INSTALLATION INSTRUCTIONS FOR STORMWATER

RECHARGER® 360HD & 902HD
STORMWATER MANAGEMENT SOLUTIONS

INSTALLATION INSTRUCTIONS

RETENTION • DETENTION • INFILTRATION • WATER QUALITY
These instructions are for single-layer traffic applications only. For multi-layer applications, contact CULTEC. All illustrations and photos shown herein are examples of typical situations. Be sure to follow the engineer’s drawings. Actual designs may vary.
Required Materials and Equipment

- Proper geotechnical soil evaluation by a qualified engineer or soil scientist to determine suitability of structural installation
- OSHA compliance
- CULTEC warning tape, or equivalent
- Assurances from local utilities that no underground gas, electrical or other potentially dangerous pipelines or conduits are already buried at the site
- Acceptable 25-51 mm washed, crushed stone as shown in Table 3, page 18. Cleanliness of stone to be verified by engineer.
- Acceptable fill material
- CULTEC No. 410™ non-woven geotextile or equivalent
- CULTEC No. 4800™ woven geotextile or equivalent, as required
- All CULTEC chambers and accessories as specified in the engineer's plans including CULTEC No. 410™ non-woven geotextile, CULTEC StormFilter® and CULTEC No. 4800™ woven geotextile, where applicable. Check CULTEC chambers for damage prior to installation. Do not use damaged CULTEC chambers. Contact your supplier immediately to report damage or packing list discrepancies.
- Reciprocating saw or router
- Stone bucket
- Stone conveyor and/or tracked excavator
- Transit or laser level measuring device
- Compaction equipment

Requirements for CULTEC Chamber System Installations

- CULTEC systems must be designed and installed in accordance with CULTEC’s minimum requirements. Failure to do so will void the limited warranty. To request a copy and submit the CULTEC limited warranty, call CULTEC at 203-775-4416 or visit www.cultec.com.

- Installing contractors are expected to comprehend and use the most current installation instructions prior to beginning a system installation. If there is any question as to whether these are the most current instructions, contact CULTEC at (203)775-4416 or visit www.cultec.com.

- Contact CULTEC at least thirty days prior to system installation to arrange a pre-construction meeting.

- All CULTEC system designs must be certified by a registered professional engineer.

- Use these installation instructions as a guideline only. Actual design may vary. Refer to approved construction drawings for job-specific details. Be sure to follow the engineer’s drawings as your primary guide.

- System cover/backfill requirements will vary based on installation type.

- Any discrepancies with the system sub-grade soil’s bearing capacity must be reported to the design engineer.

- Non-woven geotextile must be used as specified in the engineer’s drawings.

- Erosion and sediment-control measures must meet local codes and the design engineer’s specifications throughout the entire site construction process.

- Responsibility for preventing vehicles that exceed CULTEC’s requirements from traveling across or parking over the chamber system lies solely with the contractor throughout the entire site construction process. The placement of warning tape, temporary fencing, and/or appropriately located signs is highly recommended. Imprinted warning tape is available from CULTEC. For Acceptable Vehicle Load information, refer to Table 1 on page 16.
## Chamber Specification Information

<table>
<thead>
<tr>
<th></th>
<th>Recharger 360HD Chamber</th>
<th>Recharger 902HD Chamber</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size (L x W x H)</td>
<td>1.27 mx 1525 mm x 914 mm</td>
<td>1.30 m x 1981 mm x 1219 mm</td>
</tr>
<tr>
<td>Installed Length</td>
<td>1.12 m</td>
<td>1.12 m</td>
</tr>
<tr>
<td>Length Adjustment per Row</td>
<td></td>
<td></td>
</tr>
<tr>
<td>with two end caps installed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.76 m</td>
<td>0.31 m</td>
<td></td>
</tr>
<tr>
<td>when not using end caps</td>
<td>0.15 m</td>
<td>0.18 m</td>
</tr>
<tr>
<td>Chamber Storage</td>
<td>0.93 m³/m</td>
<td>1.61 m³/m</td>
</tr>
<tr>
<td>Minimum Installed Storage</td>
<td>1.41 m³/m</td>
<td>2.53 m³/m</td>
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<tr>
<td>Minimum Area Required</td>
<td>1.96 m²</td>
<td>2.47 m²</td>
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<tr>
<td>Minimum Center-to-Center Spacing</td>
<td>1.75 m</td>
<td>2.21 m</td>
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<tr>
<td>Minimum Spacing Between Chambers</td>
<td>229 mm</td>
<td>229 mm</td>
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<tr>
<td>Minimum Cover Requirements</td>
<td>457 mm (Paved)</td>
<td>609 mm (Paved)</td>
</tr>
<tr>
<td>Maximum Allowable Cover</td>
<td>3.66 m</td>
<td>2.53 m</td>
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<tr>
<td>Maximum Allowable O.D. in Side Portal</td>
<td>250 mm HDPE, 300 mm PVC</td>
<td>250 mm HDPE, 300 mm PVC</td>
</tr>
<tr>
<td>Compatible Feed Connector</td>
<td>HLVV FC-48 Feed Connector</td>
<td>HLVV FC-48 Feed Connector</td>
</tr>
</tbody>
</table>

## End Cap Specification Information

<table>
<thead>
<tr>
<th></th>
<th>Recharger 360HD End Cap</th>
<th>Recharger 902HD End Cap</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size (L x W x H)</td>
<td>458 mm x 1525 mm x 927 mm</td>
<td>246 mm x 1982 mm x 1231 mm</td>
</tr>
<tr>
<td>Installed Length</td>
<td>381 mm</td>
<td>157 mm</td>
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<tr>
<td>End Cap Storage</td>
<td>0.48 m³/m</td>
<td>0.50 m³/m</td>
</tr>
<tr>
<td>Minimum Installed Storage</td>
<td>1.15 m³/m</td>
<td>1.85 m³/m</td>
</tr>
<tr>
<td>Maximum Inlet Opening in End Cap</td>
<td>600 mm HDPE, 750 mm PVC</td>
<td>750 mm HDPE, 900 mm PVC</td>
</tr>
</tbody>
</table>

All dimensions are nominal. Actual dimensions may vary on-site due to shipping and temperature.
Site Preparation and Excavation

- Excavate and level the area per engineer’s drawings. Refer to plan view and cross-section details and excavate bed to accommodate chambers and manifold system. Be sure to allow for a minimum 305 mm stone border around the perimeter of the system and unforeseen overages in your excavation calculations.

- Remove any standing water and maintain positive drainage of the site throughout the installation. Dewatering procedures must be used, if necessary.

- Prepare the sub-grade soil for the chamber bed as specified by the engineer’s drawings.

- Place CULTEC No. 410™ non-woven geotextile (or equivalent) on the excavated bed bottom and perimeter sidewalls as specified by the engineer’s drawings. CULTEC No. 410™ non-woven geotextile is required on the sides and over the top of the system. It is also recommended on the system bottom. Overlap the geotextile by at least 610 mm where the fabric edges meet.

- Disperse a level base of 25-51 mm diameter washed, crushed stone over the entire area of the bed bottom. Refer to the engineer’s drawings for sub-grade soil preparation and required stone foundation thickness.

- Compact the stone base to achieve a flat, level unyielding surface. For vibratory roller use, refer to Table 1 on page 16 for recommended guidelines.

CULTEC HVLV FC-48 Feed Connector Specification Information

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Length</td>
<td>1245 mm</td>
</tr>
<tr>
<td>Installed Length (exposed)</td>
<td>229 mm min.</td>
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<tr>
<td>Width</td>
<td>406 mm</td>
</tr>
<tr>
<td>Height</td>
<td>305 mm</td>
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<tr>
<td>Chamber Storage Capacity</td>
<td>0.08 m³/m</td>
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<tr>
<td>Pipe Comparison</td>
<td>Greater flow capacity than 300 mm pipe</td>
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</tbody>
</table>
Chamber Information for Recharger® Models 360HD & 902HD

Directional arrows located on the top of the chamber point towards the Small Rib End.

CULTEC Recharger® 360HD & 902HD Chambers

The Recharger models 360HD & 902HD chambers come in only one model type which is fully open on both ends. The chamber requires the coordinating End Cap (sold separately) to cap rows of chambers or to create single stand alone units. One rib is dimensionally smaller to be able to interlock with additional units. A directional arrow points towards the small rib end. Typically, the build of the row begins with the large rib end facing you.

CULTEC Recharger® 360HD & 902HD End Caps

The End Cap is used in conjunction with the chamber to cap rows of chambers or to create single stand alone units.
Typical Installation Method

Interlock Recharger chambers using the overlapping rib connection. Cap the ends of the lines using the Recharger End Cap.
Chamber Preparation and Installation

CULTEC Recharger® 360HD & 902HD chambers have the distinctive features of being fully open on both ends and utilize an overlapping rib connection. CULTEC chamber ribs are dimensionally sized with a large rib and a smaller rib to allow for an easy interlocking rib connection. The chambers require a separate end cap to cap off lines.

- Identify and group the chambers and end caps to ensure proper quantity and usage.
- Trim all side portals, end caps and inspection ports prior to installation for easier handling during trimming.
- Place one Recharger chamber for each row of units to be installed. Directional arrows point towards the small rib end of the chamber.
- If using the side portal internal manifold feature, trim the side portal(s) according to guidelines located on the sidewall of the chamber, as required. Insert one end of the HVLV FC-48 Feed Connector into the trimmed portal to create the internal manifold. Refer to Installation of Manifold section on page 9.
- Place the next Recharger chamber so the directional arrow located in the center of the unit points downstream towards the end of the line. Overlap the large rib over the small rib of the preceding chamber’s end wall, interlocking the chambers together. When placing chambers take care to maintain separation requirements, measuring from the base of the chamber.
- To ease backfilling requirements, only install as many chambers as the stone-laying bucket or conveyor can reach.
- Place stone taking care not to drop stone over the last rib to be overlapped.
- Continue chamber and stone placement to extend the length of the row.
- Use the Recharger End Caps to cap off chamber rows. To install the end cap, lift the end cap above the chamber and slide down the chamber rib.
- Prior to the placement of the next line of chambers, check and correct the level and alignment of the chamber units, where needed.
Installation of Manifold

Utilize the side portals located on the chamber as an internal manifold in locations where indicated on the engineer’s drawings. HVLV® FC-48 Feed Connectors are inserted into the portals to promote flow. An additional external manifold is not required unless specified by the engineer’s design.

- CULTEC No. 4800™ woven geotextile is to be placed under all chambers utilizing the internal manifold feature and under all chambers accepting inlet/outlet pipe connections per engineer’s drawings. If inserting a pipe 18” diameter or larger into the CULTEC chamber, the use of CULTEC No. 4800 woven geotextile is recommended to prevent washout of the bedding stone.

- Most installations are designed with the internal manifold located at the ends of the chamber bed. However, the side portal internal manifold feature allows for the manifold to be located at any point within the chamber run. Refer to system design for manifold location(s).

- Using a reciprocating saw or router, trim the sidewall portals of the units that are to receive the HVLV FC-48 Feed Connectors. Feed connectors may be placed on any chamber requiring a manifold, as indicated by the engineer’s drawings.

- Place the HVLV FC-48 Feed Connector into the side portal of the chambers per engineer’s drawings. Maintain a 229 mm min. separation between chamber rows.

- Check for correct center-to-center spacing of chamber runs according to engineer’s drawings before proceeding to next row.

- Insert inflow/outflow pipe(s) into end cap or side portal as detailed on engineer’s drawings. Maximum inlet sizes for the end caps are: 600 mm HDPE, 750 mm PVC for the Recharger 360HD End Cap and 750 mm HDPE, 900 mm PVC for the Recharger 902HD End Cap. Maximum pipe sizes for the side portals are: 250 mm HDPE, 300 mm PVC. There is no need to feed every row if utilizing the internal manifold feature.

If the manifold installation detail does not include CULTEC’s side portal internal manifold, proceed according to the engineer’s drawings for pipe manifold installation.
How to Trim CULTEC Chamber to Accommodate Pipe on End Cap

When using a conventional pipe manifold or inlet / outlet pipes, the contractor is required to trim the CULTEC Recharger End Cap on-site. Here are some quick steps to ensure a successful outcome:

- Lay out chambers according to engineered plans.
- Directional arrows located at the top of the chamber point towards the small rib end.
- Install end caps on the chambers as detailed on the engineer’s drawing.
- Locate the proper diameter pipe outline on the end cap to accommodate the designed pipe size and invert elevation.
- Drill a hole on the chamber end wall large enough to accommodate a saw blade.
- Following the etched outline, use a reciprocating saw to trim out the opening to accommodate the pipe. Trimming should be within 6 mm tolerance of pipe O.D. to prevent stone intrusion.
- Insert the pipe or fitting a minimum of 203 mm into the chamber. This is not required to be a watertight connection. Maximum inlet pipe sizes: 360HD: 600 mm HDPE, 750 mm PVC, 902HD: 750 mm HDPE, 900 mm PVC.
- Backfill as noted in the installation instructions and engineering details.
- Trimming may only be performed on end caps or within side portal areas. Pipe may not be inserted into the sidewall of the chamber unless it is within the side portal trim lines.
How to Trim Side Portal to Accommodate HVLV FC-48 Feed Connector for Internal Manifold

When using the side portal internal manifold feature, the contractor is required to trim the side portal of the CULTEC Recharger chamber on site.

- Following the guides on the side portal, use a reciprocating saw to trim out the opening to accommodate the HVLV FC-48 Feed Connector. Trimming should be within 6 mm tolerance of HVLV FC-48 Feed Connector to prevent soil intrusion.

- Insert the HVLV FC-48 Feed Connector a minimum of 203 mm into the chamber. This is not required to be a watertight connection.

- Maintain proper separation of 229 mm minimum between chamber rows.
How to Trim Side Portal to Accommodate Pipe for Side Entry

When using the side portal feature as an inlet/outlet location, the contractor is required to trim the side portal of the CULTEC Chamber onsite.

- Line up the pipe on the chamber side portal to the designated pipe elevation as detailed on the engineer’s drawing. The side portal may accommodate 250 mm HDPE or 300 mm PVC pipe.

- Using a grease pen, outline the pipe on the side portal of the CULTEC chamber. See Fig. 1 for acceptable trim area. Do not cut outside the side portal area guides.

- Drill a hole on the chamber side portal large enough to accommodate a saw blade.

- Following the grease pen outline, use a reciprocating saw to trim out the opening to accommodate the pipe. Trimming should be within 6 mm tolerance of pipe O.D. to prevent soil intrusion.

- Insert the pipe or fitting a minimum of 203 mm into the chamber. This is not required to be a watertight connection.

Fig. 1 - Acceptable Trim Area

Trimming may only be performed on the side portal area. Side entry in any other location is unacceptable.
**Embedment Stone Backfill**

Backfill using washed, crushed stone. To maintain row separation distance and prevent chamber displacement, slowly distribute stone on top of the center of the chamber crown so that stone trickles down and builds between chamber rows as required. Stone column differential should not exceed 300 mm between adjacent chamber rows or between chamber rows and perimeter.

Place the stone carefully over the centerline of the chamber crown. Embedment stone must only be placed by an excavator or telescoping conveyor boom. Placement of embedment stone with a bulldozer is not an acceptable method of installation and may cause damage to the chambers. Any chambers damaged using an unacceptable method of backfill are not covered under the CULTEC limited warranty.

**Excavator-Placed Stone**

Typically the most common method, excavator-placed stone is limited by the reach of the arm. To accommodate this issue with larger beds, it is common to prepare a bed by joining just a few chamber units at a time, then placing the stone and fabric before installing the next few units.

The excavator is usually operated within the excavation area. The excavator may work at grade level over recently placed chambers, provided coverage between the chambers and the excavator tracks meets the minimum requirements.

**Telescoping Conveyor Boom Placement**

With booms as much as 36.6 - 42.7 meters long, telescoping aggregate conveyors can greatly aid the process of stone placement.

With both stone-placement methods, ladling the stone carefully over the chambers’ centers will secure them in place. Evenly distributing the stones will help prevent chamber movement and maintain row separation.

Once secured, stone may be placed to surround the chambers and fill the perimeter areas. Be sure to adhere to manufacturer recommendations and engineer’s drawings for system cover/backfill requirements.
Do not allow equipment to drive over the chambers unless the minimum cover is in place. Use a warning tape (available from CULTEC) to restrict access.

Repeat steps until all of the last chamber units are in place. Be certain to use the Recharger End Caps to end the line of chambers as specified by the drawings.

If a manifold system is designed on the back end of the chamber bed, follow manifold installation instructions as described previously.

Stone column height differential should never exceed 300 mm with adjacent chambers or between chamber rows and perimeter. Minimum depth of cover of properly compacted material must be met before allowing vehicles to drive over the bed. Avoid using large rocks and/or organic matter as backfill material. Refer to “Acceptable Fill Materials” or contact the design engineer for approved fill types.
Placement of Top Fabric Layer & System Backfill Process

- Place the stone over the entire bed area as described in previous section.

- Cover the entire installation area with CULTEC No. 410 non-woven geotextile starting from the perimeter and laying it on top of the stone. The geotextile must overlap at least 610 mm at the edges.

- Fill the first 305 mm with enough material (See 3 in Fig. 1, page 18) to meet the requirements as shown in Table 3, page 18. Backfill over the top of the geotextile (See 3 in Fig. 1, page 18) in lifts that do not exceed 152 mm, and disperse the fill with a vehicle that meets the maximum wheel loads or ground pressure limits as specified on specified in Table 1 on page 16.

- Compact each lift of backfill as specified in the engineer’s drawings. CULTEC specifies compacting to a minimum of 95% of the standard proctor density using compaction equipment Refer to Table 1, page 16 for acceptable equipment.

- Backfill over the chamber bed (See 4 in Fig. 1, page 18) in 305 mm maximum lifts until the specified grade is achieved. For pavement sub-base or special fill requirements, see engineer’s drawings.

**NOTE:**
Excavation alongside already installed chamber rows backfilled with stone is not acceptable. No chambers may be added or subtracted from previously installed systems.
### Table 1: Maximum Allowable Construction Loads

<table>
<thead>
<tr>
<th>Material Location</th>
<th>Cumulative Cover Depth over Chambers (mm)</th>
<th>Maximum Allowable Wheel Loads</th>
<th>Maximum Allowable Track Loads</th>
<th>Maximum Allowable Compaction Loads</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Max Axle Load for Trucks (kN)</td>
<td>Max Axle Load for Loaders (kN)</td>
<td>Track Shoe Width (mm)</td>
</tr>
<tr>
<td>4 Final Fill Material</td>
<td></td>
<td></td>
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<td>305</td>
</tr>
<tr>
<td></td>
<td>900 Compacted</td>
<td>143</td>
<td>71</td>
<td>458</td>
</tr>
<tr>
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<td></td>
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<td></td>
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<td>915</td>
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<tr>
<td>3 Initial Fill Material</td>
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<td>305</td>
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<tr>
<td></td>
<td>600 Compacted</td>
<td>143</td>
<td>71</td>
<td>458</td>
</tr>
<tr>
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<tr>
<td>2 Embedment Stone</td>
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<td></td>
<td>600 Loose/Dumped</td>
<td>360HD: 143</td>
<td>305</td>
<td>360HD: 71</td>
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<td>902HD: 107</td>
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<td>48.3</td>
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<td>2 Embedment Stone</td>
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<td>360HD: 143</td>
<td>360HD: 71</td>
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<td>902HD: 107</td>
<td>458</td>
<td>58.4</td>
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<td>915</td>
<td>41.1</td>
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<tr>
<td>2 Embedment Stone</td>
<td>450 Loose/Dumped</td>
<td>360HD: 71</td>
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<tr>
<td></td>
<td>902HD: NOT ALLOWED</td>
<td>458</td>
<td>57.0</td>
<td>NOT ALLOWED</td>
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<tr>
<td></td>
<td></td>
<td>610</td>
<td>48.3</td>
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<td>762</td>
<td>43.5</td>
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<td>40.2</td>
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<tr>
<td>2 Embedment Stone</td>
<td>150 Loose/Dumped</td>
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<td>NOT ALLOWED</td>
<td>305</td>
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<td>458</td>
<td>43.1</td>
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<td>610</td>
<td>38.3</td>
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<td>36.3</td>
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<tr>
<td></td>
<td></td>
<td>915</td>
<td>34.5</td>
<td>NOT ALLOWED</td>
</tr>
</tbody>
</table>

The use of wheeled equipment without proper cover is strictly prohibited.
For Tracked Vehicles: Ground pressure is vehicle operating weight divided by total truck contact area for both tracks. Turning should be kept to a minimum.
No wheeled vehicles are allowed prior to compacted fill placement.

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<table>
<thead>
<tr>
<th>Material Location</th>
<th>Placement Method/Restrictions</th>
<th>Wheel Load Restrictions</th>
<th>Track Load Restrictions</th>
<th>Compaction Restrictions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>4 Final Fill Material</strong></td>
<td>A variety of placement methods may be used. All construction loads shall not exceed the maximum values listed in Table 1.</td>
<td>902HD: 914 mm minimum cover for dump truck and wheel loader travel 360HD: 610 mm minimum cover for dump truck and wheel loader travel</td>
<td>Dozers shall push parallel to rows only.</td>
<td>902HD: Roller travel shall be parallel to rows only until 914 mm of cover is reached 360HD: Roller travel shall be parallel to rows only until 610 mm of cover is reached</td>
</tr>
<tr>
<td><strong>3 Initial Fill Material</strong></td>
<td>Excavator positioned off of bed or on foundation stone. Small LGP track dozer, track skid steer loaders may be used. Must maintain 305 mm minimum fill below tracks at all times.</td>
<td>902HD: Asphalt can be dumped into paver machine when total cumulative fill depth over chambers reaches 610 mm 360HD: Asphalt can be dumped into paver machine when total cumulative fill depth over chambers reaches 457 mm</td>
<td>Equipment direction of travel shall be parallel to rows at all times. Equipment shall not be permitted to turn direction over chambers.</td>
<td>Roller travel shall be parallel to rows only. 902HD: Dynamic roller mode shall be used only when total cumulative fill depth over chambers reaches 610 mm 360HD: Dynamic roller mode shall be used only when total cumulative fill depth over chambers reaches 457 mm</td>
</tr>
<tr>
<td><strong>2 Embedment Stone</strong></td>
<td>No equipment shall be permitted to contact the chambers. Stone conveyor positioned off of bed or on foundation stone. Excavator positioned off of bed or on foundation stone.</td>
<td>No wheel loads allowed. No wheel loaders permitted to dump stone directly onto chambers.</td>
<td>No tracked equipment is allowed on chambers until 305 mm of embedment stone is in place.</td>
<td>No rollers allowed.</td>
</tr>
<tr>
<td><strong>1 Foundation</strong></td>
<td>A variety of placement methods may be used including but not limited to excavator placement, stone conveyor placement or dozer placement. Plate compact or roll to achieve a flat, unyielding surface. Contractor is responsible for any conditions or requirements relating to subgrade bearing capacity, dewatering or protection of subgrade infiltrative capacity.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table 3: Acceptable Fill Materials

<table>
<thead>
<tr>
<th>Material Location</th>
<th>Description</th>
<th>AASHTO M43 Classification</th>
<th>Compaction/Density Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fill Material for Layer 4 starts from the top of Layer 3</td>
<td>Any soil/rock materials, native soils or per engineer’s plans. Check plans for pavement subgrade requirements.</td>
<td>4, 5, 6, 7, 8, 9, 10, 56, 57, 68, 78, 89, 467</td>
<td>Prepare per engineer’s drawing. Paved installations may have strict material and preparation requirements.</td>
</tr>
<tr>
<td>to the bottom of pavement or unpaved finished grade above. Refer to cross section, page 19 for proper minimum fill requirements.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fill Material for Layer 3 starts from the top of embedment stone (Layer 2) to minimum required depth above top of chamber. Refer to cross section, page 19 for proper minimum fill requirements.</td>
<td>Granular well-graded soil/aggregate mixtures, &lt;35% fines</td>
<td>3, 4, 5, 6, 7, 8, 9, 10, 56, 57, 68, 78, 89, 467</td>
<td>Compact in 152 mm lifts to a minimum 95% Standard Proctor density. Refer to Table 1 for acceptable gross vehicle weights.</td>
</tr>
<tr>
<td>Embedment Stone surrounding chambers and to a minimum elevation above chamber crown. 360HD: 152 mm min. required 902HD: 305 mm min. required.</td>
<td>Washed, crushed stone with the majority of particles between 25 - 51 mm</td>
<td>3, 4, 57, 67</td>
<td>No compaction required.</td>
</tr>
<tr>
<td>Foundation Stone below chambers per engineer’s drawing 360HD: 152 mm min. required 902HD: 229 mm min. required.</td>
<td>Washed, crushed stone with the majority of particles between 25 - 51 mm</td>
<td>3, 4, 57, 67</td>
<td>Plate compact or roll to achieve a flat, unyielding surface.</td>
</tr>
</tbody>
</table>

The listed AASHTO classifications are for gradations. The stone must be washed, crushed and angular. See Table 5, page 20. For example, the stone must be specified as washed, crushed No. 4 stone. Fill materials shall be free of debris, trash, frozen lumps and other deleterious matter. Contact CULTEC for gradation requirements for specific projects that do not fall within the above specifications.

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**Fig. 1. Fill Material Locations - refer to Tables 1-3**
Recharger 360HD Typical Cross Section for Traffic Applications

Recharger 902HD Typical Cross Section for Traffic Applications

NOTES:
1. THE CHAMBERS SHALL BE DESIGNED AND TESTED IN ACCORDANCE WITH ASTM F1297. STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS. THE LOAD CONFIGURATION SHALL BE 1.0:1.0.
2. THE CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F1180-20 "STANDARD SPECIFICATION FOR CELLULAR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS.
3. THE INSTALLED CHAMBER SYSTEM SHALL PROVIDE RESISTANCE TO THE LOADS AND LOAD FACTORS AS DEFINED IN THE ASHTO H1-94 BRIDGE DESIGN SPECIFICATIONS SECTIONS 12.12. WHEN INSTALLED ACCORDING TO CULTEC'S RECOMMENDED INSTALLATION INSTRUCTIONS, THE STRUCTURAL DESIGN OF THE CHAMBERS SHALL INCLUDE THE FOLLOWING:

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INSTALLATION INSTRUCTIONS FOR STORMWATER
Table 3: CULTEC No. 410™ Non-Woven Geotextile Specification Information

<table>
<thead>
<tr>
<th>Properties</th>
<th>ASTM Test Method</th>
<th>Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td></td>
<td>Black</td>
</tr>
<tr>
<td>Weight - Typical</td>
<td>D 5261</td>
<td>142 g/m</td>
</tr>
<tr>
<td>Tensile Strength</td>
<td>D 4632</td>
<td>533 N</td>
</tr>
<tr>
<td>Elongation @ Break</td>
<td>D 4632</td>
<td>50%</td>
</tr>
<tr>
<td>Mullen Burst*</td>
<td>D 3786*</td>
<td>1551 kPa</td>
</tr>
<tr>
<td>Puncture Strength*</td>
<td>D 4833*</td>
<td>289 N</td>
</tr>
<tr>
<td>CBR Puncture</td>
<td>D 6241</td>
<td>1513 N</td>
</tr>
<tr>
<td>Trapezoidal Tear</td>
<td>D 4533</td>
<td>222 N</td>
</tr>
<tr>
<td>AOS</td>
<td>D 4751</td>
<td>0.212 mm</td>
</tr>
<tr>
<td>Permittivity</td>
<td>D 4491</td>
<td>1.70 Sec⁻¹</td>
</tr>
<tr>
<td>Water Flow Rate</td>
<td>D 4491</td>
<td>5500 l/min/sm</td>
</tr>
<tr>
<td>UV Resistance @ 500 Hours</td>
<td>D 4355</td>
<td>70%</td>
</tr>
</tbody>
</table>

* Historical averages (current values not available): Mullen Burst Strength ASTM D3786 is no longer recognized by ASTM D-35 on Geosynthetics as an acceptable test method. Puncture Strength ASTM D4833 is not recognized by AASHTO M288 and has been replaced with CBR Puncture ASTM D6241. Substitutions must meet or exceed these minimums. Non-woven geotextile placement is mandatory over top and sides of system. Coverage of system bottom is recommended. However, follow engineer’s design preference.

Table 4: CULTEC No. 4800™ Woven Geotextile Specification Information

<table>
<thead>
<tr>
<th>Properties</th>
<th>ASTM Test Method</th>
<th>Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td></td>
<td>Black</td>
</tr>
<tr>
<td>Weight - Typical</td>
<td>D 5261</td>
<td>142 g/m</td>
</tr>
<tr>
<td>Tensile Strength</td>
<td>D 4632</td>
<td>533 N</td>
</tr>
<tr>
<td>Elongation @ Break</td>
<td>D 4632</td>
<td>20 x 20%</td>
</tr>
<tr>
<td>Wide Width Tensile</td>
<td>D 4595</td>
<td>74 x 74 kN/m</td>
</tr>
<tr>
<td>Wide Width Tensile @ 2% Strain</td>
<td>D 4595</td>
<td>14 x 16 kN/m</td>
</tr>
<tr>
<td>Wide Width Tensile @ 5% Strain</td>
<td>D 4595</td>
<td>40 x 40 kN/m</td>
</tr>
<tr>
<td>Wide Width Tensile @10% Strain</td>
<td>D 4595</td>
<td>70 x 70 kN/m</td>
</tr>
<tr>
<td>CBR Puncture</td>
<td>D 6241</td>
<td>7,560 N</td>
</tr>
<tr>
<td>Trapezoidal Tear</td>
<td>D 4533</td>
<td>801 x 801 N</td>
</tr>
<tr>
<td>Apparent Opening Size</td>
<td>D 4751</td>
<td>0.425 mm</td>
</tr>
<tr>
<td>Permittivity</td>
<td>D 4491</td>
<td>0.15 Sec⁻¹</td>
</tr>
<tr>
<td>Water Flow Rate</td>
<td>D 4491</td>
<td>470 l/min/sm</td>
</tr>
<tr>
<td>UV Resistance @ 500 Hours</td>
<td>D 4355</td>
<td>80%</td>
</tr>
</tbody>
</table>

Substitutions must meet or exceed these minimums. To be used as scour protection and in conjunction with CULTEC Separator Row (if specified).

Table 5: Criteria for acceptable 1 - 2 inch washed, crushed, angular stone

<table>
<thead>
<tr>
<th>Washed Crushed Stone</th>
<th>Description</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acceptable</td>
<td>Angular</td>
<td>Stones have sharp edges and relatively plane sides with unpolished surfaces</td>
</tr>
<tr>
<td></td>
<td>Subangular</td>
<td>Stones are similar to angular description but may have slightly rounded edges</td>
</tr>
<tr>
<td>Unacceptable</td>
<td>Subrounded</td>
<td>Stones have nearly plane sides but have well-rounded corners and edges</td>
</tr>
<tr>
<td></td>
<td>Rounded</td>
<td>Stones have smoothly curved sides and no edges</td>
</tr>
</tbody>
</table>

See Item 1 and Item 2 of Table 3 on page 18 for additional stone requirements.
For more information, contact CULTEC at (203) 775-4416 or visit www.cultec.com.
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Inspection Port Detail for Paved Traffic Applications

Trim inspection port knock-out with reciprocating saw or hole-saw. Corrugated pipe is not suitable for inspection port.
Special Handling Instructions for Polypropylene, Chambers in Colder Temperatures

CULTEC chambers are manufactured of impact-modified polypropylene, which is inherently resistant to corrosion and chemical breakdown and cold weather impact. Additional UV inhibitors and antioxidants increase the chambers’ resistance to sunlight degradation. However, CULTEC recommends that, when installed in cold temperatures below 0° C, the installer take special care when removing the chambers from the stacks, not allowing the chambers to fall from height. Avoid using machinery to handle the chambers. When possible, CULTEC recommends that the stone backfill be placed in temperatures above 0° C to minimize depressions or deflections.