Contactor® & Recharger®
Stormwater Chambers

Stormwater Management Design Guide

- Retention
- Detention
- Water Conveyance
- Water Quality

CULTEC®

The Founder of Plastic Chamber Technology

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U.S. Patents 6,129,482; 6,322,288; 6,854,925; 7,226,241; 7,806,627; 8,366,346; 8,425,148; and others; U.S. Designs D613819; D638,095; D668,318 and others; Canadian Patent 2,591,255 and others; Community Designs 1092191; 1745209; and others.

Contact Information:
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For technical support, please call (203)775-4416 ext. 203 or e-mail tech@cultec.com.

Visit www.cultec.com/downloads.html for Product Downloads and CAD details

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CULTEC has the solutions!

Residential Drainage

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Rainwater Harvesting

Product Information

In this section:

CULTEC Stormwater Systems 101 - The Basics

The CULTEC Contactor® and Recharger® chambers replace conventional stormwater retention/detention systems such as ponds, swales, pipe and stone trenches or beds, or concrete structures. The chambers may be used for drywells. Infiltration contact area is maximized by the fully open bottoms and perforated sidewalls.

Water is collected in a catch basin or other collective device followed by a CULTEC StormFilter® to be treated. The water is then directed into the Contactor® or Recharger® chambers and distributed via the side portal internal manifold and crushed stone embedment. Depending on the system application, the water infiltrates into the ground, or it is detained and released.

Typical CULTEC stormwater systems are designed by using the largest chamber that meets the site's depth constraint and system requirements. By choosing the largest available chamber that meets the system's parameters, you reduce the number of chambers and land area required. The client is able to maximize storage volume at the given workable elevations.

Applications

- Retention Systems
- Detention Systems
- Reclamation
- Drywells
- Conveyance
- Manage residential roofdrain run-off
- Contain swimming pool or water conditioner backwash

Features

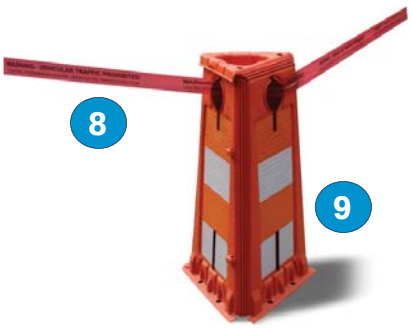
- Patented overlapping rib connection
- Unique in-line manifold available on most models
- Repeating support panel adds to strength of installation
- High infiltrative capability
- Lightweight
- Variety of sizes
- Chemically resistant
- Manufactured in ISO certified facilities

System Benefits

- Maximum use of land area
- Store larger volumes in a lower profile than comparably sized pipe
- Ability to recharge water on-site
- Single or multi-level systems
- Less heavy equipment required
- The units nest on pallets for convenient shipping and stockpiling of material
- Allows for greater infiltration into the ground
- Permits further development
- Reduces insurance liabilities and potential breeding grounds for infectious mosquitoes associated with open ponds
- Free design assistance available

Typical CULTEC Stormwater System Components

1. **CULTEC Stormwater Chamber** - used for retention, detention, reclamation
2. **CULTEC PAC® 150** - chamber with closed bottom used for water conveyance
3. **CULTEC HVLV™ Feed Connector** - internal manifold component
4. **CULTEC StormFilter® 330** - Water Quality Unit
5. **CULTEC No. 410™ Filter Fabric** - prevents soil intrusion into system
6. **CULTEC No. 20L™ Polyethylene Liner** - placed under CULTEC manifold components, prevents scouring of stone base
7. **Stone** - used for stone base, embedment stone and stone above chambers
8. **CULTEC Warning Tape** - marks off location of underground CULTEC Stormwater System during construction to prevent vehicular traffic
9. **Multicade™ Pylon** - marks location of underground CULTEC Stormwater System during construction phase



Stormwater Chambers

Contactor® Series

The Contactor® series consists of lower profile chambers and are typically used for installations with depth restrictions or when a larger infiltrative area is required. The 12.5-inch high Contactor® 100HD is the most popular model within this series for stormwater design.

Other models available within the Contactor® series are: Contactor® EZ-24, and Contactor® Field Drain C-4. Design information for these models is available upon request.

Shown: Contactor 100HD

Recharger® Series

CULTEC's Recharger® series includes higher profile, larger capacity chambers. Sizes range from 18.5" - 32" (470 - 813 mm) high. Chamber capacities vary from 2.65 - 8.68 cu. ft./ft. (0.246 - 1.13 cu. m/m).

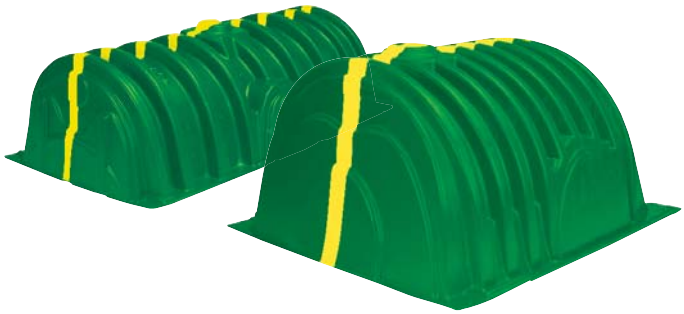
The most popular models within this series are the Recharger® 150XLHD, 280HD, 330XLHD, and V8HD.

Shown left to right: Recharger Model 150XLHD, 280HD, 330XLHD, and V8HD.

Landscaper Series®

The CULTEC Landscaper Series® are standard duty chambers with fully formed end walls. They are intended to be used as single unit installations (not interlocked together) to control stormwater or grey water for non-traffic applications.

Shown left to right: Model HVLV™ 180BT LS and Recharger V8R LS.



Water Conveyance

PAC® 150™ Series

The PAC® 150™ is a non-perforated chamber with a solid bottom plate that is used as a substitute for pipe for water conveyance. Side portals located on the unit allow for easy entry points for distribution along the system.

Internal Manifold Components

HVLV™ Feed Connectors

Feed connectors are inserted into the side portals of the CULTEC Chambers or used with HVLV™ Header sections to act as feed lines within the bed of stormwater detention/retention chambers.

Shown left to right: Model HVLV™ SFCx2 Feed Connector, HVLV™ FC-24 Feed Connector and HVLV™ F-110x4 Feed Connector.

See page 47 for more information on Manifold Options.

CULTEC No. 20L™ Polyethylene Liner

CULTEC No. 20L™ Polyethylene Liner is designed as an impervious underlayment to prevent scouring caused by water movement within the CULTEC chambers and feed connectors utilizing the CULTEC manifold feature.

Water Quality

CULTEC STORM*FILTER*® 330™

The CULTEC StormFilter® 330™ is designed to be a secondary in-line filter system that effectively removes many of the smaller particles not eliminated by conventional structures during the pretreatment process.

CULTEC StormFilter® 330™ is a pass-through filter system used in stormwater applications to filter rainwater run-off prior to entering the CULTEC Stormwater Management System. It has a solid bottom and sidewalls.

CULTEC STORM*FILTER*® T-80®

CULTEC StormFilter® T-80® is a cost-effective filtration unit used to remove leaves and debris from rainwater collected by catchbasins or gutters. StormFilter T-80 prevents leaves and debris from clogging outflow systems and piping. This compact unit is easy to install and simple for the homeowner or maintenance personnel to maintain. It is perfect for treating roof and driveway runoff for light commercial or residential applications.

System Accessories

CULTEC No. 410™ Filter Fabric

CULTEC No. 410™ Filter Fabric is a non-woven polypropylene filter fabric that may be used with CULTEC Contactor® and Recharger® stormwater installations. CULTEC Stormwater Systems are typically enveloped top, sides and bottom with filter fabric in order to provide a barrier that prevents soil intrusion into the stone.

Warning Tape

CULTEC recommends taping off the installation location during construction to prevent any equipment or vehicles from traversing over the chambers until the system has been completely installed, backfilled and paved (where applicable) according to the CULTEC's requirements.

Multicade™ Barricade

Multicade™ Barricade is available from CULTEC to assist in advising of restricted areas during the construction phase.

Collapsible Multicade™ pylons tri-fold to 3" thick or lay flat for easy storage and shipping. Unique triangular shape prevents rolling if knocked over. Join multiple units together to create larger Megacade. M.U.T.C.D. accepted. N.C.H.R.P. 350 approved. Multicade™ is manufactured by Advanced Construction Products, LLC.

Design Information

In this section:

How to Submit for Design Assistance

CULTEC's Technical Department can assist you with the design of your CULTEC Stormwater System by aiding with preliminary calculations, shop drawings and submittal packages. Our Technical Staff will propose an equivalently sized stormwater system utilizing CULTEC products for projects designed with pipe, ponds, concrete structures and competitor chamber products.

We provide system layouts, cross section details and other CAD details for you to pick and plot for use on your blueprints.

Please note that CULTEC is able to provide these services free of charge and is limited to proposals and evaluating that the criteria meets minimum CULTEC requirements. It is the client's responsibility to have all work reviewed and approved by a licensed professional engineer.

Follow these steps for requesting design assistance:

1. Call or e-mail CULTEC's Technical Department and notify them that you have a project that may have an application for our products.

   How to Contact our Technical Staff:

   Toll Free: 1-800-4-CULTEC, Ext. 203 - (1-800-428-5832, Ext. 203)
   Phone: 203-775-4416, Ext. 203
   E-mail: tech@cultec.com

2. Request a Project Information Sheet be emailed to you. (See sample on Page 15) Or, you can download the Project Information Sheet by visiting: www.cultec.com/stormwater_design.html

3. Fill out the Project Information Sheet as completely as possible and return via e-mail to the Technical Assistant you spoke with at CULTEC along with your site plan's CAD file.

   Requirements for E-Filing

   - Acceptable formats are AutoCAD® 2015 or earlier.
   - Please zip your file and title your subject line: "E-file for CULTEC Review – name of project"
   - Be sure to include the following information on the Project Information Sheet:
     - Storage required in ft^3 or m^3
     - Workable depth
     - Desired chamber model to design *(if available)*
     - Inlet/outlet locations and inverts
     - Redline out the area where you want the system plotted
     - Send file to: the e-mail address of the Technical Assistant you spoke to or e-mail to tech@cultec.com

4. Allow 2-3 business days to receive the following from CULTEC:
   - Proposed Bed Design - specifies CULTEC models, fabric and stone requirements.
   - Supporting Detail Sheets - shows three-view drawings, cross sections, and written specifications.
   - Preliminary Calculations - project specific calculations detailing bed layout, storage provided, material lists and incremental storage calculations.

5. We can also provide you with these documents upon request:
   - Submittal Packages to assist in the permitting process
   - Latest copy of our Installation Instructions

CULTEC Stormwater Project Information Sheet v. 2009-1

Project					
CULTEC Project #	FOR INTERNAL USE ONLY	Date			
Project name		Deadline Date			
		CULTEC Contact	FOR INTERNAL USE ONLY		
		CULTEC Technical Assistant	FOR INTERNAL USE ONLY		
Address		*Indicate available width and length or check off if the area is redlined on the drawing*	☐ Available area is indicated by red line on included drawing		
		Limiting Dimensions	W =		Choose Unit of Measure
City, State Zip			L =		Choose Unit of Measure
		Workable Depth	D =		Choose Unit of Measure
		Required Storage Volume	V =		Choose Unit of Measure

Engineer		Contractor	
Engineer Name		Contractor Name	
Company		Company	
Address		Address	
City, State Zip		City, State Zip	
Phone		Phone	
Fax		Fax	
Email		Email	

Owner		Submitted By: (if not owner, contractor or engineer)	
Owner Name		Submitted By Name	
Company		Company	
Address		Address	
City, State Zip		City, State Zip	
Phone		Phone	
Fax		Fax	
Email		Email	

Project Information					
Design Stage Status (check box)	☐ New Design	☐ Changeover	☐ Out for Bid		
If changeover, fill in	Current Specified Model	FILL IN MODEL		Quantity =	FILL IN QTY
Type of System (check box)	☐ Retention	☐ Detention			
CULTEC Chamber to Design (fill in)	☐ TBD	☐ Given	Choose one…		☐ Multi-Layer
Send directly to (check box)	☐ Engineer	☐ Contractor	☐ Other (specify)		FILL IN OTHER
List Specific Concerns or Design Instructions					

Technical Department Information - *For Internal Use Only*						
Total Storage	☐ Given	☐ Calculated	Calculated Storage =	FILL IN STORAGE	Choose Unit of Measure	
Type/Size of Manifold	☐ External HVLV	☐ Internal FC	☐ Pipe	Pipe Diameter:	FILL IN DIAMETER	
Sent Checklist	☐ Bed Layout	☐ Plot Plan	☐ Detail Sheets	☐ Calculations		

Download the Project Information Sheet by visiting: www.cultec.com/stormwater_design.html

CULTEC Contactor® & Recharger® Chamber Specification Information

	Contactor® 100HD	Recharger® 150XLHD	Recharger® 280HD	Recharger® 330XLHD	Recharger® V8HD
Length	8' 2.44 m	11' 3.35 m	8' 2.44 m	8.5' 2.59 m	8' 2.44 m
Installed Length	7.5' 2.29 m	10.25' 3.12 m	7' 2.13 m	7' 2.13 m	7.5' 2.29 m
Width	36" 914 mm	33" 838 mm	47" 1194 mm	52" 1321 mm	60" 1524 mm
Height	12.5" 318 mm	18.5" 470 mm	26.5" 673 mm	30.5" 775 mm	32" 813 mm
Chamber Storage Capacity	14.00 ft^3 0.40 m^3	27.16 ft^3 0.77 m^3	42.55 ft^3 1.21 m^3	52.21 ft^3 1.48 m^3	65.09 ft^3 1.84 m^3
Min. Storage Capacity Surrounded in Stone	28.81 ft^3 0.82 m^3	50.17 ft^3 1.42 m^3	64.46 ft^3 1.83 m^3	79.26 ft^3 2.24 m^3	99.56 ft^3 2.82 m^3
Compatible Feed Connector	HVLV SFCx2	HVLV FC-24	HVLV FC-24	HVLV FC-24	HVLV F-110x4 for V8SHD Starter and V8EHD End HVLV FC-24 for V8IHD Intermediate
For More Information See Pages	Pages 48-51	Pages 52-55	Pages 56-69	Pages 60-63	Pages 64-69

Based on installed length. Stone void is calculated at 40%. Includes 6" (152 mm) stone base, 6" (152 mm) stone above chamber crown and stone around units based on typical minimum center-to-center spacing.

The Recharger V8HD information is based on the V8IHD Intermediate. See pages 64-69 for information on the V8SHD Starter and V8EHD End units.

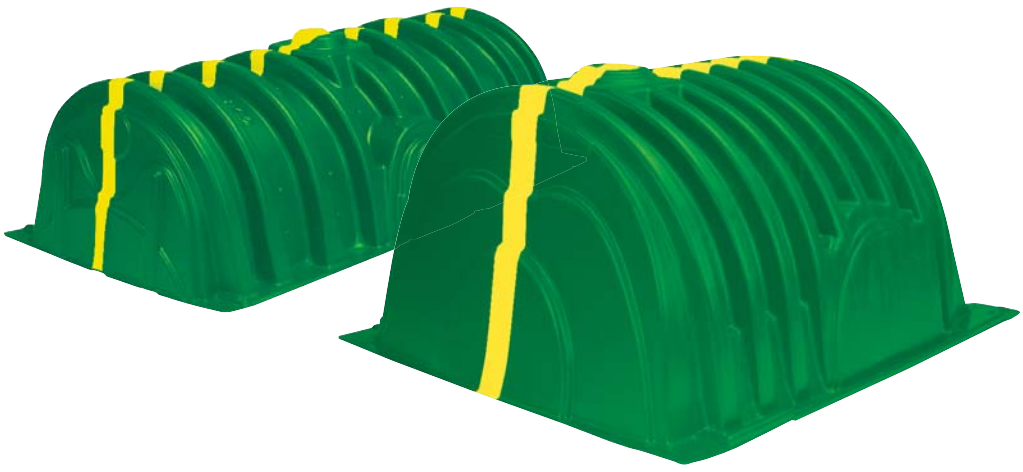
Other CULTEC models are available if the above chambers do not meet your design parameters. Please contact our Technical Department for more information.

Shown L->R- Contactor 100HD, Recharger 150XLHD, Recharger 280HD, Recharger 330XLHD, and Recharger V8HD.

CULTEC Landscaper Series® Chamber Specification Information

	HVLV® 180BT LS	Recharger® V8R LS
Length	5.63' 1.72 m	5.08' 1.55 m
Width	36" 914 mm	60" 1524 mm
Height	20.5" 521 mm	32" 813 mm
Chamber Storage Capacity	19.40 ft^3 0.55 m^3	44.12 ft^3 1.25 m^3
For More Information See Pages	Pages 70-73	Pages 74-77

For Non-Traffic Applications Only.
To be used as single stand-alone units. For larger systems, use the Contactor & Recharger chambers as seen on pg. 46.



Shown L->R- HVLV 180BT LS, Recharger V8R LS

CULTEC Internal Manifold Components Specification Information

	HVLV® SFCx2 Feed Connector	HVLV® FC-24 Feed Connector	HVLV® F-110x4 Feed Connector
Length	19.7" 500 mm	24.2" 614 mm	39" 991 mm
Installed Length (exposed)	4" min. 102 mm min.	Recharger 150XLHD: 6" (152 mm) min. Recharger 280HD: 5" (127 mm) min. Recharger 330XLHD: 6" (152 mm) min.	6" min. 152 mm min.
Width	12" 305 mm	16" 406 mm	27.5" 699 mm
Height	7.6" 194 mm	12" 305 mm	18" 457 mm
Chamber Storage Capacity	0.29 ft^3/ft 0.03 m^3/m	0.91 ft^3/ft 0.08 m^3/m	1.97 ft^3/ft 0.18 m^3/ft
Compatible With	Contactor 100HD	Recharger models 150XLHD, 280HD, 330XLHD and Recharger V8IHD Intermediate	Recharger V8RHD Stand Alone, V8SHD Starter and V8EHD End units
Pipe Comparison	Greater flow capacity than 6" (150 mm) pipe	Greater flow capacity than 12" (300 mm) pipe	Greater flow capacity than 18" (450 mm) pipe
For More Information See Pages	Pages 78-79	Pages 80-81	Pages 82-83

Shown L->R- HVLV SFCx2, HVLV FC-24, and HVLV F-110x4 Feed Connector

CULTEC Water Quality Unit Specification Information

	StormFilter® T-80	StormFilter® 330
Length	42" 1067 mm	8' 2.44 m
Width	31" 787 mm	55" 1397 mm
Height	26.4" 670 mm	36" 914 mm
Capacity	90 gal. 340.7 l	418.5 gal. 1584 l
Filtration Capability	301.4 gpm 1141 l/min	708.4 gpm 2682 l/min
Apparent Opening Size of Filter	70 US Std. Sieve 0.212 mm	70 US Std. Sieve 0.212 mm
For More Information See Pages	Pages 92-95	Pages 88-91

The StormFilter T-80 is for non-traffic application use only.

Shown L->R- StormFilter T-80, StormFilter 330

Minimum Fill Requirements

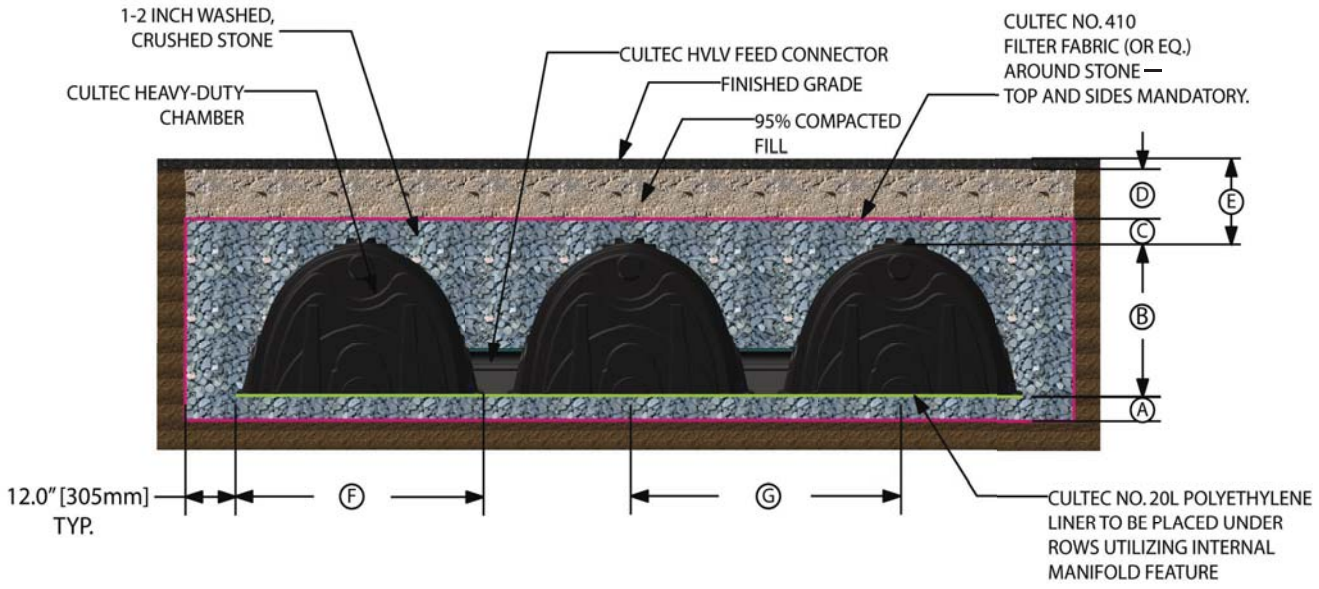
These requirements are for traffic applications only. If these models and design parameters do not meet your needs, please call CULTEC's Technical Department at 1-800-4-CULTEC, Ext. 203 (1-800-428-5832, Ext. 203) for further information and assistance.

Refer to CULTEC's most current installation instructions for further details including but not limited to acceptable fill materials and vehicle loads.

Table 1

	See Fig. 1	Contactor® 100HD	Recharger® 150XLHD	Recharger® 280HD	Recharger® 330XLHD	Recharger® V8HD
Typical Center-to-Center Spacing	G	3.33′ 1.02 m	3.25′ 0.99 m	4.33′ 1.32 m	4.83′ 1.47 m	5.5′ 1.68 m
Chamber width	F	36″ 914 mm	33″ 838 mm	47″ 1194 mm	52″ 1321 mm	60″ 1524 mm
Max. depth of cover allowed above crown of chamber	E	12′ 3.66 m	12′ 3.66 m	12′ 3.66 m	12′ 3.66 m	8′ 2.44 m
Min. depth required of 95% Compacted Fill for Paved Traffic Application	D	8″ 203 mm	8″ 203 mm	8″ 203 mm	10″ 254 mm	12″ 305 mm
Min. depth required of 95% Compacted Fill for Unpaved Traffic Application	D	10" 254 mm	10" 254 mm	10" 254 mm	12" 254 mm	14" 356 mm
Min. depth of stone required above units for traffic applications	C	6″ 152 mm	6″ 152 mm	6″ 152 mm	6″ 152 mm	6″ 152 mm
Chamber height	B	12.5″ 318 mm	18.5″ 470 mm	26.5″ 673 mm	30.5″ 775 mm	32″ 813 mm
Min. depth of stone base	A	6″ 152 mm	6″ 152 mm	6″ 152 mm	6″ 152 mm	6″ 152 mm

Fig. 1



System Sizing Calculations

For more detailed calculations you may use our MS-Excel based CULTEC Stormwater Design Calculator at **www.cultec.com** or contact our Technical Department for free design assistance.

We are also modeled in HydroCAD®, Autodesk® Storm and Sanitary Analysis, Bentley Systems' PondPack® V8*i* and Streamline Technologies' ICPR® modeling software.

Separate calculations will be listed for the Recharger® V8HD series because of its unique chamber length characteristics. For Recharger V8HD System Sizing Calculations, refer to Pages 27-31.

Other models are available, ask our Technical Department if you need further information.

Bed Area and Quantity of Stone Required will be increased by the required min. 1 foot (305 mm) stone border and installed chamber length adjustments - *not calculated below.*

Volume of Excavation will be increased by the required min. 1 foot (305 mm) stone border and final backfill requirements - *not included below.*

Determine the Required Storage Volume (V_s)

Required Storage Volume (Vs) = Given

Determine the Number of Chambers Required (C)*

Number of Chambers Required (C) C = Required Storage Volume ÷ Chamber and Stone Base Storage per Unit

$C = V_s \div D_u$

Table 2

	Bare Chamber Storage	Chamber and Stone Storage per Unit (D_u) 6" 152 mm	12" 305 mm	18" 457 mm
Contactor® 100HD	14 ft³	28.81 ft³	33.81 ft³	38.81 ft³
	0.4 m³	0.82 m³	0.96 m³	1.10 m³
Recharger® 150XLHD	27.16 ft³	50.17 ft³	56.83 ft³	63.49 ft³
	0.77 m³	1.42 m³	1.61 m³	1.80 m³
Recharger® 280HD	42.55 ft³	64.46 ft³	70.53 ft³	76.59 ft³
	1.21 m³	1.83 m³	2.00 m³	2.17 m³
Recharger® 330XLHD	52.21 ft³	79.26 ft³	86.03 ft³	92.79 ft³
	1.48 m³	2.24 m³	2.44 m³	2.63 m³

*This is an approximation only. Actual number of chambers required may be reduced when stone border storage and chamber length adjustments per row are calculated.

The Chamber and Stone Storages listed in Table 2 are based on the installed chamber length, stone base as listed in the table, 6" (152 mm) stone above the unit and typical center-to-center spacing. Assumes 40% stone void.

System Sizing Calculations - *continued*

Determine the Required Bed Area (A)

Bed Area (A) $A = \text{Number of Chambers} \times \text{Surface Area Required per Unit}$

$A = C \times A_c$

Table 3

	Typical Center-to-Center Spacing	Surface Area Required per Unit (A_c)
Contactor® 100HD	3.33′	25 ft²
	1.02 m	2.32 m²
Recharger® 150XLHD	3.25′	33.31 ft²
	0.99 m	3.09 m²
Recharger® 280HD	4.33′	30.33 ft²
	1.32 m	2.82 m²
Recharger® 330XLHD	4.83′	33.83 ft²
	1.47 m	3.14 m²

Surface area per unit is based on the installed chamber length and typical center-to-center spacing. Chamber length adjustments per row and stone border requirements are not calculated.

Determine the Stone Required (V_{st})

Quantity of Stone Required (V_{st}) $V_{st} = \text{Number of Chambers Required} \times \text{Stone Required per Chamber}$

$V_{st} = C \times S_c$

Table 4

	Stone Required per Chamber Based on Stone Foundation Depth (S_c)		
	6”	12”	18”
	152 mm	305 mm	457 mm
Contactor® 100HD	1.37 yd³	1.84 yd³	2.30 yd³
	1.05 m³	1.40 m³	1.76 m³
Recharger® 150XLHD	2.13 yd³	2.75 yd³	3.36 yd³
	1.63 m³	2.10 m³	2.57 m³
Recharger® 280HD	2.03 yd³	2.59 yd³	3.15 yd³
	1.55 m³	1.98 m³	2.41 m³
Recharger® 330XLHD	2.50 yd³	3.13 yd³	3.76 yd³
	1.91 m³	2.39 m³	2.87 m³

Based on installed chamber length. Assumes stone base as listed in Table 4, 6” (152 mm) stone above the units and typical center-to-center spacing for models listed above. Chamber length adjustments per row and stone border requirements are not calculated.

System Sizing Calculations - *continued*

Table 5

	Min. Effective Depth Determined by Stone Base (D_c)		
	6” 152 mm	12” 305 mm	18” 457 mm
Contactor® 100HD	2.04′ 0.62 m	2.54′ 0.77 m	3.04′ 0.93 m
Recharger® 150XLHD	2.54′ 0.77 m	3.04′ 0.93 m	3.54′ 1.08 m
Recharger® 280HD	3.21′ 0.98 m	3.71′ 1.13 m	4.21′ 1.28 m
Recharger® 330XLHD	3.54′ 1.08 m	4.04′ 1.23 m	4.54′ 1.38 m

Based on stone base as listed, chamber height, and minimum fill requirements for paved, traffic application. The “Minimum Effective Depth” does not take into consideration any additional fill requirements or final grade materials above the 6” (152 mm) of stone above the units.

Once you have determined your bed layout (number of rows wide x number of chambers per row), you can then proceed to these calculations.

How to Calculate Bed Length (L_b)

Bed Length (L_b)

L_b = [(# of Chambers per Row x Installed Chamber Length) + Chamber Length Adjustment per Row] + (2 x Stone Border Width)

L_b = [(# of Chambers per Row x L_{ul}) + L_a] + (2 x 1′ (0.3 m))

Table 6

	Installed Chamber Length (L_{ul})	Chamber Length Adjustment per Row (L_a)
Contactor® 100HD	7.5′ 2.29 m	0.5′ 0.15 m
Recharger® 150XLHD	10.25′ 3.12 m	0.75′ 0.23 m
Recharger® 280HD	7′ 2.13 m	1′ 0.3 m
Recharger® 330XLHD	7′ 2.13 m	1.5′ 0.45 m

A typical stone border is 1' (0.3 m) wide around the perimeter of the chamber bed.

System Sizing Calculations - *continued*

How to Calculate Bed Width (W_b)

Bed Width (W_b) =

W_b *U.S.* = (# of Chambers Wide x Min. Center-to-Center Spacing) + [2 ((12" - Min. Chamber Spacing Between Rows)/12)]

W_b *U.S.* = (# of Chambers Wide x D_{uw}) + [2((12" - C_{sp})/12)]

W_b *Metric* = (# of Chambers Wide x Min. Center-to-Center Spacing) + [2 ((305 mm - Min. Chamber Spacing Between Rows)/1000)]

W_b *Metric* = (# of Chambers Wide x D_{uw}) + [2 ((305 mm - C_{sp})/1000)]

Table 7

	Min. Center-to-Center Spacing (D_{uw})	Min. Chamber Spacing Between Rows (C_{sp})
Contactor® 100HD	3.33′ 1.02 m	4″ 102 mm
Recharger® 150XLHD	3.25′ 0.99 m	6″ 152 mm
Recharger® 280HD	4.33′ 1.32 m	5″ 127 mm
Recharger® 330XLHD	4.83′ 1.47 m	6″ 152 mm

Additional Calculations

How to Calculate Actual Bed Area (A_a)

Actual Bed Area (A_a)

A_a = Bed Length x Bed Width

$A_a = L_b \times W_b$

How to Calculate Filter Fabric Required (F_b)

Filter Fabric Required (F_b) =

F_b = [((Bed Width x Min. Effective Depth) x 2 End walls) + ((Bed Length x Min. Effective Depth) x 2 Sidewalls) + (Actual Bed Area x 2 layers)] + 15% for waste

$F_b = [((W_b \times D_c) \times 2) + ((L_b \times D_c) \times 2) + (A_a \times 2)] + 15\%$

This calculates filter fabric for top, sides and bottom of system. Filter Fabric is mandatory for the top and sides of the stormwater system; it is recommended for the bottom of the system.

How to Calculate CULTEC No. 20L Polyethylene Liner Required (P)

CULTEC No. 20L™ Polyethylene Liner Required (P) =

P *For internal manifold on one end only* = Bed Width

P *For internal manifold on one end only* = W_b

P *For internal manifold on two ends* = 2 x Bed Width

P *For internal manifold on two ends* = 2 x W_b

This is based on a 6' (1.83 m) wide roll. Calculates liner runs at 6' (1.83 m) wide and spanning the width of the bed.

Additional Calculations - *continued*

How to Calculate HVLV Feed Connectors Required (H)

Number of Rows Wide = R

HVLV™ Feed Connectors Required (H) =

H *For internal manifold on one end only* = Number of Rows Wide - 1

H *For internal manifold on one end only* = R - 1

H *For internal manifold on two ends* = (2 x Number of Rows Wide) - 2

H *For internal manifold on two ends* = (2 x R) - 2

CULTEC Stormwater System Worksheet

Project: Location: Calculated By:

CULTEC Chamber model proposed for this design *(check one)*: Date:

- □ Contactor 100HD
- □ Recharger 150XLHD
- □ Recharger 280HD
- □ Recharger 330XLHD

System Requirements	Calculation	Circle Unit of Measure
Required Storage Volume (V_s)	= Given = _____	ft^3 m^3
Number of chambers required (C)	= $V_s \div D_u$ (See Table 2, pg. 21) = _____V_s ÷ _____D_u	pieces
Required Bed Area (A)	= C x A_c (See Table 3, pg. 22) = _____C x _____A_c	ft^2 m^2
Stone Required (V_{st})	= C x S_c (See Table 4, pg. 22) = _____C x _____S_c	yd^3 m^3

These are to be used as quick calculations only. Stone borders and chamber length adjustments are not calculated and will affect each system requirement.

For more detailed calculations you may use our MS Excel-based CULTEC Stormwater Design Calculator at **www.cultec.com** or contact our Technical Department at 1-800-428-5832 for free design assistance.

Cost Estimate	Quantity	Cost	Total
Chambers (C)	_____ x	$_____/Chamber =	= $_____
Stone (V_{st})	_____ x	$_____ / yd^3 m^3	= $_____
		Subtotal	= $_____
Cost per ft^3 (m^3)	= Subtotal ÷ Required Storage Volume (V_s)		= $_____

Some additional items required but not included are: manifold, polyethylene liner, and filter fabric.

System Sizing Calculations for Recharger® V8HD

Determine the Required Storage Volume (V_s)

Required Storage Volume (V_s) = Given

Determine the Desired Bed Width (W_{bd})

Desired Bed Width (W_{bd}) = Given

Determine the System's Number of Rows (R)

Number of Rows Wide (R)

R = ROUND DOWN (Desired Bed Width - (2 x Width of Additional Stone on Sidewalls of Stone Border)) ÷ Typical Center-to-Center Spacing

$R = \text{ROUND DOWN } (W_{bd} - (2 \times W_{ab})) \div C_{sp}$

Table 8

	Typical Center-to-Center Spacing (C_{sp})	Width of Additional Stone on Sidewalls of Stone Border - Outside of Design Unit (W_{ab})
Recharger® V8HD	5.5′ 1.68 m	0.75' 0.23 m

Determine the Number of Starter and End Chambers Required (C_{se})

Number of Starter Units Required (S)

S = Number of Rows Wide

S = R

Number of End Units Required (E)

E = Number of Rows Wide

E = R

Total Number of Starter and End Units Required (C_{se})

C_{se} = Number of Starter Units Required + Number of End Units Required

$C_{se} = S + E$

Determine the Number of Intermediate Chambers Required (I)

Storage Provided by Starter and End Units (V_{se})

V_{se} = Total Number of Starter and End Units Required x Chamber and Stone Base Storage per Starter or End

$V_{se} = C_{se} \times D_u$

Storage Required by Intermediate Units (V_i)

V_i = Required Storage Volume - Storage Provided by Starter and End Units

$V_i = V_s - V_{se}$

System Sizing Calculations for Recharger® V8HD - *continued*

Number of Intermediate Chambers Required (I)

I = Storage Required by Intermediate Units ÷ Chamber and Stone Base Storage per Intermediate

$= V_i \div D_u$

Table 9

	Bare Chamber Storage	Chamber and Stone Base Storage (D_u) 6” 152 mm	12” 305 mm	18” 457 mm
Recharger® V8SHD Starter or V8EHD End	39.78 ft^3	60.84 ft^3	65.88 ft^3	70.92 ft^3
	1.13 m^3	1.72 m^3	1.87 m^3	2.01 m^3
Recharger® V8IHD Intermediate	65.09 ft^3	99.56 ft^3	107.81 ft^3	116.06 ft^3
	1.84 m^3	2.82 m^3	3.05 m^3	3.29 m^3

This is an approximation only. Actual number of chambers required may be reduced when stone border storage and chamber length adjustments per row are calculated.

The Chamber and Stone Base Storages above are based on the installed chamber length, stone base as listed in Table 9, 6” (152 mm) stone above the unit and typical center-to-center spacing. Assumes 40% stone void.

Determine the Required Bed Area (A)

Bed Area (A)

A = (Total Number of Starter and End Chambers x Surface Area Required per Unit) + (Number of Intermediate Units Required x Surface Area per Unit)

$A = (C_{se} \times A_c) + (I \times A_c)$

Table 10

	Typical Center-to-Center Spacing	Surface Area (A_c)
Recharger® V8SHD Starter or V8EHD End	5.5’	25.21 ft^2
	1.68 m	2.34 m^2
Recharger® V8IHD Intermediate	5.5'	41.25 ft^2
	1.68 m	3.83 m^2

Surface area per unit is based on the installed chamber length and typical center-to-center spacing. Chamber length adjustments per row are not calculated.

Determine the Stone Required (V_{st})

Quantity of Stone Required (V_{st})

V_{st} =(Total Number of Starter and End Chambers Required x Stone Required per Chamber) + (Number of Intermediate Units Required x Stone Required per Chamber)

$V_{st} = (C_{se} \times S_c) + (I \times S_c)$

System Sizing Calculations for Recharger® V8HD - *continued*

Table 11

	Stone Required per Chamber Based on Stone Foundation Depth (S_c)		
	6” 152 mm	12” 305 mm	18” 457 mm
Recharger® V8SHD Starter or V8EHD End	1.95 yd^3 1.49 m^3	2.42 yd^3 1.85 m^3	2.88 yd^3 2.20 m^3
Recharger® V8IHD Intermediate	3.19 yd^3 2.44 m^3	3.95 yd^3 3.02 m^3	4.72 yd^3 3.61 m^3

Based on installed chamber length. Assumes stone base as listed in Table 11, 6” (152 mm) stone above the units and typical center-to-center spacing. Stone border requirements are not calculated above.

Table 12

	Min. Effective Depth Determined by Stone Base (D_c)		
	6” 152 mm	12” 305 mm	18” 457 mm
Recharger® V8HD	3.67’ 1.12 m	4.17’ 1.27 m	4.67’ 1.42 m

Based on stone base as listed, chamber height, and minimum fill requirements for paved, traffic application. The “Minimum Effective Depth” does not take into consideration any additional fill requirements or final grade materials above the 6” (152 mm) of stone above the units.

Additional Calculations for Recharger® V8HD

Once you have determined your bed layout (number of rows wide x number of chambers per row), you can then proceed to these calculations.

How to Calculate Bed Length (L_b)

Number of Intermediate Units per Row (I_r)

I_r = Number of Intermediate Units Required ÷ Number of Rows

$I_r = I \div R$

Bed Length (L_b)

L_b = (2 x Installed Chamber Length of Starter Unit) + (# of Intermediate Chambers per Row x Installed Chamber Length of Intermediate Unit) + (2 x Stone Border Width)

$L_b = (2 \times L_{ul}) + (I_r \times L_{ul}) + (2 \times 1' (0.3\ m))$

Table 13

	Installed Chamber Length (L_{ul})
Recharger® V8SHD Starter or V8EHD End	4.58′ 1.40 m
Recharger® V8IHD Intermediate	7.5' 2.29 m

A typical stone border is 1' (0.3 m) wide around the perimeter of the chamber bed.

How to Calculate Bed Width (W_b)

Bed Width (W_b)

W_b *U.S.* = (# of Rows Wide x Min. Center-to-Center Spacing) + [2 ((12″ - Min. Chamber Spacing Between Rows)/12)]

W_b *U.S.* = $(R \times D_{uw}) + [2((12'' - C_{sp})/12)]$

W_b *Metric* = (# of Rows Wide x Min. Center-to-Center Spacing) + [(2 x 305 mm) - Min. Chamber Spacing Between Rows)/1000]

W_b *Metric* = $(\#\ of\ Chambers\ Wide \times D_{uw}) + [(2 \times 305\ mm) - C_{sp})/1000]$

Table 14

	Min. Center-to-Center Spacing (D_{uw})	Min. Chamber Spacing Between Rows (C_{sp})
Recharger® V8HD	5.5′ 1.68 m	6″ 152 mm

How to Calculate Actual Bed Area (A_a)

Actual Bed Area (A_a)

A_a = Bed Length x Bed Width

$A_a = L_b \times W_b$

Additional Calculations for Recharger® V8HD - *continued*

How to Calculate Filter Fabric Required (F_b)

Filter Fabric Required (F_b)

F_b = [((Bed Width x Min. Effective Depth) x 2 End walls) + ((Bed Length x Min. Effective Depth) x 2 Sidewalls) + (Actual Bed Area x 2 layers)] + 15% for waste

$F_b = [((W_b \times D_c) \times 2) + ((L_b \times D_c) \times 2) + (A_a \times 2)] + 15\%$

This calculates filter fabric for top, sides and bottom of system. Filter Fabric is mandatory for the top and sides of the storm-water system; it is recommended for the bottom of the system.

How to Calculate CULTEC No. 20L Polyethylene Liner Required (P)

CULTEC No. 20L™ Polyethylene Liner Required (P)

P *For internal manifold on one end only* = Bed Width

P *For internal manifold on one end only* = W_b

P *For internal manifold on two ends* = 2 x Bed Width

P *For internal manifold on two ends* = 2 x W_b

This is based on a 6' (1.83 m) wide roll. Calculates liner runs at 6' (1.83 m) wide and spanning the width of the bed.

How to Calculate HVLV Feed Connectors Required (H)

HVLV™ Feed Connectors Required (H)

H *For internal manifold on one end only* = Number of Rows Wide - 1

H *For internal manifold on one end only* = R-1

H *For internal manifold on two ends* = (2 x Number of Rows Wide) - 2

H *For internal manifold on two ends* = (2 x R) - 2

CULTEC Recharger® V8HD Stormwater System Worksheet

Project: Location: Calculated By:

CULTEC Chamber model proposed for this design: Recharger V8HD Date:

System Requirements	Calculation	Circle Unit of Measure
Required Storage Volume (V_s)	= Given	
	= _____	ft^3 m^3
Desired Bed Width (W_{bd})	= Given	
	= _____	ft m
Number of Rows Wide (R)	= ROUND DOWN (W_{bd} - (2 x W_{ab})) ÷ C_{sp} (See Table 8, pg. 27)	
	= ROUND DOWN (_____W_{bd} - (2 x _____W_{ab})) ÷ _____C_{sp}	Rows
Number of Starter and End Chambers Required (C_{se})	= 2 x R	
	= 2 x _____R	pieces
Storage Provided by Starter and End Units (V_{se})	= C_{se} x D_u (See Table 9, pg. 28)	
	= _____C_{se} x _____D_u	ft^2 m^2
Storage Required by Intermediate Units (V_i)	= V_s - V_{se}	
	= _____V_s - _____V_{se}	ft^2 m^2
Number of Intermediate Chambers Required (I)	= V_i ÷ D_u (See Table 9, pg. 28)	
	= _____V_i ÷ _____D_u	pieces
Required Bed Area (A)	= (C_{se} x A_c) + (I x A_c) (See Table 10, pg. 28)	
	= (_____C_{se} x _____A_c) + (_____I x _____A_c)	ft^2 m^2
Stone Required (V_{st})	= (C_{se} x S_c) + (I x S_c) (See Table 11, pg. 29)	
	= (_____C_{se} x _____S_c) + (_____I x _____S_c)	yd^3 m^3

These are to be used as quick calculations only. Stone borders and chamber length adjustments are not calculated and will affect each system requirement. For more detailed calculations you may use our MS-Excel based CULTEC Stormwater Design Calculator at **www.cultec.com** or contact our Technical Department at 1-800-428-5832 for free design assistance.

Cost Estimate	Quantity	Cost	Total
Starter & End Chambers (C_{se})	_____ x	$_____/Chamber =	= $_____
Intermediate Chambers (I)	_____ x	$_____/Chamber =	= $_____
Stone (V_{st})	_____ x	$_____ / (circle one) yd^3 m^3	= $_____
		Subtotal	= $_____
Cost per ft^3 (m^3)	= Subtotal ÷ Required Storage Volume (V_s)		= $_____

Some additional items required but not included are: manifold, polyethylene liner, and filter fabric.

CULTEC StormGenie® Automated Drawing Program

For Use with CULTEC Stormwater Design Calculator and HydroCAD® Chamber Wizard

What is StormGenie?

The CULTEC StormGenie® is an AutoCAD® plug-in for designing CULTEC Stormwater Systems. The StormGenie generates project-specific AutoCAD drawings for CULTEC's Contactor® and Recharger® Stormwater Systems.

The CULTEC StormGenie may be used in two ways. You can either design the system using the CULTEC Stormwater Design Calculator or you may use the HydroCAD Stormwater Modeling depending on your needs.

The CULTEC StormGenie® takes information from whichever program you prefer and creates the proposed system in AutoCAD®. The generated CAD drawing is fully usable. It may be modified and incorporated into existing plans.

CULTEC's StormGenie® automatically generates CAD drawings that include:

- Project-specific Designs
- CULTEC's Internal Manifold System
- Accurate Center-to-Center Spacing and System Dimensions
- Dimensional Call-outs
- Legend and Hatching
- List of Materials for Easy Takeoffs
- Storage Provided

CULTEC's Stormwater Design Calculator

The CULTEC, Inc. Stormwater Design Calculator is an MS Excel-based spreadsheet used for designing CULTEC Stormwater Systems. It can be used as a stand alone design tool that generates report outputs based on your parameters.

Calculates:

- List of Materials for Easy Estimating
- Bed Area Required
- Breakdown of Storage Provided
- Custom Cross Section Detail

CULTEC Stormwater Design Calculator is included in the StormGenie software.
See C:/Program Files/CULTEC StormGenie or access it from the CULTEC toolbars within AutoCAD.

HydroCAD Stormwater Modeling

HydroCAD is a computer aided design tool for modeling stormwater runoff. Storage calculations are performed easily using HydroCAD's Chamber Wizard. Popular CULTEC stormwater chambers are included in the design library.

Calculates:

- Everything the CULTEC Stormwater Design Calculator does ***PLUS*** hydraulically models the system.

If you don't already have HydroCAD, you have two options:

Free HydroCAD Sampler

A free HydroCAD Sampler is available from HydroCAD Stormwater Software LLC. The HydroCAD Sampler is a functional evaluation program that lets you create and save projects of up to 5-nodes. It provides most of the capabilities of a full HydroCAD program, but **is limited to 60-minutes** of operation per session. This is a metered sampler of HydroCAD's full version which includes CULTEC chambers as well as a full array of competitor products.

Visit www.hydrocad.net for the free HydroCAD Sampler.

Free HydroCAD CULTEC Edition

If you don't want to be limited to 60-minutes of use, CULTEC offers a free HydroCAD CULTEC edition for **unlimited usage.** With the CULTEC Edition you can construct basic watershed models of up to 5-nodes, including complete storage, runoff, and routing calculations using CULTEC chambers. This edition only includes CULTEC products.

Since the CULTEC Edition will replace any previous HydroCAD installation on your PC, existing HydroCAD users should generally obtain a version update in order to retain all the capabilities of their existing software.

Visit www.cultec.com for the free HydroCAD CULTEC Edition.

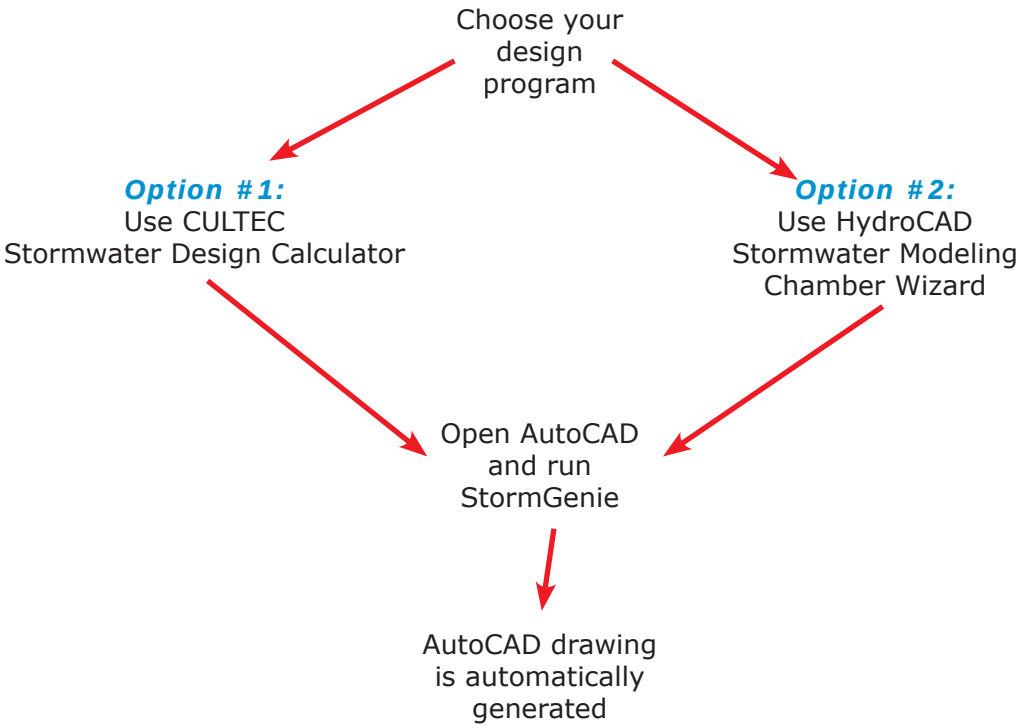
Minimum system requirements:

- Microsoft® Windows OS
- Microsoft® Excel 2002 or later
- AutoCAD® v. 2010-2015 by Autodesk, Inc.

Don't have AutoCAD®? No problem.

Just fill out the CULTEC Stormwater Design Calculator and e-mail it to us and we will design the system for you.

For assistance, call our Technical Department at 203-775-4416 ext. 203 or e-mail tech@cultec.com
For updates to CULTEC Stormwater Design Calculator, visit www.cultec.com/sdc.html
For updates to CULTEC StormGenie™, visit www.cultec.com/stormgenie.html



CALCULATE THE CULTEC STORMWATER SYSTEM

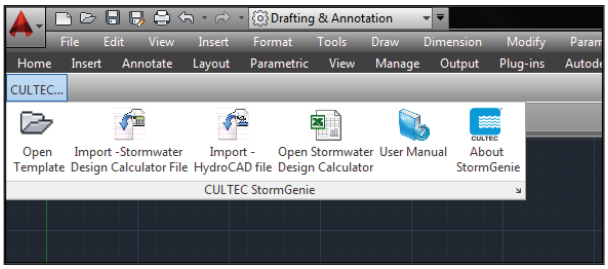
You can calculate your CULTEC Stormwater System using either the CULTEC Stormwater Design Calculator program or with HydroCAD.

Option 1: Calculate a System Using CULTEC Stormwater Design Calculator

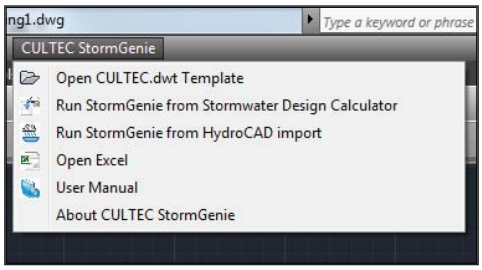
Run CULTEC Stormwater Design Calculator found in **C:\Program Files\CULTEC StormGenie\ CULTEC Stormwater Design Calculator** or open from within AutoCAD from CULTEC StormGenie drop down menu or ribbon.

If already in AutoCAD, click on "Open Design Calculator" on the ribbon or "Open Excel" on the drop down menu.

CULTEC StormGenie Ribbon



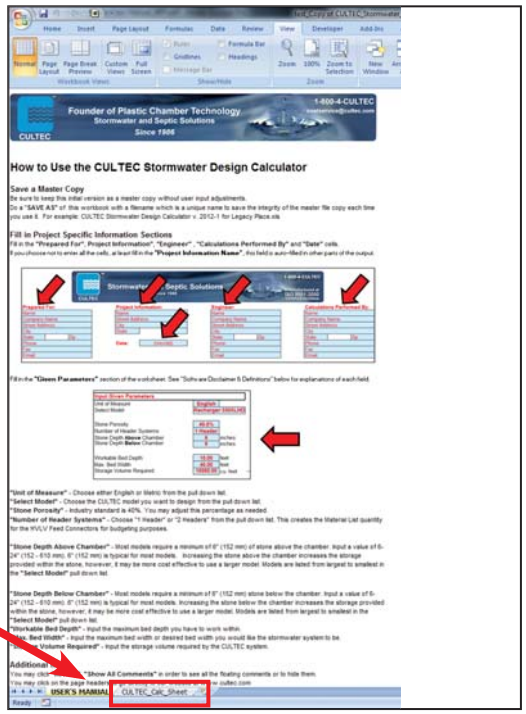
CULTEC StormGenie Pull-Down Menu



Read **"How to Use the CULTEC Stormwater Design Calculator"** located on the USER'S MANUAL tab of the CULTEC Stormwater Design Calculator.

To calculate a system, click on the "CULTEC_Calc_Sheet" tab located at the bottom of the work-book.

Stormwater Design Calculator USER'S MANUAL



Click on the CULTEC_Calc_Sheet tab to get to the calculation page.

To keep the integrity of the master file, rename the file each time you use it.

Click, File, Save As — enter a unique file name for your project.

Save the CULTEC Stormwater Design Calculator project file in a place you can reference it easily.

Input the custom information into the blue boxes for *Prepared For*, *Project Information*, *Engineer*, *Date*, and *Calculations Performed By*.

Stormwater Design Calculator - Custom report section

Prepared For:	Project Information:	Engineer:	Calculations Performed By:
Name	Name	Name	Jane Doe
Company Name	Street Address	Company Name	CULTEC, Inc.
Street Address	City	Street Address	PO Box 280
City	State Zip	City	Brookfield
State Zip	Date: December 29, 2014	State Zip	CT 06804
Phone		Phone	203-775-4416
Fax		Fax	203-775-1462
Email		Email	custservice@cultec.com

Fill in the "Input Given Parameters" section of the Stormwater Design Calculator.

Stormwater Design Calculator - Input Given Parameters section

CULTEC Stormwater and Septic Solutions Since 1986

Prepared For:	Project Information:	Engineer:	Calculations Performed By:
Name	Name	Name	Jane Doe
Company Name	Street Address	Company Name	CULTEC, Inc.
Street Address	City	Street Address	PO Box 280
City	State Zip	City	Brookfield
State Zip	Date: December 29, 2014	State Zip	CT 068
Phone		Phone	203-775-4416
Fax		Fax	203-775-1462
Email		Email	custservice@cultec.com

Input Given Parameters		
Unit of Measure	English	
Select Model	Recharger 330XLHD	
Stone Porosity	40.0%	
Number of Header Systems	1 Header	
Stone Depth **Above** Chamber	6	inches
Stone Depth **Below** Chamber	6	inches
Workable Bed Depth	10.00	feet
Max. Bed Width	50.00	feet
Storage Volume Required	10000.00	cu. feet

Chamber Specificatio		
Height	30.5	inches
Width	52.00	inches
Length	8.50	feet
Installed Length	7.00	feet
Bare Chamber Volume	52.21	cu. feet
Installed Chamber Volume	79.26	cu. feet

Image for visual reference only.May not reflect selected model.

Bed Depth	4.63	feet
Bed Width	49.83	feet
Storage Volume Provided	10006.18	cu. feet

Once you have filled in all the parameters and hit ENTER the spreadsheet automatically calculates the proposed system. You can modify the output by changing the Given Parameters.

Save the spreadsheet with a unique filename for your project.

Click the hyperlinks under Additional Information to go to product web pages and find downloadable CAD Detail Sheets, Submittal Packages, Brochures and product specific information.

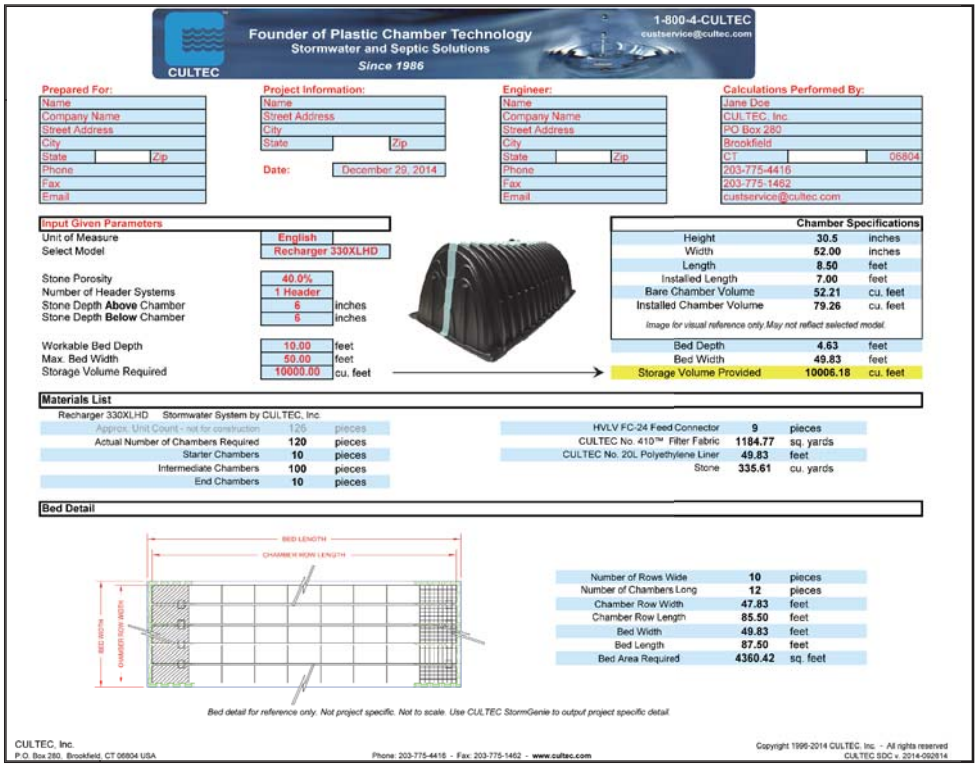
Hyperlinks for more information

Additional Information

Other models are available if products above do not meet your requirements. Contact CULTEC for further design assistance.
Model "S" Starter is available on Recharger models only. Contactor models use Model "R" Starters.
Call CULTEC at 203-775-4416 for pricing information.

Hyperlinks to product specific webpages:
Please visit our website for more information such as CAD details, spec information, brochures, installation instructions, and other design tools on certain models.

Recharger V8IHD (Intermediate)	Recharger 330XLHD	Contactor 100HD	HVLV F-110x4 Feed Connector
Recharger V8SHD (Starter)	Recharger 280HD	CULTEC No. 410 Filter Fabric	HVLV FC-24 Feed Connector
	Recharger 150XLHD	CULTEC No. 20L Polyethylene Liner	HVLV SFCx2 Feed Connector



Founder of Plastic Chamber Technology
Stormwater and Septic Solutions
Since 1986
1-800-4-CULTEC
custservice@cultec.com

Prepared For:	Project Information:	Engineer:	Calculations Performed By:
Name	Name	Name	Jane Doe
Company Name	Street Address	Company Name	CULTEC, Inc.
Street Address	City	Street Address	PO Box 280
City	State Zip	City	Brookfield
State Zip	Date: December 29, 2014	State Zip	CT 06804
Phone		Phone	203-775-4416
Fax		Fax	203-775-1462
Email		Email	custservice@cultec.com

Input Given Parameters

Unit of Measure	English	
Select Model	Recharger 330XLHD	
Stone Porosity	40.0%	
Number of Header Systems	1 Header	
Stone Depth **Above** Chamber	6	inches
Stone Depth **Below** Chamber	6	inches
Workable Bed Depth	10.00	feet
Max. Bed Width	50.00	feet
Storage Volume Required	10000.00	cu. feet

Chamber Specifications

Height	30.5	inches
Width	52.00	inches
Length	8.50	feet
Installed Length	7.00	feet
Bare Chamber Volume	52.21	cu. feet
Installed Chamber Volume	79.26	cu. feet

Image for visual reference only.May not reflect selected model.

Bed Depth	4.63	feet
Bed Width	49.83	feet
Storage Volume Provided	10006.18	cu. feet

Materials List

Recharger 330XLHD Stormwater System by CULTEC, Inc.

Approx. Unit Count - not for construction	126	pieces
Actual Number of Chambers Required	120	pieces
Starter Chambers	10	pieces
Intermediate Chambers	100	pieces
End Chambers	10	pieces

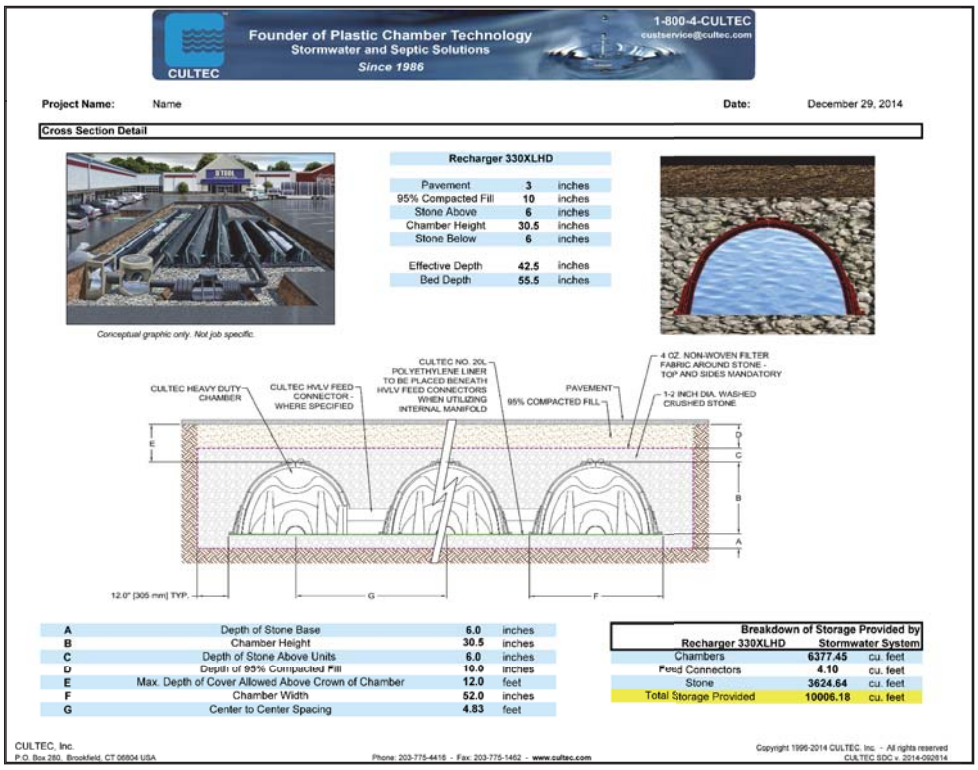
HVLV FC-24 Feed Connector	9	pieces
CULTEC No. 410™ Filter Fabric	1184.77	sq. yards
CULTEC No. 20L Polyethylene Liner	49.83	feet
Stone	335.61	cu. yards

Bed Detail

Number of Rows Wide	10	pieces
Number of Chambers Long	12	pieces
Chamber Row Width	47.83	feet
Chamber Row Length	85.50	feet
Bed Width	49.83	feet
Bed Length	87.50	feet
Bed Area Required	4360.42	sq. feet

Bed detail for reference only. Not project specific. Not to scale. Use CULTEC StormGenie to output project specific detail.

CULTEC, Inc.
P.O. Box 280, Brookfield, CT 06804 USA
Phone: 203-775-4416 - Fax: 203-775-1462 - www.cultec.com



Founder of Plastic Chamber Technology
Stormwater and Septic Solutions
Since 1986
1-800-4-CULTEC
custservice@cultec.com

Project Name: Name **Date:** December 29, 2014

Cross Section Detail

Conceptual graphic only. Not job specific.

Recharger 330XLHD

Pavement	3	inches
95% Compacted Fill	10	inches
Stone Above	6	inches
Chamber Height	30.5	inches
Stone Below	6	inches
Effective Depth	42.5	inches
Bed Depth	55.5	inches

A	Depth of Stone Base	6.0	inches
B	Chamber Height	30.5	inches
C	Depth of Stone Above Units	6.0	inches
D	Depth of 95% Compacted Fill	10.0	inches
E	Max. Depth of Cover Allowed Above Crown of Chamber	12.0	feet
F	Chamber Width	52.0	inches
G	Center to Center Spacing	4.83	feet

Breakdown of Storage Provided by

Recharger 330XLHD	Stormwater System	
Chambers	6377.45	cu. feet
Feed Connectors	4.10	cu. feet
Stone	3624.64	cu. feet
Total Storage Provided	10006.18	cu. feet

CULTEC, Inc.
P.O. Box 280, Brookfield, CT 06804 USA
Phone: 203-775-4416 - Fax: 203-775-1462 - www.cultec.com

Sample CULTEC Stormwater Design Calculator Printouts

Option 2 - Calculate a System Using HydroCAD

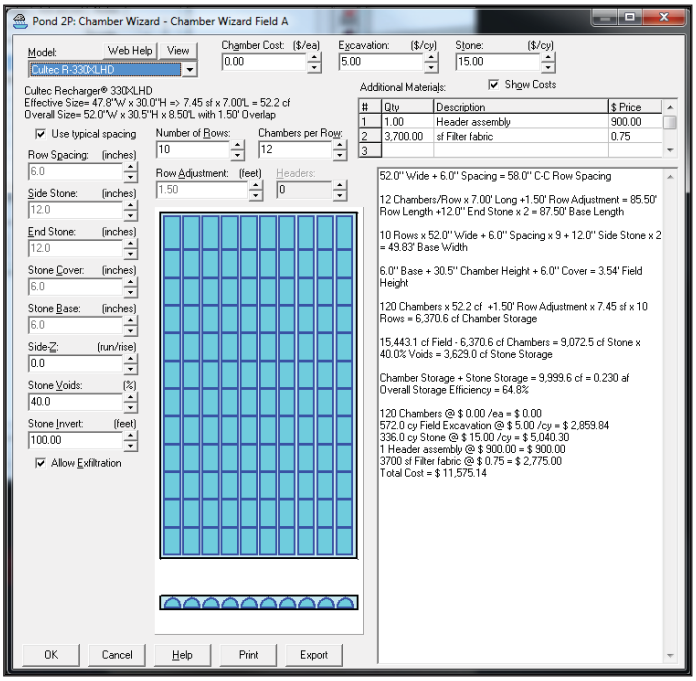
A free 5-node version of HydroCAD CULTEC Edition is available for download on our website at: www.cultec.com/hydrocaddownload.html

To purchase a full version of HydroCAD or for assistance on how to create a system using the Chamber Wizard, contact HydroCAD Technical Support directly by calling 603-323-8666.

Open HydroCAD.

Calculate a system using the HydroCAD Chamber Wizard.

HydroCAD Chamber Wizard



Click Export to export the HydroCAD .txt file.

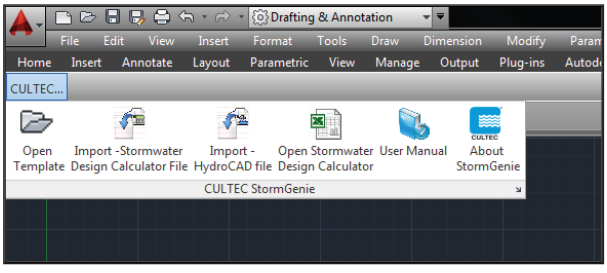
Save your HydroCAD .txt file with a unique filename for your project.

CREATE THE CAD FILE FOR THE STORMWATER SYSTEM

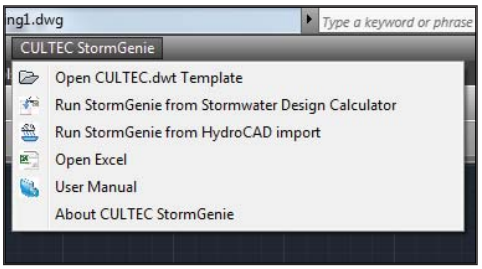
Open AutoCAD.

You will see the CULTEC StormGenie Ribbon and CULTEC StormGenie pull-down menu.

CULTEC StormGenie Ribbon in AutoCAD

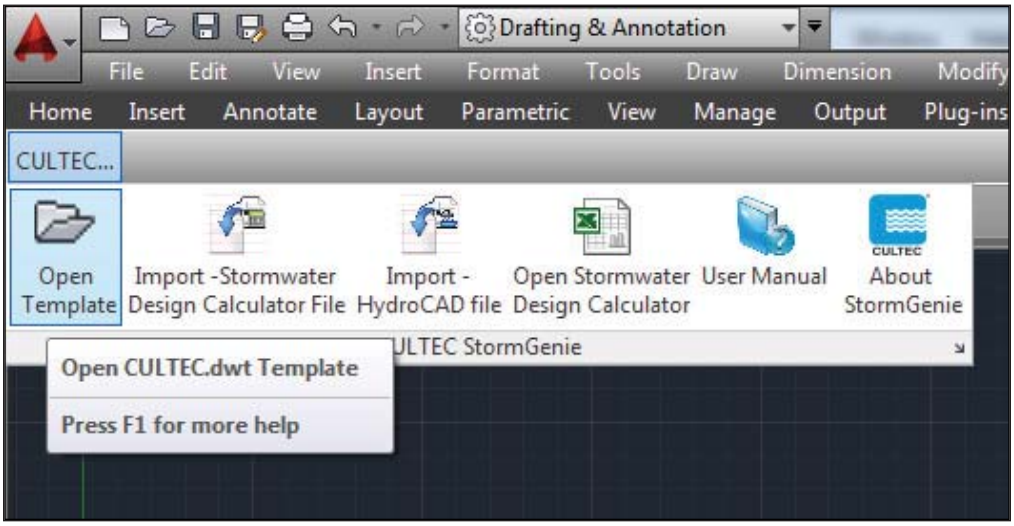


CULTEC StormGenie Pull-Down Menu in AutoCAD



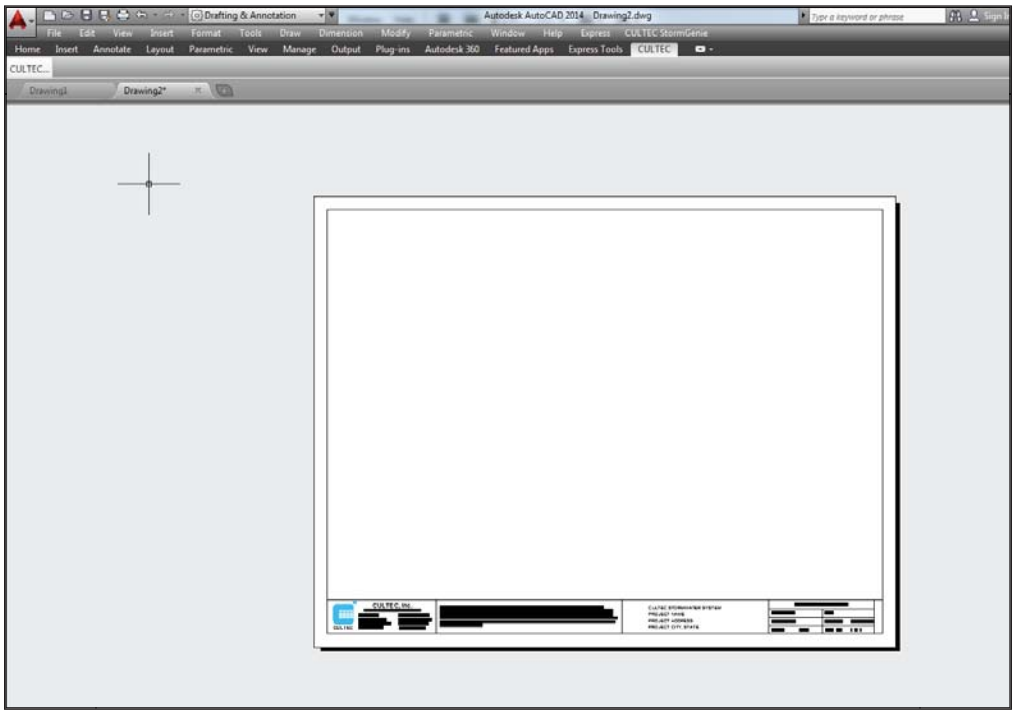
From either the ribbon or the pull-down menu, click "Open Template".

Open Template from Ribbon



The template will open and it will look like this:

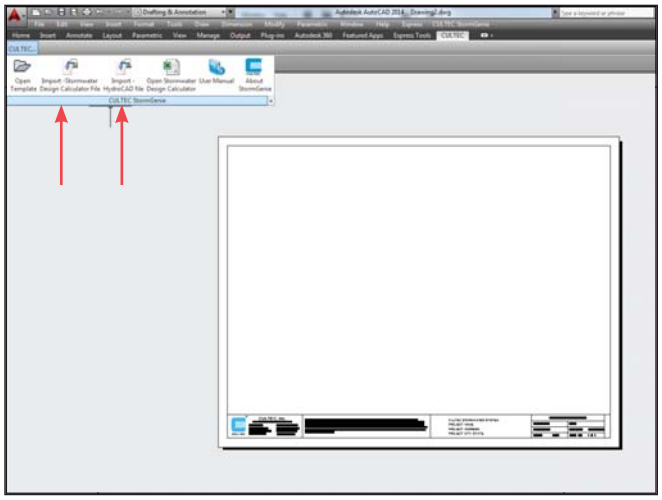
CULTEC Template



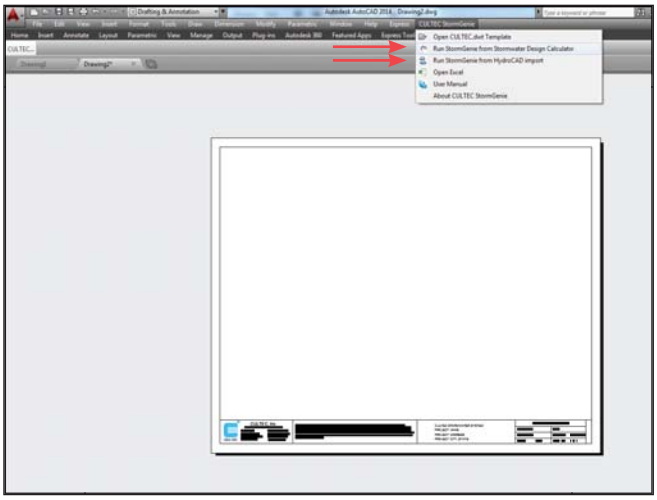
You must perform this step. The drawing cannot be produced without opening up the template prior to importing the file.

Next, you will either click "Import - Stormwater Design Calculator File" ("Run StormGenie from Stormwater Design Calculator" on pull down) or "Import - HydroCAD file" ("Run StormGenie from HydroCAD import" on pull-down menu) based on how you created your system.

Import from Ribbon



Import from Pull-Down Menu

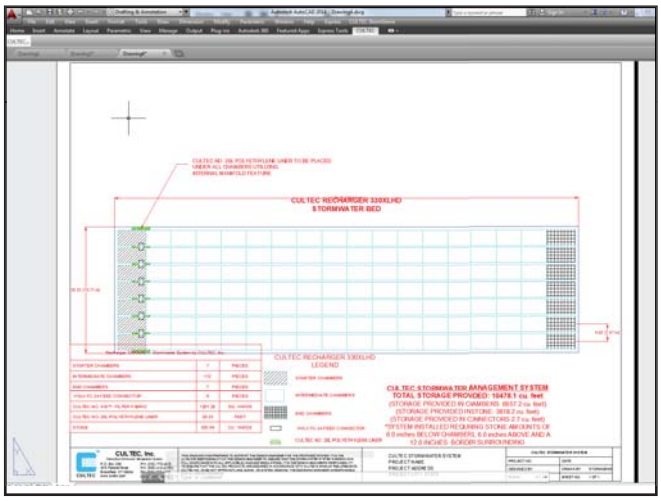


To run StormGenie from Stormwater Design Calculator, click "Import – Stormwater Design Calculator File" and browse to select the Existing Excel Worksheet that you saved for your project. Click open and OK.

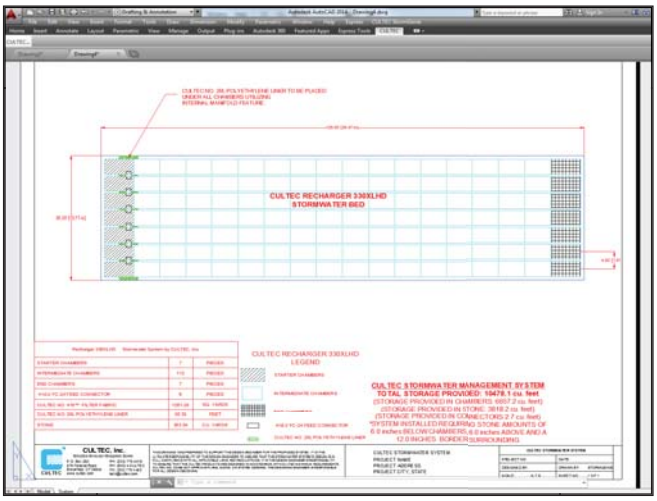
To run StormGenie from HydroCAD file, click "Import – HydroCAD file" and browse to select the Existing HydroCAD file that you saved for your project. Click open and OK.

The drawing is automatically generated to match your Excel worksheet. You can manipulate the drawing from its raw form to clean it up.

System Drawing - prior to manipulation



System Drawing - following manipulation



Save the drawing file.

This drawing may be copied and pasted or imported into civil drawing sets.

Technical Support:

StormGenie is distributed by CULTEC, Inc.
Contact CULTEC, Inc. at 203-775-4416 or e-mail at tech@cultec.com

CULTEC, Inc.
P.O. Box 280, 878 Federal Road
Brookfield, CT 06804 USA
203-775-4416
www.cultec.com
custservice@cultec.com or tech@cultec.com

For HydroCAD questions, contact HydroCAD Software Solutions LLC at 800-927-7246 or e-mail them at support@hydrocad.net.

HydroCAD Software Solutions LLC
P.O. Box 477
Chocorua, NH 03817 USA
800-927-7246
www.hydrocad.net
support@hydrocad.net

CULTEC Landscaper Series®
Single Drywell - Non-Traffic Application

CULTEC's Landscaper Series® chambers are used in non-traffic applications for residential drainage.

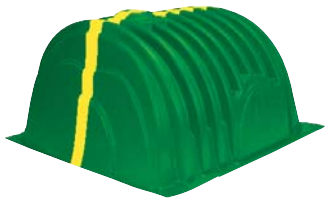
Uses

- Eliminate flooded basements and yards
- Act as drywells to contain water from sump pump, washer machine, pool backwash or water softener discharge
- Control rainwater from gutters and driveway

System Benefits

- Large storage capacity in small footprint
- Fully-formed unit containing no separate parts
- Lightweight
- Can be carried by one or two people
- Easily transported by pick-up truck
- Install as a single unit or in a group
- Quick and easy installation
- Minimal site disturbance

HVLV™ 180BT LS



Recharger® V8R LS

Model	Chamber Width	Trench Width	Chamber Height	Trench Depth	Chamber Length	Trench Length	Bare Chamber Volume		Storage Volume per Installed Unit with Stone		Stone Required per Unit[1]
HVLV™ 180BT LS	36"	48"	20.5"	32.5"	5.63'	6.63'	19.40 ft³	145 gal.	29.76 ft³	223 gal.	0.96 yd³
	914 mm	1219 mm	521 mm	826 mm	1.72 m	2.02 m	0.55 m³	549 l	0.84 m³	843 l	0.73 m³
Recharger® V8R LS	60"	72"	32"	44"	5.08'	6.08'	44.12 ft³	330 gal.	65.40 ft³	489 gal.	1.97 yd³
	1524 mm	1829 mm	813 mm	1118 mm	1.55 m	1.85 m	1.25 m³	1249 l	1.85 m³	1852 l	1.51 m³

All calculations are for a single unit installed as a **non-traffic application.**

[1] Units may be installed with stone to provide additional storage volume.
This calculation for stone required per unit is based off the typical cross section using stone. See pages 72 & 76.

The Landscaper Series™ is not to be used in traffic areas. The chambers are for use in non-traffic applications only.
For products suitable for traffic applications, see the Contactor® & Recharger® series on page 43. For additional models, contact CULTEC.

CULTEC Contactor® & Recharger® Chambers
Single Drywell - Non-Traffic Application

In addition to our Landscaper Series®, our Contactor® and Recharger® chambers may also be used as dry-wells.

Specify the Model R version which has two fully-formed end walls for single drywell applications.

The chart below shows a single unit installed in a non-traffic application. These models listed may also be used in traffic applications (*see notes at bottom of page*).

Contactor® 100HD

Recharger ® 150XLHD

Recharger® 280HD

Recharger® 330XLHD

Model	Chamber Width	Trench Width	Chamber Height	Trench Depth	Chamber Length	Trench Length	Bare Chamber Volume		Storage Volume per Installed Unit		Stone Required per Unit[1]
Contactor 100HD	36"	48"	12.5"	24.5"	8'	9'	14.93 ft³	112 gal.	23.96 ft³	179 gal.	0.84 yd³
	914 mm	1219 mm	318 mm	622 mm	2.44 m	2.74 m	0.42 m³	423 l	0.68 m³	678 l	0.64 m³
Recharger 150XLHD	33"	45"	18.5"	30.5"	11'	12'	29.15 ft³	218 gal.	45.24 ft³	338 gal.	1.49 yd³
	838 mm	1143 mm	470 mm	775 mm	3.35 m	3.66 m	0.83 m³	825 l	1.28 m³	1281 l	1.14 m³
Recharger 280HD	47"	59"	26.5"	38.5"	8'	9'	48.63 ft³	364 gal.	68.27 ft³	511 gal.	1.82 yd³
	1194 mm	1499 mm	673 mm	978 mm	2.44 m	2.74 m	1.38 m³	1377 l	1.93 m³	1933 l	1.39 m³
Recharger 330XLHD	52"	64"	30.5"	42.5"	8.5'	9.5'	63.4 ft³	474 gal.	89.55 ft³	670 gal.	2.42 yd³
	1321 mm	1626 mm	775 mm	1080 mm	2.59 m	2.90 m	1.8 m³	1795 l	2.54 m³	2536 l	1.85 m³

All calculations are for a single Model R unit installed as a **non-traffic application.**
Values will differ for multiple interlocked units or traffic applications.
[1] Units may be installed with stone to provide additional storage volume. This calculation for stone required per unit is based off the typical cross section using stone.

The heavy duty (HD) models listed above may also be used in traffic applications.
See the Technical Information section of this manual for proper cross section details and calculations for traffic applications. Contact CULTEC for assistance.

Modeling Software

CULTEC products are fully supported by these modeling software partners making it easy to design and model underground retention and detention facilities that employ CULTEC chambers.

HydroCAD®

HydroCAD Software Solutions LLC.
PH: 603-323-8666
FX: 603-323-7467
PO Box 477
216 Chocorua Mountain Hwy
Chocorua, NH 03817
www.hydrocad.net

Autodesk Storm & Sanitary Analysis®

Autodesk, Inc.
PH: 800-964-6432
www.autodesk.com

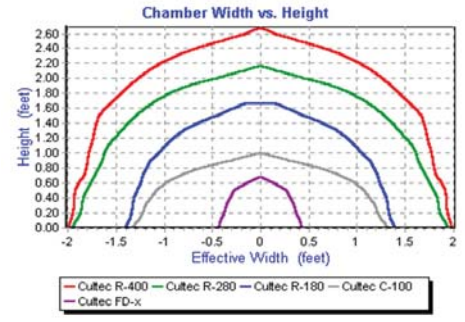
Bentley Systems' PondPack® V8*i*

Bentley Systems, Incorporated
PH: 1-800-BENTLEY (1-800-236-8539)
685 Stockton Drive
Exton, PA 19341
www.bentley.com

Streamline Technologies' ICPR®:

Streamline Technologies, Inc.
PH: 800-828-7584
FX: 407-695-0022
1900 Town Plaza Court
Winter Springs, FL 32708
www.streamnologies.com

Don't want to purchase the full version of HydroCAD?
CULTEC offers a FREE 5-node HydroCAD CULTEC edition. See www.cultec.com/hydrocaddownload.html for more information and download.



Technical Information

In this section:

CULTEC Contactor® & Recharger® Chamber Specification Information

	Contactor® 100HD	Recharger® 150XLHD	Recharger® 280HD	Recharger® 330XLHD	Recharger® V8HD
Length	8' 2.44 m	11' 3.35 m	8' 2.44 m	8.5' 2.59 m	8' 2.44 m
Installed Length	7.5' 2.29 m	10.25' 3.12 m	7' 2.13 m	7' 2.13 m	7.5' 2.29 m
Width	36" 914 mm	33" 838 mm	47" 1194 mm	52" 1321 mm	60" 1524 mm
Height	12.5" 318 mm	18.5" 470 mm	26.5" 673 mm	30.5" 775 mm	32" 813 mm
Chamber Storage Capacity	14.00 ft^3 0.40 m^3	27.16 ft^3 0.77 m^3	42.55 ft^3 1.21 m^3	52.21 ft^3 1.48 m^3	65.09 ft^3 1.84 m^3
Min. Storage Capacity Surrounded in Stone	28.81 ft^3 0.82 m^3	50.17 ft^3 1.42 m^3	64.46 ft^3 1.83 m^3	79.26 ft^3 2.24 m^3	99.56 ft^3 2.82 m^3
For More Information See Pages	Pages 49-51	Pages 52-55	Pages 56-59	Pages 60-63	Pages 64-69
Visit www.cultec.com/downloads.html for Product Downloads, Design Tools and CAD Details					

Based on installed length. Stone void is calculated at 40%. Includes 6" (152 mm) stone base, 6" (152 mm) stone above chamber crown and stone around units based on typical minimum center-to-center spacing.

The Recharger V8HD information is based on the V8IHD Intermediate. See pages 64-69 for information on the V8SHD Starter and V8EHD End units.

Other CULTEC models are available if the above chambers do not meet your design parameters. Please contact our Technical Department for more information.

Shown L->R- Contactor 100HD, Recharger 150XLHD, Recharger 280HD, Recharger 330XLHD, and Recharger V8HD.

Manifold Options for CULTEC Chambers

	Contactor® 100HD	Recharger® 150XLHD	Recharger® 280HD	Recharger® 330XLHD	Recharger® V8HD
Preferred Method	In-line internal manifold using Side Portals and Feed Connector	In-line internal manifold using Side Portals and Feed Connector	In-line internal manifold using Side Portals and Feed Connector	In-line internal manifold using Side Portals and Feed Connector	In-line internal manifold using Side Portals and Feed Connector
Feed Connector to Specify	HVLV® SFCx2 Feed Connector	HVLV® FC-24 Feed Connector	HVLV® FC-24 Feed Connector	HVLV® FC-24 Feed Connector	HVLV® FC-24 or F-110x4 Feed Connector
Option #2	n/a	n/a	External CULTEC HVLV® 180 Header System	External CULTEC HVLV® 180 Header System	External CULTEC HVLV® 180 Header System
Option #3	Pipe Max. Allowable Pipe Size in End Wall = 10" (250 mm) Max. Allowable Pipe Size in Side Portal = 6" (150 mm)	Pipe Max. Allowable Pipe Size in End Wall = 12" (300 mm) Max. Allowable Pipe Size in Side Portal = 10" (250 mm)	Pipe Max. Allowable Pipe Size in End Wall = 18" (450 mm) Max. Allowable Pipe Size in Side Portal = 10" (250 mm)	Pipe Max. Allowable Pipe Size in End Wall = 24" (600 mm) Max. Allowable Pipe Size in Side Portal = 10"(250 mm)	Pipe Max. Allowable Pipe Size in End Wall = 24" (600 mm) Max. Allowable Pipe Size in V8SHD Starter and V8EHD End Side Portal = 12" (300 mm) Max. Allowable Pipe Size in V8IHD Intermediate Side Portal = 10" (250 mm)

Preferred Method - Internal manifold using side portals and CULTEC feed connector

Option #2- External manifold using CULTEC HVLV™ 180 Header System

Option #3 - External conventional pipe and fitting manifold

CULTEC Contactor® 100HD

The Contactor® 100HD is a 12.5" (318 mm) tall, low profile chamber and is typically used for installations with depth restrictions or when a larger infiltrative area is required. The Contactor 100HD has the side portal internal manifold feature. The HVLV® SFCx2 Feed Connector is inserted into the side portal of the Contactor 100HD to create the internal manifold.

Size (L x W x H)	8' x 36" x 12.5" 2.44 m x 914 mm x 318 mm
Installed Length	7.5' 2.29 m
Length Adjustment per Run	0.5' 0.15 m
Chamber Storage	1.87 ft^3/ft 0.17 m^3/m 14.00 ft^3/unit 0.40 m^3/unit
Min. Installed Storage	3.84 ft^3/ft 0.36 m^3/m 28.81 ft^3/unit 0.82 m^3/unit
Min. Area Required	25 ft^2 2.32 m^2
Min. Center-to-Center Spacing	3.33' 1.02 m
Max. Allowable Cover	12' 3.66 m
Max. Inlet Opening in End Wall	10" 250 mm
Max. Allowable O.D. in Side Portal	6.9" 175 mm
Compatible Feed Connector	HVLV SFCx2 Feed Connector

Contactor® 100HD Bare Chamber Storage Volumes

Elevation		Incremental Storage Volume				Cumulative Storage	
in.	mm	ft^3/ft	m^3/m	ft^3	m^3	ft^3	m^3
12	305	0.009	0.001	0.068	0.002	13.995	0.396
11	279	0.067	0.006	0.503	0.014	13.928	0.394
10	254	0.110	0.010	0.825	0.023	13.425	0.380
9	229	0.139	0.013	1.043	0.030	12.600	0.357
8	203	0.159	0.015	1.193	0.034	11.558	0.327
7	178	0.174	0.016	1.305	0.037	10.365	0.294
6	152	0.184	0.017	1.380	0.039	9.060	0.257
5	127	0.192	0.018	1.440	0.041	7.680	0.217
4	102	0.203	0.019	1.523	0.043	6.240	0.177
3	76	0.203	0.019	1.523	0.043	4.718	0.134
2	51	0.203	0.019	1.523	0.043	3.195	0.090
1	25	0.223	0.021	1.673	0.047	1.673	0.047
Total		1.866	0.173	13.995	0.396	13.995	0.396

Calculations are based on installed chamber length.

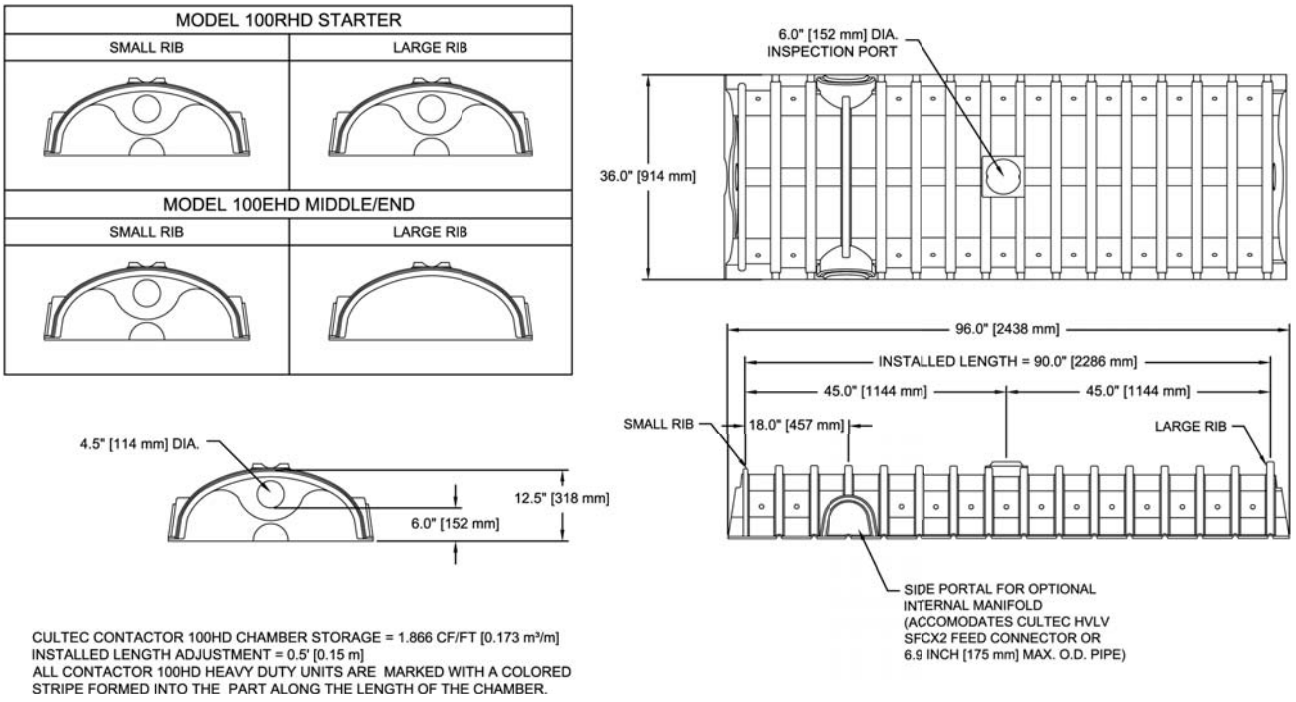
Visit www.cultec.com/downloads.html for Product Downloads and CAD details.

	Stone Foundation Depth		
	6"	12"	18"
	152 mm	305 mm	457 mm
Chamber and Stone Storage Per Chamber	28.81 ft^3	33.81 ft^3	38.81 ft^3
	0.82 m^3	0.96 m^3	1.10 m^3
Min. Effective Depth	2.04'	2.54'	3.04'
	0.62 m	0.77 m	0.93 m
Stone Required Per Chamber	1.37 yd^3	1.84 yd^3	2.30 yd^3
	1.05 m^3	1.40 m^3	1.76 m^3

Calculations are based on installed chamber length.
Includes 6" (152 mm) stone above crown of chamber and typical stone surround.
Stone void calculated at 40%.

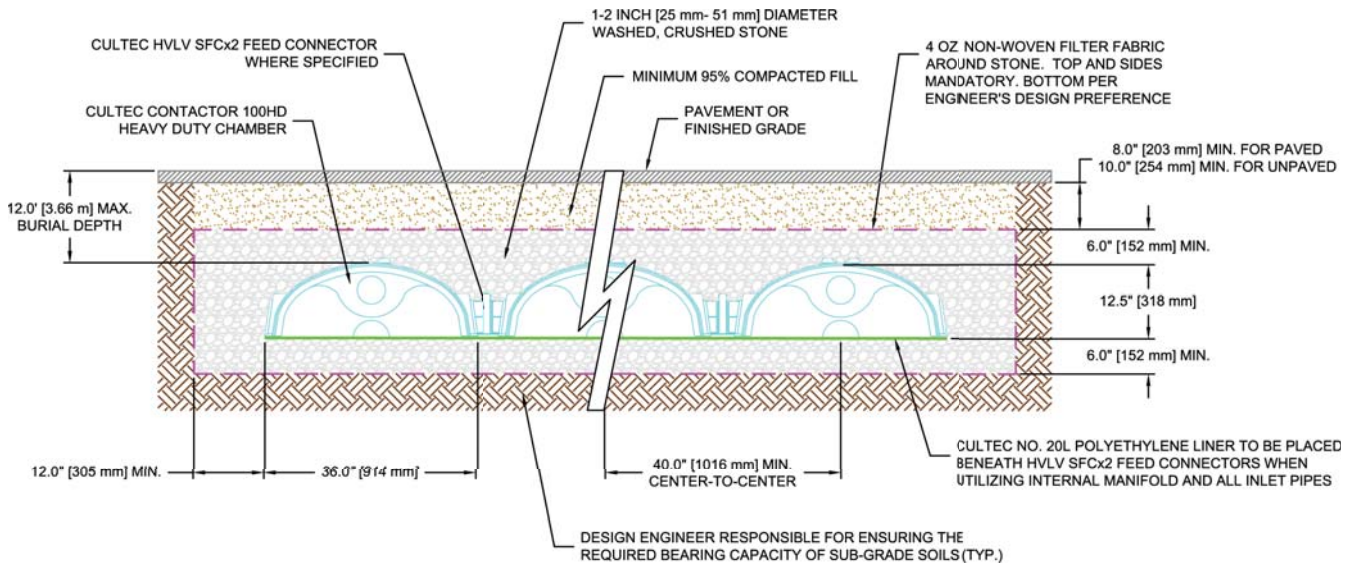
CULTEC Contactor® 100HD

Three View Drawing



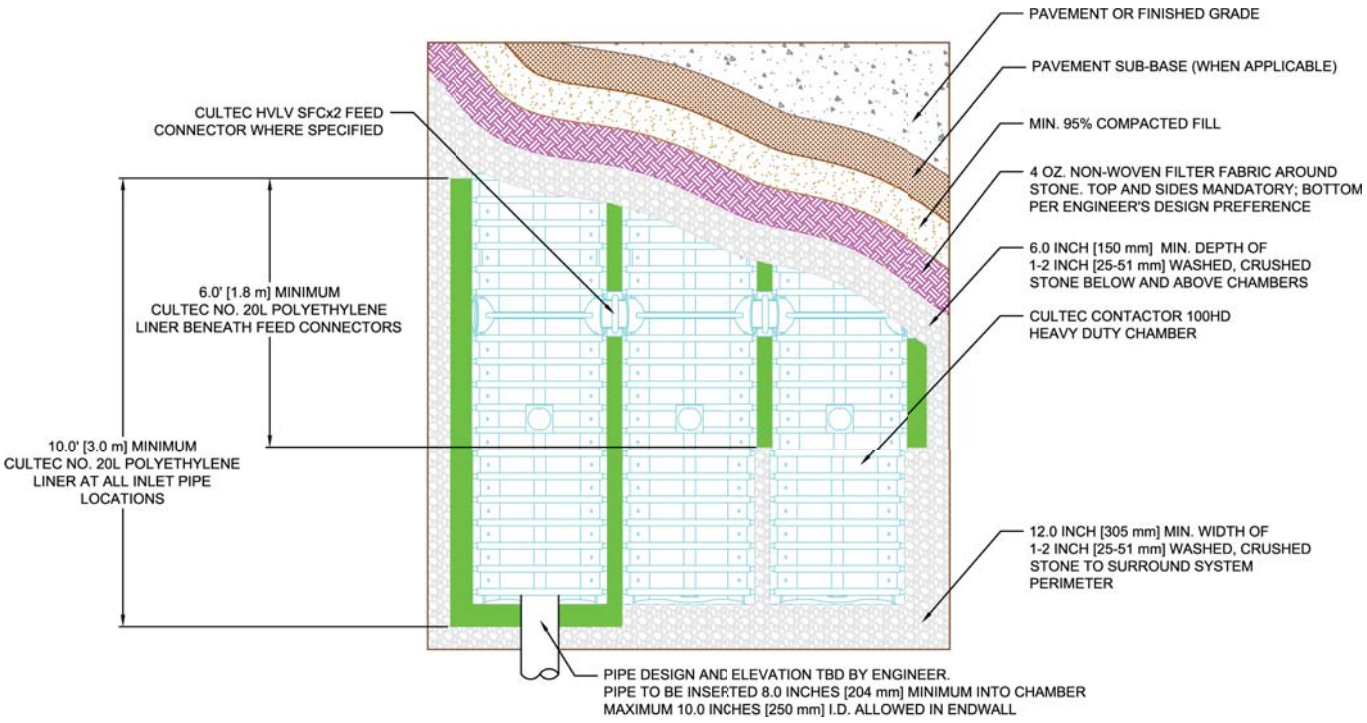
CULTEC CONTACTOR 100HD CHAMBER STORAGE = 1.866 CF/FT [0.173 m³/m]
INSTALLED LENGTH ADJUSTMENT = 0.5' [0.15 m]
ALL CONTACTOR 100HD HEAVY DUTY UNITS ARE MARKED WITH A COLORED STRIPE FORMED INTO THE PART ALONG THE LENGTH OF THE CHAMBER.

Typical Cross Section for Traffic Application



CULTEC Contactor® 100HD

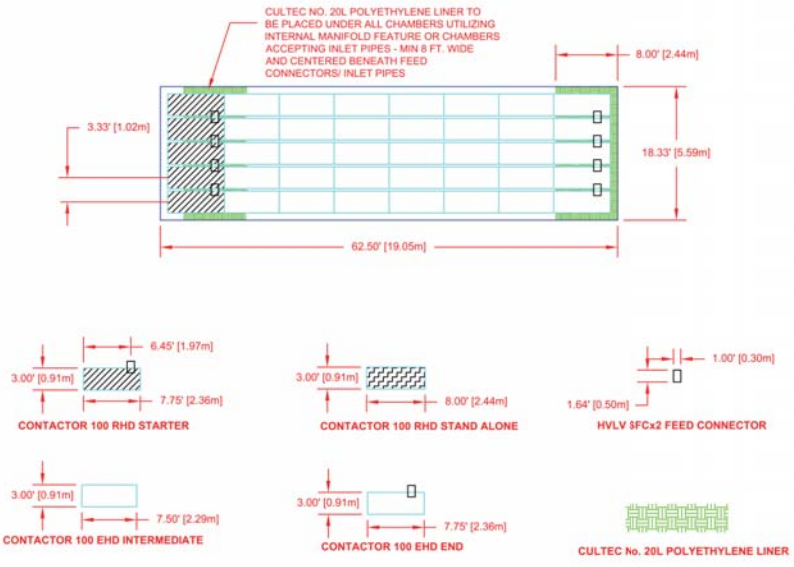
Plan View Drawing



Creating a Typical Bed Layout in AutoCAD

Using AutoCAD Array Function

1. Add Alternate Units to your Dimension Style and use 0.3048 as the Multiplier
2. Using the Rectangle command, create the three chamber outlines and the feed connectors:
   - Starter: 3.00' x 7.75'
   - Intermediate: 3.00' x 7.50'
   - End: 3.00' x 7.75'
   - Feed Connector: 1.00' x 1.64'
3. Hatch the Starter and End chambers to differentiate them. Place a feed connector (as shown) at one end of the starter and end chambers.
4. Select the Intermediate chamber and select the array command.
5. Specify the number of rows and columns (ex. 10 rows, 7 columns). Do not included the starter and end chambers in the column count.
6. The chambers should be oriented horizontally (as shown). Set the row offset to 3.33' and the column offset to 7.75'. The rotation angle should be 0.
7. Click accept to create the bed.
8. If the design is incorporating an R-Model chamber as a stand alone unit, use the rectangle command to create a chamber outline 8.00' x 3.00'. Hatch the R-Model using the appropriate hatch pattern. Orient the R-Model chamber horizontally, and orient the chambers so there is a 0.33' spacing between the R-Model and the rest of the chamber rows. Proceed to steps 9 and 10 using the Polyline command instead of the Rectangle command to show the stone border and polyethylene liner. If no R-Model chambers are being used as a stand -alone units, proceed to steps 9 and 10.
9. Using the Rectangle command to surround the bed, offset the rectangle 1' to represent the stone border.
10. Using the Rectangle command create a polyethylene liner underneath the feed connectors at both ends of the bed. It should be 5' wide and span the width of the bed. Apply correct hatching and label the liner.



Storm Water System Design Aide download available online

CULTEC Contactor® 100HD Specifications

GENERAL

CULTEC Contactor® 100HD chambers are designed for underground stormwater management. The chambers may be used for retention, recharging, detention or controlling the flow of on-site stormwater runoff.

CHAMBER PARAMETERS

1. The chambers shall be manufactured by CULTEC, Inc. of Brookfield, CT (203-775-4416 or 1-800-428-5832).
2. The chamber shall be vacuum thermoformed of black polyethylene.
3. The chamber shall be arched in shape.
4. The chamber shall be open-bottomed.
5. The chamber shall be joined using an interlocking overlapping rib method. Connections must be fully shouldered overlapping ribs, having no separate couplings or separate end walls.
6. The nominal chamber dimensions of the CULTEC Contactor® 100HD shall be 12.5 inches (318 mm) tall, 36 inches (914 mm) wide and 8 feet (2.44 m) long. The installed length of a joined Contactor® 100HD shall be 7.5 feet (2.29 m).
7. Maximum inlet opening on the chamber end wall is 10 inches (250 mm).
8. The chamber shall have two side portals to accept CULTEC HVLV® SFCx2 Feed Connectors to create an internal manifold. Maximum allowable O.D. in the side portal is 6.9 inches (175 mm).
9. The nominal chamber dimensions of the CULTEC HVLV® SFCx2 Feed Connector shall be 7.6 inches (194 mm) tall, 12 inches (305 mm) wide and 19.7 inches (500 mm) long.
10. The nominal storage volume of the Contactor® 100HD chamber shall be 1.866 ft^3 / ft (0.173 m^3 / m) - without stone. The nominal storage volume of a single Contactor® 100RHD Stand Alone unit shall be 14.93 ft^3 (0.42 m^3) - without stone. The nominal storage volume of a joined Contactor® 100EHD as an Intermediate unit shall be 13.995 ft^3 (0.396 m^3) - without stone. The nominal storage volume of the length adjustment amount per run shall be 0.93 ft^3 (0.09 m^3) - without stone.
11. The nominal storage volume of the HVLV® SFCx2 Feed Connector shall be 0.294 ft^3 / ft (0.027 m^3 / m) - without stone.
12. The Contactor® 100HD chamber shall have fifty-six discharge holes bored into the sidewalls of the unit's core to promote lateral conveyance of water.
13. The Contactor® 100HD chamber shall have 16 corrugations.
14. The end wall of the chamber, when present, shall be an integral part of the continuously formed unit. Separate end plates cannot be used with this unit.
15. The Contactor® 100RHD Starter/Stand Alone unit must be formed as a whole chamber having two fully formed integral end walls and having no separate end plates or separate end walls.
16. The Contactor® 100EHD Middle/End unit must be formed as a whole chamber having one fully formed integral end wall and one fully open end wall and having no separate end plates or end walls.
17. The HVLV® SFCx2 Feed Connector must be formed as a whole chamber having two open end walls and having no separate end plates or separate end walls. The unit shall fit into the side portals of the Contactor® 100HD and act as cross feed connections.
18. Chambers must have horizontal stiffening flex reduction steps between the ribs.
19. Heavy duty units are designated by a colored stripe formed into the part along the length of the chamber.
20. The chamber shall have a raised integral cap at the top of the arch in the center of each unit to be used as an optional inspection port or clean-out.
21. The units may be trimmed to custom lengths by cutting back to any corrugation on the large rib end.
22. The chamber shall be manufactured in an ISO 9001:2008 certified facility.
23. Maximum allowable cover over the top of the chamber shall be 12' (3.66 m) for the Heavy Duty version.
24. The chamber shall be designed to withstand traffic loads when installed according to CULTEC's recommended installation instructions.

CULTEC Recharger® 150XLHD

The Recharger® 150XLHD is an 18.5" (470 mm) tall, lower profile chamber and is typically used for installations with depth restrictions or when a larger infiltrative area is required. The Recharger® 150XLHD has the side portal internal manifold feature. HVLV® FC-24 Feed Connectors are inserted into the side portals to create the internal manifold.

Size (L x W x H)	11' x 33" x 18.5"
	3.35 m x 838 mm x 470 mm
Installed Length	10.25'
	3.12 m
Length Adjustment per Run	0.75'
	0.23 m
Chamber Storage	2.65 ft³/ft
	0.25 m³/m
	27.16 ft³/unit
	0.77 m³/unit
Min. Installed Storage	4.89 ft³/ft
	0.45 m³/m
	50.17 ft³/unit
	1.42 m³/unit
Min. Area Required	33.31 ft²
	3.09 m²
Min. Center-to-Center Spacing	3.25'
	0.99 m
Max. Allowable Cover	12'
	3.66 m
Max. Inlet Opening in End Wall	12"
	300 mm
Max. Allowable O.D. in Side Portal	10.25"
	260 mm
Compatible Feed Connector	HVLV FC-24 Feed Connector

Recharger® 150XLHD Bare Chamber Storage Volumes

Elevation		Incremental Storage Volume				Cumulative Storage	
in.	mm	ft³ / ft	m³ / m	ft³	m³	ft³	m³
18.5	470	0.006	0.001	0.062	0.002	27.193	0.770
18	457	0.010	0.001	0.103	0.003	27.132	0.768
17	432	0.032	0.003	0.328	0.009	27.029	0.765
16	406	0.077	0.007	0.789	0.022	26.701	0.756
15	381	0.102	0.009	1.046	0.030	25.912	0.734
14	356	0.119	0.009	1.220	0.035	24.867	0.704
13	330	0.134	0.011	1.374	0.039	23.647	0.670
12	305	0.146	0.012	1.497	0.042	22.273	0.631
11	279	0.156	0.014	1.599	0.045	20.777	0.588
10	254	0.165	0.015	1.691	0.048	19.178	0.543
9	229	0.172	0.016	1.763	0.050	17.487	0.495
8	203	0.179	0.017	1.835	0.052	15.724	0.445
7	178	0.184	0.017	1.886	0.053	13.889	0.393
6	152	0.188	0.017	1.927	0.055	12.003	0.340
5	127	0.191	0.018	1.958	0.055	10.076	0.285
4	102	0.193	0.018	1.978	0.056	8.118	0.230
3	76	0.195	0.018	1.999	0.057	6.140	0.174
2	51	0.197	0.018	2.019	0.057	4.141	0.117
1	25	0.207	0.019	2.122	0.060	2.122	0.060
Total		2.650	0.246	27.193	0.770	27.193	0.770

Calculations are based on installed chamber length.

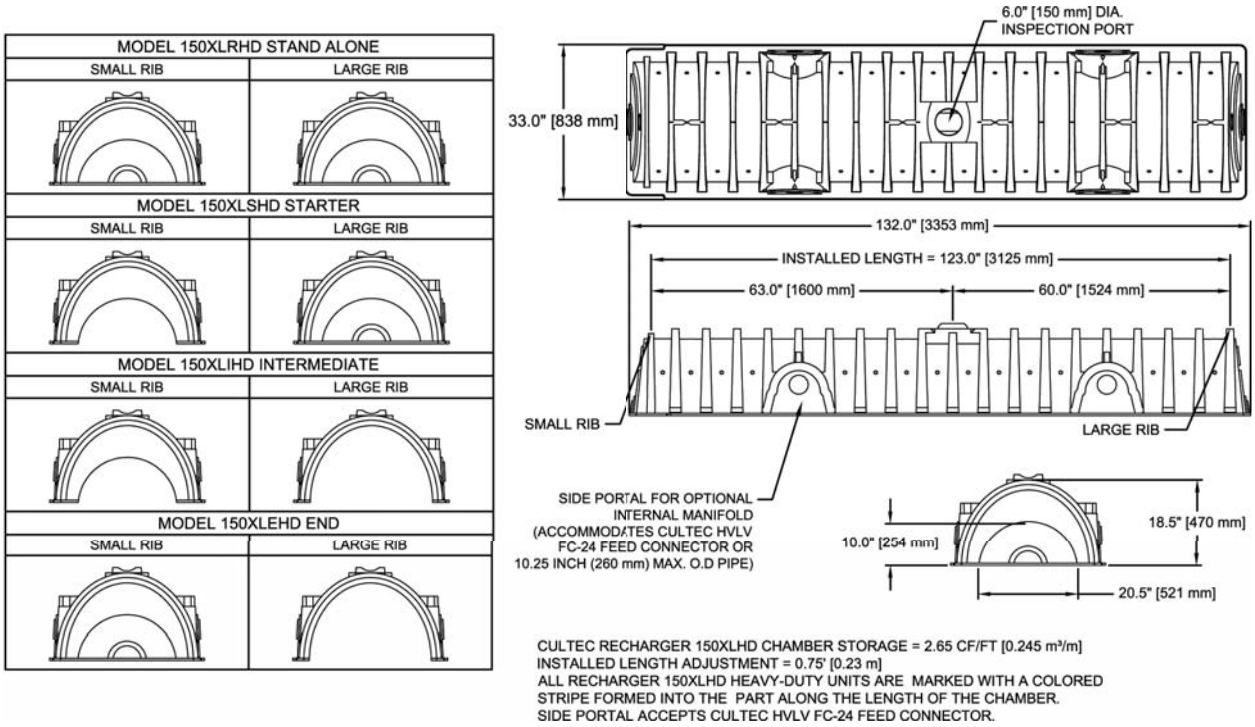
	Stone Foundation Depth		
	6"	12"	18"
	152 mm	305 mm	457 mm
Chamber and Stone Storage Per Chamber	50.17 ft³	56.83 ft³	63.49 ft³
	1.42 m³	1.61 m³	1.80 m³
Min. Effective Depth	2.54'	3.04'	3.54'
	0.77 m	0.93 m	1.08 m
Stone Required Per Chamber	2.13 yd³	2.75 yd³	3.36 yd³
	1.63 m³	2.10 m³	2.57 m³

Calculations are based on installed chamber length.
Includes 6" (152 mm) stone above crown of chamber and typical stone surround.
Stone void calculated at 40%.

Visit www.cultec.com/downloads.html for Product Downloads and CAD details.

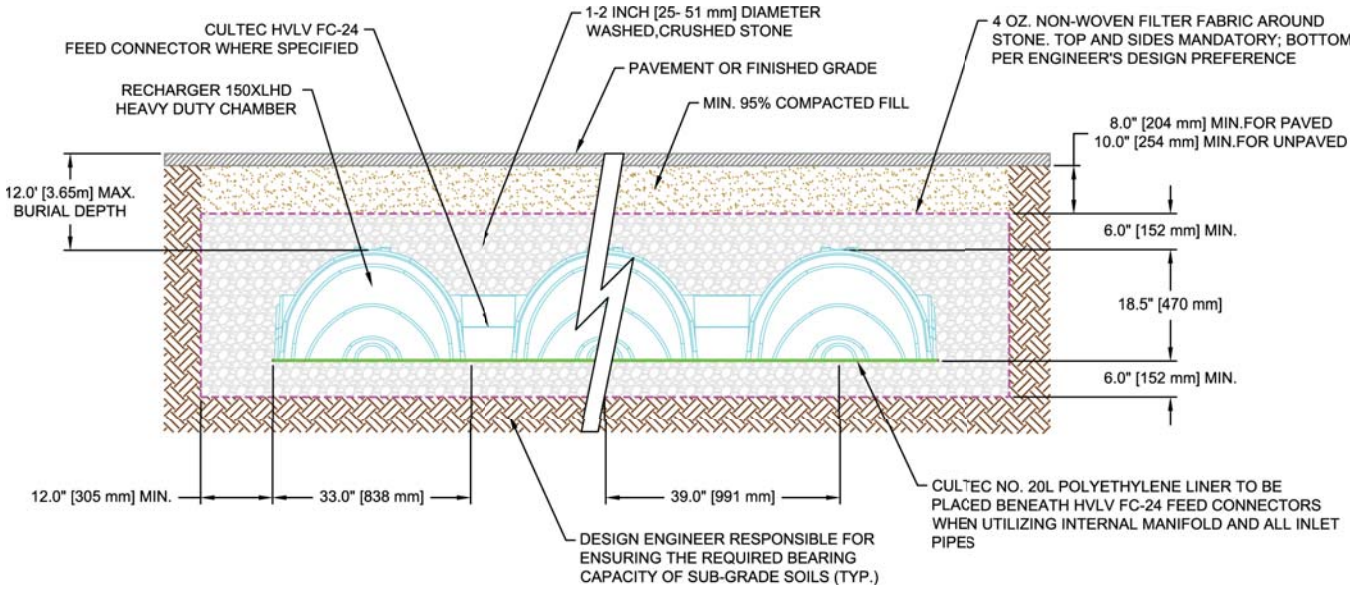
CULTEC Recharger® 150XLHD

Three View Drawing



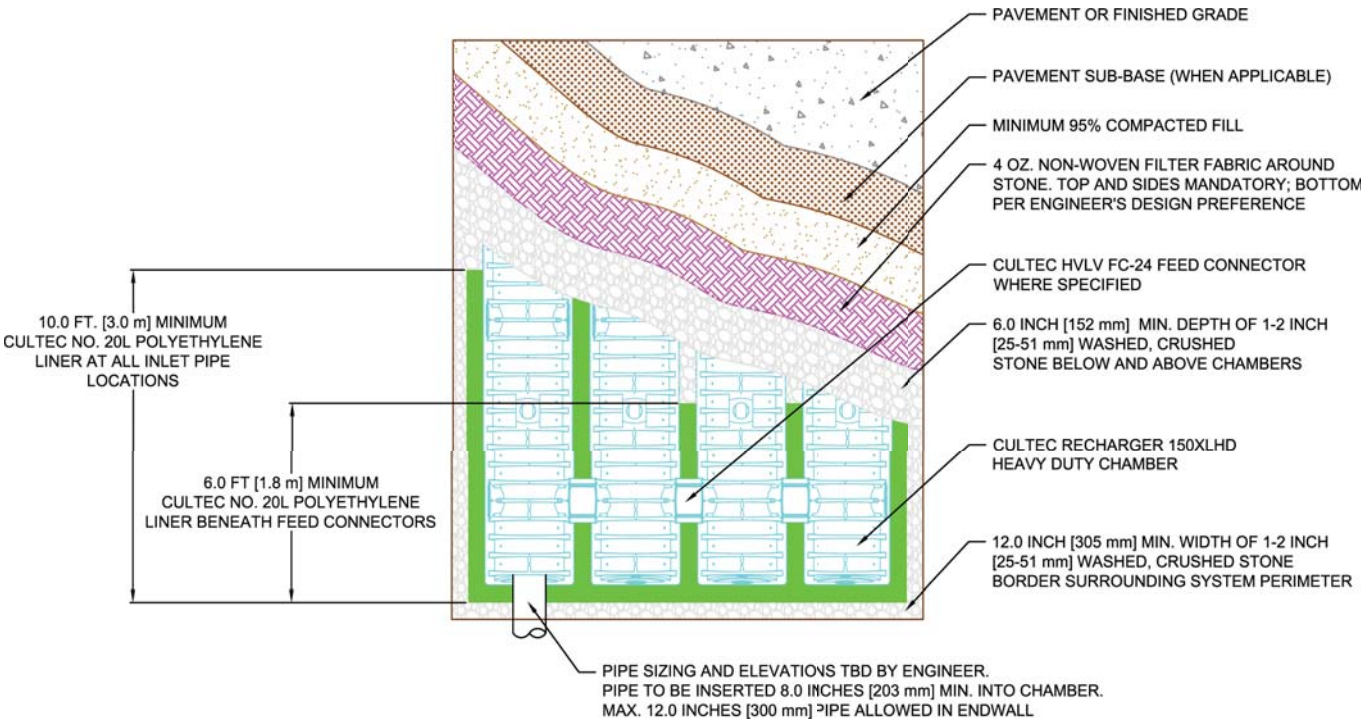
CULTEC RECHARGER 150XLHD CHAMBER STORAGE = 2.65 CF/FT [0.245 m³/m]
INSTALLED LENGTH ADJUSTMENT = 0.75' [0.23 m]
ALL RECHARGER 150XLHD HEAVY-DUTY UNITS ARE MARKED WITH A COLORED STRIPE FORMED INTO THE PART ALONG THE LENGTH OF THE CHAMBER.
SIDE PORTAL ACCEPTS CULTEC HVLV FC-24 FEED CONNECTOR.

Typical Cross Section for Traffic Application



CULTEC Recharger® 150XLHD

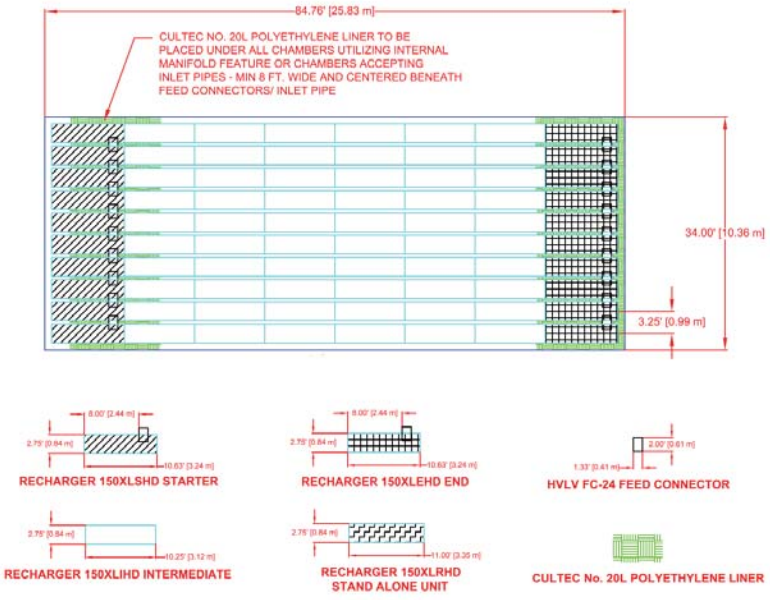
Plan View Drawing



Creating a Typical Bed Layout in AutoCAD

Using AutoCAD Array Function

1. Add Alternate Units to your Dimension Style and use 0.3048 as the Multiplier
2. Using the Rectangle command, create the three chamber outlines and the feed connectors:
   - Starter: 3.25' x 10.63'
   - Intermediate: 3.25' x 10.25'
   - End: 3.25' x 10.63'
   - Feed Connector: 1.33' x 2'
3. Hatch the Starter and End chambers to differentiate them. Place a feed connector (as shown) at one end of the starter and end chambers.
4. Select the Intermediate chamber and select the array command.
5. Specify the number of rows and columns (ex. 10 rows, 7 columns). Do not included the starter and end chambers in the column count.
6. The chambers should be oriented horizontally (as shown). Set the row offset to 3.75' and the column offset to 10.25'. The rotation angle should be 0.
7. Click accept to create the bed.
8. If R-Model chamber is incorporated into the design, use the Rectangle command to create a chamber outline 11.0' x 2.75'. Hatch the R-Model chambers using a unique pattern to differentiate them. Orient the R-Model chambers horizontally, and orient the chambers so there is a 0.5' spacing between the R-Model and the rest of the chamber rows. Proceed to steps 9 and 10 using the Polyline command instead of the Rectangle command to show the stone border and polyethylene liner. If no R-Model is incorporated into the design, proceed to steps 9 and 10.
9. Using the Rectangle command to surround the bed, offset the rectangle 1' to represent the stone border.
10. Using the Rectangle command create a polyethylene liner underneath the feed connectors at both ends of the bed. It should be 5' wide and span the width of the bed. Apply correct hatching and label the liner.



Storm Water System Design Aide download available online

CULTEC Recharger® 150XLHD Specifications

GENERAL

CULTEC Recharger® 150XLHD chambers are designed for underground stormwater management. The chambers may be used for retention, recharging, detention or controlling the flow of on-site stormwater runoff.

CHAMBER PARAMETERS

1. The chambers shall be manufactured by CULTEC, Inc. of Brookfield, CT (203-775-4416 or 1-800-428-5832).
2. The chamber shall be vacuum thermoformed of black polyethylene.
3. The chamber shall be arched in shape.
4. The chamber shall be open-bottomed.
5. The chamber shall be joined using an interlocking overlapping rib method. Connections must be fully shouldered overlapping ribs, having no separate couplings or separate end walls.
6. The nominal chamber dimensions of the CULTEC Recharger® 150XLHD shall be 18.5 inches (470 mm) tall, 33 inches (838 mm) wide and 11 feet (3.35 m) long. The installed length of a joined Recharger® 150XLHD shall be 10.25 feet (3.12 m).
7. Maximum inlet opening on the chamber end wall is 12 inches (300 mm).
8. The chamber shall have two side portals to accept CULTEC HVLV® FC-24 Feed Connectors to create an internal manifold. Maximum allowable O.D. in the side portal is 10.25 inches (260 mm).
9. The nominal chamber dimensions of the CULTEC HVLV® FC-24 Feed Connector shall be 12 inches (305 mm) tall, 16 inches (406 mm) wide and 24.2 inches (615 mm) long.
10. The nominal storage volume of the Recharger® 150XLHD chamber shall be 2.650 ft^3 / ft (0.246 m^3 / m) - without stone. The nominal storage volume of a single Recharger 150XLRHD Stand Alone unit shall be 29.15 ft^3 (0.83 m^3) - without stone. The nominal storage volume of a joined Recharger® 150XLIHD Intermediate unit shall be 27.16 ft^3 (0.77 m^3) - without stone. The nominal storage volume of the length adjustment amount per run shall be 1.99 ft^3 (0.18 m^3) - without stone.
11. The nominal storage volume of the HVLV® FC-24 Feed Connector shall be 0.913 ft^3 / ft (0.085 m^3 / m) - without stone.
12. The Recharger® 150XLHD chamber shall have thirty discharge holes bored into the sidewalls of the unit's core to promote lateral conveyance of water.
13. The Recharger® 150XLHD chamber shall have 20 corrugations.
14. The end wall of the chamber, when present, shall be an integral part of the continuously formed unit. Separate end plates cannot be used with this unit.
15. The Recharger® 150XLRHD Stand Alone unit must be formed as a whole chamber having two fully formed integral end walls and having no separate end plates or separate end walls.
16. The Recharger® 150XLSHD Starter unit must be formed as a whole chamber having one fully formed integral end wall and one partially formed integral end wall with a lower transfer opening of 10 inches (254 mm) high x 20.5 inches (521 mm)wide.
17. The Recharger® 150XLIHD Intermediate unit must be formed as a whole chamber having one fully open end wall and one partially formed integral end wall with a lower transfer opening of 10 inches (254 mm) high x 20.5 inches (521 mm) wide.
18. The Recharger® 150XLEHD End unit must be formed as a whole chamber having one fully formed integral end wall and one fully open end wall and having no separate end plates or end walls.
19. The HVLV® FC-24 Feed Connector must be formed as a whole chamber having two open end walls and having no separate end plates or separate end walls. The unit shall fit into the side portals of the Recharger® 150XLHD and act as cross feed connections.
20. Chambers must have horizontal stiffening flex reduction steps between the ribs.
21. Heavy duty units are designated by a colored stripe formed into the part along the length of the chamber.
22. The chamber shall have a raised integral cap at the top of the arch in the center of each unit to be used as an optional inspection port or clean-out.
23. The units may be trimmed to custom lengths by cutting back to any corrugation on the large rib end.
24. The chamber shall be manufactured in an ISO 9001:2008 certified facility.
25. Maximum allowable cover over the top of the chamber shall be 12' (3.66 m).
26. The chamber shall be designed to withstand traffic loads when installed according to CULTEC's recommended installation instructions.

CULTEC Recharger® 280HD

The Recharger® 280HD is a 26.5" (673 mm) tall, mid-size chamber and is typically used for installations with depth restrictions or when a larger infiltrative area is required. The Recharger® 280HD has the side portal internal manifold feature. HVLV® FC-24 Feed Connectors are inserted into the side portals to create the internal manifold.

Size (L x W x H)	8' x 47" x 26.5" 2.44 m x 1194 mm x 673 mm
Installed Length	7' 2.13 m
Length Adjustment per Run	1' 0.30 m
Chamber Storage	6.08 ft^3/ft 0.56 m^3/m 42.55 ft^3/unit 1.21 m^3/unit
Min. Installed Storage	9.21 ft^3/ft 0.86 m^3/m 64.46 ft^3/unit 1.83 m^3/unit
Min. Area Required	30.33 ft^2 2.82 m^2
Min. Center-to-Center Spacing	4.33' 1.32 m
Max. Allowable Cover	12' 3.66 m
Max. Inlet Opening in End Wall	18" 450 mm
Max. Allowable O.D. in Side Portal	12.25" 311 mm
Compatible Feed Connector	HVLV FC-24 Feed Connector

	Stone Foundation Depth		
	6"	12"	18"
	152 mm	305 mm	457 mm
Chamber and Stone Storage Per Chamber	64.46 ft^3	70.53 ft^3	76.59 ft^3
	1.83 m^3	2.00 m^3	2.17 m^3
Min. Effective Depth	3.21'	3.71'	4.21'
	0.98 m	1.13 m	1.28 m
Stone Required Per Chamber	2.03 yd^3	2.59 yd^3	3.15 yd^3
	1.55 m^3	1.98 m^3	2.41 m^3

Calculations are based on installed chamber length.
Includes 6" (152 mm) stone above crown of chamber and typical stone surround.
Stone void calculated at 40%.

Recharger® 280HD Bare Chamber Storage Volumes

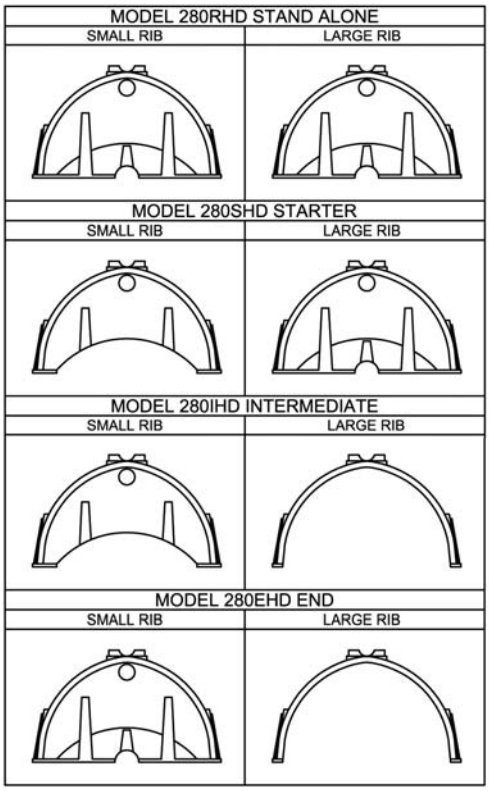
Elevation		Incremental Storage Volume				Cumulative Storage	
in.	mm	ft^3/ft	m^3/m	ft^3	m^3	ft^3	m^3
26.5	686	0.000	0.000	0.000	0.000	42.553	1.205
26	660	0.018	0.002	0.126	0.004	42.553	1.205
25	635	0.047	0.004	0.329	0.009	42.427	1.202
24	609	0.100	0.009	0.700	0.020	42.098	1.192
23	584	0.134	0.012	0.938	0.027	41.398	1.172
22	559	0.159	0.015	1.113	0.032	40.460	1.146
21	533	0.179	0.017	1.253	0.035	39.347	1.114
20	508	0.195	0.018	1.365	0.039	38.094	1.079
19	483	0.209	0.019	1.463	0.041	36.729	1.040
18	457	0.221	0.021	1.547	0.044	35.266	0.999
17	432	0.232	0.022	1.624	0.046	33.719	0.955
16	406	0.241	0.022	1.687	0.048	32.095	0.909
15	381	0.249	0.023	1.743	0.049	30.408	0.861
14	356	0.263	0.024	1.841	0.052	28.665	0.812
13	330	0.267	0.025	1.869	0.053	26.824	0.760
12	305	0.271	0.025	1.897	0.054	24.955	0.707
11	279	0.275	0.026	1.925	0.055	23.058	0.653
10	254	0.279	0.026	1.953	0.055	21.133	0.598
9	229	0.287	0.027	2.009	0.057	19.180	0.543
8	203	0.292	0.027	2.044	0.058	17.171	0.486
7	178	0.294	0.027	2.058	0.058	15.127	0.428
6	152	0.305	0.028	2.135	0.060	13.069	0.370
5	127	0.306	0.028	2.142	0.061	10.934	0.310
4	102	0.308	0.029	2.156	0.061	8.792	0.249
3	76	0.310	0.029	2.170	0.061	6.636	0.188
2	51	0.312	0.029	2.184	0.062	4.466	0.126
1	25	0.326	0.030	2.282	0.065	2.282	0.065
Total		6.079	0.565	42.553	1.205	42.553	1.205

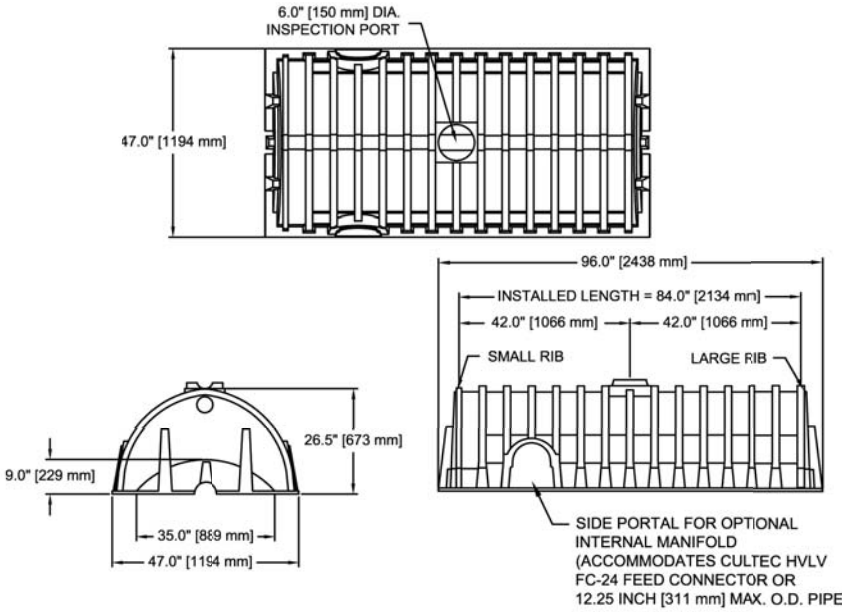
Calculations are based on installed chamber length.

Visit www.cultec.com/downloads.html for Product Downloads and CAD details.

CULTEC Recharger® 280HD

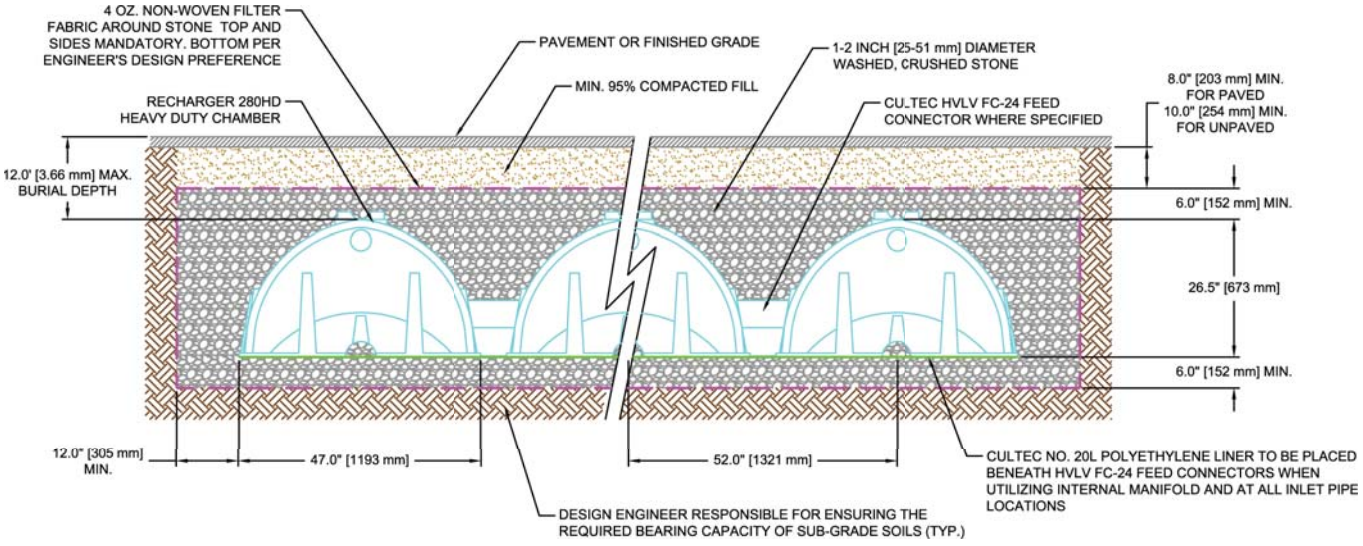
Three View Drawing





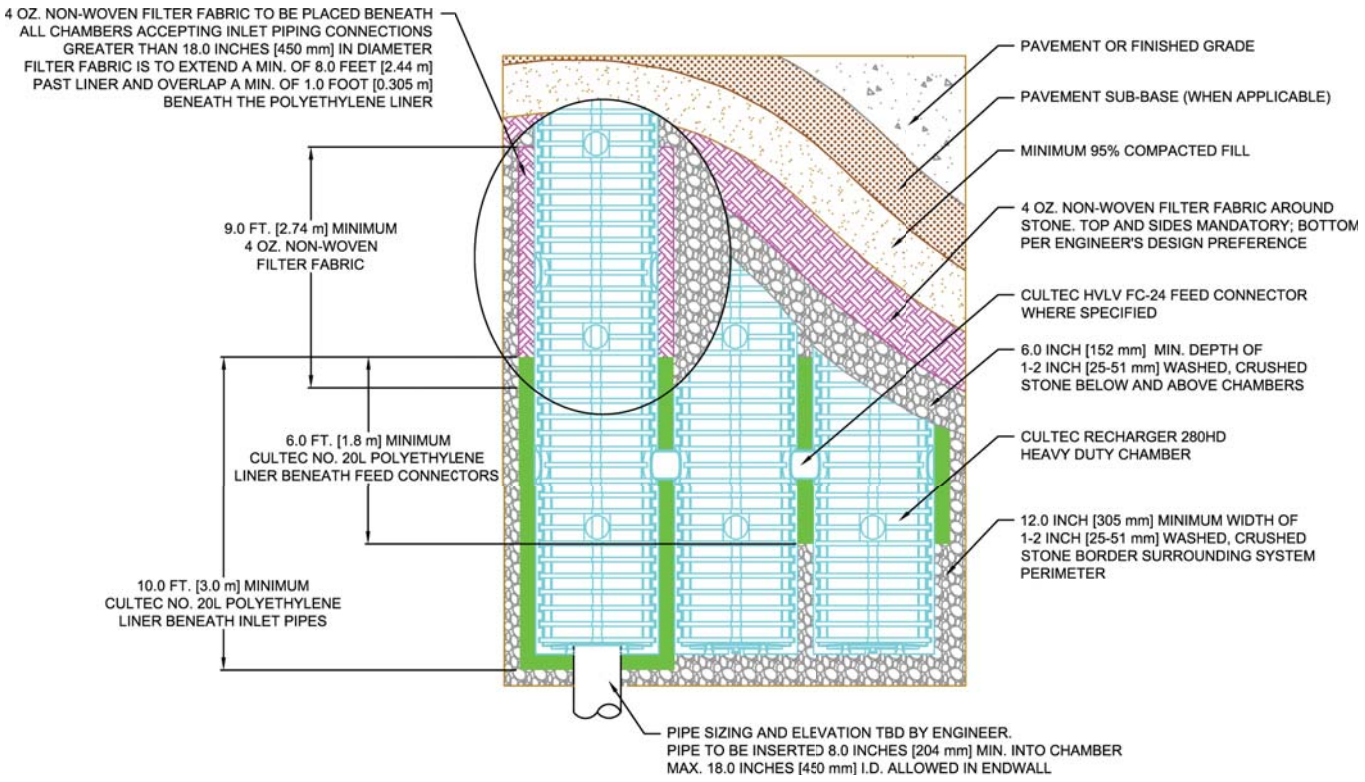
CULTEC RECHARGER 280HD CHAMBER STORAGE = 6.079 CF/FT [0.565 m³/m]
INSTALLED LENGTH ADJUSTMENT = 1.0' [0.3048 m]
ALL RECHARGER 280HD HEAVY DUTY UNITS ARE MARKED WITH A COLORED STRIPE FORMED INTO THE PART ALONG THE LENGTH OF THE CHAMBER.
SIDE PORTAL ACCEPTS CULTEC HVLV FC-24 FEED CONNECTOR.

Typical Cross Section for Traffic Application



CULTEC Recharger® 280HD

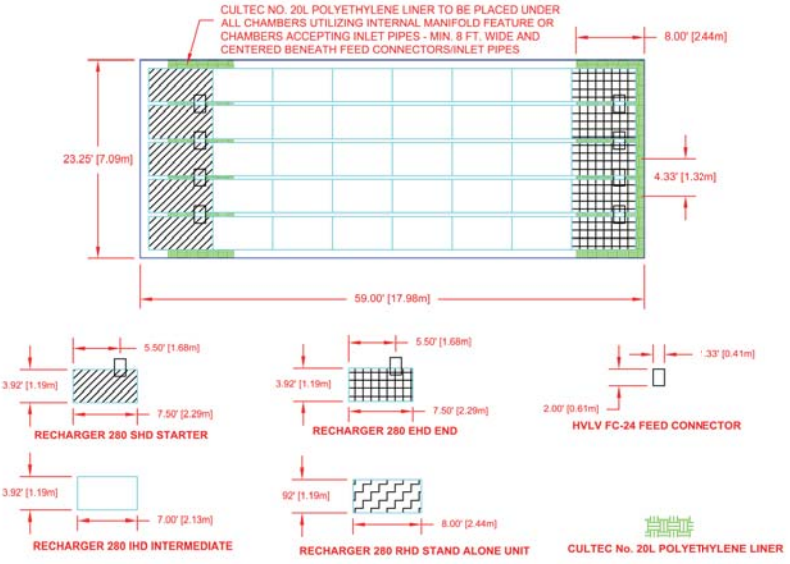
Plan View Drawing



Creating a Typical Bed Layout in AutoCAD

Using AutoCAD Array Function

1. Add Alternate Units to your Dimension Style and use 0.3048 as the Multiplier
2. Using the Rectangle command, create the three chamber outlines and the feed connectors:
   Starter: 3.92' x 7.5'
   Intermediate: 3.92' x 7.0'
   End: 3.92' x 7.5'
   Feed Connector: 1.33' x 2'
3. Hatch the Starter and End chambers to differentiate them. Place a feed connector (as shown) at one end of the starter and end chambers.
4. Select the Intermediate chamber and select the array command.
5. Specify the number of rows and columns (ex. 10 rows, 7 columns). Do not included the starter and end chambers in the column count.
6. The chambers should be oriented horizontally (as shown). Set the row offset to 4.33' and the column offset to 7'. The rotation angle should be 0.
7. Click accept to create the bed.
8. If R-Model chamber is incorporated into the design, use the Rectangle command to create a chamber outline 8.00' x 3.92'. Hatch the R-Model chambers using a unique pattern to differentiate them. Orient the R-Model chambers horizontally, and orient the chambers so there is a 0.42' spacing between the R-Model and the rest of the chamber rows. Proceed to steps 9 and 10 using the Polyline command instead of the Rectangle command to show the stone border and polyethylene liner. If no R-Model is incorporated into the design, proceed to steps 9 and 10.
9. Using the Rectangle command to surround the bed, offset the rectangle 1' to represent the stone border.
10. Using the Rectangle command create a polyethylene liner underneath the feed connectors at both ends of the bed. It should be 5' wide and span the width of the bed. Apply correct hatching and label the liner.



Storm Water System Design Aide download available online

CULTEC Recharger® 280HD Specifications

GENERAL

CULTEC Recharger® 280HD chambers are designed for underground stormwater management. The chambers may be used for retention, recharging, detention or controlling the flow of on-site stormwater runoff.

CHAMBER PARAMETERS

1. The chambers shall be manufactured by CULTEC, Inc. of Brookfield, CT (203-775-4416 or 1-800-428-5832).
2. The chamber shall be vacuum thermoformed of black polyethylene.
3. The chamber shall be arched in shape.
4. The chamber shall be open-bottomed.
5. The chamber shall be joined using an interlocking overlapping rib method. Connections must be fully shouldered overlapping ribs, having no separate couplings or separate end walls.
6. The nominal chamber dimensions of the CULTEC Recharger® 280HD shall be 26.5 inches (673 mm) tall, 47 inches (1194 mm) wide and 8 feet (2.44 m) long. The installed length of a joined Recharger® 280HD shall be 7 feet (2.13 m).
7. Maximum inlet opening on the chamber end wall is 18 inches (450 mm).
8. The chamber shall have two side portals to accept CULTEC HVLV® FC-24 Feed Connectors to create an internal manifold. Maximum allowable O.D. in the side portal is 12.25 inches (311 mm).
9. The nominal chamber dimensions of the CULTEC HVLV® FC-24 Feed Connector shall be 12 inches (305 mm) tall, 16 inches (406 mm) wide and 24.2 inches (614 mm) long.
10. The nominal storage volume of the Recharger® 280HD chamber shall be 6.079 ft^3 / ft (0.565 m^3 / m) - without stone. The nominal storage volume of a single Recharger 280RHD Stand Alone unit shall be 48.63 ft^3 (1.38 m^3) - without stone. The nominal storage volume of a joined Recharger® 280IHD Intermediate unit shall be 42.553 ft^3 (1.205 m^3) - without stone. The nominal storage volume of the length adjustment amount per run shall be 6.08 ft^3 (0.56 m^3) - without stone.
11. The nominal storage volume of the HVLV® FC-24 Feed Connector shall be 0.913 ft^3 / ft (0.085 m^3 / m) - without stone.
12. The Recharger® 280HD chamber shall have eighty-two discharge holes bored into the sidewalls of the unit's core to promote lateral conveyance of water.
13. The Recharger® 280HD chamber shall have 15 corrugations.
14. The end wall of the chamber, when present, shall be an integral part of the continuously formed unit. Separate end plates cannot be used with this unit.
15. The Recharger® 280RHD Stand Alone unit must be formed as a whole chamber having two fully formed integral end walls and having no separate end plates or separate end walls.
16. The Recharger® 280SHD Starter unit must be formed as a whole chamber having one fully formed integral end wall and one partially formed integral end wall with a lower transfer opening of 9 inches (229 mm) high x 35 inches (889 mm) wide.
17. The Recharger® 280IHD Intermediate unit must be formed as a whole chamber having one fully open end wall and one partially formed integral end wall with a lower transfer opening of 9 inches (229 mm) high x 35 inches (889 mm) wide.
18. The Recharger® 280EHD End unit must be formed as a whole chamber having one fully formed integral end wall and one fully open end wall and having no separate end plates or end walls.
19. The HVLV® FC-24 Feed Connector must be formed as a whole chamber having two open end walls and having no separate end plates or separate end walls. The unit shall fit into the side portals of the Recharger® 280HD and act as cross feed connections.
20. Chambers must have horizontal stiffening flex reduction steps between the ribs.
21. Heavy duty units are designated by a colored stripe formed into the part along the length of the chamber.
22. The chamber shall have a raised integral cap at the top of the arch in the center of each unit to be used as an optional inspection port or clean-out.
23. The units may be trimmed to custom lengths by cutting back to any corrugation on the large rib end.
24. The chamber shall be manufactured in an ISO 9001:2008 certified facility.
25. Maximum allowable cover over the top of the chamber shall be 12' (3.66 m).
26. The chamber shall be designed to withstand traffic loads when installed according to CULTEC's recommended installation instructions.

CULTEC Recharger® 330XLHD

The Recharger® 330XLHD is a 30.5" (775 mm) tall, high capacity chamber. Typically when using this model, fewer chambers are required resulting in less labor and a smaller installation area. The Recharger® 330XLHD has the side portal internal manifold feature. HVLV® FC-24 Feed Connectors are inserted into the side portals to create the internal manifold.

Size (L x W x H)	8.5' x 52" x 30.5" 2.59 m x 1321 mm x 775 mm
Installed Length	7' 2.13 m
Length Adjustment per Run	1.50' 0.46 m
Chamber Storage	7.46 ft³/ft 0.69 m³/m 52.21 ft³/unit 1.48 m³/unit
Min. Installed Storage	11.32 ft³/ft 1.05 m³/m 79.26 ft³/unit 2.24 m³/unit
Min. Area Required	33.83 ft² 3.14 m²
Min. Center-to-Center Spacing	4.83' 1.47 m
Max. Allowable Cover	12' 3.66 m
Max. Inlet Opening in End Wall	24" 600 mm
Max. Allowable O.D. in Side Portal	11.75" 298 mm
Compatible Feed Connector	HVLV FC-24 Feed Connector

	Stone Foundation Depth		
	6"	12"	18"
	152 mm	305 mm	457 mm
Chamber and Stone Storage Per Chamber	79.26 ft³	86.03 ft³	92.79 ft³
	2.24 m³	2.44 m³	2.63 m³
Min. Effective Depth	3.54'	4.04'	4.54'
	1.08 m	1.23 m	1.38 m
Stone Required Per Chamber	2.50 yd³	3.13 yd³	3.76 yd³
	1.91 m³	2.39 m³	2.87 m³

Calculations are based on installed chamber length.
Includes 6" (152 mm) stone above crown of chamber and typical stone surround.
Stone void calculated at 40%.

Recharger® 330XLHD Bare Chamber Storage Volumes

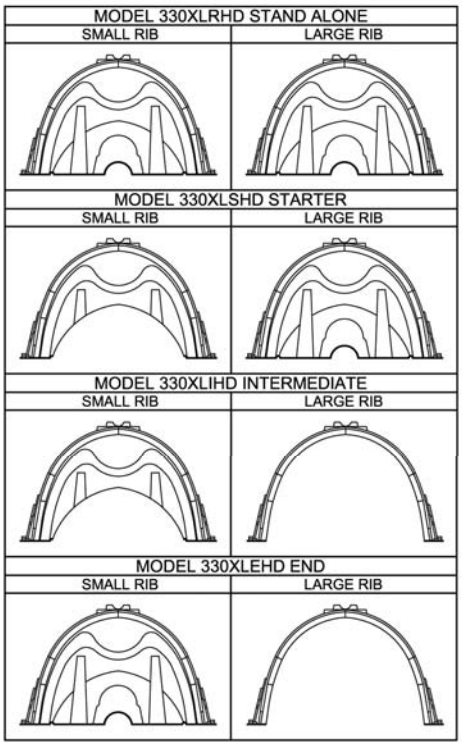
Elevation		Incremental Storage Volume				Cumulative Storage	
in.	mm	ft³ / ft	m³ / m	ft³	m³	ft³	m³
30.5	775	0.000	0.000	0.000	0.000	52.213	1.479
30	762	0.019	0.002	0.133	0.004	52.213	1.479
29	737	0.051	0.005	0.357	0.010	52.080	1.475
28	711	0.084	0.008	0.588	0.017	51.723	1.465
27	686	0.124	0.012	0.868	0.025	51.135	1.448
26	660	0.150	0.014	1.05	0.030	50.267	1.424
25	635	0.173	0.016	1.211	0.034	49.217	1.394
24	609	0.191	0.018	1.337	0.038	48.006	1.360
23	584	0.207	0.019	1.449	0.041	46.669	1.322
22	559	0.221	0.021	1.547	0.044	45.220	1.281
21	533	0.233	0.022	1.631	0.046	43.673	1.237
20	508	0.244	0.023	1.708	0.048	42.042	1.191
19	483	0.254	0.024	1.778	0.050	40.334	1.142
18	457	0.264	0.025	1.848	0.052	38.556	1.092
17	432	0.271	0.025	1.897	0.054	36.708	1.040
16	406	0.283	0.026	1.981	0.056	34.811	0.986
15	381	0.294	0.027	2.058	0.058	32.830	0.930
14	356	0.296	0.027	2.072	0.059	30.772	0.871
13	330	0.299	0.028	2.093	0.059	28.700	0.813
12	305	0.301	0.028	2.107	0.060	26.607	0.754
11	279	0.303	0.028	2.121	0.060	24.500	0.694
10	254	0.304	0.028	2.128	0.060	22.379	0.634
9	229	0.306	0.028	2.142	0.061	20.251	0.574
8	203	0.313	0.029	2.191	0.062	18.109	0.513
7	178	0.321	0.030	2.247	0.064	15.918	0.451
6	152	0.322	0.030	2.254	0.064	13.671	0.387
5	127	0.323	0.030	2.261	0.064	11.417	0.323
4	102	0.324	0.030	2.268	0.064	9.156	0.259
3	76	0.325	0.030	2.275	0.064	6.888	0.195
2	51	0.327	0.030	2.289	0.065	4.613	0.131
1	25	0.332	0.031	2.324	0.066	2.324	0.066
Total		7.459	0.693	52.213	1.479	52.213	1.479

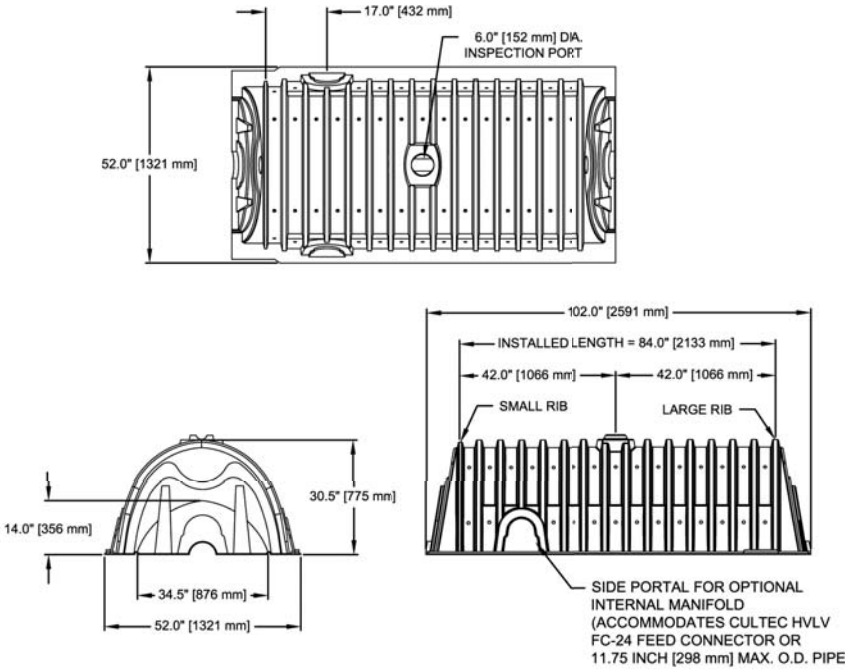
Calculations are based on installed chamber length.

Visit www.cultec.com/downloads.html for Product Downloads and CAD details.

CULTEC Recharger® 330XLHD

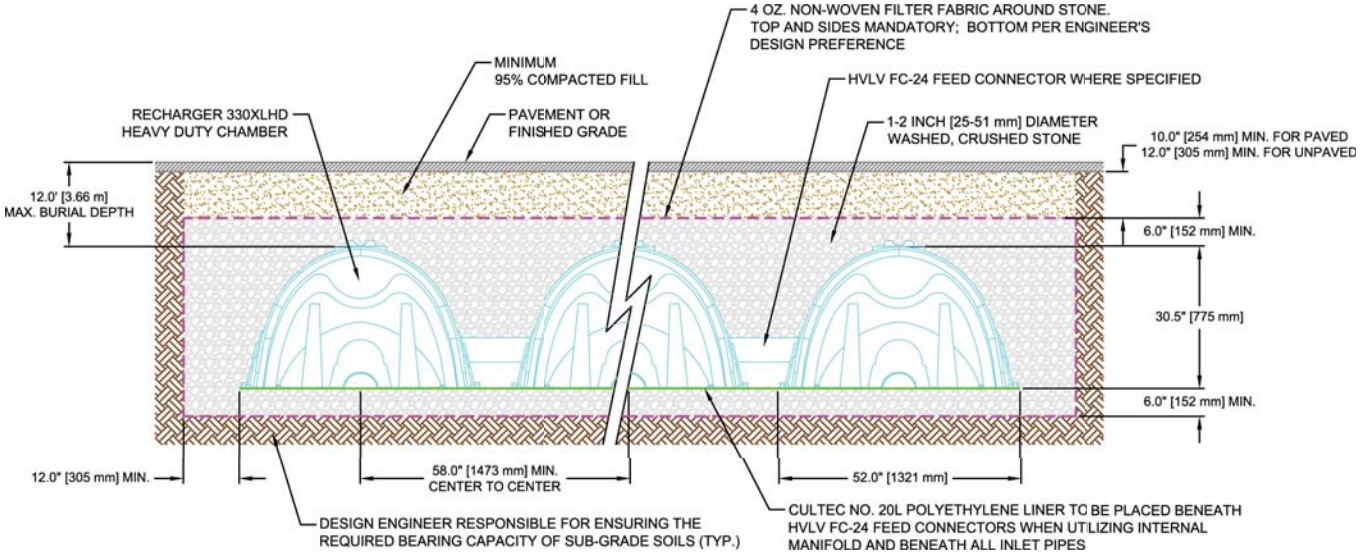
Three View Drawing





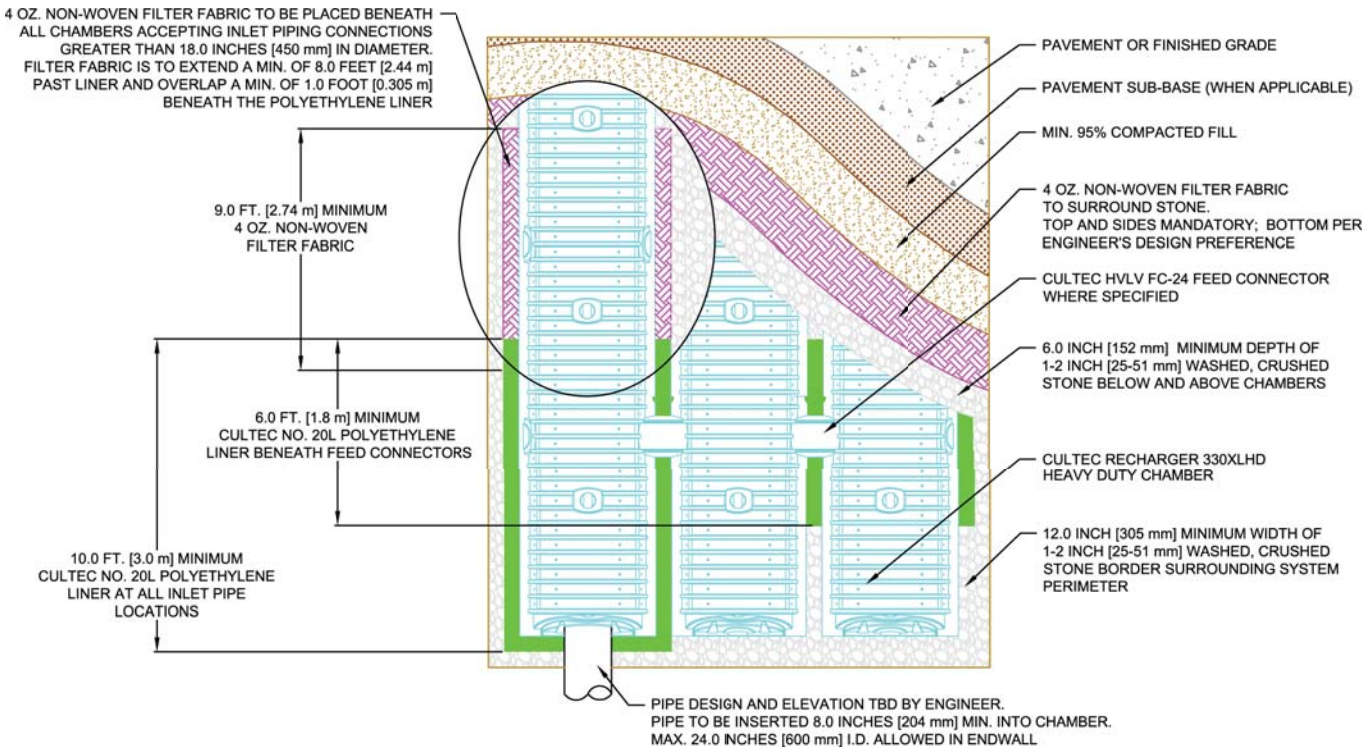
CULTEC RECHARGER 330XLHD CHAMBER STORAGE = 7.459 CF/FT [0.693 m³/m]
INSTALLED LENGTH ADJUSTMENT = 1.5' [0.46 m]
SIDE PORTAL ACCEPTS CULTEC HVLV FC-24 FEED CONNECTOR

Typical Cross Section for Traffic Application



CULTEC Recharger® 330XLHD

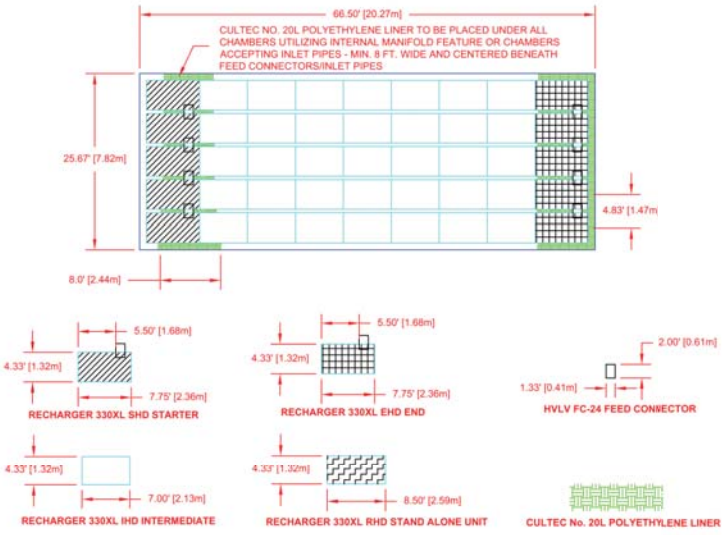
Plan View Drawing



Creating a Typical Bed Layout in AutoCAD

Using AutoCAD Array Function

1. Add Alternate Units to your Dimension Style and use 0.3048 as the Multiplier.
2. Using the Rectangle command, create the three chamber outlines and the feed connectors:
   Starter: 4.33' x 7.75'
   Intermediate: 4.33' x 7.00'
   End: 4.33' x 7.75'
   Feed Connector: 1.33' x 2.00'
3. Hatch the Starter and End chambers to differentiate them. Place a feed connector (as shown) at one end of the starter and end chambers.
4. Select the Intermediate chamber and select the array command.
5. Specify the number of rows and columns (ex. 10 rows, 7 columns). Do not include the starter and end chambers in the column count.
6. The chambers should be oriented horizontally (as shown). Set the row offset to 4.83' and the column offset to 7'. The rotation angle should be 0.
7. Click accept to create the bed.
8. If R-Model chamber is incorporated into the design, use the Rectangle command to create a chamber outline 8.50' x 4.33'. Hatch the R-Model chambers using a unique pattern to differentiate them. Orient the R-Model chamber horizontally, and orient the chambers so there is a 0.5' spacing between the R-Model and the rest of the chamber rows. Proceed to steps 9 and 10 using the Polyline command instead of the Rectangle command to show the stone border and polyethylene liner. If no R-Model is incorporated into the design, proceed to steps 9 and 10.
9. Using the Rectangle command to surround the bed, offset the rectangle 1' to represent the stone border.
10. Using the Rectangle command create a polyethylene liner underneath the feed connectors at both ends of the bed. It should be 5 wide and span the width of the bed. Apply correct hatching and label the liner.



Storm Water System Design Aide download available online

CULTEC Recharger® 330XLHD Specifications

GENERAL

CULTEC Recharger® 330XLHD chambers are designed for underground stormwater management. The chambers may be used for retention, recharging, detention or controlling the flow of on-site stormwater runoff.

CHAMBER PARAMETERS

1. The chambers shall be manufactured by CULTEC, Inc. of Brookfield, CT (203-775-4416 or 1-800-428-5832).
2. The chamber shall be vacuum thermoformed of black polyethylene.
3. The chamber shall be arched in shape.
4. The chamber shall be open-bottomed.
5. The chamber shall be joined using an interlocking overlapping rib method. Connections must be fully shouldered overlapping ribs, having no separate couplings or separate end walls.
6. The nominal chamber dimensions of the CULTEC Recharger® 330XLHD shall be 30.5 inches (775 mm) tall, 52 inches (1321 mm) wide and 8.5 feet (2.59 m) long. The installed length of a joined Recharger® 330XLHD shall be 7 feet (2.13 m).
7. Maximum inlet opening on the chamber end wall is 24 inches (600 mm).
8. The chamber shall have two side portals to accept CULTEC HVLV® FC-24 Feed Connectors to create an internal manifold. Maximum allowable O.D. in the side portal is 11.75 inches (298 mm).
9. The nominal chamber dimensions of the CULTEC HVLV® FC-24 Feed Connector shall be 12 inches (305 mm) tall, 16 inches (406 mm) wide and 24.2 inches (614 mm) long.
10. The nominal storage volume of the Recharger® 330XLHD chamber shall be 7.459 ft^3 / ft (0.693 m^3 / m) - without stone. The nominal storage volume of a single Recharger® 330XLRHD Stand Alone unit shall be 63.40 ft^3 (1.80 m^3) - without stone. The nominal storage volume of a joined Recharger® 330XLIHD Intermediate unit shall be 52.213 ft^3 (1.478 m^3) - without stone. The nominal storage volume of the length adjustment amount per run shall be 11.19 ft^3 (1.04 m^3) - without stone.
11. The nominal storage volume of the HVLV® FC-24 Feed Connector shall be 0.913 ft^3 / ft (0.026 m^3 / m) - without stone.
12. The Recharger® 330XLHD chamber shall have fifty-six discharge holes bored into the sidewalls of the unit's core to promote lateral conveyance of water.
13. The Recharger® 330XLHD chamber shall have 16 corrugations.
14. The end wall of the chamber, when present, shall be an integral part of the continuously formed unit. Separate end plates cannot be used with this unit.
15. The Recharger® 330XLRHD Stand Alone unit must be formed as a whole chamber having two fully formed integral end walls and having no separate end plates or separate end walls.
16. The Recharger® 330XLSHD Starter unit must be formed as a whole chamber having one fully formed integral end wall and one partially formed integral end wall with a lower transfer opening of 14 inches (356 mm) high x 34.5 inches (876 mm) wide.
17. The Recharger® 330XLIHD Intermediate unit must be formed as a whole chamber having one fully open end wall and one partially formed integral end wall with a lower transfer opening of 14 inches (356 mm) high x 34.5 inches (876 mm) wide.
18. The Recharger® 330XLEHD End unit must be formed as a whole chamber having one fully formed integral end wall and one fully open end wall and having no separate end plates or end walls.
19. The HVLV® FC-24 Feed Connector must be formed as a whole chamber having two open end walls and having no separate end plates or separate end walls. The unit shall fit into the side portals of the Recharger® 330XLHD and act as cross feed connections.
20. Chambers must have horizontal stiffening flex reduction steps between the ribs.
21. Heavy duty units are designated by a colored stripe formed into the part along the length of the chamber.
22. The chamber shall have a raised integral cap at the top of the arch in the center of each unit to be used as an optional inspection port or clean-out.
23. The units may be trimmed to custom lengths by cutting back to any corrugation on the large rib end.
24. The chamber shall be manufactured in an ISO 9001:2008 certified facility.
25. Maximum allowable cover over the top of the chamber shall be 12' (3.66 m).
26. The chamber shall be designed to withstand traffic loads when installed according to CULTEC's recommended installation instructions.

CULTEC Recharger® V8HD

The Recharger® V8HD is a 32" (813 mm) tall, high capacity chamber. The Recharger® V8HD has the side portal internal manifold feature. HVLV® Feed Connectors are inserted into the side portals to create the internal manifold.

The Recharger V8SHD Starter and V8EHD End sections are **shorter** in length than the Recharger V8IHD Intermediate section. These differences must be considered during product specification, calculation and design.

Recharger V8SHD Starter

Recharger V8IHD Intermediate

Recharger V8EHD End

	Recharger V8SHD Starter or V8EHD End Section	Recharger V8IHD Intermediate Section
Size (L x W x H)	5.08' x 60" x 32"	8' x 60" x 32"
	1.55 m x 1524 mm x 813 mm	2.44 m x 1524 mm x 813 mm
Installed Length	4.58'	7.5'
	1.40 m	2.29 m
Length Adjustment per Run	-5.83'	-5.83'
	-1.78 m	-1.78 m
Chamber Storage	8.68 ft^3/ft	8.68 ft^3/ft
	0.81 m^3/m	0.81 m^3/m
	39.78 ft^3/unit	65.09 ft^3/unit
	1.13 m^3/unit	1.84 m^3/unit
Min. Installed Storage	13.27 ft^3/ft	13.27 ft^3/ft
	1.23 m^3/m	1.23 m^3/m
	60.84 ft^3/unit	99.56 ft^3/unit
	1.72 m^3/unit	2.82 m^3/unit
Min. Area Required	25.21 ft^2	41.25 ft^2
	2.34 m^2	3.83 m^2
Min. Center-to-Center Spacing	5.5'	5.5'
	1.68 m	1.68 m
Max. Allowable Cover	8'	8'
	2.44 m	2.44 m
Max. Inlet Opening in End Wall	24"	n/a
	600 mm	n/a
Max. Allowable O.D. in Side Portal	15.3"	12.25"
	387 mm	311 mm
Compatible Feed Connector	HVLV F-110x4 Feed Connector	HVLV FC-24 Feed Connector

Recharger V8SHD Starter or V8EHD End	Stone Foundation Depth 6" 152 mm	12" 305 mm	18" 457 mm
Chamber and Stone Storage Per Chamber	60.84 ft^3	65.88 ft^3	70.92 ft^3
	1.72 m^3	1.87 m^3	2.01 m^3
Min. Effective Depth	3.67'	4.17'	4.67'
	1.12 m	1.27 m	1.42 m
Stone Required Per Chamber	1.95 yd^3	2.42 yd^3	2.88 yd^3
	1.49 m^3	1.85 m^3	2.20 m^3

Recharger V8IHD Intermediate	Stone Foundation Depth 6" 152 mm	12" 305 mm	18" 457 mm
Chamber and Stone Storage Per Chamber	99.56 ft^3	107.81 ft^3	116.06 ft^3
	2.82 m^3	3.05 m^3	3.29 m^3
Min. Effective Depth	3.67'	4.17'	4.67'
	1.12 m	1.27 m	1.42 m
Stone Required Per Chamber	3.19 yd^3	3.95 yd^3	4.72 yd^3
	2.44 m^3	3.02 m^3	3.61 m^3

Includes 6" (152 mm) stone above crown of chamber and typical stone surround. Stone void calculated at 40%.

CULTEC Recharger® V8HD

Recharger® V8HD Bare Chamber Storage Volumes

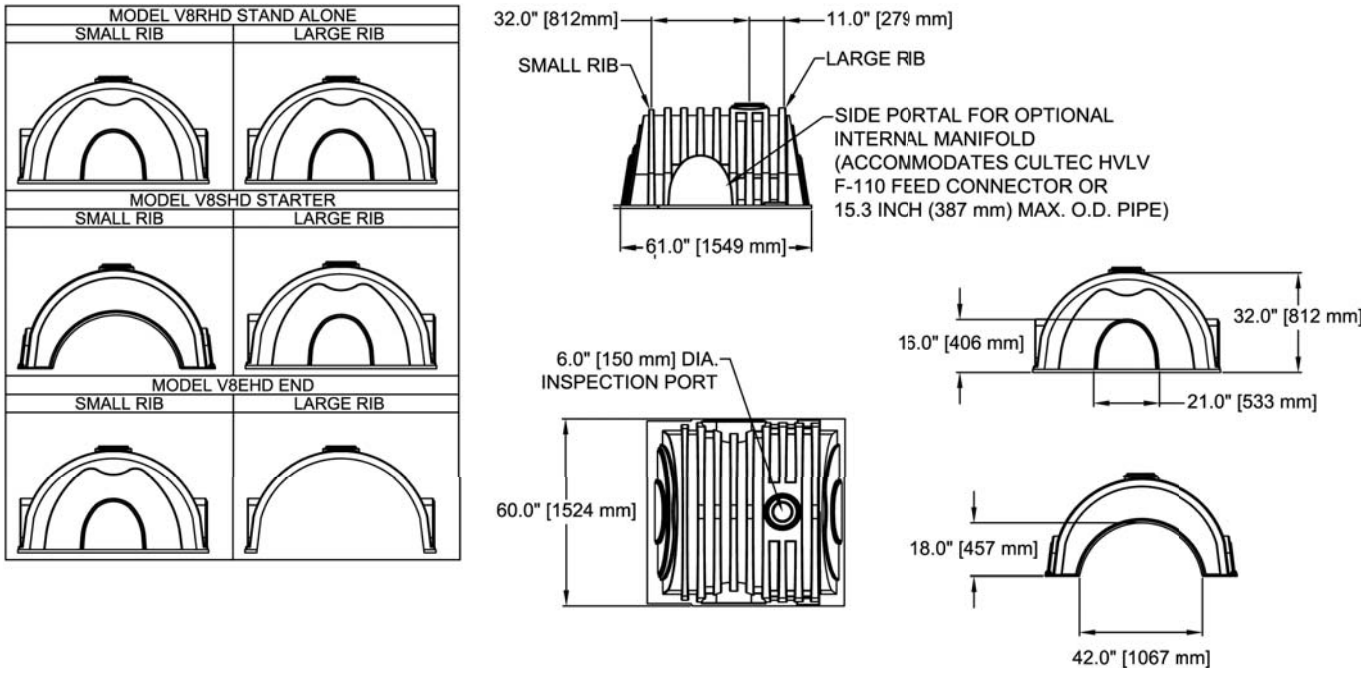
Elevation		Incremental Storage Volume						Cumulative Storage			
				Recharger V8SHD Starter or V8EHD End Section		Recharger V8IHD Intermediate Section		Recharger V8SHD Starter or V8EHD End Section		Recharger V8IHD Intermediate Section	
in.	mm	ft^3/ft	m^3/m	ft^3	m^3	ft^3	m^3	ft^3	m^3	ft^3	m^3
32	813	0.006	0.001	0.028	0.001	0.045	0.001	39.779	1.126	65.093	1.843
31	787	0.027	0.003	0.124	0.004	0.203	0.006	39.751	1.126	65.048	1.842
30	762	0.040	0.004	0.183	0.005	0.300	0.008	39.628	1.122	64.845	1.836
29	737	0.084	0.008	0.385	0.011	0.630	0.018	39.444	1.117	64.545	1.828
28	711	0.129	0.012	0.591	0.017	0.968	0.027	39.059	1.106	63.915	1.810
27	686	0.159	0.015	0.729	0.021	1.193	0.034	38.468	1.089	62.948	1.782
26	660	0.183	0.017	0.839	0.024	1.373	0.039	37.739	1.069	61.755	1.749
25	635	0.204	0.019	0.935	0.026	1.530	0.043	36.900	1.045	60.383	1.710
24	609	0.222	0.021	1.018	0.029	1.665	0.047	35.965	1.018	58.853	1.666
23	584	0.238	0.022	1.091	0.031	1.785	0.051	34.948	0.990	57.188	1.619
22	559	0.252	0.023	1.155	0.033	1.890	0.054	33.857	0.959	55.403	1.569
21	533	0.265	0.025	1.215	0.034	1.988	0.056	32.702	0.926	53.513	1.515
20	508	0.277	0.026	1.270	0.036	2.078	0.059	31.488	0.892	51.525	1.459
19	483	0.287	0.027	1.315	0.037	2.153	0.061	30.218	0.856	49.448	1.400
18	457	0.298	0.028	1.366	0.039	2.235	0.063	28.903	0.818	47.295	1.339
17	432	0.307	0.029	1.407	0.040	2.303	0.065	27.537	0.780	45.060	1.276
16	406	0.315	0.029	1.444	0.041	2.363	0.067	26.130	0.740	42.758	1.211
15	381	0.323	0.030	1.480	0.042	2.423	0.069	24.686	0.699	40.395	1.144
14	356	0.329	0.031	1.508	0.043	2.468	0.070	23.205	0.657	37.973	1.075
13	330	0.336	0.031	1.540	0.044	2.520	0.071	21.698	0.614	35.505	1.005
12	305	0.344	0.032	1.577	0.045	2.580	0.073	20.158	0.571	32.985	0.934
11	279	0.350	0.033	1.604	0.045	2.625	0.074	18.581	0.526	30.405	0.861
10	254	0.352	0.033	1.613	0.046	2.640	0.075	16.977	0.481	27.780	0.787
9	229	0.367	0.034	1.682	0.048	2.753	0.078	15.363	0.435	25.140	0.712
8	203	0.369	0.034	1.691	0.048	2.768	0.078	13.681	0.387	22.388	0.634
7	178	0.370	0.034	1.696	0.048	2.775	0.079	11.990	0.340	19.620	0.556
6	152	0.371	0.034	1.700	0.048	2.783	0.079	10.294	0.291	16.845	0.477
5	127	0.372	0.035	1.705	0.048	2.790	0.079	8.594	0.243	14.063	0.398
4	102	0.372	0.035	1.705	0.048	2.790	0.079	6.889	0.195	11.273	0.319
3	76	0.373	0.035	1.710	0.048	2.798	0.079	5.184	0.147	8.483	0.240
2	51	0.375	0.035	1.719	0.049	2.813	0.080	3.474	0.098	5.685	0.161
1	25	0.383	0.036	1.755	0.050	2.873	0.081	1.755	0.050	2.873	0.081
Total		8.679	0.806	39.779	1.126	65.093	1.843				

Calculations are based on installed chamber length.

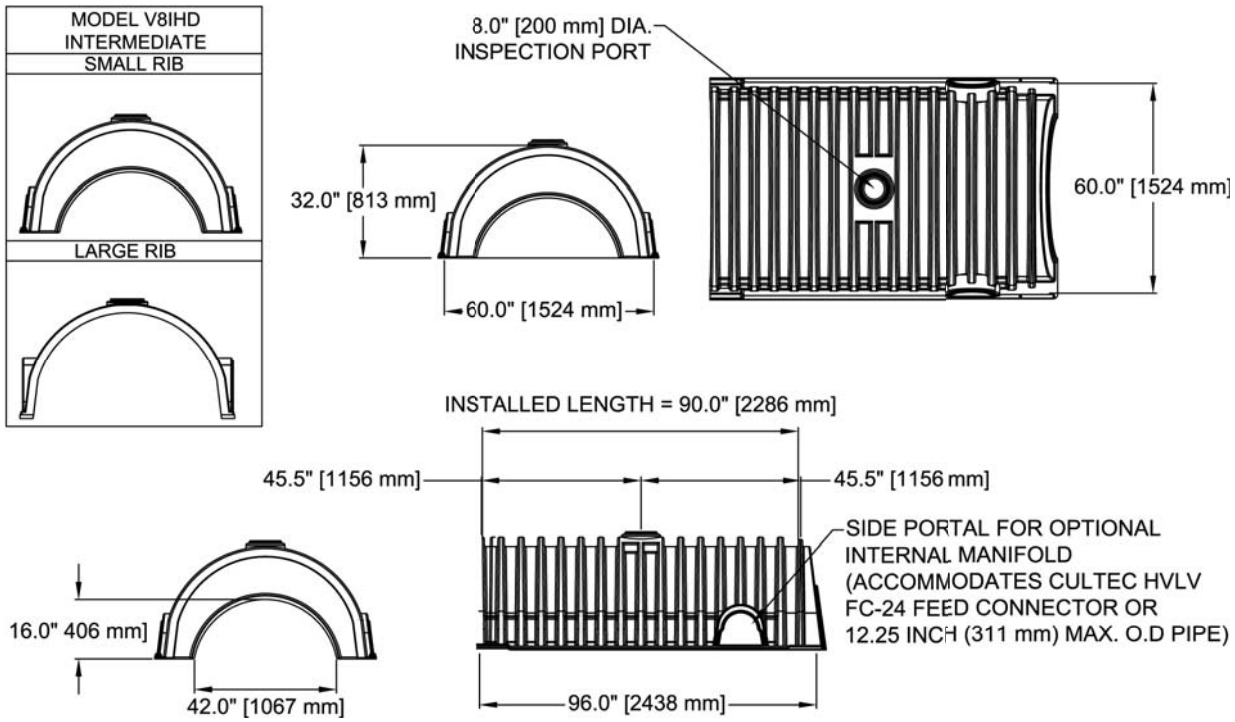
Visit www.cultec.com/downloads.html
for Product Downloads and CAD details.

CULTEC Recharger® V8HD

Recharger V8SHD Starter and V8EHD End Three View Drawing

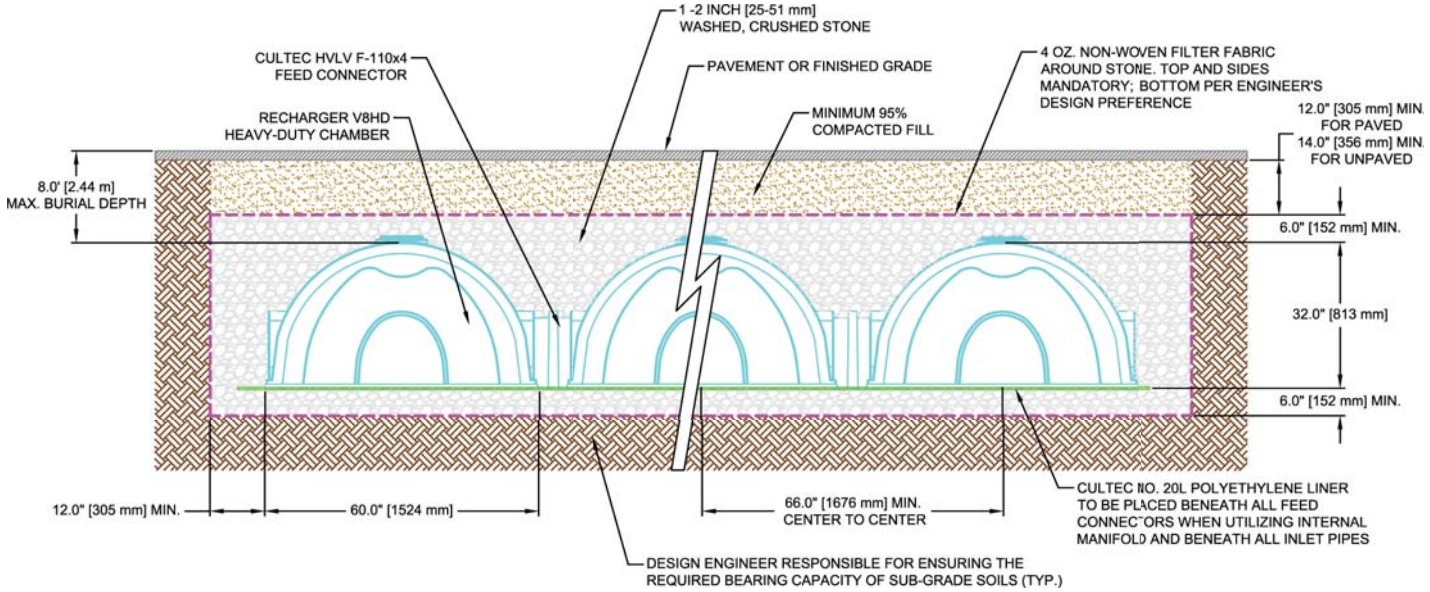


Recharger V8IHD Intermediate Three View Drawing

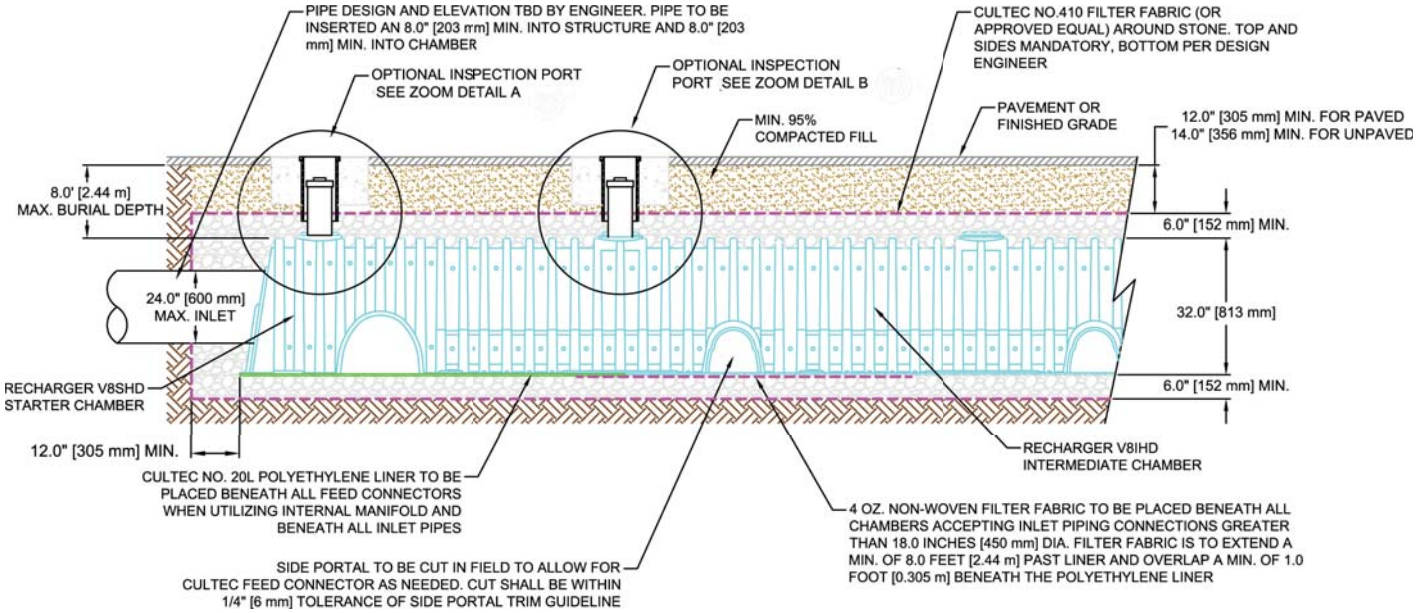


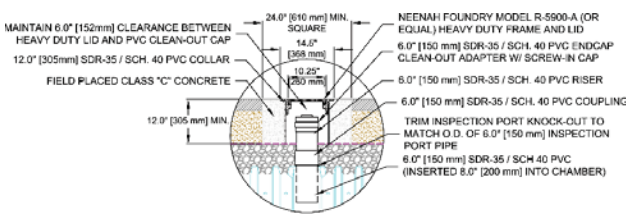
CULTEC Recharger® V8HD

Typical Cross Section for Traffic Application

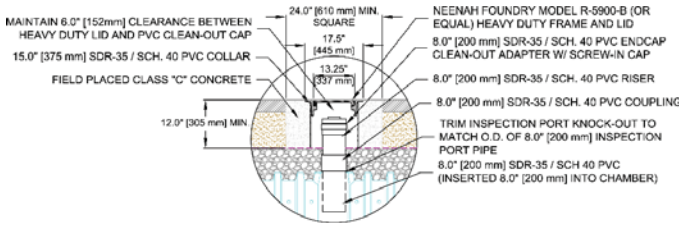


Typical Cross Section for Traffic Application - Side View





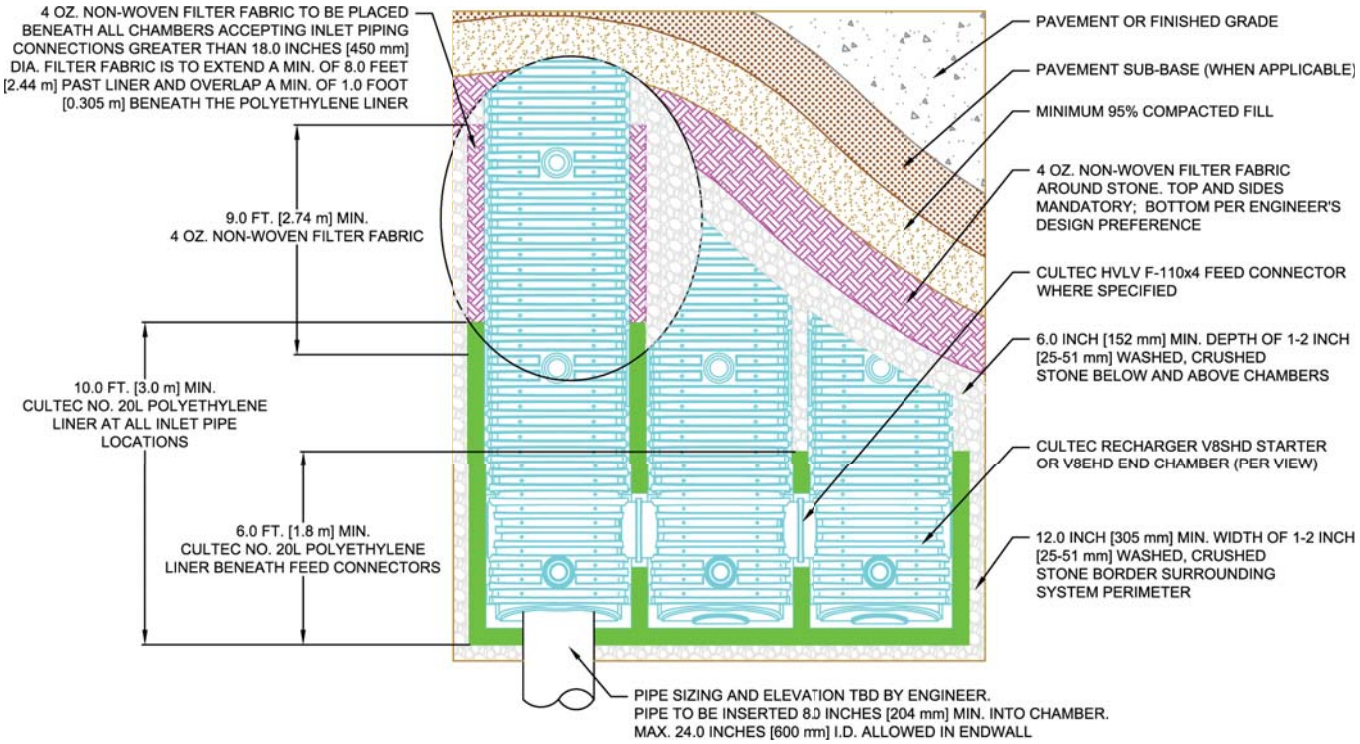
Zoom Detail A



Zoom Detail B

CULTEC Recharger® V8HD

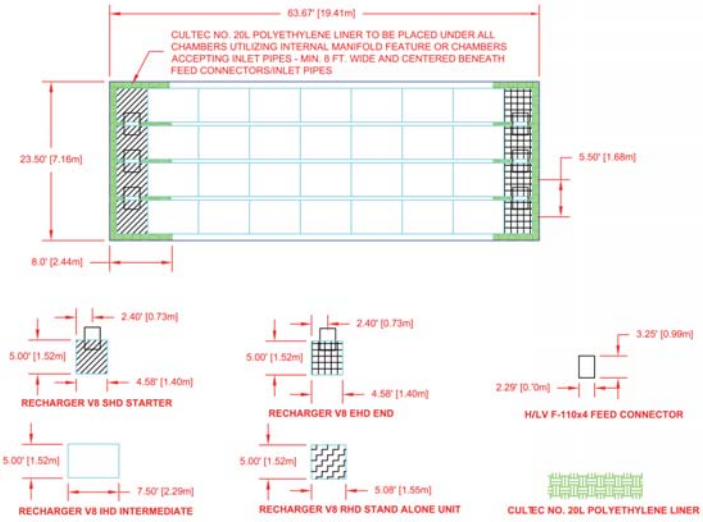
Plan View Drawing



Creating a Typical Bed Layout in AutoCAD

Using AutoCAD Array Function

1. Add Alternate Units to your Dimension Style and use 0.3048 as the Multiplier
2. Using the Rectangle command, create the three chamber outlines and the feed connectors:
   - Starter: 4.58' x 5.00'
   - Intermediate: 7.50' x 5.00'
   - End: 4.58' x 5.00'
   - Feed Connector: 2.29' x 3.25'
3. Hatch the Starter and End chambers to differentiate them. Place a feed connector (as shown) at one end of the starter and end chambers.
4. Select the Intermediate chamber and select the array command.
5. Specify the number of rows and columns (ex. 10 rows, 8 columns). Do not include the starter and end chambers in column count.
6. The chambers should be oriented horizontally (as shown). Set the row offset to 5.50' and the column offset to 7.50'. The rotation angle should be 0.
7. Click accept to create the bed.
8. If R-Model chamber is incorporated into the design, use the Rectangle command to create a chamber outline 5.08' x 5.00'. Hatch the R-Model chambers using a unique pattern to differentiate them. Orient the R-Model chambers horizontally, and orient the chambers so there is a .50' spacing between the R-Model and rest of the chamber rows. Proceed to steps 9 and 10 using the Polyline command instead of the Rectangle command to show the stone border and polyethylene liner. If no R-Model is incorporated into the design, proceed to steps 9 and 10. * R-Model chambers have two fully closed end walls are intended to be installed as a single unit row only
9. Using the Rectangle command to surround the bed, offset the rectangle 1' to represent the stone border.
10. Using the Rectangle command create a polyethylene liner underneath the feed connectors at both ends of the bed. It should be 8' wide and span the width of the bed. Apply correct hatching and label the liner.



Storm Water System Design Aide download available online

CULTEC Recharger® V8HD Specifications

GENERAL

CULTEC Recharger® V8HD chambers are designed for underground stormwater management. The chambers may be used for retention, recharging, detention or controlling the flow of on-site stormwater runoff.

CHAMBER PARAMETERS

1. The chambers shall be manufactured by CULTEC, Inc. of Brookfield, CT (203-775-4416 or 1-800-428-5832).
2. The chamber shall be vacuum thermoformed of black polyethylene.
3. The chamber shall be arched in shape.
4. The chamber shall be open-bottomed.
5. The chamber shall be joined using an interlocking overlapping rib method. Connections must be fully shouldered overlapping ribs, having no separate couplings or separate end walls.
6. The nominal chamber dimensions of the CULTEC Recharger® V8IHD Intermediate unit shall be 32 inches (813 mm) tall, 60 inches (1524 mm) wide and 8 feet (2.44 m) long. The installed length of a joined Recharger® V8IHD shall be 7.5 feet (2.29 m).
7. The nominal chamber dimensions of the CULTEC Recharger® V8SHD Starter or V8EHD End unit shall be 32 inches (813 mm) tall, 60 inches (1524 mm) wide and 5.08 feet (1.55 m) long. The installed length of a joined Recharger® V8SHD or V8EHD shall be 4.58 feet (1.4 m).
8. The CULTEC Recharger® V8SHD Starter or V8EHD End unit shall have two side portals to accept CULTEC HVLV® F-110x4 Feed Connectors to create an internal manifold. Maximum allowable O.D. in the side portal is 15.3 inches (387 mm).
9. The CULTEC Recharger® V8IHD Intermediate unit shall have two side portals to accept CULTEC HVLV® FC-24 Feed Connectors to create an internal manifold. Maximum allowable O.D. in the side portal is 12.25 inches (311 mm).
10. The nominal chamber dimensions of the CULTEC HVLV® FC-24 Feed Connector shall be 12 inches (305 mm) tall, 16 inches (406 mm) wide and 24.2 inches (614 mm) long.
11. The nominal chamber dimensions of the CULTEC HVLV® F-110x4 Feed Connector shall be 18 inches (457 mm) tall, 27.5 inches (699 mm) wide and 39 inches (991 mm) long.
12. The nominal storage volume of the Recharger® V8HD chamber shall be 8.679 ft^3 / ft (0.806 m^3 / m) - without stone. The nominal storage volume of a single Recharger® V8RHD Stand Alone unit shall be 44.12 ft^3 (1.25 m^3) - without stone. The nominal storage volume of a joined Recharger® V8SHD Starter or V8EHD End shall be 39.779 ft^3 / unit (1.126 m^3 / unit) - without stone. The nominal storage volume of a joined Recharger® V8IHD Intermediate shall be 65.093 ft^3 / unit (1.843 m^3 / unit) - without stone.
13. The nominal storage volume of the HVLV® FC-24 Feed Connector shall be 0.913 ft^3 / ft (0.085 m^3 / m) - without stone.
14. The nominal storage volume of the HVLV® F-110x4 Feed Connector shall be 1.968 ft^3 / ft (0.183 m^3 / m) - without stone.
15. The Recharger® V8HD chamber shall have discharge holes bored into the sidewalls of the unit's core to promote lateral conveyance of water.
16. The end wall of the chamber, when present, shall be an integral part of the continuously formed unit. Separate end plates cannot be used with this unit.
17. The Recharger® V8RHD Stand Alone unit must be formed as a whole chamber having two fully formed integral end walls and having no separate end plates or separate end walls. Maximum inlet opening on the chamber end wall is 24 inches (600 mm).
18. The Recharger® V8SHD Starter unit must be formed as a whole chamber having one fully formed integral end wall and one partially formed integral end wall with a lower transfer opening of 18 inches (457 mm) high x 42 inches (1067 mm) wide. Maximum inlet opening on the chamber end wall is 24 inches (600 mm).
19. The Recharger® V8IHD Intermediate unit must be formed as a whole chamber having one fully open end wall and one partially formed integral end wall with a lower transfer opening of 16 inches (406 mm) high x 42 inches (1067 mm) wide.
20. The Recharger® V8EHD End unit must be formed as a whole chamber having one fully formed integral end wall and one fully open end wall and having no separate end plates or end walls. Maximum inlet opening on the chamber end wall is 24 inches (600 mm).
21. The HVLV® FC-24 Feed Connector must be formed as a whole chamber having two open end walls and having no separate end plates or separate end walls. The unit shall fit into the side portals of the Recharger® V8IHD Intermediate and act as cross feed connections.
22. The HVLV® F-110x4 Feed Connector must be formed as a whole chamber having two open end walls and having no separate end plates or separate end walls. The unit shall fit into the side portals of the Recharger® V8SHD Starter and V8EHD End and act as cross feed connections.
23. Heavy duty units are designated by a colored stripe formed into the part along the length of the chamber.
24. The chamber shall have a raised integral cap at the top of the arch in the center of each unit to be used as an optional inspection port or clean-out.
25. The units may be trimmed to custom lengths by cutting back to any corrugation on the large rib end.
26. The chamber shall be manufactured in an ISO 9001:2008 certified facility.
27. Maximum allowable cover over the top of the chamber shall be 8' (2.44 m).
28. The chamber shall be designed to withstand traffic loads when installed according to CULTEC's recommended installation instructions.

CULTEC HVLV® 180BT LS Landscaper Series®

For Non-Traffic Applications Only

The HVLV® 180BT LS is a 20.5" (521 mm) tall, high capacity chamber. CULTEC's Landscaper Series™ chambers are used in residential applications to control rainwater collected from gutters and/or catch basins. The chambers collect and store the stormwater underground until the soil is able to accept it back into the ground. Puddles and saturated soil are eliminated as water is diverted into the chamber and recharged into the ground. CULTEC chambers are lightweight and easily transported by hand, making them ideal to install in tight areas or where minimal site disturbance is desired.

Size (L x W x H)	5.63' x 36" x 20.5" 1.72 m x 914 mm x 521 mm
Chamber Storage	145 gal 549 L 19.40 ft^3/unit 0.55 m^3/unit
Min. Installed Storage	223 gal 843 L 29.76 ft^3/unit 0.84 m^3/unit
Min. Area Required	26.52 ft^2 2.46 m^2
Max. Allowable Cover	4' 1.22 m
Max. Inlet Opening in End Wall	15" 350 mm
Max. Allowable O.D. in Side Portal	12.25" 311 mm
Compatible Feed Connector	HVLV® FC-24 Feed Connector

Visit www.cultec.com/downloads.html
for Product Downloads and CAD details.

HVLV 180BT LS Bare Chamber Storage Volumes

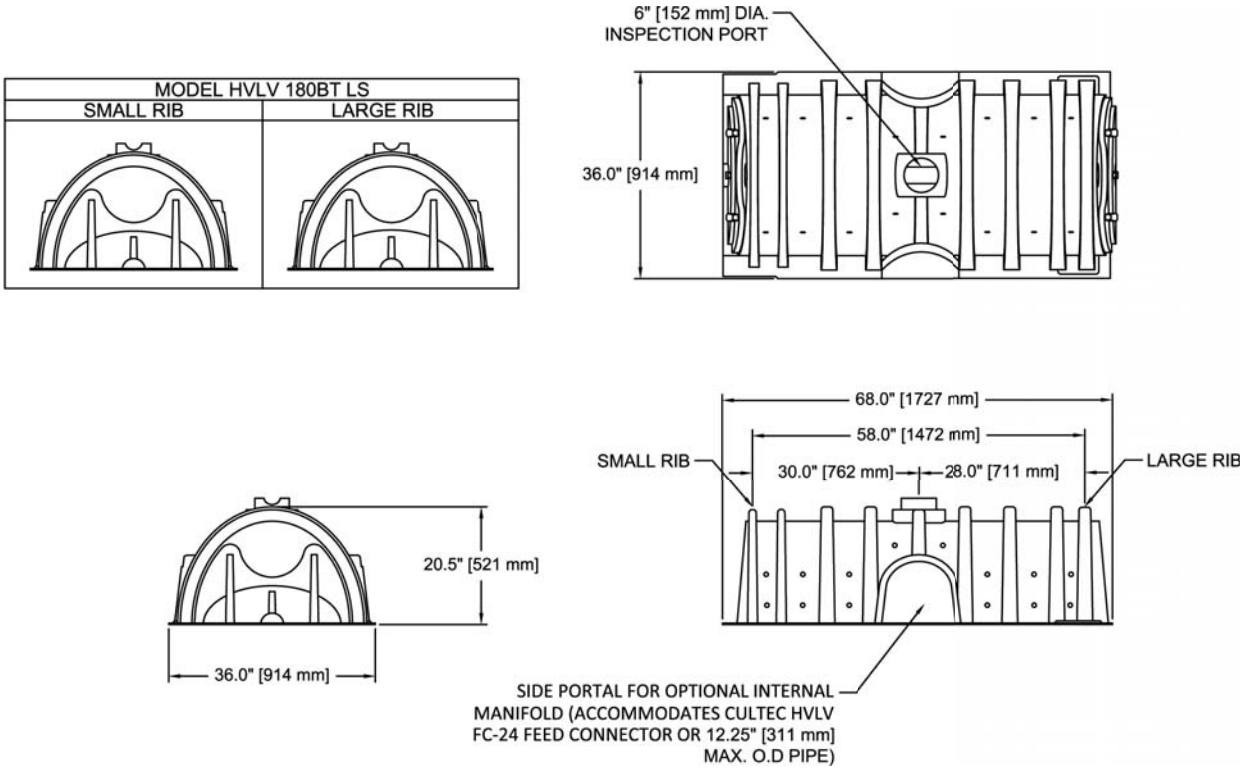
Elevation		Incremental Storage Volume				Cumulative Storage	
in.	mm	ft^3 / ft	m^3 / m	ft^3	m^3	ft^3	m^3
20.5	521	0.000	0.000	0.000	0.000	19.378	0.549
20	508	0.038	0.004	0.214	0.006	19.378	0.549
19	483	0.060	0.006	0.338	0.010	19.164	0.543
18	457	0.090	0.008	0.506	0.014	18.827	0.533
17	432	0.117	0.011	0.658	0.019	18.321	0.519
16	406	0.135	0.013	0.759	0.022	17.633	0.500
15	381	0.150	0.014	0.844	0.024	16.903	0.479
14	356	0.161	0.015	0.906	0.026	16.059	0.455
13	330	0.171	0.016	0.962	0.027	15.154	0.429
12	305	0.181	0.017	1.018	0.029	14.192	0.402
11	279	0.193	0.018	1.086	0.031	13.174	0.373
10	254	0.198	0.018	1.114	0.032	12.088	0.342
9	229	0.202	0.019	1.136	0.032	10.974	0.311
8	203	0.206	0.019	1.159	0.033	9.838	0.279
7	178	0.209	0.019	1.176	0.033	8.679	0.246
6	152	0.216	0.020	1.215	0.034	7.504	0.213
5	127	0.220	0.020	1.238	0.035	6.289	0.178
4	102	0.221	0.021	1.243	0.035	5.051	0.143
3	76	0.222	0.021	1.249	0.035	3.808	0.108
2	51	0.222	0.021	1.249	0.035	2.559	0.072
1	25	0.233	0.022	1.311	0.037	1.311	0.037
Total		3.445	0.320	19.378	0.549	19.378	0.549

Calculations are based on a single installed chamber.

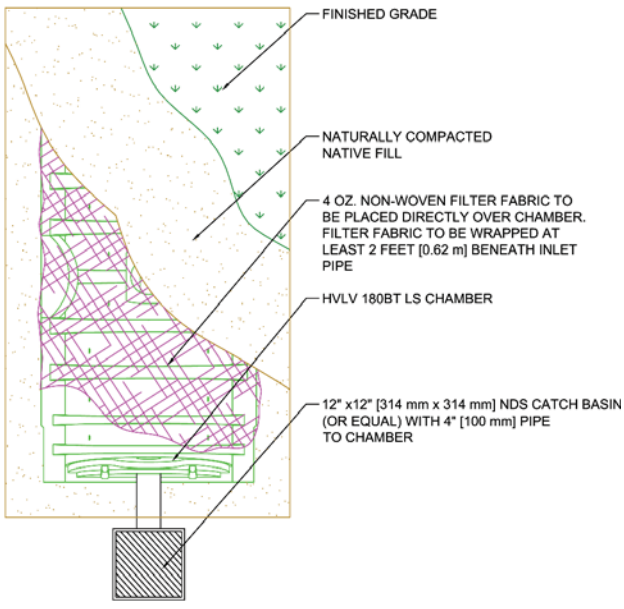
CULTEC HVLV® 180BT LS Landscaper Series®

For Non-Traffic Applications Only

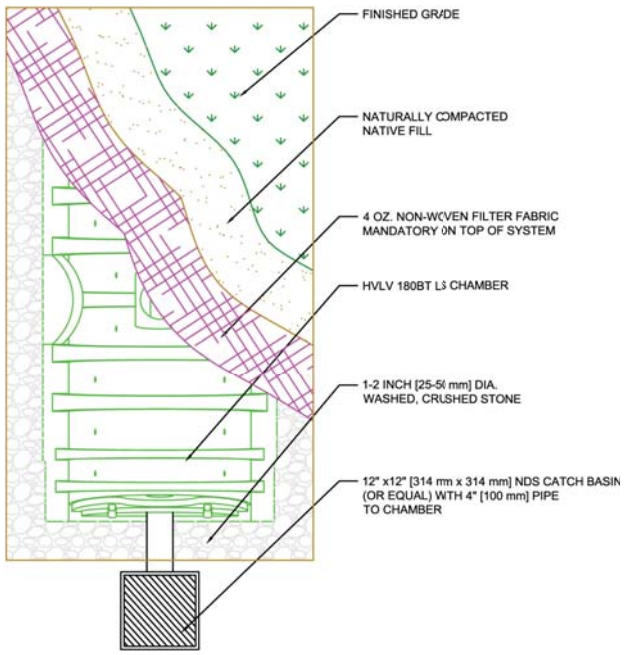
Three View Drawing



Plan View Drawing

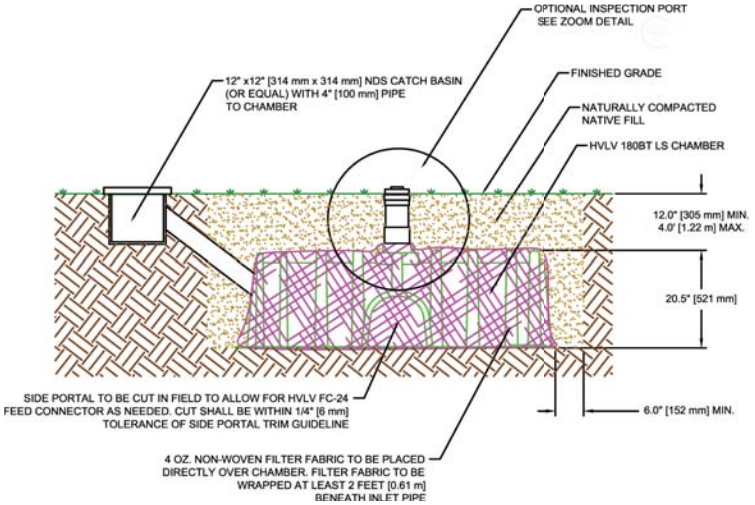


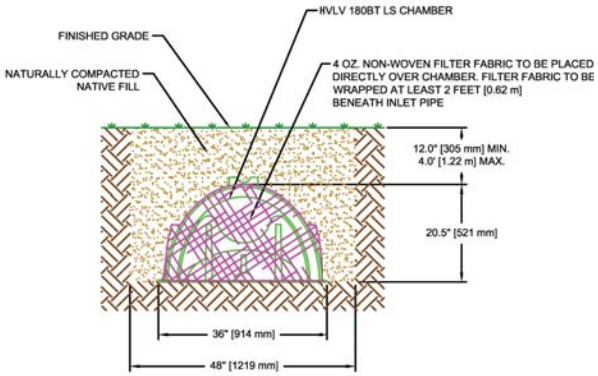
Gravel-less installation - chamber storage only

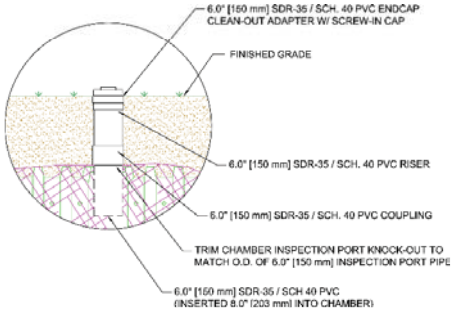


With stone - chamber & stone for additional storage

HVLV 180BT LS Typical Cross Section - without stone

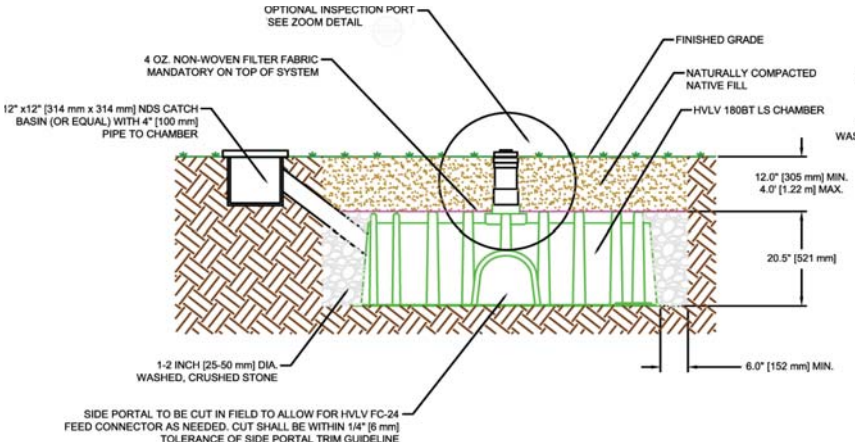


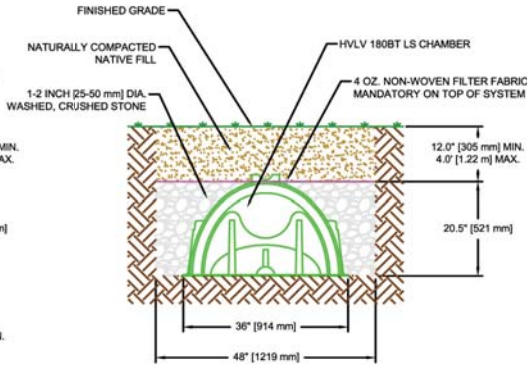


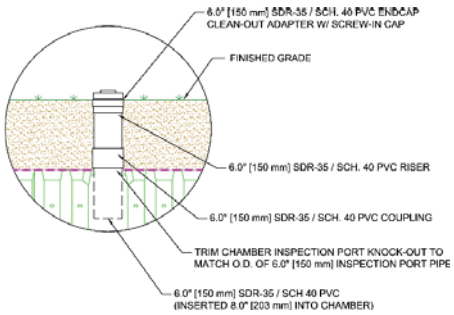


Trench Width	Trench Depth	Trench Length	Bare Chamber Volume	
48"	32.5"	6.63'	19.40 ft³	145 gal.
1219 mm	826 mm	2.02 m	0.55 m³	549 l

HVLV 180BT LS Typical Cross Section - with stone







Trench Width	Trench Depth	Trench Length	Bare Chamber Volume		Storage Volume per Installed Unit with Stone		Stone Required per Unit
48"	32.5"	6.63'	19.40 ft³	145 gal.	29.76 ft³	223 gal.	0.96 yd³
1219 mm	826 mm	2.02 m	0.55 m³	549 l	0.84 m³	843 l	0.73 m³

CULTEC HVLV® 180BT LS Landscaper Series® Specifications

GENERAL

CULTEC HVLV® 180BT LS chambers are designed for underground stormwater management. The chambers may be used for retention, recharging, detention or controlling the flow of on-site stormwater runoff in non-traffic areas.

CHAMBER PARAMETERS

1. The chambers shall be manufactured by CULTEC, Inc. of Brookfield, CT (203-775-4416 or 1-800-428-5832).
2. The chamber shall be vacuum thermoformed of green polyethylene.
3. The chamber shall be arched in shape.
4. The chamber shall be open-bottomed.
5. The nominal chamber dimensions of the CULTEC HVLV® 180BT LS shall be 20.5 inches (521 mm) tall, 36 inches (914 mm) wide and 5.63 feet (1.72 m) long.
6. Maximum inlet opening on the chamber end wall is 15 inches (350 mm).
7. The chamber shall have two side portals to accept CULTEC HVLV® FC-24 Feed Connectors to create an internal manifold, if required. Maximum allowable pipe size in the side portal is 12.25 inches (311 mm).
8. The nominal chamber dimensions of the CULTEC HVLV® FC-24 Feed Connector shall be 12 inches (305 mm) tall, 16 inches (406 mm) wide and 24.2 inches (614 mm) long.
9. The nominal storage volume of the CULTEC HVLV® 180BT LS chamber shall be 3.445 ft^3 / ft (0.32 m^3 / m) - without stone.
10. The nominal storage volume of the HVLV® FC-24 Feed Connector shall be 0.913 ft^3 / ft (0.026 m^3 / m) - without stone.
11. The CULTEC HVLV® 180BT LS chamber shall have twenty-eight discharge holes bored into the sidewalls of the unit's core to promote lateral conveyance of water.
12. The CULTEC HVLV® 180BT LS chamber shall have 9 corrugations.
13. The CULTEC HVLV® 180BT LS Stand Alone unit must be formed as a whole chamber having two fully formed integral end walls and having no separate end plates or separate end walls.
14. The HVLV® FC-24 Feed Connector must be formed as a whole chamber having two open end walls and having no separate end plates or separate end walls. The unit shall fit into the side portals of the CULTEC HVLV® 180BT LS and act as cross feed connections, if required.
15. The chamber shall have a raised integral cap at the top of the arch in the center of each unit to be used as an optional inspection port or clean-out.
16. The chamber shall be manufactured in an ISO 9001:2008 certified facility.
17. The chamber shall be used for non-traffic applications only.
18. Maximum allowable cover over the top of the chamber shall be 4' (1.22 m).

CULTEC Recharger® V8R LS Landscaper Series®

For Non-Traffic Applications Only

The Recharger V8R LS is a 32" (813 mm) tall, high capacity chamber. CULTEC's Landscaper Series™ chambers are used in residential applications to control rainwater collected from gutters and/or catch basins. The chambers collect and store the stormwater underground until the soil is able to accept it back into the ground. Puddles and saturated soil are eliminated as water is diverted into the chamber and recharged into the ground. CULTEC chambers are lightweight and easily transported by hand, making them ideal to install in tight areas or where minimal site disturbance is desired.

Size (L x W x H)	5.08' x 60" x 32" 1.55 m x 1524 mm x 813 mm
Chamber Storage	330 gal 1249 L 44.12 ft³/unit 1.25 m³/unit
Min. Installed Storage	489 gal 1852 L 65.4 ft³/unit 1.85 m³/unit
Min. Area Required	36.48 ft² 3.39 m²
Max. Allowable Cover	4' 1.22 m
Max. Inlet Opening in End Wall	24" 600 mm
Max. Allowable O.D. in Side Portal	15.3" 387 mm
Compatible Feed Connector	HVLV F-110x4 Feed Connector

Visit www.cultec.com/downloads.html
for Product Downloads and CAD details.

Recharger® V8R LS Bare Chamber Storage Volume

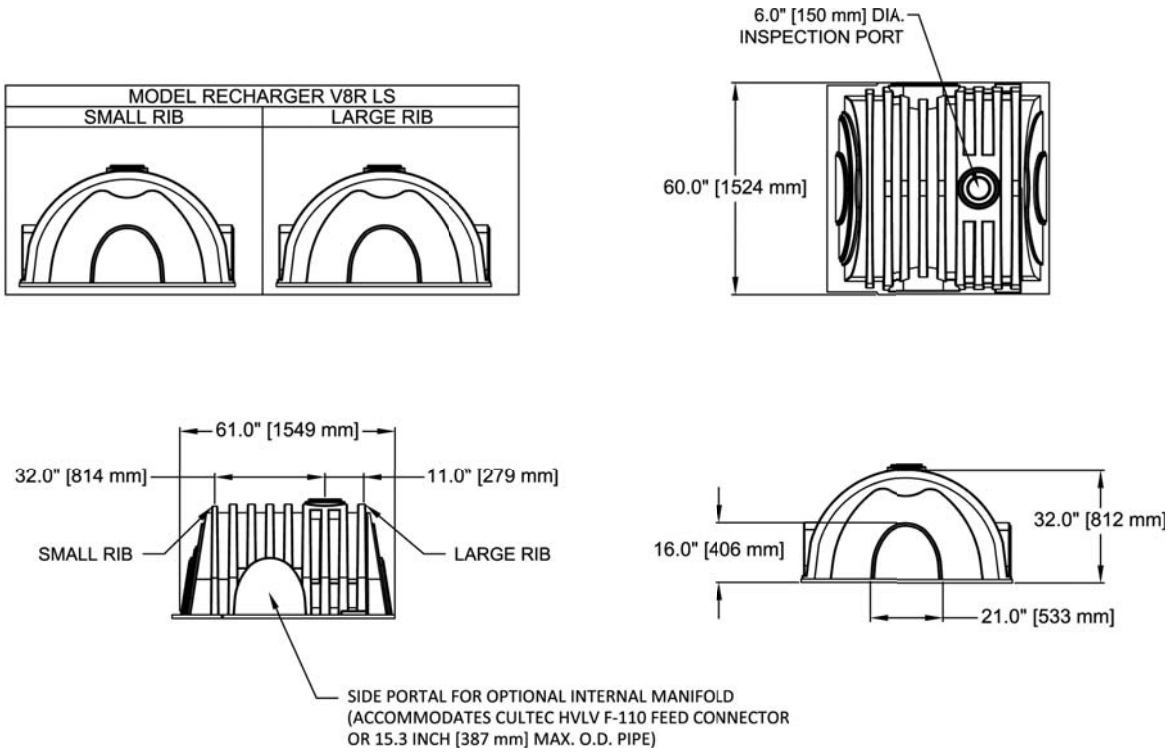
Elevation		Incremental Storage Volume				Cumulative Storage	
in.	mm	ft³ / ft	m³ / m	ft³	m³	ft³	m³
32	813	0.006	0.001	0.031	0.001	44.118	1.249
31	787	0.027	0.003	0.137	0.004	44.088	1.249
30	762	0.040	0.004	0.203	0.006	43.951	1.245
29	737	0.084	0.008	0.427	0.012	43.747	1.239
28	711	0.129	0.012	0.656	0.019	43.320	1.227
27	686	0.159	0.015	0.808	0.023	42.664	1.208
26	660	0.183	0.017	0.930	0.026	41.856	1.185
25	635	0.204	0.019	1.037	0.029	40.926	1.159
24	609	0.222	0.021	1.129	0.032	39.889	1.130
23	584	0.238	0.022	1.210	0.034	38.760	1.098
22	559	0.252	0.023	1.281	0.036	37.551	1.063
21	533	0.265	0.025	1.347	0.038	36.270	1.027
20	508	0.277	0.026	1.408	0.040	34.923	0.989
19	483	0.287	0.027	1.459	0.041	33.514	0.949
18	457	0.298	0.028	1.515	0.043	32.056	0.908
17	432	0.307	0.029	1.561	0.044	30.541	0.865
16	406	0.315	0.029	1.601	0.045	28.980	0.821
15	381	0.323	0.030	1.642	0.046	27.379	0.775
14	356	0.329	0.031	1.672	0.047	25.737	0.729
13	330	0.336	0.031	1.708	0.048	24.065	0.682
12	305	0.344	0.032	1.749	0.050	22.357	0.633
11	279	0.350	0.033	1.779	0.051	20.608	0.584
10	254	0.352	0.033	1.789	0.053	18.829	0.533
9	229	0.367	0.034	1.866	0.053	17.039	0.483
8	203	0.369	0.034	1.876	0.053	15.174	0.430
7	178	0.370	0.034	1.881	0.053	13.298	0.377
6	152	0.371	0.034	1.886	0.053	11.417	0.323
5	127	0.372	0.035	1.891	0.054	9.531	0.270
4	102	0.372	0.035	1.891	0.054	7.640	0.216
3	76	0.373	0.035	1.896	0.054	5.749	0.163
2	51	0.375	0.035	1.906	0.054	3.853	0.109
1	25	0.383	0.036	1.947	0.055	1.947	0.055
Total		8.679	0.806	44.118	1.249		

Calculations are based on a single installed chamber.

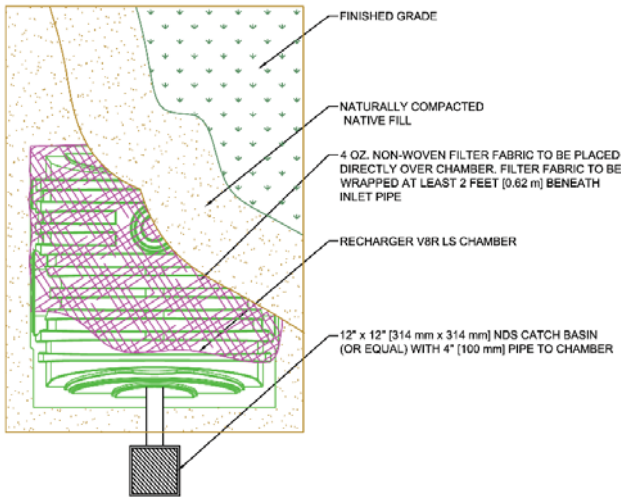
CULTEC Recharger® V8R LS Landscaper Series®

For Non-Traffic Applications Only

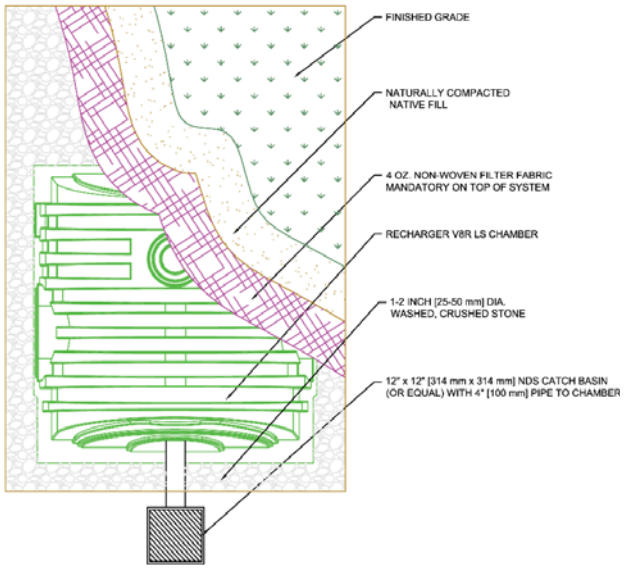
Three View Drawing



Plan View Drawing

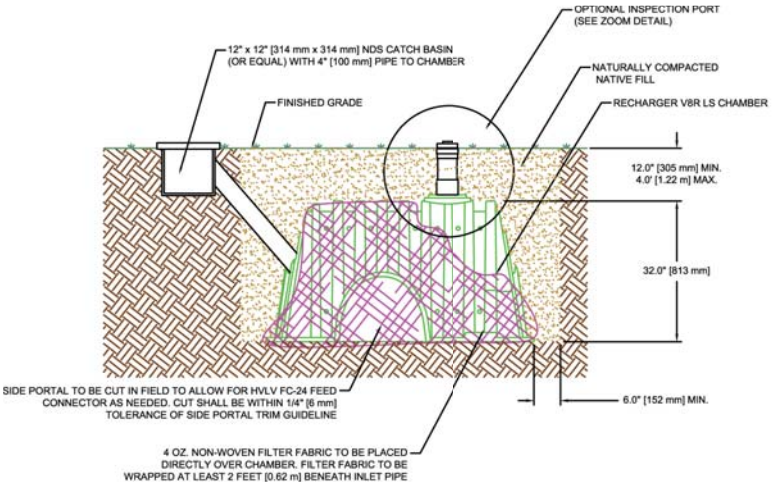


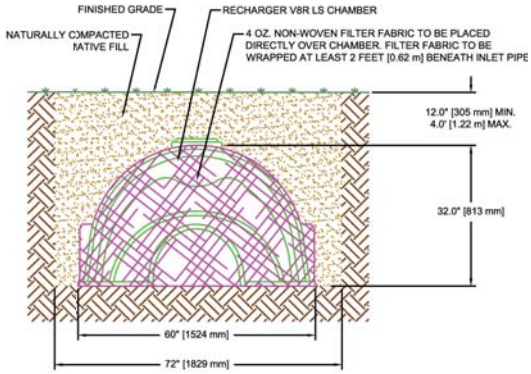
Gravel-less installation - chamber storage only



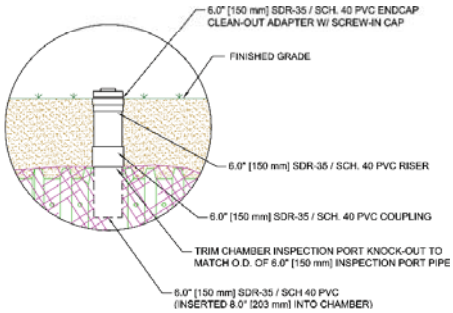
With stone - chamber & stone for additional storage

Recharger V8R LS Typical Cross Section - without stone

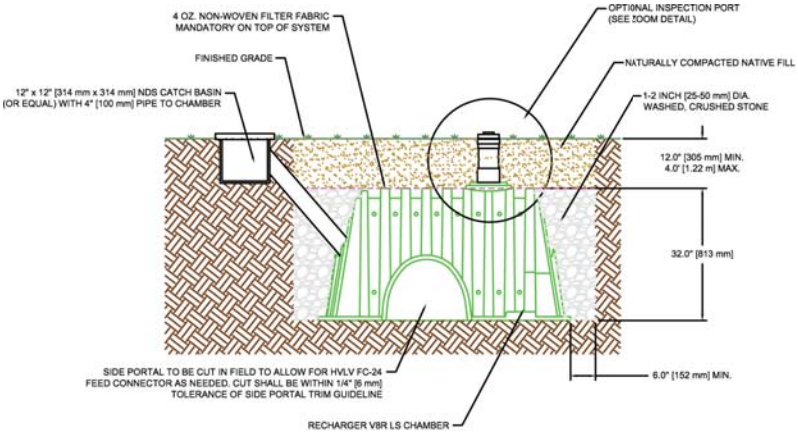


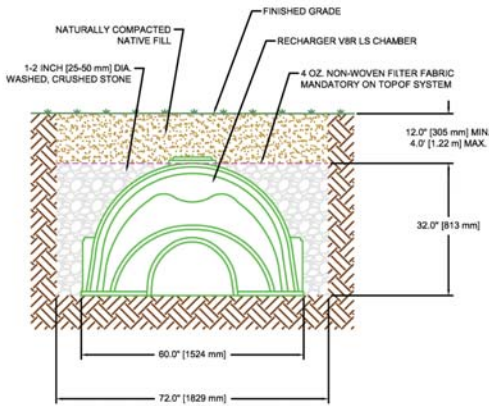


Trench Width	Trench Depth	Trench Length	Bare Chamber Volume	
72″	44″	6.08′	44.12 ft³	330 gal.
1829 mm	1118 mm	1.85 m	1.25 m³	1249 l

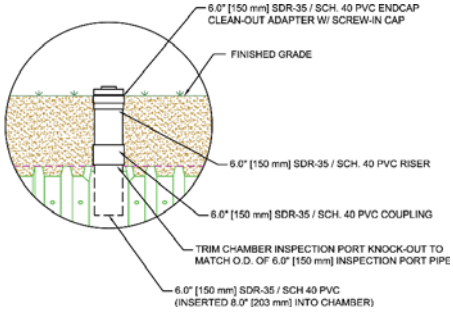


Recharger V8R LS Typical Cross Section - with stone





Trench Width	Trench Depth	Trench Length	Bare Chamber Volume		Storage Volume per Installed Unit		Stone Required per Unit
72″	44″	6.08′	44.12 ft³	330 gal.	65.40 ft³	489 gal.	1.97 yd³
1829 mm	1118 mm	1.85 m	1.25 m³	1249 l	1.85 m³	1852 l	1.51 m³



CULTEC Recharger® V8R LS Landscaper Series® Specifications

GENERAL

CULTEC Recharger® V8R LS chambers are designed for underground stormwater management. The chambers may be used for retention, recharging, detention or controlling the flow of on-site stormwater runoff in non-traffic areas.

CHAMBER PARAMETERS

1. The chambers shall be manufactured by CULTEC, Inc. of Brookfield, CT (203-775-4416 or 1-800-428-5832).
2. The chamber shall be vacuum thermoformed of green polyethylene.
3. The chamber shall be arched in shape.
4. The chamber shall be open-bottomed.
5. The nominal chamber dimensions of the CULTEC Recharger® V8R LS shall be 32 inches (813 mm) tall, 60 inches (1524 mm) wide and 5.08 feet (1.55 m) long.
6. Maximum inlet opening on the chamber end wall is 24 inches (600 mm).
7. The chamber shall have two side portals to accept CULTEC HVLV® F-110x4 Feed Connectors to create an internal manifold, if required. Maximum allowable O.D. in the side portal is 15.3 inches (387 mm).
8. The nominal chamber dimensions of the CULTEC HVLV® F-110x4 Feed Connector shall be 18 inches (457 mm) tall, 27.5 inches (699 mm) wide and 39 inches (991 mm) long.
9. The nominal storage volume of the CULTEC Recharger® V8R LS chamber shall be 8.68 ft^3 / ft (0.81 m^3 / m) - without stone.
10. The nominal storage volume of the HVLV® F-110x4 Feed Connector shall be 1.968 ft^3 / ft (0.183 m^3 / m) - without stone.
11. The CULTEC Recharger® V8R LS chamber shall have discharge holes bored into the sidewalls of the unit's core to promote lateral conveyance of water.
12. The CULTEC Recharger® V8R LS chamber shall have 9 corrugations.
13. The CULTEC Recharger® V8R LS Stand Alone unit must be formed as a whole chamber having two fully formed integral end walls and having no separate end plates or separate end walls.
14. The HVLV® F-110x4 Feed Connector must be formed as a whole chamber having two open end walls and having no separate end plates or separate end walls. The unit shall fit into the side portals of the Recharger® V8R LS and act as cross feed connections, if required.
15. The chamber shall have a raised integral cap at the top of the arch in the center of each unit to be used as an optional inspection port or clean-out.
16. The chamber shall be manufactured in an ISO 9001:2008 certified facility.
17. The chamber shall be used for non-traffic applications only.
18. Maximum allowable cover over the top of the chamber shall be 4' (1.22 m).

CULTEC HVLV® SFCx2 Feed Connector

HVLV® SFCx2 Feed Connectors may be used to create an internal manifold by inserting them into the side portals of the CULTEC stormwater chamber. The HVLV® SFCx2 Feed Connector may be used with Contactor® 100HD chambers. They have a larger flow capacity than 6" (150 mm) diameter pipe.

Size (L x W x H)	19.7" x 12" x 7.6" 500 mm x 305 mm x 194 mm
Installed Length (exposed)	For Contactor 100HD: 4" typ. For Contactor 100HD: 102 mm typ.
Chamber Storage	0.29 ft^3/ft 0.03 m^3/m
Compatible Model	Contactor 100HD

HVLV SFCx2 Feed Connector Bare Chamber Storage Volumes

Elevation		Incremental Storage Volume		Cumulative Storage	
in.	mm	ft^3/ft	m^3/m	ft^3/ft	m^3/m
7.6	193	0.001	0.000	0.294	0.027
7	178	0.008	0.001	0.293	0.027
6	152	0.031	0.003	0.285	0.026
5	127	0.041	0.004	0.254	0.024
4	102	0.045	0.004	0.213	0.020
3	76	0.048	0.004	0.168	0.016
2	51	0.050	0.005	0.120	0.011
1	25	0.070	0.007	0.070	0.070
Total		0.294	0.027	0.294	0.027

Calculations are based on ft^3/ft (m^3/m).
Multiply by the installed length (exposed) to calculate storage per unit.

Shown: CULTEC HVLV SFCx2 Feed Connector inserted into side portals of CULTEC chamber.

Visit www.cultec.com/downloads.html for Product Downloads and CAD details.

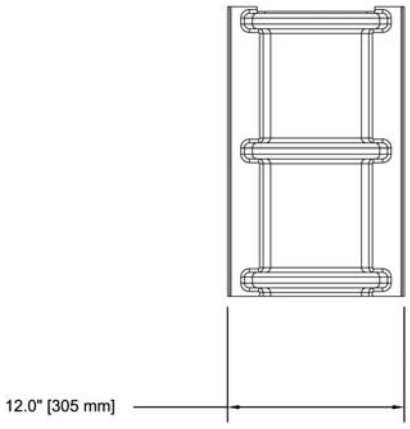
CULTEC HVLV® SFCx2 Feed Connector Specifications

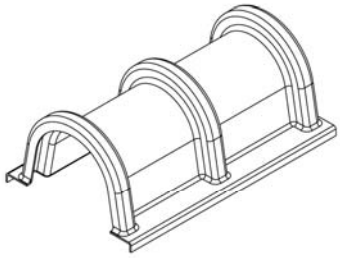
GENERAL

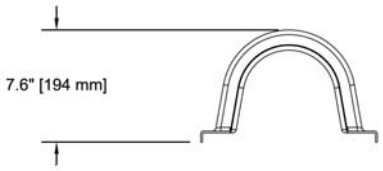
CULTEC HVLV® SFCx2 Feed Connectors are designed to create an internal manifold for CULTEC Contactor® 100HD stormwater chambers.

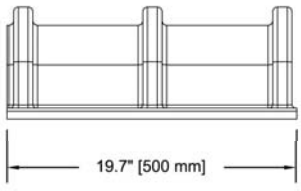
CHAMBER PARAMETERS

1. The chambers shall be manufactured by CULTEC, Inc. of Brookfield, CT (203-775-4416 or 1-800-428-5832).
2. The chamber shall be vacuum thermoformed of black polyethylene.
3. The chamber shall be arched in shape.
4. The chamber shall be open-bottomed.
5. The nominal chamber dimensions of the CULTEC HVLV® SFCx2 Feed Connector shall be 7.6 inches (194 mm) tall, 12 inches (305 mm) wide and 19.7 inches (500 mm) long.
6. The nominal storage volume of the HVLV® SFCx2 Feed Connector shall be 0.294 ft^3 / ft (0.027 m^3 / m) - without stone.
7. The HVLV® SFCx2 Feed Connector chamber shall have 3 corrugations.
8. The HVLV® SFCx2 Feed Connector must be formed as a whole chamber having two open end walls and having no separate end plates or separate end walls. The unit shall fit into the side portals of the Contactor® 100HD stormwater chamber and act as cross feed connections creating an internal manifold.
9. The chamber shall be manufactured in an ISO 9001:2008 certified facility.









CULTEC HVLV® FC-24 Feed Connector

HVLV® FC-24 Feed Connectors may be used to create an internal manifold by inserting them into the side portals of the CULTEC stormwater chamber. The HVLV® FC-24 Feed Connector may be used with Recharger® 150XLHD, 280HD, 330XLHD and V8IHD chambers. They have a larger flow capacity than 12" (300 mm) diameter pipe.

Size (L x W x H)	24.2" x 16" x 12" 614 mm x 406 mm x 305 mm
Installed Length (exposed)	For Recharger 150XLHD: 6" typ. For Recharger 150XLHD: 152 mm typ. For Recharger 280HD: 5" typ. For Recharger 280HD: 127 mm typ. For Recharger 330XLHD: 6" typ. For Recharger 330XLHD: 152 mm typ.
Chamber Storage	0.91 ft^3/ft 0.08 m^3/m
Compatible Models	Recharger 150XLHD , 280HD, 330XLHD, and Recharger V8IHD Intermediate

HVLV FC-24 Feed Connector Bare Chamber Storage Volumes

Elevation		Incremental Storage Volume		Cumulative Storage	
in.	mm	ft^3/ft	m^3/m	ft^3/ft	m^3/m
12	305	0.004	0.000	0.913	0.085
11	279	0.031	0.003	0.909	0.084
10	254	0.060	0.006	0.878	0.082
9	229	0.073	0.007	0.818	0.076
8	203	0.081	0.008	0.745	0.069
7	178	0.085	0.008	0.664	0.062
6	152	0.089	0.008	0.579	0.054
5	127	0.093	0.009	0.490	0.046
4	102	0.095	0.009	0.397	0.037
3	76	0.097	0.009	0.302	0.028
2	51	0.099	0.009	0.205	0.019
1	25	0.106	0.010	0.106	0.010
Total		0.913	0.085	0.913	0.085

Calculations are based on ft^3/ft (m^3/m).
Multiply by the installed length (exposed) to calculate storage per unit.

Shown: CULTEC HVLV FC-24 Feed Connector inserted into side portals of CULTEC chamber.

Visit www.cultec.com/downloads.html for Product Downloads and CAD details.

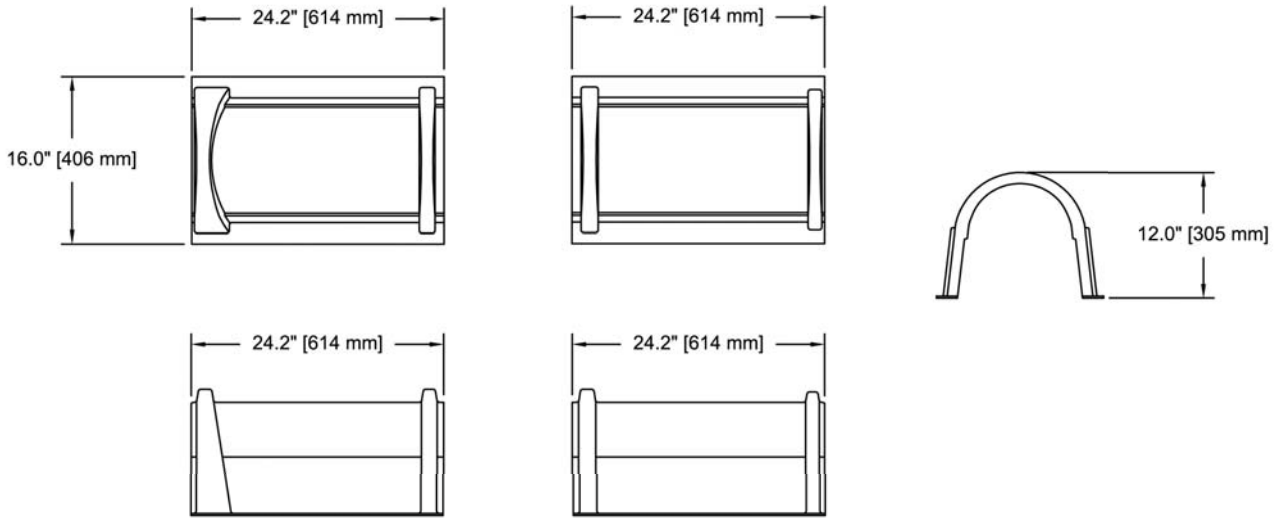
CULTEC HVLV® FC-24 Feed Connector Specifications

GENERAL

CULTEC HVLV® FC-24 Feed Connectors are designed to create an internal manifold for CULTEC Recharger model 150XLHD, 280HD, and 330XLHD stormwater chambers.

CHAMBER PARAMETERS

1. The chambers shall be manufactured by CULTEC, Inc. of Brookfield, CT (203-775-4416 or 1-800-428-5832).
2. The chamber shall be vacuum thermoformed of black polyethylene.
3. The chamber shall be arched in shape.
4. The chamber shall be open-bottomed.
5. The nominal chamber dimensions of the CULTEC HVLV® FC-24 Feed Connector shall be 12 inches (305 mm) tall, 16 inches (406 mm) wide and 24.2 inches (614 mm) long.
6. The nominal storage volume of the HVLV® FC-24 Feed Connector shall be 0.913 ft^3 / ft (0.085 m^3 / m) - without stone.
7. The HVLV® FC-24 Feed Connector chamber shall have 2 corrugations.
8. The HVLV® FC-24 Feed Connector must be formed as a whole chamber having two open end walls and having no separate end plates or separate end walls. The unit shall fit into the side portals of the CULTEC Recharger stormwater chamber and act as cross feed connections creating an internal manifold.
9. The chamber shall be manufactured in an ISO 9001:2008 certified facility.



CULTEC HVLV® F-110x4 Feed Connector

HVLV® F-110x4 Feed Connectors may be used to create an internal manifold by inserting them into the side portals of the CULTEC stormwater chamber. The HVLV® F-110x4 Feed Connector may be used with Recharger® V8SHD Starter and V8EHD End chambers. They have a larger flow capacity than 18" (450 mm) diameter pipe.

Size (L x W x H)	39" x 27.5" x 18"
	991 mm x 699 mm x 457 mm
Installed Length (exposed)	For Recharger V8HD: 6" typ.
	For Recharger V8HD: 152 mm typ.
Chamber Storage	1.97 ft^3/ft
	0.18 m^3/m
Compatible Models	Recharger V8RHD, V8SHD and V8EHD

HVLV F-110x4 Feed Connector Bare Chamber Storage Volumes

Elevation		Incremental Storage Volume		Cumulative Storage	
in.	mm	ft^3/ft	m^3/m	ft^3/ft	m^3/m
18	457	0.005	0.000	1.968	0.183
17	432	0.029	0.003	1.963	0.182
16	406	0.062	0.006	1.934	0.180
15	381	0.081	0.008	1.872	0.174
14	356	0.094	0.009	1.791	0.166
13	330	0.104	0.010	1.697	0.158
12	305	0.112	0.010	1.593	0.148
11	279	0.118	0.011	1.481	0.138
10	254	0.123	0.011	1.363	0.127
9	229	0.126	0.012	1.240	0.115
8	203	0.129	0.012	1.114	0.103
7	178	0.131	0.012	0.985	0.092
6	152	0.133	0.012	0.854	0.079
5	127	0.134	0.012	0.721	0.067
4	102	0.136	0.013	0.587	0.055
3	76	0.138	0.013	0.451	0.042
2	51	0.140	0.013	0.313	0.029
1	25	0.173	0.016	0.173	0.016
Total		1.968	0.183	1.968	0.183

Calculations are based on ft^3/ft (m^3/m).
Multiply by the installed length (exposed) to calculate storage per unit.

Shown: CULTEC HVLV F-110x4 Feed Connector inserted into side portals of CULTEC chamber.

Visit www.cultec.com/downloads.html for Product Downloads and CAD details.

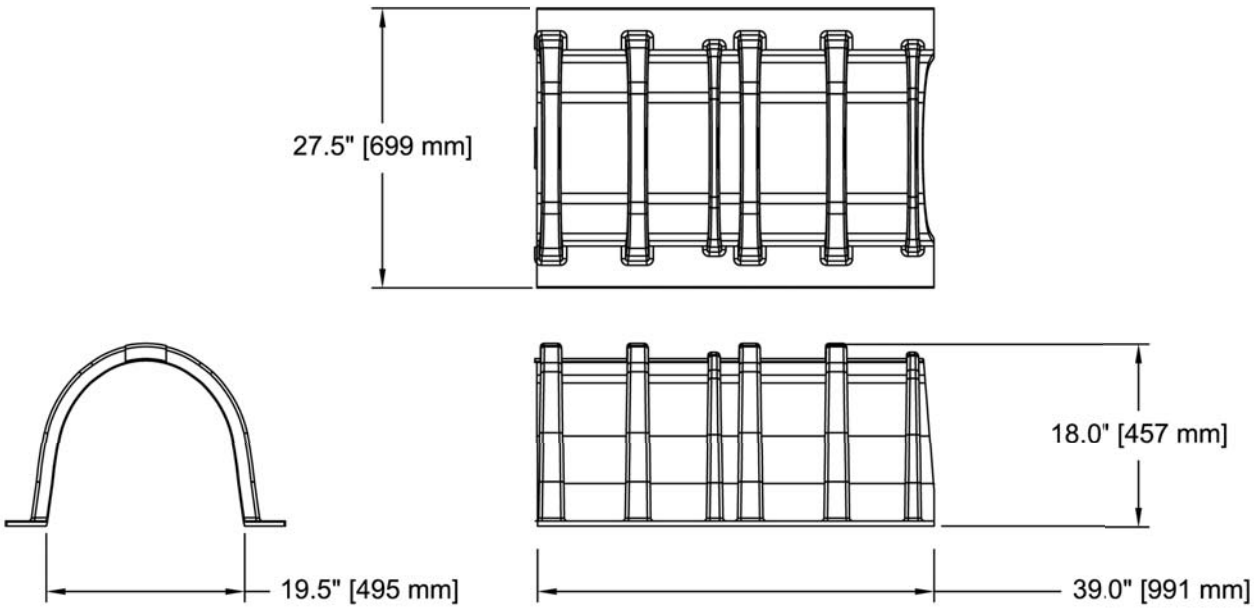
CULTEC HVLV® F-110x4 Feed Connector Specifications

GENERAL

CULTEC HVLV® F-110x4 Feed Connectors are designed to create an internal manifold for CULTEC Recharger V8HD stormwater chambers.

CHAMBER PARAMETERS

1. The chambers shall be manufactured by CULTEC, Inc. of Brookfield, CT (203-775-4416 or 1-800-428-5832).
2. The chamber shall be vacuum thermoformed of black polyethylene.
3. The chamber shall be arched in shape.
4. The chamber shall be open-bottomed.
5. The nominal chamber dimensions of the CULTEC HVLV® F-110x4 Feed Connector shall be 18 inches (457 mm) tall, 27.5 inches (699 mm) wide and 39 inches (991 mm) long.
6. The nominal storage volume of the HVLV® F-110x4 Feed Connector shall be 1.968 ft^3 / ft (0.183 m^3 / m) - without stone.
7. The HVLV® F-110x4 Feed Connector chamber shall have 5 corrugations.
8. The HVLV® F-110x4 Feed Connector must be formed as a whole chamber having two open end walls and having no separate end plates or separate end walls. The unit shall fit into the side portals of the Recharger V8SHD Starter and V8EHD End stormwater chamber and act as cross feed connections creating an internal manifold.
9. The chamber shall be manufactured in an ISO 9001:2008 certified facility.



CULTEC No. 410™ Filter Fabric

Use of a non-woven polypropylene filter fabric is required by CULTEC Contactor® and Recharger® stormwater installations. CULTEC Stormwater Systems are typically enveloped top, sides and bottom with filter fabric in order to provide a barrier that prevents soil intrusion into the stone. Covering the bed's top and sides are mandatory; the use of filter fabric on the bottom of the system is up to the engineer's design preference.

Properties	Test Method	Test Results
Appearance		Black
Grab Tensile	D 4632	90 lbs 400 N
Elongation	D 4632	50%
Trapezoid Tear	D 4533	35 lbs 155 N
Puncture	D 4833	55 lbs 245 N
Mullen Burst	D 3786	175 psi 1205 kPa
AOS	D 4751	70 U.S. sieve .21 mm
Permittivity	D 4491	2.0 sec^{-1}
Permeability	D 4491	.2 cm/sec
Water Flow	D 4491	145 $gal/min/ft^2$ 5908 $l/min/m^2$
UV Stability	D 4355	70%

CULTEC No. 410™ Filter Fabric Specifications

GENERAL

CULTEC No. 410™ Non-Woven Filter Fabric may be used with CULTEC Contactor® and Recharger® stormwater installations to provide a barrier that prevents soil intrusion into the stone.

FABRIC PARAMETERS

1. The filter fabric shall be provided by CULTEC, Inc. of Brookfield, CT (203-775-4416 or 1-800-428-5832).
2. The filter fabric shall be black in appearance.
3. The filter fabric shall have a Grab Tensile value of 90 lbs (400 N) per ASTM D4632 testing method.
4. The filter fabric shall have an Elongation value of 50% per ASTM D4632 testing method.
5. The filter fabric shall have a Trapezoid Tear value of 35 lbs (155 N) per ASTM D4533 testing method.
6. The filter fabric shall have a Puncture value of 55 lbs (245 N) per ASTM D4833 testing method.
7. The filter fabric shall have a Mullen Burst value of 175 psi (1205 kPa) per ASTM D3786 testing method.
8. The filter fabric shall have a AOS value of 70 U.S. Sieve (.21 mm) per ASTM D4751 testing method.
9. The filter fabric shall have a Permittivity value of 2.0 sec^{-1} per ASTM D4491 testing method.
10. The filter fabric shall have a Permeability value of .2 cm/sec per ASTM D4491 testing method.
11. The filter fabric shall have a Water Flow value of 145 gal/min/ft^2 (5908 l/min/m^2) per ASTM D4491 testing method.
12. The filter fabric shall have a UV Stability value of 70% per ASTM D4355 testing method.

CULTEC No. 20L™ Polyethylene Liner

CULTEC No. 20L™ Polyethylene Liner is a membrane consisting of a blended linear polyethylene. It is designed to provide an economical solution to prevent scouring and to provide a smooth surface upon which the water may travel when using the CULTEC manifold feature. The liner is to be placed beneath the CULTEC stormwater chambers that will be utilizing the internal manifold feature and span the entire width of the bed. Carbon black provides protection from UV rays. It does not contain plasticizers that in time can migrate to the surface, causing premature aging.

Properties	Test Method	Test Results
Appearance		Black
Thickness, Nominal		20 mil 0.51 mm
Weight		93 lbs/MSF 453 g/m^2
Tensile Strength @ Break 1" (2.54 cm)	ASTM D6693	75 lbs 334 N
Elongation at Break	ASTM D6693	800% 800%
Tear Resistance	ASTM D1004	11 lbf 49 N
Hydrostatic Resistance	ASTM D751	100 psi 689 kPa
Puncture Resistance	ASTM D4833	30 lbf 133 N
Volatile Loss	ASTM D1203	< 1% < 1%
Dimensional Stability	ASTM D1204	< 2% < 2%
Maximum Use Temperature		180° F 82° C
Minimum Use Temperature		-70° F -57° C
Perm Rating	ASTM E96 Method A	0.041 U.S. Perms 0.027 Metric Perms

CULTEC No. 20L™ Polyethylene Liner Specifications

GENERAL

CULTEC No. 20L™ Polyethylene Liner is designed as an impervious underlayment to prevent scouring caused by water movement within the CULTEC chambers and feed connectors utilizing the CULTEC manifold feature.

LINER PARAMETERS

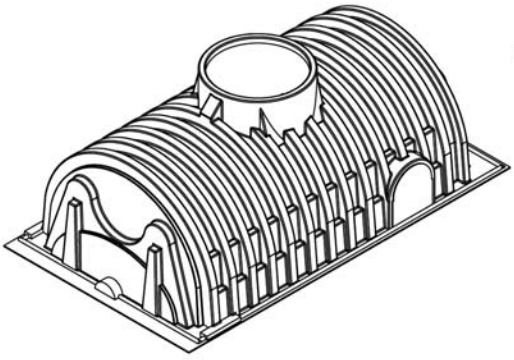
1. The liner shall be provided by CULTEC, Inc. of Brookfield, CT (203-775-4416 or 1-800-428-5832).
2. The liner shall be black in appearance.
3. The liner shall have a nominal thickness of 20 mil (0.51 mm).
4. The liner shall have a weight of 93 lbs/MSF (453 g/m^2).
5. The liner shall have a tensile strength @ break 1" (2.54 cm) of 75 lbs (334 N) per ASTM D6693 testing method.
6. The liner shall have an elongation at break of 800% per ASTM D6693 testing method.
7. The liner shall have a tear resistance of 11 lbf (49 N) per ASTM D1004 testing method.
8. The liner shall have a hydrostatic resistance of 100 psi (689 kPa) per ASTM D751 testing method.
9. The liner shall have a puncture resistance of 30 lbf (133 N) per ASTM D4833 testing method.
10. The liner shall have a volatile loss of <1% per ASTM D1203 testing method.
11. The liner shall have a dimensional stability of <2% per ASTM D1204 testing method.
12. The liner shall have a maximum use temperature of 180° F (82° C).
13. The liner shall have a minimum use temperature of -70° F (-57° C).
14. The liner shall have a perm rating of 0.041 U.S. Perms (0.027 Metric Perms) per ASTM E96 Method A.
15. The liner shall consist of a blended linear polyethylene.
16. The liner shall not contain plasticizers.

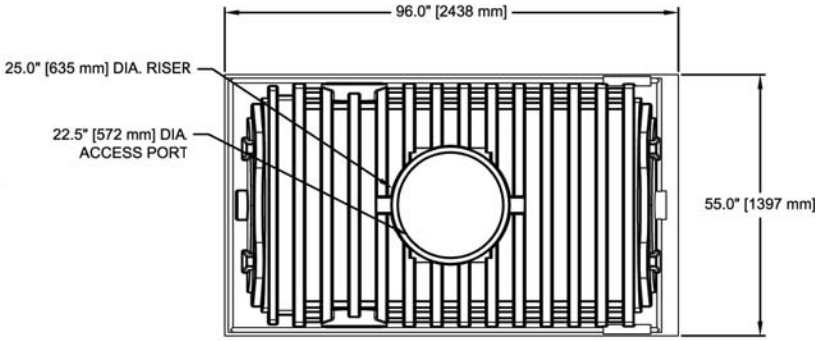
CULTEC STORMFILTER® 330 Water Quality Unit

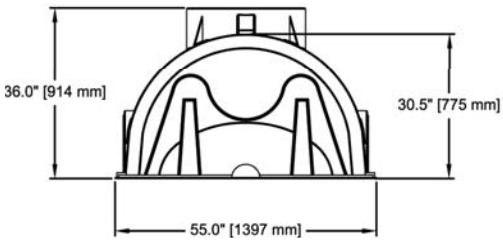
The CULTEC StormFilter® 330 is designed to be a secondary in-line filter system that effectively removes many of the smaller particles not eliminated by conventional structures during the pretreatment process.

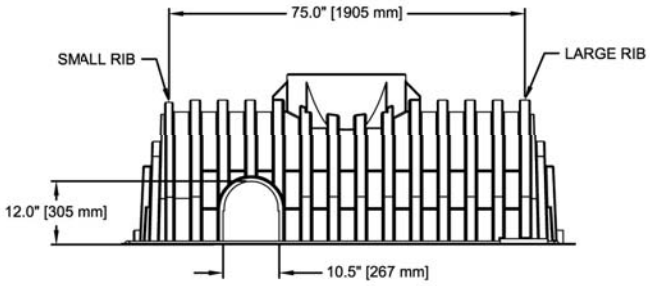
CULTEC StormFilter® 330 is a pass-through filter system. It has a welded and secured solid bottom.

Size (L x W x H)	8' x 55" x 36" 2.44 m x 1397 mm x 914 mm
Access Opening	22.5" 572 mm
Capacity	418.5 gal. 1584 l
Number of Filters	2 Typical (up to 4 available)
Filtration Capability	708.4 gpm 2682 l/min
Apparent Opening Size of Filter	70 US Std. Sieve 0.212 mm
Max. Allowable Cover	4' 1.22 m
Weight	300 lbs. 136.1 kg
Max. Inlet Opening in End Wall	8" (fully filtered) 203 mm (fully filtered) 24" (w/ bypass capability) 600 mm (w/ bypass capability)



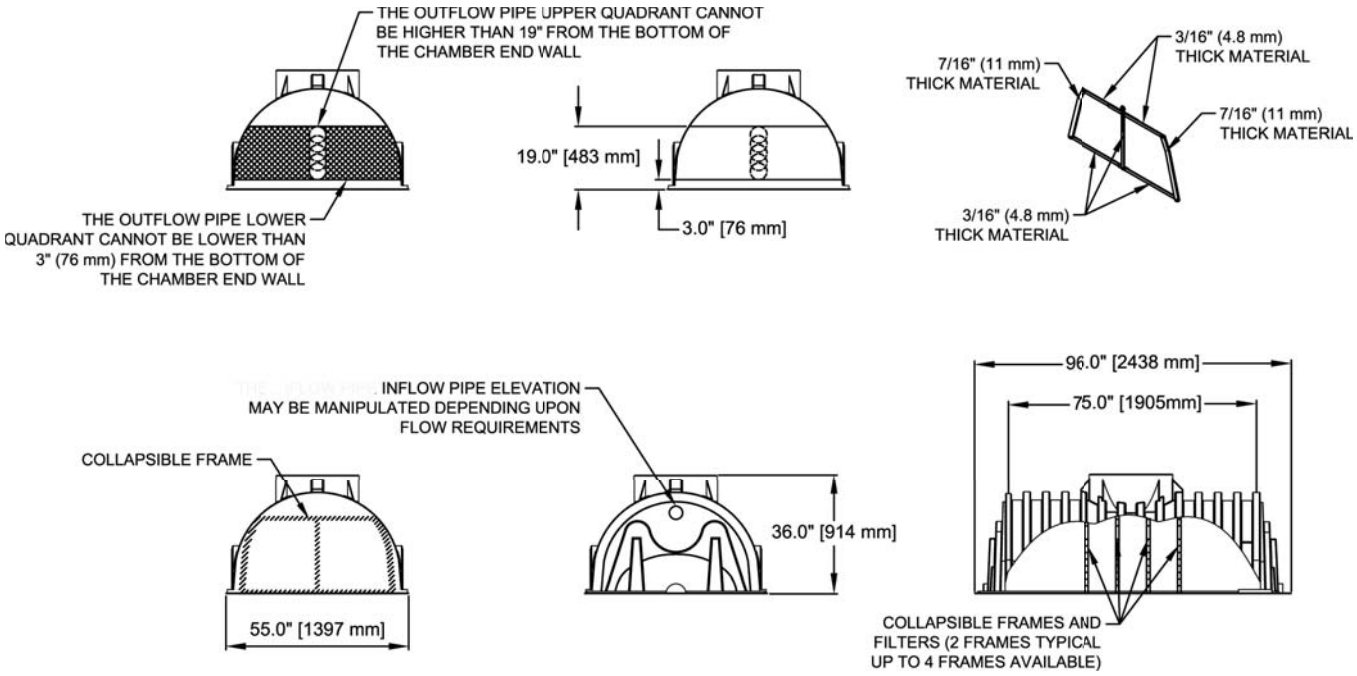




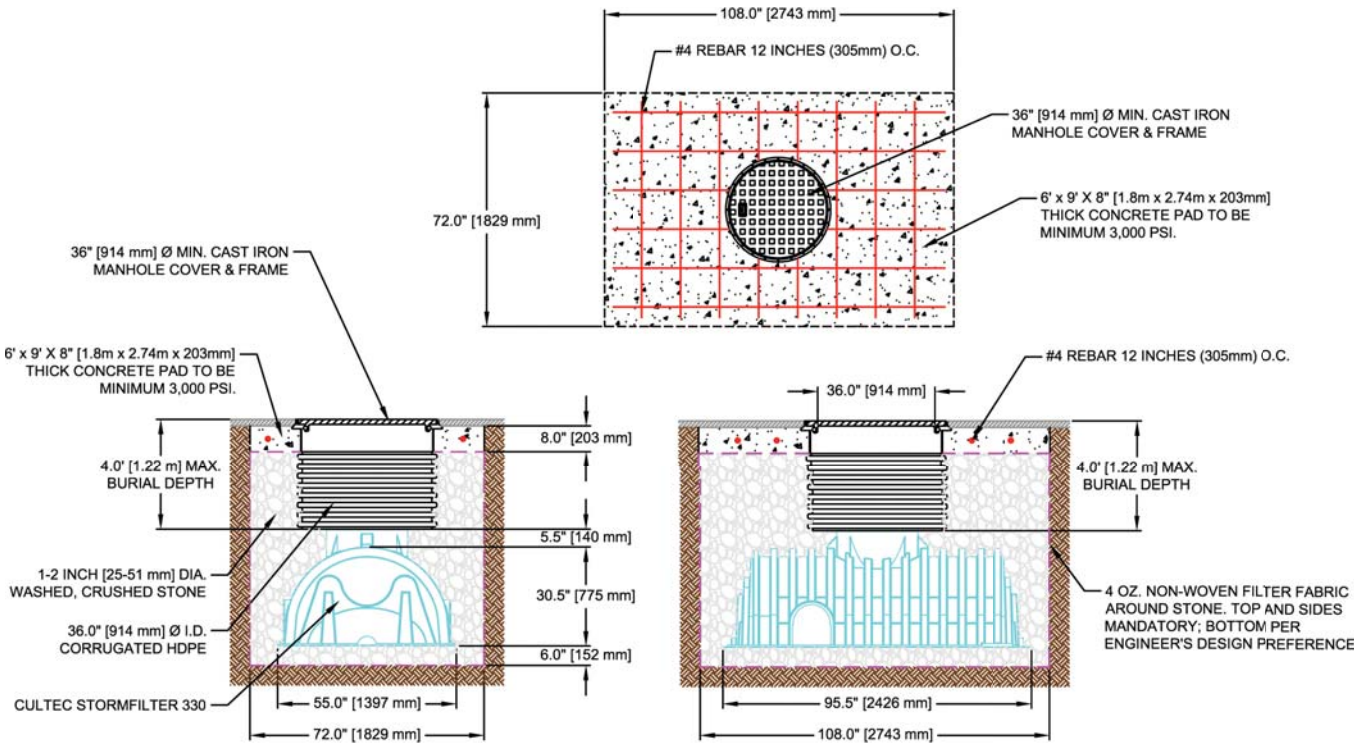


CULTEC STORMFILTER® 330 Water Quality Unit

Frame Detail

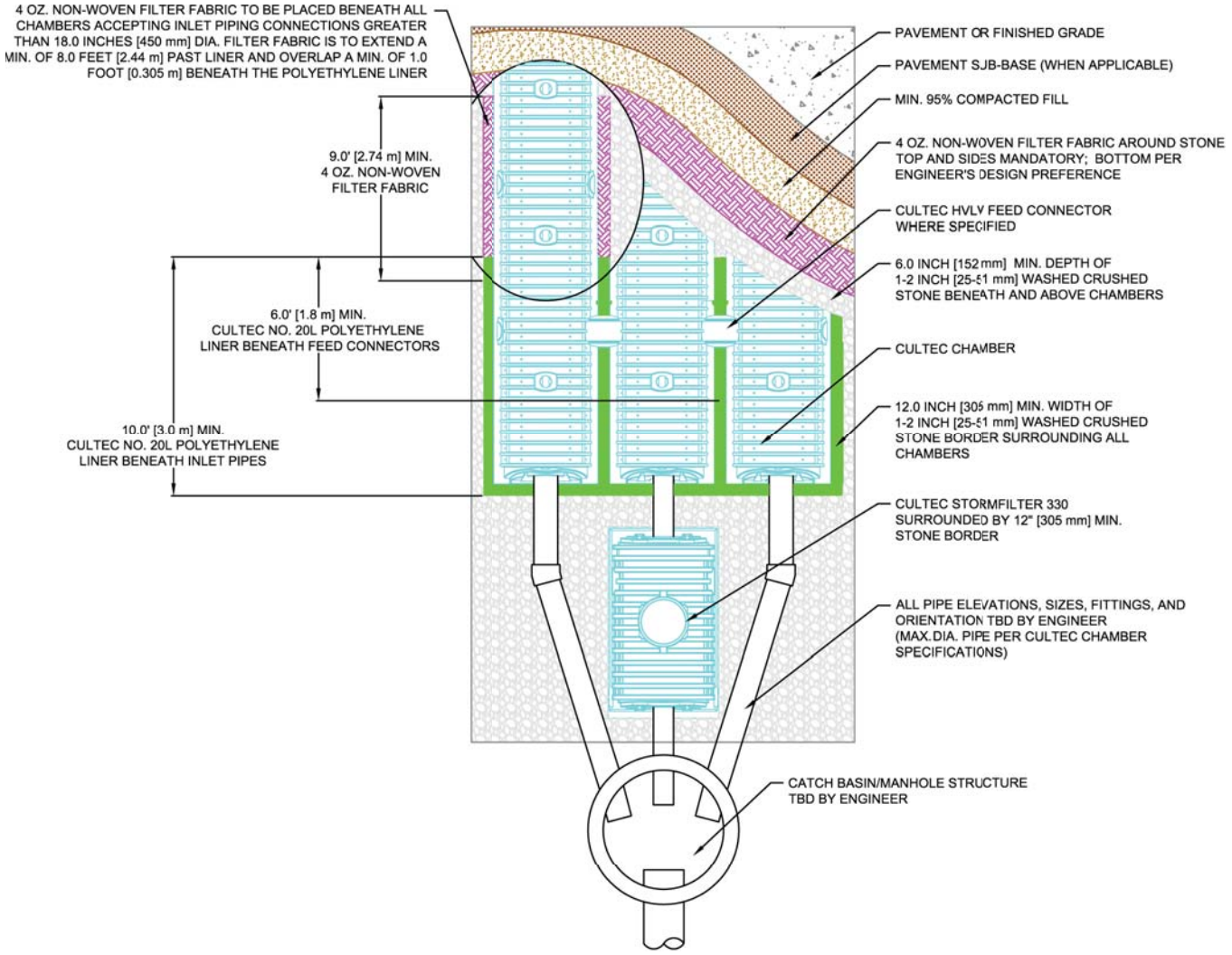


Typical Cross Section for Paved Traffic Application



CULTEC STORMFILTER® 330 Water Quality Unit

Overflow / Bypass Plan View Detail



Visit www.cultec.com/downloads.html
for Product Downloads and CAD details.

CULTEC STORM*FILTER*® 330 Water Quality Unit Specifications

GENERAL

CULTEC StormFilter® 330 designed as a water quality unit. The unit may be used to filter stormwater run-off via pass-thru filtration baffles.

STORMFILTER 330 PARAMETERS

1. The chambers shall be manufactured by CULTEC, Inc. of Brookfield, CT (203-775-4416 or 1-800-428-5832).
2. The chamber shall be vacuum thermoformed of black polyethylene.
3. The chamber shall be arched in shape.
4. The chamber shall have a welded and secured solid bottom plate.
5. The nominal chamber dimensions of the CULTEC StormFilter® 330 shall be 36 inches (914 mm) tall, 55 inches (1397 mm) wide and 8 feet (2.44 m) long.
6. The chamber shall have a 22.5 inch (572 mm) diameter access opening located at the top of the unit.
7. Maximum inlet opening on the chamber end wall is 24 inches (600 mm) when utilizing bypass capability.
8. The recommended inlet pipe diameter is 8 inches (200 mm) for full filtering capacity.
9. The recommended outlet pipe diameter is 15 inches (375 mm) for full filtering capacity.
10. The chamber shall have two side portals to accept CULTEC HVLV™ FC-24 Feed Connectors. The nominal dimensions of each side portal shall be 12 inches (305 mm) high by 10.5 inches (267 mm) wide. Maximum allowable pipe size in the side portal is 10 inches (250 mm).
11. The nominal storage volume of the StormFilter® 330 shall be 418.5 gal / unit (1584 l/unit).
12. The StormFilter® 330 chamber shall have 14 corrugations.
13. The StormFilter 330 shall be designed to withstand traffic loads when installed according to CULTEC's recommended installation instructions.
14. The StormFilter® 330 has a maximum filtering capacity of 708.4 gpm (2682 l/min).
15. The maximum burial depth shall not exceed 4 feet (1.22 m).
16. The chamber shall be manufactured in an ISO 9001:2008 certified facility.

FILTER FRAME BAG SPECIFICATIONS

GENERAL

CULTEC's filter enclosures, manufactured from a multipurpose nonwoven geotextile of 100% polypropylene plastic staple fibers formed into a random network, needlepunched and heatset for dimensional stability, are designed to fit collapsible metal frames.

FILTER FRAME BAG PARAMETERS

1. The geotextile shall be provided by CULTEC, Inc. of Brookfield, CT (203-775-4416 or 1-800-428-5832).
2. The filter enclosures are constructed from multipurpose nonwoven geotextile of 100% polypropylene plastic staple fibers formed into a random network, needlepunched and heatset for dimensional stability.
3. The filter bag shall have a nominal area of 6.44 ft^2 (0.598 m^2).
4. The geotextile shall be black in appearance.
5. The geotextile shall have a Grab Tensile Strength value of 160 lbs (0.71 kN) per ASTM D4632 testing method.
6. The geotextile shall have a Grab Tensile Elongation value of 50% per ASTM D4632 testing method.
7. The geotextile shall have a Trapezoid Tear value of 60 lbs (0.27 kN) per ASTM D4533 testing method.
8. The geotextile shall have a CBR Puncture value of 410 lbs (1.82 kN) per ASTM D6241 testing method.
9. The geotextile shall have a AOS value of 70 U.S. Sieve (0.212 mm) per ASTM D4751 testing method.
10. The geotextile shall have a Permittivity value of 1.5 sec^{-1} per ASTM D4491 testing method.
11. The geotextile shall have a Water Flow value of 110 gpm/ft^2 (4480 lpm/m^2) per ASTM D4491 testing method.

FILTERING SPECIFICATIONS

1. The filter removes more than 70% of the total suspended solids typically present in stormwater run off.
2. Continuous filtration capability for clean filters is rated at 1.58 CFS (0.0447 m^3/s).
3. Treatment capability is approximately 708.4 gpm (2682 l/min).

CULTEC STORM*FILTER*® T-80 Water Quality Unit

CULTEC StormFilter® T-80 is a cost-effective filtration unit used to remove leaves and debris from rainwater collected by catchbasins or gutters. StormFilter T-80 prevents leaves and debris from clogging outflow systems and piping. Rainwater is piped into the end wall of the StormFilter T-80 and passed thru a removable filter. Pollutants are collected within the tank and may be removed by a wet/dry vac. The filter bag may be cleaned or replaced. This compact unit is easy to install and simple for the homeowner or maintenance personnel to maintain. It is perfect for treating roof and driveway runoff for light commercial or residential applications.

Use the StormFilter® T-80 with or without a corrugated riser, grate or optional filter *(each sold separately)* based on your needs.

When the filter frames are not installed, the StormFilter® T-80 may be used as a holding tank or catchbasin.

Shown with optional accessories
(sold separately)

Size (L x W x H)	42" x 31" x 26.38" 1067 mm x 787 mm x 670 mm
Access Opening	12.5" 318 mm
Capacity	90 gal 340.7 L
Number of Filters	1 Typical
Filtration Capability	301.4 gpm 1141 l/min
Apparent Opening Size of Filter	70 US Std. Sieve 0.212 mm
Max. Allowable Cover	12” 305 mm
Weight	44 lbs. 20 kg
Max. Inlet Opening in End Wall	4" 100 mm

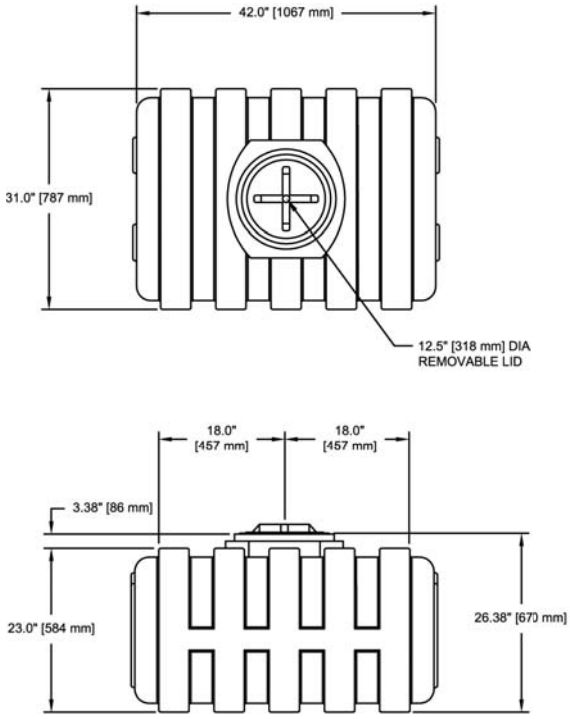
MAINTENANCE PROCEDURES

The CULTEC StormFilter T-80 should be inspected and cleaned as necessary, usually at the start of spring and at the end of fall.

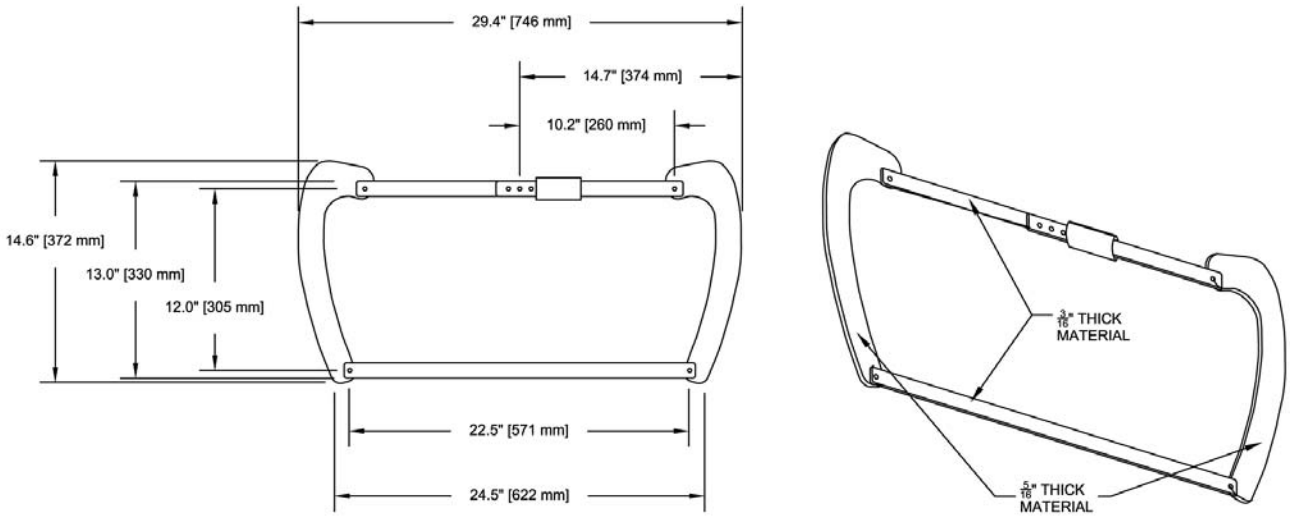
1. Clean and inspect all roof leaders, catch basins, drains, and other inlet structures upstream of the StormFilter T-80.
2. Remove the 15.0" (375 mm) end cap located at the top of the maintenance access riser pipe.
3. Remove the 12.5" (318 mm) removable lip from the top of the StormFilter T-80.
4. Open the filter bag assembly and slide the locking sleeve away from the center of the frame to let the frame collapse.
5. Remove filter bag assembly from the StormFilter.
6. Clean or replace filter bag as necessary. Bag can be cleaned using a common garden hose. If the filter bag is worn, damaged, or cannot be cleaned, contact CULTEC, Inc. for a new filter bag.
7. Clean out any leaves, sticks, or other large debris from StormFilter. Make sure to wear gloves and safety glasses.
8. Vacuum any dirt, sediment, and small debris from bottom of StormFilter using a wet/dry vac.
9. Reinstall filter bag assembly.
10. Open metal frame and slide locking sleeve back to the center of the frame.
11. Replace 12.5" (318 mm) removable lip at the top of the StormFilter T-80.
12. Replace 15.0" (375 mm) end cap at the top of the maintenance access rise pipe.

CULTEC STORMFILTER® T-80 Water Quality Unit

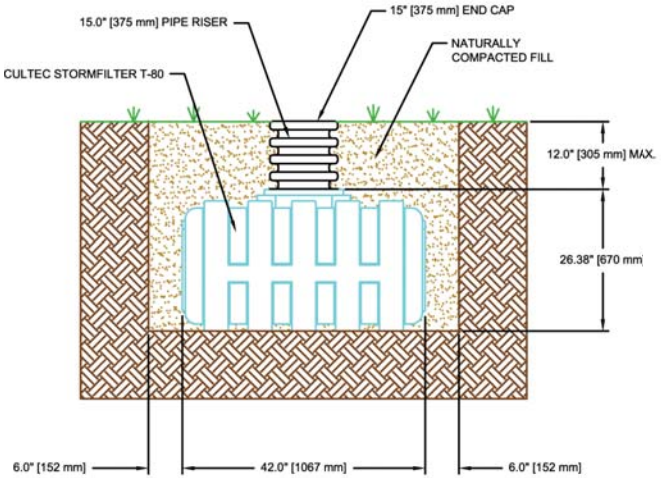
Three View Drawing

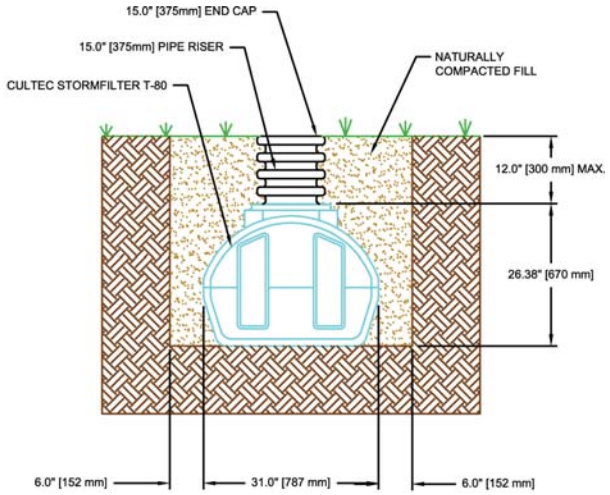


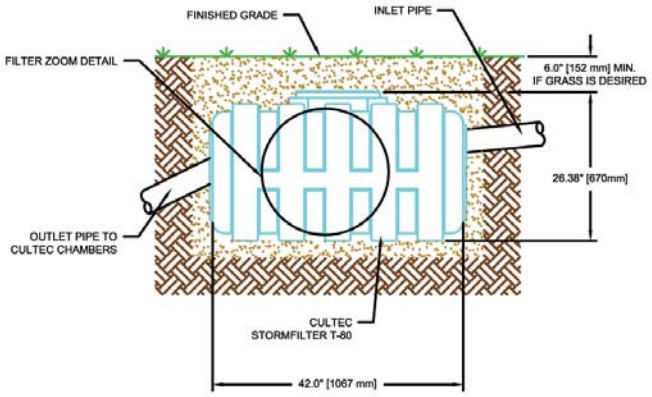
Filter Frame Detail



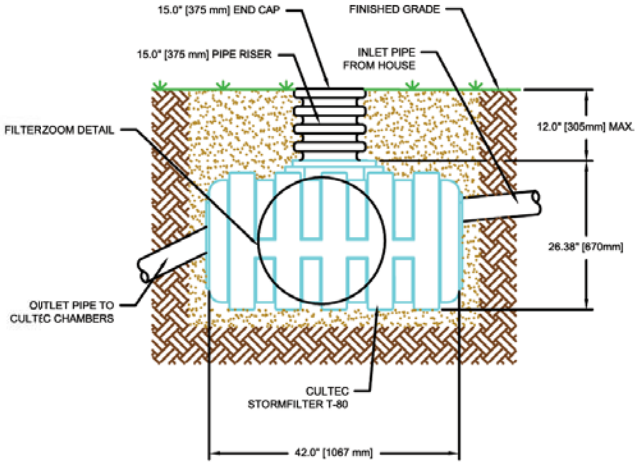
Typical Cross Section for Non-Traffic Application



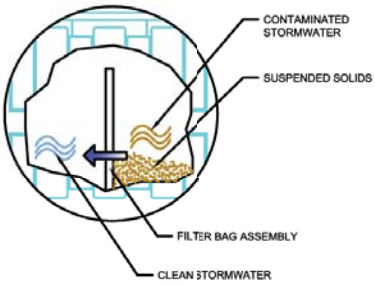




Shown: Installed close to final grade



Shown: Installed with optional riser



FILTER ZOOM DETAIL

Visit www.cultec.com/downloads.html
for Product Downloads and CAD details.

CULTEC STORM*FILTER*® T-80 Water Quality Unit Specifications

GENERAL

CULTEC StormFilter® T-80 may be used as a stormwater filtration unit, holding tank or catchbasin.

CHAMBER PARAMETERS

1. The chambers shall be manufactured by CULTEC, Inc. of Brookfield, CT (203-775-4416 or 1-800-428-5832).
2. The chamber shall be formed of black polyethylene.
3. The nominal chamber dimensions of the CULTEC StormFilter® T-80 shall be 26.38 inches (670 mm) tall, 31 inches (787 mm) wide and 42 inches (1067 mm) long.
4. The chamber shall have a 12.5 inch (318 mm) diameter access opening located at the top of the unit.
5. Maximum inlet opening on the chamber end wall is 4 inches (100 mm).
6. The nominal storage volume of the StormFilter™ T-80 shall be 90 gal / unit (340.7 l / unit).
7. The StormFilter® T-80 chamber shall have 5 corrugations.
8. The StormFilter® T-80 shall have a maximum filtering capacity of 301.4 gpm (1141 l/min).
9. The chamber shall be designed for non-traffic applications when installed according to CULTEC's recommended installation instructions.
10. The chamber shall be manufactured in an ISO 9001:2008 certified facility.

FILTER FRAME BAG SPECIFICATIONS

GENERAL

CULTEC's filter enclosures, manufactured from a multipurpose nonwoven geotextile of 100% polypropylene plastic staple fibers formed into a random network, needlepunched and heatset for dimensional stability, are designed to fit collapsible metal frames.

FILTER FRAME BAG PARAMETERS

1. The geotextile shall be provided by CULTEC, Inc. of Brookfield, CT (203-775-4416 or 1-800-428-5832).
2. The filter enclosures are constructed from multipurpose nonwoven geotextile of 100% polypropylene plastic staple fibers formed into a random network, needlepunched and heatset for dimensional stability.
3. The filter bag shall have a nominal area of 2.74 ft^2 (0.255 m^2).
4. The geotextile shall be black in appearance.
5. The geotextile shall have a Grab Tensile Strength value of 160 lbs (0.71 kN) per ASTM D4632 testing method.
6. The geotextile shall have a Grab Tensile Elongation value of 50% per ASTM D4632 testing method.
7. The geotextile shall have a Trapezoid Tear value of 60 lbs (0.27 kN) per ASTM D4533 testing method.
8. The geotextile shall have a CBR Puncture value of 410 lbs (1.82 kN) per ASTM D6241 testing method.
9. The geotextile shall have a AOS value of 70 U.S. Sieve (.212 mm) per ASTM D4751 testing method.
10. The geotextile shall have a Permittivity value of 1.5 sec^{-1} per ASTM D4491 testing method.
11. The geotextile shall have a Water Flow value of 110 gpm/ft^2 (4480 lpm/m^2) per ASTM D4491 testing method.

FILTERING SPECIFICATIONS

1. The filter removes more than 70% of the total suspended solids typically present in stormwater run off.
2. Continuous filtration capability for clean filters is rated at 0.67 CFS (0.019 m^3/s).
3. Treatment capability is approximately 301.4 gpm (1141 l/min).

CULTEC PAC® 150 Conveyance Chamber

The PAC® 150 is an 18.5" (470 mm) tall chamber typically used as an alternate to pipe for water conveyance. The PAC® 150 has a solid bottom plate and four side portals for easy distribution of feed lines or outlets. CULTEC's HVLV™ FC-24 Feed Connectors or pipe may be inserted into the side portals to feed the chamber.

Size (L x W x H)	10.33' x 33" x 18.5"
	3.15 m x 838 mm x 470 mm
Installed Length	9.4'
	2.87 m
Length Adjustment per Run	0.93'
	0.28 m
Chamber Storage	2.65 ft^3/ft
	0.25 m^3/m
	24.91 ft^3/unit
	0.71 m^3/unit
Min. Area Required	35.25 ft^2
	3.27 m^2
Max. Allowable Cover	12'
	3.66 m
Max. Inlet Opening in End Wall	12"
	300 mm
Side Portal Dimensions (H x W)	12" x 10.5"
	305 mm x 267 mm
Max. Allowable Pipe Size in Side Portal	10"
	250 mm
Compatible Feed Connector	HVLV™ FC-24 Feed Connector

	Stone Foundation Depth 6" 152 mm
Stone Required Per Chamber	2.40 yd^3
	1.83 m^3

Calculations are based on installed chamber length.
Includes 6" (152 mm) stone above crown of chamber and typical stone surround - single row. Stone void calculated at 40%.

PAC 150 Bare Chamber Storage Volumes

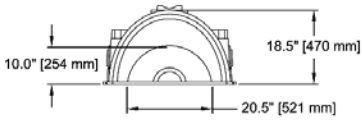
Elevation		Incremental Storage Volume				Cumulative Storage	
in.	mm	ft^3 / ft	m^3 / m	ft^3	m^3	ft^3	m^3
18.5	470	0.006	0.001	0.058	0.002	24.912	0.705
18	457	0.010	0.001	0.089	0.003	24.854	0.704
17	432	0.032	0.003	0.301	0.009	24.764	0.701
16	406	0.077	0.007	0.724	0.020	24.464	0.693
15	381	0.102	0.009	0.960	0.027	23.740	0.672
14	356	0.119	0.009	1.121	0.032	22.780	0.645
13	330	0.134	0.011	1.256	0.036	21.659	0.613
12	305	0.146	0.012	1.370	0.039	20.403	0.578
11	279	0.156	0.014	1.466	0.042	19.033	0.539
10	254	0.165	0.015	1.550	0.044	17.567	0.497
9	229	0.172	0.016	1.621	0.046	16.017	0.454
8	203	0.179	0.017	1.681	0.048	14.396	0.408
7	178	0.184	0.017	1.729	0.049	12.715	0.360
6	152	0.188	0.017	1.763	0.050	10.987	0.311
5	127	0.191	0.018	1.791	0.051	9.224	0.261
4	102	0.193	0.018	1.813	0.051	7.434	0.210
3	76	0.195	0.018	1.831	0.052	5.620	0.159
2	51	0.197	0.018	1.848	0.052	3.789	0.107
1	25	0.207	0.019	1.941	0.055	1.941	0.055
Total		2.650	0.246	24.912	0.705		

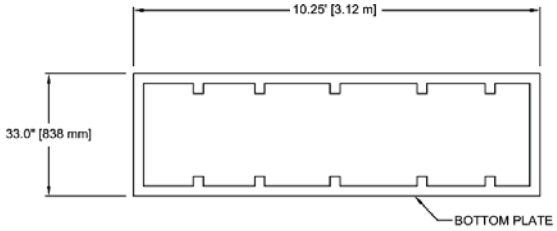
Calculations are based on installed chamber length.

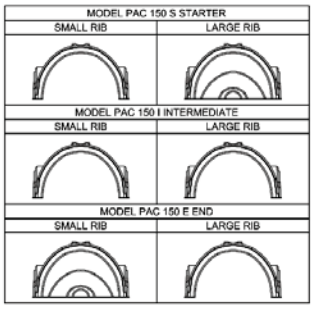
Visit www.cultec.com/downloads.html
for Product Downloads and CAD details.

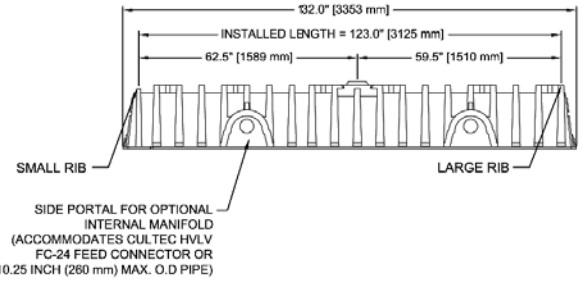
CULTEC PAC® 150 Conveyance Chamber

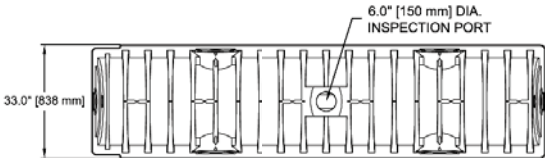
Three View Drawing



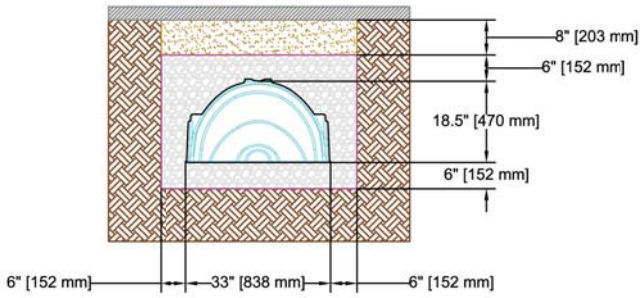


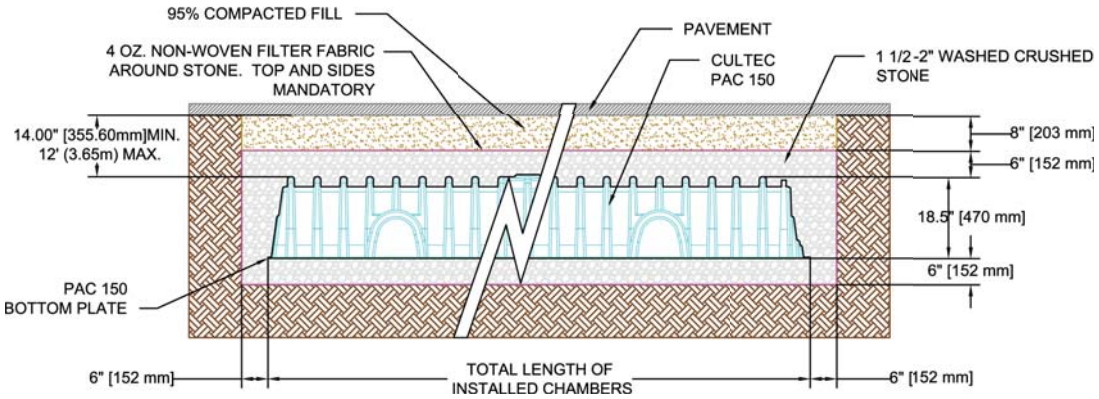






Typical Cross Section for Paved Traffic Application - Single Row





CULTEC PAC® 150 Specifications

GENERAL

CULTEC PAC®150 chambers are designed for underground stormwater management. The chambers may be used for conveyance, retention, recharging, detention or controlling the flow of on-site stormwater runoff.

CHAMBER PARAMETERS

1. The chambers will be manufactured by CULTEC, Inc. of Brookfield, CT (203-775-4416 or 1-800-428-5832).
2. The chamber will be vacuum thermoformed of black polyethylene.
3. The chamber will be arched in shape.
4. The chamber will be have a separate bottom plate to allow for conveyance of water.
5. The chamber will be joined using an interlocking overlapping rib method. Connections must be fully shouldered overlapping ribs, having no separate couplings or separate end walls.
6. The nominal chamber dimensions of the CULTEC PAC®150 shall be 18.5 inches (470 mm) tall, 33 inches (838 mm) wide and 10.33 feet (3.15 m) long. The installed length of a joined PAC® 150 shall be 9.4 feet (2.86 m).
7. The nominal dimensions of the CULTEC PAC® 150 separate bottom plate shall be 3.08 feet (0.94 m) wide and 10.25 feet (3.12 m) long.
8. Maximum inlet opening on the chamber end wall is 12 inches (300 mm).
9. The chamber will have four side portals to accept CULTEC HVLV™ FC-24 Feed Connectors or pipe. The nominal dimensions of each side portal will be 12 inches (305 mm) high by 10.5 inches (267 mm) wide. Maximum allowable pipe size in the side portal is 10 inches (250 mm).
10. The nominal storage volume of the PAC®150 chamber will be 2.650 ft^3 / ft (0.246 m^3 / m) - without stone. The nominal storage volume of a joined PAC®150 shall be 24.91 ft^3 / unit (0.705 m^3 / unit) - without stone.
11. The PAC®150 chamber shall have 20 corrugations.
12. The end wall of the chamber, when present, will be an integral part of the continuously formed unit. Separate end plates cannot be used with this unit.
13. The PAC®150 Stand Alone unit must be formed as a whole chamber having two fully formed integral end walls and having no separate end plates or separate end walls.
14. The PAC®150SHD Starter unit must be formed as a whole chamber having one fully formed integral end wall and one fully open end wall.
15. The PAC®150IHD Intermediate unit must be formed as a whole chamber having two fully open end walls.
16. The PAC®150EHD End unit must be formed as a whole chamber having one fully formed integral end wall and one fully open end wall and having no separate end plates or end walls.
17. Chambers must have horizontal stiffening flex reduction steps between the ribs.
18. Heavy duty units are designated by a colored stripe formed into the part along the length of the chamber.
19. The chamber will have a raised integral cap at the top of the arch in the center of each unit to be used as an optional inspection port or clean-out.
20. The units may be trimmed to custom lengths by cutting back to any corrugation on the large rib end.
21. Maximum burial depth shall not exceed 12 feet (3.66 m).
22. The chamber will be designed to withstand traffic loads when installed according to CULTEC's recommended installation instructions.
23. The chamber shall be manufactured in an ISO 9001:2008 certified facility.

CULTEC Contactor® Series End Detail Information

for Contactor Model 100HD

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

Large Rib End Detail | Small Rib End Detail

Model RHD is a **starter / stand alone** unit with two full end walls. They are used to start lines or can be used singularly. They may also be trimmed to into model type EHD.

Model RHD

Model EHD is a **middle / end unit** with one closed end wall and one open end. They are used to continue lines and also used to end a line.

Model EHD

CULTEC Recharger® Series End Detail Information

for Recharger Models 150XLHD, 280HD, and 330XLHD

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

Large Rib End Detail | Small Rib End Detail

Model RHD is a **stand alone** unit with two fully closed end walls. They are used when a single unit is required. They may also be trimmed to into model types SHD, IHD, or EHD.

Model RHD

Model SHD is a **starter** unit with one closed end wall and one partially open end wall. They are used to start a chamber row.

Model SHD

Model IHD is an **intermediate** unit with one fully open end and one partially open end wall. They are used to continue the length of a line of chambers.

Model IHD

Model EHD is an **end unit** with one fully open end and one fully closed end wall. They are used to end a chamber row.

Model EHD

CULTEC End Detail Information for Recharger® V8HD

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

Large Rib End Detail | Small Rib End Detail

Model RHD is a **stand alone** unit with two fully closed end walls. They are used when a single unit is required. They may be also be trimmed to into model types SHD or EHD.

Model RHD

Model SHD is a **starter** unit with one closed end wall and one partially open end wall. They are used to start a chamber row.

Model SHD

Model IHD is an **intermediate** unit with one fully open end and one partially open end wall. They are used to continue the length of a line of chambers.

Model IHD

Model EHD is an **end unit** with one fully open end and one fully closed end wall. They are used to end a chamber run.

Model EHD

Note:
- The Starter and End Sections are shorter in length than the Intermediate sections.
- The Starter and End sections are able to accept the HVLV™ F-110x4 Feed Connector into its side portal.
- The Intermediate sections are able to accept the HVLV™ FC-24 Feed Connector into its side portal.

Shown L->R- Contactor 100HD, Recharger 150XLHD, Recharger 280HD, Recharger 330XLHD, and Recharger V8HD.

CULTEC Interlocking Rib Connection

The CULTEC chambers use an overlapping rib connection to interlock together. It uses a series of model types (starters, intermediates and ends) to build a run of chambers.

The Contactor series is available in Model R - Starter/Stand Alone and Model E - Middle/End models only (see pg. 101).

The Recharger series comes in Model R - Stand Alone, Model S - Starters, Model I - Intermediates and Model E - End units (see page 102).

The sections below describe how the units go together for each series.

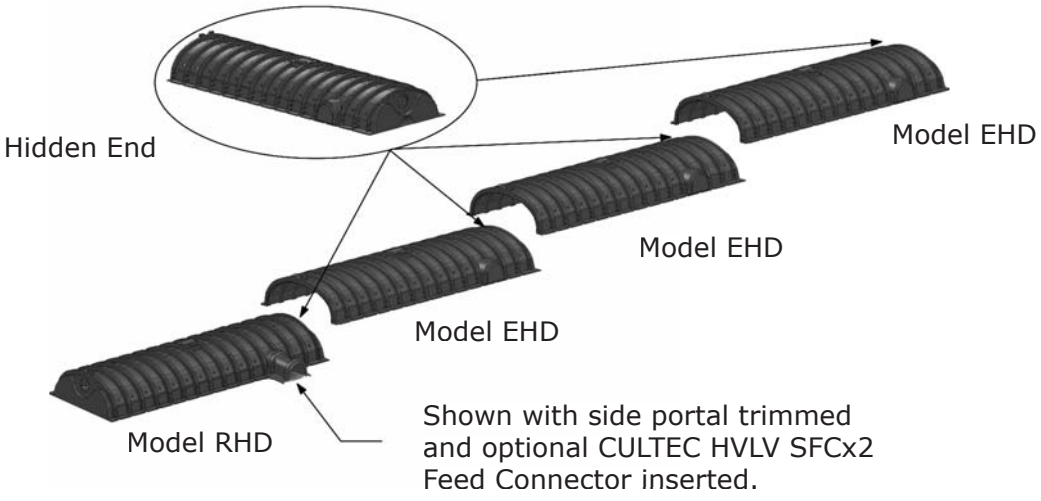
Directional arrows located on the top of the chamber point towards the Small Rib End. The open end of the next chamber overlaps the small rib end of the preceding chamber.

CULTEC Contactor® Series Typical Installation Method

for Contactor Model 100HD

Interlock Model RHD to EHD using the patented overlapping rib connection.

- Start each line with a Model RHD.
- Use Model EHD to continue the length of your line.
- End your line by using a Model EHD.

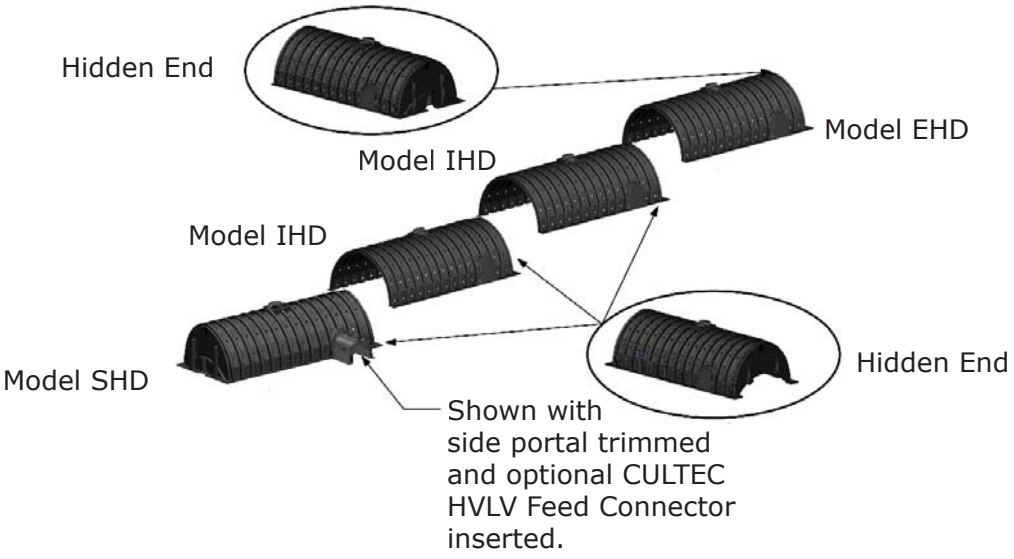


CULTEC Recharger® Series Typical Installation Method

for Recharger Models 150XLHD, 280HD, and 330XLHD

Interlock Model SHD to IHD using the patented overlapping rib connection. Finish the line with Model EHD.

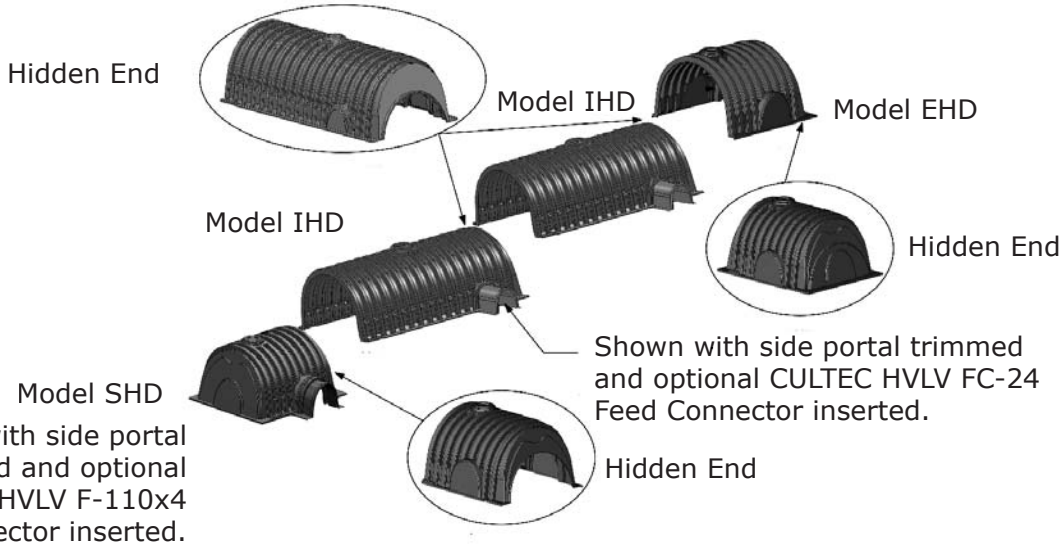
- Start each line with a Model SHD.
- Use Model IHD to continue the length of your line.
- End your line by using a Model EHD.



CULTEC Typical Installation Method for Recharger® V8HD

Interlock Model SHD to IHD using the patented overlapping rib connection. Finish the line with Model EHD.

- Start each line with a Model SHD.
- Use Model IHD to continue the length of your line.
- End your line by using a Model EHD.



CULTEC, Inc. finished products, when properly installed, registered with Cultec, Inc., and operated under normal conditions of use, are covered under Cultec Inc.'s Limited Warranty to be free from defects in material and workmanship for a period of one (1) year from the date of manufacture. In order to obtain Cultec's Limited Warranty, the product warranty registration card must be completed and returned to Cultec, Inc., having been postmarked within thirty (30) days of installation. Failure to return the warranty registration card to Cultec, Inc. shall void the Limited Warranty. This Limited Warranty shall be void if the finished product is not installed within forty-five (45) days of the date of purchase from Cultec, Inc. In order to obtain performance under this Limited Warranty, Cultec, Inc. must be provided with written notice of any defect promptly (in no case later than ten (10) business days after initial discovery AND prior to the end of the Limited Warranty period), with such notice sent to 878 Federal Road, PO Box 280, Brookfield, CT 06804-0280. The original purchase receipt for the product must be included with documentation supporting any claim under the terms of this Limited Warranty. Failure to promptly submit notice of defect, a receipt and completed limited warranty certificate will void the Limited Warranty. Cultec, Inc. shall not be responsible for any freight charges incurred in connection with this Limited Warranty. A fee may be incurred when Cultec, Inc. (in its sole discretion) deems it necessary for a Cultec, Inc. representative to visit a product installation site.

This Limited Warranty extends only to Cultec, Inc. products when the products are installed in 'single level', provided that such products do not, in the collective, amount to more than 12,000 cubic feet (339.84 cubic meters) of water volume storage capacity. This Limited Warranty shall be void where products are installed in 'multi-layer' or 'multi-tier' systems, as well as wherein collective system volume exceeds 12,000 cubic feet (339.84 cubic meters) of water volume storage capacity. Notwithstanding the foregoing, Cultec, Inc., in its sole discretion, may extend certain Limited Warranty terms upon 'double-layer' or 'double-tier' product installations, as well as 'single level' product installations wherein collective system volume exceeds 12,000 cubic feet (339.84 cubic meters) of water volume storage capacity, provided that (i) the buyer has contacted Cultec, Inc. prior to installation and has advised of the proposed installation design; (ii) all product warranty registration information has been provided prior to product installation; (iii) a pre-construction/pre-installation meeting has been held with representatives of Cultec, Inc.; and (iv) Cultec, Inc. has provided written confirmation of its intent to honor any Limited Warranty terms with respect to the specific installation. Under no circumstances shall any decision by Cultec, Inc. to honor such terms be relied upon by any party in any subsequent product purchase or installation.

This Limited Warranty does not apply to installation piping and/or other parts not supplied by Cultec, Inc. Cultec, Inc.'s limited warranties also do not extend to any goods or parts which have been damaged prior to installation, subjected to misuse, damaged by lack of maintenance, improper installation, neglect, damaged by accident, or damaged by being crushed by heavy equipment weighing in excess of the rated load carrying capacity of the product. This Limited Warranty also does not apply to shipping or in-transit damage.

THIS LIMITED WARRANTY DOES NOT APPLY TO CULTEC, INC. PRODUCTS THAT HAVE NOT BEEN INSTALLED ACCORDING TO CULTEC WRITTEN INSTALLATION INSTRUCTIONS. ANY PRODUCT DAMAGE OR FAILURE RESULTING FROM IMPROPER OR NEGLIGENT INSTALLATION IS SPECIFICALLY EXCLUDED FROM THIS WARRANTY AND SHALL REMAIN THE BUYER'S RESPONSIBILITY.

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- Cultec, Inc.'s 1-Year Limited Warranty coverage applies only to new products purchased from an Authorized Cultec Dealer/Distributor and is based on the date of manufacture.
- If warranty service is required, every effort will be made to replace covered product with identical model. However, we reserve the right to make equal or better substitution as needed.

Disclaimer:
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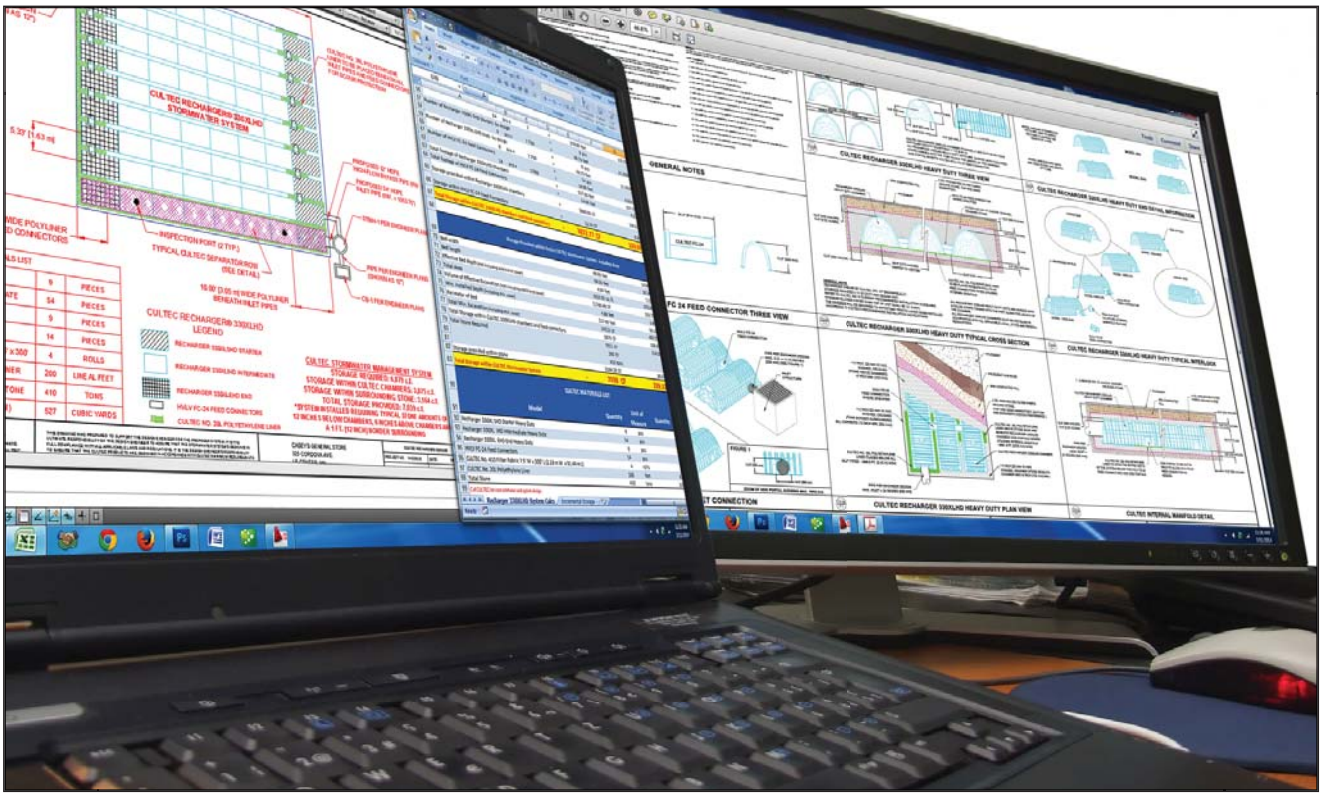

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