

Grundfos 3" SQ Sizing Guide

*Curves and sizing information for all
Grundfos SQ submersible pumps*

SQ Curves

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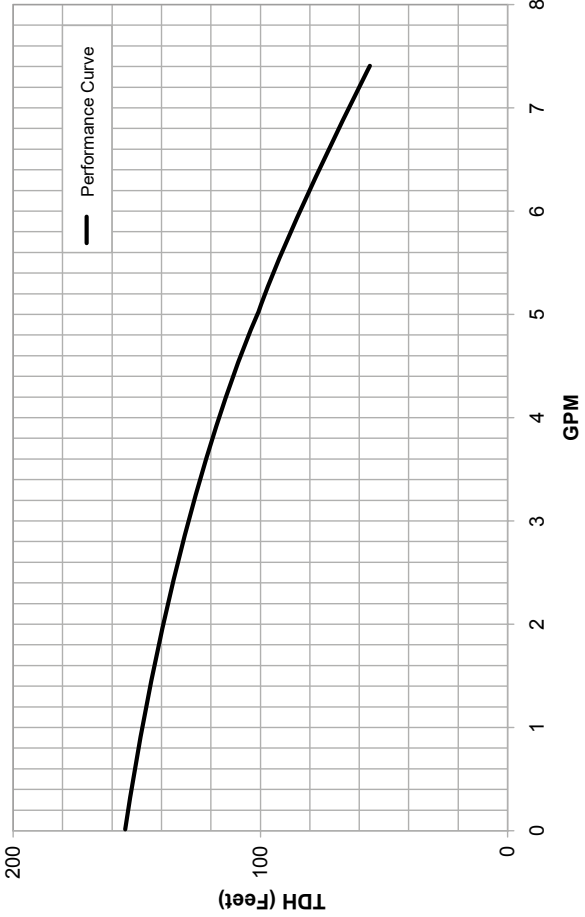
Technical Data & Features

- Flow up to 36 GPM
- Head up to 780 ft.
- HP range from 1/2 to 1 1/2
- Max. acceptable liquid temp: 86°F (30°C)
- Thread connections: NPT 1" to NPT 1 1/2"
- Torque exceeds that of traditional 4" motors

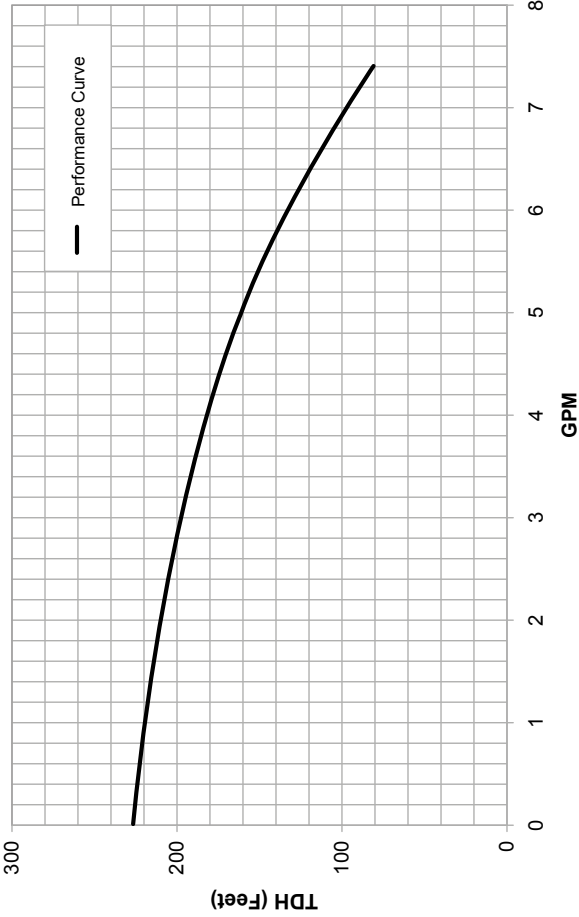


PUMP FEATURES	3" SQ	4" CONVENTIONAL PUMP
Nominal voltage range	150-280 volts	207-244 volts
Pump weight	Under 15 lbs.	22 lbs. and above
Pump diameter	2.9"	3.9"
Soft-start feature	Yes	No
Integrated dry-run protection	Yes	No
Integrated overload protection	Yes	No
Over-temperature protection	Yes	Thermal switch only
Integrated frequency converter	Yes	No
Starter box required	No	Some
High-efficiency permanent magnet motor	Yes	No
Vertical or horizontal installation	Yes	Yes

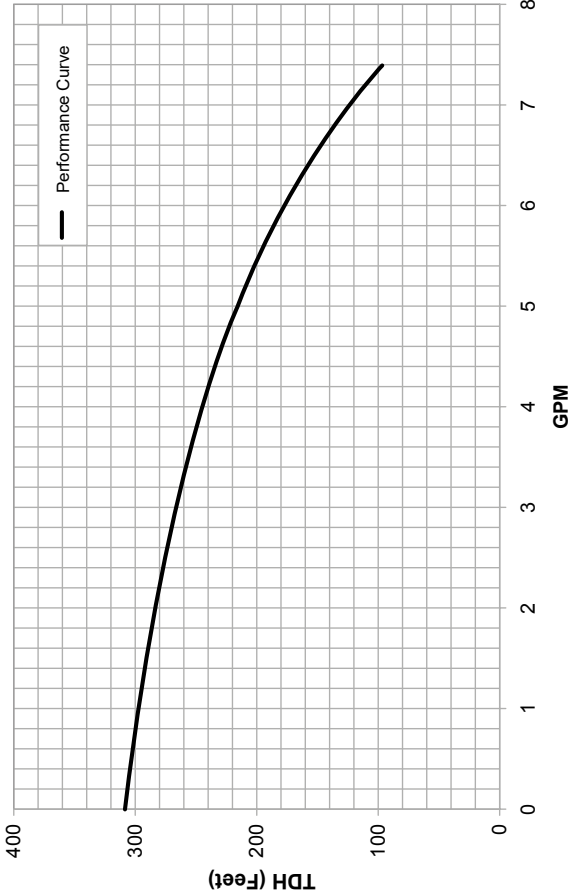
5SQ



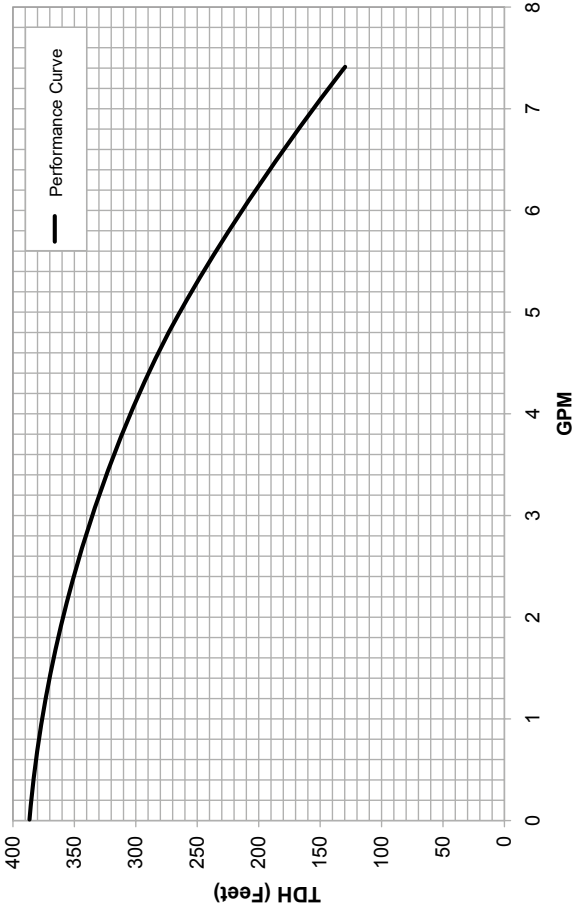
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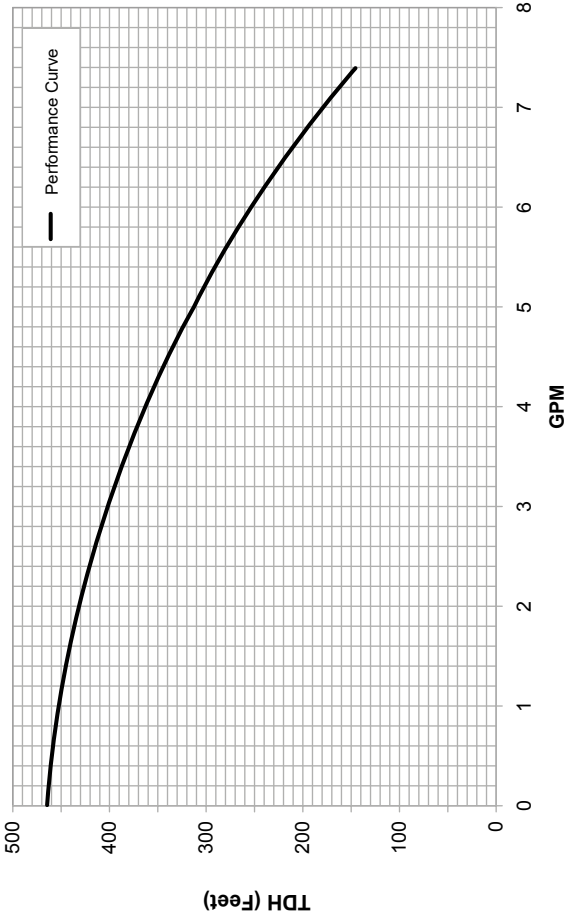
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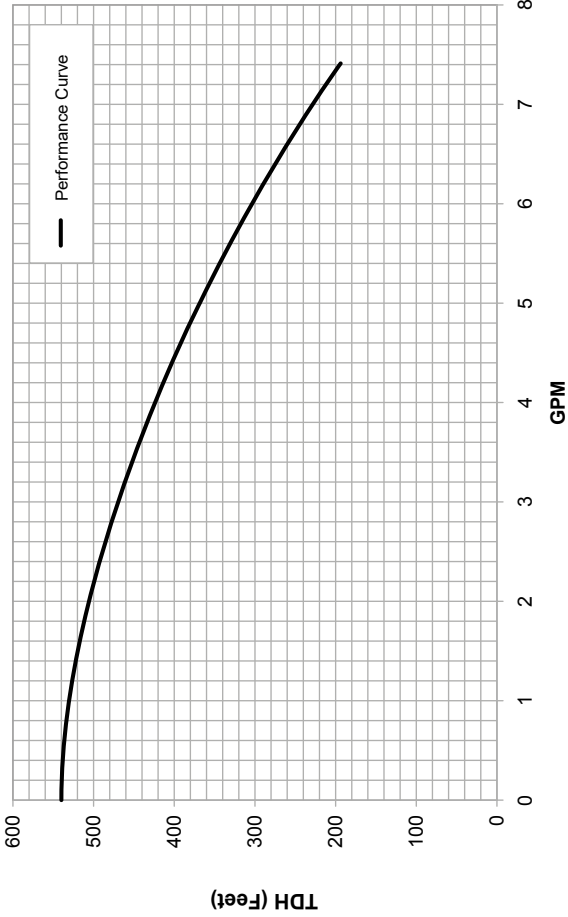
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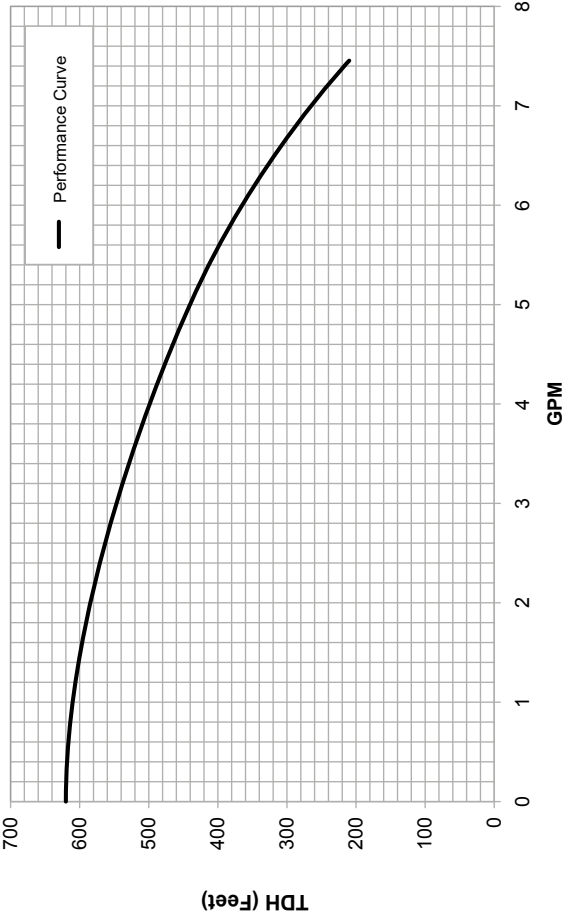
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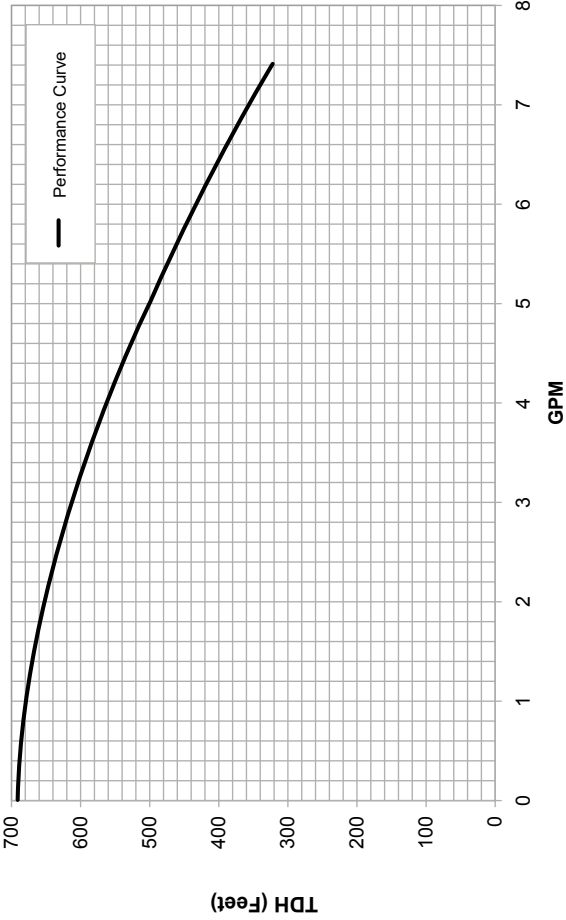
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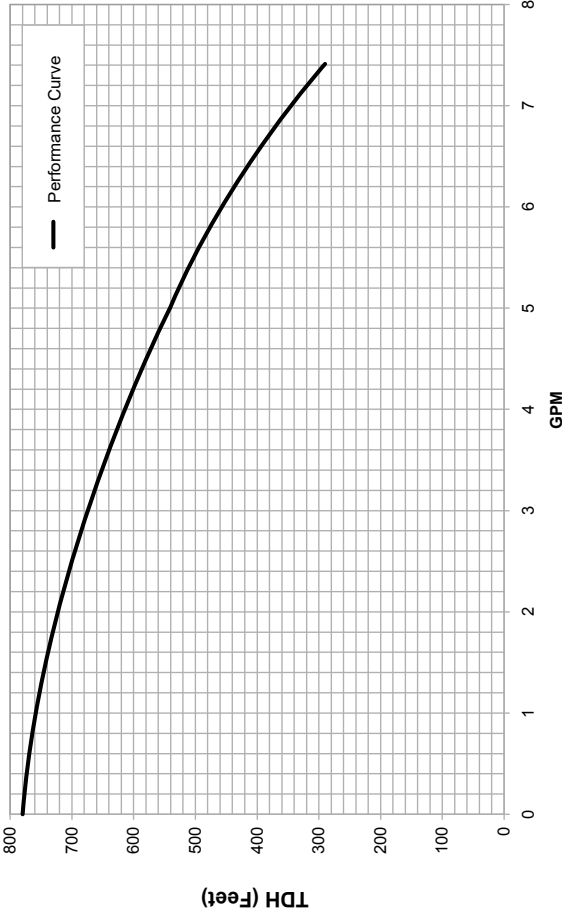
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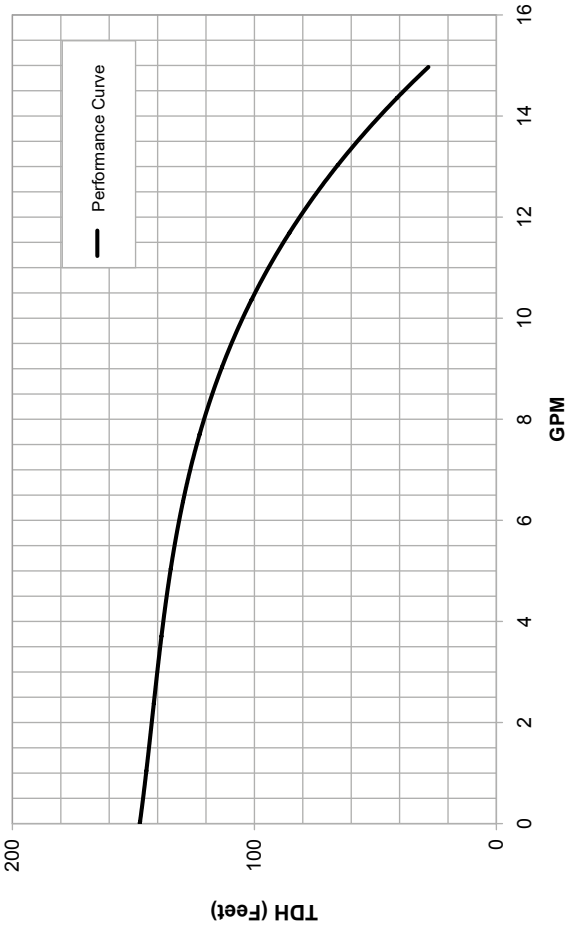
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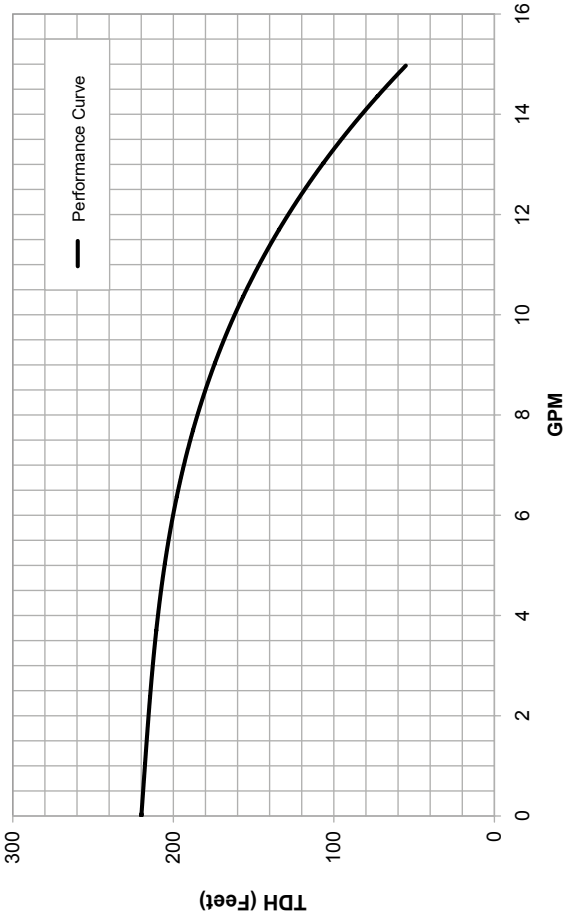
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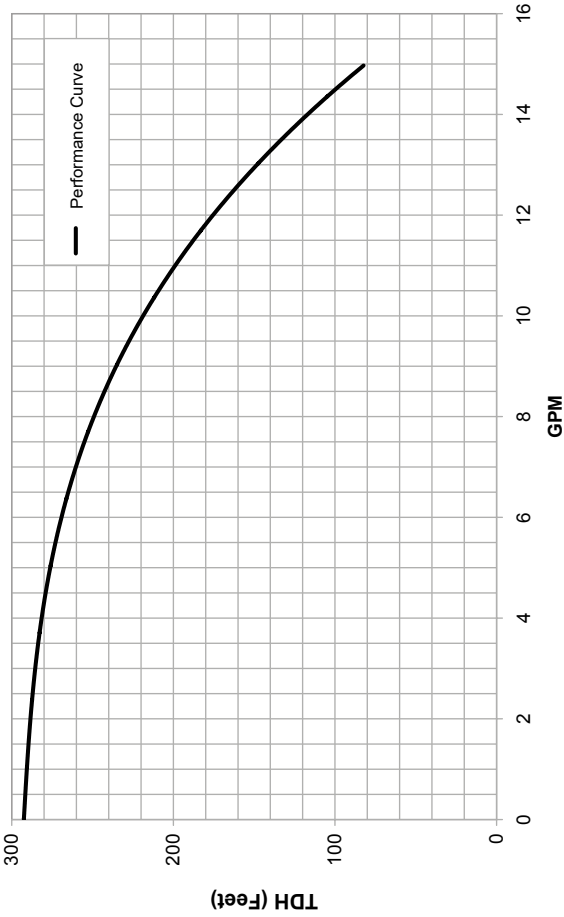
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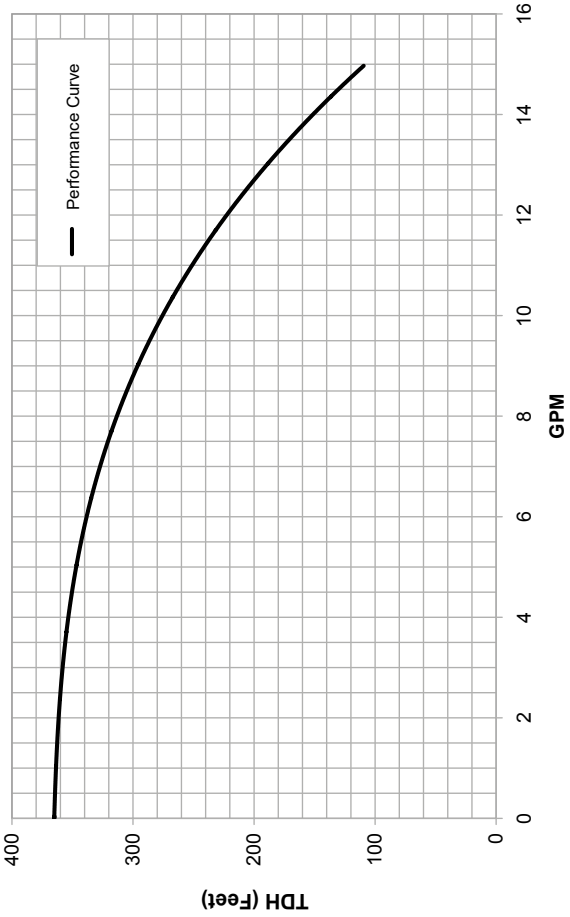
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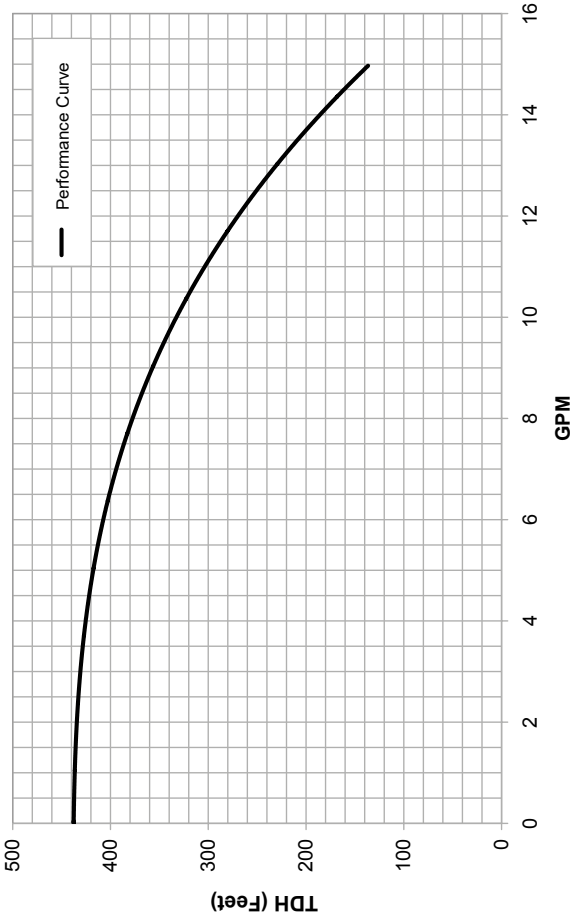


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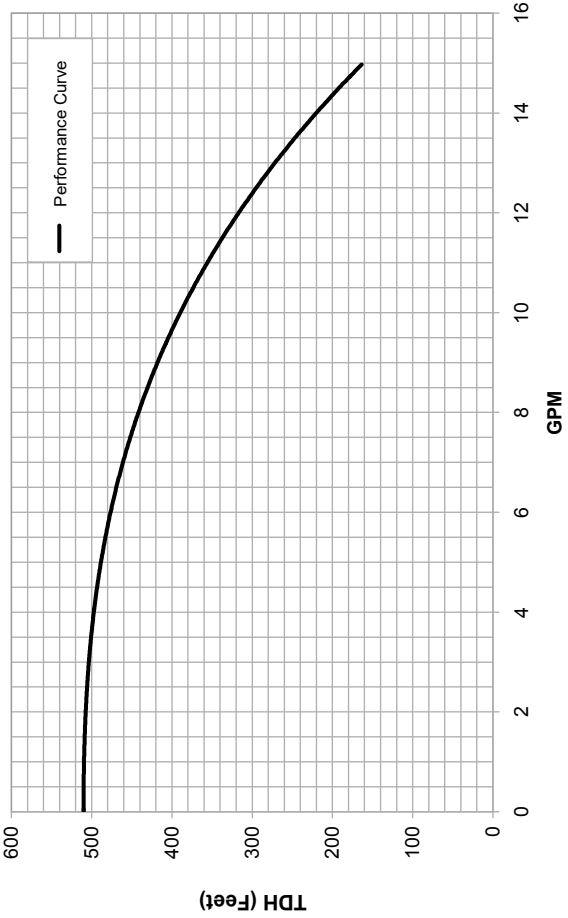
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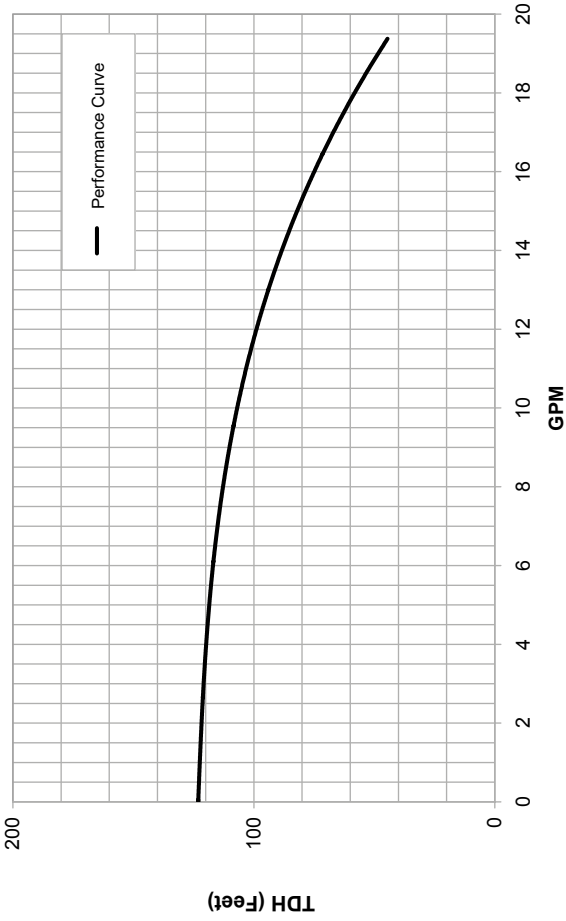




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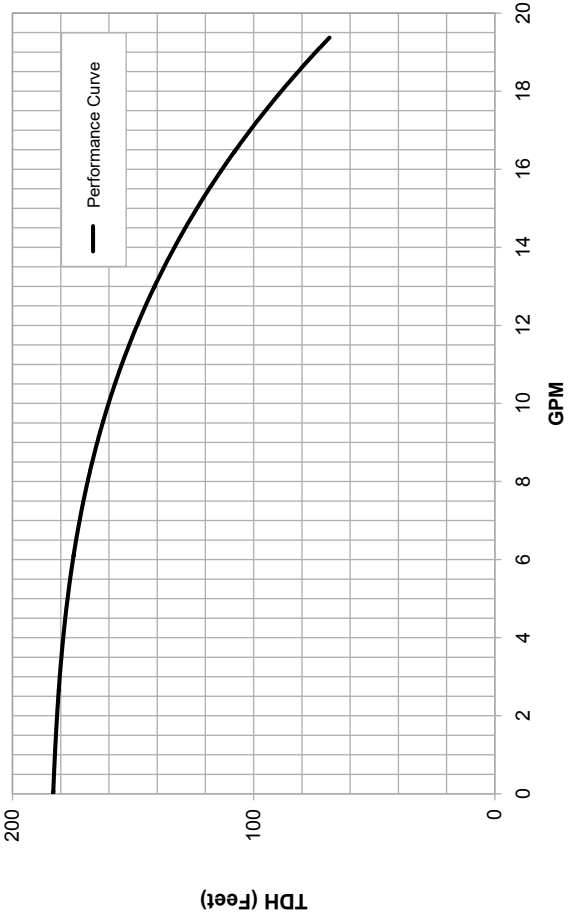
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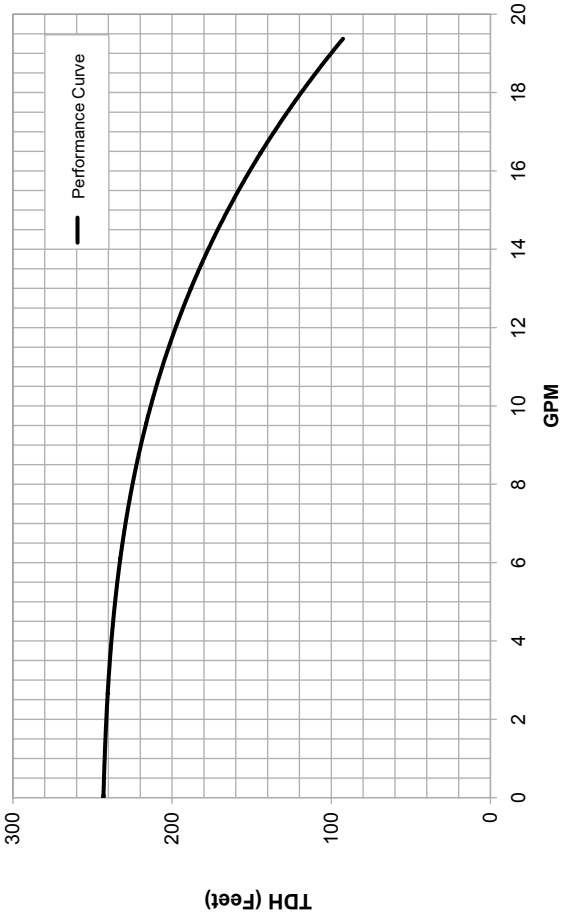




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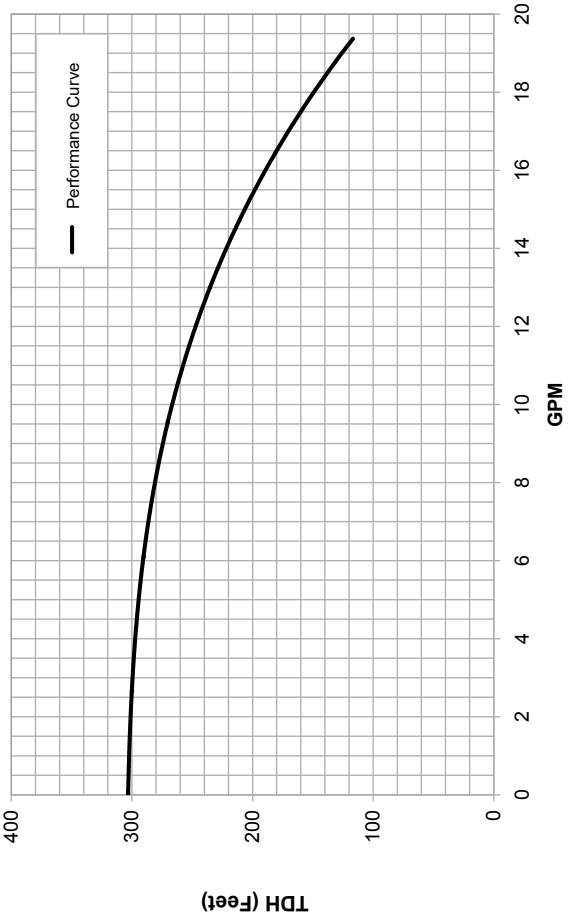
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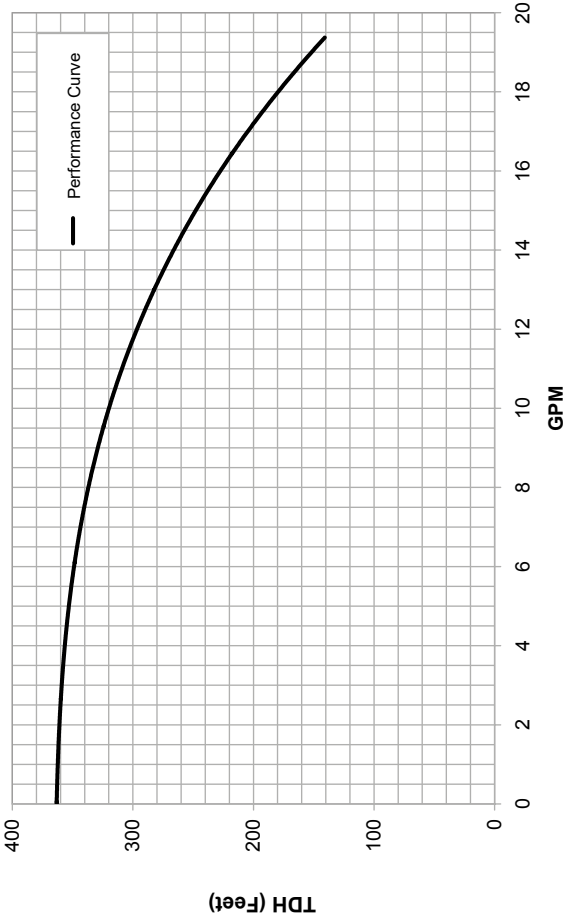




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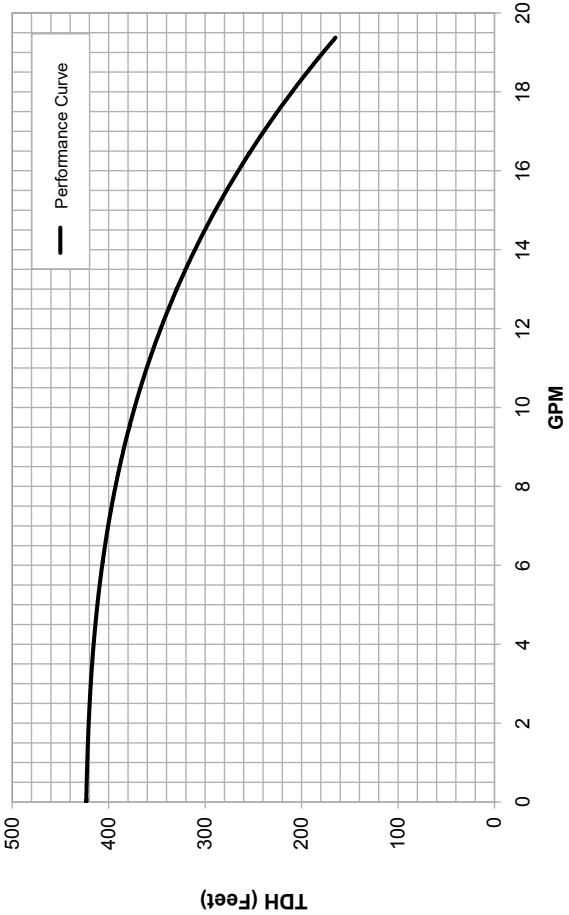
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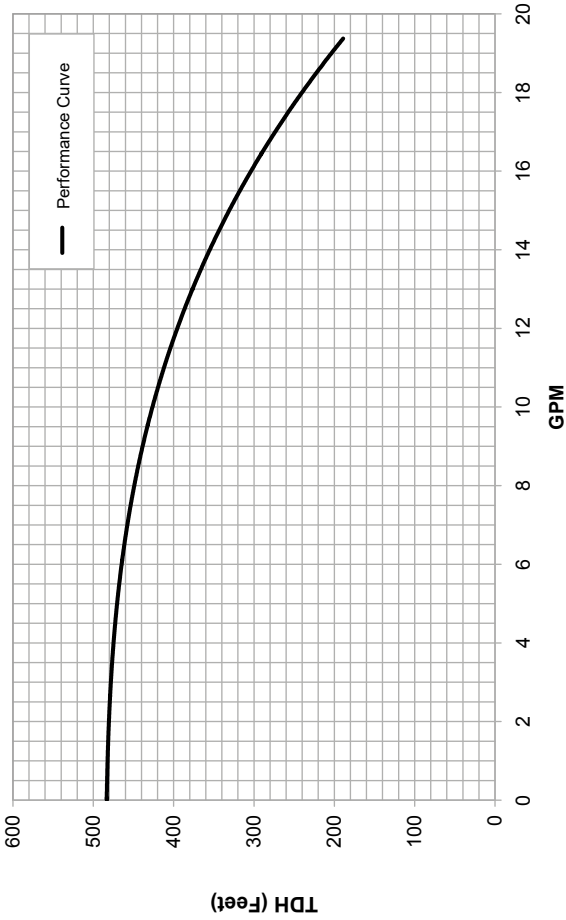




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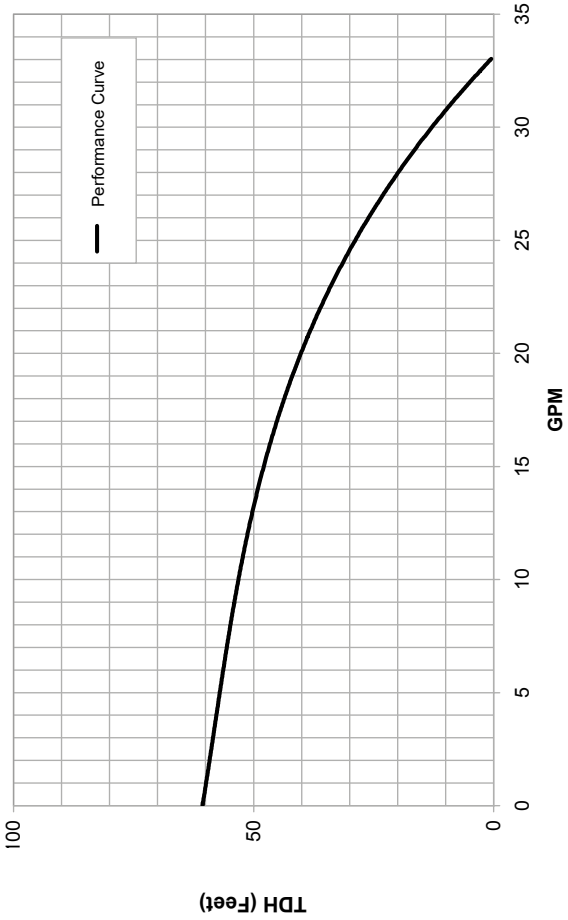
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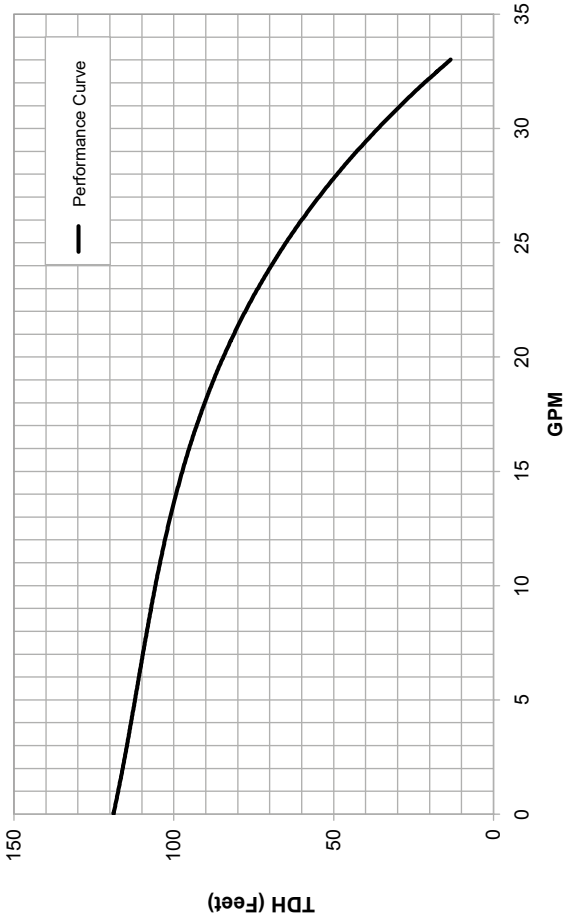




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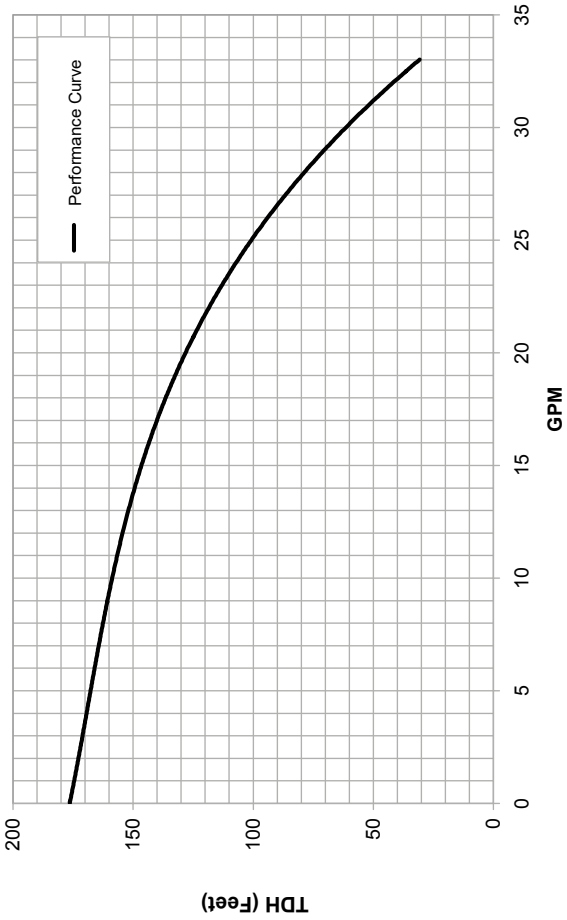
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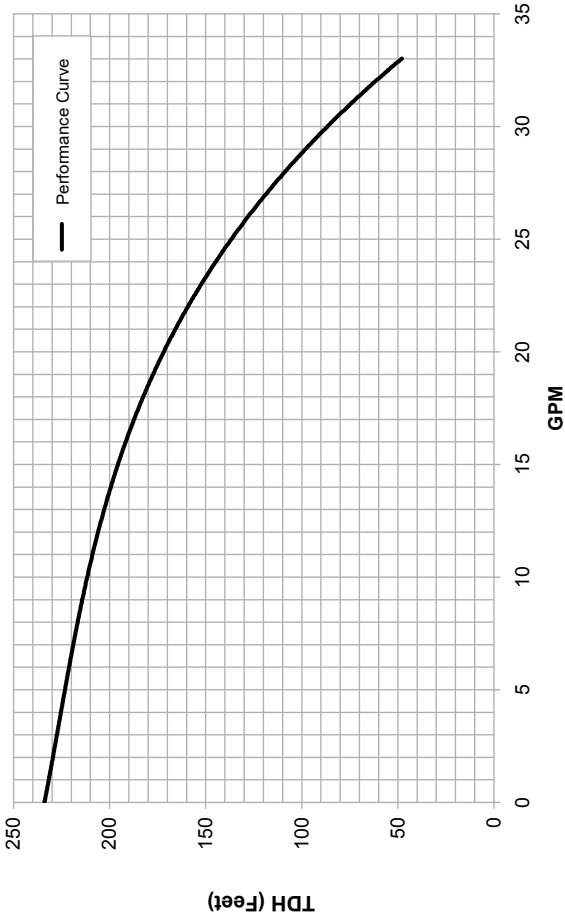




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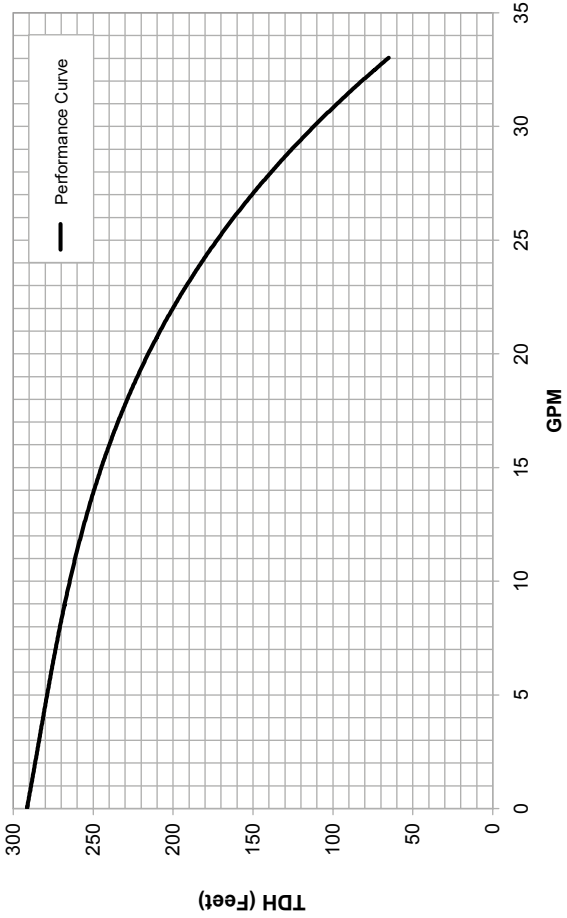
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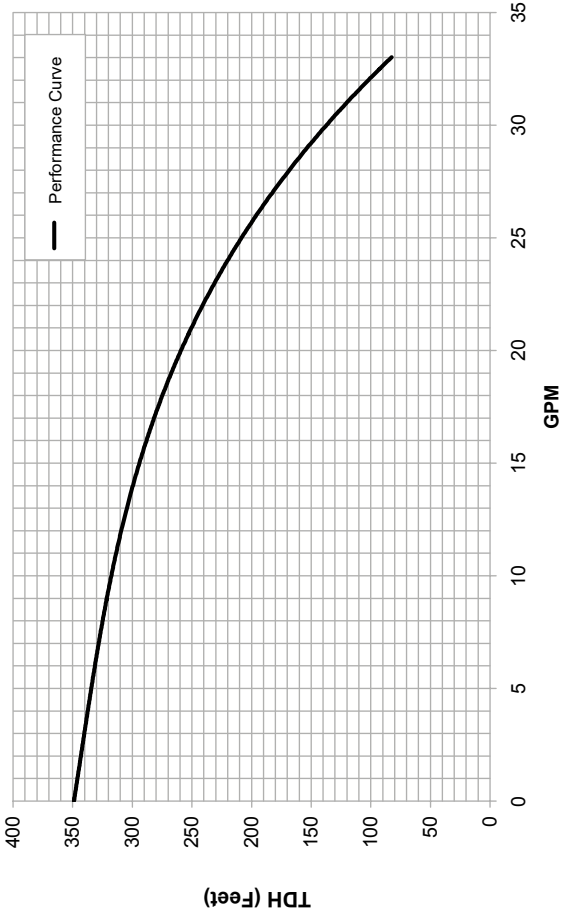




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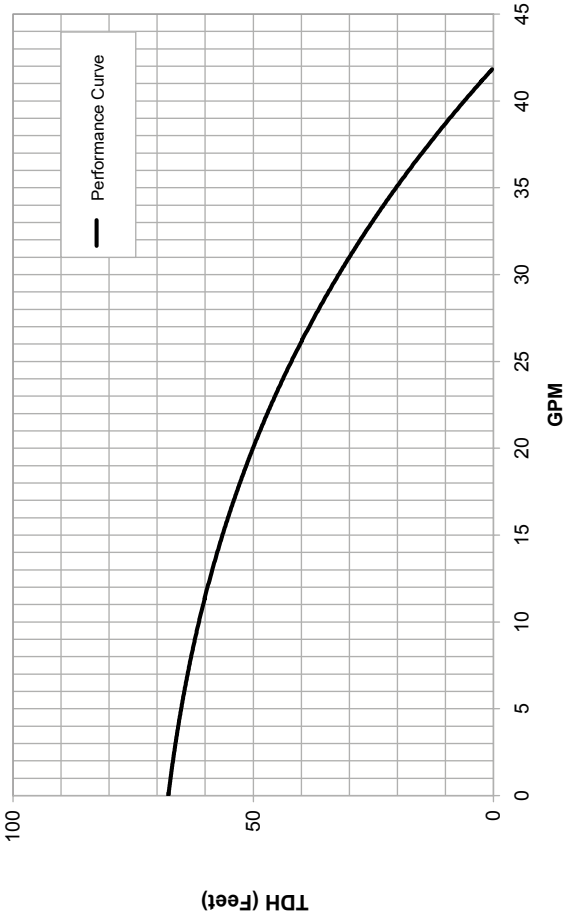
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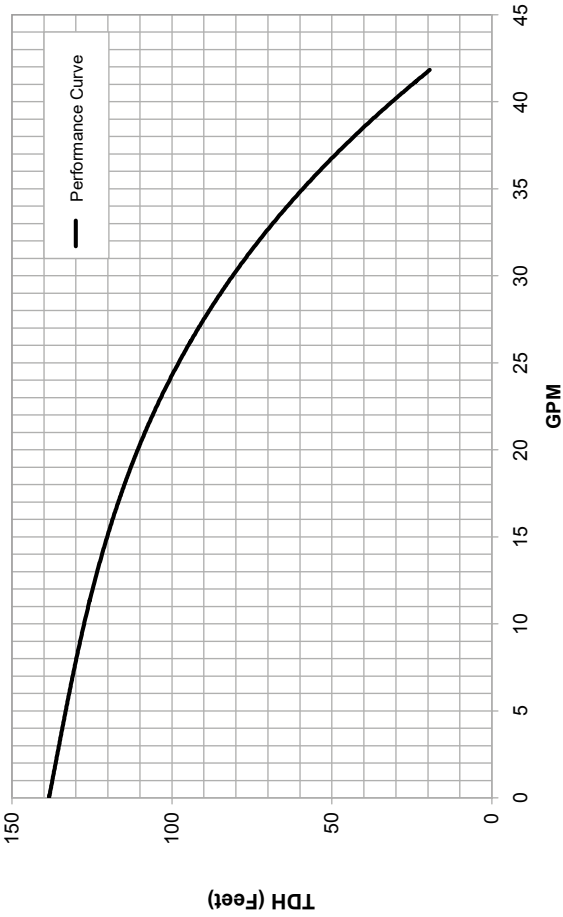




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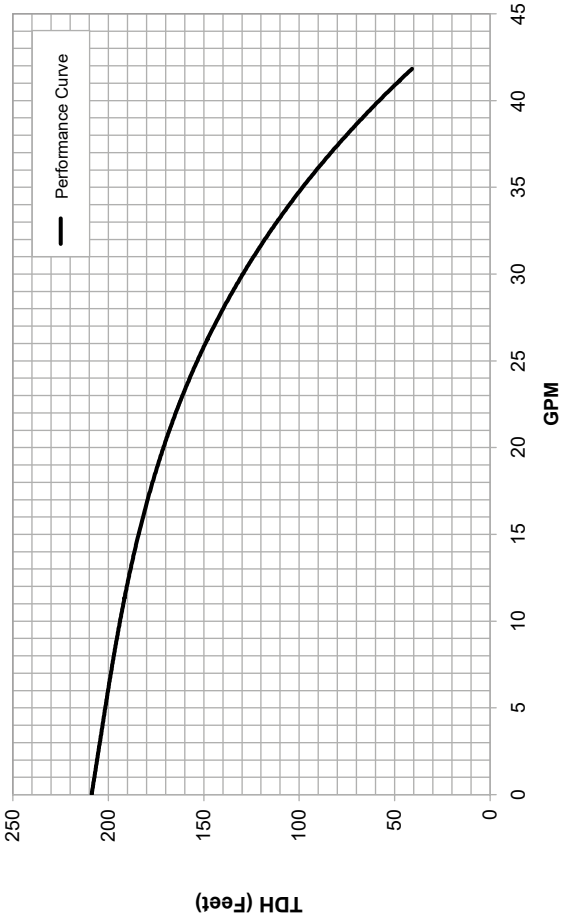
30SQ





30SQ

30SQ



SQ System Sizing Charts

The following SQ Sizing Charts can be used as an alternative method of sizing and selecting SQ pump models.



1

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5SQ

5 SQ
FLOW RANGE
(1.5 - 8 GPM)

Ratings are in GALLONS PER MINUTE-GPM

Pump Outlet 1" NPT

Pump Model	HP	PSI	Depth to Pumping Water Level (Lift) in Feet																														
			20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	340	400	460	520	600	700										
5SQ05-90	1/2	0	7.0	6.0	5.0	4.0	2.3																										
		20	6.8	5.8	4.8	4.0	1.8																										
		30	5.5	5.0	3.3	1.3																											
		40	4.4	3.0	0.8																												
		50	2.8																														
SHUT-OFF PSI:			58	49	41	32	23	15	6																								
5SQ05-140	1/2	0			7.4	6.8	6.2	5.6	4.9	4.0	3.1	1.8																					
		20		7.1	6.6	6.0	5.4	4.6	3.8	2.8	1.2																						
		30		7.0	6.5	5.9	5.2	4.5	3.7	2.6	0.8																						
		40		6.5	5.8	5.1	4.4	3.5	2.4																								
		50		5.7	5.0	4.2	3.3	2.2																									
SHUT-OFF PSI:			91	83	74	66	57	48	40	31	22	14	5																				
5SQ05-180	1/2	0			7.5	7.2	6.7	6.3	5.8	5.3	4.8	4.2	3.5	2.7	1.5																		
		20			7.4	7.0	6.6	6.1	5.7	5.2	4.6	4.0	3.2	2.3																			
		30		7.4	7.0	6.5	6.0	5.6	5.0	4.5	3.9	3.1	2.2																				
		40		7.3	6.9	6.5	6.0	5.5	5.0	4.4	3.8	3.0	2.0																				
		50		6.8	6.4	5.9	5.4	4.9	4.3	3.6	2.9	1.7																					
SHUT-OFF PSI:			126	117	108	100	91	82	74	65	56	48	39	30	22	13	4																
5SQ07-230	3/4	0						7.5	7.3	7.0	6.7	6.4	6.1	5.8	5.4	4.6																	
		20						7.5	7.2	6.9	6.6	6.3	6.0	5.7	5.3	4.9	4.6	3.6															
		30						7.4	7.1	6.8	6.7	6.2	6.0	5.6	5.2	4.8	4.5	4.0															
		40						7.5	7.4	7.1	6.8	6.5	6.2	5.9	5.5	5.2	4.8	4.5	4.0														
		50		7.5	7.3	7.0	6.7	6.5	6.1	5.8	5.5	5.1	4.8	4.3	4.0																		
SHUT-OFF PSI:			160	151	142	134	125	116	108	99	90	82	73	65	56	47	39	21															

Pump Model	HP	Depth to Pumping Water Level (Lift) in Feet																					
		20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	340	400	460	520	600	700	
5SQ07-270	0																						
	30									7.4	7.1	6.8	6.5	6.2	5.9	5.6	5.2	4.9	4.5	3.6	1.6		
	40								7.3	7.0	6.7	6.4	6.1	5.8	5.5	5.1	4.8	4.3	3.4	2.2			
	50								7.3	7.0	6.7	6.4	6.1	5.8	5.4	5.1	4.7	4.3	3.8	3.4	2.8	1.2	
	60									7.2	6.9	6.6	6.4	6.0	5.7	5.4	5.0	4.6	4.2	3.8	3.3	2.7	2.0
	SHUT-OFF PSI:		185	177	168	159	151	142	133	125	116	107	99	90	81	73	55	29					
5SQ07-320	0																						
	20																						
	30									7.4	7.1	6.8	6.7	6.4	6.0	5.8	5.5	4.9	3.8	2.3			
	40									7.3	7.1	6.8	6.6	6.3	6.0	5.8	5.4	5.1	4.5	3.3			
	50									7.2	7.0	6.8	6.6	6.3	6.0	5.7	5.4	5.1	4.8	4.1	2.6		
	60									7.5	7.3	7.0	6.8	6.5	6.2	6.0	5.7	5.4	5.1	4.7	4.3	3.6	2.0
SHUT-OFF PSI:		210	201	192	184	175	166	158	149	140	132	123	114	106	88	62	36	10					
5SQ10-360	0																						
	20																						
	30																						
	40																						
	50																						
	60																						
SHUT-OFF PSI:		227	218	210	201	192	184	175	166	158	149	140	132	123	114	106	88	62	36	10			
5SQ10-410	0																						
	20																						
	30																						
	40																						
	50																						
	60																						
SHUT-OFF PSI:		251	242	234	225	216	208	199	190	182	173	166	158	149	140	123	97	71	45	10			
5SQ15-450	0																						
	20																						
	30																						
	40																						
	50																						
	60																						
SHUT-OFF PSI:		271	262	253	245	236	227	219	210	199	191	182	173	166	150	104	78	43					
SHUT-OFF PSI:		271	262	253	245	236	227	219	210	199	191	182	173	166	150	104	78	43					

5SQ

* Values in the table **DO NOT** account for friction loss in the pipe.

Pump Model	HP	PSI	Depth to Pumping Water Level (Lift) in Feet																								
			20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	340	400	460	520	600	700				
10SQ10-290	1	0								14.5	14.1	13.7	13.3	12.7	12.3	11.6	11.0	9.7	6.3								
		20				14.8	14.4	14.0	13.6	13.1	12.6	12.0	11.5	10.8	10.2	9.5	7.3										
		30				14.7	14.4	13.9	13.5	13.0	12.5	12.0	11.4	10.8	10.0	9.2	8.2	5.5									
		40				14.7	14.2	13.9	13.4	13.0	12.4	11.9	11.4	10.7	9.8	9.0	8.1	6.8									
		50				14.6	14.2	13.8	13.3	12.9	12.3	11.8	11.2	10.5	9.8	8.9	8.0	6.8	5.0								
		60				14.5	14.2	13.7	13.2	12.7	12.2	11.8	11.0	10.3	9.6	8.8	7.7	6.4	4.8								
SHUT-OFF PSI:			180	171	163	154	145	137	128	119	111	102	94	85	76	68	59	42	16								
10SQ15-330	1 1/2	0								14.7	14.4	14.0	13.7	13.3	13.0	12.4	11.5	9.7	7.2								
		20				14.9	14.6	14.3	13.9	13.5	13.2	12.7	12.3	11.8	11.4	10.1	7.9										
		30				15.0	14.7	14.2	13.8	13.5	13.1	12.7	12.2	11.8	11.3	10.6	9.5	6.6									
		40				14.9	14.5	14.1	13.8	13.5	13.0	12.6	12.1	11.8	11.2	10.5	10.0	8.4	4.8								
		50				14.8	14.4	14.1	13.7	13.3	12.9	12.5	12.0	11.6	11.1	10.4	9.9	9.1	7.4								
		60				14.7	14.4	14.0	13.8	13.8	12.9	12.5	12.1	11.4	11.0	10.5	9.8	9.0	8.3	5.9							
SHUT-OFF PSI:			204	196	187	178	170	161	152	144	135	126	118	109	100	92	74	48	23								

* Values in the table **DO NOT** account for friction loss in the pipe.

10SQ

15SQ

15 SQ

FLOW RANGE
(4 - 20 GPM)

Ratings are in GALLONS PER MINUTE-GPM

Pump Outlet 1 1/4" NPT

Pump Model	HP	PSI	Depth to Pumping Water Level (Lift) in Feet																								
			20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	340	400	460	520	600	700				
15SQ05-70	1/2	0	19.5	17.2	14.4	10.1																					
		20	16.6	13.3	8.4																						
		30	12.8	7.1																							
		40	5.9																								
		50																									
		60																									
SHUT-OFF PSI:			42	33	25	16	7																				
15SQ05-110	1/2	0			18.6	17.1	15.5	13.0	10.1																		
		20		18.3	16.6	14.8	12.4	8.5																			
		30	18.0	16.4	14.5	11.9	8.3																				
		40	16.1	14.2	11.5	7.0																					
		50	13.8	10.9	6.2																						
		60	10.4	5.0																							
SHUT-OFF PSI:			71	62	53	45	36	27	19	10																	
15SQ07-150	3/4	0					19.0	18.0	16.7	15.4	13.7	11.8	8.7														
		20			18.8	17.6	16.3	15.0	13.1	11.1	7.5																
		30	18.6	17.5	16.3	14.8	12.9	10.5	6.6																		
		40	18.5	17.3	16.0	14.4	12.4	10.3	5.9																		
		50	17.0	15.8	14.1	12.3	9.9	4.8																			
		60	15.4	13.8	11.9	9.0	3.9																				
SHUT-OFF PSI:			97	88	79	71	62	53	45	36	27	19	10														
15SQ07-180	3/4	0					19.4	18.5	17.6	16.5	15.4	14.2	12.6	10.6	8.1												
		20			19.1	18.3	17.3	16.3	15.0	13.6	12.1	10.0	6.8														
		30	19.0	18.1	17.1	16.1	14.8	13.4	11.9	9.5	6.5																
		40	18.8	17.9	17.0	15.9	14.7	13.2	11.4	9.5	5.6																
		50	18.7	17.7	16.8	15.7	14.4	12.8	11.1	9.0	4.8																
		60	17.7	16.7	15.5	14.1	12.7	10.7	8.2																		
SHUT-OFF PSI:			122	113	105	96	87	79	70	61	53	44	35	27	18	10											

Pump Model	HP	PSI	Depth to Pumping Water Level (Lift) in Feet																								
			20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	340	400	460	520	600	700				
155Q10-220	1	0								19.4	18.8	18.0	17.2	16.4	15.4	14.4	13.2	11.7	7.8								
		20								19.3	18.6	17.8	17.0	16.1	15.1	14.0	12.6	11.3	9.3	6.5							
		30								19.2	18.4	17.7	16.8	16.0	14.8	13.8	12.5	11.1	9.3	6.0							
		40								19.1	18.3	17.7	16.8	15.8	14.7	13.7	12.4	11.0	8.8	5.0							
		50								18.9	18.1	17.4	16.6	15.7	14.6	13.4	12.0	10.3	8.3	4.3							
		60								18.9	18.1	17.3	16.5	15.4	14.4	13.1	11.9	10.1	7.7								
SHUT-OFF PSI:			149	140	132	123	114	106	97	88	80	71	62	54	45	36	28	10									
155Q10-250	1	0																									
		20								19.4	18.8	18.1	17.5	16.9	16.1	15.2	14.3	13.3	12.0	8.8							
		30								19.3	18.7	18.2	17.4	16.7	15.8	15.1	13.0	11.9	10.3	6.1	5.4						
		40								19.2	18.6	18.0	17.3	16.6	15.8	15.0	14.0	12.9	11.6	10.0	8.1						
		50								19.0	18.5	17.9	17.2	16.4	15.6	14.7	13.7	12.7	11.4	9.7	7.8	4.5					
		60								19.1	18.5	17.8	17.0	16.3	15.5	14.6	13.6	12.4	11.3	9.7	7.4	3.5					
SHUT-OFF PSI:			166	157	148	140	131	123	114	105	97	88	79	71	62	53	36	10									
155Q15-290	1 1/2	0																									
		20																									
		30																									
		40																									
		50																									
		60																									
SHUT-OFF PSI:			184	175	166	158	149	140	132	123	114	106	97	88	80	62	36	10									

* Values in the table **DO NOT** account for friction loss in the pipe.

15SQ

22SQ

22 SQ FLOW RANGE (7 - 33 GPM) Pump Outlet 1 1/2" NPT

Ratings are in GALLONS PER MINUTE-GPM

Pump Model	HP	PSI	Depth to Pumping Water Level (Lift) In Feet																						
			20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	340	400	460	520	600	700		
22SQ05-40	1/2	0	27.5	20.0																					
		20																							
		30																							
		40																							
		50																							
		60																							
SHUT-OFF PSI:			18	9																					
22SQ05-80	1/2	0	29.5	26.0	21.0	13.5																			
		20	25.0	20.0	10.2																				
		30	18.7	7.7																					
		40	5.7																						
		50																							
		60																							
SHUT-OFF PSI:			43	34	26	17	8																		
22SQ07-120	3/4	0	32.3	30.3	27.9	25.2	21.9	17.2	9.4																
		20	29.6	27.2	24.4	20.7	15.5																		
		30	27.0	24.0	20.0	14.2																			
		40	23.4	19.5	13.0																				
		50	18.4	11.9																					
		60	10.0																						
SHUT-OFF PSI:			68	59	50	42	33	24	16	7															
22SQ10-160	1	0	32.4	30.8	29.0	27.0	24.6	22.0	18.8	14.0	7.0														
		20	32.0	30.3	28.5	26.4	24.0	21.1	17.5	12.3															
		30	30.0	28.2	26.0	23.8	20.7	16.6	11.9																
		40	27.8	25.7	23.3	20.1	16.1	10.4																	
		50	25.3	22.7	19.5	15.6	8.9																		
		60	22.2	19.0	14.0	7.6																			
SHUT-OFF PSI:			93	84	75	67	58	49	41	32	23	15	6												

30SQ

30 SQ

FLOW RANGE
(8 - 42 GPM)

Pump Outlet 1 1/2" NPT

Ratings are in GALLONS PER MINUTE-GPM

Pump Model	HP	PSI	Depth to Pumping Water Level (Lift) In Feet																								
			20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	340	400	460	520	600	700				
30SQ005-40	1/2	0	35.0	26.5	11.0																						
		20	3.8																								
		30																									
		40																									
30SQ007-90	3/4	0	21	12	3																						
		20	38.5	34.8	30.5	24.3	15.5																				
		30	33.7	28.8	22.2	12.1																					
		40	19.5	6.5																							
30SQ10-190	1	0	51	42	34	25	16	8																			
		20	39.3	36.7	34.1	31.0	26.9	21.9	14.7																		
		30	36.3	33.7	30.2	26.0	20.9	13.9																			
		40	28.9	24.6	18.7	10.0																					
SHUT-OFF PSI:	SHUT-OFF PSI:	60	23.7	17.8	7.6																						
		82	7.3	6.5	5.6	4.7	3.9	3.0	2.1	1.3																	

* Values in the table **DO NOT** account for friction loss in the pipe.

SQ System Sizing

Follow these 2 steps.

STEP 1

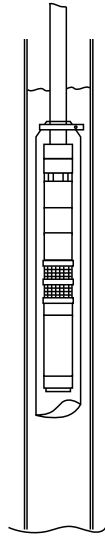
Calculate maximum head requirements at rated flow conditions:

TDH (in feet) = depth to pumping level + system pressure (in feet) + friction loss + above grade elevation.

STEP 2

Select pump from the chart on the following page:

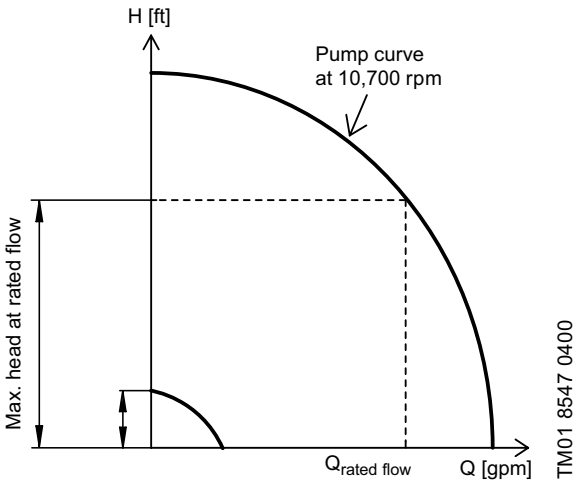
- Choose model family based on desired flow rate i.e. 15SQ for a flow rate of 15 gpm.



2

Continues on next page ➤

- Select the first model with a value that is greater than the TDH (in feet) calculated in Step 1.
- For example: the choice for a 22 gpm model with an TDH (in feet) of 140' would be the 22SQ-160. Double check your selection in the performance curve found in the front of this book.



System Sizing Matrix

Pump Model	Shutoff head (0 gpm) @ 3000 rpm min. speed TDH [feet]	Head @ rated gpm @ 10700 rpm max. speed TDH [feet]
5SQ-90	11	86
5SQ-140	17	131
5SQ-180	22	177
5SQ-230	28	222
5SQ-270	34	270
5SQ-320	39	315
5SQ-360	45	360
5SQ-410	51	405
5SQ-450	56	450
10SQ-110	12	105
10SQ-160	17	164
10SQ-200	23	215
10SQ-240	29	267
10SQ-290	34	328
10SQ-330	40	390
15SQ-70	10	75
15SQ-110	14	123
15SQ-150	19	164
15SQ-180	24	205
15SQ-220	29	246
15SQ-250	33	287
15SQ-290	38	328
22SQ-40	5	36
22SQ-80	9	77
22SQ-120	14	117
22SQ-160	18	159
22SQ-190	23	200
22SQ-220	27	240
30SQ-40	5	33
30SQ-90	11	82
30SQ-130	16	126

SQ Specification Information

PUMP TYPE	HP	VOLTAGE	FULL LOAD AMPS	
			230V	115V
55Q05-90	1/2	230V/115V	2.1	4.2
55Q05-140	1/2	230V/115V	2.9	6.0
55Q05-180	1/2	230V/115V	3.7	7.7
55Q07-230	3/4	230V	4.6	
55Q07-270	3/4	230V	5.3	
55Q07-320	3/4	230V	6.2	
55Q10-360	1	230V	7.2	
55Q10-410	1	230V	8.1	
55Q15-450	1 1/2	230V	9.2	
105Q05-110	1/2	230V/115V	2.9	6.1
105Q05-160	1/2	230V/115V	4.1	8.6
105Q07-200	3/4	230V	5.3	
105Q7-240	3/4	230V	6.0	
105Q10-290	1	230V	7.7	
105Q15-330	1 1/2	230V	8.9	
155Q05-70	1/2	230V/115V	2.9	6.0
155Q05-110	1/2	230V/115V	4.0	8.3
155Q07-150	3/4	230V	5.1	
155Q07-180	3/4	230V	6.2	
155Q10-220	1	230V	7.4	
155Q10-250	1	230V	8.4	
155Q15-290	1 1/2	230V	9.7	
225Q05-40	1/2	230V/115V	1.9	3.9
225Q05-80	1/2	230V/115V	3.4	7.2
225Q07-120	3/4	230V	4.9	
225Q10-160	1	230V	6.4	
225Q10-190	1	230V	7.9	
225Q15-220	1 1/2	230V	9.5	
305Q05-40	1/2	230V/115V	2.8	5.7
305Q07-90	3/4	230V	5.2	
305Q10-130	1	230V	7.6	

SQ Specification Information

OVERLOAD AMPS		MIN. WELL DIA.	DISCHARGE
230V	115V		
5	11	3"	1" NPT
5	11	3"	1" NPT
5	11	3"	1" NPT
8		3"	1" NPT
8		3"	1" NPT
8		3"	1" NPT
11		3"	1" NPT
11		3"	1" NPT
12		3"	1" NPT
5	11	3"	1 1/4" NPT
8	11	3"	1 1/4" NPT
8		3"	1 1/4" NPT
8		3"	1 1/4" NPT
11		3"	1 1/4" NPT
12		3"	1 1/4" NPT
5	11	3"	1 1/4" NPT
5	11	3"	1 1/4" NPT
8		3"	1 1/4" NPT
8		3"	1 1/4" NPT
11		3"	1 1/4" NPT
11		3"	1 1/4" NPT
12		3"	1 1/4" NPT
5	11	3"	1 1/2" NPT
5	11	3"	1 1/2" NPT
8		3"	1 1/2" NPT
8		3"	1 1/2" NPT
11		3"	1 1/2" NPT
12		3"	1 1/2" NPT
5	11	3"	1 1/2" NPT
8		3"	1 1/2" NPT
11		3"	1 1/2" NPT

Cable length selection tables

The following table (Fig. 7) lists the recommended copper cable sizes and various cable lengths for SQ motors. Proper wire size will ensure that adequate voltage will be supplied to the motor.

To assure adequate voltage, the maximum cable lengths are calculated for when the motor is running at maximum nameplate amps. Cable sizes larger than specified may always be used and will reduce power loss.

The use of cables smaller than the recommended sizes will void the warranty. Smaller cable sizes may cause under-voltage alarms.

SQ Wiring Sizing

Motor Rating		Copper Wire Size (AWG)									
Volts	HP	AMPS	14	12	10	8	6	4	2		
115	1/2	12	140	220	360	550	880	1390	2260		
230	1/2	5.2	640	1000	1660	2250	4060				
230	3/4	8.4	400	620	1030	1580	2510	3970			
230	1	11.2	300	460	770	1190	1890	2980	4850		
230	1 1/2	12	280	430	720	1110	1760	2780	4530		

Fig. 7

Cable length is in feet

Note: The calculations in the table are based on supply of 115V or 230V

Friction Loss Table - SCH 40 Steel Pipe

(Friction loss in feet of head per 100 feet of pipe)

GPM	GPH	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"
		ID 0.622"	ID 0.824"	ID 1.049"	ID 1.380"	ID 1.610"	ID 2.067"	ID 2.469"	ID 3.068"	ID 4.026"
2	120	4.8								
3	180	10	2.5							
4	240	17.1	4.2							
5	300	25.8	6.3	1.9						
6	360	36.5	8.9	2.7						
7	420	48.7	11.8	3.6						
8	480	62.7	15	4.5						
9	540	78.3	18.8	5.7						
10	600	95.9	23	6.9	1.8					
12	720		32.6	9.6	2.5	1.2				
14	840		43.5	12.8	3.3	1.5				
16	960		56.3	16.5	4.2	2				
20	1,200		86.1	25.1	6.3	2.9				
25	1,500			38.7	9.6	4.5	1.3			
30	1,800			54.6	13.6	6.3	1.8			
35	2,100			73.3	18.2	8.4	2.4			
40	2,400			95	23.5	10.8	3.1	1.3		
45	2,700				29.4	13.5	3.9	1.6		
50	3,000				36	16.4	4.7	1.9		
60	3,600				51	23.2	6.6	2.7		
70	4,200				68.8	31.3	8.9	3.6	1.2	
80	4,800				89.2	40.5	11.4	4.6	1.6	
90	5,400					51	14.2	5.8	2	
100	6,000					62.2	17.4	7.1	2.4	
120	7,200						24.7	10.1	3.4	
140	8,400						33.2	13.5	4.5	1.2
160	9,600						43	17.5	5.8	1.5
200	12,000						66.3	27	8.9	2.3
260	15,600							45	14.8	3.7
300	18,000							59.6	19.5	4.9

Friction Loss Table - Valves and Fittings

(Friction loss in equivalent number of feet of straight pipe)

TYPE OF FITTING AND APPLICATION	PIPE AND FITTING	NOMINAL SIZE OF FITTING AND PIPE						
		1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"
		EQUIVALENT LENGTH OF PIPE(IN FEET)						
Insert Coupling	Plastic	3	3	3	3	3	3	3
Threaded Adapter (Plastic to Thread)	Plastic	3	3	3	3	3	3	3
90° Standard Elbow	Steel	2	2	3	4	4	5	6
	Plastic	2	2	3	4	4	5	6
Standard Tee (Flow Through Run)	Steel	1	2	2	3	3	4	4
	Plastic	1	2	2	3	3	4	4
Standard Tee (Flow Through Side)	Steel	4	5	6	7	8	11	13
	Plastic	4	5	6	7	8	11	13
Gate Valve ¹	Steel	1	1	1	1	2	2	2
Swing Check Valve ¹	Steel	5	7	9	12	13	17	21

Friction Loss Table - SCH 40 PVC

(Friction loss in feet of head per 100 feet of pipe)

GPM	GPH	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"
		ID 0.622"	ID 0.824"	ID 1.049"	ID 1.380"	ID 1.610"	ID 2.067"	ID 2.469"	ID 3.068"	ID 4.026"
2	120	4.1								
3	180	8.7	2.2							
4	240	14.8	3.7							
5	300	22.2	5.7	1.8						
6	360	31.2	8	2.5						
7	420	41.5	10.6	3.3						
8	480	53	13.5	4.2						
9	540	66	16.8	5.2						
10	600	80.5	20.4	6.3	1.7					
12	720		28.6	8.9	2.3	1.1				
14	840		38	11.8	3.1	1.4				
16	960		48.6	15.1	4	1.9				
20	1,200		60.5	22.8	6	2.8				
25	1,500			38.7	9.1	4.3	1.3			
30	1,800				12.7	6	1.8			
35	2,100				16.9	8	2.4			
40	2,400				21.6	10.2	3	1.1		
45	2,700				28	12.5	3.8	1.4		
50	3,000					15.4	4.6	1.7		
60	3,600					21.6	6.4	2.3		
70	4,200					28.7	8.5	3	1.2	
80	4,800					36.8	10.9	3.8	1.4	
90	5,400					45.7	13.6	4.8	1.8	
100	6,000					56.6	16.5	5.7	2.2	
120	7,200						23.1	8	3	
140	8,400						30.6	10.5	4	1.1
160	9,600						39.3	13.4	5	1.4
200	12,000						66.3	20.1	7.6	2.1
260	15,600							32.4	12.2	3.4
300	18,000							42.1	15.8	4.4

3

NOTES:

Based on schedule 40 steel and plastic fittings. Figures given are friction losses in terms of equivalent lengths of straight pipe.

1 Friction loss figures are for screwed valves and are based on equivalent lengths of steel pipe.

SQ Tank Sizing Chart

Cut-Out PSI	SQ GPM				
	5	10	15	22	30
	Tank Size*				
40	4	10	14	14	20
50	4	10	14	20	20
60	4	10	14	20	-
70	4	14	14	20	-
80	4	14	14	20	-

NOTES:

Chart includes recommendations for minimum tank sizes

***Recommended pressure adjustment for SQ:**

To maintain system pressure with the SQ's soft start-feature, it is recommended that the tank pressure setting be approximately 5 psi lower than the pressure switch cut-in setting.

Example: If pressure tank pre-charge is 35 psi, the switch cut in is set at 40 psi.

Fault	Cause	Remedy
1. The pump does not run.	a) The fuses are blown.	Replace the blown fuses. If the new fuses blow too, check the electrical installation and the drop cable.
	b) The GFI circuit breaker has tripped.	Reset the circuit breaker.
	c) No electricity supply.	Contact the electricity provider.
	d) The motor protection has cut off the electricity supply due to overload.	Check for motor/pump blockage.
	e) The drop cable is defective.	Repair or replace the pump/cable.
	f) Overvoltage has occurred.	Check the electricity supply.
2. The pump runs but gives no water.	a) The discharge valve is closed.	Open the valve.
	b) No water or too low water level in well.	Increase the installation depth of the pump, throttle the pump or replace it with a smaller capacity model.
	c) The check valve is stuck in its closed position.	Pull the pump and clean or replace the valve.
	d) The suction strainer is closed.	Pull the pump and clean the strainer.
	e) The pump is defective.	Repair or replace the pump.

NOTES:

A megohmmeter (“megger”) or other high voltage device must never be used during troubleshooting of an SQ pump. This will damage the internal electronics.

Fault	Cause	Remedy
3. The pump runs at reduced capacity.	a) The drawdown is larger than anticipated.	Increase the installation depth of the pump, throttle the pump or replace it with a smaller capacity model.
	b) The valves in the discharge pipe are partly closed/blocked.	Check and clean or replace the valves as necessary.
	c) The discharge pipe is partly choked by impurities (iron bacteria).	Clean or replace the discharge pipe.
	d) The check valve of the pump is blocked.	Pull the pump and clean or replace the valve.
	e) The pump and the riser pipe are partly choked by impurities (iron bacteria).	Pull the pump. Check and clean or replace the pump, if necessary. Clean the pipes.
	f) The pump is defective.	Repair or replace the pump.
	g) Hole in discharge pipe.	Check and repair the piping.
	h) The riser pipe is defective.	Replace the riser pipe.
	i) Undervoltage has occurred.	Check the electricity supply.
4. Frequent starts and stops.	a) The differential of the pressure switch between the start and stop pressures is too small.	Increase the differential. However, the stop pressure must not exceed the operating pressure of the pressure tank and the start pressure should be high enough to ensure sufficient water supply.
	b) The water level electrodes or level switches in the reservoir have not been installed correctly.	Adjust the intervals of the electrodes/level switches to ensure suitable time between the cutting-in and cutting-out of the pump. See installation and operating instructions for the automatic devices used. If the intervals between start/stop cannot be changed via the automatics, the pump capacity may be reduced by throttling the discharge valve.
	c) The check valve is leaking or stuck half-open.	Pull the pump and clean or replace the check valve.
	d) The supply voltage is unstable.	Check the electricity supply.
	e) The motor temperature is too high.	Check the water temperature.

**Have product or
application questions?**
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