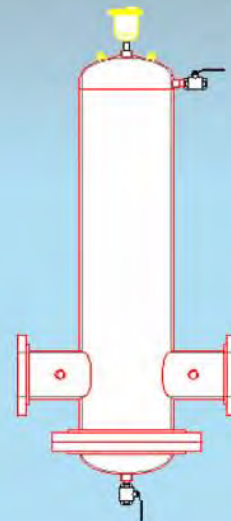
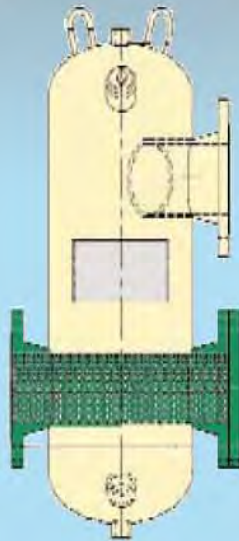


# FLO FAB

## AIR SEPARATOR

### Series SEP-T-F-(G)



[www.flofab.com](http://www.flofab.com)

Manufacturer of Pumps, Tanks, Heat Exchangers & Accessories  
for HVAC Market After-Sales Parts and Services

Air separator - SEP-T-F-(G)

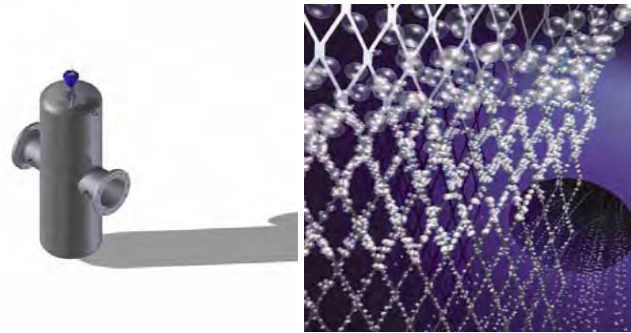
FLO FAB INC  
LAKE WORTH,  
FLORIDA, USA

## AIR & DIRT SEPARATOR

Air and dirt separators increase thermal conductivity and extend the life of piping and equipment in chilled water systems, heating hot water systems, and commercial central plants.

Air is introduced when the system is filled. As the water circulates, the air will collect in piping high points, coils, and the pump, forming bubbles that can restrict—or even stop—the water flow, reducing thermal transfer efficiency. It also promotes interior corrosion that adds to other sources of dirt (i.e., pipe thread shavings, weld slag) that shortens the life of piping and pumps.

Vortex air separators have been used for years to eliminate the dissolved air from closed-loop systems. They work by reducing the velocity of the water and creating a vortex, which allows air to be released. Some dirt also will fall to the bottom. However, studies have shown they are only about 40% effective. Air and dirt separators utilize a similar design, but add a coalescent medium inside the tank. A coalescent medium is a series of wires with supports, wrapped around a center tube causing the small bubbles of air to combine into larger air bubbles and then rise to the top of the vessel. This provides for added area to allow for greater dirt trapping and elimination of up to 99.5% of the dissolved air. With continuous cycling, dirt removal will approach 99%.



### Microbubble air separation

The Flo Fab Air and Dirt internal element (1) creates the whirling movement required to facilitate the release of microbubbles and their adhesion to the internal element surfaces. The bubbles, fusing with each other, increase in size until the hydrostatic thrust overcomes the adhesion force to the mesh.

They rise toward the top of the unit from which they are released through a float-operated automatic air vent.

### Microparticle dirt separation

Impurities in the fluid upon striking the surfaces of the Flo Fab Air and Dirt internal element (1), get separated and drop to the bottom of the body where they collect.

In addition, the large internal volume of Flo Fab Air and Dirt slows down the flow speed of the fluid thus helping, by gravity, to separate the particles it contains. The collected impurities are discharged by opening the drain valve (2) with the handle, even with the system operating.

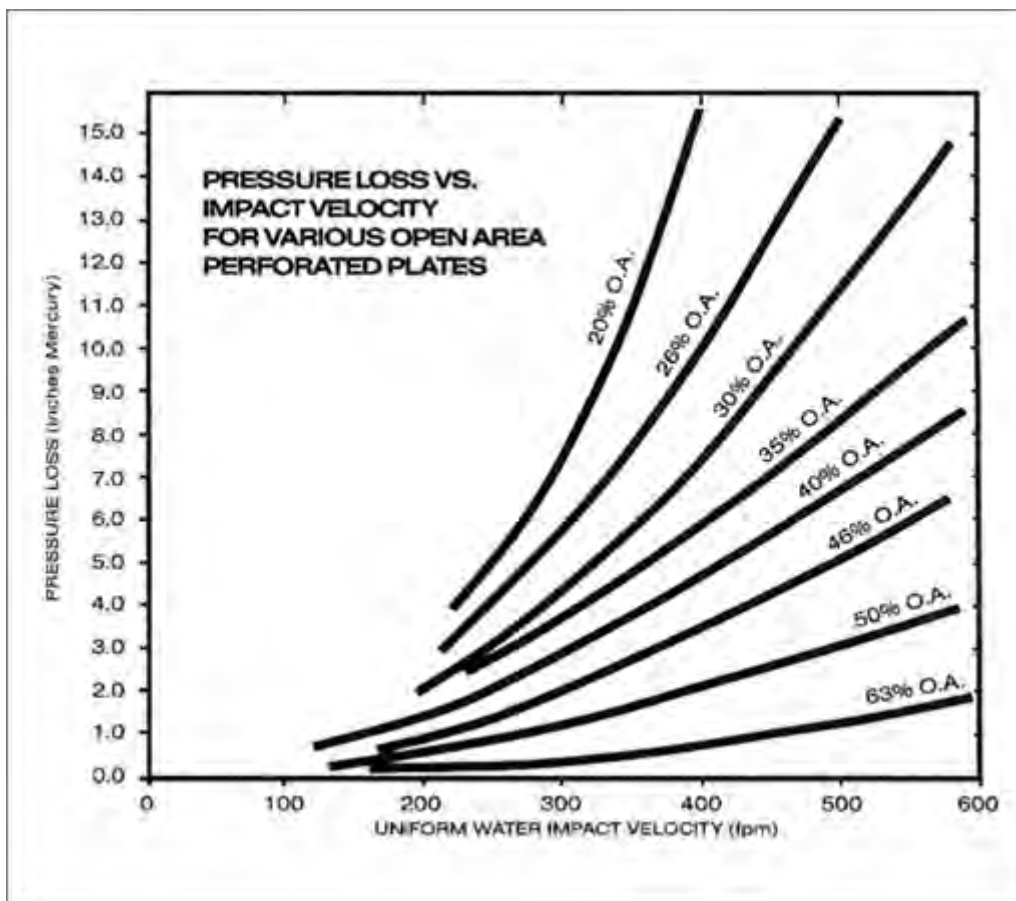
## Fluid Pressure Loss Through Perforated Plate

In many applications of perforated plate, the estimated energy loss or pressure loss through perforated plates is one of the design considerations. The following pressure loss information was developed from a laboratory liquid flow system. The laboratory system maintained a non-swirling flow impacting perpendicularly on the sample. Various perforated thin gage plates were inserted into a uniform velocity liquid flow stream.

Pressure loss for ambient liquid flow was then measured at a series of velocities and reported as inches of mercury loss for each flow.

This data therefore presents the best flow condition value loss. Pressure loss can be estimated beyond the range of the data on the basis of the ratio of the anticipated velocity to the highest tabulated velocity. This ratio squared multiplied by the tabulated pressure loss can be used to approximate the higher velocity loss.

Pressure loss can be estimated from the tables for a different liquid density by using the ratio of the anticipated liquid density to the tabulated density as a multiplier of the noted loss. In applying this data, consideration must be given to the actual anticipated characteristics of the flow impacting on the perforated plate. Distorted flow patterns with high velocity zones will increase the loss of the plate, as will directional flow not perpendicular to the plate surface.





# FLO FAB

SUBMITTAL SHEET  
 ISSUE DATE: 2008/04/21  
 REVISION DATE: 2008/04/21  
 SECTION: 8

## AIR & DIRT SEPARATOR WITH REMOVABLE MEDIUM

MODELS: ADSR-2 TO ADSR-12

UNIT TAG NO.: \_\_\_\_\_

ORDER NO. \_\_\_\_\_

ENGINEER: \_\_\_\_\_

SUBMITTED BY \_\_\_\_\_ DATE \_\_\_\_\_

FLO FAB REPRESENTATIVE: \_\_\_\_\_

APPROVED BY \_\_\_\_\_ DATE \_\_\_\_\_

### DESCRIPTION

FLO FAB ADSR SERIES AIR & DIRT SEPARATORS ARE DESIGNED TO ELIMINATE ENTRAINED AIR AND SEPARATE DEBRIS ASSOCIATED WITH START-UP AND MAINTENANCE OF ANY HYDRONIC SYSTEM. THE DESIGN INCORPORATES A SKIM VALVE, USED TO ELIMINATE FLOATING DEBRIS, A REMOVABLE END COVER FOR COALESCING MEDIUM ACCESS, AND AN AIR VENT TO AUTOMATICALLY RELEASE AIR FROM THE SEPARATOR. THE DESIGN AND CONSTRUCTION CONFORMS TO ASME SECTION VIII, DIV.1

### CONSTRUCTION

SHELL: CARBON STEEL  
 COALESCING MEDIUM: STAINLESS STEEL  
 BLOW DOWN VALVE (OPTIONAL): BRONZE  
 SKIM VALVE (OPTIONAL): BRONZE  
 VENT (OPTIONAL): STAINLESS STEEL

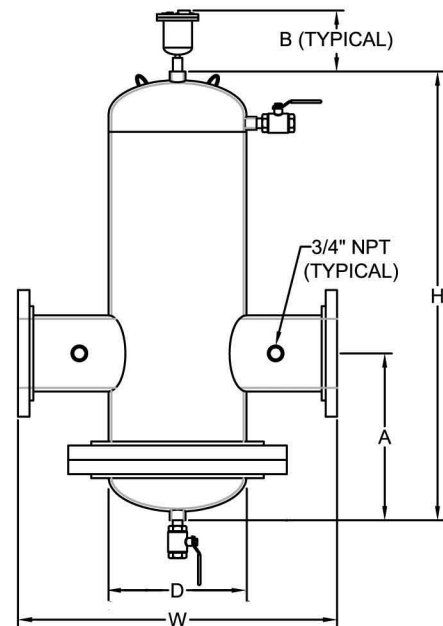
### PERFORMANCE LIMITATIONS

MAXIMUM DESIGN TEMPERATURE: 250°F  
 MAXIMUM DESIGN PRESSURE: 150 PSIG

### DIMENSIONS AND WEIGHTS

MODEL	CONN. SIZE	FLOW GPM	D (IN.)	H (IN.)	W (IN.)	A (IN.)	B (IN.)	WT LBS.
ADSR-2-F	2 FLG.	46	4-1/2	23	15-1/4	11-1/2	8-5/8	100
ADSR-2-FNPT	2 NPT.	46	4-1/2	23	10-3/8	11-1/2	8-5/8	90
ADSR-2.5-F	2-1/2 FLG.	72	5-9/16	23	15-3/4	11-1/2	8-5/8	125
ADSR-2.5-FNPT	2-1/2 NPT.	72	5-9/16	23	11	11-1/2	8-5/8	115
ADSR-3-F	3 FLG.	96	6-5/8	29	20-1/4	14-1/2	8-5/8	150
ADSR-3-FNPT	3 NPT.	96	6-5/8	29	12-1/2	14-1/2	8-5/8	130
ADSR-4-F	4 FLG.	170	8-5/8	29	20-5/8	14-1/2	8-5/8	250
ADSR-5-F	5 FLG.	265	10-3/4	39	27-3/4	19-1/2	8-5/8	310
ADSR-6-F	6 FLG.	380	12-3/4	39	27-3/4	19-1/2	8-5/8	375
ADSR-8-F	8 FLG.	630	16	49	33-5/8	24-1/2	8-5/8	700
ADSR-10-F	10 FLG.	960	20	65	37-1/2	32-1/2	8-5/8	1000
ADSR-12-F	12 FLG.	1400	24	76	42-1/2	38	8-5/8	1500

NOTE: LARGER SIZES ARE AVAILABLE UP TO 36 INCHES.



### SPECIFICATION

FURNISH AND INSTALL ON THE PLANS AND DESCRIBED HEREIN, A FLO FAB-VENT ADSR AIR & DIRT SEPARATOR AS MANUFACTURED BY FLO FAB COMPANY. EACH SEPARATOR MUST BE DESIGNED WITH A BLOWDOWN VALVE, SKIM VALVE, AND AUTOMATIC AIR VENT. THE SEPARATOR MUST ALSO UTILIZE IN ITS DESIGN A STAINLESS STEEL COALESCING MEDIUM TO AID IN THE SEPARATION OF AIR AND DIRT IN THE SYSTEM ENTRAINED WATER. THE SEPARATOR MUST BE CONSTRUCTED IN ACCORDANCE WITH THE LATEST REVISION OF THE ASME BOILER AND PRESSURE VESSEL CODE AND STAMPED 150 PSI WORKING PRESSURE.

EACH SEPARATOR SHALL BE FLO FAB MODEL ADSR-\_\_\_\_\_ OR APPROVED EQUAL.



# FLO FAB

SUBMITTAL SHEET  
 ISSUE DATE: 2008/04/21  
 REVISION DATE: 2008/11/24  
 SECTION: 8

## "HIGH VELOCITY" AIR & DIRT SEPARATOR WITH REMOVABLE MEDIUM MODELS: ADSR-HV-2 TO ADSR-HV-12

<b>UNIT TAG NO.:</b> _____	<b>ORDER NO.:</b> _____
<b>ENGINEER:</b> _____	<b>SUBMITTED BY</b> _____ <b>DATE</b> _____
<b>FLO FAB REPRESENTATIVE:</b> _____	<b>APPROVED BY</b> _____ <b>DATE</b> _____

### DESCRIPTION

FLO FAB ADSR-HV (HIGH VELOCITY) SERIES AIR & DIRT SEPARATORS ARE DESIGNED TO ELIMINATE ENTRAINED AIR AND SEPARATE DEBRIS ASSOCIATED WITH START-UP AND MAINTENANCE OF ANY HYDRONIC SYSTEM. THE DESIGN INCORPORATES A SKIM VALVE, USED TO ELIMINATE FLOATING DEBRIS, A REMOVABLE END COVER FOR COALESCING MEDIUM ACCESS, AND AN AIR VENT TO AUTOMATICALLY RELEASE AIR FROM THE SEPARATOR. THE DESIGN AND CONSTRUCTION CONFORMS TO ASME SECTION VIII, DIV.1

### CONSTRUCTION

SHELL: CARBON STEEL  
 COALESCING MEDIUM: STAINLESS STEEL  
 BLOW DOWN VALVE (OPTIONAL): BRONZE  
 SKIM VALVE (OPTIONAL): BRONZE  
 VENT (OPTIONAL): STAINLESS STEEL

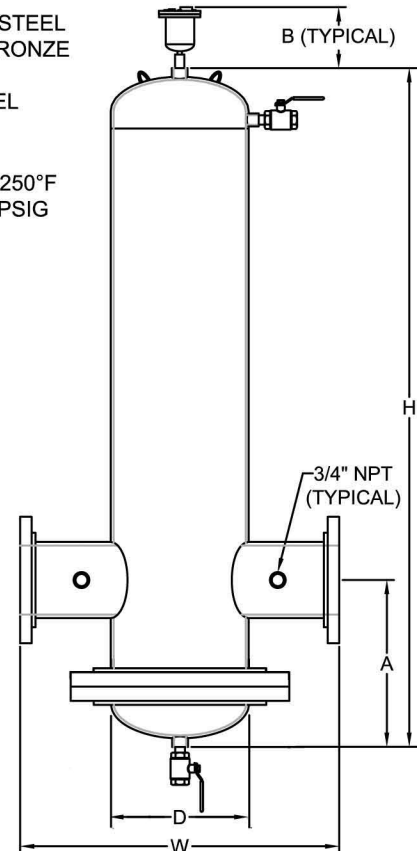
### PERFORMANCE LIMITATIONS

MAXIMUM DESIGN TEMPERATURE: 250°F  
 MAXIMUM DESIGN PRESSURE: 150 PSIG

### DIMENSIONS AND WEIGHTS

MODEL	CONN. SIZE	FLOW GPM	D (IN.)	H (IN.)	W (IN.)	A (IN.)	B (IN.)	WT LBS.
ADSR-HV-2-F	2 FLG.	105	4-1/2	33	15-1/4	11-1/2	8-5/8	110
ADSR-HV-2-FNPT	2 NPT.	105	4-1/2	33	10-3/8	11-1/2	8-5/8	100
ADSR-HV-2.5-F	2-1/2 FLG.	155	5-9/16	33	15-3/4	11-1/2	8-5/8	140
ADSR-HV-2.5-FNPT	2-1/2 NPT.	155	5-9/16	33	11	11-1/2	8-5/8	125
ADSR-HV-3-F	3 FLG.	225	6-5/8	42	20-1/4	14-1/2	8-5/8	175
ADSR-HV-3-FNPT	3 NPT.	225	6-5/8	42	12-1/2	14-1/2	8-5/8	155
ADSR-HV-4-F	4 FLG.	405	8-5/8	42	20-5/8	14-1/2	8-5/8	275
ADSR-HV-5-F	5 FLG.	630	10-3/4	59	27-3/4	19-1/2	8-5/8	475
ADSR-HV-6-F	6 FLG.	910	12-3/4	59	27-3/4	19-1/2	8-5/8	525
ADSR-HV-8-F	8 FLG.	1610	16	75	33-5/8	24-1/2	8-5/8	825
ADSR-HV-10-F	10 FLG.	2450	20	92	37-1/2	32-1/2	8-5/8	1275
ADSR-HV-12-F	12 FLG.	3500	24	110	42-1/2	38	8-5/8	2050

**NOTE: LARGER SIZES ARE AVAILABLE UP TO 36 INCHES.**



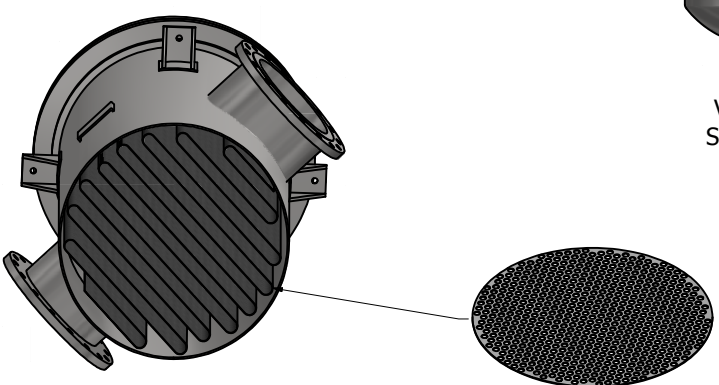
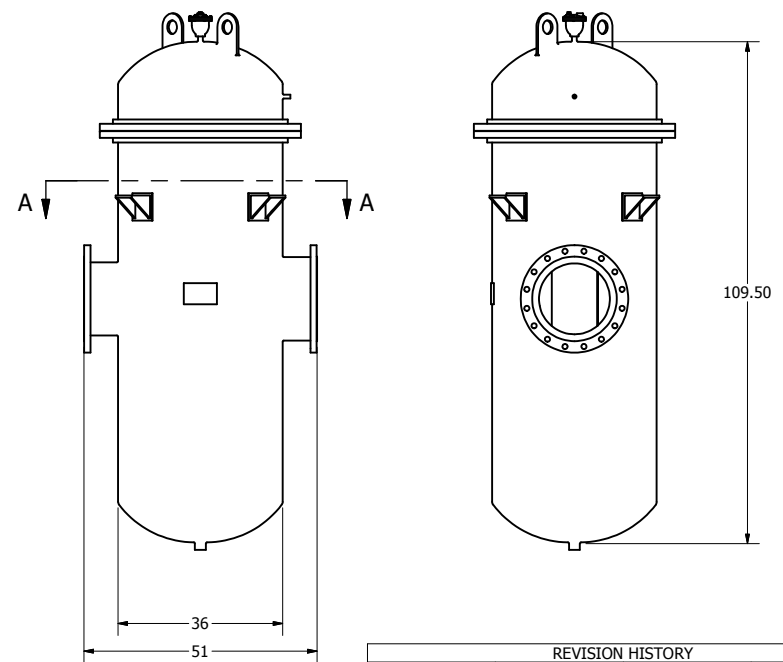
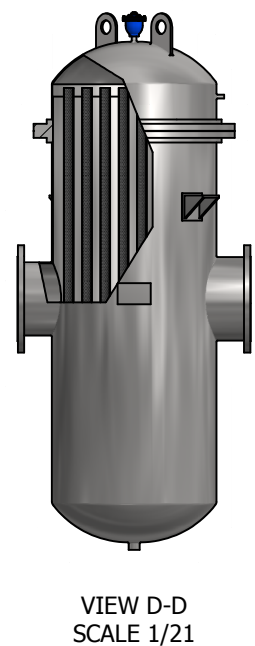
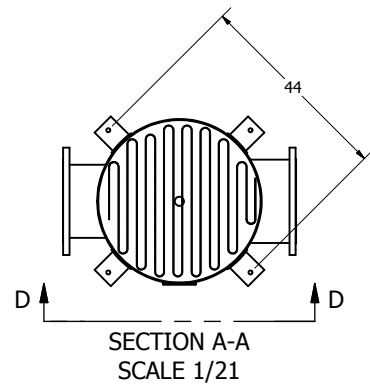
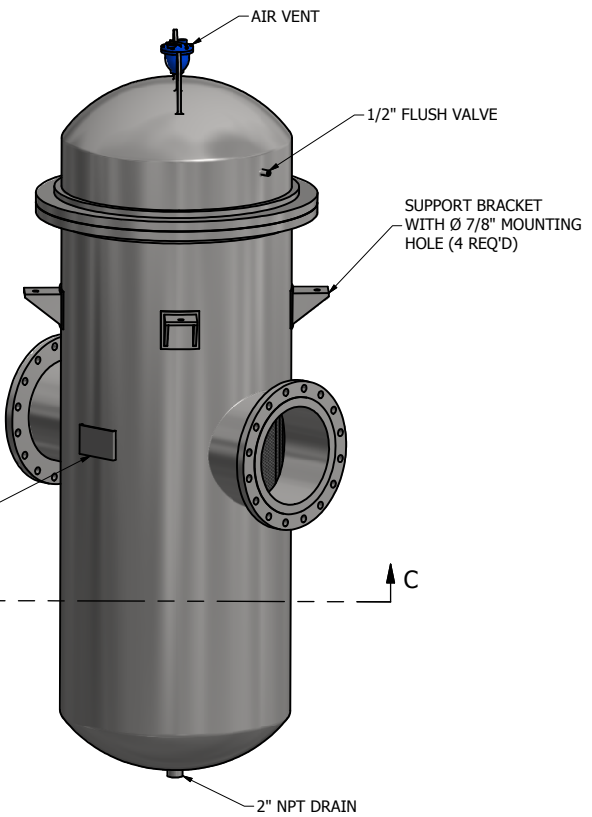
### SPECIFICATION

FURNISH AND INSTALL ON THE PLANS AND DESCRIBED HEREIN, A FLO FAB-VENT ADSR-HV (HIGH VELOCITY) AIR & DIRT SEPARATOR AS MANUFACTURED BY FLO FAB COMPANY. EACH SEPARATOR MUST BE DESIGNED WITH A BLOWDOWN VALVE, SKIM VALVE, AND AUTOMATIC AIR VENT. THE SEPARATOR MUST ALSO UTILIZE IN ITS DESIGN A STAINLESS STEEL COALESCING MEDIUM TO AID IN THE SEPARATION OF AIR AND DIRT IN THE SYSTEM ENTRAINED WATER. THE SEPARATOR MUST BE CONSTRUCTED IN ACCORDANCE WITH THE LATEST REVISION OF THE ASME BOILER AND PRESSURE VESSEL CODE AND STAMPED 150 PSI WORKING PRESSURE.

EACH SEPARATOR SHALL BE FLO FAB MODEL ADSR-HV-\_\_\_\_\_ OR APPROVED EQUAL.



**NOTE:**  
 AS PER ASME CODE SEC VIII 2007-A08  
 DIV. 1 PARAG. UW-12(C)  
 OPERATING PRESSURE 150 PSI (1034 kPa)  
 HYDROSTATIC TEST AT 195 PSI (1345 kPa)  
 DESIGN TEMPERATURE 550 °F (288 °C)  
 MATERIAL SA-516 GR.70  
 CARBON STEEL OPENING 3000#  
 APPROX. WEIGHT 2016 POUNDS (916 KG)  
 EXTERNAL PRIMER FINISH  
 100% TESTED



**PERFORATED PLATE**  
 $\varnothing$  0.078 x .125" STAGGERED  
 Max. solid passage size 0.077"

REVISION HISTORY			
REV	DESCRIPTION	DATE	APPROVED
1			
3			
2			

\*\*\* DRAWING NOT TO SCALE, FOR REFERENCE ONLY\*\*\*  
 DIMENSIONS SUBJECT TO CHANGE WITHOUT NOTICE.  
 DO NOT USE FOR CONSTRUCTION PURPOSES

DESIGNER F. Gariepy	18/09/2013	TITLE / TITRE <b>High velocity air and dirt separator 16"</b>	
		PROJECT / PROJET	
		CUSTOMER / CLIENT	
LAKE WORTH FLORIDA U.S.A WWW.FLOFAB.COM		QUOTE	DWG NO ADSF-HV-16-F
SCALE / ECHELLE		TAG	REV

SHEET 1 OF 1

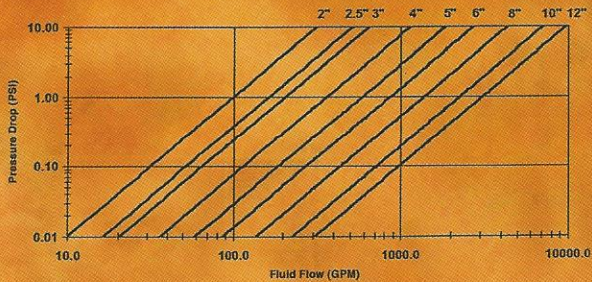


# WESS-VENT AIR & DIRT SEPARATOR



Wessels WVA-series Air & Dirt Separators are designed to eliminate entrained air and separate debris associated with start-up and maintenance of any hydronic system. The design incorporates a skim valve (optional), used to eliminate floating debris, a removable end cover (optional) for coalescing medium access, and an air vent (optional) to automatically release air from the separator. The design and construction is manufactured Non-ASME or to conform to ASME Section VIII, Div. 1.

**WESS-VENT AIR & DIRT SEPARATOR**  
Flow/Pressure Performance Data



## STANDARD VELOCITY DATA

MODEL	PIPE SIZE	WIDTH	STANDARD HEIGHT	HV HEIGHT	STANDARD GPM	HV GPM	CV RATING
WVA-2	2	15-1/4	23	33	46	105	99
WVA-2.5	2-1/2	15-3/4	23	33	72	155	163
WVA-3	3	20-1/4	29	42	96	225	204
WVA-4	4	20-5/8	29	42	170	405	361
WVA-5	5	27-3/4	39	59	265	630	588
WVA-6	6	27-3/4	39	59	380	910	864
WVA-8	8	33-5/8	49	75	630	1610	1378
WVA-10	10	37-1/2	65	92	960	2450	2268
WVA-12	12	42-1/2	76	110	1400	3500	3095

## HIGH VELOCITY DIMENSIONS AND WEIGHTS

MODEL	FLANGE SIZE	FLOW GPM	D (IN.)	H (IN.)	W (IN.)	A (IN.)	B (IN.)	WT LBS.
WVA-2HV	2	105	9	33	15-1/4	16-1/2	8-5/8	100
WVA-2.5HV	2-1/2	155	10	33	15-3/4	16-1/2	8-5/8	125
WVA-3HV	3	225	11	42	20-1/4	21	8-5/8	175
WVA-4HV	4	405	13-1/2	42	20-5/8	21	8-5/8	275
WVA-5HV	5	630	16	59	27-3/4	29-1/2	8-5/8	475
WVA-6HV	6	910	19	59	27-3/4	29-1/2	8-5/8	525
WVA-8HV	8	1610	23-1/2	75	33-5/8	37-1/2	8-5/8	825
WVA-10HV	10	2450	27-1/2	92	37-1/2	46	8-5/8	1275
WVA-12HV	12	3500	32	110	42-1/2	55	8-5/8	2050

Shell: Carbon Steel

Coalescing Medium: Stainless Steel

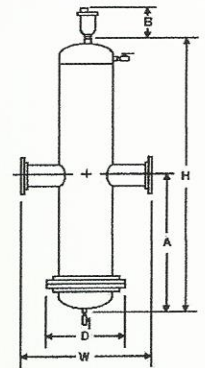
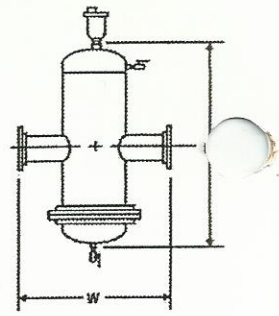
Blow Down Valve (optional): Bronze

Skim Valve (optional): Bronze

Vent (optional): Stainless Steel

Maximum Design Temperature: 250° F

Maximum Design Pressure: 125 PSIG



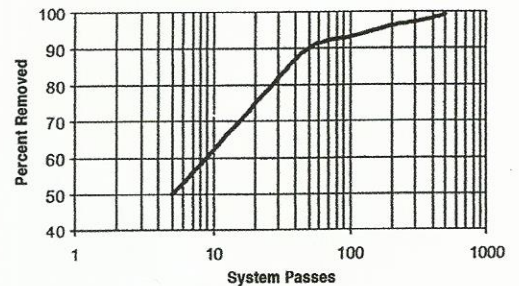
## AIR REMOVAL

Independent third party laboratory testing has concluded that Wessels WVA Air & Dirt separator will eliminate air to a level of greater than 99.5%. This testing was accomplished with measurements of dissolved oxygen and observation of bubbles over time. Results concluded that within 15 to 45 minutes, 50% of the dissolved oxygen was removed. With sufficient time (less than two hours), the dissolved oxygen level was reduced to less than 0.1%.

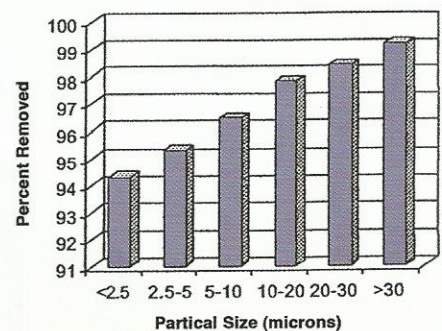
## DIRT REMOVAL

Dirt flowing with the system water is diverted to the WVA Air & Dirt Separator. As this flow enters the unit, dirt particle removal (dependent on system cycles) is measured according to particle size. Results from testing are revealed in Charts A and B below. From Chart A, 90% of dirt (in the 15 to 70 micron size) is separated and diverted to the bottom of the Wess-Vent. With continual system cycling, dirt removal will approach 99%. Chart B reveals the particle size removal percentage in 24 hours of operation. For example more than 97% of particles in the 10 to 20 micron size range were separated with 24 hours.

**Chart A • Solids Removal**  
(15 to 70 micron particle mix)



**Chart B • Solids Removal**  
(Partial Size)







**FLO FAB**





FF

# FLO FAB



[www.flofab.com](http://www.flofab.com)

**Manufacturer of Pumps, Tanks, Heat Exchangers & Accessories  
for HVAC Market After-Sales Parts and Services**

FLO-FAB INC  
LAKE WORTH,  
FLORIDA, USA

SEPTEMBER 2009