

Selecting The Armstrong Air/Gas Vent

With the desired CFM capacity known, find the orifice size required from the table on this page. Then find the vent or vents with the correct orifice size on pages 457, 459, 461 or 469 that will operate at the required pressure with a liquid of the specific gravity being handled.

Example—Find a model number that will vent 52 cfm of air (including safety factor of 1.5 - 2.0) from a liquid with a specific gravity of 0.93 at 250 psi. Using the table below, follow the 250 psi line across to the number 60.9. Orifice size is 5/32". Now go to pages 457, 459, 461 or 469 checking the 5/32" orifice lines to locate a vent for 250 psi or higher with 0.90 gravity liquid.

NOTE: Since specific gravity falls between 0.95 and 0.90, use 0.90 gravity data. The model 3-AV on page 456 is the one to use.

$$V = \frac{W}{d} = \frac{2.05 C A P_2 \times 60}{d} \sqrt{\frac{\left(\frac{P_1}{P_2}\right)^{283} \left[\left(\frac{P_1}{P_2}\right)^{283} - 1\right]}{T}}$$

Where:

- V = Volume flow rate, ft³/min
- W = Mass flow rate, lb/min
- d = Density, 0.07494 lb/ft³ at standard conditions
- C = Flow coefficient = 0.65
- A = Orifice area, in²
- P1 = Upstream pressure, psia
- P2 = Pressure at throat orifice or downstream pressure = greater of 0.53 P1 or 14.7 psia
- T = Upstream temperature = 530°R

Ref: Baumeister & Marks, Standard Handbook for Mechanical Engineers, 7th edition.

For Venting During Filling Only

If a vent is required only for getting rid of air when a system is started up, such as when starting up a deep well pump or filling an empty pipe, tank or other vessel, ability of the vent to open at operating pressure can be ignored. In these cases, a model number with a large orifice for fast venting may be selected, **but the vent will not open after air is expelled and the system reaches operating pressure.**

Discharge of Air Through an Orifice in Standard Cubic Feet per Minute at a Standard Atmospheric Pressure of 14.7 psia and 70°F																						
pressure psig	Orifice Diameter, inches																					
	1/16	5/64	3/32	#38	7/64	1/8	9/64	5/32	3/16	7/32	1/4	9/32	5/16	11/32	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1-1/16
5	0.64	1.00	1.44	1.54	1.96	2.56	3.24	4.00	5.76	7.84	10.2	13.0	16.0	19.4	23.0	31.4	41.0	51.9	64.0	92.2	125	185
6	0.70	1.09	1.57	1.69	2.14	2.80	3.54	4.37	6.30	8.57	11.2	14.2	17.5	21.2	25.2	34.3	44.8	56.7	70.0	101	137	202
7	0.75	1.18	1.70	1.82	2.31	3.02	3.82	4.71	6.78	9.23	12.1	15.3	18.8	22.8	27.1	36.9	48.2	61.1	75.4	109	148	218
9	0.85	1.33	1.91	2.05	2.61	3.40	4.31	5.32	7.66	10.4	13.6	17.2	21.3	25.7	30.6	41.7	54.4	68.9	85.1	122	167	246
12	0.98	1.52	2.19	2.35	2.99	3.90	4.94	6.10	8.78	11.9	15.6	19.8	24.4	29.5	35.1	47.8	62.4	79.0	97.5	140	191	282
15	1.09	1.70	2.44	2.62	3.33	4.34	5.50	6.79	9.78	13.3	17.4	22.0	27.2	32.9	39.1	53.2	69.5	88.0	109	156	213	314
20	1.27	1.98	2.86	3.06	3.89	5.08	6.42	7.93	11.4	15.5	20.3	25.7	31.7	38.4	45.7	62.2	81.2	103	127	183	249	367
25	1.45	2.27	3.27	3.50	4.45	5.81	7.35	9.07	13.1	17.8	23.2	29.4	36.3	43.9	52.3	71.1	92.9	118	145	209	285	420
30	1.63	2.55	3.68	3.94	5.01	6.54	8.28	10.2	14.7	20.0	26.2	33.1	40.9	49.5	58.9	80.1	105	132	163	235	320	472
35	1.82	2.84	4.09	4.38	5.57	7.27	9.20	11.4	16.4	22.3	29.1	36.8	45.4	55.0	65.4	89.1	116	147	182	262	356	525
40	2.00	3.13	4.50	4.82	6.13	8.00	10.1	12.5	18.0	24.5	32.0	40.5	50.0	60.5	72.0	98.0	128	162	200	288	392	578
45	2.18	3.41	4.91	5.26	6.69	8.73	11.1	13.6	19.6	26.7	34.9	44.2	54.6	66.0	78.6	107	140	177	218	314	428	631
50	2.37	3.70	5.32	5.70	7.25	9.46	12.0	14.8	21.3	29.0	37.9	47.9	59.2	71.6	85.2	116	151	192	237	341	464	684
60	2.73	4.27	6.15	6.58	8.37	10.9	13.8	17.1	24.6	33.5	43.7	55.3	68.3	82.6	98.3	134	175	221	273	393	535	790
70	3.10	4.84	6.97	7.46	9.49	12.4	15.7	19.4	27.9	37.9	49.6	62.7	77.4	93.7	112	152	198	251	310	446	607	895
80	3.46	5.41	7.79	8.34	10.6	13.9	17.5	21.6	31.2	42.4	55.4	70.1	86.6	105	125	170	222	281	346	499	679	1,001
90	3.83	5.98	8.62	9.2	11.7	15.3	19.4	23.9	34.5	46.9	61.3	77.5	95.7	116	138	188	245	310	383	551	750	1,107
100	4.19	6.55	9.44	10.1	12.8	16.8	21.2	26.2	37.8	51.4	67.1	84.9	105	127	151	206	268	340	419	604	822	1,212
110	4.56	7.13	10.3	11.0	14.0	18.2	23.1	28.5	41.0	55.9	73.0	92.4	114	138	164	223	292	369	456	657	894	1,318
125	5.11	7.98	11.5	12.3	15.6	20.4	25.9	31.9	46.0	62.6	81.7	103	128	155	184	250	327	414	511	736	1,001	1,477
150	6.02	9.41	13.6	14.5	18.4	24.1	30.5	37.6	54.2	73.8	96.4	122	151	182	217	295	385	488	602	867	1,181	1,741
200	7.85	12.3	17.7	18.9	24.0	31.4	39.8	49.1	70.7	96.2	126	159	196	238	283	385	503	636	785	1,131	1,539	2,269
250	9.68	15.1	21.8	23.3	29.6	38.7	49.0	60.5	87.1	119	155	196	242	293	348	474	620	784	968	1,394	1,897	2,798
300	11.5	18.0	25.9	27.7	35.2	46.0	58.3	71.9	104	141	184	233	288	348	414	564	737	932	1,151	1,657	2,256	3,326
400	15.2	23.7	34.1	36.5	46.4	60.7	76.8	94.8	136	186	243	307	379	459	546	743	971	1,228	1,517	2,184	2,973	4,383
500	18.8	29.4	42.4	45.3	57.6	75.3	95.3	118	169	231	301	381	471	569	678	922	1,205	1,525	1,882	2,711	3,689	5,440
600	22.5	35.1	50.6	54.1	68.8	89.9	114	141	202	275	360	455	562	680	809	1,102	1,439	1,821	2,248	3,237	4,406	6,497
750	28.0	43.7	62.9	67.4	85.6	112	142	175	252	343	447	566	699	846	1,007	1,370	1,790	2,265	2,797	4,027	5,481	8,082
1000	37.1	58.0	83.5	89.4	114	148	188	232	334	455	594	751	928	1,123	1,336	1,818	2,375	3,006	3,711	5,344	7,273	10,725

Air Vents