

April 26, 2024

Mr. Leo Cosentini
California State Water Resources Control Board
Division of Water Quality
P.O. Box 100
Sacramento, CA 95812-100

RE: Amended Application for Trash Treatment Control Device – Bio Clean[®] Grate Inlet and Curb Inlet Filters

Dear Mr. Cosentini,

Contech is pleased to submit this amended application for the Bio Clean[®] Grate Inlet and Curb Inlet Filters for trash full capture certification. The Bio Clean[®] Grate Inlet and Curb Inlet Filters were first certified by the California State Water Resources Control Board in March 2018 (application 4). Contech submitted an amended application for new grate inlet filter configurations that was certified in October 2021.

This amended application includes a modification of the grate inlet filter basket shape so that multiple baskets can be nested during shipping. Additionally, a new method has been developed for easier access by vector control agencies that eliminates the need to open an access port. It is our understanding that modifications that do not change the fundamental functionality of the Bio Clean[®] Grate Inlet and Curb Inlet Filters do not require a separate certification application but rather an amended application.

The grate inlet configuration details in this application have been updated accordingly. Everything having to do with the grate inlet design is updated including the descriptions, tables, figures, and appendices. We changed the vector control inspection guidance and removed the previous MVCAC approval letter.

We also updated the corporate contact information and references to Contech from Bio Clean and updated the warrantee information. Contech acquired Bio Clean[®] on 03/31/2022¹. We request that the ownership of the Bio Clean[®] Grate Inlet and Curb Inlet Filters be changed to Contech Engineered Solutions, LLC without changing the name of the unit. We also updated most of the curb inlet version information in the appendices since it was all branded Bio Clean instead of Contech.

This application is being submitted in accordance with the California State Water Resources Control Board *Application Guidance for Trash Full Capture Certification* document and includes the following requisite sections:

1. Cover Letter

2. Table of Contents
3. Physical Description
4. Installation Guidance
5. Operation and Maintenance Information
6. Vector Control Accessibility
7. Reliability Information
8. Field/Lab Testing Information and Analysis

Please contact me with any questions or should additional information be required. Thank you for your consideration of this application.

Sincerely,



Vaikko Allen
Director – Stormwater Regulatory Management
Contech Engineered Solutions, LLC

ⁱ Bio Clean acquisition press release available online at: <https://www.conteches.com/press-releases/bio-clean-to-be-integrated-into-contech-engineered-solutions-customers-to-benefit-from-expanded-stormwater-management-solutions/>

1.0 COVER LETTER

1.A. Device product name and general description;

The Bio Clean® Grate Inlet and Curb Inlet Filters are designed to capture trash and debris. The Grate Inlet and Curb Inlet Filters are passive, gravity flow devices and can be installed as a new construction BMP or retrofit BMP into standard storm drain inlets to treat flows after interception but prior to conveyance. The design incorporates a 4.7mm screen that ensures capture of all trash particles 5mm in size or larger. Each device also incorporates an integrated internal bypass feature ensuring captured trash does not impede interception or conveyance of peak storm water runoff.

These Devices are fabricated from rigid, durable materials such as stainless steel and marine grade fiberglass. Installation is quick and easy with the design requiring minimal to no mounting hardware. Routine maintenance is required to remove trash and is site and trash loading dependent. Maintenance is facilitated by the unique design of the device allowing for direct access of the Filters through the manhole access and/or grate.

1.B. The name of the Device owner;

California Contact:

Sean Hasan
Area Director
Contech Engineered Solutions, LLC
398 Via El Centro
Oceanside, California 92058
(760) 283-7188
Sean.Hasan@ContechES.com

Corporate Contact:

Zach Kent
Director – Stormwater Product Development
7410 Blanco Rd, Suite 315
San Antonio, TX 78216
(760) 579-9752
Zach.Kent@ContechES.com

1.C. The owner or manufacturer’s website where the Device can be found on the internet;

The Bio Clean® Grate Inlet and Curb Inlet Filters can be found on the Contech website: <https://www.conteches.com/stormwater-management/other-stormwater/bio-clean-catch-basin-inlet-filters/>

1.D. The location of the Device manufacturing site;

Bio Clean® inlet filters are manufactured in California at:

Contech Engineered Solutions, LLC
398 Via El Centro
Oceanside, California 92058

1.E. A brief summary of any field/lab testing results that demonstrates the device functions as described within the application;

Bio Clean® conducted laboratory testing on the proprietary non-blocking screen material utilized in the Grate Inlet and Curb Inlet Filters. Bio Clean conducted this testing to empirically determine unique properties of the screen including the Effective Open Area (EOA), the Coefficient of Discharge (C_d), and the flow capacity and characteristics. The results of the testing provided a clear relationship between discharge (Q) and head (h) acting on the screen. The results of the testing have been incorporated into the design of the Filters to determine both the treatment and peak flow rates for the Filters.

The test report has been included in the Application as Appendix F for review by the SWRCB and interested parties.

1.F. A brief summary of the device limitations, and operational sizing, and maintenance considerations;

The Bio Clean® Grate Inlet and Curb Inlet Filters are pre-engineered filtration systems designed to meet site-specific water quality treatment requirements. Conformance with the Engineer’s Plans and Specifications and the Manufacturer’s recommendations is essential to ensure proper operation and function of the Device.

Contech manufactures the Grate Inlet and Curb Inlet Filters using stainless steel and marine grade fiberglass components. The materials selected serve a wide variety of applications and are the most durable materials available for these types of devices. Adherence to installation recommendations is required to ensure the design service life of the Device is maintained.

The size of the Bio Clean[®] Grate Inlet and Curb Inlet Filters must be selected to meet the requirements of the Trash Provisions. Systems that are not designed and installed in conformance within the maximum treatment flow rate and maximum bypass flow rate limits can cause adverse hydraulic conditions. Additionally, non-conformance with the Device design limits may cause non-compliance with the Trash Provisions.

All structural, post-construction Best Management Practices require routine and scheduled inspection and maintenance. Inspection and maintenance are facilitated by the design of the Device. The design of the Device allows for placement of the Filters directly beneath the grate and/or manhole access allowing direct, unimpeded access to the storage baskets for quick and easy removal with no confined space entry required. Design considerations for maintenance frequency should be considered.

1.G. A description or list of locations, if any, where the device has been installed. Include the name and contact information of as many as three municipality(s) purchasing the Device; and

Installations of the Trash Capture version of this device are pending SWRCB Certification.

1.H. The application shall be signed by the owner or authorized representative (not the technical or sales representative) and include the following certification:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons that manage the system or those persons directly responsible for gathering the information, to the best of my knowledge and belief, the information submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.



Zach Kent, Director – Stormwater Product Development

04/26/2024
Date

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3.0 PHYSICAL DESCRIPTION

3.A. Trash Capture: Describe how the Device traps all trash particles 5 mm or greater in size;

The Bio Clean[®] Grate Inlet and Curb Inlet Filters are passive, gravity flow, stormwater treatment systems utilizing screening to capture trash and debris. The non-blocking screening system is suspended from either the grate or at the curb inlet opening and retains the captured trash above the bottom of the catch basin allowing the captured trash and debris to be stored in a dry state that prevents further contamination of the stormwater and minimizes maintenance requirements. Design flows are directly routed through a basket made from non-blocking, stainless steel screen that has an aperture not greater than 4.7 mm ensuring capture of all trash particles 5mm in size or larger.

The Bio Clean[®] Grate and Curb Inlet Filters incorporate the following features to achieve full capture of all trash particles larger than 5mm. These features additionally ensure no re-suspension of previously captured trash.

- The trash capture basket sidewall is manufactured from a proprietary, non-blocking louver-expanded stainless steel 4.7 mm screen. The openings of the screen are made by a process that angles the opening in one direction so that when water and debris encounter the screen a wiping action occurs which pushes both water and debris across the opening rather than through the opening. This perpetual, deflective shielding action minimizes blockages and penetration of debris through the screen opening.
- The proprietary, non-blocking 4.7 mm screens are made from 20-gauge, type 304 stainless steel with an aperture not greater than 4.7mm. The open area is not less than 37%.
- The trash capture basket bottom screen is manufactured from 14-gauge, type 304 stainless steel with an aperture of 4.7 mm. The open area is not less than 51%.
- Bypass features are incorporated in all Devices and are located above the treatment water level in the basket ensuring retention of all trash and debris for flows conforming to full capture requirements.

3.B. Peak Flows/Trash Volumes: Explain how the device is sized for varying peak flow rates and trash capture volumes;

Grate Inlet Filter Operation & Sizing

The Grate Inlet Filter is designed for trash removal at locations where no curb is present. On these sites, stormwater flows from parking lots and roads to a catch basin through a grated inlet. Prior to entering the catch basin, the flows must first pass through the Grate Inlet Filter. The

Grate Inlet Filter installs directly beneath the grate of the catch basin and all flow that enters the catch basin is first directed through the Filter (*See Figure 2 – Grate Inlet Filter Operation*).

The Inlet Filter is straightforward in design, but special consideration was given to the configuration and capacities to ensure maximum possible treatment and adequate bypass without re-suspension of previously removed trash (*See Figure 1 – Grate Inlet Filter Features*). The sidewall of the filter basket is constructed from a proprietary, non-blocking, louver-expanded stainless steel 4.7 mm screen. The openings of the screen are made by a process that angles the opening in one direction so that when water and debris encounter the screen, a wiping action occurs which pushes both water and debris across the opening rather than through the opening. This perpetual, deflective shielding action minimizes blockages and penetration of debris through the screen opening. Once flows are filtered, the stormwater enters the catch basin and is allowed to freely exit through the lateral pipe.

During peak flow events, the Inlet filter continues to treat, however water levels in the filter basket may rise to the point of overflow, at which point the Inlet Filter is considered to be operating in bypass mode. Bypass occurs through a circumferential opening (or window) at the top of the basket just above the filter screen but beneath the grate. During smaller peak flow events, the bypass window operates as a weir allowing these flows to exit through the bottom of the window. A significant amount of flow continues to be filtered, and this continued flow forces previously retained trash to remain in the filter basket. During larger peak flow events, the water level will rise above the bypass window changing the window to act like an orifice. Peak flows are discharged through the window with the orifice controlling flow.

The Engineer should make note of the treatment flow capacity, the bypass flow capacity, as well as the grate inlet flow capacity and determine which of the three may be a limitation of the flow capacity for this component of the storm drain system.

A sizing chart for the Grate Inlet Filter is shown in Table 1. The nomenclature for models lists the Width x Length x Height of the grate and filter basket. The characteristics and capacity Table lists the maximum treatment capacity for Full Capture trash removal. The Table additionally lists the maximum storage capacity (for trash). These capacities are considerate of both re-suspension of removed trash and screen blocking. A safety factor has been applied to the storage capacity, treatment capacity, and bypass capacity. The Table lists the most commonly utilized standard sizes available. Other standard sizes are available as well as custom configurations. Characteristics and capacities will be determined on an as needed basis following the same guidelines and using the same empirically determined data for sizing of the custom configurations.

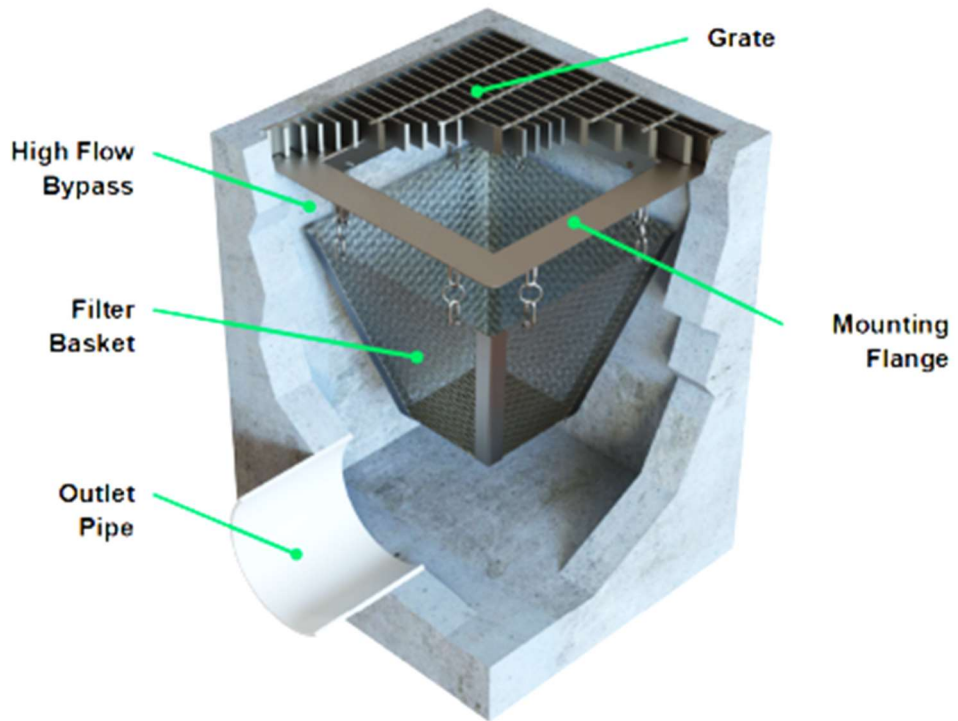
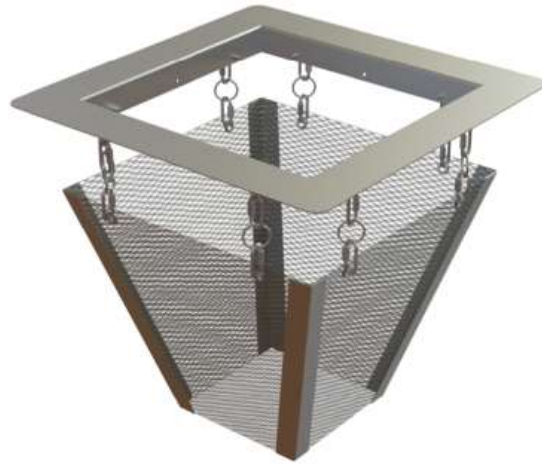


Figure 1 - Grate Inlet Filter Features

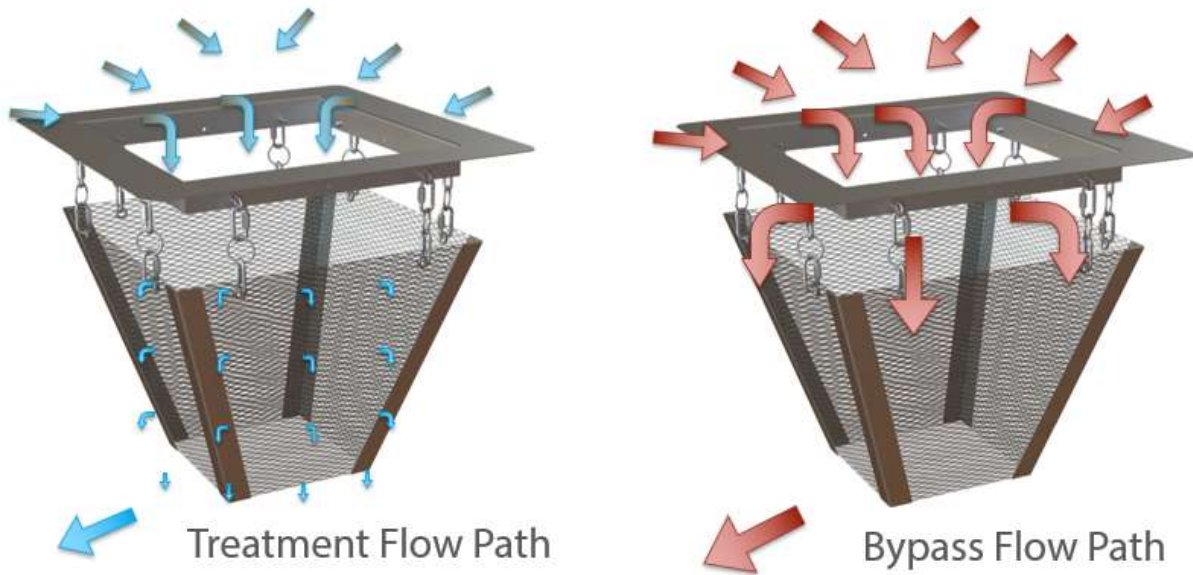


Figure 2 - Grate Inlet Filter Operation

Table 1 - Bio Clean Grate Inlet Filter Capacity - California Full Capture Certified Capacities			
Model No.¹	Treatment Flow Rate (CFS)	Bypass Flow (CFS)	Solids Storage Capacity (CF)
Bio-Grate-Full 12-12-12	1.04	1.24	0.15
Bio-Grate-Full 18-18-12	1.78	2.79	0.33
Bio-Grate-Full 24-24-12	2.7	4.96	0.59
Bio-Grate-Full 24-40-12	3.7	6.35	0.88
Bio-Grate-Full 24-24-24	7.31	4.96	1.22
Bio-Grate-Full 24-40-24	9.53	6.35	1.82
Bio-Grate-Full 36-36-24	11.93	7.74	2.73

1. Other standard and custom model sizes available. Contact Contech for more information.
 2. Storage Capacity based on the basket half full.
 3. Considers a Safety Factor of 2.0 for side discharge and a Safety Factor of 3.0 for bottom discharge.
 4. Considers a local depression ponding depth of 6-inches and a grate thickness of 3.5-inches.
 5. In some cases, the filtered flow capacity has been reduced to the maximum possible inflow to the filter.
 6. In some cases, the bypass capacity has been reduced to the maximum possible inflow to the filter.

Table 1 - Bio Clean Grate Inlet Filter Capacity - California Full Capture Certified Capacities

Curb Inlet Filter Operation & Sizing

The Curb Inlet version of the Device functions very similarly to the Grate Inlet version in terms of physical filtration. Both Devices utilize the same cylindrical basket for physical filtration of the stormwater. The two Devices differ in how stormwater flow is received and conveyed to the filter and how peak flows bypass the filter (*See Figure 3 – Curb Inlet Filter Features*).

Stormwater flowing from parking lots and roads begin their entrance into the catch basin through a curb opening. The opening may be as short as two feet long or as long as 28 feet long. In a typical curb inlet, these flows would be allowed to drop to the bottom of the catch basin and freely exit the basin. To treat for Trash Full Capture, the inlet is outfitted with a trough made from marine grade fiberglass. The trough is mounted directly beneath the curb opening and spans the entire length of the opening. The trough collects all low flows entering the catch basin and conveys and directs the water to the filter. The filter is connected to the trough by a square tray system. The tray provides a physical and hydraulic connection between the trough and the filter. Additionally, the tray positions the filter back away from the curb opening. This position is an adequate distance away from the curb opening to remove the filter from the influence of peak flows. Furthermore, the tray positions the filter basket directly beneath the manhole access cover to provide for quick and easy removal of trash and debris without the need to enter the catch basin.

The filter basket is similarly constructed to the Grate Inlet Filter with the exception of the bypass window. The filter basket operates the same during filtration of the stormwater. The bypass window is omitted from the filter basket of the Curb Inlet Filter and bypass occurs upstream in the trough system. The trough is designed such that the height of the trough is less than the height of the filter tray system. The trough height has adequate capacity to collect and convey treatment flows to the filter. Peak flows exceed the capacity of the trough system and overtop the height of the trough. Because bypass occurs upstream of the filter, peak flows are kept separate from the treatment area and re-suspension of trash does not occur. Because the Curb Inlet Filter bypass operation is the same as the standard curb inlet operation, the bypass capacity of the filter is the same as the standard inlet capacity of the curb opening (*See Figure 4 – Curb Inlet Filter Operation*).

A sizing chart for the Curb Inlet Filter is shown in Table 2. The treatment basket diameter is the same for all models. The variable dimension between models is the filter basket height and this is noted in the nomenclature for the models with the last digits of the model number. The characteristics and capacity Table lists the maximum treatment capacity for Full Capture Trash removal. The Table additionally lists the maximum storage capacity (for trash). These capacities are considerate of both re-suspension of removed pollutants and screen blocking. A safety factor has been applied to the storage capacity and treatment capacity. The Table includes the most commonly utilized standard sizes available. Other standard sizes are available as well as custom configurations. Characteristics and capacities will be determined on an as needed basis following the same guidelines and using the same empirically determined data for sizing of the custom configurations.

Curb Inlet Filter Features

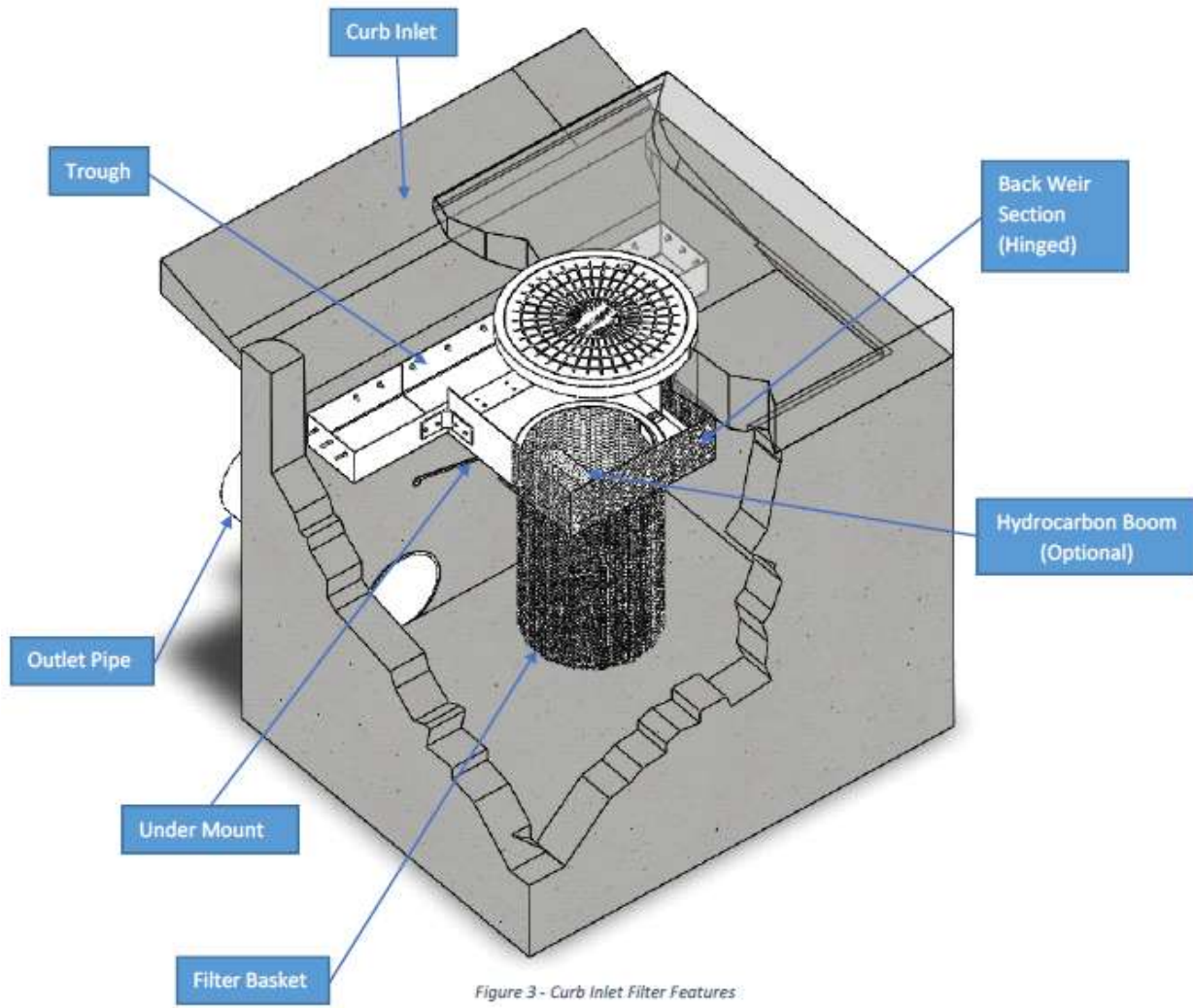


Figure 3 - Curb Inlet Filter Features

Curb Inlet Filter Operation - Diagram

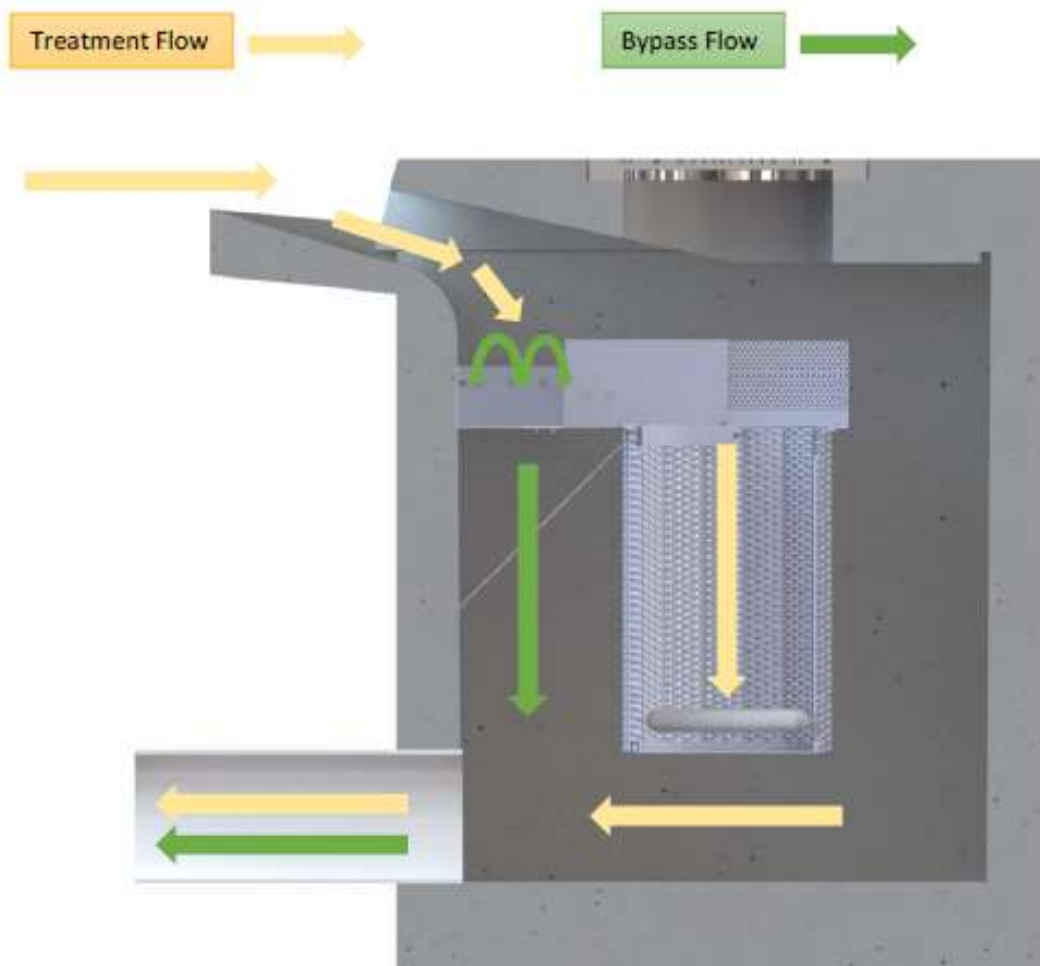


Figure 4 - Curb Inlet Filter in Bypass Operation

Table 2 - Bio Clean Grate Inlet Filter Capacity Table - California Full Capture Certified Capacities			
Model No. ¹	Treatment Flow Rate ² (CFS)	Bypass Flow (CFS)	Solids Storage Capacity (CF)
Bio-Curb-Full-12	2.85	Unlimited	0.7
Bio-Curb-Full-24	2.85	Unlimited	1.4
1. Other standard and custom model sizes available. Contact Contech for more information.			
2. Considers a Safety Factor of 2.0 for side discharge and a Safety Factor of 3.0 for bottom discharge.			

Table 2 - Bio Clean Grate Inlet Filter Capacity Table - California Full Capture Certified Capacities

3.C. Hydraulic Capacity: For all standard sizes, provide a table of the hydraulic capacity (flow rate) when the Device is empty and at several intervals of trash capture volumes up to the Device’s recommended maximum trash capture volume;

Table 1 and Table 2 above list the trash capture volume (ft³) retained by each Inlet Filter model. The trash capture volumes listed are maximum volumes that can be removed without a reduction in treatment performance and considers full retention of trash with no re-entrainment under peak flow conditions. Table 3 and Table 4 list the hydraulic capacities of each Device at various levels of trash capture volume. Sample calculations for the hydraulic flow for the Curb and Grate Inlet Filters can be found in Appendix H. The formula used to calculate trash treatment capacity is as follows:

$$Q_F = \frac{Cd_1 A_{f1} \sqrt{2gh_1}}{SF_1} + \frac{Cd_2 A_{f1} \sqrt{2gh_2}}{SF_2}$$

Where:

Q_F = Filtered flow capacity (ft³/s)

Cd₁ = Coefficient of discharge (unitless) = 0.66

Cd₂ = Coefficient of discharge (unitless) = 0.62

A₁ = Cumulative basket sidewall area (ft²)

A₂ = Bottom basket screen area (ft²)

h₁ = average driving head on basket sidewall (ft)

h₂ = filter driving head on basket bottom (ft)

SF₁ = Factor of safety on basket sidewall flow capacity (unitless) = 2

SF₂ = Factor of safety on basket bottom flow capacity (unitless) = 3

The equation for calculating bypass capacity is as follows:

$$Q_B = \frac{(C_d A_b \sqrt{2gh})}{SF}$$

Where:

Q_B = Bypass flow capacity (cfs)

Cd = Coefficient of discharge (unitless) = 0.62
 A_b = Bypass area (ft²)
 g = gravitational acceleration constant (ft/s²) 32.174
 h = Bypass driving head (ft)

Bio Clean® Grate Inlet Filter Hydraulic Capacities at Various levels of trash capture volumes

TABLE 3

Grated Inlets						
Model	Filtered Flow Capacity ^{2&3} (ft ³ /s)	Filtered Flow Capacity - 25% Clogging Factor ^{2&3} (ft ³ /s)	Filtered Flow Capacity - 50% Clogging Factor ^{2&3} (ft ³ /s)	Filtered Flow Capacity - 75% Clogging Factor ^{2&3} (ft ³ /s)	Bypass Flow Capacity - 100% Clogged ⁴ (ft ³ /s)	Solids Storage Capacity ⁵ ft ³
BC-G-12-12-12	1.04	0.78	0.52	0.26	1.24	0.15
BC-G-18-18-12	1.78	1.34	0.89	0.45	2.79	0.33
BC-G-24-24-12	2.70	2.03	1.35	0.68	4.96	0.59
BC-G-24-40-12	3.70	2.78	1.85	0.93	6.35	0.88
BC-G-24-24-24	7.31	5.48	3.66	1.83	4.96	1.22
BC-G-24-40-24	9.53	7.15	4.77	2.38	6.35	1.82
BC-G-36-36-24	11.93	8.95	5.97	2.98	7.74	2.73

1. Other standard and custom model sizes available. Contact Bio Clean® for more information.
2. Based on 37% Open Area.
3. Considers a Safety Factor of 2.0 for side discharge and a Safety Factor of 3.0 for bottom discharge.
4. Considers a local depression ponding depth of 6-inches and a grate thickness of 3.5-inches.
5. Storage Capacity based on the basket half full.

Bio Clean® Curb Inlet Filter Hydraulic Capacities at Various Levels of Trash Capture Volumes

TABLE 4

Curb Inlets					
Model	Filtered Flow Capacity ^{2&3}	Filtered Flow Capacity - 25% Clogging Factor ^{2&3}	Filtered Flow Capacity - 50% Clogging Factor ^{2&3}	Filtered Flow Capacity - 75% Clogging Factor ^{2&3}	Solids Storage Capacity ⁵
	(ft ³ /s)	(ft ³ /s)	(ft ³ /s)	(ft ³ /s)	ft ³
BC-CURB-24	2.85	2.14	1.43	0.71	1.40
BC-CURB-18	2.85	2.14	1.43	0.71	1.05
BC-CURB-12	2.85	2.14	1.43	0.71	0.70

1. Other standard and custom model sizes available. Contact Bio Clean® for more information.
2. Based on 37% Open Area.
3. Considers a Safety Factor of 2.0 for side discharge and a Safety Factor of 3.0 for bottom discharge.
4. Bypass capacity is not a function of the filter system as bypass occurs over the filter system.
5. Storage Capacity based on the basket half full.

3.D. Comparison Table: For all standard sizes, provide a table that includes the peak flow rates, and recommended maximum trash capture volume;

Maximum trash capture volume and hydraulic capacities are listed in Table 1 and Table 3 for Grate Inlet Filters, as well as Table 2 and Table 4 for Curb Inlet Filters.

3.E. Design Drawings: Provide design drawings for all standard Device sizes and, if any, alternate configurations;

Design drawings for all standard devices and configurations are included in Appendix A.

3.F. Alternative Configurations: If the Device includes alternative configurations, explain the purpose of each configuration and mandatory installation conditions;

As of this amended application, the originally approved cylindrical grate inlet version of the Grate Inlet Filter is replaced with a tapered square shape so that these baskets can be nested into each other during shipping. The top flange and bypass components remain the same, and the system operates similarly. This alternative configuration is also installed in the same way as the

standard size. This application has been updated with new drawings, tables and specifications for this configuration.

3.G. Internal Bypass: If the Device has an internal bypass, explain how the bypass functions to only allow a bypass of flows exceeding the peak flow rate;

The Grate Inlet and Curb Inlet Filters are designed to capture trash without impeding normal hydraulic operation of the catch basins in which they are installed. This is accomplished by way of an internal bypass feature of the basket for the Grate Inlet Filter and the weir tray for the Curb Inlet Filter. These bypass features are incorporated into the Device before the retained trash and treatment area and therefore do not release previously retained trash.

Grate Inlet Filter Bypass Operation

During peak flow events, the Grate Inlet Filter continues to treat, however water levels in the filter basket may rise to the point of overflow at which point the Inlet Filter is considered to be operating in bypass mode. Bypass occurs through a circumferential opening (or window) at the top of the basket just above the filter screen but beneath the grate (*See Figure 5*). During smaller peak flow events, the bypass window operates as a weir allowing these flows to exit through the bottom of the window. A significant amount of flow continues to be filtered and this continued flow forces previously retained pollutants to remain in the filter basket. During larger peak flow events, the water level will rise above the bypass window changing the window to act like an orifice. Peak flows are discharged through the window with the orifice controlling the flow.

The bypass flows continue to convey between the exterior of the filter basket and the interior of the catch basin. The bypass flow and treated flow rejoin prior to exiting the catch basin. Adequate annular space is required for these bypass flows to continue unimpeded and at a capacity not less than originally intended for the catch basin. The bypass flow rates for each filter basket configuration have been pre-determined and are published in Table 1. This bypass flow rate should be noted and compared to the original design capacity of the catch basin. A safety factor has been applied to the bypass capacity.

Section 3.G. (Continued)

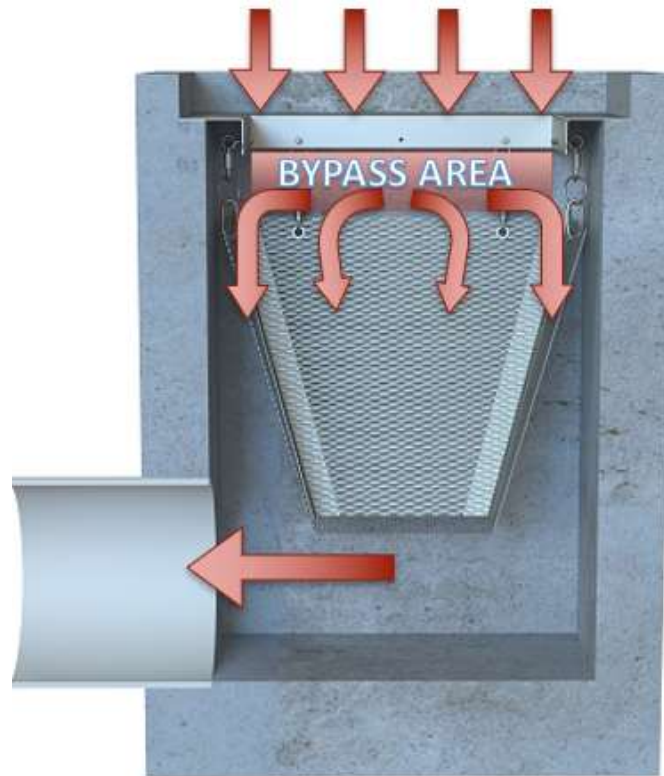


Figure 5 - Grate Inlet Filter in Bypass Operation

Curb Inlet Filter Bypass Operation

The filter basket for the Curb Inlet is similarly constructed to the Grate Inlet Filter basket with the exception of the bypass window. Both filter baskets operate the same during filtration of stormwater. The bypass window is omitted from the filter basket of the Curb Inlet Filter and bypass occurs upstream in the trough system (*See Figure 6*). The trough is designed such that the height of the trough is less than the height of the filter tray system. The trough height has adequate capacity to collect and convey treatment flows to the filter basket. Peak flows exceed the capacity of the trough system and overtop the height of the trough. Because bypass occurs upstream of the filter, peak flows are kept separate from the treatment area and re-suspension of pollutants does not occur. Because the filter bypass operation is the same as the standard curb inlet operation, the bypass capacity of the filter is the same as the standard inlet capacity of the curb opening.

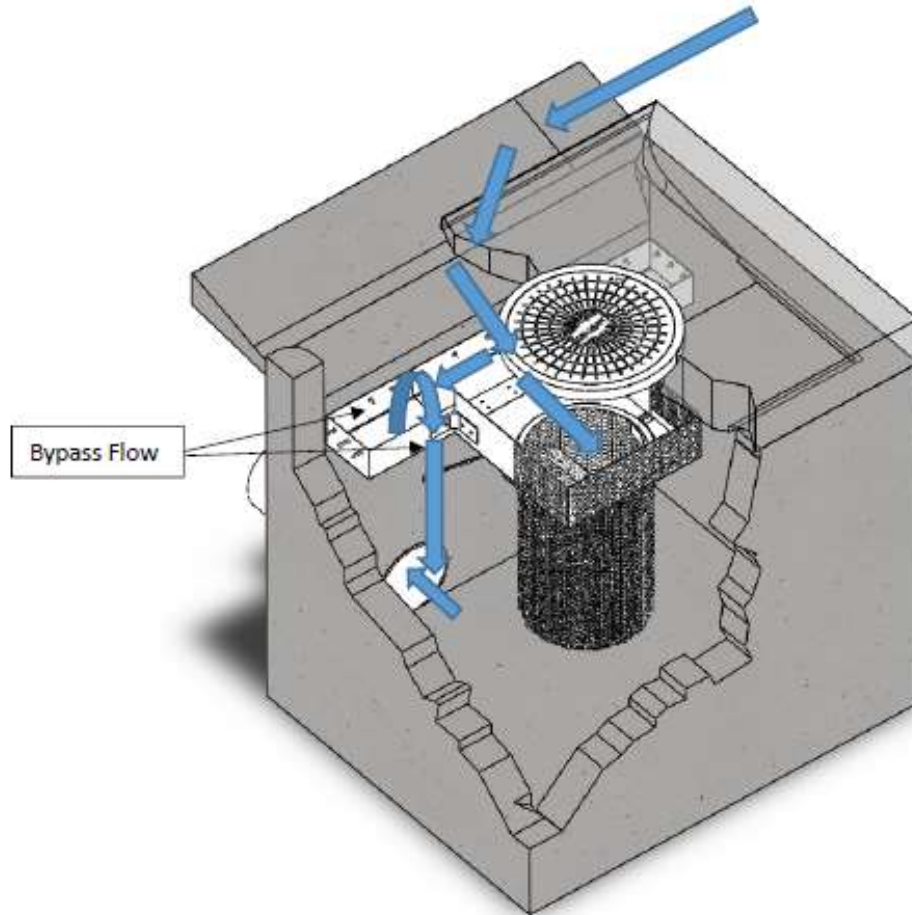


Figure 6 - Curb Inlet Filter in Bypass Operation

3.H. Previously Trapped Trash: Explain the condition(s) under which the Device re-introduces previously trapped trash (e.g., via the internal bypass);

The Grate Inlet and Curb Inlet Filters have been designed to remove and permanently retain all trash and debris that is 5mm in size or larger. Conditions under which either configuration of the Device re-introduce previously trapped trash are listed below:

- If the Device is not properly maintained and trash and debris are allowed to accumulate beyond the prescribed maximum allowable level in the trash containment compartments, conditions will be present that could cause a re-introduction of trash into the effluent of the Device.
- Broken or damaged screens, baskets or troughs can cause an adverse condition that would allow re-introduction of trash and debris into the effluent.
- Missing or un-replaced components after a maintenance service can cause an adverse condition that could re-introduce trash and debris into the effluent of the Device.

3.I. Calibration Feature: If the Device includes an adjustable calibration feature, describe how the calibration feature functions;

The Grate Inlet and Curb Inlet Filters do not have any adjustable calibration features.

3.J. Photos: If any, provide device installation photographs; (see for potential photos.



Figure 7 - Grate Inlet Filter (no access window) Prior to Installation.



Figure 8 - Grate Inlet Filter (no access window) Being Installed.



Figure 9 - Grate Inlet Filter (no access window) Being Installed.



Figure 10 - Grate Inlet Filter (no access window) Being Installed.



Figure 11 - Grate Inlet Filter (no access window) installed.



Figure 12 - Grate Inlet Filter (no access window) Prior to Maintenance.

Section 3.J. (Continued)



Figure 13 - Grate Inlet Filter (no access window) Prior to Maintenance.



Figure 14 - Grate Inlet Filter (no access window) Installed After Maintenance.



Figure 15 - Grate Inlet Filter (no access window) Installed After Maintenance.



Figure 16 - Curb Inlet Filter Basket Being Installed.



Figure 17 - Curb Inlet Filter Basket Being Installed.



Figure 18 - Curb Inlet Filter Basket Being Installed.

Section 3.J. (Continued)



Figure 19 - Curb Inlet Filter Basket Installed In Tray System.



Figure 20 - Curb Inlet Filter Basket Installed In Tray System.



Figure 21 - Curb Inlet Filter Basket Installed In Tray System.

3.K. Material Type: Provide each material and material grade used to construct the Device (e.g., stainless steel, plastic, etc.); and

The Grate Inlet and Curb Inlet Filters are constructed of high strength, durable materials and components that ensure a long design and service life for the Device. Appendix B of this submittal includes a detailed Specification for the Grate Inlet and Curb Inlet Filters which includes material Specifications. Key materials and components are additionally listed below:

- Filter Housing – The Filter Housing is manufactured from Type 304 Stainless Steel.
- Side Screens – The Side Screen is manufactured from Type 304 Stainless Steel, louver-expanded metal with openings equal to or less than 4.7mm in size.
- Bottom Screens – The Bottom Screens are manufactured from Type 304 Stainless Steel, perforated mesh, with round openings equal to or less than 5mm in size.
- Trough – The Trough is manufactured from marine grade fiberglass and Type 304 Stainless Steel.
- Weir – The weir box is manufactured from Type 304 Stainless Steel.

3.L. Design Life: Provide the estimated design life.

The estimated design life for the Grate Inlet and Curb Inlet systems is 25 to 50 years. The design life is dependent on the materials utilized as well as the proper application of those materials.

4.0 INSTALLATION GUIDANCE

4.A. Standard device installation procedures including calibration instructions if applicable;

Installation requirements and procedures for the Grate Inlet Filter and Curb Inlet Filter are detailed in the *Grate Inlet Filter Installation Manual* and *Curb Inlet Filter Installation Manual* which have been included in Appendix C of this submittal. The guidelines include requirements and procedures for:

- Delivery
- Inspection
- Catch Basin Preparation
- Installation
- Installation Diagrams

Grate Inlet Filter Installation

The Grate Inlet Filter requires minimal tools and effort for a successful installation. The most critical part of the installation is measurement of the catch basin and grate dimensions. Proper measurements ensure proper manufacture of the Inlet Filter and provides an opportunity to check that the Device will function properly with no adverse effects to the existing storm drain system. Measurement charts for the Grate Inlet Filter are included as part of this submittal at the end of Appendix C.

Once the measurements have been completed, the Inlet Filter is manufactured and delivered for installation. Most installations require only removing the catch basin grate, cleaning the catch basin, lowering the Inlet Filter into position, and then replacing the grate. Some versions of the Inlet Filter require installation of a secondary support structure within the catch basin. Details of this type of installation and the standard installation can be found in Appendix C.

Curb Inlet Filter Installation

The Curb Inlet Filter system utilizes several components in addition to the filter basket and requires mounting some of the components to the inside walls of the catch basin. As with the Grate Inlet Filter, the most critical part of the installation is measurement of the catch basin. Proper measurement ensures proper manufacture of the Inlet Filter and provides an opportunity

to check that the Device will function properly with no adverse effects to the existing storm drain system. Measurement charts for the Curb inlet Filter are included as part of this submittal at the end of Appendix C.

Additionally, confined space entry of the catch basin is likely required for the primary installation of the Curb Inlet Filter system. It is imperative the installer adhere to all jurisdictional and/or OSHA safety recommendations and requirements.

Post installation inspection of the Inlet Filters is strongly advised. Inspection should determine if the Inlet Filter was installed properly as well as provided in a clean condition with no defects as a result of the installation.

Installation for Trash Capture in association with Full Capture programs, Trash TMDLs, or the Statewide Trash Amendment are often retrofit type installations. Care should be taken to document existing and as-built conditions to determine if the Inlet Filters must be supplied in a unique configuration to meet the retrofit conditions. Consideration must be given to any unique configurations for flow, treatment, and installation. Note: Installation procedure may differ, but the design cannot change.

4.B. Description of device installation limitations and/or non-standard device installation procedures; and

Aside from confined space requirements and/or other OSHA safety recommendations, there are no additional limitations on the installation of the Grate Inlet and Curb Inlet Filters.

4.C. Methods for diagnosing and correcting installation errors.

Contech has a process for design and manufacturer that includes checks and balances to minimize and eliminate errors in the design and manufacturing processes for the Grate Inlet and Curb Inlet systems. This process involves a formal submittal and review of the design and fabrication details for each unit. The owner has and should take this opportunity to review the proposed device prior to installation. This process helps to reduce or eliminate errors during installation. In the event an installation error does occur, the error should be documented and reviewed with Contech and the Contractor immediately upon determination of the error.

After completion of installation, a checklist should be reviewed to ensure proper installation of the Inlet Filter system. The checklist should include key criteria for determination of proper installation. This checklist should be reviewed in its entirety at the completion of the installation and kept as documentation of proper installation. If during the checklist review an error is determined, the documented error should be reported to Contech as well as the Owner and Engineer. The checklist includes key criteria such as:

- The catch basin is clean and free of trash and debris.
- The grate is properly seated in the frame and does not protrude above the frame.

- The grate is properly oriented to receive storm drain flow (ensure the veins of the grate are positioned in the direction of water flow).
- The filter basket has been properly sealed.
- Inlet/Outlet pipes to/from the catch basin are not blocked or impeded as a result of the filter installation.
- Inlet Filter and Inlet Filter components are not bent, broken, or damaged.
- All debris from the installation has been cleaned and removed.
- All components are free of sharp corners and edges.

Additionally, the Grate Inlet and Curb Inlet Filters can be inspected after commencement of operation to determine proper operation.

5.0 OPERATION AND MAINTENANCE INFORMATION

5.A. Inspection procedures and frequency considerations;

The Grate Inlet Filter *Operation and Maintenance Manual* and Curb Inlet Filter *Operation and Maintenance Manual* are included with this submittal as Appendix D. These manuals include detailed requirements and recommendations for operation and maintenance of the Inlet Filters when used as Full Capture Trash Treatment Control Devices. However, the Municipal Storm Water permit may specify more frequent maintenance. A summary of requirements and recommendations are listed below:

Maintenance Summary

- Clean filter basket. Typical service interval occurs once every 12 months (\approx 10-minute service time).

Notes:

- Maintenance cycles are dependent on site-specific pollutant loading.
- Maintenance operations should be planned to occur just prior to the start of the rainy season and at the termination of the rainy season for the most effective system operation.

Inspection Procedures

- Following the installation of a Grate Inlet Filter or Curb Inlet Filter, the unit will require periodic and scheduled maintenance. A Contech certified maintenance provider is recommended to provide inspection and maintenance services. A list of local certified

maintenance providers can be found at: <https://www.conteches.com/stormwater-management/maintenance-services/>

- Inspection of the Inlet Filters should be quick and require no entry into the catch basins or extensive use of equipment. The inspection should provide a general assessment of the condition and operation of the Inlet Filter and an estimate as to the need or timing for maintenance.
 - The primary observation during inspection is the condition of the filter basket. The filter basket should be in good working condition and should be free from obstructions or blockages. Accumulated trash levels should be documented and if maximum capacity levels are exceeded, maintenance should occur.

5.B. Description of maintenance frequency considerations related to the Device's hydraulic capacity at various levels of trash capture volumes;

Standardized maintenance frequencies that are suitable for most sites are detailed in Section 5.A. Maintenance frequency is very site specific depending on pollutant loading. Records from inspections and prior maintenance should be periodically reviewed to assess the appropriateness of the prescribed maintenance frequency. Table 3 and Table 4 in Section 3.c. list the hydraulic capacities at various levels of trash capture volumes for the Grate Inlet and Curb Inlet Filters respectively.

5.C. Maintenance procedures, including procedures to clean the trash capture screen;

A full description of the maintenance procedures is located in the *Grate Inlet Operation and Maintenance Manual* and *Curb Inlet Operation and Maintenance Manual* included with this submittal as Appendix D. A summary of the key components of the procedures is listed below:

Maintenance Procedures

It is recommended that maintenance occur at least two days after the most recent rain event to allow debris and sediments to dry out. Maintaining the Device while flows are still entering it will increase the time and complexity required for maintenance. Cleaning of the Grate Inlet and Curb Inlet Filter can be performed from the finished surface without entry into catch basin utilizing a vacuum truck. Some unique and custom configurations may create conditions that would require entry for some or all of the maintenance procedures. Once all safety measures have been set up, cleaning of the Grate Inlet and Curb Inlet Filter can proceed as follows:

- Remove all manhole cover or access hatches (traffic control and safety measures to be completed prior).
- Using an extension on a vacuum truck, position the hose over the opened manhole, hatch or grate opening. Insert the vacuum hose down into the filter basket and suck out trash,

foliage, and sediment. A pressure washer is recommended and will assist in spraying any debris stuck on the side or bottom of the filter basket. For the Curb Inlet filter, if the filter basket is overly full, trash, sediment, and debris can accumulate inside the trough and weir sections of the system. Once the filter basket is clean, power wash the weir and trough pushing the debris into the filter basket (leave the vacuum hose in the filter basket during this process so entering debris will be sucked out). Power wash off the trough, weir, debris screen, and filter basket sides and bottom.

- The last step is to close up and replace the manhole or hatch and remove all traffic control.
- All removed debris and trash shall be disposed of following local and state requirements.
- Disposal requirements for recovered trash may vary depending on local guidelines. In most areas, the sediment, once dewatered, can be disposed of in a sanitary landfill. It is not anticipated that the sediment would be classified as hazardous waste.
- In the case of damaged components, replacement parts can be ordered from the manufacturer.

Record Keeping Maintenance Procedures

- Following maintenance and/or inspection, the maintenance operator shall prepare a maintenance/inspection record. The record shall include any maintenance activities performed, amount and description of debris collected, and condition of the system and its various filter mechanisms.
- The owner shall retain the maintenance/inspection record for a minimum of five years from the date of maintenance. These records shall be made available to the governing municipality for inspection upon request at any time.

5.D. Essential equipment and materials for proper maintenance activities;

The following equipment is helpful when conducting Grate Inlet Filter and Curb Inlet Filter inspections and maintenance:

- Recording device (pen and paper form, voice recorder, tablet, etc.)
- Suitable clothing (appropriate footwear, gloves, hardhat, safety glasses, etc.)
- Traffic control equipment (cones, barricades, signage, flagging, etc.)
- Manhole hook or pry bar
- Flashlight
- Tape measure
- Measuring stick or sludge sampler
- Confined space entry equipment (if necessary)
- Vacuum truck
- Pressure washer
- Replacement absorbent booms

5.E. Description of the effects of deferred maintenance on device structural integrity, performance, odors, etc.; and

Delayed or deferred maintenance can cause diminished trash removal, re-entrainment of trash in catch basin and upstream hydraulic impacts and impacts to water quality.

5.F. Repair Procedures for the Device's structural and screening components.

In the case that damage is done to any part of the Bio Clean® Grate Inlet and Curb Inlet Filter, there are two approaches to repairing the damaged baskets. For minor damage, a field welder can fix the basket on the spot. In cases where the damage is more extensive. Contech recommends removing the damaged basket and replacing it with a new one to ensure that all installed devices adhere to full capture requirements. In most cases regarding damage, Contech recommends replacing the entire basket.

6.0 VECTOR CONTROL ACCESSIBILITY

6.A. The date the Device application was submitted for vector control accessibility design verification via email to the Mosquito Vector Control Association of California (MVCAC) (Trashtreatment@mvcac.org);

MVCAC approval process was initiated on March 14th, 2024.

6.B. Description and/or video that demonstrates how mosquito vector control personnel can readily access the bottom of the storm water vault and/or Device for visual observation and mosquito treatment; and

Contech designed the Grate Inlet and Curb Inlet Filter with access that facilitates maintenance. Filter baskets are located directly beneath the grate of the catch basin for the Grate Inlet version of the Filter. Filter baskets are located directly beneath the manhole access covers and/or hatches for the Curb Inlet basket of the Filter. Filter baskets are easily removed providing direct, unimpeded access to the catch basin.

While in operation, the Grate Inlet and Curb Inlet Filters are designed to be free of standing or constant pools of water in both the Filters and the catch basins. In addition, filter baskets are suspended above the catch basin bottoms allowing the contents to dry between storm events..

It should be noted that some catch basins may be inadequately constructed and may be prone to retaining water even small amounts, which can be problematic for mosquito breeding. The preferred course of action is to repair any deficiencies that may cause standing water in a catch basin prior to installation of a Full Capture Device, it is critical that the deficient areas be visible and accessible by Vector/Mosquito Control personnel.

To provide accessibility for inspection and treatment by Vector/Mosquito Control personnel, the Bio Clean® Grate Inlet Filter features flexible/hanging bypass brackets that connect the top flange to the basket. The void area between the top flange and basket creates the internal bypass area. Using a standard hook for pulling grates and covers, the basket can be pushed or pulled to any side to create a viewing area along the side of the basket, allowing clear visibility of the sump area below the insert as shown in Figure 22. The example photos in Figure 23 are based on a 26-inch x 26-inch top flange, with the viewing area being approximately 3.5 inches by 18 inches. For other models, the viewing area will be 3.5 inches deep and as wide as the top flange. This is a vast increase in the size of the viewing area versus the previously approved access ports. In addition, this viewing area is available on all four sides of the basket which is beneficial due to variability in pipe(s) inlet and outlet positions in catch basins. Inspection of the insert and the sump area below the insert can be done with or without the grate in place. See Figure 30 in Appendix I.

The Bio Clean® Curb Inlet Filter is located directly beneath the manhole opening for easier cleaning. The location of the filter does not impede Vector/Mosquito control activities, however. The filter is located at an elevation that allows an acute angle view and access on the sides of the filter. *Figure 24, Figure 25, and Figure 26* illustrate this view for an installed filter in a typical catch basin. Visibility and access beneath the filter are facilitated by a design feature on the filter. In the case of larger catch basins, extra precautions are put into place during the filter installation to ensure visibility and accessibility by Vector/Mosquito Control personnel. In these instances, the Back Weir Section of the filter will be no larger than 8-inches tall, and the filter will be installed 12-inches lower than normal. The limits placed on the back weir and the additional 12-inch clearance create adequate visibility and accessibility in even the largest of vaults, as illustrated in *Figure 27* and *Figure 28*.

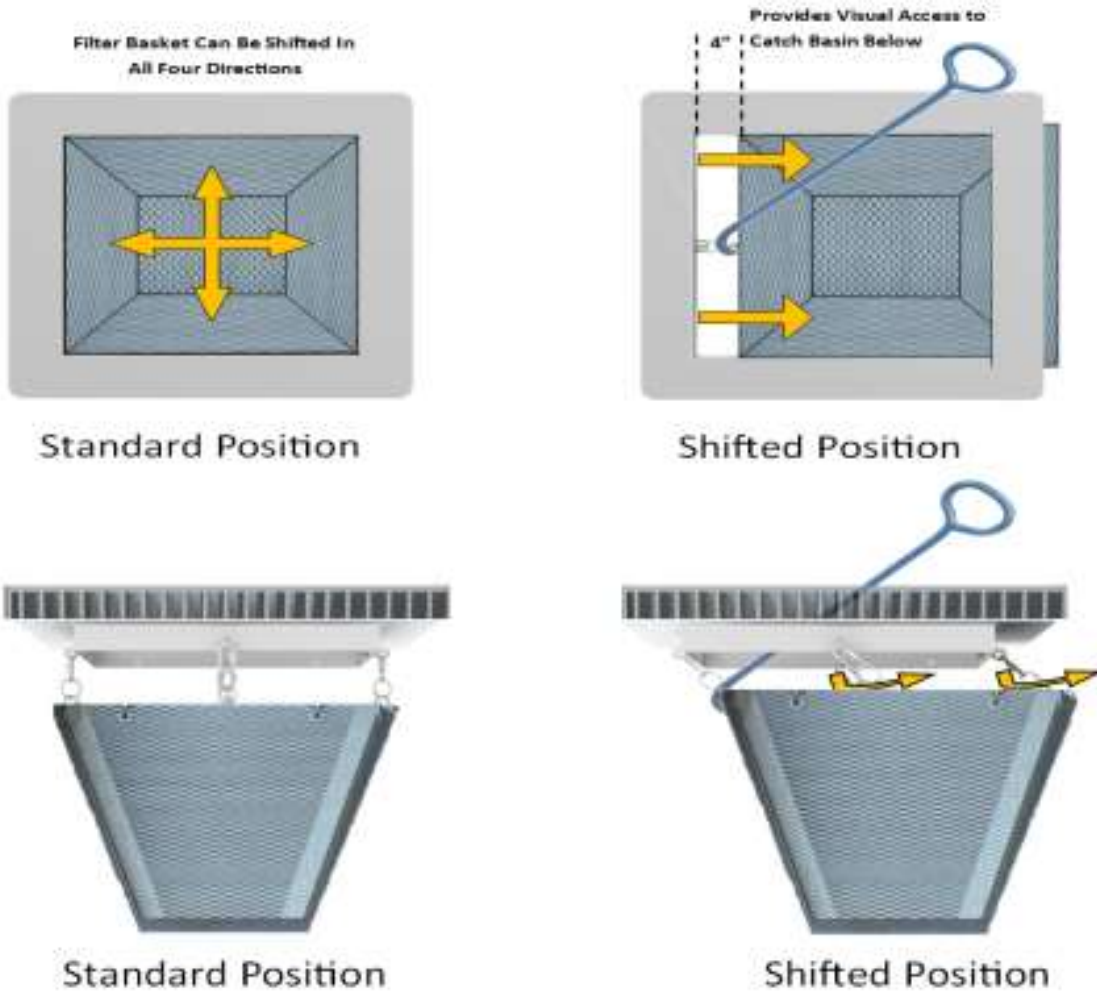


Figure 22

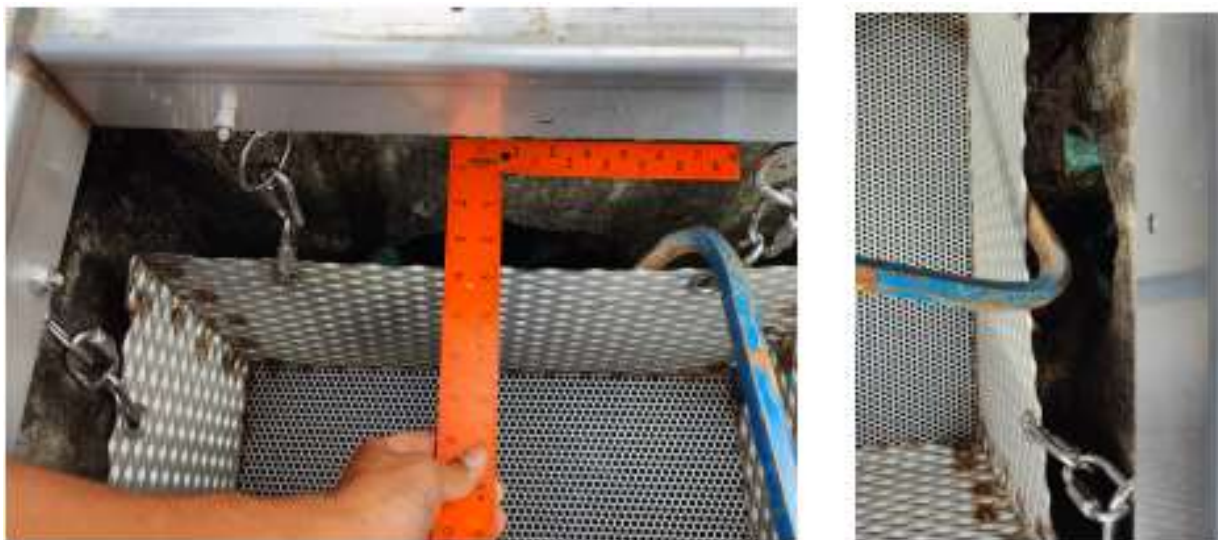


Figure 23



Figure 24 - View 1 of Catch Basin Bottom with Bio Clean® Curb Inlet Filter Installed



Figure 25 - View 2 of Catch Basin Bottom with Bio Clean® Curb Inlet Filter Installed



Figure 26 - View 3 of Catch Basin Bottom with Bio Clean® Curb Inlet Filter Installed

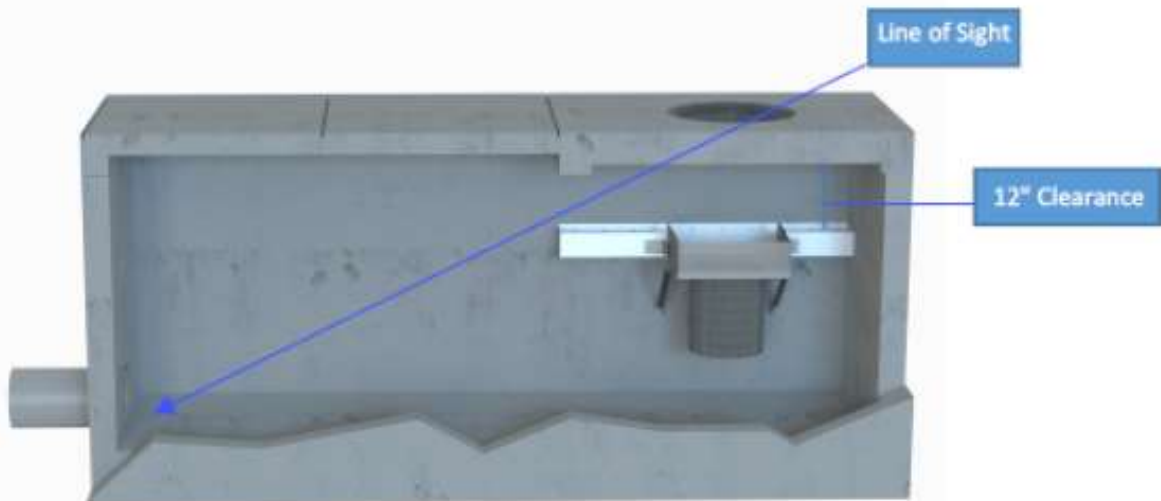


Figure 27 - Bio Clean® Curb Inlet Filter installed lower to increase visibility in larger vaults. Back Side View



Figure 28 - Bio Clean® Curb Inlet Filter installed lower to increase visibility in larger vaults. Top View.

6.C. The MVCAC Letter of Verification as an attachment to the application when it becomes available. This letter shall verify that the Device design allows full visual access for presence of standing water and treatment of mosquitos when necessary. Table of Contents shall note the MVCAC approval letter.

A letter of verification from the MVCAC was received April 25th, 2024 is attached as Appendix G.

7.0 RELIABILITY INFORMATION

7.A. Estimated design life of Device components before major overhaul;

The estimated design life for the Grate Inlet and Curb Inlet systems is 25 to 50 years. The design life is dependent on the materials utilized as well as the proper application of those materials.

7.B. Warranty Information; and

Contech provides a one-year limited warranty for the Grate Inlet and Curb Inlet Filter per the conditions listed in the warranty document included in the submittal in Appendix E.

7.C. Customer support Information

Customer support is available through Contech Engineered Solutions, LLC.

Contech Engineered Solutions, LLC

9100 Centre Pointe Drive
West Chester, OH 45069

Phone: (800) 338-1122

info@conteches.com

8.0 FIELD/LAB TESTING INFORMATION AND ANALYSIS

8.A. For devices with 5mm screening, any available field/lab testing information that demonstrates the device functionality and performance; and

Bio Clean® conducted laboratory testing on the proprietary non-blocking screen material utilized in the Grate Inlet and Curb Inlet Filters. Bio Clean® conducted this testing to empirically determine the unique properties of the screen including the Effective Open Area (EOA), the Coefficient of Discharge (C_d), and the flow capacity and characteristics. The results of the testing provided a clear relationship between discharge (Q) and head (h) acting on the screen. The results of the testing have been incorporated into the design of the Filters to determine both the treatment and peak flow rates for the Filters.

The test report has been included in this Application in Appendix F for review by the SWRCB and interested parties.

8.B. If the Device does not include a 5mm screen, adequate field/lab testing information that demonstrates the Device captures trash particles of 5mm or greater.

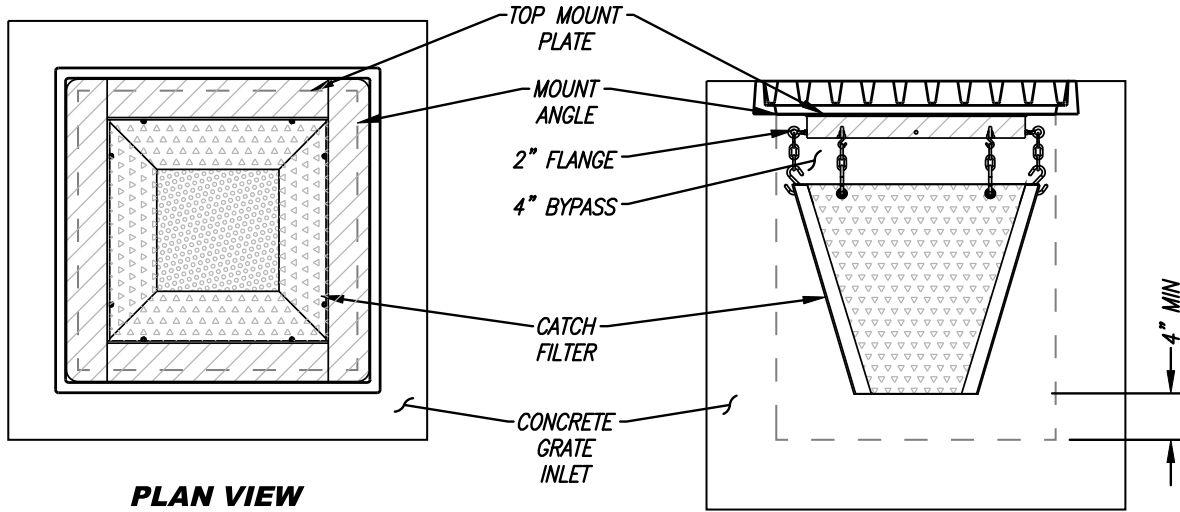
The Grate Inlet and Curb Inlet Filters include a 5mm screen with lab testing, which is available in Appendix F.

APPENDIX A – Design Drawings

Bio Clean® Full Capture Grate Inlet Filter.....	38
Bio Clean® Full Capture Curb Inlet Filter.....	39

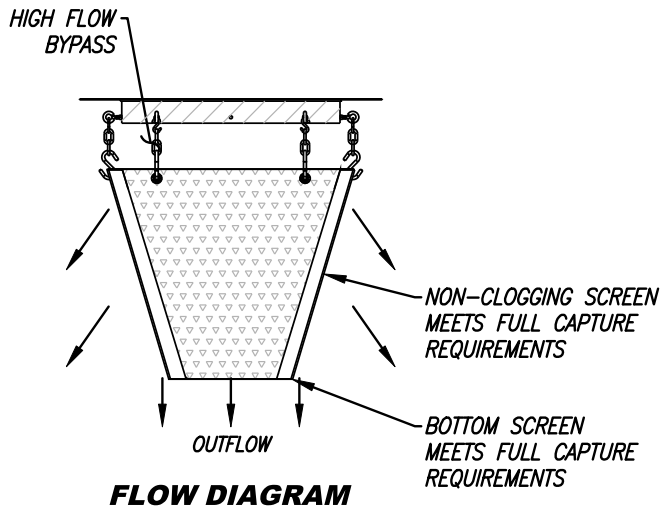
BIO CLEAN FULL CAPTURE FILTER

FOR USE IN GRATE INLETS



**PLAN VIEW
(GRATE NOT SHOWN)**

ELEVATION VIEW



FLOW DIAGRAM

MODEL #	TREATMENT FLOW RATE (CFS)	BYPASS FLOW (CFS)	SOLIDS STORAGE CAPACITY (CF)
BIO-GRATE-FULL 12-12-12	1.04	1.24	0.15
BIO-GRATE-FULL 18-18-12	1.78	2.79	0.33
BIO-GRATE-FULL 24-24-12	2.70	4.96	0.59
BIO-GRATE-FULL 24-40-12	3.70	6.35	0.88
BIO-GRATE-FULL 24-24-24	7.31	4.96	1.22
BIO-GRATE-FULL 24-40-24	9.53	6.35	1.82
BIO-GRATE-FULL 36-36-24	11.93	7.74	2.73

INSTALLATION NOTES:

1. ALL HARDWARE, FLANGE, FRAME, SCREENS SHALL BE STAINLESS STEEL.
2. OPTIONAL HYDROCARBON BOOM SHALL BE 2" DIAMETER.
3. SEE PERFORMANCE REPORTS IN MANUFACTURES SPECIFICATIONS.
4. OTHER STANDARD AND CUSTOM MODEL SIZES AVAILABLE - CONTACT BIO CLEAN FOR MORE INFORMATION.
5. BASED ON 37% OPEN AREA.
6. CONSIDERS A SAFETY FACTOR OF 2.0.
7. CONSIDERS A LOCAL DEPRESSION PONDING DEPTH OF 6 INCHES.
8. STORAGE CAPACITY BASED ON THE BASKET HALF FULL.
9. CONCRETE STRUCTURES SOLD SEPARATELY.

NOT TO SCALE

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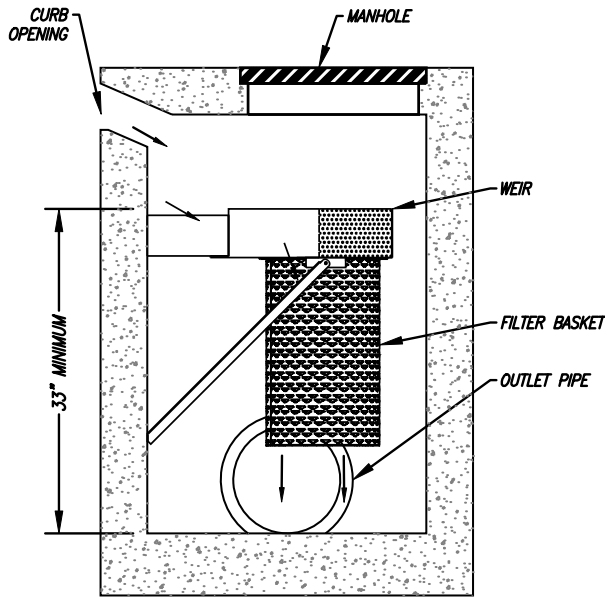
CONTECH
ENGINEERED SOLUTIONS LLC
www.ContechES.com

**GRATE INLET FILTER
FULL CAPTURE
STANDARD DETAIL**

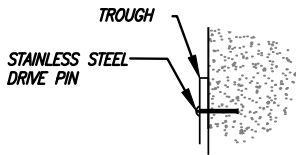
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BIO CLEAN FULL CAPTURE FILTER

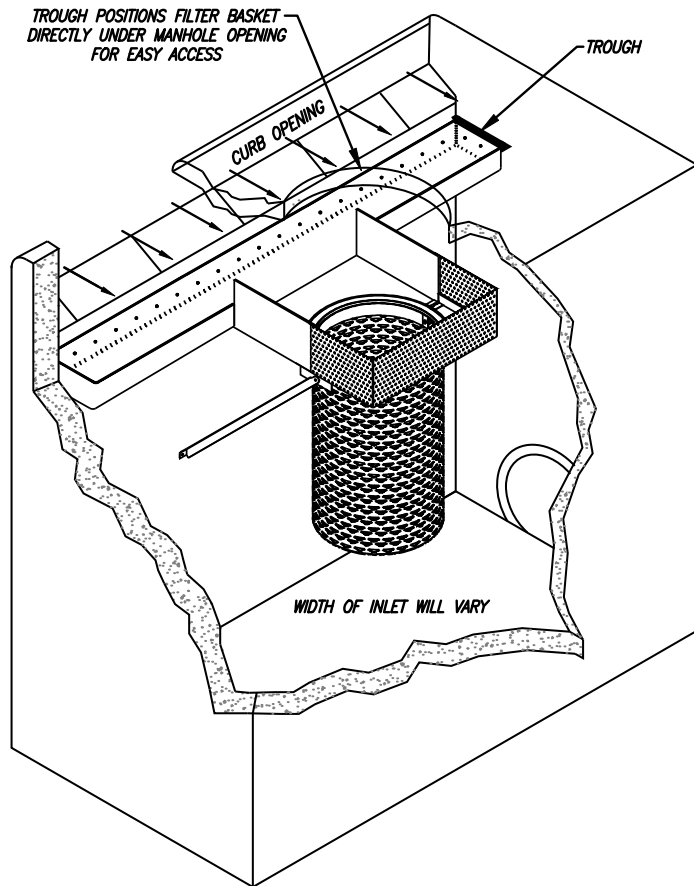
FOR USE IN CURB INLETS



PROFILE VIEW



MOUNTING DETAIL



CONFIGURATION DETAIL

INSTALLATION NOTES

1. TROUGH SYSTEM PROVIDES FOR ENTIRE COVERAGE OF INLET OPENING SO TO DIVERT ALL FLOW TO FILTER.
2. TROUGH SYSTEM TO BE MANUFACTURED FROM MARINE GRADE FIBERGLASS, GEL COATED FOR UV PROTECTION.
3. ALL HARDWARE, FLANGE, FRAME, SHALL BE STAINLESS STEEL.
4. FILTER MANUFACTURED OF 100% STAINLESS STEEL
5. FILTER MADE OF NON-GLOGING SCREEN WITH 4.7 MM OPENINGS AND MEETS FULL CAPTURE REQUIREMENTS
6. FILTER IS LOCATED DIRECTLY UNDER THE MANHOLE FOR EASY REMOVAL AND MAINTENANCE.
7. LENGTH OF TROUGH CAN VARY FROM 2' TO 30'
8. OTHER STANDARD AND CUSTOM MODEL SIZES AVAILABLE - CONTACT CONTECH FOR MORE INFORMATION.
9. BYPASS IS FACILITATED VIA OVERFLOW OF THE TROUGH SYSTEM AND IS EQUAL TO THE CAPACITY OF THE CURB OPENING.
10. ADDITIONAL TREATMENT AND STORAGE CAPACITY CAN BE ACHIEVED BY UTILIZING MULTIPLE FILTER BASKETS.
11. STORAGE CAPACITY BASED ON BASKET HALF FULL.
12. CONCRETE STRUCTURES SOLD SEPARATELY.

NOT TO SCALE

PERFORMANCE NOTES

1. MEETS FULL CAPTURE REQUIREMENTS

MODEL #	TREATMENT FLOW RATE (CFS)	SOLIDS STORAGE CAPACITY (CF)
BIO-CURB-FULL-24	2.85	1.77
BIO-CURB-FULL-12	2.85	0.88

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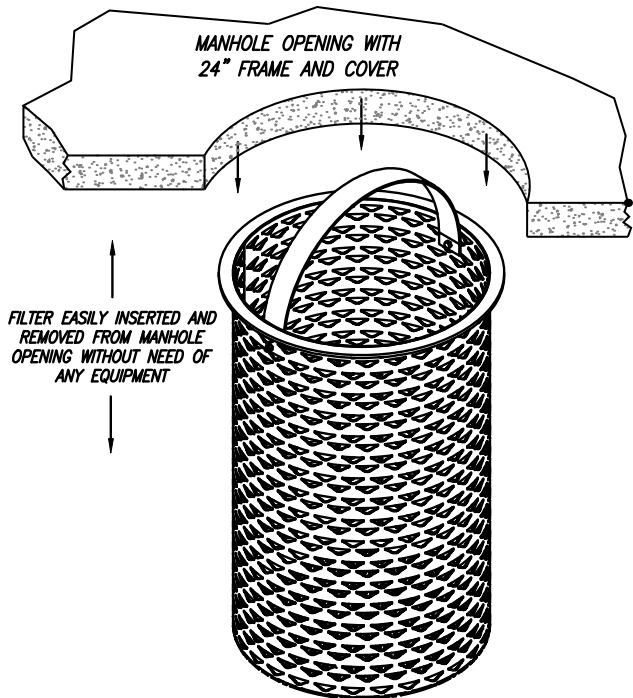
CONTECH
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**CURB INLET FILTER
FULL CAPTURE FILTER
STANDARD DETAIL**

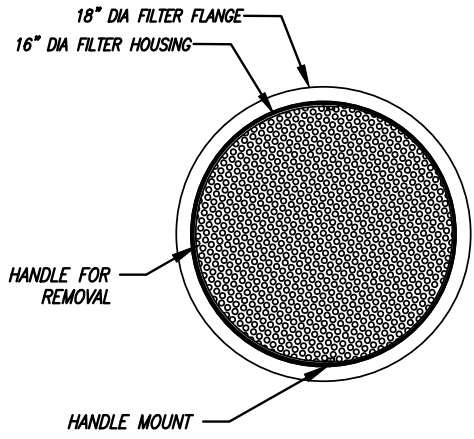
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BIO CLEAN FULL CAPTURE FILTER

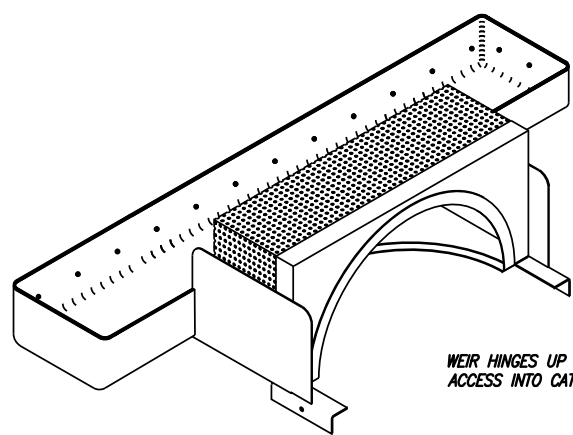
FOR USE IN CURB INLETS



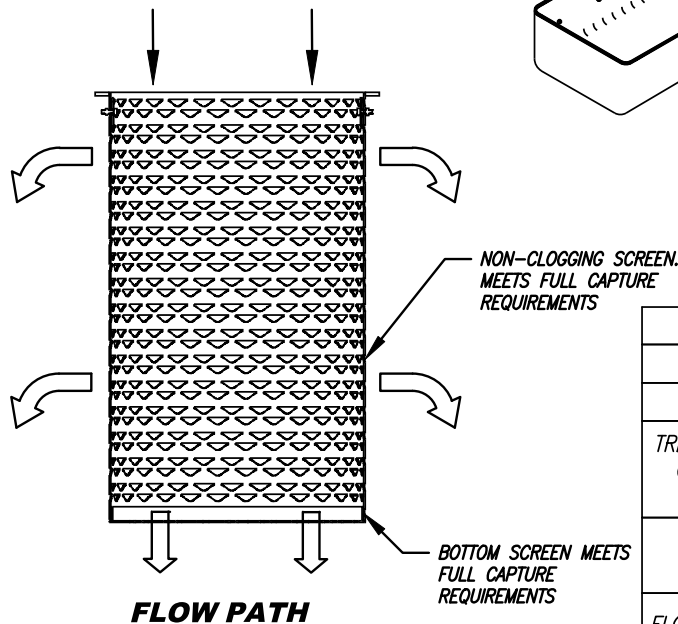
INSTALLATION DETAIL



DETAIL OF DIAMETERS



WEIR DETAIL



FLOW PATH

FLOW RATES - FULL CAPTURE FILTER	
FILTER TREATMENT FLOW RATE	2.85 CFS
SAFETY FACTOR = 2	
TREATMENT FLOW RATE IS BASED ON THE CRITICAL POINT OF RESTRICTION, WHICH IS EITHER THE WEIR OR THE SCREEN CAPACITIES	
WEIR CAPACITY = 2.85 CFS SCREEN CAPACITY = 4.82 CFS	
FLOW RATES CALCULATED USING THE FOLLOWING EQUATION $Q = 50 * c_d * A * \sqrt{2 * g * h}$ $c_d = 0.62$	
SEE PAGE 1 FOR NOTES	

NOT TO SCALE

PROPRIETARY AND CONFIDENTIAL:

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CURB INLET FILTER
FULL CAPTURE FILTER
STANDARD DETAIL

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Section [_____]

Stormwater Grate Type Catch Basin Filtration Device – Full Capture

PART 1 – GENERAL

01.01.00 Purpose

The purpose of this specification is to establish generally acceptable criteria for devices used for filtration of stormwater runoff captured by catch basins with grates or combo curb-grate inlets. They also can be used in catch basins with curb inlets. It is intended to serve as a guide to producers, distributors, architects, engineers, contractors, plumbers, installers, inspectors, agencies, and users; to promote understanding regarding materials, manufacture and installation; and to provide for identification of devices complying with this specification.

01.02.00 Description

Stormwater Catch Basin Filtration Devices (SCBFD) are used to filter stormwater runoff captured by catch basins. The SCBFD is a filter system composed of a mounting flange, mounting brackets, internal high flow bypass, and a filter basket. SCBFDs are used to remove various pollutants from stormwater by means of screening, separation, and filtration.

01.03.00 Manufacturer

The manufacturer of the SCBFD shall be one that is regularly engaged in the engineering, design and production of systems developed for the treatment of stormwater runoff for at least (10) years, and which have a history of successful production, acceptable to the engineer of work. In accordance with the drawings, the SCBFD(s) shall be a filter device manufactured/distributed by Contech Engineered Solutions, LLC., or assigned distributors or licensees. Contech Engineered Solutions, LLC. can be reached at:

West Coast Headquarters:
398 Via El Centro
Oceanside, CA 92058
Phone: (760) 433-7640
www.conteches.com

01.04.00 Submittals

- 01.04.01 Submittal drawings will be provided with each order to the contractor and engineer of work.
- 01.04.02 Submittal drawings are to detail the SCBFD, its components and the sequence for installation, including:
 - SCBFD configuration with primary dimensions
 - Various SCBFD components
 - Any accessory equipment
- 01.04.03 Inspection and maintenance documentation submitted upon request.

01.05.00 Work Included

- 01.05.01 Specification requirements for installation of SCBFD.
- 01.05.02 Manufacturer to supply SCBFD(s):
 - Filter Basket
 - Optional Media Filtration Boom

01.05.03 Media Filtration Boom may be provided with each Filter Basket housed in nylon netting and securely fastened entrance to the Filtration basket. Each media boom shall contain polymer beads to permanently absorb hydrocarbons.

01.06.00 Reference Standards

ASTM A 240	Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
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PART 2 – COMPONENTS

02.01.00 Filter Basket Components

All SCBFD components must be made of stainless steel, per these specifications. SCBFD's containing any fabrics or plastics will not be accepted.

- 02.01.01 Mounting Flange shall be manufactured of 100% stainless steel.
- 02.01.02 Mounting Brackets shall be manufactured of 100% stainless steel. The quick links must have a load rating from the manufacture of at least 800 lbs.
- 02.02.03 Filter Basket shall be manufactured of 100% stainless steel.
 - The openings shall be louver, non-clogging, with opening widths less than 5 mm in size.
 - Opening shall face a direction opposite the direction of flow and be self-cleaning during storm flows into the basket.
- 02.02.04 Bottom Screens shall be manufactured of 100% stainless steel perforated round openings less than 5 mm in size.
- 02.02.05 Hydrocarbon Boom (optional add-on) shall be made of granulated oil absorbing polymers that have been tested in accordance with section 11.2 of ASTM F 716.07 and held within a netting.
 - Oil absorbing polymers must be proven to absorb 180% of its weight within a 300 second contact time, and at this absorption percentage the physical increase in the size of granules is not more than 50%.
 - Netting shall be 100% polyester with a number 16 sieve size, and strength tested per ASTM D 3787.

PART 3 – PERFORMANCE

03.01.00 General

03.01.01 Function - The SCBFD has no moving internal components and functions based on gravity flow, unless otherwise specified. Runoff enters the SCBFD from a catch basin with a grate opening and flows downward into the SCBFD. This SCBFD shall be positioned directly under the catch basin grate. After removal of the grate, the SCBFD must be able to be removed through the catch basin opening without any further disassembly. Stormwater enters the inside of the Filter Basket and flows downward toward the bottom portion of the Basket. The non-clogging screen has openings that are facing upward. As water flows downward, the screening continuously removes debris from the screen's surface. Stormwater flow up to the peak treatment flow rate is processed through the

- filtration screens. During the highest flows, the Basket fills with water and spills out the internal bypass openings between the basket and top flange and into the bottom of the catch basin.
- 03.01.02 Pollutants - The SCBFD will remove and retain trash, debris, sediments, particulate metals, particulate nutrients, and hydrocarbons (with hydrocarbon boom add-on) entering the catch basin during frequent storm events and specified flow rates. For pollutant removal performance, see section 03.02.00.
 - 03.01.03 Treatment Flow Rate - The SCBFD operates using gravity flow. The SCBFD treatment flow rate varies by size/model and is provided on the drawings. Flow rates must be supported by independent third-party observed lab results.
 - 03.01.04 Bypass Flow Rate – The SCBFD is designed to fit within the catch basin in a way not to affect the existing hydraulic. The bypass must be sized with an open area greater than the outlet pipe size, thus the SCBFD shall not be a critical point of flow restriction. Bypass flow rate must be based on the SCBFD's inlet throat or bypass orifice capacity, whichever is less.
 - 03.01.05 Pollutant Load – The SCBFD must be designed to have minimum storage capacity as documented on the drawing for each size and model.
 - 03.01.06 Performance Protocol and Results – The Filter Basket must be submitted and approved by a state agency as a “full capture” trash device.

03.02.00 Test Performance

At a minimum, the SCBFD shall be tested, according to section 03.01.06, and meet these performance specifications:

- 03.02.01 Filter Pollutant Removal Table

POLLUTANT	REMOVAL EFFICIENCY
Trash and Debris - (down to 5 mm)	100%

PART 4 - EXECUTION

04.01.00 General

The installation and use of the SCBFD shall conform to all applicable national, state, municipal and local specifications.

04.02.00 Installation & Measurements

The contractor shall furnish all measurements, labor, equipment, materials and incidentals required to install the (SCBFD) device(s) and appurtenances in accordance with the drawings, installation manual, and these specifications, and be inspected and approved by the local governing agency. Installation contractor should possess a Confined Space Entry Certification Permit (especially for curb inlet catch basins), pursuant to OSHA standards. Any damage to catch basin and surrounding infrastructure caused by the installation of the SCBFD is the responsibility of the installation contractor.

- 04.02.01 Mounting Flange, Mounting Hardware, and Filter Basket and all components or accessories shall be inserted through the catch basin and properly secured per manufactures installation manual and these specifications.

04.03.00 Shipping, Storage and Handling

- 04.03.01 Shipping – SCBFD shall be shipped to the contractor’s address and is the responsibility of the contractor to transport the unit(s) to the exact site of installation. Filters must be nested and stacked during shipping.
- 04.03.02 Storage and Handling– The contractor shall exercise care in the storage and handling of the SCBFD(s) and its components prior to and during installation. Any repair or replacement costs associated with events occurring after delivery is accepted, and unloading has commenced shall be born by the contractor. The SCBFD(s) and its components shall always be stored indoors and transported inside the original shipping container(s) until the SCBFD(s) are ready to be installed. The SCBFD shall always be handled with care and lifted according to OSHA and NIOSA lifting recommendations and/or contractor’s workplace safety professional recommendations.

04.04.00 Maintenance and Inspection

- 04.04.01 Inspection – After installation, the contractor shall demonstrate that the SCBFD has been properly installed at the correct location(s), elevations, and with appropriate supports and fasteners. All components associated with the SCBFD and its installation shall be subject to inspection by the engineer of work, governing agency, and the manufacture at the place of installation. In addition, the contractor shall demonstrate that the SCBFD has been installed per the manufacturer’s specifications and recommendations. SCBFD(s) shall be physically inspected regularly in accordance to owner’s Stormwater Pollution Prevention Plans (SWPPP) and manufacture’s recommendations. An inspection record shall be kept by the operator. The record shall include the condition of the SCBFD and its appurtenances. The most current copy of the inspection record shall always be copied and placed in the owner’s SWPPP.
- 04.04.02 Maintenance – The manufacturer recommends cleaning and debris removal and replacement of the Media Filtration Boom as needed. The maintenance shall be performed by someone qualified. A Maintenance Manual is available upon request from the manufacturer. The manual has detailed information regarding the maintenance of the SCBFD(s). A detailed Maintenance Record shall be kept by the maintenance operator. The Maintenance Record shall include any maintenance activities preformed, amount and description of debris collected, and the condition of the filter. The most current copy of the Maintenance Record shall always be copied and placed in the owner’s Stormwater Pollution Prevention Plan (SWPPP) per governing agency.
- 04.04.03 Material Disposal - All debris, trash, organics, and sediments captured and removed from the SCBFD shall be transported and disposed of at an approved facility for disposal in accordance with local and state regulations. Please refer to state and local regulations for the proper disposal of toxic and non-toxic material.

PART 5 – QUALITY ASSURANCE

05.01.00 Warranty

The manufacturer shall guarantee the SCBFD against all manufacturing defects in materials and workmanship for a period of (1) year from the date of delivery to the contractor. The manufacturer shall be notified of repair or replacement issues in writing within the warranty period. The SCBFD is limited to recommended application for which it was designed.

[End of This Section]

Section [_____] Stormwater Curb Type Catch Basin Filtration Device – Full Capture

PART 1 – GENERAL

01.01.00 Purpose

The purpose of this specification is to establish generally acceptable criteria for devices used for filtration of stormwater runoff captured by catch basins with curb inlets. It is intended to serve as a guide to producers, distributors, architects, engineers, contractors, plumbers, installers, inspectors, agencies and users; to promote understanding regarding materials, manufacture and installation; and to provide for identification of devices complying with this specification.

01.02.00 Description

Stormwater Catch Basin Filtration Devices (SCBFD) are used to filter stormwater runoff captured by catch basins. The SCBFD is a filter system composed of a flow trough, weir section with mounting flange, and a filter basket. SCBFDs are used to remove various pollutants from stormwater by means of screening, separation, and filtration.

01.03.00 Manufacturer

The manufacturer of the SCBFD shall be one that is regularly engaged in the engineering, design and production of systems developed for the treatment of stormwater runoff for at least (10) years, and which have a history of successful production, acceptable to the engineer of work. In accordance with the drawings, the SCBFD(s) shall be a filter device manufactured/distributed by Bio Clean Environmental Services, Inc. or assigned distributors or licensees. Contech Engineered Solutions, LLC. can be reached at:

West Coast Headquarters:
398 Via El Centro
Oceanside, CA 92058
Phone: (855) 566-3938
www.conteches.com

01.04.00 Submittals

- 01.04.01 Shop drawings are to be submitted with each order to the contractor and engineer of work.
- 01.04.02 Shop drawings are to detail the SCBFD, its components and the sequence for installation, including:
 - SCBFD configuration with primary dimensions
 - Various SCBFD components
 - Any accessory equipment
- 01.04.03 Inspection and maintenance documentation submitted upon request.

01.05.00 Work Included

- 01.05.01 Specification requirements for installation of SCBFD.
- 01.05.02 Manufacturer to supply SCBFD(s):
 - Flow trough
 - Weir with Mounting Flange
 - Filter Basket

- 01.05.03 Hydrocarbon Booms are optional (add on) and can be provided with each Filter Basket housed in nylon netting and securely fastened to the bottom of the filter basket. Each boom shall contain polymer beads to permanently absorb hydrocarbons.

01.06.00 Reference Standards

ASTM A 240	Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
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PART 2 – COMPONENTS

02.01.00 Filtration Device Components

All SCBFD components must be made of stainless steel, per these specifications, except for the woven monofilament filtration geotextile filter basket. SCBFD's containing any plastic will not be accepted.

- 02.01.01 Flow Trough shall be manufactured of 100% marine grade fiberglass.
- The entire fiberglass structure must be coated with a polyester gel coating with ultraviolet inhibitors incorporated into the coating for maximum protection.
 - Fiberglass must have a minimum thickness of 3/16".
- 02.01.02 Weir with Mounting Flange shall be manufactured of 100% stainless steel. The hardware must also be stainless steel including mounting brackets, pins, screws.
- The weir shall fully surround the Filter Basket on all sides. On the end of the weir the sides shall be made of screen with perforated round openings less than 5 mm in size.
 - Water flows more than the capacity of the Filter Basket shall pass through the additional weir screen for added treatment and retention of trash and debris during higher bypass flows.
 - The weir shall be hinged in the middle along the centerline of the Filter Basket and hinge upward to allow for access into the catch basin.
- 02.02.03 Filter Basket shall be manufactured of 100% stainless steel.
- The openings shall be louver, non-clogging, with opening widths less than 5 mm in size.
 - Opening shall face a direction opposite the direction of flow and be self-cleaning during storm flows into the basket.
- 02.02.04 Bottom Screens shall be manufactured of 100% stainless steel perforated round openings less than 5 mm in size.
- 02.02.05 Handle shall be manufactured entirely of 100% stainless steel and be mounted to the Filter Basket Housing using mounting hardware per section 02.01.03
- 02.02.06 Hydrocarbon Boom (optional add-on) shall be made of granulated oil absorbing polymers that have been tested in accordance with section 11.2 of ASTM F 716.07 and held within a netting.
- Oil absorbing polymers must be proven to absorb 180% of its weight within a 300 second contact time, and at this absorption percentage the physical increase in the size of granules is not more than 50%.
 - Netting shall be 100% polyester with a number 16 sieve size, and strength tested per ASTM D 3787.

PART 3 – PERFORMANCE

03.01.0 General

- 03.01.01 **Function** - The SCBFD has no moving internal components and functions based on gravity flow, unless otherwise specified. Runoff enters the SCBFD from a catch basin with a curb opening and flows downward into the SCBFD. This SCBFD's Filter Basket shall be positioned directly under manhole opening and the flow trough must be mounted directly under the curb opening and extend the entire length of the opening. The SCBFD's Filter Basket must be able to be removed through the catch basin opening without any further disassembly. Stormwater enters the inside of the Filter Basket and flows downward toward the bottom portion of the Basket. The non-clogging screen has openings that are facing upward. As water flows downward the screening continuously removes debris from the screen's surface. During the highest flows, the Basket fills with water and spills over the top of the flow trough. The top of the weir is higher than the top of the flow trough to allow floatables to be retained during bypass flow conditions.
- 03.01.02 **Pollutants** - The SCBFD will remove and retain trash, debris, sediments, particulate metals, particulate nutrients, and hydrocarbons (with hydrocarbon boom add-on) entering the catch basin during frequent storm events and specified flow rates. For pollutant removal performance, see section 03.02.00.
- 03.01.03 **Treatment Flow Rate** - The SCBFD operates using gravity flow. The SCBFD treatment flow rate varies by size and is provided on the drawings for each model. Flow rates must be supported by independent lab results.
- 03.01.04 **Bypass Flow Rate** – The SCBFD is designed to fit within the catch basin in a way not to affect the hydraulics. The area over the top of the Trough System is always greater than the curb opening area and/or the area of the outflow pipe. Therefore, the SCBFD does not create a critical point of restriction.
- 03.01.05 **Pollutant Load** – The SCBFD must be designed to have minimum storage capacity as documented on the drawing for each size and model.
- 03.01.06 **Performance Protocol and Results** – The Filter Basket must be submitted and approved by a state agency as a “full capture” trash device.

03.02.00 Test Performance

At a minimum, the SCBFD shall be tested, according to section 03.01.06, and meet these performance specifications:

03.02.01 **Filter Pollutant Removal Table**

POLLUTANT	REMOVAL EFFICIENCY
Trash and Debris - (down to 5 mm)	100%

- 03.02.02 **Maintenance Performance** – The Filter Basket must be able to be maintained and cleaned from finish surface using a vacuum hose inserted through the manhole or hatch opening and not the curb face. All cleaning shall be done without entering the catch basin. The Filter Basket shall be removable from finish surface and reinstalled from finish surface without entrance into the catch basin.

PART 4 - EXECUTION

04.01.00 General

The installation and use of the SCBFD shall conform to all applicable national, state, municipal and local specifications.

04.02.00 Installation & Measurements

The contractor shall furnish all measurements, labor, equipment, materials and incidentals required to install the (SCBFD) device(s) and appurtenances in accordance with the drawings, installation manual, and these specifications, and be inspected and approved by the local governing agency. Installation contractor should possess a Confined Space Entry Certification Permit (especially for curb inlet catch basins), pursuant to OSHA standards. Any damage to catch basin and surrounding infrastructure caused by the installation of the SCBFD is the responsibility of the installation contractor.

- 04.02.01 Flow Trough & Weir with Mounting Flange will be installed in accordance with manufactures' recommendations. The Flow Trough will be installed the complete width of the curb opening, or underneath any wings as to provide 100% coverage of incoming stormwater. The Weir must be located directly under the manhole opening or other access point. The Flow Trough must be properly mounted and assembled inside the catch basin with drive pins and pop rivets per manufacture's recommendations. Once the Flow Trough is secured to the walls of the catch basin all seams must be filled with waterproof sealant. The weir must be properly connected to the Flow Trough and seams between components must be made waterproof.
- 04.02.02 Filter Basket will be inserted through the manhole opening or access point of the catch basin directly without entry into the basin. The Filter Basket shall be fully visible from finish surface while looking into the access point for ease of inspection and maintenance.

04.03.00 Shipping, Storage and Handling

- 04.03.01 Shipping – SCBFD shall be shipped to the contractor's address and is the responsibility of the contractor to transport the unit(s) to the exact site of installation.
- 04.03.02 Storage and Handling– The contractor shall exercise care in the storage and handling of the SCBFD(s) and its components prior to and during installation. Any repair or replacement costs associated with events occurring after delivery is accepted, and unloading has commenced shall be born by the contractor. The SCBFD(s) and its components shall always be stored indoors and transported inside the original shipping container(s) until the SCBFD(s) are ready to be installed. The SCBFD shall always be handled with care and lifted according to OSHA and NIOSA lifting recommendations and/or contractor's workplace safety professional recommendations.

04.04.00 Maintenance and Inspection

- 04.04.01 Inspection – After installation, the contractor shall demonstrate that the SCBFD has been properly installed at the correct location(s), elevations, and with appropriate supports and fasteners. All components associated with the SCBFD and its installation shall be subject to inspection by the engineer of work, governing agency, and the manufacture at the place of installation. In addition,

- the contractor shall demonstrate that the SCBFD has been installed per the manufacturer's specifications and recommendations. SCBFD(s) shall be physically inspected regularly in accordance to owner's Stormwater Pollution Prevention Plans (SWPPP) and manufacture's recommendations. An inspection record shall be kept by the inspection operator. The record shall include the condition of the SCBFD and its appurtenances. The most current copy of the inspection record shall always be copied and placed in the owner's SWPPP.
- 04.04.02 Maintenance – SCBFD(s) must be completely maintained from outside the catch basin. The SCBFD(s) shall be inspected, maintained and cleaned 1 to 4 times a year and/or in accordance to owner's Stormwater Pollution Prevention Plans (SWPPP). The maintenance shall be preformed by someone qualified. A Maintenance Manual is available upon request from the manufacturer. The manual has detailed information regarding the maintenance of the SCBFD. A Maintenance Record shall be kept by the maintenance operator. The Maintenance Record shall include any maintenance activities preformed, amount and description of debris collected, and the condition of the filter. The most current copy of the Maintenance Record shall always be copied and placed in the owner's SWPPP.
- 04.04.03 Material Disposal - All debris, trash, organics, and sediments captured and removed from the SCBFD shall be transported and disposed of at an approved facility for disposal in accordance with local and state regulations. Please refer to state and local regulations for the proper disposal of toxic and non-toxic material.

PART 5 – QUALITY ASSURANCE

05.01.00 Warranty

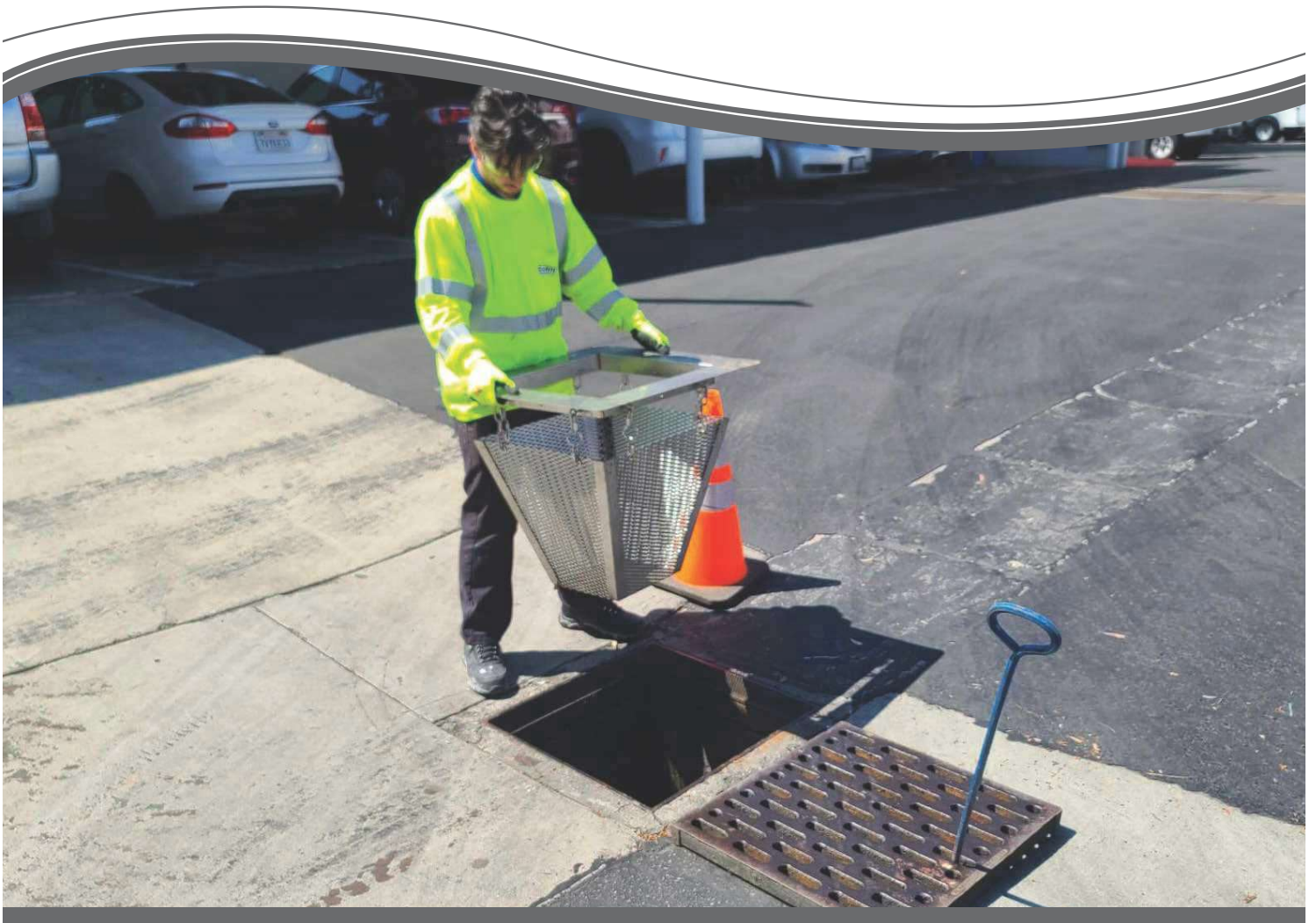
The manufacturer shall guarantee the SCBFD against all manufacturing defects in materials and workmanship for a period of (1) year from the date of delivery to the contractor. The manufacturer shall be notified of repair or replacement issues in writing within the warranty period. The SCBFD is limited to recommended application for which it was designed.

[End of This Section]

APPENDIX C – Installation Manuals

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BioClean[®] Full Grate Inlet Filter Installation Manual



**BIO CLEAN® FULL CAPTURE GRATE INLET FILTER
INSTALLATION MANUAL**

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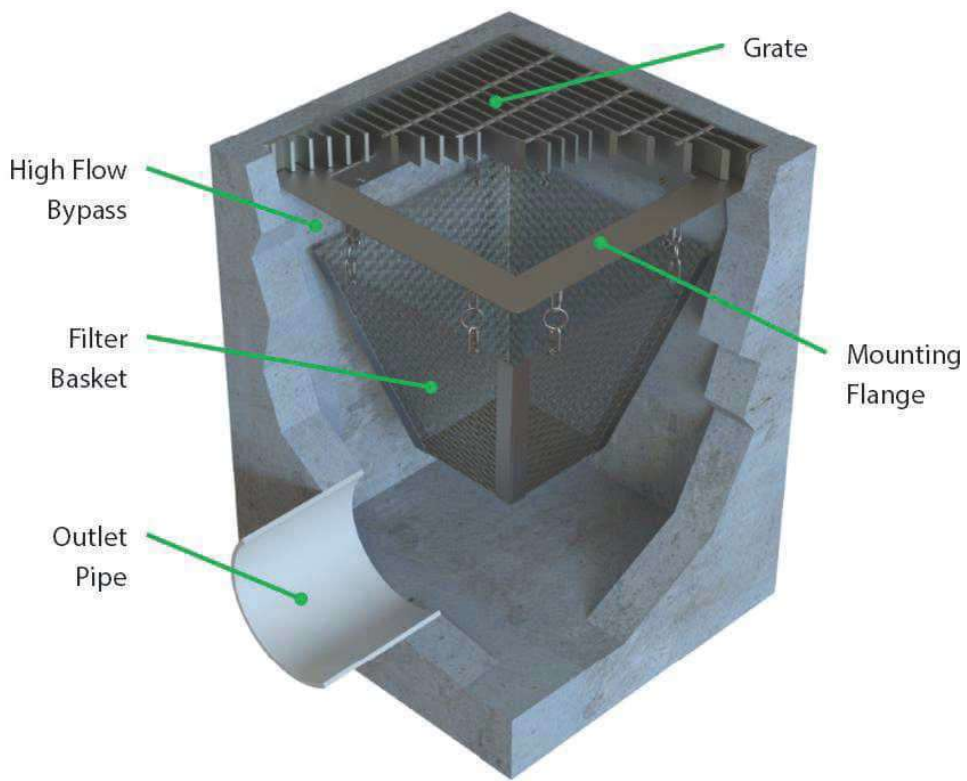
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OVERVIEW

Contech's Bio Clean® Full Capture Grate Inlet Filter is a stormwater catch basin filter designed to remove trash, debris, sediments, particulates, and hydrocarbons (with hydrocarbon boom add-on). The filters are available at various sizes and depths, allowing them to fit in any grated catch basin inlet. The filter is generally mounted under the grate flange but can also be mounted below the grate to the wall of the basin. This configuration is recommended in areas with "direct traffic" ratings such as roads with higher speed traffic. The flange is cut to size allowing for quick and simple installation.



Filter Diagram



WARNING

Confined space entry may be required. Contractor to obtain all equipment and training to meet applicable local and OSHA regulations regarding confined space entry. It is the Contractor's or entry personnel's responsibility to always proceed safely.

SAFETY NOTICE AND PERSONAL SAFETY EQUIPMENT

Jobsite safety is a topic and a practice addressed comprehensively by others. The inclusions here are merely reminders of whole areas of Safety Practice that are the responsibility of the Owner(s), Manager(s), and Contractor(s). OSHA and Canadian OSH, Federal, State/Provincial, and Local Jurisdiction Safety Standards apply on any given site or project. The knowledge and applicability of those responsibilities is the Contractor's responsibility and outside the scope of Contech Engineered Solutions.



Ear Protection



Safety Boots



Gloves



Hard Hat



Eye Protection



Ventilation and Respiratory Protection



Maintenance and Protection of Traffic Plan

DELIVERY

Various delivery options are available. Please coordinate with the local company representative for details.

INSPECTION

Inspection of the Bio Clean® Grate Inlet Filter and all associated parts shall be conducted at time of delivery by the site Engineer/Inspector and the Contractor. Any non-conformance to approved drawings or damage to any part of the system shall be documented on the Contech shipping ticket.

CATCH BASIN PREPARATION

The Contractor is responsible for providing adequate and complete safety measures including fall protection, gas monitoring, and other safety equipment when installing the Bio Clean® Grate Inlet Filter.

The Contractor shall adhere to all jurisdictional and/or OSHA safety rules during installation of the filter.

The Contractor or Owner is responsible for appropriately barricading the catch basin from traffic in accordance with local codes.

INSTALLATION NOTES

Each Bio Clean® Grate Inlet Filter shall be installed according to the locations, elevations, and other details shown on the approved drawings. Any modifications to the elevation, location, or other details shall be at the direction of and approved by the Engineer.

It is recommended that the catch basin is properly cleaned and inspected for any damage prior to installing the Grate Inlet Filter. The filter rests on the grate flange or on undermounts mounted to the walls of the catch basin using concrete wedge anchors.

Unless otherwise noted, all hardware and fasteners must be stainless steel. Under no circumstances shall galvanized or zinc-plated hardware or fasteners be used.

TOOLS CHECKLIST

The following tools are recommended for this installation. Other tools may be necessary based on product configuration or site conditions. Always wear appropriate PPE such as gloves and safety glasses during installation.



Impact Driver or Ratchet
and 7/16" Socket



Hammer Drill and
1/4" Concrete Bit



Tape Measure



Hammer



Angle Grinder and
Cutoff Disk



Marker



Caulk Gun and
Sikaflex 1A



Level



Traffic Control



Manhole Hook

PARTS AND HARDWARE CHECKLIST

The following parts and hardware are required for this installation. Ensure all pieces are present and free from damage or defects before beginning assembly. Check the Project Drawings for any project-specific configuration notes.



Filter Basket

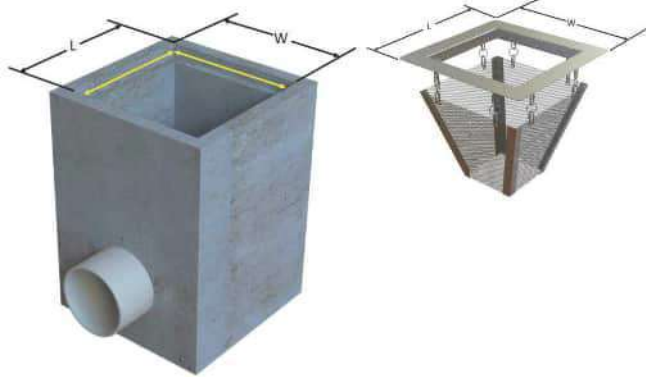


Wedge Anchors
1/4" x 2-1/4"
(Undermount Install Only)



Undermounts
(Undermount Install Only)

INSTRUCTIONS | OPTION 1 - MOUNTING ON GRATE FLANGE (PREFERRED METHOD)



1. MEASURE CATCH BASIN AND FILTER FLANGE

Measure to ensure the filter will properly and fully fit the catch basin opening. Once the grate is removed, use a tape measure to check the dimensions (length and width) of the grate frame lip. Next, check the dimensions (length and width) of the filter mounting flange. The mounting flange should be approximately 1/4" to 1/2" shorter than the grate frame lip ID.



1. TRIM FILTER FLANGE

If the mounting flange is too large it will need to be trimmed to fit. First, use a tape measure, straightedge, and marker to draw a cutting line. Then, cut the flange using an angle grinder with cutoff disk, making sure to use proper PPE such as protective eyewear. After cutting ensure that any sharp or protruding edges are ground smooth. Once cut, check the dimensions again to verify they are accurate and that the filter will properly fit.

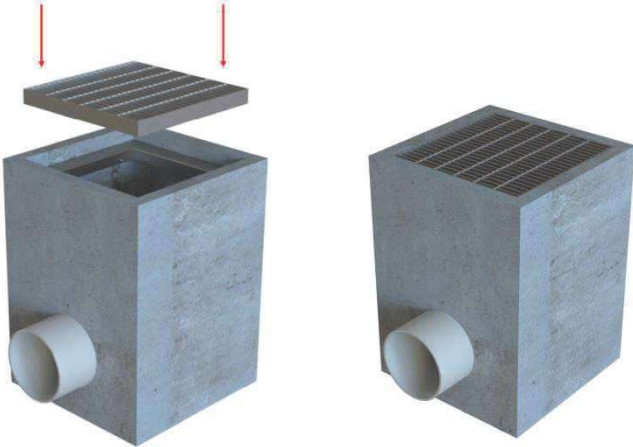
Caution: sharp edges may cause injury.



2. INSTALL FILTER

Clean the grate frame lip of any debris, then simply set the filter into place, resting the mounting flange on the grate frame lip. It is recommended that gloves are worn and proper lifting techniques are used. Larger filters may require two people to set in place. Do not drop the filter into place. Center the filter in the grate frame so any gaps are even on all four sides.

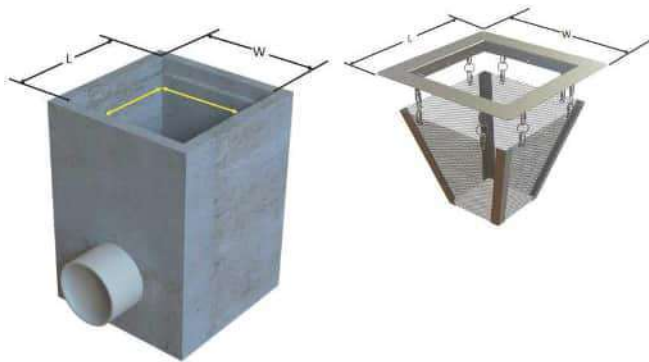
INSTRUCTIONS | OPTION 1 - MOUNTING ON GRATE FLANGE (PREFERRED METHOD)



3. FINISH INSTALLATION

Installation is now complete. Be sure to remove all tools, seal up the catch basin by replacing the grate, and take down any traffic control. Ensure the install site is returned to its original condition.

INSTRUCTIONS | OPTION 2 – UNDERMOUNT CONFIGURATION



1. MEASURE CATCH BASIN AND FILTER FLANGE

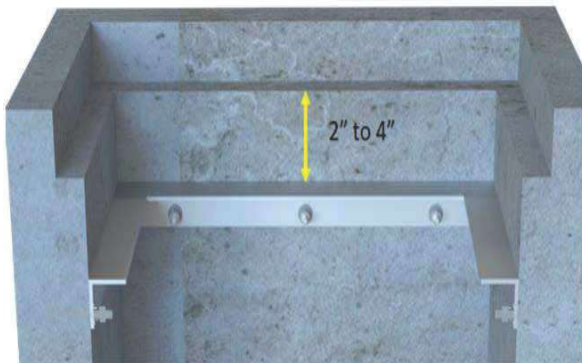
Measure to ensure the filter and undermounts will properly and fully fit the catch basin opening. Once the grate is removed, use a tape measure to pull the dimensions (length and width) of the catch basin ID below the grate flange. Next, check the dimensions (length and width) of the filter mounting flange. The filter mounting flange should be approximately 1/4" to 1/2" shorter than the catch basin ID. Finally, check the length of each undermount - there should be two longer pieces and two shorter pieces, with the shorter pieces sized to fit between the long ones. Ensure the undermounts are arranged correctly when checking fit.



1. TRIM FILTER FLANGE AND UNDERMOUNTS

If the mounting flange or undermounts are too large they will need to be trimmed to fit. First, use a tape measure, straightedge, and marker to draw a cutting line. Then, cut the flange or undermounts using an angle grinder with cutoff disk, making sure to use proper PPE such as protective eyewear. After cutting ensure that any sharp or protruding edges are ground smooth. Once cut, check the dimensions again to verify they are accurate and that the filter and undermounts will properly fit.

Caution: sharp edges may cause injury.

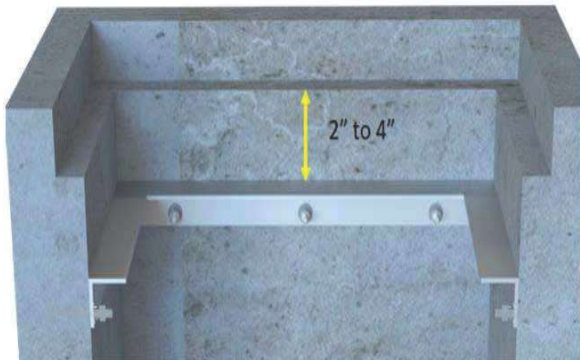


2. MARK INSTALL LOCATION

Using a tape measure and chalk or a large marker, draw a guideline 2" to 4" below the edge of the grate flange on all four sides of the basin walls. Ensure the lines are level.

The short undermounts are sized to fit between the long ones. Ensure the undermounts are arranged correctly when checking fit and before installation.

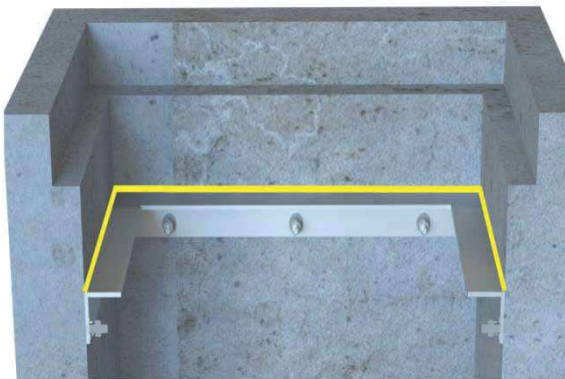
INSTRUCTIONS | OPTION 2 – UNDERMOUNT CONFIGURATION



3. INSTALL UNDERMOUNTS

Orient the first undermount so the holes are on the bottom and align the top edge with the guideline (see picture). While holding the undermount in place drill holes 2" deep at each location where there is a pre-drilled hole. After each hole is drilled insert a wedge anchor into the hole. When all holes have been drilled drive the wedge anchors tight and tighten the nuts.

Repeat this process for the other three undermounts.



4. APPLY SEALANT

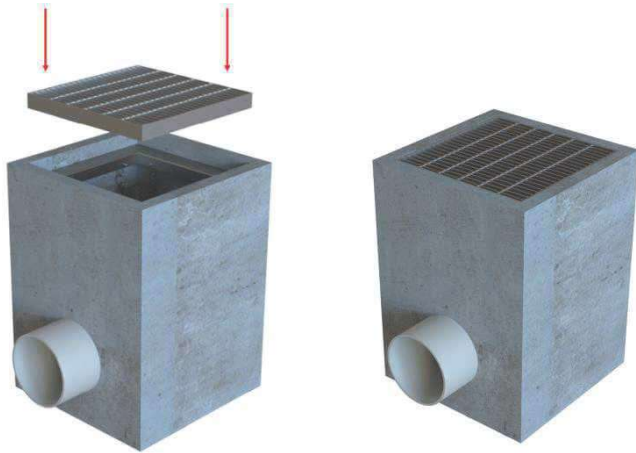
When all undermounts have been installed, apply Sikaflex-1A sealant where the tops of the undermounts meet the catch basin walls. All such joints must be fully filled with sealant and made completely watertight.



5. INSTALL FILTER

Clean the undermounts of any debris, then simply set the filter into place, resting the mounting flange on the undermounts. It is recommended that gloves are worn and proper lifting techniques are used. Larger filters may require two people to set in place. Do not drop the filter into place. Center the filter on the undermounts so any gaps are even on all four sides.

INSTRUCTIONS | OPTION 2 – UNDERMOUNT CONFIGURATION



6. FINISH INSTALLATION

Installation is now complete. Be sure to remove all tools, seal up the catch basin by replacing the grate, and take down any traffic control. Ensure the install site is returned to its original condition.



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BioClean[®] Full Capture Curb Inlet Filter Installation Manual



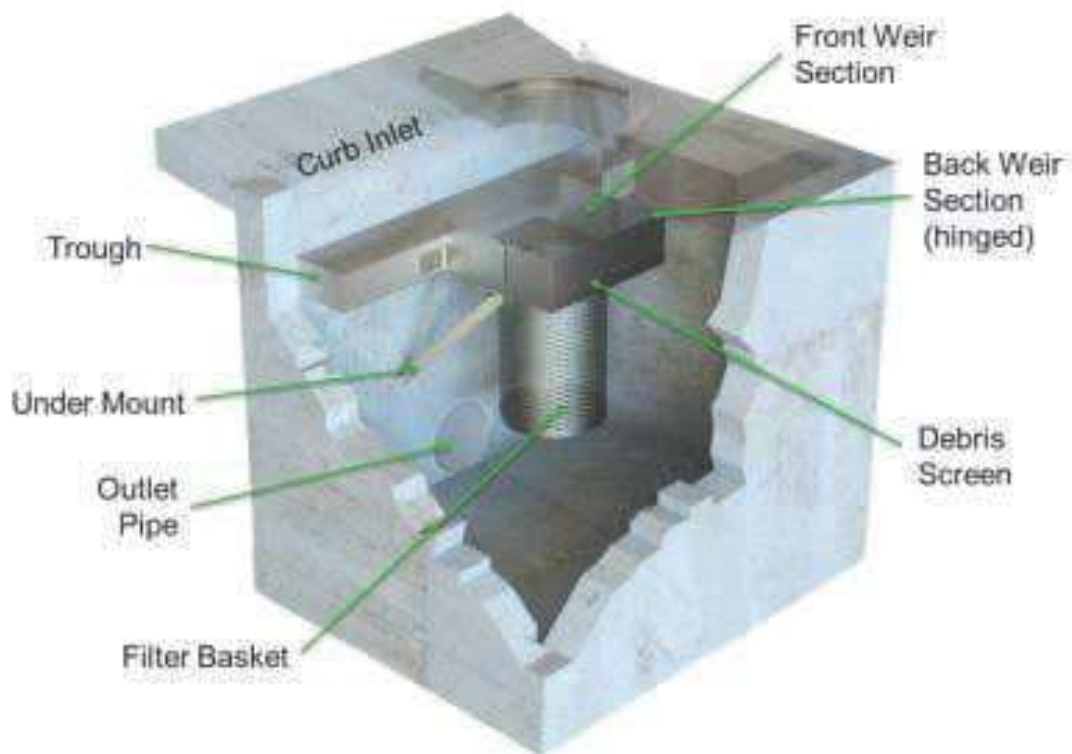
BIO CLEAN® FULL CAPTURE CURB INLET FILTER INSTALLATION MANUAL

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OVERVIEW

Contech's Bio Clean® Full Capture Curb Inlet Filter is a stormwater catch basin filter designed to remove trash, debris, sediments, particulates, and hydrocarbons (with hydrocarbon boom add-on). The innovative trough and weir system is mounted along the curb face and directs incoming stormwater toward the filter basket, which is positioned directly under the manhole access opening regardless of its location in the catch basin. This simple yet profound design allows the filter to be cleaned from the finished surface without access into the catch basin, significantly reducing maintenance time and eliminating confined space entry. The filter lifting handle allows for the filter to be removed easily through the manhole. The weir also folds up to allow unimpeded access into the basin for routine maintenance or pipe jetting.



Filter Diagram



WARNING

Confined space entry may be required. Contractor to obtain all equipment and training to meet applicable local and OSHA regulations regarding confined space entry. It is the Contractor's or entry personnel's responsibility to always proceed safely.

SAFETY NOTICE AND PERSONAL SAFETY EQUIPMENT

Jobsite safety is a topic and a practice addressed comprehensively by others. The inclusions here are merely reminders of whole areas of Safety Practice that are the responsibility of the Owner(s), Manager(s), and Contractor(s). OSHA and Canadian OSH, Federal, State/Provincial, and Local Jurisdiction Safety Standards apply on any given site or project. The knowledge and applicability of those responsibilities is the Contractor's responsibility and outside the scope of Contech Engineered Solutions.



Ear Protection



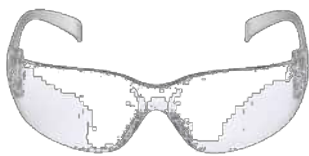
Safety Boots



Gloves



Hard Hat



Eye Protection



Ventilation and Respiratory Protection



Maintenance and Protection of Traffic Plan

DELIVERY

Various delivery options are available. Please coordinate with the local company representative for details.

INSPECTION

Inspection of the Bio Clean® Curb Inlet Filter and all associated parts shall be conducted at time of delivery by the site Engineer/Inspector and the Contractor. Any non-conformance to approved drawings or damage to any part of the system shall be documented on the Contech shipping ticket.

CATCH BASIN PREPARATION

The Contractor is responsible for providing adequate and complete safety measures including fall protection, gas metering, and other safety equipment when installing the Bio Clean® Curb Inlet Filter.

The Contractor shall adhere to all jurisdictional and/or OSHA safety rules during installation of the filter.

The Contractor or Owner is responsible for appropriately barricading the catch basin from traffic in accordance with local codes.

INSTALLATION NOTES

Each Bio Clean® Curb Inlet Filter shall be installed according to the locations, elevations, and other details shown on the approved drawings. Any modifications to the elevation, location, or other details shall be at the direction of and approved by the Engineer.

It is recommended that the catch basin is properly cleaned and inspected for any damage prior to installing the Curb Inlet Filter. The trough and weir system mount directly to the walls of the catch basin using concrete wedge and/or drive anchors.

Unless otherwise noted, all hardware and fasteners must be stainless steel. Under no circumstances shall galvanized or zinc-plated hardware or fasteners be used.

TOOLS CHECKLIST

The following tools are recommended for this installation. Other tools may be necessary based on product configuration or site conditions. Always wear appropriate PPE such as gloves and safety glasses during installation.



Impact Driver or Ratchet
with 7/16" Socket



Drill with 1/4" and 13/64"
Standard Bits



Hammer Drill with
1/4" Concrete Bit



Hammer



Rivet Gun
(Electric Suggested)



Marker



Jigsaw or
Reciprocating Saw



Tape Measure



Traffic Control



Torpedo Level



Caulk Gun and
Sikaflex 1A



Manhole Hook

PARTS AND HARDWARE CHECKLIST

The following parts and hardware are required for this installation. Ensure all pieces are present and free from damage or defects before beginning assembly. Check the Project Drawings for any project-specific configuration notes.



Wedge Anchors
1/4" x 2-1/4"



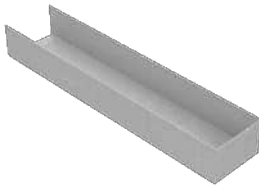
Hex Bolts
1/4" x 1"



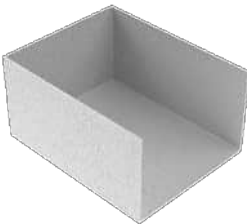
1/4" Locknuts and
Flat Washers



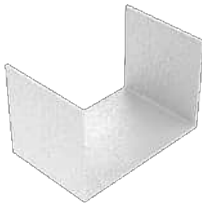
Large Flange Pop Rivets
3/16" x .626 - .750



Curb Trough



Trough Endcap



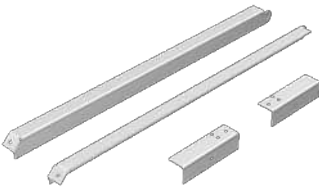
Trough Coupler
(Some Sizes Only)



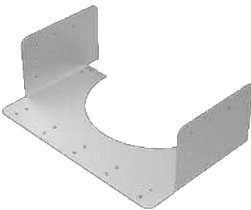
Trough Extension
(Some Sizes Only)



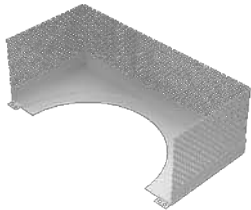
Full Capture Filter Basket



Undermounts and
Hinge Stops
(L and R of each)

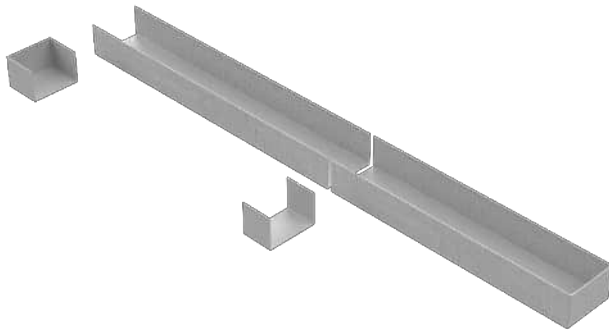


Weir Front



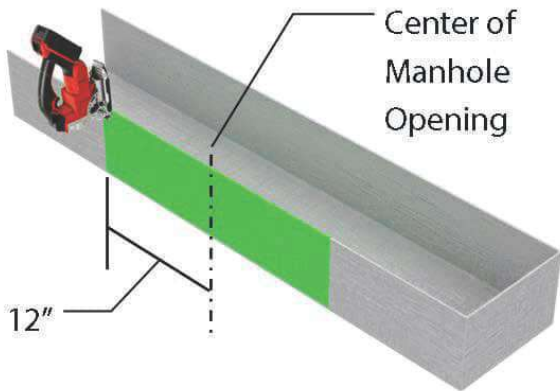
Weir Back

INSTRUCTIONS | TROUGH PRE-ASSEMBLY



1. ARRANGE TROUGH FOR PRE-ASSEMBLY

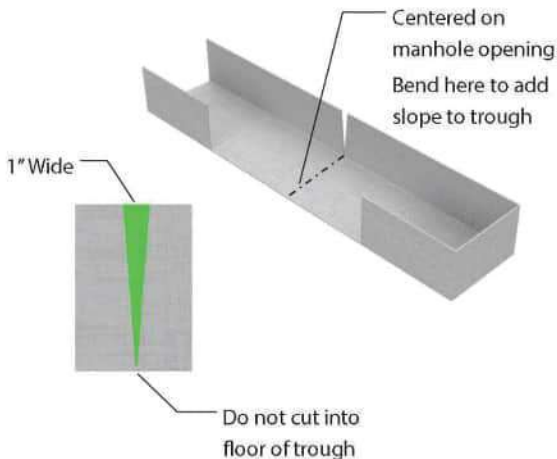
Outside the catch basin, lay out the trough as it will be installed. Begin with the section that has an integrated end cap. For catch basins with manhole openings on the right or left end (not in the middle), the closed trough end will go against the side wall nearest the manhole opening. For catch basins with manhole openings in the middle, the closed trough end may go against either side wall.



2. MAKE CUTOUT FOR WEIR

Using a tape measure, find the distance from the side of the catch basin to the center of the manhole opening. Transfer this distance to the trough, then mark 12" on either side of this centerline. It is critical that the cutout is perfectly centered with the manhole opening.

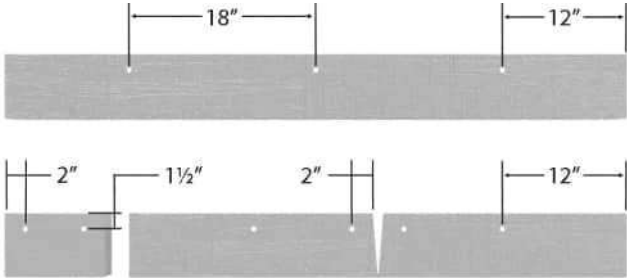
Cut the trough at the marks with a jigsaw or reciprocating saw. Ensure the side is fully cut to the bottom of the trough and the opening measures 24", then cut flush with the floor of the trough to finish the cutout. Any remaining upward protrusions must be sanded flat with the floor of the trough.



3. V-NOTCH BACK OF TROUGH

Trough systems longer than 4ft and/or installations on slopes will require v-notching the back of the trough to achieve the required slope. In the trough wall opposite the weir cutout, layout a v-notch 1" wide and centered on the weir opening. Cut the notch with a jigsaw or reciprocating saw, ensuring the cut goes all the way to the bottom of the trough. Take care to not cut into the floor of the trough.

INSTRUCTIONS | TROUGH PRE-ASSEMBLY

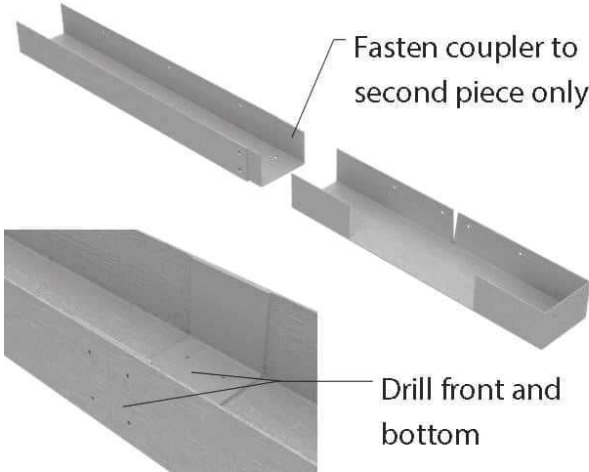


4. DRILL TROUGH MOUNTING HOLES

Mark drill locations 1-1/2" from the top edge of the back side of the trough 12" from each end, then approximately every 18" between those marks. If the trough has a v-notch, mark drill locations 1-1/2" from the top edge and 2" on either side of the notch. Repeat for all trough sections.

On the end caps and trough end, mark drill locations 1-1/2" from the top edge and 2" in from the sides.

Drill each marked location with a 1/4" drill bit.

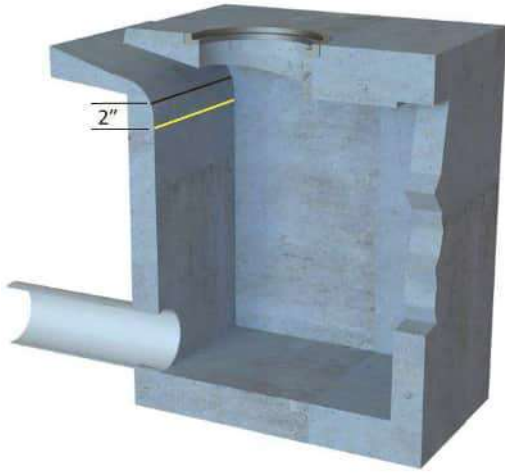


5. INSTALL COUPLERS

If the system was supplied with trough couplers, center each coupler over a joint where trough sections will be butted together. Drill four 13/64" holes on each side of the joint, two through the bottom and two through the front.

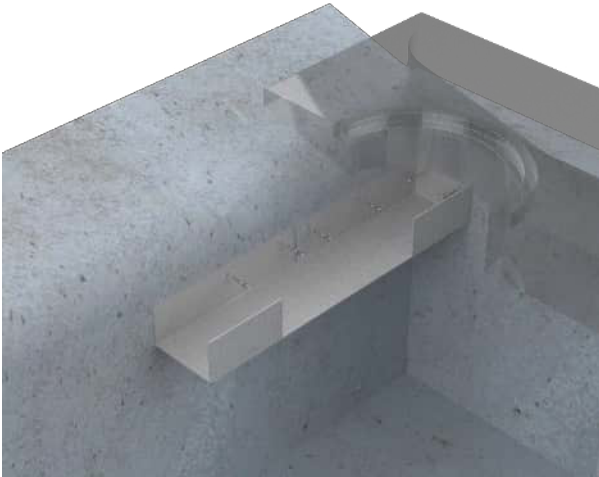
Using pop rivets, fasten the coupler to the trough section that will be installed further from the manhole opening or closed end of the trough. Do not attach the coupler to the other section at this time.

INSTRUCTIONS | TROUGH INSTALLATION



1. MARK INSTALL LOCATION

Position the trough under the face of the curb. The top of the trough should be approximately 2" below the end of the local depression transition into the catch basin where the catch basin wall is vertical. Use chalk or a large marker to mark this position on the basin wall. Next, use a tape measure and level to measure a slope of 0.5% to 1% from the corners of the catch basin sloping toward the position where the filter basket and weir will be located. Use chalk or a large marker to draw a guideline along where the top of the trough wall will be located for proper mounting.



2. INSTALL FIRST TROUGH PIECE

Begin with the trough that has the integrated endcap. Position the end flush with the side of the catch basin wall nearest the manhole opening and the top of the back along the guideline. Flex the trough at the notch as required to match the slope of the guidelines.

While holding the trough in place, drill 1/4" holes 2" deep through the mounting holes drilled earlier. After each hole is drilled insert a wedge anchor into the hole. When all holes have been drilled drive the wedge anchors tight and tighten the nuts.



3. INSTALL TROUGH EXTENSIONS

Install additional trough sections by placing the overhanging coupler into the trough section that has already been installed. Insert rivets into the holes drilled earlier to hold the sections together – do not pop them yet. Align the top of the trough back to the guideline, then drill a 1/4" hole 2" deep through the mounting hole at the other end of the trough, insert a wedge anchor into the hole, and drive it tight. Then pop the rivets in the trough coupler and tighten the nut.

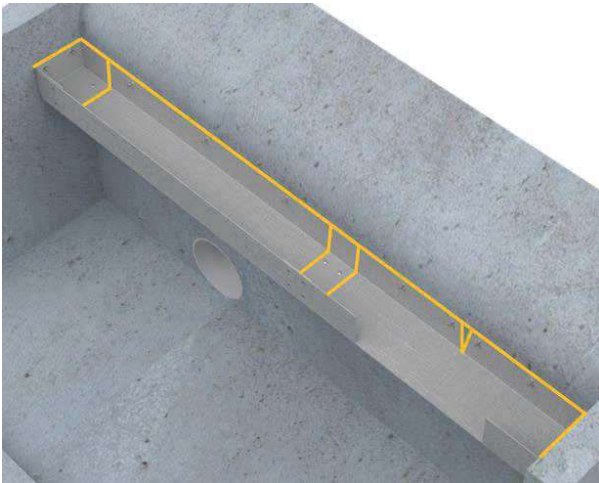
Drill the rest of the mounting holes. When all holes have been drilled drive the wedge anchors tight and tighten the nuts. Repeat for any additional trough sections.

INSTRUCTIONS | TROUGH INSTALLATION



4. INSTALL END CAP

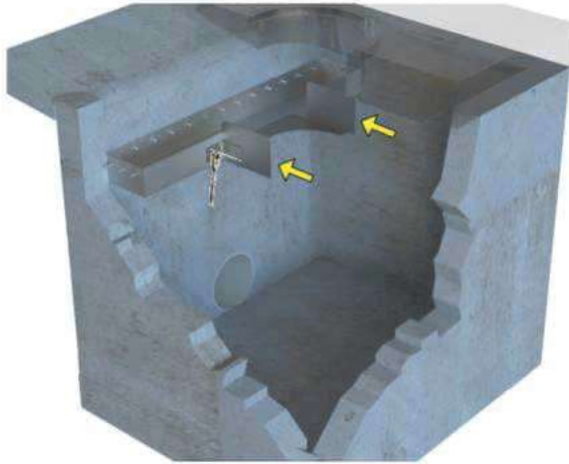
Place the end cap inside the trough with the closed end flush with the catch basin wall. While holding the end cap in place drill 1/4" holes 2" deep through the mounting holes drilled earlier. After each hole is drilled insert a wedge anchor into the hole. When all holes have been drilled drive the wedge anchors tight and tighten the nuts. Then drill four 13/64" holes near the open end of the end cap, two through the bottom and two through the side not against the catch basin wall. Fasten the end cap and trough together using pop rivets.



5. APPLY SEALANT TO TROUGH

Working from the end cap back toward the manhole opening, apply Sikaflex 1-A to the trough, end cap, rivets, and any couplers. The trough must be sealed to the catch basin all along the top edge on the back and ends. Inside the trough, the steps formed where the end cap or couplers overlap the trough must also be sealed on the bottom and sides. If present, the edges of the v-notch must also be sealed. All such gaps and overlaps must be fully filled with sealant and made completely watertight.

INSTRUCTIONS | FOLDING WEIR INSTALLATION



1. INSTALL FRONT WEIR SECTION

Position the front weir section into the cutout in the trough. The mounting flange of the weir must rest flat on the floor of the trough. Adjust the weir so the walls of the trough intersect the walls of the weir at 90 degrees. Check that the ends of the recessed flange opposite the trough span the center of the manhole opening. If they are misaligned by more than 2", STOP and contact the manufacturer – a weir extension may be required.

Holes are pre-drilled in the mounting flange on the front weir section. Using a 13/64" drill bit, drill through the fiberglass trough using the holes as a guide. Fasten the weir to the trough with pop rivets.



2. CONNECT MOUNTING BRACKETS

Use the mounting brackets to connect the side of the trough to the side of the weir. The mounting brackets will be pre-bolted to the weir. The brackets will have adjustable slides on this side. The side of the mounting bracket which attaches to the trough will have holes pre-drilled. Once lined up, use a 1/4" drill bit to drill through the trough using the holes in the mounting bracket as a guide. Fasten the bracket to the trough with bolts, flat washers, and locknuts. The flat washers should be placed on the locknut side.



3. INSTALL REAR WEIR AND HINGE STOPS

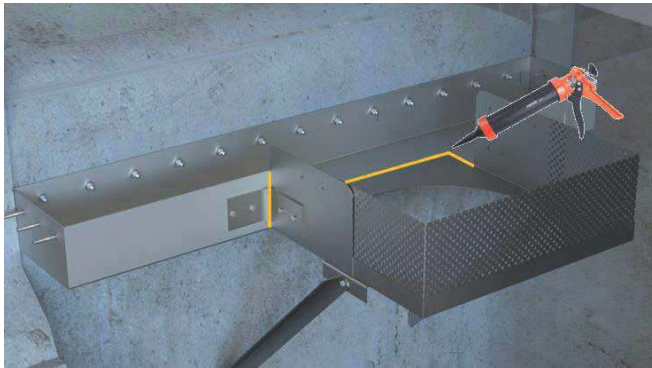
Attach the rear weir section and hinge stops to the front weir section. Align the holes in the hinges welded to the back weir section with the matching holes in the front weir section and put a bolt through each hole. Slide the hinge stops over the bolts underneath the weir with the stop pointing away from the trough and the single-hole flange facing the outside. Secure with flat washers and lock nuts, making sure the rear weir hinges up and down freely.

INSTRUCTIONS | FOLDING WEIR INSTALLATION



4. ATTACH UNDERMOUNTS

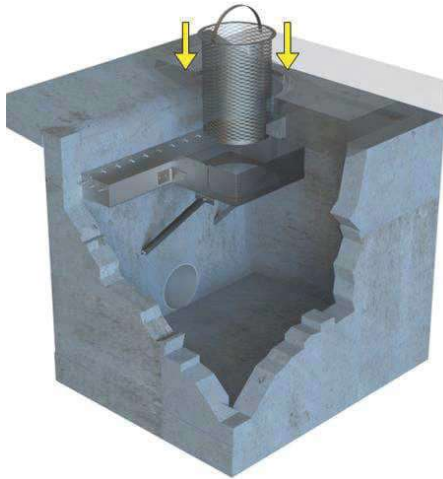
Fasten the undermounts to the hinge stops through the single hole on the side using bolts, flat washers, and lock nuts. The flat washers should be on the locknut side. Next, use a level to make sure the horizontal plane of the weir is at 0.5% to 1% slope from the trough sloping down toward the back of the catch basin. Swing the free end of one undermount flush with the catch basin wall. While holding the undermount in place, drill a hole 2" deep through the hole in the undermount. Insert a wedge anchor into the hole, drive the anchor tight, and fasten the nut. Repeat for the other undermount.



5. APPLY SEALANT TO WEIR

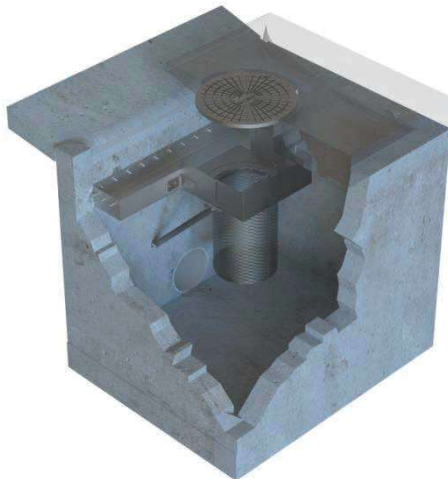
Apply Sikaflex 1-A to the front weir section where it makes contact with the trough and fill any gaps remaining after installation. All such gaps and overlaps must be fully filled with sealant and made completely watertight.

INSTRUCTIONS | FINISH INSTALLATION



1. INSTALL FILTER BASKET

Clean the weir of any debris then install the basket into the weir through the manhole opening. The opening in the weir section should be directly under the manhole opening for easy installation. It is recommended that gloves are worn and proper lifting techniques are used. Do not drop the filter into place. The basket should rest flat in the circular recess in the weir.



2. FINISH INSTALLATION

Clean up any remaining debris from the inside of the catch basin and the surrounding work area. Installation is now complete. Be sure to remove all tools, seal up the catch basin by replacing the manhole cover, and take down any traffic control.

NOTES



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APPENDIX D – O&M Manuals

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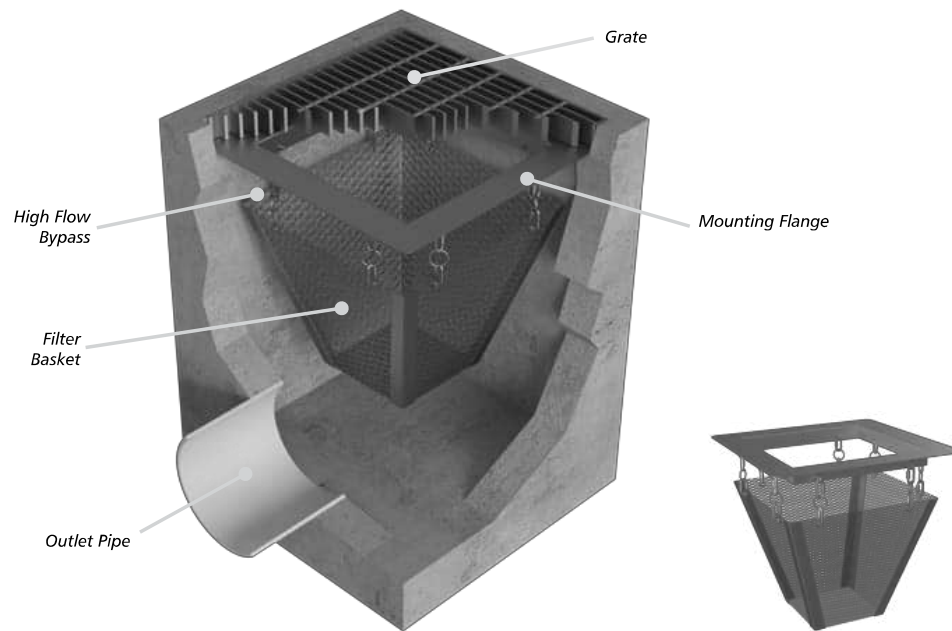
**Bio Clean[®] Grate Inlet Filter
Full Capture Type
Operation & Maintenance Manual**



Operation & Maintenance

Contech's Bio Clean® Grate Inlet Filter is a stormwater catch basin filter designed to remove trash, debris, sediments, particulates, and hydrocarbons (with hydrocarbon boom add-on). Constructed of 100% stainless steel, the filters are available at various sizes and depths, allowing them to fit in any grated catch basin inlet. The heavy duty construction allows for cleaning with any vacuum truck. The filter can also easily be cleaned by hand.

As with all stormwater BMPs, inspection and maintenance on the Grate Inlet Filter is necessary. Stormwater regulations require BMPs be inspected and maintained to ensure they are operating as designed to allow for effective pollutant removal and provide protection to receiving water bodies. It is recommended that inspections be performed multiple times during the first year to assess site-specific loading conditions. This is recommended because pollutant loading can vary greatly from site to site. Variables such as nearby soil erosion or construction sites, winter sanding of roads, amount of daily traffic, and land use can increase pollutant loading on the system. The first year of inspections can be used to set inspection and maintenance intervals for subsequent years. Without appropriate maintenance, a BMP can exceed its storage capacity which can negatively affect its continued performance in removing and retaining captured pollutants.



Filter Diagram

Inspection Equipment

Following is a list of equipment to allow for simple and effective inspection of the Grate Inlet Filter:

- Contech Inspection Form (page 7 of this O&M Manual).
- Manhole hook or appropriate tools to remove access hatches and covers.
- Appropriate traffic control signage and procedures.
- Protective clothing and eye protection.
- Note: entering a confined space requires appropriate safety procedures, PPE, and certification. It is generally not required for routine inspections or maintenance of the system.



Inspection Steps

The core to any successful stormwater BMP maintenance program is routine inspections. The inspection steps required on the Grate Inlet Filter are quick and easy. As mentioned above the first year should be seen as the maintenance interval establishment phase. During the first year more frequent inspections should occur in order to gather loading data and maintenance requirements for that specific site. This information can be used to establish a base for long-term inspection and maintenance interval requirements.

The Grate Inlet Filter can be inspected through visual observation without entry into the catch basin. All necessary pre-inspection steps must be carried out before inspection occurs, such as safety measures to protect the inspector and nearby pedestrians from any dangers associated with an open access hatch or manhole. Once the manhole has been safely opened the inspection process can proceed, as follows:

- Prepare the inspection form by writing in the necessary information including project name, location, date & time, unit number and other details as noted (page 7 of this O&M Manual).
- Observe the inside of the catch basin through the manhole. If minimal light is available and vision into the unit is impaired utilize a flashlight to see inside the catch basin.
- Look for any out of the ordinary obstructions in the catch basin, trough, weir, filter basket, basin floor or outlet pipe. Write down any observations on the inspection form.
- Through observation and/or digital photographs estimate the amount of trash, foliage and sediment accumulated inside the filter basket. Record this information on the inspection form.
- Observe the condition and color of the hydrocarbon boom. Record this information on the inspection form.
- Finalize inspection report for analysis by the maintenance manager to determine if maintenance is required.

Maintenance Indicators

Based upon observations made during inspection, maintenance of the system may be required based on the following indicators:

- Missing or damaged internal components.
- Obstructions in the filter basket and/or its bypass.
- Excessive accumulation of trash, foliage and sediment in the filter basket. Maintenance is required when the basket is greater than half-full.
- The following chart shows the 50% and 100% storage capacity of each filter height:

Basket Model	Height ¹ (inches)	Top Width (inches)	Top Length (inches)	Bottom Width (inches)	Bottom Length (inches)	50% Storage Capacity (CF)	100% Storage Capacity (CF)
BC-GRATE-FULL-12-12-12	6.00	10.00	10.00	8.31	8.31	0.15	0.30
BC-GRATE-FULL-18-18-12	6.00	15.00	15.00	12.50	12.50	0.33	0.66
BC-GRATE-FULL-24-24-12	6.00	20.00	20.00	16.69	16.69	0.59	1.18
BC-GRATE-FULL-24-24-24	18.00	20.00	20.00	10.00	10.00	1.22	2.44
BC-GRATE-FULL-24-40-12	6.00	20.00	30.00	16.69	25.00	0.88	1.76
BC-GRATE-FULL-24-40-24	18.00	20.00	30.00	10.00	15.00	1.82	3.64
BC-GRATE-FULL-36-36-24	18.00	30.00	30.00	15.00	15.00	2.73	5.46

¹ Refers to basket height. Total system height is equal to basket height plus 6 inches for bypass.

Maintenance Equipment

Following is a list of equipment to allow for simple and effective maintenance of the Grate Inlet Filter. It is recommended that a vacuum truck be utilized to minimize the time required to maintain the Grate Inlet Filter, though it can easily be cleaned by hand.

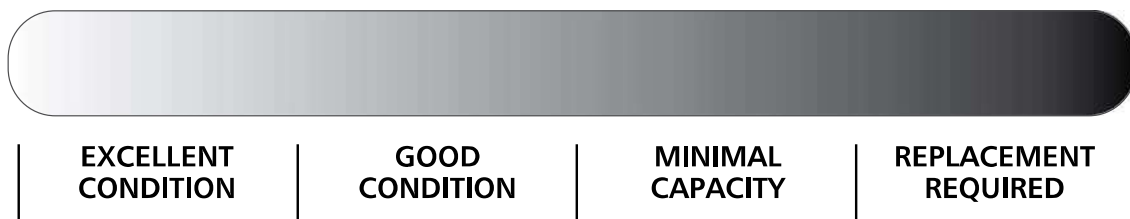
- Contech Maintenance Form (page 7 of this O&M Manual).
- Manhole hook or appropriate tools to access hatches and covers.
- Appropriate safety signage and procedures.
- Protective clothing and eye protection.
- Small or large vacuum truck (with pressure washer attachment preferred).
- Note: entering a confined space requires appropriate safety procedures, PPE, and certification. It is generally not required for routine maintenance of the system.

Maintenance Procedures

It is recommended that maintenance occurs at least two days after the most recent rain event to allow debris and sediments to dry out. Maintaining the system while flows are still entering it will increase the time and complexity required for maintenance.

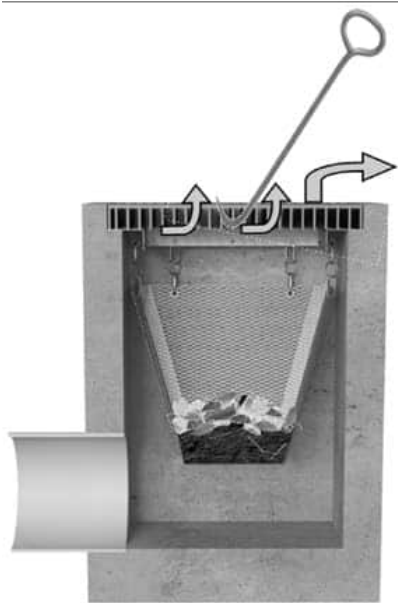
Cleaning of the Grate Inlet Filter can be performed from finish surface without entry into catch basin utilizing a vacuum truck. Some unique and custom configurations may create conditions which would require entry for some or all of the maintenance procedures. All necessary pre-maintenance steps must be carried out before maintenance begins, such as safety measures to protect the maintainer and nearby pedestrians from any dangers associated with an open access hatch or manhole. Once the manhole has been safely removed, the maintenance process can proceed:

- Inspect the Grate Inlet Filter as detailed under Inspection Steps above (page 3 of this O&M Manual).
- Using an extension on a vacuum truck, position the hose over the opened catch basin. Insert the vacuum hose down into the filter basket and suck out trash, foliage, and sediment. Pressure wash the sides and bottom of the filter basket to remove any stuck debris.
- Remove the optional hydrocarbon boom that is attached to the inside of the filter basket (if present). The hydrocarbon boom is fastened to vertical rails on two opposite sides of the basket. Assess the color and condition of the boom using the diagram below. If replacement is required, install and fasten on a new hydrocarbon boom. Booms can be ordered directly from the manufacturer.
- Below is a replacement indication color chart for the hydrocarbon booms.

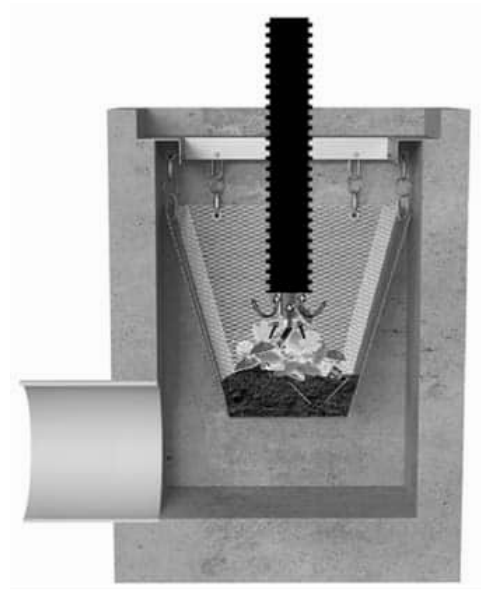


- When maintenance is complete, replace the grate and remove all traffic control.
- All removed debris and pollutants shall be disposed of following local and state requirements.
- Disposal requirements for recovered pollutants may vary depending on local guidelines. In most areas the sediment, once dewatered, can be disposed of in a sanitary landfill. It is not anticipated that the sediment would be classified as hazardous waste.
- In the case of damaged components, replacement parts can be ordered from the manufacturer. Hydrocarbon booms can also be ordered directly from the manufacturer as previously noted.

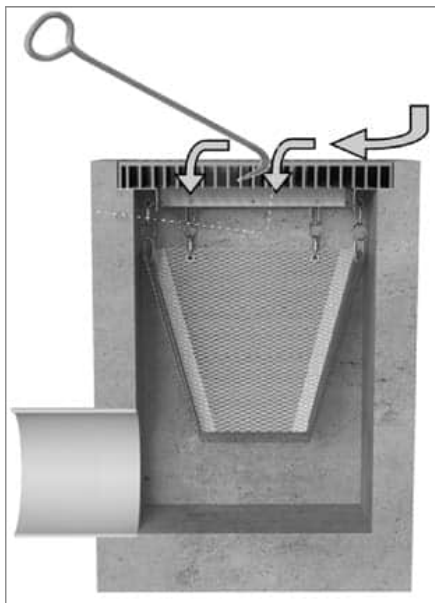
Maintenance Sequence



1. Remove grate and set up vacuum truck to clean the filter basket.



2. Insert the vacuum hose down into the filter basket and suck out debris. Pressure wash the sides and bottom of the filter basket to remove any stuck debris.



3. Replace the grate and remove all traffic control. All removed debris and pollutants shall be disposed of following local and state requirements.



Inspection and Maintenance Report Catch Basin Only

Project Name _____

Project Address _____ (city) (Zip Code)

Owner / Management Company _____

Contact _____

Phone () -

Inspector Name _____

Date ____ / ____ / ____

Time _____ AM / PM

Type of Inspection Routine Follow Up Complaint Storm Storm Event in Last 72-hours? No Yes

Weather Condition _____

Additional Notes _____

For Office Use Only
(Reviewed By)
(Date) <small>Office personnel to complete section to the left.</small>

Site Map #	GPS Coordinates of Insert	Catch Basin Size	Evidence of Illicit Discharge?	Trash Accumulation	Foliage Accumulation	Sediment Accumulation	Signs of Structural Damage?	Functioning Properly or Maintenance Needed?
1	Lat: _____							
	Long: _____							
2	Lat: _____							
	Long: _____							
3	Lat: _____							
	Long: _____							
4	Lat: _____							
	Long: _____							
5	Lat: _____							
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6	Lat: _____							
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8	Lat: _____							
	Long: _____							
10	Lat: _____							
	Long: _____							
11	Lat: _____							
	Long: _____							
12	Lat: _____							
	Long: _____							

Comments: _____



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GLF Full Capture Operation & Maintenance Manual 06/23

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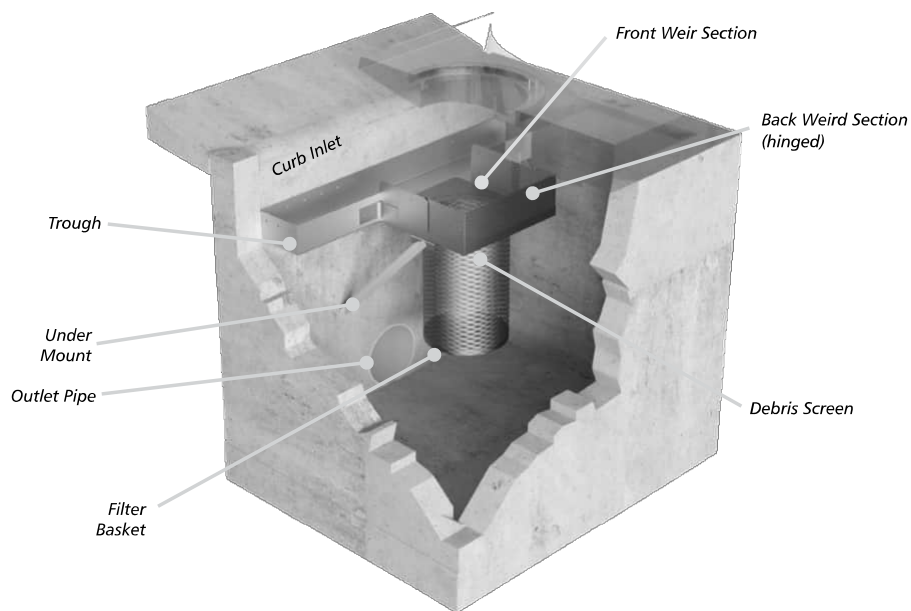
Bio Clean[®] Curb Inlet Filter
Full Capture Type
Operation & Maintenance Manual



Operation & Maintenance

Contech's Bio Clean® Full Capture Curb Inlet Filter is a stormwater catch basin filter designed to remove trash, debris, sediments, particulates, and hydrocarbons (with hydrocarbon boom add-on). The innovative trough and weir system is mounted along the curb face and directs incoming stormwater toward the filter basket, which is positioned directly under the manhole access opening regardless of its location in the catch basin. This simple yet profound design allows the filter to be cleaned from the finished surface without access into the catch basin, significantly reducing maintenance time and eliminating confined space entry. The filter lifting handle allows for the filter to be removed easily through the manhole. The weir also folds up to allow unimpeded access into the basin for routine maintenance or pipe jetting.

As with all stormwater BMPs, inspection and maintenance on the Curb Inlet Filter is necessary. Stormwater regulations require BMPs be inspected and maintained to ensure they are operating as designed to allow for effective pollutant removal and provide protection to receiving water bodies. It is recommended that inspections be performed multiple times during the first year to assess site-specific loading conditions. This is recommended because pollutant loading can vary greatly from site to site. Variables such as nearby soil erosion or construction sites, winter sanding of roads, amount of daily traffic, and land use can increase pollutant loading on the system. The first year of inspections can be used to set inspection and maintenance intervals for subsequent years. Without appropriate maintenance, a BMP can exceed its storage capacity which can negatively affect its continued performance in removing and retaining captured pollutants.



System Diagram

Inspection Equipment

Following is a list of equipment to allow for simple and effective inspection of the Curb Inlet Filter:

- Contech Inspection Form (page 7 of this O&M Manual).
- Manhole hook or appropriate tools to remove access hatches and covers.
- Appropriate traffic control signage and procedures.
- Protective clothing and eye protection.
- Note: entering a confined space requires appropriate safety procedures, PPE, and certification. It is generally not required for routine inspections or maintenance of the system.



Inspection Steps

The core to any successful stormwater BMP maintenance program is routine inspections. The inspection steps required on the Curb Inlet Filter are quick and easy. As mentioned above the first year should be seen as the maintenance interval establishment phase. During the first year more frequent inspections should occur in order to gather loading data and maintenance requirements for that specific site. This information can be used to establish a base for long-term inspection and maintenance interval requirements.

The Curb Inlet Filter can be inspected though visual observation without entry into the catch basin. All necessary pre-inspection steps must be carried out before inspection occurs, such as safety measures to protect the inspector and nearby pedestrians from any dangers associated with an open access hatch or manhole. Once the manhole has been safely opened the inspection process can proceed:

- Prepare the inspection form by writing in the necessary information including project name, location, date & time, unit number and other details as noted (page 7 of this O&M Manual).
- Observe the inside of the catch basin through the manhole. If minimal light is available and vision into the unit is impaired, utilize a flashlight to see inside the catch basin.
- Look for any out of the ordinary obstructions in the catch basin, trough, weir, filter basket, basin floor, or outlet pipe. Write down any observations on the inspection form.
- Through observation and/or digital photographs estimate the amount of trash, foliage and sediment accumulated inside the filter basket. Record this information on the inspection form.
- Observe the condition and color of the hydrocarbon boom (if present). Record this information on the inspection form.
- Finalize inspection report for analysis by the maintenance manager to determine if maintenance is required.

Maintenance Indicators

Based upon observations made during inspection, maintenance of the system may be required based on the following indicators:

- Missing or damaged internal components.
- Obstructions in the filter basket and its bypass.
- Excessive accumulation of trash, foliage and sediment in the filter basket. Maintenance is required when the basket is greater than half-full.
- The following chart shows the 50% and 100% storage capacity of each filter height:

Basket Model	Filter Basket Diameter (inches)	Filter Basket Height (inches)	50% Storage Capacity (CF)	100% Storage Capacity (CF)
BC-CURB-FABRIC-24	16	24	1.77	3.53
BC-CURB-FABRIC-12	16	12	0.88	1.77

Maintenance Equipment

Following is a list of equipment to allow for simple and effective maintenance of the Grate Inlet Filter. It is recommended that a vacuum truck be utilized to minimize the time required to maintain the Curb Inlet Filter though it can easily be cleaned by hand:

- Contech Maintenance Form (page 7 of this O&M Manual).
- Manhole hook or appropriate tools to access hatches and covers.
- Appropriate safety signage and procedures.
- Protective clothing and eye protection.
- Small or large vacuum truck (with pressure washer attachment preferred).
- Note: entering a confined space requires appropriate safety and certification. It is generally not required for routine maintenance of the system.

Maintenance Procedures

It is recommended that maintenance occurs at least two days after the most recent rain event to allow debris and sediments to dry out. Maintaining the system while flows are still entering it will increase the time and complexity required for maintenance.

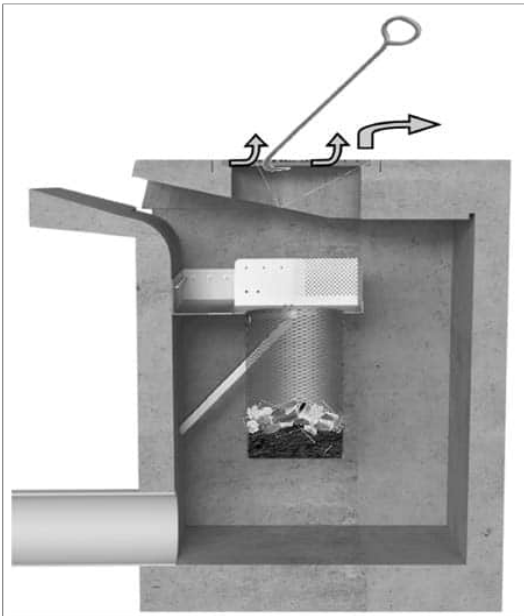
Cleaning of the Curb Inlet Filter can be performed from finish surface without entry into catch basin utilizing a vacuum truck. Some unique and custom configurations may create conditions which would require entry for some or all of the maintenance procedures. All necessary pre-maintenance steps must be carried out before maintenance begins, such as safety measures to protect the maintainer and nearby pedestrians from any dangers associated with an open access hatch or manhole. Once the manhole has been safely removed, the maintenance process can proceed, as follows:

- Inspect the Curb Inlet Filter as detailed under Inspection Steps above (page 3 of this O&M Manual).
- Using an extension on a vacuum truck, position the hose over the opened manhole or hatch opening. Insert the vacuum hose down into the filter basket and suck out trash, foliage, and sediment. Pressure wash the sides and bottom of the filter basket to remove any stuck debris. Once the filter basket is clean power wash the weir and trough, pushing the debris into the filter basket - leave the hose in the filter basket during this process so entering debris will be sucked out.
- Remove the optional hydrocarbon boom that is attached to the inside of the filter basket (if present). The hydrocarbon boom is fastened to vertical rails on two opposite sides of the basket. Assess the color and condition of the boom using the diagram below. If replacement is required, install and fasten on a new hydrocarbon boom. Booms can be ordered directly from the manufacturer.
- Below is a replacement indication color chart for the hydrocarbon booms:

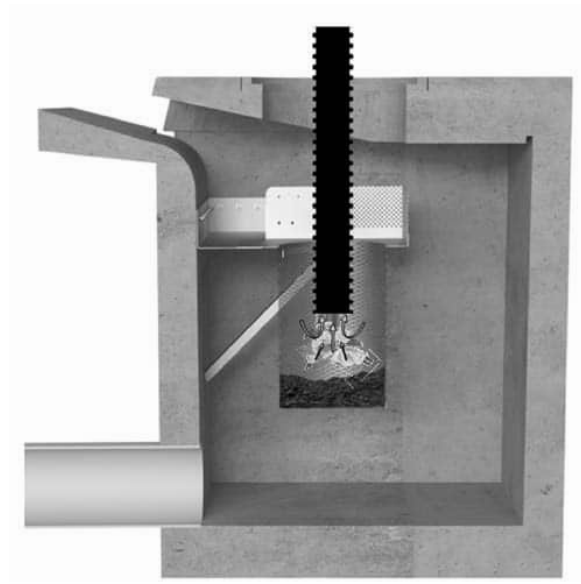


- When maintenance is complete, replace the manhole or hatch and remove all traffic control.
- All removed debris and pollutants shall be disposed of following local and state requirements.
- Disposal requirements for recovered pollutants may vary depending on local guidelines. In most areas the sediment, once dewatered, can be disposed of in a sanitary landfill. It is not anticipated that the sediment would be classified as hazardous waste.
- In the case of damaged components, replacement parts can be ordered from the manufacturer. Hydrocarbon booms can also be ordered directly from the manufacturer as previously noted.

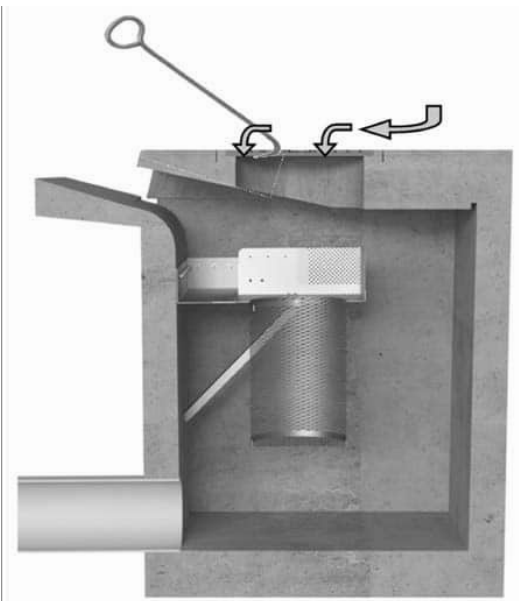
Maintenance Sequence



1. Remove manhole cover and set up vacuum truck to clean the filter basket. Ensure all traffic control and safety measures are in place.



2. Insert the vacuum hose down into the filter basket and suck out debris. Pressure wash the sides and bottom of the filter basket to remove any stuck debris. Pressure wash the weir and trough and vacuum out any remaining debris.



3. Replace the manhole or hatch and remove all traffic control. All removed debris and pollutants shall be disposed of following local and state requirements.



Inspection and Maintenance Report Catch Basin Only

Project Name _____

Project Address _____ (city) (Zip Code)

Owner / Management Company _____

Contact _____

Phone () -

Inspector Name _____

Date ___ / ___ / _____

Time _____ AM / PM

Type of Inspection Routine Follow Up Complaint Storm Storm Event in Last 72-hours? No Yes

Weather Condition _____

Additional Notes _____

For Office Use Only
(Reviewed By)
(Date) <small>Office personnel to complete section to the left.</small>

Site Map #	GPS Coordinates of Insert	Catch Basin Size	Evidence of Illicit Discharge?	Trash Accumulation	Foliage Accumulation	Sediment Accumulation	Signs of Structural Damage?	Functioning Properly or Maintenance Needed?
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12	Lat: _____							
	Long: _____							

Comments: _____



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CF Full Operation & Maintenance Manual 06/23

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APPENDIX E – Warranty

Contech Engineered Solutions LLC Stormwater Treatment System LIMITED WARRANTY

Contech Engineered Solutions LLC (Contech) warrants to the original purchaser (the "Purchaser"), but subject to the terms and conditions hereof, that the stormwater treatment system manufactured by or for Contech (the "Product") and sold to the Purchaser shall be free from defects in material and workmanship under normal use and service when properly installed, used and maintained in accordance with Contech's written instructions for a period of one (1) year from date of purchase. Purchaser shall provide Contech with written notice of any alleged breach of the foregoing warranty within fifteen (15) days of discovery of the defect, including a reasonably detailed written description of the alleged defect. Written notice of alleged defects shall be sent to Contech Engineered Solutions, 9025 Centre Point Drive, Suite 400, West Chester, OH 45069 or such other address as Contech may specify. Any components determined by Contech during the warranty period to be defective in material and workmanship will be repaired or replaced, at Contech's sole discretion, provided that by doing so Contech will not be obligated to replace an entire assembly, the entire mechanism or the complete unit. The repair or replacement of the defective Product is Purchaser's sole and exclusive warranty for any breach of this Limited Warranty. No allowance will be made for shipping charges, damages, and cost of removal, installation, labor or other charges that may occur due to product failure, repair or replacement.

This Limited Warranty does not apply to any material that has been disassembled without prior approval of Contech, that has been subjected to misuse, misapplication, neglect, alteration, accident or act of God, or that has not been installed, operated or maintained in accordance with Contech's written instructions. Contech does not authorize any representative or other person to modify, expand, extend or otherwise modify this Limited Warranty in connection with the Product. This Limited Warranty does not apply to any person or entity other than the Purchaser. This Limited Warranty is exclusive. There are no other warranties, express or implied, of merchantability or fitness for a particular purpose and none shall be created whether under the Uniform Commercial Code, custom or usage in the industry or the course of dealing between the parties. Contech will repair or replace any Products that breach the foregoing Limited Warranty during the warranty period as the sole and exclusive remedy for breach of such warranty.

Subject to the foregoing, all conditions, warranties, terms, undertakings or liabilities (including liability as to negligence), expressed or implied, and howsoever arising, as to the condition, suitability, fitness, safety, or title to the Product are hereby negated and excluded and Contech gives and makes no such representation, warranty, or undertaking except as expressly set forth herein. Under no circumstances shall Contech be liable to the Purchaser or to any third party for product liability claims; claims arising from the design, shipment, or installation of the Product, or the cost of other goods or services related to the purchase and installation of the Product. For this Limited Warranty to apply, the Product must be installed in accordance with all site conditions required by state and local codes; all other applicable laws; and Contech's written installation instructions.

CONTECH EXPRESSLY DISCLAIMS LIABILITY FOR SPECIAL, CONSEQUENTIAL OR INCIDENTAL DAMAGES (EVEN IF IT HAS BEEN ADVISED OF THE POSSIBILITY OF THE SAME) OR BREACH OF EXPRESSED OR IMPLIED WARRANTY. CONTECH SHALL NOT BE LIABLE FOR PENALTIES OR LIQUIDATED DAMAGES, INCLUDING LOSS OF PRODUCTION AND PROFITS; LABOR AND MATERIALS; OVERHEAD COSTS; OR OTHER LOSS OR EXPENSE INCURRED BY THE PURCHASER OR ANY THIRD PARTY. SPECIFICALLY EXCLUDED FROM LIMITED WARRANTY COVERAGE ARE DAMAGE TO THE PRODUCT ARISING FROM ORDINARY WEAR AND TEAR; ALTERATION, ACCIDENT, MISUSE, ABUSE OR NEGLIGENCE; FAILURE OF THE PRODUCT DUE TO IMPROPER SITTING OR IMPROPER SIZING; OR ANY OTHER EVENT NOT CAUSED BY CONTECH. THIS LIMITED WARRANTY REPRESENTS CONTECH'S SOLE LIABILITY TO THE PURCHASER FOR CLAIMS RELATED TO THE PRODUCTS, WHETHER THE CLAIM IS BASED UPON CONTRACT, TORT, OR OTHER LEGAL THEORY.

APPENDIX F – Field/Lab Testing Data

CUSTOMER:	Bio Clean Environmental Services & Modular Wetlands 398 Via El Centro Oceanside California 92058
Report Date:	October 06, 2017
Date(s) Analysis Performed:	September 28 - 29

Good Harbour Laboratories was asked to determine the head loss that occurs as water passes through a section of expanded metal grating that was supplied by Bio Clean Environmental Services. The screen had a diamond pattern that could be oriented either horizontally or vertically, as well as one side that had raised edges.

The section of screen (Figure 1) was mounted in a wooden frame that exposed a screen face 16-5/8 inches wide and 16-1/2 inches high when the diamonds were in the vertical position. The frame was mounted in a trough and water was passed through the screen. The difference in water height before and after the screen was used to determine head loss.



Figure 1: Expanded Metal Screen

TEST RESULTS:

Test 1: Diamond opening placed vertically; raised face on inlet side (against flow).

Flow rate (gpm)	Water Height ¹		Head Loss, ΔH	
	Inlet (cm)	Outlet (cm)	cm	inch
50	5.4	1.9	3.5	1.4
100	8.2	2.7	5.5	2.2
200	12.7	3.5	9.2	3.6
300	16.0	4.4	11.6	4.6
400	19.3	5.2	14.1	5.6

Test 2: Diamond opening placed vertically; raised face on outlet side (with flow).

Flow rate (gpm)	Water Height ¹		Head Loss, ΔH	
	Inlet (cm)	Outlet (cm)	cm	inch
50	5.2	1.8	3.4	1.3
100	7.7	2.6	5.1	2.0
200	12.7	3.6	9.1	3.6
300	15.8	4.5	11.3	4.4
400	19.5	5.3	14.2	5.6

Test 3: Diamond opening placed horizontally; raised face on outlet side (with flow).

Flow rate (gpm)	Water Height ¹		Head Loss, ΔH	
	Inlet (cm)	Outlet (cm)	cm	inch
50	5.2	1.6	3.6	1.4
100	7.2	2.5	4.7	1.9
200	11.4	3.9	7.5	3.0
300	14.7	4.3	10.4	4.1
400	18.5	5.0	13.5	5.3

¹ Water height has been corrected for the thickness of the wood frame.

The above tests were repeated however for the second set of tests, the effluent side of the screen was allowed to free-fall into a receiving tank. The water height on the inlet side of the grating was recorded:

Test 4: Diamond opening placed vertically; raised face on inlet side (against flow).

Flow rate (gpm)	Inlet Water Height ¹	
	cm	inch
50	5.3	2.1
100	7.7	3.0
200	12.0	4.7
300	15.5	6.1
400	19.0	7.5

Test 5: Diamond opening placed vertically; raised face on outlet side (with flow).

Flow rate (gpm)	Inlet Water Height ¹	
	cm	inch
50	5.1	2.0
100	7.3	2.9
200	10.9	4.3
300	15.2	6.0
400	18.6	7.3

Test 6: Diamond opening placed horizontally; raised face on outlet side (with flow).

Flow rate (gpm)	Inlet Water Height ¹	
	cm	inch
50	4.9	1.9
100	7.4	2.9
200	11.0	4.3
300	14.4	5.7
400	17.3	6.8

Results Summary:

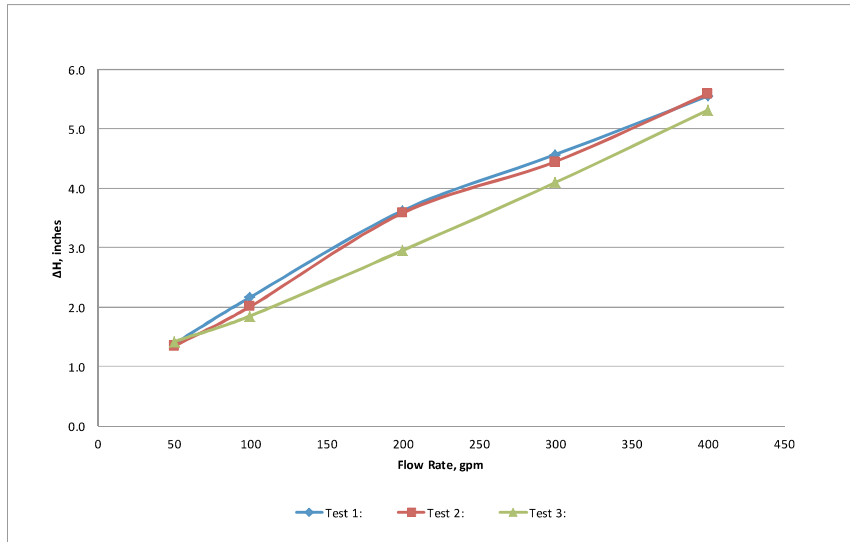


Figure 1: Head loss across expanded metal grating

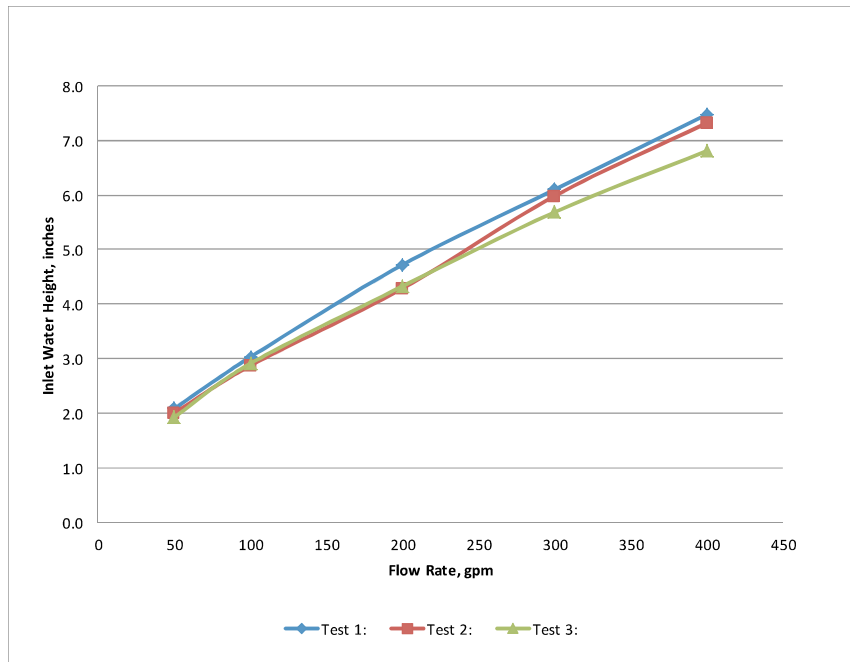


Figure 2: Inlet water height with effluent free-fall



Test Report

2596 Dunwin Drive
Mississauga ON L5L 1J5
Phone: 905.696.7276
Fax: 905.696.7279

Released By:

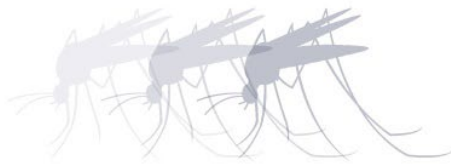
Joe Costa
Name


Signature

Oct. 06, 2017
Date

Senior Scientist
Title

APPENDIX G – MVCAC Verification Letter



MVCAC
Mosquito and Vector Control Association of California

One Capitol Mall, Suite 320 • Sacramento, CA 95814 • p: (916) 440-0826 • f: (916) 444-7462 • e: mvcac@mvcac.org

Bio Clean
398 Via El Centro
Oceanside, CA 92058

April 25, 2024

Dear Mr. Hasan,

Thank you for the submission of the Bio Clean Grate Inlet and Curb Inlet full trash capture devices for review by the Mosquito and Vector Control Association of California pursuant to the SWRCB Trash Treatment Control Device Application Requirements. The Association has reviewed the conceptual drawings for the Grate Inlet and Curb Inlet devices and verifies that provisions have been included in the design that allow for full visual access to all areas for presence of standing water, and when necessary, allows for treatments of mosquitoes.

While this verification letter confirms that inspection and treatment for the purpose of minimizing mosquito production should be possible with the Bio Clean Grate Inlet and Curb Inlet full trash capture devices as presented, it does not affect the local mosquito control agency's rights and remedies under the State Mosquito Abatement and Vector Control District Law. For example, if the installed device or the associated stormwater system infrastructure becomes a mosquito breeding source, it may be determined by a local mosquito control agency to be a public nuisance in accordance with California Health and Safety Code sections 2060-2067.

"Public nuisance" means any of the following:

1. Any property, excluding water, that has been artificially altered from its natural condition so that it now supports the development, attraction, or harborage of vectors. The presence of vectors in their developmental stages on a property is prima facie evidence that the property is a public nuisance.
2. Any water that is a breeding place for vectors. The presence of vectors in their developmental stages in the water is prima facie evidence that the water is a public nuisance.
3. Any activity that supports the development, attraction, or harborage of vectors, or that facilitates the introduction or spread of vectors. (Heal. & Saf. Code § 2002 (j).)

Declaration of a facility or property as a public nuisance may result in penalties as provided under the Health and Safety Code. Municipalities and the vendors they work with are encouraged to discuss the design, installation, and maintenance of stormwater trash capture devices with their local mosquito control agency to reduce the potential for disease transmission and public nuisance associated with mosquito production.

Sincerely,

Megan MacNee
MVCAC Executive Director

APPENDIX H – Sample Hydraulic Calculations

Bio Clean Grate and Curb Insert Filter – Full Capture Type Example Calculations

Equations used for flow calculations and referenced on following example calculation pages.

$Q_F = (C_d A_f \sqrt{2gh}) / SF$

Filtered Flow Capacity =

where	$C_d =$	Coefficient of discharge (non-blocking screen) =	0.66	unitless
	$C_d =$	Coefficient of discharge (non-blocking screen) =	0.62	unitless
	$A_f =$	screen open area, $ft^2 = A_s$ (Open Area)		
	$g =$	gravitational acceleration =	32.174	ft/s^2
	$h =$	filter driving head, ft		
	$SF =$	Safety Factor (Vertical Screen) =	2	unitless
	$SF =$	Safety Factor (Horizontal Screen) =	3	unitless

$Q_B = (C_d A_b \sqrt{2gH}) / SF$

Bypass Flow Capacity =

where	$C_d =$	Coefficient of discharge =	0.62	unitless
	$A_b =$	bypass area, ft^2		
	$g =$	gravitational acceleration =	32.174	ft/s^2
	$h =$	bypass driving head, ft		
	$SF =$	Safety Factor =	2	unitless

$Q_i = C_w (L + 1.8W_o) d^{1.5}$

Interception Capacity =

where	$C_w =$	Weir coefficient =	2.3	$ft^{0.5}/ft/s$
	$L =$	Length of opening, ft		
	$W_o =$	depression width, ft		ft
	$d =$	head at inlet opening, ft		

Example Calculation – BIO-GRATE-FULL-24-24-24

Filtered Flow Capacity - $Q_F = (Cd1A_{f1}\sqrt{2gh1})/SF + (Cd2A_{f2}\sqrt{2gh2})/SF = 13.65$ CFS

Filtered Flow Capacity greater than throat capacity – Filtered Flow revised to Throat capacity = **7.67 CFS**

where	C_{d1} =	Coefficient of discharge (non-blocking screen) =	0.66	unitless
	C_{d2} =	Coefficient of discharge (non-blocking screen) =	0.62	unitless
	A_{r1} =	Cylinder screen open area, ft ² = A_s (Open Area)	4.07	sq-ft
	A_{r2} =	Bottom screen open area, ft ² = A_s (Open Area)	1.26	sq-ft
	g =	gravitational acceleration =	32.174	ft/s ²
	h_1 =	filter driving head, ft	1	ft
	h_2 =	filter driving head, ft	2	ft
	SF =	Safety Factor (Vertical Screen) =	2	unitless
	SF =	Safety Factor (Horizontal Screen) =	3	unitless

Bypass Flow Capacity - $Q_B = (CdA_b\sqrt{2gH})/SF = 4.83$ CFS;

Bypass Flow Capacity less than throat capacity – Bypass flow capacity confirmed.

where	C_d =	Coefficient of discharge	0.62	unitless
	A_b =	bypass area, ft ²	1.83	sq-ft
	g =	gravitational acc. =	32.174	ft/s ²
	h =	bypass driving head, ft	0.63	ft
	SF =	Safety Factor =	2	unitless

Example Calculation – BIO-CURB-FULL-24

Filtered Flow Capacity - $Q_F = (Cd_1A_{f1}\sqrt{2gh_1})/SF + (Cd_2A_{f2}\sqrt{2gh_2})/SF + (Cd_3A_{f3}\sqrt{2gh_3})/SF = 11.23 \text{ CFS}$

Filtered Flow Capacity greater than Interception capacity – Filtered Flow revised to interception capacity = 2.85 CFS

where	C_{d1} =	Coefficient of discharge (non-blocking screen) =	0.66	unitless
	C_{d2} =	Coefficient of discharge (non-blocking screen) =	0.62	unitless
	A_{r1} =	Cylinder screen open area, $\text{ft}^2 = A_s$ (Open Area)	3.49	sq-ft
	A_{r2} =	Bottom screen open area, $\text{ft}^2 = A_s$ (Open Area)	0.90	sq-ft
	A_{r3} =	Perforated Ext. open area, $\text{ft}^2 = A_s$ (Open Area)	0.49	sq-ft
	g =	gravitational acceleration =	32.174	ft/s^2
	h_1 =	filter driving head, ft	1	ft
	h_2 =	filter driving head, ft	2	ft
	h_3 =	filter driving head, ft	1	ft
	SF =	Safety Factor (Vertical Screen) =	2	unitless
	SF =	Safety Factor (Horizontal Screen) =	3	unitless

Interception Capacity Check - $Q_i = C_w(L + 1.8W_o)d^{1.5} = 2.85 \text{ CFS}$

where	C_w =	Weir coefficient =	2.3	$\text{ft}^{0.5}\text{ft}/\text{s}$
	L =	Length of opening, ft	2	ft
	W_o =	depression width, ft	0.83	ft
	d =	head at inlet opening, ft	0.5	ft

1. Other standard and custom model sizes available - contact Bio Clean for more information.
2. Cylinder screen based on 37% Open Area.
3. Bottom screen based on 51% Open Area.
4. Considers a SF of 2.0 for side discharge and a SF of 3.0 for bottom discharge.
5. Storage capacity based on the basket half full.
6. In some cases the filtered flow capacity has been reduced to the maximum possible inflow to the filter.