

**IMPORTANT NOTE:** For the most up-to-date version of this manual, please visit [www.h2flow.net/product-literature](http://www.h2flow.net/product-literature)

# ACUFLOW™

## FLOW METER

### Operating Manual

North American version (English)



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**Above:** AF-2-U, AF-15, AF-2, AF-25, AF-3, AF-4, AF-6 and AF-8

## DESCRIPTION

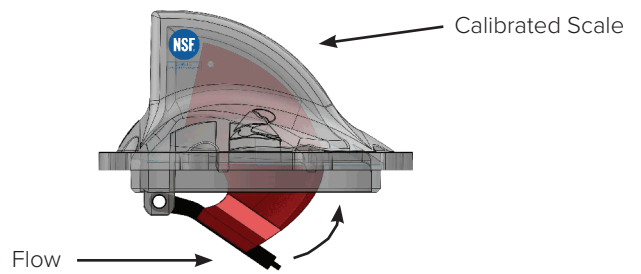
AcuFlow™ is a revolutionary, patented solution for accurate and reliable flow and velocity rate measurement in fresh, gray and potable water applications. A variation of this product, named FlowVis®, is also available for swimming pool, spa, fountain, water feature and flotation tank applications.

Using a design that is based on ‘mass flow’ principles, AcuFlow™ provides many benefits that include:

- Ease of installation with zero to minimal straight pipe
- Installation flexibility that allows orientation in any position, e.g., horizontal, vertical or even upside-down
- Long life without sticking floats or paddle wheels
- Combined Flow Meter and Check Valve for models AF-15, AF-2, and AF-25
- User upgradeable to include Digital functionality (AF-D and AF-D-PM)

## CONCEPT

As flow increases, the flapper moves forward toward its fully open position. The flapper’s angular position is directly related to the flow rate through the valve body / tee / pipe. A calibrated scale on the valve’s lid provides a highly accurate reading of the flow rate and velocity.



## RESOURCES

Thank you for purchasing the AcuFlow flow meter by H2flow Controls. If you would like to find additional product resources, including tech tip sheets, brochures, videos, and materials in other languages, please visit our website at [www.h2flow.net](http://www.h2flow.net) or scan the QR Code below.



## SERVICE REPAIR KIT

Service repair kits are available for all models:

**AF-SK** for all 1.5”, 2”, and 2.5” models, comprising:

- 1 x o-ring
- 1 x spring
- 1 x flapper and indicator arm
- 1 x pivot pin

**AF-SK-CAR** for all 3”, 4”, 6”, and 8” models, comprising:

- 1 x o-ring
- 1 x spring
- 1 x spring pulley pivot pin
- 1 x spring pulley to flapper pulley wire

For all other parts, please contact H2flow at 888-635-0296 (toll-free) or (+1) 419-841-7774 (International).

## MODELS & SPECIFICATIONS

AcuFlow™ comprises several models; it is important that you check that the model you are about to install is the correct one for your application.

Model	Pipe Diameter							Pipe Schedule		GPM Scale	Body Type				Independently verified (NSF 50)	Flow Range (GPM)
	1.5"	2"	2.5"	3"	4"	6"	8"	40	80		Union	Valve	Tee	Saddle clamp		
AF-15	●							●		●		●			●	10-80
AF-2		●						●		●		●			●	10-110
AF-25			●					●		●		●			●	10-110
AF-3				●					●	●			●		●	70-240
AF-3-40				●				●		●			●		●	70-240
AF-4					●				●	●			●		●	125-450
AF-6						●			●	●				●	●	300-1000
AF-8							●		●	●				●	●	600-1800
AF-15-U	●							●		●	●	●			●	10-90
AF-2-U		●						●		●	●	●			●	10-110

## VALVE BODY FEATURE

On the side of the valve body that is used for the 1.5", 2", and 2.5" models, you will note the following feature:



This feature has no functionality relating to the operation of the AcuFlow™ and is simply provided as an attribute to be able to plumb in a drain down pipe and valve. A typical use for this might be a roof mounted solar system. Under no circumstances should this hole be drilled out when using the valve body with the AcuFlow™.

# INSTALLATION

## General Installation Guidance

Installation of AcuFlow™ should be in accordance with the following instructions.

Normal plumbing procedures such as cleaning, priming and gluing of fixtures should be followed in order to avoid leaks. If you are not familiar with plumbing procedures, it is recommended that you employ the skills of a qualified plumber.

Unlike other flow meters, the majority of AcuFlow™ models are not affected by flow stream disturbances caused by its proximity to pumps, elbows, tees, valves, etc. AcuFlow™ can be installed either horizontally or vertically. Straight pipe requirements are addressed in the table on page 19.

Pay particular attention to the system's direction of flow and make sure that the arrow on the lid of the AcuFlow™ is pointing in the correct direction. For the AF-3, AF-4, AF-6 and AF-8 versions, the Tee / Saddle-clamp will feature an additional arrow label. In the event that the AcuFlow™ is inadvertently installed into the plumbing in the wrong direction, simply remove the (8) screws holding the lid in place and rotate the entire lid assembly by 180°.

**NOTE: For all models 2.5" and smaller, always remove the AcuFlow™ lid assembly prior to gluing in the valve body.**

**NOTE (1):** When selecting a physical location to install AcuFlow™, be sure to allow accessibility to read the scale on the lid.

**NOTE (2):** Due to the possibility of excessive turbulence, models AF-3, AF-3-40, AF-4, AF-6, and AF-8 should not be installed directly after the pump.

**NOTE (3):** AcuFlow models are designed for the specific pipe Schedule stated at the bottom of the flow scale label. While it is important to comply with the specific Schedule of pipe, the accuracy stated within this manual can be maintained if a short length (3-6 inches / 75-150mm), of the correct pipe type, is installed either side of the AcuFlow. For example, an AF-4 can be installed to a SCH 40 plumbing system, provided that a short length of SCH 80 pipe is installed into each end of the AcuFlow AF-4.

## Certified NSF 50 Accuracy and Associated Pipe Configurations

Model	NSF 50 Level	Pipe Configuration
AF-15	L1	A
AF-15-U	L1	A
AF-2	L1	A
AF-2-U	L1	A
AF-25	L1	A
AF-3	L1	B
AF-3-40	L1	B
AF-4	L1	C
AF-6	L1	D
AF-8	L1	E

### Pipe Configuration Definitions:

- A.** Zero straight pipe before or after AcuFlow. Can be installed in any orientation - horizontal, vertical up or vertical down.
- B.** Straight horizontal pipe of  $\geq 11"$  before AcuFlow
- C.** Straight horizontal pipe of  $\geq 17"$  before AcuFlow
- D.** Straight horizontal pipe of  $\geq 33"$  before AcuFlow
- E.** Straight horizontal pipe of  $\geq 64"$  before AcuFlow

## Pipe Configurations other than those used by NSF for Testing

Piping configurations that are more demanding than those used by NSF for testing AcuFlow, e.g., installing an AF-3 right next to another fitting such as an elbow, will result in a lower accuracy level than stated above. It is impossible to determine the exact impact that each scenario will have, but like all flow meters installed in larger pipe sizes, turbulence becomes an issue. The longer the run of straight pipe before the AcuFlow, the better.

## NSF 50 Accuracy Levels

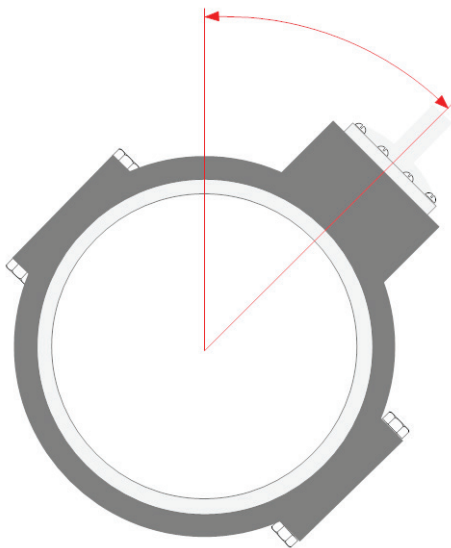
The NSF 50 Standard for flow meters, has five levels of accuracy (L1-L5) that are expressed as follows:

- Level 1 (L1)** - Average of absolute values of all single point deviations must be  $\leq 2\%$ . Single point deviations shall not exceed  $\pm 4\%$ .
- Level 2 (L2)** - Average of absolute values of all single point deviations must be  $\leq 5\%$ . Single point deviations shall not exceed  $\pm 7.5\%$ .
- Level 3 (L3)** - Average of absolute values of all single point deviations must be  $\leq 10\%$ . Single point deviations shall not exceed  $\pm 12.5\%$ .
- Level 4 (L4)** - Average of absolute values of all single point deviations must be  $\leq 12.5\%$ . Single point deviations shall not exceed  $\pm 15\%$ .
- Level 5 (L5)** - Average of absolute values of all single point deviations must be  $\leq 15\%$ . Single point deviations shall not exceed  $\pm 20\%$ .

## Installation of Saddle-clamp style models (AF-6 and AF-8)

AcuFlow models AF-6 and AF-8, use Schedule 80 Saddle Clamps. Dimensional details are as follows:

AcuFlow Model	Saddle Size	Hole to be Drilled in Pipe	Angle for Hole / Saddle Clamp
AF-6	6" x 3"	3"	45°
AF-8	8" x 4"	4"	45°



When drilling the hole, the following precautions should be taken:

1. Prior to drilling, make sure that the intended hole will be at 45 degrees from the perpendicular.
2. Ensure that the intended position will allow the user to read the AcuFlow scale on the lid. If this is not possible, then we recommend adding an AcuFlow Digital upgrade to enable the flow reading to be read remotely.  
**NOTE:** Model AF-8 includes AcuFlow Digital as standard.
3. Do not damage the external pipe area around the drilled hole. Surface damage will result in the Saddle's o-ring being unable to provide a watertight seal.
4. If using a hole saw, it is advisable to run the drill in reverse, and although this will take longer to cut through the pipe, it will be less aggressive and will cut a cleaner hole.
5. Be sure to obtain the correct sized hole saw.

Before securing the Saddle Clamp to the pipe, apply a good quality o-ring lubricant to the o-ring. Install the o-ring into the socket on the underside of the upper-half of the Saddle Clamp. Position the Clamp to the pipe so that the o-ring is centered around the drilled hole. Evenly tighten the nuts and bolts until both halves of the Saddle Clamp are mated together.

## Installation of Union-style models (AF-15-U and AF-2-U)

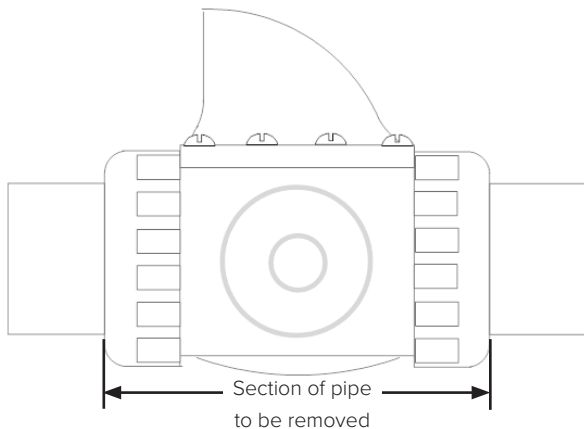
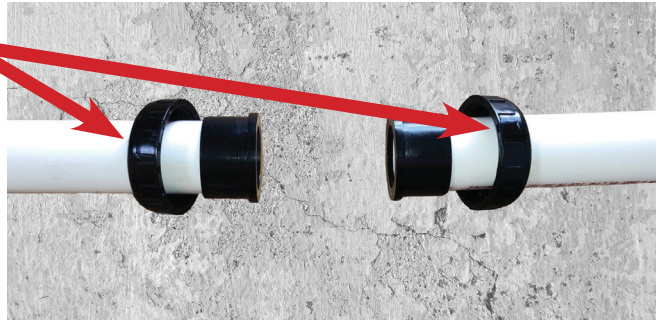
Union style valve bodies are available for 1.5" and 2" AcuFlow models and are designated AF-15-U and AF-2-U, respectively. The Union style valve body offers two main advantages:

1. Ease of installation for retrofitting to existing plumbing, and where it is difficult to 'spread' the pipe for the standard AcuFlow valve body, and;
2. Where the user wishes to uninstall the AcuFlow during cold winter months

As with all Union style fittings, **it is essential that accurate measurements are taken** before cutting out the section of pipe. The ends of the cut pipe must be cut square. Removing too much pipe will prevent the union fitting from tightening up, and leaks will occur. Cutting out insufficient pipe will result in difficulty inserting the valve body in-between the unions.

**IMPORTANT NOTE:** Be careful to slide the two locking rings onto each pipe end **before** gluing on the union flanges.

The amount of pipe to be removed is as follows:



Length of pipe to be removed

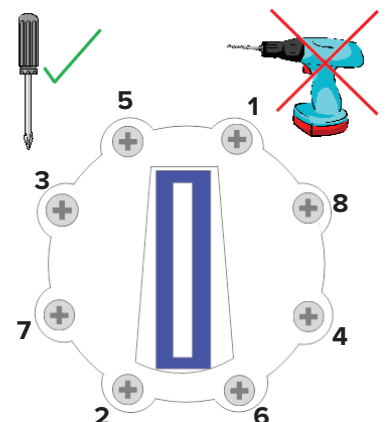
Model	Inches (decimal)	Inches (fraction)	mm
AF-15-U	5.81"	5 <sup>13</sup> / <sub>16</sub> "	147.6 mm
AF-2-U	5.72"	5 <sup>23</sup> / <sub>32</sub> "	145.3 mm

**NOTE:** The lid assembly from the standard valve body cannot be transferred to a union style valve body (and visa-versa), due to the flow reading being different.

## Tightening Lid Screws

When removing and re-installing the AcuFlow™ lid assembly, it is important to adhere to the following procedure:

1. Make sure that the o-ring on the underside of the lid is undamaged, lubricated with silicone (such as Boss 820) and is in-place without twists.
2. Ensure flapper hinge pin is centered.
3. Carefully lower the lid onto its valve body, Tee, or Saddle-Clamp, making sure that the o-ring stays in place.
4. Insert by hand the (8) stainless steel screws but do not tighten at this stage.
5. Using a hand Phillips-head screwdriver, slowly tighten the screws in a diagonal pattern, per the sequence to the right. Do not fully tighten one screw before proceeding to the next, i.e., pull them down slowly multiple times to avoid stressing and cracking the lid. Screws should be tightened to a final torque of 25 inch / pounds or 2.8 Nm.



## OPERATION

### Reading the Flow Rate

AcuFlow is factory-calibrated to be extremely accurate across its full operating range. Any perceived 'inaccuracy' is related to the viewing angle at which the scale is being read. To avoid so-called 'parallax error', it is important to position your eye so that you are looking squarely at the tip of the indicator arm. To achieve this, simply move your head so that you just lose sight of the vertical leading edge of the red arm.

**NOTE:** Slowly move your head in this direction to the point where the leading edge of the indicating arm is not visible.



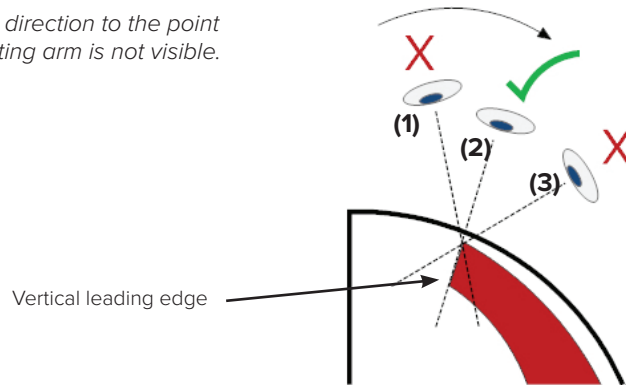
(1) Indicator arm is being viewed too far forward / near the rear of the lid.



(2) Indicator arm is being viewed correctly.

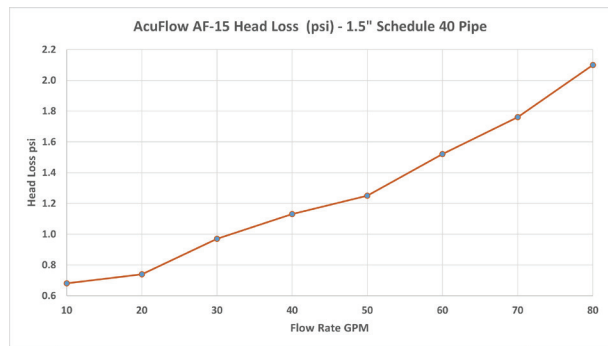
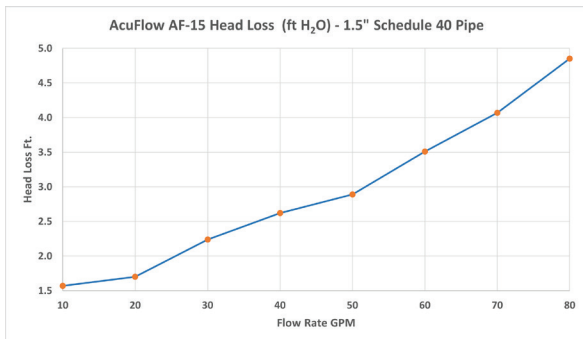


(3) Indicator arm is being viewed too far back / front of the lid.

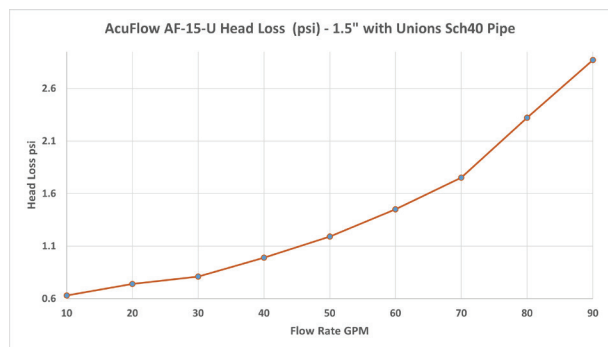
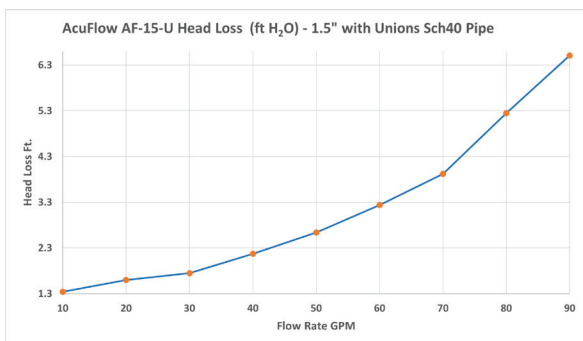


## HEAD LOSS DATA

### Head Loss (AF-15):

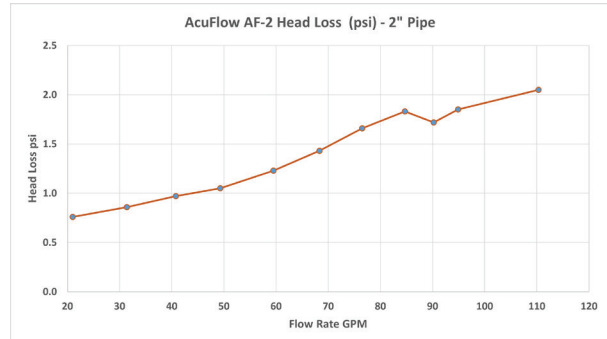
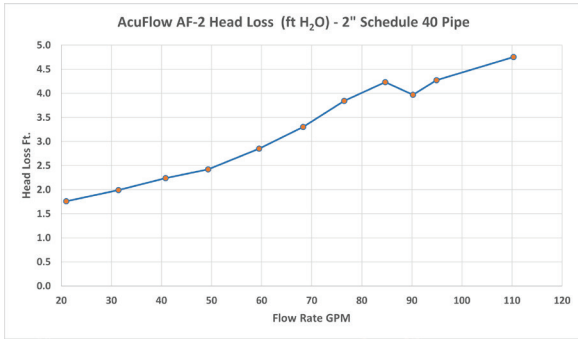


### Head Loss (AF-15-U):

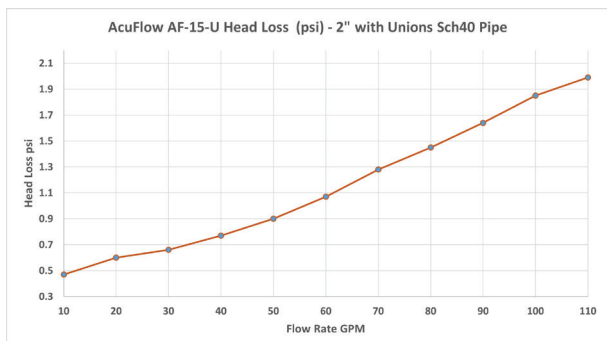
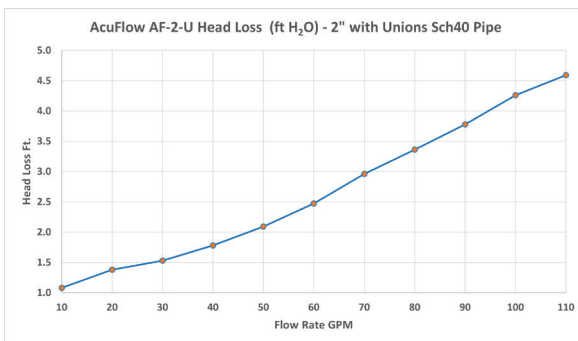




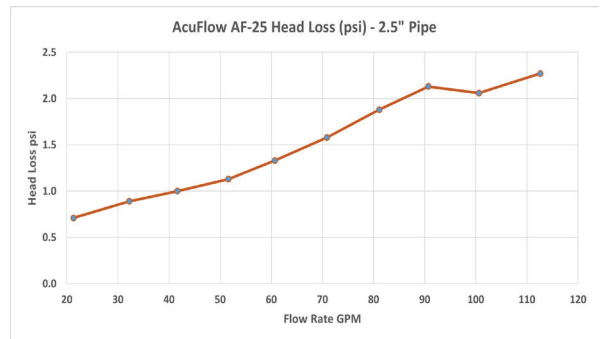
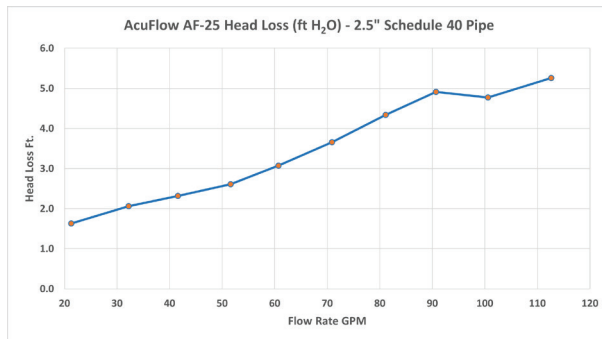
## Head Loss (AF-2):



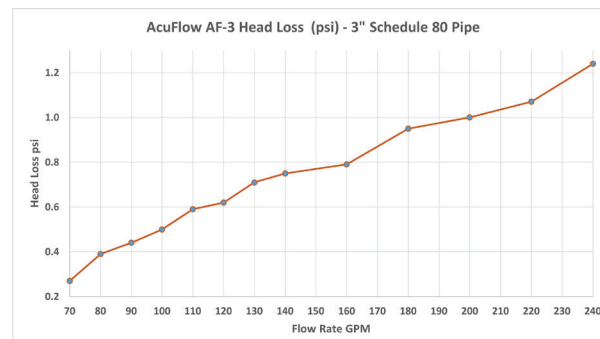
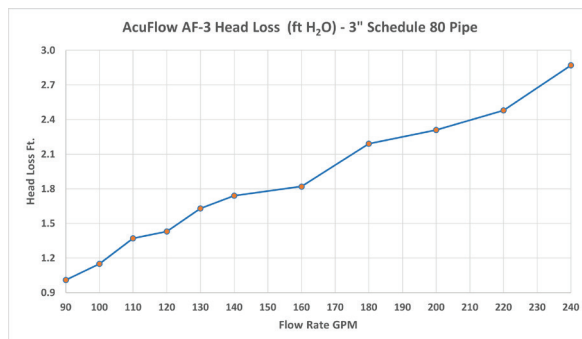
## Head Loss (AF-2-U):



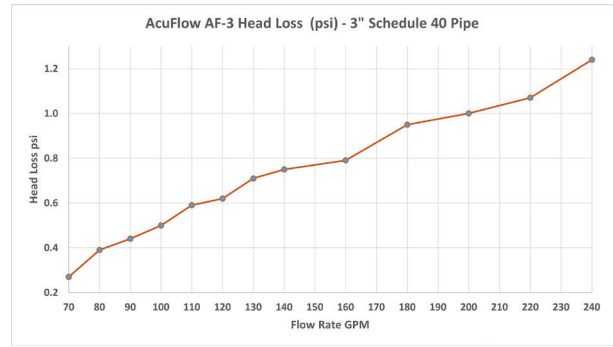
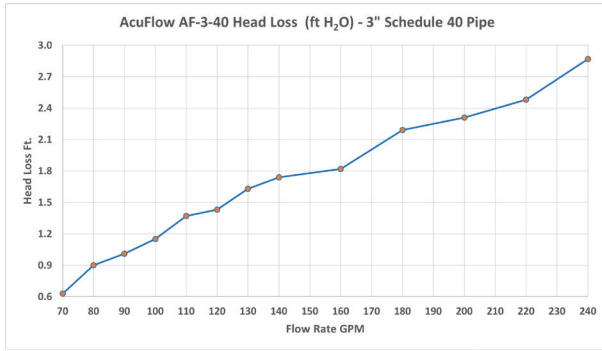
## Head Loss (AF-25):



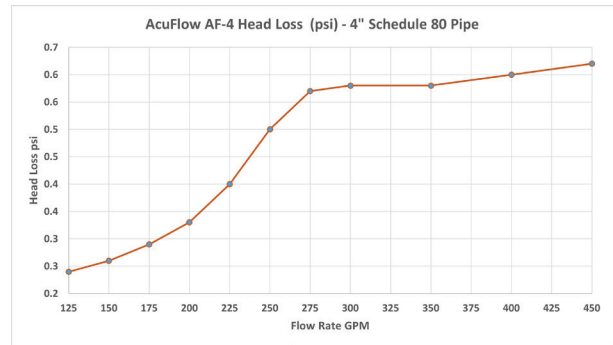
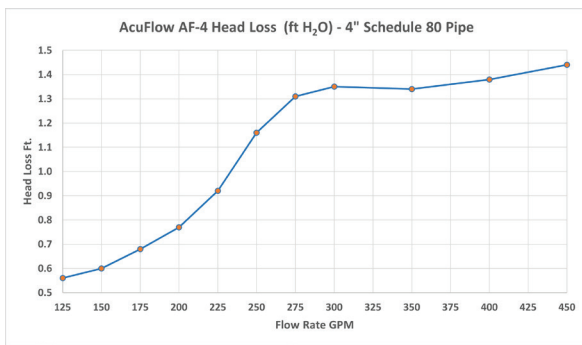
## Head Loss (AF-3):



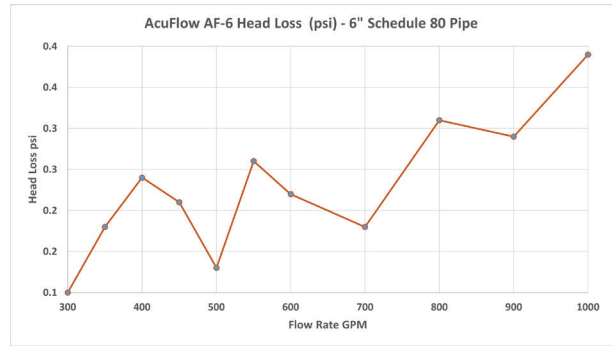
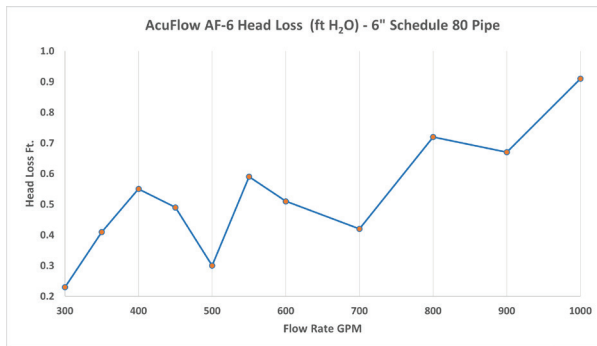
## Head Loss (AF-3-40):



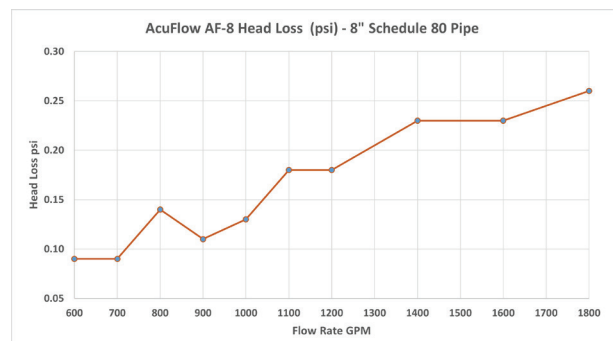
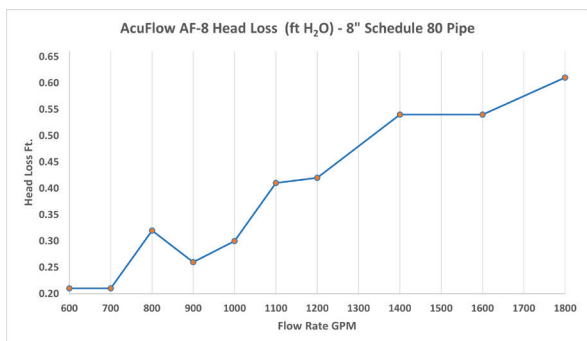
## Head Loss (AF-4):



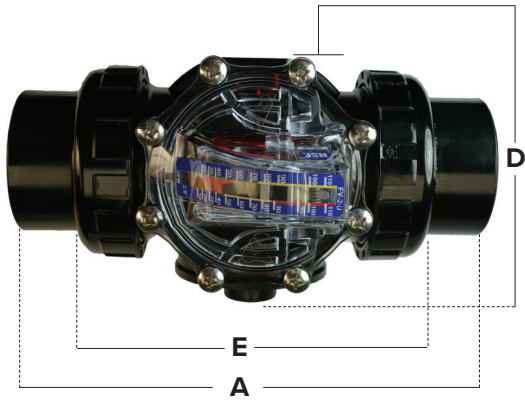
## Head Loss (AF-6):



## Head Loss (AF-8):



## DIMENSIONS



Models: AF-15-U

ENGLISH/STANDARD

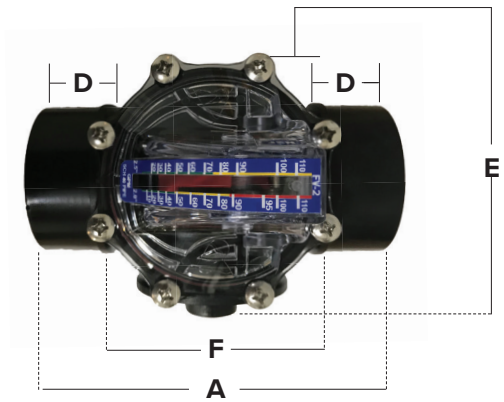
Reference	Dimension
A	8.24"
B	5.50"
C	Schedule 40 - 1.5" (Slip)
D	4.63"
E	5.81"
WEIGHT	2 lbs.



Models: AF-2-U

ENGLISH/STANDARD

Reference	Dimension
A	8.75"
B	5.50"
C	Schedule 40 - 2" (Slip)
D	4.63"
E	5.72"
WEIGHT	2 lbs.

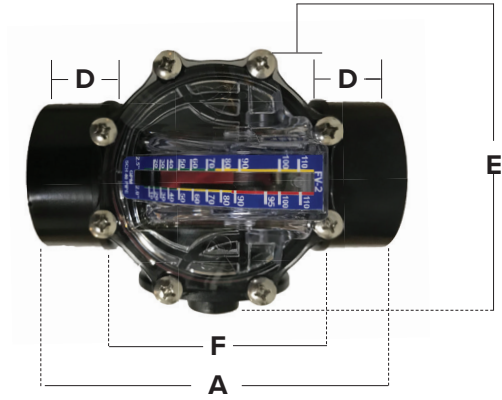


Models: AF-15

ENGLISH/STANDARD

Reference	Dimension
A	6.5"
B	5.875"
C	Schedule 40 - 1.5"
D	1.375"
E	4.63"
F	3.75"
WEIGHT	1.5 lbs

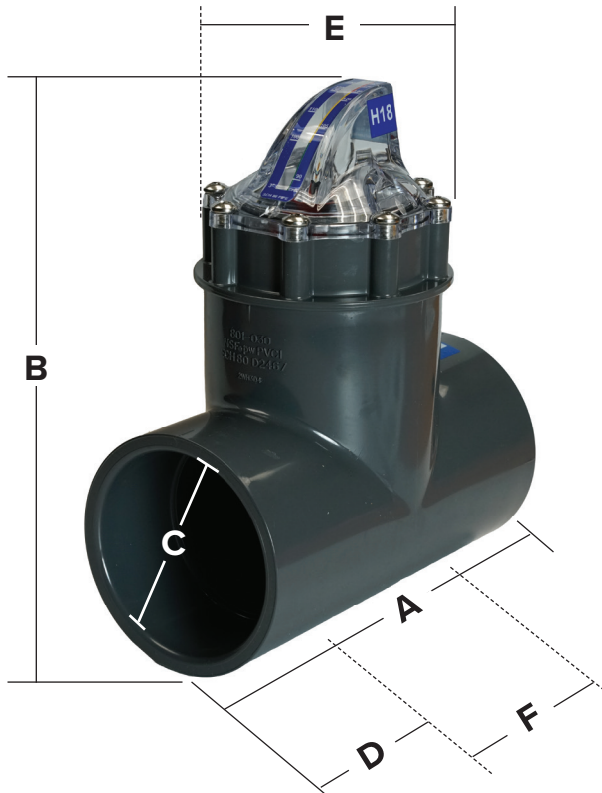




Models: AF-2 / AF-25

ENGLISH/STANDARD

Reference	Dimension
A	6.5"
B	5.875"
C	Schedule 40 - 2" (Slip) & 2.5" (with coupling)
D	1.375"
E	4.63"
F	3.75"
WEIGHT	1.5 lbs



Models: AF-3 / AF-3-40

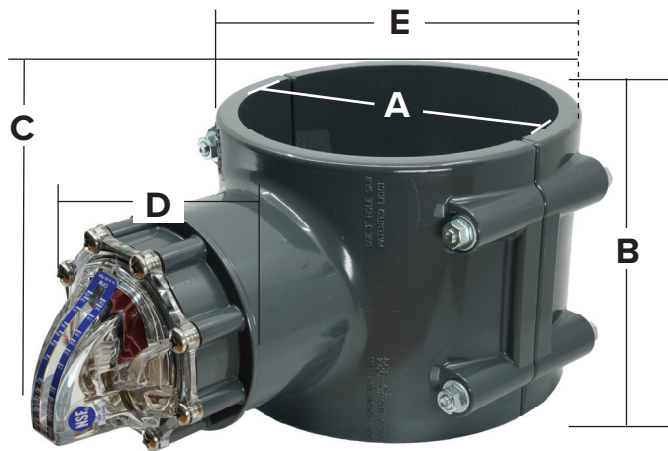
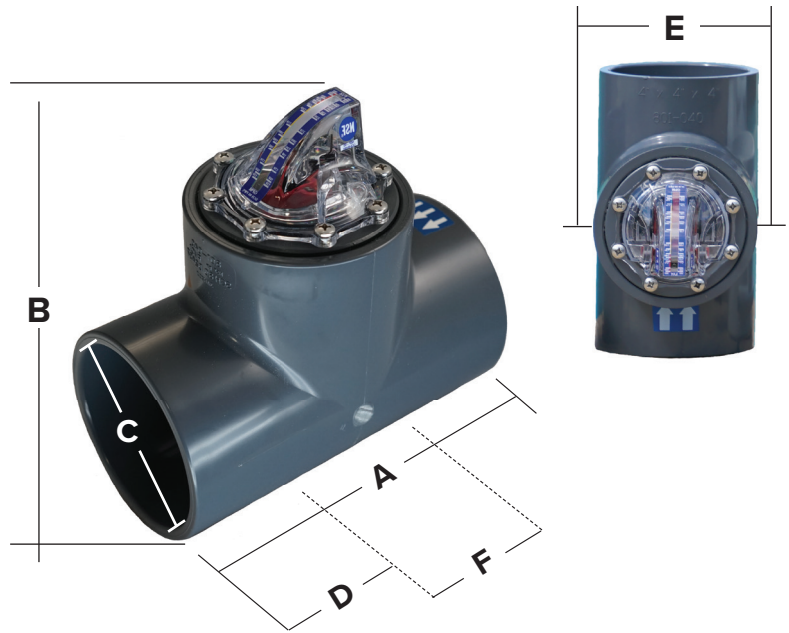
ENGLISH/STANDARD

Reference	Dimension
A	8.0"
B	9.5"
C	Schedule 80 - 3"
D	1.875"
E	4.5"
F	4.25"
WEIGHT	3 lbs

Models: AF-4

ENGLISH/STANDARD

Reference	Dimension
A	9.5"
B	9.75"
C	Schedule 80 - 4"
D	2.25"
E	5.25"
F	5.0"
WEIGHT	5 lbs



Models: AF-6

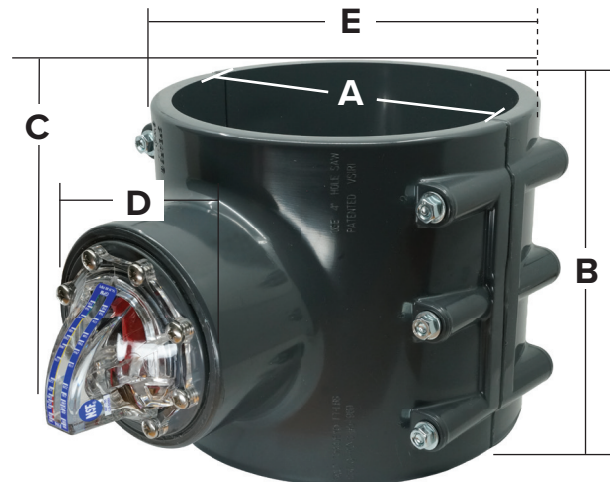
ENGLISH/STANDARD

Reference	Dimension
A	Schedule 80 - 6.65" (6")
B	6.00"
C	12.53"
D	4.23"
E	7.53"
WEIGHT	5 lbs.

Models: AF-8

ENGLISH/STANDARD

Reference	Dimension
A	Schedule 80 - 8.65" (8")
B	8.59"
C	14.37"
D	5.24"
E	9.53"
WEIGHT	5 lbs.



## TECHNICAL DATA

### Material Data Sheet (MSDS)

Component	AF-15	AF-15-U	AF-2	AF-2-U	AF-25	AF-3	AF-4	AF-6	AF-8	Material
Lid	•	•	•	•	•	•	•	•	•	Clear Polycarbonate
Spring	•	•	•	•	•	•	•	•	•	Hasteloy c-276
o-ring	•	•	•	•	•	•	•	•	•	Viton
Lid Screws	•	•	•	•	•	•	•	•	•	316 Stainless Steel
Indicator Pivot Pin	•	•	•	•	•	•	•	•	•	Hasteloy c-276
Scale Label	•	•	•	•	•	•	•	•	•	Armalex
Product Label	•	•	•	•	•	•	•	•	•	Armalex
NSF Label	•	•	•	•	•	•	•	•	•	Armalex
Valve Body	•		•		•					CPVC
Union Valve Body		•		•						CPVC
Check Valve Flapper	•	•	•	•	•					PPEPS
Flapper Seal	•	•	•	•	•					Viton
Non Check Valve Flapper										ABS
Indicator (AF-15 to AF-25)	•	•	•	•	•					ABS
Indicator (AF-3 to AF-8)						•	•	•	•	ABS
Magnet	•	•	•	•	•	•	•	•	•	N52 Neodymium
Carriage						•	•	•	•	ABS
Flapper Pulley						•	•	•	•	ABS
Spring Pulley						•	•	•	•	ABS
Flapper to Indicator Link						•	•	•	•	ABS
Connecting Wire						•	•	•	•	316 Stainless Steel
Dowel Pin - Link to Indicator						•	•	•	•	316 Stainless Steel
Dowel Pin - Flapper to Carriage						•	•	•	•	316 Stainless Steel
Barrel Bolt - Link to Flapper Binding						•	•	•	•	316 Stainless Steel
Tee, Schedule 80, 3" x 3"						•				CPVC
Tee, Schedule 80, 4" x 4"							•			CPVC
Reducing Bushing 3"						•		•		PVC
Reducing Bushing 4"							•		•	PVC
Saddle Clamp 6" x 3"								•		CPVC
Saddle Clamp 8" x 4"									•	CPVC
Saddle Clamp Nut & Bolt Set								•	•	316 Stainless Steel

## Operational Data

Model	Accuracy	Pressure Rating	Calibration Required?	Min/Max Operating Ambient Temp	Design Life
AF-15, AF-15-U	Average: >98%	50 psi	No	32°F (0°C) / 140°F (60°C)	Greater than 5 years
AF-2, AF-2-U, AF-25	Average: 97.9%				
AF-3, AF-3-40	Average: 98.15% in straight pipe (pending NSF 50 test results)				
AF-4	Average: 98.7% in straight pipe (pending NSF 50 test results)				
AF-6	Average: >98% in straight pipe (pending NSF 50 test results)				
AF-8	Average: >98% in straight pipe (pending NSF 50 test results)				

## Straight Pipe Requirements

Model	Straight Pipe Before (x Pipe Diameters)	Straight Pipe After (x Pipe Diameters)
AF-15, AF-15-U, AF-2, AF-2-U, AF-25	0" (x0)	0" (x0)
AF-3, AF-3-40	15" (x5)	0" (x0)
AF-4	20" (x5)	0" (x0)
AF-6	36" (x6)	0" (x0)
AF-8	64" (x8)	0" (x0)

## MAINTENANCE

Although AcuFlow™ is designed to be maintenance-free, periodic checks should be made to the following:

Condition	Check for	Remedy
Leak around lid seal	O-Ring Failure	Replace O-Ring
Leak from lid	Cracks in lid	Order new lid from supplier
Higher flow reading than normal	Broken or weak spring	Replace spring
Lower flow reading than normal	Indicator arm stuck due to debris	Remove lid and clear debris
Flow indicator stuck at one position	Debris between indicator arm and lid	Remove lid and clear debris
Indicator always at max flow when pump running	Broken spring	Replace spring



## WARRANTY

**IMPORTANT, please read and keep this document on record.**

### 1. Definition

H2flow Controls, Inc., warrants the AcuFlow™ product for 3-years from its date of supply from H2flow Controls, Inc. or its stocking Distributor. In the event that the product experiences a premature failure due to defective workmanship or materials, H2flow will, at its discretion, replace either the failed component(s) or the complete AcuFlow unit. H2flow shall not be responsible for third-party labor or any consequential losses. Damage caused by improper installation, misuse or exposure to excessive chemicals such as acids or chlorine, will not be covered by this warranty.

### 2. Eligibility

This warranty extends to the original purchaser only or to the end-user client of an H2flow Controls Inc authorized affiliate.

### 3. How to obtain service

To obtain service under the terms of this warranty, the customer is required to notify H2flow Controls Inc. before the expiration of the warranty period and to return the item in accordance with H2flow Controls Inc's product return policy. Any product returned for warranty repair must be accompanied by a full fault report specifying the symptoms and the conditions under which the fault occurs. Should H2flow Controls Inc incur additional cost as a result of a failure to complete the appropriate paperwork, an administrative charge may be levied.

### 4. Exclusions

This warranty shall not apply to any defect, failure or damage caused by improper use or improper or inadequate care. H2flow Controls Inc. shall not be obligated to provide service under this warranty if:

- a) damage has been caused by a failure to make a full and proper inspection of the product (as described by the documentation enclosed with the product at the time of shipment) on initial receipt of the product following shipment;
- b) damage has been caused by the attempts of individuals, other than H2flow Controls Inc staff to repair or service the product;
- c) damage has been caused by the improper use of the product, including but not limited to, the installation of a AcuFlow unit using a chlorination system as described in this manual.

### 5. Charges

Under cover of this warranty, H2flow Controls Inc will pay the carriage and insurance charges for the shipment of defective product back to H2flow Controls Inc and for its return to the client's original site of dispatch except when:

- a) H2flow Controls Inc's product return policy has not been followed.
- b) product failure is caused by any of the exclusions described at paragraph 4 above, when the customer will be liable for the full cost of the repair (parts and labor) plus all carriage and insurance costs to and from H2flow Controls Inc's premises.
- c) the product is damaged in transit and a contributory cause is inadequate packaging. It is the customer's responsibility to ensure that the packaging used to return equipment to H2flow Controls Inc is the same, or has equivalent protective qualities, to that used to ship the product to the customer in the first instance. Any damage resulting from the use of inadequate packaging will nullify H2flow Controls Inc's obligations under this warranty.

Should the customer's product be damaged in transit following a repair at H2flow Controls Inc's site, a full photographic record of the damage must be obtained (packaging and the product) to support any claim for recompense. Failure to present this evidence may limit H2flow Controls Inc's obligations under this warranty.

**THIS WARRANTY IS GIVEN BY H2FLOW CONTROLS INC IN LIEU OF ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY, NON INFRINGEMENT OR FITNESS FOR A PARTICULAR PURPOSE. H2FLOW CONTROLS INC SHALL NOT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LOSSES. WE SPECIFICALLY DISCLAIM ANY AND ALL WARRANTIES TO CUSTOMERS OF THE CUSTOMER. THE CUSTOMER'S SOLE REMEDY FOR ANY BREACH OF WARRANTY IS THE REPAIR OR REPLACEMENT, AT H2FLOW CONTROLS INC'S DISCRETION, OF THE FAILED PRODUCT.**



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