

SkyHARVESTER™



SH-MICRO
FOR DRIP IRRIGATION



CUSTOM TURNKEY WATER HARVESTING SYSTEMS



SH-80 FOR INTERIOR/EXTERIOR
WATER USAGE WITH DISINFECTION

RAIN WATER HARVESTING

GALLONS COLLECTED FROM A SURFACE BASED UPON RAINFALL VOLUME

620 gallons per 1,000 ft² of roof per 1" of rain
620 × roof area (kft²) = y gallons

FLOW FROM A SURFACE AREA BASED UPON RAINFALL INTENSITY

Rainfall intensity must be in ft/hr

rainfall intensity (ft/hr) × roof area (ft²) = flow rate (ft³/hr)
flow rate (ft³/hr) × .1247 = flow rate in GPM

VARIABLE DEFINITIONS

RADIUS	½ Diameter
d	Inside Diameter of Pipe
TDH	Total Dynamic Head (Feet)
GPM	Gallons Per Minute
BHP	Brake Horsepower
PSI	Pounds Per Square Inch
H_f	Head Loss Due to Friction (Feet of Liquid)
H	Total Head (Feet)
Q	Capacity (GPM)
N	Pump Speed
E	Voltage (Volts)
I	Amperage (Amps)
R	Resistance (Ohms)
C	Hazen & Williams Friction Factor

VOLUME

units		[to obtain]						
		in ³	gallons	ft ³	yd ³	acre-ft	liters	m ³
[you have]	in ³	1	0.004329	0.000579	2.14E-05	1.33E-08	0.01639	1.64E-05
	gallons	231	1	0.1337	0.004951	3.07E-06	3.785	0.003785
	ft ³	1728	74805	1	0.037	0.000023	28.32	0.02832
	yd ³	46656	202	27	1	0.00062	764.6	0.7646
	acre-ft	75270000	325892	43592	1613	1	12330000	1233
	litres	61.02	0.2642	0.03531	0.001308	8.11E-07	1	0.001
	m ³	61023	264.2	35.31	1.308	0.0000811	1000	1

PRESSURE

units		[to obtain]					
		PSI	feet H ₂ O	meters H ₂ O	kg/cm ²	kPa	bar
[you have]	PSI	1	2.31	0.730317	0.0703	6.895	0.06896
	feet H ₂ O	0.4335	1	0.3048	0.0305	2.984	0.02983
	meters H ₂ O	1.422	3.281	1	0.1	9.804	0.9804
	kg/cm ²	14.22	32.81	10	1	98.04	0.9804
	kPa	0.145	0.3351	0.102	0.0102	1	0.01
	bar	14.5	33.52	10.2	1.02	100	1

FLOW

units		[to obtain]					
		US GPM	IPM GPM	acre in/hr	liters/sec	liters/min	m ³ /hr
[you have]	US GPM	1	0.833	0.0022	0.0631	3.785	0.227
	IPM GPM	1.2	1	0.0026	0.0757	4.546	0.272
	acre in/hr	452.4	376.9	1	28.57	1715.27	102.77
	liters/sec	15.85	13.2	0.035	1	60	3.6
	liters/min	0.2642	0.22	0.000583	0.0167	1	0.06
	m ³ /hr	4.4	3.69	0.00973	0.2778	16667	1

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FRICION LOSS IN PIPE FITTING IN TERMS OF EQUIVALENT LENGTH OF FEET IN STRAIGHT PIPE

Pipe Size	Gate Valve	90 Degree Elbow	Long Rad. 90 or 45	Std. Tee Thru Flow	Std. Tee Branch Flow	Butterfly Valve
1"	0.70	2.62	1.40	1.75	5.25	
1-1/4"	0.92	3.45	1.84	2.30	6.90	
1-1/2"	1.07	4.03	2.15	2.68	8.05	
2"	1.38	5.17	2.76	3.45	10.30	7.75
2-1/2"	1.65	6.17	3.29	4.12	12.30	9.26
3"	2.04	7.67	4.09	5.11	15.30	11.50
4"	2.68	10.10	5.37	6.71	20.10	15.10
6"	4.04	15.20	8.09	10.10	30.30	22.70
8"	5.32	20.00	10.60	13.30	39.90	29.90
10"	6.68	25.10	13.40	16.70	50.10	29.20
12"	7.96	29.80	15.90	19.90	59.70	34.80
14"	8.75	32.80	17.50	21.80	65.60	38.30

POWER

units		[to obtain]		
		HP	Watts	BTU
[you have]	HP	1	745.7	42.43
	Watts	0.00134	1	0.05689
	BTU	0.02358	17.58	1

FLOW IN GPM (Required to Cover One Acre)

Irrigation Time in Hours	1/4"	1/2"	1"
6	18.86	37.70	75.40
7	16.15	32.30	64.60
8	14.14	28.28	56.55
9	12.56	25.12	50.24
10	11.31	22.62	45.24

MESH SIZE

Mesh	Micron	Inches
4	4760	0.185
6	3360	0.131
8	2380	0.093
12	1680	0.065
16	1190	0.046
20	840	0.0328
30	590	0.0232
40	420	0.0164
50	297	0.0116
60	250	0.0097
70	210	0.0082
80	177	0.0069
100	149	0.0058
140	105	0.0041
200	74	0.0029
230	62	0.0023
270	53	0.0021
325	44	0.0017
400	37	0.0015
625	20	0.0008
1250	10	0.0004
2500	5	0.0002

SUBMERSIBLE MOTORS (3600 RPM, 460 Volt, 3 Phase)

HP	FLA 460 Volt	Locked Starting Amps	Full Load Efficiency	Full Power Factor	NEMA Code Design
4-inch Motors					
1	2	13.5	70	M	B
1.5	2.5	16.6	76	K	B
2	3.5	23.3	69	L	B
3	4.9	31.0	75	K	B
5	8	53.2	74	K	B
7.5	11.8	81.9	76	K	B
10	17.0	116.0	75	L	A
6-inch Motors					
15	20.8	133	81	H	B
20	26.9	181	82	J	B
25	33.5	240	83	J	B
30	39.5	284	83	J	B
40	53.5	397	83	J	B
50	67.7	414	83	H	B
60	80.5	518	84	H	B

HORIZONTAL ODP MOTORS (3600 RPM, 3 Phase)

HP	Frame	FLA 208 Volt	FLA 230 Volt	FLA 460 Volt	Locked Starting Amps	Full Load Efficiency	Full Power Factor	NEMA Code Design
2	145JM	5.6	5	2.5	21.5	85.5	87	B
3	145JM	8	7.6	3.8	72.1	85.5	87	B
5	182JM	12.8	12	6	49.63	86.5	91	A
7.5	184JM	18	17.2	8.6	86.3	88.5	89	A
10	213JM	25.6	24	12	79	89.5	86	B
15	215JM	36	35	17.5	109.3	90.2	89	B
20	254JM	51	47	23.5	153	91	88	B
25	256JM	62	56	28	197	91.7	89	B
30	284JM	76	70	35	240	91.7	87	A
40	286JM	100	92	46	282	92.4	89	B
50	324JM	124	112	56	376	93	90	A
60	326JM	—	136	68	443	93.6	89	A
75	364TCZ	178	164	82	556	93.6	91	B

FORMULAS

TEMPERATURE	$F = (1.8 \times C) + 32$	$C = \frac{(F - 32)}{1.8}$	CYLINDER VOLUME	$3.142 \times \text{radius}^2 (\text{ft}) \times \text{height} \times 7.48$	AFFINITY	$\frac{Q1}{Q2} = \frac{N1}{N2}$ $\frac{H1}{H2} = \frac{(N1)^2}{(N2)^2}$ $\frac{BHP1}{BHP2} = \frac{(N1)^3}{(N2)^3}$
VELOCITY	$\frac{0.4085 (\text{GPM})}{d^2}$		KVA SINGLE PHASE	$\frac{IE}{1000}$	HAZEN AND WILLIAMS	$H_f = 0.002083 L \left(\frac{100}{c} \right)^{1.85} \times \frac{\text{GPM}}{d^{4.865}}$
BHP	$\frac{\text{PSI} \times \text{GPM}}{1714 \times \text{EFF of pump}}$		KVA THREE PHASE	$\frac{IE(1.73)}{1000}$	OHMS LAW	$E = IR$ $R = \frac{E}{I}$ $I = \frac{E}{R}$

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