During Installation to Engage Shear Knobs (Typical)
- Free Draining Backfill (ASTM No. 57 or Equivalent) to Extend at Least 12" Behind Wall
- Fill Slot and Wedge Between Blocks with Stone
- 41" PC Middle Block (Typical)
- 41" Bottom Block (No Center Slot)
- Perforated Sock Drain As Specified by Engineer
- Crushed Stone Leveling Pad (ASTM No. 57 or Equivalent)

* This drawing is for reference only.

* Final designs for construction must be prepared by a registered Professional Engineer using the actual conditions of the proposed site.

* Final wall design must address both internal and external drainage and shall be evaluated by the Professional Engineer who is responsible for the wall design.
Typical Reinforced Wall with 28" Positive Connection (PC) Blocks

No Scale

- **SETBACK** = 1 \( \frac{5}{16} \) (5° Batter Angle on Wall)

Non-Woven Geotextile or Geomembrane If Specified

Grade to Drain Surface Water Away From Wall

12" Wide Strip of Geogrid Wrapped Through Block and Extending Full Length (L) Back into Reinforced Fill Zone (Typical)

---

Exposed Wall

- Top Block
- Block 6
- Block 5
- Block 4
- Block 3
- Block 2
- Bot Block

REINFORCED SOIL

(L)

(Length of Geogrid Strip - Typical)

Non-Woven Geotextile Fabric If Specified

Move Blocks Forward During Installation to Engage Shear Knobs (Typical)

Free Draining Backfill (ASTM No. 57 or Equivalent) to Extend at Least 12" Behind Wall

Fill Slot and Wedge Between Blocks with Stone

28" PC Middle Block (Typical)

28" PC Bottom Block

---

Crushed Stone Leveling Pad (ASTM No. 57 or Equivalent)

Perforated Sock Drain As Specified by Engineer

---

**NOTE:**
One Degree or Zero Degree Batter Angle Walls are Available Using Blocks with 7 1/2" or 6 3/4" Knobs (Specially Items)

---

*This drawing is for reference only.

- **Final designs for construction must be prepared by a registered Professional Engineer** using the actual conditions of the proposed site.

- **Final wall design must address both internal and external drainage and shall be evaluated by the Professional Engineer who is responsible for the wall design.**

---

Redi-Rock® International, LLC

J. JOHNSON 05/23/11

Typical 28"h PC Block Reinforced Wall 052311.dwg

ISSUE DATE

SCALE

NO SCALE

SHEET NO.

1 OF 1

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Redi-Rock International

6.15

June 2011
POSITIVE CONNECTION (PC) BLOCKS

**Top - 28” PC Block**
Volume = 8.38 cft  
Weight = ±1200 lbs  
C of G = 15.5°

The slot in all Positive Connection blocks is tapered and varies in width from 12 ½” to 13”. It is sized to accept a 12” wide strip of geogrid soil reinforcement.

**Middle - 28” PC Block**
Volume = 10.77 cft  
Weight = ±1540 lbs  
C of G = 14.4°

**Bottom - 28” PC Block**
Volume = 11.50 cft  
Weight = ±1645 lbs  
C of G = 14.5°

**Middle - 41” PC Block**
Volume = 15.34 cft  
Weight = ±195 lbs  
C of G = 20.7°

**Notes:**
Volume and Center of Gravity (C of G) calculations are based on the blocks as shown.
Center of Gravity is measured from the back of the block.
Half blocks may include a fork lift slot on one side.
Actual weights and volumes may vary.
Weight shown is based on 143 pcf concrete.
FIVE DEGREE (5°) SETBACK WALL
(STANDARD)

SETBACK = 1 5/8"
(5° Batter Angle on Wall)

MOVE BLOCKS FORWARD
DURING INSTALLATION
TO ENGAGE SHEAR
KNOBS (TYPICAL)

28" PC (Positive Connection) Middle Block

ONE DEGREE (1°) SETBACK WALL
(SPECIALTY)

SETBACK = 3/8"
(1° Batter Angle on Wall)

MOVE BLOCKS FORWARD
DURING INSTALLATION
TO ENGAGE SHEAR
KNOBS (TYPICAL)

28" PC (Positive Connection) Middle Block

ZERO DEGREE (0°) SETBACK WALL
(SPECIALTY)

SETBACK = 0"
(0° Batter Angle on Wall)

MOVE BLOCKS FORWARD
DURING INSTALLATION
TO ENGAGE SHEAR
KNOBS (TYPICAL)

28" PC (Positive Connection) Middle Block
Positive Connection (PC) Details

See [www.redi-rock.com](http://www.redi-rock.com) for Geogrid Connection and Interface Shear Test Reports.

Fill Slot and Wedge Between Blocks with Stone

12" Wide Strip of Geogrid Wrapped Through Block and Extending Full Length (L) Back Into Reinforced Fill Zone

Nonwoven Geotextile Fabric (If Specified)

Free Draining Backfill (ASTM No. 57 or Equivalent) To Extend at Least 12" Behind Wall

Section View Through Blocks

No Scale

12" Wide Strip of Geogrid Wrapped Through Block and Extending Full Length (L) Back Into Reinforced Fill Zone

Isometric View of Back of Blocks

No Scale
28" Middle Positive Connection (PC) Block with Soil Infill

CENTER OF GRAVITY CALCULATIONS

CONCRETE
- Design Unit Weight = 143 pcf
- Volume (Vc) = 10.77 ft³ (Data from CAD Model)
- Center of Gravity (COGc) = 14.4 in from Back of Block (Data from CAD Model)
- Concrete Block Weight (Wc) = 10.77 ft³ x 143 pcf = 1,540 lbs

INFILL SOIL
- Design Unit Weight = 120 pcf
- Volume (Vs) = 1.62 ft³ (Data from CAD Model)
  (Includes Area Between Blocks and In Geogrid Slot and Top Groove)
- Center of Gravity (COGs) = 9.6 in from Back of Block (Data from CAD Model)
- Infill Soil Weight (Ws) = 1.62 ft³ x 120 pcf = 194 lbs

COG CALCULATIONS

<table>
<thead>
<tr>
<th>Weight</th>
<th>COG</th>
<th>Weight x COG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Block</td>
<td>1,540 lb</td>
<td>14.4 in</td>
</tr>
<tr>
<td>Soil</td>
<td>194 lb</td>
<td>9.6 in</td>
</tr>
<tr>
<td>Totals</td>
<td>1,734 lb</td>
<td></td>
</tr>
<tr>
<td>Weighted COG</td>
<td>= Σ Weight x COG / Σ Weight</td>
<td></td>
</tr>
</tbody>
</table>
  = 24,038 lb*in / 1,734 lb |
  = 13.9 in (From Back of Block)

FOR WALL STABILITY CALCULATIONS,
COG = 14.1" FROM THE FRONT FACE OF BLOCK

INFILLED UNIT WEIGHT CALCULATIONS

DESIGN VOLUME
- 28.0 in x 46.125 in x 18 in = 23,247 in³ = 13.45 ft³

WEIGHT
- Concrete Block = 1,540 lb
- Infill Soil = 194 lb
- Total Weight = 1,734 lb

INFILLED UNIT WEIGHT
- \( \gamma_{\text{INFL}} = \frac{1,734 \text{ lb}}{13.45 \text{ ft}^3} = 128.9 \text{ pcf} \)

FOR WALL STABILITY CALCULATIONS,
INFILLED UNIT WEIGHT, \( \gamma_{\text{INFL}} = 129 \text{ pcf} \)
41" Middle Positive Connection (PC) Block with Soil Infill

CENTER OF GRAVITY CALCULATIONS

CONCRETE
Design Unit Weight = 143pcf
Volume (Vc) = 15.34 cft (Data from CAD Model)
Center of Gravity (COGc) = 20.7 in from Back of Block (Data from CAD Model)
Concrete Block Weight (Wc) = 15.34 cft x 143pcf = 2,195 lbs

INFILL SOIL
Design Unit Weight = 120pcf
Volume (Vs) = 2.87 cft (Data from CAD Model)
(Includes Area Between Blocks and In Geogrid Slot and Top Groove)
Center of Gravity (COGs) = 14.9 in from Back of Block (Data from CAD Model)
Infill Soil Weight (Ws) = 2.87 cft x 120pcf = 344 lbs

COG CALCULATIONS

<table>
<thead>
<tr>
<th>Weight</th>
<th>COG</th>
<th>Weight x COG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Block</td>
<td>2,195 lb</td>
<td>46,436 lb*in</td>
</tr>
<tr>
<td>Soil</td>
<td>344 lb</td>
<td>5,126 lb*in</td>
</tr>
<tr>
<td>Totals</td>
<td>2,539 lb</td>
<td>50,562 lb*in</td>
</tr>
</tbody>
</table>

Weighted COG = Σ Weight x COG / Σ Weight
= 50,562 lb*in / 2,539 lb
= 19.9 in (From Back of Block)

FOR WALL STABILITY CALCULATIONS,
COG = 20.8" FROM THE FRONT FACE OF BLOCK

INFILLED UNIT WEIGHT CALCULATIONS

DESIGN VOLUME
40.5 in x 46.125 in x 18 in = 33,625 in³ = 19.46 cft

WEIGHT
Concrete Block = 2,195 lb
Infill Soil = 344 lb
Total Weight = 2,539 lb

INFILLED UNIT WEIGHT
γ_infill = 2,539 lb / 19.46 cft = 130.5 pcf

FOR WALL STABILITY CALCULATIONS,
INFILLED UNIT WEIGHT, γ_infill = 130 pcf