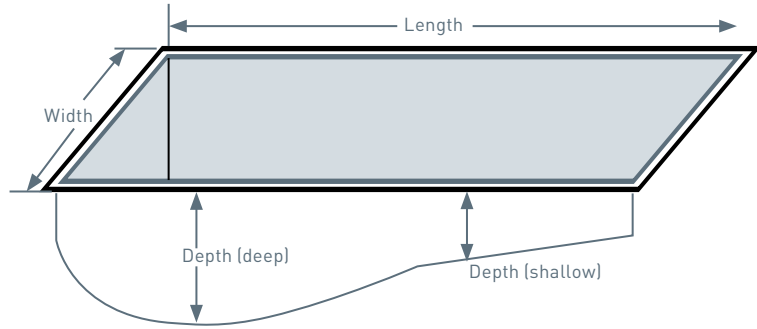
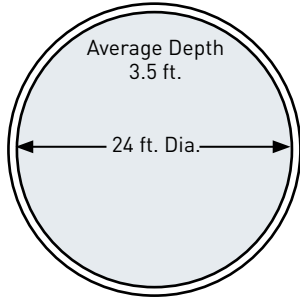




ENGINEERING DATA

ENGINEERING DATA

ESTIMATING TOTAL GALLONS IN A POOL OR SPA



Radius² x 3.14 x A.D. x 7.5 = Gallons
 12 x 12 x 3.14 x 3.5 x 7.5 = 11,869 Gals.
 Dia. x Dia. x Av Dp x 5.9 = Gallons
 24 x 24 x 3.5 x 5.9 = 11,894 Gals.

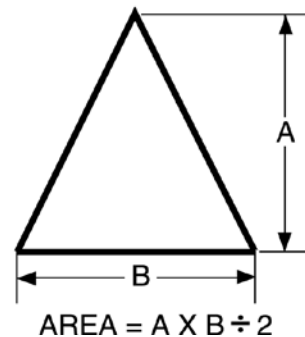
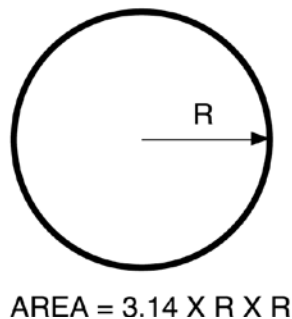
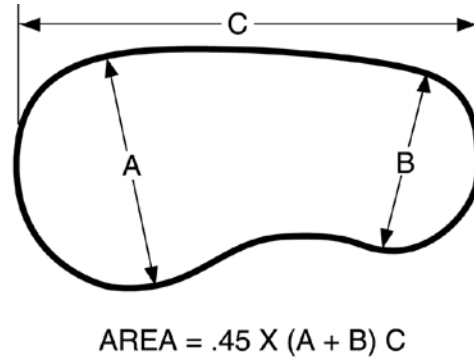
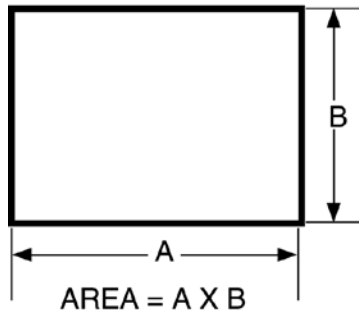
Gal.cu.ft.	
Rectangle:	7.5
Oval:	6.7
Kidney:	7.0

Formula A: Length X Width X Average Depth X Gal.cu.ft. = Gallons

Example: Pool Length = 40 ft.
 Pool Width = 20 ft.
 Shallow Depth = 3 ft.
 Deep Depth = +8 ft.

Total Depth = 11 ft.

Using formula A: 40 X 20 = 800 sq. ft., 800 X 5.5 = 4,400 cubic ft.,
 4,400 X 7.5 = 33,000 gallons



ENGINEERING DATA

UNITS OF MEASURE

UNITS OF PRESSURE

UNIT	INCHES OF WATER	FEET OF WATER	POUNDS PER SQUARE INCH	INCHES OF MERCURY
INCHES OF WATER	1.0	.0833	.0361	.0736
FEET OF WATER	12.0	1.0	.433	.883
POUNDS PER SQUARE INCH	27.72	2.31	1.0	2.04
INCHES OF MERCURY	13.596	1.133	.4906	1.0

CURRENT CAPACITY (AMPS) OF WIRE *

Three wires in cable, ambient temp. 86°F

WIRE SIZE	AMPERES	
	COPPER	ALUMINIUM
14	20	-
12	25	20
10	30	25
8	40	30
6	55	40
4	70	55
3	85	65
2	95	75
1	110	85
0	125	100

* Wire size is minimum for amperes listed.

EFFICIENCY	
EFFICIENCY	$\frac{\text{POWER OUTPUT}}{\text{POWER INPUT}}$
MOTOR EFFICIENCY	$\frac{\text{HP OUTPUT}}{\text{K.W. INPUT}}$
PUMP EFFICIENCY	$\frac{\text{G.P.M} \times \text{TOTAL HEAD (F.T.)}}{3960 \times \text{BHP}}$
OVERALL PLANT EFFICIENCY (OPE)	$\frac{\text{G.P.M} \times \text{TOTAL HEAD (F.T.)}}{5310 \times \text{K.W. INPUT}}$

Amperage =	$\frac{\text{Watts}}{\text{Volts}}$
Watts =	Volts x Amperage
WHP =	Water Horsepower (output HP of pump) = $\frac{\text{g.p.m} \times \text{total head}}{3960}$
HP input (to motor) =	KW input x 1.341
Total Head =	Discharge head + Pumping water level (ft)
Discharge Head =	Discharge Pressure (PSI) x 2.31 ft. of head

ENGINEERING DATA

HEATER SIZING INFORMATION

° F Temperature Rise	Pool Volume (Gallons)									
	10,000	20,000	30,000	40,000	50,000	60,000	70,000	80,000	90,000	100,000
	Hours to Reach Temperature									
5	1.08	2.17	3.26	4.34	5.43	6.52	7.60	8.69	9.77	10.86
10	2.17	4.34	6.52	8.69	10.86	13.03	15.20	17.38	19.55	21.72
15	3.25	6.52	9.77	13.03	16.29	19.55	22.80	26.06	29.32	35.58
20	4.35	8.69	13.03	17.38	21.72	26.06	30.41	34.75	39.09	43.44
25	5.43	10.86	16.29	21.72	27.15	32.58	38.01	43.44	48.87	54.30
30	6.52	13.03	19.55	26.06	32.58	39.09	45.61	52.13	58.64	65.16
35	7.60	15.20	22.80	30.41	38.01	45.61	53.21	60.81	68.41	76.02
40	8.68	17.38	26.06	34.75	43.44	52.13	60.81	69.50	78.19	86.88
50	9.77	19.55	29.32	39.09	48.87	58.64	68.41	78.19	87.96	97.73
	10.87	21.72	32.58	43.44	54.30	65.16	76.02	86.88	97.73	108.59

ENGINEERING DATA

ACU DRIVE™ XS STARTUP INFORMATION

Acu Drive Startup Request Information Sheet

Please complete the following information and return to Pentair Aquatic Systems (phone - 845-463-7200, ext. 2 / fax - 845-463-7291 / email - paragoncustserv@pentair.com) in order to schedule the startup service for your new Acu-Drive. A startup service partner will contact the job site contact person listed below to schedule the

**** Before Requesting a Start-Up be Performed, Please Ensure the Following has been Completed ****

- All VFDs requiring start-up have been properly mounted per installation guide
- The power wiring has been properly connected to each VFD
- Any control wiring (i.e. flowmeter, level control, alarms) have been properly connected
- If needed, be prepared to explain any special programming requirements with startup representative

**** Appointments are based on availability. Allot up to 10 working days to schedule a startup appointment.

Startup Job Site Information:

_____/_____/_____
Requested Startup Date (NUMBERS ONLY)

Facility Name

Street

City

State/Province

Zip Code

Number of units to startup

Site Contact Name

PM NUMBER DISTRIBUTOR

PO NUMBER DATE

Contact Phone Number

INITIAL

ACU-DRIVE SERIAL #(S): REQUIRED

Lorem ipsum

By signing below, please confirm that your equipment will be ready for startup by the requested startup date listed below:

"I confirm that the equipment for startup will be ready for startup at a time and date agreed to by the contact person listed above and startup service partner. All control and power wiring necessary to perform startup will be completed by the agreed date. All processes will be ready and available by the agreed date. All equipment is installed per Danfoss installation instructions and all local codes. I will coordinate all personnel and contractors that I want present at startup. I agree to notify the startup service partner 24 hours prior to the agreed startup time and date of any changes to the schedule. I accept any additional charges not covered by the service agreement for the startup contract."

Print Name: _____

Phone: _____

Signature: _____

Date: _____

ENGINEERING DATA, FRICTION FLOW

FRICTION/FLOW CHART FOR SCHEDULE 40 RIGID PVC PIPE *

U.S. Gal. per min.	3/4 in. pipe		1 in. pipe		1-1/4 in. pipe		1-1/2 in. pipe		2 in. pipe		2-1/2 in. pipe		3 in. pipe		4 in. pipe		5 in. pipe		6 in. pipe		U.S. Gal. per min.		
	Velocity feet per second	Loss in feet	Velocity feet per second	Loss in feet	Velocity feet per second	Loss in feet	Velocity feet per second	Loss in feet	Velocity feet per second	Loss in feet	Velocity feet per second	Loss in feet	Velocity feet per second	Loss in feet	Velocity feet per second	Loss in feet	Velocity feet per second	Loss in feet	Velocity feet per second	Loss in feet			
1	.71	.40	.40	.10	0.26	0.03															1		
2	1.43	1.44	.80	.35	.51	.12	.36	.05													2		
3	2.14	3.05	1.20	.75	.77	.25	.53	.10													3		
4	2.85	5.19	1.60	1.28	1.03	.43	.71	.18													4		
5	3.56	7.85	2.00	1.94	1.28	.65	.89	.27	.50	.07	.32	.02	.22	.01							5		
6	4.28	11.01	2.41	2.71	1.54	.92	1.07	.38	.60	.09	.38	.03	.27	.01							6		
8	5.70	18.75	3.21	4.62	2.05	1.56	1.43	.64	.80	.16	.51	.05	.36	.02							8		
10	7.13	28.34	4.01	6.99	2.57	2.36	1.78	.97	1.00	.24	.64	.08	.45	.03							10		
15	10.69	60.06	6.01	14.81	3.85	5.00	2.67	2.06	1.50	.51	.96	.17	.67	.07							15		
20			8.02	25.24	5.13	8.52	3.56	3.51	2.00	.87	1.28	.29	.89	.12	.50	.03					20		
25			10.02	38.16	6.41	12.88	4.45	5.31	2.51	1.31	1.60	.44	1.11	.18	.63	.04					25		
30			12.03	53.48	7.70	18.06	5.34	7.44	3.01	1.83	1.92	.62	1.34	.26	.75	.06	.48	.02			30		
35					8.98	24.03	6.24	9.89	3.51	2.44	2.24	.82	1.56	.34	.88	.08	.56	.03			35		
40					10.26	30.77	7.13	12.67	4.01	3.13	2.57	1.06	1.78	.43	1.00	.11	.64	.04			40		
45					11.54	38.27	8.02	15.76	4.51	3.89	2.89	1.31	2.00	.54	1.13	.13	.72	.05			45		
50					12.83	46.51	8.91	19.16	5.01	4.72	3.21	1.60	2.23	.66	1.25	.16	.80	.05	.56	.02	50		
60							10.69	26.85	6.01	6.62	3.85	2.24	2.67	.92	1.50	.23	.96	.08	.67	.03	60		
70									7.01	8.81	4.49	2.98	3.12	1.23	1.75	.30	1.12	.10	.78	.04	70		
80									8.02	11.28	5.13	3.81	3.56	1.57	2.00	.39	1.28	.13	.89	.05	80		
90									9.02	14.03	5.77	4.74	4.01	1.95	2.25	.48	1.44	.16	1.00	.07	90		
100									10.02	17.06	6.41	5.76	4.45	2.37	2.51	.59	1.60	.20	1.11	0.08	100		
125											8.02	8.71	5.57	3.59	3.13	.88	2.00	.30	1.39	.12	125		
150											9.62	12.20	6.68	5.03	3.76	1.24	2.41	.42	1.67	.17	150		
175													7.79	6.69	4.38	1.65	2.81	.56	1.95	.23	175		
200															8.91	8.56	5.01	2.11	3.21	.71	2.23	.29	200
225															10.02	10.65	5.64	2.63	3.61	.89	2.51	.37	225
250															11.13	12.95	6.26	3.19	4.01	1.08	2.78	.44	250
275																	6.89	3.81	4.41	1.29	3.06	.53	275
300																	7.52	4.48	4.81	1.51	3.34	.62	300
325																	8.14	5.19	5.21	1.75	3.62	.72	325
350																	8.77	5.95	5.61	2.01	3.90	.83	350
375																	9.39	6.77	6.01	2.28	4.18	.94	375
400																	10.02	7.63	6.41	2.57	4.45	1.06	400
425																			6.81	2.88	4.73	1.19	425
450																			7.22	3.20	5.01	1.32	450
475																			7.62	3.54	5.29	1.46	475
500																			8.02	3.89	5.57	1.60	500
550																			8.82	4.64	6.12	1.91	550
600																			9.62	5.46	6.68	2.25	600
650																					7.24	2.61	650
700																					7.79	2.99	700
750																					8.35	3.40	750
1000																					11.13	5.79	1000

* Friction loss of water in feet per 100 feet length of pipe. Based on Williams & Hazen formula using constant 150.

* Recommended operating flow velocities indicated by boxed areas.

ENGINEERING DATA

FRICTION LOSS CHARTS

Hydraulic Charts and Tables

Friction/Flow Chart For Schedule 40 Rigid PVC Pipe

Friction Loss of Water in Feet per 100 Feet Length of Pipe

Based on Williams & Hazen Formula Using Constant 150. Sizes of Standard Pipe in Inches.

U.S. Gals. per Min.	¾" Pipe		1" Pipe		1¼" Pipe		1½" Pipe		2" Pipe		2½" Pipe		3" Pipe		4" Pipe		6" Pipe		U.S. Gals. per Min.
	Vel. Ft. per Sec.	Loss in Feet	Vel. Ft. per Sec.	Loss in Feet	Vel. Ft. per Sec.	Loss in Feet	Vel. Ft. per Sec.	Loss in Feet	Vel. Ft. per Sec.	Loss in Feet	Vel. Ft. per Sec.	Loss in Feet	Vel. Ft. per Sec.	Loss in Feet	Vel. Ft. per Sec.	Loss in Feet	Vel. Ft. per Sec.	Loss in Feet	
1	.60	.25	.37	.07	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1
2	1.20	.90	.74	.28	.43	.07	....	....	....	....	....	....	....	....	....	....	....	....	2
3	1.80	1.92	1.11	.60	.64	.16	.47	.07	....	....	....	....	....	....	....	....	....	....	3
4	2.41	3.28	1.48	1.02	.86	.25	.63	.12	....	....	....	....	....	....	....	....	....	....	4
5	3.01	5.8	1.86	1.52	1.07	.39	.79	.18	....	....	....	....	....	....	....	....	....	....	5
6	3.61	7.0	2.33	2.15	1.29	.55	.95	.25	.57	.07	....	....	....	....	....	....	....	....	6
8	4.81	11.8	2.97	3.6	1.72	.97	1.25	.46	.76	.14	.54	.05	....	....	....	....	....	....	8
10	6.02	17.9	3.71	5.5	2.15	1.46	1.58	.69	.96	.21	.67	.09	....	....	....	....	....	....	10
15	9.02	37.8	5.57	11.7	3.22	3.07	2.36	1.45	1.43	.44	1.01	.18	.65	.07	....	....	....	....	15
20	....	....	7.42	19.9	4.29	4.2	3.15	2.47	1.91	.74	1.34	.30	.87	.12	....	....	....	....	20
25	....	....	9.28	30.0	5.36	7.9	3.94	3.8	2.39	1.11	1.67	.46	1.08	.16	....	....	....	....	25
30	....	....	11.14	42.0	6.43	11.1	4.73	5.2	2.87	1.55	2.01	.65	1.30	.23	....	....	....	....	30
35	....	U.S. GAL. PER MIN.	....	....	7.51	14.7	5.52	7.0	3.35	2.06	2.35	.88	1.52	.30	.88	.07	....	....	35
40	....	....	8" PIPE		8.58	18.9	6.30	8.9	3.82	2.63	2.64	1.11	1.73	.39	1.01	.09	....	....	40
45	....	....	9.65	23.5	9.65	23.5	7.09	11.1	4.30	3.28	3.01	1.39	1.95	.48	1.13	.12	....	....	45
50	....	700	4.37	.66	10.72	28.5	7.88	13.5	4.78	4.0	3.35	1.69	2.17	.58	1.26	.16	....	....	50
60	....	750	4.70	.75	....	....	9.46	18.9	5.74	5.6	4.02	2.36	2.60	.81	1.51	.21	....	....	60
70	....	800	4.99	.82	....	....	11.03	25.1	6.69	7.4	4.69	3.14	3.04	1.09	1.76	.28	....	....	70
80	....	850	5.37	.95	....	....	....	....	7.65	9.5	5.35	4.0	3.47	1.39	2.02	.37	....	....	80
90	....	900	5.64	1.06	....	....	....	....	8.60	11.8	6.03	5.0	3.91	1.73	2.27	.46	....	....	90
100	....	950	5.94	1.23	....	....	....	....	9.56	14.4	6.70	6.1	4.34	2.10	2.52	.55	1.11	.07	100
125	....	1000	6.25	1.28	....	U.S. GAL. PER MIN.	....	....	11.95	21.8	8.38	9.2	5.42	3.19	3.15	.85	1.39	.12	125
150	....	1050	6.57	1.40	....	....	....	....	....	....	10.05	12.8	6.51	4.5	3.78	1.18	1.67	.16	150
175	....	1100	6.89	1.51	....	....	....	....	....	....	....	....	7.59	5.9	4.41	1.57	1.94	.21	175
200	....	1150	7.20	1.65	....	....	....	....	....	....	....	....	8.68	7.9	5.04	2.08	2.22	.28	200
225	....	1200	7.51	1.79	....	1500	5.99	.92	....	....	....	....	9.76	9.4	5.67	2.52	2.50	.35	225
250	....	1250	7.82	1.94	....	1600	6.40	1.03	....	....	....	....	10.85	11.5	6.30	3.05	2.78	.42	250
275	....	1300	8.13	2.09	....	1700	6.80	1.15	....	....	....	....	....	....	6.93	3.6	3.05	.48	275
300	....	1350	8.45	2.23	....	1800	7.20	1.27	....	....	....	....	....	....	7.56	4.3	3.33	.58	300
325	....	1400	8.77	2.37	....	1900	7.60	1.41	....	....	....	....	....	....	8.19	5.0	3.61	.67	325
350	....	1450	9.08	2.53	....	2000	7.99	1.54	....	....	....	....	....	....	8.82	5.7	3.89	.79	350
375	....	1500	9.39	2.68	....	2100	8.39	1.68	....	....	....	....	....	....	9.45	6.5	4.17	.88	375
400	....	1550	9.70	2.85	....	2200	8.80	1.82	....	....	....	....	....	....	10.08	7.3	4.44	.99	400
425	....	1600	10.00	3.01	....	2300	9.20	1.99	....	....	....	....	....	....	....	....	4.72	1.11	425
450	....	1650	10.32	3.21	....	2400	9.60	2.17	....	....	....	....	....	....	....	....	5.00	1.22	450
475	....	1700	10.64	3.40	....	2500	10.00	2.34	....	....	....	....	....	....	....	....	5.28	1.36	475
500	....	1750	10.96	3.59	....	2600	10.40	2.50	....	....	....	....	....	....	....	....	5.55	1.50	500
550	....	1800	11.27	3.78	....	2700	10.79	2.69	....	....	....	....	....	....	....	....	6.11	1.80	550
600	....	1850	11.58	3.98	....	2800	11.18	2.88	....	....	....	....	....	....	....	....	6.67	2.10	600
650	....	1900	11.89	4.19	....	2900	11.59	3.08	....	....	....	....	....	....	....	....	7.22	2.44	650
700	....	1950	12.21	4.40	....	3000	11.99	3.28	....	....	....	....	....	....	....	....	7.78	2.79	700
750	....	2000	12.52	4.61	....	3100	12.39	3.32	....	....	....	....	....	....	....	....	8.33	3.19	750
800	....	....	....	....	....	3200	12.79	3.35	....	....	....	....	....	....	....	....	8.89	3.6	800

Normal safe operating selection; Suction piping; Discharge or pressure piping.
Note: Where long pipe runs are encountered, make selection in minimum head loss range.

P.V.C. Pipe Specifications

PVC Pipe Size	Nominal Diameter (Inches)	Nominal Square Inch	Cubic Feet Water	Gallons Water/ Foot
0.5	0.622	0.303858694	0.00211013	0.01578
0.75	0.824	0.53326775	0.003703248	0.02770
1	1.049	0.864254945	0.00600177	0.04489
1.25	1.38	1.49571576	0.010386915	0.07769
1.5	1.61	2.03583534	0.014137745	0.10575
2	2.067	3.355612861	0.023302867	0.17431
2.5	2.469	4.787767769	0.033248387	0.24870
3	3.068	7.39267489	0.05133802	0.38401
4	4.026	12.73029413	0.08840482	0.66127
6	6.065	28.89033032	0.200627294	1.50069
8	7.961	49.77670499	0.345671562	2.58562
10	10.02	78.85447416	0.547600515	4.09605
12	11.938	111.9319439	0.777305166	5.81424

ENGINEERING DATA

FRICTION LOSS CHARTS

Hydraulic Charts and Tables

Friction/Flow Chart For Schedule 80 Rigid PVC Pipe

Friction Loss of Water in Feet per 100 Feet Length of Pipe

Based on Williams & Hazen Formula Using Constant 150. Sizes of Standard Pipe in Inches.

U.S. Gals. per Min.	½" Pipe		¾" Pipe		1" Pipe		1¼" Pipe		1½" Pipe		2" Pipe		2½" Pipe		3" Pipe		3½" Pipe		4" Pipe	
	Vel. Ft. per Sec.	Loss in Feet	Vel. Ft. per Sec.	Loss in Feet	Vel. Ft. per Sec.	Loss in Feet	Vel. Ft. per Sec.	Loss in Feet	Vel. Ft. per Sec.	Loss in Feet	Vel. Ft. per Sec.	Loss in Feet	Vel. Ft. per Sec.	Loss in Feet	Vel. Ft. per Sec.	Loss in Feet	Vel. Ft. per Sec.	Loss in Feet	Vel. Ft. per Sec.	Loss in Feet
2	2.74	6.72	1.48	1.51	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
4	5.48	24.2	2.97	5.45	1.79	1.54	1.00	.39	.73	.177	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
6	8.23	51.2	4.45	11.5	2.68	3.34	1.50	.82	1.09	.375	.65	.107	.....	.....	.....	.....	.....	.....	.....	.....
8	11.0	86.9	5.94	19.6	3.57	5.69	2.00	1.39	1.45	.64	.87	.183	.61	.077	.....	.....	.....	.....	.....	.....
10	13.7	132.0	7.42	29.6	4.46	8.60	2.50	2.10	1.82	.96	1.09	.276	.76	.115	.485	.039	.....	.....	.....	.....
12	.....	.....	8.91	41.5	5.36	12.0	3.00	2.94	2.18	1.35	1.30	.387	.91	.161	.572	.055	.....	.....	.....	.....
15	.....	.....	11.1	62.7	6.7	22.9	3.76	4.45	2.72	2.04	1.63	.585	1.14	.243	.727	.083	.54	.035	.....	.....
18	.....	.....	13.4	87.9	8.03	25.5	4.50	6.25	3.27	2.96	1.96	.818	1.36	.340	.873	.116	.65	.056	.....	.....
20	5" PIPE		14.8	107	8.92	30.9	5.00	7.57	3.63	3.47	2.17	.996	1.51	.414	.97	.140	.72	.068	.56	.037
25	.....	.....	.....	.....	11.2	58.8	6.25	11.4	4.55	5.25	2.71	1.51	1.9	.625	1.21	.212	.90	.103	.695	.055
30	.53	.025	.....	.....	13.4	65.3	7.50	16.0	5.45	7.98	3.26	2.11	2.27	.874	1.44	.297	1.08	.145	.84	.077
35	.62	.034	.....	.....	15.6	86.9	8.75	21.3	6.38	9.78	3.80	2.81	2.65	1.16	1.70	.396	1.26	.192	.973	.103
40	.71	.043	6" PIPE		17.9	111	10.0	27.3	7.26	12.5	4.35	3.59	3.03	1.49	1.94	.507	1.44	.246	1.12	.132
45	.795	.054	.....	.....	.....	.....	11.2	33.9	8.26	15.6	4.89	4.46	3.41	1.86	2.18	.629	1.63	.306	1.25	.164
50	.88	.065	.62	.027	.....	.....	12.5	41.3	9.08	18.9	5.43	5.41	3.79	2.25	2.42	.766	1.80	.372	1.40	.199
55	.973	.078	.676	.032	.....	.....	13.7	49.2	10.0	32.0	5.96	6.44	4.16	2.68	2.67	.912	1.99	.443	1.53	.237
60	1.06	.091	.74	.039	.....	.....	15.0	57.8	10.9	26.5	6.52	7.61	4.54	3.16	2.92	1.07	2.17	.522	1.67	.279
65	1.15	.106	.80	.044	.....	.....	16.1	67.0	11.8	30.7	7.06	8.84	4.92	3.66	3.14	1.25	2.35	.604	1.81	.323
70	1.23	.121	.86	.051	.....	.....	17.5	77.1	12.7	35.3	7.61	10.1	5.30	4.20	3.39	1.43	2.53	.691	1.95	.371
75	1.33	.138	.923	.057	.....	.....	18.8	87.4	13.6	40.1	8.15	11.5	5.68	4.79	3.64	1.62	2.70	.787	2.08	.421
80	1.41	.155	.98	.065	.....	.....	20.0	98.2	14.5	45.2	8.69	12.9	6.05	5.36	3.88	1.83	2.89	.888	2.23	.475
85	1.50	.174	1.04	.072	.....	.....	21.2	110	15.4	50.3	9.03	14.5	6.43	6.02	4.10	2.04	3.05	.992	2.34	.531
90	1.59	.193	1.11	.080	.....	.....	22.5	122	16.3	55.9	9.78	16.1	6.81	6.53	4.33	2.27	3.25	1.10	2.51	.592
95	1.67	.213	1.20	.089	.....	.....	.....	.....	17.2	62.0	10.3	17.8	7.19	7.38	4.57	2.51	3.42	1.21	2.64	.652
100	1.76	.234	1.23	.098	.....	.....	.....	.....	18.2	68.2	10.9	19.6	7.57	8.13	4.85	2.76	3.67	1.34	2.79	.719
110	1.95	.279	1.36	.117	.....	.....	.....	.....	20.0	81.3	12.0	23.4	8.33	9.68	5.33	3.29	3.97	1.60	3.07	.855
120	2.11	.329	1.48	.137	8" PIPE		21.8	95.4	13.0	27.4	13.0	27.4	9.08	11.4	5.80	3.87	4.33	1.88	3.35	1.00
130	2.3	.381	1.60	.159	.....	.....	23.6	111	14.1	31.8	14.1	31.8	9.84	13.2	6.30	4.48	4.69	2.18	3.63	1.16
140	2.47	.437	1.72	.182	.98	.047	.....	.....	25.4	127	15.2	36.5	10.6	15.1	6.80	5.12	5.05	2.50	3.91	1.33
150	2.65	.496	1.85	.207	1.05	.054	.....	.....	.....	.....	16.3	41.5	11.3	17.2	7.27	5.87	5.41	2.84	4.19	1.52
160	2.82	.559	1.97	.234	1.12	.059	.....	.....	.....	.....	17.4	46.7	12.1	19.4	7.75	6.58	5.78	3.20	4.47	1.71
170	3.0	.626	2.08	.261	1.19	.067	.....	.....	.....	.....	18.5	52.2	12.9	21.7	8.20	7.37	6.14	3.58	4.75	1.91
180	3.16	.696	2.22	.290	1.26	.074	.....	.....	.....	.....	19.6	58.3	13.6	24.1	8.60	8.18	6.50	3.97	5.02	2.12
190	3.36	.769	2.34	.321	1.33	.082	.....	.....	.....	.....	20.6	64.4	14.4	26.6	9.00	9.05	6.85	4.39	5.30	2.35
200	3.52	.846	2.46	.353	1.41	.091	.....	.....	.....	.....	21.7	70.5	15.1	29.3	9.70	9.96	7.22	4.84	5.58	2.58
220	3.88	1.01	2.71	.421	1.55	.108	.....	.....	.....	.....	23.9	84.1	16.7	34.9	10.6	11.9	7.94	5.78	6.14	3.08
240	4.23	1.18	2.96	.484	1.69	.126	.....	.....	.....	.....	26.1	98.7	18.2	41.0	11.6	13.9	8.66	6.77	6.70	3.62
260	4.58	1.37	3.20	.573	1.83	.147	.....	.....	.....	.....	28.3	115	19.7	47.5	12.6	16.2	9.38	7.85	7.26	4.19
280	4.94	1.57	3.45	.658	1.97	.168	.....	.....	.....	.....	.....	.....	21.2	54.5	13.5	18.6	10.1	9.02	7.82	4.79
300	5.29	1.79	3.69	.747	2.11	.191	.....	.....	.....	.....	.....	.....	22.7	62.0	14.4	21.1	10.8	10.2	8.38	5.45
320	5.64	2.01	3.94	.841	2.24	.215	.....	.....	.....	.....	.....	.....	24.2	69.9	15.5	23.7	11.5	11.5	8.94	6.16
340	5.99	2.26	4.19	.940	2.39	.240	.....	.....	.....	.....	.....	.....	25.8	78.2	16.3	26.6	12.3	12.9	9.50	6.91
360	6.35	2.51	4.43	1.05	2.64	.261	.....	.....	.....	.....	.....	.....	27.2	86.9	17.4	29.5	13.0	14.3	10.0	7.66
380	6.70	2.77	4.68	1.16	2.68	.295	.....	.....	.....	.....	.....	.....	28.8	96.1	18.6	32.6	13.7	15.8	10.6	8.46
400	7.05	3.05	4.93	1.27	2.81	.325	.....	.....	.....	.....	.....	.....	30.3	106	19.4	35.9	14.4	17.4	11.2	9.31
450	7.95	3.79	5.54	1.58	3.16	.404	.....	.....	.....	.....	.....	.....	.....	.....	21.8	44.6	16.2	21.6	12.5	11.6
500	8.82	4.61	6.16	1.92	3.51	.493	.....	.....	.....	.....	.....	.....	.....	.....	23.2	54.1	18.1	26.3	14.0	14.1
550	9.70	5.50	6.77	2.29	3.86	.587	.....	.....	.....	.....	.....	.....	.....	.....	25.5	64.9	19.9	31.4	15.3	16.8
600	10.6	6.44	7.39	2.69	4.22	.686	.....	.....	.....	.....	.....	.....	.....	.....	29.1	76.1	21.7	36.9	16.7	19.7
650	11.5	7.47	8.00	3.12	4.57	.799	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	23.5	42.8	18.1	22.9
700	12.3	8.60	8.63	3.58	4.92	.916	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	25.3	48.9	19.5	26.2
750	13.2	9.77	9.24	4.07	5.27	1.04	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	27.1	55.9	20.9	29.8
800	14.1	11.0	9.85	4.58	5.62	1.17	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	28.9	61.6	22.3	33.6
850	15.0	12.3	10.5	5.12	5.97	1.31	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	30.7	70.5	23.7	37.6
900	15.9	13.7	11.1	5.69	6.32	1.46	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	25.1	41.8
950	16.7	15.1	11.7	6.29	6.67	1.61	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1000	17.6	16.6	12.3	6.91	7.03	1.77	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1100	19.4	19.8	13.5	8.27	7.83	2.11	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1200	21.1	23.3	14.8	9.73	8.43	2.48	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1300	.....	.....	.....	.....	9.13	2.87	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1400	.....	.....	.....	.....	9.83	3.30	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1500	.....	.....	.....	.....	10.5	3.75	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1600	.....	.....	.....	.....	11.2	4.23	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1800	.....	.....	.....	.....	12.6	5.26	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
2000	.....	.....	.....	.....	14.1	6.39	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
2200	.....	.....	.....	.....	15.5	7.80	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
2400	.....	.....	.....	.....	16.9	8.93	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

* Data shown is calculated from Williams and Hazen Formula $H = \frac{3.023}{C} \frac{V}{1.852} \frac{V}{D} \frac{1.852}{D} \frac{L}{1.167}$ using C-150.

For water at 60° F. Where H = head loss, V = fluid velocity ft./sec., D = diameter of pipe, ft.
 C = coefficient representing roughness of pipe interior surface.

ENGINEERING DATA

2 AND 3 SYSTEM MANIFOLDS

3 SYSTEM MANIFOLDS

SUCTION MANIFOLD

RETURN MANIFOLD

TECHNICAL DATA

Gallons	Gallons Per Min.	Turn Over Rate.-Hrs.	Pump H.P.(3)	Filter Sq.Ft.	Filter Flow Rate	Pipe Sizing					
						A	B	C	D	E	F
43,200	120	6.0	1/2	900	.133	3"	2"	2"	3"	2"	1 1/2"
64,800	180	6.0	3/4	900	.20	4"	2 1/2"	2"	3"	2 1/2"	2"
78,800	219	6.0	1	1,350	.16	4"	3"	2 1/2"	4"	2 1/2"	2"
91,800	255	6.0	1.5	1,350	.19	6"	3"	3"	4"	3"	2"
113,400	315	6.0	1.5	1,350	.233	6"	4"	3"	4"	3"	3"
124,200	345	6.0	2	1,350	.26	6"	4"	3"	6"	3"	3"
155,500	432	6.0	3	2,700	.16	6"	4"	4"	6"	4"	3"
167,400	465	6.0	5	2,700	.17	6"	6"	4"	8"	4"	3"
216,000	600	6.0	5	2,700	.22	8"	6"	4"	8"	4"	4"
324,000	900	6.0	7.5	4,050	.22	8"	6"	6"	8"	6"	4"
459,000	1,275	6.0	10	5,400	.24	10"	8"	6"	8"	6"	6"

ALL SUCTION PIPING SIZED AT 6 FPS OR BETTER.

ALL RETURN PIPING SIZED AT 8 FPS OR BETTER.

ALL PUMPS AVAILABLE IN SINGLE OR THREE PHASE.

PIPE SIZING BASED ON 35' RUNS OR LESS.

GALLONS PER MINUTE ARE BASED ON 60 FOOT OF HEAD.

FILTER FLOW RATES OF .375 OR LOWER ARE REQUIRED.

3 SYSTEM MANIFOLDS

3 SYSTEM MANIFOLDS

SUCTION MANIFOLD

RETURN MANIFOLD

TECHNICAL DATA

Gallons	Gallons Per Min.	Turn Over Rate.-Hrs.	Pump H.P.(4)	Filter Sq.Ft.	Filter Flow Rate	Pipe Sizing					
						A	B	C	D	E	F
57,600	160	6.0	1/2	1,200	.133	4"	2"	2"	3"	2"	2"
86,400	240	6.0	3/4	1,200	.20	4"	2 1/2"	2"	3"	3"	2"
105,120	292	6.0	1	1,800	.16	6"	3"	2 1/2"	4"	3"	2"
122,400	340	6.0	1.5	1,800	.19	6"	3"	2 1/2"	6"	3"	2"
151,200	420	6.0	1.5	1,800	.233	6"	3"	3"	6"	4"	2 1/2"
165,600	460	6.0	2	1,800	.26	6"	4"	3"	6"	4"	3"
207,360	576	6.0	3	3,600	.16	8"	4"	4"	8"	4"	3"
223,200	620	6.0	5	3,600	.17	8"	4"	4"	8"	4"	3"
288,000	800	6.0	5	5,400	.22	8"	6"	4"	8"	6"	4"
432,000	1,200	6.0	7.5	7,200	.22	10"	6"	6"	8"	6"	6"
612,000	1,700	6.0	10	10,800	.24	12"	8"	6"	10"	8"	6"

ALL SUCTION PIPING SIZED AT 6 FPS OR BETTER.

ALL RETURN PIPING SIZED AT 8 FPS OR BETTER.

ALL PUMPS AVAILABLE IN SINGLE OR THREE PHASE.

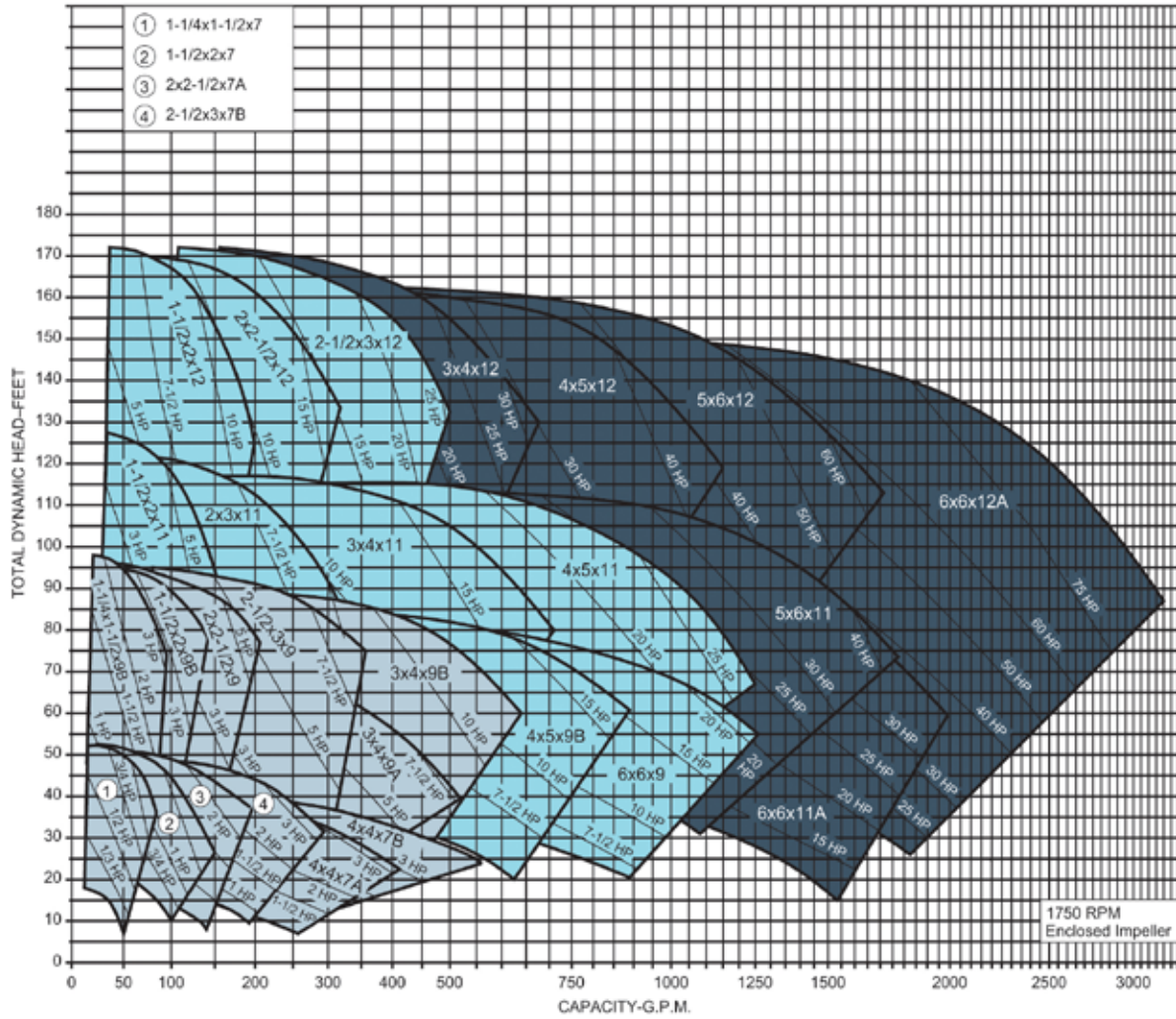
PIPE SIZING BASED ON 35' RUNS OR LESS.

GALLONS PER MINUTE ARE BASED ON 60 FOOT OF HEAD.

FILTER FLOW RATES OF .375 OR LOWER ARE REQUIRED.

ENGINEERING DATA

AURORA 340 SERIES PUMP SELECTIONS



For assistance in selecting the proper pump, please contact our commercial sales team or technical support.

CONVERSION REFERENCE CHARTS

**1 U.S. Gallon/Minute = 0.22712470704
Cubic Meter/Hour**

**1 U.S. Gallon/Minute = 0.83267418463
UK Gallon/Minute**

**1 Foot of Water/Head = 0.30487804878
Meter of Water/Head**

**1 Foot of Water/Head = 0.43352750193
Pound/Square Inch**

Pressure to Head Conversion

Feet of Water	Meters of Water	PSI
10	3.05	4.34
20	6.10	8.67
30	9.15	13.01
40	12.20	17.34
50	15.24	21.68
60	18.29	26.01
70	21.34	30.35
80	24.39	34.68
90	27.44	39.02
100	30.49	43.35
110	33.54	47.69
120	36.59	52.02
130	39.63	56.36
140	42.68	60.69
150	45.73	65.03

Volumetric Flow Rate Conversion

US Gallons per Minute	Cubic Meters per Hour	British Gallons per Minute
10	2.27	8.33
20	4.54	16.65
30	6.81	24.98
40	9.09	33.31
50	11.36	41.64
60	13.63	49.96
70	15.90	58.29
80	18.17	66.62
90	20.44	74.94
100	22.71	83.27
110	24.98	91.60
120	27.26	99.92
130	29.53	108.25
140	31.80	116.58
150	34.07	124.91
160	36.34	133.23
170	38.61	141.56
180	40.88	149.89
190	43.15	158.21
200	45.43	166.54
210	47.70	174.87
220	49.97	183.19
230	52.24	191.52
240	54.51	199.85
250	56.78	208.18
260	59.05	216.50
270	61.32	224.83
280	63.60	233.16
290	65.87	241.48
300	68.14	249.81
310	70.41	258.14
320	72.68	266.46
330	74.95	274.79
340	77.22	283.12
350	79.49	291.45
360	81.77	299.77
370	84.04	308.10
380	86.31	316.43
390	88.58	324.75
400	90.85	333.08

