



# **AURORA<sup>®</sup>** 1050 SERIES AIR SEPARATOR

# AURORA® 1050 SERIES

## Air Separator

### The Air Removal Requirement.

Air is introduced to a hydronic system:

- During initial fill
- While maintaining system pressure
- During routine equipment maintenance
- In a cooling tower operation

Fill water at 50°F (10°C) can hold up to 9% entrained air at 30 psig (207 kPa). When heated up to 200°F (93°C), the water can hold up to 4.5% entrained air. The remaining 4.5% air is released into the system as air pockets, bubbles, and microbubbles, that can negatively impact the performance of fluid flow or heat transfer equipment.

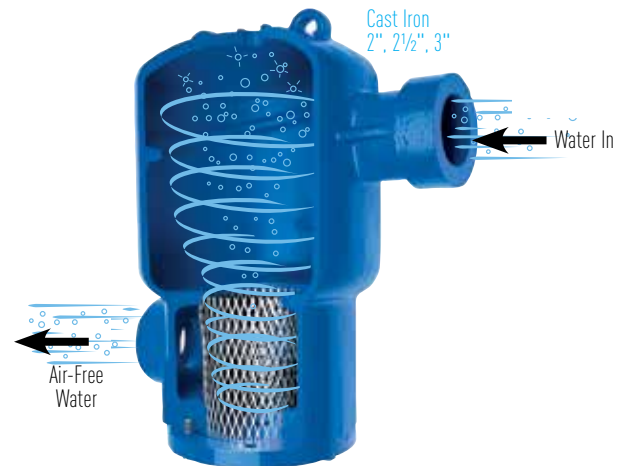
### How the Air Separator Removes Air.

Circulating the water through the Air Separator creates a vortex or whirlpool action, sending the heavier air-free water to the outer portion of the tank and allowing the lighter air-entrained water mixture to move into the lower velocity center. At the center of the vortex the air is released from the water, forms bubbles and exits through an air vent or compression tank installed above. Instead of relying entirely on low velocity separation, the Air Separator offers the advantage of efficient separation in a much smaller tank.

### The Benefit and Advantage of an Air-Free System.

Air-free water flow means improved systems operation and lower operating costs. The Air Separators eliminate entrained air from heating and cooling systems providing these benefits:

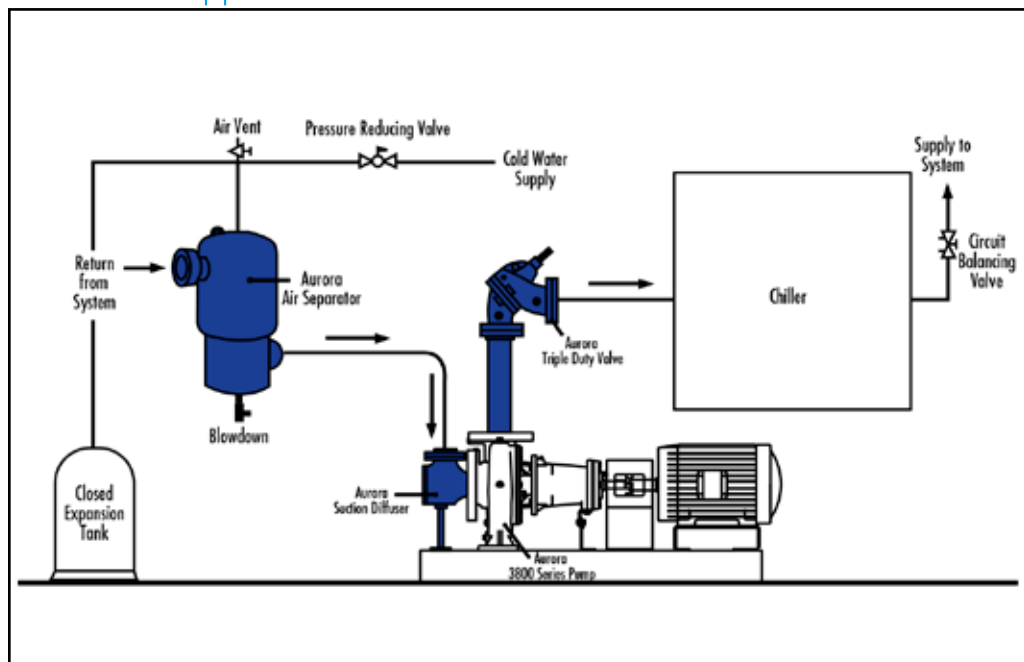
- Allows quick venting of air at start-up
- Reduces annoying noise caused by air entrained in the system
- Reduces service costs due to air-bound piping
- Extends the life of the system by reducing corrosion and erosion
- Improves heat transfer efficiency in boilers, fan coils, chillers, etc.
- Reduces the overall energy costs of your system
- Optimizes pump performance by reducing incidences of 'air lock'



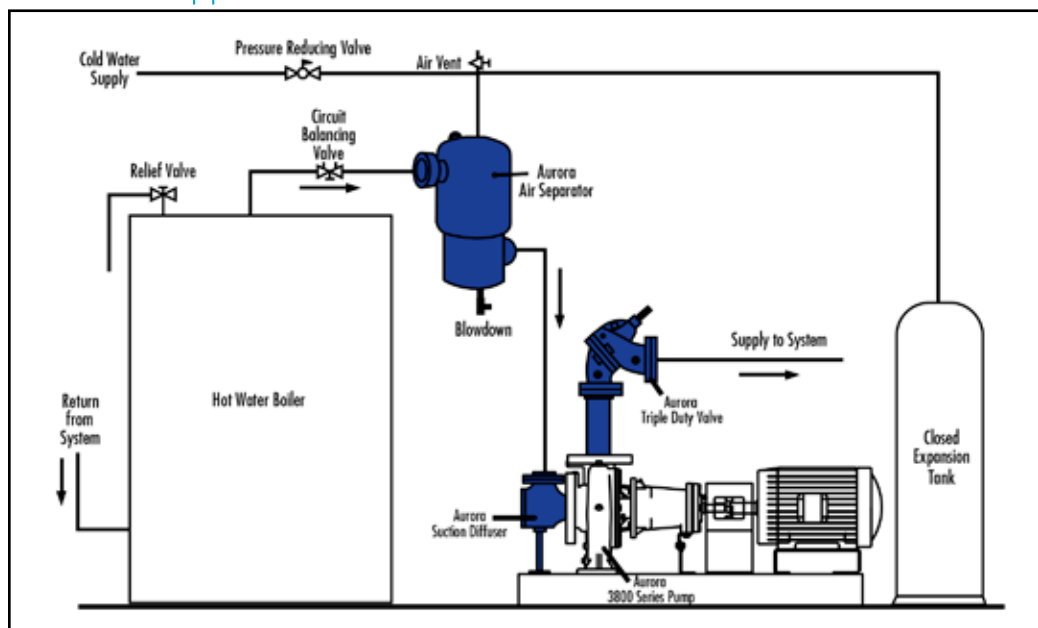
# Installation Schematics

Air Separators should be installed at the highest temperature and the lowest pressure points in the system. Where this is not possible, the best location is at the point of highest temperature. Ideally, a separator should be located on the outlet side of the boiler and the suction side of the pump.

## For Chiller Applications

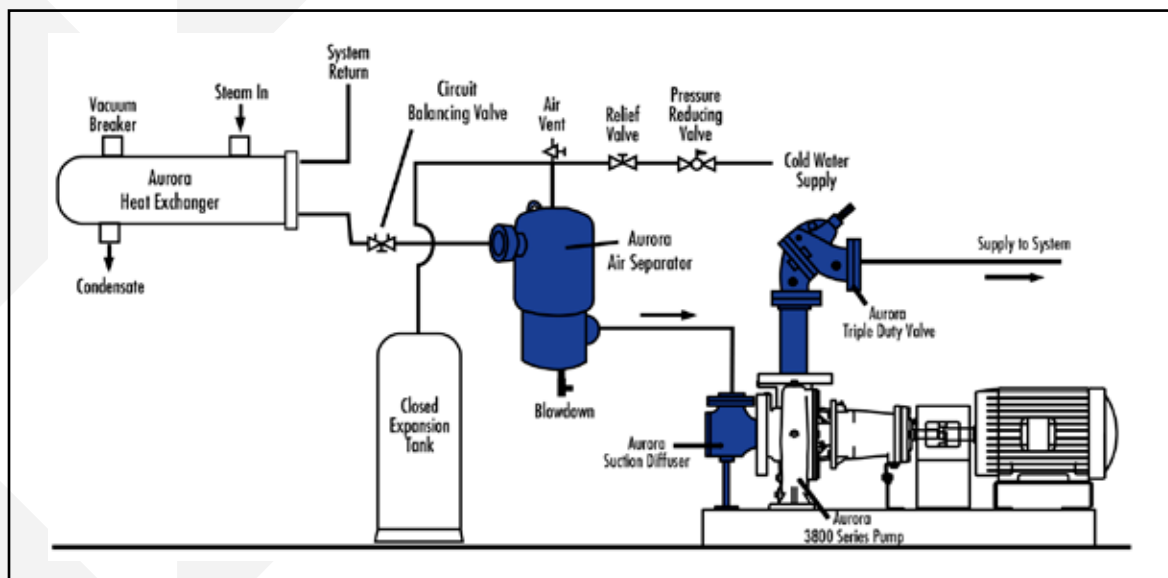


## For Boiler Applications

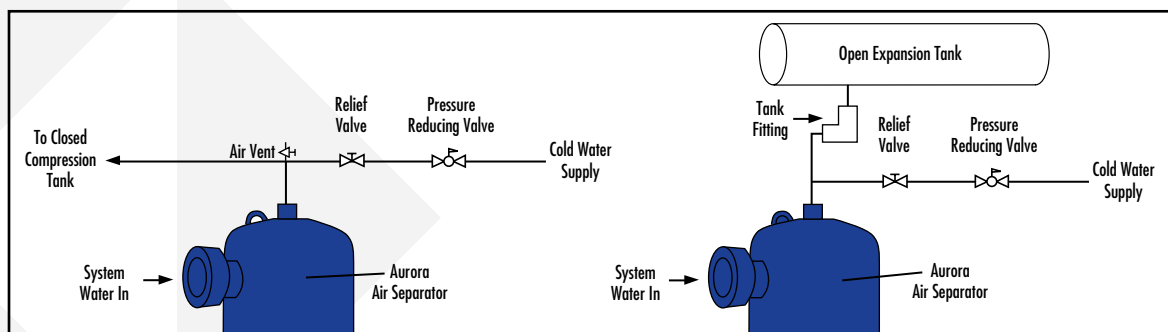


# Installation Schematics

## For Heat Exchanger Applications



## Typical Piping Connections to an Air Separator

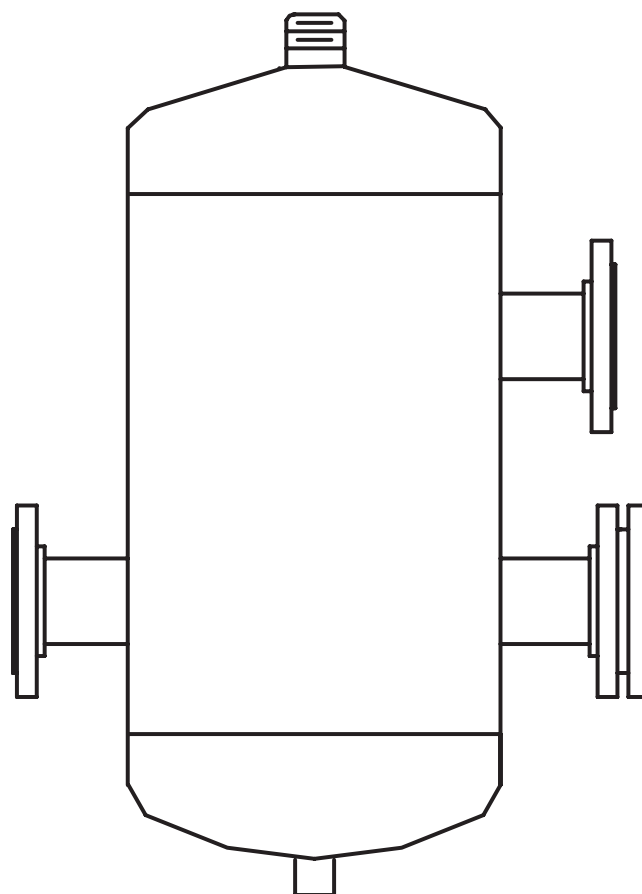


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**AURORA®**



# 1050 SERIES

## **VORTEX AIR SEPARATOR**

### **INSTRUCTION, INSTALLATION, MAINTENANCE AND REPAIR MANUAL**

NOTE! To the installer: Please make sure you provide this manual to the owner of the equipment or to the responsible party who maintains the system.

### **VESSEL DESCRIPTION:**

Aurora **1050 Series Vortex Air Separators** eliminate air quickly and efficiently from heating/cooling systems. Water enters and exits through unique "tangential" connections which promote a low velocity swirling effect in the center of the unit. Centrifugal force moves the water to the outer edges of the unit and a vortex is formed. Entrained air migrates to the eye of the vortex (lower pressure point) and is evacuated at the top of the separator. The water exits the unit near the bottom of the unit, bubble free, protecting the system against the noise, corrosion and damage associated with entrained air.

### **CONSTRUCTION DETAILS:**

<b>Materials of Construction</b>	
<b>2", 2.5" &amp; 3" – Cast Iron</b>	
Shell	Cast Iron
Strainer	Stainless Steel Mesh (¼" x ¾")
Gasket	Non-Asbestos
<b>4 to 6" – Cast Iron, 8" to 12" – Fabricated C. Steel</b>	
Shell	Cast Iron (4" to 6") – Fabricated Steel (8" to 12")
Strainer	Steel Mesh (¼" x ¾")
Gasket	Non-Asbestos
<b>14" to 24" – Fabricated C. Steel</b>	
Shell	Fabricated Steel
Strainer	Steel Mesh (¼" x ¾")
Gasket	Non-Asbestos
<b>Technical Data</b>	
<b>2", 2.5" &amp; 3" – Cast Iron</b>	
Max. Working Temp.	350°F (176°C)
Max. Working Pressure	160 psi (1105 kPa)
Connection Type	Threaded NPT
<b>4 to 6" – Cast Iron, 8" to 12" – Fabricated C. Steel</b>	
Max. Working Temp.	375°F (190°C)
Max. Working Pressure	4" to 6" Models – 160 psi (1103 kPa) 8" to 12" Models – 165 psi (1140 kPa)
Connection Type	150# Flanged ANSI (RFSO)
<b>14" to 24" – Fabricated C. Steel</b>	
Max. Working Temp.	450°F (232°C)
Max. Working Pressure	125 psi (865 kPa)
Connection Type	150# Flanged ANSI (RFSO)

### **CALIFORNIA PROPOSITION 65 WARNING:**

**▲ WARNING** This product and related accessories contain chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

### **Sizes: 2", 2.5" & 3" – Cast Iron**

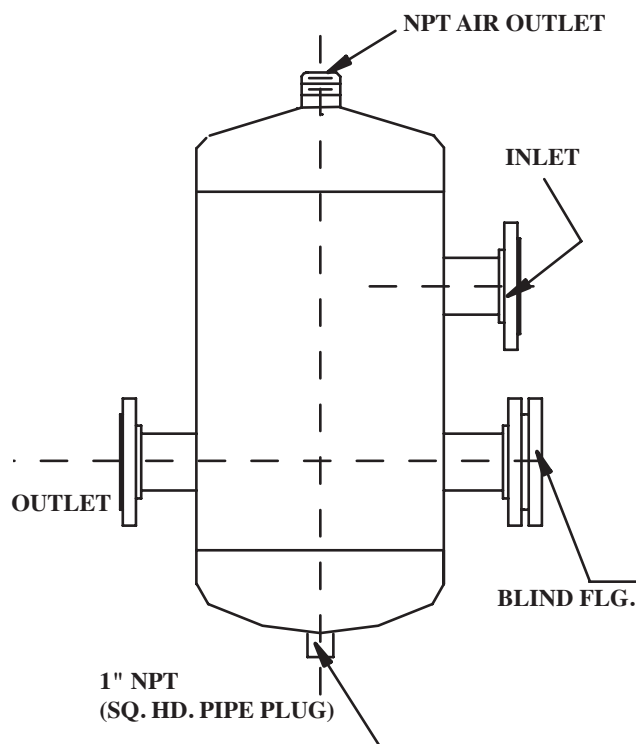


### **STEPS & PROCEDURE:**

- Visually inspect the air separator for damage, which may occur during transit.
- A manual drain can be added to help facilitate purging sediment from the air separator.
- 1050 Series have a strainer that must be removed and cleaned after 24 hours of operation.

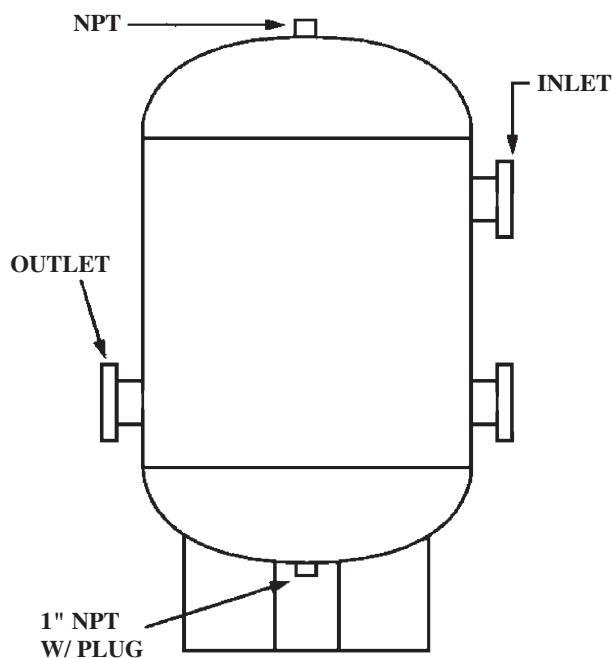
<b>Distance Required to Remove Strainer</b>	
<b>Size</b>	<b>Distance (mm)</b>
2.0	7.0" (178)
2.5	8.0" (203)
3.0	8.0" (203)
4.0	16" (406)
5.0	19" (483)
6.0	22" (558)
8.0	26" (660)
10.0	29" (737)
12.0	36" (914)
14.0	46" (1168)
16.0	60" (1524)
18.0	67" (1701)
20.0	72" (1829)
22.0	80" (2032)
24.0	85" (2159)

**Sizes: 4" to 6" – Cast Iron,  
8" to 12" – Fabricated C. Steel**



Distance Required to Remove Strainer	
Size	Distance in. (mm)
1050-4	16 (406)
1050-5	19 (483)
1050-6	22 (558)
1050-8	26 (660)
1050-10	29 (737)
1050-12	36 (914)

**Sizes: 14" to 24" –  
Fabricated C. Steel**



Distance Required to Remove Strainer	
Size	Distance in. (mm)
1050-14	46 (1168)
1050-16	60 (1524)
1050-18	67 (1701)
1050-20	72 (1829)
1050-22	80 (2032)
1050-24	85 (2159)



## WARRANTY

Seller warrants equipment (and its component parts) of its own manufacture against defects in materials and workmanship under normal use and service for one (1) year from the date of installation or start-up, or for eighteen (18) months after the date of shipment, whichever occurs first. Seller does not warrant accessories or components that are not manufactured by Seller; however, to the extent possible, Seller agrees to assign to Buyer its rights under the original manufacturer's warranty, without recourse to Seller. Buyer must give Seller notice in writing of any alleged defect covered by this warranty (together with all identifying details, including the serial number, the type of equipment, and the date of purchase) within thirty (30) days of the discovery of such defect during the warranty period. No claim made more than 30 days after the expiration of the warranty period shall be valid. Guarantees of performance and warranties are based on the use of original equipment manufactured (OEM) replacement parts. Seller assumes no responsibility or liability if alterations, non-authorized design modifications and/or non-OEM replacement parts are incorporated. If requested by Seller, any equipment (or its component parts) must be promptly returned to Seller prior to any attempted repair, or sent to an authorized service station designated by Seller, and Buyer shall prepay all shipping expenses. Seller shall not be liable for any loss or damage to goods in transit, nor will any warranty claim be valid unless the returned goods are received intact and undamaged as a result of shipment. Repaired or replaced material returned to customer will be shipped F.O.B., Seller's factory. Seller will not give Buyer credit for parts or equipment returned to Seller, and will not accept delivery of any such parts or equipment, unless Buyer has obtained Seller's approval in writing. The warranty extends to repaired or replaced parts of Seller's manufacture for ninety (90) days or for the remainder of the original warranty period applicable to the equipment or parts being repaired or replaced, whichever is greater. This warranty applies to the repaired or replaced part and is not extended to the product or any other component of the product being repaired. Repair parts of its own manufacture sold after the original warranty period are warranted for a period of one (1) year from shipment against defects in materials and workmanship under normal use and service. This warranty applies to the replacement part only and is not extended to the product or any other component of the product being repaired. Seller may substitute new equipment or improve part(s) of any equipment judged defective without further liability. All repairs or services performed by Seller, which are not covered by this warranty, will be charged in accordance with Seller's standard prices then in effect.

THIS WARRANTY IS THE SOLE WARRANTY OF SELLER AND SELLER HEREBY EXPRESSLY DISCLAIMS AND BUYER WAIVES ALL OTHER WARRANTIES EXPRESSED, IMPLIED IN LAW OR IMPLIED IN FACT, INCLUDING ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Seller's sole obligation under this warranty shall be, at its option, to repair or replace any equipment (or its component parts) which has a defect covered by this warranty, or to refund the purchase price of such equipment or part. Under the terms of this warranty, Seller shall not be liable for (a) consequential, collateral, special or liquidated losses or damages; (b) equipment conditions caused by normal wear and tear, abnormal conditions of use, accident, neglect, or misuse of said equipment; (c) the expense of, and loss or damage caused by, repairs or alterations made by anyone other than the Seller; (d) damage caused by abrasive materials, chemicals, scale deposits, corrosion, lightning, improper voltage, mishandling, or other similar conditions; (e) any loss, damage, or expense relating to or resulting from installation, removal or reinstallation of equipment; (f) any labor costs or charges incurred in repairing or replacing defective equipment or parts, including the cost of reinstalling parts that are repaired or replaced by Seller; (g) any expense of shipment of equipment or repaired or replacement parts; or (h) any other loss, damage or expense of any nature.

The above warranty shall not apply to any equipment which may be separately covered by any alternate or special warranties.

**PERFORMANCE:** In the absence of Certified Pump Performance Tests, equipment performance is not warranted or guaranteed. Performance curves and other information submitted to Buyer are approximate and no warranty or guarantee shall be deemed to arise as a result of such submittal. All testing shall be done in accordance with Seller's standard policy under Hydraulic Institute procedures.

**LIABILITY LIMITATIONS:** Under no circumstances shall the Seller have any liability under the Order or otherwise for liquidated damages or for collateral, consequential or special damages or for loss of profits, or for actual losses or for loss of production or progress of construction, regardless of the cause of such damages or losses. In any event, Seller's aggregate total liability under the Order or otherwise shall not exceed the contract price.

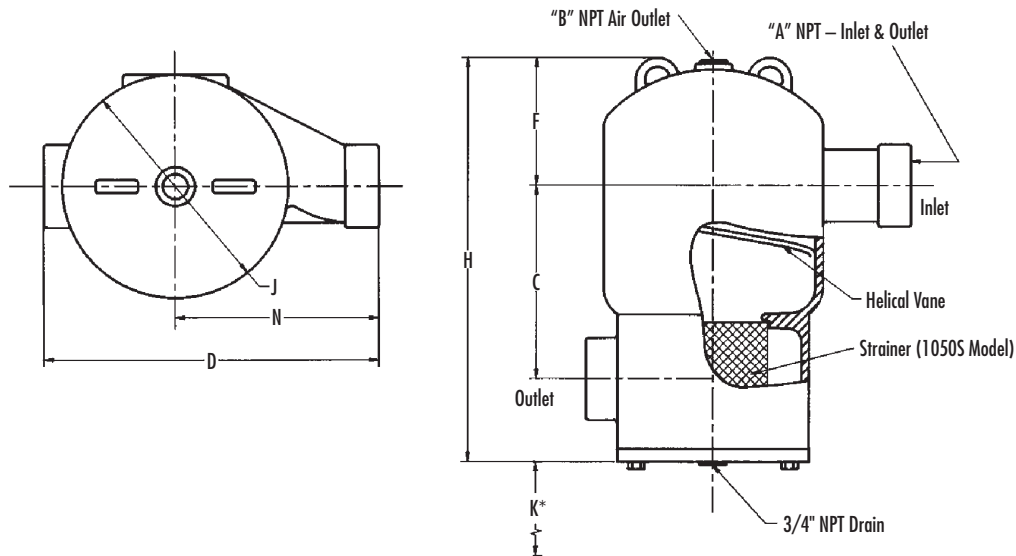
**ACTS OF GOD:** Seller shall in no event be liable for delays in delivery of the equipment or other failures to perform caused by fires, acts of God, strikes, labor difficulties, acts of governmental or military authorities, delays in transportation or procuring materials, or causes of any kind beyond Seller's control.

**COMPLIANCE WITH LAW:** Seller agrees to comply with all United States laws and regulations applicable to the manufacturing of the subject equipment. Such compliance shall include: The Fair Labor Standards Acts of 1938, as amended; Equal Employment Opportunity clauses of Executive Order 11246, as amended; Occupational Safety and Health Act of 1970 and the standards promulgated thereunder, if applicable. Since compliance with the various Federal, State, and Local laws and regulations concerning occupational health and safety, pollution or local codes are affected by the use, installation and operation of the equipment and other matters over which Seller has no control, Seller assumes no responsibility for compliance with those laws and regulations, whether by way of indemnity, warranty, or otherwise. It is incumbent upon the Buyer to specify equipment which complies with local codes and ordinances.



**AURORA®**

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\*K is distance required to remove strainer.

Model		DIMENSIONS in inches (mm)									FLOW RATE in US gpm (l/s) for LINE VELOCITY ft/s (m/s)			WEIGHT lbs. (kg)		STRAINER SCREEN FREE AREA
Less Strainer	With Strainer	A	B	C	D	F	H	J	K	N	4 (1.22)	6 (1.83)	8 (2.44)	1050	1050S	Sq. in. (Sq. cm)
1050-2	1050-2S	2.00 (51)	0.75 (19)	7.50 (191)	12.75 (324)	4.75 (121)	15.75 (400)	8.63 (219)	7.00 (178)	7.75 (197)	42 (2.6)	63 (4.0)	84 (5.3)	70 (32)	70 (32)	40 (258)
1050-2.5	1050-2.5S	2.50 (64)	0.75 (19)	9.25 (235)	15.50 (394)	6.15 (156)	19.00 (483)	10.70 (272)	7.88 (200)	9.50 (241)	60 (3.8)	90 (5.7)	120 (7.6)	100 (45)	100 (45)	67 (432)
1050-3	1050-3S	3.00 (76)	0.75 (19)	9.25 (235)	15.50 (394)	6.15 (156)	19.00 (483)	10.70 (272)	7.88 (200)	9.50 (241)	93 (5.9)	140 (8.8)	185 (11.7)	100 (45)	100 (45)	67 (432)

**NOTE:** Dimension "K" applies only to 1050S models.

#### Materials of Construction

Shell	Cast Iron
Strainer	Stainless Steel Mesh (1/4" x 3/4")
Gasket	Non-Asbestos

#### Technical Data

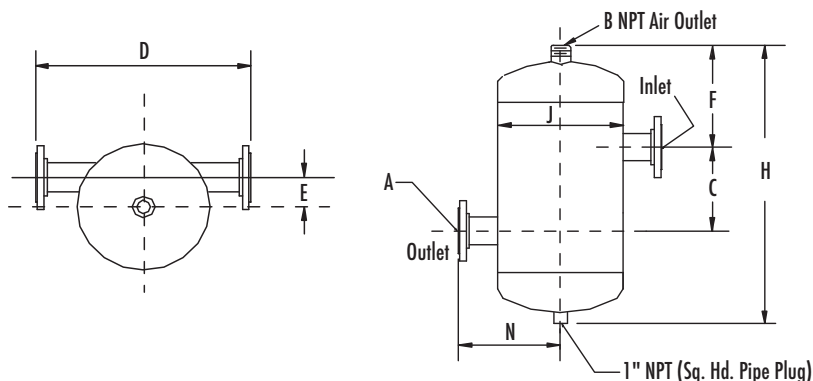
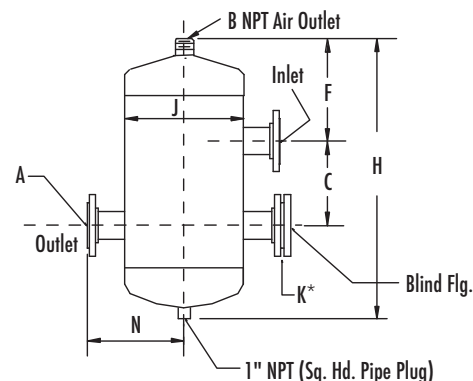
Max. Working Temperature	350°F (176°C)
Max. Working Pressure	160 psi (1105 kPa)
Connection Type	Threaded NPT

#### Typical Specification

ASME Coded Units	Non-ASME Coded Units
Furnish & install an Aurora Air Separator, Model ____ 1050 or Model ____ 1050S (with strainer) with NPT tangential connections as shown on plans. The unit shall be designed and built in accordance with the latest revisions of ASME Pressure Vessel Code, Section VIII, Division 1. A blowdown connection is provided for routine cleaning of the unit.	Furnish & install an Aurora Air Separator, Model ____ 1050 or Model ____ 1050S (with strainer) with NPT tangential connections as shown on plans. The unit is considered as "part of the piping" and no Code Inspection applies. A blowdown connection is provided for routine cleaning of the unit.

**AURORA ACCESSORIES****AIR SEPARATOR**

MODELS 1050/1050S – 4" TO 12"

**Model 1050****Model 1050S**

\*K is distance required to remove strainer.

Model		DIMENSIONS in inches (mm)										MAX. FLOW RATE in US gpm (l/s) for LINE VELOCITY ft/s (m/s)			WEIGHT lbs. (kg)		STRAINER SCREEN FREE AREA
Less Strainer	With Strainer	A	B	C	D	E	F	H	J	K	N	4 (1.22)	6 (1.83)	8 (2.44)	1050	1050S	Sq. in. (Sq. cm)
1050-4	1050-4S	4.00 (102)	1.50 (38)	9.50 (241)	18.00 (457)	2.25 (57)	6.80 (173)	22.25 (565)	10.75 (273)	16.00 (406)	9.00 (229)	160 (10.1)	240 (15.1)	320 (20.2)	121 (55)	151 (69)	76 (490)
1050-5	1050-5S	5.00 (127)	1.50 (38)	11.00 (279)	20.00 (508)	2.88 (73)	8.69 (221)	28 (711)	12.75 (324)	19.00 (483)	10.00 (254)	250 (9.84)	375 (14.8)	500 (31.6)	173 (79)	207 (94)	124 (800)
1050-6	1050-6S	6.00 (152)	1.50 (38)	12.50 (318)	24.00 (610)	4.00 (102)	9.85 (250)	32.24 (819)	16.00 (406)	22.00 (558)	12.00 (305)	360 (22.7)	540 (34.1)	720 (45.4)	264 (120)	306 (139)	183 (1181)
1050-8	1050-8S	8.00 (203)	2.00 (51)	16.00 (406)	28.00 (711)	5.00 (127)	12.81 (310)	41.25 (1048)	20.00 (508)	26.00 (660)	14.00 (356)	630 (39.8)	940 (59.3)	1250 (78.9)	228 (103)	332 (151)	302 (1949)
1050-10	1050-10S	10.00 (254)	2.00 (51)	20.00 (508)	32.00 (813)	5.75 (146)	15.00 (381)	49.50 (1257)	24.00 (610)	29.00 (737)	16.00 (406)	990 (62.5)	1500 (94.6)	1980 (124.9)	390 (177)	547 (248)	452 (2916)
1050-12	1050-12S	12.00 (305)	2.00 (51)	26.00 (660)	38.00 (965)	7.75 (197)	17.56 (446)	61.25 (1556)	30.00 (762)	36.00 (914)	19.00 (483)	1400 (88.3)	2100 (132.5)	2800 (176.7)	609 (276)	856 (388)	679 (4381)

**Materials of Construction**

Shell	4" to 6" Models: Cast Iron 8" to 12" Models: Fabricated Steel
Strainer	Stainless Steel Mesh (1/4" x 3/4")
Gasket	Non-Asbestos

**Technical Data**

Max. Working Temperature	375°F (190°C)
Max. Working Pressure	4" to 6" Models: 160 psi (1103 kPa) 8" to 12" Models: 165 psi (1140 kPa)
Connection Type	150# Flanged ANSI (RFSSO)

All models designed and built to ASME Pressure Vessel Code, Section VIII, Division 1.

**Typical Specification**

Furnish & install an Aurora Air Separator, Model \_\_\_\_ 1050 or Model \_\_\_\_ 1050S (with strainer) with flanged tangential connections as shown on plans. The unit shall be designed and built in accordance with the latest revisions of ASME Pressure Vessel Code, Section VIII, Division 1. A blowdown connection is provided for routine cleaning of the unit.

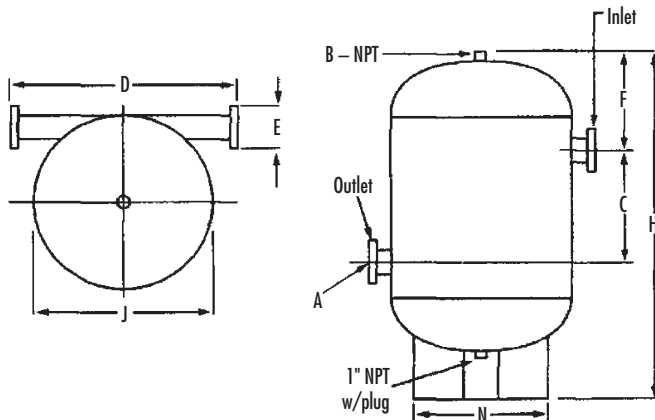
# AURORA ACCESSORIES

## AIR SEPARATOR

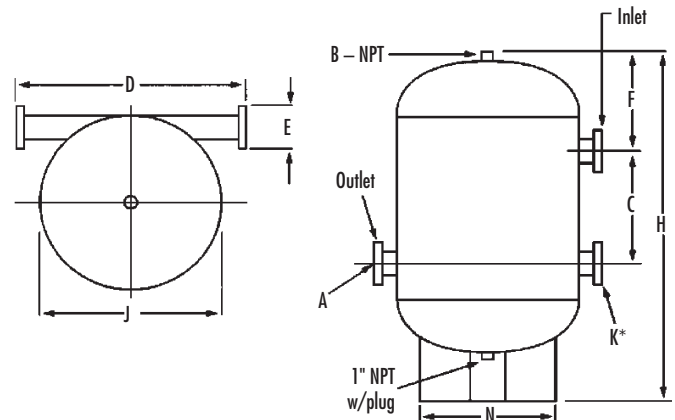
MODELS 1050/1050S - 14" TO 24"

Section **1050** Page **307**

Dated **MAY 2010**



**Model 1050**



**Model 1050S**

\*K is distance required to remove strainer.

Model		DIMENSIONS in inches (mm)										MAX. FLOW RATE in US gpm (l/s) for LINE VELOCITY ft/s (m/s)			WEIGHT lbs. (kg)		STRAINER SCREEN FREE AREA
Less Strainer	With Strainer	A	B	C	D	E	F	H	J	K	N	4 (1.22)	6 (1.83)	8 (2.44)	1050	1050S	Sq. in. (Sq. cm)
1050-14	1050-14S	14 (356)	2 (51)	31.50 (800)	46.38 (1178)	14 (356)	22 (559)	78 (1981)	36 (914)	46 (1168)	30 (762)	1680 (106.0)	2500 (157.7)	3350 (211.4)	1680 (762)	1848 (838)	810 (5226)
1050-16	1050-16S	16 (406)	2 (51)	40 (1016)	60 (1524)	16 (406)	30 (762)	108 (2743)	48 (1219)	60 (1524)	38 (965)	2200 (138.8)	2800 (176.7)	3500 (220.8)	2300 (1043)	2530 (1148)	969 (6252)
1050-18	1050-18S	18 (457)	2 (51)	50 (1270)	66 (1676)	18 (457)	33 (838)	124 (3150)	54 (1372)	67 (1702)	44 (1118)	3300 (208.2)	4200 (265.0)	5200 (328.1)	3235 (1467)	3559 (1614)	1517 (9787)
1050-20	1050-20S	20 (508)	2 (51)	60 (1524)	72 (1829)	20 (508)	35 (889)	138 (3505)	60 (1524)	72 (1829)	50 (1270)	4500 (283.9)	5600 (353.3)	7000 (441.6)	5100 (2313)	5610 (2545)	1860 (12000)
1050-22	1050-22S	22 (559)	2 (51)	66 (1676)	78 (1981)	22 (559)	38 (965)	150 (3810)	66 (1676)	80 (2032)	56 (1422)	5000 (315.5)	6300 (397.5)	7900 (498.4)	6150 (2790)	6765 (3069)	2073 (13374)
1050-24	1050-24S	24 (610)	2 (51)	66 (1676)	78 (1981)	22 (559)	38 (965)	150 (3810)	66 (1676)	85 (2159)	56 (1422)	5500 (347.0)	7000 (441.6)	8800 (551.21)	6400 (2903)	7931 (3597)	2712 (17497)

Custom sizes larger than 24" available.

### Materials of Construction

Shell	Fabricated Steel
Strainer	Steel Mesh (1/4" x 3/4")
Gasket	Non-Asbestos

### Technical Data

Max. Working Temperature	450° (232°C)
Max. Working Pressure	125 psi (865 kPa)
Connection Type	150# Flanged ANSI (RFSO)

All models designed and built to ASME Pressure Vessel Code, Section VIII, Division 1.

### Typical Specification

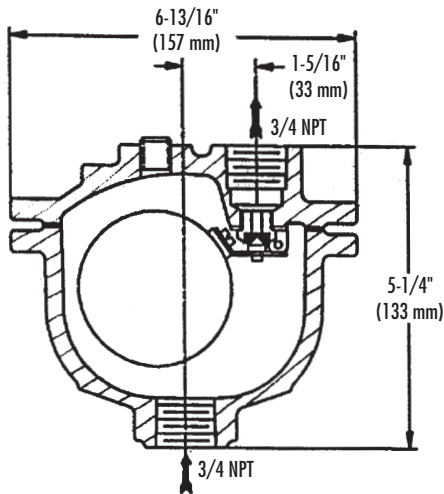
Furnish & install an Aurora Air Separator, Model \_\_\_\_ 1050 or Model \_\_\_\_ 1050S (with strainer) with flanged tangential connections as shown on plans. The unit shall be designed and built in accordance with the latest revisions of ASME Pressure Vessel Code, Section VIII, Division 1. A blowdown connection is provided for routine cleaning of the unit.

# AURORA ACCESSORIES

## AUTOMATIC AIR ELIMINATOR MODEL 1050AE

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Dated **MAY 2010**

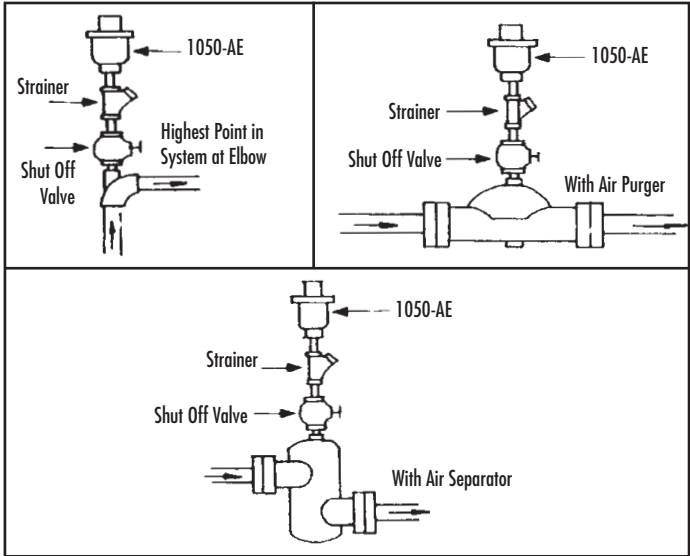


### Specifications

Maximum Operating Temperature	250°F (121°C)
Air Elimination Range	2 to 133 psi (9 bar)

### Materials of Construction

Cover and Body	Cast Iron
Control Portion	Stainless Steel
Bolts	Carbon Steel
Valve Seat	Viton
Weight	8 Lbs.

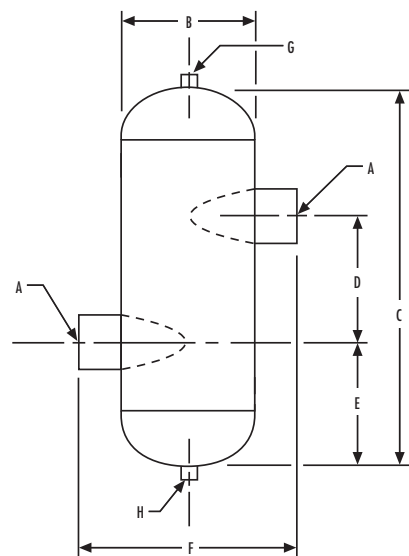


### Installation

1. Install the 1050-AE in a vertical position with the system connection at 6 o'clock and the air passage to atmosphere at 12 o'clock.
2. The air passage opening at the top must be kept open and not plugged or blocked. It is recommended that a drain tube be installed from this opening to an open drain to prevent water damage in the event the operating mechanism becomes fouled by foreign material.
3. A strainer is recommended (installed as shown) on systems that could contain suspended particles which would affect the proper operation of this vent.

**AURORA ACCESSORIES**

AIR ELIMINATOR  
MODEL 1050-AE1 – 1"



**Materials of Construction**

Body	Steel
System Connection	Steel

Designed and constructed per ASME, Section VIII, Division 1.

**Maximum Operating Conditions**

Working Temperature	350°F (176°C)
Working Pressure	125 psi (862 kPa)

Model	A	B	C	D	E	F	G	H	Shipping Weight lbs. (kg)
	NPT	inches (mm)	inches (mm)	inches (mm)	inches (mm)	inches (mm)	NPT	NPT	
1050-AE1	1.00	4.50 (114)	12.00 (305)	4.00 (102)	4.00 (102)	7.00 (178)	0.75	0.75	15 (7)