PADDOCK OF CALIFORNIA INC.

since 1920, builders
of the nations finest
pool equipment!

Paddock

POOL EQUIPMENT COMPANY, INC.

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POOL EQUIPMENT COMPANY, INC.

DEPARTMENT OF THE NAVY
OFFICER IN CHARGE OF CONSTRUCTION
RESIDENT OFFICER IN CHARGE OF CONSTRUCTION
NAVAL FACILITIES ENGINEERING COMMAND CONTRACTS
CAMP LEJEUNE, NORTH CAROLINA 28542

IN REPLY REFER TO

JAX/02/MLE/sel
N62470-82-C-2055
10 November 1983

From: Officer in Charge of Construction, Jacksonville, North Carolina Area
To: Base Maintenance Officer

Subj: Contract N62470-82-C-2055, Swimming Pool, MCB, Camp Lejeune, NC

Encl: (1) Operation and Maintenance Manuals

1. Enclosure (1), submitted by the Contractor under the subject contract, is forwarded for your use in the maintenance and operation of the facility.

M. L. Ennett sj.

M. L. ENNETT
By direction

Received by: _____ Date: _____
(sign and return enclosed copy)

Copy to:
PWO (Records Section) w/encls ←
Contract folder w/o encl (signed copy)

4091258

Paddock Construction Co., Inc.

P.O. BOX 11676
ROCK HILL, SOUTH CAROLINA 29730

LETTER OF TRANSMITTAL

TO Mr. M W Clark

King Hunter

P.O. Box 173

Tarawa Terrace, N.C.

DATE	JOB NO.
October 25, 1983	

ATTENTION Mr. M.W. Clark

RE Camp LeJeune
swimming pool

Gentlemen:

WE ARE SENDING YOU ☐ attached ☐ Under separate cover via _____

☐ shop drawings ☐ prints ☐ plans ☐ samples ☐ specifications

☐ copy of letter ☐ change order ☒ Operator Manuals & Information

COPIES	DATE	NO.	
3	10/25/83		Hydroanalyzer Specs
3	"		Manufacture List
1	"		Operator Manual

THESE ARE TRANSMITTED as checked below:

☐ for approval ☐ approved as submitted ☐ resubmit ____ copies for approval

☐ for your use ☐ approved as noted ☐ submit ____ copies for distribution

☒ as requested ☐ returned for corrections ☐ return ____ corrected prints

☐ for review and comment ☐ _____

☐ for bids due _____ 19___ ☐ prints returned after loan to us

REMARKS

Please sign and return one copy of this transmittal

Donald C. Baker, Operations Manager

COPY TO _____ SIGNED _____

Paddock Construction Co., Inc.

P.O. BOX 11676
ROCK HILL, SOUTH CAROLINA 29730

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REMARKS

Please sign and return one copy of this transmittal

Donald C. Baker, Operations Manager

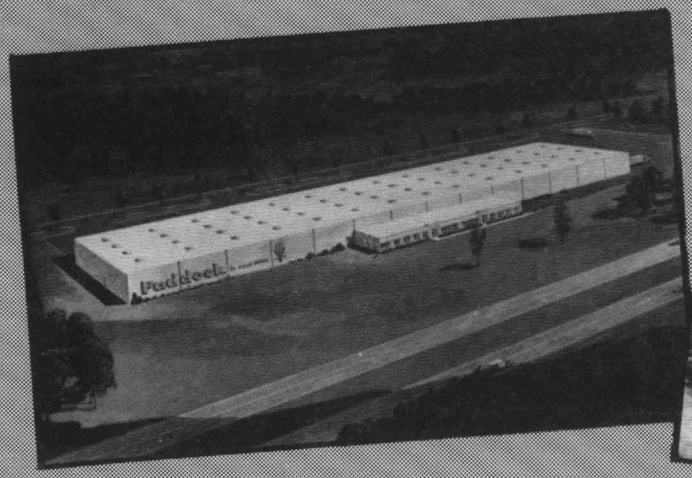
COPY TO _____ SIGNED _____

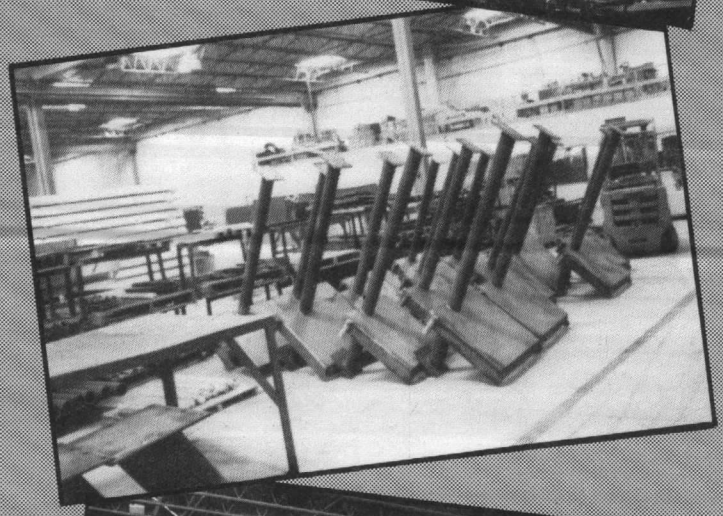
Paddock Pool

Equipment Company Inc.

OPERATOR'S MANUAL

PADDOCK OF CALIFORNIA





OPERATING INSTRUCTIONS

FOR

_____

CAMP LEJEUNE, N.C.

_____

_____

FOR

INFORMATION, PARTS OR SERVICE

CONTACT

PADDOCK CONSTRUCTION CO.

P.O. BOX 11676

ROCK HILL, S.C. 29730

(803) 324-1111

OR

PADDOCK POOL EQUIPMENT CO., INC.
555 PADDOCK PARKWAY
ROCK HILL, SOUTH CAROLINA 29730
AREA CODE 803-324-1111

Manufacturing Facilities — Rock Hill, South Carolina Plant

JANUARY, 1979

Technical Bulletin 80-7

WATER BALANCE

Preparing For Equipment Start Up

PREPARING SWIMMING POOL WATER FOR START UP

INTRODUCTION

Once a swimming pool has been constructed it must be filled with water, and problems, due to the make up water, can arise. The pool professional must be prepared for them or they can be unpleasant, expensive and give a swimming pool company a bad reputation. This short paper discusses some of the simpler problems that arise and how to overcome them without too much time and expense. The most important of all is good water balance.

WATER BALANCE

Much has been written about this subject, hardly a month goes by without somebody writing in Swimming Pool Weekly about obtaining good water balance. Throughout most of the year seminars are held by various chemical manufacturers on pool water problems and pool water balance and yet it still seems to be a subject that most people ignore. The problems of ignoring pool water balance are many, a few of them are:

GREEN WATER

The pool can seem quite clean, pH seems to be about right, chlorine seems to be about right, the filter is working well and yet the pool is green. Correcting the pool water balance will change the water from green to sparkling blue.

CLOUDINESS

Again everything seems to be in order yet the pool does not completely clear up. Correcting the pool water balance will provide clear water.

CORROSION

This is a very common problem causing etching of the pool finish, corrosion of metal fittings and gives unpleasant swimming conditions. Tests of pH and chlorine seem to suggest that all is well yet swimmers complain that they get eye irritation and the water is unpleasant to swim in, metal fittings start to show signs of corrosion. Good attention to pool water balance will correct problems.

Short Filter Runs

If the water balance is incorrect, filter runs may shorten drastically due to deposition of calcium carbonate. Correct pool water balance will bring filter runs back to normal (in case of D.E. filters, elements may need acid washing).

GOOD BASIC PARAMETERS FOR POOL WATER

pH 7.5
Total Alkalinity 90-110 ppm
Calcium Hardness 200-250 ppm
Free chlorine 1-0

Water temperature 78-80°F
Air Temperature 81-85°F

POOL WATER BALANCE PROCEDURE

Pool water balance is simply having the right amount of the necessary minerals in the water, that is all there is to it. To do the simple work required for pool water balance requires a test kit for pH, total alkalinity and calcium and a thermometer, also a set of tables to arrive at the saturation index.

SATURATION INDEX

To arrive at the correct pool water balance a figure called the saturation index is used. This is a numerical figure which indicates whether a particular water will have a tendency to deposit calcium carbonate or

can be given as to the amount of acid required, small increments should be added, the water allowed to circulate and then the water tested for the total alkalinity. If insufficient acid has been put in then the process must be repeated until the correct alkalinity is achieved.

Calcium Hardness

Calcium hardness is a measure of the dissolved calcium in the water. It can vary considerably depending on the source from which the water was obtained. Calcium is necessary in pool water to contribute to overall balance and should be carefully checked. High levels of calcium hardness in conjunction with other factors in the pool water balance may cause cloudy water and scaling of pool surfaces and the recirculation system. Low levels of calcium hardness may lead to etching of the pool plaster as the pool water attempts to pick up calcium.

The desired range for calcium hardness is between 200 to 250 parts per million. A test kit should be used to check the calcium hardness and it should be adjusted to the correct figures. If the calcium hardness is too low it should be raised by the addition of calcium chloride. One pound of calcium chloride in 10,000 gallons of water will raise the calcium hardness by approximately 11 ppm. If the calcium hardness is too high it may be lowered by the addition of trisodium phosphate. One pound of trisodium phosphate in 10,000 gallons of water will lower the calcium hardness by 11 ppm. Note: When adding chemicals, add in small increments only.

Temperature

In addition to swimmer comfort, temperature is involved in the overall balance of swimming pool water. The average swimming pool should be maintained at a temperature between 78 and 80 degrees.

Saturation Index Calculations

To help in understanding saturation index calculations it will be useful to look at one or two examples:

Example 1

Check on pool water indicates pH 7.6, temperature 76°, calcium hardness 200, total alkalinity 50. To calculate the saturation index, proceed as follows:

$$(pH + Ft + Fca + Fta) - 12.1 = \text{Saturation Index}$$

pH 7.6, Ft (from temperature chart) 0.6, Fca from calcium hardness chart is 1.9, Fta from total alkalinity chart is 1.7,

$$(7.6 + 0.6 + 1.9 + 1.7) - 12.1 = \text{Saturation Index}$$
$$11.8 \qquad\qquad - 12.1 = -0.3$$

The required saturation index is 0, so an additional value of +0.3 is needed. Looking at the analysis of the water it can be seen that the total alkalinity of 50 is below the desired range of 90 to 110. Sodium bicarbonate should be used to raise the total alkalinity to 100 ppm. The saturation index should then be rechecked.

Substituting in the formula:

$$(7.6 + 0.6 + 1.9 + 2.0) - 12.1 = \text{Saturation Index}$$
$$12.1 \qquad\qquad - 12.1 = 0$$

Q.E.D.

Example 2

Testing the pool water gives the following result. pH 8.0, temperature 84°F, calcium hardness 400 ppm, total alkalinity 25 ppm.

From the chart Ft for 84° is 0.7, Fca for 400 is 2.2, Fta for 25 is 1.4

$$(pH + Fe + Fca + Fta) - 12.1 = \text{Saturation Index}$$

Substituting:

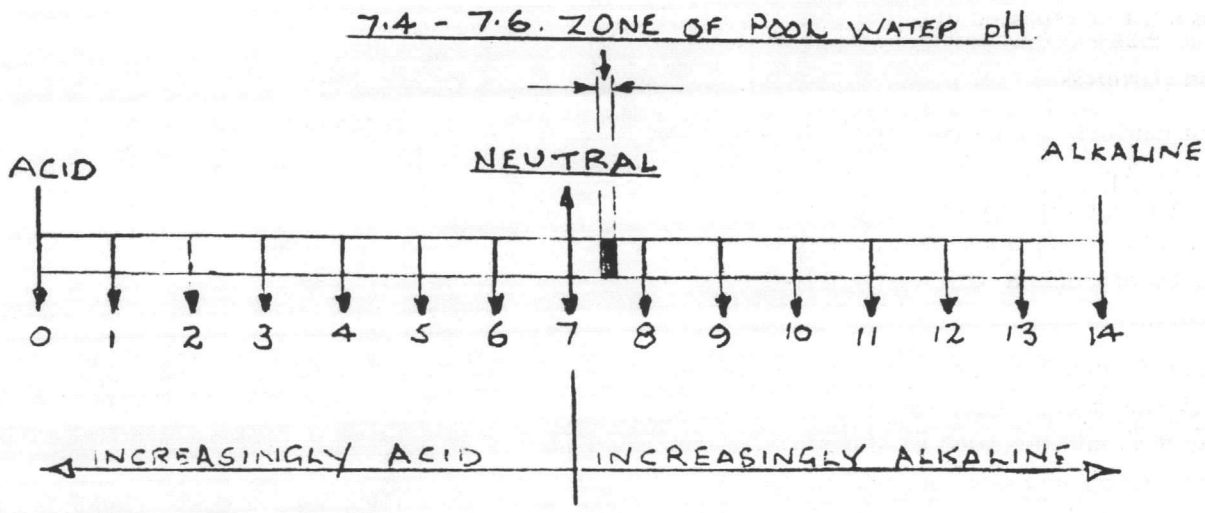
$$(8.0 + 0.7 + 2.2 + 1.4) - 12.1 = \text{Saturation Index}$$
$$12.3 \qquad\qquad - 12.1 = 0.2$$

Which seems correct

This is a good example of a situation that seems to be satisfactory, however looking at the analysis there are one or two things which are not correct. The pH is too high and the total alkalinity is far too low. Treatment of the pool should be as follows:

1. Increase total alkalinity to 125 ppm. Note: Always increase a low total alkalinity before adding acid to bring down the pH to prevent severe 'bounce'.

tween 7.4 to 7.6. This range has been proven over many years to give optimum swimmer comfort and efficient usage of chlorine without deleterious side effects to the pool itself.



If pH is too low the effects may be:

1. Poor chlorine stability. This means that the chlorine will dissipate more rapidly than if the pH was kept in the correct area.
2. Eye irritation.
3. Corrosion of metal work in the filtration and recirculation system, ladders, etc.
4. Etching and corrosion of the pool finish if it is plaster, or deterioration of the grout in a tile pool with final lifting of the tiles.

If pH is too high (alkaline range) it may have these effects:

1. Poor chlorine efficiency, high dosage or use because the chlorine activity is slowed.
2. Scale formation on the pool finish, in the piping, in coils of the heater. If there is iron or other metals in the water, these will be complexed into the scale permanently discoloring the pool surface.
3. Cloudy water.
4. Short filter runs and possible solidifying of the filter.

It can be seen from the foregoing that the maintenance of the correct pH in the pool water is very important.

Total Alkalinity

Alkalinity in swimming pool water is usually due to the presence of carbonate, bicarbonate and hydroxide ions. Total alkalinity is checked by titration with a standard acid in a test kit.

Low total alkalinity allows the pH to 'swing', that is very small increments of an alkali will cause the pH to rise very suddenly or if an acid is added the pH will drop rapidly. A little further explanation of this is required, assume that the total alkalinity is low and the pool is using sodium hypochlorite, each time this very strongly alkaline material is fed into the water the pH will climb into the scale forming zone. If the pool is on gas chlorine each time the chlorine is added the pH will drop into the corrosive zone. High total alkalinity decreases the sensitivity of pH change.

To arrive at the correct alkalinity range it is necessary to know whether the pool will be on sodium hypochlorite or gas chlorine. If the pool is on sodium hypochlorite then the desired range for total alkalinity is between 90 to 110 parts per million. If the pool is on gas chlorine then a range of between 110 and 130 can be used.

If the alkalinity is too low it can be raised by the addition of sodium bicarbonate (baking soda). A simple rule to arrive at the amount to be put into the water is: 1.5 lbs. of sodium bicarbonate in 10,000 gallons of water will raise the total alkalinity by 10 parts per million.

If the alkalinity is too high it should be lowered by the addition of muriatic acid. No hard and fast rules

whether it will be corrosive. If water has a correct balance the saturation index will be in the correct range and the water will be neither scale forming nor corrosive.

CALCULATING THE SATURATION INDEX

The saturation index can be obtained by the use of a very simple formula:

$$(pH + Ft + Fca + Fta) - 12.1 = \text{Saturation Index}$$

In the above formula pH = pH reading from the test kit of the pool water:

Ft = Factor for water temperature
Fca = Factor for calcium hardness
Fta = Factor for total alkalinity

The pH is determined by using a reliable test kit (or if you have plenty of money a pH meter). Temperature is the highest temperature the pool is likely to reach during the year. Calcium hardness and total alkalinity are obtained by using test kits. The following chart is used to obtain the various factors for temperature and calcium and total alkalinity.

SATURATION INDEX VALUES

WATER TEMPERATURE		TOTAL ALKALINITY		CALCIUM HARDNESS	
°F.	Ft.	ppm	Fta	ppm	Fca
32	0.0	5 – 10	0.7	5 – 10	0.3
33-37	0.1	11 – 25	1.4	11 – 25	1.0
38-46	0.2	26 – 50	1.7	26 – 50	1.3
47-53	0.3	51 – 75	1.9	51 – 75	1.5
54-60	0.4	76 – 100	2.0	76 – 100	1.6
61-66	0.5	101 – 150	2.2	101 – 150	1.8
67-76	0.6	151 – 200	2.3	151 – 200	1.9
77-84	0.7	201 – 300	2.5	201 – 300	2.1
85-94	0.8	301 – 400	2.6	301 – 400	2.2
95-105	0.9	401 – 800	2.9	401 – 800	2.5
106-128	1.0	801 – 1000	3.0	801 – 1000	2.6

Note the chart is divided into three sections, water temperature on the left, showing the temperature in degrees Fahrenheit and the factor for that temperature. Similarly with total alkalinity, concentration in ppm on the left and the factor on the right and similarly with the calcium hardness.

The optimum saturation index is 0. Index readings of +.3 or above will be scale forming and readings of −0.3 or below will be corrosive. The greater the deviation from an index of 0 the greater will be the tendency to form a scale or to corrode. The saturation index for a particular water is considered satisfactory if it is in the range of +.3 to −.3.

A water will have a saturation index of 0 and will be in perfect balance when the following is achieved: pH 7.5, temperature 76° Fahrenheit, calcium hardness 250 ppm, total alkalinity 100 ppm. This is what should be aimed for. Before proceeding further there are four very important factors involved with pool water balance. These are pH, total alkalinity, calcium hardness and temperature, a clear understanding of what they are is important.

pH

pH is a term used to denote the relative acidity or alkalinity of a liquid. pH is extremely important in a swimming pool in relation to water balance and has a direct relationship to the activity of the chlorine used to keep the pool in a sanitary condition.

It is important to have a basic understanding of pH and how it influences pool water. The pH scale runs from 0 (strongly acidic) to 14 (strongly basic) or alkaline. A pH of 7 is neutral, neither acidic nor basic. The following chart shows the pH range and shows the optimum range of pH for pool water, that is be-

2. Reduce pH to 7.5 by addition of muriatic acid.
3. After pH equilibrium has been established, (this will probably take 2 to 3 hours with the pump running) recheck the total alkalinity as the addition of acid will have reduced it.

This is why a slight excess of total alkalinity (125 as opposed to 110) should be put into the water when an obvious need for acid exists to reduce the pH.

After the chemical additions the pool water was again tested and the following results obtained: pH 7.5, temperature 84°F, calcium 400, total alkalinity 100.

$$(pH + Fc + Fca + Fta) - 12.1 = \text{Saturation Index}$$

Substituting

$$(7.5 + 0.7 + 2.2 + 2.0) - 12.1 = \text{Saturation Index}$$

$$12.4 = 12.1 = +0.3 \quad \text{Q.E.D.}$$

The index is in the acceptable range and the pool water is in good balance. If time permitted and the necessary chemicals were available it would help to reduce the calcium hardness.

SUMMARY OF THE SATURATION INDEX

Whatever else happens, of first importance in pool water balance is to establish the proper total alkalinity. This will prevent 'bouncing' of the pool water to the acid side when pH adjustments are being made. Too much or too little calcium hardness causes far less problems than proper maintenance of total alkalinity. Whatever else is done, the total alkalinity must be correct.

Experience is required when dealing with saturation index calculations and chemical additions to the water and it is always a good idea to practice on one or two pools which are not giving problems before actually doing it under pressure. Practice with the test kits so that there is no doubt about the results.

WATER QUALITY

All waters that are used for filling swimming pools contain some dissolved and suspended solids, the kind and quantity varying according to the source, geographic location and the amount of chemical treatment given at the water treatment plant supplying the area in which the pool is constructed. Dissolved solids in the water to be used for the pool are desirable from a standpoint of maintaining correct water balance. Balance in this case meaning the correct amount of various mineral constituents that go together to make clear sparkling good pool water.

The factors involved in water balance are pH, total alkalinity, calcium hardness and temperature. These factors are all interrelated and each contributes a part to overall balance. A correction for an imbalance of one factor made to produce the desired results, must have no adverse effects on the other factors in the system.

Waters not having the correct chemical composition for swimming pool will need an initial adjustment with the proper sequence of chemical addition. This will put the pool water in proper balance and should be done prior to starting the chemical maintenance program which would be part of the normal operation of the pool.

SUMMARY

Correct pool water balance will give good pool water, green water will become blue, cloudy water will become clear. The Hydro-Analyzer will work far better on a pool where the water has been balanced. The procedure is simple when understood.

Report Prepared by Frederick Wall, Ph.D.
A.R.I.C., M.R.S.H., M.I.B.M.
F.I.E.E., M.I.W.E.S.

Your Paddock Pool Representative is:

1/82

Paddock
OF CALIFORNIA INC.
555 PADDOCK PARKWAY, P. O. Box 11676
ROCK HILL, SOUTH CAROLINA 29730
(803) 324-1111

PADDOCK REPORTS

HELPFUL HINTS FOR POOL CHLORINATION

CAMP LEJEUNE, N.C.

Indoor pools on the average use approximately .25 pounds of chlorine per 10,000 gallons of water per day.

Outdoor pools on the average use approximately .65 pounds of chlorine per 10,000 gallons of water per day.

APPROXIMATE CAPACITY OF THIS POOL - 298,800 GALLONS

This is an OUTDOOR pool.

Approximate chlorine requirement per 24 hours 19.42 lbs.

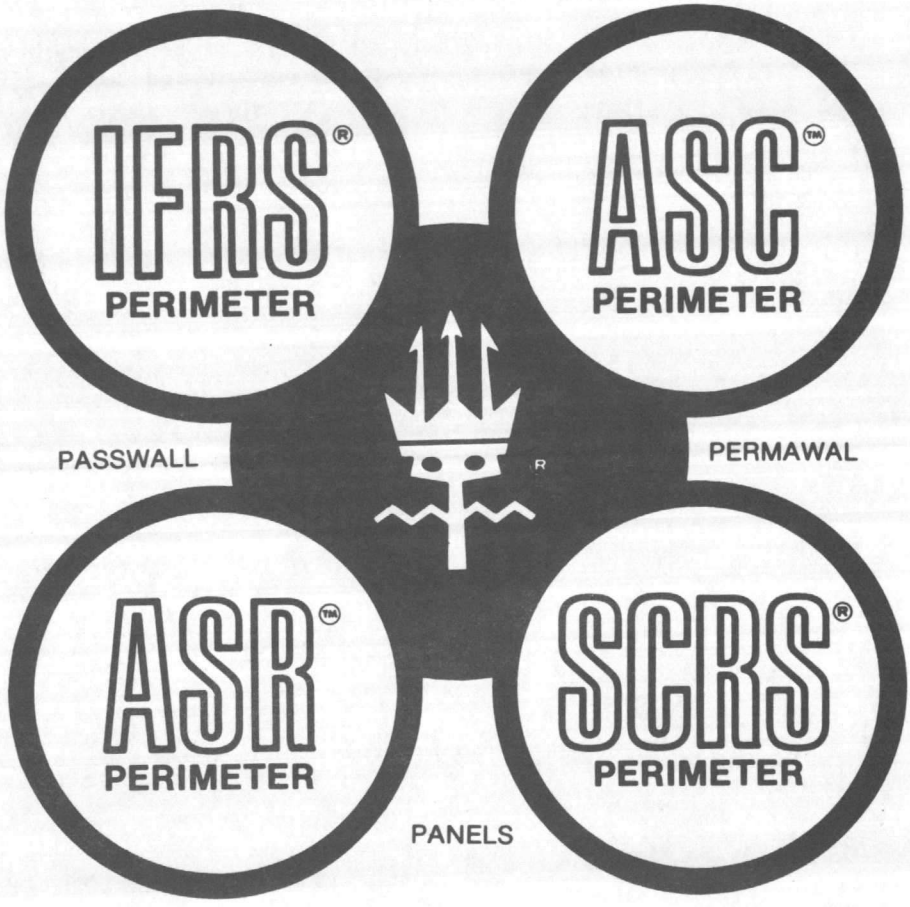
If 10% sodium hypochlorite is used; 23.31 gpd required.

If 15% sodium hypochlorite is used; 15.54 gpd required.

It is best to set the chlorine feeder in the mid-range position and feed chlorine continuously over long periods of time. If the chlorinator or hypochlorinator feeds at high capacity or a concentrated hypochlorite solution is used, chlorine will feed for only short periods of time and the chlorine residual will tend to overshoot. If too low a feed rate or weak a solution is used, the free residual will drop during use periods and may be lost altogether. If gas is being used, set the chlorinator feed rate initially at 125% to 150% of the calculated daily requirement.

If sodium hypochlorite is used, a little over a pint of 50 normal hydrochloric acid will be required to counteract the effect on pH of 1 pound of chlorine fed in the form of sodium hypochlorite. A mid-range setting on the acid feeder is also desirable and, therefore, the acid should be diluted. Ten or more to one is usual.

If gas chlorine is used, about 1-1/4 lbs. of soda ash will be required to neutralize each pound of chlorine gas fed. A 15% solution is the maximum practical solubility of soda ash in water, therefore, dissolve approximately 1-1/4 lbs. of soda ash per gallon of water (60 to 65 lbs. in a 55-gallon drum). Set the soda feeder to pump 1 gallon of this mix for each 1 lb. of gas chlorine. For example, if the gas chlorinator feed rate is set for 60 lbs. per 24 hours, set the soda ash feeder for 60 gallons per 24 hours, or as most feeders are calibrated, 2.5 gallons per hour.



Paddock®

"Pipeless" Recirculating System

Paddock Pool Equipment Co., Inc.

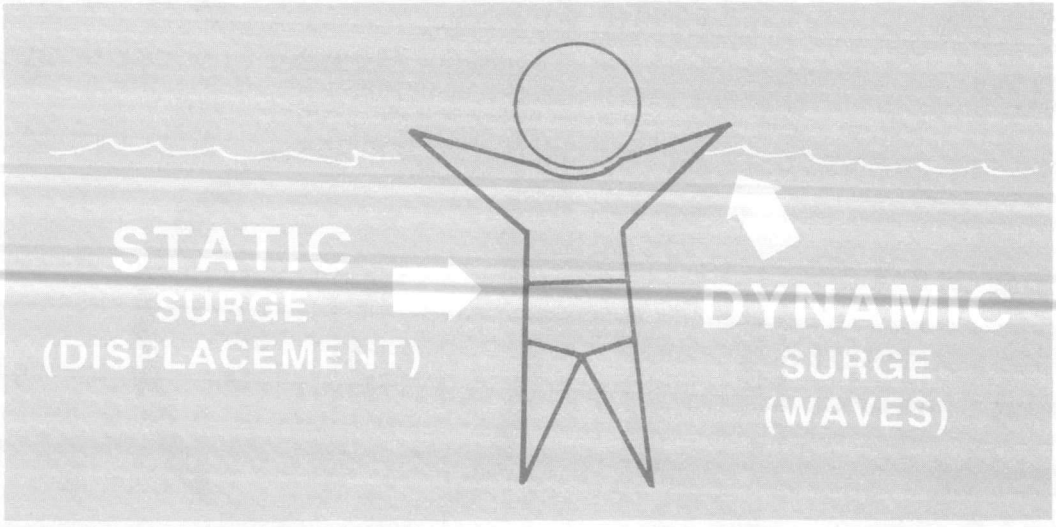
P. O. BOX 11676 ROCK HILL, S. C.

OPERATING INSTRUCTIONS

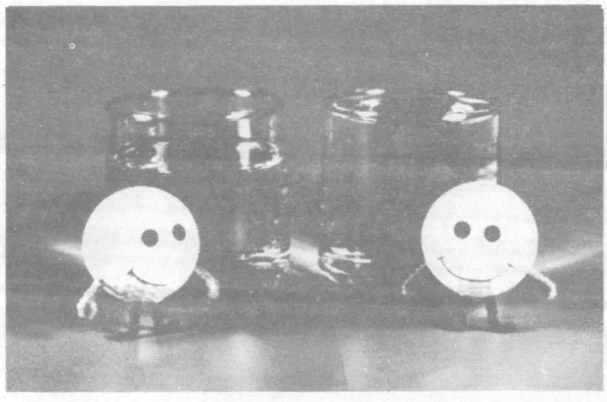
PIPELESS SWIMMING POOL

Your swimming pool is equipped with the finest and most efficient recirculating system available. Your Paddock perimeter is more than just a recirculating system in that it forms the top of the pool wall into a highly efficient wave trap and provides true *in-pool* surge capacity. Your swimming pool has a pipeless perimeter so perimeter pipe maintenance and care is completely eliminated. Observing the following simple operational and maintenance procedures will insure years of trouble-free operation.

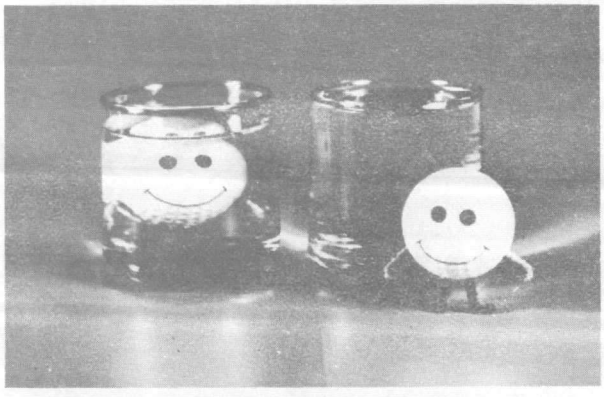
SURGE: a knowledge of surge, what it is, how it is created and how it affects your swimming pool is essential for maximum efficiency of operation and complete understanding of the operating instructions. Surge can be defined in a swimming pool as an increase in water level above the static or quiescent level. It is caused by the swimmers entering the pool and results in a sudden increase in the volume of water being offered to the gutter channel. There are two types of surge: static and dynamic.



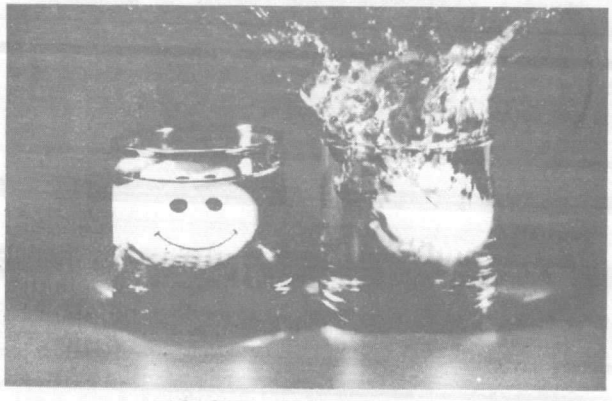
The displacement of the swimmer's body causes static surge and his movement, causing waves, results in dynamic surge and their sum equals total surge.



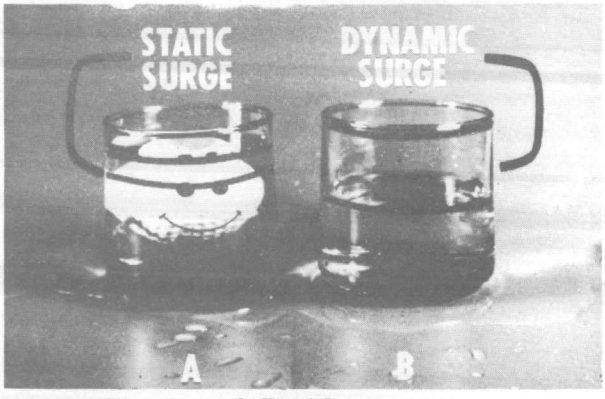
1. Swimmers Ready!



2. Swimmer Displacement



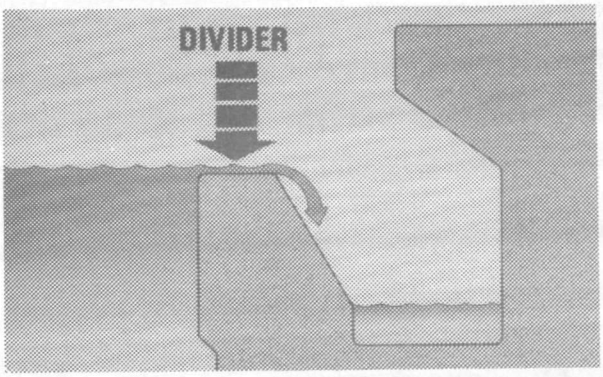
3. Swimmer Movement

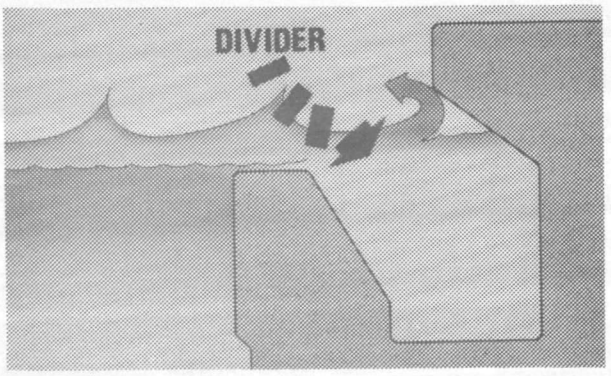


4. Total Surge

In the above illustrations, the golf balls represent swimmers; the glasses the swimming pool. In each instance the left hand glass illustrates the static or displacement surge. The water splashed from the right

hand glass represents the magnitude of the dynamic, or wave, surge. If the water level is maintained at the top rim of the gutter lip, both static and dynamic surges rise above the top rim of the gutter lip resulting in a flooding of the gutter channel. When the gutter channel floods, the gutter lip no longer functions as a divider between the surface of the swimming pool and the gutter channel.





All normal functions of the gutter channel; e.g. surface cleaning, entrapment of surface contamination, retainage of entrapped debris and wave quelling, cease and 100% failure of operation occurs. Flooding of the gutter channel during use means simply that surface contamination remains in the pool until the gutter lip again becomes a divider and the gutter channel again begins to function normally. At this point, it should be noted that nearly all swimming pool authorities agree that the principal source of pool contamination occurs at the surface during periods of use—it being brought in by the swimmers; in their suits or on their bodies, from open cuts or sores, expectorating, etc. Therefore, for the most sanitary swimming pool, it is of utmost importance that the gutter lip be maintained as a divider between the gutter channel and the pool surface; allowing wave action to deposit surface contamination into the gutter channel where it must be retained and conducted to the filtration and chemical treatment portion of the recirculating system.

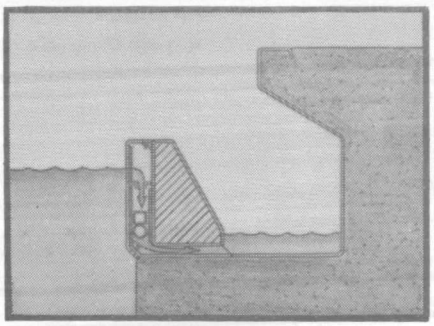
When the quiescent water level is maintained at the top rim of the gutter lip, the swimmers' displacement and the waves they cause increases the flow into the gutter to a rate four to six times the total recirculating rate or maximum gallonage, which can be taken from the gutter channel, flooding occurs, and the gutter lip ceases to function as a divider. It is the rush of water (thus the term, ***surge***) which must be controlled.

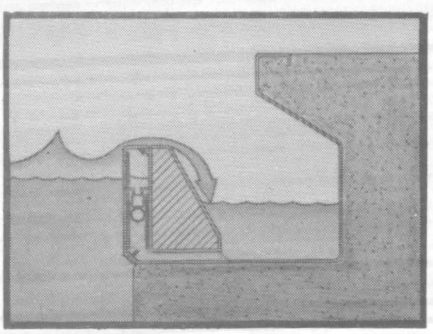
Before the introduction of the Paddock systems, the most efficient method of handling total surge was by means of a remote storage or ***surge tank,*** a reservoir, properly valved, to accept total surge and store it while the swimmers are in the pool. To better understand ***in pool*** surge capacity, let's investigate just what a ***surge tank*** must do in order to maintain proper gutter operation:

1. The surge tank must provide storage for all swimmer displacement.
2. The surge tank must continue to store water until only that portion of the dynamic surge waves, which can be drawn from the gutter channel (up to the total recirculating rate) are allowed to enter. This second requirement is actually accomplished by continuing to transfer water from the pool until the actual water level is below the lip of the gutter.
3. When the swimmers leave, the quiescent water level will be as much as 1" below the top rim of the gutter. Water must then return from the storage tank to the pool. The maximum rate of return is the total recirculating rate. This means that as much as ten minutes can be required to establish the re-entry of surface water into the gutter channel.

Therefore, it can be readily understood that even with a surge tank, the gutter system is out of operation during the time water is being transferred to or from the surge tank. Your swimming pool equipped with a Paddock perimeter is designed to instantaneously contain total surge and to provide for 100% gutter channel efficiency under all conditions of operation.

IN-POOL SURGE CAPACITY: The surge weirs which are a part of your system provide for a variable water level without loss of surface cleaning. The surge weir permits the pre-selection of a quiescent water level which would be that established by a remote surge tank after the transfer of water from the swimming pool. Thus, transfer time is eliminated and instant in-pool surge capacity results.





The above left-hand diagram illustrates quiescent surface cleaning (weir open) and on the right, normal operation with the Paddock perimeter and surge weir handling both static and dynamic surge.

QUIESCENT WATER LEVEL: To establish a surge capacity of 1 gallon per square foot of surface area, the quiescent water level is set 1-9/16" below the lip. This is 1" from the bottom of the weir opening on the SCRS or ASR Systems. To select a different quiescent water level (or surge capacity) the level can be determined by the average number of swimmers who use the swimming pool during a regular period of use. One swimmer is generally conceded to displace 1-1½ cubic feet of water which will cause an increase of ⅛" in depth over 144 sq. ft. of water surface. A simple rule of thumb therefore becomes: each 7 swimmers equal a ⅛" level over 1,000 sq. ft. of water surface. Thus each 24 swimmers in a 45' x 75' pool will cause an increase in water level of ⅛" (45 x 75 - 3,375÷1,000 = 3.375 x 7 = 23.6 or 24). After calculating swimmer displacement (static surge) allow twice this amount for dynamic surge and the quiescent water level can be established.

Example

1. Pool size 42' x 75'
2. Instructional swimming classes of 38
3. Recreational swimming groups of 60
4. Select 49 swimmers as average use
5. Pool contains 3,150 sq. ft. of surface area
6. Static surge of 49 swimmers
   (49 x 144 = 7,056÷3,150 = 2.24 x .125 = 2.7, say ¼"
7. Dynamic surge ¼" x 2 = ½"
8. Total surge allowance = ¾"
   Quiescent water level established ¾" below lip.

WATER LEVEL — COMPETITIVE SWIMMING: During swimming meets, generally only 6 to 8 swimmers will be in the water at a time. The quiescent water level calculates to be less than 3/16" in a 75' pool—as a rule of thumb, the water level may be taken at the lower edge of the radius at the top of the gutter lip.

SURGE WEIRS: The surge weirs provided through the face of the system are for surface cleaning at the quiescent water level during periods of non-use. At such times the surge weir gates will be in the open position allowing water to enter the gutter channel. As swimmers enter, the weir gates begin to close and at moderate loading, are closed allowing water to enter the gutter channel only by passing over the top of the gutter lip which then serves as a divider between the swimming pool water surface and the gutter trough or channel.

DISTRIBUTION: The Paddock system of pipeless perimeter recirculation seems to offer perpetual motion. With pipes eliminated, different hydraulic principles apply and a uniform pressure exists at each jet outlet (located on approximately 36 inch centers) around the entire perimeter of the pool. It is this uniform pressure which absolutely insures an equal flow of water from each outlet. The direction of jet flow is fixed and calculated to distribute the water to the bottom third of the swimming pool, maintaining maximum efficiency from the sterilizing agent. Jet wash fittings directed into the gutter channel maintain a continuous cleansing flow of water into the gutter channel. The jet wash fitting also provides directional kinetic energy to maintain flow toward the gutter channel outlet at all times.

CLEANING AND MAINTENANCE: The low carbon stainless steel components will require little, if any, maintenance. A weekly rub-down with a 3M Scotch-Brite Pad No. 447 will remove any calcium deposits or water marks. A little detergent with this process will remove any surface grease. Should a stain occur in the non-skid area which cannot be cleaned with the Scotch-Brite Pad, swab the section with 20% nitric acid solution. Should a darkening of the weld effect zone occur which is felt to be objectionable, it may be removed by swabbing the area with a one to one solution of muriatic acid and water. Keep the area wet with acid for approximately five minutes and rinse thoroughly. *TYPE 304 STAINLESS STEEL DOES NOT RUST. THE APPEARANCE OF RUST IS CAUSED BY DEPOSITS ON THE SURFACE OF THE STAINLESS STEEL AND IN ALL CASES, SUCH STAINS CAN BE REMOVED EASILY.* Enameled, galvanized mild steel IFRS components should be checked regularly and any rust spots touched up. See Bulletin 66-3 for painting instructions.

WINTERIZING: A Paddock system is designed to simplify all phases of pool operating. If your recirculating system is on an outdoor pool in a freezing climate, you will be able to take full advantage of this completely pipeless system. There are no perimeter pipes to winterize! There are no pipes circling the pool's perimeter to freeze. Simply lower the water level in the pool 6 - 12" below the stainless steel perimeter and your IFRS of SCRS perimeter is winterized.

FILLING THE POOL: On the initial and subsequent fillings of the pool, the **static fill level** (filter off) shall be _____ inches below the overflow rim of the swimming pool. The reason being that on the SCRS or ASC perimeter pools, the reserve capacity of the system will fill with the pool when the filter is turned off. When the recirculating system is started up, this water will be pumped back into the swimming pool, raising its water level. Therefore, the static fill level will always be below the normal quiescent operting level of the swimming pool. To determine the static fill level:

On swimming pools equipped with the SCRS or ASC system, multiply the perimeter of the pool expressed in feet by .9; divide this answer by the surface area of the swimming pool expressed in square feet and multiply by 12. The answer is the number of inches the static fill level is below the normal quiescent operating level.

Example: Swimming pool size 75' long x 45' wide
Perimeter = 240' Surface area = 3,375 sq. ft.
240 x .9÷3,375 x 12 = .76 or ¾".
Therefore, the **static** fill level is ¾" below the normal quiescent **operating** level.

AUTOMATIC CONTROLS: On SCRS equipped pools, the water level, the main drain and the recirculating rate **may** be automatically controlled by integrated electronic circuitry. If you have an SCRS system which incorporates one or more of the automatic features, it will be properly placed in operation by your Paddock representative upon start-up. For additional information on the control system, refer to the specific Technical Bulletin covering SCRS controls.

"PIPELESS" RECIRCULATION SYSTEMS

PADDOCK ® OF CALIFORNIA

STAINLESS STEEL RECIRCULATION SYSTEMS
Series 9000

Paddock's most recent contribution to the pool industry is the "Pipeless" Recirculation System. Paddock's engineers have developed them for use on indoor and outdoor pool installations of every size and purpose.

The "Pipeless" prefabricated perimeters combine an easy-out, semi-recessed gutter and the pool's entire filtered water and gutter drain piping. They provide a safe, well-designed pool perimeter which simplifies structural design, eliminates costly pipe tunnels and equipment housings, greatly reduces the margin of error in pool mechanical installations and simplifies day-to-day operating routine. The double-tiered SCRS System offers unique efficiencies and continuous operation under all use conditions.

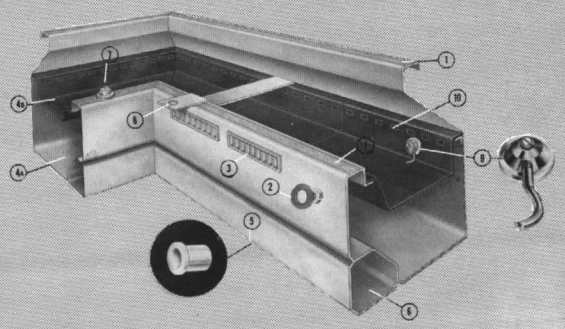
- All buried perimeter pool piping is completely eliminated.
- Directional jet inlets approximately every 40" around the pool provides superior filtered water distribution and deep water supply.
- "Jet Clean" combination perimeter gutter system provides more efficient surface cleaning.
- Pool winterizing problems are eliminated — just close one valve, lower pool level 6", drain filter and job is finished.
- Adaptable to all types of permanent pool construction.
- "In-Pool" surge capacity.
- SCRS metering weirs responsive to pool water level.
- Non-surgecharging, two-tiered SCRS System.

Paddock

POOL EQUIPMENT COMPANY, Inc.
555 Paddock Parkway, Rock Hill, S.C. 29730

For complete information write Paddock requesting its detailed 12 page brochure or refer to Sweet's Catalog, Architectural File 13.22/Pa.

SCRS® SYSTEM



1. non-skid safety strip
2. life line anchor
3. integral surge weir
4a. lower perimeter overflow channel
4b. upper perimeter overflow channel
5. jet inlet—sized to flow rate
6. filtered water supply tube
7. water agitator jet
8. racing line anchor—attaches to line, contours to lip—eliminates perimeter anchorage
9. jet wash fitting
10. surge control port

design and construction details

The Paddock Pipeless Perimeters allow the designer complete flexibility on the choice of pool construction materials as it is adaptable to any type of structure, therefore, the structural design may be selected which is appropriate for the site, availability of materials and contractors to build the swimming pool. The system is also adaptable to any type or location of filtration equipment.

gunite pools

Gunite, or pneumatically applied concrete, is the most popular pool material today. Gunite provides a sound monolithic pool structure and economy in construction. Gunite shells cradled in poured concrete have become increasingly popular for elevated pools.

poured concrete pools

Poured concrete is a popular method of building a swimming pool when the pool is a part of a larger building project, or the site requires extensive fill.

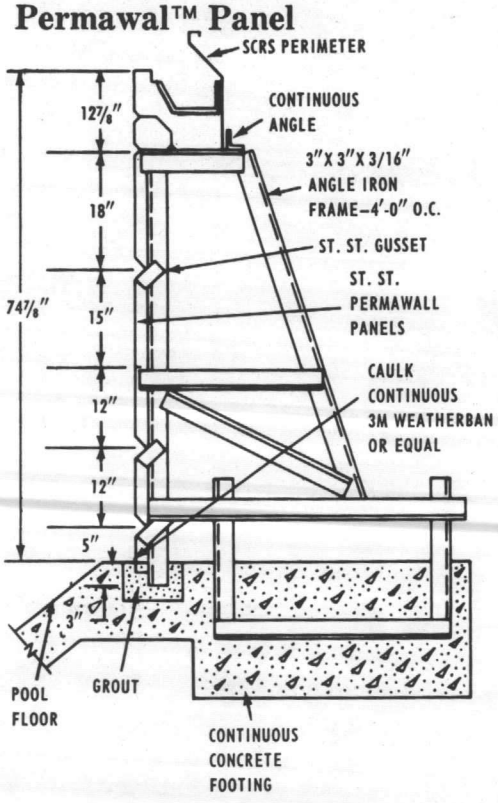
steel pools

Steel has been used for many years in swimming pool structures. Low carbon stainless steel is presently available, from Paddock, in a completely new wall system which provides "super" surge capacity while simplifying pool construction. See the center diagram above.

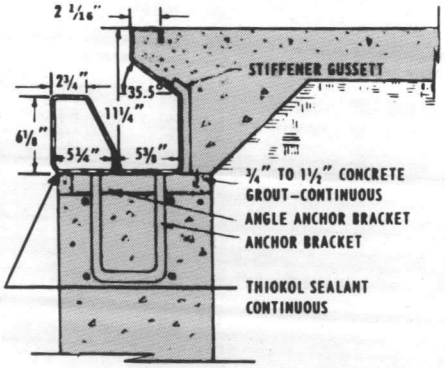
installation of IFRS system

When the steel for the concrete wall is being placed, reinforcing "U" bar anchors are tied to the wall steel every 4 feet. Anchor angles are leveled and welded onto each "U" bar anchor and the supply tube, which comes precut in 20 ft. maximum sections, is tack welded to the angle anchors. The perimeter overflow system channel is then tacked into place and a continuous weld run between the tube and channel. Stiffeners are then welded into the system for alignment and grout poured in behind and under the IFRS perimeter. A bead of sealant is run under the edge of the IFRS system and installation is complete. On other types of steel pools, a channel section replaces the "U" bars and angle anchors and, of course, welding replaces the grout.

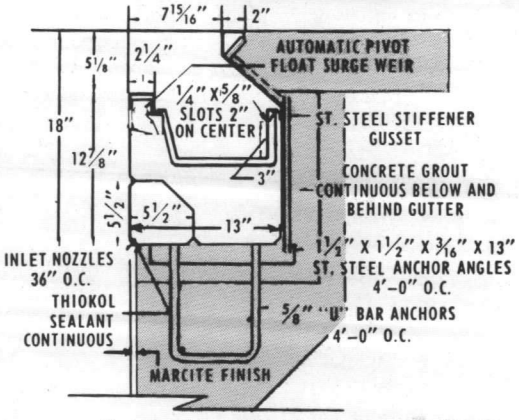
Permawal™ Panel



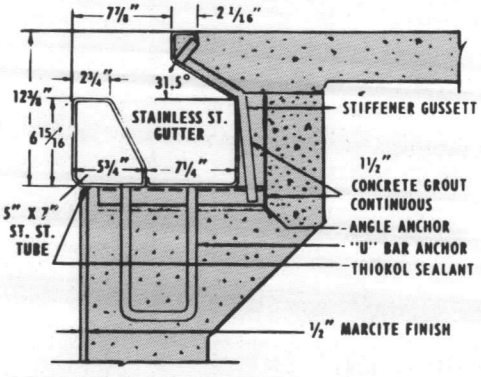
Any Paddock pipeless recirculating system is enhanced by being installed upon a gleaming stainless steel Paddock Permawal panel. Permawal panels come in two heights, one for approximately a 6' depth, the other approximately 4' with a transition piece from one wall height to the other. The wall panels are strengthened by integrally formed "V" groove as shown on drawing to the left. The wall system has been designed for installation after the footing and floor have been poured. This simplifies the logistics of job construction and reduces the exposure to a "washed out" excavation. The Permawal panels are fabricated of 12 gauge 304 low carbon stainless steel and are supported by 3/16" mild steel buttresses placed on 4' centers around the perimeter of the swimming pool. The buttress attaches to an angle anchor imbedded in the footing and is put in place prior to the installation of the wall panels. After the panels and the recirculating system have been installed the bottom portion of the wall is grouted into the groove provided with an expansive grout after which a bead of 3M Weatherban sealant is applied at the joint between the stainless steel and the grout. The panels are fuse welded together and the weld washed with filler metal to improve its thickness and strength.



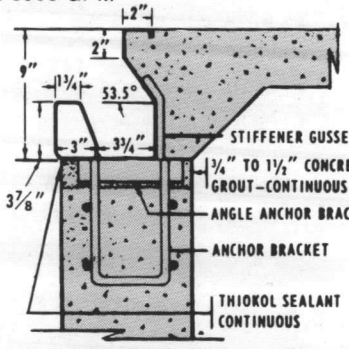
Catalog No. 9510, Stainless Steel IFRS System—channel flows to 600 GPM



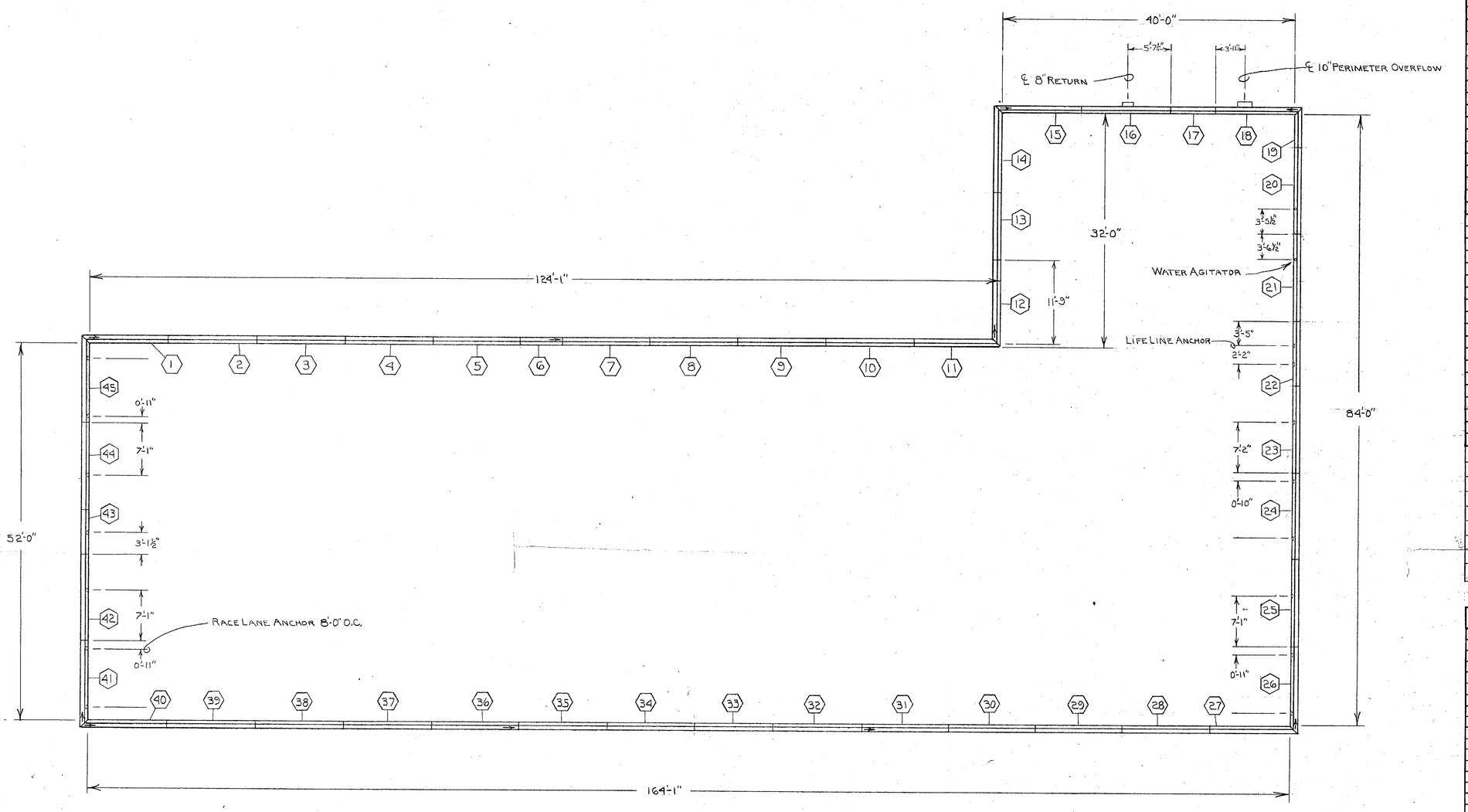
Catalog No. 9710 Stainless Steel SCRS perimeter system-double channel flows to 3000 GPM



Catalog No. 9610, Stainless Steel IFRS System—channel flows to 1050 GPM (also available in Combination System, Catalog No. 9150)



Catalog No. 9410, Stainless Steel Mini Tube IFRS System—channel flows to 200 GPM



GRATE SUPPORT ANGLE

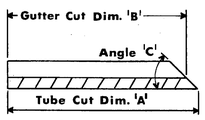
PERIMETER SECTION SCHEDULE

SEC. NO.	TYPE	DESCRIPTION DIM. 'A'	DIM. 'B'	ANGLE 'C'		WEIR	JET	OTHER
1	III	10'-11"		45°			1L	
2	STR	11'-11⅞"						
3	STR	11'-11½"						
4	STR	11'-11⅜"						
5	STR	11'-11½"						
6	STR	5'-10"			▲3"		1L	
7	STR	11'-11½"						
8	STR	11'-11½"						
9	STR	11'-11½"						
10	STR	11'-11½"						
11	I	11'-11"		45°				
12	IV	11'-11"		45°			1L	(1) LLA
13	STR	9'-2"						
14	II	10'-11"						
15	III	10'-11"					1L	
16	STR	11'-11½"						8" RETURN
17	STR	6'-3½"			▲1"			
18	II	10'-11"		45°			1R	10" P.O.
19	III	4'-6"		45°				
20	STR	11'-11½"						(1) W.A.
21	STR	11'-11½"						(1) W.A.
22	STR	8'-11½"			▲2"			(1) LLA & (1) RLA
23	STR	11'-11½"						(1) RLA
24	STR	11'-11½"						(2) RLA
25	STR	11'-11½"						(1) RLA
26	II	10'-11"		45°			1R	(2) RLA
27	III	10'-11"		45°				
28	STR	11'-11½"						
29	STR	11'-11½"						
30	STR	11'-11½"						
31	STR	11'-11½"					1R	
32	STR	11'-11½"						
33	STR	11'-0½"			▲4"			
34	STR	11'-11½"						
35	STR	11'-11½"						
36	STR	11'-11½"					1R	
37	STR	11'-11½"						
38	STR	11'-11½"						
39	STR	11'-11½"						
40	II	10'-11"		45°			1R	
41	III	10'-11"		45°			1L	(2) RLA & (1) AAR
42	STR	11'-11½"						(1) RLA
43	STR	6'-5"			▲2"			(2) RLA
44	STR	11'-11½"						(1) RLA
45	II	10'-11		45°				(2) RLA

MATERIAL SCHEDULE

DESCRIPTION	QTY.
Stainless Steel Tube	497'-2"
Stainless Steel Gutter	507'-2"
Anchor Angles 1½"x1½"x3/16"x12"	137
Stiffener Brackets (Set of 3) 2⅛"x5½"±13"	137
'U' Bar Anchors	137
Plastic Inlet Nozzles 3/16" O.D. 5/16" I.D.	182
O Rubber Test Plugs	182
Surge Weirs	
Jet Wash Fittings #9018-L	5
Jet Wash Fittings #9018-R	5
Water Agitator Fittings	2
Life Line Anchors #9026	2
Racing Lane Anchors #9026	14
Scotch Brite Pads	6
Auto Air Release	1
8" Return Line Connection	1
10" Gutter Line Connection	1
3/4"x3/4"x 12 Ga. St. St. Angles- 90° Bend	507'-2"
3/4"x3/4"x 12 Ga. St. St. Angles- 90° Bend 9" LG	167
9"x9" CYCOLAC GRATES	681
#10-24 x 1¼" LG ST. ST. PAN HD. MACH SCREW	237

CUT SECTION TYPE I



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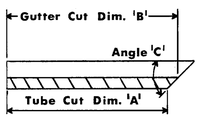

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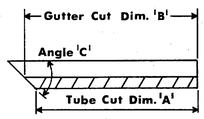
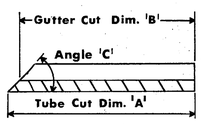


CUT SECTION TYPE IV



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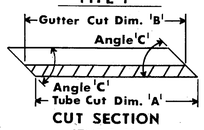
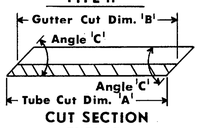
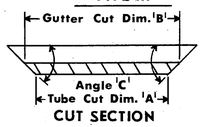


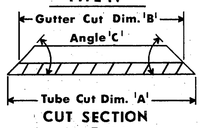
CUT SECTION TYPE VI



CUT SECTION TYPE VII



CUT SECTION TYPE VIII



NOTES:

1. Pool Dimensions Are From Face Of Tube To Face Of Tube.
2. ▬ Denotes Surge Weirs.
3. ← Denotes Jet Wash Fittings.
4. ▲ Denotes " Extra Material Added For Field Cut.
5. ✳ Denotes Drill & Tap Tube 1/4" I.P.S. To Supply Jet Wash Fitting in Gutter Pan.
6. Total Main Drain Head Loss Not To Exceed 1'-0".
7. All St. St. Shall Be 304 Low Carbon.
8. Total Recirculation Rate is: G.P.M.
9. Pool Perimeter is 496 Ft. 2 In.
10. Type Of Pool Construction:
11. Pool Area: 9812.3 Sq. Ft.
12. Pool Constructed: Indoor Outdoor
13. Type Of Recirculation System: 8' ASC

No.	REVISION	BY	DATE
	REMOVE ARROWS & ADD DIMS TO EACH SECT ADD STIFFNER SIZES & CAT.# FOR ANCHORS	BH BH	5-9-83 4-12-83

FABRICATION DRAWING

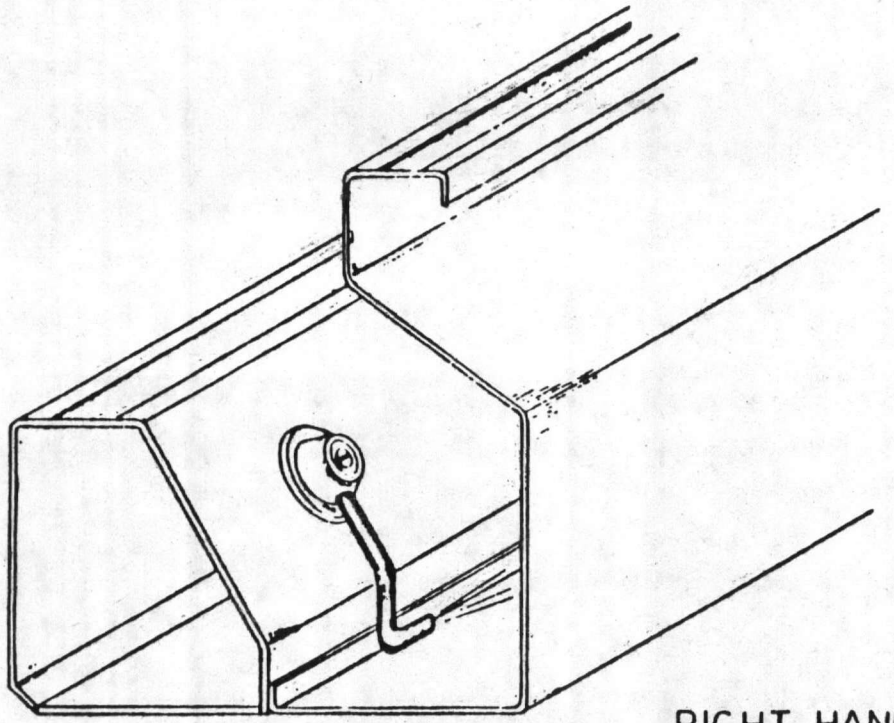
CAMP LEJEUNE

CONTRACTOR - BUILDER

PADDOCK CONSTRUCTION

PADDOCK POOL EQUIPMENT COMPANY, INC.
ROCK HILL, SOUTH CAROLINA 29730

W.O. No: 8849
SCALE:
DATE: 4-7-83
DWN BY: BH
REV. No:
DWG No: 2356-1



RIGHT HAND SHOWN
LEFT HAND STYLE ALSO AVAILABLE

ANTI-NOISE JET WASH FITTING

SCALE 1/4" = 1'-0"	REVISIONS REMOVE LEFT HAND CAT NO 9018 RIGHT HAND	BY LM	DATE 8-3-72
DATE 12-1-71	#9018		
DR'N. MD CKD.			
AP'VD.			

TITLE PADDOCK POOL EQUIP. CO. INC. ROCK HILL, S.C.

NO. AB-2114

FLOW RATE 2.6 G.P.M. AT 10 P.S.I.
FLOW RATE 3.67 G.P.M. AT 12 P.S.I.

PADDOCK REPORTS

TECHNICAL BULLETIN 69-6

MAINTENANCE - RECIRCULATION PERIMETER

Your low carbon 304 stainless steel pool perimeter will require little, if any, maintenance. A weekly rub-down with a 3M Scotch Brite Pad No. 447 will remove any calcium deposits or water marks. A little detergent with this process will remove any surface grease. Should a stain occur in the non-skid area or one which cannot be cleaned with the Scotch Brite Pad, swab the section with 20% nitric acid solution. Should a darkening of the weld effect zone occur, which is felt to be objectionable, it may be removed by swabbing the area with a one to one solution of muriatic acid and water. Keep this area wet with acid for approximately five minutes and rinse thoroughly.

LOW CARBON 304 STAINLESS STEEL DOES NOT RUST. THE APPEARANCE OF RUST IS CAUSED BY DEPOSITS ON THE SURFACE OF THE STAINLESS STEEL AND IN ALL CASES SUCH STAINS CAN BE REMOVED EASILY BY ONE OF THE PROCESSES DESCRIBED ABOVE.

Paddock of California, Inc. P. O. BOX 11676 • ROCK HILL, S. C. 29730 • 803–324-1111

PADDOCK® OF CALIFORNIA

OPERATOR'S MANUAL

(MULTI-CELL SAND PRESSURE FILTER)

FILTER

Paddock Pool Equipment Co., Inc.
P. O. BOX 11676 ROCK HILL, S.C.

PADDOCK MULTI-CELL SAND PRESSURE FILTERS

Introduction

The filter on your pool is a Single tank, 3 cell pressure filter which utilizes sand as the filtering medium. It has a surface area of 49.48 square feet per cell, or a total surface area of 148.44 square feet. A Pressure Sand Filter is one in which the water to be filtered is pumped through a layer of sand contained within a pressure vessel. Your total pool gallonage is approximately 298-800 gallons and the designed flow rate is 5.59 gallons per square foot of filter area per minute, or 830 gallons per minute. At this rate, the entire contents of the pool will be turned over in approximately 6 hours. This filter system will, with proper care and maintenance, give trouble-free and efficient operation.

The filtering principle is simple. Sand supported by a layer of fine gravel is used to filter out all of the dirt suspended in the water. Pool water is forced by the pump through a distributor system in the top of each filtering cell. This distributor system is designed to maintain a uniform flow downward through the sand and out a second collector system in the bottom of each cell.

Sand filtration has been known and used for over a century as a means of clarifying water. The size and shape of the filtering media plus the rate of flow through the bed determine the quality of filtrate. When the bed becomes clogged, the turbidity is removed by reversing the flow of water up through the bed, expanding it and releasing the entrapped turbid of particles. This process of backwashing the clogged filter bed returns the bed to its original useful condition.

Filter rates are figured in gallons per minute per square foot of filter surface area. The usual flow rate for swimming pools and rapid sand filters is to 20 GPM per square foot. In backwashing, the filter bed is so heavy that it requires between 12 and 15 GPM per square foot to expand the bed and wash out the turbidity, therefore, each cell of this filter must be backwashed separately. Your filter system is designed to run 24 hours per day.

Initial Start Up

The following steps are to be taken when you place your filter in operation for the first time:

1. Check pump strainer. Make sure it is clean and full of water.

2. Check pump rotation to insure that the motor has been correctly wired.

   NOTE: The impeller should rotate in a clockwise direction when viewed from the motor end. If rotation is opposite, the motor has been incorrectly wired.

3. Clean the filter sand by backwashing the filter (see Operating Instructions). Backwash a minimum of 5 minutes or until the sight glass runs clear.

In many areas when a new pool is filled, the water will appear green or cloudy. This green and/or cloudy appearance can be caused by plaster fines present in the water, traces of iron or organic matter, algae in the makeup water, or by a combination of all. This type of contamination always will clog any type of filter in a relatively short period of time. It is recommended that the pool be super-chlorinated immediately after filling and that the filter be backwashed promptly when the designed flow rate cannot be maintained. If this procedure is followed, the pool will be cleaned up in a minimum of time. After super-chlorination, do not enter the pool until the chlorine level has returned to normal.

If any appreciable amounts of iron are present, they will turn brown upon chlorination and may stain the interior finish of the swimming pool. Chlorinate a small sample of pool water first. If it turns brown, floc the pool with alum and then super-chlorinate.

The backwash operation may be required daily or several times a day for the first few days until the water becomes a sparkling blue. After the cloudiness and/or green appearance is gone, you need only backwash as covered elsewhere in this manual. Check the pump strainer, the convertor strainer basket and any skimmer baskets daily and clean as required, establishing regular schedules.

OPERATING INSTRUCTIONS

Valve Legend

All normal functions of the filter are controlled by wafer valves. It is good practice to stop the pump and motor before changing the handle position of the valves. For convenience in operation, all valves have been tagged. (Your system may not include all valves listed.)

#1 - Main Suction
V - Vacuum Suction
#2 - Return to Pool
#3 - Backwash
#4 - Filter Influent
#5 - Filter Effluent
#6 - #_ - Cell Isolation Valves (-1, Cell #1; -2, Cell #2, etc.)

All valves are considered closed unless otherwise stated in the instructions.

To Filter Pool

Open valves #1, #2, #4 and #6-1 through #6-3. Adjust valve #2 until the desired flow rate is indicated on the rate-of-flow indicator. If the system does not have a rate-of-flow indicator, the flow rate can be set by reading the pressure and vacuum gauges as indicated elsewhere in these instructions.

To Filter Pool With Balancing Tank

With system set to filter pool and the proper recirculating rate set, the suction valve on the pump connected to the tank is opened fully. With no water entering from the gutter, the main drain valve (#1), at its entrance to the balancing tank, is adjusted until there is about a 6" water cover over the pump suction line. This establishes the minimum level in the balancing tank and the point at which all of the water is being supplied by the main drain.

To Clean Strainer

Stop pump. Close isolation valves on either side of the strainer. Remove cover and clean basket. Be sure strainer is filled with water after cleaning. Replace cover tightly. Open filter valves for desired operation. Start pump. Establish regular schedule for checking the strainer.

TO BACKWASH FILTER - FLOW RATE PER CELL 830 GPM (16.77 GPM Per SQ. Ft.)
EACH CELL MUST BE BACKWASHED SEPARATELY

To Backwash Cell #1
Close valves 3, 4, 6-2 + 6-3. Open valves #1, #3, #5 and #6-1. Start pump. Continue backwashing until the water runs clear in the sight glass. This normally takes 3-5 minutes. Stop pump.

To Backwash Cell #2
Close valves 2, 4, 6-1 + 6-3. Open valves #1, #3, #5 and #6-2. Start pump. Continue backwashing until the water runs clear in the sight glass. This normally takes 3-5 minutes. Stop pump.

To Backwash Cell #3
Close valves 2, 4, 6-1 + 6-2. Open valves #1, #3, #5 and #6-3. Start Pump. Constinue backwashing until the water runs clear in the sight glass. This normally takes 3-5 minutes. Stop pump.

Checking the Flow Rate

The recirculating pump is designed to deliver the design flow rate of 830 GPM at a total dynamic head of 55 feet. Total head on the pump is the combination of the vacuum and discharge pressure losses. The conversion factors for the vacuum and pressure reading to feet of head are:

1. 1" of vacuum equals 1.13 feet of head.
2. 1 psi equals 2.31 feet of head.

Procedure

(Assume a newly backwashed filter.)

1. Set the system to filter with all valves fully open.
2. Read the vacuum gauge.
3. Convert vacuum reading to feet of head by multiplying by 1.13. (This is the vacuum head.)
4. Subtract the vacuum head from the design head of the pump. (This is the pressure head.)

5. To convert the pressure head to a gauge reading in pounds per square inch, divide by 2.31. This gives the desired pump discharge pressure gauge reading to obtain the desired total dynamic head and, hence, the designed flow rate. Obtain the reading by adjusting valve #2.

6. In adjusting valve #2, should the vacuum reading drop appreciably, repeat Steps 2 through 5.

Like a properly installed flowmeter, a pump performance curve is guaranteed accurate within 5%. Flowmeter installations vary, thus, when pump pressures are set as described here, the flowmeter reading should be noted as the proper recirculation rate, regardless of its actual reading.

Winterizing

1. Backwash filter thoroughly.

2. Close main drain and return valves. Open backwash valve (gravity drain line assumed). OPEN all valves which are a part of the filter face piping.

3. Drain all water from the filter tanks and piping by opening tank drain valves.

4. Remove manhole cover (indoor installations only), gauges and rate-of-flow indicator and store in a dry area.

5. Check sand bed in filter, clean as necessary.

6. Check filter tank for rust spots, clean and paint as necessary.

7. Remove strainer lid and basket. (Loosen lid and remove basket - outdoor installation.)

8. For longest service life, recirculating pump and motor should be in a dry area during shutdown. Remove and store as required.

NOTES AND TIPS FROM THE ENGINEERING DEPARTMENT

1. Clean and repack the recirculating pump and/or check the seal and overhaul the motor at least once a year.

2. Clean the pump strainer regularly to eliminate the pump operating without water. Leaves become water logged, sink to the bottom of the pool, are sucked into the strainer and clog it. This causes the pump to run dry, overheating the motor and damaging the seal.

3. Establish a definite period for using the vacuum cleaner and skimmer in removing leaves and other foreign matter from the pool. Do not allow nails, pins or other metal articles to remain in the pool for any length of time, as a rust stain will mar the finish. Also, if the pool is empty for any reason, do not allow any walking on the floor as stains and marks will result.

4. Brush walls and the floor of the pool frequently.

5. Alum is generally required as a filter aid.

6. If an amount of fine sand or similar material has accumulated on the bottom of a new pool prior to start up, it is recommended that the pool be vacuumed to waste.

7. After initial cleanup, if milky white or light green cast appears, super-chlorinate to at least 10 ppm free chlorine residual.

8. After initial clean up, if murky green cast appears and procedure "11" has no effect, it is coloidal suspension. Remove by alum floccing the pool.

TROUBLESHOOTING SAND FILTERS

A. Motor Won't Run

1. Open switch or wiring
2. Blown fuse or open thermal reset
3. Burned out motor or start switch
4. Locked shaft
5. Impeller jammed with rock

B. Motor Runs Too Slow Or Hot

1. Low or improper voltage
2. Binding shaft or rubbing impeller
3. Inadequate ventilation
4. Pump strainer full
5. Skimmer basket full

C. Low Pumping Action

1. Valves partially closed on suction or discharge
2. Plugged suction or discharge line
3. Undersized piping on suction or discharge line
4. Pump rotation wrong
5. Impeller clearance too great
6. Impeller partially clogged
7. Plugged skimmer basket or hair and lint in pump strainer
8. Dirty filter
9. Air leak in suction line or gate valve

D. High Pump Or Filter Pressure Reading

1. Dirty filter
2. Valve on discharge side partially closed
3. Return lines too small
4. Heater bypass valve restricted

E. Noisy Pump and Motor

1. Clogged hair and lint in pump strainer
2. Clogged skimmer basket
3. Bad bearings in motor
4. Partially closed valve or clogged suction line

F. Short Filter Cycles

1. Excessive dirt load
2. Heavy bathing loads
3. Dirty makeup water
4. Algae present in water
5. Bathers using an excessive amount of suntan lotion
6. Check filter media for hard spots

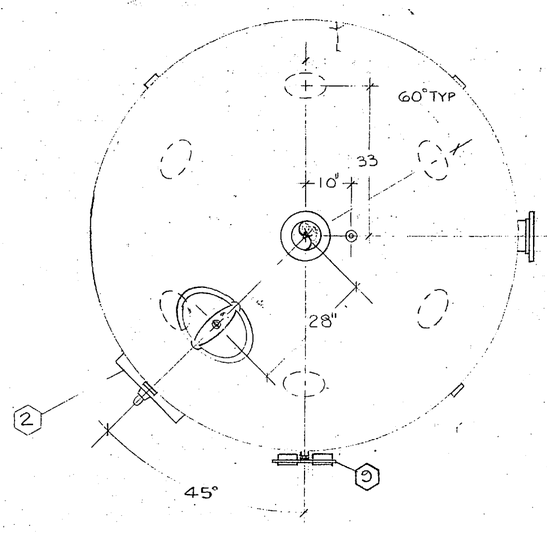
G. Water Leakage From Pump Shaft

1. Replace seal on pumps with mechanical seals
2. Shafts with glands, tighten gland nuts or repack gland

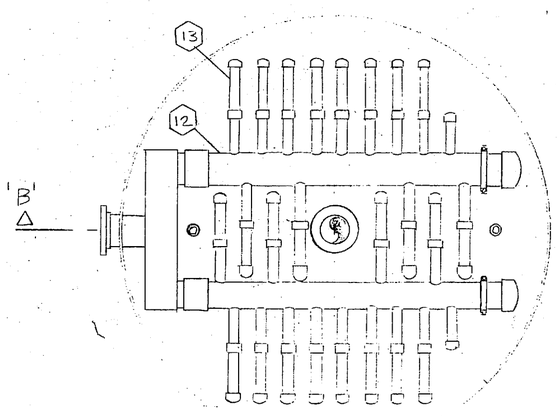
H. Excessive Amount of Air Returning To Pool

1. Leak or restriction in suction line
2. Low pool level
3. Check skimmer weir
4. Air relief clogged
5. Check lid, gasket and strainer on pump, tighten securely

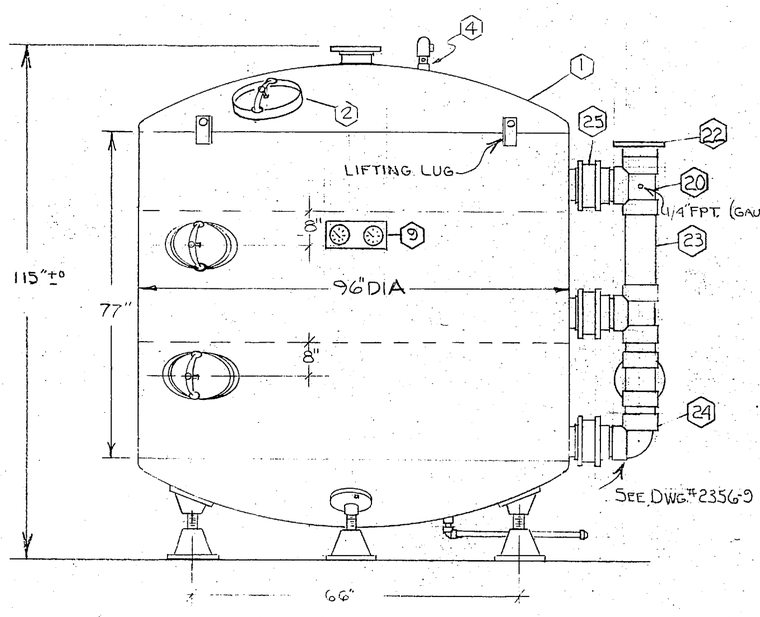
ITEM	QTY	DESCRIPTION
1	1	96" DIA. CARBON STEEL VERTICEL TANK
2	3	11"x15" MANHOLE W/COVER
3	6	TANK JACK STANDS #4906 W/#4646 SADDLE
4	1	3/4" AUTOMATIC AIR RELIEF VALVE W/3/4"x3/4"x1/4" PVC TEE
5		
6	1	AURORA PUMP & MOTOR 830GPM@55'TDH 5x6x12 349A
7	1	1165 RPM 20HP 208v 3ϕ 60Hz. (NOT SHOWN)
8	5	6" SCH. WELDON FLANGE
9	1	GAUGE PANEL W/1/4 COPPER TUBING
10	1	#5811-5 FLOW METER
11	3	12GA SS BAFFLE PLATE
12	6	6" SCH 80 PVC UNDERDRAIN HEADER
13	50	2"x10" SLOTTED UNDERDRAIN LATERALS
14	1	6" OVERDRAIN HEADER
15	1	6" OVERDRAIN HEADER
16	5	3/4" PRESSURE EQUALIZING ORIFICE, SAND RETAINER
17	1	8" STRAINER W/BASKET & (1) EXTRA BASKET
18		FILTER SAND -(170.5) FT³
19	1	1½" BACKWASH LINE SIGHTGLASS
20	3	6" SCH 40 PVC TEE (SOC)
21		FILTER GRAVEL (100.6) FT³
22	5	6" PVC FLANGE (SOC)
23	AR	6" SCH 40 PVC PIPE (PE)
24	1	6" SCH 40 PVC ELL (SOC)
25	3	6" WAFER VALVE



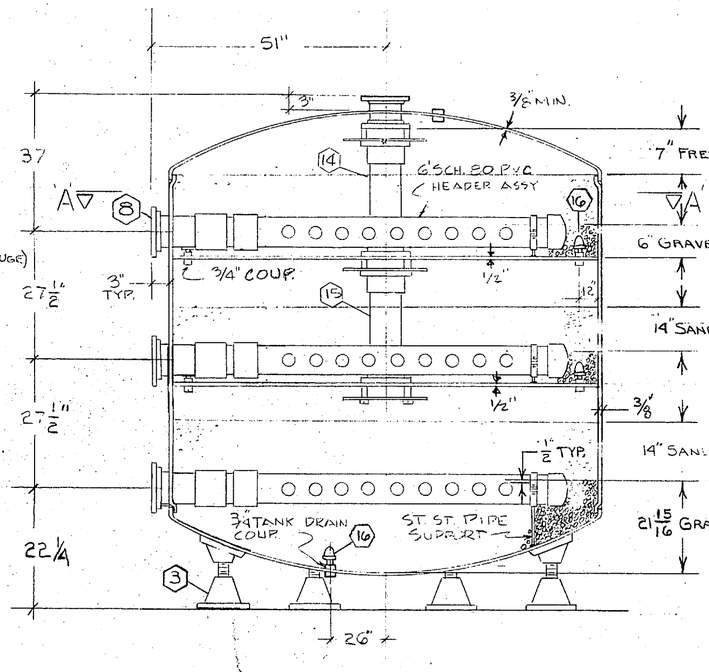
PLAN VIEW



SECTION 'AA'



FRONT VIEW



SECTION 'B-B'

NOTES

1. FILTER WORKING PRESSURE TO BE 75# TESTED @ 112.5#.
2. FILTER MEDIA TO BE FINE SILICA SAND, .40-.55MM WITH A UNIFORMITY COEFFICIENT OF 1.6 MAX
3. EXTERIOR FACE PIPING TO BE SCH 40 PVC.
4. INTERIOR PIPING TO BE SCH. 80 PVC
5. INTERIOR OF FILTER TANK TO BE COATED W/ KOPPERS SUPER TANK SOLUTION.
6. EXTERIOR OF TANK TO BE PRIMED W/ RED OXIDE PRIMER.
7. TANK WT. W/INTERNALS = 7500#

P-8845

Paddock

REVISIONS	BY	DATE
ADD 3/4x3/4x1/4 TEE & 1/4 FPT. ADD FACE PIPING & MEDIA TOTAL QTY. CHG UNDERDRAIN LS TO ACCOMODATE OVERSIZE HOS CHG. LOCATION OF EQUALIZER COUPS. RELOCATE MANHOLE & GAUGE PANEL TO AFFORD EASY ACCESS. ADD GRAVEL TO MEDIA. MOVE DRAIN TO AFFORD CLEARENCE, CHG. SIDE SHT. SHOW SAND RETAINERS	BH 5/6 BH 5/10 BH 4/13/83 AES 4/12/85	

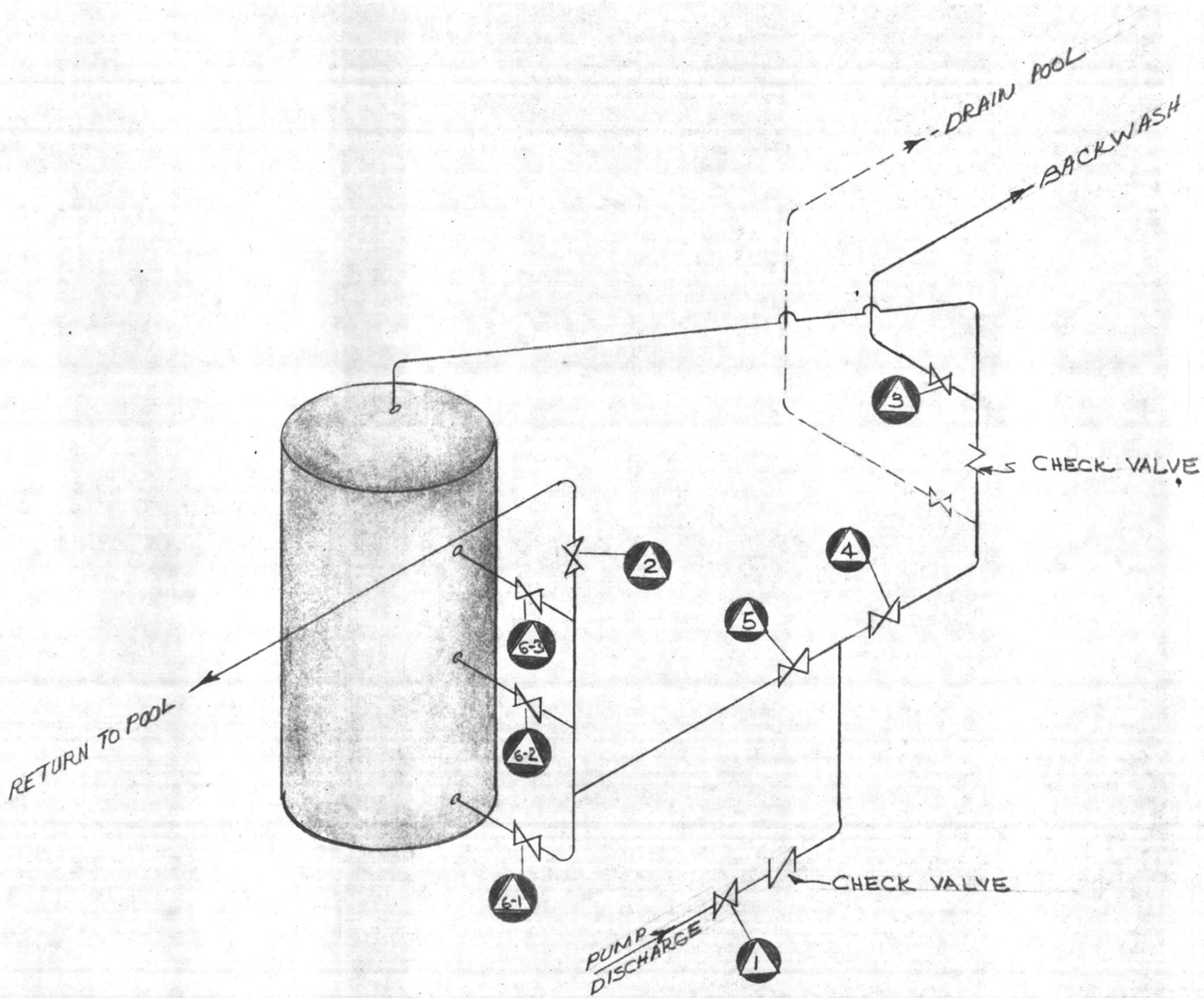
Paddock POOL EQUIPMENT CO. INC. P.O. BOX 511 - ROCK HILL, S.C.

96" DIA. (3) CELL VERTICELL

TYPICAL FILTER ASSY.
CAMP LEJEUNE

Drawn By: B...
Date: 3/20/83
Scale: 1/2"=1'-0"
Drawing No.: 2356-3

DATE	SYM	REVISION RECORD	DR.	CK.



LEGEND OF VALVE NUMBERS USED IN OPERATORS MANUAL

* 1 PUMP DISCHARGE

* 2 RETURN TO POOL

* 3 BACKWASH

* 4 FILTER INFLUENT

* 5 FILTER EFFLUENT

6-1 CELL 1 ISOLATION

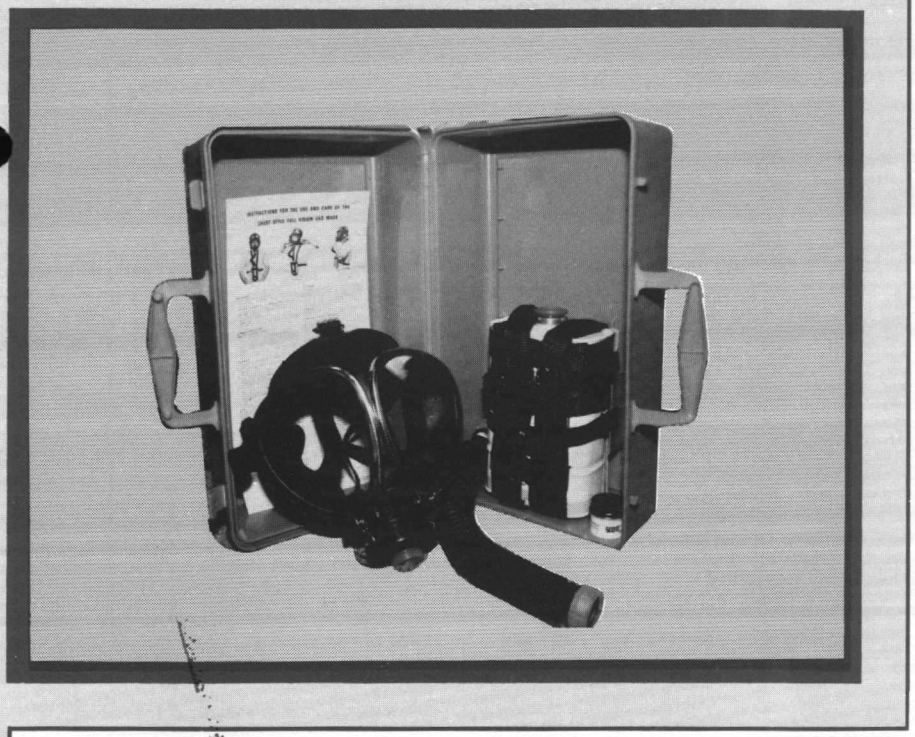
6-2 CELL 2 ISOLATION

6-3 CELL 3 ISOLATION

* NOT SUPPLIED BY P.P.E.C.

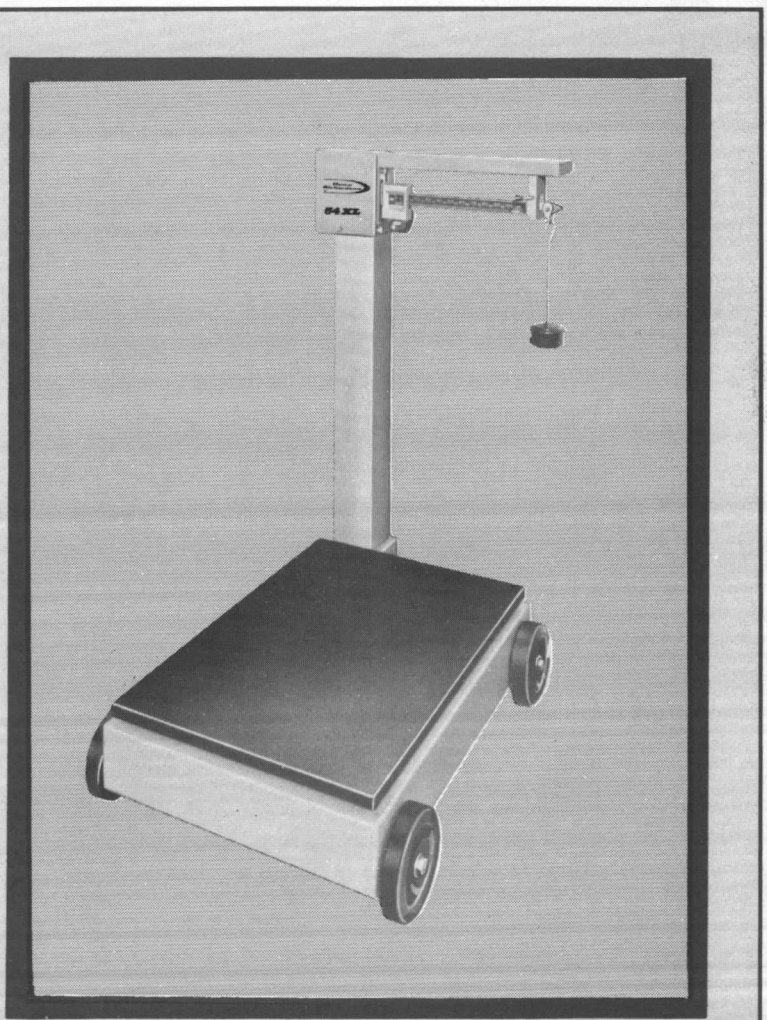
TOLERANCES (EXCEPT AS NOTED)	ISOMETRIC PIPING DIAGRAM		
DECIMAL ±		SCALE NONE	DRAWN BY / APPROVED BY
FRACTIONAL ±	TITLE CAMP LEJEUNE		
ANGULAR ±	DATE 26 JULY 83	DRAWING NUMBER 2356-8A	

CHLORINATOR ACCESSORIES



GAS MASK: 2499

Paddock's Gas Mask is approved by the Bureau of Mines. It is canister style and is supplied with a twin eye lense face piece. The flexible tube connecting the face piece to the canister permits easy movement of the head. A nylon strap holder is supplied for the canister. The complete mask is packed in a orange plastic case.

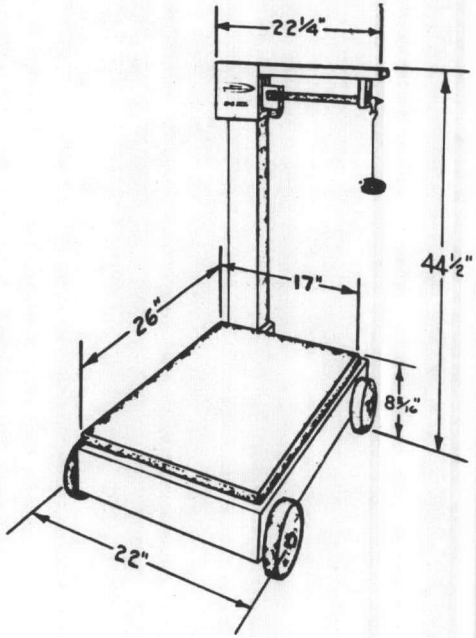


PLATFORM SCALE: 2480

The Paddock heavy duty Platform Scale with corrosion resistant dye cast beam permits easy checking of the amount of chlorine gas remaining in the cylinder. Graduations stand out against darker background made even more error-free by a center indicating poise with non-removable set screw. The Platform Scale can be supplied with or without 5" diameter wheels.

Paddock

POOL EQUIPMENT COMPANY, Inc.
555 Paddock Parkway, Rock Hill, S.C. 29730



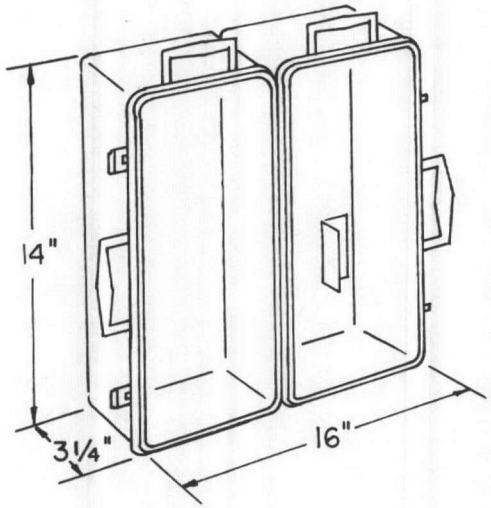
SPECIFICATIONS:
Platform Scale:
There shall be supplied one heavy duty portable beam type platform scale. Platform shall lift for maintenance accessibility. Platform shall overhang base openings to prevent dust and dirt from falling into level system. Platform shall be supported by four ball bearing pivots. The inside frame shall be cast iron. The load bearings shall be self aligning. There shall be a center indicating poise with non-removable set screw. The scale shall (shall not) be supplied with 5" diameter wheels. Paddock No. 2480 or equal.

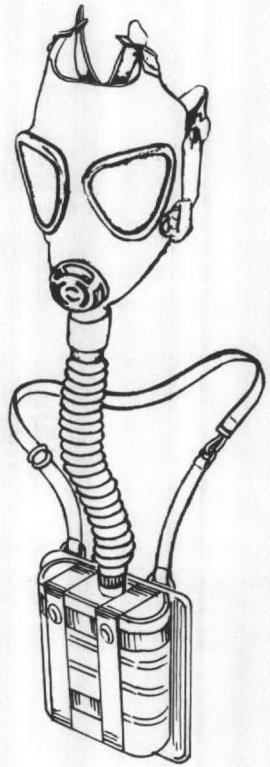
NO.	DESCRIP.	DATE
REVISIONS		

Paddock
POOL EQUIPMENT CO. INC.
Rock Hill, South Carolina 29730

PLATFORM SCALE

SCALE NONE
DATE MAY, 1981
CAT. NO. 2480
DWG. NO. B-229





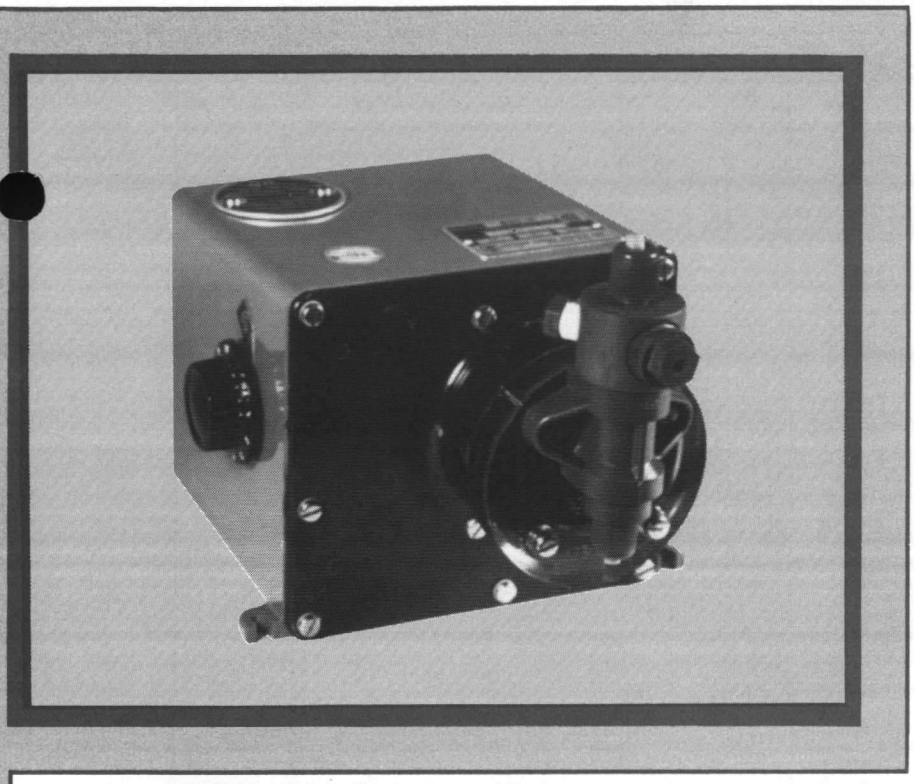
SPECIFICATIONS:
Gas Mask:
There shall be supplied one Bureau of Mines approved canister type, chest style, gas mask. The face piece shall be twin-eye lense style connected to the canister with a 10" flexible breathing tube assembly. The face piece and connecting hoses shall be black. A nylon strap holder shall be supplied for the canister. The canister holder shall also have a neck band which is readily adjustable for easy movement of the head. (The gas mask shall carry the Bureau of Mines approval no.14-F-77.) The gas mask shall be Paddock No. 2499.

NO.	DESCRIP.	DATE
REVISIONS		

Paddock
POOL EQUIPMENT CO. INC.
ROCK HILL, SOUTH CAROLINA 29730

GAS MASK

SCALE NONE
DATE MAY, 1981
CAT. NO. 2499
DWG. NO. A-229

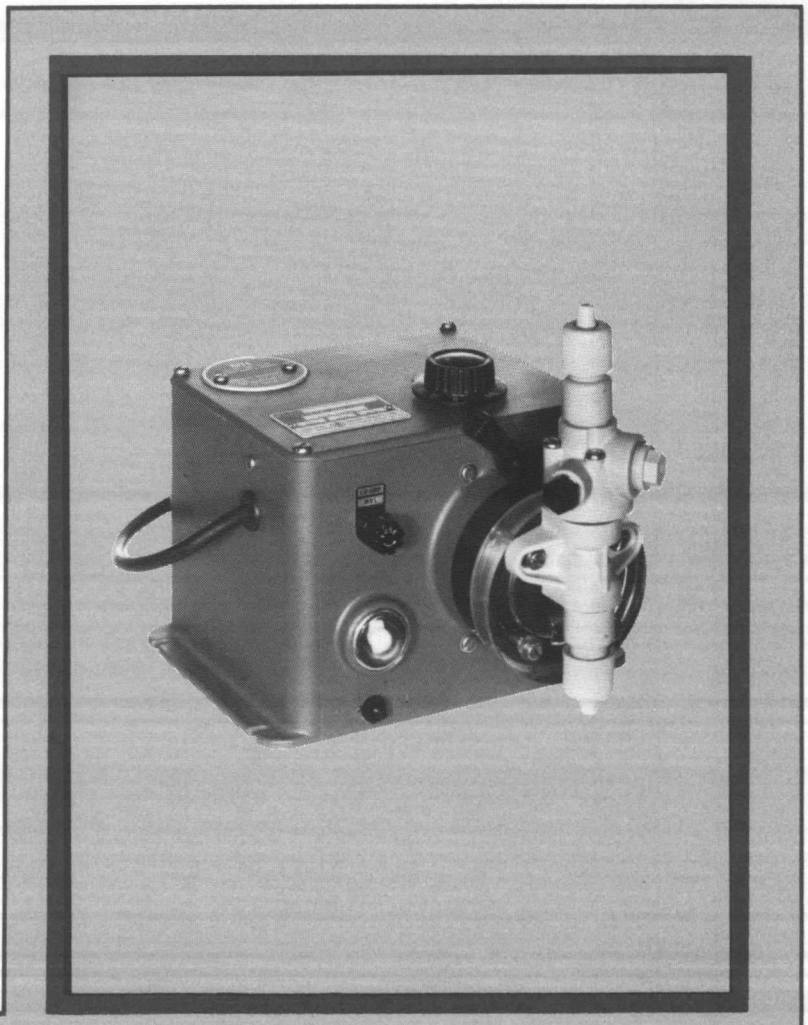


CHEMICAL FEEDERS

PADDOCK OF CALIFORNIA ®

HYPOCHLORINATOR 2516

Paddock Precision 8000 Series Chemical Pumps are designed and constructed to meet all of the ordinary output, pressure, control environmental of those applications without lost-adding options and control features. A newly developed "liquid piston" type cartridge valve makes priming easy. This new concept uses the chemical solution, itself, as a "piston" of zero leakage which conforms exactly to the cylinder wall. The compact size (less than one-half cubic foot) and light-weight make this unit extremely versatile, yet rugged.



HYPOCHLORINATOR 2519-2520

Paddock Precision 9000 Series Chemical Pumps are a positive displacement type which use a sealed piston. The liquid being pumped never contacts any of the metal in the pump assembly. The 9000 series consists of two types; the standard version has a maximum output of 2.5 GPH at 125 PSIG, the high speed version has a maximum output of 5 GPH at 60 PSIG.

Paddock

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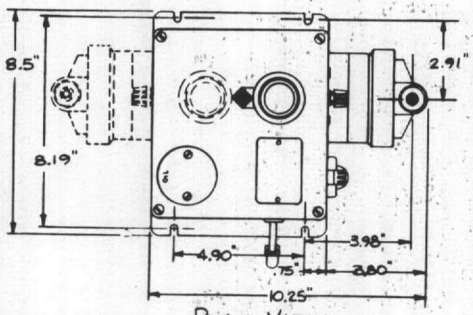
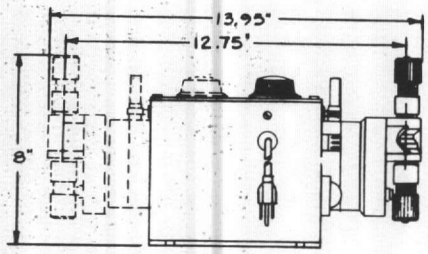
555 Paddock Parkway, Rock Hill, S.C. 29730



PLAN VIEW



SIDE VIEW

CAT. NO.	OUTPUT CAPACITY GPH MAX.	INJECTION PRESSURE PSI	DESCRIPTION MODEL	SHIPPING WEIGHT (APPROX.)	DIM. INCHES
2519	2.5	125	SIMPLEX ¾ ACRYLIC HEAD, HYPALON O-RINGS & HYPALON DIATON® DIAPHRAGM 9711-11	18 lbs.	W- 8½" D- 10" H- 7¼"
2520	5	60	SIMPLEX HIGH SPEED ¾ ACRYLIC HEAD, HYPALON O RINGS & HYPALON DIATON® DIAPHRAGM 9711-21	18 lbs.	W- 8½" D- 10" H- 7¼"

SPECIFICATIONS:

Chemical metering pump valves shall be of ball type with ceramic balls seating on double O-Ring type seats. Valve seats shall be renewable by replacing only the O-Rings. Pump head shall be of acrylic. Valve seats, fittings and connections at the pump shall be rigid PVC. Discharge and Suction valves shall be cartridge type, removable and changeable as a unit. Ten feet of polyethylene discharge tubing and six feet of vinyl suction tubing shall be provided complete with compression connections. A foot valve with strainer shall be provided for the suction line and injection check valve with 1/2" NPT male connection for the injection point. Injection check valve shall have dilating nozzle (flapper) to prevent plugging.

The motor and drive train shall be totally enclosed and immersed in oil.

It shall consist of a shaded pole 115 volt, 50/60 cycle (Hz.), 1.3 amp motor driving steel and bronze spur gears supported in aluminum framework. Final drive shall be a full complement roller bearing installed on an eccentric. No moving parts shall be exposed. The gear housing shall be equipped with a drain plug 1/4" NPT in size.

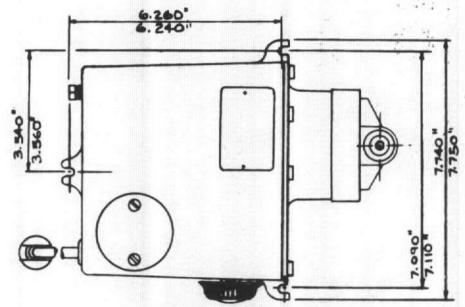
The Hypochlorinator shall be Paddock Catalog # 2519.

NO.	DESCRIP.	DATE
	REVISIONS	

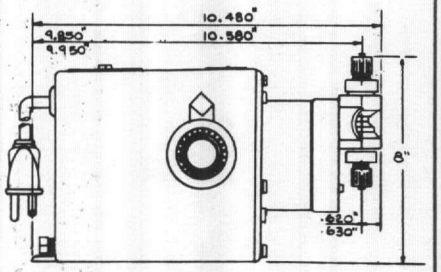
Paddock POOL EQUIPMENT CO. INC.
Rock Hill, South Carolina 29730

HYPOCHLORINATOR

SCALE NONE
DATE August, 1982
CAT. NO. 2519, 2520
DWG. NO. B-202



PLAN VIEW



SIDE VIEW

CAT. NO	OUTPUT CAPACITY GPH	INJECTION PRESSURE PSI	DESCRIPTION MODEL	SHIPPING WEIGHT (APPROX.)	DIM. INCHES
2516	.17-.83	100	SIMPLEX WITH ACRYLIC HEAD, ANTI-SIPHON VALVE, HYPALON O-RINGS 8311-11	17 lbs.	W- 8½" L- 7½" H- 8¼"

SPECIFICATIONS:

Chemical metering pump valves shall be of ball type, with ceramic balls seating on single O-Ring type seats. Valve seats shall be renewable by replacing only the O-Ring. Pump head shall be of acrylic. Valve seats, fittings and connections at the pump head shall be rigid PVC. Discharge and Suction valves shall be cartridge type, removable and changeable as a unit. Ten feet of polyethylene discharge tubing and six feet of vinyl suction tubing shall be provided per head complete with compression connections. A foot valve with strainer shall be provided for the suction line, and injection check valve with 1/2" NPT male connections for the injection point. Injection check valve shall have dilating nozzle (flapper) to prevent plugging.

The motor and drive train shall be totally enclosed and immersed in oil. It shall consist of a shaded pole 115 volt, 50/60 cycle (Hz.),

0.8-1.0 amp motor driving steel and bronze spur gears supported in aluminum framework. Final drive shall be a full complement roller bearing installed on an eccentric. Stroking rate shall be 36 strokes per minute. No moving parts shall be exposed. The gear housing shall be equipped with a drain plug 1/4" NPT in size.

The Hypochlorinator shall be Paddock Catalog # 2516.

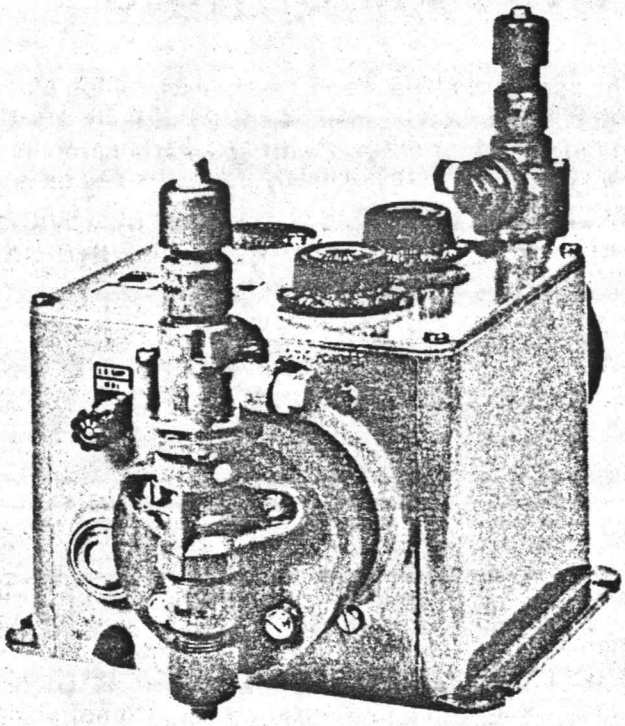
NO.	DESCRIP.	DATE
	REVISIONS	

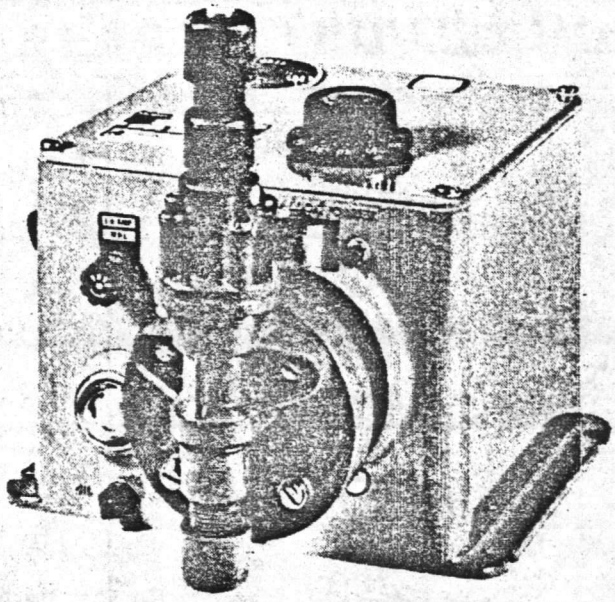
Paddock POOL EQUIPMENT CO. INC.
Rock Hill, South Carolina 29730

HYPOCHLORINATOR

SCALE NONE
DATE August, 1982
CAT. NO. 2516
DWG. NO. B-201

4701-6
2/81
Cancels 4701-6
11/78





AMF

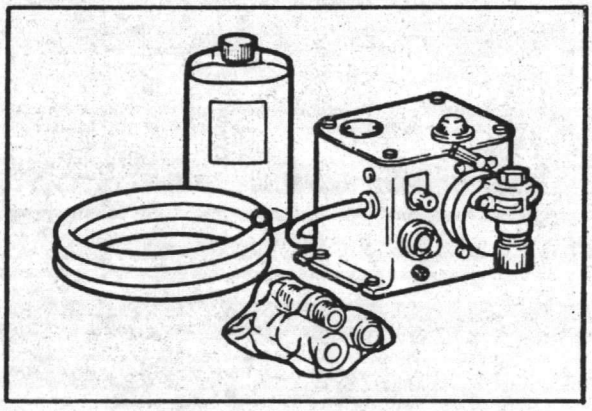
Cuno

Precision Control Products 9000 Series Instructions

Pump Model _____

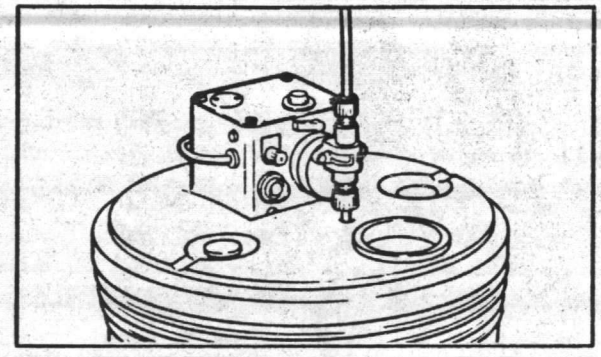
INSTRUCTIONS FOR 9000 SERIES

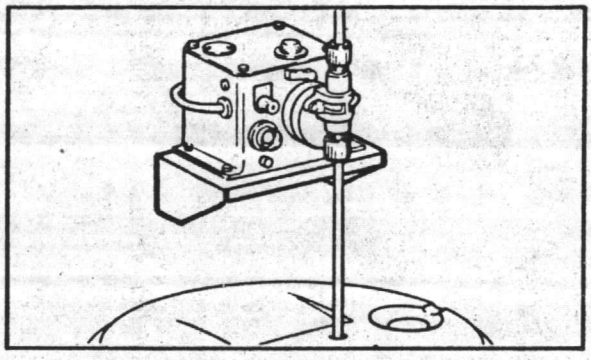
A. UNPACKING



1. The chemical pump, Valve Assemblies, tubing and Oil are shipped in one box. Inspect carton. If there are signs of rough handling, check **Pump** and **Parts** carefully. Notify delivering carrier immediately if there is any damage.
2. **MAKE SURE ALL ITEMS HAVE BEEN REMOVED FROM SHIPPING CARTON BEFORE THROWING CARTON AWAY.**

B. MOUNTING

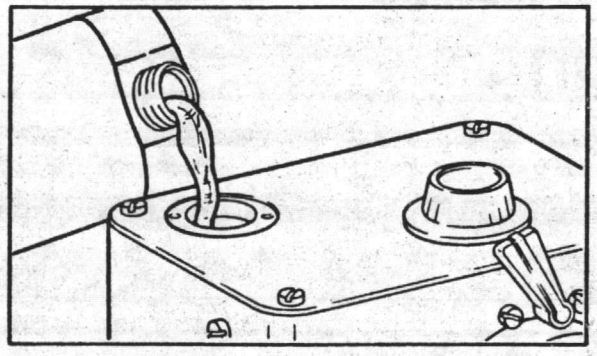




1. The chemical pump should be located in an area that allows convenient connections to both chemical tank and chemical injection point. Avoid locations that may be subjected to high temperatures (over 110°F, 43°C), high humidity, direct sunlight, rain, snow, etc. Do not place in an area which may be sprayed with water or chemical.
2. When mounting chemical pump on molded fiberglas cover Precision P/N 1350, refer to drawing at left. Insert suction tubing through center hole and cut tubing so foot valve hangs about one inch (25mm) above bottom of tank. It is not necessary to bolt down chemical pump because it cannot slide away from tank cover.
3. When using Precision's Mounting Bracket P/N 260028 install pump as shown in drawing. Dimensional layout is included with mounting bracket. Tubing should be long enough so that the foot valve hangs about one inch (25mm) above bottom of chemical tank. To keep chemical from contamination, the tank should have a cover.

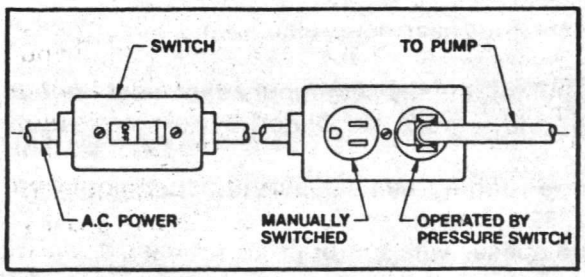
IMPORTANT — Pressure relief must be included on any fluid handling system where a positive displacement pump is installed. Over pressurizing, in excess of system design pressure, can cause leaks, fractures and/or some form of permanent damage. These conditions may expose personnel to hazardous chemical spraying or leaking from the pump and/or piping.

C. LUBRICATION



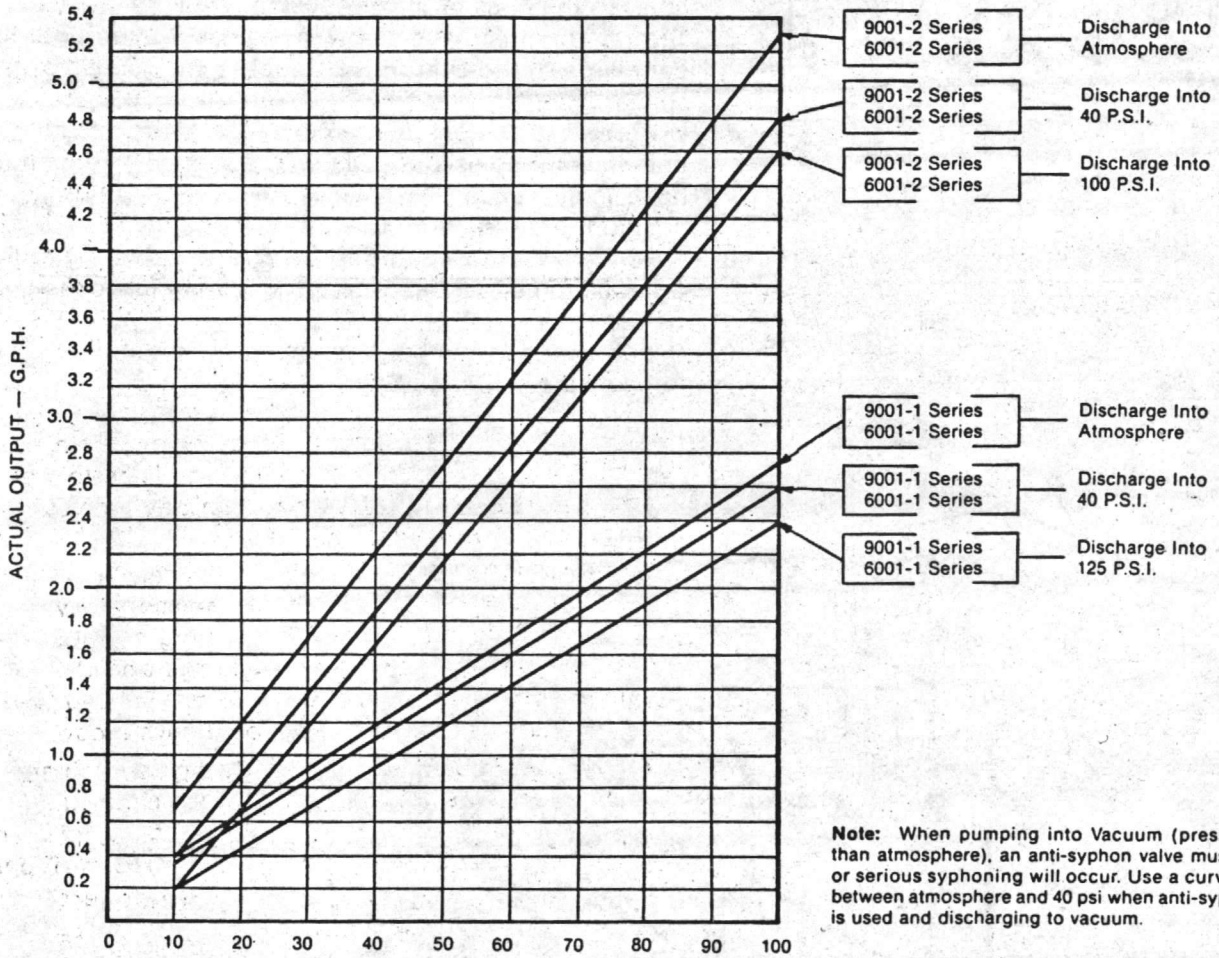
1. To lubricate the pump remove the 224 oil cover plate located on top of the pump and pour oil into the pump housing, refer to drawing at left.
   THIS OIL SHOULD BE CHANGED ONLY EVERY SIX MONTHS, OR 2000 OPERATING HOURS.
2. The oil may be drained by removing the 1/4" NPT Drain Plug, Part No. 909 located at the front of pump. If the pump is easily removed after installation, it is easier to drain the oil by removing the 224 oil cover plate and pouring the oil out. If the pump is bolted or screwed in place, install a short length of 1/4" pipe and a petcock to make it easier to drain the oil.
3. 9000 Series pumps require one quart of lubricating oil, Precision Part No. 205. Substitutes are Shell Tellus 21 or Mobile Velocite No. 10.

D. ELECTRICAL



1. The unit should be wired to an electrical source which has specifications conforming to those marked on the pump serial number name plate.
2. Do no defeat the purpose of the ground wire by cutting off the ground prong.
3. Fuse is:
   1. 115 VAC: 1.0 amp. Type MDL or 1.0 amp 3AG Slo-Blo. Part No. 1589
   2. 230 VAC: 0.5 amp. Type MDL or 0.5 amp 3AG Slo-Blo. Part No. 1699

E. OUTPUT ADJUSTMENT

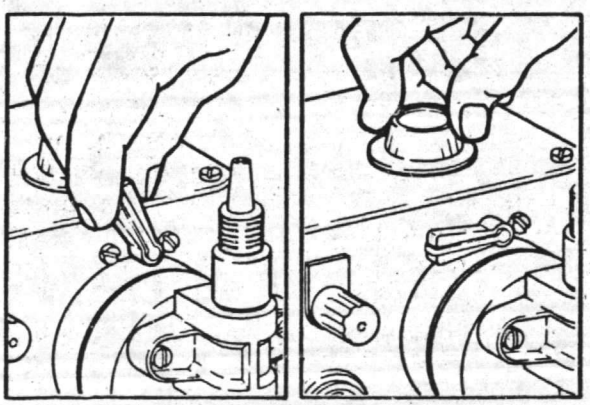


Note: When pumping into Vacuum (pressures less than atmosphere), an anti-syphon valve must be used or serious syphoning will occur. Use a curve halfway between atmosphere and 40 psi when anti-syphon valve is used and discharging to vacuum.

TYPICAL CALIBRATION CURVE

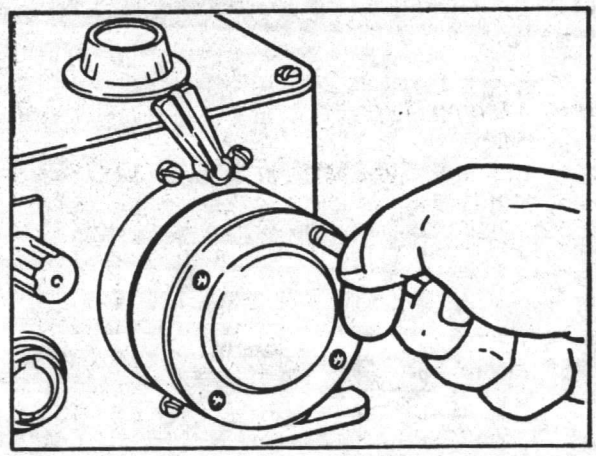
9001-1 / 6001-1 Series & 9001-2 / 6001-2 Series Pumps

F.



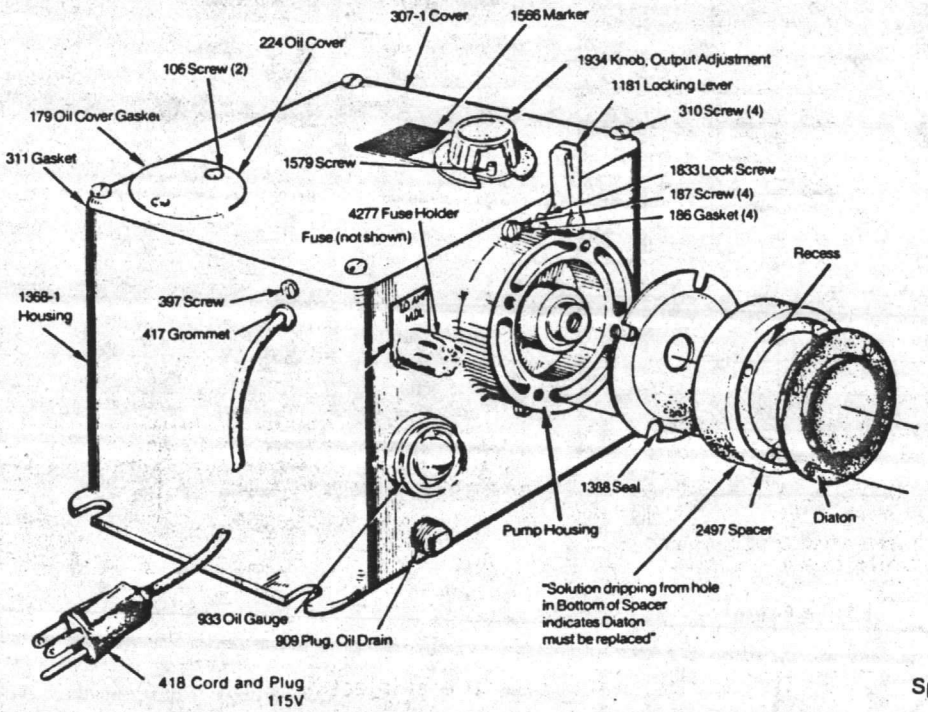
1. Determine pressure at injection point.
2. From output graph set dial knob corresponding to approximate output desired.
3. Fill a large graduate (1 liter or 1000cc) or measuring cup (32 oz.) with chemical being pumped.
4. Place suction tubing in graduate or cup and start pump.
5. Determine amount of chemical pumped out of graduate or cup for 3 minutes.
6. Divide 3 minutes into 60.
7. Multiply result by amount of chemical pumped in three minutes. The result is amount of chemical pumped per hour.

G. CHANGING THE DIATON®



NOTE: See drawing below for correct installation sequence of parts.

1. Switch pump OFF. Release pressure in pumping line. Disconnect suction and discharge tubing from cartridge valve.
2. Unscrew the four head screws and remove head and cartridge valve assembly.
3. With the pump running, set output adjustment knob at 50 (i.e. 50%) and remove old Diaton by turning it counterclockwise.
4. With pump running be sure output adjustment knob is locked at 50% setting.
5. Install the spacer with the drain hole facing down with the 1388 seal between the spacer and the boss of the pump housing. Make certain that the slots of the 1388 seal are aligned with holes in the spacer and the tapped holes in the boss of pump housing.
6. Turn on the pump and screw in the new Diaton until the back side of the Diaton just touches the recess of the spacer.
7. Unscrew the Diaton counterclockwise 1/4 to 1/2 full turn until the four holes in the Diaton are aligned with the four holes in the spacer. This places the Diaton in an optimum position for long lift and best accuracy.
8. Re-install pump head and cartridge valve assembly, tightening the four head mounting screws in a criss-cross pattern.
9. Retighten these four head mounting screws after two days to take care of Diaton Set.



Fuses

Part 1589 (Simplex and Duplex 115V)

Part 1699 (Simplex and Duplex 230V)

Specifications subject to change without notice

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AMF Cuno

Precision Control Products

400 Research Parkway, Meriden, Conn. 06450

(203) 237-5541 Telex: 96-2457 Cable: AMMAFOCO, Meriden

4700-71
2-81
Cancels 4700-71
10-80

CODE 71
LIQUID HANDLING ASSEMBLY
8000, 9000, 11000, 12000 and 13000 Series

MATERIAL:

Fittings	PVC
Valve Seat O-Rings	Hypalon
Seal Rings	Viton
Balls	Ceramic
Head	Plexiglas, Acrylic
Diaton	Hypalon

CONNECTIONS:

Suction	½" OD Tubing
Discharge	½" OD Tubing

SPARE PARTS KIT:
500-71

CAUTION:
When pumping any dangerous chemical make certain that all tubing and/or pipe is securely attached to the fittings, and that no lines are closed or blocked. It is recommended that tubing or pipe lines be shielded to prevent possible injury in case of rupture or accidental damage. Always wear protective clothing when working on or near the pump.

A. INJECTION INSTALLATION:

1. Location of the injection point is important.
   (a) If the water line at the injection point has a positive pressure, the injection point may be above or below the solution level in the chemical supply tank.
   (b) If the pressure at the injection point is negative or atmospheric pressure, an anti-syphon valve must be used. Part No. 300-483P anti-syphon valve is included.
2. If injection check valve is included, install in the line into which chemical is to be injected. This prevents backflow from **treated line** into the chemical pump.
   (a) Install pipe tee which has ½" outlet. Tee should be schedule 120 PVC material if the chemical solution being pumped is corrosive to metals.
   (b) To insure correct seating of valves, injection check valve should be installed upward in direction of arrows on valve.
   (c) Systems with pipe lines larger than ½" should use the No. 992, ¾" NPT Corporation Stop.

B. ATTACHING THE DISCHARGE TUBING:

(If included)
Note: The discharge tubing is the stiff translucent polyethylene tubing 10 ft. (3 meters) long.

1. Cut discharge tubing to required length and route from injection check valve to chemical pump. Do not let tubing touch hot surface or bend sharply. Maximum vertical rise should not exceed the following:

Pump Model Series	Maximum Vertical Rise*
8000	183 ft. (56m)
9000	229 ft. (70m)
11000	82 ft. (25m)
12000	146 ft. (45m)
13000-HO	164 ft. (50m)
13000	229 ft. (70m)

*Chem. wgt. = 10.5 lb/gal. (1.25 gm/cc).

2. Slide coupling nut onto tubing.
3. Gently push discharge tubing over tapered end of discharge valve assembly so that it flares out. (If tubing is stiff from cold, dip end in hot water.)
4. Make sure tubing is forced onto fitting cone (tapered end) all the way to shoulder of the threads.
5. Push down on the coupling nut and turn until the threads are engaged. Tighten by hand until the tubing is held securely in place. **Caution:** Undue force will fracture the plastic fittings. **DO NOT USE PIPE WRENCH.**
6. Following same procedure, connect discharge tubing to injection check valve (if included).

C. ATTACHING THE SUCTION TUBING:

(If included)
Note: The suction tubing is the soft transparent vinyl tubing 6 ft. (1.8 meters) long.

1. Cut the suction tubing to the length required. The foot valve (if included) should hang approximately 2" (5 cm) to 3" (7.6 cm) above the bottom of the chemical tank. Maximum recommended vertical suction lift 5 ft. (1.5 meters).
2. Following the same procedure as discharge tubing (See B) connect suction tubing to suction valve.
3. Connect the other end of the suction tubing to the foot valve and drop foot valve into the chemical tank.

D. PRIMING:

1. The chemical pump is pre-primed with water for your convenience. Set pump at maximum output and start pump. If chemical to be pumped cannot be mixed with water, loosen the four head screws and drain water out.
2. Loosen 535 986-P Plug to prevent pressure build-up in pump head. Set pump at maximum output and start pump. **Caution:** Switch off pump as soon as suction tubing is filled with chemical.
3. Tighten 535 986-P Plug to prevent squirting of chemical around plug. Set pump at desired output rate.

E. CLEANING HEAD AND VALVES: (Refer to exploded view on other side).

NOTE: IF VALVES ARE DIRTY OR NOT ASSEMBLED EXACTLY AS SHOWN IN EXPLODED VIEW, THE PUMP WILL NOT OPERATE.

1. Switch-off chemical pump. Release pressure from discharge line. Remove discharge and suction lines from pump. Plug discharge line so chemical will not drain back.
2. Unscrew discharge and suction valves from cartridge housing. Disassemble valves.
3. Clean valve balls, O-Rings, valve seats and head with detergent or soap solution.
4. **Inspect O-Rings, balls and valve seats for pits or imperfections. O-Rings and balls must be perfectly smooth. If not, they must be replaced. Spare Parts Kit 500-71.**
5. Assemble valves exactly as shown in exploded view.

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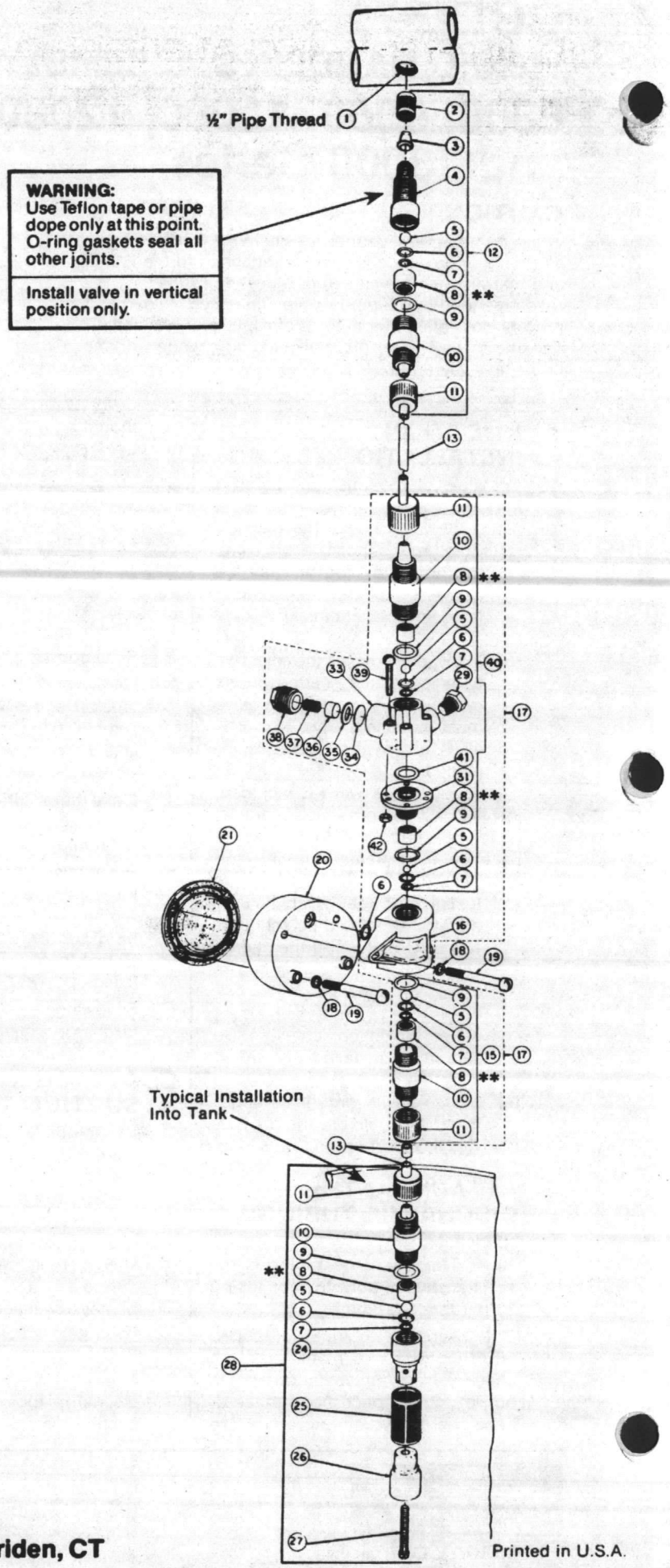
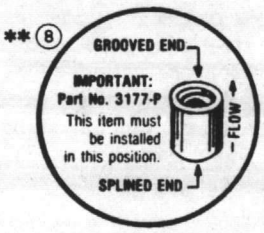
Precision Control Products
400 Research Parkway, Meriden, Conn. 06450
(203) 237-5541 Telex: 96-2457 Cable: AMMAFOCO, Meriden



Key No.	Part No.	Description	Quantity
1		Injection Point	1
2	2399	Coupling Nut	1
3	3329*	Flapper	1
4	535 944-P	Injector Fitting	1
5	1058*	Valve Ball	5
6	1061*	O-Ring	6
7	1060*	O-Ring	5
8	3177-P	O-Ring Seat	5
9	3388*	O-Ring	5
10	532 882-P	Housing Valve, Single	4
11	211-P	Coupling Nut	4
12	290 250-P	Injection Check Valve Assembly	1
13	242	Tubing, Polyethylene	10 ft. (3 meters)
15	292 711-P	Suction Valve Assembly	1
16	3312-P	Cartridge Valve Housing	1
17	300 519-P	Cartridge Valve Assembly	1
18	118	Washer	4
19	3376	Screw, Pan Head, ss	4
20	552 736	Head	1
21	2-A	Diaton	1
23	241	Tubing, Vinyl	6 ft. (1.8 meters)
24	2471-2P	Valve Seat	1
25	2472	Screen, Filter	1
26	2473	Retainer, Screen	1
27	2474*	Screw, 12-24 x 1½" Polypropylene	1
28	297 729-P	Foot Valve Assembly	1
29	535 986-P	Plug	1
31	535 957-P	Adapter Housing	1
33	532 918-P	Body, Valve	1
34	750*	Diaphragm	1
35	3119*	Washer	1
36	236*	Spring Cap	1
37	235*	Spring	1
38	535 973-P	Plug	1
39	177	Screw	4
40	300 483-P	Anti-Syphon Valve Assembly	1
41	1691*	O-Ring	1
42	290	Nut	4

* Parts included in Spare Parts Kit 500-71



Specifications subject to change without notice.

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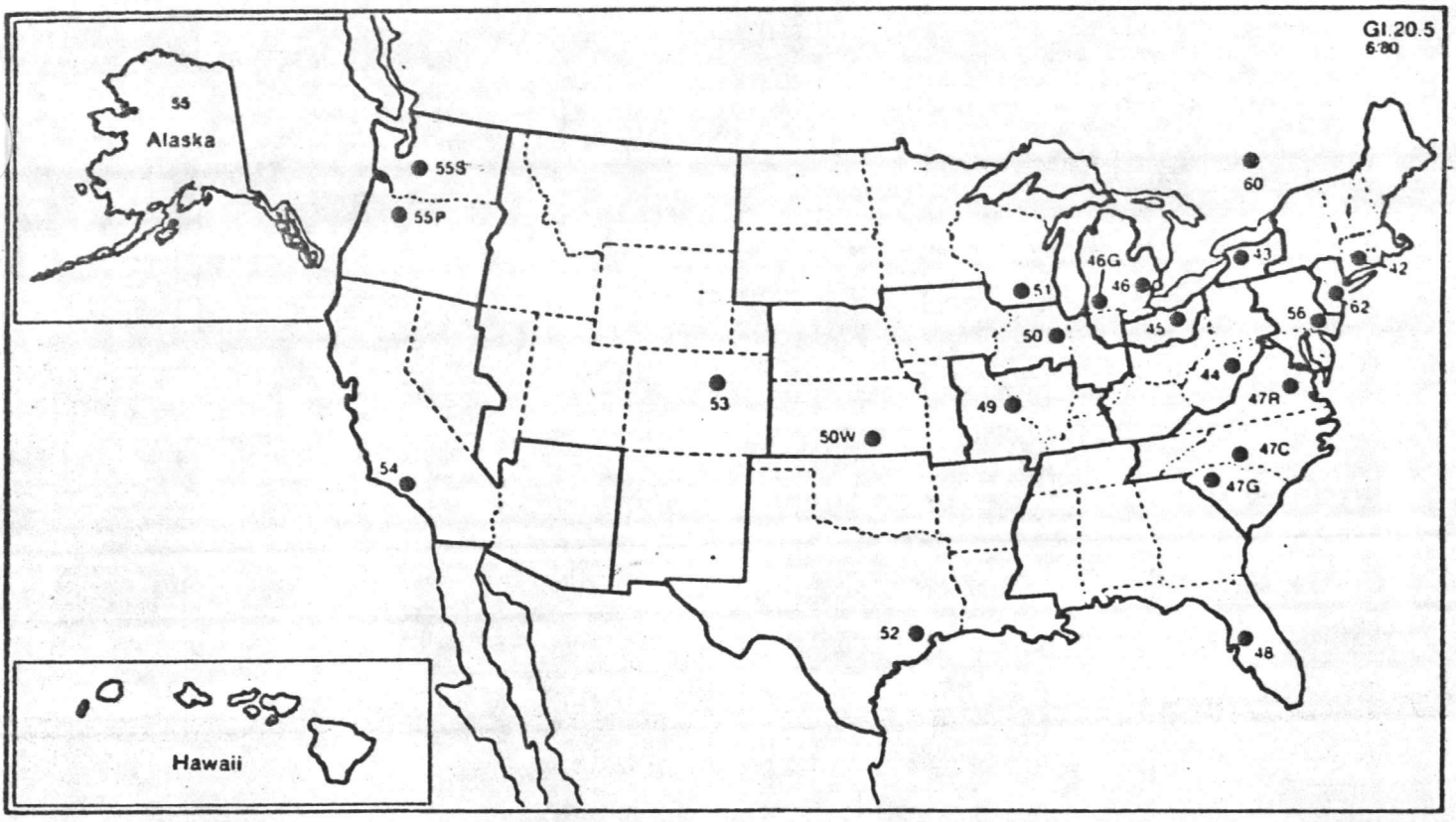

AMF CUNO/PRECISION STOCKING DISTRIBUTORS

42 • PUMP SERVICES CORPORATION
1861 Dixwell Ave
Hamden, CT 06514
203/288-5990
Tlx 96-3544

43 • KINEQUIP, INC.
3261 Sheridan Dr
Buffalo, NY 14226
716/835-6031
Tlx 91-6465

44 • PRECISION PUMP SERVICE CO.
PO Box 7027
Charleston, WV 25313
304/776-1710

45 • DORNBIRER PUMP COMPANY
23570 Miles Road
Cleveland, OH 44128
216/663-9600

46 • DETROIT PUMP & MANUFACTURING CO.
18943 John R Street
Detroit, MI 48203
313/893-4242
Tlx 23-0231

46G • DETROIT PUMP & MFG. CO.
190-39th St., SW
Grand Rapids, MI 49508
616/531-5630

47C • PNUCOR
300 Westinghouse Blvd
Charlotte, N C 28217
704/588-3333
Tlx 57-2464

47G • PNUCOR
200C N. Pleasantburg Dr
Greenville, S C 29607
803/235-1648
Tlx 57-0423

47R • PNUCOR
10910 S. Lake Ct. Suite G
Richmond, VA 23235
804/794-6806
Tlx 82-8306

48 • PRECISION CONTROL PRODUCTS SERVICE CO.
2211 No. 38th Street
Tampa, FL 33605
813/247-5122
Tlx 52-412

49 • RIMBACH and ASSOCIATES, INC.
3305 Jamieson Ave
St. Louis, MO 63139
314/645-9121

50 • STRANCO
P.O. Box 389
Bradley, IL 60915
815/932-8154

50W • STRANCO
1703 N. Sabin
Wichita, KS 67212
316/943-4482

51 • PRECISION CONTROL PRODUCTS SERVICE CO.
906 Jonathan Dr.
Madison, WI 53713
608/231-2981

52 • FERGUSON SERVICE SYSTEMS, INC.
P O Box 1399
Conroe, TX 77301
713/756-0037
713/353-8518 (Houston)
Tlx 77-4147

53 • DEWCO WATER EQUIPMENT, INC.
P O Box 441
Wheatridge, CO 80033
303/232-6861

54 • BURT COURT ASSOCIATES
1120 W. 9th Street
P O Box 967
Upland, CA 91786
714/985-7271
Tlx 67-0342

PRECISION CHEMICAL PUMP SERVICE INC.
(Parts & Service Only)
1120 W. 9th Street
P O Box 967
Upland, CA 91786
714/982-9816

55P • MARVIN CO
5691 S E International Way
Suite G
Portland, OR 97222
503/653-5920
Tlx 15-1345

55S • MARVIN CO.
PO Box 9347
Seattle, WA 98109
206/284-0331
Tlx 32-0230

56 • WACO ASSOCIATES INC.
P O Box B
Lafayette Hill, PA 19444
215/825-3300
Tlx 84-6436

62 • PUMP SALES & SERVICE, INC.
107 Wade Ave
S. Plainfield, NJ 07080
201/754-2050

60 • F. E. MYERS (CANADA) LTD/LTEE
269 Trillium Dr
Box 38
Kitchener, Ontario N2G3W9
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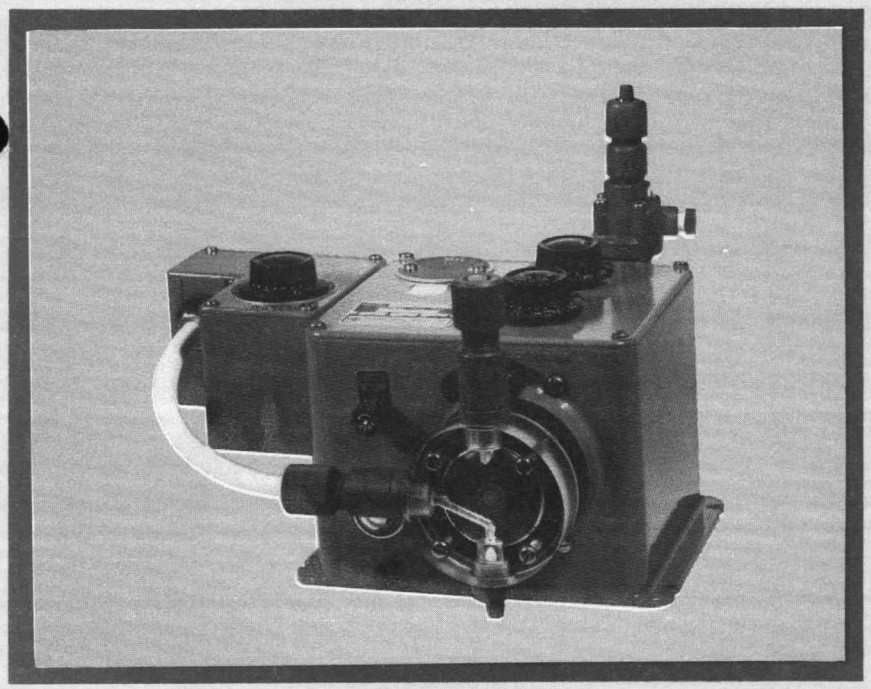
AMF Cuno Precision Control Products

400 Research Parkway, Meriden, CT 06450



CHEMICAL FEEDERS

PADDOCK ® OF CALIFORNIA

SLURRY FEEDER 2530-2532

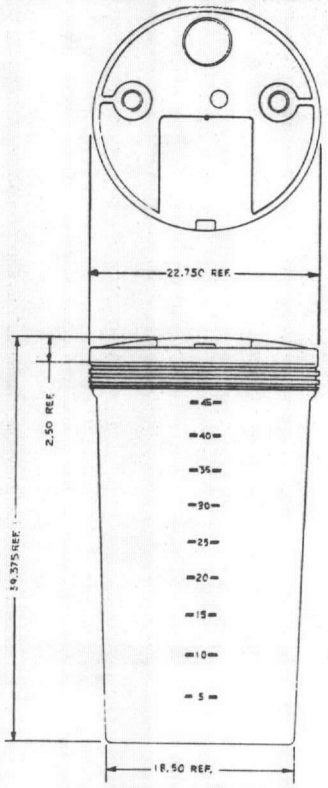
The Paddock Precision Slurry Feeders are of the positive displacement type with sealed piston diaphragm type pumps. Adjustments are made easy by a dial knob on top of the unit. The feeder is equipped with a device for automatically flushing the valves and diaphragm chamber. Injection point assembly shall contain a check valve to permit complete withdrawal of the injection assembly while the line is under pressure.

TANK WITH AGITATOR 2540 AND 2541

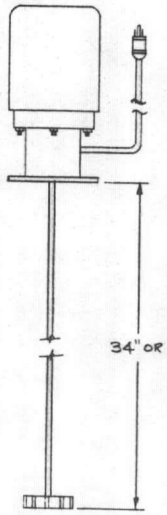
Paddock Precision Tank and Agitator Systems are designed to do the job. The 30 gallon tank with a 19" long agitator or the 50 gallon tank with a 34" long agitator provide gentle agitation to maintain solution consistency. Both tanks are translucent which makes it easy to see liquid levels in the tank. Tanks are supplied with covers with recesses for the mounting and installation of chemical pump. Both tanks have marked 5 gallon graduations on the tank to aid in solution measurement and preparation. All agitators are equipped with stainless steel shafts and are available with either stainless steel or neoprene impellors. The latter is used for slurry feeding applications only.

Paddock

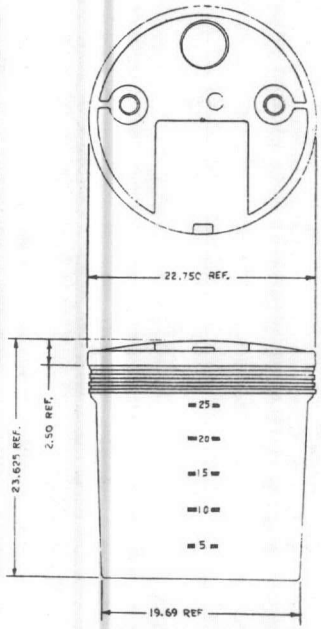
POOL EQUIPMENT COMPANY, Inc.
555 Paddock Parkway, Rock Hill, S.C. 29730



50 GAL. TANK



AGITATOR



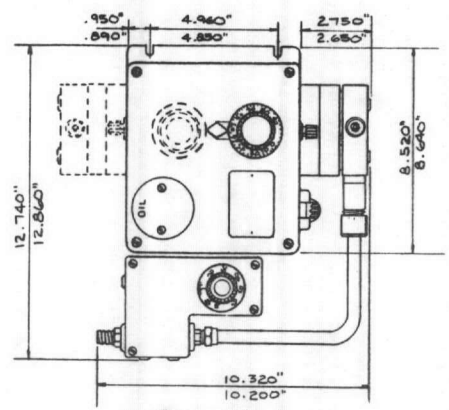
30 GAL TANK

CAT. NO.	TANK CAP	AGITATOR SHAFT LENGTH	MODEL NO.
2540	30 GAL.	19"	370 - 2
2541	50 GAL.	34"	475 - 2

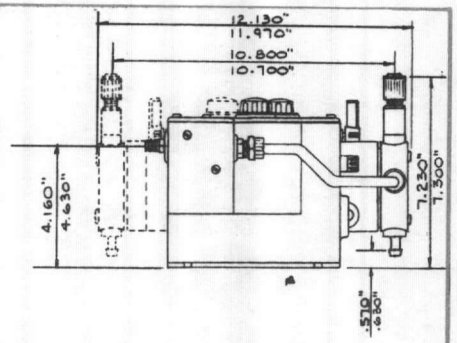
SPECIFICATIONS:

The Paddock Precision 50 gallon and 30 gallon tanks are constructed of polyethylene with a molded fiberglass covers with recesses for mounting pumps. There shall be three (3) cap plugs. One for the agitator and the other two for feed influent and effluent lines. There shall be supplied a 1/20 HP agitator, 115 volt AC (230 volt AC), 1.5 amp 60 Hz. Agitator shall have a stainless steel shaft 34" or 19" long with either a neoprene impellor or a stainless steel. Tank and agitator shall be Paddock No. 2541.

NO.	DESCRIP. REVISIONS	DATE	Paddock POOL EQUIPMENT CO. INC. ROCK HILL, S.C.	SCALE NONE
				DATE JAN. 1979
			TANK WITH AGITATOR	CAT. NO. 2540, 2541
				DWG. NO. A-229



PLAN VIEW



SIDE VIEW

CAT. NO.	OUTPUT CAPACITY MAX GPH	INJECTION PRESSURE PSI	DESCRIPTION	MODEL	SHIPPING WEIGHT (APPROX.)	DIM. INCHES
2530	2.5	60	SIMPLEX ACRYLIC HEAD, CERAMIC VALVE BALL, HYPALON O'RING HYPALON DIATON-AUTO-FLUSH	6401-11F	21 lbs	L- 10" W- 12½" H- 7¼"
2531	5	60	SAME AS ABOVE ONLY HIGH SPEED	6401-21F	21 lbs	SAME AS ABOVE
2532	10	50	SAME AS ABOVE ONLY DUAL HEAD	6402-21DF	24 lbs	L-12¾" W.-12½" H- 7¼"

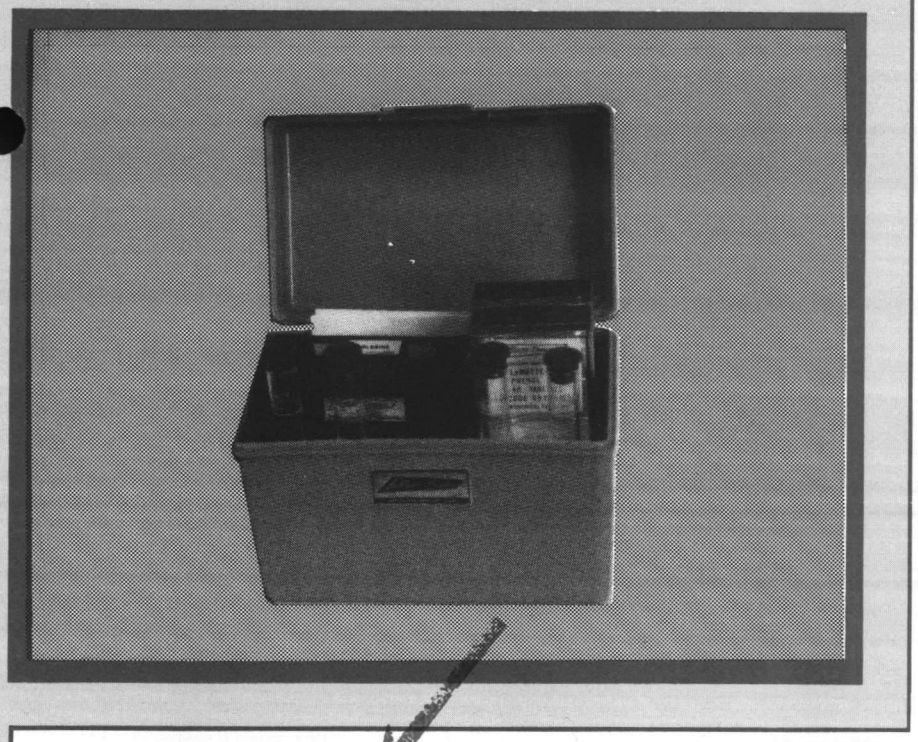
SPECIFICATIONS:

The Slurry Feeder shall be sealed piston diaphragm type pump enclosed in a metal housing. The motor and drive train shall be totally enclosed and immersed in oil. The chemical feeder head assembly shall be of acrylic with ceramic valve balls, hypalon "O" Rings. Motor shall be of a shaded pole 115 volt, 50/60 cycle (Hz.) A.C., 1.3 amp driving steel and bronze spur gears supported in an aluminum frame work. Final drive shall be a full complement roller bearings installed on an eccentric. Housing contains sightglass to check oil level and shall have a drain plug 1/4" NPT in size. All exposed screws shall be stainless steel. Slurry Feeder valves shall be of ceramic balls seated on double "O" Ring type seats.

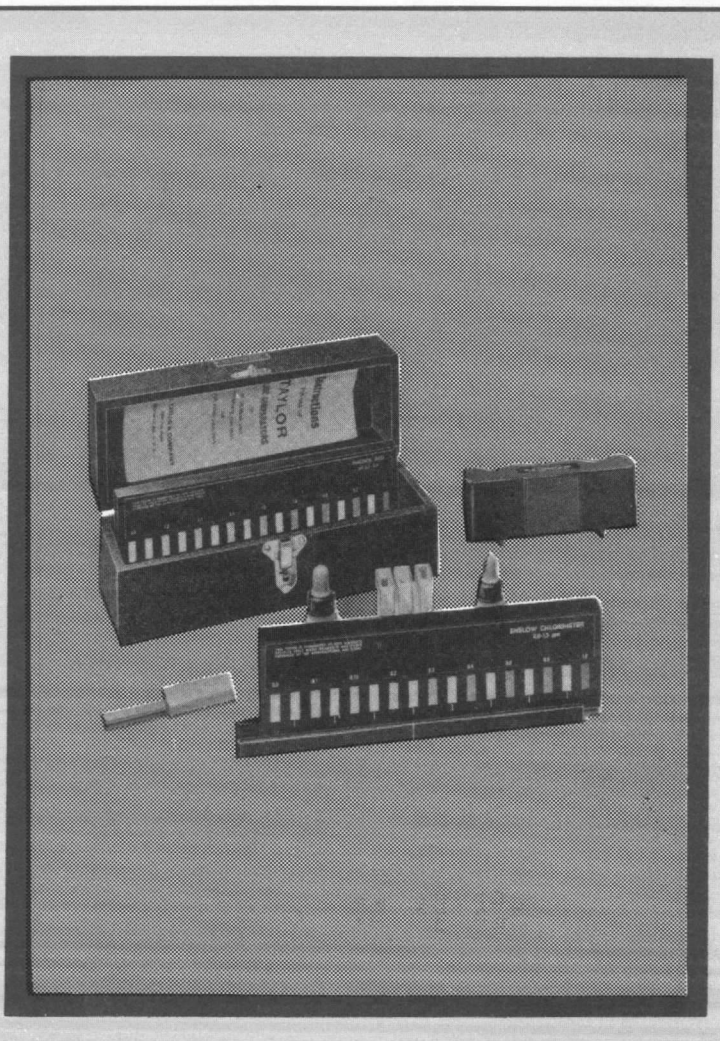
The Feeder shall be Paddock Catalog Number _____.

NO.	DESCRIP. REVISIONS	DATE	Paddock POOL EQUIPMENT CO. INC. Rock Hill, South Carolina 29730	SCALE NONE
				DATE JAN. 1979
			SLURRY FEEDER	CAT. NO. 2530,31,32
				DWG. NO. A-229

TESTING EQUIPMENT



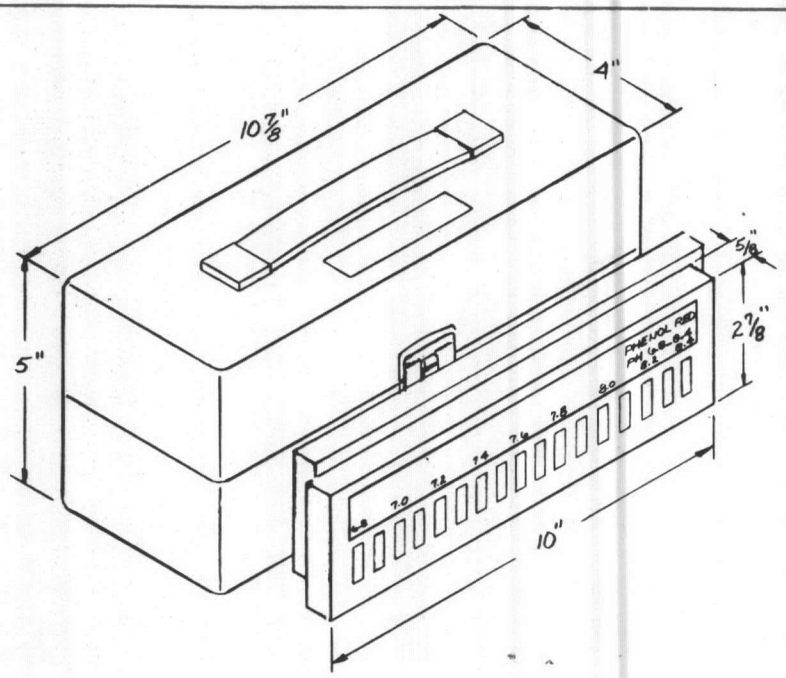
CHLORINE & pH TEST KIT 2814
Paddock's Chlorine and pH Test Kit Model LP-3 is a comparator type kit designed to provide tests for free chlorine, total chlorine residual and pH. Two comparators are furnished so that closer readings can be made.



COMMERCIAL TEST KIT: 2813
Paddock's Commercial Test Kit is a slide comparator designed to provide accurate, easy to operate testing equipment essential to proper control of pool chemicals. The Paddock Commercial Test Kit automatically compensates for off color or turbidity in the treated sample, permitting accurate comparison with the guaranteed permanent color standards in the slide. The base, sample cells, test solutions, slide comparator and slides all fit compactly into an impact resistant carrying case.

Paddock

POOL EQUIPMENT COMPANY, Inc.
555 Paddock Parkway, Rock Hill, S.C. 29730

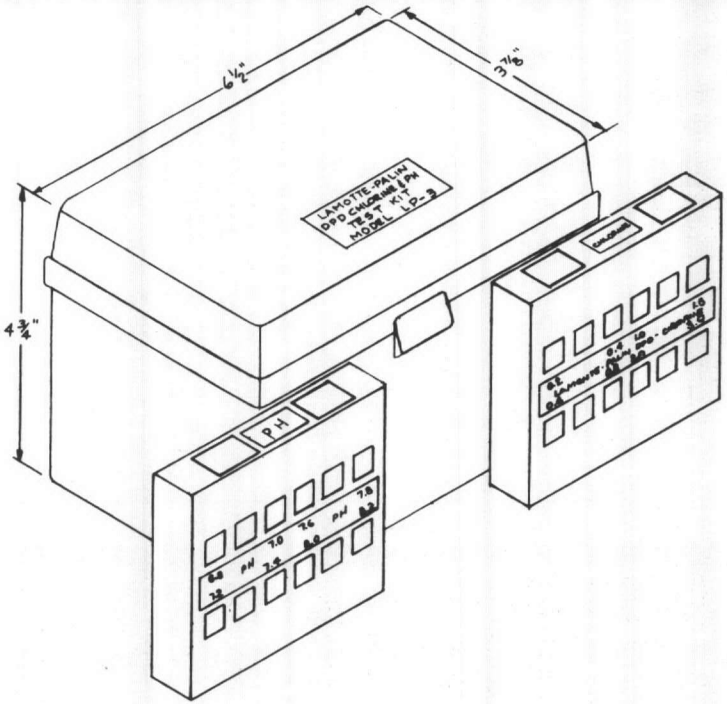


SPECIFICATIONS:

Commercial Test Kit:

There shall be supplied one slide comparator for testing ph and chlorine residuals. The slide comparator shall consist of a slide for ph (6.8, 7.0, 7.2, 7.4, 7.6, 7.8, 8.0, 8.2, 8.4) and a slide for chlorine (0.0, 0.1, 0.15, 0.2, 0.3, 0.4, 0.6, 0.8, 1.0 ppm), a base with protective top, three test cells and an impact resistent case. The test kit shall be supplied with a 2 oz. bottle of phenol red indicator for testing ph and a 2 oz. bottle of orthotolidine. The test kit shall include N/10 thiosulfate for use in testing for ph in waters with high chlorine or bromine residuals. The slide comparator shall be Paddock No. 2813 or equal.

NO.	DESCRIP.	DATE	Paddock POOL EQUIPMENT CO. INC. ROCK HILL, S.C.	SCALE NONE
	REVISIONS		COMMERCIAL TEST KIT	DATE JUNE, 1982
				CAT. NO. 2813
				DWG. NO. B-203

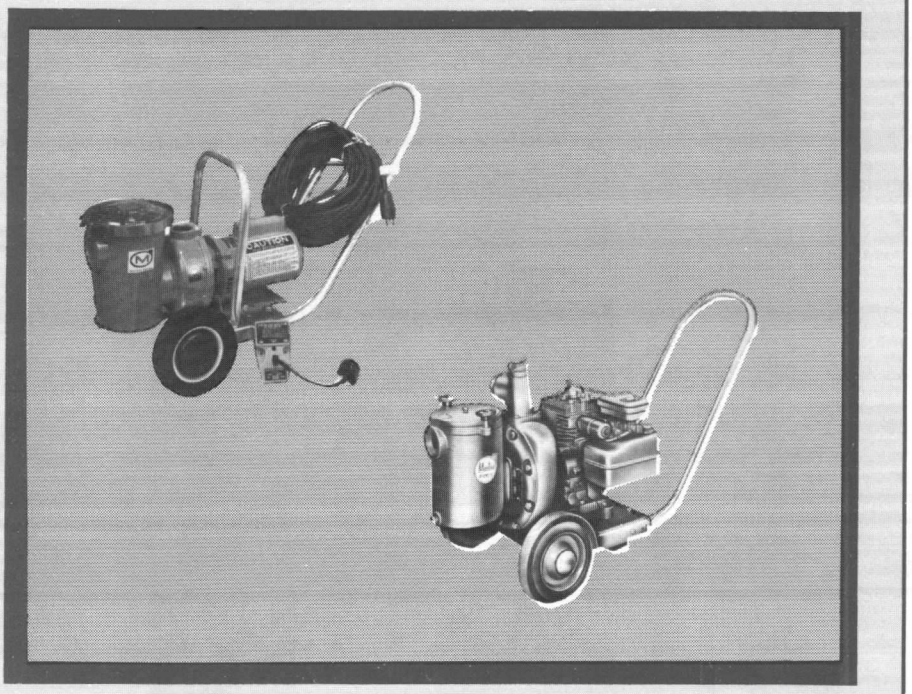


SPECIFICATIONS:

Chlorine and pH test kit model LP-3 shall have a octet chlorine comparator with eight permanent color standards for chlorine valves of 0.2, 0.4, 0.6, 0.8, 1.0, 1.5, 2.0 and 3.0 parts per million and a octet pH comparator which provides 8 permanent color standards for pH valves of 6.8, 7.0, 7.2, 7.4, 7.6, 7.8, 8.0 and 8.2. Readings can be made to 0.8 pH valves.

The chlorine reagents and pH reagents shall be in tablet form. There shall also be provided comparator tubes. All shall be packaged in a water and shatterproof carry case with a compartmented platform for holding and protecting each item, which also doubles as a test tube stand. Chlorine and pH test kit model LP-3 shall be Paddock No. 2814.

NO.	DESCRIP.	DATE	Paddock POOL EQUIPMENT CO. INC. ROCK HILL, S.C.	SCALE NONE
	REVISIONS		CHLORINE & pH TEST KIT	DATE JUNE, 1982
				CAT. NO. 2814
				DWG. NO. A-203

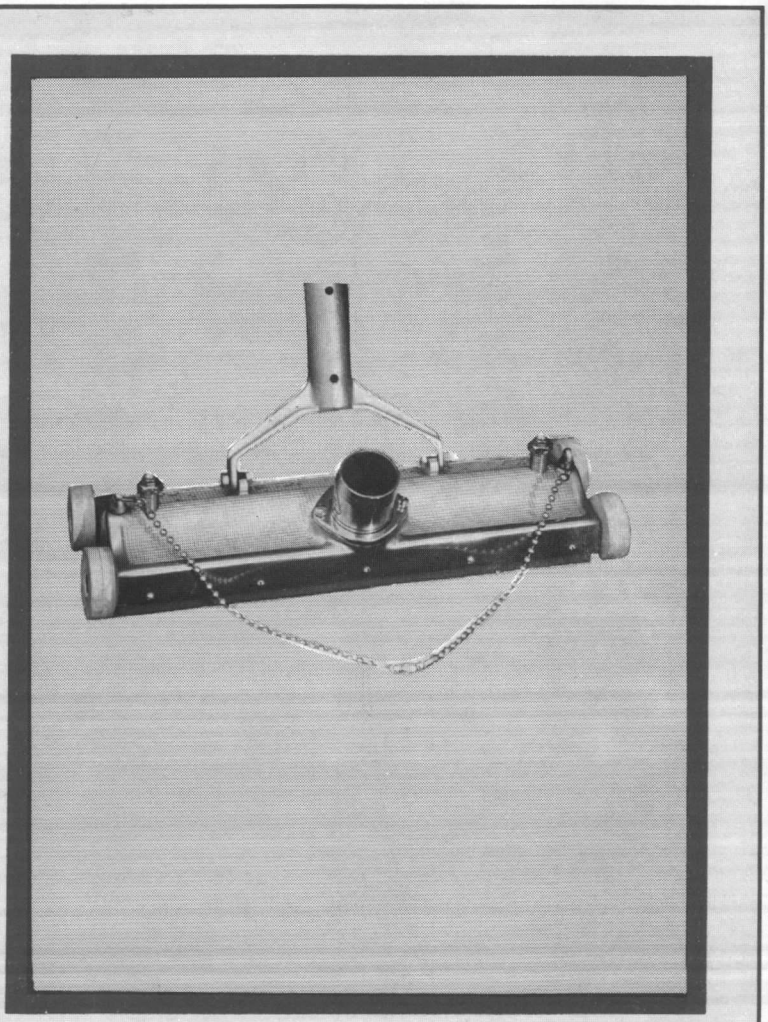


CLEANING EQUIPMENT

PADDOCK OF CALIFORNIA

PORTABLE VACUUM PUMP: 3180

A highly efficient self-priming pump mounted on a two-wheeled, penumatic tired cart suitable for use with any Paddock vacuum cleaning set. This pump may be ordered driven by either an electric motor or gasoline engine. The volume of water drawn through the cleaning head has been designed for maximum efficiency. Electric motor driven units are supplied with ground fault interrupters as a basic part of the unit.

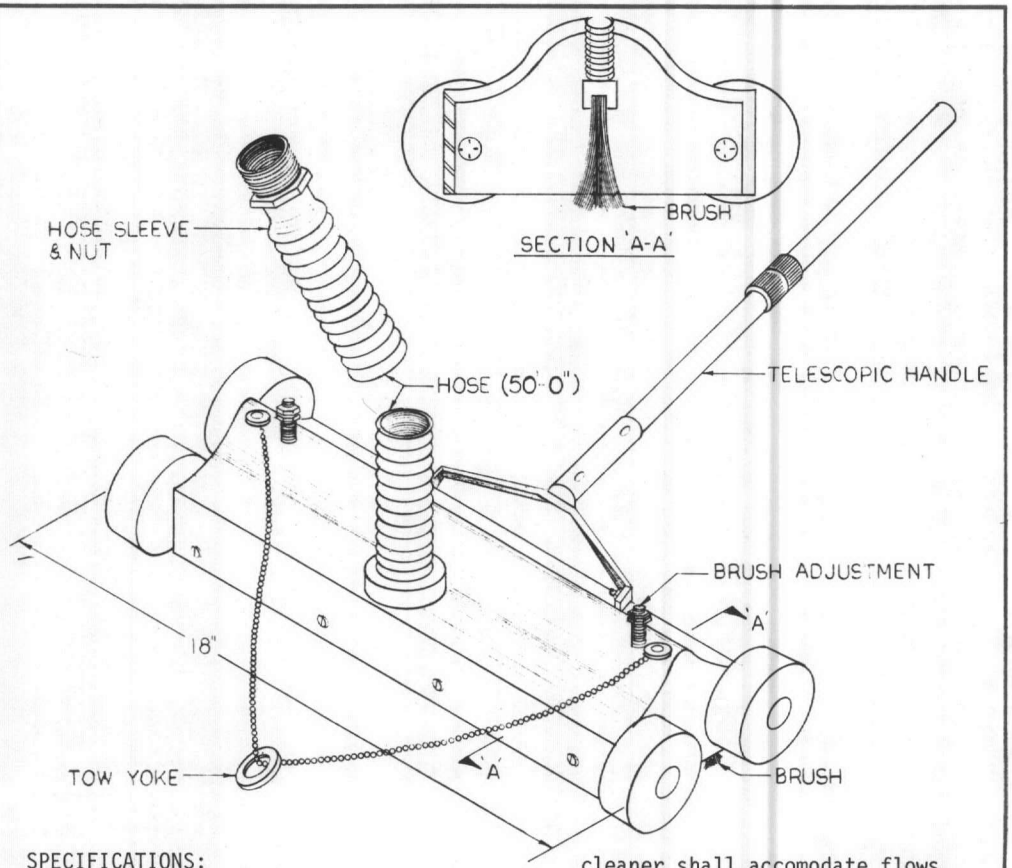


VACUUM SET (18" heads): 3163

This rugged, heavy duty chrome-plated brass vacuum head utilizes the turbo-scrubbing action and is also provided with a brush swivel hose connection and towing chain. The vacuum set consists of the head, 50 feet of 2 inch white plastic floating hose, hose sleeve and nut and 16 ft. telescopic handle.

Paddock

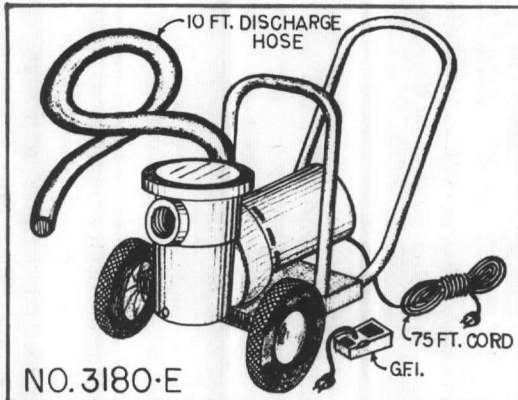
POOL EQUIPMENT COMPANY, Inc.
555 Paddock Parkway, Rock Hill, S.C. 29730



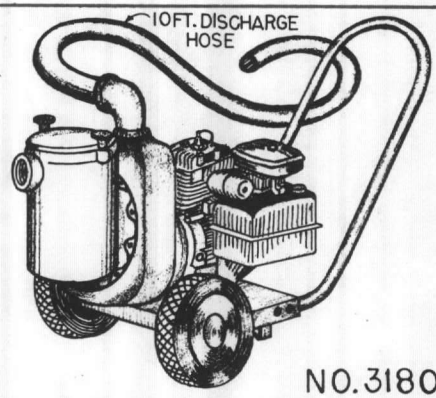
SPECIFICATIONS:
18" Vacuum Cleaner:
Vacuum cleaner shall have an over all width of 18".The head shall be of cast bronze with a chrome-plated finish. The 2" hose connection shall swivel 360° and is tapered to accomodate the hose without the use of hose clamps. The white rubber wheels and nylon brush shall be adjustable. A hard plastic flap shall be provided at the front and rear edge of the head to dislodge foreign caked material. The cleaner shall accomodate flows ranging from 75 to 110 GPM. The swivel handle shall permit the cleaner head to remain parallel to floor at all times. A towing yoke shall be provided with the cleaner for use in large pools. Head with 2" connection shall be Paddock No. 3162-1. Vacuum cleaner set shall be Paddock No. 3163 with 2" hose connection. Vacuum set shall include head, 50' of 2" floating hose, 1-6' & 1-12' handle and hose sleeve and nut.

Paddock

SCALE: NONE	POOL EQUIPMENT CO INC ROCK HILL SOUTH CAROLINA 29730	CAT NO. AS NOTED
DATE AUG. 1980	18" VACUUM CLEANER	DWG NO. B-205

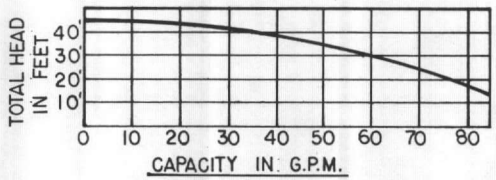


NO. 3180-E

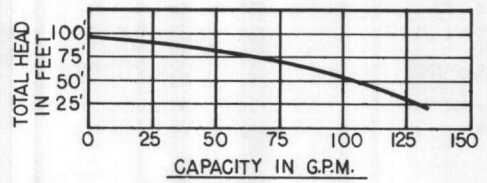


NO. 3180-G

SPECIFICATIONS
Portable Electric Vacuum Pump:
There shall be supplied one cart mounted, electrically powered, portable centrifugal pump and strainer specifically designed for use with the vacuum cleaning equipment. The pump shall be self-priming and shall be molded of high strength "NORYL" construction. A 2" suction connection shall be provided adaptable to the vacuum hose and 10' of discharge hose shall be furnished. The pump strainer shall be NORYL with a clear, quick opening lid. The motor shall be a 1/2 horsepower, single phase, 115/230 volt, 60 cycle, 3450 RPM, drip-proof, continuous duty type provided with 75' of one-ground and two-conductor cord with three-way plug. A ground fault circuit interrupter rated at 15 amps, 60 cycle with trip level of .005 and trip time of .025 seconds shall be provided. The cart shall consist of enameled steel base, two rubber tired wheels and handle. The unit provided shall be a Paddock No. 3180-E.



SPECIFICATIONS:
Portable Gasoline Vacuum Pump:
There shall be supplied one engine driven portable centrifugal pump and strainer specifically designed for use with the vacuum cleaning equipment specified elsewhere. The pump shall be a rapid prime diffuser type with Remite mechanical shaft seal and suction connection shall be provided adaptable to the vacuum hose and a 2" discharge connection with 10' of discharge hose shall also be provided. The pump strainer shall be a cast iron body with a 5-1/4" diameter x 6" deep Type 302 stainless steel basket and quick opening lid. The motor shall be a Briggs-Stratton Model 8, four cycle gasoline powered aluminum engine, 3 horsepower, with 3600 RPM. The cart shall consist of enameled steel base, two rubber tired wheels, and handle. The unit provided shall be a Paddock No. 3180-G, Model 2AF1-B.



Paddock

SCALE: NONE	POOL EQUIPMENT CO. INC. ROCK HILL, SOUTH CAROLINA 29730	CAT. NO. AS NOTED
DATE: UG. 1980	PORTABLE VACUUM CLEANING PUMPS AND MOTORS	DWG. NO. A-205

DIVING EQUIPMENT

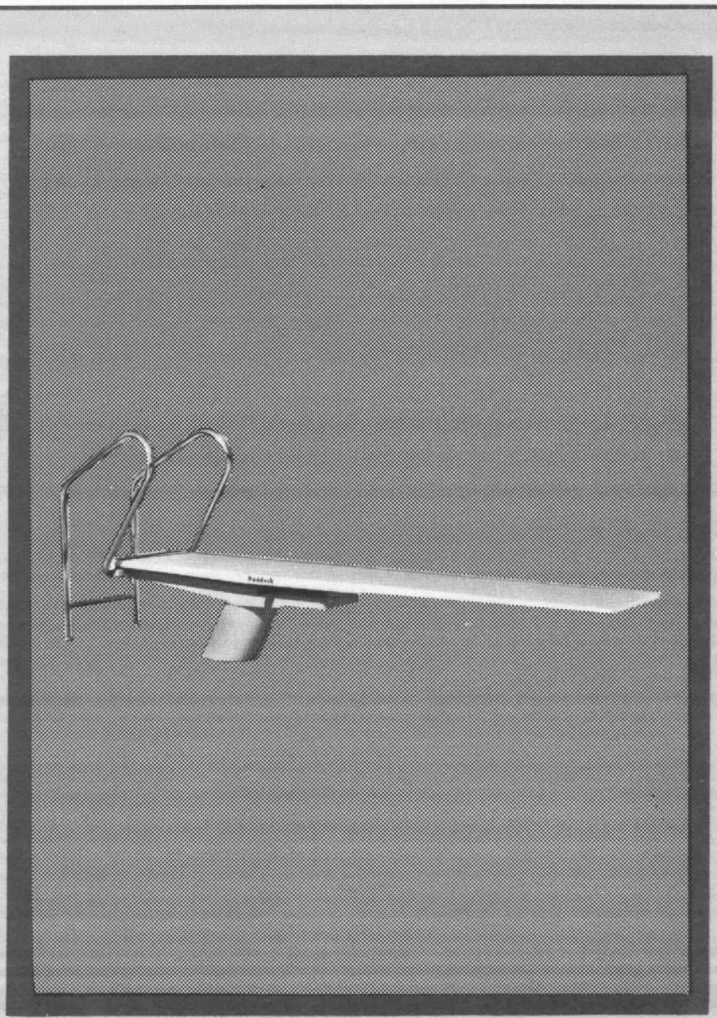
PADDOCK ® OF CALIFORNIA

ONE METER CANTILEVER DIVING STAND: 4061-1

One meter cantilever diving stand, combines beauty and design simplicity. The hand and guard rails are fabricated from lifetime stainless steel. The intermediate guard rail adds much to the safety of the support and prevents side access to the board. Extra wide ladder treads are 11" apart with horizontal faces for an easy climb. High style cantilever diving board is completely encased...looks just as elegant from "close-up" inspection. The cantilever diving stand is designed to conform with AAU and NCAA regulations. After fabrication the entire assembly is cleaned by sand blasting and then receives a rugged rust preventing galvanized coating of .003" of pure zinc. It is supplied with flange mounting for ease of installation.

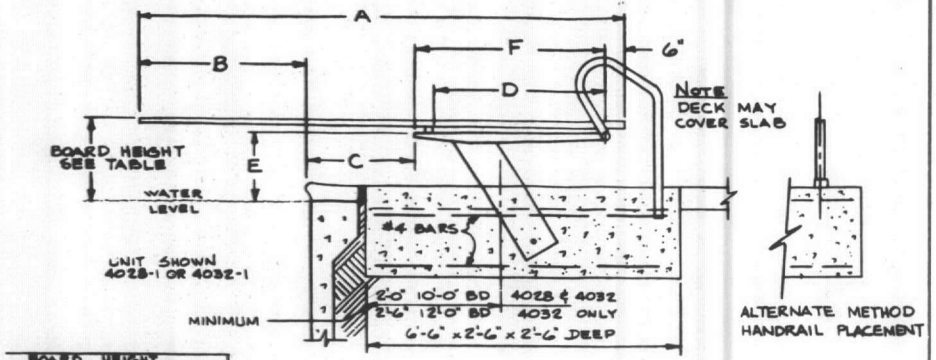
CANTILEVER DIVING SUPPORT: 4028, 4032

This diving stand, with its tapered support channel, stainless steel rails and cantilever column, brings simplicity and luxury to any swimming pool. Its versatile design makes it practical for installation on residential, apartment and motel pools or on larger pools for training or when diving competition is not contemplated. The board rests on an adjustable rubber fulcrum. The stand may be installed so that the tip of the board is 18", 24", 30" or 39" above the water. The rails, as pictures, may be ordered as an accessory by adding "-1" to the catalog number. For increased resistance to weather and rusting, this cantilever support is provided with a heavy pure zinc galvanized coating.



Paddock

POOL EQUIPMENT COMPANY, Inc.
555 Paddock Parkway, Rock Hill, S.C. 29730



BOARD HEIGHT			
18"	24"	30"	39⅜"
"E" DIMENSION			
1'-0½"	1'-6½"	2'-0½"	2'-9⅜"
4028	★	4032	

★TO BE USED FOR
4028 & 4032

MOUNTING DATA						
A	B		C		D	F
*	MAX	MIN	MAX	MIN	HOLD	HOLD
10'FT	4'-0"	2'-6"	2'-5"	0'-11"	4'-4"	4'-7"
12'FT	4'-9"	4'-0"	1'-10½"	1'-1½"	5'-2"	5'-7½"

*{4028 - 10 FT BOARD ONLY
4032 - 10 & 12 FT BOARDS

SPECIFICATIONS:

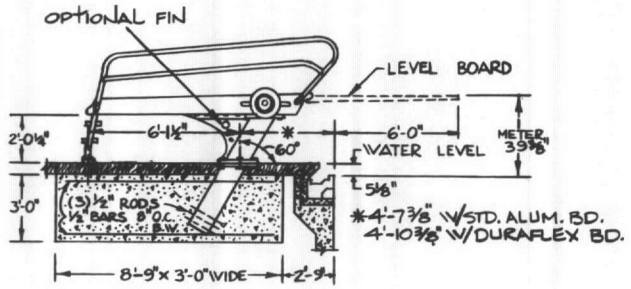
Cantilever Diving Stand:
The diving stand shall be of the cantilever design in which the board support is held by a column cantilevered toward the pool. The column shall be 10" IPS x .188" wall steel pipe. The board support shall be formed from high tensile steel and securely welded to the column. The front fulcrum bar shall be covered with rubber and shall be adjustable thru 12". The column and platform assembly shall be sand blasted after fabrication and metalized with .003" **coating of pure zinc prior to priming and a finish coat of white enamel. Two 1/2" diameter bolts with anchor plates shall be supplied to secure the diving board to the stand. The diving stand may be installed at 18", 24", 30" or one meter (39 3/8") height. One pair of formed hand rails made of 304L stainless steel with a single tread for the 18", 24"and 30" stand and two treads with the one meter stand may be supplied as an accessory. The cantilever diving stand shall be Paddock No._____. (Note: The designation "-1" after the catalog number indicates inclusion of formed stainless steel handrails.**

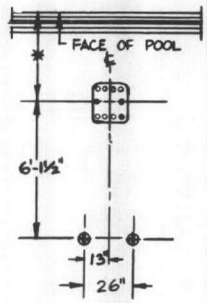
NO.	DESCRIP.	DATE
	REVISIONS	

Paddock
POOL EQUIPMENT CO. INC.
ROCK HILL, SOUTH CAROLINA 29730

18", 24", 30", and 1 METER (39 3/8")
RESIDENTIAL CANTILEVER DIVING STAND

SCALE	NONE
DATE	JUNE, 1982
CAT. NO.	4028-1,4032-1
DWG. NO.	B-208





ANCHOR SETTING
PLAN VIEW

SPECIFICATIONS

Cantilever Diving Stand:
There shall be supplied one 1 meter diving stand(s), Paddock 4061-1. It shall conform to USD and NCAA recommendations. The diving stand shall be flanged mounted to deck anchors firmly embedded in the concrete and shall be removable. The stand shall be constructed of welded and pre-assembled units. The column and platform assembly shall be sand blasted after fabrication and metalized with .003" coating of pure zinc prior to priming and a finish coat of white enamel. The rails shall be Type 304L stainless steel. The rear mounting for the diving board shall be hinged to eliminate the flexing of the board anchoring bolts and to permit the board to be raised to a vertical position for storage.

Column:
The platform shall be supported by a single column fabricated of 10" IPS Schedule 20 steel pipe minimum thickness .250. A heavy mounting flange of plate steel shall be jig welded to either end.

Platform:
The platform shall be of channel construction fabricated from ASTM-A7 high tensile steel plate, 3/16" minimum thickness. The platform shall rigidly connect to the support column with a minimum of ten 3/4" steel bolts, lock washers and nuts.

Ladder Assembly:
The ladder assembly shall consist of side rails of 1.90" x .065" wall thickness. Ladder treads shall be injection molded 26" wide at 11" intervals with non-slip top surface. Side rails of the ladder shall slope at least 15° from the vertical. Each tread shall be fastened to the side rails by two 3/8" upset carriage bolts.

Handrails:
Handrails shall be constructed of 1.90" tubing as specified for ladder assembly and shall be attached to the platform to form a continuous line with the side rails. Handrails shall extend horizontally approximately 30" above the diving board and there shall be an intermediate guardrail. Both shall run continuously along the length of the entire platform.

Mechanical Fulcrum:
There shall be a wheel operated pinion gear and rack type mechanical fulcrum. The pinion gears shall be molded from urethane rubber. The fulcrum bar shall be covered with a resilient pure gum rubber covering 30 to 40 durometer hardness. Paddock 4061-1 with optional fin 4061-2.

DATE: JUNE, 1982
REVISION DATE:

Paddock
POOL EQUIPMENT CO. INC.
ROCK HILL, SOUTH CAROLINA 29730

ONE METER CANTILEVER DIVING STAND

SCALE:	NONE
CAT. NO.	4061
DWG. NO.	A-208

DECK & DIVING EQUIPMENT

PADDOCK ® OF CALIFORNIA

THREE METER CANTILEVER DIVING STAND: 4071-1

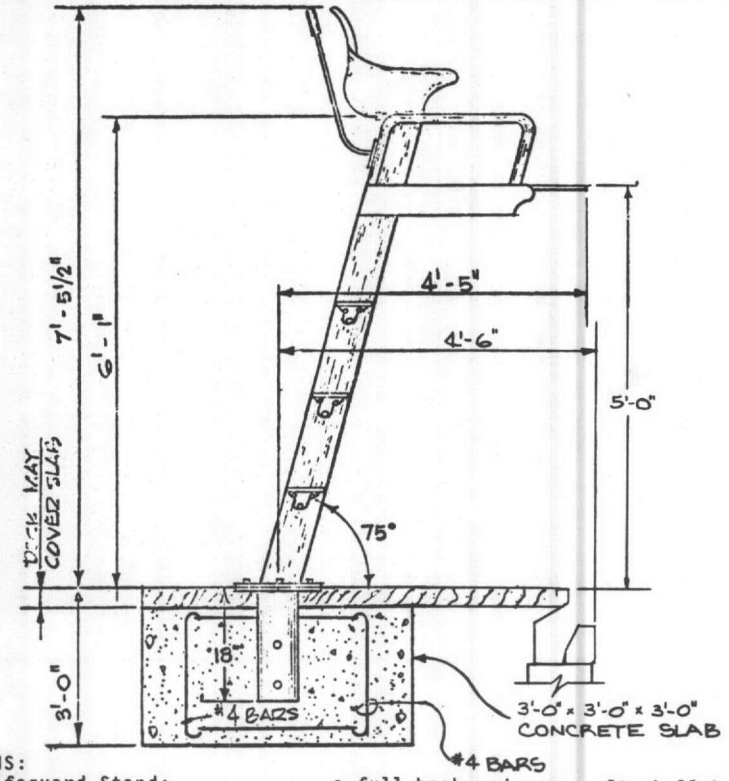
An outstanding accomplishment in Paddock's "High Style" line of pool equipment is the three meter cantilever diving stand. The hand and guard rails are fabricated from lifetime stainless steel. Combining beauty and design simplicity, this crowning achievement in deck equipment is recommended for municipal and commercial pools. The diver ascends to the platform on a gracefully slanted ladder with treads spaced 11" apart for an easy climb. The face of the treads are horizontal and are provided with an integral non-skid surface. For minimum maintenance, all steel assemblies in the three meter cantilever diving stand are sand blasted and galvanized with a .003" coating of pure zinc after fabrication. The three meter cantilever diving stand is designed to conform with all AAU and NCAA regulations. It is supplied as a flange mounting unit for ease of installation.

CANTILEVER LIFEGUARD CHAIR: 4706

To give your pool the distinctive look found in contemporary design, use the cantilever styled lifeguard chair with the guard rail and molded fiberglass seat. Three aluminum cantilever steps are attached to the column for ascending. The platform is complete with guard rail and umbrella holder and may be painted to match cantilever diving stands. Lifeguard chair is provided with flanged anchor mounting. All steel assemblies in the lifeguard chair are sand blasted and galvanized with a coating of pure zinc after fabrication.

Paddock

POOL EQUIPMENT COMPANY, Inc.
555 Paddock Parkway, Rock Hill, S.C. 29730



SPECIFICATIONS:

Cantilever Lifeguard Stand:
There shall be supplied ____ cantilever lifeguard stand(s), Paddock No. 4706.

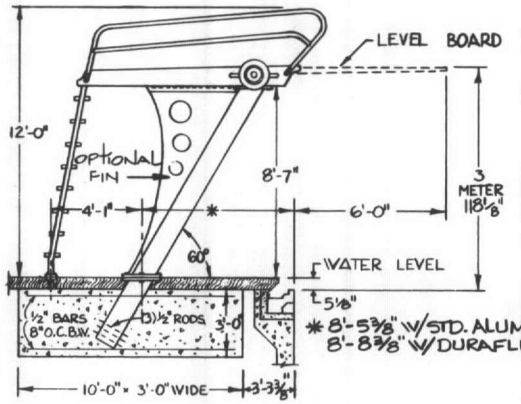
Main Assembly: The column shall be fabricated from 4" Schedule 40 steel pipe to which a 3/16" channel formed steel plate platform shall be welded. The platform shall have internal bracing for maximum rigidity. After all fabrication on the steel assembly is completed, it shall be sand blasted and metalized with a .005" thick coat of pure zinc prior to priming and a finish coat of white enamel.

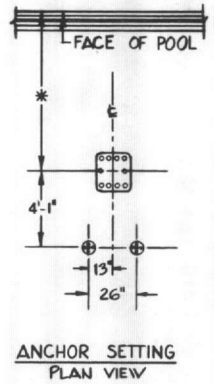
Seat: A flange, for attachment of the lifeguard seat, shall be welded to the column top.. The seat shall be of molded fiberglass construction and shall have a full back and arms. It shall bolt to the mounting flange.

Platform: The top of the channel platform shall be covered with a white 3/4" laminated Douglas Fir platform fiberglass reinforced and encapsulated in a polyester coating. The top surface shall be non-skid.

Safety: For safety and to assist in ascending to the chair, there shall be a 1-1/2" x .065" wall stainless steel rail on one side of the platform, a steel handgrip at the top of the column behind the seat and three cast aluminum treads securely bolted to the column. A socket shall be provided for an umbrella The entire assembly shall be flange mounted to the deck.

NO.	DESCRIP.	DATE	Paddock POOL EQUIPMENT CO. INC. Rock Hill, South Carolina 29730	SCALE NONE
REVISIONS			CANTILEVER LIFEGUARD STAND	DATE JUNE, 1982
				CAT. NO. 4706
				DWG. NO. B-209





ANCHOR SETTING
PLAN VIEW

SPECIFICATIONS

Cantilever Diving Stand:
There shall be supplied one 3 meter diving stand(s), Paddock #4071-1. It shall conform to USD and NCAA recommendations. The diving stand shall be flanged mounted to deck anchors firmly embedded in the concrete and shall be removable. The stand shall be constructed of welded and pre-assembled units. The column and platform assembly shall be sand blasted after fabrication and metalized with .003" coating of pure zinc prior to priming and a finish coat of white enamel. The rails shall be Type 304L stainless steel. The rear mounting for the diving board shall be hinged to eliminate the flexing of the board anchoring bolts and to permit the board to be raised to a vertical position for storage.

Column:
The platform shall be supported by a single column fabricated of 10" IPS Schedule 20 steel pipe minimum thickness .250. A heavy mounting flange of plate steel shall be jig welded to either end.

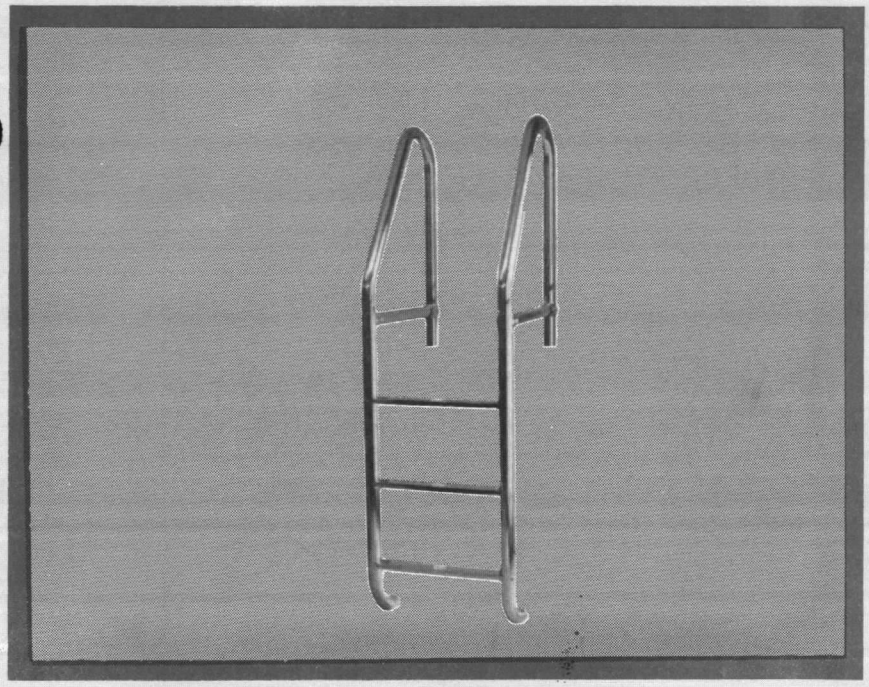
Platform:
The platform shall be of channel construction fabricated from ASTM-A7 high tensile steel plate, 3/16" minimum thickness. The platform shall rigidly connect to the support column with a minimum of ten 3/4" steel bolts, lock washers and nuts.

Ladder Assembly:
The ladder assembly shall consist of side rails of 1.90" x .065" wall thickness. Ladder treads shall be injection molded 26" wide at 11" intervals with non-slip top surface. Side rails of the ladder shall slope at least 15° from the vertical. Each tread shall be fastened to the side rails by two 3/8" upset carriage bolts.

Handrails:
Handrails shall be constructed of 1.90" tubing as specified for ladder assembly and shall be attached to the platform to form a continuous line with the side rails. Handrails shall extend horizontally approximately 30" above the diving board and there shall be an intermediate guardrail. Both shall run continuously along the length of the entire platform.

Mechanical Fulcrum:
There shall be a wheel operated pinion gear and rack type mechanical fulcrum. The pinion gears shall be molded from urethane rubber. The fulcrum bar shall be covered with a resilient pure gum rubber covering 30 to 40 durometer hardness. Paddock 4071-1 with optional fin 4071-2.

DATE: JUNE, 1982	Paddock POOL EQUIPMENT CO. INC. ROCK HILL, SOUTH CAROLINA 29730	SCALE: NONE	
REVISION DATE:		CAT. NO. 4071	
	THREE METER CANTILEVER DIVING STAND	DWG. NO. A-209	



STAINLESS STEEL LADDERS

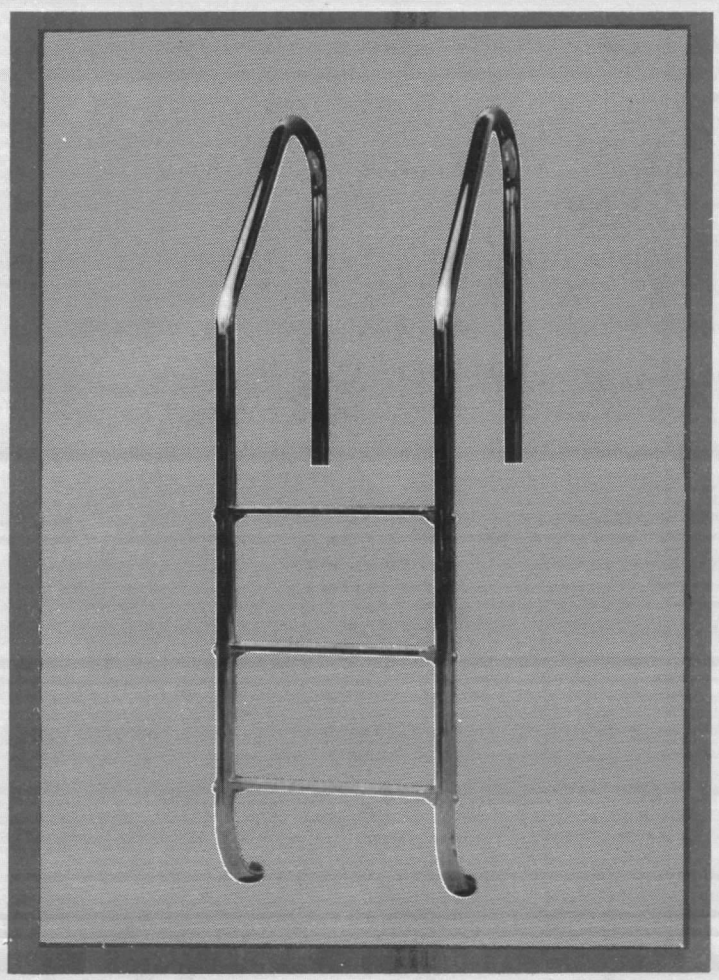
PADDOCK ® OF CALIFORNIA

CUSTOM LADDERS: 4539-1, 4540-1, 4541-1

Custom ladders fabricated of type 304L stainless steel tubing and injection molded treads, are available with either three or four treads. They are supplied with a welded cross brace for added stability and maximum strength. The graceful curves of the ladder rails allow bathers natural handholds and a wide ladder tread with a nonskid surface. The custom ladder represents the ultimate in personal safety, durability and strength. Rubber bumpers support each ladder rail at the bottom to avoid chipping the pool finish.

STANDARD LADDERS: 4543, 4544, 4545

Standard ladders are constructed of highly corrosion resistant type 304L stainless steel available with either two treads, three treads or four treads. Ladder rails are designed to accommodate rubber bumpers at the lower end to avoid damaging the pool finish at point of contact. Upper end of the rail fits into deck anchors for rigidity and easy removal during winter seasons. Wide ladder treads are fabricated of injection molded cycolac and have a permanent non-slip surface.



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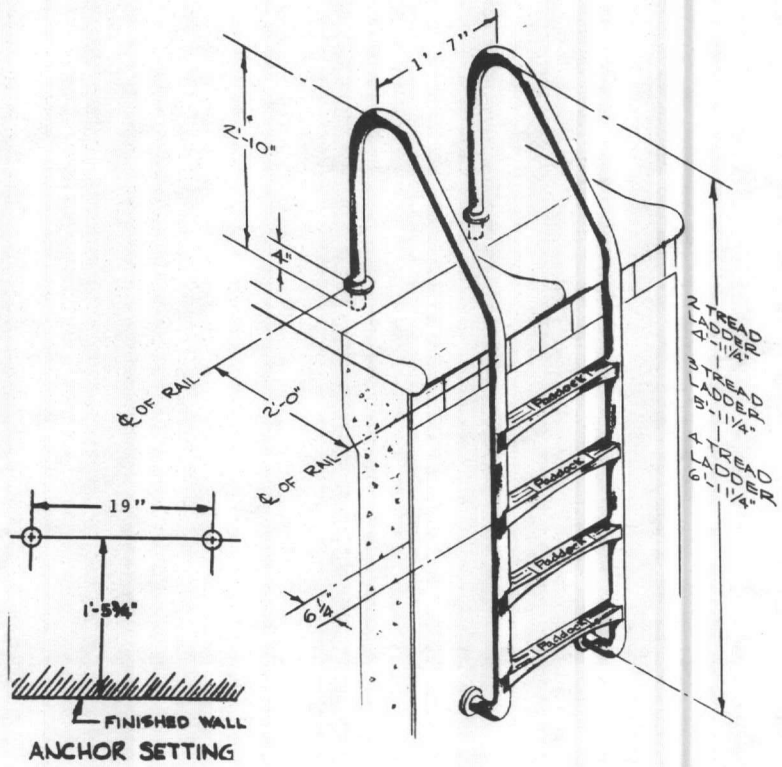


ANCHOR SETTING

SPECIFICATIONS:

Standard Ladders, Stainless Steel:

The ladder rails shall be made from 1.9" OD x .065 wall type 304 L stainless steel tubing. They shall be polished so that no traces of fabrication shall be visible. Each cycolac tread shall be bolted to the ladder rail with a 3/8" flush head stainless steel carriage bolt.

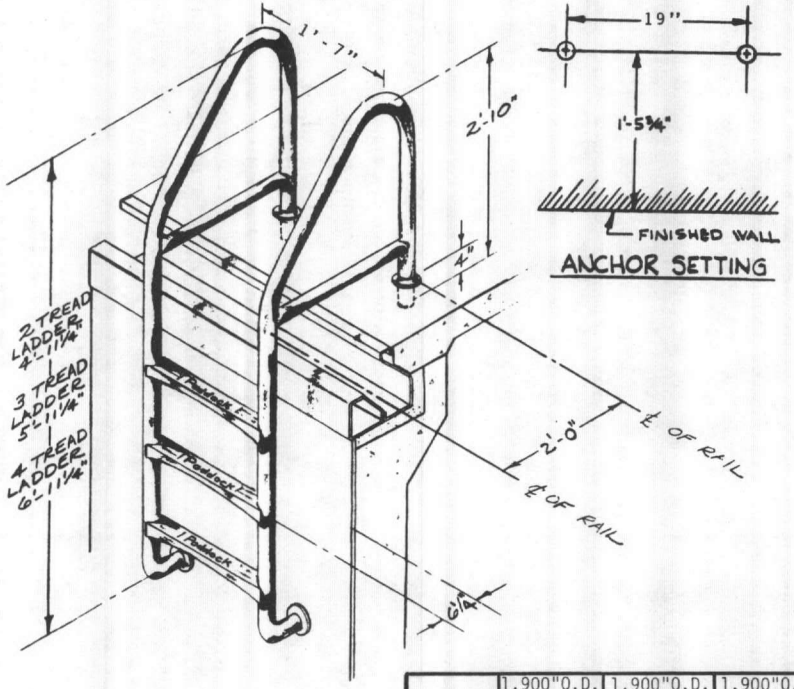
Rubber bumpers shall be provided in the rails at the lower end to prevent the metal from coming in contact with the pool wall. Ladder shall be Paddock No. 4543, 2 tread; 4544, 3 tread; 4545, 4 tread.

NO.	DESCRIP.	DATE
	REVISIONS	

Paddock
POOL EQUIPMENT CO. INC.
Rock Hill, South Carolina 29730

STANDARD 2,3,4, TREAD STAINLESS STEEL LADDERS

SCALE NONE
DATE MAY, 1981
CAT. NO. 4543,4544,4545
DWG. NO. B-213



ANCHOR SETTING

Item	1.900"O.D. x.145"wall	1.900"O.D. x.109"wall	1.900"O.D. x.065"wall
2 Tread	4539-3	4539-2	4539-1
3 Tread	4540-3	4540-2	4540-1
4 Tread	4541-3	4541-2	4541-1
5 Tread	4542-3	4542-2	4542-1

SPECIFICATIONS:

Custom Ladders, Stainless Steel:

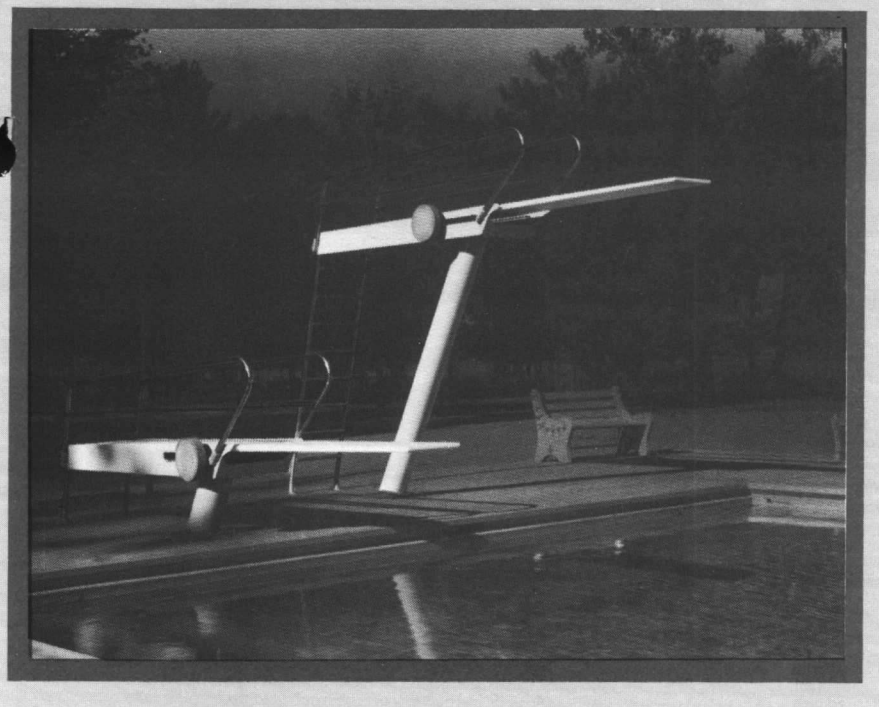
Ladder rails shall be constructed of 1.9" OD x polished stainless steel tubing. The stainless steel shall be type 304 L. The treads shall be formed of molded cycolac and shall have a deeply formed non-skid surface. The end of each tread shall bolt into the rail with one 3/8" flush head stainless steel carriage bolt. The tread shall be at least 3 inches in width. Ladder rails shall be of the progressive bend type and shall be spaced 19 inches apart center to center. There shall be a rubber bumper at the lower end of each ladder rail so that the metal rail shall not come in contact with the pool wall. Each rail shall contain a cross brace for additional stability. The cross brace shall be type 304 L stainless steel. Ladders shall be Paddock No. 4539-1, 2 tread; _____, 3 tread; 4541-1, 4 tread.

NO.	DESCRIP.	DATE
	REVISIONS	

Paddock
POOL EQUIPMENT CO. INC.
Rock Hill, South Carolina 29730

CUSTOM 2,3,&4 TREAD STAINLESS STEEL LADDERS

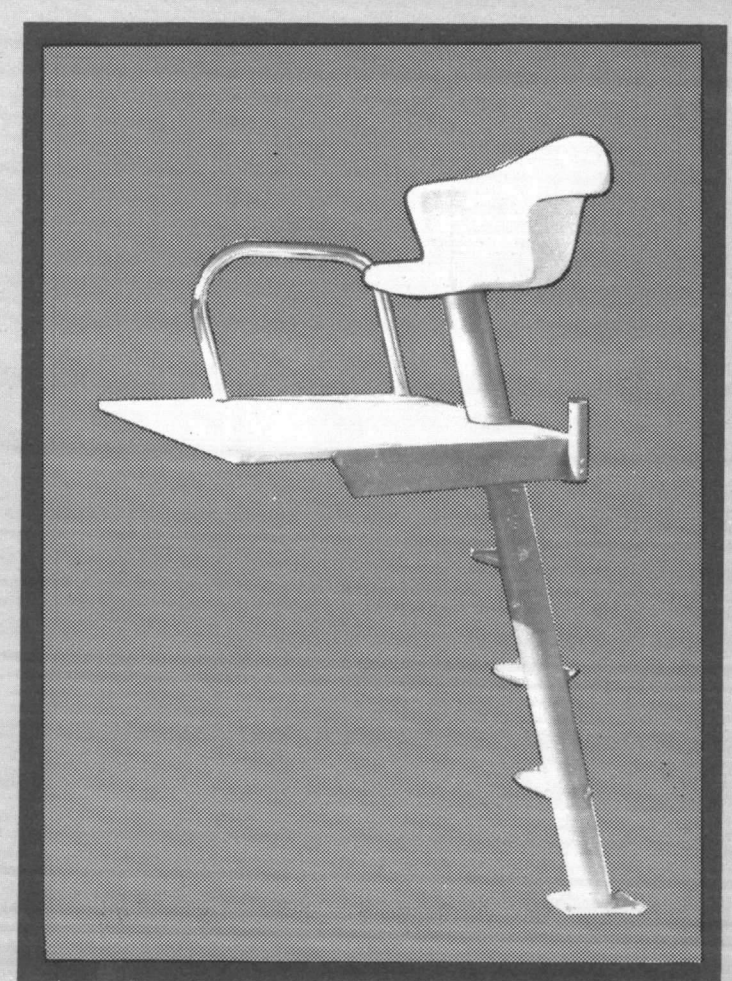
SCALE NONE
DATE MAY, 1981
CAT. NO. 4539-1, 4540-1, 4541-1
DWG. NO. A-213



DECK & DIVING EQUIPMENT

PADDOCK ® OF CALIFORNIA

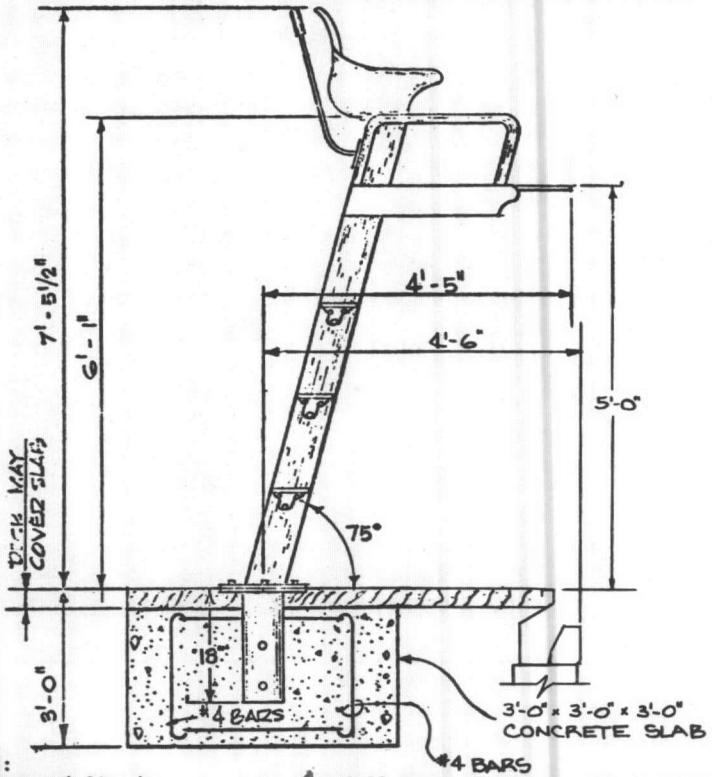
THREE METER CANTILEVER DIVING STAND: 4071-1
An outstanding accomplishment in Paddock's "High Style" line of pool equipment is the three meter cantilever diving stand. The hand and guard rails are fabricated from lifetime stainless steel. Combining beauty and design simplicity, this crowning achievement in deck equipment is recommended for municipal and commercial pools. The diver ascends to the platform on a gracefully slanted ladder with treads spaced 11" apart for an easy climb. The face of the treads are horizontal and are provided with an integral non-skid surface. For minimum maintenance, all steel assemblies in the three meter cantilever diving stand are sand blasted and galvanized with a .003" coating of pure zinc after fabrication. The three meter cantilever diving stand is designed to conform with all AAU and NCAA regulations. It is supplied as a flange mounting unit for ease of installation.



CANTILEVER LIFEGUARD CHAIR: 4706
To give your pool the distinctive look found in contemporary design, use the cantilever styled lifeguard chair with the guard rail and molded fiberglass seat. Three aluminum cantilever steps are attached to the column for ascending. The platform is complete with guard rail and umbrella holder and may be painted to match cantilever diving stands. Lifeguard chair is provided with flanged anchor mounting. All steel assemblies in the lifeguard chair are sand blasted and galvanized with a coating of pure zinc after fabrication.

Paddock

POOL EQUIPMENT COMPANY, Inc.
555 Paddock Parkway, Rock Hill, S.C. 29730



SPECIFICATIONS:

Cantilever Lifeguard Stand: There shall be supplied 4 cantilever lifeguard stand(s), Paddock No. 4706.

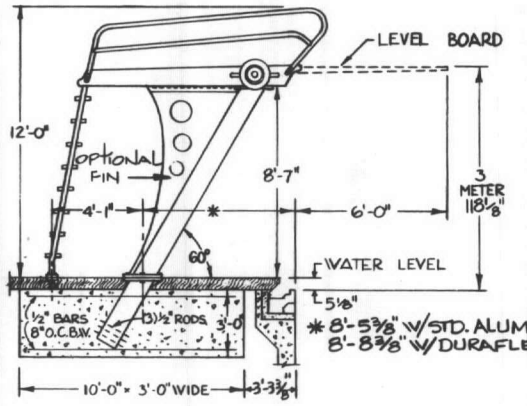
Main Assembly: The column shall be fabricated from 4" Schedule 40 steel pipe to which a 3/16" channel formed steel plate platform shall be welded. The platform shall have internal bracing for maximum rigidity. After all fabrication on the steel assembly is completed, it shall be sand blasted and metalized with a .005" thick coat of pure zinc prior to priming and a finish coat of white enamel.

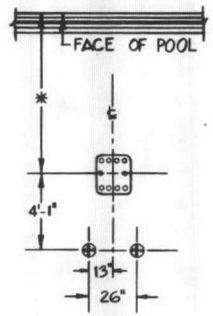
Seat: A flange, for attachment of the lifeguard seat, shall be welded to the column top. The seat shall be of molded fiberglass construction and shall have a full back and arms. It shall bolt to the mounting flange.

Platform: The top of the channel platform shall be covered with a white 3/4" laminated Douglas Fir platform fiberglass reinforced and encapsulated in a polyester coating. The top surface shall be non-skid.

Safety: For safety and to assist in ascending to the chair, there shall be a 1-1/2" x .065" wall stainless steel rail on one side of the platform, a steel handgrip at the top of the column behind the seat and three cast aluminum treads securely bolted to the column. A socket shall be provided for an umbrella The entire assembly shall be flange mounted to the deck.

			Paddock POOL EQUIPMENT CO. INC. Rock Hill, South Carolina 29730	SCALE NONE
NO.	DESCRIP.	DATE		DATE JUNE, 1982
REVISIONS			CANTILEVER LIFEGUARD STAND	CAT. NO. 4706
				DWG. NO. B-209





ANCHOR SETTING PLAN VIEW

SPECIFICATIONS

Cantilever Diving Stand:
There shall be supplied ____ 3 meter diving stand(s), Paddock #4071-1. It shall conform to USD and NCAA recommendations. The diving stand shall be flanged mounted to deck anchors firmly embedded in the concrete and shall be removable. The stand shall be constructed of welded and pre-assembled units. The column and platform assembly shall be sand blasted after fabrication and metalized with .003" coating of pure zinc prior to priming and a finish coat of white enamel. The rails shall be Type 304L stainless steel. The rear mounting for the diving board shall be hinged to eliminate the flexing of the board anchoring bolts and to permit the board to be raised to a vertical position for storage.

Column:
The platform shall be supported by a single column fabricated of 10" IPS Schedule 20 steel pipe minimum thickness .250. A heavy mounting flange of plate steel shall be jig welded to either end.

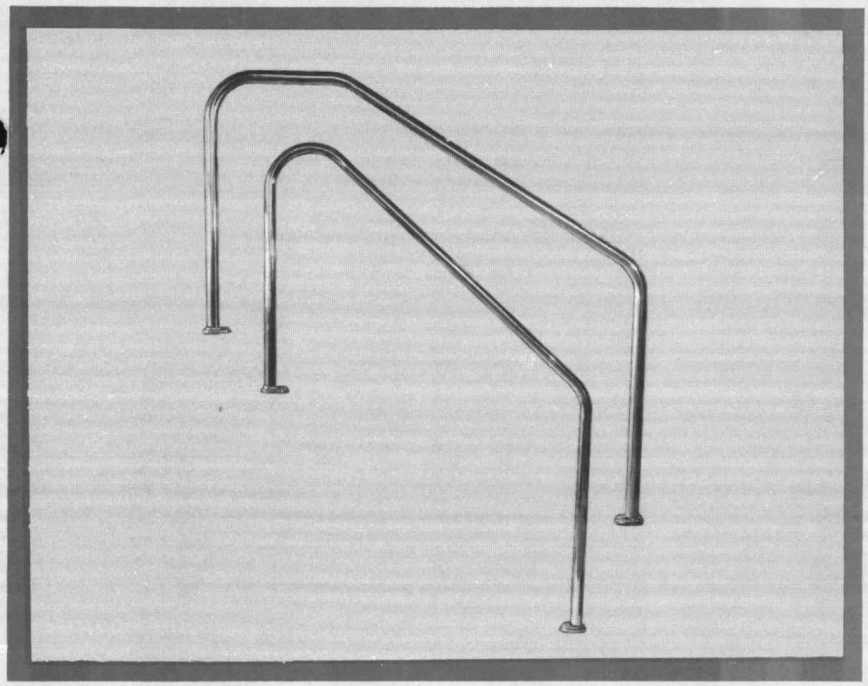
Platform:
The platform shall be of channel construction fabricated from ASTM-A7 high tensile steel plate, 3/16" minimum thickness. The platform shall rigidly connect to the support column with a minimum of ten 3/4" steel bolts, lock washers and nuts.

Ladder Assembly:
The ladder assembly shall consist of side rails of 1.90" x .065" wall thickness. Ladder treads shall be injection molded 26" wide at 11" intervals with non-slip top surface. Side rails of the ladder shall slope at least 15° from the vertical. Each tread shall be fastened to the side rails by two 3/8" upset carriage bolts.

Handrails:
Handrails shall be constructed of 1.90" tubing as specified for ladder assembly and shall be attached to the platform to form a continuous line with the side rails. Handrails shall extend horizontally approximately 30" above the diving board and there shall be an intermediate guardrail. Both shall run continuously along the length of the entire platform.

Mechanical Fulcrum:
There shall be a wheel operated pinion gear and rack type mechanical fulcrum. The pinion gears shall be molded from urethane rubber. The fulcrum bar shall be covered with a resilient pure gum rubber covering 30 to 40 durometer hardness. Paddock 4071-1 with optional fin 4071-2.

DATE: JUNE, 1982	Paddock POOL EQUIPMENT CO. INC. ROCK HILL, SOUTH CAROLINA 29730	SCALE: NONE	
REVISION DATE:		CAT. NO. 4071	
	THREE METER CANTILEVER DIVING STAND	DWG. NO. A-209	



DECK ACCESSORIES

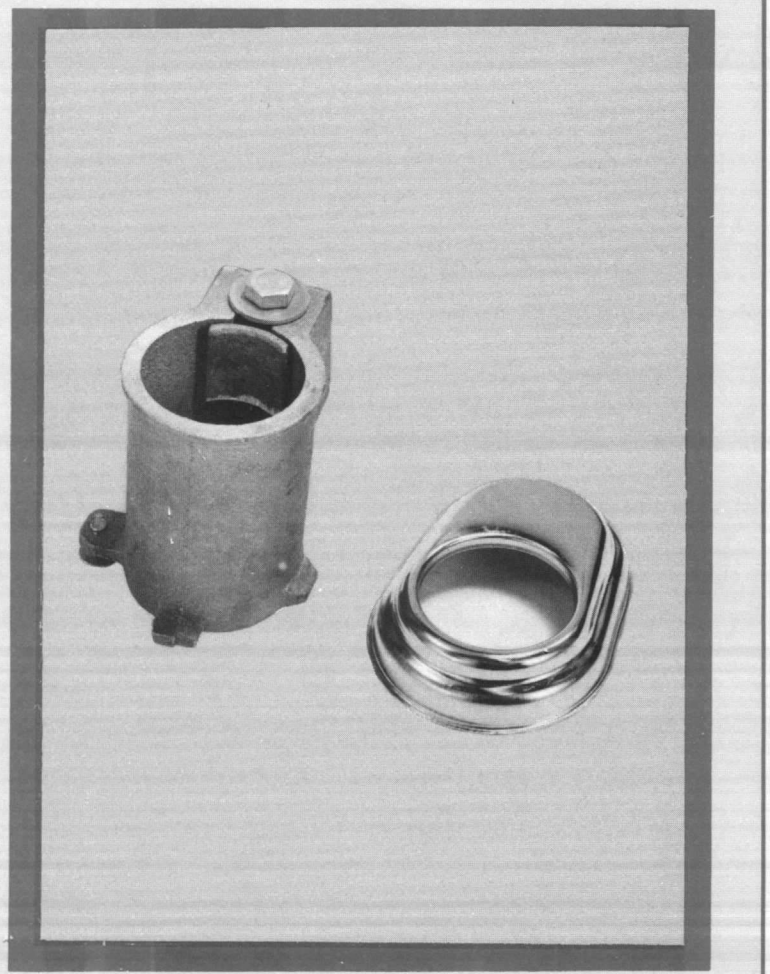
PADDOCK OF CALIFORNIA

HAND RAILS: 4713, 4714, 4715, 4716, 4717

Paddock hand rails are used to provide safety and convenience for those bathers entering or leaving the swimming pool by means of a stairway. Handrails can either be put at the ends of the stairway or in the middle. Hand rails are 32" above the pool floor and incline at the same angle as that of the stairs. They are held by anchor sockets located in the pool bottom and in the pool deck so they can be removed during the winter season. Hand rails are available in type 304L stainless steel.

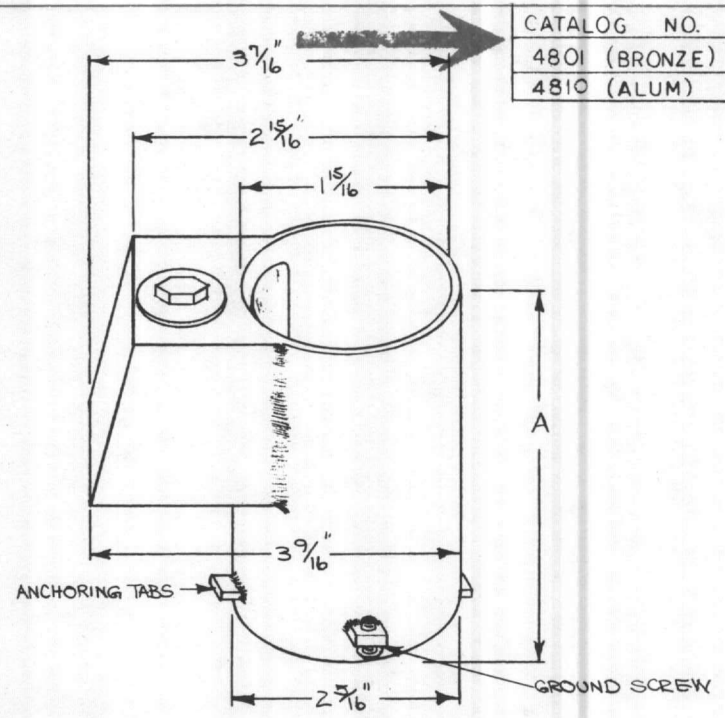
WEDGE DECK ANCHORS: 4801, 4810

One and a half inch wedge deck anchor is cast into concrete to hold rails. Lug on the side of the anchor body prevents archor from being pulled from the concrete. Tightening of the bolt raises wedge up the tapered chamber which presses it against the pipe creating a rigid connection. Wedge anchors are available with cast bronze body and bronze wedge. Paddock No. 4801, and cast aluminum body and bronze wedge, Paddock No. 4810. Paddock No. 4837 stainless steel escutcheon gracefully covers the wedge anchor.



Paddock

POOL EQUIPMENT COMPANY, Inc.
555 Paddock Parkway, Rock Hill, S.C. 29730



CATALOG NO.	A
4801 (BRONZE)	3 3/8"
4810 (ALUM)	4 1/8"

SPECIFICATIONS:
Wedge Type Deck Anchors:
The body shall be constructed of cast (bronze) (aluminum) and shall have a tapered chamber to receive the wedge by means of which a ladder or other rail may be held securely. The wedge shall be of cast bronze and shall be drawn against the rail being anchored by means of a 1/2" bolt. Anchor bodies shall be made to accommodate 1-1/2" IPS standard pipe rails.

The wedge deck anchor shall be provided with a ground connection at its base and shall have an anchoring protrusion at its center. Anchor shall be Paddock No. 4801 (bronze) or ~~No. 4810 (aluminum)~~. 14 required. Wedge anchors shall be covered with stainless steel escutcheon Paddock No. 4837.

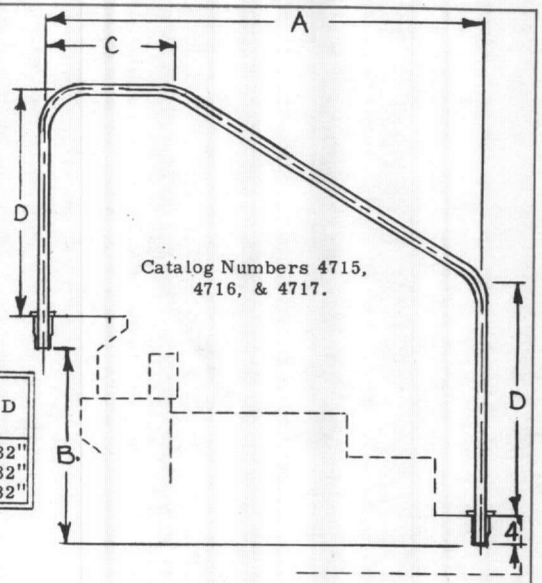
NO	DESCRIPTION	DATE
REVISIONS		

Paddock
POOL EQUIPMENT CO. INC.
ROCK HILL, SOUTH CAROLINA 29730

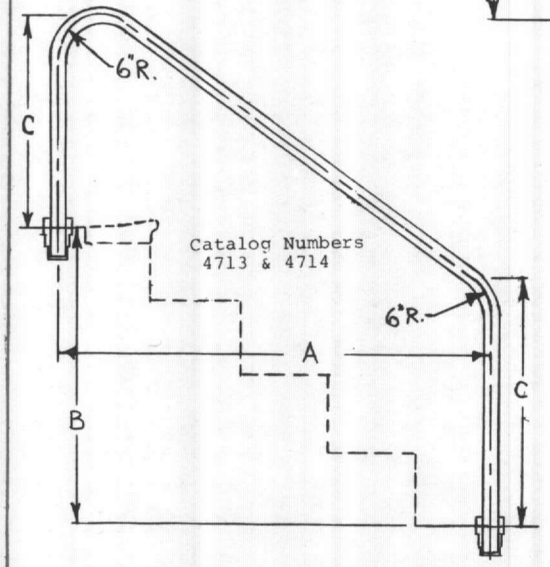
1-1/2" WEDGE DECK ANCHOR
CAST ALUMINUM AND CAST BRONZE

SCALE: NONE
DATE MAY, 1981
CAT. NO 4801 - 4810
DWG. NO B-215

SPECIFICATIONS:
Hand Rails - Stainless Steel:
Stair hand rails shall be of stainless steel construction. Hand rail shall have an outside diameter of 1.90" and a wall thickness of .065". Handrails shall be constructed of Type 304L stainless steel polished to a mirror finish. Hand rails shall be Paddock No. _____, _____ provided. Anchors shall be Paddock No. _____, _____ provided.



Catalog Number Stainless Steel Only	A	B	C	D
4715	48"	26"-36"-46"	18"	32"
4716	60"	26"-36"-46"	18"	32"
4717	72"	26"-36"-46"	18"	32"



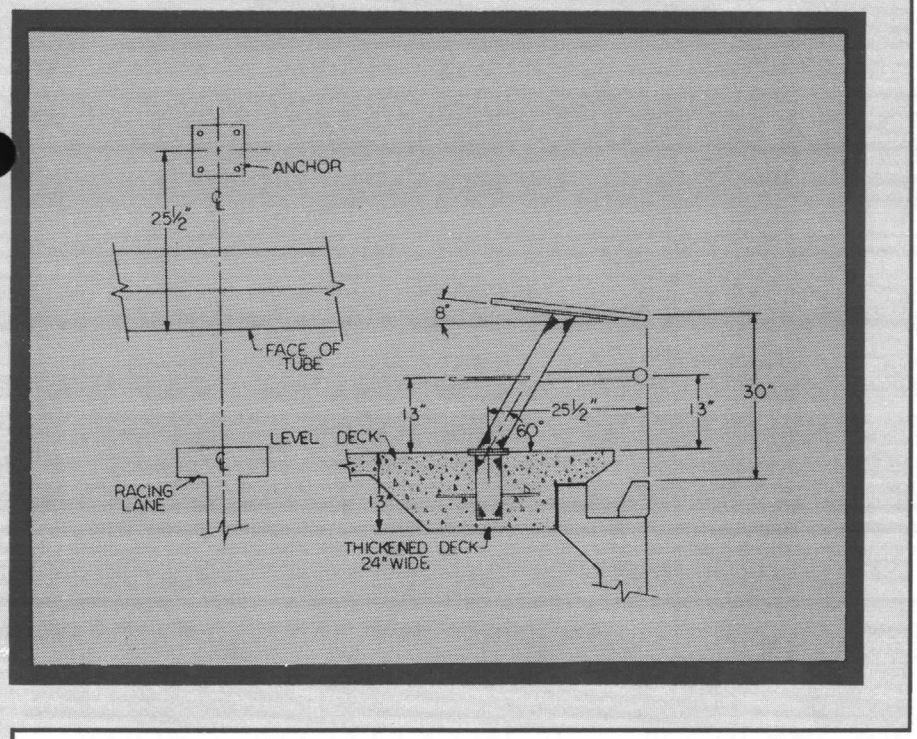
A	B	C	Catalog Number Stainless Steel Only
48"	36"	32"	4713
60"	36"	32"	4714

NO	DESCRIPTION	DATE
REVISIONS		

Paddock
POOL EQUIPMENT CO. INC.
ROCK HILL, SOUTH CAROLINA 29730

STAIR HANDRAILS

SCALE: NONE
DATE MAY, 1981
CAT. NO AS NOTED
DWG. NO A-215



STARTING PLATFORM

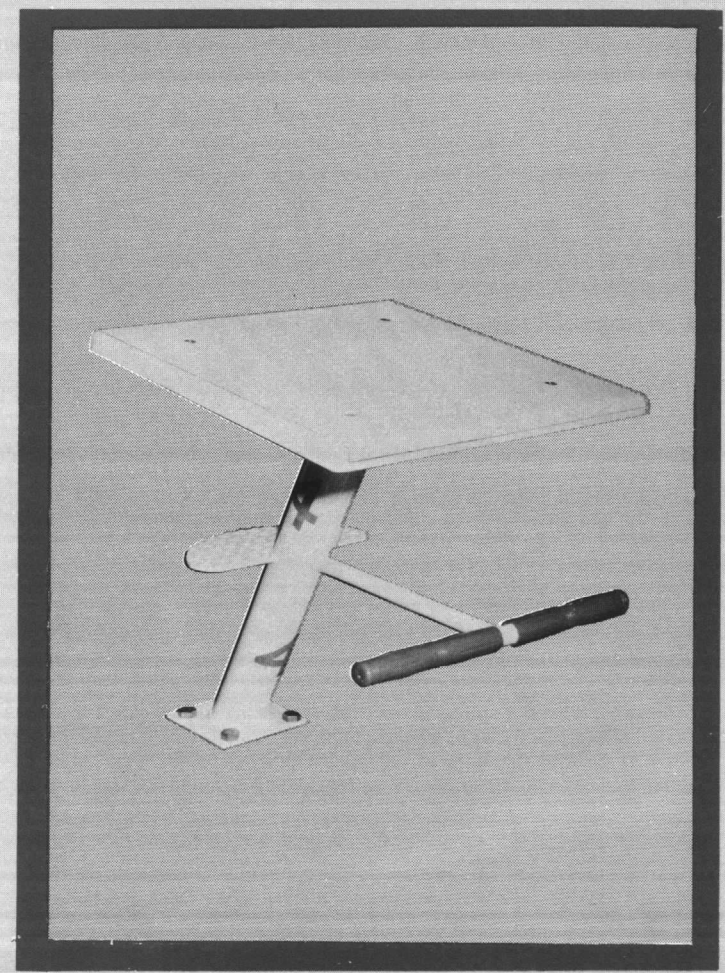
PADDOCK ® OF CALIFORNIA

STARTING PLATFORM: 4908 -SS

Paddock's graceful cantilever starting platform is designed to meet all NCAA, AAU and FINA requirements while offering a graceful appearance and rugged support.

For the first time a starting platform is offered which is color-coded to the racing lane, as well as identified by number. While the color coding is not a requirement, it is certainly preferred by Coaches and people involved in competitive swimming.

Paddock's starting platform is fabricated from rugged heavy steel sections which have been given a coating of pure zinc prior to the finish enamel to prevent rusting. The Paddock starting platform is easy to remove when competition is not being held, as it is fastened to the deck with a flange anchor. The buried portion of the anchor has a stainless steel surface plate and is designed to provide a smooth walking surface when the platform is stored. The metal portions of the frame are also available, fabricated from stainless steel.



Paddock

POOL EQUIPMENT COMPANY, Inc.
555 Paddock Parkway, Rock Hill, S.C. 29730

CANTILEVER STARTING PLATFORM

There shall be supplied Six cantilever starting platforms, Paddock No. 4908. The platform shall conform to NCAA, AAU and FINA regulations. Platform shall be 22" x 22" with an 8° slope toward course. Top of platform shall not be more than 30" above the water level. Backstroke bar shall be an integral part of the platform. Starting platforms shall be numbered on four sides with number one starting from the right facing the course, numbers distinguishable from 100'. Each platform shall be color-coded for its lane. Lane No. 1 – Blue; No. 2 – Red; No. 3 – White; No. 4 – Orange; No. 5 – Green; No. 6 – Yellow; No. 7 – Brown; and No. 8 – Grey. Platforms shall be removable by means of a flange anchor. The exposed surface of the flange anchor shall be stainless steel with a number three finish. When exposed, the stainless steel anchor plate shall have all anchoring apertures filled to provide a level walking surface on the deck.

Main Assembly: The column shall be fabricated from 3" Schedule 40 steel pipe welded to an 18" x 18" x 3/16" steel plate, to support top platform. A 7" x 3/16" anchor plate shall be welded to the bottom of the column. A mounting step shall be welded to the column. The step shall be fabricated from 1/4" thick diamond plate. The backstroke bar shall be fabricated from 3/4" diameter pipe welded to the column and be located so that the bar will be flush with front edge of platform. Horizontal bar is to be supplied with custom molded rigid vinyl (unplasticized) grips. After fabrication of the assembly, it shall be sandblasted and metallized with .003" thick coat of pure zinc. The zinc coating shall be prime-coated with zinc oxide and given a final top coating of high gloss enamel; color-coded to correspond with its lane number.

Top: The top of the starting platform shall be 1" thick marine plywood, fiberglass reinforced and encapsulated in white polyester coating. Mounting holes shall be drilled oversize and filled with resin to seal the exposed plywood, then redrilled for the attaching bolt. The top and front edge shall have a white sani-tred non-slip finish.

Anchor: The anchor shall be fabricated from a 4" x 12" IPS black pipe nipple with a 7" x 7" x 3/16" stainless steel plate with a number three finish. All bolts and nuts to be stainless steel.

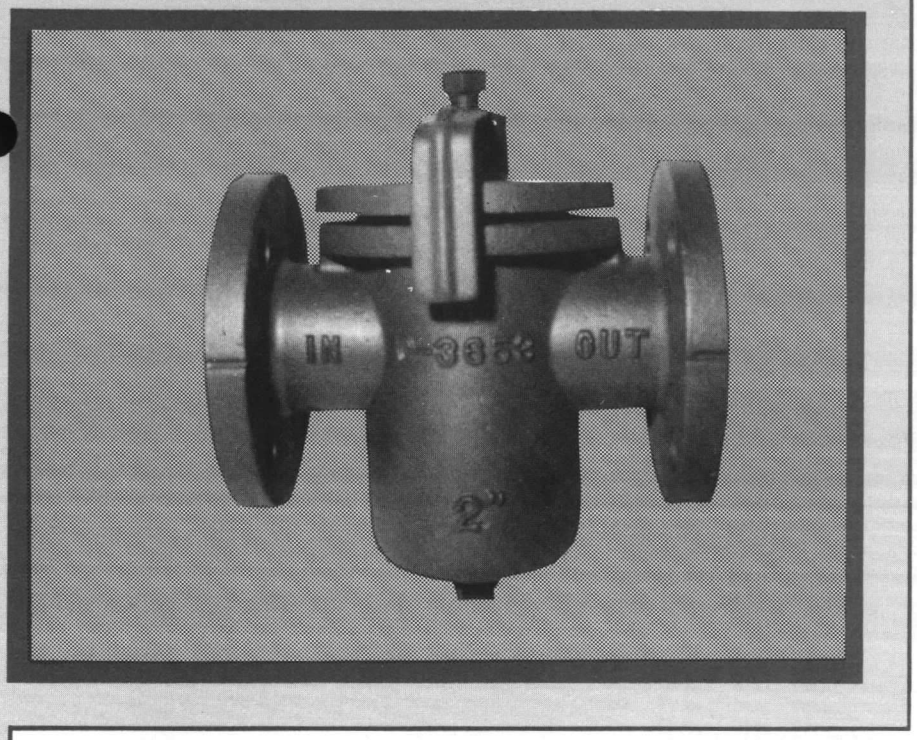
Alternate: The column shall be fabricated from 3" Type 304 Schedule 20 pipe and welded to a Type 304 stainless steel plate. Tread to be fabricated from a 12 gauge, 304 stainless sheet sandblasted to provide a non-skid surface. The back-stroke bar and anchor nipple are fabricated from 304 stainless steel pipe. The entire assembly is lightly sandblasted after fabrication and finish coated with enamel, color-coded for each lane.

NO.	DESCRIP.	DATE
REVISIONS		

Paddock POOL EQUIPMENT CO. INC.
Rock Hill, South Carolina 29730

STARTING PLATFORM

SCALE	NONE
DATE	MAY, 1981
CAT. NO.	4908
DWG. NO	A 217-1



PUMP STRAINERS

PADDOCK ® OF CALIFORNIA

LOW PROFILE STRAINER: 5734-MC, 5735-MC, 5736-MC, 5738-MC, 5740-MC, 5742-MC

Paddock's low profile strainers are constructed of heavy duty iron bodies with stainless steel baskets. They are designed to fit into the Main Drain line without undue raising of the pump or filter housing. All connections are flanged. A strong steel yoke holds the cover tightly in place yet opens quickly for cleaning of the basket.

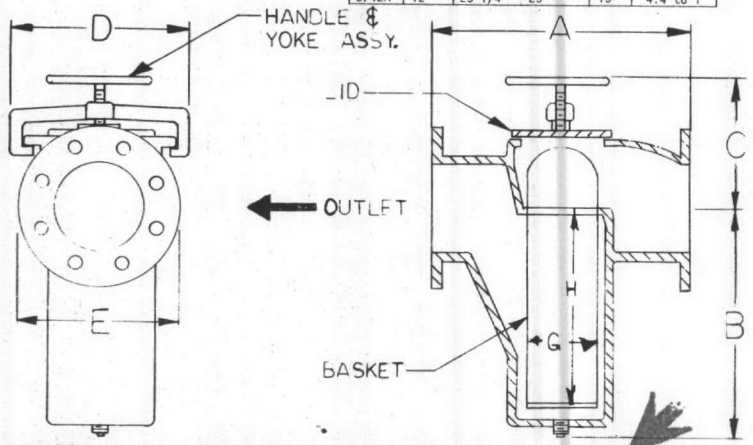
STRAINERS: 5733H, 5734H, 5735H, 5736H, 5738H, 5738M, 5740M, 5742M

Strainers are used on the suction of the recirculating pump to prevent clogging of the pump impeller and are sized according to the main suction line. Paddock strainers are of fine grained grey cast iron. The yoke and screw design top is used. The perforated basket has several times the open area of the cross-section of the pipe.

Paddock

POOL EQUIPMENT COMPANY, Inc.
555 Paddock Parkway, Rock Hill, S.C. 29730

Cat. #	Pipe Size	A	B	C	Ratio OPEN
5738M	8"	17 1/8"	15 1/2"	11"	4.2 to 1
5740M	10"	21 3/4"	16 5/8"	14"	3.5 to 1
5742M	12"	25 1/4"	25"	15"	4.4 to 1



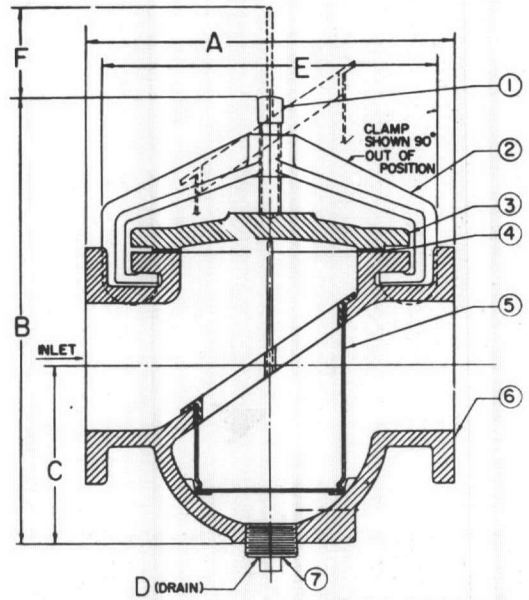
CAT. NO.	5733-H	5734-H	5735-H	5736-H	5738-H
SIZE	3"	4"	5"	6"	8"
"A"	11-3/4"	13-3/4"	16-1/8"	17-5/8"	23-5/8"
"B"	11-1/4"	10-7/8"	12-3/4"	14-1/8"	17-7/8"
"C"	4-7/8"	7"	8-1/4"	8-3/4"	12"
"D"	7-7/8"	9-1/8"	10-1/8"	11-7/8"	15-1/4"
"E"	Screwed	9"	10"	11"	13-1/2"
CAT. NO. Baskets	5753-H	5754-H	5755-H	5756-H	5758-H
"H"	7-11/16"	8-5/8"	10-1/4"	11-7/8"	15-1/2"
"G"	4-1/16"	4-9/16"	5-1/4"	6-1/4"	8-3/4"
FREE AREA SQ. IN.	44.5	58.5	80.9	112.6	200.6
RATIO FREE AREA TO PIPE AREA	6.0	4.6	4.1	4.0	4.0

SPECIFICATIONS:

Strainers:

Strainers shall be constructed of fine grained grey cast iron, designed for 125 PSI working pressure. A quick removable cast iron cover and yoke shall be sealed with a rubber gasket. Standard pipe connections for inlet and outlet shall be provided; IPS female thread for 3" and standard 125 lb. companion flange for 4" and larger. Each strainer shall be provided with a perforated brass basket which has several times the open area of the cross-section of the pipe. Strainer shall be Paddock No. 5738-H fabricated of brass for "H" Models, Stainless Steel for "M", primed and ready for painting.

			Paddock POOL EQUIPMENT CO. INC. Rock Hill, South Carolina 29730	SCALE NONE
				DATE JUNE, 1982
NO	DESCRIPTION	DATE	PUMP STRAINERS	CAT NO AS NOTED
REVISIONS				DWG NO A-227



LIST OF MATERIALS			
ITEM	PART NAME	MATERIAL	REMARKS
1	SCREW, CLAMP	STEEL	HIGH CARBON
2	CLAMP	DUCTILE IRON	ASTM A 395
3	COVER	CAST IRON	ASTM A 126 CL B
4	GASKET	ASBESTOS	
5	SCREEN ASSEMBLY	ST'N ST'L	SEE NOTES
6	BODY	CAST IRON	ASTM A 126 CL B
7	PLUG, DRAIN	CAST IRON	

DIMENSIONAL DATA									
CAT NO.	PIPE SIZE	A	B	C	D	E	F REQD for BASKET	SCREEN AREA	RATIO OPEN AREA TO PIPE SIZE
5734Mc	4"	11 1/2"	15 1/2"	8 3/4"	1"	10"	8 1/4"	98.2	3.6 TO 1
5735Mc	5"	13 1/8"	16 3/8"	8 3/4"	1"	11 3/4"	9 3/8"	115.9	2.7 TO 1
5736Mc	6"	14 3/4"	17 7/8"	9 3/8"	1 1/4"	13 1/4"	10	148.8	2.4 TO 1
5738Mc	8"	18 1/2"	26 3/4"	12 3/4"	2"	16 3/8"	11	282	2.2 TO 1
5740Mc	10"	20 1/8"	32 3/4"	13 3/4"	1"	18 3/4"	15"	377	2.0 TO 1
5742Mc	12"	27	37 3/4"	17"	3"	25"	16 1/2"	589	2.0 TO 1

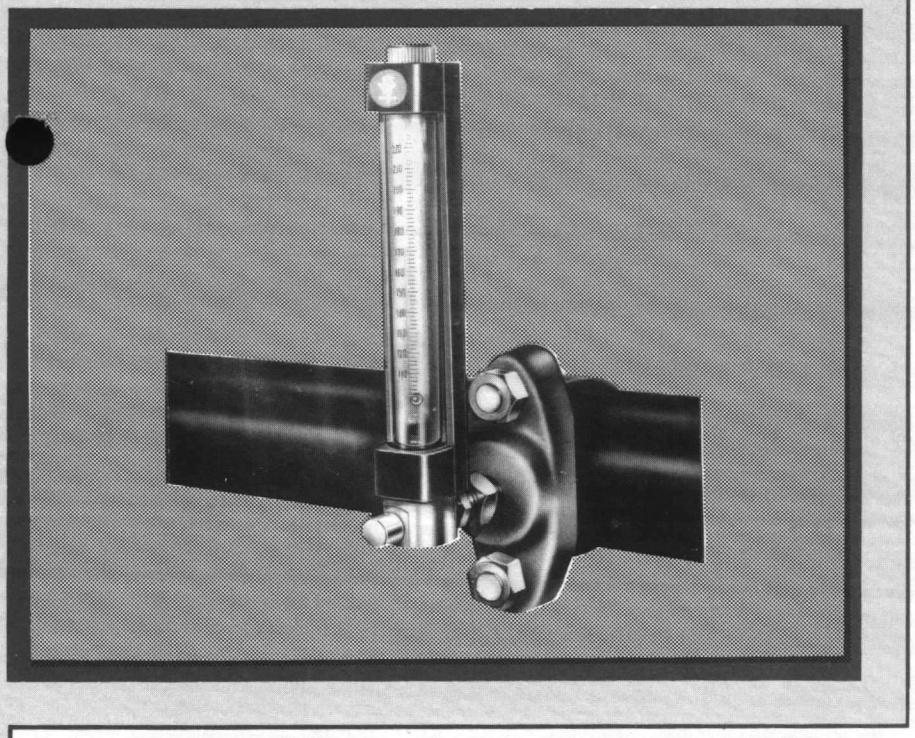
SPECIFICATIONS:

Low Profile Strainer:

There shall be supplied a low profile strainer(s). The body shall be ASTM A 126 cast iron with a stainless steel basket. Perforation in the basket shall be not more than .125" in diameter. To seal the unit, a cast iron cover shall be held in place over an asbestos gasket by a high carbon steel yoke and screw. The lid shall be easily removable for the cleaning of the strainer basket. Paddock No. _____ _____ required.

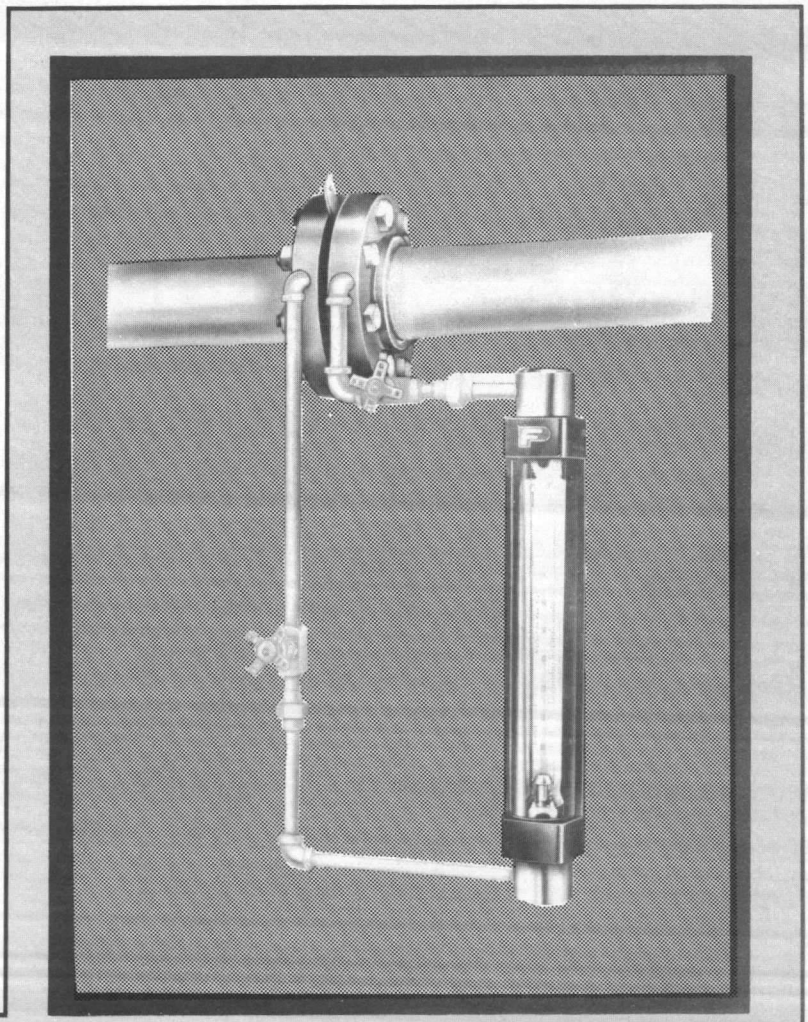
			Paddock POOL EQUIPMENT CO. INC. Rock Hill, South Carolina 29730	SCALE NONE
				DATE JUNE, 1982
NO	DESCRIPTION	DATE	LOW PROFILE STRAINER	CAT. NO AS NOTED
REVISIONS				DWG NO A-227

FILTER ACCESSORIES



FLOW METER (Impact): 5811 -8

This flow rate indicator is a combination impact tube and direct reading variable area flow meter. It can be easily and inexpensively mounted by means of a pipe saddle mounting fitting, directly in a steel or PVC pipe line running at any angle. To read the indicator simply push the button as indicated.



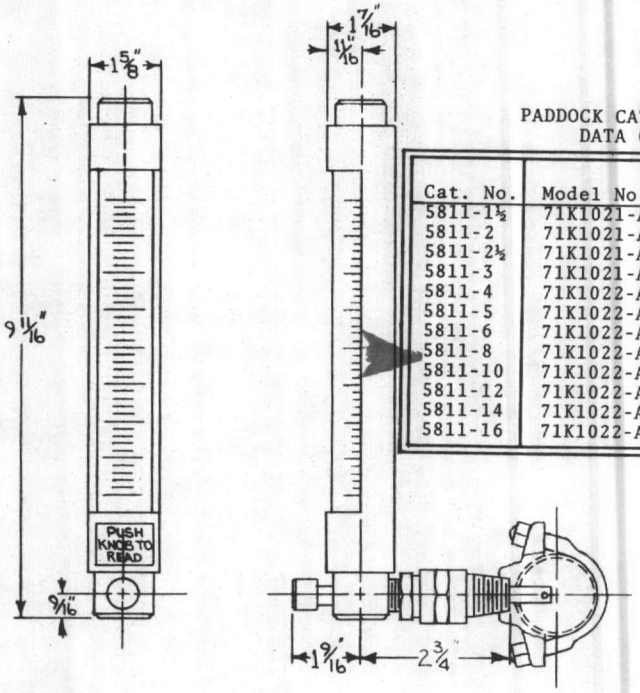
#5808

FLOW METER (Monometer): 5800

The Paddock Ori-Flowmeter is of the self purging by-pass kinetic monometer type. It provides linear indication of flow rate over a 10 to 1 flow range. It is connected to the main line by orifice taps. The meter measures by-pass flow. Accuracy of this unit is plus or minus 2%. Orifice flanges and stainless steel orifice plate must be ordered separately designating the IPS line from which flow is to be read.

Paddock

POOL EQUIPMENT COMPANY, Inc.
555 Paddock Parkway, Rock Hill, S.C. 29730



PADDOCK CAT. NO. 5811
DATA CHART

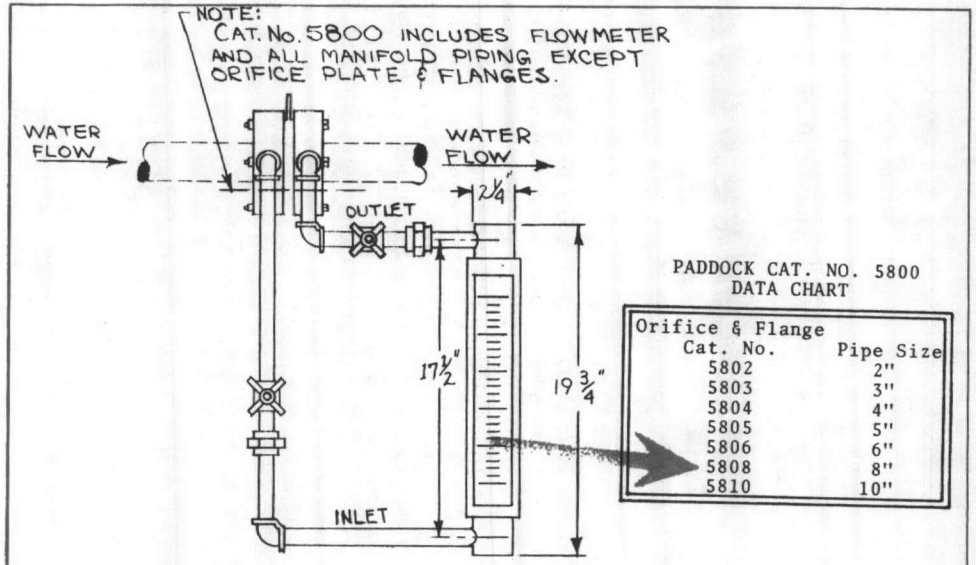
Cat. No.	Model No.	Pipe Size	GPM Flow Range
5811-1½	71K1021-A	1½"	8-80
5811-2	71K1021-A	2"	10-135
5811-2½	71K1021-A	2½"	15-195
5811-3	71K1021-A	3"	30-300
5811-4	71K1022-A	4"	40-520
5811-5	71K1022-A	5"	80-820
5811-6	71K1022-A	6"	100-1200
5811-8	71K1022-A	8"	200-2200
5811-10	71K1022-A	10"	300-3300
5811-12	71K1022-A	12"	500-4600
5811-14	71K1022-A	14"	500-5600
5811-16	71K1022-A	16"	600-7400

SPECIFICATIONS:

Flowmeter:

The indicator shall have a maximum indicated capacity of 530 GPM of water in a 8 inch diameter pipeline. The flow indicator shall be Paddock No. 5811. The indicator shall provide a minimum 10 to 1 operating range for all pipe sizes to which it shall apply. The indicator shall have a rated pressure of 100 PSI. The indicator shall be equipped with an integral shut-off valve so that the flow is indicated only when desired. The glass tubes and orifice shall be readily removable from the body for cleaning without dewatering the pipeline. The meter shall be constructed completely of metal with glass tubes and Teflon float stops. The flow rate indicator shall mount directly on the pipelines by means of a service clamp and shall not require the use of tapping or threading tools. Orifice plates and flanges are not required and the unit may be mounted in any existing line with the proper pipe saddle.

			Paddock POOL EQUIPMENT CO. INC. Rock Hill, South Carolina 29730	SCALE: NONE
				DATE June, 1979
Nº	DESCRIPTION	DATE	IMPACT TUBE VARIABLE AREA FLOWMETER	CAT. Nº 5811
REVISIONS				DWG. Nº B-226



PADDOCK CAT. NO. 5800
DATA CHART

Orifice & Flange Cat. No.	Pipe Size
5802	2"
5803	3"
5804	4"
5805	5"
5806	6"
5808	8"
5810	10"

SPECIFICATIONS:

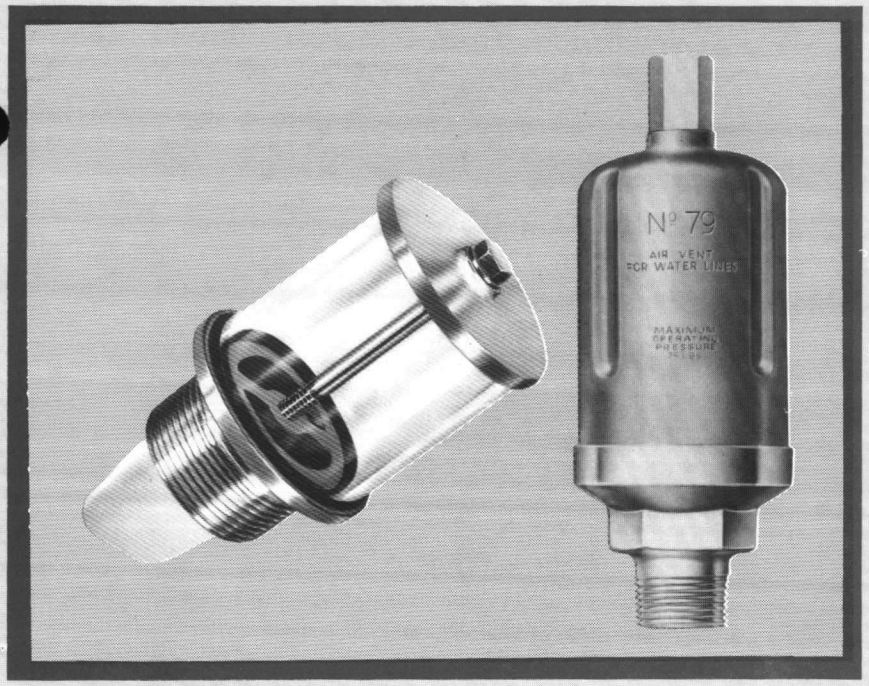
Flowmeter:

The flowmeter shall be a self-purging bypass or kinetic monometer type providing linear indication of flow rate over a ten to one flow range. The unit shall be piped to main line orifice taps with the bypass flow reading given as a function of main line flow. Ori-Flowrator seals may be readily converted from O ring to packing gland type with the provision that the entire tube, float assembly, etc. may be removed for cleaning and inspection with meter in line.

Performance shall be ± 2% of maximum bypass flow rate with a ten to one rangibility. Meter body shall be rigid extruded aluminum with all parts and fittings of corrosion resistant materials similar to Lucite, neoprene, Teflon, stainless steel, Delrin, and glass. Standard unit for pipeline mount is furnished with all manifold piping including a set of orifice flanges and stainless steel orifice plate. Flowmeter shall be Paddock No. 5808.

			Paddock POOL EQUIPMENT CO. INC. Rock Hill, South Carolina 29730	SCALE: NONE
				DATE June, 1979
Nº	DESCRIPTION	DATE	KINETIC MONOMETER ORI-FLOWRATOR	CAT. Nº 5800
REVISIONS				DWG. Nº A-226

FILTER ACCESSORIES

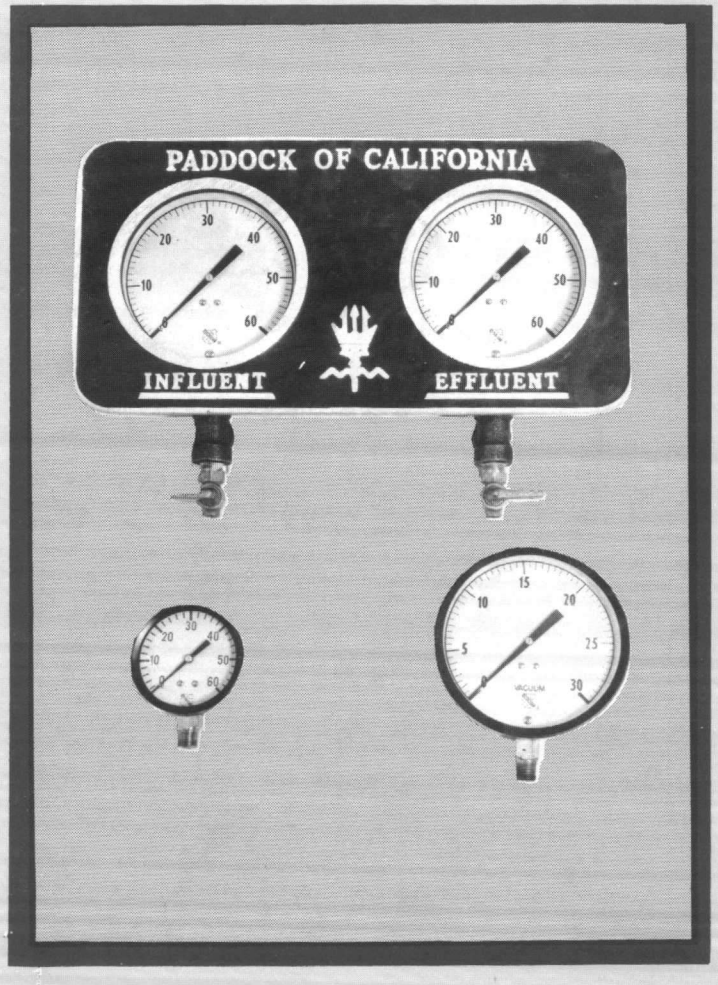


SIGHT GLASS: 5818 (1½") and 5819 (2")
The sight glass is installed in the backwash line to allow the operator to observe the clarity of the filter discharge water during backwashing. This permits the shortest possible backwash and conserves energy and water. Paddock's sight glass is constructed of chrome plated brass with a lucite viewing tube.

AIR RELIEF VALVE: 5866
Pressure filter tanks are provided with a means to automatically vent any entrapped air from the tank. The valve has a 3/4-inch male connection and is fabricated of brass. It contains a built-in check valve.

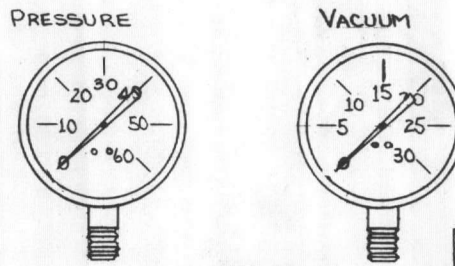
GAUGES: 5830, 5832, 5834, 5834-1, 5835
Paddock gauges are provided with easy to read faces in pressed steel cases with 1/4" IPS brass connectors. They are available in ranges from 0 to 60 lbs. per sq. in. pressure and from 0 to 30 in. of mercury vacuum in both 2 1/2" and 4 1/2" sizes and also in compound pressure-vacuum gauges.

GAUGE PANEL: 5840
This cast aluminum panel mounted securely onto a holder is supplied with two 4 1/2" gauges designed to read the influent and effluent pressure readings on a filter. The panel comes complete with gauges, sample cocks and copper tubing.

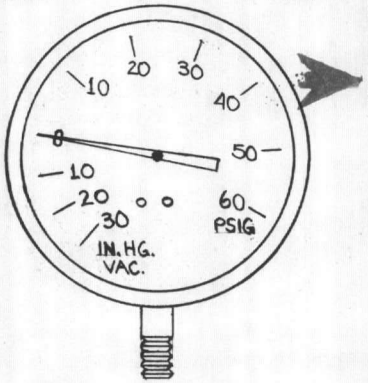


Paddock

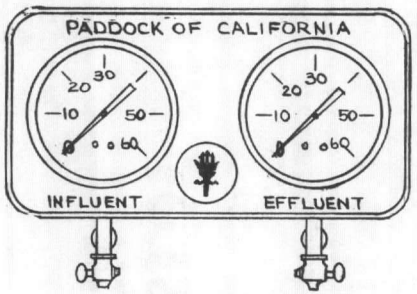
POOL EQUIPMENT COMPANY, Inc.
555 Paddock Parkway, Rock Hill, S.C. 29730



CAT. NO.	SIZE	PRESSURE	VACUUM
5830	2-1/2"	0 - 60	—
5832	4-1/2"	0 - 60	—
5834	2-1/2"	—	0 - 30
5834-1	2-1/2"	0 - 60	0 - 30
5835	4-1/2"	0 - 60	0 - 30



PRESSURE & VACUUM



GAUGE PANEL

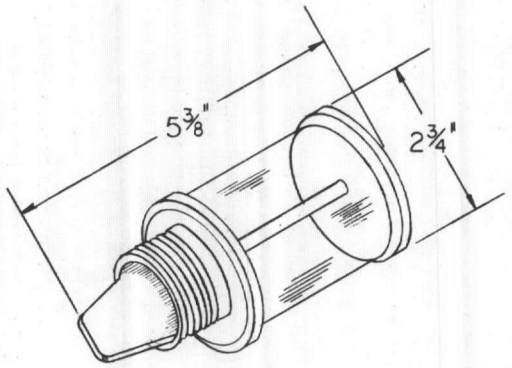
SPECIFICATIONS:

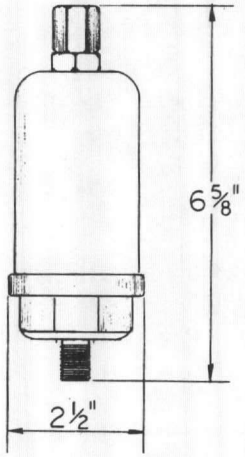
Gauges:
Gauges shall be 4 1/2 inches in diameter and shall have a glass-covered face reading directly in PSI from 0 to 60 (and/or in inches of mercury from 0 to 30). The case shall be pressed steel. The bourdon tube shall be trumpet brass soldered to the socket and tip. The brass movement shall be of the rotary gear design, mounted independent of the case.

A 1/4" IPS brass connection shall be provided for connection to tubing or directly into tapped holes provided in the system, Paddock No. 5835.

A common gauge holder panel for two 4-1/2" diameter influent and effluent gauges shall be provided. It shall be cast aluminum and designed to connect to a pipe saddle. It shall be supplied with two 4-1/2" diameter gauges, Paddock No. 5832, sample cocks and connections for tubing, Paddock No. 5840.

			Paddock POOL EQUIPMENT CO. INC. Rock Hill. South Carolina 29730	SCALE NONE
				DATE DEC. 1979
NO	DESCRIPTION	DATE	FILTER GAUGES	CAT. NO AS NOTED
REVISIONS				DWG NO B-225





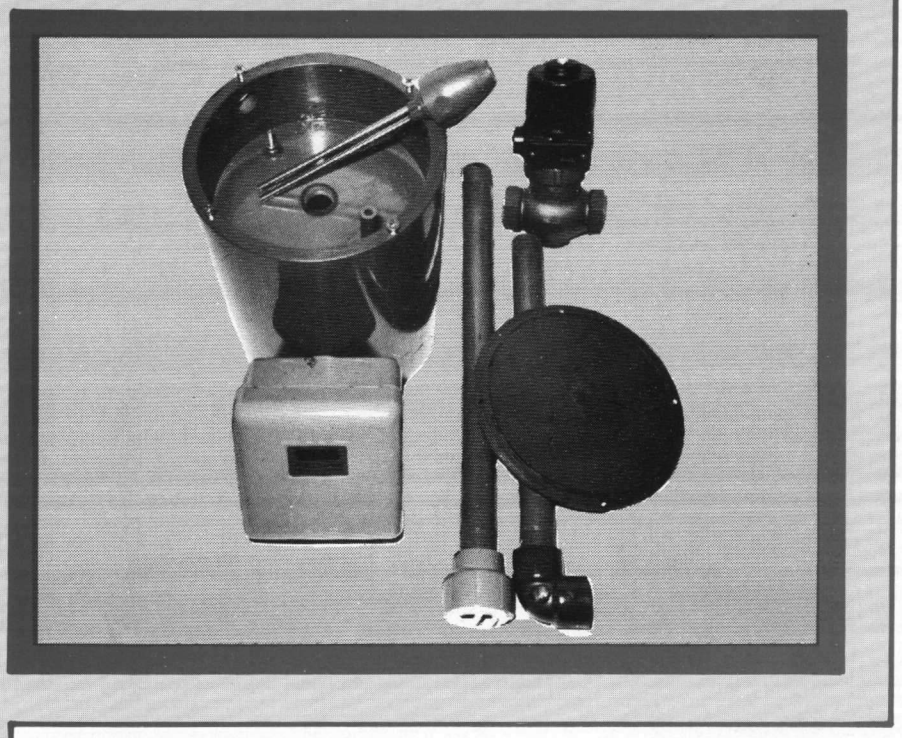
SPECIFICATIONS:

Sight Glass:
There shall be a sight glass installed in the backwash line as shown on the drawings. The sight glass shall be installed in a manner to permit the operator to view the plant effluent during backwashing. The backwash sight glass shall be constructed of cast bronze, chrome plated ends with an acrylic body. The assembly shall be held together with a central bolt. The sight glass shall have a 1 1/2 inch male IPS thread for attachment to the piping. Catalog No. 5818.

SPECIFICATIONS:

Air Relief Valve:
Each filter tank shall be provided with a 3/4" bronze air relief valve. The air relief valve shall be threaded into a coupling in the top head of the tank. The air relief valve shall be so designed as to permit the connection of the discharge line. The valve shall be of the float type. Paddock Catalog No. 5866.

			Paddock POOL EQUIPMENT CO. INC. ROCK HILL, S.C. 29730	SCALE: NONE
				DATE: DEC. 1979
NO.	DESCRIPTION	DATE	SIGHTGLASS AND AIR RELIEF VALVE	CAT. NO. AS NOTED
REVISIONS				DWG. NO. A-225

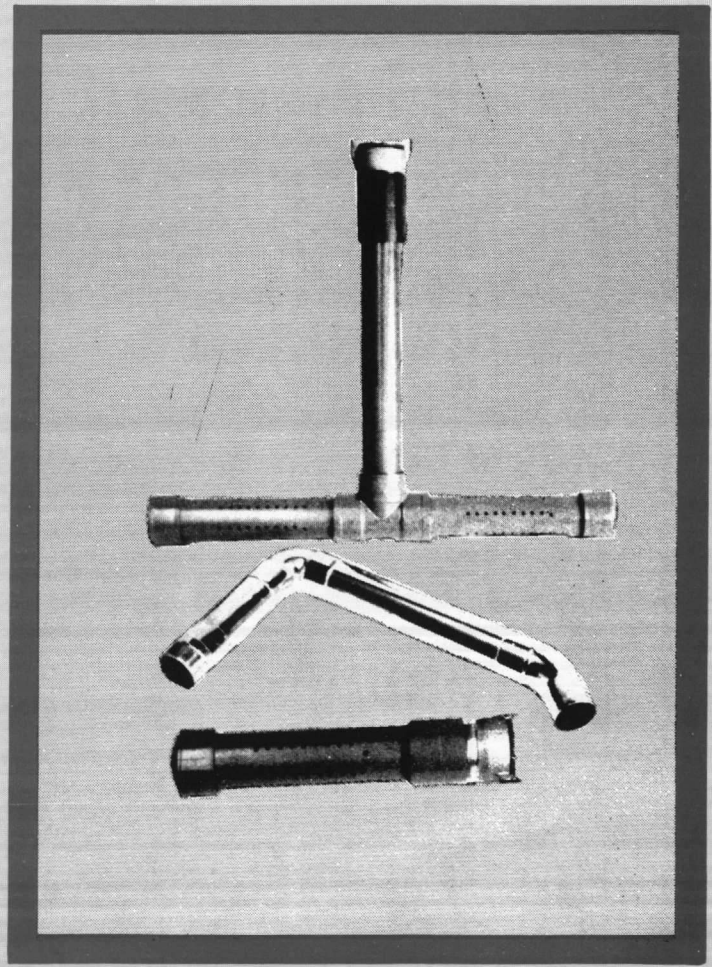


POOL ACCESSORIES

AUTOMATIC WATER LEVEL CONTROLLER: 6610
Paddock's® Automatic Water Level Controller installs in the deck and maintains a preset water level within the swimming pool by actuating a solenoid valve in the make-up water line. All parts which come in contact with the water are either plastic or stainless steel. The electrode holder and relay are UL approved. Specify the Paddock Automatic Water Level Controller and eliminate the daily manual addition of water. Any preset water level will be maintained automatically.

FILLSPOUT: 8531, 8533
Paddock's stainless steel, gracefully bent fillspout provides a method of filling the pool using an indirect connection. Fillspouts may be installed under diving board for maximum safety.

HYDROSTATIC RELIEF VALVE: 8700, 8702, 8703
This automatic valve insures the release of any hydrostatic pressures accumulating under the pool. Made of sturdy, noncorrosive machined materials, the hydrostatic relief valve provides dependable service at a minimal cost.



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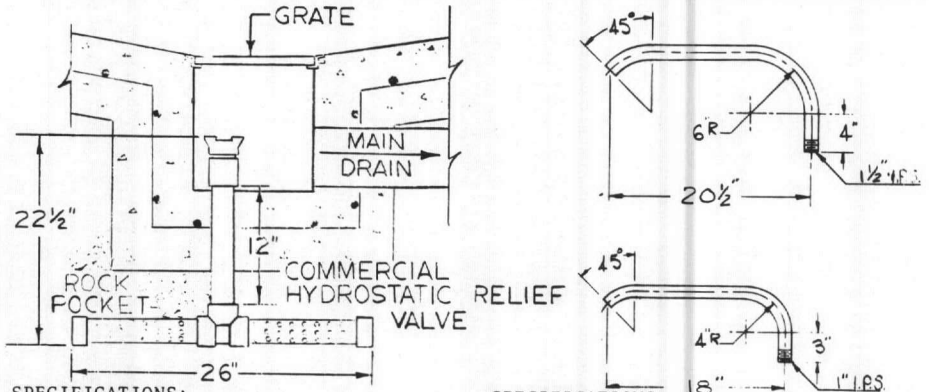
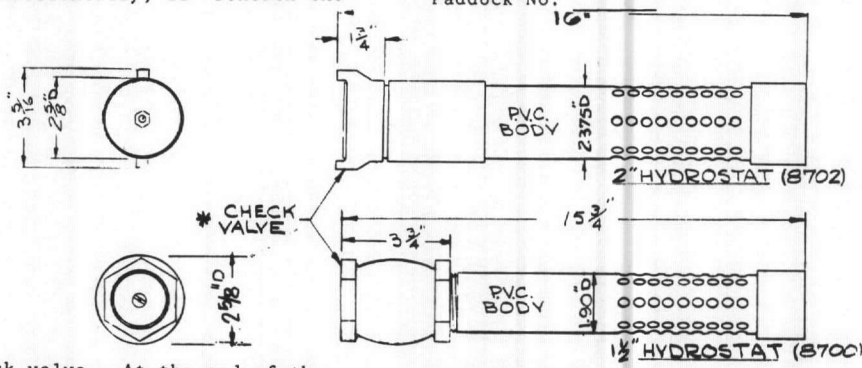
555 Paddock Parkway, Rock Hill, S.C. 29730



SPECIFICATIONS:
Hydrostatic Relief Valve:
The body of the hydrostatic relief valve shall be high impact schedule 80 PVC pipe, perforated with 3/16" holes at intervals to automatically release hydrostatic pressures under the pool. The commercial header shall have the perforated section run horizontally, 12" beneath the

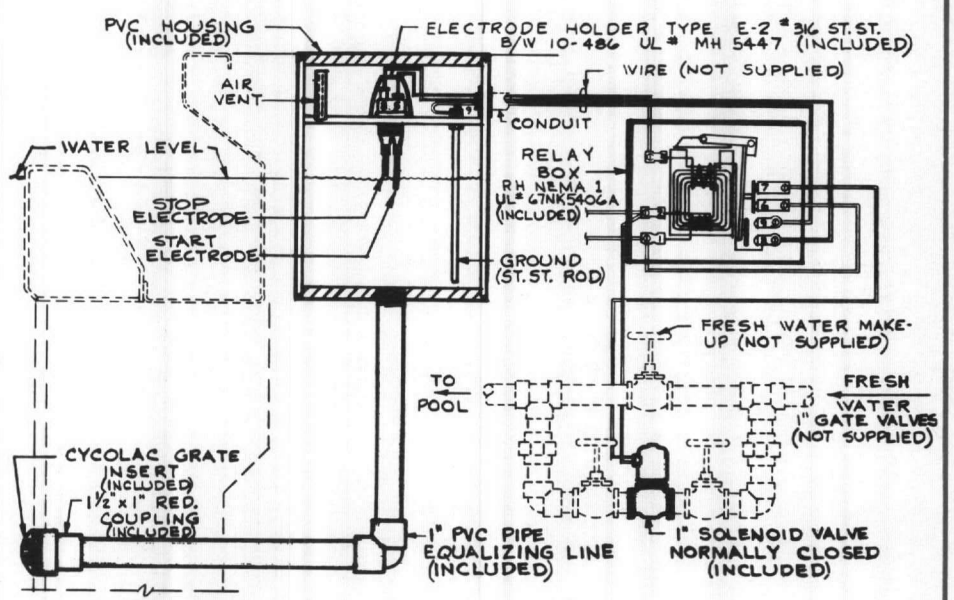
SPECIFICATIONS:
Fillspout:
The fillspout shall be constructed of stainless steel pipe gracefully bent. Fillspout shall provide an indirect connection when adding water to the pool. Fillspout sizes shall be 1" IPS, Paddock No. 8531 and 1 1/2" IPS, Paddock No. 8533. Fillspout shall be Paddock No. _____.



check valve. At the end of the perforated section, the hydrostatic relief valve body shall be capped to prevent clogging and at the top there shall be provided a check valve allowing water to enter from under the pool only. The check valve shall be of heavy _____ construction with a machined interior to insure water tightness. There shall be _____ hydrostatic relief valves supplied, Paddock No. _____.

*Normally constructed of PVC. if brass valve desired add "B" after Cat. No.

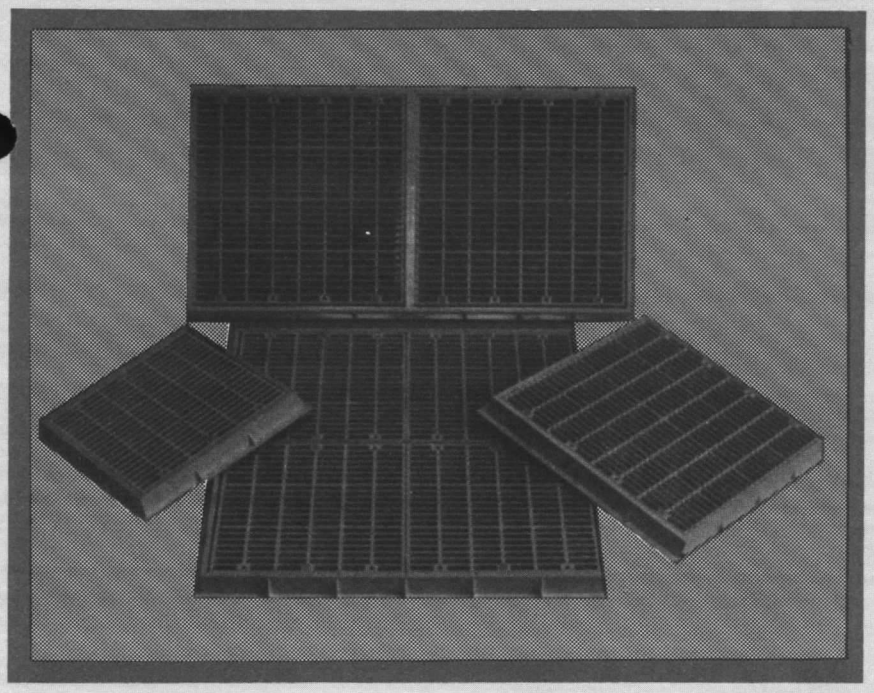
			Paddock POOL EQUIPMENT CO, INC ROCK HILL, SOUTH CAROLINA 29730	SCALE: NONE
				DATE. APRIL 1983
NO	DESCRIPTION	DATE	FILLSPOUT AND HYDROSTATIC RELIEF VALVE	CAT. NO. AS NOTED
REVISIONS				DWG NO: B-224



SPECIFICATIONS:
Automatic Water Level Controller:
There shall be an automatic water level controller supplied. It shall be the double probe (electrode) type. The electrodes shall be stainless steel and the electrode holder shall be UL approved. The electrodes and holder shall be supplied within a cylindrical PVC container. The container shall be designed for installation in the deck at poolside with a removable cover. The container shall be divided horizontally into 2 chambers with provisions for damping water surges in the lower chamber and draining of any leakage from the upper chamber. A water level sensing line shall be supplied to inter-connect the lower chamber with the swimming pool. The electrodes and a stainless steel ground rod shall protrude through the divider from the upper into the lower chamber. A hole through the upper chamber shall be provided for the attachment of conduit. A UL approved relay in a NEMA #1 enclosure and a 1" normally closed solenoid valve shall be supplied. Conduit, wiring or any required safety devices shall be supplied by the electrician. Paddock Cat. # 6610, or equal ___/___ required.

			Paddock POOL EQUIPMENT CO. INC. ROCK HILL, SOUTH CAROLINA 29730	SCALE NONE
A	CORRECT RELAY	8-22-77		DATE APRIL 1983
NO.	DESCRIP.	DATE	AUTOMATIC WATER LEVEL CONTROLLER	CAT. NO. 6610
REVISIONS				DWG. NO. A-224

FITTINGS AND CLEANING EQUIPMENT

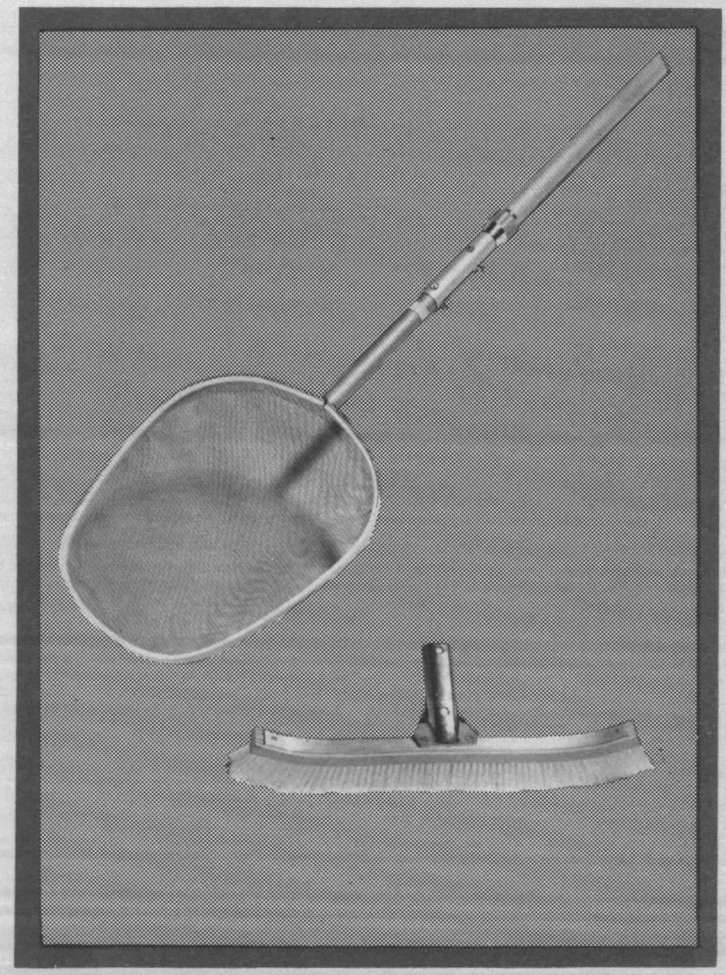


FRAME AND GRATE: 8809, 8812, 8814, 8818, 8820, 8821
Paddock's standard family of injection molded white cycolac main drains ranges from a 9" sq. to an 18" sq. size. The unique interlocking of grate members permits an unusual latitude of special sizes and shapes. The frames are extruded from dependable long life plastic.

TELESCOPIC HANDLE: 3367
Aluminum handle telescopes to any length between 8 ft. and 16 ft. by means of two 8 ft. sections. Standard 1¼" dia. exterior handle provides a two screw disconnect arrangement.

POOL BRUSH AND HOLDER: 3330
This nylon pool brush with nylon bristles has a rigid backing and is supplied with a permanently attached adaptor for the standard aluminum or telescopic handle.

LEAF SKIMMERS: 3348
Leaf skimmer with net 3" deep provides easy removal of leaves. Stainless Rim will not mark pool finish. Skimmer is provided with standard 1¼" disconnect adapter.

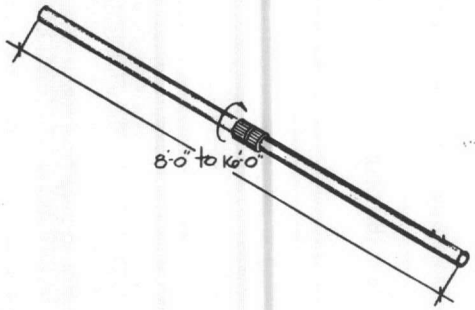


Paddock

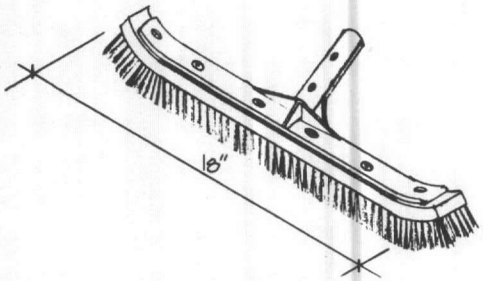
POOL EQUIPMENT COMPANY, Inc.
555 Paddock Parkway, Rock Hill, S.C. 29730

SPECIFICATIONS:

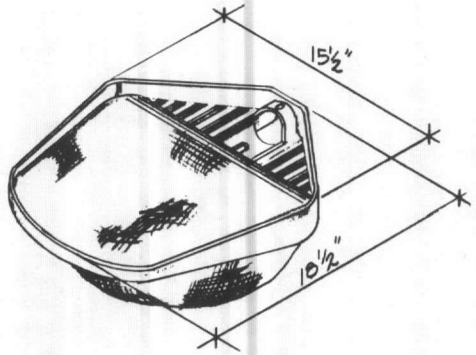
Telescopic Handle:
Cleaning tool handle shall be of the telescopic design consisting of two 8' lengths of anodized aluminum tubing, a 1" tube fitted inside a 1-1/4" tube. Handle shall be adjustable from 8' to approximately 16' having a threaded bushing type clamp to lock handle at desired position. The attachment shall have a quick disconnect arrangement which will attach to the cleaning tools. Telescopic handle shall be Paddock No. 3367.



Pool Brush:
The pool brush and holder shall be permanently attached. The pool brush shall be 18" long with nylon bristles and rigid back. Holder bracket shall be of cast aluminum and shall be designed for easy attachment to standard 1-1/4" aluminum handle. Paddock No. 3330.

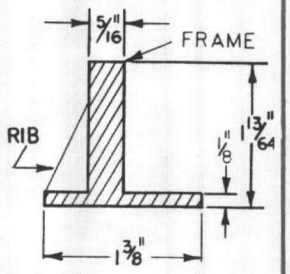


Leaf Skimmers:
Skimmer head shall consist of a one piece molded plastic frame with a reinforced, integral handle bracket suitable for quick attachment to a standard 1-1/4" diameter handle using bolts and wing nuts. The standard nylon net shall be attached to the frame using the groove and spline method. Net depth shall be four inch minimum in the center. Paddock No. 3348.

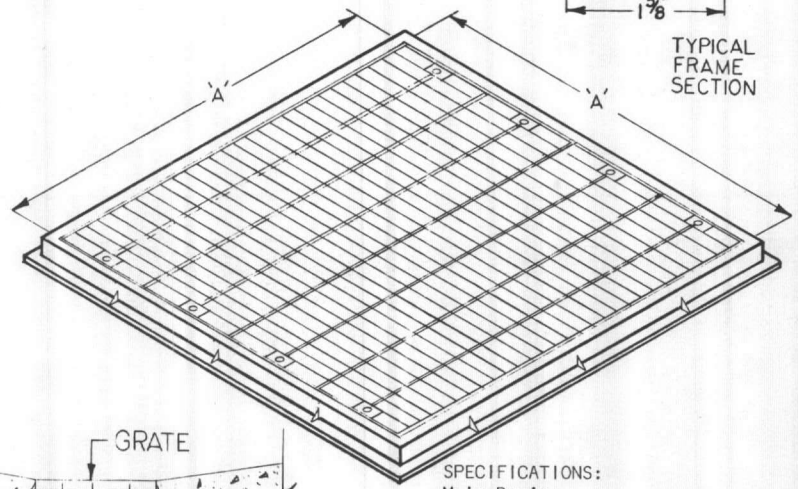


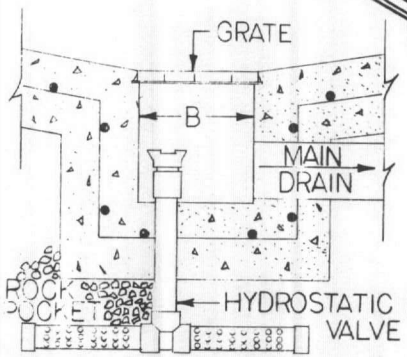
DATE JUNE, 1982	Paddock POOL EQUIPMENT CO. INC. ROCK HILL, SOUTH CAROLINA 29730	SCALE	NONE
REVISION DATE		CAT. NO.	AS NOTED
	TELESCOPIC HANDLE, POOL BRUSH & LEAF SKIMMER	DWG. NO.	B-220

CAT. NO.	A	B	OPEN AREA
8809	9" x 9"	7 3/4"	38.6 SQ. IN.
8812	12" X 12"	10 5/8"	69 SQ. IN.
8814	12" X 24"	10 5/8" x 22 3/16"	138 SQ. IN.
8818	18" X 18"	16 3/4"	154.5 SQ. IN.
8820	12" X 36"	10 5/8" x 33 3/4"	207 SQ. IN.
8821	18" X 36"	16 3/4" x 35 3/8	309 SQ. IN.



TYPICAL FRAME SECTION





SPECIFICATIONS:
Main Drain:
The Main Drain frame and grate shall be white and fabricated from complete non-ferrous materials. The grate shall be injection molded cycolac. The frame shall be injection molded cycolac and shall be designed with a flange for holding it in place in the concrete and shall have a lip for supporting the grate. Paddock No. 5818, 2 required.

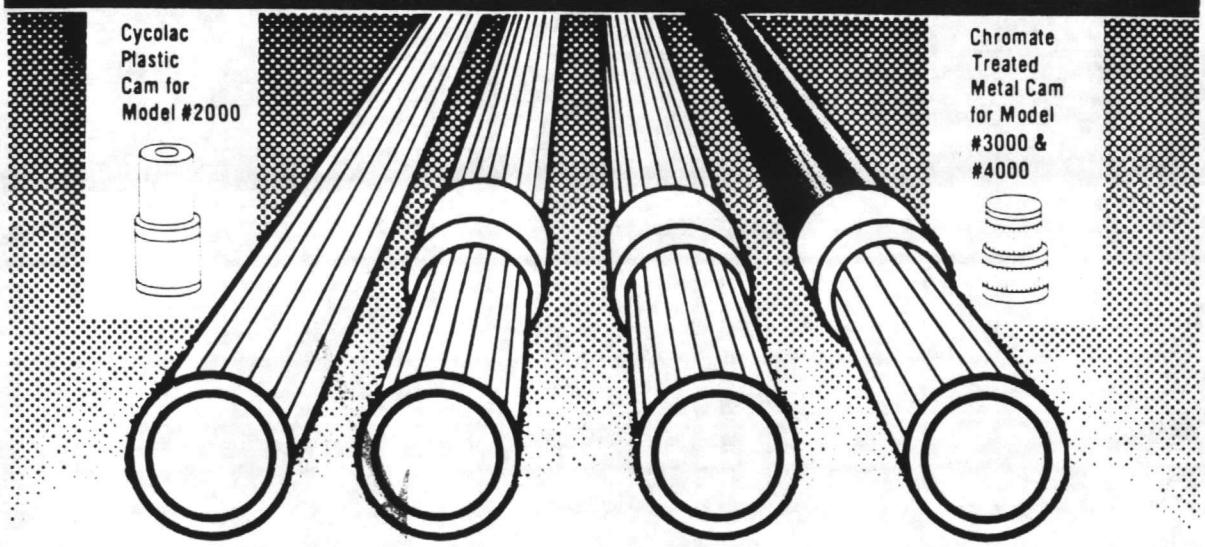
A	OPEN AREAS	3-5-80	Paddock POOL EQUIPMENT CO. INC. ROCK HILL, SOUTH CAROLINA 29730
NO.	DESCRIP.	DATE	MAIN DRAIN FRAME AND GRATE
REVISIONS			

SCALE	NONE
DATE	JUNE, 1982
CAT. NO.	AS NOTED
DWG. NO.	A-220

4 Ways with Royal Extruded Aluminum Poles...

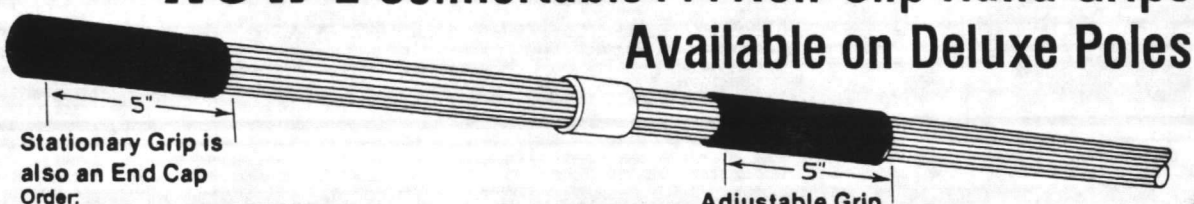
-
-
-
-

Ezy twist lock cams - simple wrist action - locks & unlocks



STRAIGHTS 8' 12' 16' / TELESCOPES to approx. 12' 16' 20' 24'

NOW 2 Comfortable . . . Non-Slip Hand Grips Available on Deluxe Poles



Stationary Grip is also an End Cap

Order:
#3500 Deluxe Pole with Grips
#4500 Blue Deluxe Pole with Grips

Adjustable Grip
Can be moved up or down pole to match your reach.

ROYAL ALUMINUM, INC.

Distributed by

Paddock #3217 - 12'

Paddock #3360 - 16'

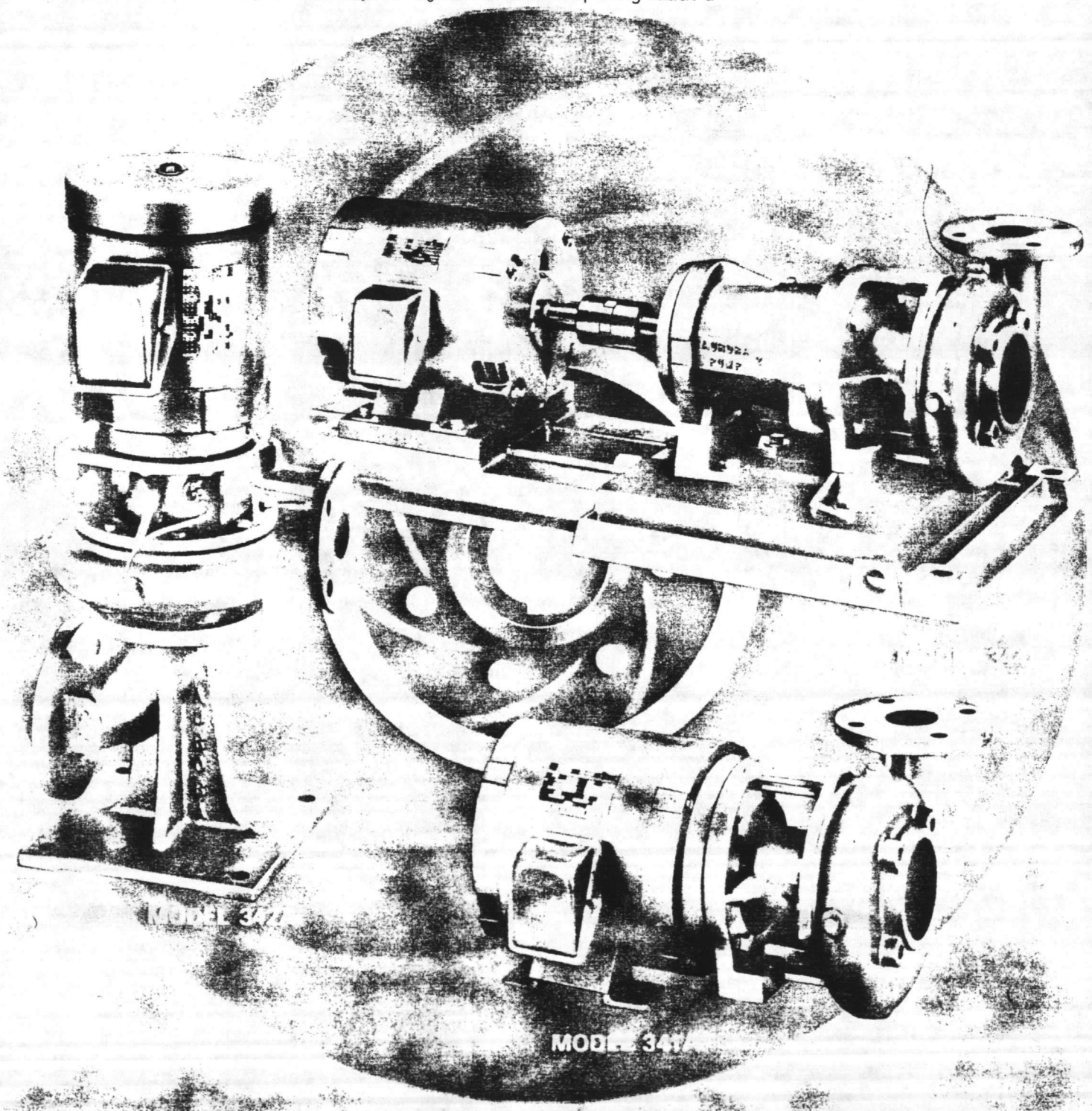
AURORA® PUMPS

BULLETIN 340B

340 SERIES SINGLE STAGE END SUCTION PUMPS

CAPACITIES TO 1900 G.P.M.
HEADS TO 360 FEET
TEMPERATURES TO 225°F.

Aurora 344, 5x6x12, Recirculating Pump and Motor, 830 GPM at 55', 20 HP, 208 Volt, 3 Phase, 60 Cycle with Coupling Guard



A.I.A. FILE NO. 30-C-5

970 AURORA PUMP, AURORA, ILLINOIS

ENGINEERING SPECIFICATIONS AND DIMENSIONS

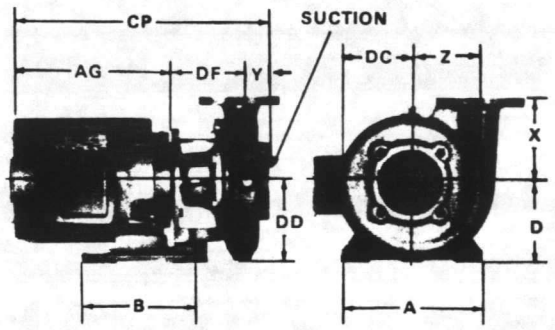
FLEXIBLE-CLOSE COUPLED PUMPS
The contractor shall furnish (~~and install as shown on the plans~~) Aurora Model (~~341A horizontal close coupled~~) (~~342A vertical close coupled~~) (344A horizontal flexible coupled) back pull out centrifugal pumps size .5.x.6.x.12 of (bronze fitted) (~~all iron~~) construction. Each pump shall have a capacity of 330 GPM at 55. ft. total head, with a temperature of .. °F., .. specific gravity and structureborne sound level not to exceed .. ADB. Each pump is to be furnished with a mechanical seal with all metal parts to be 303 stainless steel with "Buna-N" elastomers, Ni-Resist seat, and carbon washer. The unit must be equipped with (bronze) (~~stainless steel~~) keylocked shaft sleeve that extends the length of the seal box. The pump shaft extension shall be "O" ring sealed from the pumped liquid. Pump shall have a case wearing ring (~~impeller wearing rings~~). Impellers to be vacuum cast, dynamically balanced, and keylocked to the shaft.

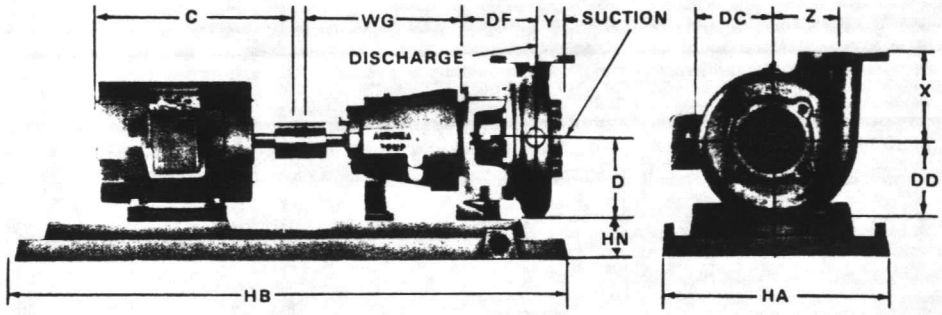
FLEXIBLE COUPLED PUMPS (344A)
Pump and motor are to be mounted on a common (fab. steel drip rim) (steel) baseplate. The shaft is to be steel, installed in a cast iron power frame. Pumps shall have a shaft design for .002" deflection at the seal face with the pump running under max. load condition. (Grease) (oil) lubricated ball bearings, having a 3 year min. life (AFBMA B_{10}) under the max. condition of load protected by separate oil seals and slingers, shall be used. The pump shall be flexible coupled to a standard horizontal NEMA ... HP ... phase ... Hertz ... volts ... RPM (drip-proof) (totally enclosed) (explosion-proof) motor. Alignment shall be checked in accordance with the Standards of the Hydraulic Institute after installation and there shall be no strain transmitted to the pumps.

CLOSE COUPLED PUMPS (341A)
CLOSE COUPLED PUMPS (342A)
Each pump is to be close coupled to a standard HI-NEMA-JM 20HP 3. phase 60 Hertz 208volt 1750 RPM (drip-proof) (~~totally enclosed~~) (~~explosion-proof~~) motor. Model 341A in motor frame sizes up to 184JM shall be supported by a separate support foot on the pump bracket.

NOTES:
1. Dimensions and weights are approximate.
2. All dimensions are in inches and may vary ± 1/4".
3. Frame sizes "C" & "AG" dimension and motor weight are for open drip proof motors only.
4. Conduit box is shown in approximate position. Dimensions are not specified as they vary with each motor manufacturer.
5. Add pump, base and motor weight for unit weight.
6. Not for construction purposes unless certified.
7. Discharge position No. 2 and 3 is not available on Model 341A and 344A. Position No. 1 is furnished as standard unless otherwise specified. See page 4.
8. Aurora Pump reserves the right to make revisions to its products and their specifications, and to this bulletin and related information, without notice.
9. When two "D" dimensions are indicated, always use the larger figure.
10. Note: Power frame selection can be made from the range charts.

†Model 341A & 342A have "JM" motor frames
Model 344A have "T" frame motors





PUMPS WITH THREADED CONNECTIONS

PUMP SIZE DISCH.	SUCTION	CASE BORE	PUMP WEIGHT IN LBS.	X	Y	Z	DC	DD	DF FRAME 1 143 JM-213 JM	DF FRAME 2 or 3 254 JM-256 JM	VD	VE	VY
1-1/4	1-1/2	7	52	5-1/4	2-7/16	4-3/16	4-15/16	5-3/16	4-3/4	—	9-3/8	3-3/4	4
1-1/4	1-1/2	9	71	6-5/8	2-9/16	5-3/8	6-3/16	6-3/8	4-11/16	—	9-3/8	3-3/4	4
1-1/2	2	7	56	5-3/8	2-1/2	4-5/16	5-1/8	5-3/8	4-13/16	—	10-5/16	4-1/8	4-1/2
1-1/2	2	9	76	6-3/4	2-5/8	5-1/2	6-5/16	6-9/16	4-3/4	5-3/4	10-5/16	4-1/8	4-1/2
1-1/2	2	12	112	7-3/4	2-3/4	7-1/16	8	8-1/4	4-7/8	5-7/8	10-7/16	4-1/8	4-1/2
PUMPS WITH AM. STD. 125 LBS. FLANGED CONNECTIONS													
2	2-1/2	7	68	5-5/8	1-7/8	4-9/16	5-3/8	5-13/16	4-15/16	5-15/16	11-7/16	4-1/2	5
2	2-1/2	9	94	7	1-7/8	5-11/16	6-1/2	6-7/8	4-7/8	5-7/8	11-7/16	4-1/2	5
2	2-1/2	12	142	8	1-7/8	7-3/16	8-3/16	8-1/2	5	6	11-7/16	4-1/2	5
2-1/2	3	7	73	5-7/8	2	4-13/16	5-13/16	6-1/4	5-1/16	6-1/16	12-9/16	5	5-1/2
2-1/2	3	9	101	7-1/4	2	5-15/16	6-3/4	7-1/4	5	6	12-9/16	5	5-1/2
2-1/2	3	12	142	8-1/4	2	7-3/8	8-3/8	8-3/4	5-1/8	6-1/8	12-9/16	5	5-1/2
3	4	9	104	7-1/2	2-1/8	6-1/8	6-7/8	7-7/16	5-1/8	6-1/8	14-11/16	6	6-1/2
3	4	12	158	8-1/2	2-1/8	7-9/16	8-7/16	8-15/16	5-1/4	6-1/4	14-11/16	6	6-1/2
4	4	7	103	6-1/2	2-1/2	5-1/2	6-7/16	7-5/16	5-7/16	6-7/16	14-15/16	6	6-1/2
4	5	9A	133	7-1/4	3-1/8	5-3/4	6-11/16	7-3/8	5-1/4	6-1/4	17-3/16	6-1/2	7-1/2
4	5	9B	133	7-3/4	2-5/8	6-5/8	8-1/16	8-11/16	5-3/8	6-3/8	16-11/16	6-1/2	7-1/2
4	5	12	176	8-3/4	2-5/8	7-15/16	8-7/8	9-9/16	—	6 1/2	16-11/16	6-1/2	7-1/2
•5	6	12	195	9	2-7/8	8-5/16	9-1/4	10-1/8	—	6-3/4	—	—	—
6	6	9	164	8-1/4	2-3/4	7	8	9	5-1/2	6-1/2	17-13/16	7	8
•6	6	12	221	9-1/4	3-1/8	8-11/16	9-11/16	10-13/16	—	7	—	—	—

•Not available in Models 341A and 342A.

PUMP MODEL	BASE NUMBER	WEIGHT IN POUNDS	HA	HB	HN
344A	1	100	14-1/2	42-3/4	3-1/2
	2	110	17	43	3-1/2
	3	175	19	51	4-1/2

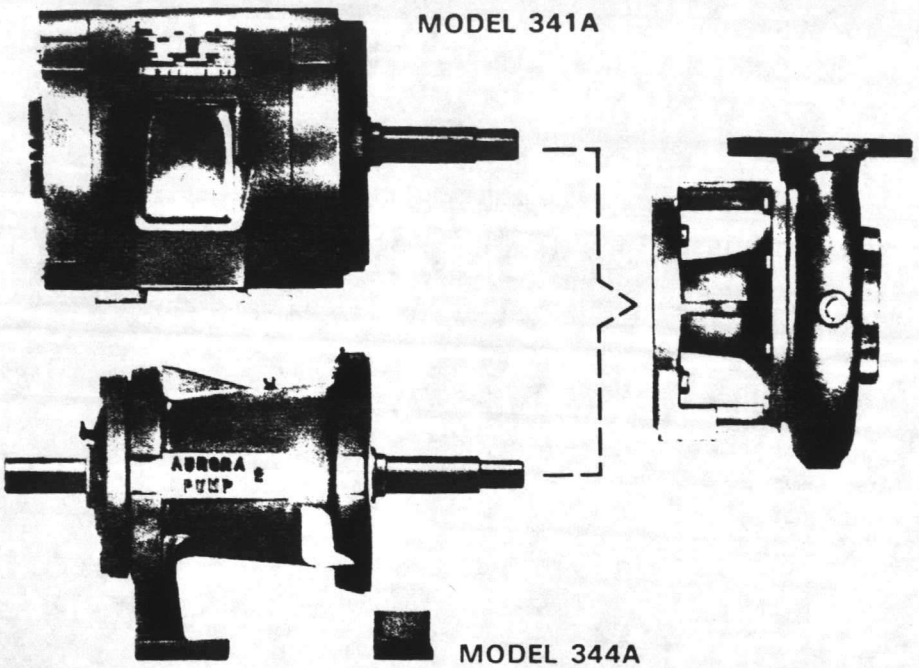
POWER FRAME		1	2	3
WEIGHT IN POUNDS		36	82	87
D	CASE BORE 7	5-1/4	6-1/4	—
	CASE BORE 9 & 12	6-1/4	7	7
WG		10-5/16	13-13/16	13-13/16

PUMP MODEL	MOTOR FRAME	HORSEPOWER 3500 RPM	HORSEPOWER 1750 RPM	MOTOR WEIGHT IN LBS.	D
344A	56	—	1/3-1/2-3/4	50	5-1/4
	143T	1-1/2	1	30	5-1/4
	145T	2-3	1-1/2-2	35	5-1/4
341A, 342A† & 344A	182T	5	3	45	5-1/4
	184T	7-1/2	5	50	5-1/4
	213T	10	7-1/2	120	5-1/4
	215T	15	10	144	5-1/4
	254T	20	15	217	6-1/4
	256T	25	20	246	6-1/4
	284T	—	25	320	7
	284TS	30	—	320	7
	286T	—	30	351	7
	286TS	40	—	351	7
	324T	—	40	442	8
	324TS	50	—	442	8
	326TS	60	50	522	8
	364TS	75	60	625	9

PUMP MODEL 341A & 342A A	B	AG	C	BASE NUMBER 1	2	3
—	—	—	12	1	—	—
9-3/4	8-5/8	10	11	1	—	—
9-3/4	8-5/8	11	12	1	2	—
9-3/4	8-5/8	11	13	1	2	—
9-3/4	8-5/8	12	14	1	2	—
10-1/2	7-1/2	14	16	1	2	—
10-1/2	9	15	18	1	2	—
12-1/2	10-3/4	17	21	1	3	3
12-1/2	12-1/2	19	23	—	3	3
—	—	—	24	—	3	3
—	—	—	22	—	3	3
—	—	—	25	—	3	3
—	—	—	24	—	3	3
—	—	—	26	—	3	3
—	—	—	25	—	3	3
—	—	—	26	—	3	3
—	—	—	27	—	3	3

AURORA PUMP
A UNIT OF GENERAL SIGNAL
800 AIRPORT ROAD • NORTH AURORA, ILLINOIS • 60542
SALES OFFICES IN ALL MAJOR CITIES AND COUNTRIES
Refer to "Pumps" in the yellow pages of your phone directory
MANUFACTURING FACILITIES ARE LOCATED IN THE FOLLOWING CITIES: NORTH AURORA, ILLINOIS • CITY OF INDUSTRY (GREATER LOS ANGELES), CALIFORNIA
Export Dept.: No. Aurora, Illinois, Cable Address "NYABINT"

INTRODUCTION
AURORA 340 SERIES PUMPS



MODEL 341A

MODEL 344A

INTERCHANGEABILITY

The 340 series offer the greatest degree of interchangeability. An important interchangeability feature is shown. The complete liquid end (casing, impeller, and bracket) of any size pump is fully interchangeable between standard close coupled JM motors and the Aurora power frame of comparable size. The shaft extension and mounting face dimensions are identical. This means less spare parts inventory & speedy delivery on replacement parts or components. A 2½ x 3 x 7 pump is shown illustrating typical interchangeability between motor frame 215 JM & the number 2 power frame, 341A and 344A respectively.

Today's problem of liquid handling is much more involved than it was just five years ago. The variety of liquids being handled has increased along with temperatures and pressures. The costs of engineering and construction have risen considerably. The need for economy and interchangeability in design has become more important. The variety of today's installations demands quiet, smooth-running pumps with long life. Sound data is now required to assure quiet pump operation.

The reliability of pump performance has become an essential. The 340 series is a modern design based on Aurora Pump's 65 years experience with the design, sales and manufacture of centrifugal pumps. Significantly, pump Models 341A and 342A offer as standard HI-NEMA type JM stock motors. Aurora Pump also offers the power frame mounted Model 344A as a solution to your pumping problems. With this new design Aurora Pump offers several important features:

QUIET, SMOOTH-RUNNING DESIGN FOR LONGER LIFE.
MAXIMUM INTERCHANGEABILITY FOR GREATER ECONOMY.
COMPACT DESIGN FOR EASY INSTALLATION AND MAINTENANCE.
RELIABLE PUMP OPERATION.

Look through this bulletin and see what real accomplishments can be made when an imaginative approach is taken to the customer's problem of moving liquids within complex piping installation systems of today.

STANDARD

Bronze fitted construction
Bronze shaft sleeve
Dynamically balanced vacuum cast impeller
Casing wearing ring
303 Stainless mechanical seal with Buna-N, Ni-Resist and carbon parts
Regreaseable bearings (Model 344A)
Discharge position No. 1
Std. JM motor (Model 341A, 342A)
V.I.P. performance test
Coupling guards (Model 344A)

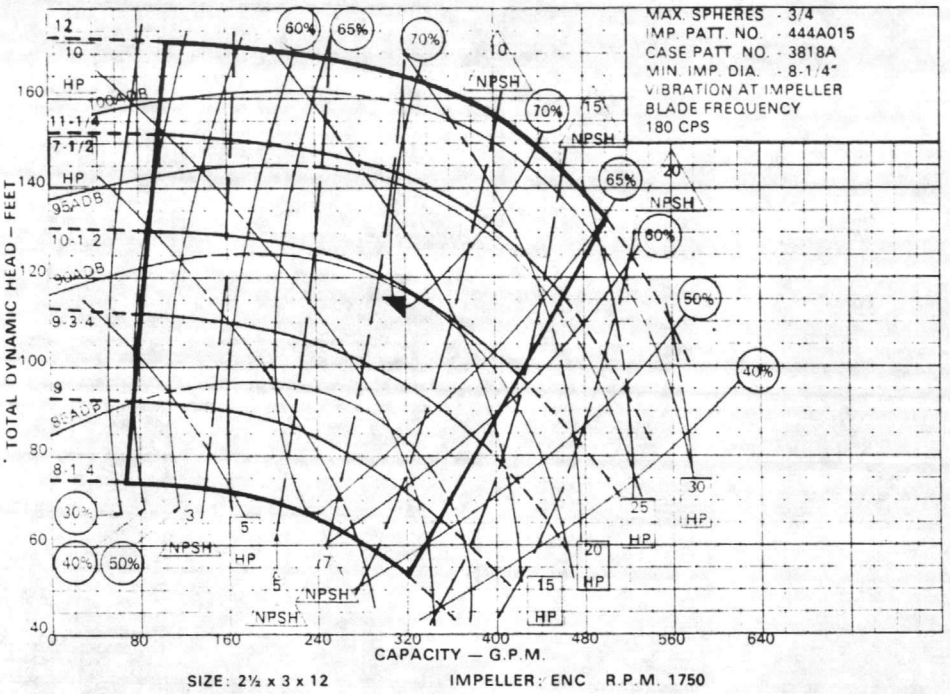
OPTIONAL

All iron construction
316 Stainless steel shaft sleeve (standard on all iron pumps)
Stainless steel shaft
Impeller wearing rings
Oil lubricated ball bearings (Model 344A)
Discharge position No. 2, 3 & 4 (see dimensions)
Fabricated steel drip-rim bases (Models 341A & 344A)
Formed steel bases (Model 344A)

NEW PUMP STANDARDS FROM AURORA

1. SOUND DATA

The problem of noise in commercial and industrial buildings has become more acute in recent years. Noise problems associated with pumping installations are troublesome, expensive, and frequently very difficult to solve. The best way to solve a noise problem is to prevent it. As a result, quite often building specifications will state the maximum acceptable structureborne sound level readings for rotating equipment in acceleration decibels (ADB). Technical facts available. Aurora Pump has extensive sound testing facilities and has long been involved in building "quiet" pumps for use aboard submarines. These facilities have been used to derive the maximum structureborne sound level lines (ADB) now shown on 1750 and 1150 R.P.M. pump curves. The two color performance curve shown is typical of the individual catalog curves now available on many Aurora Pump models and sizes.



Specifying maximum sound levels in addition to capacity and head will assure the pump user of minimum potential noise problems. The following example shows how the pump curves are used:

EXAMPLE For a size 2½ x 3 x 12 duty point 320 gpm at 115 ft. head, the maximum structureborne vibration from the pump would be 90 ADB. The NPSH required would be eight feet.

2. STANDARD TYPE JM MOTORS

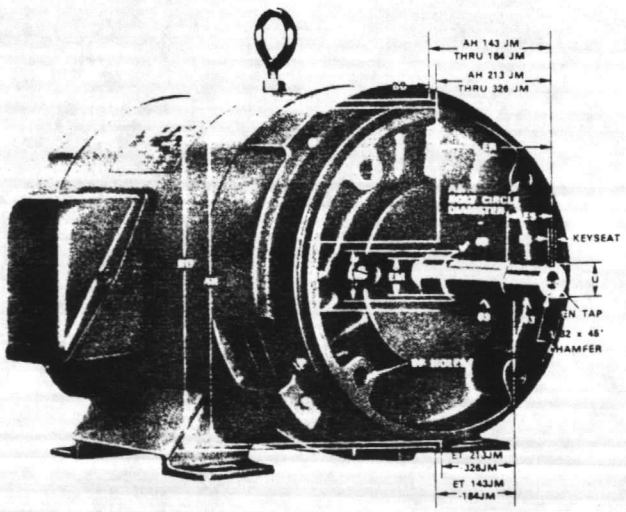
Motors used on Aurora Model 341A close coupled pumps are a major engineering advancement. The best experience and talent of both the motor and pump industries, meeting over many months, derived the first joint NEMA-Hydraulic Institute Standard on motors to be used on close coupled pumps. The new standard Type JM motor is thus better matched with the pump than has ever been possible before.

Advantages of the joint NEMA-Hydraulic Institute standard motor to the close coupled pump users are:

1. Increased availability of motors. Less danger of downtime.
2. Better control of tolerances and quieter, more uniform performance.
3. Assured control of shaft deflection and longer mechanical seal life.
4. Adequate bearing size for longer bearing life.

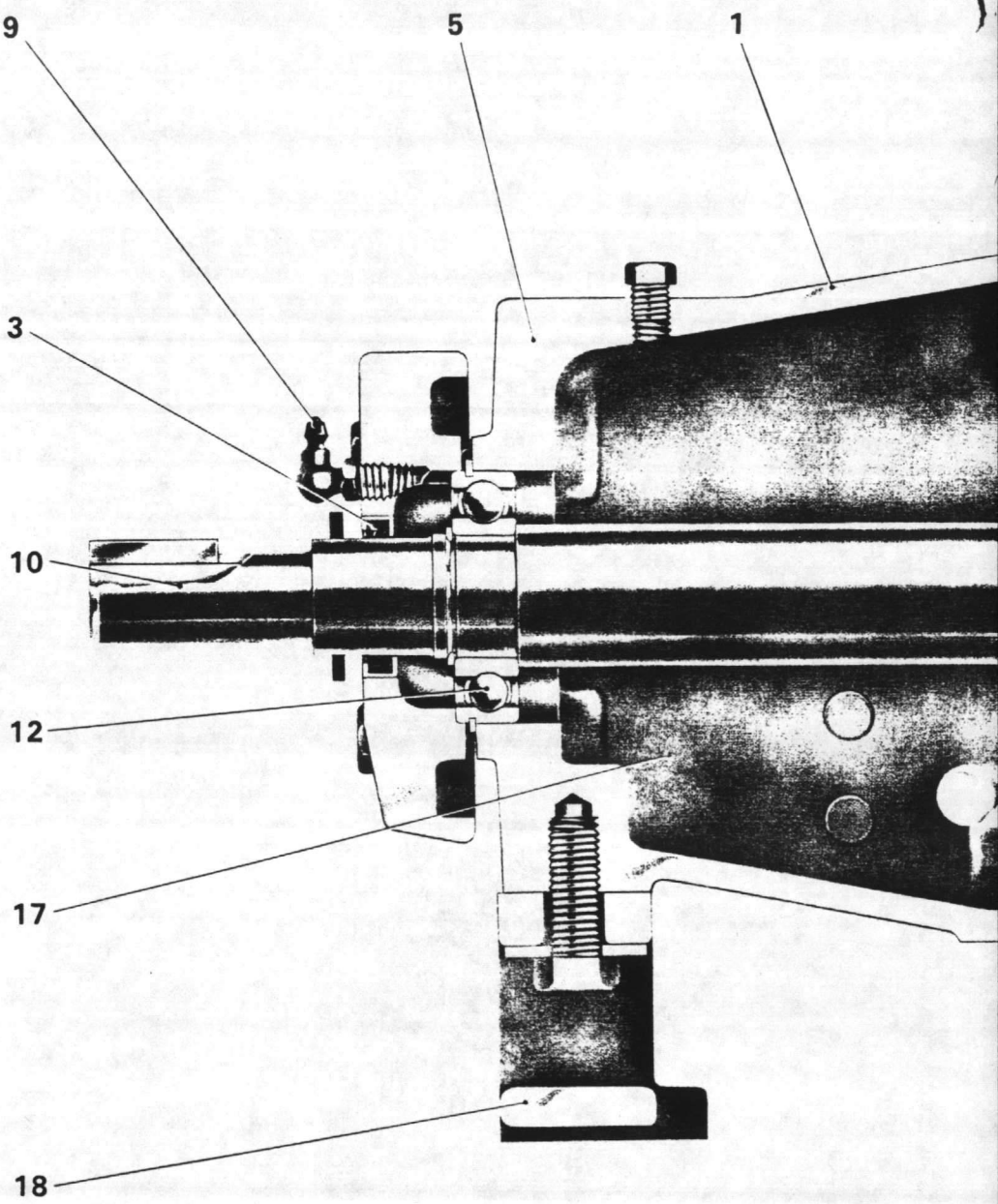
Standardized dimensions for the close coupled motor are illustrated. Detailed dimensions can be obtained from Aurora Pump, your motor supplier, NEMA, or the Hydraulic Institute.

These motors are now available at no added cost. Specify: all close coupled pumps to use joint NEMA-Hydraulic Institute design type JM motors for pump use.



PUMP FEATURES

1 COMPUTER-MACHINED major components with 360 degree registered fits to assure concentricity of all pump parts.
2 VACUUM CAST IMPELLER Quality controlled manufacturing process assures consistently high pumping performance.
3 OIL SEALS and non-sparking Neoprene rotating slingers protect both bearings during pump operation and pump washdown.
4 MECHANICAL SEAL has carbon against Ni-Resist face for optimum hot water performance. Long life is also assured with 303 stainless steel metal parts and "Buna-N" elastomers.
5 POWER FRAME provides maximum interchangeability for flexible coupled applications.
6 V.I.P. FACTORY TEST guarantees performance at your specified operating conditions.
7 BRONZE SHAFT SLEEVE prevents shaft wear, is slip fit over the shaft, keylocked, and extends the full length of seal box. Sleeve is "O" ring sealed.
8 BACK PULL-OUT design simplifies disassembly. The suction and discharge piping is not disturbed at disassembly.
9 LUBRICATION FITTINGS are conveniently located for quick accessibility and provides positive bearing lubrication. Oil lubrication optionally available.

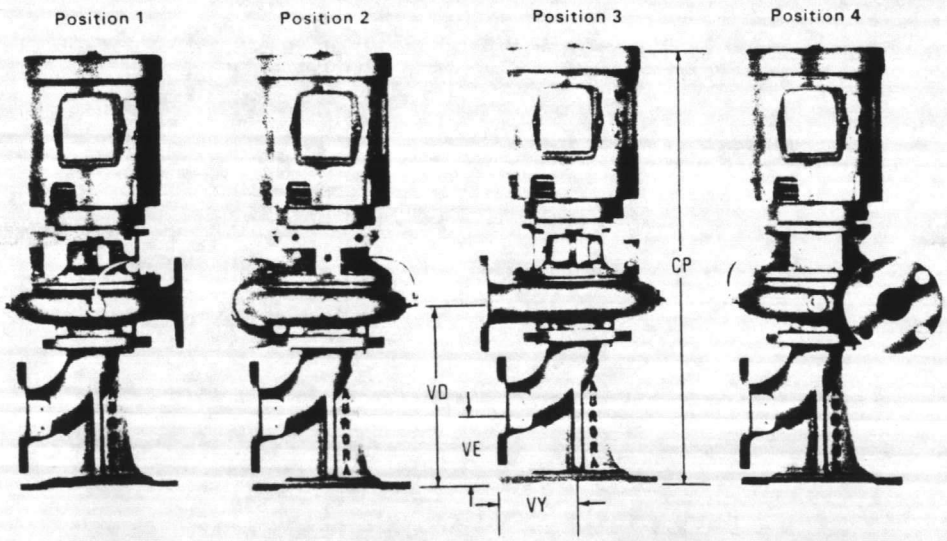


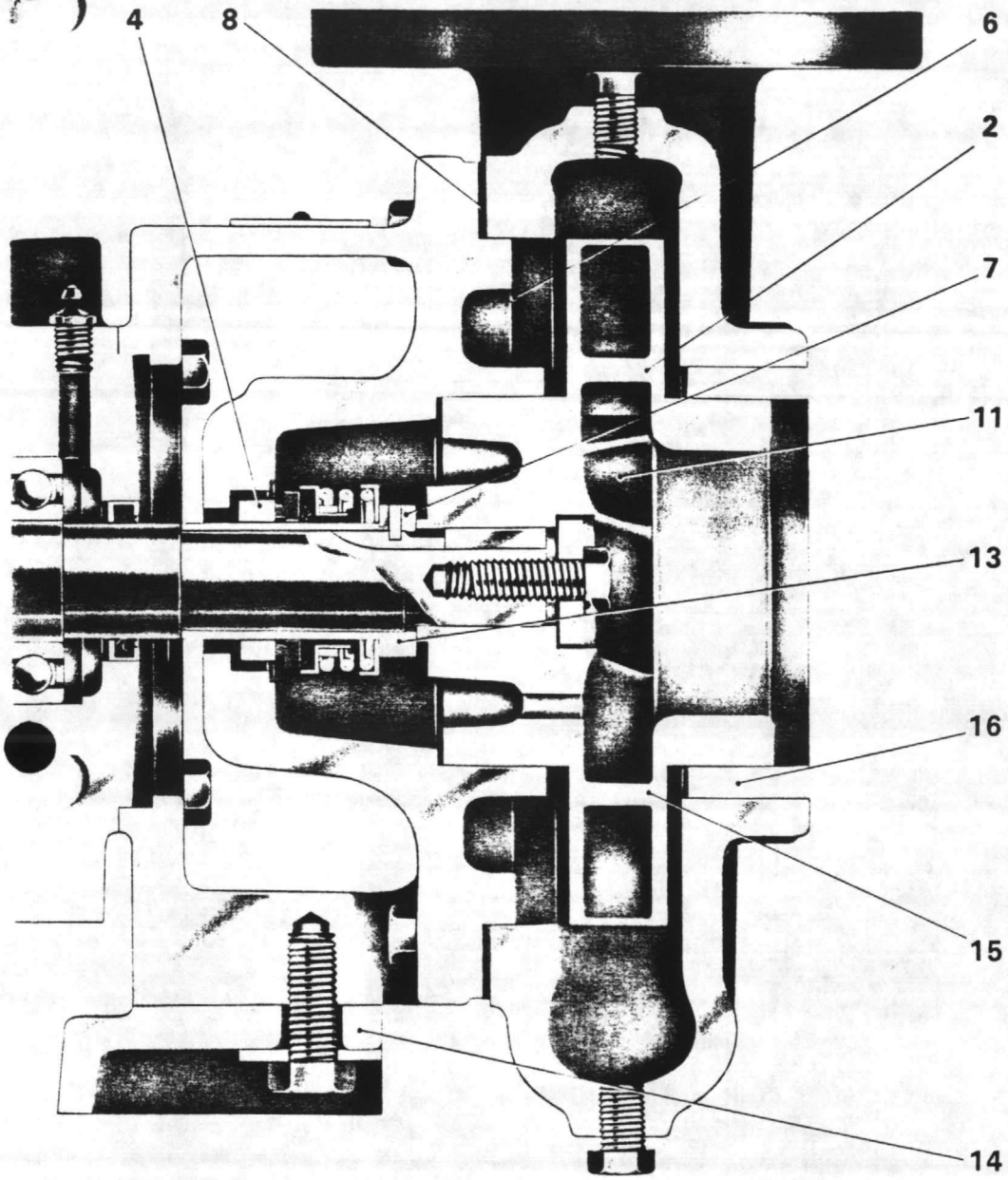
VERTICAL PUMPS

Aurora quality is also available in a space saving vertical package. Valuable floor space is saved by specifying vertical Aurora pumps with all the advantages of the HI-NEMA standard motor.

Aurora Model 342 A skimps on floor space—actually using less than ½ of the space normally required with horizontal pumps. Vertical design makes installation easy, too. Choose from the four discharge positions—lay out piping the way you need it.

Discharge position No. 2 and 3 is not available on Model 341A and 344A. Position No. 1 is furnished as standard unless otherwise specified.





10 CARBON STEEL SHAFT designed for minimum deflection, not to exceed .002" at the sealing faces at maximum load.
11 DYNAMICALLY BALANCED IMPELLER is keyed to the shaft extension and secured by a capscrew and washer.
12 BEARINGS selected for 3 year minimum life at maximum load. Average bearing life 5 x minimum. Grease lube standard.
13 SHAFT SLEEVE and hex head impeller screw are "O" ring sealed to eliminate corrosion of the shaft by the pumped liquid. This eliminates the requirement for high cost, special stainless steel or alloy shafts.
14 CLOSE COUPLED MOTORS in smaller frame sizes are supported off of the motor bracket for maximum rigidity.
15 ENCLOSED IMPELLER design provides highest efficiency.
16 CASE WEARING RING prevents wear on casing and is easily and inexpensively replaced. Impeller rings are available.
17 LARGE CAPACITY OIL RESERVOIR is provided on power frame Model 344A pumps for optional oil lube.
18 REAR SUPPORT FOOT provides support and simplifies coupling alignment. All supports are slotted to simplify back pull-out of power frame.

OPTIONAL EQUIPMENT

Standard 340 series pumps are designed to meet the requirements of most applications. However, to meet special services, a number of optional features have been made available. For services not handled by the features listed, refer to the factory.

IMPELLER WEARING RINGS—Replaceable wearing rings protect the impeller from wear.

OILER—Oil lubrication is available to provide constant bearing lubrication.

ALL IRON CONSTUCTION

SLEEVES—316 stainless steel sleeves which prevent shaft wear are available for bronze fitted pumps and are furnished as standard on all iron pumps.

FAB. STEEL DRIP RIM BASES—Are available for Models 341A & 344A. Drip pocket extends under pump casing drain openings. Close coupled bases allow back pull out of pump.

FORMED STEEL BASES—Are available for Model 344A.

COUPLING GUARDS—Are standard for Model 344A.

ALTERNATE DISCHARGE POSITIONS — Refer to dimension tables page 8 for details.

SHAFTS—Stainless steel shafts are available for special applications.

SPECIAL FEATURES

Aurora 340 Series pumps are available in 27 horizontal and 27 vertical sizes, offering a size and model precisely fitted to a wide range of head and capacity requirements. For maximum interchangeability of parts all sizes are grouped into 3 power series. Details are tabled on page 6. Pump size nomenclatures are as follows.

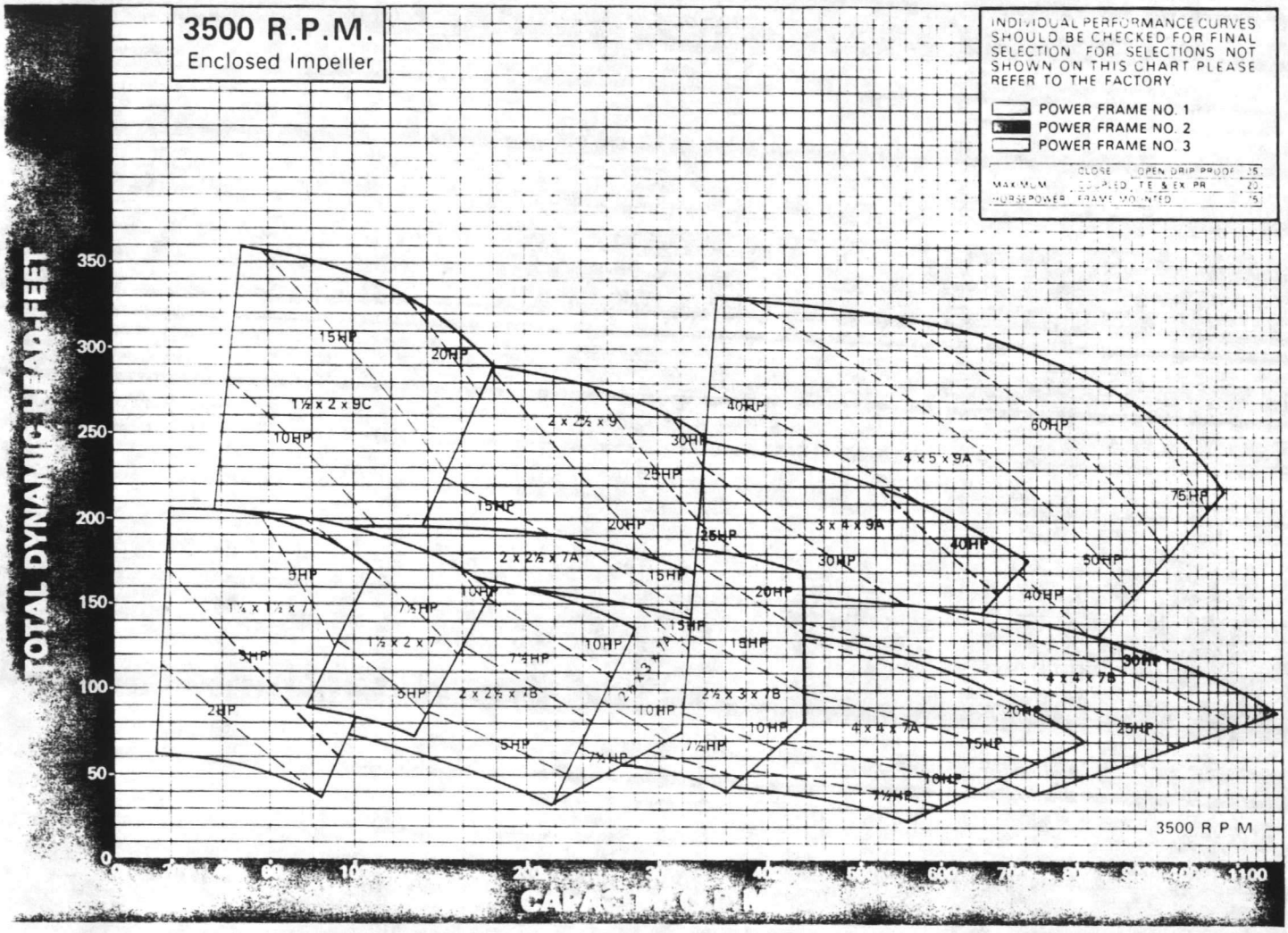
Example: 2 x 2½ x 12

2—Diameter of discharge

2½—Diameter of suction

12—Maximum (nominal) impeller diameter.

RANGE CHARTS

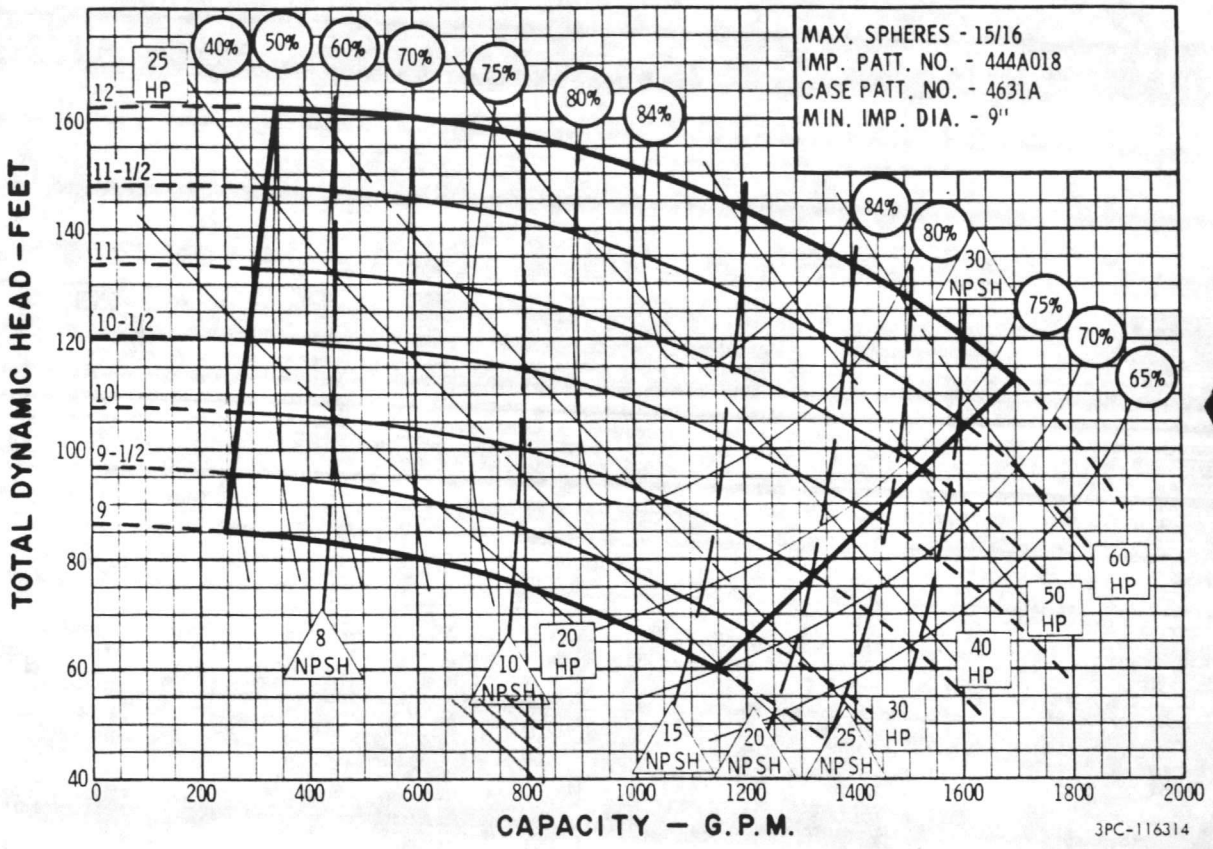


POWER SERIES

R.P.M.	1-1/4 x 1-1/2 x 7 1-1/4 x 1-1/2 x 9B	1-1/2 x 2 x 7 1-1/2 x 2 x 9A 1-1/2 x 2 x 9B 1-1/2 x 2 x 9C 1-1/2 x 2 x 12	2 x 2-1/2 x 7A 2 x 2-1/2 x 7B 2 x 2-1/2 x 9 2 x 2-1/2 x 12	2-1/2 x 3 x 7A 2-1/2 x 3 x 7B 2-1/2 x 3 x 9 2-1/2 x 3 x 12	3 x 4 x 9A 3 x 4 x 9B	3 x 4 x 12	4 x 4 x 7A 4 x 4 x 7B 4 x 5 x 9A 4 x 5 x 9B 4 x 5 x 12	5 x 6 x 12	6 x 6 x 9 6 x 6 x 12
3500	1 *	1 * * 2 *	2 1 2 *	1 2 * *	2 *	*	2 2 3 * *	*	* *
1750	1 1	1 1 1 1 2	1 1 1 2	1 1 1 2	1 1	3	1 1 2 2 3	3	2 *
1150	* *	* * * * 2	* * * 2	* * * 2	* *	2	* * * * 2	2	2 3

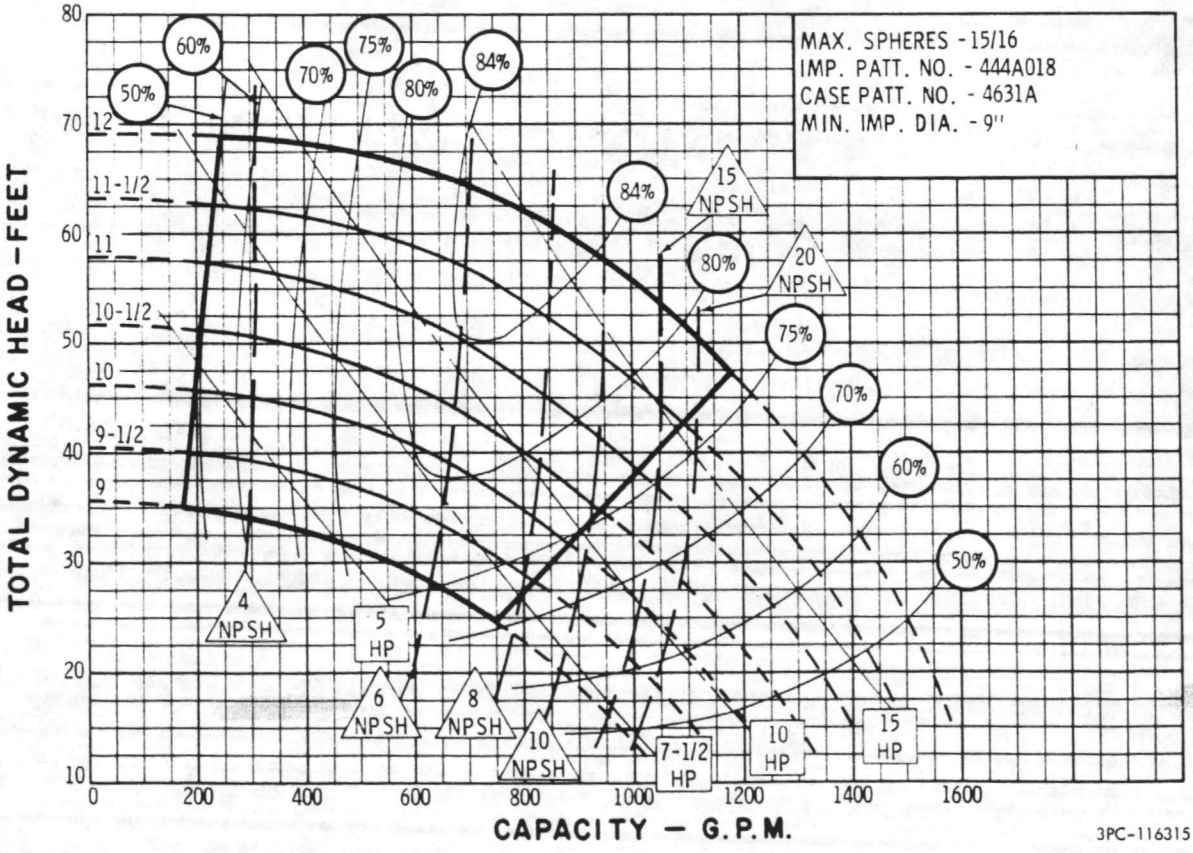
DESIGN DETAILS

AREA	DESCRIPTION	POWER SERIES 1	2	3
PUMP SHAFT	ROTATION—FROM DRIVER END	CW	CW	CW
	DIAMETER AT IMPELLER	7/8	1-1/4	1-1/4
	DIAMETER AT SHAFT SLEEVE	1	1-3/8	1-3/8
	DIAMETER BETWEEN BEARINGS	1-3/8	1-15/16	2-3/8
	DIAMETER AT COUPLING END	7/8	1-1/8	1-1/8
	COUPLING KEY—SQUARE	3/16	1/4	1/4
	MAX. DEFLECTION AT SEAL FACE	.002	.002	.002
	OUTSIDE DIAMETER OF SLEEVE	1-1/8	1-1/2	1-1/2
BALL BEARINGS	BEARING (INBOARD RADIAL)	206K	308K	310K
	BEARING (OUTBOARD THRUST)	206KG	308KG	310KG
	BEARING CENTERS	5-11/16	7-11/16	7-11/16
	BEARING TYPE	BALL	BALL	BALL
	MIN B_{10} BEARING LIFE UNDER MAXIMUM LOAD	2 YRS.	2 YRS.	2 YRS.



1750 R.P.M.

3PC-116314



1150 R.P.M.

3PC-116315

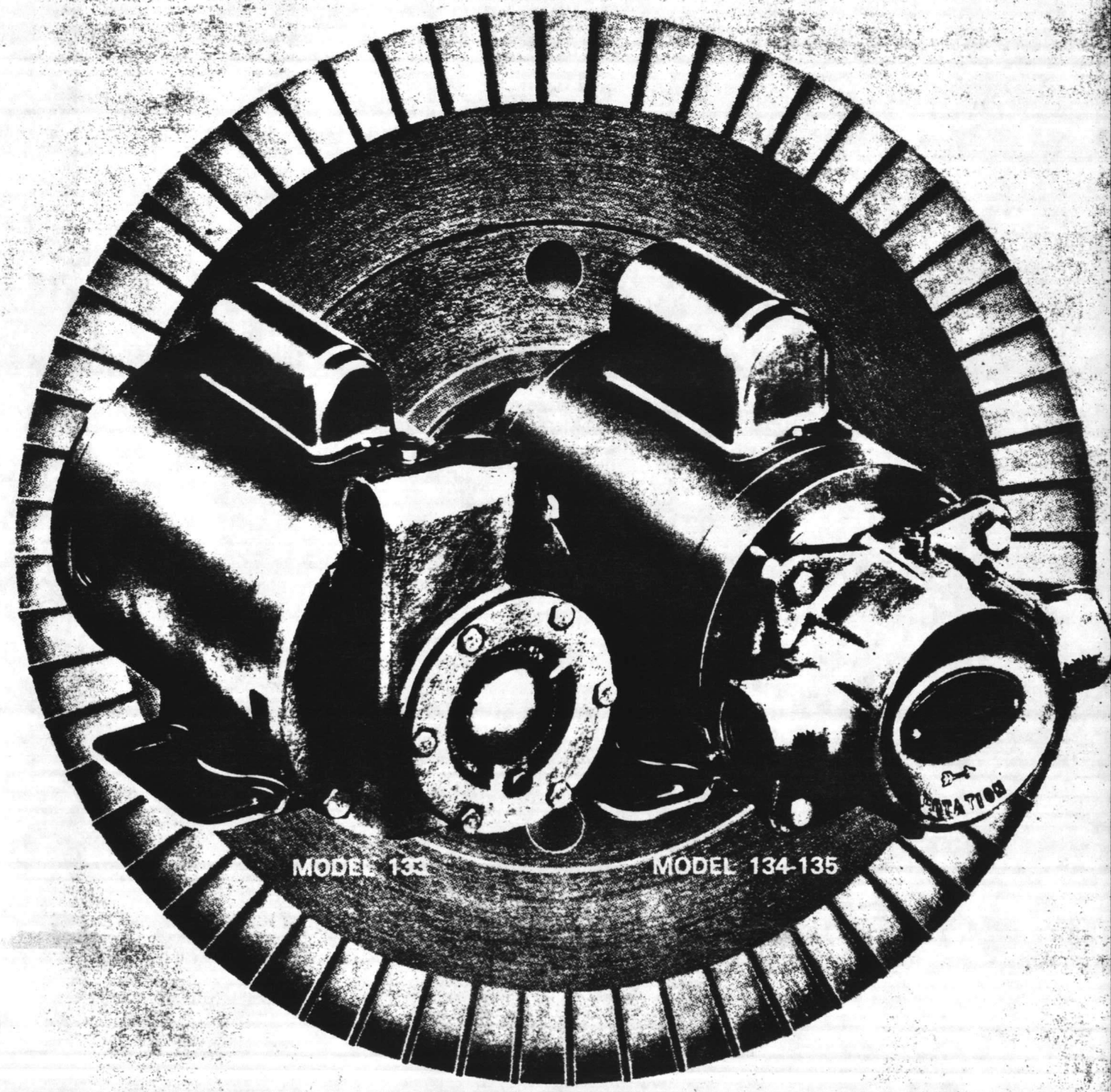
AURORA® PUMPS

BULLETIN 130E

130 SERIES SINGLE STAGE TURBINE TYPE PUMPS—"O"

CAPACITIES TO 50 G.P.M.
HEADS TO 700 FEET
TEMPERATURES TO 212° F

Aurora, Chlorine Booster Pump, 7.9 GPM at 48 PSI, 3500 RPM, 208 Volt, 3 Phase



A.I.A. FILE NO. 29-D-8

INTRODUCTION
AURORA TURBINE PUMPS

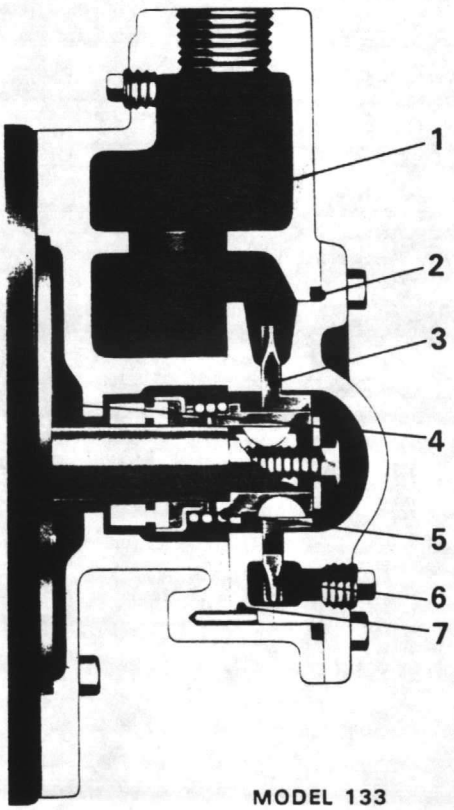
AURORA PUMP, a pioneer in turbine pump design, has long been the leader in the turbine pump industry. AURORA's leadership consistently offers the ultimate in turbine pump design.

The regenerative turbine pump offers many advantages in the area of low flow and moderate to high pressure. A turbine pump is efficient under low flow — high pressure conditions and delivers a steady stream of liquid free from pressure pulsations. There is no metal to metal contact existing within the operating parts of a turbine pump channel.

Turbine pumps have solved many liquid handling problems. Because of this versatility, thousands of turbine pump units have been in use for over 50 years.

The following pages explain the reasons why AURORA PUMP is able to offer you a modern, efficient, economical and customer proven turbine pump.

PUMP FEATURES



MODEL 133

1 SELF-PRIMING feature is provided on Model 133.

2 "O" RING GASKETS prevent leakage.

3 SELF-CENTERING IMPELLER minimizes wear.

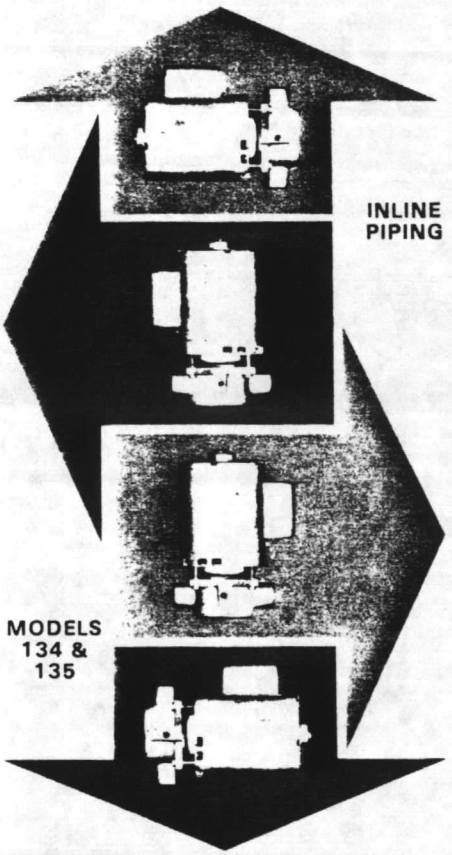
4 WATER SLINGERS protect bearings.

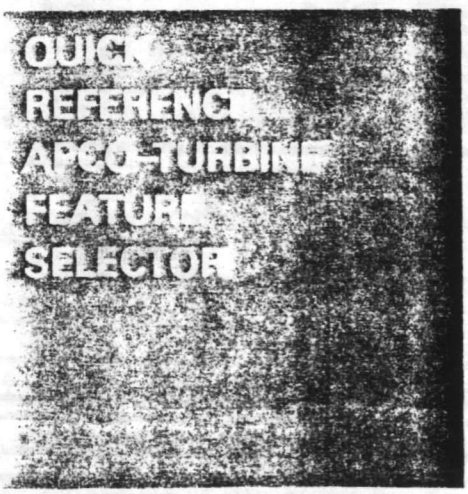
5 MECHANICAL SEAL has carbon against Ni-Resist face for optimum hot water performance. Long life is also assured with 303 stainless steel metal parts and "Buna-N" elastomers.

6 DOUBLE SUCTION IMPELLER minimizes axial thrust.

7 REPLACEABLE CHANNEL RINGS and impellers reduce maintenance costs.

8 STRAIGHT THROUGH IN LINE PIPING is provided on Models 134 and 135 for simple installation.





STANDARD

Bronze fitted construction

Hydraulically balanced bronze impeller

300# case working pressure

416 stainless steel shaft

Internal sealing water passages

Removable channel rings

VIP TEST — Every pump is hydrostatically tested and given a running check with data consisting of head, capacity and horsepower readings at your specified operating conditions.

OPTIONAL

All iron, bronze ring, all bronze construction

Ductile iron or stain. steel impeller

316 stainless steel or monel shaft

Vertical ASA Flanged suction casing (See Bulletin 680, Models 134 and 135 only)

Bypass with manual shut-off valves

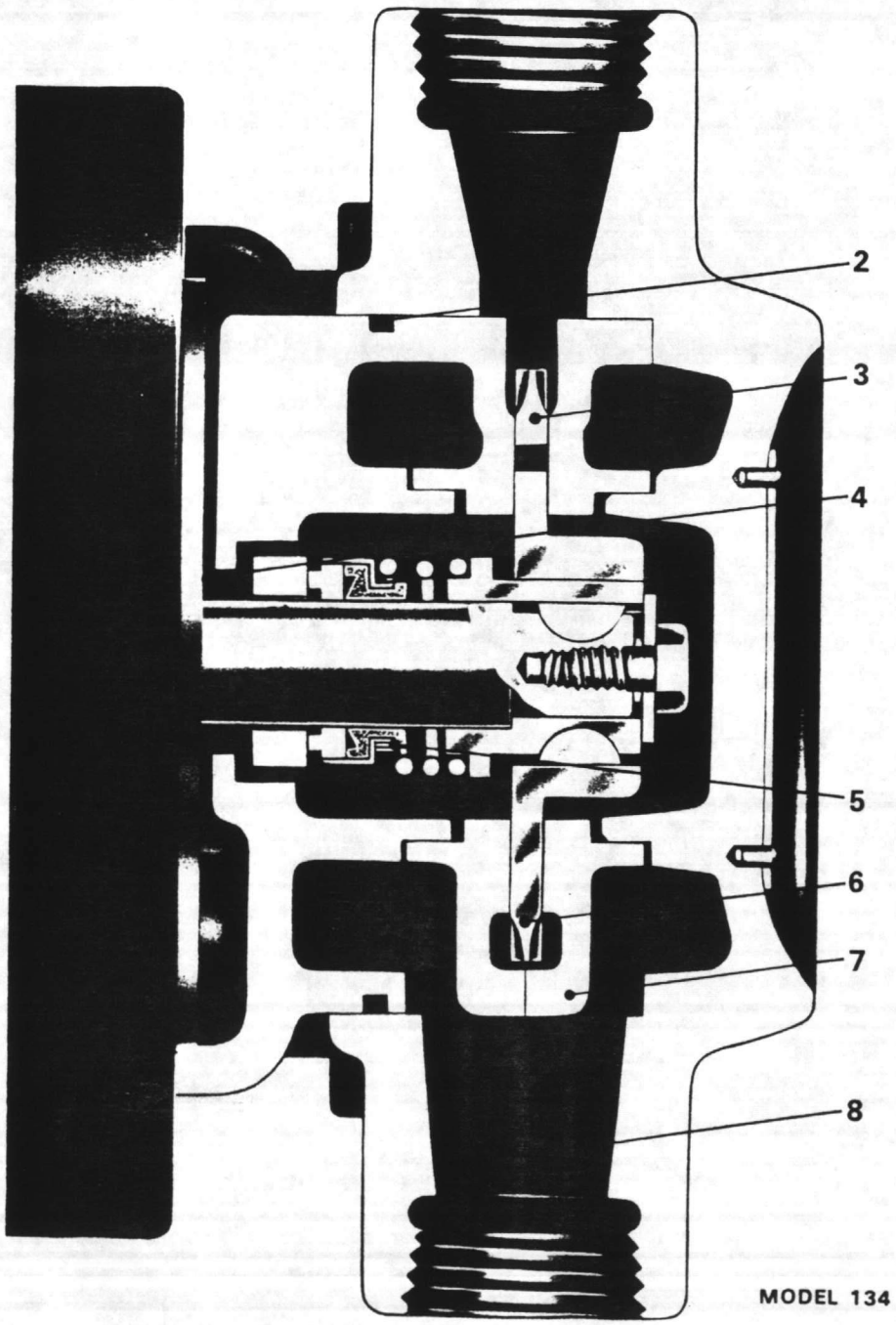
Bypass with relief valve

Certified performance test data consisting of head capacity and horsepower readings taken over the full operating range of the pump.

THEY'RE ECONOMICAL
End-mounted, close-coupled design with single mechanical seal and choice of 3500 RPM or 1750 RPM operating speeds means you get greater capacity and pressure—dollar for dollar. In fact, these close-coupled pumps are so economical, it's practical to have a spare unit ready for immediate replacement when maintenance is required.

THEY CAN'T "VAPOR LOCK"
Turbine impeller handles gases and vapors (up to 20%) along with the liquid . . . eliminating any possibility of vapor lock within the pump.

THEY'RE VERSATILE
Steep head curves with near-constant capacity over wide head variations means you can specify 130 Series Pumps for an extremely wide range of operating conditions. And, if it's necessary, Model 134 and 135 Pumps can be easily field converted to right- or left-hand operation by rotating the casing 180° after removing only 4 mounting bolts. Need a self-priming pump? Specify Model 133 with the self-priming feature. This feature has made Model 133 a popular pump selection.



MODEL 134

THEY SAVE SPACE AND ARE EASY TO INSTALL
Close-coupled design gives you substantial space savings compared to conventional bearing frame pumps. Installation is quick and easy, too. Straight-through piping (Model 134 and 135) also means you can locate the pump almost anywhere within the piping system — without using elbows at the pump.

AND, THEY'RE RELIABLE
It takes quality materials and careful production methods to make reliable pumps. Standard construction 130 Series Turbine Pumps are bronze-fitted with bronze impellers, (chrome-plated channel rings are standard on Models 133 and 134), cast iron casings, and stainless steel motor shafts. (They're also available in All-Bronze or All-Cast Iron construction to meet your most demanding application. Then, after 130 Series Pumps are assembled with these quality materials, each pump is tested on dynamic test stands which duplicate operating conditions and measure precisely each pump's head, capacity, and power requirement — not to mention hydrostatic and mechanical function tests. After a 130 Series Pump passes these tests it's VIP-rated (Verified Individual Performance) and one you can apply with full confidence that the rating you specify will be attained.

WHAT'S SO SPECIAL ABOUT OUR TURBINE PUMPS?

They have steep head-capacity characteristics. They have excellent vapor handling properties. They have unusually high suction lift properties. And, they're economical.

THE STEEPER THE BETTER

Take head-capacity characteristics, for example. Figure 1 shows a performance curve for a typical Aurora turbine pump. As you can probably tell at a glance, the steep head characteristics make it possible for an Aurora turbine to go on pumping about the same amount of liquid even though there are relatively wide variations in head pressure. Pressure variations can occur for a number of reasons, but the most common designed-in variations are the result of automatic pop-off valves and similar control devices. The important point is this: you can design your system using Aurora turbine pumps, knowing that you can always count on about the same capacity despite some unavoidable variations in pressure.

VAPOR LOCK! WHAT'S THAT?

The second feature that makes Aurora turbine pumps somewhat special is the way they handle vapor without any serious effect on pumping capacity. Even though bubbles form in the suction nozzle, the pump will carry them along with the liquid, discharging the vapors. This makes Aurora turbine pumps ideal not only for handling hot water but also for pumping refrigerants and liquids that may vaporize at normal temperatures. Aurora turbines can also handle steam and air along with hot water, without vapor lock or bind.

BIG LIFTS, TOO

As for high suction lift properties, just take a look at Figure 2. Here you'll find that the maximum suction lift of an Aurora turbine pump is only 5½ feet less than the theoretical maximum for any type of pump. (No wonder Aurora turbines are specified, over and over, for "lifting" operations . . . especially hot water and liquids that vaporize at normal temperatures.)

BUDGET WATCHERS

How about economy? More good news. Turbine pumps, by their very design, are the most economical solution to general lift applications. What's more, we think we know how to design and build a very economical turbine pump without sacrificing quality or performance.

We ought to. We've been at it more than 50 years.

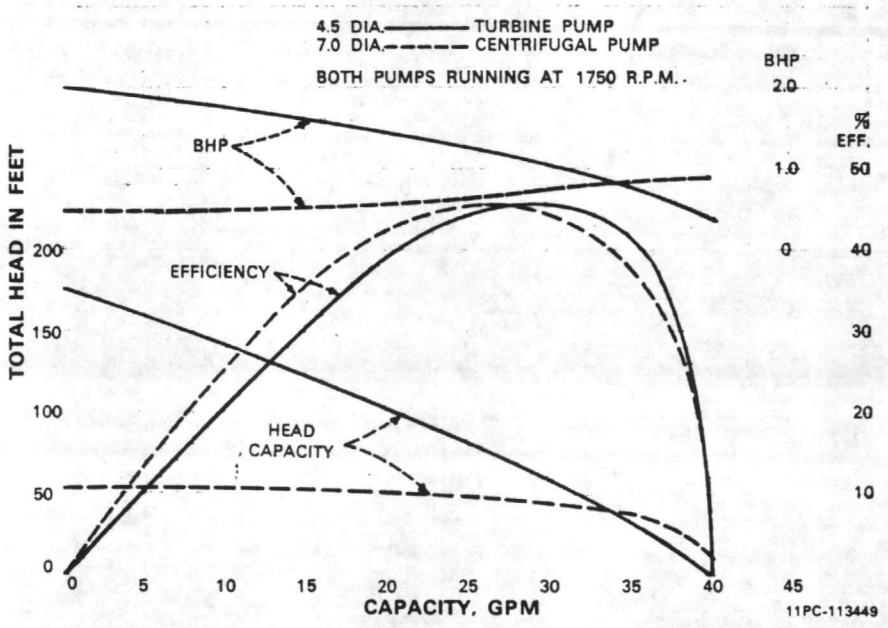


Fig. 1

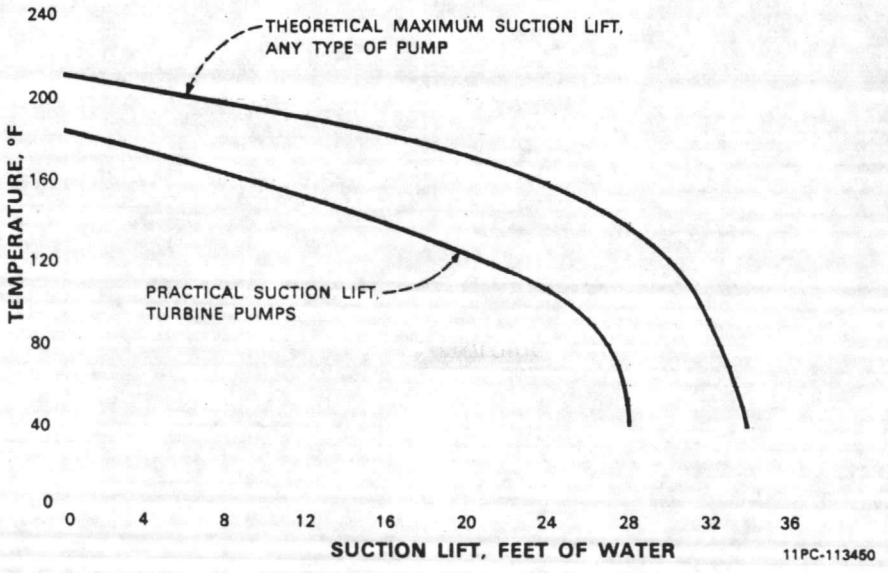


Fig. 2

TURBINE PUMPS ARE UNIQUE PERFORMERS

Turbine pumps derive their name from the many buckets machined into the periphery of the rotating impeller. They have long since been recognized for their effectiveness in the areas of low flow, high head application. The turbine pump offers higher heads than centrifugal pumps.

Because the head capacity curve is steep in a turbine pump, a greater degree of flexibility is available to the engineer.

Turbine pumps having top center line discharge are self-venting and have the ability to handle vapors without vapor lock. This characteristic allows handling of boiling liquids and liquified gases at suction heads slightly over the vapor pressure. The turbine pump also has higher efficiencies at low flows than a centrifugal pump.

Turbine pumps utilize close running clearances and are normally utilized on clean liquid applications. Viscous materials up to 500 S.S.U. can be pumped.

Turbine pumps are unique in operation. The pumped liquid is directed by the liquid passage so that the liquid circulates in and out of the impeller buckets many times on its way from the pump inlet to the pump outlet. Both centrifugal and shearing action combine to impart additional energy to the liquid each time it passes through the buckets.

Heads over 900 feet are successfully developed in a single stage.

The impeller runs at very close axial clearances with the pump channel rings to minimize recirculation losses. The channel rings provide a circular channel around the blade area of the impeller, from the inlet to the outlet.

Liquid entering the channel from the inlet is picked up immediately by the buckets on both sides of the impeller and pumped through the channel (Figure 3) by a shearing action. The flow of the liquid within the impeller buckets is illustrated in Figure 4. This process is repeated over and over, each cycle imparting more energy until the liquid is discharged. This flow is smooth and continous.

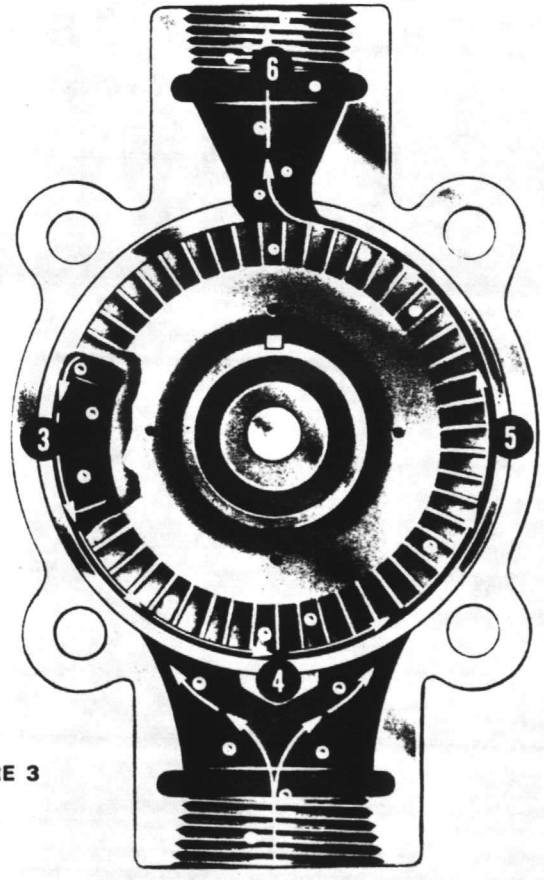


FIGURE 3

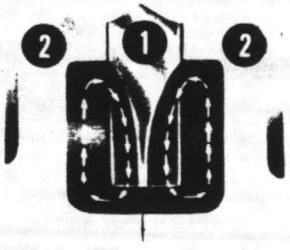


FIGURE 4

1 TURBINE IMPELLER

2 CHANNEL RINGS

3 25% OF DISCHARGE PRESSURE

4 50% OF DISCHARGE PRESSURE

5 75% OF DISCHARGE PRESSURE

6 100% OF DISCHARGE PRESSURE

SELECTION CHART

Determine the pump capacity and discharge head. Find the nearest charted head under the Total Dynamic Head listing, select the desired motor speed, and read down to the next larger capacity closest to the calculated requirement. The figures and numbers identify the size of the pump and the motor horsepower.

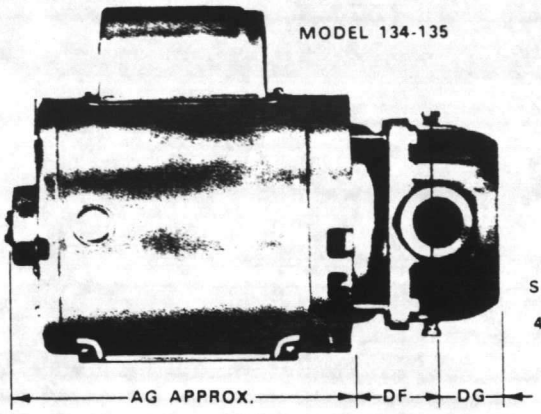
Horsepowers shown may not be non-overloading. Check performance curve for actual B.H.P.

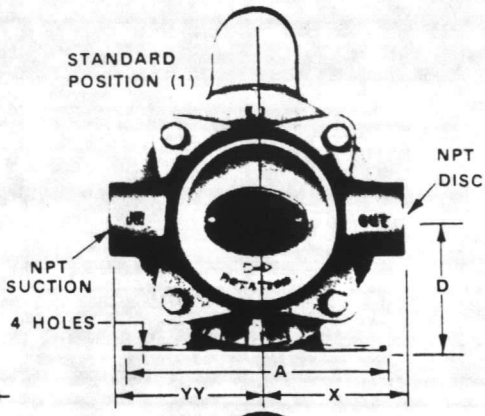
Selections are based on cold water with specific gravity of 1.0 . . . for final selection refer to performance curves.

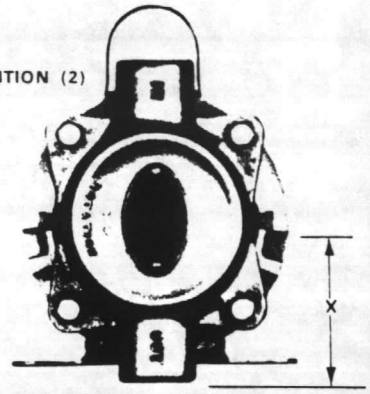
If fluctuation or increase in head is anticipated, the specific pump performance curve should be checked for final selection.

TOTAL DYNAMIC HEAD IN FEET

PUMP SIZE	R.P.M.		10	20	30	40	50	60	70	80	90	100	150	200	250	300	350	400	450	500	550	600	650
D03	3500	GPM	7.2	6.9	6.6	6.3	5.9	5.6	5.2	4.7	4.3	3.9	2.3	1.0									
		HP	⅓	⅓	⅓	⅓	⅓	⅓	⅓	⅓	⅓	⅓	½	¾									
E03	3500	GPM	10.8	10.1	9.7	9.2	8.8	8.4	8.0	7.6	7.2	6.9	5.2	3.7	2.1								
		HP	⅓	⅓	⅓	⅓	⅓	½	½	½	½	½	¾	1	1								
F03	3500	GPM	12.0	11.5	11.0	10.4	9.9	9.5	9.1	8.6	8.3	7.9	6.1	4.4	2.7								
		HP	⅓	⅓	⅓	⅓	½	½	½	½	¾	¾	¾	1	1½								
G03	3500	GPM	15.8	15.3	14.7	14.2	13.7	13.2	12.7	12.2	11.7	11.3	9.1	6.9	4.5	2.0							
		HP	½	½	½	½	¾	¾	¾	¾	¾	1	1	1½	2	2							
A04	1750	GPM	2.9	2.6	2.4	2.2	2.0	1.8	1.6	1.4	1.2	1.1											
		HP	⅓	⅓	⅓	⅓	⅓	⅓	⅓	⅓	⅓	⅓											
	3500	GPM	5.8	5.6	5.5	5.2	5.1	4.9	4.8	4.6	4.5	4.3	3.7	3.1	2.6	2.0	1.6	1.1					
		HP	½	½	½	¾	¾	¾	¾	¾	¾	¾	¾	1	1	1½	1½	1½					
B04	1750	GPM	3.8	3.5	3.2	2.8	2.5	2.2	1.8	1.5	1.1	0.7											
		HP	⅓	⅓	⅓	⅓	⅓	⅓	⅓	⅓	⅓	⅓											
	3500	GPM	8.5	8.2	7.8	7.6	7.3	7.0	6.8	6.6	6.3	6.1	5.1	4.2	3.3	2.4	1.4						
		HP	⅓	⅓	⅓	⅓	⅓	⅓	½	½	½	½	¾	¾	1	1	1½						
C04	1750	GPM	5.0	4.4	3.9	3.6	3.2	2.9	2.6	2.3	2.0	1.7											
		HP	⅓	⅓	⅓	⅓	⅓	⅓	⅓	⅓	⅓	⅓											
	3500	GPM	10.6	10.2	9.9	9.6	9.4	9.1	8.8	8.5	8.3	8.1	6.9	5.8	4.8	3.8	2.8	1.9					
		HP	⅓	⅓	½	½	½	½	½	½	½	½	¾	¾	1	1	1½	1½					
D04	1750	GPM	6.6	6.2	5.7	5.2	4.7	4.2	3.6	3.0	2.4	1.8											
		HP	⅓	⅓	⅓	⅓	⅓	⅓	⅓	⅓	⅓	⅓											
	3500	GPM	12.3	12.2	12.1	12.0	11.9	11.8	11.7	11.6	11.5	11.3	10.4	9.0	7.1	5.5	4.0	2.6					
		HP	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	1	1	1½	1½	2	2					
F05	1750	GPM	8.2	7.6	7.1	6.6	6.3	6.0	5.6	5.4	5.1	4.8	3.4	2.0									
		HP	⅓	⅓	⅓	⅓	⅓	⅓	⅓	⅓	½	½	½	¾									
	3500	GPM	16.5	16.3	16.0	15.7	15.5	15.3	15.0	14.7	14.4	14.2	13.0	11.9	10.8	9.8	9.0	8.0	7.1	6.3	5.5	4.6	3.8
		HP	¾	¾	¾	¾	¾	1	1	1	1	1	1½	1½	2	2	3	3	3	3	5	5	5
G05	1750	GPM	12.3	10.7	9.9	9.2	8.4	7.8	7.2	6.6	6.0	5.4	2.6										
		HP	⅓	⅓	⅓	⅓	⅓	⅓	⅓	½	½	½	¾										
	3500	GPM	24.9	24.6	24.1	23.8	23.6	23.0	22.7	22.3	22.0	21.5	20.0	18.2	16.6	15.0	13.5	12.0	10.5	9.0	7.7	6.4	5.1
		HP	2	2	2	2	2	2	2	2	3	3	3	3	5	5	5	5	5	5	7½	10	10
H05	1750	GPM	14.0	13.1	12.4	11.8	11.2	10.7	10.2	9.7	9.2	8.8	6.7	4.7	3.0								
		HP	⅓	⅓	⅓	⅓	½	½	½	¾	¾	¾	1	1	1½								
	3500	GPM	25.0	24.9	24.7	24.5	24.4	24.2	24.1	24.0	23.8	23.7	22.8	21.7	20.5	19.2	17.8	16.0	14.4	12.9	11.3	10.0	8.5
		HP	1½	1½	1½	1½	1½	1½	1½	1½	2	2	2	3	3	5	5	5	5	7½	10	10	10
I05	1750	GPM	18.0	17.2	16.5	15.6	15.0	14.2	13.5	12.8	12.2	11.5	8.5	5.7	3.0								
		HP	⅓	⅓	½	½	½	¾	¾	¾	¾	¾	1	1½	2								
	3500	GPM	31.3	31.2	31.1	31.1	31.0	30.9	30.8	30.7	30.6	30.5	29.8	28.5	26.8	25.0	23.2	21.5	19.8	18.1	16.5	14.9	13.2
		HP	3	3	3	3	3	3	3	3	3	3	5	5	5	5	5	7½	10	10	10	10	10
J05	1750	GPM	24.4	23.7	22.6	21.5	20.3	19.2	18.1	17.0	15.6	14.5	8.4	2.2									
		HP	½	½	½	½	¾	¾	¾	¾	¾	1	1½	1½									
	3500	GPM	38.4	38.3	38.2	38.1	38.1	38.0	38.0	37.9	37.8	37.8	37.2	36.5	35.0	32.8	30.3	27.5	24.5	21.3	18.0	14.5	11.0
		HP	3	3	3	3	3	3	3	3	5	5	5	5	5	7½	7½	10	10	10	10	10	15
K05	1750	GPM	30.1	29.0	28.0	26.9	25.8	24.6	23.5	22.2	21.0	19.8	12.7	5.0									
		HP	⅓	⅓	½	½	¾	¾	¾	1	1	1	1½	2									
	3500	GPM	43.7	43.6	43.6	43.5	43.5	43.4	43.4	43.3	43.3	43.2	42.9	42.3	41.7	40.9	39.0	36.0	32.7	29.1	25.7	22.0	18.0
		HP	7½	7½	7½	7½	7½	7½	7½	7½	7½	7½	7½	7½	7½	7½	10	10	10	10	15	15	15



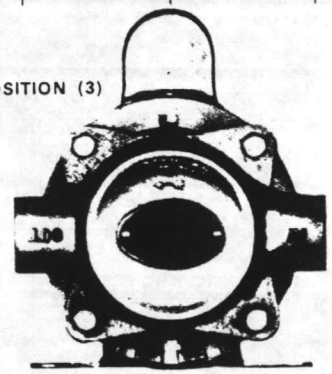


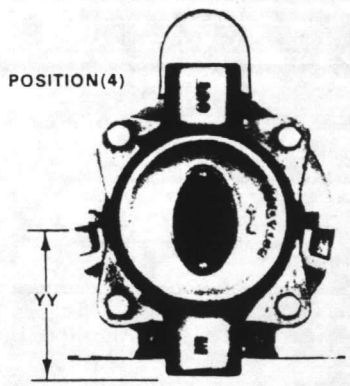


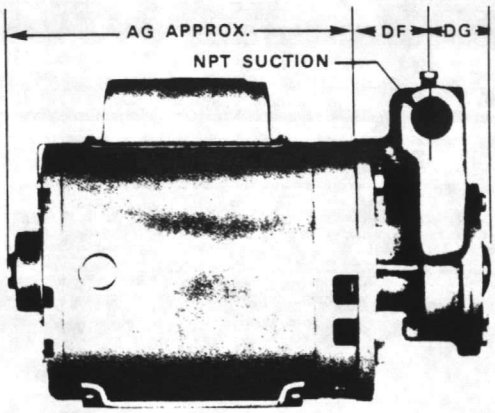
NOTES

1. Dimensions and weights are approximate.
2. All dimensions are in inches and may vary $\pm 1/8$".
3. Frame sizes, "AG" dimension and motor weight are for open drip proof motors only.
4. Conduit box is shown in approximate position. Dimensions are not specified as they vary with each motor manufacturer.
5. Add pump and motor weight for unit weight.
6. Not for construction purposes unless certified.
7. Aurora Pump reserves the right to make revisions to its products and their specifications, and to this bulletin and related information, without notice.

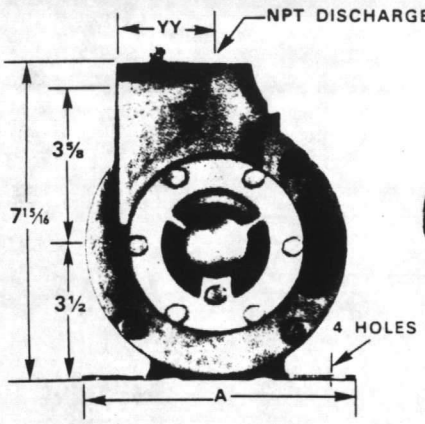
*Single phase only. **Three phase only.

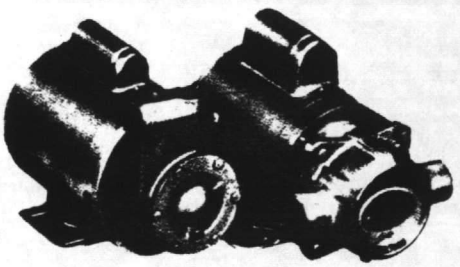






MODEL 133





MODEL 133 MODEL 134-135

Frame	Horsepower 3500 RPM	Horsepower 1750 RPM	Motor Weight (Lbs.)	A	D	AG	Model
56	⅓	⅓	29	6¾	3½	11	133 134 135
	½	½	46				
	¾	¾	56				
	1	1	56				
	1½	1½**	65				
	2	—	80				
145T	—	1½*	42	7	3½	11	134 135
	3**	2**	48				
182T	3*	2*	65	9	4½	11	
	5**	3**	69				
184T	7½**	3*	79	9	4½	12	
	—	5**	83				
213T	10	—	105	10½	5¼	14	135
215T	15	—	125	10½	5¼	15	
254T	20	—	200	12½	6¼	17	

Model	133	134	135
Suction	¾	1	2
Disch.	¾	1	1½
DF	1⅞	2	2¼
DG	1½	1 11/16	2¼
X	NA	3¾	4½
YY	2½	3¾	4½
Pump Wt. (Lbs.)	13	16	30

SPECIFICATIONS

The Vendor shall furnish an Aurora 130 Series Close-Coupled Turbine Type Pump size .133. (bronze fitted) ~~(all iron) (all bronze)~~ when operating against a total discharge head of construction. Each pump shall have a capacity of ..75.. G.P.M. at ..48.. feet. Suction pressure will be ..... feet. Pumping temperature is ..... ° F. Specific gravity is ..... The fluid to be pumped is (describe). Chlorinated water Pump is to be furnished with mechanical seal, replaceable channel rings with in-line suction and discharge openings in casing. The pump shall be close-coupled to a ..314..... H.P., ..3..... phase, ..60.... cycle, ..208... voltage, ..3500.... R.P.M. (drip proof) ~~(totally enclosed)~~ ~~(explosion proof)~~ motor for ~~(continuous)~~ (intermittent) operation in a ..... ° F. maximum and ..... ° F. minimum atmosphere. Installed per Hydraulic Institute standards.

LIMITATIONS

Pump Series	Pump Size	Max. Suct. Pressure P.S.I.	Max. Diff. Pressure P.S.I.	Max. Casing Pressure P.S.I.	Max. Temp. °F.	Min. Suct. Pressure Vac. in Hg	Motor Frame
133	D03 thru G03	100	150	175	225	26	
134	A04	100	225	300	225	26	56
	B04		225				145T
	C04		190				182T
	D04		180				184T
135	F05	100	280	300	225	26	
	G05		250				
	H05		220				
	I05		175				
	J05		150				
	K05		130				
135	F05 thru K05	100	300	300	225	26	213T 215T 254T

MATERIALS OF CONSTRUCTION

PUMP PART	BRONZE FITTED	ALL IRON	ALL BRONZE
CASING	CAST IRON ASTM A48-64	CAST IRON ASTM A48-64	BRONZE ASTM B62-63
COVER (153)	CAST IRON ASTM A48-64	CAST IRON ASTM A48-64	BRONZE ASTM B62-63
IMPELLER	BRONZE ASTM B62-63	DUCTILE IRON ASTM A395-61	BRONZE ASTM B62-63
IMPELLER SLEEVE	BRONZE ASTM B62-63	STAIN. STEEL AISI 316	BRONZE ASTM B62-63
INNER RING	CAST IRON ASTM A48-64	CAST IRON ASTM A48-64	BRONZE ASTM B62-63
OUTER RING (154-155)	CAST IRON ASTM A48-64	CAST IRON ASTM A48-64	BRONZE ASTM B62-63
MECHANICAL SEAL	316 stainless steel metal parts, "Buna-N" elastomer parts, Ni-resist seat and carbon washer.		

NOTES

1 Maximum differential pressure based on allowable shaft deflection for standard shafts.

2 Maximum casing pressure based on laboratory tests at twice the pressure shown.

3 All pressure limitations on this chart are based on standard pumps constructed of standard materials and handling water at normal temperatures.

4 For temperatures below −32° F., consult factory.

5 Maximum suction pressure based on limitations of mechanical seal furnished as standard.

6 Pumps should not be used when any one of the above limitations is exceeded.

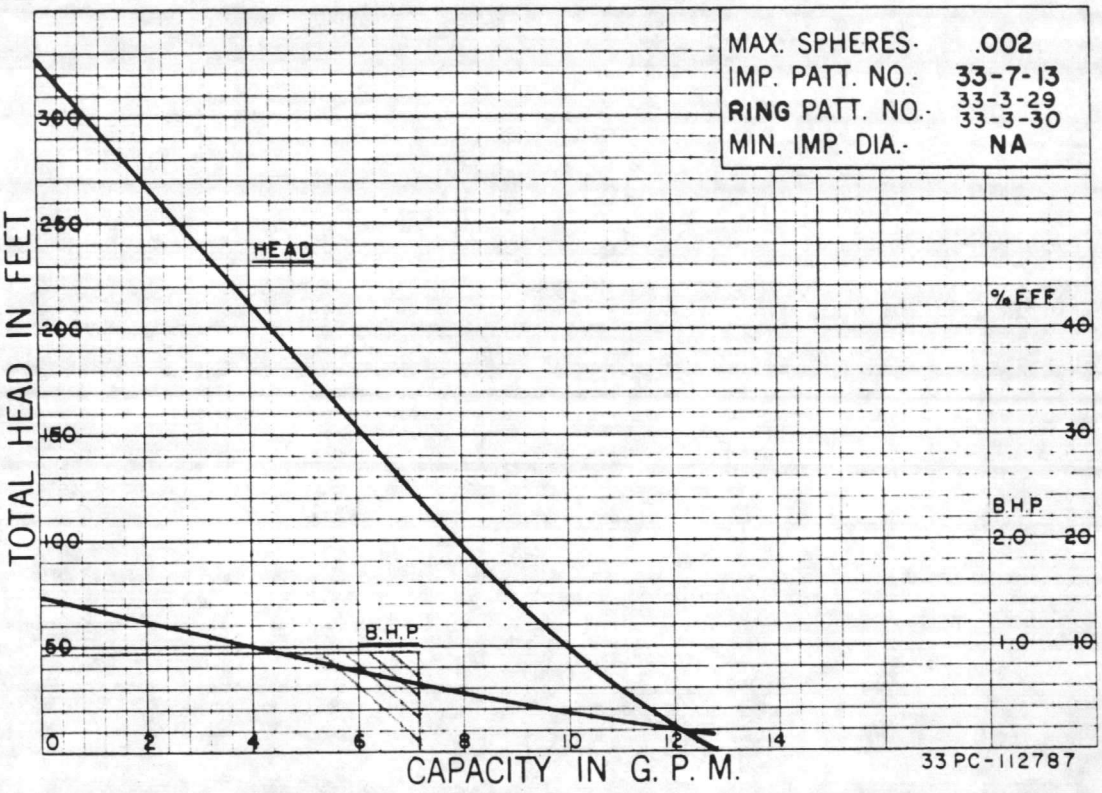
MODEL 133-134-135 IMPELLER

AURORA PUMP
A UNIT OF GENERAL SIGNAL
800 AIRPORT ROAD • NORTH AURORA, ILLINOIS • 60542
SALES OFFICES IN ALL MAJOR CITIES AND COUNTRIES
Refer to "Pumps" in the yellow pages of your phone directory
MANUFACTURING FACILITIES LOCATED IN: NORTH AURORA, ILLINOIS • CITY OF INDUSTRY (GREATER LOS ANGELES), CALIFORNIA • REXDALE (TORONTO), ONTARIO
Export Dept.: No. Aurora, Illinois, Cable Address "NYABINT"

MODEL FO 3

3/4" x 3/4"

3500 R.P.M.



Chop/Hoop Filament Winding . . .

Chop/hoop filament winding is a unique combination of two proven fabrication techniques — chopped glass spray-up and continuous glass filament winding. This combination provides the benefits of maximum resistance to corrosion and chemical attack plus the strength required for vertical storage.

Fiberglass reinforced plastic (FRP) tanks manufactured by Raven using this method of fabrication meet or exceed the performance of tanks built to the design criteria of Voluntary Product Standard PS 15-69 and ASTM D 3299-74. As a standard, Raven's chop/hoop filament wound storage vessels are designed for liquids with a specific gravity up to 1.3. Tanks can be manufactured to handle materials with higher specific gravities.

Fabrication

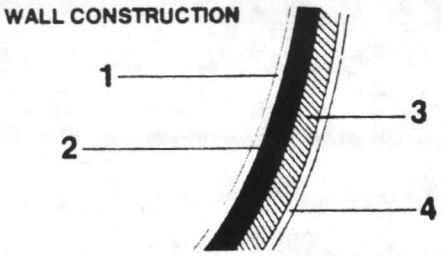
Raven's vertical, atmospheric storage tanks are fabricated in four automated and carefully-monitored steps:

Step No. 1 - An inner corrosion barrier consisting of a minimum 10 mil surface of "C" veil and resin (20/80 glass to resin ratio).

Step No. 2 - An interior corrosion barrier with a minimum 90 mil layer of chopped "E" glass strand and resin. This interior corrosion barrier carries a 30/70 glass/resin ratio.

Step No. 3 - The structural wall is produced by using a process of simultaneous glass chopping, resin spraying and hoop filament winding. The glass to resin ratio in the structural wall section is approximately 50/50, with the glass roving (filament) insuring maximum hoop strength. The thickness of the structural wall is varied according to tank height, application and specific gravity of the contents.

Step No. 4 - An exterior corrosion barrier with a minimum 45 mil layer of chopped "E" glass strand and resin.

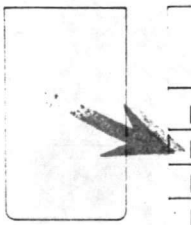


Resins

Raven's available resin systems — isophthalic polyester, vinyl ester, bisphenol polyester and hetacid polyester — meet most all application requirements, including those calling for FDA-approved storage.

10' Diameter OPEN TOP

4,000 - 15,000 GAL.
True I.D. — 10'4"
52.3 gal./inch straight sidewall



PART NO.	GAL.	HT.	APPROX. WALL THICKNESS*	APPROX. WT./LBS.
F104OT	4,000	6' 7"	7/32"- 9/32"	875
F105OT	5,000	8' 2"	7/32"- 9/32"	1,006
F106OT	6,000	9' 9"	7/32"-11/32"	1,136
F107OT	7,000	11' 4"	7/32"-11/32"	1,280
F108OT	8,000	12'11"	7/32"-11/32"	1,447
F109OT	9,000	14' 6"	7/32"-11/32"	1,613
F1010OT	10,000	16' 1"	7/32"- 7/16"	1,788
F1011OT	11,000	17' 8"	7/32"- 7/16"	1,990
F1012OT	12,000	19' 4"	7/32"- 7/16"	2,190
F1013OT	13,000	20'11"	7/32"- 1/2"	2,400
F1014OT	14,000	22' 6"	7/32"- 1/2"	2,620
F1015OT	15,000	24' 2"	7/32"- 1/2"	2,900

* Graduated top to bottom. Wall thicknesses designed for 1.3 specific gravity.

12' Diameter OPEN TOP

6,000 - 21,000 GAL.
True I.D. — 11'9"
67.5 gal./inch straight sidewall

PART NO.	GAL.	HT.	APPROX. WALL THICKNESS*	APPROX. WT./LBS.
F126OT	6,000	7' 7"	7/32"- 5/16"	1,110
F128OT	8,000	10' 8"	7/32"- 5/16"	1,350
F1210OT	10,000	12' 6"	7/32"- 3/8"	1,635
F1212OT	12,000	15'	7/32"- 3/8"	1,940
F1214OT	14,000	16' 9"	7/32"- 7/16"	2,290
F1216OT	16,000	19'11"	7/32"- 7/16"	2,660
F1218OT	18,000	22' 5"	7/32"- 1/2"	3,075
F1220OT	20,000	24'10"	7/32"- 1/2"	3,305
F1221OT	21,000	26' 1"	7/32"- 1/2"	3,525

* Graduated top to bottom. Wall thicknesses designed for 1.3 specific gravity.

Accessories

FRP Couplings: FRP vinyl ester ~~half and~~ full couplings are available in ~~1/2", 3/4"~~, 1", ~~1-1/2", 2", 2-1/2", 3", 4" and 6"~~ inside diameters. Bottom sidewall couplings can be flush mounted for complete drainage. with Lightglass

FRP Flanges: Press-molded vinyl ester 150 lb. ASA flanged fittings with centrifugally-cast FRP pipe are offered in two gusseted styles — blade and conical — in 1", 1-1/2", 2", 2-1/2", 3", 4", 6" and 8" ID sizes. Non-gusseted FRP flanges are available in 10", 12", 14", 18" and 24". Blinds also. Hand-layed bisphenol A polyester resin flanges installed in bisphenol-built tanks.

FRP Siphon Drain Flanges: Available in ~~1-1/2", 2", 3", 4", 6" and 8"~~ pipe size for maximum drainage (within 1" of tank bottom) from side opening. Press-molded vinyl ester 150 lb. ASA with centrifugally-cast FRP pipe. Blade gusseted and conical gusseted flanges offered.

FRP Vents: FRP U-type vents for enclosed tanks are available in 2", 3", 4", 6" and 8" sizes. The 2", 3" and 4" vents are installed in tank tops via FRP couplings. The 6" and 8" sizes are bolted to FRP flanges. Vent size must be equal to or greater than the largest inlet or outlet.

FRP Down Pipes & Brace Supports: For use where fuming or foaming must be kept at a minimum, or as a siphon drain nozzle. Vinyl ester pipe in ~~2", 3", 4", 6"~~ and 8" diameters. Pipe is installed to 1/2" FRP brace supports which are laminated to inside of tank wall.

FRP Baffle Plates & Gussets: Four baffles recommended where tank contents require agitation. Positioned to oppose agitation direction specified by customer. FRP baffle plates are 8" wide, 3/8" thick, located one inch from tank wall, and attached via FRP gussets bonded to tank wall. Plate length is equal to wall length in enclosed top tanks and to 12" less than wall length in open top tanks.

Agitator Support Assembly: Primed carbon steel channel with steel mounting plate for open top and domed top tanks are designed and installed to meet the individual customer's mixing requirements.

Sloped Bottoms: For use where full drainage required or where sludge may form on tank bottom. Tank bottom slopes 1/2" per foot from the high side to low side or drainage point. Installed slope is formed by adding urethane foam covered by a minimum 1/4" laminate in tank bottom. Outside tank bottom holds tank vertical.

Hold Down Lugs and Lift Lugs: Unless otherwise specified, all chop/hoop filament wound tanks will be equipped with hold down and lift lugs.

Mounting Lugs: May be located per customer specifications. For use where mounting tank accessories which should be bolted to tank wall such as ladders, gauges, etc. Center bent steel plate with outside dimensions 4" wide x 12" long, with 4" center portion raised for working clearance.

FRP Manways w/Bolt Down Covers: For use above liquid level. FRP manways w/bolt down covers are offered in diameters of 24" and 32" FRP solid cover (3/8") fastened to 3/8" thick flanged tank lip with 8 bolts, 3/8" x 1-1/2", each with two washers and stainless steel nut. Teflon rope gasket supplied.

FRP Manways/Hinged Quick Access: For use where quick and easy access to tank interior is required. Available in 18" and 24" diameters. Above liquid level usage only. One-hand operation, with adjustable hinge and over-center latch for good gasket contact. Stainless steel hinge assembly and plated zinc latch. Lockable.

Ladders, Cages and Platforms: Coated with red oxide primer, carbon steel ladders, cages and platforms can be supplied for field assembly.

Tank Insulation: Standard insulation consists of 2" polyurethane foam covered with a 100 mil liner of weather-resistant fiberglass laminate. Electrical heating pads or tapes are available upon request and installed to meet requirements.

10' Diameter CLOSED TOP

4,000 - 15,000 GAL.

True I.D. – 10'4"

52.3 gal./inch straight sidewall

PART NO.	GAL.	HT.	APPROX. WALL THICKNESS*	APPROX. WT. LBS.
F104CT	4,000	7'11"	7/32" - 9/32"	1,075
F105CT	5,000	8' 8"	7/32" - 9/32"	1,206
F106CT	6,000	10' 3"	7/32" - 11/32"	1,336
F107CT	7,000	11'10"	7/32" - 11/32"	1,480
F108CT	8,000	13' 5"	7/32" - 11/32"	1,647
F109CT	9,000	15'	7/32" - 11/32"	1,813
F1010CT	10,000	16' 7"	7/32" - 7/16"	1,988
F1011CT	11,000	18' 3"	7/32" - 7/16"	2,190
F1012CT	12,000	19'10"	7/32" - 7/16"	2,390
F1013CT	13,000	21' 5"	7/32" - 1/2"	2,600
F1014CT	14,000	23'	7/32" - 1/2"	2,820
F1015CT	15,000	24' 7"	7/32" - 1/2"	3,100

Graduated top to bottom. Wall thicknesses designed for 1.3 specific gravity.

12' Diameter CLOSED TOP

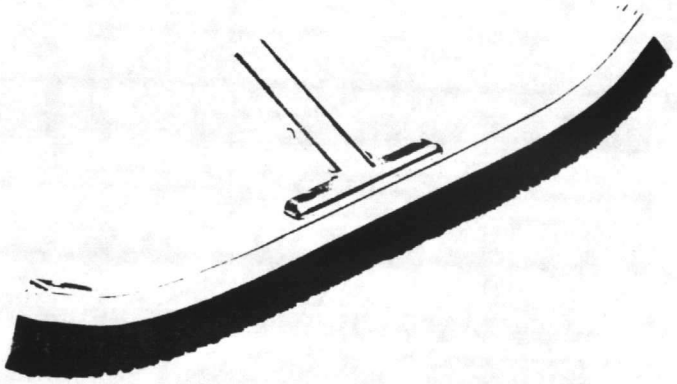
6,000 - 21,000 GAL.

True I.D. – 11'9"

67.5 gal./inch straight sidewall

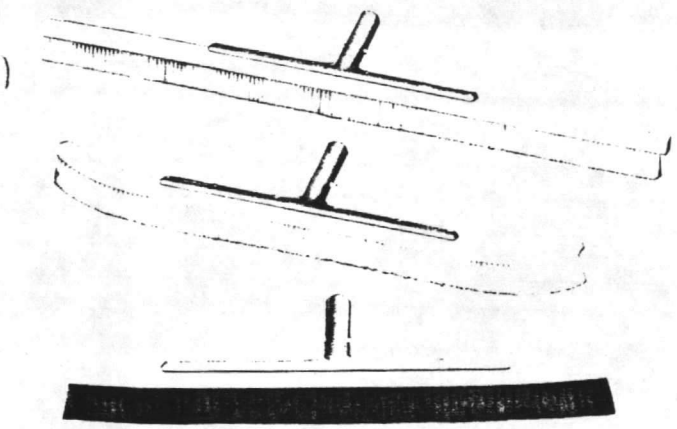
PART NO.	GAL.	HT.	APPROX. WALL THICKNESS*	APPROX. WT. LBS.
F126CT	6,000	8' 1"	7/32" - 5/16"	1,375
F128CT	8,000	10' 7"	7/32" - 5/16"	1,625
F1210CT	10,000	13' 1"	7/32" - 3/8"	1,910
F1212CT	12,000	15' 6"	7/32" - 3/8"	2,215
F1214CT	14,000	18'	7/32" - 7/16"	2,565
F1216CT	16,000	20' 5"	7/32" - 7/16"	2,935
F1218CT	18,000	22'11"	7/32" - 1/2"	3,350
F1220CT	20,000	25' 5"	7/32" - 1/2"	3,580
F1221CT	21,000	26' 8"	7/32" - 17/32"	3,800

Graduated top to bottom. Wall thicknesses designed for 1.3 specific gravity.



VINYL LINER WALL BRUSH

No. 818C Vinyl Liner Wall Brush. 18″ curved wall brush designed for use in all liner pools. Blue plastic block with specially rounded, no-snag ends are densely filled with 4 rows of blue plastic, 1¼″ trim bristles. Equipped with Kwik-Change handle bracket mounted on extruded aluminum channel backing.

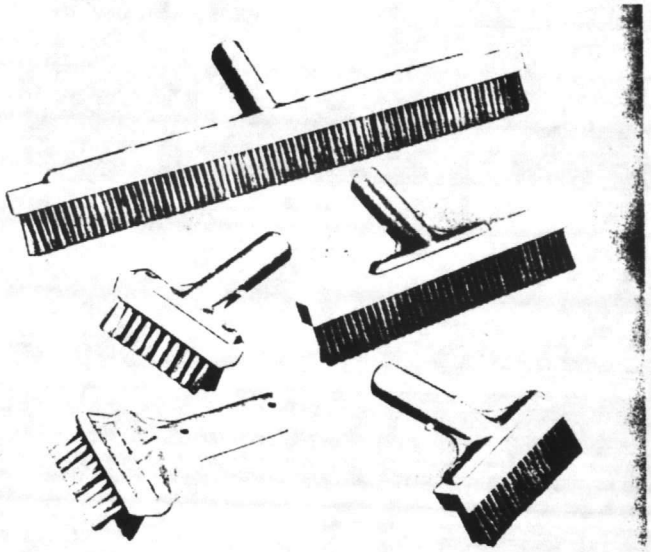


MAINTENANCE WALL BRUSHES

No. 924 Pro-Wall Brush. A stiff, aggressive wall brush for the professional serviceman, 24″ wide, straight end design is heavily filled with 2 rows of 1½″ trim black nylon bristles. Blue plastic block with Kwik-Change handle bracket.

No. 927C Giant Curved Wall Brush. New 27″ wide, curved end wall brush for the professional serviceman. Filled with 5 rows of durable 1½″ trim white nylon bristles. Has Kwik-Change handle bracket mounted on extruded aluminum channel backing.

No. 936 Olympic Wall Brush. The tool every serviceman needs for cleaning large commercial pools. Extra-wide 36″ straight end brush with 5 rows of 1½″ trim white nylon bristles. Blue plastic block has Kwik-Change bracket mounted on extruded aluminum channel backing for added strength.



ALGAE BRUSHES

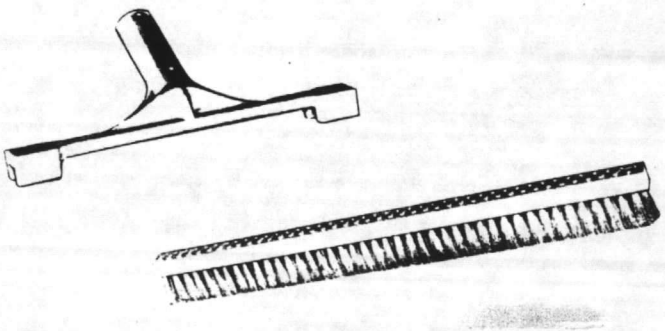
No. 103SS Algae Brush. Our original 3½″ wide algae brush. Two rows of aggressive stainless steel wire bristles with 1⅛″ trim are hand drawn at different angles for fast cleaning of small, hard-to-get-at algae deposits. One piece, cast aluminum back has two screw holes for attaching to handle.

No. 104SS Algae Brush. New version of our original algae brush. Has 4¼″ width, 2 rows of stainless steel wire bristles trimmed to 1¼″. Kwik-Change handle bracket mounted on blue plastic block.

No. 105SS Algae Brush. 5″ wide brush has solid 5 row fill of 1¼″ stainless steel bristles, set in blue plastic block fitted with Kwik-Change handle bracket.

No. 109SS Algae Brush. A 9″ wide brush with 5 rows of stainless steel wire trimmed 1¼″ set in blue plastic block. Also has Kwik-Change bracket.

No. 118SS Algae Wall Brush. 18″ wide straight end algae wall brush with 5 rows of 1¼″ trim stainless steel wire. Blue, no-mar plastic block is fitted with Kwik-Change handle bracket.

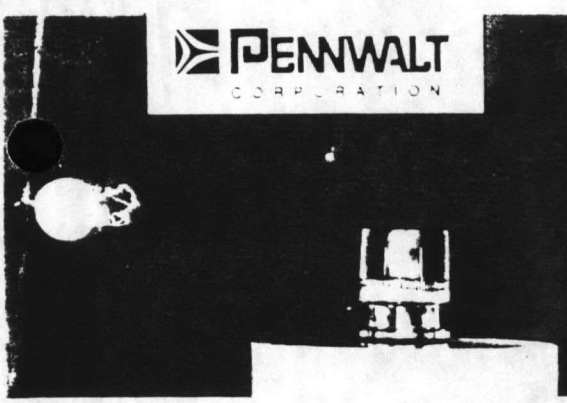


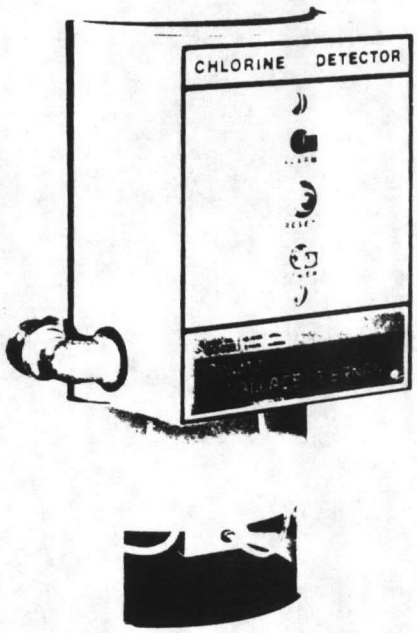
SPECIALTY WALL BRUSH AND BRACKET

No. 115HB. Cast aluminum bracket for 2 row wall brush shown below. Fits standard tubular handles and has 2 thumbscrews to hold brush.

No. 116SS Wall Brush. Here's a serviceman's special 2 row wall brush filled with stainless steel wire 1⅛″ trim. It's ideal for heavy-duty scrubbing of pool walls and bottoms to remove stains. Overall length 16″.

PENNWALT
CORPORATION





Stressing dependability, this unit monitors for chlorine gas with its sensor in continuous contact with ambient air. Design simplicity and positive air sampling make it capable of detecting in seconds at 1 ppm. This level corresponds to OSHA regulations and AWWA guidelines concerning exposure to chlorine.

FEATURES

FIRST NON-INSTRUMENT-TYPE DETECTOR

Design simplicity removes this unit from the class of sophisticated instrumentation. It is the first truly uncomplicated chlorine detector ... easy to understand, operate, and maintain.

DEPENDABLE

A high capacity, integral fan provides positive air sampling. The measuring electrode is continuously cleaned by gravity flow of the electrolyte.

LOW IN COST, LOW COST IN OPERATION

Design simplicity means low initial cost: there is no light-sensing system; few moving parts. Takes only 4 oz of electrolyte (glycerin-based potassium iodide solution) every 3-4 weeks and ½ oz of activated filter carbon after a chlorine leak.

CHOICE OF MODELS, EASY TO INSTALL

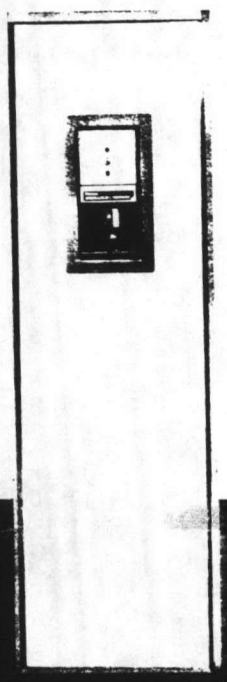
Installation requires only mounting on a wall with bracket supplied and connecting 115-volt power to a terminal strip. Two optional models for remote sampling up to 80 feet: one is in a W&T Chlorination module (free-standing cabinet); the other is mounted on a panel. Both have a high capacity blower, junction box, and hose connections for sample-air inlet and vent. The panel-mounted model can have an optional audible alarm.

EASY TO OPERATE

Requires only two periodic visual checks: electrolyte supply as shown by a red level indicator and electrolyte flow as shown by a wet electrode. Reservoir is filled with the detector in place. No sample-air adjustments. After a power failure, the alarm resets if no chlorine is present. After an alarm, it can be reset only when chlorine is no longer present.

LOW MAINTENANCE

Materials are chemical-resistant plastics and alloys. The electronics compartment and connections are air-tight. Solid state components are on a quality printed-circuit board. Operation of the alarm and circuitry is easily checked by placing a drop of chlorine bleach on the electrode.



W&T Chlorine Detector mounted in a fiber glass chlorinator module for remote installation.

WALLACE & TIERNAN
PENNWALT
EQUIPMENT ■ CHEMICALS
HEALTH PRODUCTS

TECHNICAL DATA

DESIGN AND OPERATION

The W&T Chlorine Detector consists of an electrolyte tank with a level indicator and an air filter. The activated-carbon filter keeps chlorine gas away from the electrolyte. From the bottom of this tank a sensor projects down into a sensing chamber where it contacts sample air driven by the fan or blower.

The sensor is a plastic holder containing two platinum electrodes. Electrolyte drains slowly down the holder keeping it constantly wet and continuously washing off dirt and contaminants. Excess solution drops into a tray; some of it evaporates and the remainder drains through plastic tubing.

When chlorine-laden air enters the sensor chamber, chlorine reacts with the electrolyte at the electrodes to produce an electrical current. The current is amplified in the solid state electronic unit to light a built-in red alarm and de-energize a double-pole, double-throw relay. The relay contacts are wired to a terminal strip to permit pick-up of a contact opening or closure for operating fans, chlorine shut-off valves, or external alarms. Contact rating is 8 amperes at 250 volts ac.

As well as the alarm light, an alarm-reset button and an amber power-on light are included. The latter indicates when the unit is operating. Upon power interruption, the amber light goes out but the relay is de-energized to the alarm state. When power is restored, the amber light comes on, the alarm relay resets automatically and will alarm if a leak occurred during the power interruption.

SHORT DESCRIPTION

The Wallace & Tiernan Series 50-125 Chlorine Detector operates amperometrically. Its sensor is continuously wetted with electrolyte solution and is in continuous contact with fan-driven sample air. It is specific for chlorine gas. The detector consists of an electrolyte tank, a sensor, sensor chamber, electronic unit, and mounting hardware. The tank has an activated carbon air filter and a level indicator.

The sensor has two platinum electrodes which detect chlorine gas in seconds at 1 ppm (by volume) in sample air. The electronics compartment and connections are air-tight.

There is a red alarm light, an amber power-on light, and an alarm reset button on the front of the detector. The solid state electronic unit has a printed circuit board, a current amplifier, a double-pole double-throw relay, and a terminal strip containing two pairs of relay contacts. These permit pick-up of a contact opening or contact closure for operation of external alarms or other equipment. The contacts are rated at 8 amperes, 250 volts ac. The detector can be furnished: by itself for wall mounting; in a free-standing modular cabinet for remote installation; on a panel for remote installation. The wall-mounted model has an integral fan; other models have separate blower units.

TECHNICAL DATA

sensitivity
Detects in seconds at 1 ppm chlorine by volume (3 mg/m³) in air.

electrolyte
Dilute glycerin-based potassium iodide solution. 4 oz of this concentrate mixed with 4 quarts of distilled water fills the reservoir (3-4 weeks' supply). One gallon plastic container (about 2 years' supply) supplied.

temperature limits 35 to 125 F.

alarm
Local indication by red alarm light; relay contacts provided for external alarms and other equipment. There is also a power-on light and an alarm-reset button.

relay contacts
Two pairs rated 8 amperes (resistive load), 250 volts ac: one pair for equipment normally operated with an open circuit, the other pair for closed circuit equipment.

electrical requirements
Wall-mounted detector: 115-volt, 50 60 Hz, single-phase, 0.5 ampere; module-mounted detector: 115-volt, 60 Hz, single-phase, 0.75 ampere.

electrical connections
Airtight ½-inch conduit connections for customer-furnished power and external alarm leads.

installation
Wall mounted with brackets supplied. Must be approximately 12″ above floor for proper sampling of the ambient air. But for convenient servicing, may be mounted higher with optional package consisting of 4 ft of 1″ PVC pipe and locknut fittings (maximum length for 1″ sample pipe is 5 ft).

remote sampling
Optional model has the detector in a W&T Chlorination Module (free-standing fiber glass cabinet). Another option has the detector and blower on a panel for convenient wall mounting. Blower units in both models have connections for customer-furnished 1-inch pipe for sample inlet and vent.

blower capacity
1.5 cfm with zero suction and approximately 1 cfm with 80 feet of suction and 20 ft of discharge (1″ pipe or hose).

standard accessories

4 ft. drain tubing; about 2 years' supply of electrolyte; felt wicking for the electrode holder; two 4-oz packages of activated carbon for recharging the air filter; bracket for wall mounting.

optional accessories

1″ vinyl hose or 1″ PVC pipe for sample inlet and vent; 4 oz bottles (3-4 weeks' supply) and 1-gallon containers (approx. 2 years' supply) of electrolyte; remote W&T Central Alarm (red alarm light and buzzer); remote W&T Individual Alarm (red alarm light and green light to indicate the detector and remote alarm are in use); automatic chlorine-line shut-off valves. And for the panel-mounted detector, audible alarm with alarm acknowledgement button.

equipment furnished
Items such as external tubing, piping, and wiring, conduit, and elective features are included only as specifically listed in a quotation.

overall dimensions
Detector on wall with bracket, 9¼″x18½″x9⅞″; detector in cabinet, 20½″x5′8¼″x15″; detector on panel, 24″x 24″x10½″.

weight and shipping weight
Detector only, 12 lb and 32 lb; detector in cabinet, 70 lb and 120 lb; detector on panel, 35 lb and 55 lb.

SERVICE & REFERENCES

Prompt service on Wallace & Tiernan equipment is available from branch offices in principal cities. Publications on chlorinators and other related equipment are available on request.

Progressive changes in design may be made without prior announcement.

WALLACE & TIERNAN DIVISION

V-NOTCH CHLORINATOR

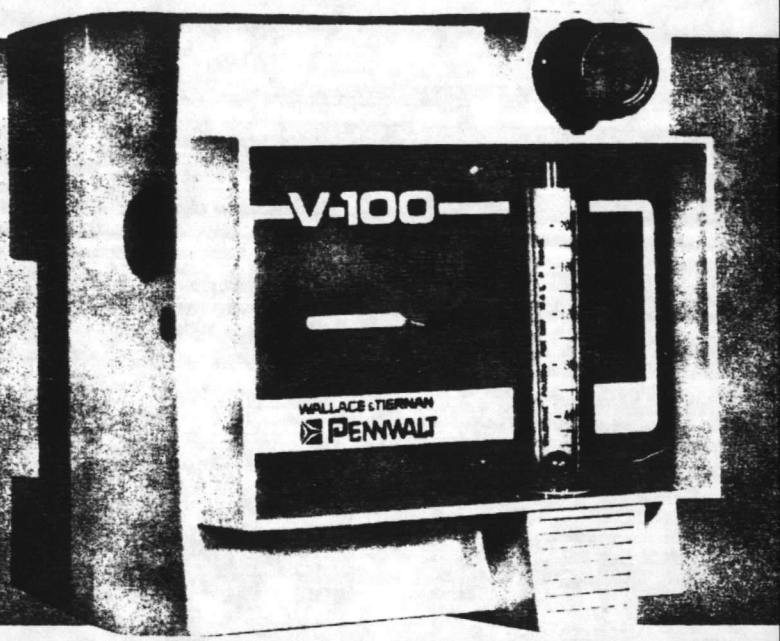
SERIES V-100

WALLACE AND TIERNAN, V100, GAS CHLORINATOR WITH V100C SWITCHOVER, 100 PPD ANS SPARE PARTS

This chlorinator is designed for continuous or start-stop applications requiring gas flows to 100 lb of chlorine per day. (To 200 lb per day with optional, high capacity conversion kit). It features design simplicity, corrosion-resistant construction, and the famous V-notch orifice for precise control of gas flow.

Combined with one or more of an array of accessories, the V-100 becomes the basic component of a mini-chlorination control center.

A special swimming pool arrangement of this chlorinator, with anti-syphon injector, is designed for public swimming pools. The Los Angeles County Health Department has approved it for installation and replacement in public pools in Los Angeles County.



WATER TREATMENT

Small water treatment plants. Also disinfects water supplies for housing projects, farms, trailer courts, motels, resorts, summer camps.

WASTE TREATMENT

Small municipal waste treatment plants and for lift stations in large plants. Ideal for package waste treatment systems. Also disinfects domestic wastes from home, farm, and private systems.

SWIMMING POOLS

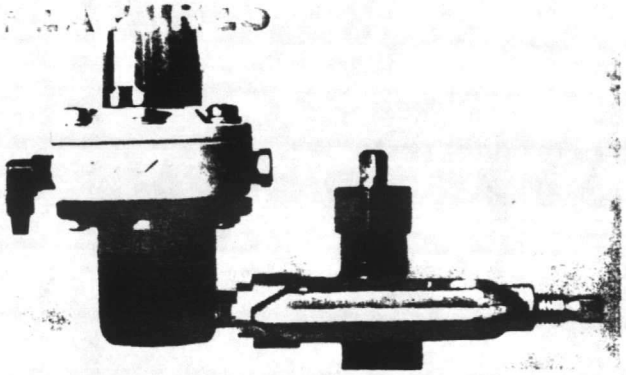
Helps protect bathers, keep water free of algae, and keep slime off pool sides and bottom.

INDUSTRIAL USES

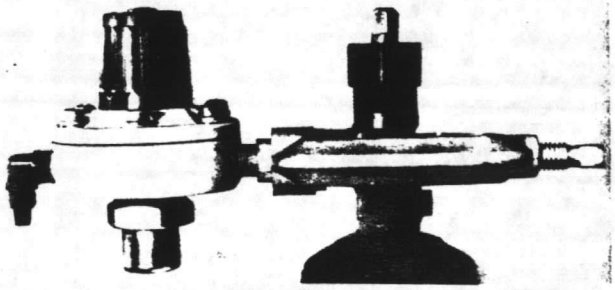
Disinfects water used in food plants, fish plants, canneries, abattoirs, and trawlers. In heavier doses, adds a powerful disinfectant to the clean-up water used in such plants. Treats plating and other industrial wastes. Helps prevent slime in cooling water.

Manufactured by Wallace & Tiernan Division, PENNWALT Corporation, Belleville, N. J.
Sold and serviced by:

CAT. FILE **910.200**



Cylinder unit above with optional trap and filter.



THREE-PART CONSTRUCTION PROTECTS CONTROL UNIT

The V-100 consists of a separate cylinder unit, control unit, and injector. The control unit is mounted away from the cylinder. It is not disturbed when a cylinder is changed.

DEPENDABLE OPERATION

The direct-mounted cylinder unit reduces gas pressure to a vacuum immediately. There are no high pressure gas lines. Tubing carries dry gas under vacuum. If any component after the cylinder unit gets broken, air leaks in; gas can't leak out. Loss of vacuum for any reason causes the cylinder unit to shut off the gas supply.

CHLORINE SUPPLY INDICATOR

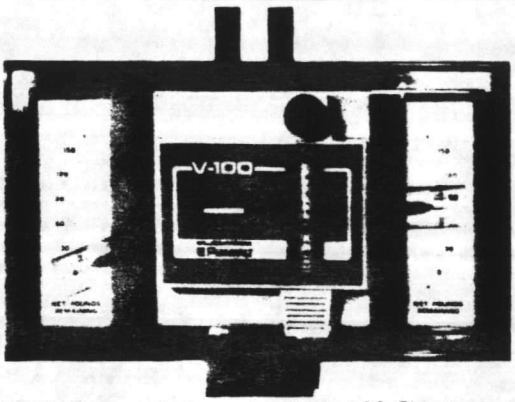
This built-in unit provides positive indication of chlorine availability. It will remain white during normal operation but will register red during conditions of high vacuum. Red signals an exhaustion or interruption of the chlorine supply. The indicator can be fitted with an optional switch to actuate external alarms or to operate a pump starter interlock. The switch is a gas- and vapor-tight sealed unit and is easily installed in the field.

LOW MAINTENANCE, EASY TO INSTALL

The V-100 is all plastic; springs are coated with KYNAR® vinylidene fluoride resin for corrosion resistance. Cylinder aids in protecting control components from contaminants in the gas. Installation hardware and instructions are included.

AUTOMATIC SWITCHOVER PREVENTS RUNNING OUT OF CHLORINE

Optional cylinder units switch over automatically to a new gas supply when the on-line supply runs out. There is no interruption of chlorination and the period between cylinder changes can be doubled.



Head of two-cylinder scale with V-100 Chlorinator

A MINI-CHLORINATION CENTER

This chlorinator and a Wallace & Tiernan Series 50-345 Two-Cylinder Scale bring the chlorine feed rate adjustment, feed rate indication, and the chlorine-supply-remaining readout conveniently together. (The scale weighs 2 cylinders independently and reads out net pounds remaining on separate dials.) Add automatic switchover (above) and the units become an efficient, time-and-labor saving control center for small treatment plants.

RELIABLE GAS METERING

The V-notch consists of a precisely grooved plug sliding in a fitted ring. Any position of the plug in the ring results in a particular orifice size and a corresponding feed rate. The V-notch resists sticking and binding; it's made of corrosion-resistant, self-lubricating plastic.

SWIMMING POOL ARRANGEMENT

This arrangement is required for swimming pool applications. It is the same chlorinator as the V-100, but its injecter is an anti-syphon type. A minimum of 20 psi water pressure at the injector is required to operate the chlorinator. This is designed to prevent chlorine from syphoning into the pool piping during shutdown or filter backwash cycles.

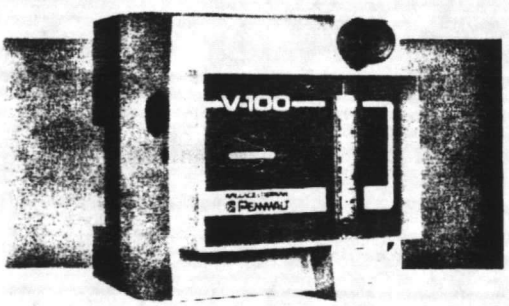
DESIGN AND CONSTRUCTION

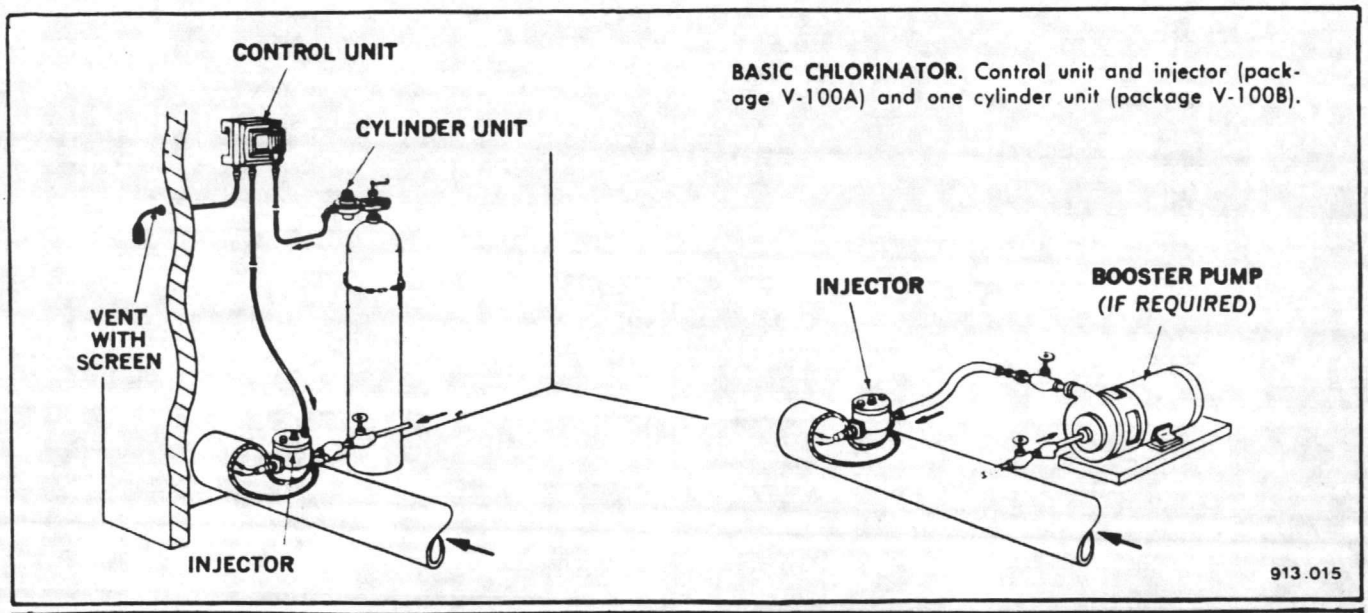
The direct-mounted cylinder unit puts the pressure-reducing and shut-off valve right at the chlorine cylinder. The valve allows manual shut-off and closes automatically when the operating vacuum stops. Thus chlorine cylinders can be changed without admitting dirt, air, or moisture to the control unit and without turning off the injector. An optional trap-and-filter unit aids in protecting the chlorinator from contaminants in the gas. An optional adapter kit allows the cylinder units to be mounted on ton containers. The cylinder units are all-metal, more resistant to damage when changing cylinders.

In the automatic switchover version, the unit on stand-by is held by a mechanical detent-type lock-out. When the "operating" cylinder is exhausted, the system vacuum rises to a higher-than-normal level. This increased vacuum overcomes the latching force of the detent and the stand-by cylinder becomes the "operating" cylinder.

Cylinder units of both types are factory-adjusted to reduce cylinder or container pressure to the optimum chlorinator-operating vacuum. But with a special wrench, pressure or vacuum can be regulated in the field without disassembling the cylinder unit.

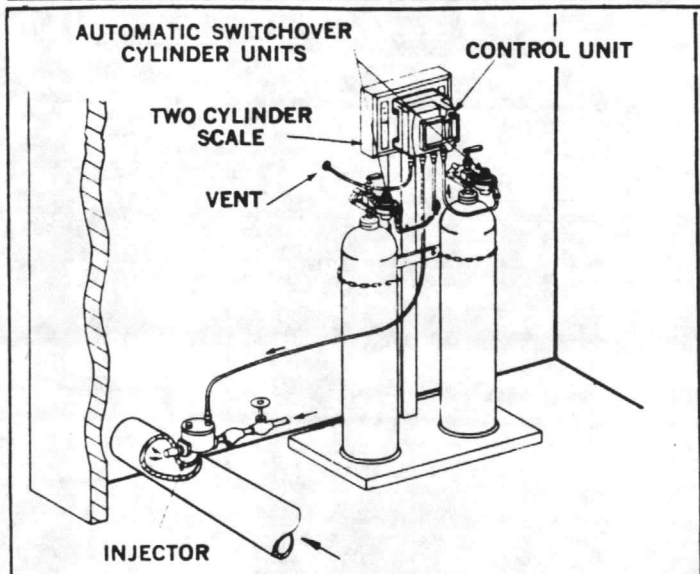
The control unit has wall-mounting brackets. The rotameter is easy to remove. A pressure relief valve vents to atmosphere should chlorine pressure build up. The control unit has a built-in chlorine supply indicator. Check valves in the injector and the control unit keep injector water out of the control unit.





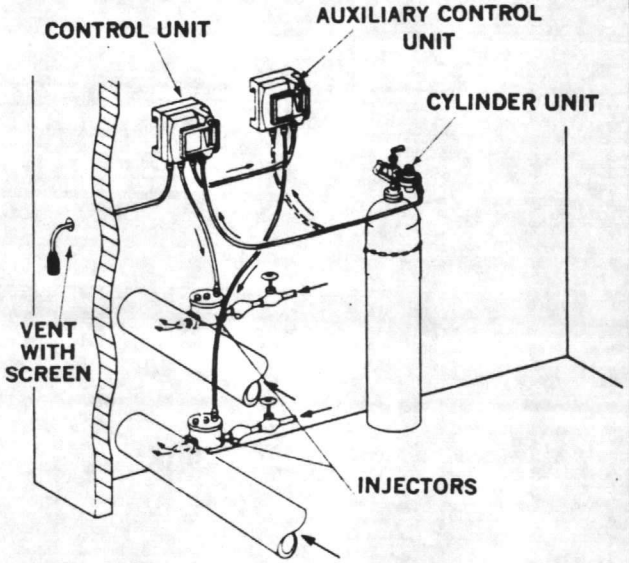
BASIC CHLORINATOR. Control unit and injector (package V-100A) and one cylinder unit (package V-100B).

913.015



AUTOMATIC SWITCHOVER. Control unit and injector (package V-100A) and two automatic switchover cylinder units (package V-100C).

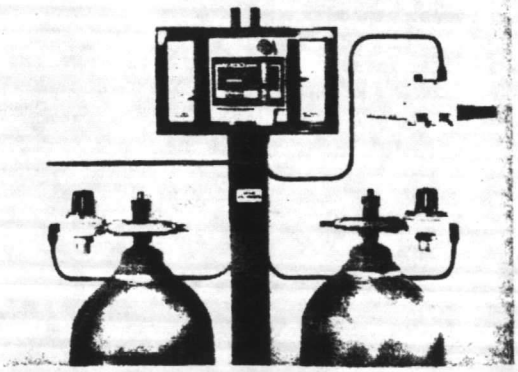
913.016



TWO APPLICATION POINTS. (Two separate, metered gas streams to two application points.) Single cylinder unit (package V-100B), control unit and injector (package V-100A), and a second control unit and a second injector (package V-100D).

913

SHORT DESCRIPTION



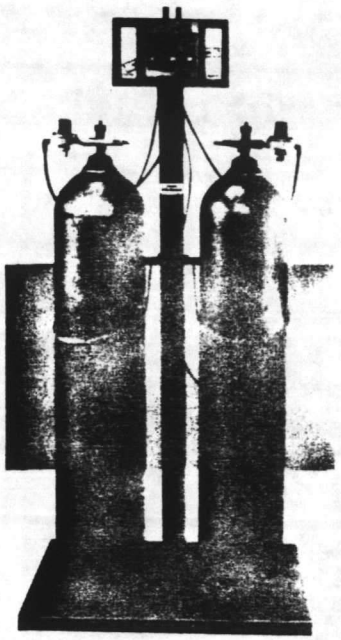
This is a Wallace & Tiernan Series V-100 Chlorinator or V-100 Swimming Pool Chlorinator. It is a vacuum-type with separate cylinder unit, control unit, and injector. A series of rotameters give capacities of 1.2, 4, 10, 20, 50, 100, 150, and 200 lb of chlorine per day. (The 150-and 200-pound capacities are achieved with an optional high capacity conversion kit). Maximum backpressure is 160 psi; feed range is 20:1. The gas regulating device is a V-notch Variable Orifice. It maintains the set feed rate within 4% of full scale.

The cylinder-mounted unit has a pressure reducing and shut-off valve with manual gas shut-off. The control unit has a rotameter, V-notch Orifice, feed rate control knob, differential regulating valve, chlorine pressure relief valve, chlorine supply indicator. A check valve in the injector and one in the control unit prevent back-flooding. Springs exposed to chlorine are Kynar coated.

The V-100 Chlorinator is sold in packages containing instructions and installation hardware. In one arrangement it gives automatic switchover from an empty to a full cylinder. Another gives two or more separate, controlled gas streams to two or more application points. The V-100 can have a trap-and-filter unit to protect the mechanism from impurities in the gas, a kit to adapt the cylinder units to mounting on ton containers. The swimming pool chlorinator has an anti-syphoning injector. It prevents chlorine from being syphoned into pool piping due to a vacuum anywhere in the piping.

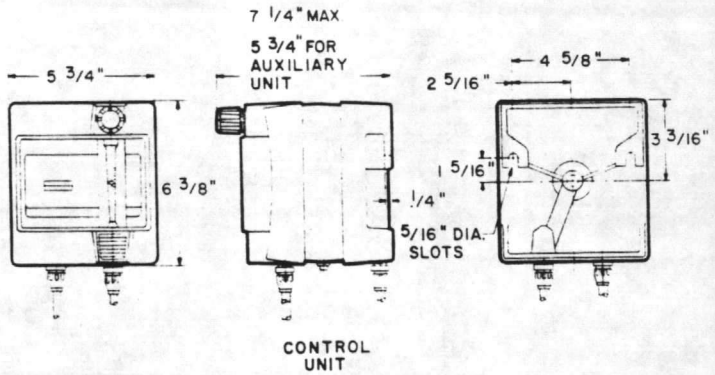
A single-pole, double-throw, 7-ampere vacuum switch can be supplied. It is a gas- and vapor-tight sealed unit. It closes normally open contacts to actuate a local or remote alarm on restriction of chlorine flow or an empty container.

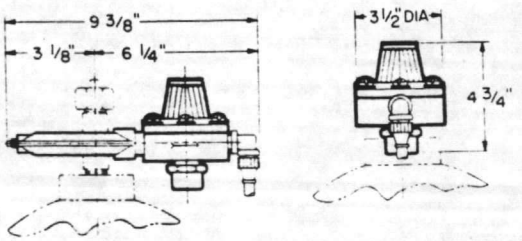
MINI-CHLORINATION CENTER

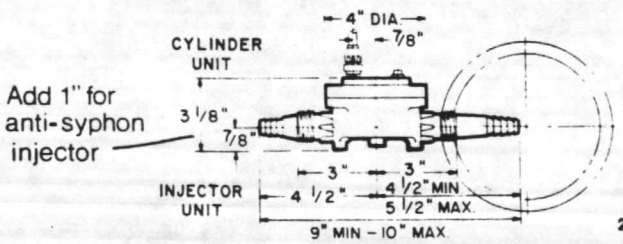


This V-100 Chlorinator-Two-cylinder Scale combination brings the chlorine feed rate knob, feed rate indication, and chlorine-supply - remaining readout together for convenience. The Series 50-345 Two-cylinder Scale weighs the two cylinders independently and shows net pounds of chlorine remaining on separate dials. Dials are readable to within ½ lb. and the readout is accurate to 1% of full scale. The scale's platform is only 1½ inches high. No floor recess is required; cylinders roll on and off easily. Automatic switchover provides uninterrupted treatment during unattended periods, saving time and labor. For convenience, the unit can be ordered for metering to two application points. The chlorinator can be the swimming-pool type with anti-syphon injector.

DIMENSIONS

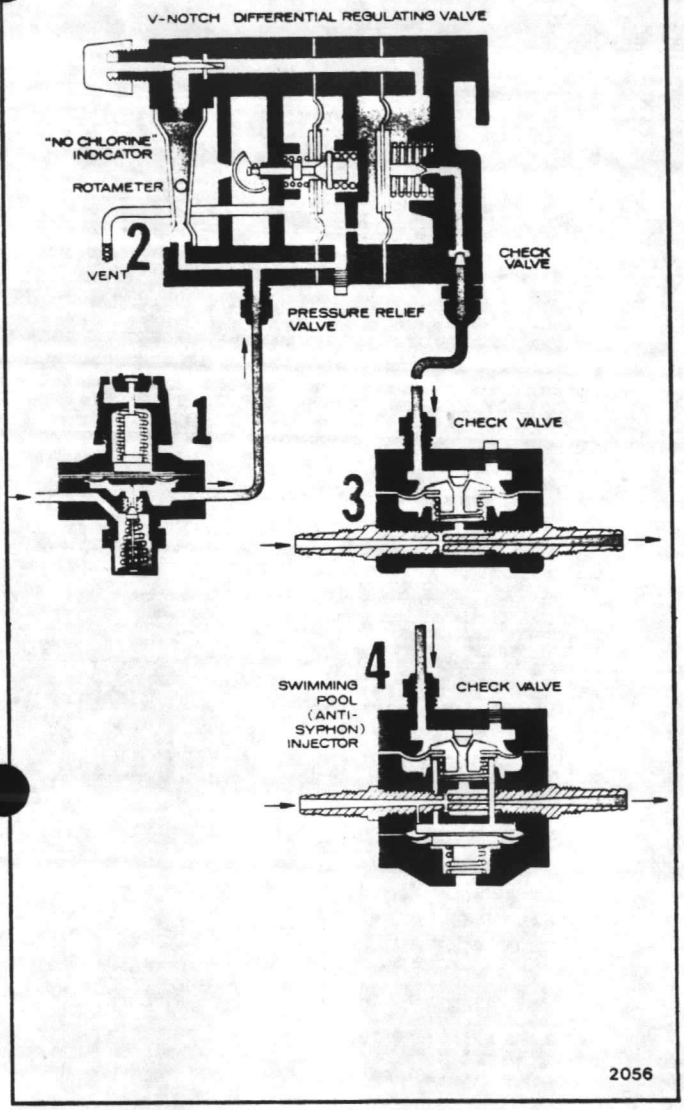






2055

FLOW DIAGRAM



OPERATION

Gas leaves the cylinder through a pressure regulating valve (1). This diaphragm-operated valve maintains the proper operating vacuum ahead of the control unit (2).

Gas next enters the control unit and passes through the rotameter to the V-notch Variable Orifice. Here feed rate is changed manually by positioning the V-notch plug in its ring (changing orifice area). The manual adjustment knob is on the front of the control unit.

After the orifice, gas passes through a differential regulating-valve. This diaphragm-operated valve maintains the proper operating differential across the V-notch. A pressure relief valve is incorporated in the control unit. If a malfunction occurs gas escapes into the left hand .section of the chamber and vents to atmosphere.

At the injector (3), metered gas is dissolved in water. The resultant solution is discharged to the point of application.

Two check valves, a spring-diaphragm type in the injector (which closes the injector suction port when the injector is not operating), and a spring-loaded poppet type located in the control unit, prevent injector water from backflooding the control unit.

The anti-syphon injector (4) has a tensioned spring and an auxiliary diaphragm. The spring holds the inlet valve closed until water pressure builds up to 20 psi on the diaphragm.

TECHNICAL DATA

When chlorinator capacity and maximum pressure at application point are known, the water quantity (gpm) and pressure (psi) required for chlorinator operation can be found in the table. For example, to operate a chlorinator with a 50-lb meter against 40 psi, 5.2 gpm of water at 80 psi (or more) is required.

PRESSURE AT POINT OF APPLICATION	CHLORINATOR WITH 1.2-, 4-, 10-, or 20-lb METER		CHLORINATOR WITH 50-lb METER		CHLORINATOR WITH 100-lb METER		CHLORINATOR WITH 150-lb METER		CHLORINATOR WITH 200-lb METER	
PSI	GPM	MIN PSI	GPM	MIN PSI	GPM	MIN PSI	GPM	MIN PSI	GPM	MIN PSI
2½	2.5	16	2.9	23	4.1	49	4.6	64	6.2	116
5	2.7	20	3.1	26	4.3	53	4.7	66	6.3	117
10	3.1	26	3.4	32	4.4	58	4.9	71	6.3	118
20	3.7	40	3.9	45	4.9	72	5.2	82	6.4	122
40	5.0	76	5.2	80	5.7	100	6.0	108	6.7	137
60	6.1	112	6.2	115	6.6	129	6.7	138	7.2	157
80	7.0	148	7.1	150	7.3	162	7.4	168	7.8	182
100	7.8	184	7.8	185	8.0	194	8.1	201	8.3	210
120	8.5	220	8.5	220	8.6	227	8.7	235	8.8	242
140	9.1	256	9.1	256	9.1	259	9.3	269	9.4	275
150	9.4	275	9.4	275	9.4	275	9.6	285	9.7	291

NOTE: Table based on the injector included in the standard installation package. It provides the best all-around performance. Other injectors available. Some will operate the chlorinator on smaller flows at higher pressures. Others require higher flows at lower pressures.

accuracy 4% of full scale flow.

capacities
Rotameters for 1.2, 4, 10, 20, 50, 100, 150, or 200 lb of chlorine per 24 hours. (The 150- and 200-lb capacities require an optional high capacity conversion kit).

feed range 20 to 1.

methods of control
Manual or intermittent start-stop by interrupting injector water supply by a solenoid valve.

electrical requirements
Solenoid valve for start-stop operation; 115 volts, 50 or 60 Hz, 15 watts for heater used on ton containers. Vacuum switch is rated: 7 amperes resistive, 7 amperes inductive, 125 or 250 volts ac, 60 Hz; 7 amperes resistive, 4 amperes inductive, 28 volts dc.

injector water supply
Must be reasonably clean. Maximum temperature is 130 F. Maximum inlet pressure is 300 psi to 100 F; 150 psi to 130 F. 20 psi minimum pressure required for injector operation in the swimming pool arrangement.

pressure at point of application
Maximum with flexible polyethylene pipe is approximately 75 psi. Rigid pipe or high pressure hose for the solution line will allow application against backpressures to 160 psi. A solution pump after the injector will allow application against higher pressures.

vent requirements
Vent line must exhaust to outside atmosphere in an area where gas fumes cannot cause damage or injury.

ambient temperature limits
Injector, 35 F to 120 F; maximum water temperature, 130 F. Other components, −20 F to 120 F. Ambient temperature affects withdrawl rates from chlorine cylinders. Based on a single 150 lb cylinder, the following chlorine feed rates can be maintained:

Maximum chlorinator withdrawal capacity (lb Cl_2/24 hrs)	Minimum ambient temperature (degree F)
100	40
50	15
25	0
10	−10
4	−20

connections
Control and cylinder units have compression fittings for ⅜″ OD plastic tubing for capacities to 100 lb per day. (For capacities to 200 lb per day, ½″ OD tubing is furnished with fittings and adapters in the high capacity conversion kit). The injector water supply and discharge connections are for ¾″ flexible pipe or ¾″ male pipe thread. Injector connections above 75 psi must be rigid pipe.

installation packages
Control unit package V-100A contains:
control unit; rotameter for one capacity; injector; 25 feet of plastic tubing; 10 feet of ¾-inch flexible plastic pipe; adapter; clamps; vent screen; bottle of ammonia; instruction book.

Cylinder unit package V-100B contains:
one cylinder unit; 10 feet plastic tubing; 20 lead gaskets.

Automatic switchover package V-100C contains:
two automatic cylinder units; 20 feet of plastic tubing; 20 lead gaskets.

Multiple-point-of-application package V-100D contains:
one auxiliary control unit; rotameter for one capacity; injector; 25 feet of plastic tubing; 10 feet of ¾-inch flexible plastic pipe; adapter; clamps. NOT VENTED, THEREFORE CANNOT BE USED WITHOUT CONNECTING TO V-100A CONTROL UNIT.

NOTE: For all swimming pool applications, the V-100 must always be furnished with an anti-syphon injector.

options
Trap-and-filter units with replaceable filters to aid in protecting the chlorinator from contaminents in the gas. A kit adapts the cylinder unit for mounting on a ton container. It has a drip leg to trap liquid chlorine spurts and a heater to evaporate them. Wrench for adjusting cylinder units.

Chlorine supply switch for electrical contact on high vacuum; includes switch, mounting hardware, and 10 feet of electrical cord with non-slip connector. For use with vacuum switch: wall- or panel-mounted alarm unit with light and buzzer; alarm horn, alarm bell.

High capacity conversion kit includes: 40 ft of ½-inch OD tubing; tubing connectors and rotameter adapting parts which, with appropriate high capacity rotameter, allow V-100A units to feed up to 150 or 200 lb of chlorine per 24 hours.

shipping weight
control-unit package, 30 lb;
cylinder-unit package, 10 lb;
automatic switchover package, 20 lb;
auxiliary control-unit package, 30 lb.

Progressive changes in design may be made without prior announcement.

CAT. FILE **910.200**

WALLACE & TIERNAN DIVISION
PENNWALT CORPORATION
25 MAIN STREET
BELLEVILLE, NEW JERSEY 07109

WALLACE & TIERNAN
PENNWALT
EQUIPMENT ■ CHEMICALS

Printed in USA

3 PHASE • 600 Volts Maximum • 60 Hertz • With 3 Pole Overload Protection

Prices do not include heater elements. Starters require three overload relay heater elements at **$6.00** list each. Refer to Page 387 for selection tables.

Continuous Ampere Rating	NEMA Size	Maximum Horsepower Ratings — Full load current must not exceed Continuous Ampere Rating			Starter Coil Voltage	NEMA Type 1 General Purpose Enclosure Surface Mounting	NEMA Type 4 Watertight Enclosure Sizes 0-5 [1] Stainless Steel	NEMA Type 4X Watertight Corrosion-Resistant Enclosure Fiberglass-Reinforced Polyester [1]	Hazardous Locations — Unilock Enclosures: NEMA Type 3R [2], 7 and 9 Class I Groups C & D — Divisions 1 & 2	Hazardous Locations — Bolted Enclosure: NEMA Type 7 & 9 Class I Groups C & D Class II Groups E, F & G — Divisions 1 & 2	NEMA Type 12 Dust-tight Industrial Use Enclosure NEMA Type 3	Open Type Without Enclosure
		Motor Voltage	Single Phase	3 Phase		Catalog No	Catalog No	Catalog No	Catalog No	Catalog No	Catalog No	Catalog No
9	00	Separate Control — 120 Volt				509-TAD	Use Size 0 Starters		–	–	Use Size 0 Starters	509-TOD
		200	–	1½	208	509-TAH						509-TOH
		230	1	1½	240	TAA						TOA
		460	–	2	480	TAB						TOB
		575	–	2	600	TAC						TOC
18	0	Separate Control — 120 Volt				509-AAD	509-ACD	509-ASD	509-AUD		509-AJD	509-AOD
		200	–	3	208	509-AAH	509-ACH	509-ASH	509-AUH		509-AJH	509-AOH
		230	2	3	240	AAA	ACA	ASA	AUA		AJA	AOA
		460	–	5	480	AAB	ACB	ASB	AUB		AJB	AOB
		575	–	5	600	AAC	ACC	ASC	AUC		AJC	AOC
27	1	Separate Control — 120 Volt				509-BAD	509-BCD	509-BSD	509-BUD		509-BJD	509-BOD
		200	–	7½	208	509-BAH	509-BCH	509-BSH	509-BUH		509-BJH	509-BOH
		230	3	7½	240	BAA	BCA	BSA	BUA		BJA	BOA
		460	–	10	480	BAB	BCB	BSB	BUB		BJB	BOB
		575	–	10	600	BAC	BCC	BSC	BUC		BJC	BOC
45	2	Separate Control — 120 Volt				509-CAD	509-CCD	509-CSD	509-CUD		509-CJD	509-COD
		200	–	10	208	509-CAH	509-CCH	509-CSH	509-CUH		509-CJH	509-COH
		230	7½	15	240	CAA	CCA	CSA	CUA		CJA	COA
		460	–	25	480	CAB	CCB	CSB	CUB		CJB	COB
		575	–	25	600	CAC	CCC	CSC	CUC		CJC	COC
90	3	Separate Control — 120 Volt				509-DAD	509-DCD		509-DUD	Use Bulletin 709	509-DJD	509-DOD
		200		25	208	509-DAH	509-DCH		509-DUH		509-DJH	509-DOH
		230	–	30	240	DAA	DCA	– –	DUA		DJA	DOA
		460		50	480	DAB	DCB		DUB		DJB	DOB
		575		50	600	DAC	DCC		DUC		DJC	DOC
135	4	Separate Control — 120 Volt				509-EAD	509-ECD		509-EUD		509-EJD	509-EOD
		200		40	208	509-EAH	509-ECH		509-EUH		509-EJH	509-EOH
		230	–	50	240	EAA	ECA	– –	EUA		EJA	EOA
		460		100	480	EAB	ECB		EUB		EJB	EOB
		575		100	600	EAC	ECC		EUC		EJC	EOC
270	5 [3]	Separate Control — 120 Volt				509-FAD	509-FCD		509-FUD		509-FJD	509-FOD
		200		75	208	509-FAH	509-FCH		509-FUH		509-FJH	509-FOH
		230	–	100	240	FAA	FCA	– –	FUA		FJA	FOA
		460		200	480	FAB	FCB		FUB		FJB	FOB
		575		200	600	FAC	FCC		FUC		FJC	FOC
540	6	Separate Control — 120 Volt				509-GAD	509-GCD				509-GJD	509-GOD
		200		150	208	509-GAH	509-GCH				509-GJH	509-GOH
		230	–	200	240	GAA	GCA	– –	– –		GJA	GOA
		460		400	480	GAB	GCB				GJB	GOB
		575		400	600	GAC	GCC				GJC	GOC
810	7	Separate Control — 120 Volt				509-HAD	509-HCD				509-HJD	509-HOD
		230		300	240	509-HAA	509-HCA				509-HJA	509-HOA
		460	–	600	480	HAB	HCB	– –	– –		HJB	HOB
		575		600	600	HAC	HCC				HJC	HOC
1215	8	Separate Control — 120 Volt				509-JAD	509-JCD				509-JJD	509-JOD
		230		450	240	509-JAA	509-JCA				509-JJA	509-JOA
		460	–	900	480	JAB	JCB	– –	– –		JJB	JOB
		575		900	600	JAC	JCC				JJC	JOC
2250	9	Separate Control — 120 Volt				509-KAD	509-KCD				509-KJD	509-KOD
		230		800	240	509-KAA	509-KCA				509-KJA	509-KOA
		460	–	1600	480	KAB	KCB	– –	– –		KJB	KOB
		575		1600	600	KAC	KCC				KJC	KOC

[1] FRP Hubs are included with each starter at no additional charge. Refer to Page 40 for information on Grounding Bushing.

[2] For NEMA Type 3R applications it is **necessary** that a drain or breather-drain combination fitting be **added**.

[3] NEMA Size 5 Unilock enclosed starters have a Continuous Ampere Rating of 210 amps.

Modifications — Refer to Page 64.

Approximate Dimensions — Refer to Pages 37 and 62.
Overload Relay Heater Element Selection — Refer to Page 387.

HOYER

SWIM POOL LIFTER

A 62" lift combines with 45 inches of horizontal radius swing to make this unit a convenient one to use.

Traditional Hoyer sturdiness, safety and ingenuity are standard equipment.

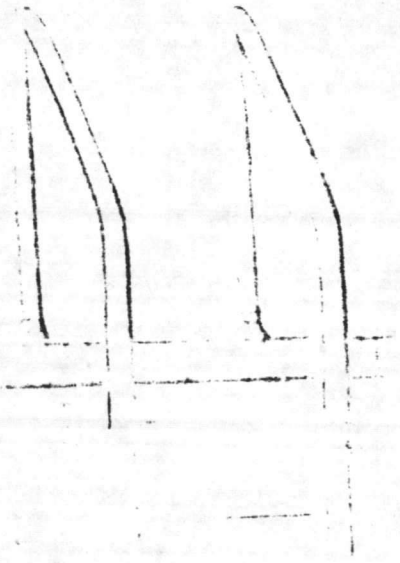
NOTE: This unit is not interchangeable with other Hoyer Lifters, except with the extension arm which would increase distance from edge of pool 20".

Restraining straps available on special order.

Maximum Capacity: 400 pounds

Shipments F.O.B. Oshkosh, Wisconsin

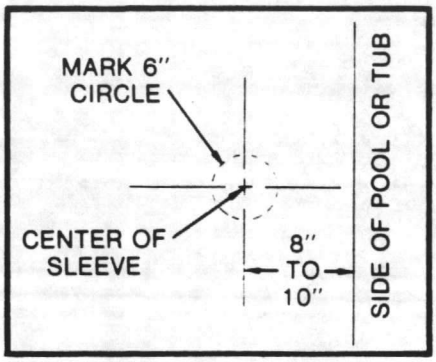
INSTRUCTIONS ON REVERSE SIDE



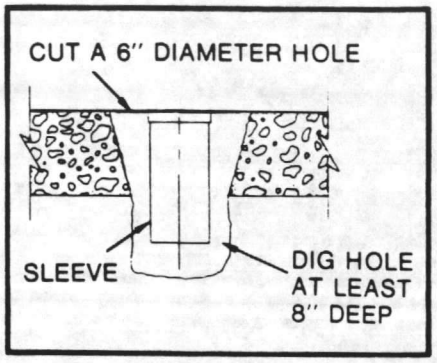
DISTRIBUTED BY EVEREST AND JENNINGS, INC., LOS ANGELES, CALIFORNIA 90025
MADE BY TED HOYER & CO., INC., P.O. BOX 2744, 2222 MINNESOTA ST., OSHKOSH, WI 54903

INSTALLATION INSTRUCTIONS
For SWIM POOL LIFTER (Cement-in Sleeve)

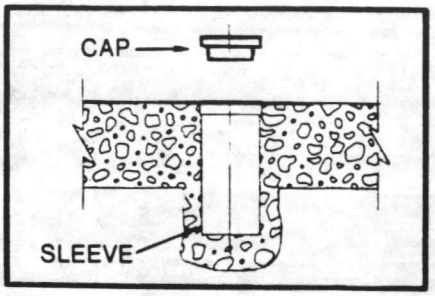
Notice: All sleeves are now being supplied for flush installation with flush cover.



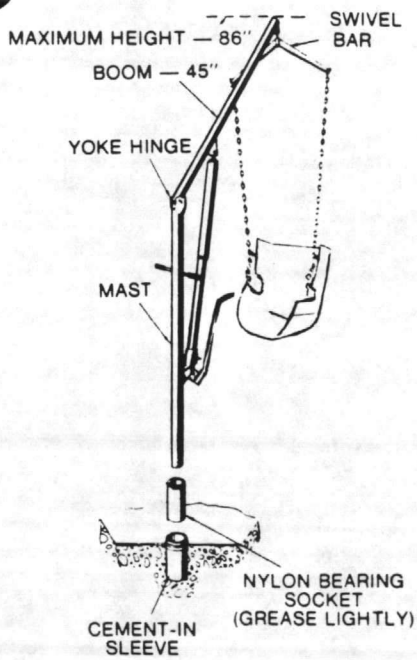
The layout required for the cement-in sleeve is shown on the diagram to the left. Proper position for the mast is 8 to 10 inches from the edge of the pool or tub. The cement-in sleeve itself is a cylinder 3¼-inches in diameter and 8-inches long. Mark a 6-inch circle if existing concrete is to be removed. In a new installation, position the sleeve on center and flush with grade.



When the cement-in sleeve is to be installed in an existing concrete floor or deck, a hole at least 6-inches in diameter must be cut. The opening must be at least 8-inches deep. Fill the bottom of the hole with a non-shrinking cement, such as Por-Rok. Make sure the sleeve is perfectly vertical. Fill in around the sleeve with more non-shrinking cement. Allow the cement to set-up and finish the top surface.



The diagram above shows a cross section of the finished installation for the cement-in sleeve. Notice that the sleeve is completely imbedded in cement and that a good bond is secured between the new and old concrete. When installing the sleeve in a new job, position the sleeve and line it up when the forms are being installed. Pour the concrete around the sleeve as the deck or floor is poured. No special type of concrete is required. (A wad of newspaper stuffed into the top of the sleeve will keep the interior free of concrete while the floor is being poured.)



INSTALLATION OF LIFTER

When the sleeve has been installed (as described above) and the concrete has had several days to cure, the lifter may be installed. The nylon bearing socket supplied with the lifter must be installed in the sleeve. Grease the outside of the socket lightly before it is inserted into the sleeve. This will prevent corrosion which may cause the socket to stick in the sleeve. (It is suggested that the socket be removed occasionally also, to prevent corrosion.) Vaseline is an excellent lubricant if no commercial grease is on hand.

With the socket in place, unpack the lifter and insert the base of the mast into the socket and sleeve. To attach the end of the boom in the yoke hinge at the top of the mast, remove the wing nut and bolt from the yoke hinge and insert the boom end. Reinsert the bolt and secure with the wing nut. Attach the swivel bar to the boom end to keep the chains apart. The lifter is now ready for use.

A cover is supplied to prevent water from accumulating in the sleeve. This cover must be placed on the sleeve at all times when the mast is not in place.

MAINTENANCE

Put a drop of oil on the joints at the top of the mast, top and bottom of the pump, and the swivel bar hook every other month. While oiling the lifter, check all the cap nuts and bolts to be sure they are tight.

Put a drop of oil on the pump handle hinge when the Hoyer lifter is put into service and oil again every other month. This is very important as the holes in the hinge socket will wear when dry.

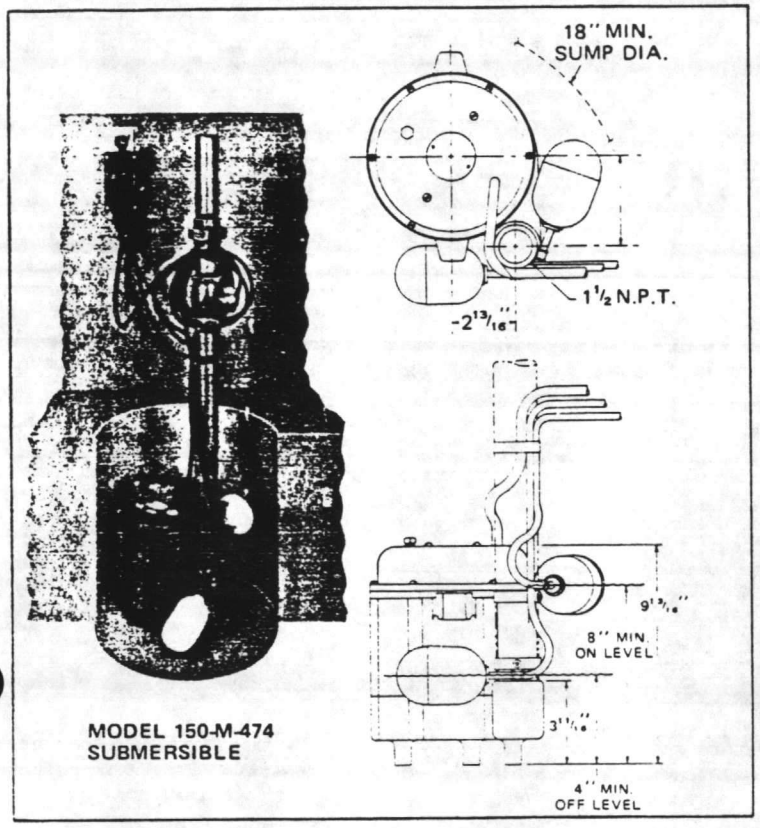
In high humidity or salt areas wax exposed lifter parts periodically to help prevent corrosion. KEEP LIFTER DRY AND CLEAN.

INSTRUCTIONS FOR OPERATION

To use the swimming pool lifter, remove the cover from the floor sleeve and insert the nylon bearing socket. Insert the mast of the lifter into the socket. Attach the long chains to the swivel bar. To use the #112-N, place the sling under the patient so that the end of the seat comes to his knees. Attach the ends of the chains to the swivel bar and the S-hooks to the sling. (In order to attain the full 62-inch lifting range of the lifter, the chains must be used in full length.) Patient's arms rest outside of chains. When the patient is lifted so that he just clears the chair, the lifter boom should be almost at maximum height. Patient can then be lowered the full 62-inches.

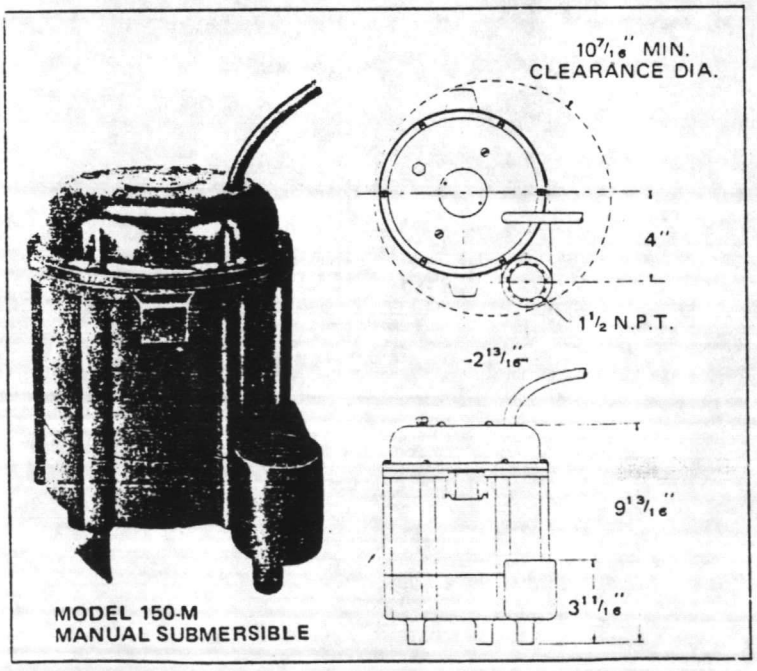
Enpo-Cornell Pump Company
A DIVISION OF
Roper Industries, Inc. (Ohio)
420 EAST THIRD STREET, PIQUA, OHIO 45356

Models 150-M and 150-M-474 Sump Pumps



MODEL 150-M-474
SUBMERSIBLE

The unit pictured above is a manual unit with the Model 474 liquid level control added making it a completely automatic unit.



MODEL 150-M
MANUAL SUBMERSIBLE

DESCRIPTION

A 1½" discharge high-capacity pump designed for heavy-duty pumping applications such as effluent control, construction jobs, manholes, and general maintenance. It performs equally well as a submersible pump for permanent installation, or for temporary applications that require portability. Will operate in liquids up to 100°F; high temperature models are available for operation in liquids up to 200°F with other level control.

SPECIFICATIONS

MOTOR
½ hp, 1725 RPM, 115V, 208V, or 230V/60 cy/1 ph; 208V, 230V, or 460V/60 cy/3 ph. Only single-phase units have built-in automatic thermal overload protection.

MATERIAL
Motor housing aluminum or cast iron. Impeller is bronze. Motor shaft is stainless steel. Units with all bronze castings are available; when ordering add -BR to model designation.

OTHER
Power cord length is 8 feet. Pump is armored and completely submersible.

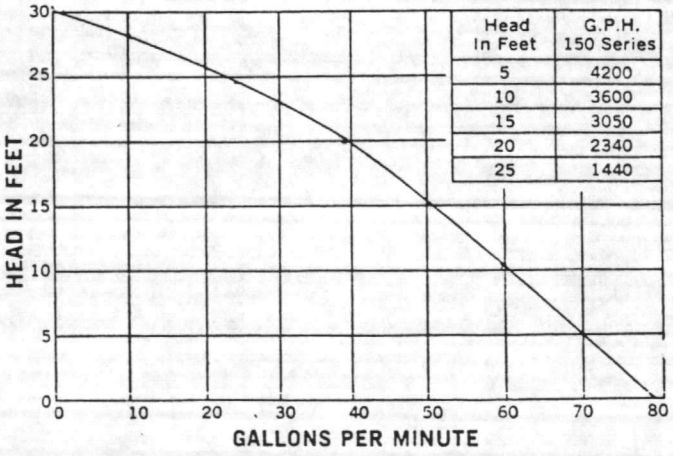
WEIGHT
Standard unit is 52 lbs.; Bronze unit is 63 lbs.

LIQUID LEVEL CONTROL
Automatic units use Model 474 consisting of two mercury float switches and control box. See catalog page 4400-1 for complete description.

MODELS

150-M & 150-M-BR are manaul units.
150-M-474 & 150-M-BR-474 are automatic units.
Add -BR to model number for all bronze pump.

PUMP CAPACITY CURVE

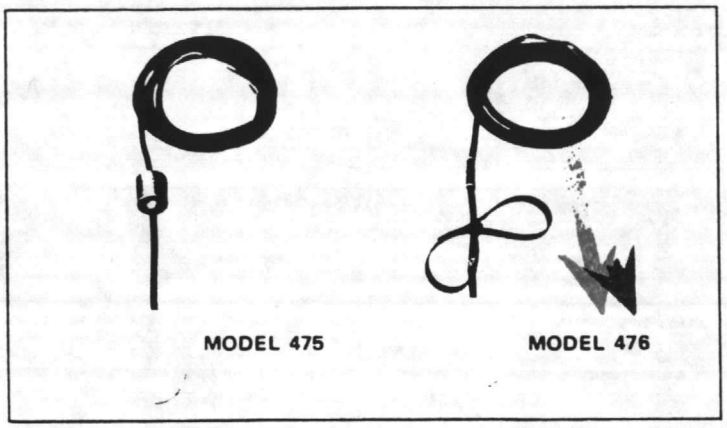


Head In Feet	G.P.H. 150 Series
5	4200
10	3600
15	3050
20	2340
25	1440

ENPO -GINEERED -WER

Enpo Pump Company
A DIVISION OF
Roper Industries, Inc. (Ohio)
420 EAST THIRD STREET, PIQUA, OHIO 45356

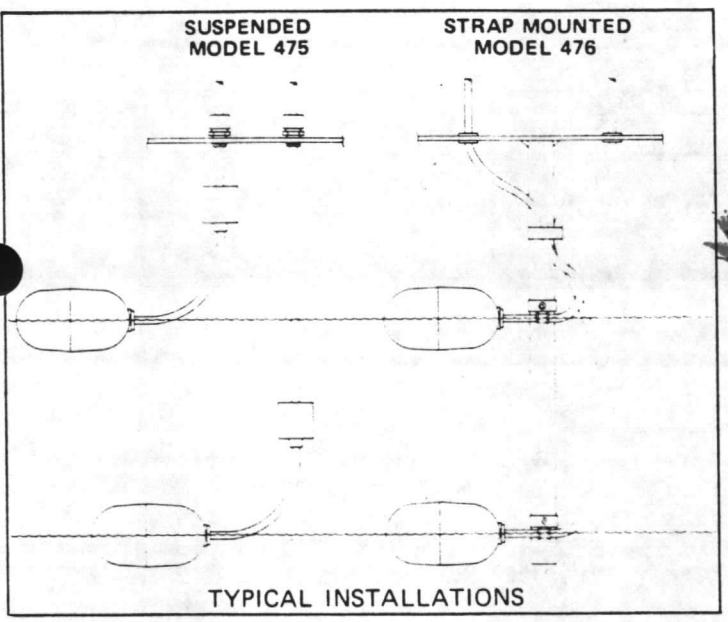
Liquid Level Controls for Submersible Sump Pumps



MODEL 475 MODEL 476

DESCRIPTION:

Individual mercury float switches provide a simple dependable method of controlling pump on and off operation as well as other alarm and control functions. Simplex pump systems require two units; On and off. Duplex pump systems require three units; On, off and emergency. These units function as pilot devices to control magnetic starters, contactors, relays or control panels which start and stop the pumps.



TYPICAL INSTALLATIONS

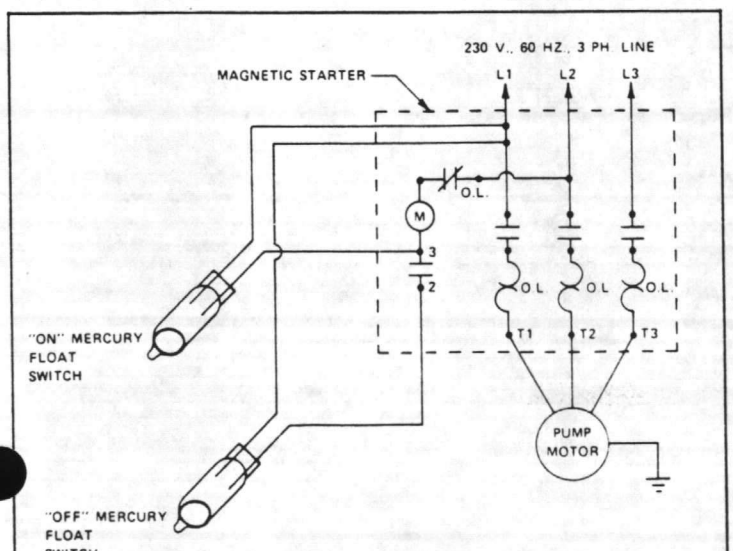
MODELS:

Suspended Models 475 and 475E are normally used in tanks or sumps 48" I.D. and larger. They are suspended from a mounting bar or tank cover. The weight attached to the cable prevents it from floating on the liquid surface. Operating levels are easily adjusted by raising or lowering the cable.

Strap mounted Models 476 and 476E are normally used where space will not permit the suspended arrangement. The cable is attached to a plastic strap that can be fastened to any pipe size from ¾" to 4".

Models 475 and 476 have short floats for use with 1¼" and 1½" discharge pumps. Standard cable length is 8 ft.

Models 475E and 476E have long floats for use with 2" discharge and larger pumps. Standard cable length is 20 ft.



TYPICAL WIRING DIAGRAM
ONE PUMP, 230V 3 PHASE
MAGNETIC STARTER
TWO MERCURY FLOAT SWITCHES

RATINGS:

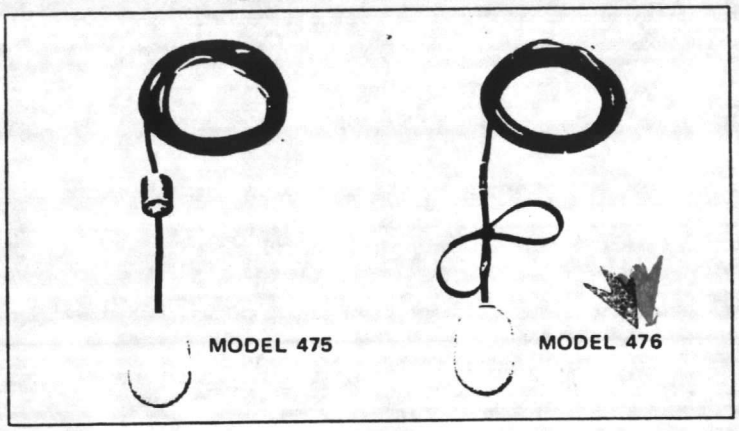
All models are for pilot duty and rated 4.5 amps at 115 VAC, and 2.25 amps at 230 VAC. Maximum operating temperature is 160°F (71°C). Switch closes on liquid rise, normally open. Normally close units also available.

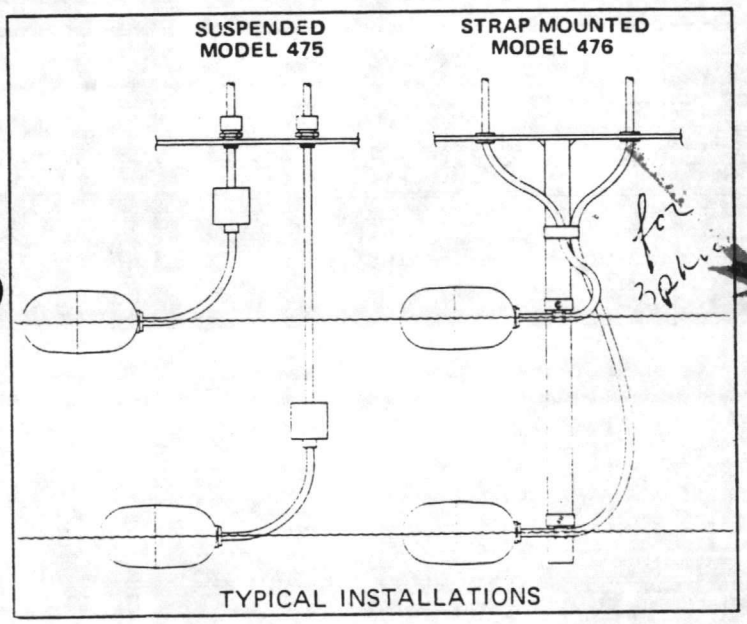
CONSTRUCTION:

A mercury switch with molybdenum contacts is sealed in the double walled float which is made of a tough, hard, rigid plastic that is virtually completely resistant to attack by inorganic salt solutions, alkalis and mineral acids. The electrical cable is extra flexible two conductor with neoprene jacket. Strap mounted Models 476 and 476E have a releaseable plastic strap. Suspended Models 475 and 475E have a lead weight.

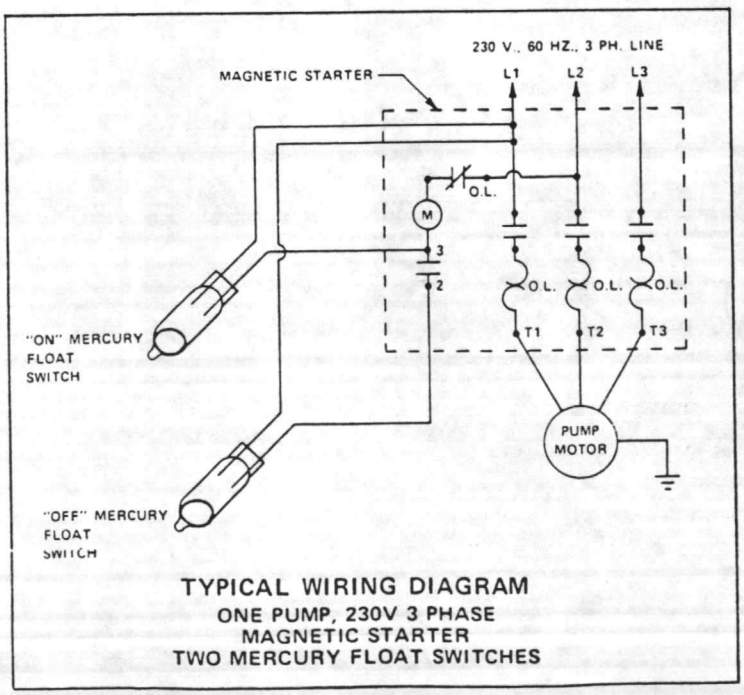
Enpo-Cornell Pump Company
A DIVISION OF
Roper Industries, Inc. (Ohio)
420 EAST THIRD STREET, PIQUA, OHIO 45356

Liquid Level Controls for Submersible Sump Pumps





TYPICAL INSTALLATIONS



TYPICAL WIRING DIAGRAM
ONE PUMP, 230V 3 PHASE
MAGNETIC STARTER
TWO MERCURY FLOAT SWITCHES

DESCRIPTION:

Individual mercury float switches provide a simple dependable method of controlling pump on and off operation as well as other alarm and control functions. Simplex pump systems require two units; On and off. Duplex pump systems require three units; On, off and emergency. These units function as pilot devices to control magnetic starters, contactors, relays or control panels which start and stop the pumps.

MODELS:

Suspended Models 475 and 475E are normally used in tanks or sumps 48" I.D. and larger. They are suspended from a mounting bar or tank cover. The weight attached to the cable prevents it from floating on the liquid surface. Operating levels are easily adjusted by raising or lowering the cable.

Strap mounted Models 476 and 476E are normally used where space will not permit the suspended arrangement. The cable is attached to a plastic strap that can be fastened to any pipe size from ¾" to 4".

Models 475 and 476 have short floats for use with 1¼" and 1½" discharge pumps. Standard cable length is 8 ft.

Models 475E and 476E have long floats for use with 2" discharge and larger pumps. Standard cable length is 20 ft.

RATINGS:

All models are for pilot duty and rated 4.5 amps at 115 VAC, and 2.25 amps at 230 VAC. Maximum operating temperature is 160° F. Switch closes on liquid rise.

CONSTRUCTION:

A mercury switch with molybdenum contacts is sealed in the double walled float which is made of a tough, hard, rigid plastic that is virtually completely resistant to attack by inorganic salt solutions, alkalis and mineral acids. The electrical cable is extra flexible two conductor with neoprene jacket. Strap mounted Models 476 and 476E have a releaseable plastic strap. Suspended Models 475 and 475E have a lead weight.

AWARD WINNING POOLS

IFRS® RECIRCULATION SYSTEM

Paddock®

Swimming Pools