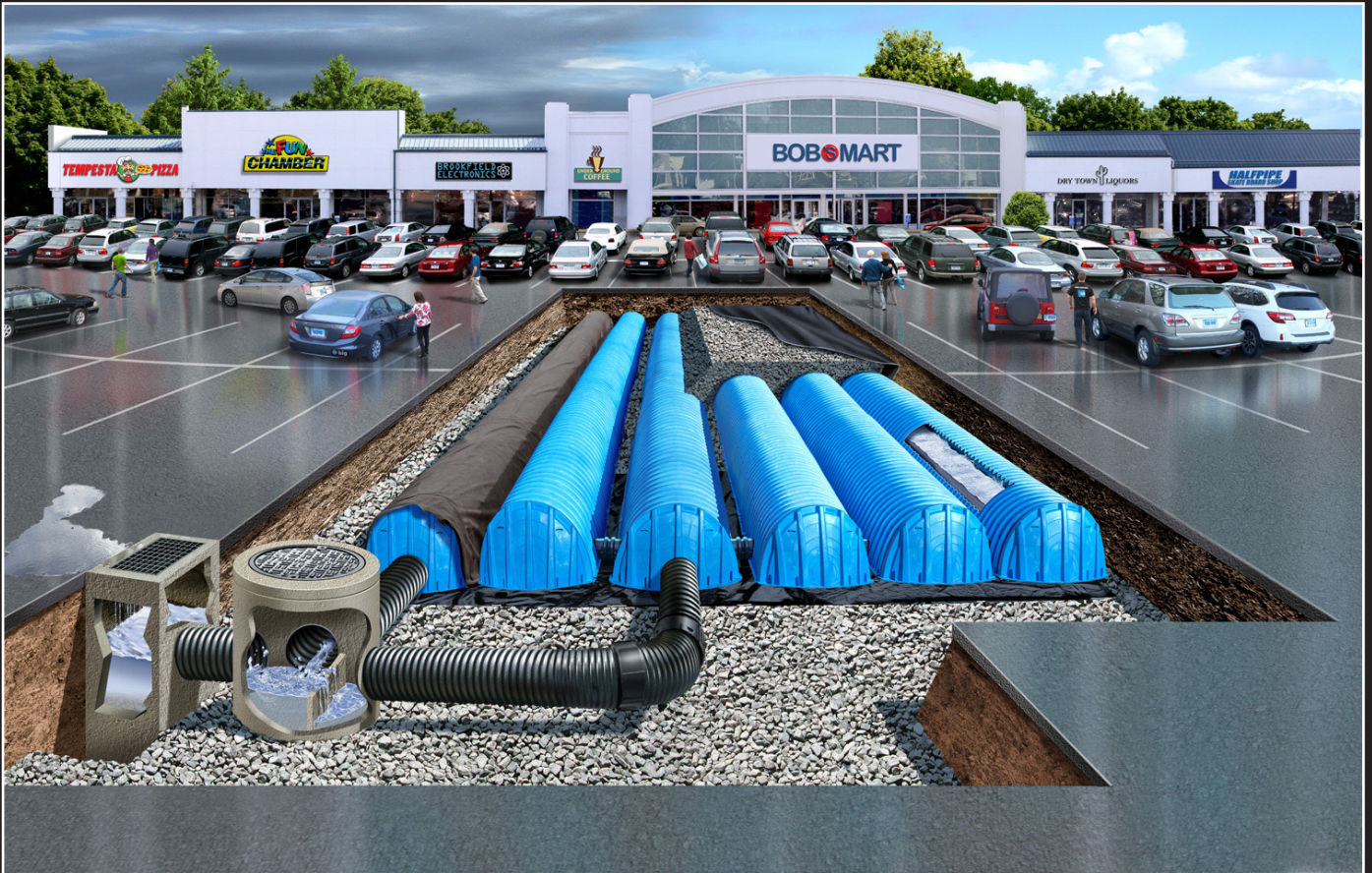


# RECHARGER® 360HD & 902HD STORMWATER MANAGEMENT SOLUTIONS



## INSTALLATION INSTRUCTIONS

RETENTION • DETENTION • INFILTRATION • WATER QUALITY





## Published by

**CULTEC, Inc.**

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## Contact Information:

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February 2022

You are using version CLT009 02-22 of our CULTEC Installation Instructions for Recharger® 360HD and 902HD Stormwater Systems.

*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](http://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](http://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

	Recharger 360HD Chamber	Recharger 902HD Chamber
Size (L x W x H)	1.27 m x 1525 mm x 914 mm	1.30 m x 1981 mm x 1219 mm
Installed Length	1.12 m	1.12 m
Length Adjustment per Row with two end caps installed	0.76 m	0.31 m
when not using end caps	0.15 m	0.18 m
Chamber Storage	0.93 m <sup>3</sup> /m 1.04 m <sup>3</sup> /unit	1.61 m <sup>3</sup> /m 1.80 m <sup>3</sup> /unit
Minimum Installed Storage	1.41 m <sup>3</sup> /m 1.58 m <sup>3</sup> /unit	2.53 m <sup>3</sup> /m 2.81 m <sup>3</sup> /unit
Minimum Area Required	1.96 m <sup>2</sup>	2.47 m <sup>2</sup>
Minimum Center-to-Center Spacing	1.75 m	2.21 m
Minimum Spacing Between Chambers	229 mm	229 mm
Minimum Cover Requirements	457 mm (Paved) 610 mm (Unpaved)	609 mm (Paved) 762 mm (Unpaved)
Maximum Allowable Cover	3.66 m	2.53 m
Maximum Allowable O.D. in Side Portal	250 mm HDPE, 300 mm PVC	250 mm HDPE, 300 mm PVC
Compatible Feed Connector	HVLV FC-48 Feed Connector	HVLV FC-48 Feed Connector

## End Cap Specification Information

	Recharger 360HD End Cap	Recharger 902HD End Cap
Size (L x W x H)	458 mm x 1525 mm x 927 mm	246 mm x 1982 mm x 1231 mm
Installed Length	381 mm	157 mm
End Cap Storage	0.48 m <sup>3</sup> /m 0.18 m <sup>3</sup> /unit (interlocked)	0.50 m <sup>3</sup> /m 0.08 m <sup>3</sup> /unit (interlocked)
Minimum Installed Storage	1.15 m <sup>3</sup> /m 0.44 m <sup>3</sup> /unit	1.85 m <sup>3</sup> /m 0.29 m <sup>3</sup> /unit
Maximum Inlet Opening in End Cap	600 mm HDPE, 750 mm PVC	750 mm HDPE, 900 mm PVC





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

## CULTEC HVLV FC-48 Feed Connector Specification Information

	HVLV® FC-48 Feed Connector
Length	1245 mm
Installed Length (exposed)	229 mm min.
Width	406 mm
Height	305 mm
Chamber Storage Capacity	0.08 m <sup>3</sup> /m
Pipe Comparison	Greater flow capacity than 300 mm pipe



## 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.**

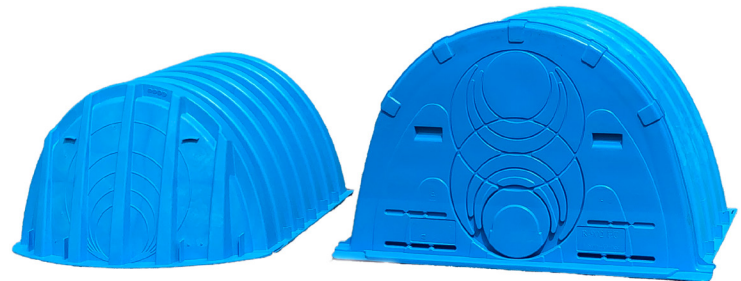
## Chamber Information for Recharger® Models 360HD & 902HD

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



### CULTEC Recharger® 360HD & 902HD Chambers

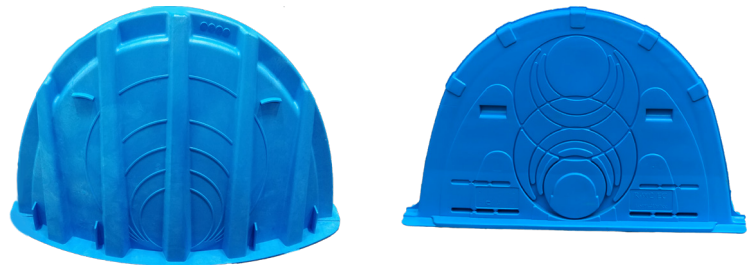
The Recharger models 360HD & 902HD chambers come in only one model type which is fully open on both ends. The chamber requires the coordinating End Cap (*sold separately*) to cap rows of chambers or to create single stand alone units. One rib is dimensionally smaller to be able to interlock with additional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



Shown: Recharger 360HD & Recharger 902HD Chambers with overlapping End Caps.

### CULTEC Recharger® 360HD & 902HD End Caps

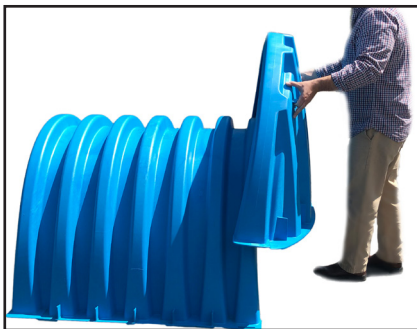
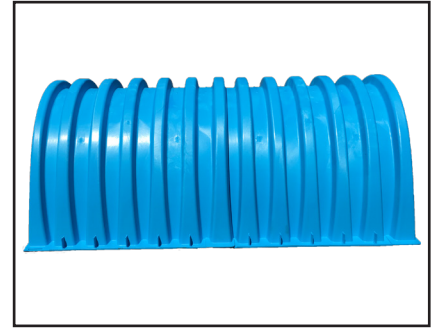
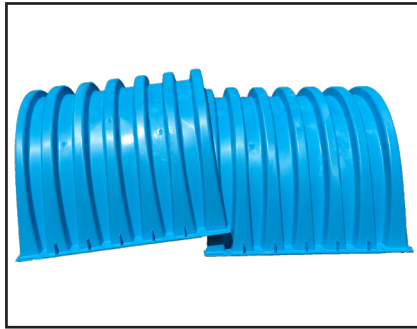
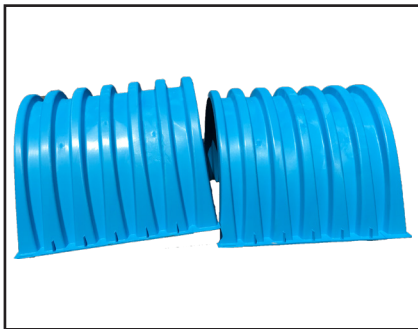
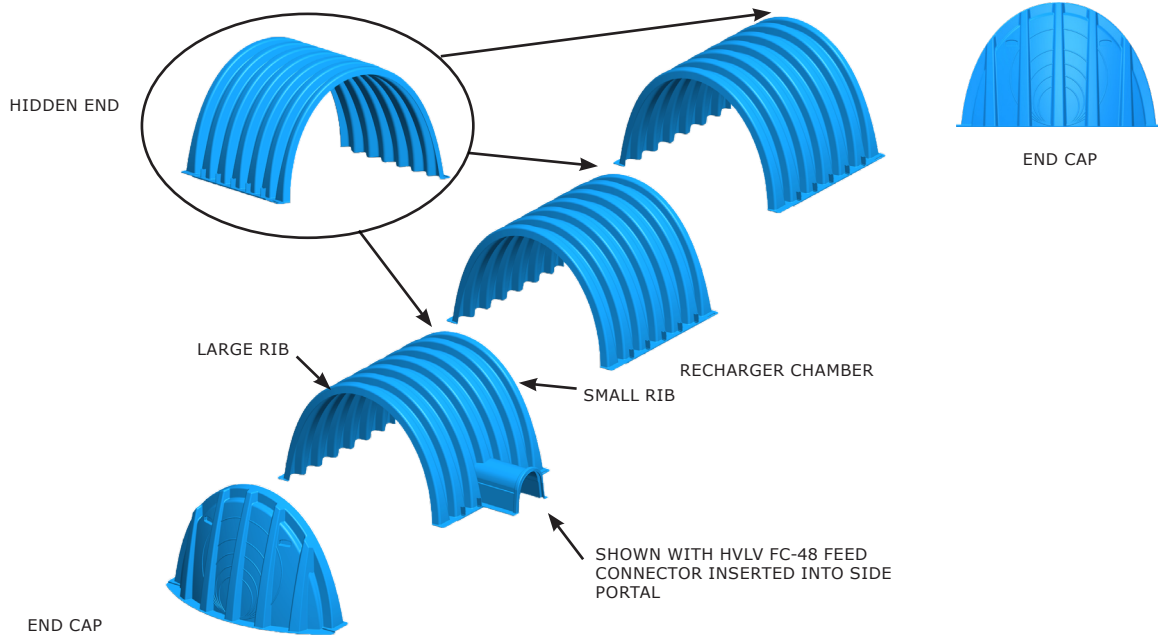
The End Cap is used in conjunction with the chamber to cap rows of chambers or to create single stand alone units.



Shown: Recharger 360HD End Cap & Recharger 902HD End Cap

## 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.

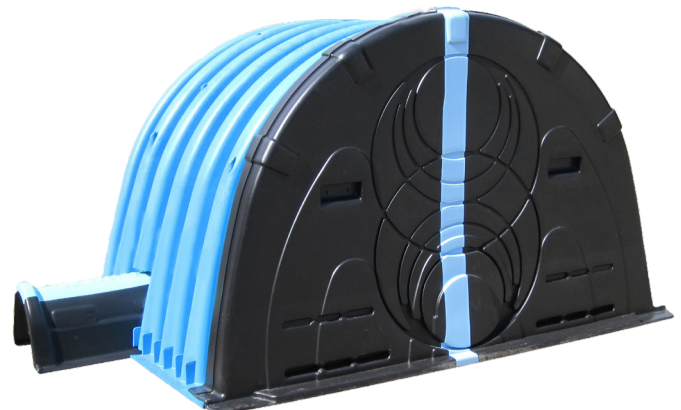




## Installation of Manifold

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 450 mm 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

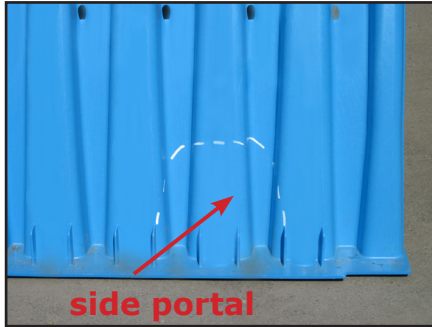
When using a conventional pipe manifold or inlet / outlet pipes, the contractor is required to trim the CULTEC Recharger End Cap on-site. Here are some quick steps to ensure a successful outcome:

- 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.**

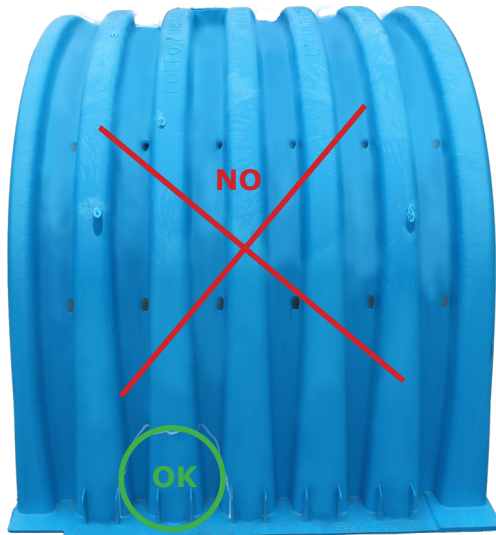


## How to Trim Side Portal to Accommodate HVLV FC-48 Feed Connector for Internal Manifold

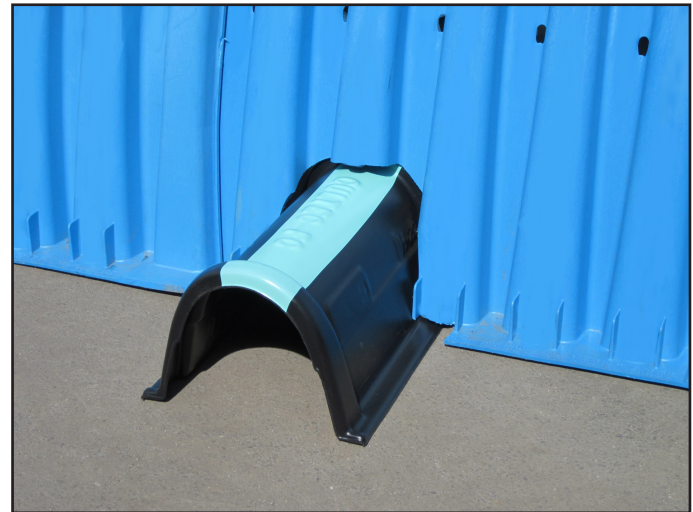
When using the side portal internal manifold feature, the contractor is required to trim the side portal of the CULTEC Recharger chamber on site.



- 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.



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



- 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.
- 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.

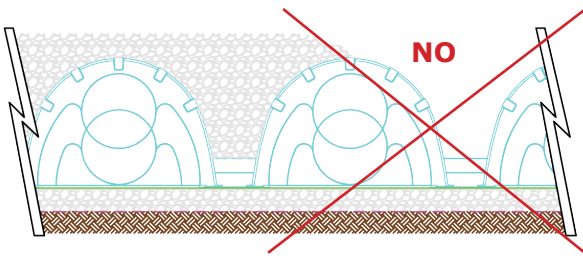


Do not allow equipment to drive over the chambers unless the minimum cover is in place. Use a warning tape (available from CULTEC) to restrict access.

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.

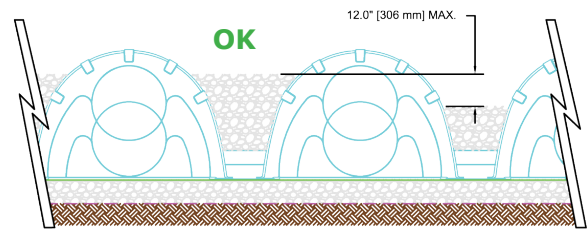
If a manifold system is designed on the back end of the chamber bed, follow manifold installation instructions as described previously.

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.



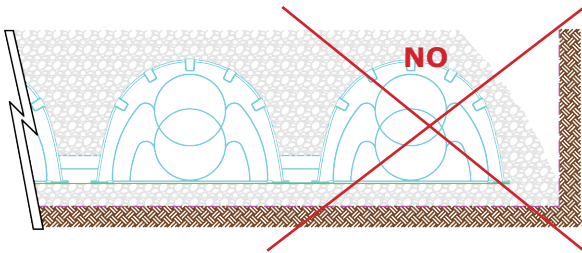
NOTE: CHAMBERS MUST BE BACKFILLED EVENLY.

UNEVEN BACKFILL - **INCORRECT INSTALLATION**



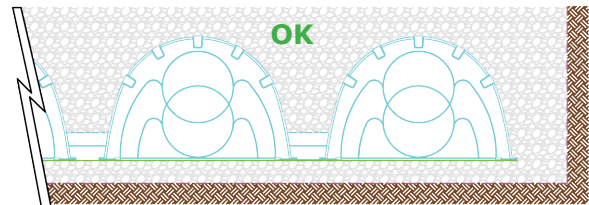
NOTE: STONE HEIGHT IN BETWEEN ROWS AND PERIMETER SHOULD NOT DIFFER BY MORE THAN 12" (306 mm).

EVEN BACKFILL - **CORRECT INSTALLATION**



NOTE: WHEN FILLING IN PERIMETER, STONE MUST BE FILLED IN EVENLY WITH CHAMBER ROWS.

PERIMETER NOT FULLY BACKFILLED  
**INCORRECT INSTALLATION**

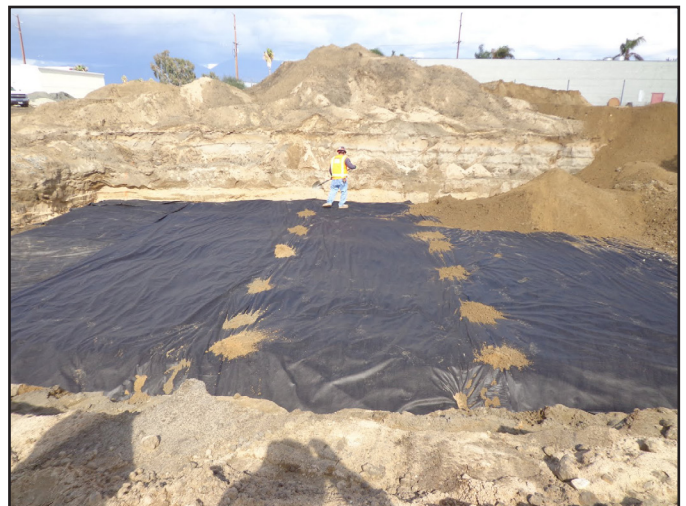


NOTE: PERIMETER MUST BE FULLY BACKFILLED WITH STONE AND EXTEND TO THE EXCAVATION WALL.

PERIMETER FULLY BACKFILLED  
**CORRECT INSTALLATION**

## 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

Material Location see Fig. 1, p. 18	Cumulative Cover Depth over Chambers (mm)	Maximum Allowable Wheel Loads		Maximum Allowable Track Loads		Maximum Allowable Compaction Loads	
		Max Axle Load for Trucks (kN)	Max Axle Load for Loaders (kN)	Track Shoe Width (mm)	Max Ground Pressure (kpa)	Maximum Centrifugal Force (kg)	Max Gross Vehicle Weight (kg)
<b>4 Final Fill Material</b>	900 Compacted	143	71	305	163.8	17,237	7,272
				458	112.5		
				610	88.5		
				762	72.7		
				915	62.7		
	762 Compacted	143	71	305	163.8	10,909	5,443
				458	112.5		
				610	88.5		
				762	72.7		
				915	62.7		
<b>3 Initial Fill Material</b>	600 Compacted	143	71	305	118.7	9,072	5,443
				458	84.7		
				610	68.5		
				762	57.9		
				915	51.2		
	600 Loose/Dumped	360HD: 143 902HD: 107	360HD: 71 902HD: 53	305	107.5	9,072	5,443
				458	77.8		
				610	63.4		
				762	54.3		
				915	48.3		
	450 Compacted	360HD: 143 902HD: 107	360HD: 71 902HD: 53	305	96.2	360HD: 9,072 902HD: NOT ALLOWED	360HD: 5,443 902HD: 2,268
				458	70.8		
				610	58.4		
				762	50.7		
				915	45.4		
	450 Loose/Dumped	360HD: 71 902HD: NOT ALLOWED	NOT ALLOWED	305	86.9	NOT ALLOWED	360HD: 5,443 902HD: NOT ALLOWED
				458	61.1		
				610	53.1		
762				46.2			
915				41.4			
<b>2 Embedment Stone</b>	300	NOT ALLOWED	NOT ALLOWED	305	73.7	NOT ALLOWED	NOT ALLOWED
				458	57.0		
				610	48.3		
				762	43.5		
				915	40.2		
	150	NOT ALLOWED	NOT ALLOWED	NOT ALLOWED FOR RECHARGER 902HD.		NOT ALLOWED	NOT ALLOWED
				150 MM FILL DEPTH TRACK LOAD DATA APPLIES TO RECHARGER 360HD ONLY			
				305	51.2		
				458	43.1		
				610	38.3		
			762	36.3			
			915	34.5			

**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



**Table 2: Placement Methods and Descriptions**

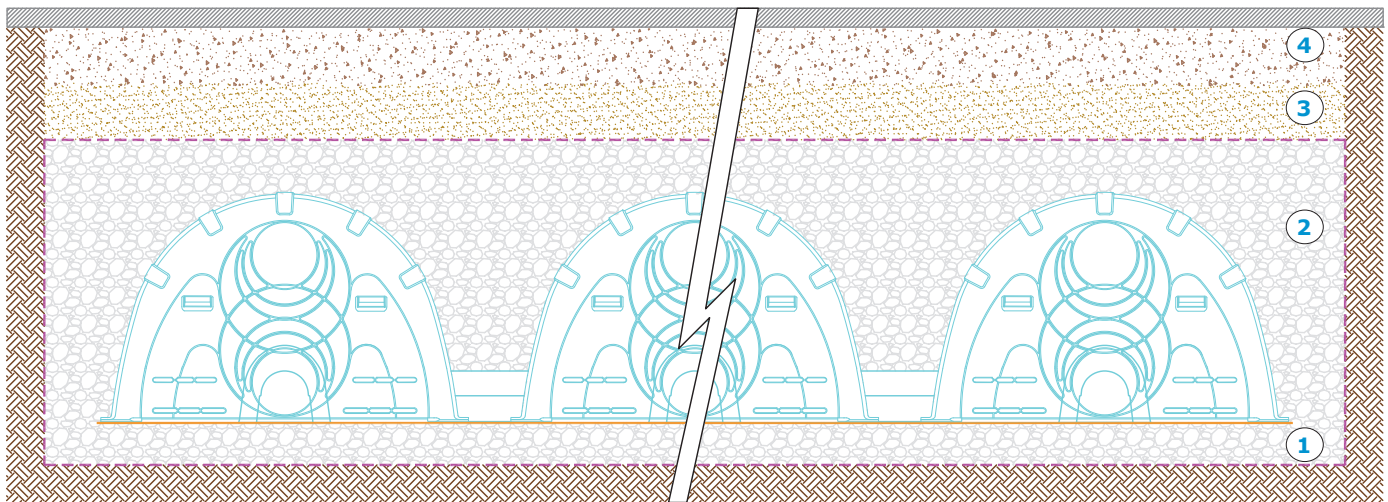
Material Location see Fig. 1, p.18		Placement Method/ Restrictions	Wheel Load Restrictions	Track Load Restrictions	Compaction Restrictions
4	Final Fill Material	<b>See Table 1, p. 16 for Maximum Construction Loads</b>			
		<p>A variety of placement methods may be used.</p> <p>All construction loads shall not exceed the maximum values listed in Table 1.</p>	<p>902HD: 914 mm minimum cover for dump truck and wheel loader travel</p> <p>360HD: 610 mm minimum cover for dump truck and wheel loader travel</p>	<p>Dozers shall push parallel to rows only.</p>	<p>902HD: Roller travel shall be parallel to rows only until 914 mm of cover is reached</p> <p>360HD: Roller travel shall be parallel to rows only until 610 mm of cover is reached</p>
3	Initial Fill Material	<p>Excavator positioned off of bed or on foundation stone.</p> <p>Small LGP track dozer, track skid steer loaders may be used.</p> <p>Must maintain 305 mm minimum fill below tracks at all times.</p>	<p>902HD: Asphalt can be dumped into paver machine when total cumulative fill depth over chambers reaches 610 mm</p> <p>360HD: Asphalt can be dumped into paver machine when total cumulative fill depth over chambers reaches 457 mm</p>	<p>Equipment direction of travel shall be parallel to rows at all times.</p> <p>Equipment shall not be permitted to turn direction over chambers.</p>	<p>Roller travel shall be parallel to rows only.</p> <p>902HD: Dynamic roller mode shall be used only when total cumulative fill depth over chambers reaches 610 mm</p> <p>360HD: Dynamic roller mode shall be used only when total cumulative fill depth over chambers reaches 457 mm</p>
		<p>No equipment shall be permitted to contact the chambers.</p> <p>Stone conveyor positioned off of bed or on foundation stone.</p> <p>Excavator positioned off of bed or on foundation stone.</p> <p>Stone column height differential between chamber rows shall never exceed 305 mm.</p> <p>Stone to be placed at the crown of the chamber.</p> <p>No stone shall be pushed over chambers.</p>	<p>No wheel loads allowed.</p> <p>No wheel loaders permitted to dump stone directly onto chambers.</p>	<p>No tracked equipment is allowed on chambers until 305 mm of embedment stone is in place.</p>	<p>No rollers allowed.</p>
1	Foundation	<p>A variety of placement methods may be used including but not limited to excavator placement, stone conveyor placement or dozer placement.</p> <p>Plate compact or roll to achieve a flat, unyielding surface.</p> <p>Contractor is responsible for any conditions or requirements relating to subgrade bearing capacity, dewatering or protection of subgrade infiltrative capacity.</p>			

**Table 3: Acceptable Fill Materials**

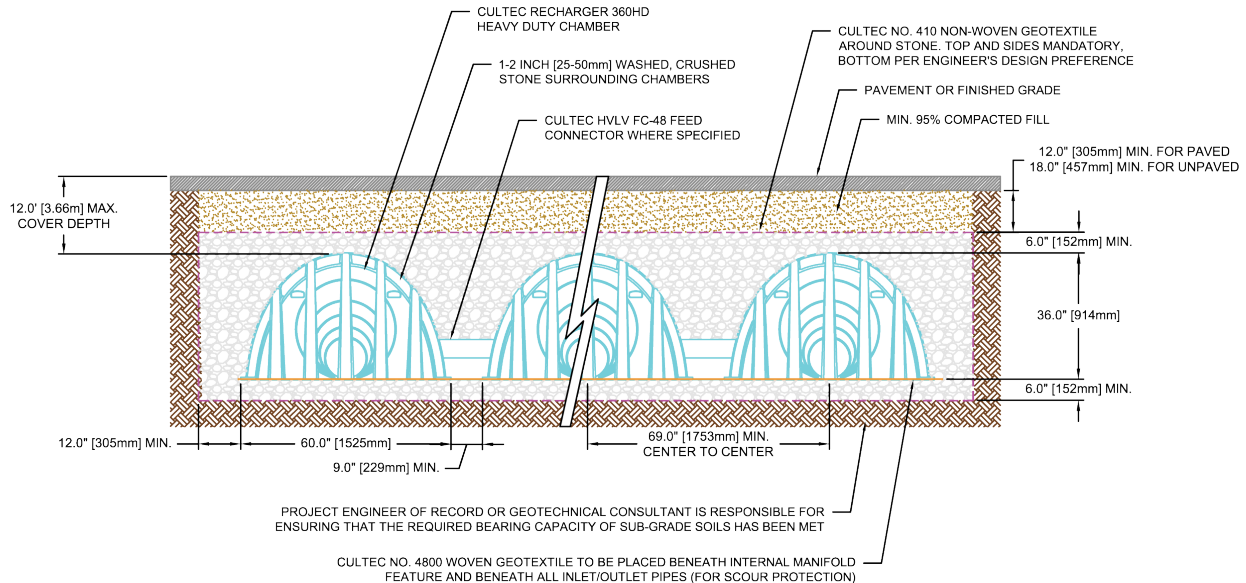
Material Location	Description	AASHTO M43 Classification	Compaction / Density Requirement
<b>4</b> Fill Material for Layer 4 starts from the top of Layer 3 to the bottom of pavement or unpaved finished grade above. Refer to cross section, page 19 for proper minimum fill requirements.	Any soil/rock materials,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

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.

**Fig. 1. Fill Material Locations - refer to Tables 1-3**



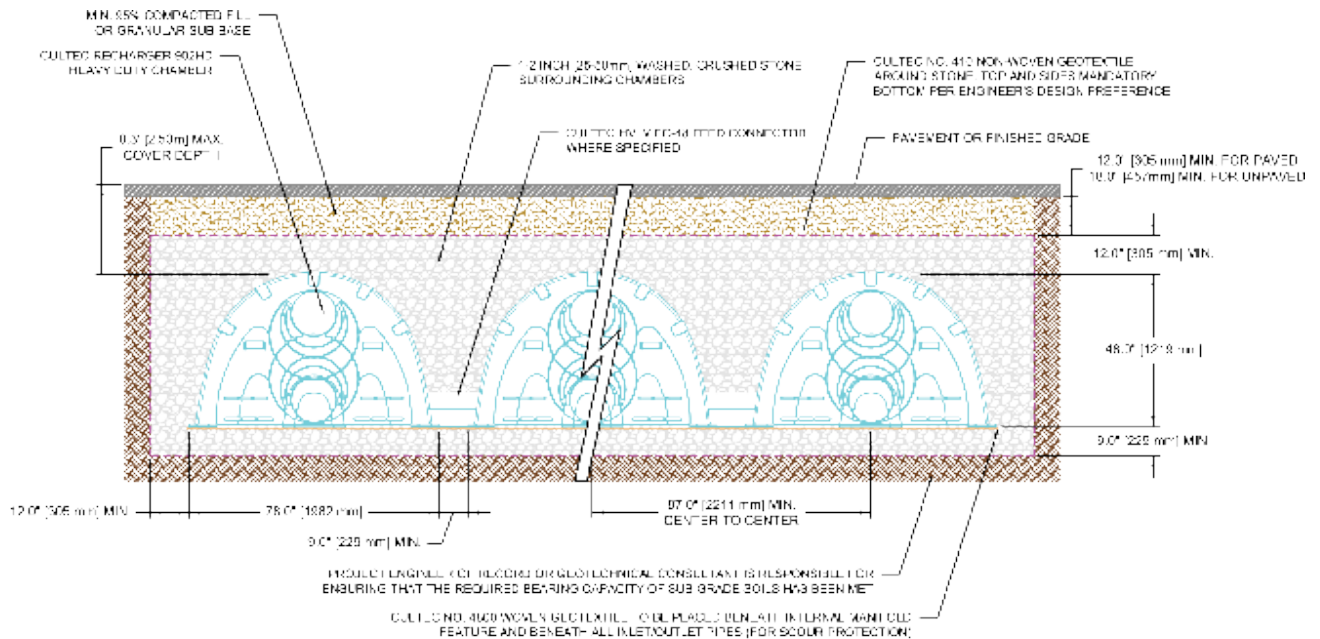
## Recharger 360HD Typical Cross Section for Traffic Applications



**NOTES:**

1. THE CHAMBERS SHALL BE DESIGNED AND TESTED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS." THE LOAD CONFIGURATION SHALL INCLUDE:
  - 1.a. INSTANTANEOUS AASHTO DESIGN TRUCK LIVE LOAD AT MINIMUM COVER
  - 1.b. MAXIMUM PERMANENT (50-YEAR) COVER LOAD
  - 1.c. 1-WEEK PARKED AASHTO DESIGN TRUCK LOAD
2. THE CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F3430-20 "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 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS SECTION 12.12, WHEN INSTALLED ACCORDING TO CULTEC'S RECOMMENDED INSTALLATION INSTRUCTIONS. THE STRUCTURAL DESIGN OF THE CHAMBERS SHALL INCLUDE THE FOLLOWING:
  - 3.a. THE CREEP MODULUS SHALL BE 50-YEAR AS SPECIFIED IN ASTM F3430
  - 3.b. THE MINIMUM SAFETY FACTOR FOR LIVE LOADS SHALL BE 1.75
  - 3.c. THE MINIMUM SAFETY FACTOR FOR DEAD LOADS SHALL BE 1.95

## Recharger 902HD Typical Cross Section for Traffic Applications



**NOTES:**

1. THE CHAMBERS SHALL BE DESIGNED AND TESTED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS." THE LOAD CONFIGURATION SHALL INCLUDE:
  - 1.a. INSTANTANEOUS AASHTO DESIGN TRUCK LIVE LOAD AT MINIMUM COVER
  - 1.b. MAXIMUM PERMANENT (50-YEAR) COVER LOAD
  - 1.c. 1-WEEK PARKED AASHTO DESIGN TRUCK LOAD
2. THE CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F3430-20 "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 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS SECTION 12.12, WHEN INSTALLED ACCORDING TO CULTEC'S RECOMMENDED INSTALLATION INSTRUCTIONS. THE STRUCTURAL DESIGN OF THE CHAMBERS SHALL INCLUDE THE FOLLOWING:
  - 3.a. THE CREEP MODULUS SHALL BE 50-YEAR AS SPECIFIED IN ASTM F3430
  - 3.b. THE MINIMUM SAFETY FACTOR FOR LIVE LOADS SHALL BE 1.75
  - 3.c. THE MINIMUM SAFETY FACTOR FOR DEAD LOADS SHALL BE 1.95

**Table 3: CULTEC No. 410™ Non-Woven Geotextile Specification Information**

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

\* 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**

Properties	ASTM Test Method	Test Results
Appearance		Black
Tensile Strength	D 4632	2,448 x 2,448 N
Elongation @ Break	D 4632	20 x 20%
Wide Width Tensile	D 4595	74 x 74 kN/m
Wide Width Tensile @ 2% Strain	D 4595	14 x 16 kN/m
Wide Width Tensile @ 5% Strain	D 4595	40 x 40 kN/m
Wide Width Tensile @10% Strain	D 4595	70 x 70 kN/m
CBR Puncture	D 6241	7,560 N
Trapezoidal Tear	D 4533	801 x 801 N
Apparent Opening Size	D 4751	0.425 mm
Permittivity	D 4491	0.15 Sec-1
Water Flow Rate	D 4491	470 l/min/sm
UV Resistance @ 500 Hours	D 4355	80%

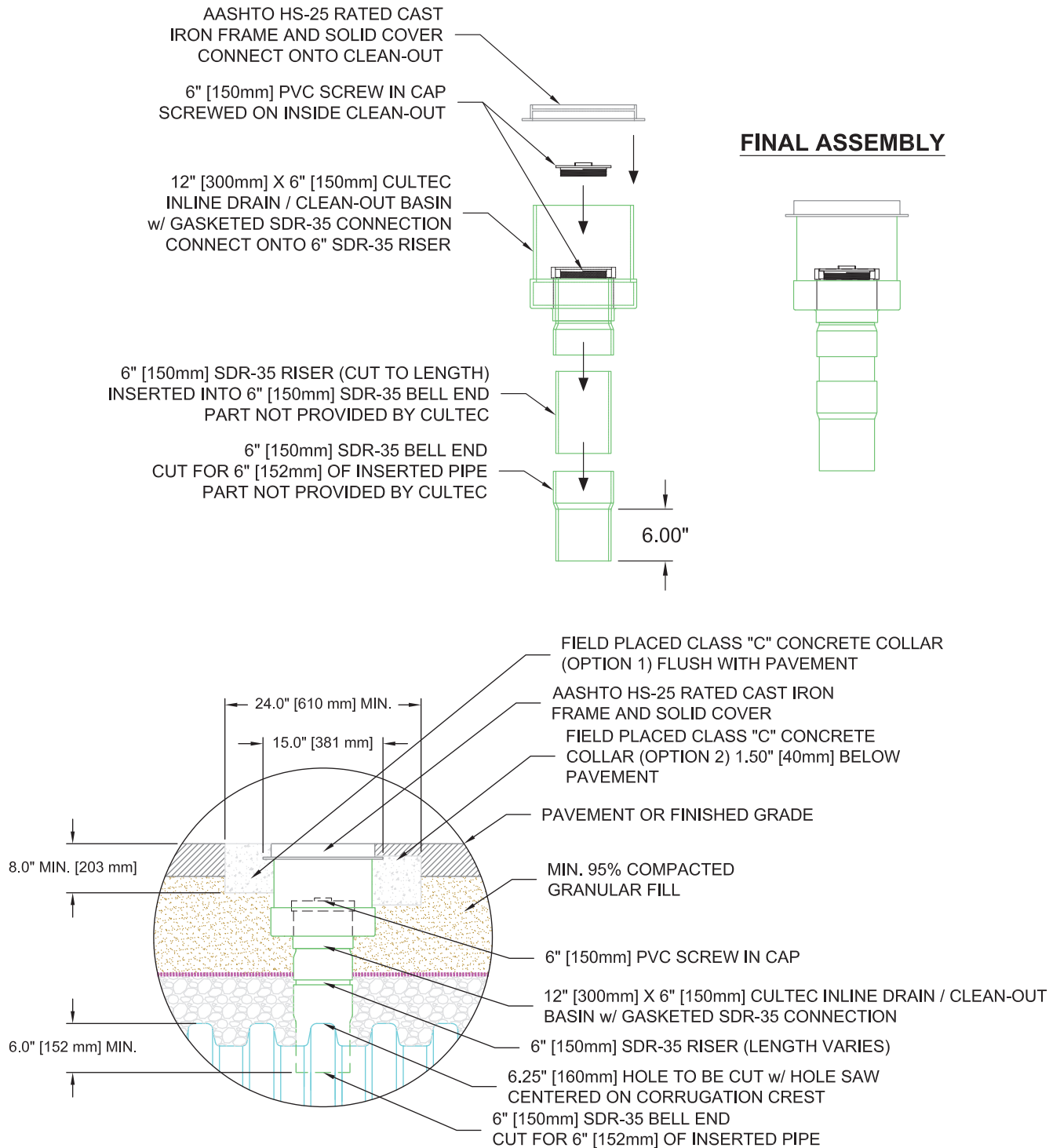
Substitutions must meet or exceed these minimums. To be used as scour protection and in conjunction with CULTEC Separator Row (if specified).

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

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

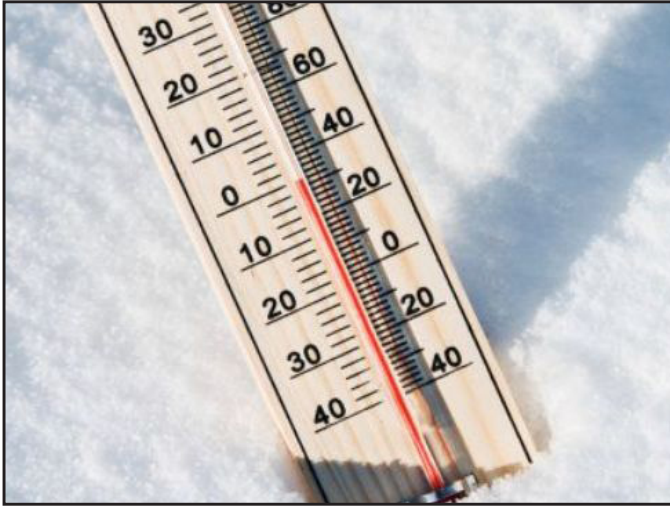
See Item 1 and Item 2 of Table 3 on page 18 for additional stone requirements.

## 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.

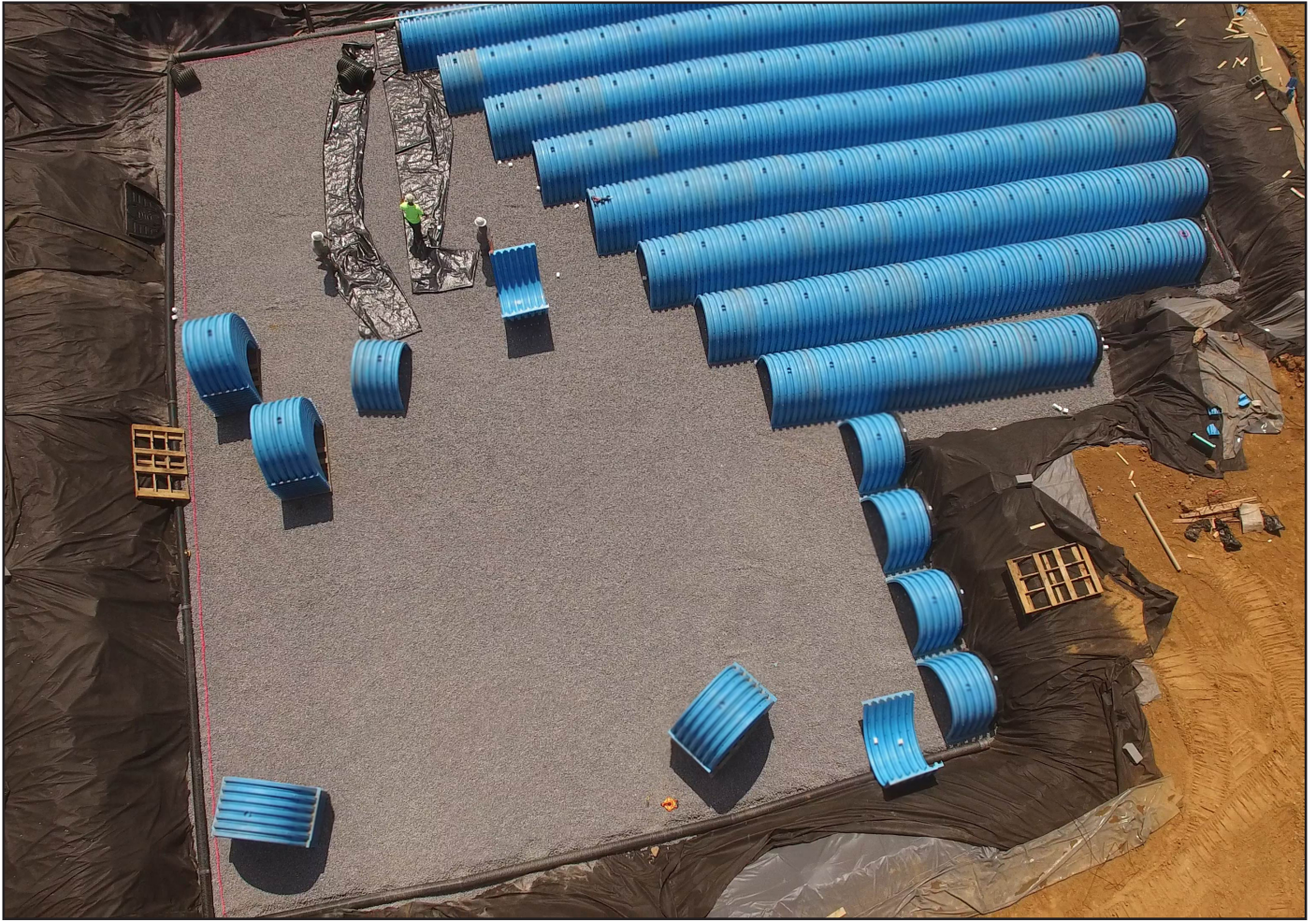
## Special Handling Instructions for Polypropylene, Chambers in Colder Temperatures



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.







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