OVAL

Low Pressure Service
AIR ELIMINATOR
(for loading service)

GENERAL SPECIFICATION
GS.No.GCC001E-9

■ GENERAL

When metering a liquid with a flowmeter, accurate flow measurement is not possible, no matter how accurate the meter may be, if entrained air or vapor is present in the liquid. Experience shows that such entrainment often takes place at the beginning or at the end of a given metering run. An air eliminatory is used to remove entrained air and vapor before the liquid enters the meter to ensure correct flow rate measurements.

■ GENERAL SPECIFICATIONS

The fact is that the greater the capacity of an air eliminator, the greater the air eliminating capability. It is important that the correct size and type are chosen.
Factors to be taken into consideration in the selection are (1) application, (2) type of liquid, (3) flow rate, viscosity, specific gravity, and (4) pressure:

1. Applicati
Elimination of small quantities of air introduced temporarily during transfer between storage tanks, pumping to barges or tankers, loading tank trucks or lorries, process control, etc.

2. Liquid to be Applied
Gasoline, JP4, kerosene, water, alcohol, crude oil, gas oil, fuel oil, etc.

3. Applicable standar
Standards applicable to "Secondary Class Pressure Vessels" in Japanese laws (x-ray test and stress relief are not applied.)

4. Maximum Operating Pressure：0.97MPa

5. Hydraulic Test Pressure：1.46MPa

6. Maximum Operating Temperature：80℃(Standard)

7. Connection Flange Rating：
JIS 10K FF(Standard), JIS 10K RF,
ANSI 150 RF, JPI 150 RF

8. Materials：Body; Steel sheet (SS400)
Vent Valve; Stainless steel
SUS304/SCS13
Valve Seat; Viton

9. Coating color：Muncell 2.5G 8/2 (Standard)

10. Accessor
(1) Safety Valve ：Spring Loaded Type
Connection ：Rc ¾ (for Capacity Model 06 to 20)
Rc1(for Capacity Model 30 to 60)
(2) Pressure Gauge：Enclosed Type
Full Scale ：0 to 1.5MPa
Connection ：G ½
(3) Pressure Gauge Valve
Connection ：G ½

11. Options
(1) Anchor bolts(rour, with nuts)
(2) Drain valve(gate valve)
(3) Vent line air release valve(gate valve)
(4) Siphon for pressure gauge(when max. operating temp. exceeds 80℃)
(5) Heater
Heating coil：¾″ standard, steel pipe (STPG370S)
Steam pressure ：0.19MPa
Max. temperature：120℃
(6) Heat insulator support rings
(Required for holding insulating material in an installation where the body needs heating externally.)

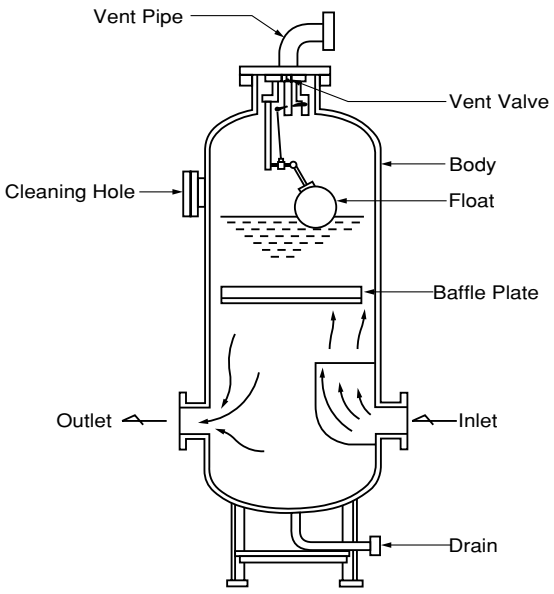
■ INDIVIDUAL SPECIFICATIONS

Gravity Type（Self Venting）

Model	Max. Flow rate m^3/h	Max. Venting Capacity at Critical Vent Valve Pres. m^3/h	Acceptable Sp. Gr. Range	Max. Vent Valve Operating Pressure MPa	Inlet & Outlet Nominal size mm	Vent Valve Type
AE $\frac{1}{1}\frac{0}{5}$3G**06**31	320	14	0.7 to 1.1	0.97	100, 150	WS−IV
AE $\frac{1}{2}\frac{5}{0}$3G**10**31	550	14	0.7 to 1.1	0.97	150, 200	WS−IV
AE253G**20**31	900	77	0.65 to 1.1	0.97	250	WS− V
AE253G**30**31	1200	77	0.65 to 1.1	0.97	300	WS− V
AE $\frac{3}{3}\frac{0}{5}$3G**40**31	1600	77	0.65 to 1.1	0.97	300, 350	WS− V
AE $\frac{4}{4}\frac{0}{5}$3G**50**31	2500	77	0.65 to 1.1	0.97	400, 450	WS− V
AE $\frac{4}{5}\frac{5}{0}$3G**60**31	3200	77	0.65 to 1.1	0.97	450, 500	WS− V

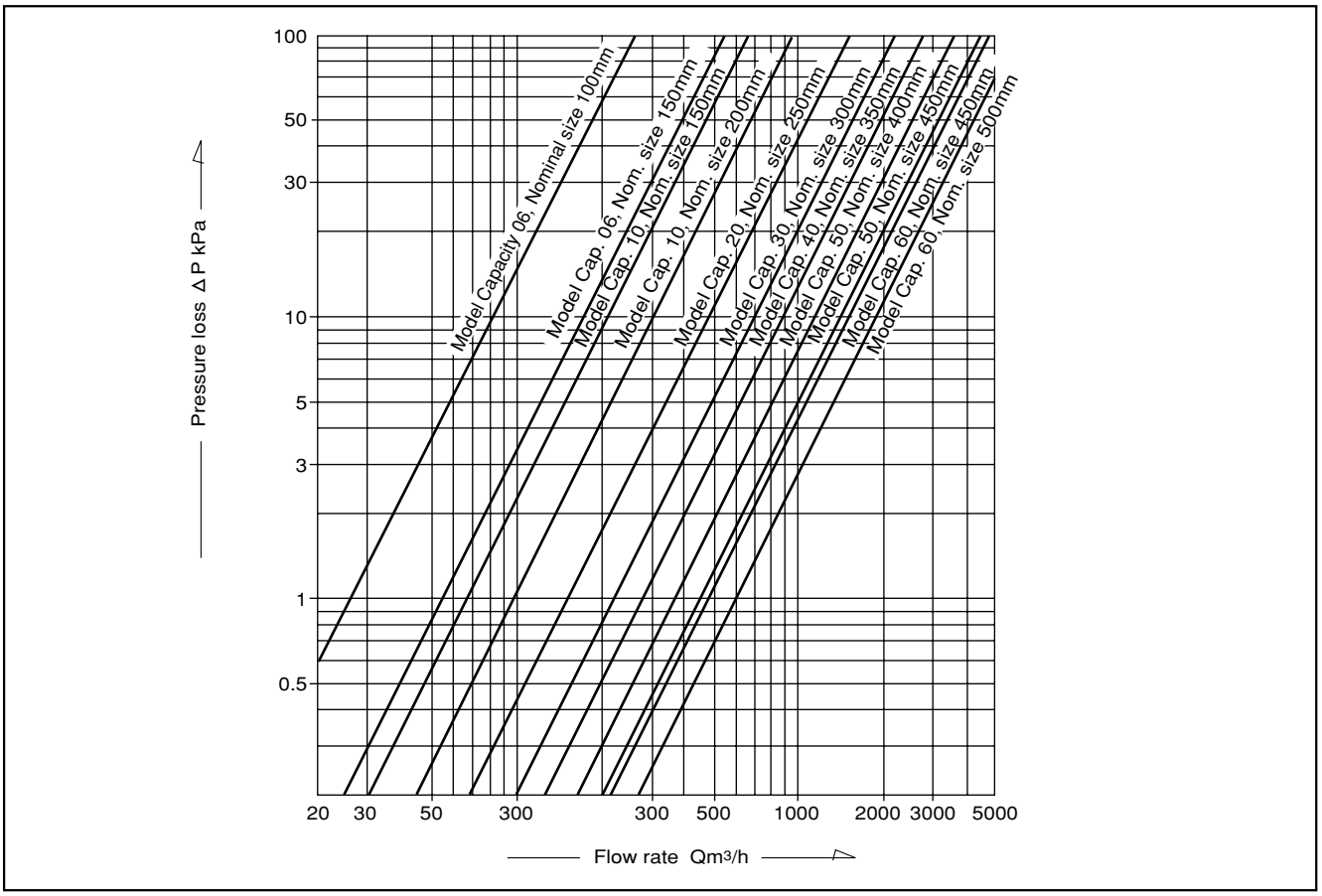
Bold letters mean capacity model of air eliminator.

■ CONSTRUCTION AND OPERATING PRINCIPLE

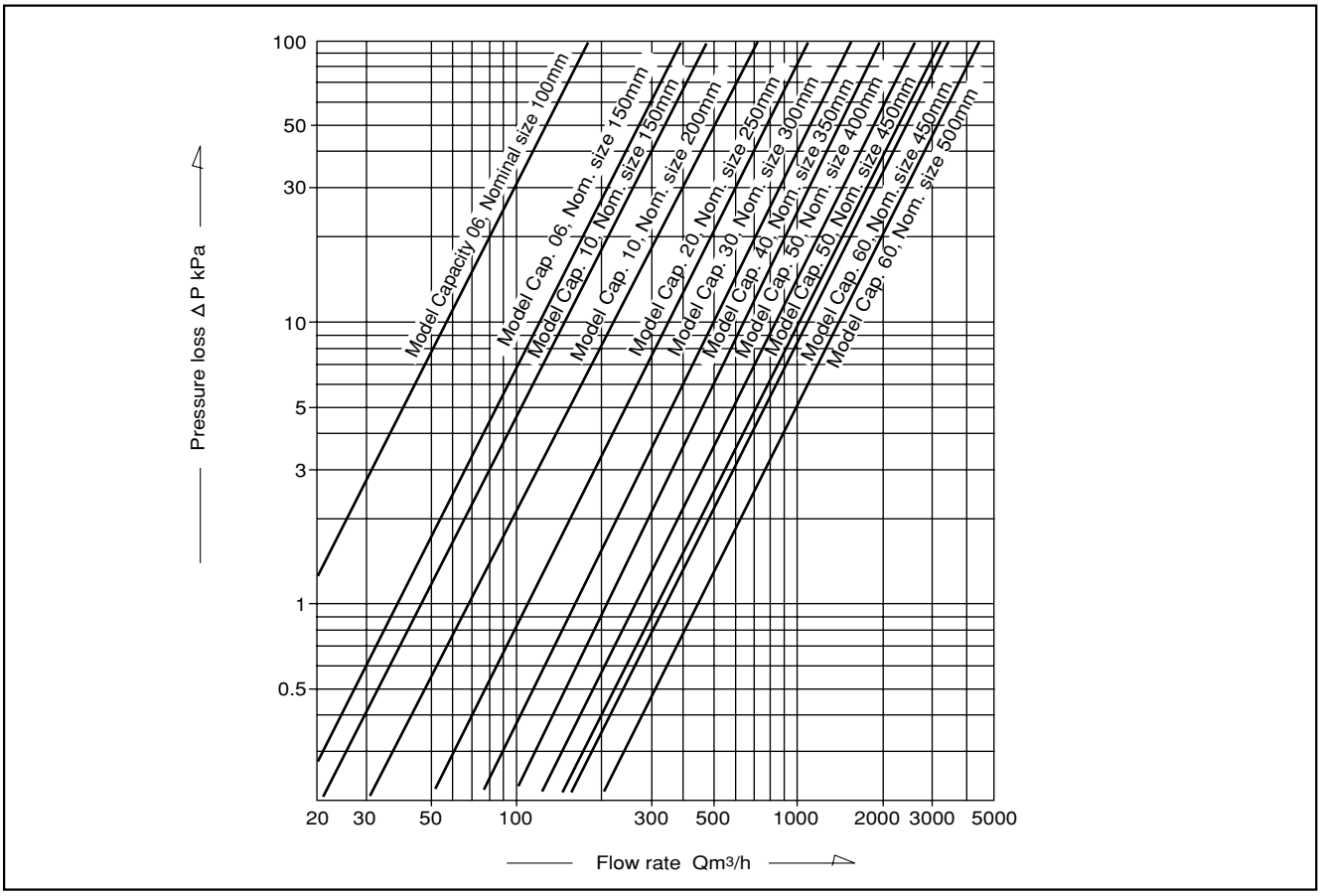
Construction	Principle of Operation
	The air bubble containing fluid introduced at the inlet port rises along the inner wall of the body at a high velocity, and ascend toward the liquid surface. Fluid with no bubbles moves slowly along the inner wall down towards the outlet. Separated air collects in the top of the chamber and forces the liquid level down. When the level drops to a specific point, a valve opens and discharges the air to atmosphere. The baffle plate serves to prevent turbulence of the liquid surface, insuring stability of float movement. （Vent valve types：WS−IV, WS−V）

■ PRESSURE LOSSES

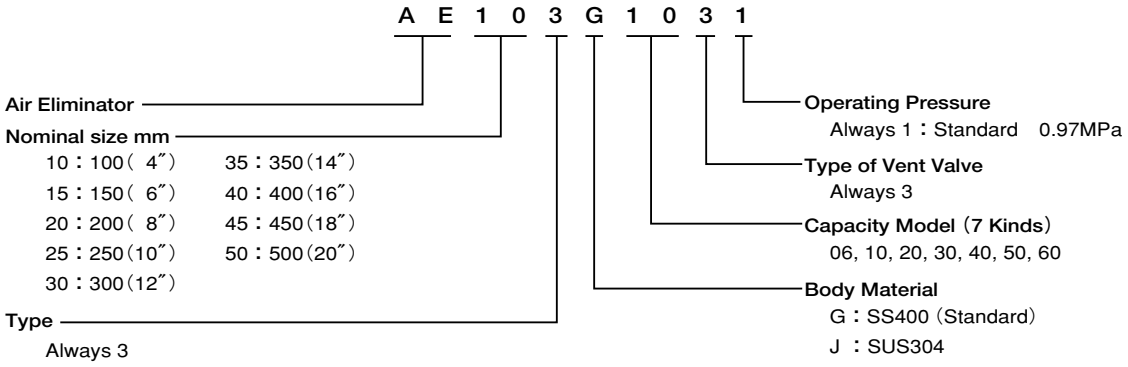
● **Type of Liquid：Gas oil（viscocity 4.7mm²/s）**



● **Type of Liquid：Fuel oil（kinetic viscocity 110mm²/s）**

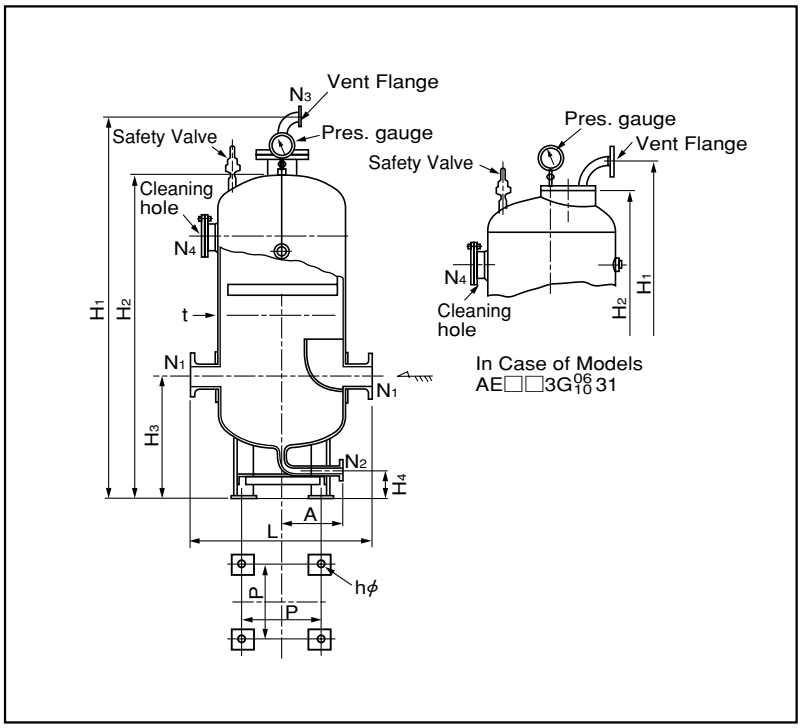


■ MODEL CODE NUMBER

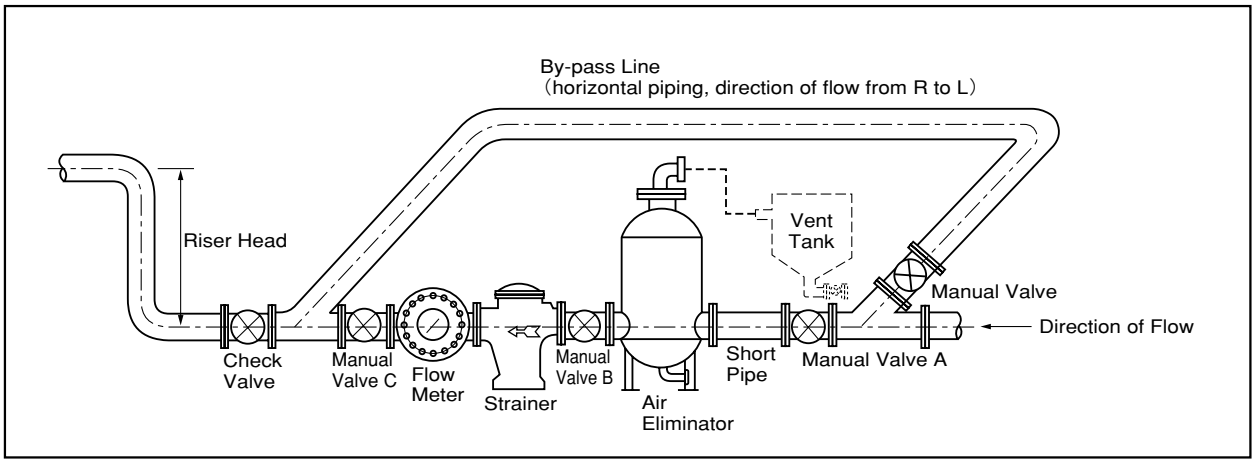


■ DIMENSIONS（Unit in mm）

Model	Nom. size N_1	L	ϕD	H_1	H_2	H_3	H_4	A	P— ϕh	ϕN_2	ϕN_3	ϕN_4	t	Approx. Weight kg	Inner Capacity m^3
AE$^{10}_{15}$3G0631	100, 150	800	400	1360	1250	600	150	300	255—19	25	20	80	6	150	0.12
AE$^{15}_{20}$3G1031	150, 200	1000	600	1898	1785	700	150	350	400—19	25	20	100	6	275	0.40
AE253G2031	250	1150	750	2290	1984	800	150	400	500—23	25	25	100	9	480	0.68
AE253G3031	300	1400	950	2615	2414	950	180	500	640—23	40	25	100	9	690	1.34
AE$^{30}_{35}$3G4031	300, 350	1650	1150	2825	2641	1000	180	600	790—23	40	25	400	12	1225	2.17
AE$^{40}_{45}$3G5031	400, 450	1800	1300	3214	2996	1100	180	650	880—33	50	25	400	12	1600	3.28
AE$^{45}_{50}$3G6031	450, 500	2000	1500	3600	3311	1250	180	700	1020—33	50	25	400	14	2220	4.80



■ TYPICAL PIPING LAYOUT



To maintain the stated performance of your air eliminator throughout its service life, observe the following instructions:

1. Sequence of component installation—Install, from the inlet side, the air eliminator, strainer, and flowmeter, in this order.
2. The basic unit must be installed vertically.
3. Air pressure inside the air eliminator must be higher than the atmospheric pressure to effect venting.
   To fill the flowmeter piping system with liquid, provide a riser pipe downstream of the meter.
   A riser head is not necessary in a case where a storage tank is installed downstream of the meter and its tank head acts on the air eliminator.
4. Vent tank installation—In the case the vent is open to the atmosphere, small quantities of petroleum products or vaporized products contained in the discharged gas are hazardous. From a safety viewpoint, installing a vent tank to collect the entrained products is suggested (available upon request.)
5. Provide as long a straight pipe section as circumstances permit ahead of the air eliminator.
   Avoid turbulence causing objects in the stream, e.g. partially open valves. Gate valves are recommended.
6. The flow is controlled with valve C on the discharge side of the flowmeter.
7. When handling fluids which must be heated to prevent solidification or for high viscosity, open valve C after confirming the fluid is heateded up to a desirable temperature level.
8. On large air eliminators, provision of a vent valve maintenance stage is suggested.

■ Relevant Rules and Regulations

Keep in mind that air eliminators come under the following regulations:

Pressure vessels of the second kind

Ordinary low pressure liquid service air eliminators are categorized within the classification of pressure vessels of the second kind (vessels rated greater than 0.2MPa in internal pressure and larger than 0.04m^3 in internal capacity) under the "Boilers and Pressure Vessels Safety Rules and Regulations" of the Labor Ministry.
Since these regulations apply to low pressure service air eliminators in Japan, OVAL products are manufactured and tested according to these regulatory compliance requirements before they leave our factory.

REMINDER: You may be asked to submit documents necessary for the air eliminator(s) subject to the rules and regulations above before undergoing a compliance testing. For details, see "ORDERING INSTRUCTIONS."

■ WHEN YOU MAKE INQUIRIES

When you make inquiries on our air eliminators, supply the following information, filling out the blanks or writing check marks in the brackets ☐.

1	**Application**	☐ Loading ☐ Process control
2	**Model**	AE _____
3	**Quantities Desired**	_____
4	**Properties of Product**	Name_____ Sp.Gr. ρ = _____ at _____ ℃ Viscosity μ = _____ mPa･s Kinematic Viscosity_____ mm^2/s at _____℃
5	**Flow rates m^3/h**	Max._____ Nor._____ Min._____ m^3/h
6	**Operating Pressures**	Max._____ Nor._____ Min._____ MPa
7	**Operating Temperatures**	Max._____ Nor._____ Min._____ ℃
8	**Flange Rating**	☐ JIS 10K FF ☐ JIS 10K RF ☐ ANSI 150 RF ☐ JPI 150 RF ☐ Specification _____
9	**Materials**	Other than standard specifications, specify for body, flanges, bolts, nuts, packing, etc.
10	**Options**	☐ Anchor bolts ☐ Drain valve ☐ Vent valve ☐ Heat insulating material support rings ☐ Internal heating coil If you desire an internal heating coil through which hot water or steam is to be circulated, specify the following: ○ Mame of heating medium _____ ○ Pressure of heating medium _____ MPa ○ Temperature of heating medium _____ ℃ ○ Boiling point of product to be metered _____ ℃ NOTE: In case of heating the unit, a heat line control arrangement is required to keep the temperature below the boiling point of the flowing material being meterd. ☐ Companion flanges Specify main line flange, vent flange, drain flange, etc.
11	**Safety Valve Pressure Setpoint**	
12	**Testing**	Standard eliminators are not subjected to X-ray testing, nondestructive testing, destructive testing, gastight testing, or pressure testing. If you desire these tests, specify the details of inspection desired.

OVAL

Low Pressure Service
AIR ELIMINATOR
(for unloading service)

GENERAL SPECIFICATION
GS.No.GCC002E-8

■ GENERAL

When metering a liquid with a flowmeter, precise flow measurement is not possible, no matter how accurate the meter may be, if entrained air or vapor is present in the liquid. Experience shows that such entrainment often takes place at the beginning or at the end of a given metering run. An air eliminatory is used to remove entrained air and vapor before the liquid enters the meter to ensure correct flow rate measurements.

■ GENERAL SPECIFICATIONS

The fact is that the greater the capacity of an air eliminator, the greater the air eliminating capability. It is important that the correct size and type are chosen.
Factors to be taken into consideration in the selection are (1) application, (2) type of liquid, (3) flow rate, viscosity, specific gravity, and (4) pressure:

1. Application
Elimination of large quantities of air temporarily carried along during pumping from barges or tankers, pumping out from rail trucks or tank trucks, etc.

2. Liquid to be Applied
*Low viscosity products-gasoline, JP4, kerosene, water, alcohol, etc. i.e. below 2mPa·s and having least tendency to foam. (Consult OVAL for naphtha.)
*High viscosity products-crude oil, light oil, heavy oil, caustic soda, etc. i.e. products having a tendency to foam or products above 2mPa·s.

3. Applicable standards
Standards applicable to "Secondary Class Pressure Vessels" in Japanese laws (x-ray test and stress relief are not applied.)

4. Maximum Operating Pressure：0.97MPa

5. Hydraulic Test Pressure：1.46MPa

6. Maximum Operating Temperature：80℃

7. Max. Vent Valve Operating Pressure：
TYPE DP・I, II：0.02 to 0.97MPa
Ball Valve： 0 to 0.97MPa

8. Acceptable Sp.Gr. Range：0.65 to 1.1g/mL

9. Connection Flange Rating：
JIS 10K FF (Standard), JIS 10K RF,
ANSI 150 RF, JPI 150 RF

10. Materials：Body; Steel sheet (SS400)
Vent Valve; Stainless steel SUS304/SCS13
Valve Seat; Viton

11. Coating color：Muncell 2.5G 8/2 (Standard)

12. Accessories

(1) Safety Valve
The following safety valves are available depending on types of air eliminators and types of liquids to be metered.
Type of safety valve：lifting and enclosed, spring used designs.

Model capacity	Nom. size and type of connection	Material
10, 20	Rc¾ screw-in	FC200／SUS420J2
30, 40, 50, 60	Rc 1 screw-in	FC200／SUS420J2
65, 67	40～50mm Flange	SCPH2／SUS304
68	50～80mm Flange	SCPH2／SUS304

(2) Pressure Gauge
Full scale ：0 to 1.5MPa
Type ：Enclosed
Connection：G½
Material ：SUS316

(3) Pressure Gauge Valve
Connection：G½
Material ：SUS316

The following parts are also furnished as accessories with (1), (2) and (3) above on forced-venting air aliminators.

(4) Differential pressure transmitter (YEW-make model 15A)

(5) Ball valve w/positioner＝Vent valve
The ball valves are available in different connection sizes depending on the air eliminator to be used.

● Ball valve

Model capacity	Connection Nom.size	Material
65	65mm	SCPH2／SUS13
67	※65 or 80mm	
68	※80 or 100mm	

Flange rating：JIS 10K FF
※：Standard

(6) Pressure reducing valve w/filter (Type 1301－8002)
(7) Three-way valve (option：used only when a backup is required.)
(8) Connecting unit for differential pressure transmitter
(9) Air piping unit

13. Option

The following optional parts are available depending on customer's requirements.

(1) Anchor bolts (w/nuts); 4 pcs. (material：SS400)
(2) Siphon for pressure gauge
(Required when liquid temperature exceeds 80℃)
(3) Companion flange, bolts, nuts and gaskets
(4) Drain valve
Flange ball valve

Model capacity	Connection Nom. size mm	Material
10, 20	25	SFVC2A／SUS420J2 SUSF304／SUS304
30, 40	40	
50, 60, 65 67, 68	50	

Flange rating：JIS 10K FF

(5) Vent valve for discharge line
Flanged gate valve

Model capacity	Connection Nom. size mm		Material
10, 20	40		SFVC2A/SUS420J2 SUSF304/SUS304
30	50		
40, 50	65		SCPH2/SUS403 SUSF304/SUS304
60	80		
65	Seif-venting	Forced-venting	
	80	65	
67	100	65 or 80	
68	80 or 100		

Flange rating：JIS 10K FF

(6) For an installation where heating is required, steam trace furnished eliminators can be sapplied.
Steam trace：¾″ Steel pipe (STPG370-S) as standard
Steam pressure：0.2MPa
Max. operating temperature：120℃
(7) Maintenance ladder
(8) Heat insulator support ring
(Required for holding insulating material in an installation where the body needs external heating)
(9) Jig plate
(Required to hold anchor bolts during installation)

■ INDIVIDUAL SPECIFICATIONS

Group 1 Gravity Type（Self Venting）

Model	Max. Regular Unloading Flow rate m^3/h		Max. Venting Capacity at critical Vent Valve Pres. m^3/h	Inlet & Outlet Nom.size mm	Vent Valve Type
	Low Viscosity Liquid	High Viscosity Liquid			
AE□□4G**1**011	※ 160	※ 120	95	50, 80, 100	DP－I
AE□□4G**2**011	※ 280	※ 230	165	80, 100, 150	DP－I
AE□□4G**3**011	※ 420	※ 340	250	100, 150, 200	DP－I
AE□□4G**4**011	※ 575	※ 530	345	150, 200	DP－I
AE□□4G**5**011	※ 815	※ 690	490	150, 200, 250	DP－II
AE□□4G**6**011	1200	930	760	250, 300	DP－II

NOTE:The maximum pumping rate of oil in normal use is set to 1.33 times the maximum flowrate with some air entrapment. If an operating condition where air entrapment falls below 50% is met, the maximum pumping rate of oil, only for the flowrates marked by an asterisk (※) in the table above, can be increased to a higher rate - multiplied by a factor α of its accompanying table.
Example: With a low-viscosity liquid service air eliminator size 20：$280m^3/h \times 1.3 \fallingdotseq 360m^3/h$

Factor \ Model Capacity	10	20	30	40	50
α	1.3	1.3	1.3	1.2	1.15

Group 2 Vortex Type（Self Venting）

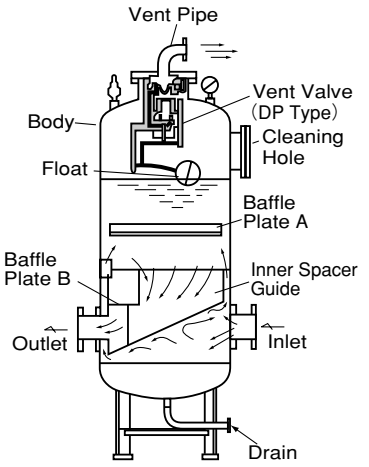
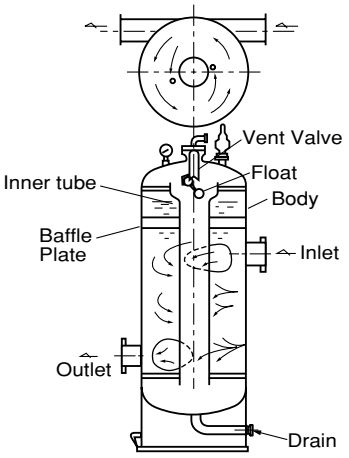
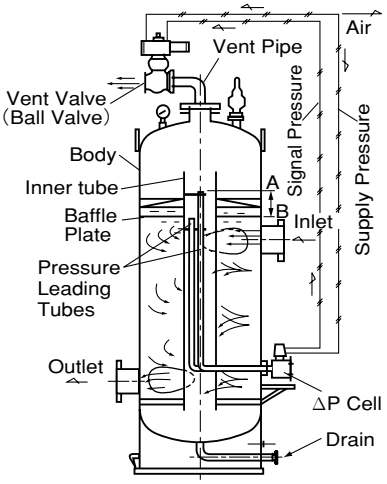
Model	Max. Regular Unloading Flow rate m^3/h		Max. Venting Capacity at critical Vent Valve Pres. m^3/h	Inlet & Outlet Nom.size mm	Vent Valve Type
	Low Viscosity Liquid	High Viscosity Liquid			
AE□□5G**65**11	1850	1600	1120	250, 300, 350	DP－II
AE□□5G**67**11	2450 (2360)	2100	1630	300, 350, 400	DP－II

( ) shows in case of 300mm Nom. size

Group 3 Vortex Type（Forced- Venting）

Model	Max. Regular Unloading Flow rate m^3/h		Max. Venting Capacity at critical Vent Valve Pres. m^3/h	Inlet & Outlet Nom.size mm	Vent Valve Type
	Low Viscosity Liquid	High Viscosity Liquid			
AE□□5G**65**51	1850	1600	1620	250, 300, 350	Ball Valve (65)
AE 30 5G**65**51	2360	2100	1620	300	Ball Valve (65)
AE□□5G**67**51	2450	2100	1620	350, 400	Ball Valve (65)
AE 30 5G**67**51	2360	2100	2300	300	Ball Valve (80)
AE□□5G**67**51	2450	2100	2300	350, 400	Ball Valve (80)
AE□□5G**68**51	3700	3100	2300	450, 500	Ball Valve (80)
AE□□5G**68**51	3700	3100	3000	450, 500	Ball Valve (100)

■ CONSTRUCTION AND OPERATING PRINCIPLE

Elimination/ Venting	Gravity Type（Self-Venting）	Vortex Type（Self-Venting）	Vortex Type（Forced-Venting）
Construction			
Principle of Operation	The air bubble containing fluid introduced at the inlet port rise along the wall of the inner spacer guide at a high velocity, and ascend toward the liquid surface. Fluid with no bubbles moves slowly along the inner wall down and towards the outlet. Separated air collects in the top of the chamber and forces the liquid level down. When the level drops to a specific point, a valve opens and discharges the air to atmosphere. The baffle plate serves to prevent turbulence of the liquid surface, insuring stability of float movement. （Vent valve types：DP・Ⅰ, Ⅱ）	The design is such that the inlet ports are provided tangent to the circular housing with the inlet at the top and the outlet at the bottom. Fluid introduced is forced to circulate along the curved inner wall of the housing, making full use of its centrifugal force to separate entrained air and vapor. Venting is the same as those in Group 1 （Vent valve types：DP・Ⅱ）	Separation is the same as those in Group 2. Venting principle is as follows. As the liquid level drops below level "A", the differential pressure transmitter detects the pressure differential between levels "A" and "B", and send a signal pressure（19.6 to 98.1kPa） proportional to the vent valve. The vent valve in turn opens corresponding to the signal pressure to discharge the air. Air discharge takes place from the vent valve while the liquid level is between levels "A" and "B". （Vent valve types：Ball valve）
Model Capacity	10, 20, 30, 40, 50, 60	65, 67	65, 67, 68
Group	1	2	3

■ MODEL CODE NUMBER

A E 0 8 4 G 1 0 1 1

Air Eliminator

Nominal size mm

05： 50(2″) 25：250(10″)
08： 80(3″) 30：300(12″)
10：100(4″) 35：350(14″)
15：150(6″) 40：400(16″)
20：200(8″) 45：450(18″)
50：500(20″)

Type

4：Gravity Type
5：Vortex Type

Body Material

G：SS400
J：SUS304
Z：Others

Capacity Model（9 Kinds）

10, 20, 30, 40, 50, 60, 65, 67, 68

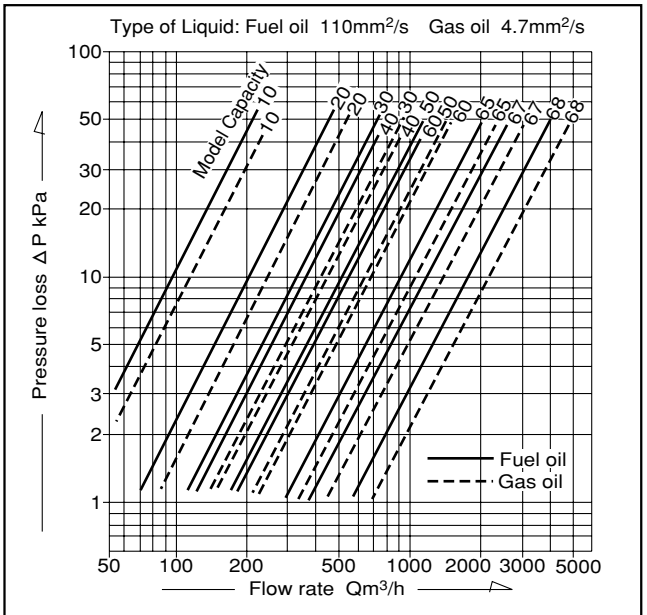
Type of Vent Valve

1：Self-Venting
5：Forced-Venting

Operating Pressure

Always 1：Standard 0.97MPa

■ PRESSURE LOSSES



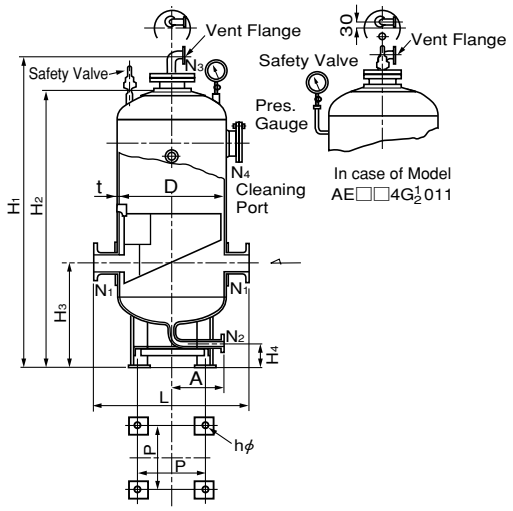
Note: This table reflects the use of the smallest nominal size available in each model.
Larger nominal size result in less pressure losses.

■ DIMENSIONS（Unit in mm）

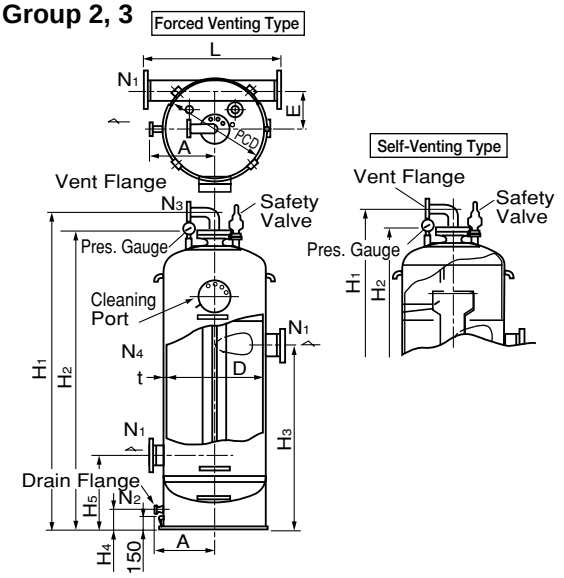
Group 1 Gravity Type（Self-Venting）

Model	Nom. size N1	L	ϕD	H1	H2	H3	H4	A	P－ϕh	ϕN2	ϕN3	ϕN4	t	Approx. Weight kg	Inner capacity m³
AE□□4G1011	50, 80, 100	1000	600	2112	1910	700	150	350	400－19	25	40	100	6	300	0.36
AE□□4G2011	80, 100, 150	1150	750	2482	2280	800	150	400	500－23	25	40	100	9	535	0.68
AE□□4G3011	100, 150, 200	1400	950	2802	2600	950	180	500	640－23	40	50	100	9	755	1.31
AE□□4G4011	150, 200	1650	1150	3065	2820	1000	180	600	790－23	40	65	400	12	1260	2.0
AE□□4G5011	150, 200, 250	1800	1300	3450	3205	1100	180	650	880－33	50	65	400	12	1670	3.17
AE□□4G6011	250, 300	2000	1500	4028	3690	1250	180	700	1020－33	50	80	400	14	2395	4.88

Group 1



Group 2, 3



Group 2 Voltex Type（Self-Venting）

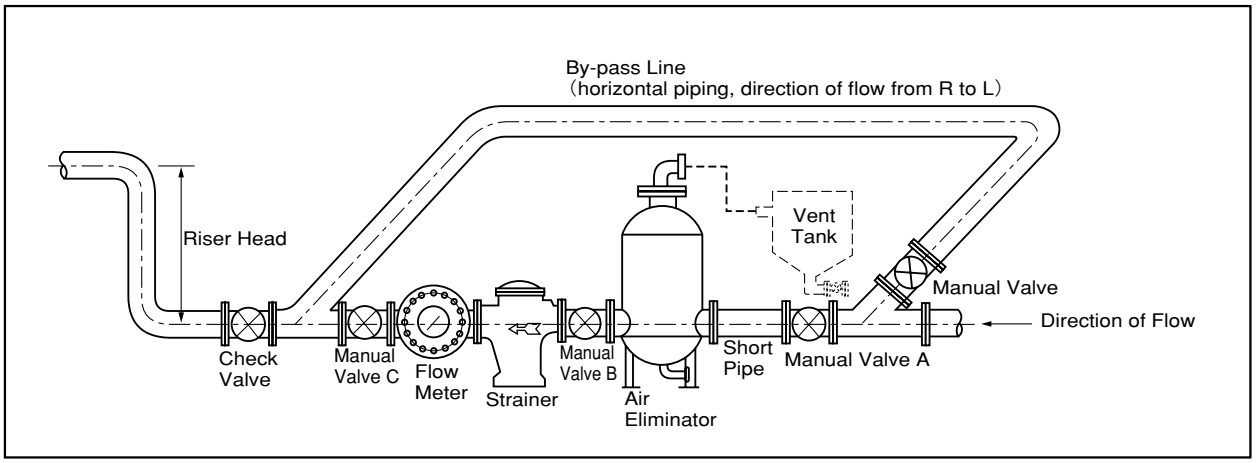
Model	Nom. size N1	E	L	ϕD	H1	H2	H3	H4	H5	A	ϕN2	ϕN3	ϕN4	PCD－ϕh	t	Approx. Weight kg	Inner capacity m³
AE□□5G6511	250	527	1600	1300	4681	4343	2630	150	1100	800	50	80	400	1388 4×28	12	2540	4.90
	300	502															
	350	484															
AE□□5G6711 ☆	300	603	1800	1500	5222	4884	2900	150	1100	900	50	100	400	1604 4×33	12	3580	7.17
	350	585															
	400	560															

Group 3 Voltex Type（Forced-Venting）

Model	Nom. size N1	E	L	ϕD	H1	H2	H3	H4	H5	A	ϕN2	ϕN3	ϕN4	PCD－ϕh	t	Approx. Weight kg	Inner capacity m³
AE□□5G6551	250	527	1600	1300	4681	4343	2630	150	1100	800	50	65	400	1388 4×28	12	2515	4.90
	300	502															
	350	484															
AE□□5G6751 ☆	300	603	1800	1500	5222	4884	2900	150	1100	900	50	65 80	400	1604 4×33	12	3690	7.17
	350	585															
	400	560															
AE□□5G6851 ☆	450	662	2200	1750	5552	5314	3300	150	1300	1020	50	80 100	400	1882 4×33	14	5680	10.84
	500	637															

☆: Required 20% X-ray test.

■ TYPICAL PIPING LAYOUT



To maintain the stated performance of your air eliminator throughout its service life, observe the following instructions:

1. Sequence of component installation—Install, from the inlet side, the air eliminator, strainer, and flowmeter, in this order.
2. The basic unit must be installed vertically.
3. Air pressure inside the air eliminator must be higher than the atmospheric pressure to effect venting.
   To fill the flowmeter piping system with liquid, provide a riser pipe downstream of the meter.
   A riser head is not necessary in a case where a storage tank is installed downstream of the meter and its tank head acts on the air eliminator.
4. Vent tank installation—In the case the vent is open to the atmosphere, small quantities of petroleum products or vaporized products contained in the discharged gas are hazardous. From a safety viewpoint, installing a vent tank to collect the entrained products is suggested (available upon request.) See GS No. GCC005E for the details.
5. Provide as long a straight pipe section as circumstances permit ahead of the air eliminator.
   Avoid partially opening a valve which could disturb the flow pattern. Gate valves are recommended.
6. The flow is controlled with valve C on the discharge side of the flowmeter.
7. When handling fluids which must be heated to prevent solidification or for high viscosity, open valve C after confirming the fluid is heateded up to a desirable temperature level.
8. On large air eliminators, provision of a vent valve maintenance stage is suggested.

■ Relevant Rules and Regulations

Keep in mind that air eliminators come under the following regulations:

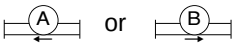
Pressure vessels of the second kind

Ordinary low pressure liquid service air eliminators are categorized within the classification of pressure vessels of the second kind (vessels rated greater than 0.2MPa in internal pressure and larger than 0.04m^3 in internal capacity) under the "Boilers and Pressure Vessels Safety Rules and Regulations" of the Labor Ministry.
Since these regulations apply to low pressure service air eliminators in Japan, OVAL products are manufactured and tested according to these regulatory compliance requirements before they leave our factory.

REMINDER: You may be asked to submit documents necessary for the air eliminator(s) subject to the rules and regulations above before undergoing a compliance testing. For details, see "ORDERING INSTRUCTIONS."

■ WHEN YOU MAKE INQUIRIES

When you make inquiries on our air eliminators, supply the following information, filling out the blanks or ticking the brackets ☐.

1	**Application**	☐ Unloading ☐ Process control
2	**Model**	AE _____
3	**Quantities Desired**	_____
4	**Properties of Product**	Name_____ Sp.Gr. ρ = _____ at _____ ℃ Viscosity μ = _____ mPa･s Kinematic Viscosity_____ mm^2/s at _____℃
5	**Flow rates m^3/h**	Max._____ Nor._____ Min._____ m^3/h
6	**Operating Pressures**	Max._____ Nor._____ Min._____ MPa
7	**Operating Temperatures**	Max._____ Nor._____ Min._____ ℃
8	**Flange Rating**	☐ JIS 10K FF ☐ JIS 10K RF ☐ ANSI 150 RF ☐ JPI 150 RF ☐ Specification _____
9	**Flow Direction**	In case of Group 2, 3, please specify flow direction 
10	**Materials**	☐ Standard (including gaskets) ☐ Special (specify such request on window, flange, bolts, nuts, or gaskets in order sheet)
11	**Document**	☐ Standard ☐ Special (specify in order sheet.)
12	**Maintenance ladder** **(option for size 50mm and bigger)**	☐ Not required ☐ Required (describe in order sheet.)
13	**Insulation material support rings**	☐ Not required ☐ Required (describe in order sheet.)
14	**Safety valve**	☐ OVAL standard ☐ Model designation (specify in order sheet.) Set pressure：_____ MPa (specify in order sheet.)
15	**Heat insulation**	☐ OVAL standard (heat trace not required) ☐ Steam trace required (insulation materials are supplied by other.)
16	**Heat conditions**	Steam heating: Pressure = MPa Temp. = °C
17	**Accessories**	In case standard accessories (safety valve, pressure gauge and stopcock of pressure gauge) are not required, their types are required to change, or other accessories are required, describe such requests in order sheet.
18	**Installation location**	
19	**Others**	

OVAL

Low Pressure Service AIR ELIMINATOR

(Non-Regulative Type for loading service)

GENERAL SPECIFICATION

GS.No.GCC003E-8

■ GENERAL

When metering a liquid with a flowmeter, accurate flow measurement is not possible, no matter how accurate the meter may be, if entrained air or vapor is present in the liquid. Experience shows that such entrainment often takes place at the beginning or at the end of a given metering run. An air eliminator is used to remove entrained air and vapor before the liquid enters the meter to ensure correct flow rate measurements.

"Pressure Vessels Safety Regulations" is not applied in this model.

■ GENERAL SPECIFICATIONS

The fact is that the greater the capacity of an air eliminator, the greater the air eliminating capability. It is important that the correct size and type are chosen.

Factors to be taken into consideration in the selection are (1) application, (2) type of liquid, (3) flow rate, viscosity, specific gravity, and (4) pressure:

1. Application

Elimination of small quantities of air introduced temporarily during transfer between storage tanks, pumping to barges or tankers, loading tank trucks or lorries, process control, etc.

2. Liquid to be Applied

Gasoline, JP4, kerosene, water, alcohol, crude oil, gas oil, fuel oil, etc. (Consult OVAL for naphtha.)

3. Maximum Operating Pressure：0.97MPa

4. Hydraulic Test Pressure：1.46MPa

5. Maximum Operating Temperature：80℃

6. Connection Flange Rating：
JIS 10K FF（Standard), JIS 10K RF,
ANSI 150 RF, JPI 150 RF

7. Materials：Body; Steel sheet (SS400)
Vent Valve; Stainless steel SUS304/SCS13
Valve Seat; Viton

8. Coating color：Muncell 2.5G 8/2（Standard）

10. Options

（1） Anchor bolts (w/nuts); 4 pcs. (material：SS400)
（2） Drain valve（gate valve）
（3） Vent line air release valve（gate valve）
（4） Siphon for pressure gauge
（Required when liquid temperature exceeds 80℃）
（5） Heater
Steam trace：¾″ Steel pipe（STPG370-S）as standard
Steam pressure：0.2MPa
Max. operating temperature：120℃
（6） Heat insulator support rings;
Required for holding insulating material in an installation where the body needs heating externally.

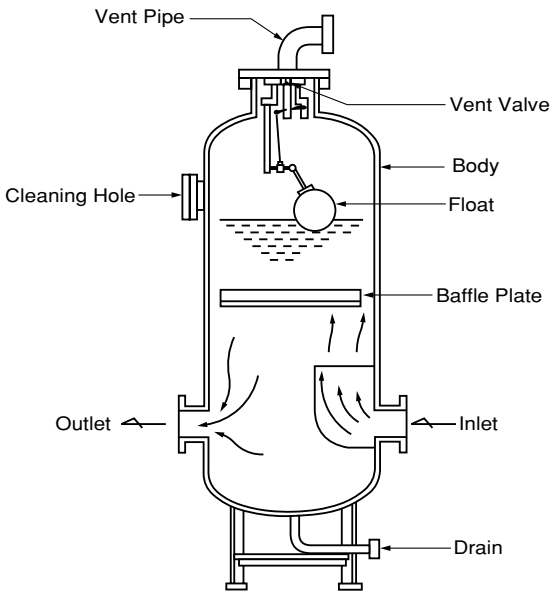
■ INDIVIDUAL SPECIFICATIONS

Gravity Type（Self Venting）

Model	Max. Flow rate m^3/h	Max. Venting Capacity at Critical Vent Valve Pres. m^3/h	Acceptable Sp. Gr. Range	Max. Vent Valve Operating Pressure MPa	Inlet & Outlet Nominal size mm	Vent Valve Type
AE$\frac{10}{15}$6G**06**31	320	14	0.7 to 1.1	0.97	100, 150	WS−IV
AE$\frac{15}{20}$6G**10**31	550	14	0.7 to 1.1	0.97	150, 200	WS−IV
AE256G**20**31	900	77	0.65 to 1.1	0.97	250	WS− V
AE256G**30**31	1200	77	0.65 to 1.1	0.97	300	WS− V
AE$\frac{30}{35}$6G**40**31	1600	77	0.65 to 1.1	0.97	300, 350	WS− V
AE$\frac{40}{45}$6G**50**31	2500	77	0.65 to 1.1	0.97	400, 450	WS− V
AE$\frac{45}{50}$6G**60**31	3200	77	0.65 to 1.1	0.97	450, 500	WS− V

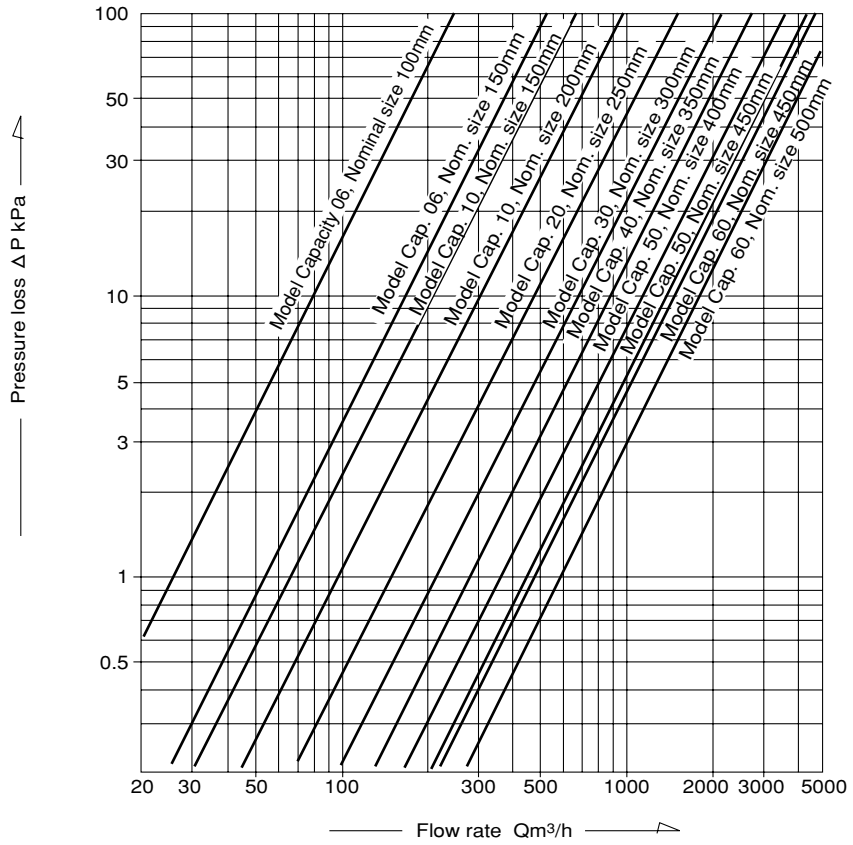
Bold letters mean capacity model of air eliminator.

■ CONSTRUCTION AND OPERATING PRINCIPLE

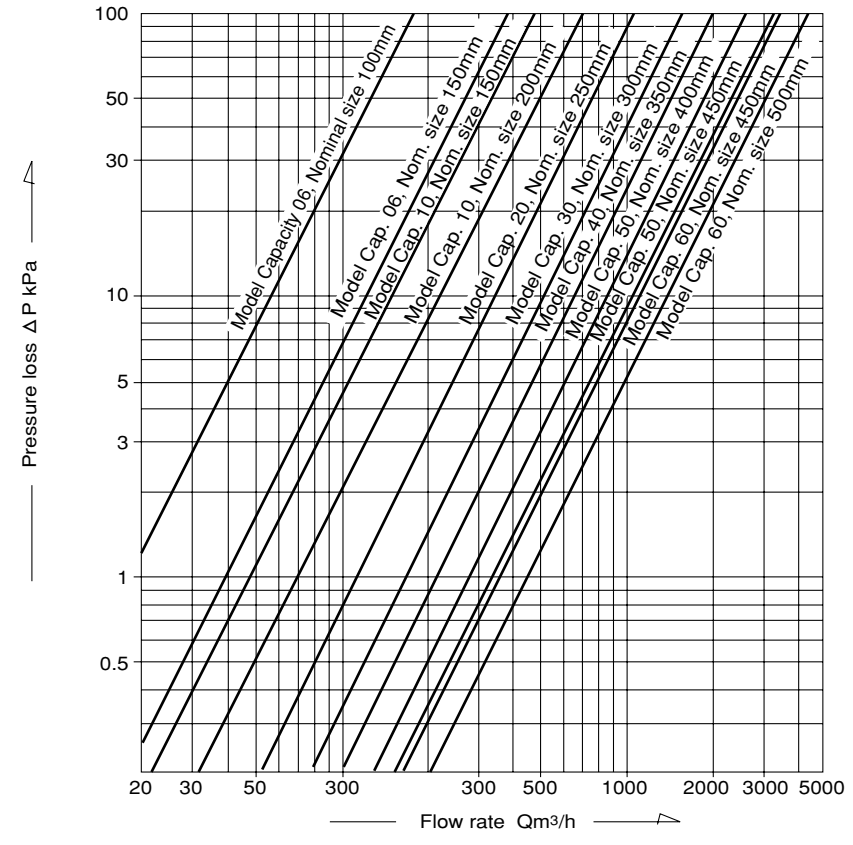
Construction	Principle of Operation
	The air bubble containing fluid introduced at the inlet port rise along the inner wall of the body at a high velocity, and ascend toward the liquid surface. Fluid with no bubbles moves slowly along the inner wall down towards the outlet. Separated air collects in the top of the chamber and forces the liquid level down. When the level drops to a specific point, a valve opens and discharges the air to atmosphere. The baffle plate serves to prevent turbulence of the liquid surface, insuring stability of float movement. （Vent valve types：WS−IV, WS−V）

■ PRESSURE LOSSES

● **Type of Liquid：Gas oil（viscocity 4.7mm²/s）**



● **Type of Liquid：Fuel oil（viscocity 110mm²/s）**



■ MODEL CODE NUMBER

A E 2 0 6 G 1 0 3 1

Air Eliminator

Nominal size mm
10：100（ 4″） 35：350（14″）
15：150（ 6″） 40：400（16″）
20：200（ 8″） 45：450（18″）
25：250（10″） 50：500（20″）
30：300（12″）

Type
Always 6

Body Material
G：SS400（Standard）
J ：SUS304

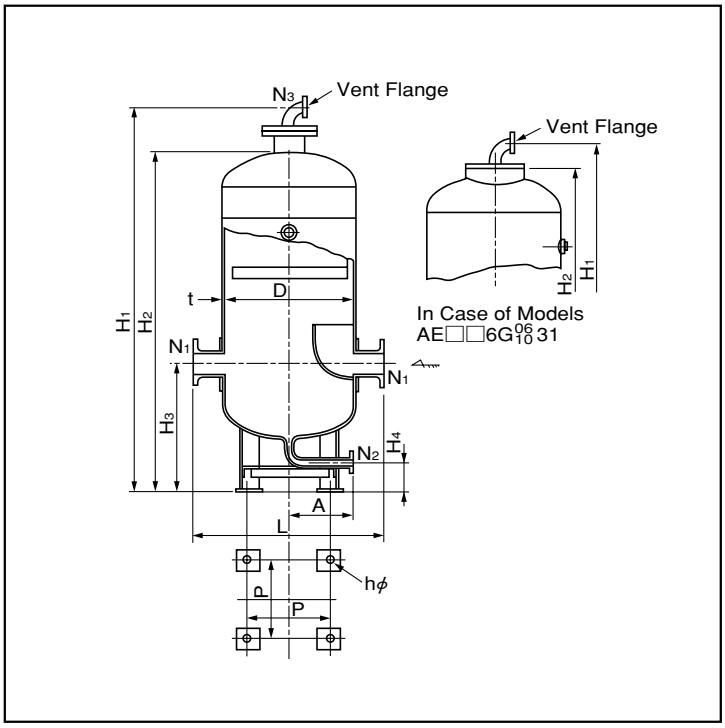
Capacity Model（7 Kinds）
06, 10, 20, 30, 40, 50, 60

Type of Vent Valve
Always 3

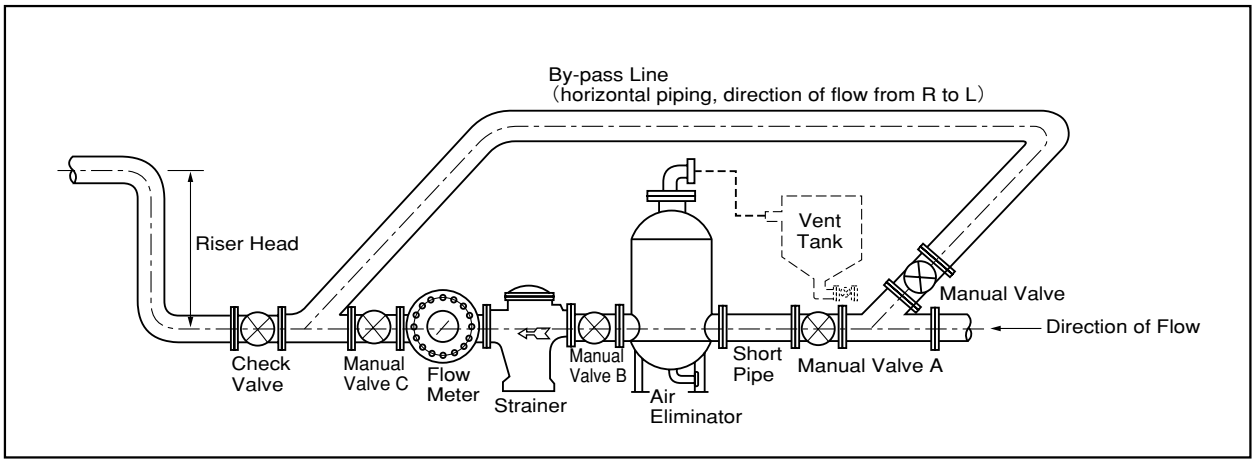
Operating Pressure
Always 1：Standard 0.97MPa

■ DIMENSIONS（Unit in mm）

Model	Nom. size N1	L	φD	H1	H2	H3	H4	A	P— φh	φN2	φN3	φN4	t	Approx. Weight kg	Inner Capacity m³
AE$^{10}_{15}$6G0631	100, 150	800	400	1360	1250	600	150	300	255—19	25	20	80	6	150	0.12
AE$^{15}_{20}$6G1031	150, 200	1000	600	1898	1785	700	150	350	400—19	25	20	100	6	275	0.40
AE256G2031	250	1150	750	2290	1984	800	150	400	500—23	25	25	100	9	480	0.68
AE256G3031	300	1400	950	2615	2414	950	180	500	640—23	40	25	100	9	690	1.34
AE$^{30}_{35}$6G4031	300, 350	1650	1150	2825	2641	1000	180	600	790—23	40	25	400	12	1225	2.17
AE$^{40}_{45}$6G5031	400, 450	1800	1300	3214	2996	1100	180	650	880—33	50	25	400	12	1600	3.28
AE$^{45}_{50}$6G6031	450, 500	2000	1500	3600	3311	1250	180	700	1020—33	50	25	400	14	2220	4.80



■ TYPICAL PIPING LAYOUT



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■ WHEN YOU MAKE INQUIRIES

When you make inquiries on our air eliminators, supply the following information, filling out the blanks or ticking the brackets □.

1	Application	□Shipment □Process control	2	Applicable standards	□None (default) □Others	
3	Model	A E ○○○○○○○○○	4	No. of units required		
5	Process fluid	Name	Density ρ = g/mL kg/m^3 at ℃		Visc. or kinematic visc. μ = or ν = at ℃	
6	Flowrate m^3/h	Max. Nor. Min.	7	Operating press. MPa	Max. Nor. Min.	
8	Operating temp ℃	Max. Nor. Min.	9	Design press. MPa	□Std. 0.97MPa □Specified	
10	Design temp. ℃	□Standard □Specified Max. ℃ Min. ℃				
11	Flange rating	□JIS 10K FF □JIS 10K RF □ANSI 150 RF □JPI 150 RF □Flange rating other than above（ ）				
12	Material	□Standard (gaskets incl.)				
13	Documents to be submitted	□None (std.) □Special Coverage of document（ ）				
14	Heat retention	(1)	Heating medium name： P= MPa t= ℃			
		(2)	Steam heat tracing	Boiling point of process fluid at atm. pressure ——— ℃	Submit a flow sheet of the heat line controller that prevents temp. rise above boiling point.	
15	Accessories	Specify the required accessories with detailed specifications in an accompanying documentation. Example: Replacement parts, Gaskets with companion flanged unit, Specify in details the required geometry of flanges.				
16	Installation location					
17	Miscellaneous					