



ADS - FLEXSTORM
24137 111th Street
Naperville, IL 60564



March 17, 2021

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

**Re: Trash Treatment Control Device Application for
ADS PURE FTC Full Trash Capture Inserts**

Dear Mr. Cosentini,

Thank you for the opportunity to submit our application for the ADS PURE FTC Full Trash Capture Inserts with Vector Control enhancements. Information is presented and organized in accordance with the Trash Treatment Control Device Application Requirements. Per the application guidelines the following document is broken into 8 sections and an appendix:

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

Thank you for reviewing this application, if any additional information is required please contact us as needed.

Jamie Ringenbach, General Manger
Advanced Drainage Systems, Inc
FLEXSTORM division



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1. COVER LETTER

1.A. General description of the device.

The ADS PURE FTC Full Trash Capture Insert, also referred to as the PURE FTC Insert, is an engineered, custom manufactured catch basin inlet filter manufactured by the FLEXSTORM division of Advanced Drainage Systems (ADS). It is placed directly under a catch basin drainage grate or suspended below a catch basin curb opening in order to collect trash and debris from surface storm water runoff.

1.B. The applicant's contact information and location.

Southern CA authorized ADS representative:
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ADS Allied Product Manager
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Irvine, CA 92612
Ph. 949-304-3087

Northern CA authorized ADS representative:
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ADS Allied Product Manager
762 Powers Ave.
Clovis, CA 93619
Ph. 559-577-7545

ADS contact at the manufacturing facility:
Jamie Ringenbach (james.ringenbach@ads-pipe.com)
General Manager, ADS FLEXSTORM
24137 111th Street, unit A
Naperville, IL, 60564
Ph. 630-355-3288

ADS executive contact at corporate headquarters:
Brian King (brian.king@ads-pipe.com)
ADS EVP, Product Management & Marketing
4640 Trueman Blvd
Hilliard, OH 43026
Ph: 800 821-6710

1.C. The owner or manufacturer's website where the device can be found on the internet.

<https://www.inletfilters.com/products/full-trash-capture-ftc>

1.D. The device's manufacturing location.

All ADS PURE FTC Inserts are designed and manufactured at the ADS FLEXSTORM facility in Naperville, IL. They may be stocked locally at 5 ADS locations in CA and at any

number of over 5,000 distributors nationwide.

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1.E. A brief summary of any field/lab testing results that demonstrate Device's functions as described within the application.

Appendix A reviews the pilot study performed by Orange County, FL where PURE FTC Inserts were monitored for a period of two years showing near 100% removal of small and large particles.

1.F. A brief summary of Device limitations, operational sizing, and maintenance considerations.

The ADS PURE FTC Inserts are designed for both below the grate installations and in wall mount applications suspended under an open throat curb opening. Units are designed to fit the CA market for all standard catch basin concrete openings and grate sizes with adjustable side flanges to take up gaps potentially larger than 5 mm. The ADS PURE FTC Insert uses 5mm 14GA perforated stainless steel as its filtration medium. Certain device limitations exist when presented with extremely shallow catch basins making installation difficult and reducing the storage capacity of the units.

Rear bolt on deflectors are used for combination inlets to prevent trash from bypassing the filter resting below the grate. ADS also builds for custom sizes or unique situations with completed field dimensional forms. For curb inlets, the ADS PURE FTC Insert is dropped through the 20" dia. manhole opening, 2 mounting brackets are secured to the catch basin wall beneath the curb opening, and the unit is lifted onto the brackets with quick release features. Installation under grates usually take 2-5 minutes, while wall mount applications will take approximately 10 minutes per 4' length. Maintenance is typically performed using an industrial vacuum with 3" hose or vactor truck when the units are half full. Alternatively, the units may be completely lifted from the drainage structure and dumped into a receptacle, rinsed, and replaced. Recommended maintenance is performed every 4 months depending on location, loading, and storage capacity. Maintenance should occur prior to the device losing its design hydraulic capacity. This is related to the trash generation within the drainage area.

1.G. Description or list of locations, if any, where Device has been installed.


ADS has sold the PURE FTC Inserts into various markets including PA, CA, and FL with excellent results. The PURE FTC Inserts are being specified in CA where CPS installations are not possible- most recently in Contra Costa, Newark, and Camarillo. A large number of inserts may be found in areas of Lancaster, PA with extreme amounts of trash entering their 2 x 4 catch basins. ADS also has PURE FTC installations in Orange County, FL where they have been actively monitoring performance and have approved ADS PURE FTC Inserts for use in their storm water insert program. A write-up of this Orange County, FL pilot program can be found in Appendix A.

FLEXSTORM has provided PURE Inlet Filters targeting various levels of particle size and pollutant removal since 2004 with well over 150,000 installations throughout the country. When ADS acquired FLEXSTORM in 2012, efforts to develop trash capture devices for the CA market began. The 5 mm 14GA perforated stainless steel became a stock item used for connector pipe screens CPS, an approved FTC device. ADS naturally transitioned this perforated steel into drop inserts replacing the traditional filter bags on the PURE framing

where larger trash, not sediment, was targeted. The field results have been successful in capturing cigarette butts, leaves and trash without resuspension given the baskets high storage capacity. The larger FTC screen openings allow ample flow through and will not blind from sand and sediment loading off streets and parking lots.

1.H. Certification Clause.

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.

A handwritten signature in black ink, appearing to read "Jamie Ringenbach", written over a horizontal line.

Jamie Ringenbach, General Manger
Advanced Drainage Systems, Inc
FLEXSTORM division

2. Table of Contents

	<u>Page #</u>
Introduction	1
1. Cover Letter	
Section 1.A	2
Section 1.B	2
Section 1.C	2
Section 1.D	2
Section 1.E	3
Section 1.F	3
Section 1.G	3
Section 1.H	4
2. Table of Contents	5
3. Physical Description	
Section 3.A	7
Section 3.B	7
Section 3.C	7
Section 3.D	7
Section 3.E	8
Section 3.F	8
Section 3.G	8
Section 3.H	9
Section 3.I	9
Section 3.J	9
Section 3.K	9
Section 3.L	9
4. Installation Information	
Section 4.A	10
Section 4.B	10
Section 4.C	10
5. Operation and Maintenance Information	
Section 5.A	11
Section 5.B	11
Section 5.C	11
Section 5.D	11
Section 5.E	11
Section 5.F	11
6. Device maintenance and vector control accessibility	
Section 6.A	12
Section 6.B	12
Section 6.C	12
7. Reliability Information	
Section 7.A	12
Section 7.B	12
Section 7.C	12

8. Field/Lab Testing Information and Analysis

Section 8.A	13
Section 8.B	13

Appendices

Appendix A.	Report from Orange County, FL pilot program
Appendix B.	Specification and Design Drawings
Appendix C.	Hydraulic calculations of Perforated Stainless-Steel Baskets
Appendix D.	Photo Gallery
Appendix E.	Hydraulic calculations of Ultimate Bypass Region
Appendix F.	Vector Control Accessibility - VC Framing

3. Physical Description

3.A. Trash Capture

The ADS PURE FTC Insert ensures that all particles greater than or equal to 5 mm are captured by constructing the filtering body of the FTC Inset from uniformly punched stainless steel with 4.8 mm openings. This ensures that no particles larger than 4.8 mm can pass by the filter.

3.B. Peak Flows/ Trash Volumes

ADS PURE FTC Inserts are built to fit varying grate or curb inlet sizes. The size and volume of the basket are adjusted accordingly for the dimensions of the inlet having larger baskets in the larger inlets. An Engineer may specify higher flow requirements to a specific catch basin in which case ADS will increase the overall capacity of the basket and/or expand the bypass area.

3.C. Hydraulic Capacity

Refer to Tables 1 & 2 for hydraulic capacity of standard ADS PURE FTC Inserts; hydraulic calculations for 36 x 18 ADS PURE FTC Insert are found in Appendix E.

3.D. Comparison Table

Table 1: Part #s, Basin IDs, and performance specifications for standard ADS PURE FTC Full Trash Capture Inserts

Table 1: Product Selection and Performance Specifications of ADS FTC Inserts						
ADS PURE FTC						
ADS FTC P/N with VECTOR CONTROL	Basin Size (in)	FTC Basket Depth (in)	Storage Capacity (cubic ft)	Flow Ratings Through FTC Basket When Empty	Flow Ratings Through FTC Basket when 50% Full	Bypass Flow Rate (CFS)* When FTC Basket is 100% Full
6HD12FTC-VC	12 X 12	12	0.7	6.8	3.0	2.4
6HD18FTC-VC	18 X 18	12	1.7	12.2	4.5	3.7
6HD24FTC-VC	24 X 24	12	3.1	18.6	6.3	4.4
6HD3618FTC-VC	36 X 18	12	3.5	20.8	7.3	5.6
6HD3624FTC-VC	36 X 24	12	5	25.1	8.3	6.5
6HD36FTC-VC	36 X36	12	7.1	41.6	14.6	9.6

* Calculated with 4" water depth above 2" grate. This bypass flow is activated with a completely full basket and is not included in the total Flow Rating through the FTC basket.

Table 2: Part #s, Curb Opening Widths, and performance specifications for selected ADS PURE FTC Inserts for Open Throat Curb Inlets (Wall Mounted)

FLEXSTORM PURE FRAME ref:	Curb Opening Width (in)	Basket Depth (in)	Storage Volume (ft ³)	Flow Ratings when empty	Flow Ratings when 50% full
62HDWM36	36	12	2.7	17.8	6.7
62HDWM42	42	12	3.1	20.3	7.6
26HDWM48	48	12	3.6	22.8	8.5
62HDWM60	60	12	4.5	27.9	10.3
62HDWM72	72	12	5.4	33	12.1
62HDWM84	84	12	6.3	37.6	13.7
62HDWM96	96	12	7.2	42.7	15.5
62HDWM120	120	12	8.9	52.4	18.9

3.E. Design drawings for all standard Device sizes including dimensions, and alternative configurations.

Refer to APPENDIX B for all design drawings. ADS has established a catalog of common sized inserts based on the standard drainage structures found throughout California and the United States. The Installer (Contractor) shall inspect the plans and/or worksite to determine the quantity of each drainage structure casting type. The catch basin design, casting number, or the exact grate and clear opening size will provide the information necessary to identify the required ADS PURE FTC Insert part number. Inserts are supplied to the field pre-configured to fit the specified drainage structure.

3.F. Alternative Configurations

ADS PURE Inserts may be supplied with alternative filter bag options however these geotextile or mesh net bags are not included in this submittal for approval as a Full Capture device retaining particles 5 mm or larger. These filter bags typically target smaller particles and hydrocarbons. These alternative configurations may be submitted for consideration under separate applications once laboratory results are conclusive and acceptable to the Water Board.

3.G. If the Device is designed with an internal bypass, explain how the bypass only operates for volumes greater than the design storm.

The bypass region of the ADS PURE FTC Insert is located above the perforated filter media. It only becomes active should the basket become completely filled with storm water, trash, and debris. In these cases, the water spills over the side of the perforated baskets and is deemed to have entered bypass mode. Hydraulic calculations for the bypass region of the ADS PURE FTC Inserts can be found in Appendix E.

The engineer is responsible for confirming the ultimate bypass capacity of the insert exceeds the design flow to the catch basin for a chosen rain event. As mentioned in section 3.B. the bypass area may be expanded to meet the engineers design requirements for a specific catch basin if necessary.

3.H. Conditions under which the device re-introduces previously trapped trash.

The trash retention screen and storage basket will not reintroduce previously trapped trash unless there is a backflow in the storm conveyance system. If water is entering the filter normally through the drainage grate the previously trapped trash will continually compact into the ADS PURE FTC Insert.

3.I. Calibration Feature

For ADS PURE FTC Inserts, side flanges may be adjusted to account for irregularities in the concrete catch basin walls or other obstructions. If there are gaps along the length of the concrete opening greater than 5 mm, loosen the adjustable flange bolt and slide the flange flush with the concrete wall.



3.J. Photographs, if any, of pre-and post-installation examples

See Appendix D (Photos 1-5)

3.K. Each material and material grade used to construct the Device.

The ADS PURE frame is constructed from 304 stainless steel of varying gauge thicknesses. The framing includes lifting handles to facilitate installation and removal of the basket into and out of the drainage structure. The top support flanges are 13GA 304 stainless steel and the long span adjustable side flanges are 14GA or 16GA 304 stainless steel. These side flanges are used to funnel all flow into the basket with the ultimate bypass beneath them. The ultimate bypass in the frame is designed to exceed that of the design flow into the drainage structure. The remaining framing is comprised of 11GA 304 stainless steel corner brackets and 12GA 304 stainless steel U-channels.

The active FTC filtering component is 14GA perforated stainless steel. The steel basket is uniformly punched with 3/16" dia. holes (4.8 mm) in such a pattern that the basket has 50% open area and retains any particles 5 mm or larger. The center main body panel is a one-piece formation stretching across of the longest span making up the front, bottom, and rear of the basket. This *single* formation provides exceptional strength and stability of the basket. The two side panels are then secured to the main body panel with either spot welds or 316 stainless rivets. The basket is secured to the U-channel framing system with 5/16" diameter 316 stainless steel bolts then spot welded for additional strength.

3.L. Estimated design life of the Device.

The ADS PURE FTC Inserts have a 25-year minimum design life when used in storm water applications exposed to moderate levels of salt and other naturally occurring roadway contaminants. The fabrication or

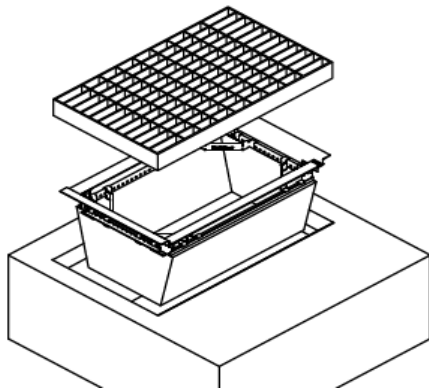
bending may stress or expose certain surfaces slightly but not significantly reduce the design life of the stainless steel. The loading for each sized insert is considered and the support materials have been tested with considerable safety factor based on 125 lbs. per cubic ft. storage capacity.

4. Installation

4.A. Device installation procedures and considerations.

Installation into Standard Grated Drainage Structures:

Remove the grate from the casting or concrete drainage structure using a grate removal tool. Clean the ledge (lip) of the casting frame or drainage structure to ensure it is free of stone and dirt. Lower the insert through the clear opening and be sure the suspension hangers rest firmly on the support ledge of the structure. Replace the grate and confirm it is elevated no more than 1/8", which is the thickness of the steel hangers. If there are gaps along the length of the concrete opening greater than 5 mm, loosen the adjustable flange bolt and slide the flange flush with the concrete wall. Replace the grate.



Installation into Curb Inlets:

For wall mount applications, the basket profile size is 12" x 12" with lengths up to 48". Lower the PURE FTC Insert into the catch basin through the manhole opening. Mark the wall mount support bracket locations on the basin wall beneath the street/curb opening. Using a hammer drill install the provided wedge anchor bolts into the concrete wall and secure the support brackets. Lift the unit and engage the support brackets allowing the basket to hang cantilevered off the wall for quick installation and removal. For multiple lengths on longer curb openings, simply use the dual support brackets securing the baskets side by side to cover the entire curb span. See Appendix C Design Drawings for more wall mount installation detail.

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

ADS PURE FTC Inserts are designed for easy installation such that there are no installation limitations or special instructions needed.

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

ADS offers standard sized configurations however there are instances where the catch basin drainage structure has been customized or varies from typical designs. This is not an issue as long as the dimensions are documented. ADS can build PURE FTC Inserts for any catch basin Configuration. Simply submit the proper field dimensional form: <http://inletfilters.com/field-dimensional-order-forms>

5. Operation and Maintenance Information

5.A. Device inspection procedures and inspection frequency considerations.

Upon inspection, the ADS PURE FTC Insert should be emptied if the basket is more than half filled with trash and debris, or as directed by the engineer, city, or municipal contract. Remove the grate and use a vacuum truck or industrial vacuum to remove the trash and debris that has collected in the filter. Alternatively, the basket may be lifted out of the drainage structure and trash emptied into a receptacle to be hauled away. Remove any caked-on trash and debris from the steel basket to ensure proper flow. When the basket is cleaned the grate should be replaced onto the basin and maintenance logged.

5.B. Maintenance frequency considerations related to the device's hydraulic capacity at various levels of trash capture volumes.

As with all storm water BMPs, inspection and maintenance must occur on a regular basis or the filtering mechanism will be overloaded and rendered useless. In such a case, the filter baskets may become completely filled with trash lowering the flow rate capacity and debris until reaching the ultimate bypass which would still allow full water flow but without filtration. Any trash entering the drainage structure may possibly escape directly into the sewer system. Examples of overflowing trash in wall mounted curb inlets that were not maintained for several years can be found in Appendix D (photo 4,5).

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

ADS PURE FTC Insert maintenance should occur prior to the device losing its design hydraulic capacity. This is related to the trash generation within the drainage area. Suggested method is using a vacuum truck to clean out the baskets. Alternatively, maintenance guidelines per the awarded contract should be followed.

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

Suggested method for maintenance is utilization of a vacuum truck combined with a power washer / high pressure hose to ensure all smaller sediment is cleared from the perforated steel openings.

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

In the event of deferred maintenance, the filter baskets may become completely filled with trash and debris lowering the flow rate capacity until reaching the ultimate bypass which would still allow full water flow but without filtration. The device framing has been load tested to over 900 lbs, which is the weight of wet sand (125 lbs / ft³) filling the largest available FTC Insert. The build-up of certain trash and debris could allow for odors to form and drift out of the catch basin.

5.F. Repair procedures for the device's structural and screening components.

If the perforated steel is damaged or dented, it will still function provided no opening exceeds 5 mm. In the event the steel framing system is damaged to the point where the support flanges do not sit flush on the catch basin frame, the contractor may attempt to straighten or flatten the damaged area. If the damage is beyond repair, it is recommended to replace the entire unit.

6.0. Device maintenance and vector control accessibility.

6.A. The date the device application was submitted for vector control accessibility via email.

ADS PURE FTC Insert's Vector Control (VC) design details were submitted to MVCAC and the Trash Treatment Control Committee concurrent with this updated application dated Feb 10, 2021.

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.

Personnel can administer vector control to the bottom of the catch basin through the 4" hinged bypass lid on the PURE "VC" framing. See Appendix F for VC details, callouts, and video link. Wall mounted units in curb inlets allow for visual inspection above the suspended filter through the curb opening. Curb inlets are typically inspected and serviced through the manhole entry.

6.C. The MVCAC Letter of Verification as an attachment to the application when it becomes available.

7.0 Reliability Information:

7.A. Estimated design life of device components before major overhaul.

The ADS PURE FTC Inserts have a 25-year minimum design life when used in storm water applications exposed to moderate levels of salt and other naturally occurring roadway contaminants. The fabrication or bending may stress or expose certain surfaces slightly but not significantly reduce the design life of the stainless steel. The loading for each sized insert is considered and the support materials have been tested with considerable safety factor based on 125 lbs. per cubic ft. storage capacity.

7.B. Warranty information.

The ADS PURE FTC 304 stainless steel framing and basket materials along with product construction are warranted for a period of 5 years from the date of installation. Replacement parts will be supplied at no charge provided the inserts were installed properly for their intended use as a full trash capture device.

7.C. Applicant's customer support.

ADS has a nationwide support team with local field representatives and product managers. The Product Managers are Stephen Denny (stephen.denny@ads-pipe.com) in southern CA and Scott Van Meter (scott.vanmeter@ads-pipe.com) in northern CA. The ADS FLEXSTORM division can address any engineering and design questions at 630 355-3288 or info@inletfilters.com.

ADS website: www.ads-pipe.com/en

ADS - FLEXSTORM website: www.inletfilters.com

8. 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.

Appendix A reviews the pilot study performed by Orange County, FL. Additional data regarding performance values for the ADS PURE FTC Inserts can be found in Appendix B and C.

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

Appendix A: Summary of Orange County Florida pilot program

A version of the ADS FTC insert in an open throat application in **Orange County, FL** installed in June 2015. These test results are used to verify the capture rate of the perforated steel screen in open throat curb inlets. Inserts located in residential areas with minimal trash but a lot of tree and sediment runoff; organic loading. Volume of inserts was 1.5 ft³. Orange County maintenance records are shown below over two years.

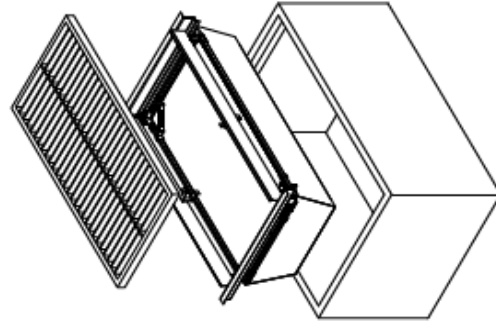
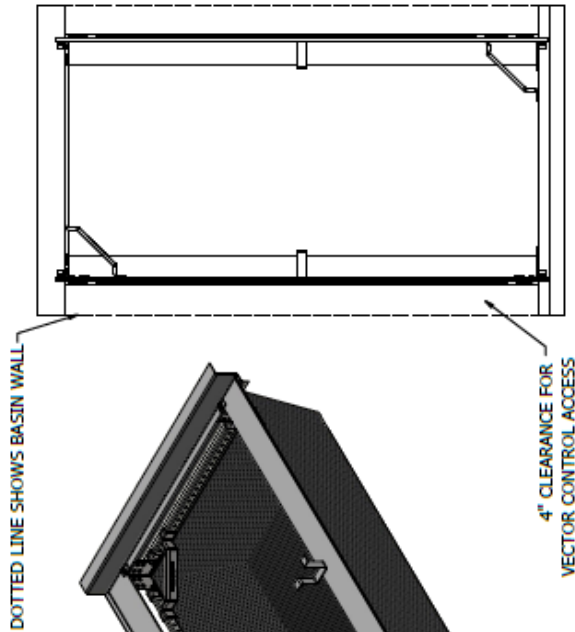
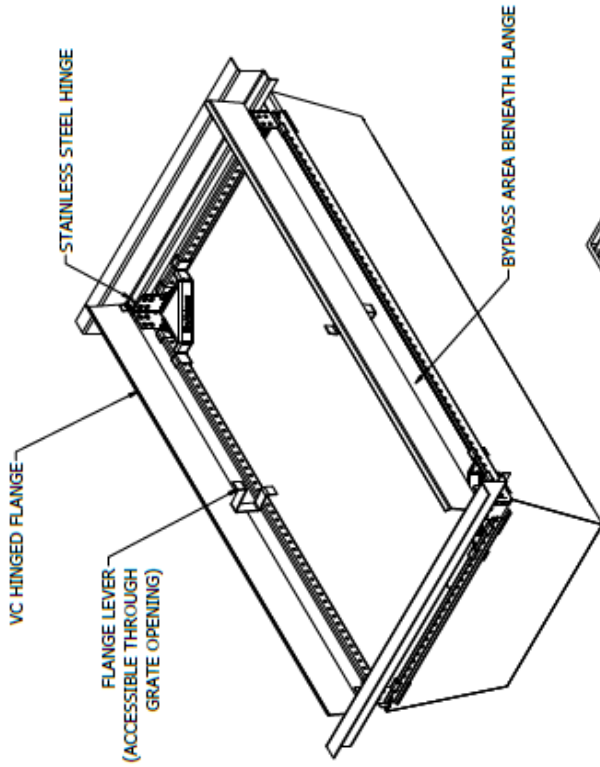


Orange County, FL Maintenance Log of ADS FTC Inserts:

Street	Basket #	Date of Maintenance	Large Particle %	Small Particle %	% Full	Debris Weight (LBS)
9220 South Bay Dr	92	11/6/2015	70%	30%	100%	57.6
9220 South Bay Dr	92	11/25/2015	70%	30%	100%	67.9
9220 South Bay Dr	92	1/11/2016	50%	50%	100%	63.9
9220 South Bay Dr	92	2/3/2016	70%	30%	100%	39.4
9220 South Bay Dr	92	2/29/2016	90%	10%	100%	39.4
9220 South Bay Dr	92	3/28/2016	70%	30%	100%	41.1
9220 South Bay Dr	92	5/25/2016	50%	50%	70%	48.6
9220 South Bay Dr	92	8/26/2016	70%	30%	60%	18.2
9220 South Bay Dr	92	9/27/2016	60%	40%	100%	28.1
9220 South Bay Dr	92	12/1/2016			70%	24.1
9220 South Bay Dr	92	1/30/2017	90%	10%	100%	42.9
9220 South Bay Dr	92	3/27/2017	100%	0%	100%	33.3
9220 South Bay Dr	92	4/27/2017	70%	30%	100%	25.3
9220 South Bay Dr	92	6/5/2017	50%	30%	100%	43.4
9220 South Bay Dr	92	6/30/2017	30%	70%	100%	33.9
9220 South Bay Dr	92	7/26/2017	0%	100%	100%	53.6
9220 South Bay Dr	92	9/27/2017	80%	20%	90%	43.4
9361 Cypress Cove Dr	91	11/6/2015	50%	50%	100%	95.4
9361 Cypress Cove Dr	91	11/25/2015	50%	50%	100%	73.1
9361 Cypress Cove Dr	91	1/11/2016	40%	10%	100%	54.1
9361 Cypress Cove Dr	91	2/3/2016	50%	50%	100%	24
9361 Cypress Cove Dr	91	2/29/2016	100%	0%	100%	46.9
9361 Cypress Cove Dr	91	3/28/2016	100%	0%	100%	32.7
9361 Cypress Cove Dr	91	5/25/2016	70%	30%	50%	34.9
9361 Cypress Cove Dr	91	8/26/2016	80%	20%	50%	16.4
9361 Cypress Cove Dr	91	9/27/2016	50%	50%	100%	37.4
9361 Cypress Cove Dr	91	12/1/2016			100%	41.6
9361 Cypress Cove Dr	91	1/30/2017	90%	10%	100%	45.6
9361 Cypress Cove Dr	91	3/27/2017	100%	0%	100%	22.9
9361 Cypress Cove Dr	91	4/27/2017	90%	10%	100%	13.6
9361 Cypress Cove Dr	91	6/5/2017	70%	30%	100%	27.6
9361 Cypress Cove Dr	91	6/30/2017	0%	100%	100%	41.5
9361 Cypress Cove Dr	91	7/26/2017	30%	70%	100%	37.5
9361 Cypress Cove Dr	91	9/27/2017	70%	30%	100%	65.5

Analysis: Average weight of debris for each service period was 41 lbs. with 65% large particles > 1" dia. The relatively small storage capacity of 1.5 ft³ required more frequent maintenance intervals. Average weight of debris is 27 lbs./ft³. Our design criteria are based on 125 lbs./ft³ resulting in a loading design safety factor of 4.6.

ADS PURE FTC FULL CAPTURE INSERTS WITH VECTOR CONTROL (VC) ACCESS



FTC FULL TRASH CAPTURE BASKET: 14GA PERFORATED STAINLESS STEEL WITH 5MM OPENINGS
SUPPORT FRAMING: 12GA 304 STAINLESS STEEL

Table 1: Product Selection and Performance Specifications of Catch Basin Drop Inserts

ADS PURE FTC						
ADS VECTOR CONTROL FTC P/N	Basin Size (in)	FTC Basket Depth (in)	Storage Capacity (ft ³)	Flow Ratings Through FTC Basket When Empty (CFS)	Flow Ratings Through FTC Basket When 50% Full (CFS)	Bypass Flow Rate (CFS)* When FTC Basket is 100% Full
6HD12FTC-VC	12 X 12	12	0.7	6.8	3.0	2.4
6HD18FTC-VC	18 X 18	12	1.7	12.2	4.5	3.7
6HD24FTC-VC	24 X 24	12	3.1	18.6	6.3	4.4
6HD3618FTC-VC	36 X 18	12	3.5	20.8	7.3	5.6
6HD3624FTC-VC	36 X 24	12	5	25.1	8.3	6.5
6HD36FTC-VC	36 X36	12	7.1	41.6	14.6	9.6

* Calculated with 4" water depth above 2" grate. This bypass flow is activated with a completely full basket and is not included in the total Flow Rating through the FTC basket.

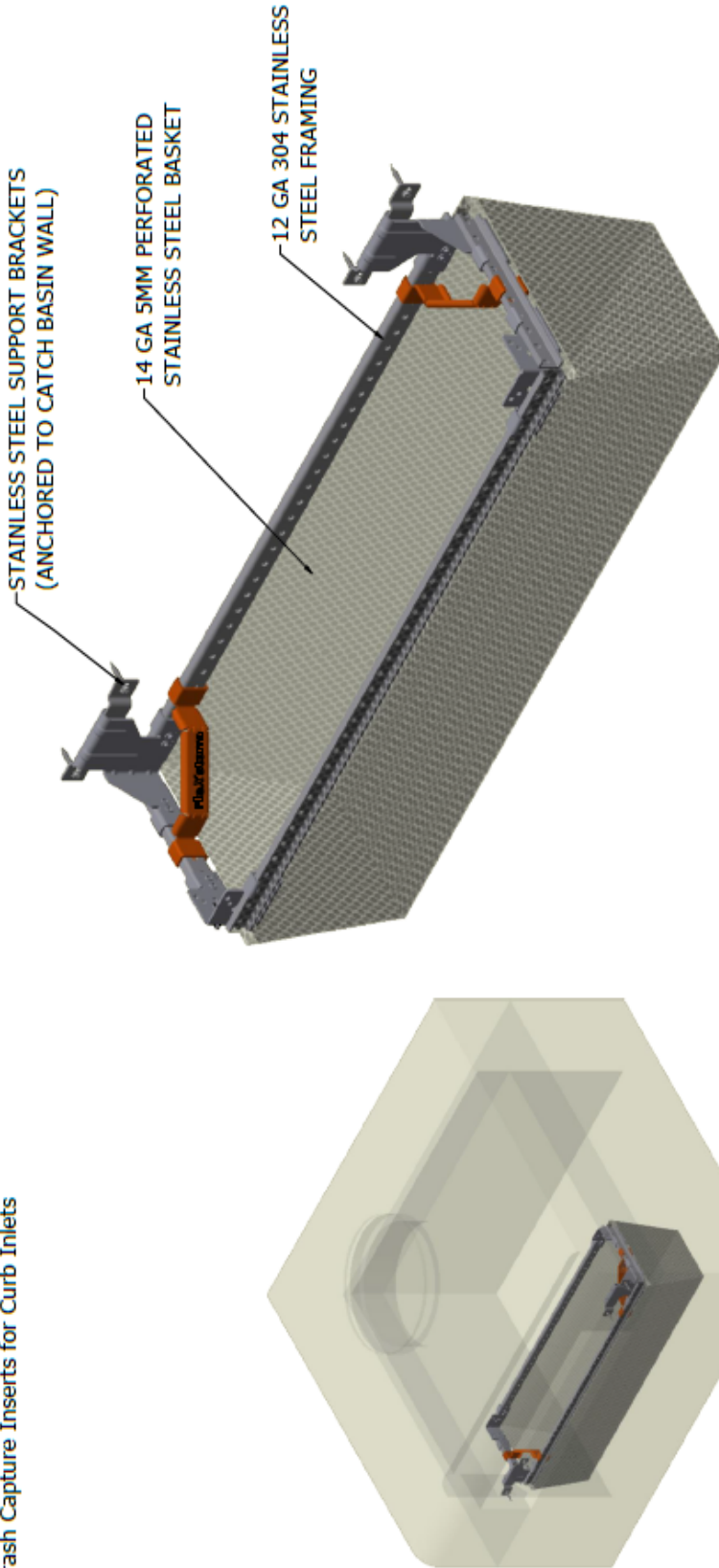
INSTALLATION INSTRUCTIONS:

1. REMOVE GRATE FROM THE DRAINAGE STRUCTURE
2. CLEAN STONE AND DIRT FROM THE GRATE SUPPORT LEDGE (LIP)
3. DROP THE FLEXSTORM INLET FILTER THROUGH THE CLEAR OPENING SUCH THAT THE FLANGES REST FIRMLY ON THE LIP OF THE CATCH BASIN
4. REPLACE THE GRATE ON TOP OF THE FILTER FRAMING

DRAWN Tyler Langel CHECKED	1/29/2021	ADVANCED DRAINAGE SYSTEMS
QA		TITLE
HRG		ADS PURE FTC FULL CAPTURE INSERTS
APPROVED		
	SIZE C	DWG NO Full Trash Capture Inserts
	SCALE 0.2 : 1	REV
		SHEET 1 OF 1

ADS PURE FTC

Full Trash Capture Inserts for Curb Inlets



INSTALLATION AND MAINTENANCE INSTRUCTIONS

1. ENTER MANHOLE OPENING WITH INLET FILTER AND MOUNTING HARDWARE
2. ALIGN FILTER FRAME WITH CURB OPENING AND MARK CENTERLINE OF EACH FRAME HANGER BRACKET
3. USING SUPPLIED WALL MOUNT BRACKETS, MARK LOCATION OF BRACKET SCREW HOLES SPACED 1" DOWN FROM TOP LEDGE OF CONCRETE.
4. USING HAMMER DRILL, DRILL HOLE TO RECOMMENDED DEPTH OF SPECIFIED FASTENER.
5. SECURE THE WALL MOUNT BRACKETS USING CONCRETE FASTENERS AND HANG THE FLEXSTORM INLET ASSEMBLY.
6. FOR MAINTENANCE SERVICE WITH TRUCK MOUNTED VACUUM.

ADS P/N	Curb Opening Width (in)	Basket Depth (in)	Storage Volume (ft ³)	Flow Rate when Empty (CFS)*	Flow Rate when 50% Full (CFS)*
62HDWM36FTC	36	12	2.7	17.8	6.7
62HDWM42FTC	42	12	3.1	20.3	7.6
62HDWM48FTC	48	12	3.6	22.8	8.5
62HDWM60FTC**	60	12	4.5	27.9	10.3
62HDWM72FTC**	72	12	5.4	33.0	12.1
62HDWM84FTC**	84	12	6.3	37.6	13.7
62HDWM96FTC**	96	12	7.2	42.7	15.5
62HDWM120FTC**	120	12	8.9	52.4	18.9

* Calculated with .5' flowing water above centroid of ultimate bypass area

** Multiple filters of the same length placed side by side

TITLE		ADVANCED DRAINAGE SYSTEMS	
SIZE		FULL TRASH CAPTURE FOR OPEN THROAT INLETS	
SCALE	DWG NO	REV	

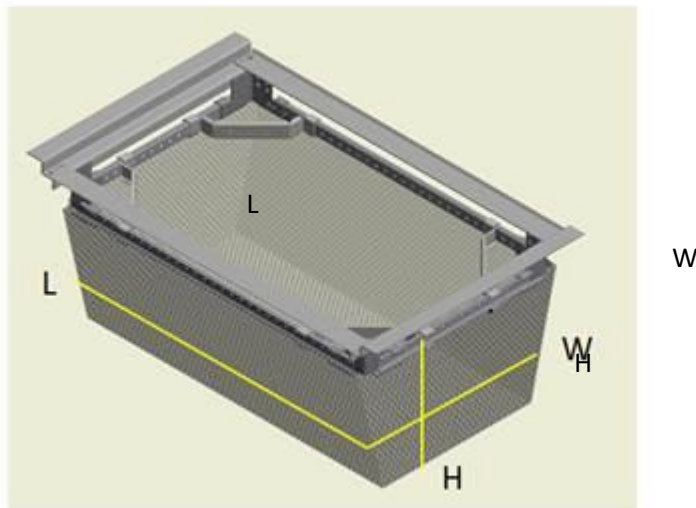
Appendix C: Hydraulic Calculations of Perforated Stainless-Steel Basket

Example Flow Through calculation for 36 x 18 ADS PURE FTC (62HD3618FTC):

Method for determining flow rate through 5mm perforated stainless steel baskets

To determine the flow rate through a perforated basket we first determine the total number of 5 mm holes in the perforated steel basket. Then we determine a pressure difference in the water between the top of the basket and the perforated holes. Then that pressure difference is used to calculate the flow rate of water through a single 5 mm opening. That flow rate is multiplied by the total # of holes to give a flow rate for the entire basket.

1. Determine the # of holes in a 36 x 18 perforated steel basket (62HD3618FTC)



The equation for the surface area of a rectangular prism with one open side:

$$L=33", W=15.5", H=12"$$

$$SA = 2 * L * H + 2 * H * W + L * W = 1675.5 \text{ in}^2$$

From physical measurements it was determined that there are 18 holes/ in^2 in the perforated material. Therefore:

$$1675.5 \text{ in}^2 * 18 \frac{\text{holes}}{\text{in}^2} = 30159 \text{ holes in the 62HD3618FTC basket}$$

2. Determine the flow rate of water through a 5 mm orifice:

To determine the flow rate through a 5 mm opening we first Determine the pressure difference of water before and after it flow through the orifice. It is assumed that once the water exits the perforated opening it has a pressure equal to sea level (101.325 kPa). Before exiting the orifice, it is assumed the water has a pressure equal to depth of the basket opening beneath the curb line (102.857 kPa). Using the formula shown below we can convert that pressure difference into a flow rate.

Equation(s)

$$p_1 - p_2 < FL^2 \cdot (p_1 - FF \cdot P) \rightarrow$$

$$Q_w = 0.0865 \cdot C \cdot \left(\frac{d_o}{4.654}\right)^2 \cdot \sqrt{\frac{p_1 - p_2}{SG}}$$

$$p_1 - p_2 \geq FL^2 \cdot (p_1 - FF \cdot P) \rightarrow$$

$$Q_w = 0.0865 \cdot C \cdot \left(\frac{d_o}{4.654}\right)^2 \cdot FL \cdot \sqrt{\frac{p_1 - FF \cdot P}{SG}}$$



p1 : Primary Pressure (kPa abs)

p2 : Secondary Pressure (kPa abs)

do : Diameter of Orifice (mm)

C : Discharge Coefficient

Qw: Water Flow Rate (m³/h)

FL : Pressure recovery factor (=0.9)

FF : Critical pressure ratio factor

P : Absolute vapor pressure of the water at inlet temperature (kPa abs)

SG : Specific Gravity

Plugging those values into the formula yields a water flow rate per opening of .313648 GPM or .0006988 CFS/hole.

Finally, we multiply the total # of holes in the 62HD3618FTC basket by the flow rate of water per hole:

.0006988 CFS/hole*30159 holes = **20.8 CFS** through the basket when empty.

To determine the flow through of the basket when it is 50% full of material, we make a change to the surface area calculation. Since it is assumed that 50% of the side walls and the bottom of the basket is blocked with debris the surface area equation becomes:

$$SA = 2 * L * H/2 + 2 * H/2 * W = 588 \text{ in}^2$$

Multiplying that surface area by the # of openings per square inch and the flow rate through each hole yields:

$$588 \text{ in}^2 * 18 \frac{\text{holes}}{\text{in}^2} * .006988 \frac{\text{CFS}}{\text{hole}} = 7.3 \text{ CFS}$$

Therefore, when 50% filled or blocked with debris the 62HD3618FTC is expected to have a water flow through rate of **7.3 CFS**.

Appendix D: Photo Gallery



Photo 1: PURE FTC inserts shown before installation into a catch basin



Photos 2 and 3: PURE FTC inserts shown during installation into a catch basin



Photo 4: Improperly maintained Open Throat Curb Inlet Filter in Pueblo, Colorado.



Photo 5: Philadelphia Water Dept. Wall Mount Filter where service was overdue

Appendix E: Hydraulic Calculations of Ultimate Bypass Region

Example Bypass calculation for 36 x 18 PURE FTC Stainless Steel Basket (62HD3618FTC):

Flow through the Ultimate Bypass Area is calculated with the same equations as flow through an orifice.

$$Q_i = C * A * V$$

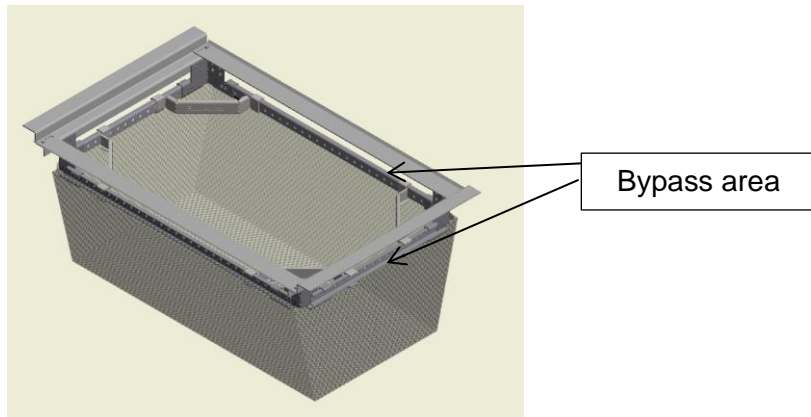
Q =Flow through an orifice in $\frac{ft^3}{s}$, C=Coefficient of discharge from opening (assumed to be .67 for bypass area), A= Area of the orifice (ft^2), and V=Velocity of water as it passes through the orifice (ft/s).

Velocity can be expanded: $V = \sqrt{2 * g * h}$

g=acceleration due to gravity ($32.2ft/s^2$), h=height of water above centroid of orifice's opening (ft) (total height h with 5" frame drop to centroid is 11", assuming 2" grate and 4" water over grate)

Therefore, flow through the bypass area can be written as $Q = CA\sqrt{2gh}$

Calculate Square Area of ultimate Bypass Area:



$$A = 2(H_1 * L_1) + 2(H_2 * L_2)$$

Where H is the height of the bypass opening and L is the Length of the Bypass Opening. For the 62HD3624FTC: $H_1 = 2"$, $L_1 = 32"$, $H_2 = 1"$, $L_2 = 12"$.

$$A = 2*(2*34) + 2*(1.5*16) = 152 \text{ in}^2 \Rightarrow 1.06 \text{ ft}^2$$

Calculate velocity of flow as it passes through the bypass area:

$$V = C\sqrt{2gh} = .67 \sqrt{2 * 32.2 \frac{ft}{s^2} * .91 \text{ ft}} = 5.3 \text{ ft/s} \text{ Therefore,}$$

$$Q = CA\sqrt{2gh} = 1.06 \text{ ft}^2 * 5.3 \frac{ft}{s} = 5.6 \text{ CFS} \text{ Ultimate Bypass Capacity}$$

Based on the above calculation it can be shown that with 4" of water over the grate a 62HD3624FTC will bypass **5.6 CFS** of water through the ultimate bypass of the framing.

Appendix F: Vector Control Accessibility - VC Framing

ADS FULL CAPTURE INSERTS - VECTOR CONTROL (VC) VERSION

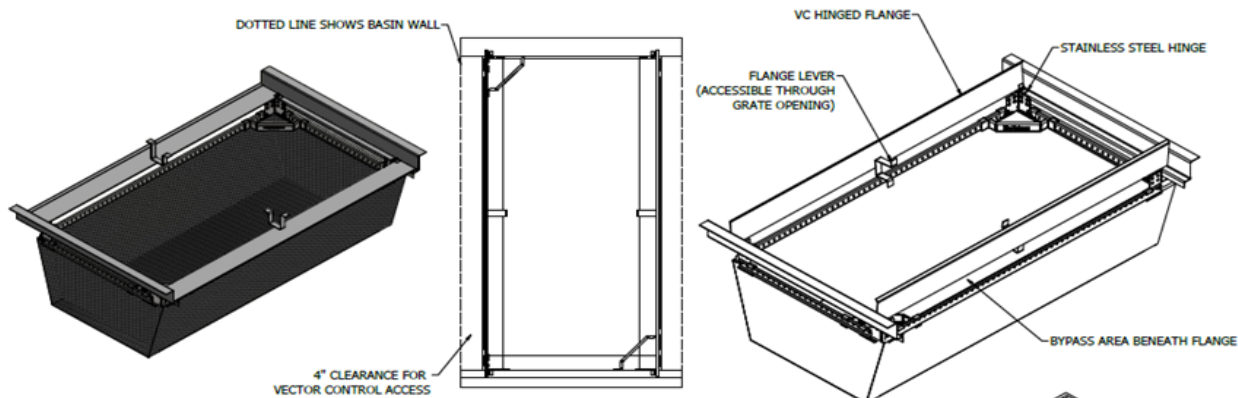
Support flanges have a 4.5" drop for standard flat bottom grates. If heavy duty traffic grate is specified then this flange would be dropped down another 1"-3" to allow for hinged lid clearance.

4" wide hinged flange for vector control access. This will run the entire length of any 12"-36" wide catch basin. The flange should be located over the outlet pipe when filter is installed.



Link to Dropbox Video demonstrating functionality of Vector Control (VC) framing:

<https://www.dropbox.com/s/aonkcsqwqa3jdh/Video%20Nov%2010%2C%202%2012%2050%20PM.mov?dl=0>



** All ADS PURE FTC Full Trash Capture Inserts specified in CA are supplied with the VC hinged flange design for vector control accessibility with a -VC part number suffix.