

# ***PUMPOLOGY***

**Little Giant<sup>®</sup>**

**“Your Solution Innovator”**

# *Major Pump Classifications And Types*

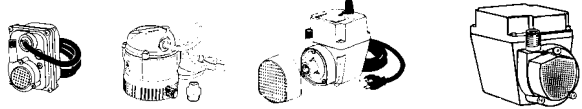
- Centrifugal
  - **Volute**
  - **Diffuser**
  - **Mixed flow**
  - **Axial flow**
  - **Turbine or regenerative**
- Rotary
  - **Gear & vane**
  - **Cam and piston or screw**
- Reciprocating
  - **Direct acting**
  - **Power**
  - **Crank-flywheel**

# Pump Class Characteristics

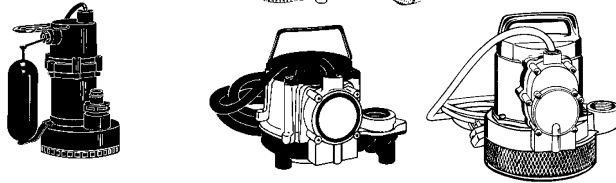
	<b>CENTRIFUGAL</b>	<b>ROTARY</b>	<b>RECIPROCATING</b>
	VOLUTE & AXIAL DIFUSER FLOW	SCREW & GEAR	DIRECT DOUBLE TRIPLEX ACTING ACTING
DISCHARGE FLOW	STEADY STEADY	STEADY	----- PULSATING-----
LIQUIDS HANDLED	CLEAN, CLEAR, DIRTY, AND WITH SOLIDS CONTENT	VISCOUS NON- ABRASIVE	CLEAN AND CLEAR
DISCHARGE PRESSURE	LOW TO HIGH	MEDIUM	LOW TO HIGHEST PRODUCED
USUAL CAPACITY RANGE	SMALL TO LARGEST AVAILABLE	SMALL TO MEDIUM	RELATIVELY SMALL

# Types Of Little Giant Pumps

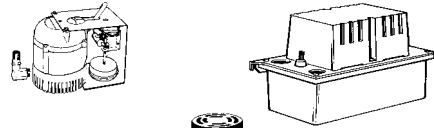
## SMALL SUBMERSIBLES



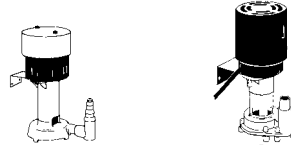
## SUMP PUMPS



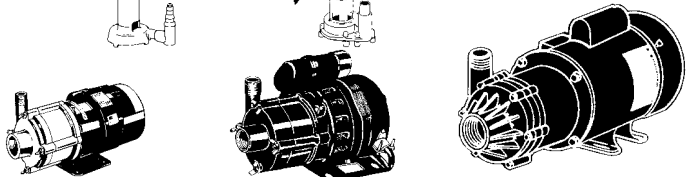
## CONDENSATE REMOVAL PUMPS



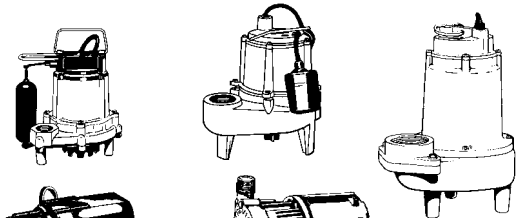
## ICE MACHINE PUMPS



## MAGNETIC DRIVE PUMPS



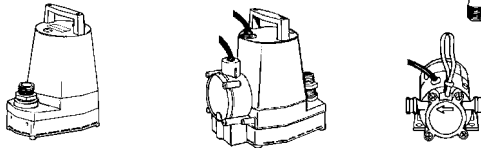
## EFFLUENT, SEWAGE, AND GRINDER PUMPS



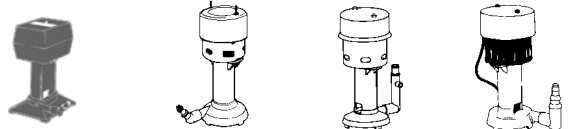
## SPECIALTY PUMPS



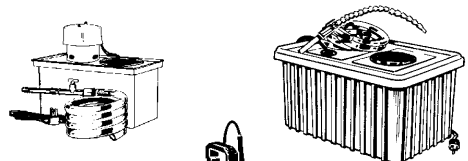
## UTILITY PUMPS



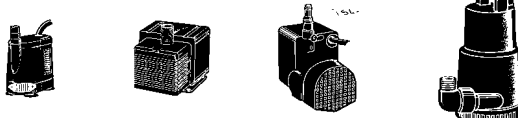
## EVAPORATIVE COOLER PUMPS



## MACHINE TOOL COOLANT PUMPS



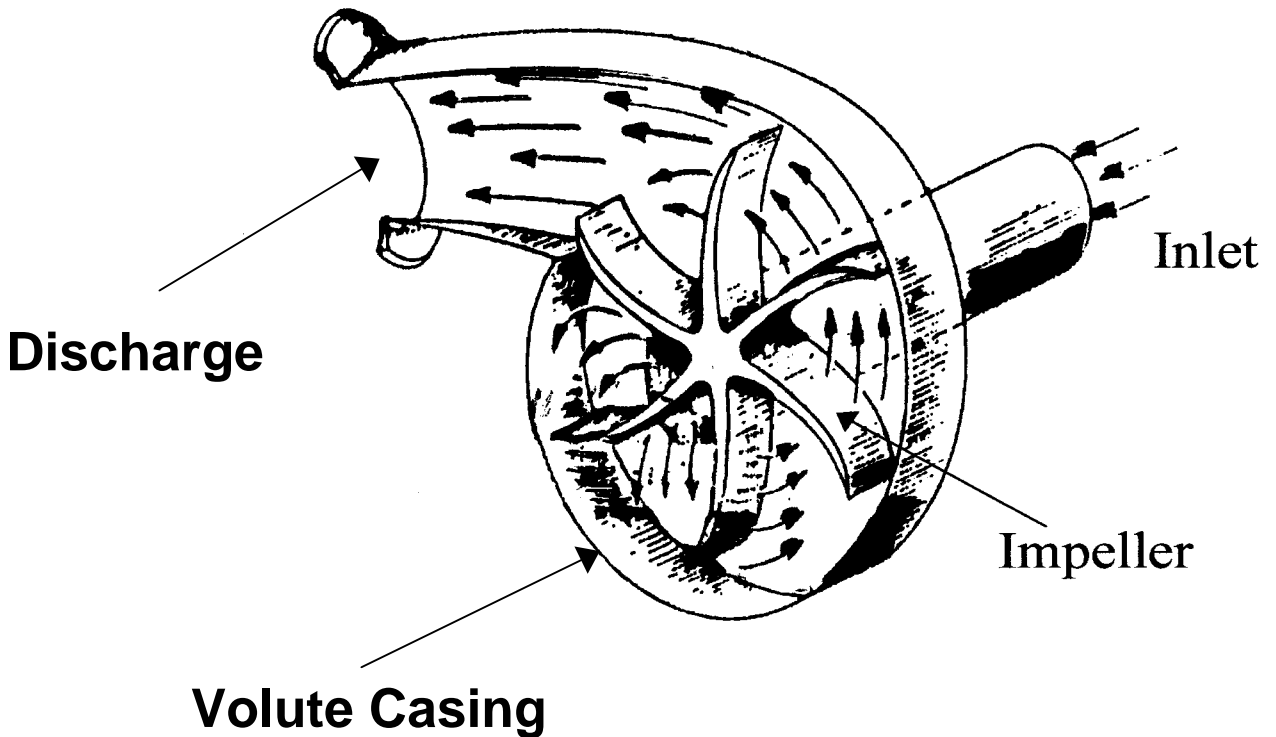
## WATER GARDEN PUMPS



# Centrifugal Pump Terminology

- FLOODED SUCTION or GRAVITY FED - inlet must be below the liquid level
- PERFORMANCE CURVES - show the *flow* (in gpm or gph) versus the *height* (in feet of head or PSIG)
- STATIC HEAD - the highest point in a system that the pumped liquid will see
- FRICTION HEAD - the friction losses and restrictions in the pumping system
- TOTAL HEAD - a total of the static and friction heads in a pumping system
- SHUT-OFF HEAD – The maximum height a pump can push water to in a tube or pipe.

# CENTRIFUGAL PUMP



# ***How It Works And Do's And Don'ts***

## ***Principle Of Operation***

**Pumping action occurs not because the pump creates a “suction”, but because the rotating impeller pushes the liquid to the outside of the volute cavity. This creates pressure and forces the liquid out the discharge.**

**New amounts of liquid flow into the pump head. There is a slight negative pressure at the inlet, but it is easily broken if any blockage on the inlet side should occur. As long as the flow to the inlet is not interrupted, pumping action continues.**

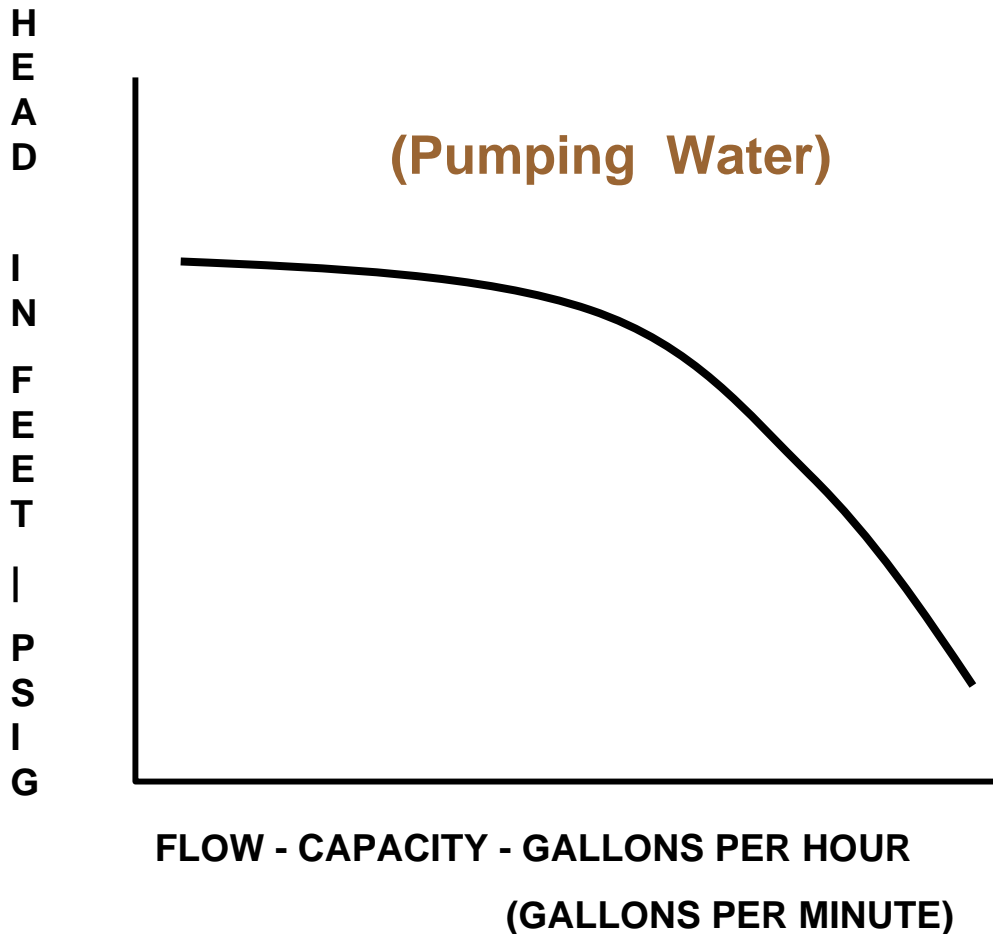
## ***Do's And Don'ts***

**Never restrict the inlet of a centrifugal pump.**

**The discharge of Little Giant's centrifugal pumps can be restricted or closed completely to adjust the flow. No damage will occur to pump.**

***Never* operate a pump without liquid(run dry).  
Damage to the seal and/or motor may occur.**

# PERFORMANCE CURVES



---

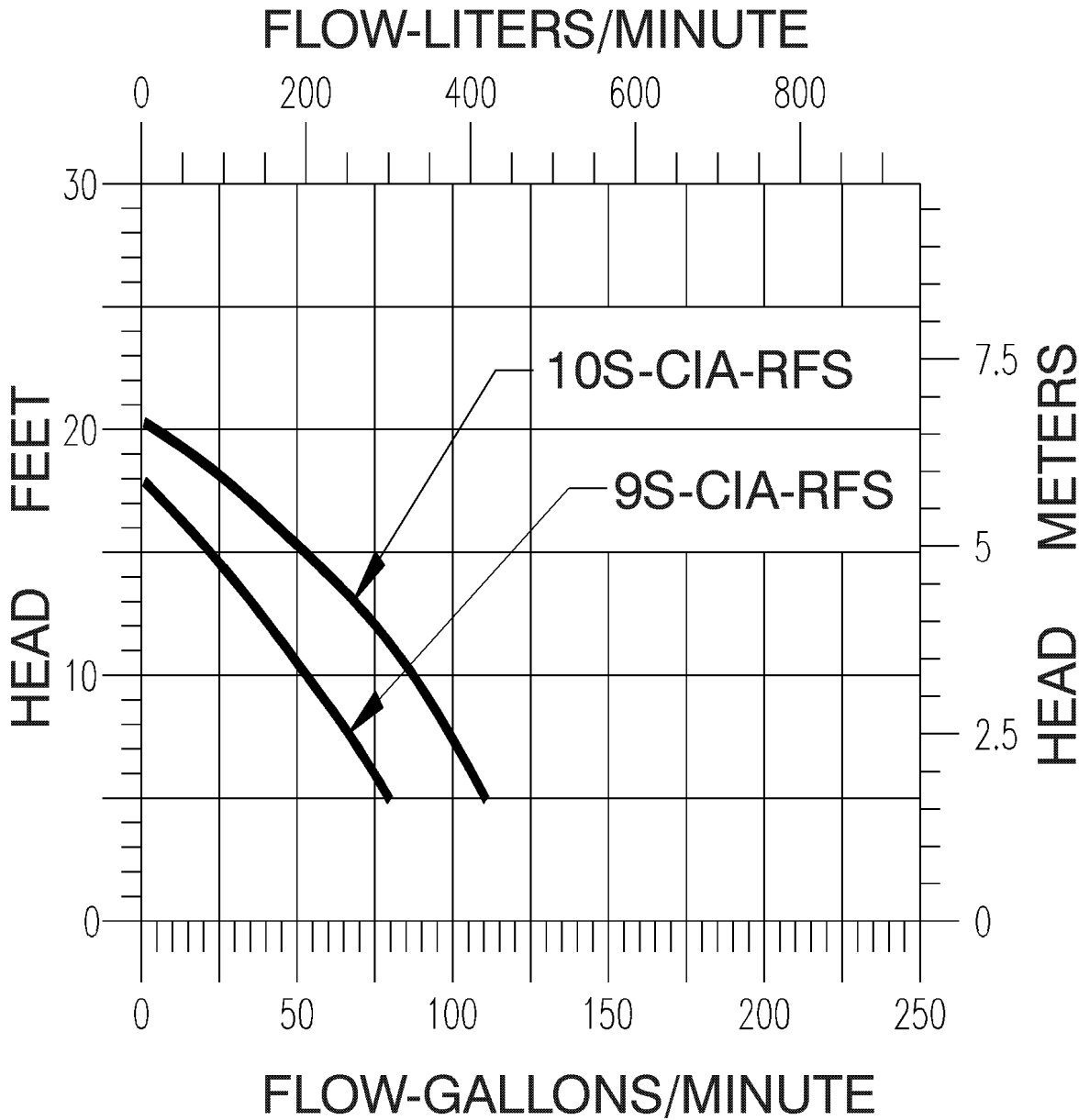
$$\text{PSIG} = \text{HEAD (FT. OF WATER)} \times .4335$$

$$\text{HEAD (FT. OF WATER)} = \text{PSIG} \times 2.31$$

$$\text{GPM} = \text{GPH} / 60$$

$$\text{GPH} = \text{GPM} \times 60$$

# EXAMPLE





**Centrifugal Pump Motors Work  
The Hardest At Full Flow - Low  
Head**


---


**Centrifugal Pump Motors Work  
The Best In The Center To The  
Upper Portion Of The  
Performance Curve - Mid To  
High -Head Range**

# TEMPERATURE

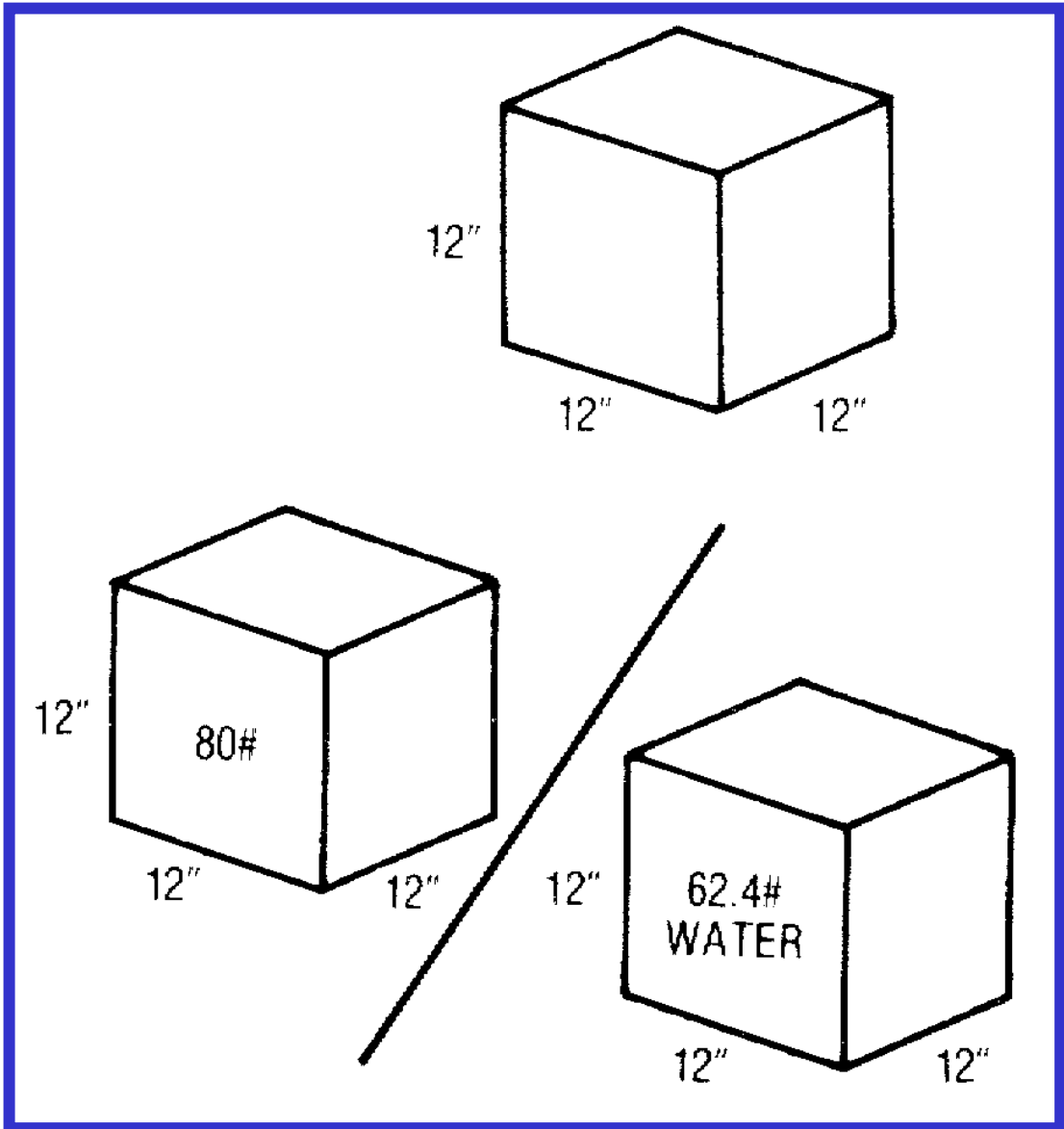
## CONVERSION OF THERMOMETER READINGS DEGREES CENTIGRADE TO DEGREES FAHRENHEIT

C	F	C	F	C	F	C	F
-40	-40.0	+ 5	+ 41.0	+ 40	+104.0	+175	+347
-38	-36.4	6	42.8	41	105.8	180	356
-36	-32.8	7	44.6	42	107.6	185	365
-34	-29.2	8	46.4	43	109.4	190	374
-32	-25.6	9	48.2	44	111.2	195	383
-30	22.0	10	50.0	45	113.0	200	392
-28	18.4	11	51.8	46	114.8	205	401
-26	14.8	12	53.6	47	116.6	210	410
-24	11.2	13	55.4	48	118.4	215	419
-22	7.6	14	57.2	49	120.2	220	428
-20	- 4.0	15	59.0	50	122.0	225	437
-19	- 2.2	16	60.8	55	131.0	230	446
-18	- 0.4	17	62.6	60	140.0	235	455
-17	+ 1.4	18	64.4	65	149.0	240	464
-16	3.2	19	66.2	70	158.0	245	473
-15	5.0	20	68.0	75	167.0	250	482
-14	6.8	21	69.8	80	176.0	255	491
-13	8.6	22	71.6	85	185.0	260	500
-12	10.4	23	73.4	90	194.0	265	509
-11	12.2	24	75.2	95	203.0	270	518
-10	14.0	25	77.0	100	212.0	275	527
- 9	15.8	26	78.8	105	221.0	280	536
- 8	17.6	27	80.6	110	230.0	285	545
- 7	19.4	28	82.4	115	239.0	290	554
- 6	21.2	29	84.2	120	248.0	295	563
- 5	23.0	30	86.0	125	257.0	300	572
- 4	24.8	31	87.8	130	266.0	305	581
- 3	26.6	32	89.6	135	275.0	310	590
- 2	28.4	33	91.4	140	284.0	315	599
- 1	30.2	34	93.2	145	293.0	320	608
0	32.0	35	95.0	150	302.0	325	617
+ 1	33.8	36	96.8	155	311.0	330	626
2	35.6	37	98.6	160	320.0	335	635
3	37.4	38	100.4	165	329.0	340	644
4	39.2	39	102.2	170	338.0	345	653

 Max. temperature for most small submersibles & most condensate pumps.

 Max. temperature for most of our Sump, Sewage & Effluent pumps

# ***SPECIFIC GRAVITY***



**The ratio of the weight of a cubic foot of water compared to the weight of a cubic foot of some other liquid.**

# FRICITION LOSSES

## PIPE FRICTION — WATER 60° F

FRICITION LOSS OF WATER IN FEET PER 100 FOOT LENGTH OF PIPE OR TUBE

NOMINAL SIZE — (INSIDE DIAMETER)													
GAL. PER MIN.	1/4" ID HOSE	1/8" PIPE (.269)	3/8" ID HOSE	1/4" PIPE (.364)	3/8" PIPE (.493)	1/2" ID HOSE	1/2" PIPE (.622)	5/8" ID HOSE	3/4" ID HOSE	3/4" PIPE (.824)	1" PIPE (1.049)	1 1/4" PIPE (1.380)	1 1/2" PIPE (1.610)
5	28.7	34.3	4.6	7.9	1.8	2.3	.58						
1	115	123.9	16.0	28.5	6.5	7.0	2.1	1.5					
2			60.0	102.7	23.5	14.0	7.6	4.8	1.3	1.9			
3			115		49.7	28.0	16.1	9.0	3.1	4.1			
4					84.8	46.0	27.4	15.0	6.0	7.0	2.2	.57	.27
5	2"				128	69.0	41.4	23.0	9.0	10.5	3.3	.86	.40
6	PIPE	2 1/2"				92.0	58	32.0	13.0	14.8	4.6	1.2	.57
8	(2.067)	PIPE					98.7	60.0	21.0	25.1	7.8	2.0	.97
10	.43	(2.469)					149	78.0	32.0	38.0	11.7	3.1	1.5
15	.92	.39	3"					175	69.0	80.5	24.9	6.5	3.1
20	1.6	.66	PIPE						115	137	42.4	11.2	5.3
25	2.4	1.0	(3.068)								64.1	16.9	8.0
30	3.3	1.4	.48								89.9	24	11.2
35	4.4	1.9	.64								120	32	14.9
40	5.6	2.4	.83								153	40	19
45	7.0	3.0	1.0									50	24
50	8.5	3.6	1.2									61	29
75	18	7.6	2.6									129	61
100	31	13	4.5										104

- NOTE: 1. Values in shaded area are recommended for nominal operation.  
 2. Pipe values based on Hazen and Williams formula using C constant of 100.  
 3. For new smooth pipe multiply above values by .71.  
 4. For plastic pipe multiply above values by .54.  
 5. Above pipe sizes are steel schedule 40.  
 6. For 15 yr.-old pipe, multiply above values by 1.25.

# HOW THICK IS IT?

## VISCOSITY CONVERSION TABLE

SAYBOLT UNIVERSAL SSU	STOKES	CENTI STOCKES	POISES*	CENTI* POISES	ENGLER SECONDS	REDWOOD NO. 1 SECONDS	TYPICAL LIQUIDS AT 70° F
31	.010	1.00	.008	.8	54	29	Water
35	.025	2.56	.020	2.05	59	32.1	Kerosene
50	.074	7.40	.059	5.92	80	44.3	No. 2 Fuel Oil
80	.157	15.7	.126	12.6	125	69.2	No. 4 Fuel Oil
100	.202	20.2	.162	16.2	150	85.6	Transformer Oil
200	.432	43.2	.346	34.6	295	170	Hydraulic Oil
300	.654	65.4	.522	52.2	470	254	SAE 10W Oil
500	1.10	110	.88	88.0	760	423	SAE 10 Oil
1,000	2.16	220	1.73	173	1,500	896	SAE 20 Oil
2,000	4.40	440	3.52	352	3,000	1,690	SAE 30 Oil
5,000	10.8	1,080	8.80	880	7,500	4,230	SAE 50 Oil
10,000	21.6	2,160	17.0	1,760	15,000	8,460	SAE 60-70 Oil
50,000	108	10,800	88	8,800	75,000	43,660	Molasses B
100,000	216	21,600	173	17,300	150,000	88,160	Molasses C

\*Poises and centipoises are given for oil of .8 spec. gravity.  
Relationship: centistokes x specific gravity = centipoises.

# *Viscosity*

## *"Thickness Of Liquid"*

### LIQUID

### VISCOSITY

---

<b>Water @ 60 F.</b>	<b>32 SSU</b>
----------------------	---------------

---

<b>SAE 10W Oil @ 48 F.</b>	<b>200 SSU</b>
----------------------------	----------------

---

<b>SAE 40W Oil @ 100 F.</b>	<b>600 SSU</b>
-----------------------------	----------------

---

<b>Chocolate Syrup @ 72 F.</b>	<b>100,000 SSU</b>
------------------------------------	--------------------

---

<b>Catsup @ 72 F.</b>	<b>200,000 SSU</b>
-----------------------	--------------------

---

**Centrifugal Pumps are not usually suitable for pumping high viscosity liquids. When pumping more viscous liquids than water, the capacity and head of the pump will be reduced and the horsepower required will be increased. Generally, the maximum viscosity that some Little Giant submersible pumps can handle is 300 SSU. 100 SSU is considered maximum for the in-line style Magnetic Drive Chemical pumps (the exception being the TE-7-MD-SST).**

# Ph ?

pH is a measure of a liquid's Acidity or Alkalinity. A pH measurement of 7 is usually referred to as "neutral".

A pH measurement above 7 is said to be an Alkaline.

A pH measurement below 7 is said to be an Acid.

## EXAMPLES

### *ACIDS*

1% Hydrochloric Acid

.5 pH

Vinegar

2.5 pH

Orange Juice

3.5 pH

Tomato Juice

4.0 pH

### *ALKALINES*

Sea Water

8.5 pH

Milk of Magnesia

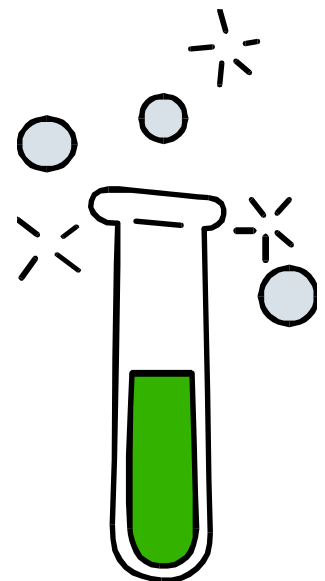
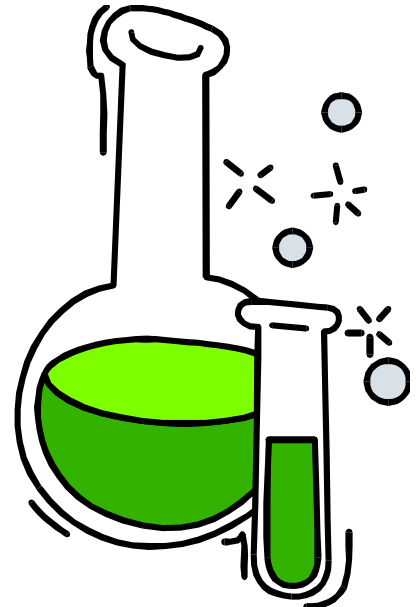
10.5 pH

Household Ammonia

12.0 pH

1% Lye Solution

13.5 pH



{pH alone should **NOT** be used as the deciding factor when choosing a pump!}

# *Nomenclature*



## Underwriter's Laboratories

Logo identifies a fully listed product. Product has been safety tested for a specific application.



## Underwriter's Recognized

Logo identifies a component listed product. Product is used in many applications. (Also seen as UR.)



## Canadian Standards Association

Logo identifies products certified by Canada's government agency as meeting the requirements for certain applications.



## Canadian Standards Component Recognized

Logo identifies products certified for use as a component in other equipment in Canada.

# LITTLE GIANT PRODUCT

## MODEL OR PRODUCT NUMBER IDENTIFICATION

The Alpha/Numeric description - all products have model numbers. Examples: P-AAA, 2E-38N, TE-5-MD-SC, etc.

## ITEM NUMBER

This is a six-digit number starting with a "5" that defines the exact characteristics of a particular product. Parts and some accessories have numbers that start with a "1" or a "9". If an item number starting with a "5" has a "9" as the fourth digit, it is a special pump made for an OEM (Original Equipment Manufacturer). To find out the specific construction of an OEM pump, call the factory.

## IMPORTANT

Always Use The Item Number When  
Writing Orders !!!

# *ISO 9001 Certified*

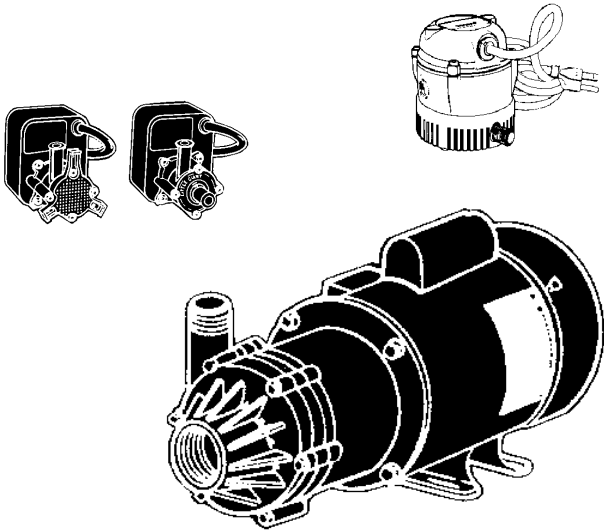
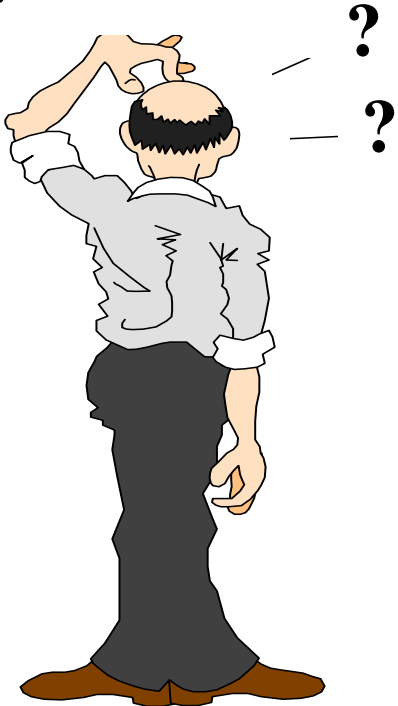
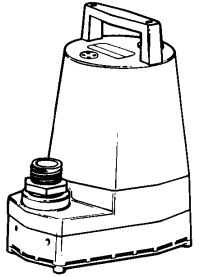
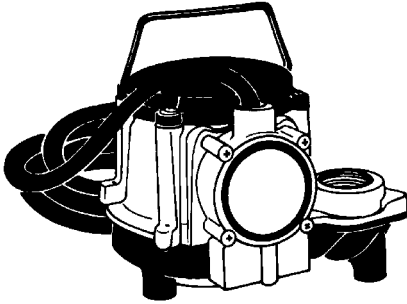
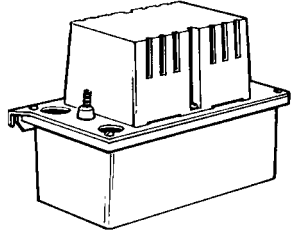
**LITTLE GIANT PUMP COMPANY** has met the qualifications required to be certified under the ISO 9001 Quality System.

**This certification does not apply to the products manufactured, as does UL and CSA. Instead, it means that Little Giant has a system in place to assure that we meet the specified requirements of our customers.**

**It also establishes a means of continuous improvement to the system to maintain a goal of excellence in manufacturing.**

# RECOMMENDING A PUMP

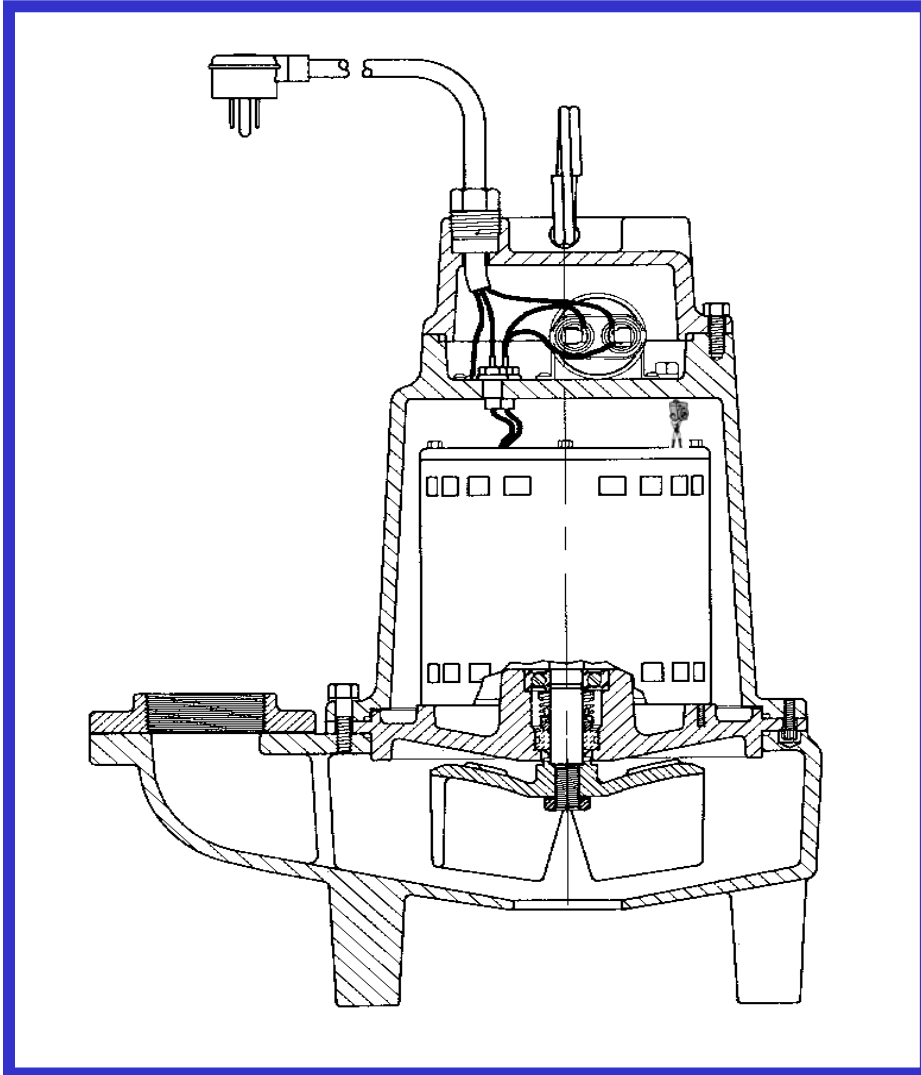
Water is not the only liquid that is pumped with Little Giant Pumps. The problem with advising a customer which pump to purchase may involve more than knowing how much water needs to be moved. Asking the right questions will help in recommending the correct pump.



# *RECOMMENDING A PUMP*

- **What is the liquid being pumped?**
- **What is the temperature of the liquid?**
- **What is the Specific Gravity of the liquid?**
- **What is the liquid's Viscosity?**
- **How much flow is needed (GPM or GPH)?**
- **What is the Total Head in the system? (Static Height + Friction Loss)**
- **Does the liquid contain any solids?**
- **Is the liquid compatible with the pump's materials?**
- **Will pump be gravity fed?**
- **Is the liquid abrasive?**
- **What size intake and discharge is needed?**
- **Will any other pressure be present in the system? (Connected to City water pressure?)**
- **What other materials are present in the liquid? (Copper, Stainless Steel, etc.)**
- **What is the voltage requirement?**

# TROUBLESHOOTING



The pump is working if :

- a) the impeller is turning &
- b) the volute is filled with liquid.

If no liquid is being discharged, examine the application for other problems!