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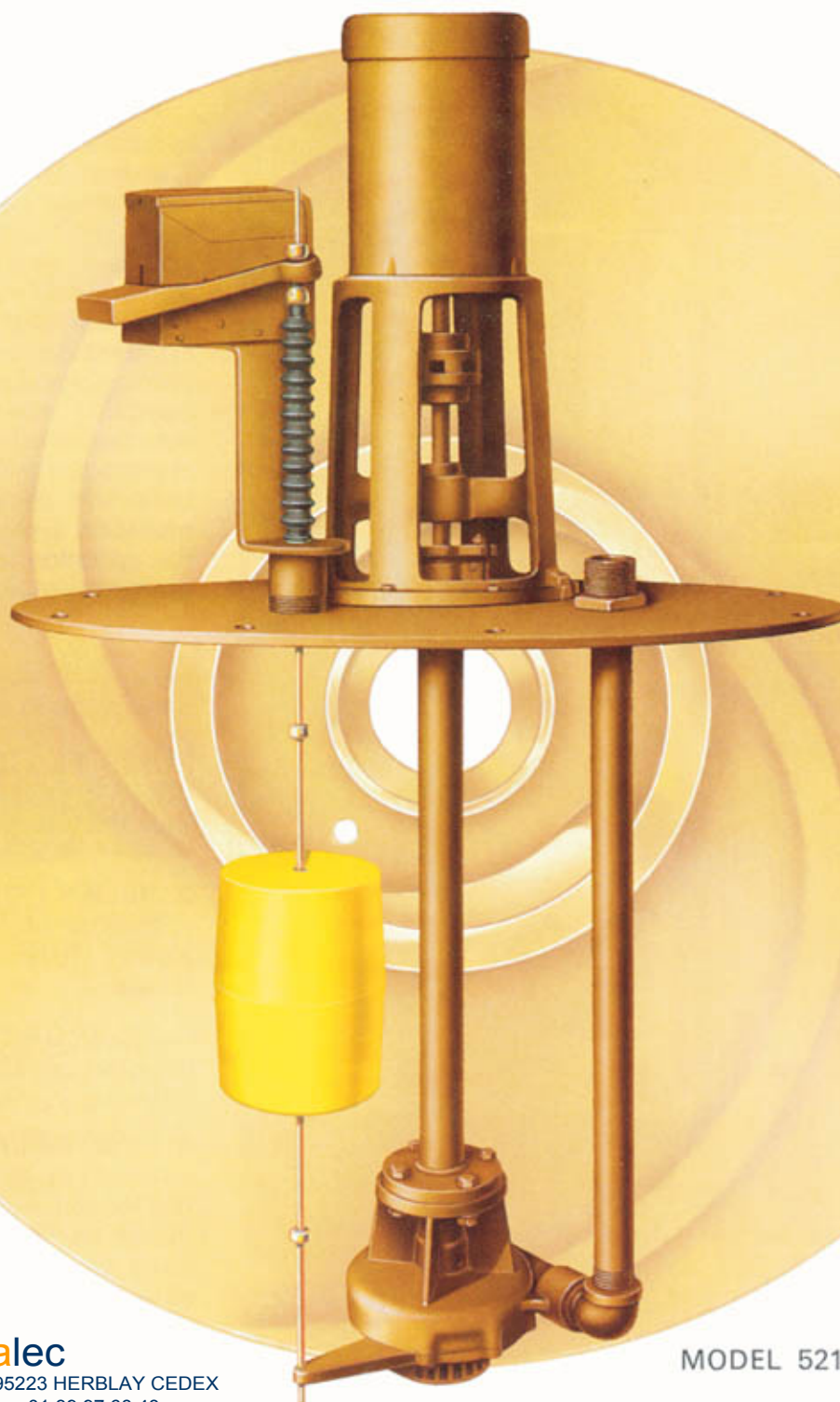
AURORA PUMP

BULLETIN 520A/Rev. F

520 SERIES

SINGLE STAGE SUMP PUMPS—"MSM"

CAPACITIES TO 110 G.P.M.
HEADS TO 40 FEET
TEMPERATURES TO 180°F.



motralec

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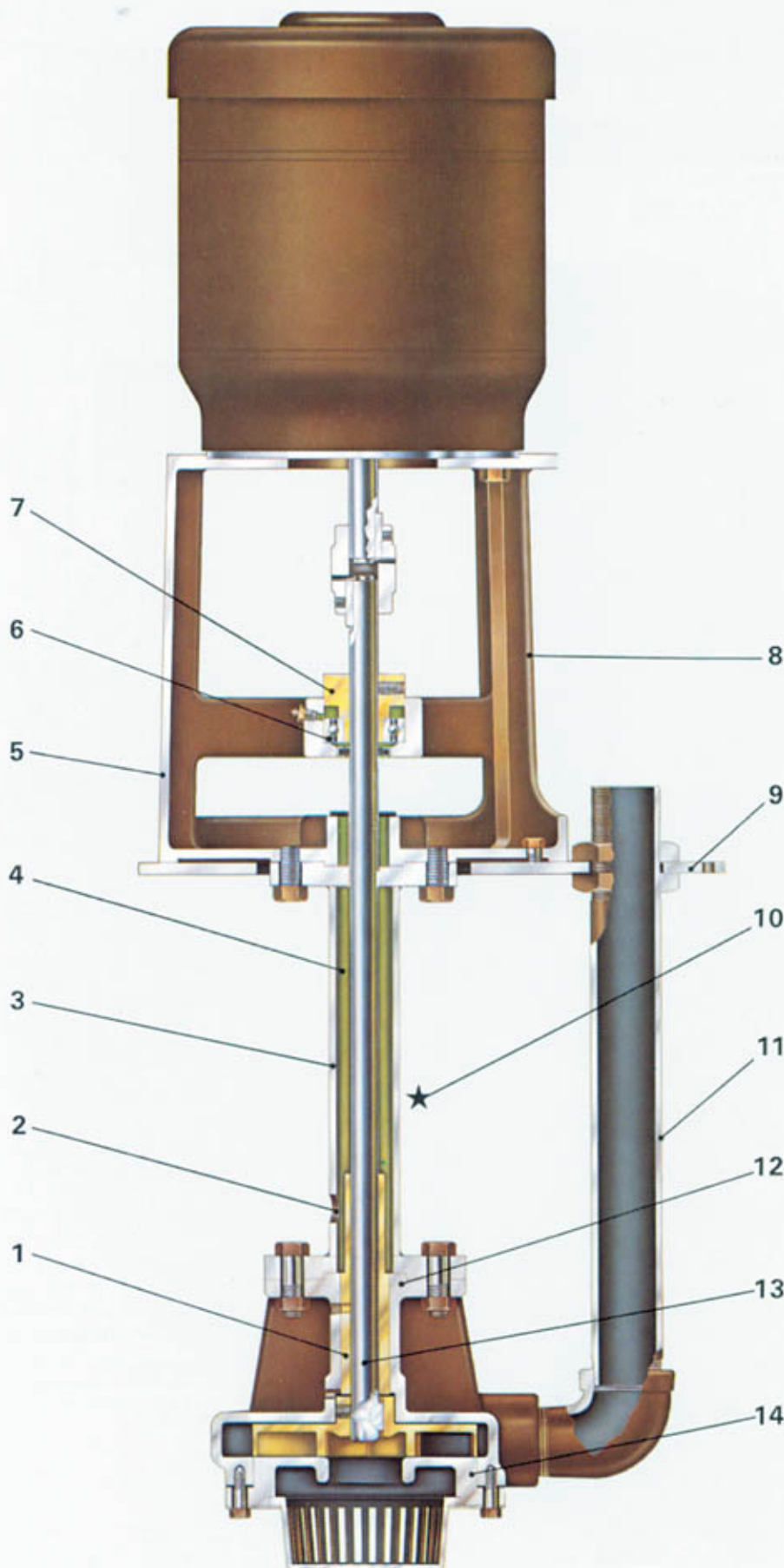
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MODEL 521A

INTRODUCTION

AURORA 520 SERIES PUMPS

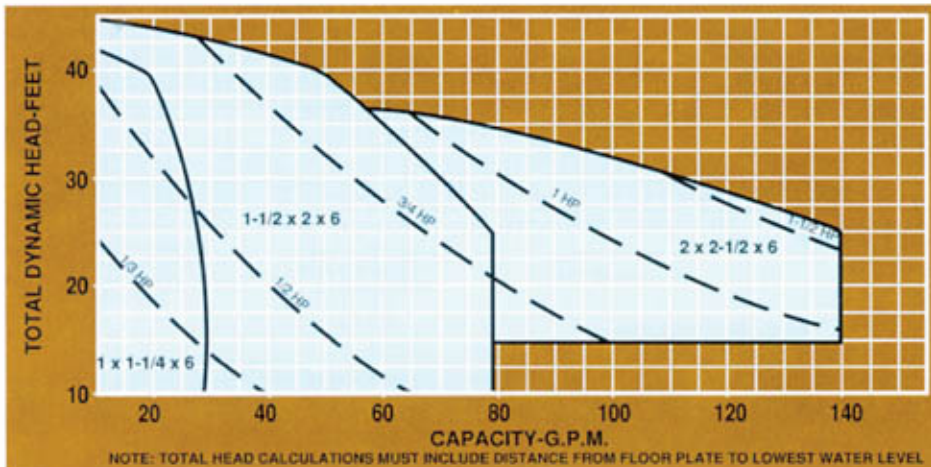


There are many requirements for vertical extended shaft single stage centrifugal pumps. These pumps perform the important function of transferring liquid from below ground reservoirs or enclosed tanks. Sump pumps are a logical choice for a variety of applications, among them — sump drainage in building basements, tunnels, pits — wherever water gathers and must be emptied into sewers or be elevated above ground. They are popular for handling wash water, boiler pit service, etc. The 2" pump renders satisfactory service for handling up to 1½" diameter sphere size screened sewage. The vertical pump design is in many ways more critical than those of more standard centrifugal pumping units. Attention must be paid to operating speeds, ball bearing arrangements, shaft design and construction. This bulletin illustrates how this pump solves these problems and will contribute to the solution of your particular pumping problem.

PUMP FEATURES

- 1 BRONZE SLEEVE BEARING** is extra length for long life.
- 2 RELIEF HOLES** prevent liquid under pressure from rising above normal sump liquid levels.
- 3 SUPPORT PIPE** is constructed of 1½" schedule 40 pipe.
- 4 LINE BEARINGS** are provided on pit depths of 5'-2" and one additional bearing is provided for each 4' thereafter. Each bearing is grease lubricated.
- 5 MOTOR MOUNTING** bracket that assures alignment of motor and pump shaft with tongue and groove machining.

RANGE CHART AND SPECIAL FEATURES



6 THRUST BALL BEARING is regreaseable and is protected from contamination.

7 EXTERNAL IMPELLER ADJUSTMENT is accomplished with an easy to reach adjusting collar.

8 ELEVATED HEAD bearing provides additional bearing protection from washdown and other contaminants. Integral stuffing box is available with packing and a split gland for gastight construction.

9 STEEL BASEPLATE is standard with optional designs available.

10 ELEVATED FLOAT SWITCH ASSEMBLY is standard. Several enclosures are available.

11 DISCHARGE PIPE is securely locked to the baseplate and is threaded.

12 POSITIVE ALIGNMENT THROUGHOUT utilizes tongue and groove design to assure true and vibration free operation.

13 PUMP SHAFT $1\frac{3}{16}$ " in diameter is provided to minimize deflection.

14 LIQUID END includes a semi-open bronze impeller as standard. A large area strainer keeps trash from clogging the impeller on 1" and $1\frac{1}{2}$ " pumps.

OPTIONAL EQUIPMENT

All iron construction
Gastight stuffing box
Grease lubricated pump bearing
Stainless steel shaft
Round, square or spl. shape baseplates
4" Vent
Various float switch enclosures
Electric controllers
High water alarm
Float guard
Special pump setting increments
Flanged discharge elbow
Strainer optional on 2" pumps

DESIGN DETAILS

Area	Description	Dim.
Pump Shaft	Rotation — From Driver End	CW
	Diameter — Full length	$1\frac{3}{16}$ "
	Bearing (Ball) — Head	7305W
Bearing	Bearing (Sleeve) — Pump	6 Lg
	SUPPORT PIPE SIZE	$1\frac{1}{2}$ "

LIMITATIONS

Maximum Limitations Based on Standard Materials and Pumping Clear Water	
Speed — R.P.M.	1750
Minimum Horsepower	$\frac{1}{2}$
Temperature °F	180
Basin Pressure — P.S.I.	2
Basin Cover Size — w/o Oval or Manhole	28"
Ovals or Manhole	53"

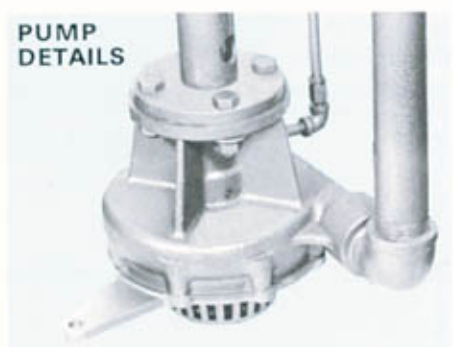
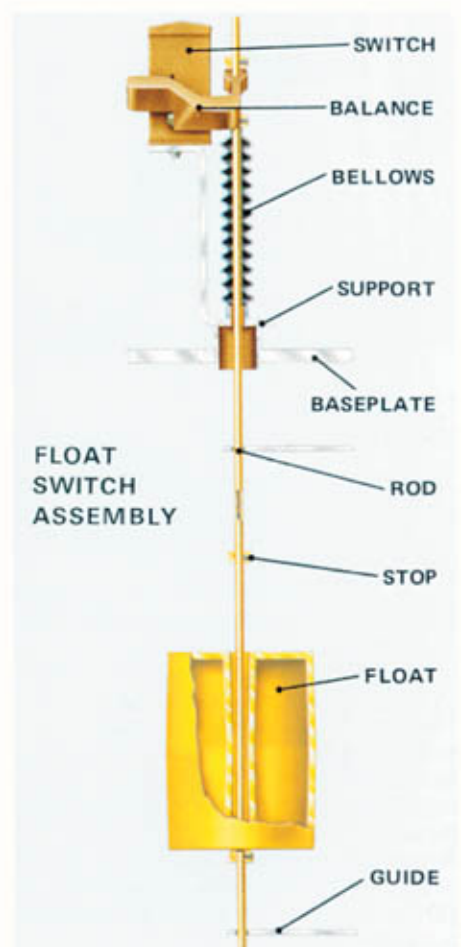
LINE SHAFT BEARINGS

Pit Depths	Number of Line Shaft Bearings
1'-4" to 5'-1"	0
5'-2" to 9'-0"	1
9'-1" to 10'-6"	2

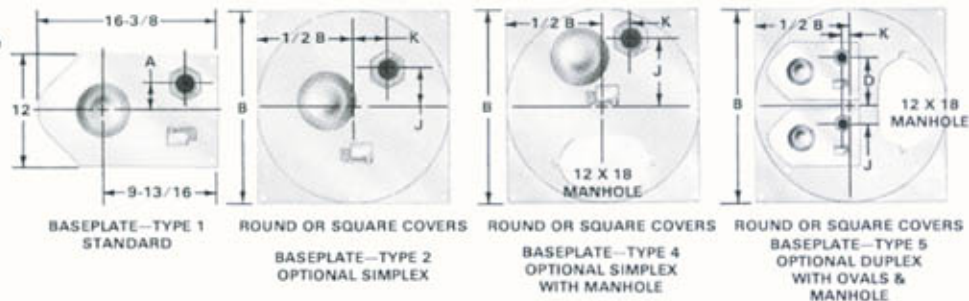
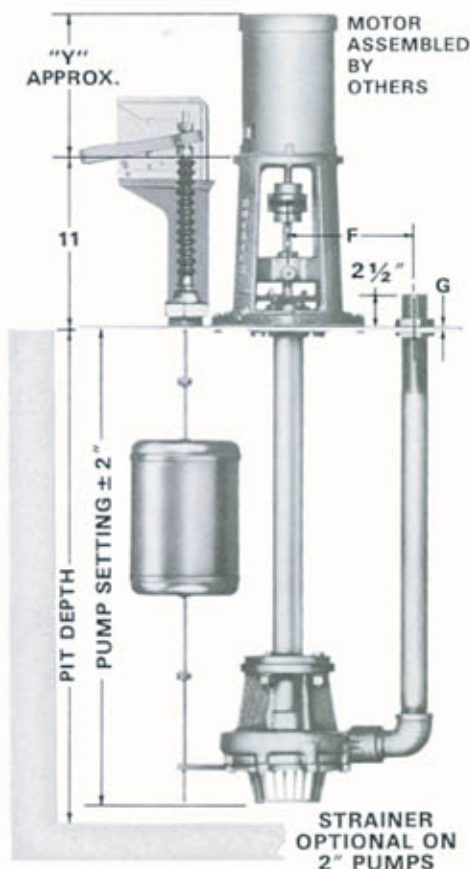
ELEVATED HEAD DETAILS



Optional packed stuffing box illustrated



ENGINEERING SPECIFICATIONS AND PUMP DIMENSIONS



STEEL BASEPLATE										MOTOR — O.D.P.			
A	B	Type 1	Type 2	Type 4	Type 5	Frame		Horsepower		Wgt. (Lbs.)		Y	
—	Oval	G	Wgt.	G	Wgt.	G	Wgt.	1750	1150	18	20	26	37
11	24	—	—	—	—	—	—	1/2	—	18	20	26	37
13	28	—	—	—	—	—	—	1/2	—	20	26	37	46
16	34	—	—	—	—	—	—	3/4	—	26	37	46	54
19	40	—	—	—	—	—	—	1	—	37	46	54	63
22	46	—	—	—	—	—	—	1 1/2	—	46	54	63	72
25 1/2	53	—	—	—	—	—	—	2	—	54	63	72	81

NOTES:

1. Dimensions and weights are approximate.
2. All dimensions are in inches and may vary $\pm 1/2$ ".

3. Not for construction purposes unless certified.
4. Add pump(s), base(s), head and motor weight(s) for unit weight.

PUMP SIZE			PUMP WGT.				MINIMUM BASEPLATE SIZE							
Disch.	Suct.	Case Bore	Sphere Size	5'-0" Pit Depth	Add For Ea. Add'l. 1' Pit	F	Type 1	Type 2	Type 4	Type 5				
H	Size	J	K	Size	J	K	Size	J	K	Size	D	J		
1	1 1/4	6	3/8	190	15	6 1/2	3 1/2	4 1/2	3 1/2	10 1/2	3 1/2	9 1/2	2 1/2	2 1/2
1 1/2	2	6	3/8	195	15	6 3/4	3 1/2	4 3/4	4 1/2	10 3/4	4 1/2	9 3/4	2 3/4	2 3/4
2	2 1/2	6	1 1/2	200	15	6 3/4	3 1/2	4 3/4	4 3/4	10 3/4	4 3/4	9 3/4	2 3/4	2 3/4

ENGINEERING SPECIFICATIONS

The contractor shall furnish (and install as shown on the plans) Aurora Model (521A Simplex) (522A Duplex) centrifugal sump pumps size ...x... of (bronze fitted) (all iron) construction. Each pump shall have a capacity of ... G.P.M. at ... ft. total head, with a temperature of ...°F., ... specific gravity.

The units shall be designed for a sump depth of ... feet and shall be furnished with the discharge terminating at the baseplate with a male threaded connection.

A steel baseplate (round) (square) —(Simplex) (Simplex with manhole) (Duplex with manhole) will be provided.

The pump casing and suction cover shall be of cast iron. The casing is to be of the single stage design and cast integrally with the bearing cover.

A strainer of sufficient size (optional on 2" pumps) shall be provided. The impeller is of the semi-open type and shall be constructed of bronze. The impeller is to be dynamically balanced and keyed to the pump shaft. The column pipe must be 1 1/2" diameter having machined tongue and grooved joints to insure shaft alignment. A pump bearing will be located directly above the impeller and shall be of the bronze sleeve type. Line bearings must be provided on pit depths of 5'-2" and one additional bearing for each 4' thereafter. Line bearings must be (grease) (oil) (water) lubricated through separate Nylon tube lubrication lines terminating at the baseplate.

The motor pedestal is to be of cast iron, one piece construction, fitted with a sealed thrust ball bearing located 3" above the baseplate. An optional packed stuffing box complete with a split gland shall be provided

for gas-tight construction. The ball bearing collar is to allow external axial adjustment of the shaft and impeller. A grease seal shall be provided to retain grease and to prevent contamination of the ball bearing. A grease fitting will be provided to allow regreasing of the bearing.

The pump shall be controlled by an enclosed (heavy-duty) (watertight and explosion resisting) (heavy-duty with built-in overload protection) (explosion proof) type float operated switch 6" above the baseplate with reinforced plastic float and float rod. A flexible bellows will provide gas-tight construction.

An automatic alternator shall be furnished on duplex pumps to allow the pumps to alternate on each successive cycle of operation. The pumps are to be driven by and flexible coupled to a standard "C" flange ... H.P., ... volt, ... cycle, ... R.P.M., ... enclosure, vertical electric motor.

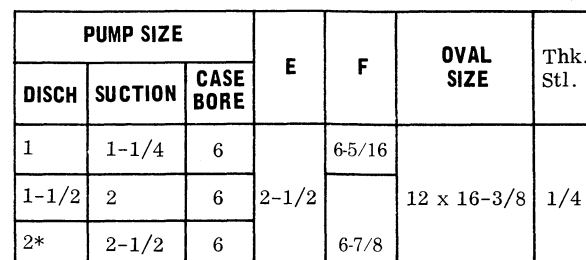
NOTE: Aurora Pump reserves the right to make revisions to its products and their specifications, and to this bulletin and related information without notice.

— Your Authorized Local Distributor —



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SALES OFFICES IN ALL MAJOR CITIES AND COUNTRIES
Refer to "Pumps" in yellow pages of your phone directory for your local distributor.

DATED AUGUST 1974

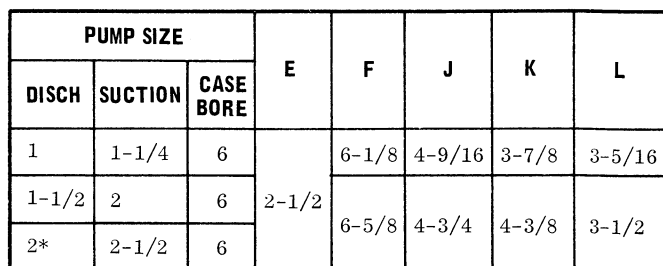


BASE PLATE		
PUMP SIZE	A	B
1	3-5/16	6-5/16
1-1/2	3-1/2	6-7/8
2		

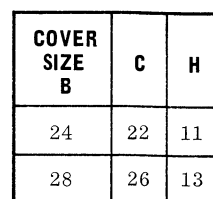
FRAME	X	Y
56C	9-1/8	10
143TC	9-1/8	9-1/2
145TC	9-1/8	10-1/2



1. ALL DIMENSIONS IN INCHES.
2. DIMENSIONS MAY VARY $\pm 3/8"$.
3. NOT FOR CONSTRUCTION PURPOSES UNLESS CERTIFIED.
4. FLOAT SWITCH FURNISHED ONLY WHEN SPECIFIED.
5. LINE SHAFT BEARING FURNISHED ON 5' 2" PUMP SETTINGS AND LONGER.
- * STRAINER SHOWN BUT NOT FURNISHED ON 2" PUMP UNLESS SPECIFIED.



FRAME	X	Y
56C	9-1/8	10
143TC	9-1/8	9-1/2
145TC	9-1/8	10-1/2



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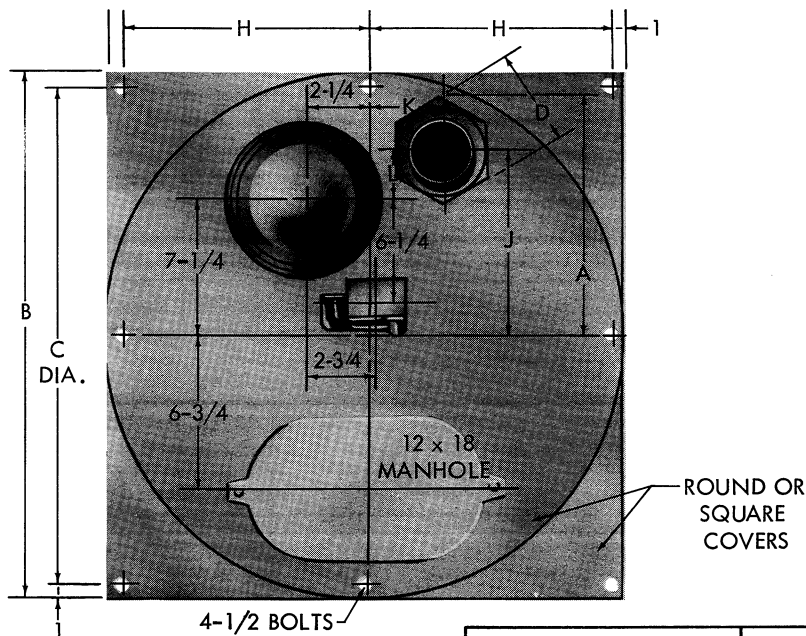
AURORA MODEL 521 PUMP ON SIMPLEX PLATE WITH MANHOLE

SECTION **520** PAGE **253**

DATED **AUGUST 1986**

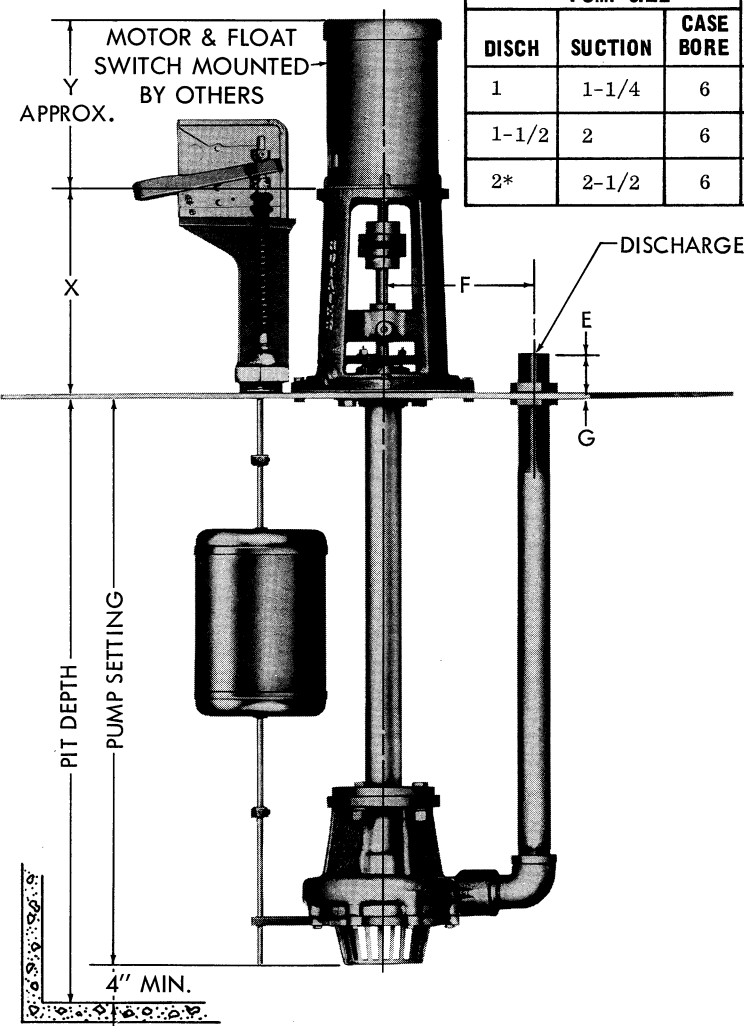
SUPERSEDES PAGE 253

DATED AUGUST 1974



FRAME	X	Y
56C	9-1/8	10
143TC	9-1/8	9-1/2
145TC	9-1/8	10-1/2

PIT SIZE	COVER SIZE B	C	H	G
				STEEL
30	34	32	16	3/8
36	40	38	19	3/8
42	46	44	22	3/8
48	53	51	25-1/2	3/8

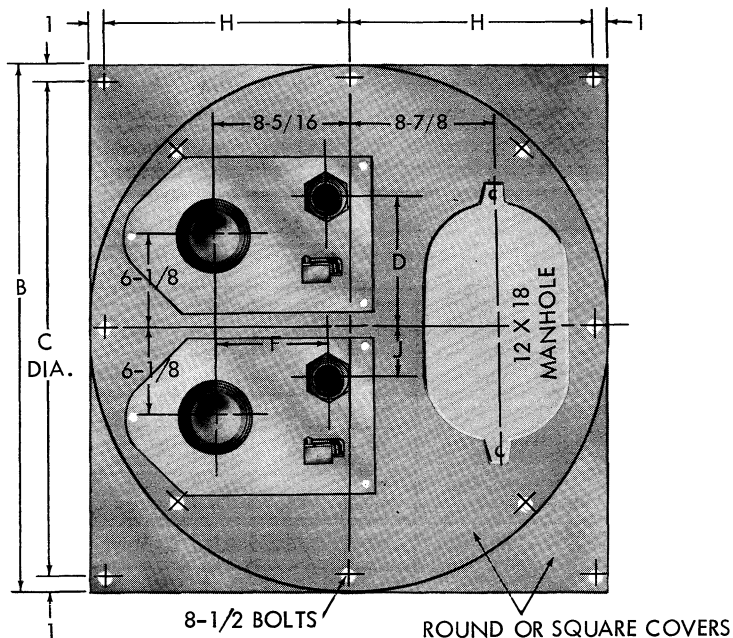


PUMP SIZE			A	D	E	F	J	K	L
DISCH	SUCTION	CASE BORE							
1	1-1/4	6	11-7/16	1-3/4		6-1/8	10-9/16	3-7/8	3-5/16
1-1/2	2	6	12	2-1/2	2-1/2				
2*	2-1/2	6	12-1/4	3		6-5/8	10-3/4	4-3/8	3-1/2

NOTES

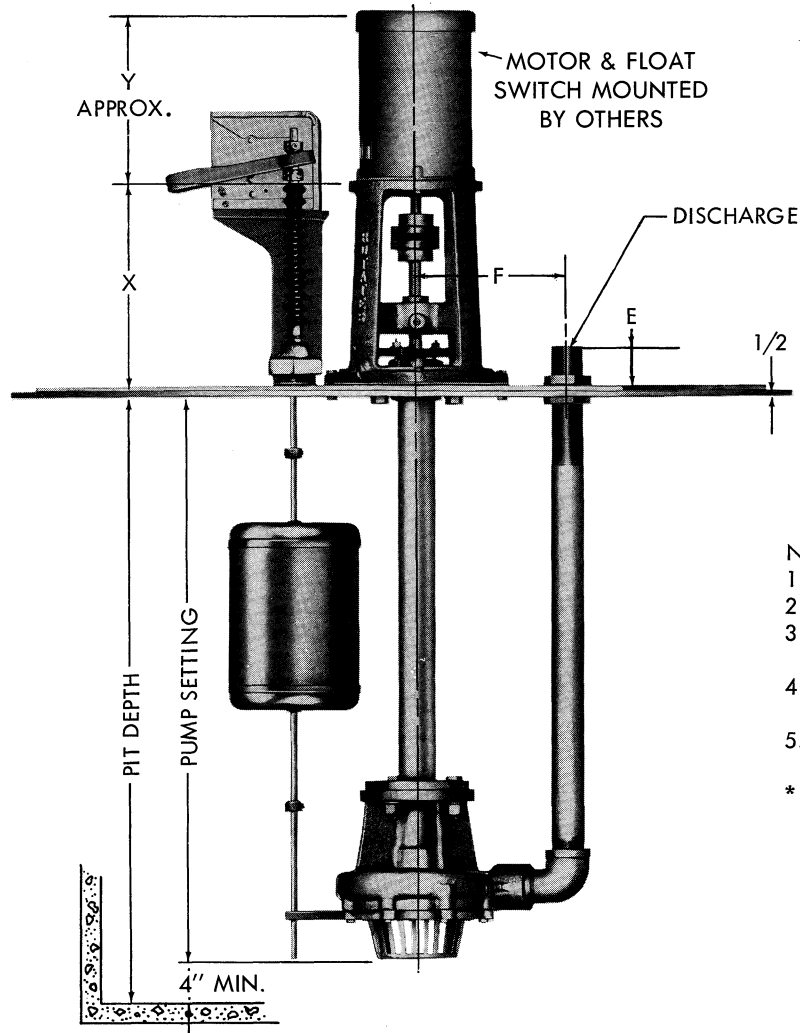
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 4. FLOAT SWITCH FURNISHED ONLY WHEN SPECIFIED.
 5. LINE SHAFT BEARING FURNISHED ON 5' 2" PUMP SETTINGS AND LONGER.
- * STRAINER SHOWN BUT NOT FURNISHED ON 2" PUMP UNLESS SPECIFIED.

AURORA MODEL 522 PUMP ON DUPLEX PLATE WITH TWO OVALS AND MANHOLE



PUMP SIZE			D	E	F	J
DISCH	SUCTION	CASE BORE				
1	1-1/4	6	9-7/16	2-1/2	6-5/16	2-13/16
1-1/2	2	6	9-5/8		6-7/8	2-5/8
2*	2-1/2	6			6-5/8	

COVER SIZE B	C	H
34	32	16
40	38	19
46	44	22
53	51	25-1/2



FRAME	X	Y
56C	9-1/8	10
143TC	9-1/8	9-1/2
145TC	9-1/8	10-1/2

NOTES

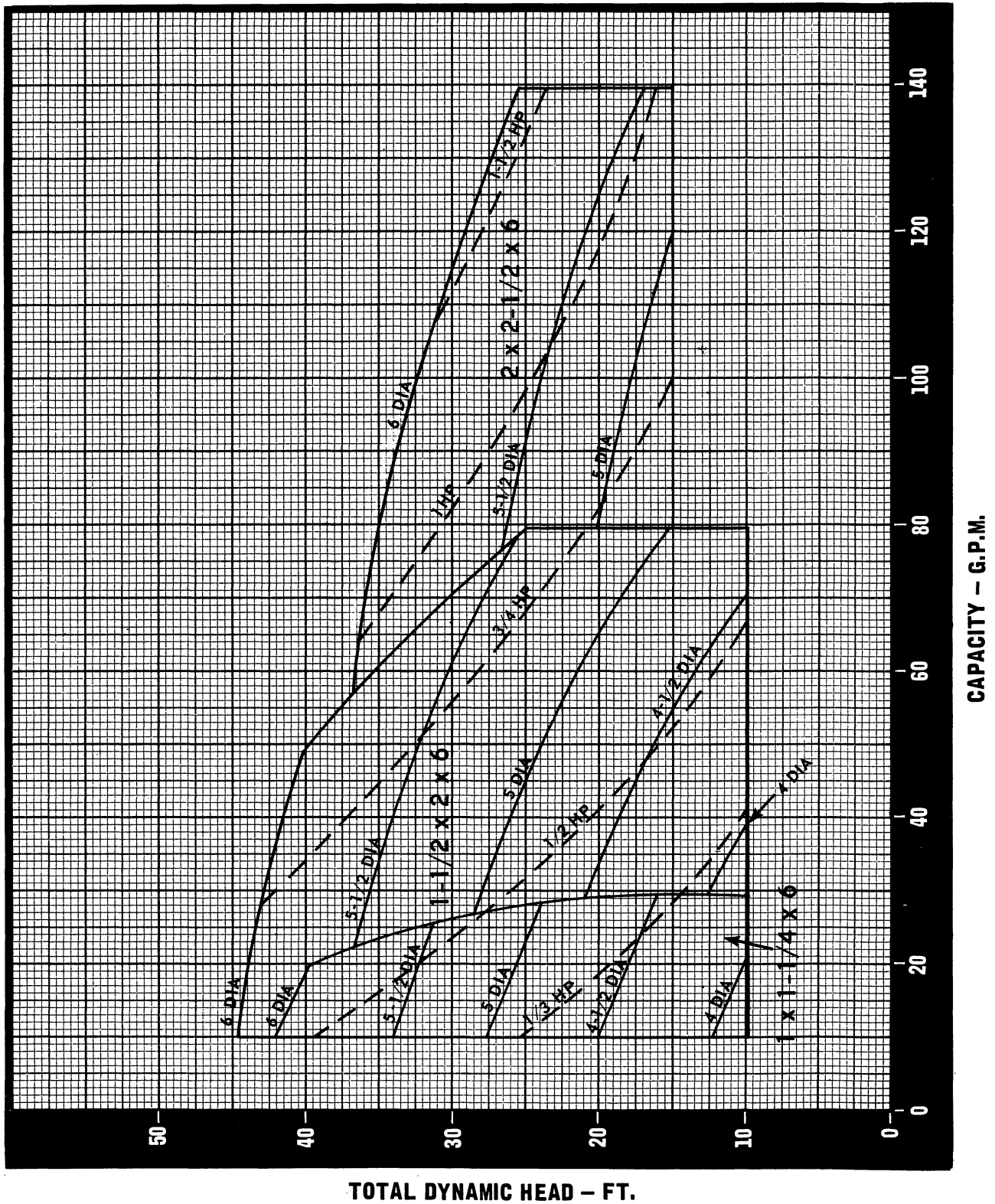
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 3. NOT FOR CONSTRUCTION PURPOSES UNLESS CERTIFIED.
 4. FLOAT SWITCH FURNISHED ONLY WHEN SPECIFIED.
 5. LINE SHAFT BEARING FURNISHED ON 5' 2" PUMP SETTINGS AND LONGER.
- * STRAINER SHOWN BUT NOT FURNISHED ON 2" PUMP UNLESS SPECIFIED.

SELECTION CHART

DATED **OCTOBER 1972**

1750 R.P.M.

SEMI-OPEN IMPELLER





A member of PENTAIR PUMP GROUP

INSTRUCTION MANUAL

INSTALLATION

VERTICAL WET PIT PUMP

2

GENERAL. The life of your Aurora Pump can be extended considerably by carefully following the installation instructions contained herein. Each step of the pump installation instructions plays a vital part in assuring long life, efficient operation and reduced maintenance, from the initial location of the pump through starting directions.

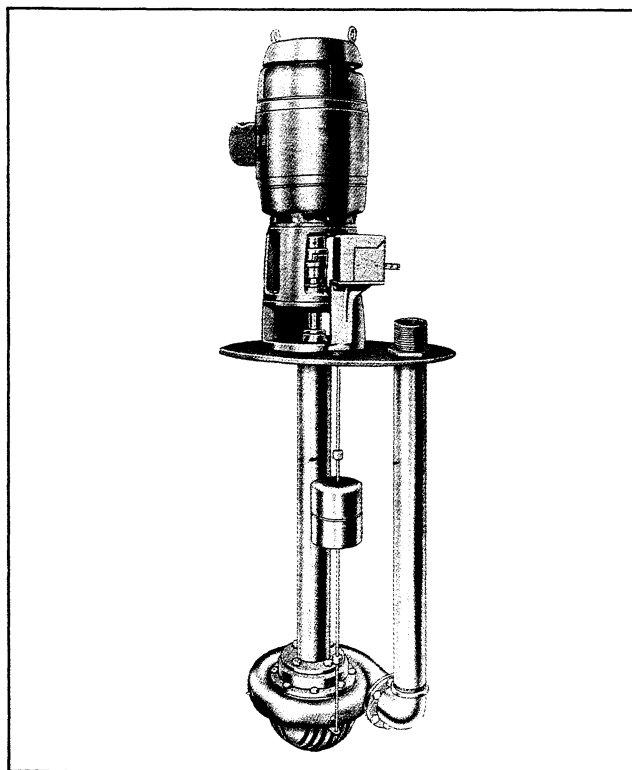


FIGURE 1. TYPICAL SUMP PUMP UNIT

UNPACKING YOUR PUMP. The crates containing your pump should be opened immediately upon receipt from the factory and the pump generally inspected for damage and shortage of parts. Look particularly for such damage as bent lengths of shafting, piping, damaged electrical components, and castings. Particular attention should be given to the discharge and suction nozzle threads or flanges. Any damage or shortage of parts should be reported to the carrier immediately.

CLEANING. If the pump is to be installed immediately, it will be necessary to clean the exposed metal parts thoroughly with white gasoline or other suitable solvent to remove the preservative coating, and to remove the protective covers from all openings. Cleaning of the pump should not be accomplished

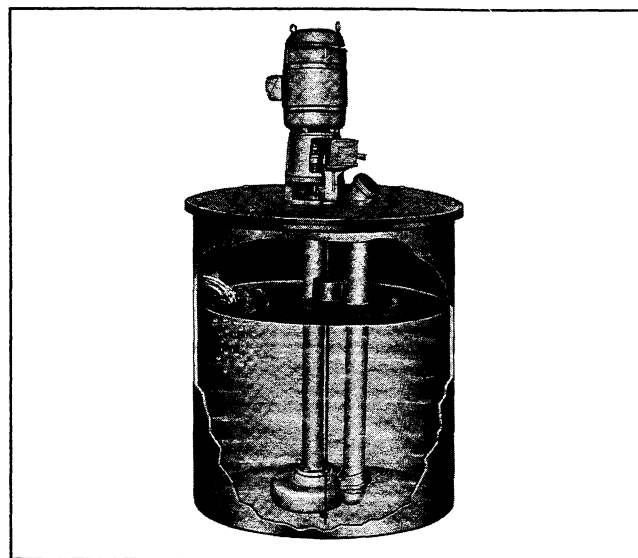


FIGURE 2. TYPICAL SEWAGE EJECTOR
IN A BASIN

until the basin and the outlet connections are completed and ready for the pump.

PLANNING THE PUMP LOCATION. It is important to know that your pump has been manufactured to your specific application, therefore you know where the pump will be located, where the outlet piping will run, and other pertinent data. However, you may have overlooked a factor which may affect your pump's operation, installation, or efficiency.

A hoist capable of lifting the assembled pump should be available to lower the pump into the basin. This will require head room that is at least equal to the depth of the basin plus approximately 3 feet. Considerable time and labor can be saved by preassembling the pump. Also, although the pump can be installed in a flooded pit, it is desirable to empty the basin if at all possible.

Adequate provisions should be made for electrical wiring to the pump motor and other electrical accessories included with your pump. Overload protection should be provided in the pump circuit. Precautions should be taken when the pump is installed to preclude the possibility of moisture entering the conduit or the motor and causing short circuits and grounding.

On applications where an extremely long driveshaft is required, it is advisable to use tie rods or some other means of supporting the pump unit in the basin.

VERTICAL WET PIT PUMP INSTALLATION

OUTLET PIPING. The outlet piping should be short and direct as possible with a minimum of elbows and fittings, to reduce head loss from friction. The outlet piping should be supported as close to the pump as possible, using either pipe hangers or supports. The outlet pipe diameter should be the same as or larger than the discharge pipe diameter. A flanged connection should be provided at the pump discharge pipe to simplify pump removal. An increaser if used, should be installed as close as possible to the discharge pipe. Straight taper increasers are satisfactory in discharge applications.

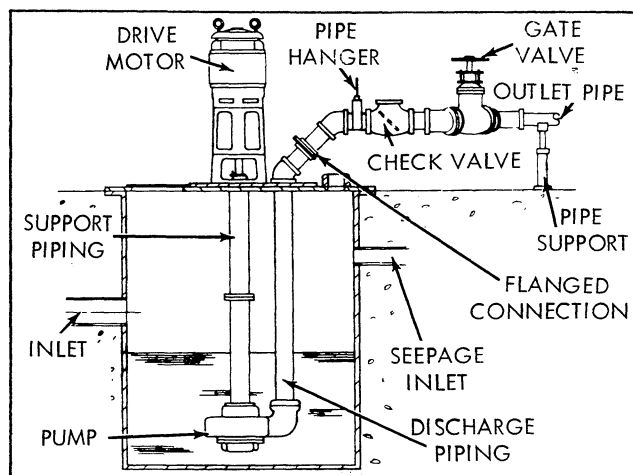


FIGURE 3. TYPICAL OUTLET PIPING

Piping should line up naturally when connected. Forcing pipes into line by using flange bolts can produce strain on the piping and on the shafting of the pump. Flange bolts when used, should be loosely installed, and the pipe alignment checked. When the alignment is satisfactory, tighten the flange bolts alternately until all are firmly secured.

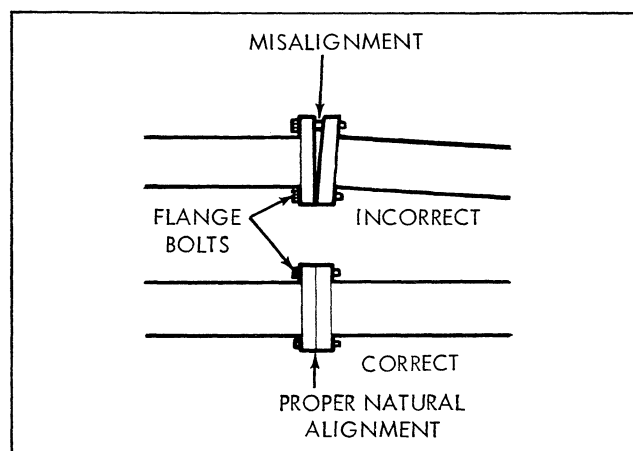


FIGURE 4. PIPE ALIGNMENT

The outlet piping should include a horizontal check valve and a gate valve. The check valve should be located between the gate valve and the pump discharge piping. The check valve protects against a reverse flow of the liquid if the driver fails. The

gate valve provides a means of throttling the pump's discharge. The gate valve should be nearly closed when starting the pump, because a centrifugal pump requires much less power with the gate valve closed than it does with the gate valve open. The gate valve also is closed when the pump is shut down for repairs or inspection.

MOUNTING THE PUMP. There are several methods of mounting vertical pumps to the foundations. The method of mounting that you choose will be based on your specific requirements.

CURB RINGS AND SOLE PLATES. In some applications, it may be desirable to use a curb ring for mounting your pump.

A curb ring can be either rectangular or circular. The curb ring should have sufficient clearance at the inside diameter to allow passage of all sections of the pump located below the support plate.

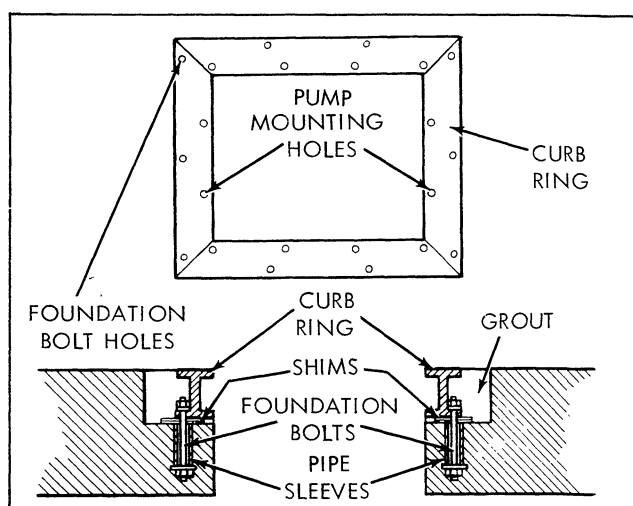


FIGURE 5. INSTALLATION OF RECTANGULAR CURB RING

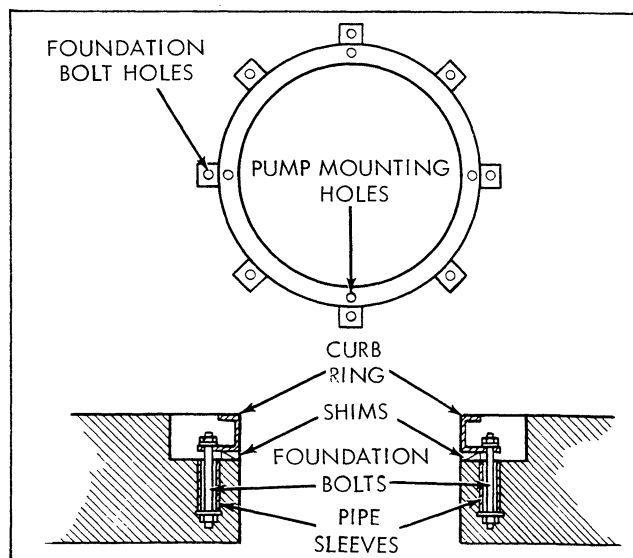


FIGURE 6. INSTALLATION OF CIRCULAR CURB RING

VERTICAL WET PIT PUMP INSTALLATION

FOUNDATION. The foundation for your pump should be heavy enough to withstand any vibration or stress encountered during pump operation.

The mounting bolts or studs for the curb ring should be imbedded in concrete and accurately located per the applicable Aurora dimension sheet. Foundation bolts should be inclosed by a sleeve two to four diameters larger than the bolt to allow movement for proper alignment with the curb ring.

LEVELING THE CURB RING. The curb ring should be set in place and leveled with shims. The mounting face of the curb ring is machined to an even flat surface and can be easily leveled with a spirit level. When the curb ring is leveled the foundation bolts should be tightened, but not too firmly. Waste material should be stuffed into the sleeves around the foundation bolts, to prevent grout from filling the sleeves during grouting.

GROUTING THE INSTALLATION. Grouting the curb ring prevents lateral movement of the ring and improves the vibration absorbing characteristics of the foundation. A wooden dam should be constructed around the sole plate to contain the grout while it is being poured. When a curb ring is to be used above the floor line it is necessary to construct a dam around the outside diameter of the ring to contain the grout. The entire area around the outside diameter of a curb ring should be filled with a non-shrinkable grout. The grout should be puddled frequently to remove any air bubbles from it.

The leveling shims should be grouted in place. Allow time for the grout to set, usually from 42 to 72 hours after pouring, before proceeding with the installation. After the grout has set, the curb ring levelness should again be checked and the foundation bolts firmly tightened down.

BASIN COVERS. Basin covers may be set in concrete either with or without a curb ring or they may be bolted to the top flange of a cast iron or steel basin. The pump may be mounted directly to the basin cover on installations where the cover is not too large. On installations where the basin cover is large, the pump normally is mounted on an oval pump plate which permits removal of the pump from the basin without removing the entire basin cover.

PREPARING TO INSTALL THE PUMP. Your wet pit pump is usually shipped in more than one crate. The pump is shipped completely assembled along with accessory equipment such as float controls, motor controllers and high water alarms in one crate and the pump motor in another. An exception to this is when the length of the pump or the method of transportation makes it necessary to ship in more than two crates.

The pump and motor should be uncrated at this time. All wrapping materials should be checked for small parts that were shipped separately. Adequate support should be provided at intervals along the length of the pump as the crate is removed.

If your installation requires a basin cover, the cover should be lowered on to the basin properly orientated to the outlet connections and securely bolted in place.

INSTALLING THE PUMP. If the pump cannot be lowered into the basin as a complete unit, it is necessary to assemble it by stages. To do this, the liquid end assembly must first be lowered into the basin before the rest of the pump can be assembled. A rope sling should be secured about the pump casing and the liquid end assembly carefully lowered into the basin while guiding the lengths of support piping through the basin cover opening. The liquid end assembly should be lowered far enough to bring the top of the support pipe within a foot or so of the top of the base plate. Additional sections of piping and shafting should be assembled as follows:

a. Slide a line shaft bearing down the pump shaft with the tapped opening toward the upper end, until it seats against the flange of the first section of support piping.

b. Thread a shaft coupling onto the threaded end of one shaft until the shaft is visible through the small hole drilled through the middle of the coupling. Thread the next length of shafting into the coupling.

NOTE

Do not use pipe wrenches on the shafting; it is not necessary to firmly tighten the shafts in their couplings because the torque of the pump motor will tighten them during operations.

c. If the line shaft bearing is to be lubricated through a oil or grease line, locate the bearing as required to align the tapped opening with the lubricant piping. Install a support pipe gasket against the pipe flange, and lower the next section of support piping into place. Align the vent openings with the tapped opening in the line shaft bearing, and bolt the support pipe together. If required, install a 1/8" nipple in the tap opening of the line bearing and connect it to the lubrication piping.

d. If necessary, assemble a discharge pipe coupling onto the threaded end of the previous section of discharge piping and thread the next section of piping into the coupling. Tighten the discharge piping with a pipe wrench. Each subsequent section of shafting support piping and discharge piping should be installed in this manner. As each successive section of piping and shafting is installed, the pump should be lowered by stages into the basin.

e. At the same time that the additional lengths of piping and shafting are being assembled, the additional sections of float control rod should be assembled. This is accomplished by installing successive lengths onto the threaded rod couplings. The lower float stop should be assembled to the rod with the flat side downward at the required distance from the liquid end. The float should be slipped onto the rod, and the upper float stop, flat side up, installed at the required distance from the bottom of the rod.

f. In a like manner, install lubrication piping and pressurization lines as required by your application.

After all of the piping has been assembled, a locknut should be installed on the upper end of the discharge

VERTICAL WET PIT PUMP INSTALLATION

pipe and the pump oval plate lowered into position. Position the gaskets on the support pipe flange, and slide the lower head into place. The lower head should be positioned so that access to the grease fitting will not be obstructed by the discharge, lubrication, or pressurization piping, or the float control. Bolt the lower head to the pump oval plate. Assemble the remaining locknut over the upper end of the discharge pipe. Carefully align and position the discharge pipe and tighten down the locknut on either side of the pump oval plate. It is essential that no strain be placed on either the discharge piping or the pump casing. Therefore it is necessary that alignment of the discharge piping should be done with great care. Any strain on the discharge piping may force the support pipe and shafting out of line and result in overloading the pump motor.

Assemble the float control mechanism to the pump oval plate and align the switch arm with the end of the float rod. Set the upper end lower float rod stops approximately 3/4" above and below the arm.

Assemble one-half of the flexible coupling with its key to the motor driveshaft. There is a clearance between the top of the pump shaft and the end face of the motor driveshaft when the motor is installed. Accordingly, the coupling halves must be secured to the motor shaft above the recess surfaces of the lower coupling half. Place the coupling insert in the lower coupling half on the pump shaft, and lower the motor into place engaging the upper coupling half with the lower half and the coupling insert. Locate the motor as required for the most convenient connections of the electrical leads and bolt it in place. Adjust the lower coupling half until the ends of the dogs in the lower half are approximately 1/8" from the recessed surface of the upper half.

The pump motor, upper head, and lower head have register fits which combined with accurate location of the pump base plate, make it unnecessary to align the flexible coupling at installation of the pump.

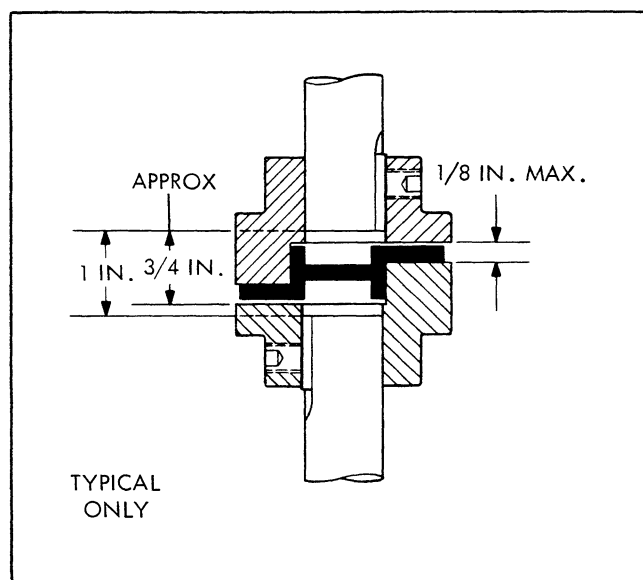


FIGURE 7. INSTALLING FLEXIBLE COUPLING

Connect the outlet piping to the pump discharge piping. For above ground discharge, two 45° elbows and flange connection are satisfactory. Check the outlet piping to make sure it is properly supported and lines up correctly before connecting it to the discharge of the pump. Misalignment of the piping can impose unnecessary loads on the discharge elbow and can cause distortion and strain of the support piping and shafting of the pump which can result in vibration, uneven bearing wear, or damage to the pump.

Connect the electrical wiring to the pump motor, the motor controller, float control and any other electrical accessories that were provided with your pump. Wiring instruction provided with the components should be followed exactly.

Connect flushing or pressurization water lines if required. Connect any vent piping to the basin cover.

Refer to the applicable maintenance manual for lubrication of liquid end bearings, head bearings, and intermediate shaft bearings.

PRESTARTING INSTRUCTION. Close the gate valve in the outlet piping. Rotate the pump shaft by hand to see that it turns freely without binding. Fill the basin to a depth at least sufficient to raise the float off the lower float stop and to cover the pump casing. Activate the float control arm and, as the pump motor starts, check the direction of rotation. The correct rotation is shown by the arrow on the lower head. As the pump motor approaches full speed open the outlet piping gate valve slowly.

Measure the effective discharge head by inserting a pressure gauge in any convenient place in the discharge head piping near the pump discharge outlet. The pounds per square inch (P.S.I.) reading can be converted to feet or head by multiplying by 2.31 and adding the height of the gauge above the basin liquid level as measured in feet. The result should be within 10% of the name plate head feet reading. Any wide variation from the head feet reading, can cause early failure of pump bearings, and should be corrected immediately. Refer to the applicable trouble shooting chart for your pump.

After several minutes of operation, the pump should be operating a quiet, vibrationless speed and neither the head bearing nor the motor casing should be exceedingly warm to the touch.

Shut down the pump and make sure that all bolts securing the pump, the pump oval plate and the basin cover are firmly tightened down.



INSTRUCTION MANUAL

INSTALLATION

CAST IRON & FIBERGLASS SUMP BASINS

2

Cast iron and fiberglass sump basins are installed in a similar manner except more care should be taken in providing a suitable anchorage for fiberglass basins.

The following chart illustrates the volumes of concrete to be placed with the various size fiberglass sumps available from Aurora Pump. This chart is

intended to aid you in providing suitable concrete anchoring to prevent floatation in wet soil.

With cast iron sump basins, floatation is usually not as critical as with fiberglass and the specific installation procedures outlined in many city building codes should be followed; consequently these instructions should be used to supplement the existing code in your area.

VOLUME OF CONCRETE REQ'D IN CUBIC FEET										
DIAMETER OF SUMP BASIN	FIBERGLASS BASINS ONLY									
	DEPTH									
	3'	4'	5'	6'	7'	8'	9'	10'	11'	12'
24"	4	6	7	8	10	11	13	14	16	17
30"	6	8	10	12	14	16	18	20	22	24
36"	9	12	15	17	20	23	26	29	32	35
42"	12	16	20	24	28	32	36	40	44	48
48"	17	22	28	34	39	45	50	56	61	67
60"	23	31	39	47	55	63	71	79	87	95
72"	30	41	52	63	74	85	96	107	118	129

Based on approx. 150 lb. per cu. ft. avg. wt. of concrete

NOTE: 27 cu. ft. — One yard concrete.

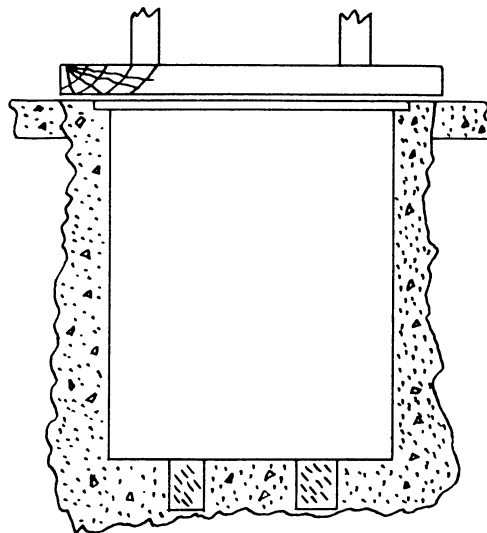
SUMP BASIN INSTALLATION

TYPICAL METHOD NO. 1

Set and shim basin to finish floor elevation.

Provide timber support to hold basin in position until concrete sets. Pour minimum amount of concrete required for anchor or completely encase basin in concrete.

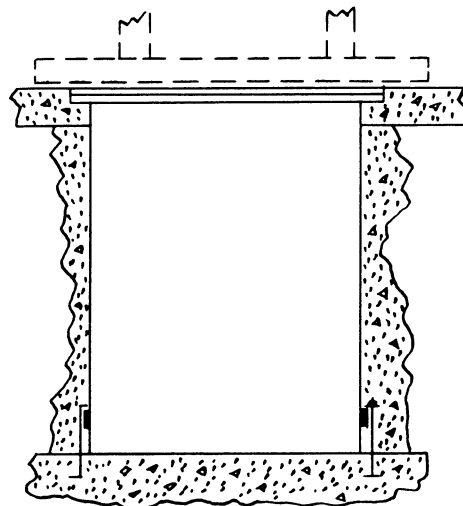
Sufficient weight for fiberglass basins can be provided by filling or partially filling the basin with water or concrete blocks, soil pipe, etc. and then pouring the concrete in two or more steps. Allow the first pour to set thereby anchoring the basin adequately for the second concrete pour or further encasement.



TYPICAL METHOD NO. 2

Pour concrete pad in bottom of hole slightly deeper than overall height of tank.

Allow for coverplate if same is to be flush with finish floor and also allow for thickness of sump bottom. Shim basin to suit after concrete pad has set and pour remainder of required concrete anchor.



NOTE: Some larger size fiberglass basins are equipped with anchoring ridges near the bottom. Reinforcing rods or threaded bolts and washers may be used to help prevent floatation until the second concrete pour has set.



AURORA PUMP
A member of PENTAIR PUMP GROUP

INSTRUCTION MANUAL

REPAIR

MODEL 521A - 522A

6

SERVICE

Your Aurora pump requires no maintenance other than periodic inspection, occasional cleaning and lubrication. The intent of inspection is to prevent breakdown, thus obtaining optimum service life. The pump bearing is grease lubricated and requires periodic lubrication as does the head bearing. Refer to lubrication section for specific instructions. The motor may also require lubrication, in which case, the motor manufacturer's recommendation should be followed.

LUBRICATION (BALL BEARINGS)

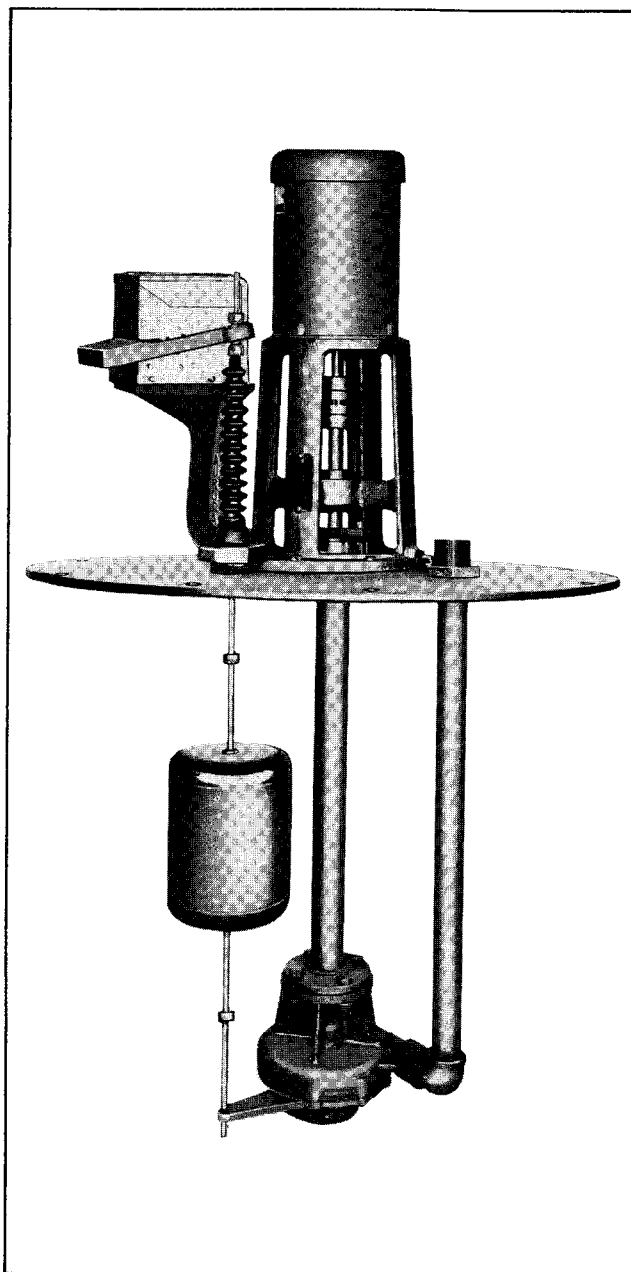
Regreasable ball bearings will require periodic lubrication and can be accomplished by using the zerk or lubrication fittings in the head assembly. Lubricate the bearing at regular intervals using a grease of high quality. Lithium, lithium soda or calcium base grease is recommended as lubricants for pumps operating in both wet and dry locations. Mixing of different brands of grease should be avoided due to possible chemical reactions between the brands which could damage the bearing. Accordingly, avoid grease of vegetable or animal base which can develop acids, as well as grease containing rosin, graphite, talc and other impurities. Under no circumstances should grease be reused.

Over lubrication of ball bearings should be avoided as it may result in overheating and possible bearing failure. Under normal application, adequate lubrication is assured if the amount of grease is maintained at 1/3 to 1/2 the capacity of the bearing and adjacent space surrounding it.

In dry locations ball bearings will need lubrication at least every 4,000 hours of running time or every 6 to 12 months, whichever is more frequent. In wet locations the ball bearings should be lubricated at least after every 2,000 hours of running time or every 4 to 6 months, whichever is more frequent. A unit is considered to be installed in a wet location if the head assembly and motor are exposed to dripping water, to the weather, or to heavy condensation such as is found in unheated and poorly ventilated underground locations.

At times it may be necessary to clean the bearings due to accumulated dirt or deteriorated lubricants. This can be accomplished by flushing the bearing with a light oil heated to 180 to 200° F. while rotating it on a spindle. Wipe the bearing housing with a clean rag soaked in a cleaning solvent, and flush all surfaces.

Dry bearing thoroughly before relubricating. Compressed air can be used to speed drying, but care should be taken not to let bearings rotate while being dried.



A. Complete unit assembly.

CAUTION

Use normal fire caution procedures when using any petroleum cleaner.

LUBRICATION (LINE SHAFT & OPTIONAL GREASE LUBRICATED PUMP BEARINGS)

Grease lubricated sleeve bearings will require frequent lubrication which can be accomplished by using the zerk fitting(s) located on the pump base. It is suggested that relubrication intervals be at least every 20 hours of running time.

REPAIRS

The pump may be disassembled using the illustrations and text provided. Although complete disassembly is covered, it will seldom be necessary to completely disassemble your Aurora pump.

The illustrations accompanying the disassembly instructions show the pump at various stages of disassembly. The illustrations are intended to aid in the correct identification of the parts mentioned in the text.

Inspect removed parts at disassembly to determine their reusability. Pump or line shaft bearings that are scored or noticeably out of round should not be reassembled. Cracked castings should never be reused and scored or worn pump shafts should be replaced.

All packings and gaskets should be replaced with new ones at reassembly simply as a matter of economy. They are much less expensive to replace routinely than to replace singly as the need arises. In general, it is economical to return to the manufacturer for repair only the motor and motor controller.

DISASSEMBLY

Disassemble only what is needed to make repairs or accomplish inspection. Proceed to disassemble the pump as follows: (Refer to figure 1.)

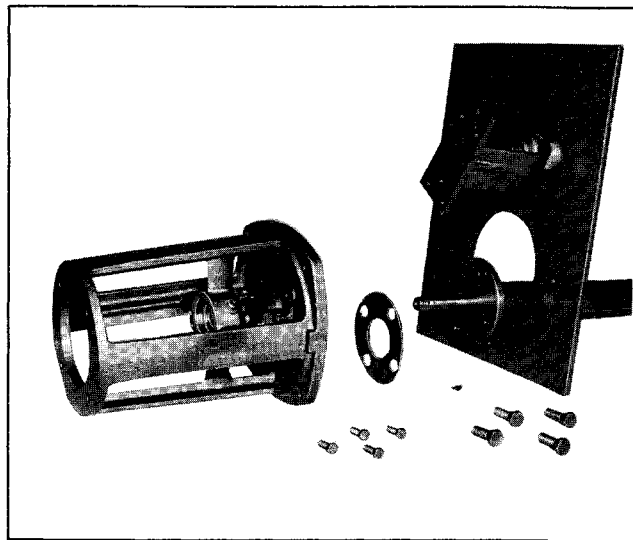
1. Disconnect wiring from motor control panel to motor and float switch. Take any other steps needed to prevent drive unit from being unintentionally energized during disassembly.

2. Remove the float switch. For instructions, refer to the repair notes on float switches.

3. Unscrew capscrews (54) to remove motor (52) from head (53). Lift motor free from lower half of coupling (48).

4. Coupling half (48) is removed by loosening setscrew (47). Similarly, setscrew (44) will free upper pump coupling half (45). Remove coupling keys (46 and 49) and insert (43).

5. Remove remaining pump and connected parts from basin to continue disassembly.



B. Upper head removed.

NOTE

However, if ventilation piping is used, remove it before lifting off plate.

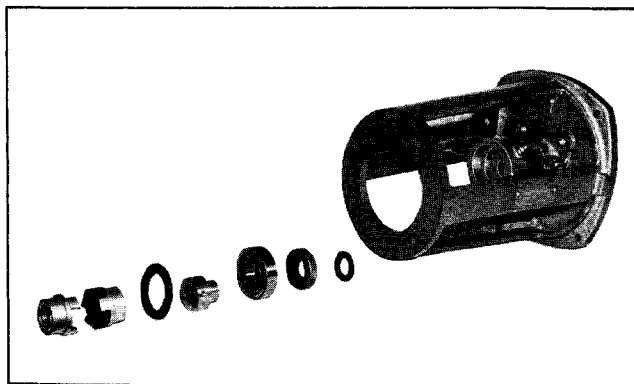
6. Remove dust cap (57), collar setscrew (81) and slide bearing collar (56) from shaft. Bearing (58) is press fitted in head (53) and a puller is needed if removal is necessary.

7. Remove grease seal (59) if necessary.

NOTE

Grease seal (59) should not be removed except for replacement because its case is easily damaged. When removal is necessary, it can be tapped out of its seat in the lower head with coupling key (49) used as a driving tool.

8. Remove nuts (66), washers (65), clamps (67) and gland (68) from studs (69). Remove packing (70).



C. Couplings, cap, collar, bearing, grease seal and slinger removed.

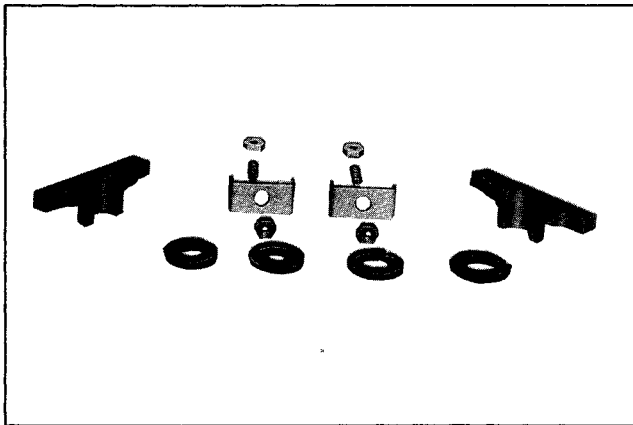
NOTE

This stuffing box arrangement is optional. Standard stuffing box will be furnished with neoprene slinger (60) only.

9. Remove grease fitting (74). Disconnect any lubrication line used to lubricate line shaft bearings or piping for pressurized support column water supply.

10. Unscrew capscrews (42 and 80) to remove head (53) from support piping (40) and pump plate.

11. Remove upper locknut (77) from discharge piping (78). Then plate can be lifted off. Remove gasket (23). Remove screws (83) and nameplate (82) only if replacement is necessary.



D. Packing box assembly removed (optional).

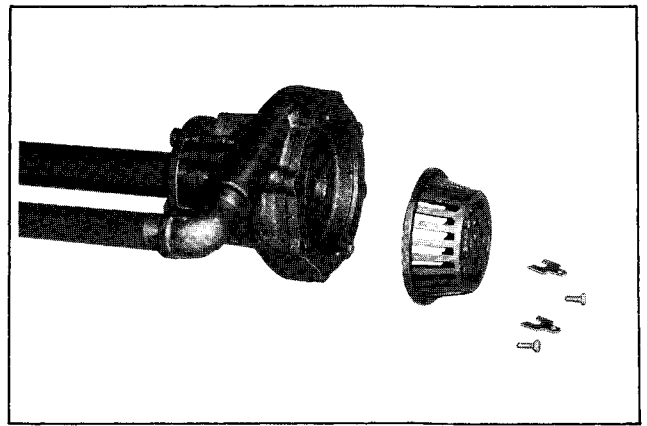
12. Successive lengths of piping and shafting are disassembled as follows:

- a. If a line shaft bearing is lubricated through an oil or grease line, detach the line and elbow from pipe nipple in upper support section and then remove nipple.
- b. Unscrew capscrews (39) and nuts (38) to lift top support pipe section and expose pump bearing (26). Slide line shaft bearing (26) off shaft. Remove gasket (23).

13. Discharge piping (78) and street elbow (75) can be removed from casing (8) by unthreading with a pipe wrench.

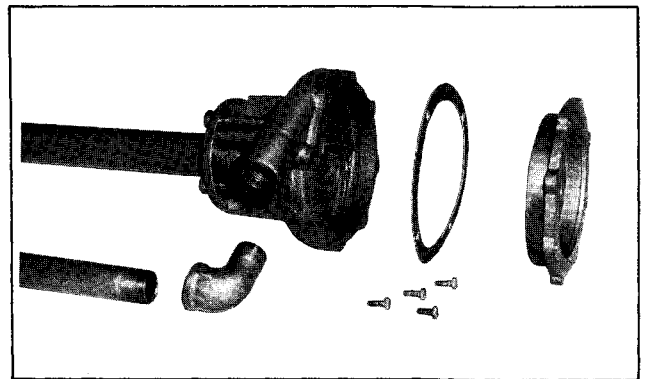
14. To remove remaining support piping (40), unscrew capscrews (21) from casing (8). Remove gasket (23).

15. Unthread capscrews (1) with washers (2) to remove strainer (3). Cover (22) and gasket (10) may be freed by removing capscrews (7).



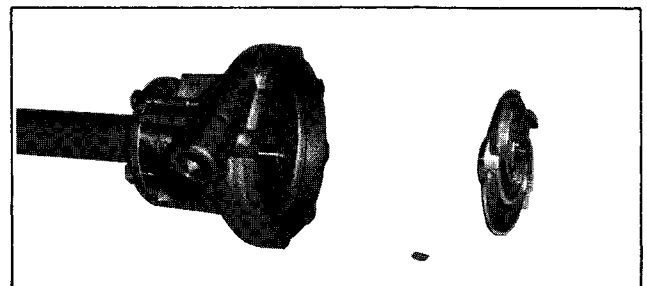
E. Strainer removed.

16. Slide shafting (61), impeller (15) and pump bearing (30) from casing (8).

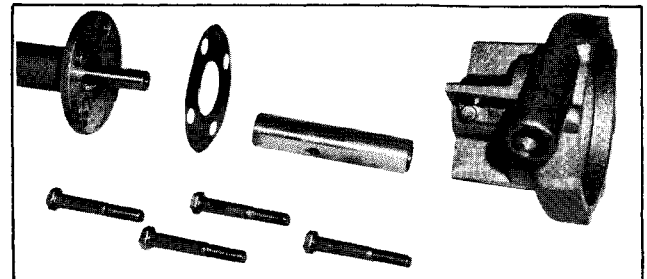


F. Cover, gasket and discharge pipe removed.

17. Impeller (15) is press fitted onto shaft (61). If removal is necessary a puller will be required. Loosen setscrew (13), remove impeller (15) and impeller key (16).



G. Impeller removed.



H. Casing and gasket removed.

REASSEMBLY

Reassembly will generally be in reverse order of disassembly. If disassembly was not complete, use only those steps related to your particular repair program.

1. Slide pump bearing (30) onto pump end of shaft. Place impeller key (16) in shaft (61) and replace impeller (15). Secure with setscrew (13).

2. Slide shaft and impeller assembly into casing (8). If pump bearing (30) is to be lubricated through a grease line, align tapped opening in the bushing with vent opening in the casing and install a 1/4 inch pipe nipple to maintain the alignment.

3. Replace gasket (10) on cover (22) and bolt to casing (8) with capscrews (7). Replace strainer (3) with capscrews (1) and washers (2).

4. Slide gasket (23) over motor end of shaft (61) and position on casing (8). Slide pump end of support piping (40) onto shaft (61) and bolt to casing (8) with capscrews (21).

5. Thread street elbow (75) into casing (8). Discharge piping (78) may now be threaded into elbow (75).

NOTE

If pump bearing is to be lubricated through a grease line, assemble the required elbow and tubing on previously installed nipple. If support column is to be pressurized with a flow of fresh water, connect the required 3/4 inch pipe nipple, elbow and pipe to support piping, and be certain that other vent openings are plugged.

6. Successive lengths of piping and shafting are assembled as follows: (pumps designed for pump settings* deeper than 5 feet, 2 inches are provided with multiple part support piping and with line shaft bearings at each support piping joint).

- a. Slide a line shaft bearing (26) down pump shaft, with tapped opening toward upper end until it seats against the flange of the previously assembled section of support piping (40).
- b. If the line shaft bearing is to be lubricated through a grease line, turn bearing as required to align tapped opening with lubricant piping. Position support pipe gasket (23) against support pipe flange and lower the next section of support piping into place. Turn it to align vent opening with tapped opening in line shaft bearing, and secure it by installing capscrew (39) and nuts (38). Install any 1/8 inch pipe nipple in tapped opening of line bearing, if required, and connect it to previously assembled lubrication piping.

* "Pump setting" is the distance from bottom of strainer (3) to bottom of head (53). This measurement is normally 3 inches less than "pit depth," the distance from bottom of basin to top face of basin.

7. Place locknut (77) on discharge pipe (78) and thread down approximately 1 inch.

8. Seat grease seal (59) with sealing edge upward in its seat in elevated section of head (53).

9. Press ball bearing (58) onto bearing collar (56). Press bearing and collar into elevated portion of head (53). Place dust cap (57) over bearing collar in head.

10. Lower pump plate over support piping (40) and discharge piping (78). Position gasket (23) on support pipe flange and slide head (53) into place.

NOTE

Install float control at this time, if liquid end is not accessible when pump is lowered into basin.

11. Lift pump plate into position against head (53) and install capscrews (80 and 42). Place locknut (77) on discharge pipe (78) and tighten locknuts above and below the plate to secure discharge piping in place. Secure bearing collar (56) to pump shaft (61) with collar setscrew (81). Screw grease fitting (74) in elevated head (53). Pump support plate and pump assembly may now be lowered into place on basin cover and can be bolted down.

12. Install slinger (60) for standard fitted pumps. For optionally equipped pumps, install packing (70) around shaft in head. Place studs (69) in head (53). Assemble packing gland halves (68) on studs (65) and nuts (66). Do not tighten nuts more than finger tight unless pump support piping is to be pressurized with fresh water.

NOTE

Connect pressurization or lubrication piping at this time by using opening provided in pump support plate. For pressurization piping, a 3/4 inch line to water supply is connected to tapped opening in head. For lubrication piping, line is connected to grease fitting.

13. Install coupling half (48) and key (49) on upper end of pump shaft, and tighten coupling setscrew (47) temporarily to prevent its slipping down shaft.

MODEL 521A-522A

14. Position coupling insert (43) in lower half of coupling and secure upper coupling half (45) with its key (46) on motor output shaft. Align bottom end of key with key slot in the end surface of motor shaft and secure by tightening setscrew (44).

15. Lower motor (52) carefully into position on head (53) while engaging coupling halves with coupling insert. Bolt motor to head (53) with capscrews (54).

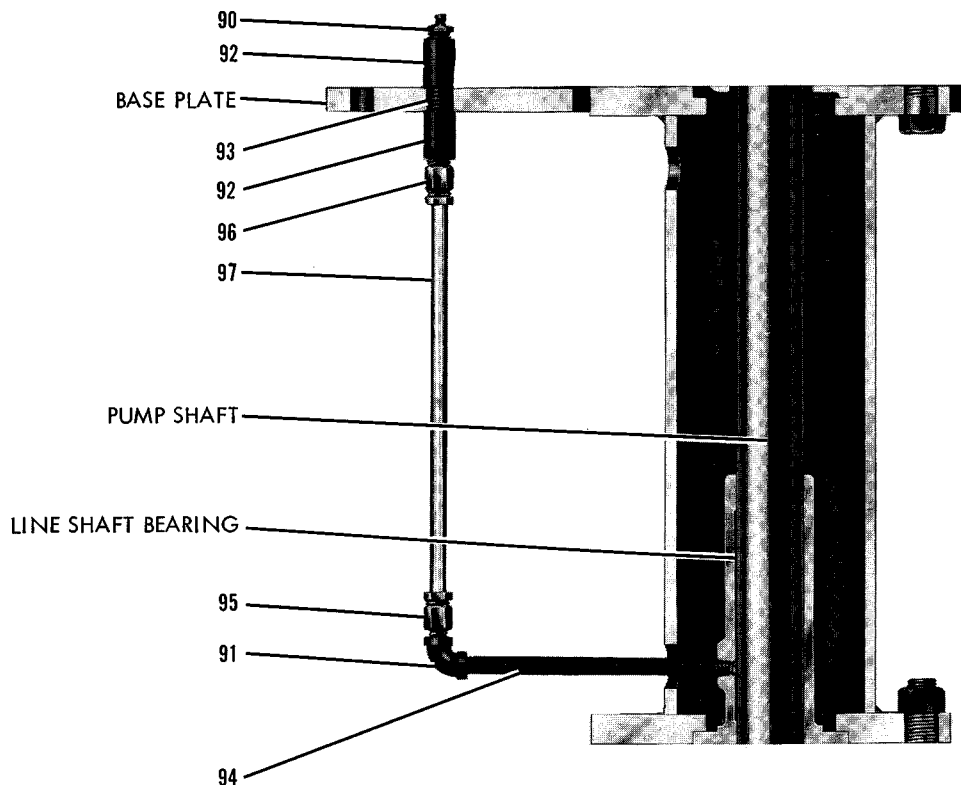
16. Loosen setscrew (47) in lower coupling half (48) and slide coupling half and key (49) upward until they engage coupling insert (43) with proper clearance as shown in Section 2, Item 4 of this instruction manual.

17. If nameplate (82) was removed, replace at this time with screws (83).

NOTE

Install float switch at this time. For instructions, refer to the repair notes on float switches.

18. Connect wiring from motor control panel to motor and float switch, following exactly the instructions provided by their respective manufacturers. Also connect solenoid valve at this time if used, using diagrams provided. All wiring must comply with applicable electrical code requirements for type of duty pump is to perform.



MODEL 521A-522A

MODELS 521A & 522A LIST OF PARTS

1. Retainer	45. Coupling Half	74. Fitting
3. Strainer	46. Key	75. Street Elbow
7. Capscrew	47. Setscrew	77. Locknut
8. Casing	48. Coupling Half	78. Discharge Pipe
10. Gasket	49. Key	80. Capscrew
13. Impeller Setscrew	52. Motor	81. Collar Setscrew
15. Impeller	53. Head	82. Nameplate
16. Impeller Key	54. Capscrew	83. Screw
21. Capscrew	56. Bearing Collar	90. Grease Fitting
22. Cover	57. Dust Cap	91. Elbow
22A. Rod Guide	58. Bearing	92. Coupling
23. Gasket	59. Seal	93. Close Nipple
26. Line Shaft Bearing	60. Slinger	94. Nipple
30. Pump Bearing	61. Shaft	95. Comp. Fitting
38. Nut	65. Washer	96. Comp. Fitting
39. Capscrew	66. Nut	97. Nylon Tube
40. Support Pipe	67. Clamp	
42. Capscrew	68. Gland	
43. Insert	69. Stud	
44. Setscrew	70. Packing	

NOTE

WHEN ORDERING SPARE PARTS ALWAYS INCLUDE THE PUMP
TYPE, SIZE, SERIAL NUMBER, AND THE PIECE NUMBER FROM
THE EXPLODED VIEW IN THIS MANUAL.

ORDER ALL PARTS FROM YOUR LOCAL AUTHORIZED DISTRIBUTOR, FACTORY
BRANCH SALES OFFICE OR THE FACTORY AT NORTH AURORA, ILLINOIS.

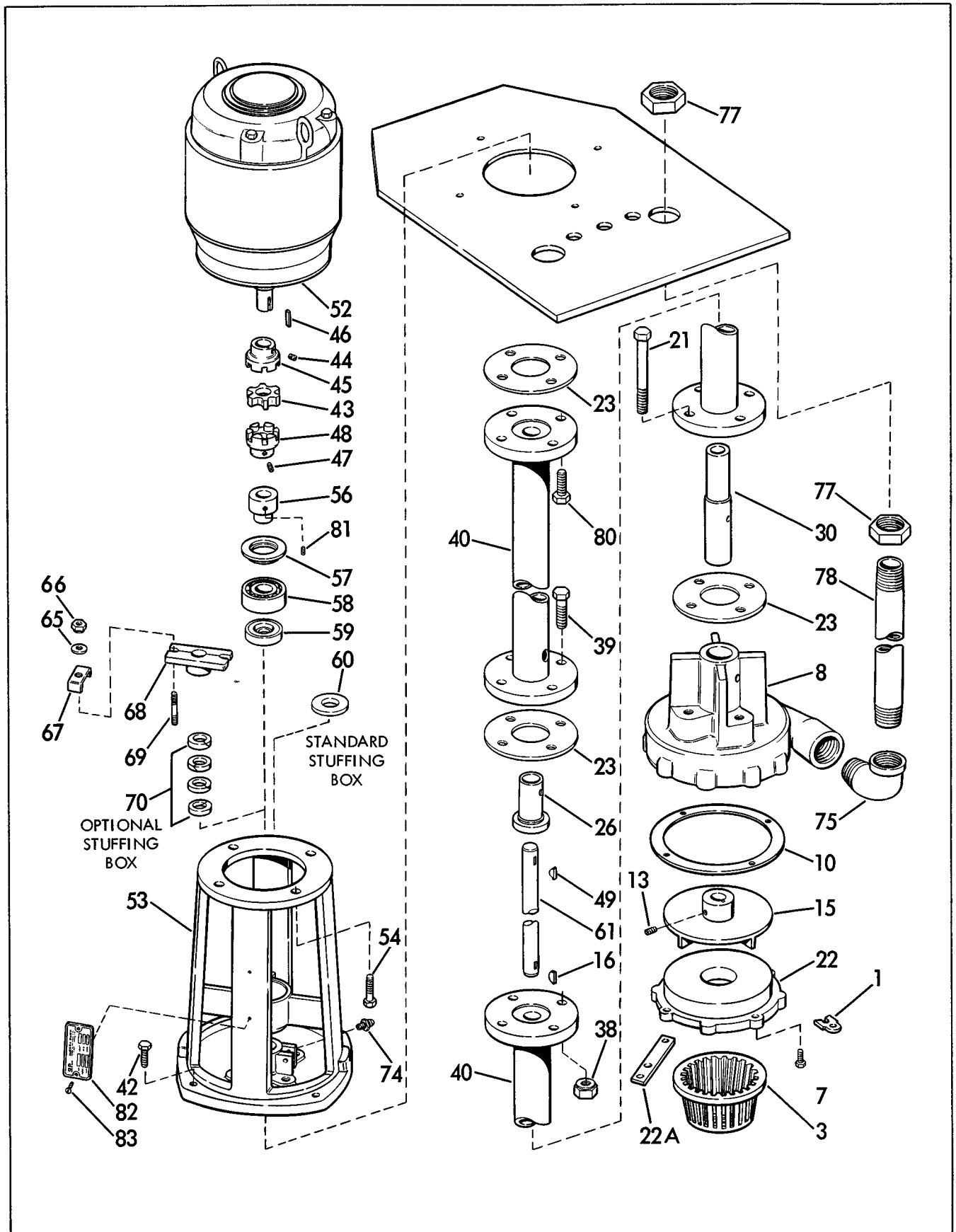


Figure 1. Model 521A-522A Exploded View

520 SERIES

REPAIR PARTS INDEX

PUMP SIZE	PAGE
1" 1¼" 1½" 2"	3

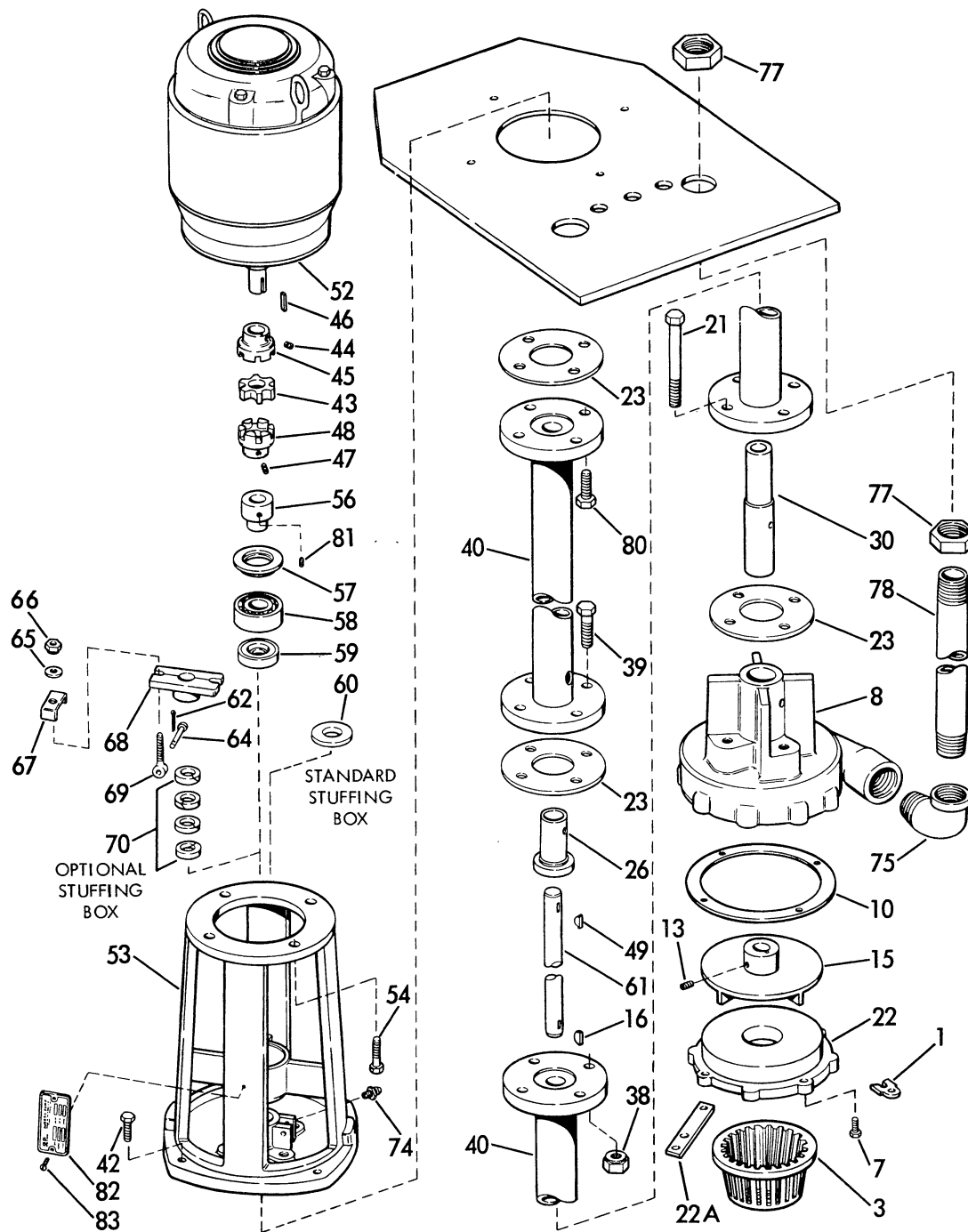
PIECE NO.

- 12 - ONE SUPPORT PIPE USED UP TO 5'-1" PIT
TWO SUPPORT PIPES USED 5'-2" TO 9'-0" PIT
THREE SUPPORT PIPES USED 9'-1" TO 10'-6" PIT
- 22 - A ROD GUIDE IS REQUIRED WITH ALL REPLACEMENT
COVERS. PC NO. 22A.
- 41 - ONE GUIDE BEARING REQUIRED 5'-2" TO 9'-0" PIT
TWO GUIDE BEARINGS REQUIRED 9'-1" TO 10'-6" PIT

520 SERIES

MODEL 521A-522A

PIECE NUMBERS



1"-1¼"-1½"-2"

DATED OCTOBER 1984

PARTS LIST

PC. NO.	DESCRIPTION	QTY	PART NO.	MATERIAL			
				B.F.	A.B.	A.I.	S.S.
1	RETAINER	2	672-0001	080		080	
3	STRAINER	1	796-0146	010		010	
7	CAPSCREW	4	168-0256	082		082	
8	CASING 1"	1	180-0669	010		010	
	1½"	1	180-0670	010		010	
	1½"	1	180-0668	010		010	
	2"	1	180-0671	010		010	
10	GASKET	1	364-1118	803		803	
13	SETSCREW	2	724-0134	080		080	
15	IMPELLER 1"	1	443-1118	208		010	
	1½"	1	443-1119	208		010	
	1½"	1	443-1117	208		010	
	2"	1	443-1123	208		010	
16	KEY	1	472-0009	087		087	
21	CAPSCREW	4	168-0512	082		082	
22	COVER 1"	1	816-0828	010		010	
	1½"	1	816-0829	010		010	
	1½ & 2"	1	816-0830	010		010	
22A	ROD GUIDE	1	396-0082	087		087	
23	GASKET		364-1113	588		588	
26	GUIDE BEARING		136-1296	208		010	
30	BEARING	1	136-1306	208		010	
38	NUT	4	544-0113	080		080	
39	CAPSCREW	4	168-0492	082		082	
40	SUPPORT PIPE		REFER TO	FACTORY			
42	CAPSCREW	4	168-0308	082		082	
43	INSERT	1	448-0021	650		650	
44	SETSCREW	1	724-0116	080		080	
45	COUPLING HALF						
	FRAME 56	1	256-0187	648		648	
	182-184	1	256-0192	648		648	
46	KEY	1	472-0009	087		087	
47	SETSCREW	1	724-0116	080		080	
48	COUPLING HALF	1	256-0193	648		648	
49	KEY	1	472-0009	087		087	
52	MOTOR		REFER TO	FACTORY			
53	HEAD	1	356-0051	010		010	
54	CAPSCREW		REFER TO	FACTORY			
56	COLLAR	1	224-0116	208		208	
57	SLINGER	1	764-0181	478		478	

PC. NO.	DESCRIPTION	QTY	PART NO.	MATERIAL			
				B.F.	A.B.	A.I.	S.S.
58	BEARING	1	068-0435	647		647	
59	SEAL	1	712-0141	653		653	
60	SLINGER	1	764-1010	478		478	
61	SHAFT		REFER TO	FACTORY			
66	NUT	2	544-0105	080		080	
67	CLAMP	2	204-0120	360		360	
68	GLAND	1	372-0152	010		010	
69	STUD	2	808-0025	082		082	
70	PACKING	4	564-0029	802		802	
74	GREASE FITTING	1	508-0001	651		651	
75	ELBOW 1"	1	600-0207	387		387	
	1½"	1	600-0208	387		387	
	1½"	1	600-0209	387		387	
	2"		NOT REQUIRED				
77	LOCK NUT 1"	2	544-0955	028		028	
	1½"	2	544-0956	028		028	
	1½"	2	544-0957	028		028	
	2"	2	544-0958	028		028	
78	DISCHARGE PIPE		REFER TO	FACTORY			
80	CAPSCREW	4	168-0512	082		082	
81	SETSCREW	1	724-0116	080		080	
82	NAMEPLATE	1	532-0045	114		114	
83	U DRIVE SCREW	2	708-0113	365		365	

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AURORA PUMP A member of PENTAIR PUMP GROUP

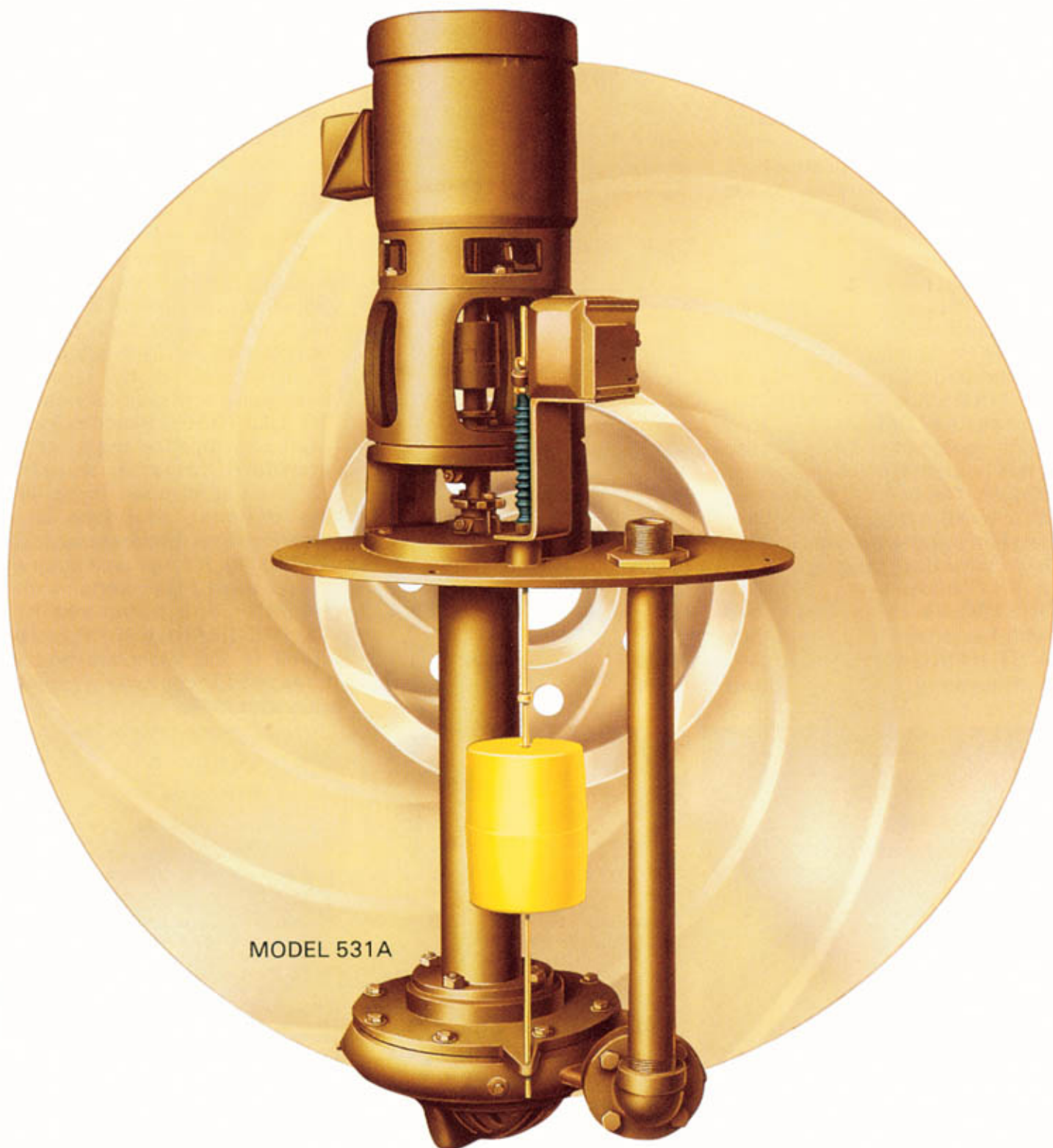
AURORA PUMP

BULLETIN 530A/Rev. I

530 SERIES

**SINGLE STAGE
SUMP
PUMPS—"NSB"**

CAPACITIES TO 1200 G.P.M.
HEADS TO 180 FEET
TEMPERATURES TO 180°F.



MODEL 531A

INTRODUCTION

AURORA 530 SERIES PUMPS

The vertical extended shaft single stage centrifugal pump occupies an important place within the pumping industry. It performs as no other pump can, the function of transferring liquid from below ground reservoirs or enclosed tanks. While the vertical pump is not necessarily expensive, its design is in many ways more critical than those of more common centrifugal pumping units. Attention must be paid to pump operating speeds, bearing arrangements, shaft design and construction. This bulletin illustrates, to the customer, how this pump will contribute to the solution of complex pumping applications.

1 MOTOR MOUNTING bracket that assures alignment of motor and pump shaft with tongue and groove machining. Motors are of standard "HP" manufacture.

2 THRUST BEARING is regreaseable and is protected from contamination by grease seals on both sides and a water slinger. The bearing is elevated 6" above the floor level for easy servicing and added protection from washdown, flooding, etc.

3 EXTERNAL IMPELLER ADJUSTMENT is accomplished with hex shaped adjusting nut.

4 STUFFING BOX is standard with packing, lantern ring and



a split gland for gastight construction. The lantern ring can also be used for packing lubrication from an external source.

5 STEEL OVAL BASEPLATE is standard and eliminates removing the complete cover plate.

6 ELEVATED FLOAT SWITCH ASSEMBLY is standard. Several enclosures are available. Refer to page 8 for additional details.

7 POSITIVE ALIGNMENT THROUGHOUT utilizes tongue and groove registered design.

8 PUMP SHAFT 1 $\frac{3}{16}$ " or 1 $\frac{1}{16}$ " in diameter is provided to minimize deflection & bearing wear.

9 BEARING ASSEMBLIES available in several arrangements and materials to suit difficult applications. Line bearings are provided on 6'-2" settings and deeper. One bearing is provided for each additional 5' of setting. All the standard bearings are grease lubricated.

10 LIQUID END includes a vacuum cast bronze impeller as standard. Impeller wearing rings or semi-open impellers are optional. Standard case wearing rings eliminate wear on the casing. A large area strainer keeps trash from clogging the impeller and pump casing.

11 DISCHARGE PIPE is secured to the baseplate and is threaded for convenient piping.

QUICK REFERENCE 530 SERIES FEATURE SELECTOR

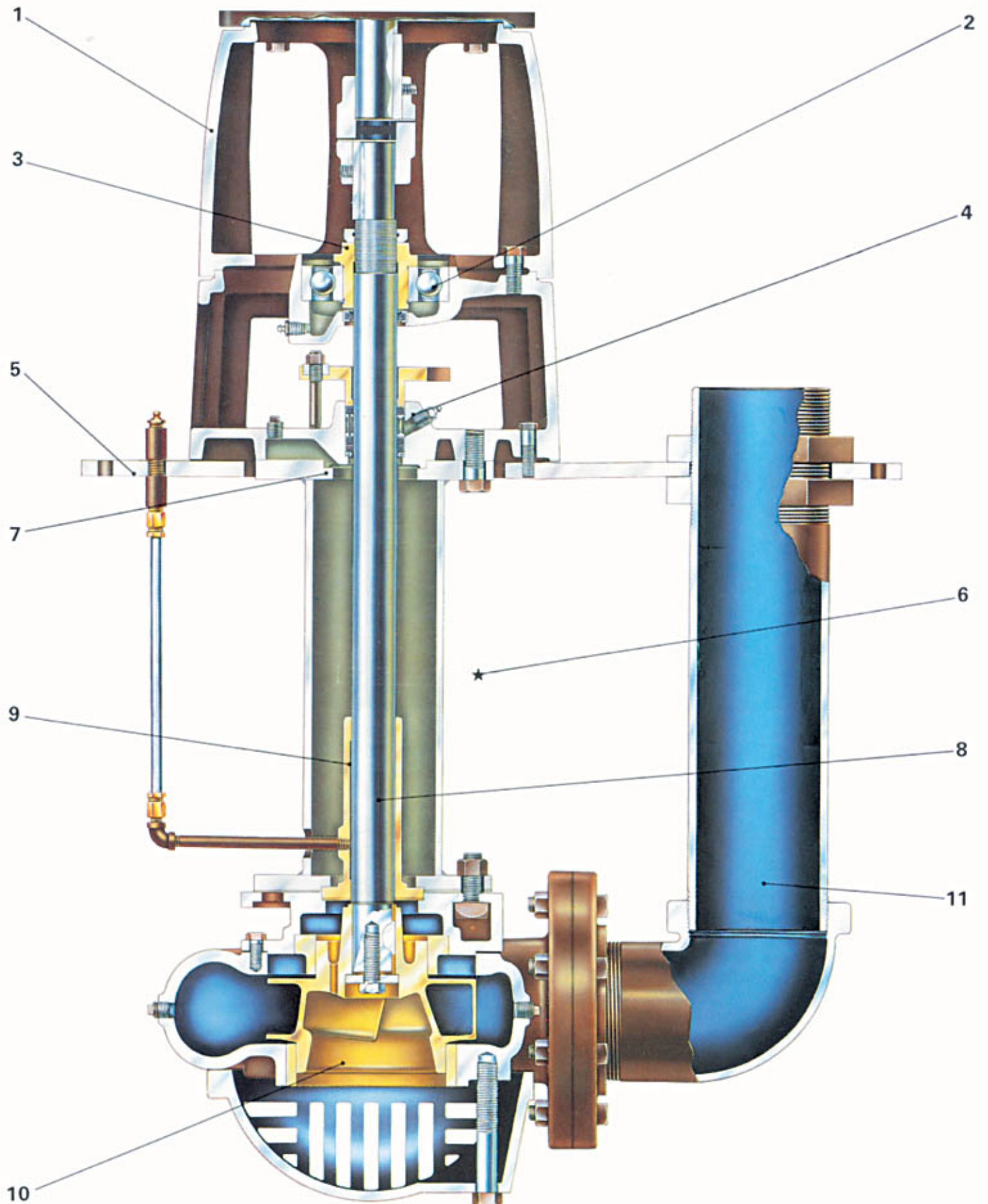
STANDARD

Bronze fitted construction
Bronze pump bearings
Bronze line bearings
(6'-2" settings and deeper)
Dynamically balanced vacuum cast enclosed impeller
Elevated regreaseable thrust ball bearing
Grease lubricated pump and line bearings
Standard "HP" base motors
Casing wearing ring(s)
Carbon steel shaft
Packing with lantern ring
Oval baseplate
4" Vent — 34" baseplate and larger
Float switch
High density Polyethylene float and rod
Elevated switch support
External adjustment of impeller
Pump setting increments of 6"
Pump settings up to 15'-8"

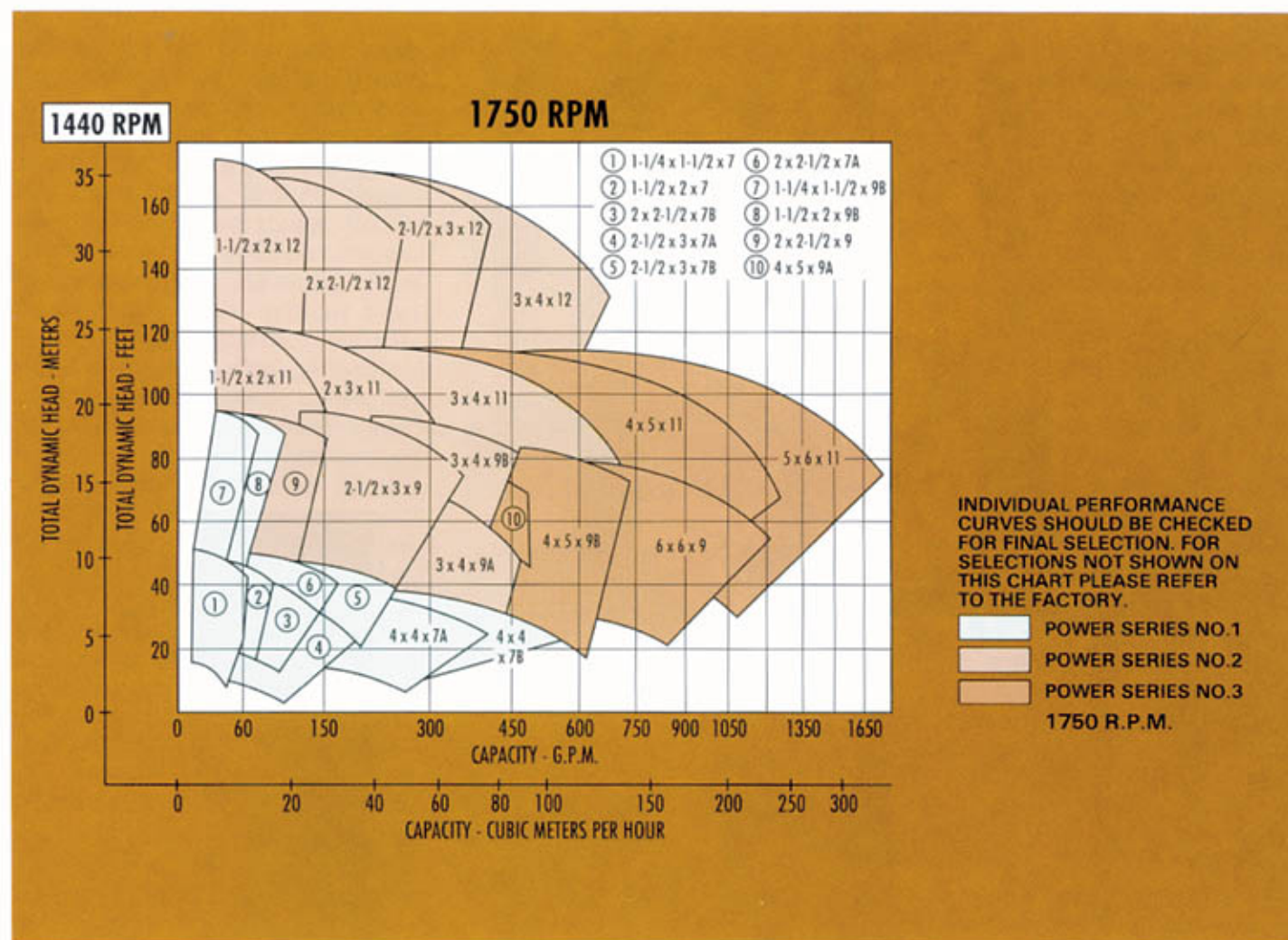
OPTIONAL

All iron, all bronze or stainless steel construction
Various pump and line bearing types
Semi-open impeller
Drip oiler for line bearings
Solenoid oiler for line bearings
Impeller wearing rings
Stainless steel shaft
Round, square, or special baseplates
4" Vent — 28" baseplate and smaller (not available on oval plates)
Various float switch enclosures
High water alarm
Float guard
Pressurized support column
Flushing lines to sleeve bearings
Electric controllers
Below surface discharge
Pump settings over 15'-8"

PUMP FEATURES



PUMP SELECTION AND RANGE CHARTS



UNUSUAL SERVICE FLOW

Careful consideration should be given to potential additional flow from unusual or abnormal additions to the service flow. This would include such additional flow from such services as boiler drainage, air conditioning drainage water, etc. All of this service flow must be added to the projected pump capacity requirement.

DETERMINING PUMP DISCHARGE HEAD

The pump discharge head is calculated by determining the distance from the *lowest level of water in the basin* to the liquid discharge level. By using the discharge level as point of reference, a reasonable factor of safety is established, ac-

counting for the possibility of back pressure. To this you must add the friction loss in the discharge pipe line and fittings.

EXAMPLE:
Distance from lowest level of water to discharge level 26 feet
Friction of discharge pipe (150 G.P.M. 4" pipe 150' long) 2 feet
Friction of pipe fittings (elbows, check valves, gate valves, Y-branch, etc.) 2 feet
Total discharge head 30 feet

DETERMINING TANK OR BASIN SIZE

The size of the tank or basin should be carefully selected to prevent both short cycling of the pumping operation and excessive settling out of sediment. A drawn down ratio of 3 to 1 is recommended . . . this means that the basin area between the low liquid level and the high liquid level should accommodate 3 times the capacity of the

pump before the pumping cycle begins. A minimum distance of 1 foot between the lowest liquid level and the basin floor should be allowed. In addition, the distance between the maximum liquid level and the basin cover should be $\frac{1}{3}$ of the storage area between the high and low liquid levels, but not less than 2 feet. Where conditions limit the basin depth, the required capacity may be obtained by using a larger basin diameter. For fast calculation:

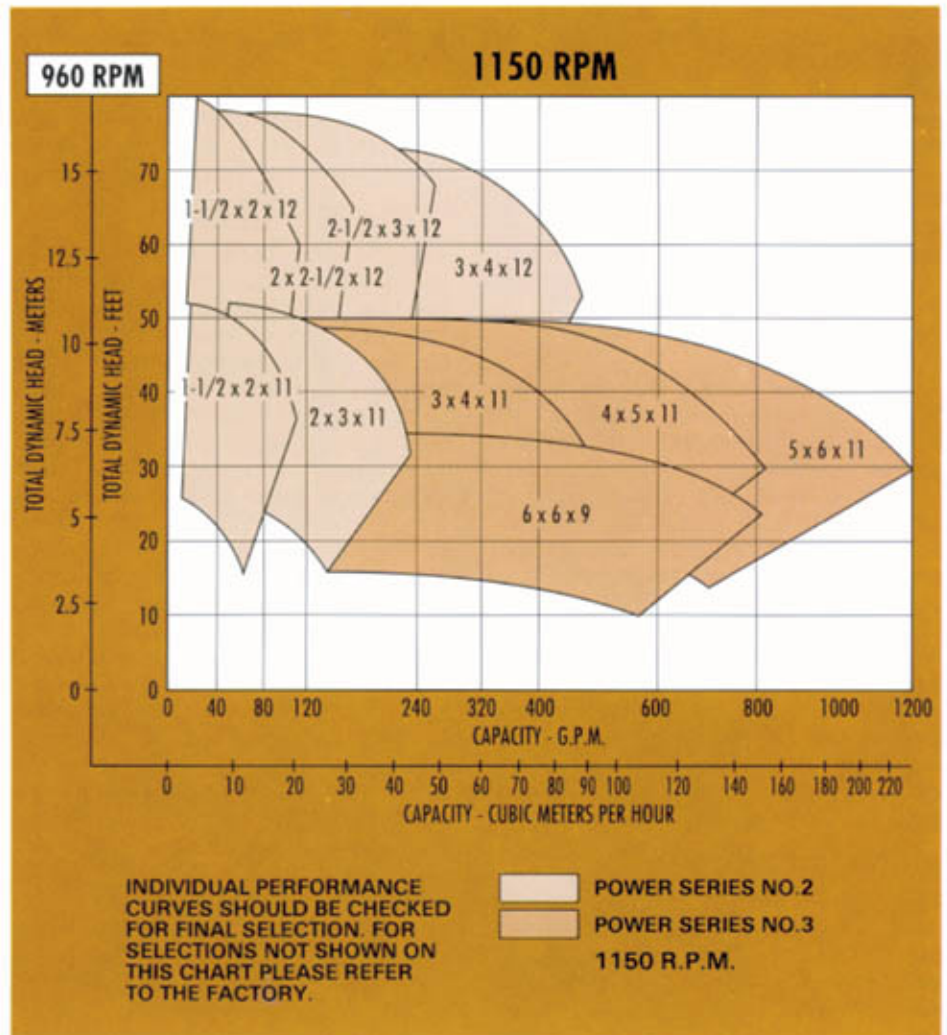
EXAMPLE:
Total Pump capacity 150 G.P.M.
Basin to hold 3 times pump capacity (3x150 Gal.) 450 Gal.
From table below a 48" dia. basin will hold 95 Gal. per foot of depth.
Therefore, basin depth is (450÷95) 4.74 ft.
Add approx. $\frac{1}{3}$ to depth for storage between high level of liquid and basin cover or (minimum 2 ft.) 2.00 ft.
Add approx. 1 ft. to depth for distance between lowest level of liquid and basin floor 1.00 ft.
Total pit depth required 7.74 ft.
Recommended pit depth (next standard 6" increment) 8 ft.

PUMPING SUBMERGENCE

Air may be entrained in the pumped liquid if the pump suction is located too close to the free liquid surface in the suction source. Pumping liquid with entrained air can cause a reduction of capacity, vibration, loss of efficiency and wasted power. Excessive wear of close running parts, bearing stresses and shaft damage are also subsequent effects. If the capacity in gallons per minute and the suction inlet size or area is known, the minimum height of the liquid above the suction inlet (submergence) can be determined. A properly designed suction inlet and sump can be accomplished with the help of the submergence chart.

EXAMPLES:

- (1) When the suction size is known, the minimum submergence required for 500 G.P.M. through a 4 inch suction is 2.2 feet.
- (2) When the suction area is known, the minimum submergence required for 500 G.P.M. through a 12.7 square inch suction is 2.2 feet.



CALCULATING ROUND BASIN CAPACITIES

Per Foot of Depth

Pump Basin Dia. Inches	Simplex	Duplex
24	30	48
36	42	54
48	54	60
60	66	72
72	78	84

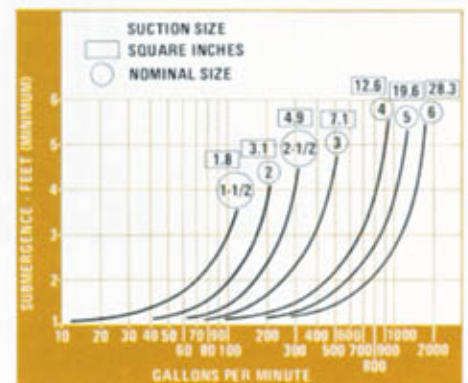
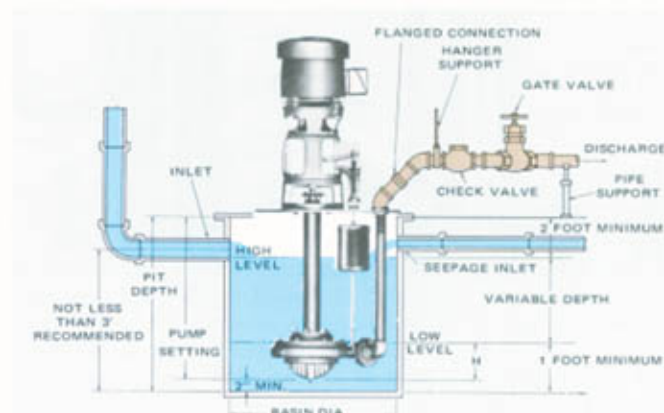
Capacity Per Foot In Gallons	24	38	53	77	95	119	150	212
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TANKS ARE AVAILABLE IN DEPTHS OF 6" INCREMENTS.

CALCULATING SQUARE PIT CAPACITIES

To determine the size of a square or rectangular pit commonly used in concrete construction the same procedure as outlined in the example may be followed. To calculate the capacity of a pit other than a round one, use the following formula: Cubic content in cu. ft. X 7.48 = number of gallons.

1 FOOT MINIMUM — Refer to the chart for additional details.



PUMP AND LINE BEARINGS

Two important parts in any sump pump construction are the pump and line bearings as they are immersed in the liquid. The line bearings frequently run wet or dry depending on the varying liquid level in the sump. A complete line of bearings for all types of service conditions is available. Line bearings are provided as standard on 6'-2" pump settings and for each additional 5' of setting thereafter.

STANDARD

All 530 Series pumps (except for 10 foot and deeper settings at 1750 R.P.M.) are furnished with a bronze sleeve type bearing unless an optional style is specified. The bearing is mounted directly above the impeller and receives lubrication from an external grease line. This bearing is also available in cast iron or ni-resist material. The majority of all vertical wet pit pump applications can be handled by this standard bearing. However, when pumping conditions are severe, abrasives are present in the liquid or the liquid temperature exceeds 140°F., one of the following optional bearings should be selected.

GRAPHITAR

The wearing surface of the graphitar bearing is made of non-metallic material. This optional bearing consists of a cast iron bearing housing and two graphitar bushings. Lubrication for this bearing is supplied by the liquid being pumped. The bearing may be used in conjunction with STANDARD line bearings or as alternate line shaft bearings. This bearing configuration is recommended for use on applications where the

temperature of the liquid exceeds 140°F. Stainless steel shafting is recommended for use with this bearing. *Do not, however, apply this option when the liquid being pumped contains abrasives, in such cases select one of the other bearing options.*

CUTLESS RUBBER

This bearing consists of a ferrous bearing housing, with a cutless rubber bushing inserted. All lubrication for this optional bearing is supplied by the liquid being pumped. This bearing may also be used in conjunction with STANDARD line bearings or as alternate line shaft bearings, *however, positive water lubrication, such as with pressurization, is necessary.* This option is recommended for applications where abrasives are held in suspension in the liquid pumped. The excellent abrasive resistant characteristics of rubber give this bearing several times the wear life than would the standard bearing. Stainless steel shafting is recommended when using this bearing. *Do not, however, apply this option when the liquid temperature exceeds 140°F., in such cases select one of the other bearing options.*

GLASS FILLED TEFLON®

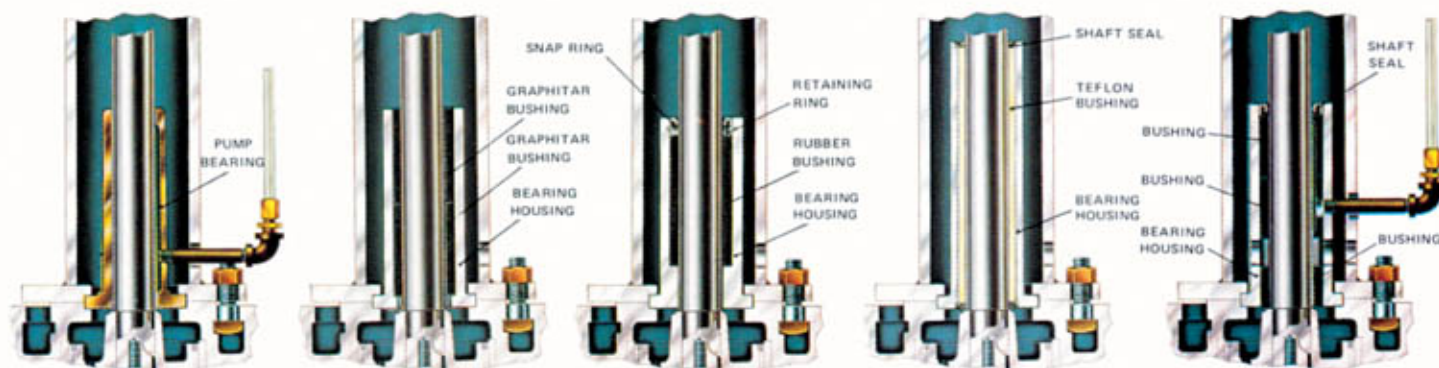
The glass filled Teflon® bearing is similar in design to the graphitar pump bearing. The option consists of a one piece alloy bearing housing with multiple glass filled Teflon® bushings as the bearing surface. The self-lubricating, low friction and inert qualities of filled Teflon® make it ideal for handling hot liquids, chemicals and solvents which may attack standard bearing materials.

Stainless steel shafting is recommended. The bearing may be used in conjunction with STANDARD line bearings or as alternate line shaft bearings.

RELIEF

A RELIEF TYPE BEARING WILL BE SUPPLIED AS STANDARD FOR 10 FOOT AND DEEPER SETTINGS AT 1750 R.P.M. and is otherwise optionally available. The relief type bearing has three bushings inserted into the housing. When in operation the liquid being pumped goes through the lower portion of the bearing and is vented to the sump through the annular ring. This venting action permits only a small amount of liquid, with a fraction of the abrasive content, to enter into the top half of the bearing housing; as a result the upper portion wears at a much slower rate. The life expectancy of this optional design will be two to four times longer than the standard bearing.

All three bushings can be constructed of different materials, therefore, opening a wide range of applications for this unique bearing. The STANDARD bearing is normally provided with this option on all line bearings, however, the GRAPHITAR or CUTLESS RUBBER options can also be provided. The liquid being pumped provides the required lubrication for the lower bushing. An external grease line lubricates the upper bushings when bronze or iron are provided. When other bushing materials are specified the pumped liquid provides the lubrication. Relief type bearings are recommended for your most demanding pump system applications.



STANDARD

GRAPHITAR

CUTLESS RUBBER

FILLED TEFLON®

*Dupont registered trademark.

RELIEF

1. GREASE FITTINGS — STANDARD

Individual forced feed grease lubrication lines are provided to each Standard, Throttle or Relief type pump and line bearing. Individual grease lines to each bearing are recommended for installations where the pumping conditions are quite severe. By providing each bearing with a constant supply of grease the expense and necessity for replacing bearings are held to a minimum. Following are several examples of installations where grease lines are recommended: 1) high temperature liquids are present; 2) the liquid contains abrasives; 3) a liquid with non-lubricating qualities is being pumped. Grease is forced through zerk fittings conveniently located on the baseplate and then through flexible $\frac{3}{8}$ " O.D. Nylon tubing directly into each bearing. The oversize tubing I.D. also minimizes the pressure required to force the grease to the bearings.

2. SOLENOID OIL LUBRICATOR

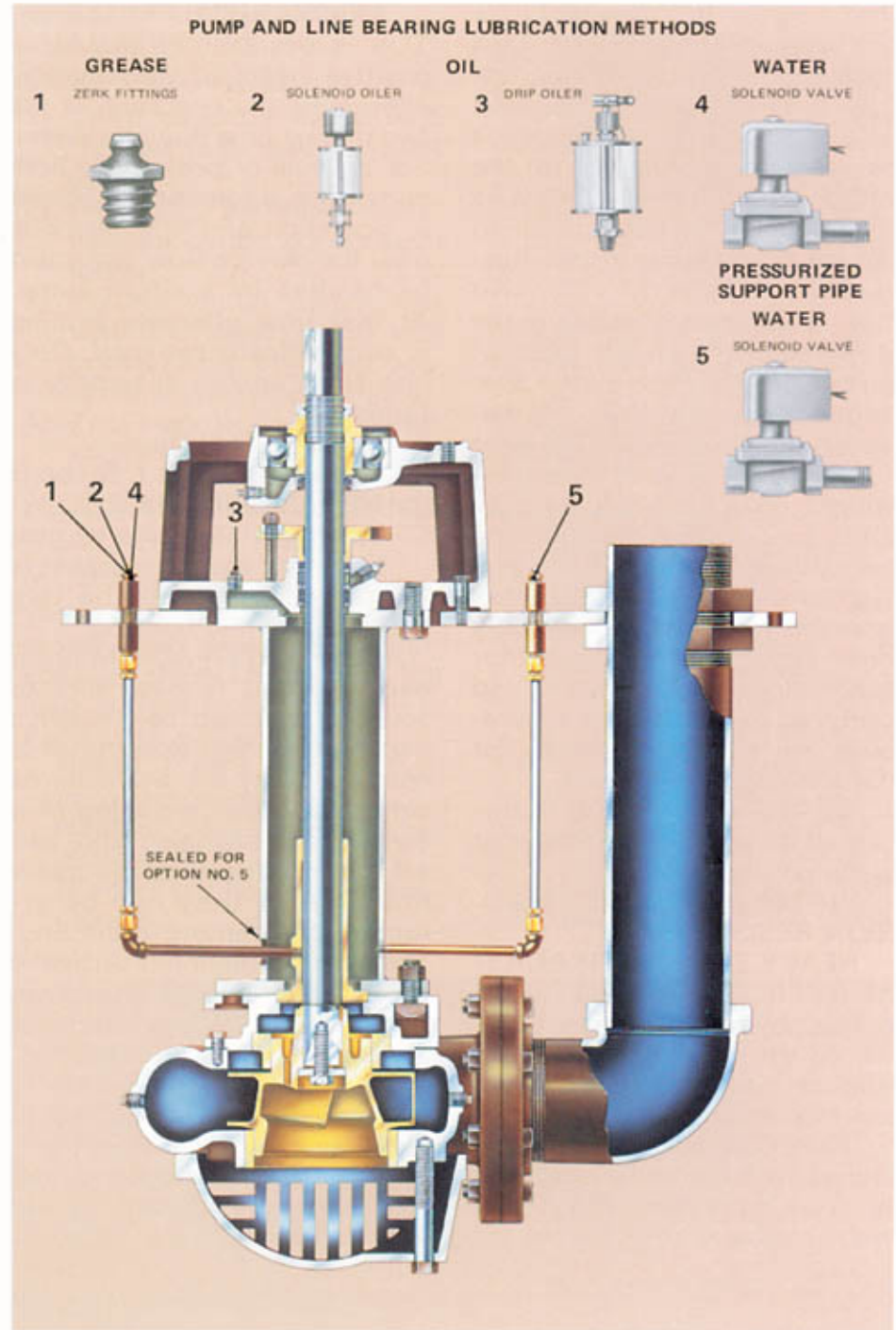
A solenoid valve operated oiler mounted on the lower head with individual feeders to substitute for the zerk fittings can also be provided. Oil is released by gravity from a reservoir by a normally closed electric solenoid valve to single or multiple sight feed valves for individual flow to each bearing. The sight feed valves can be separately adjusted. Oilers can be provided with capacities of one pint or one quart.

3. DRIP OILER

In lieu of lubrication lines to line bearings a drip oiler is available and mounts in a tap in the lower head.

4. SOLENOID WATER LUBRICATOR

A solenoid valve operated clear water valve can also be substituted for the zerk fittings. This option automatically provides water lubrication to pump and line shaft bearings while the pump is running and is especially useful when pressurized support column is provided. This option is also recommended for use with cutless rubber bearings described on pg. 6.



5. PRESSURIZED SUPPORT COLUMN

Pressurizing the support column with water, is a preferred way of handling harmful matter entrained in the pumped solution. The column is pressurized by forcing water, under a higher pressure than the pump discharge, through the oiler hole in the lower head into all sections of the support column. On long pump settings an auxiliary pressure line is

connected to the section of support pipe above the pump bearing to maintain pressure at the bottom of the column. The continuous action of water flushing through the bearing minimizes the possibility of damaging liquids backing up into the bearing housing. This system should be utilized when handling: 1) highly corrosive liquids; 2) high temperature liquids; 3) liquids with heavy concentrations of abrasive materials; or 4) non-lubricating liquids. See Bulletin 680, Water Seal Units.

FLOAT CONTROLS AND CONTROLLERS

The float switch assembly for the simplex unit consists of the float, float rod, rod guides, adjusting stops, gastight pedestal and float switch. This unit serves as a pilot device for the motor magnetic starter. It is mounted on the basin cover in the position shown in the illustration on page 11. The two float stops are adjustable to the desired high and low level pumping levels. The plastic float slides along the float rod between the float stops. The float rod is balanced with a counterweight on the switch arm for quick response. A flexible rubber bellows is supplied for gastight service. On the Duplex unit the float switch assembly described above is provided for each pump. The standard and optional float switch assemblies are the same except for the switches themselves.

STANDARD DUTY is designed for operation on basin or sump pit applications.

WATERTIGHT AND EXPLOSION RESISTING.

HEAVY DUTY WITH BUILT-IN OVERLOAD PROTECTION is reset by pressing a reset button on the outside of the case. Application is restricted according to horsepower limitations.

EXPLOSION-PROOF is designed for hazardous locations. All working parts of the switch are completely immersed in oil.

MECHANICAL ALTERNATOR is designed to provide a positive means of mechanically alternating the operation of the two pumps on a duplex system. For unusual or peak loads both pumps are automatically placed in operation and will continue until the service flow can again be handled by a single pump. At that time alternate cycling is automatically resumed. Only one float switch assembly is furnished.

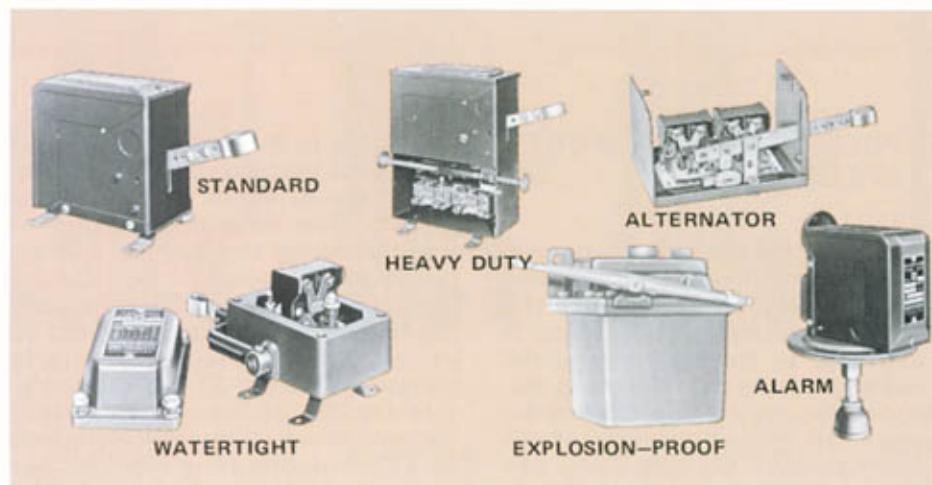
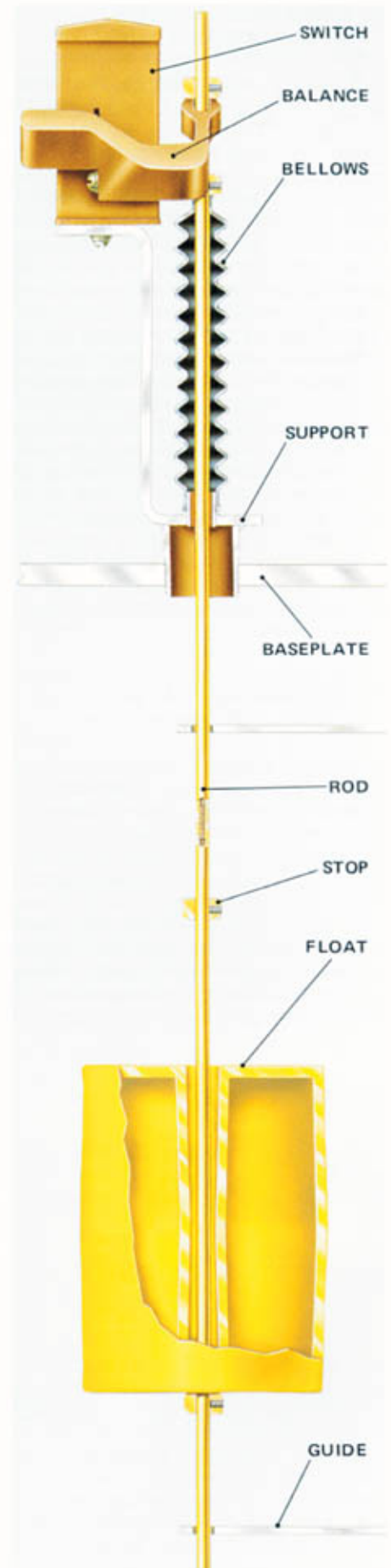
A. NEMA 1 Enclosure.

B. Gastight — Class I, Group D Hazardous locations.

C. Watertight — Same as gastight unit except a gasket is placed between the two halves of the housing.

HIGH WATER ALARM is for use where it is desirable to sound a warning bell when a dangerously high water level is reached. They are available as complete units consisting of a switch, transformer, and bell all mounted within the same housing, or they can be arranged for remote mounting. The alarm is mounted vertically on a 1" pipe through the cover.

FLOAT GUARD enclosure, of either sheet or mesh steel, supported from the baseplate in shorter settings or secured to the support pipe in deeper settings, encases the float and float rod to prevent damage by objects entrained in the liquid.



DUPLEX PUMP CONTROLLERS AND OPTIONAL EQUIPMENT

MODEL (LDS) consists of two magnetic starters, an electric alternator, with the components prewired and enclosed in a common panel.

MODEL (FD or NFD) These duplex controllers include two magnetic starters, an electric alternator, fusible or non-fusible disconnect switches, with the components prewired and enclosed in a common panel. Disconnect switch handles protrude through the cover door.

MODEL (CB) This prewired panel includes two magnetic starters, an electric alternator, and magnetic trip circuit breakers. The handles of the circuit breaker protrude through the cover door.

THE ELECTRIC ALTERNATOR in these duplex pump controllers alternate the pumping cycle from one pump to the other.

OPTIONAL EQUIPMENT AVAILABLE WITH CONTROL PANEL

- 1) Third overload relay with thermal unit, one for each motor.
- 2) (H-O-A) "Hand-Off-Auto" selector switch, one for each motor.
- 3) Control circuit transformer with 550, 440, or 220 Volt primary and 110 Volt secondary, one for each motor.
- 4) Pilot light in cover, one for each motor.

FLOOR MOUNTING STAND. AVAILABLE FOR ALL MODELS

When ordering, please state model and give horsepower, voltage, phase, cycle and full load current rating of motors. Panels are available in:

- NEMA Type 1 General Purpose Enclosure.
- NEMA Type 4 Watertight Enclosure.
- NEMA Type 12 Dust-tight Enclosure.



MODEL LDS

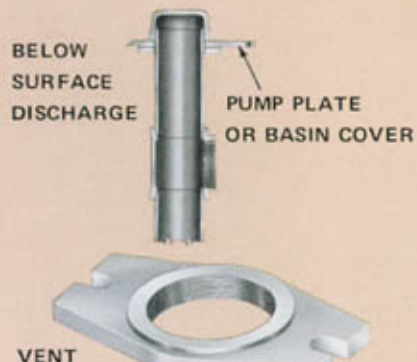


MODEL FD OR NFD



MODEL CB

OPTIONAL EQUIPMENT



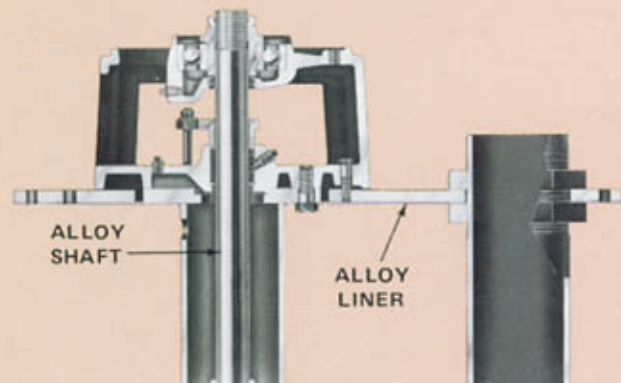
VENT

(28" BASEPLATES & SMALLER — NOT AVAILABLE ON OVALS)

IMPELLER WEARING RINGS



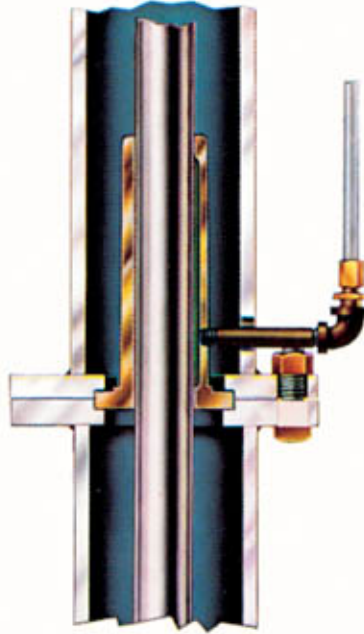
SEMI-OPEN IMPELLER



ENGINEERING DETAILS

PIT DEPTH OR PUMP SETTING

Aurora wet pit pumps are available in lengths shown in the chart. For pit depths or pump settings other than shown, refer to the factory. A pump may be specified either by pit depth or pump setting. These lengths are measured from either: the underside of the basin cover to the bottom of the strainer; or from the top of the sump basin to the bottom of the basin as illustrated. The distance between the pit depth and pump setting will vary from 4" to 6" depending upon the pump size and whether a cast iron or steel basin cover is used.



DESIGN DETAILS

AREA	DESCRIPTION	POWER SERIES	
		1	2 & 3
PUMP SHAFT	ROTATION — FROM DRIVER END	CW	CW
	DIAMETER AT IMPELLER	7/8	1 1/4
	DIAMETER BETWEEN COUPLING & IMPELLER	1 1/8	1 3/4
	DIAMETER AT COUPLING END	1	1 1/4
	COUPLING KEY — SQUARE	1/4	1/4
BEARING	BEARING (BALL) — HEAD	311	311
	BEARING (SLEEVE) — PUMP	6" LG.	6" LG.

PIT DEPTH OR PUMP SETTING

LENGTH IN FT.		LENGTH IN FT.		LENGTH IN FT.	
PIT DEPTH	PUMP SETTING	PIT DEPTH	PUMP SETTING	PIT DEPTH	PUMP SETTING
2'	1'-8"	7'	6'-8"	12'	11'-8"
2'-6"	2'-2"	7'-6"	7'-2"	12'-6"	12'-2"
3'	2'-8"	8'	7'-8"	13'	12'-8"
3'-6"	3'-2"	8'-6"	8'-2"	13'-6"	13'-2"
4'	3'-8"	9'	8'-8"	14'	13'-8"
4'-6"	4'-2"	9'-6"	9'-2"	14'-6"	14'-2"
5'	4'-8"	10'	9'-8"	15'	14'-8"
5'-6"	5'-2"	10'-6"	10'-2"	15'-6"	15'-2"
6'	5'-8"	11'	10'-8"	16'	15'-8"
6'-6"	6'-2"	11'-6"	11'-2"	REFER TO FACTORY	

INTERMEDIATE LINE SHAFT BEARINGS

PIT DEPTHS	PUMP SETTING	NO. OF LINE SHAFT BRG.
6'-6"	6'-2"	1
11'-6"	11'-2"	2
16'-6"	16'-2"	3

MAXIMUM LIMITATIONS

BASED ON STD. MAT'L. AND PUMPING CLEAR WATER		
SPEED — RPM		1750
MINIMUM HORSEPOWER	1750 RPM	1
	1150 RPM	3/4
TEMPERATURE — °F		180
HYDROSTATIC TEST PRESSURE — PSI		120
CASE WORKING PRESSURE — PSI		80
BASIN PRESSURE — PSI		2
BASIN COVER SIZE	W/O OVAL OR MANHOLE	28
	W OR W/O OVAL OR MANHOLE	78

MATERIAL OF CONSTRUCTION

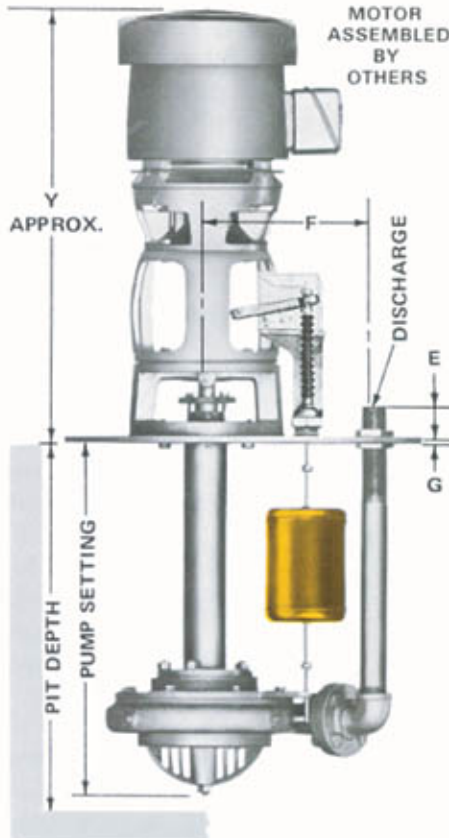
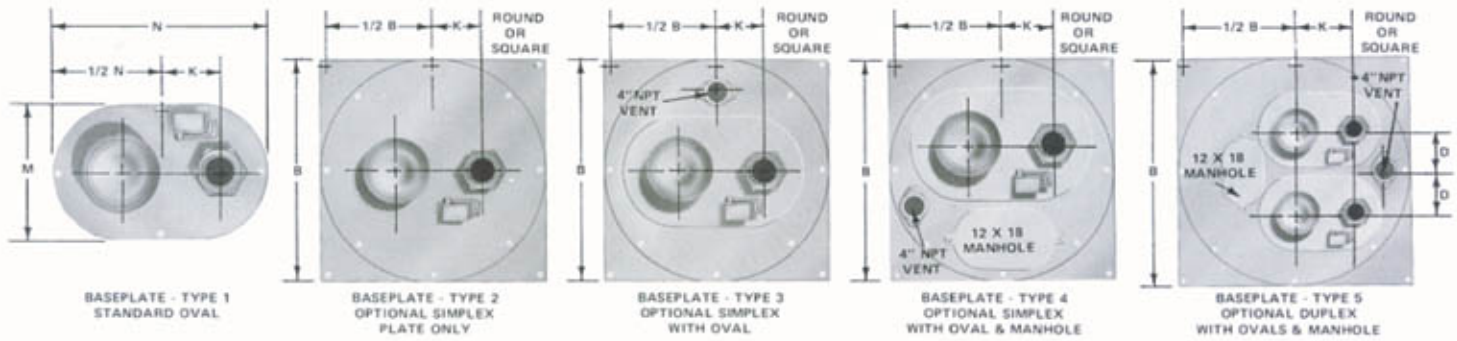
PUMP PART	BRONZE FITTED	ALL BRONZE*	ALL IRON	STAINLESS STEEL*
BASEPLATE	STEEL WRT	STEEL WRT	STEEL WRT	STEEL WRT
BEARING (Pump and Line)	BRONZE ASTM B62-63	BRONZE ASTM B62-63	CAST IRON ASTM A48-64	GRAPHITAR
BEARING COLLAR	BRONZE ASTM B62-63	BRONZE ASTM B62-63	BRONZE ASTM B62-63	BRONZE ASTM B62-63
BEARING COVER	CAST IRON ASTM A48-64	BRONZE ASTM B62-4A	CAST IRON ASTM A48-64	STAINLESS STEEL AISI 316
CASING	CAST IRON ASTM A48-64	BRONZE ASTM B62-4A	CAST IRON ASTM A48-64	STAINLESS STEEL AISI 316
DISCHARGE PIPE	STEEL WRT-SCHD 40	BRASS ASTM B135	STEEL WRT-SCHD 40	STAINLESS STEEL AISI 316
HEAD-LOWER	CAST IRON ASTM A48-64	CAST IRON ASTM A48-64	CAST IRON ASTM A48-64	CAST IRON ASTM A48-64
HEAD-UPPER	CAST IRON ASTM A48-64	CAST IRON ASTM A48-64	CAST IRON ASTM A48-64	CAST IRON ASTM A48-64
IMPELLER	BRONZE ASTM B62-63	BRONZE ASTM B62-4A	CAST IRON ASTM A48-64	STAINLESS STEEL AISI 316
PACKING	INTERWOVEN GRAPHITE/TEFLON LUBRICATED ACRYLIC YARN PACKING. DIE MOLDED, DIAGONALLY CUT			
SHAFT	STEEL AISI C1045	STAINLESS STEEL AISI 316	STEEL AISI C1045	STAINLESS STEEL AISI 316
STRAINER	CAST IRON ASTM A48-64	BRONZE ASTM B62-4A	CAST IRON ASTM A48-64	STAINLESS STEEL AISI 316
SUPPORT PIPE	STEEL WRT-SCHD 40	BRASS ASTM B135	STEEL WRT-SCHD 40	STAINLESS STEEL AISI 316
WEARING RING(S)	BRONZE ASTM B62-63	BRONZE ASTM B144-3B	CAST IRON ASTM A48-64	STAINLESS STEEL AISI 316

POWER SERIES

PUMP SIZE	BASIC POWER SERIES	SHAFT DIA.	SUPPORT PIPE SIZE	
			* UP TO 10' DEEP SETTING	** OVER 10' DEEP SETTING
1 1/4 x 1 1/2 x 7	1	1 1/4	2 1/2	3
1 1/4 x 1 1/2 x 9B	1	1 1/4	2 1/2	3
1 1/2 x 2 x 7	1	1 1/4	2 1/2	3
1 1/2 x 2 x 9	1	1 1/4	2 1/2	3
1 1/2 x 2 x 12	2	1 1/4	2 1/2	3
1 1/2 x 2 x 11	2	1 1/4	2 1/2	3
2 x 2 1/2 x 7	1	1 1/4	2 1/2	3
2 x 2 1/2 x 9	2	1 1/4	2 1/2	3
2 x 3 x 11	2	1 1/4	2 1/2	3
2 x 2 1/2 x 12	2	1 1/4	2 1/2	3
2 1/2 x 3 x 7	1	1 1/4	2 1/2	3
2 1/2 x 3 x 9	2	1 1/4	2 1/2	3
2 1/2 x 3 x 12	2	1 1/4	2 1/2	3
3 x 4 x 9	2	1 1/4	2 1/2	3
3 x 4 x 11	2	1 1/4	2 1/2	3
3 x 4 x 12	2	1 1/4	2 1/2	3
4 x 4 x 7	1	1 1/4	2 1/2	3
4 x 5 x 9A	3	1 1/4	4	4
4 x 5 x 9B	3	1 1/4	4	4
4 x 5 x 11	3	1 1/4	4	4
5 x 6 x 11	3	1 1/4	4	4
6 x 6 x 9	3	1 1/4	4	4

*STD. PUMP OR LINE BRGS. **SPEC. PUMP OR LINE BRGS.

PUMP DIMENSIONS



BASEPLATE — OVAL — STEEL

NO.	TYPE	G	M	N	WGT
1	20 x 24	1/4	20	24	36
2	22 x 28	1/2	22	28	63
3	26 x 36	1/2	26	36	102

BASEPLATES — ROUND OR SQUARE — STEEL

TYPE 2					TYPE 4					TYPE 5				
B	OVAL NO.	C	WGT.		OVAL NO.	C	WGT.		OVAL NO.	C	WGT.			
			RD.	SQ.			RD.	SQ.			RD.	SQ.		
24	N.A.	1/4	41	54										
26	N.A.	1/4	58	76										
TYPE 3														
34	1	1/4	89	115										
40	2	1/4	126	163	1	1/4	136	173						
46	2	1/2	225	289	2	1/2	235	299	1	1/2	245	309		
53	2	1/2	392	387	2	1/2	312	397	2	1/4	397	504		
60	2	1/4	487	623	2	1/4	497	633	2	1/4	507	643		
66	2	1/4	592	755	2	1/4	602	765	2	1/4	730	927		
78	2	1/4	832	1060	2	1/4	842	1070	2	1/4	1016	1290		

MOTOR

FRAME	HORSEPOWER		MOTOR WGT (LBS)	UPPER HEAD WGT (LBS)	Y APPROX
	1750	1150			
143 HP	1	1/4	40	21	25
145 HP	1 1/2	2	45	21	26
182 HP	3	1 1/2	72	21	27
184 HP	5	2	80	21	28
213 HP	7 1/2	3	130	21	30
215 HP	10	5	145	21	32
254 HP	15	7 1/2	220	21	34
256 HP	20	10	240	21	36
284 HPH	25	15	330	42	39
286 HPH	30	—	370	42	40
324 HP	40	—	475	42	41
326 HP	50	—	525	42	43
364 HP	60	—	630	42	48
365 HP	75	—	690	42	48

NOTES:

1. Dimensions and weights are approximate.
2. All dimensions in inches and may vary $\pm 1/8$ ".
3. Frame sizes, "Y" dimension and motor weight are for open drip-proof motors only.
4. Conduit box is shown in approximate position.

5. Add pump(s), base(s), upper head(s) and motor weight(s) for unit weight.
6. Not for construction purposes unless certified.

PUMP SIZE			PUMP WL. LBS.		D	E	F	MINIMUM BASEPLATE SIZE									
DISCH.	SUCTION	CASE BORE	5'-8" SETTING	FOR EA. ADD 1" SETTING				TYPE 1		TYPE 2		TYPE 3		TYPE 4		TYPE 5	
								SIZE	K	SIZE	K	SIZE	K	SIZE	K	SIZE	K
1 1/4	1 1/2	7	202	20	10 1/2	3 1/2	8 1/4	20 x 24	5 1/4	24	5 1/4	34	5 1/4	40	5 1/4	46	8 1/4
1 1/4	1 1/2	9B	222	20	10 1/2	3 1/2	9 1/4	20 x 24	7 1/4	24	7 1/4	34	7 1/4	40	7 1/4	46	10 1/4
1 1/2	2	7	217	20	10 1/2	3 1/4	8 1/2	20 x 24	6	24	6	34	40	6	46	9	9
1 1/2	2	9	241	20	10 1/2	3 1/4	10 1/4	20 x 24	7 1/4	24	7 1/4	34	7 1/4	40	7 1/4	46	10 1/4
1 1/2	2	11	247					22 x 28	7 1/4	26	7 1/4		7 1/4				10 1/4
1 1/2	2	12	252	25	11 1/2	3 1/4	12 1/4	22 x 28	9 1/4	26	9 1/4	36	9 1/4	42	9 1/4	53	11 1/4
2	2 1/2	7	234	20	10 1/2	4 1/4	10 1/4	20 x 24	7 1/4	26	7 1/4	34	7 1/4	40	7 1/4	46	10 1/4
2	2 1/2	9	245	25	11 1/2	4 1/2	12	22 x 28	9	26	9 1/2	36	9	42	9	53	11 1/2
2	3	11	282					22 x 28	7 1/4	30	7 1/4	36	7 1/4	42	7 1/4	53	10 1/4
2	2 1/2	12	296	25	11 1/2	3 1/4	13 1/4	22 x 28	10 1/4	30	11 1/4	36	10 1/4	42	10 1/4	53	13 1/4
2 1/2	3	7	220	20	11 1/2	4 1/4	11 1/4	22 x 28	8 1/4	26	8 1/4	36	8 1/4	42	8 1/4	53	10 1/4
2 1/2	3	9	267	25	11 1/2	4 1/4	12 1/4	22 x 28	9 1/4	28	10 1/4	36	9 1/4	42	9 1/4	53	12 1/4
3	4	11	292					22 x 28	10		10	36	10	42	10	53	12 1/2
2 1/2	3	12	314	25	11 1/2	3 1/4	14 1/2	22 x 28	9	32	12	36	9	42	9	53	11 1/2
3	4	9	295	25	11 1/2	4 1/4	13 1/4	22 x 28	8 1/4	32	11 1/4	36	8 1/4	42	8 1/4	53	10 1/4
3	4	12	296	25	11 1/2	4 1/4	15 1/4	22 x 28	9 1/4			36	9 1/4	42	9 1/4	53	12 1/4
4	4	7	304	20	11 1/2	4 1/4	13 1/4	22 x 28	8 1/4			36	8 1/4	42	8 1/4	53	10 1/4
4	5	9A	340	30	11 1/2	4 1/4	14 1/4	22 x 28	8 1/4			36	8 1/4	42	8 1/4	53	11 1/4
4	5	9B	340	30	11 1/2	4 1/4	15 1/4	22 x 28	9 1/4			36	9 1/4	42	9 1/4	53	12 1/4
4	5	11	390					26 x 36	11 1/4			46	11 1/4	46	11 1/4	64	11 1/4
5	6	11	430					26 x 36	10 1/2			46	10 1/2	46	10 1/2	64	10 1/2
6	6	9	442	30	11 1/2	5 1/4	14 1/4	22 x 28	8 1/4			36	8 1/4	42	8 1/4	53	11 1/4

ENGINEERING SPECIFICATIONS

The contractor shall furnish (and install as shown on the plans) Aurora Model (531A Simplex) (532A Duplex) centrifugal sump pumps size . . . x . . . x . . . of (bronze fitted) (all bronze) (all iron) (stainless steel) construction. Each pump shall have a capacity of . . . G.P.M. at . . . ft. total head, with a temperature of . . . °F., . . . specific gravity.

The units shall be designed for a sump depth of . . . feet and shall be furnished with an (above the floor discharge terminating at the baseplate with a threaded connection) (below the floor discharge terminating with a threaded pipe connection).

A steel baseplate (oval); (round) (square) — (Simplex) (Simplex with oval) (Simplex with oval and manhole) (Duplex with ovals and manhole) will be provided.

The pump casing and bearing cover shall be of cast iron. The casing is to be provided with . . . wearing rings held securely in place by means of a

press fit. A strainer of sufficient size shall be bolted to the pump casing.

The impeller is of the (enclosed) (semi-open) standard type and shall be constructed of (vacuum cast bronze) (cast . . .). The impeller is to be dynamically balanced and keyed to the pump shaft.

The column pipe must be with a minimum diameter of . . . " having machined tongue and grooved joints to insure shaft alignment. A pump bearing will be located directly above the impeller and shall be of the (bronze sleeve) (graphitar) (cutless rubber) (filled Teflon*) (relief) type.

Line bearings must be provided with a setting of 6'-2" and one bearing or each additional 5' of setting thereafter. All standard sleeves, throttle or relief pump and line bearings must be (grease) (oil) (water) lubricated through separate Nylon tube lubrication lines terminating at the baseplate.

The motor pedestal is to be of cast iron, two piece construc-

tion, fitted with a sealed thrust ball bearing located 6" above the baseplate. The ball bearing collar will be arranged to allow external axial adjustment of the shaft and impeller. Grease seals shall be provided to retain grease and to prevent contamination of the vertically mounted ball bearing. A grease fitting will be provided to allow regreasing of the bearing. A packed stuffing box with lantern ring and split gland provides for gastight construction. The pump shall be controlled by an enclosed (heavy duty) (water tight and explosion resisting) heavy duty with built in overload protection) (explosion proof) type float operated switch 6" above the baseplate with high density Polyethylene float and float rod. A flexible bellows will provide gastight construction.

An automatic alternator shall be furnished on duplex pumps to allow the pumps to alternate on each successive cycle of operation.

The pumps are to be driven by and flexible coupled to a standard "HP," . . . H.P., . . . volt, . . . phase, . . . Hertz, . . . R.P.M., . . . vertical electrical motor.

Many thousands of Aurora pumps serve building facilities, municipalities, utilities, industries, institutions, and maritime, government, and armed services throughout the world . . . the result of dedication to creative pump engineering since 1919, when the firm was founded as the Aurora Pump

and Manufacturing Company. New product development, product refinement, and expansion of sizes to accommodate broader ranges of application have been continuous and aggressive since that date. The resulting company growth has elevated Aurora to its present prominent industry position.



NOTE: Aurora Pump reserves the right to make revisions to its products and their specifications, and to this bulletin and related information without notice.

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Refer to "Pumps" in yellow pages of your phone directory
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MODEL 531A - 532A

ENGINEERING DATA

PUMP AND LINE BEARINGS

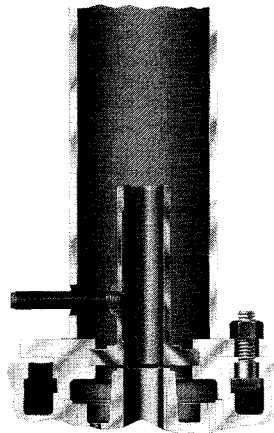
SECTION 530 PAGE 71
DATED JANUARY 1982

BEARING TYPE	PUMP CONSTRUCTION	BEARING HOUSING MATERIAL	BUSHING MATERIAL				
			IRON	BRONZE	CUTLESS RUBBER	GRAPHITAR	FILLED TEFLON
STANDARD BEARING FOR PIT DEPTHS UNDER 10'	BRONZE FITTED	BRONZE			NO		
	ALL BRONZE	BRONZE			BUSHINGS		
	ALL IRON	IRON			REQUIRED		
	STAINLESS STEEL	STAINLESS STEEL					X
RELIEF BEARING STANDARD FOR PIT DEPTHS 10' AND DEEPER	BRONZE FITTED	STEEL		X			
	ALL BRONZE	BRONZE		X			
	ALL IRON	STEEL	X				
	STAINLESS STEEL	STAINLESS STEEL					X
STANDARD LUBRICATION			GREASE		PUMPED LIQUID		
OPTIONAL LUBRICATION			WATER FLUSH-OIL (1)		WATER FLUSH (2)	WATER FLUSH-GREASE (2)	WATER FLUSH

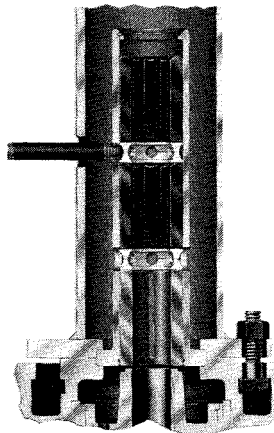
BEARING TYPE	PUMP CONSTRUCTION	BEARING HOUSING MATERIAL	BUSHING MATERIAL				
			IRON	BRONZE	CUTLESS RUBBER	GRAPHITAR	FILLED TEFLON
OPTIONAL RELIEF BEARING	ALL BRONZE	BRONZE		X	X	X	X
	BRONZE FITTED	STEEL		X	X	X	X
	ALL IRON	STEEL	X		X	X	X
	STAINLESS STEEL	STAINLESS STEEL			X	X	X
OPTIONAL SPOOL BEARING	BRONZE FITTED	STEEL		X	X	X	X
	ALL IRON	STEEL	X		X	X	X
	STAINLESS STEEL	STAINLESS STEEL			X	X	X
STANDARD LUBRICATION			GREASE		PUMPED LIQUID		
OPTIONAL LUBRICATION			WATER FLUSH-OIL (1)		WATER FLUSH (2)	WATER FLUSH-GREASE (2)	WATER FLUSH

(1) OIL - FOR LINE SHAFT BEARINGS ONLY.
(2) WATER FLUSH - RELIEF HOUSING ONLY.

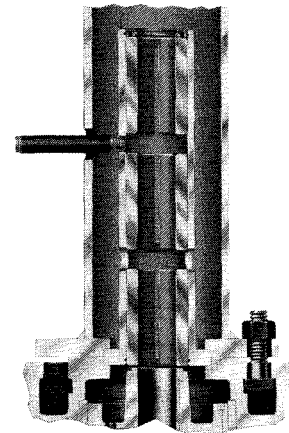
STANDARD



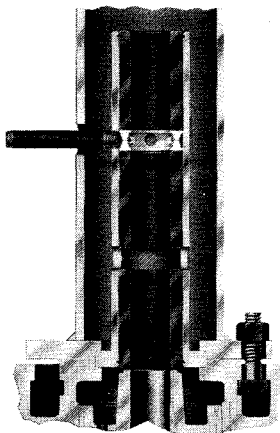
CUTLESS RUBBER



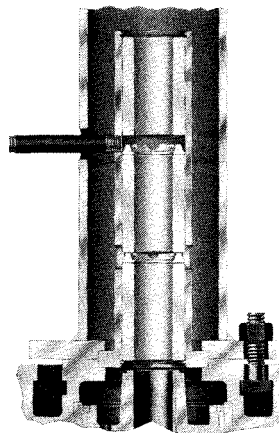
RELIEF



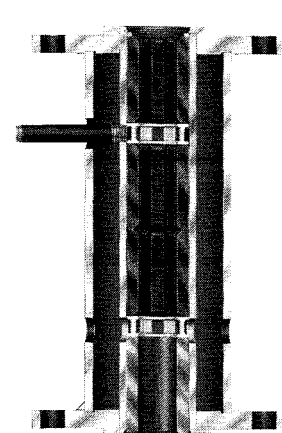
GRAPHITAR



GLASS-FILLED TEFLON*



SPOOL



MODEL 531A - 532A

ENGINEERING DATA

PUMP AND LINE BEARINGS

Two important parts in any sump pump construction are the pump and line bearings as they are immersed in the liquid. The line bearings frequently run wet or dry depending on the varying liquid level in the sump. A complete line of bearings for all types of service conditions is available. Line bearings are provided as standard on 6'-2" pump settings and for each additional 5' of setting thereafter.

STANDARD

All 530 Series pumps (except for 10 foot and deeper settings at 1750 R.P.M.) are furnished with bronze sleeve type bearing unless an optional style is specified and is also the standard lineshaft bearing for all settings. The bearing is mounted directly above the impeller and receives lubrication from individual external grease lines. This bearing is also available in cast iron or ni-resist material. The majority of all vertical wet pit pump applications can be handled by this standard bearing. However, when pumping conditions are severe, abrasives are present in the liquid or the liquid temperature exceeds 140°F., one of the following optional bearings should be selected.

GRAPHITAR (OPTIONAL BEARING)

The wearing surface of the graphitar bearing is made of nonmetallic material. It consists of a carbon steel relief-type bearing housing and three graphitar bushings. Lubrication can be supplied by the liquid being pumped when used as a pump bearing. When used as an optional lineshaft bearing, water flush lubrication is provided. The waterflush lines may be connected to the pump discharge pipe or a secondary city water supply, depending upon the application. The flush lines can be equipped with "zerk fittings" for optional grease lubrication. This bearing can also be used in conjunction with STANDARD lineshaft bearings which are also capable of being lubricated with grease (standard lubrication) or waterflush (optional lubrication). The graphitar bearing configuration is recommended for use on applications where the temperature of the liquid exceeds 140°F. Stainless steel shafting is recommended for use with this bearing. **DO NOT APPLY THIS OPTION WHEN THE LIQUID BEING PUMPED CONTAINS ABRASIVES; IN SUCH CASES, SELECT ONE OF THE OTHER BEARING OPTIONS.**

CUTLESS RUBBER (OPTIONAL BEARING)

This bearing consists of a carbon steel relief-type bearing housing and two cutless rubber bushings. A third bushing located at bottom of bearing housing is made of bronze on standard fitted or all bronze

pumps and is a third cutless rubber bushing on all iron or stainless steel pumps. The standard metal bushing carries most of the shaft bearing loads. As wear occurs, the bearing loads are gradually distributed among the remaining cutless rubber bushings, thus increasing total bearing life. Lubrication can be supplied by the liquid being pumped when used as a pump bearing. When used as an optional lineshaft bearing, water flush lubrication is provided. The water flush lines may be connected to the pump discharge pipe or a secondary city water supply, depending upon the application. Grease lubrication is not recommended. Cutless rubber bearings may be used in conjunction with STANDARD lineshaft bearings which are also capable of water flush lubrication. This option is recommended for applications where abrasives are held in suspension in the liquid pumped. The excellent abrasive-resistant characteristics of rubber give this bearing several times the wear life of a standard bearing. Stainless steel shafting is recommended. **DO NOT APPLY THIS OPTION WHEN THE LIQUID TEMPERATURE EXCEEDS 140°F.; IN SUCH CASES, SELECT ONE OF THE OTHER BEARING OPTIONS.**

GLASS-FILLED TEFLON* (OPTIONAL BEARING)

This bearing consists of a carbon steel relief-type bearing housing with three glass-filled Teflon* bushings as the bearing surface. The self-lubricating, low-friction and inert qualities of filled Teflon* make it ideal for handling hot liquids, chemicals and solvents which may attack standard bearing materials. Lubrication can be supplied by the liquid being pumped when used as a pump bearing. When used as an optional lineshaft bearing, waterflush lubrication is provided. The water flush lines may be connected to the pump discharge pipe or a secondary city water supply, depending upon the application. Grease lubrication is not recommended for use with this bearing. Stainless steel shafting is recommended. This bearing may be used in conjunction with STANDARD lineshaft bearings which are also capable of water flush lubrication.

RELIEF

A RELIEF-TYPE PUMP BEARING WILL BE SUPPLIED AS STANDARD FOR 10 FOOT AND DEEPER SETTINGS AT 1750 R.P.M., and is otherwise optionally available. The relief-type bearing housing has three metal bushings inserted into the housing. When in operation, the liquid being pumped goes through the lower portion of the bearing under pressure and is vented to the sump through the annular ring. This venting action permits only a small amount of liquid, with a

fraction of the abrasive content, to enter into the top half of the bearing housing; as a result, the upper portion which is not subject to pumping pressure wears at a much slower rate. The life expectancy of this optional design will be two to four times longer than the standard bearing. Since this relief-type bearing housing is also used with the other bushing materials (Graphitar, Cutless Rubber and Teflon*) the same venting principle applies to these bushing materials. All three bushings can be constructed of different materials, therefore opening a wide range of applications. The STANDARD bearing is normally provided with this option on all lineshaft bearings; however, the GRAPHITAR, CUTLESS RUBBER, or TEFLON* options can also be provided for use as a relief-type lineshaft bearing. The liquid being pumped provides the required lubrication for the lower bushing. An external grease line lubricates the upper bushings when bronze or iron bushings are provided. When other bushing materials are specified, they are water-flush lubricated from either the pump discharge pipe or a secondary city water supply, depending upon the application.

SPOOL (OPTIONAL BEARING)

This bearing can be supplied as an optional bearing for any pump setting. It is intended for use as a rigid pump bearing for unusually rugged pump applications. It retains the lubrication characteristics of the relief bearing previously discussed. The housing can be equipped with different bushing materials (Iron, Bronze, Graphitar, Cutless Rubber, or Glass-Filled Teflon*) depending upon the application. The bearing housing is of rigid "double-wall" metal construction and is flanged at each end. The outer pipe acts as a rigid support while the inner pipe serves as a bushing carrier. This construction allows the bearing housing to be bolted to the support pipe at the upper flange and to the pump casing at the lower flange, thus making this housing a rigid and integral part of the pump support piping system. Undesirable bearing housing deflections under high shaft loads are eliminated by this rigid construction thus providing positive pump shaft guidance. The additional length of this bearing provides increased bearing area for rugged applications. A lubrication line attached to the bearing housing may be connected to the pump discharge pipe or a secondary city water supply, or grease lubricated, depending upon the application. This bearing may be used in conjunction with STANDARD LINESHAFT bearings which are also capable of water flush or grease lubrication.

*E.I. DuPont Registered TM

ENGINEERING DATA

LUBRICATION AND OPTIONAL EQUIPMENT

1. GREASE FITTINGS—STANDARD

Individual forced feed grease lubrication lines are provided to each Standard or Relief Type pump and line bearing.

By providing each bearing with a constant supply of grease the expense and necessity for replacing bearings is held to a minimum. Grease is forced through zerk fittings conveniently located on the baseplate and then through flexible 3/8" O.D. Nylon tubing directly into each bearing.

2. SOLENOID OIL LUBRICATOR

A solenoid valve operated oiler mounted on the lower head allows oil to be released by gravity from a reservoir by a normally closed electric solenoid valve to single or multiple sight feed valves for individual flow to each bearing.

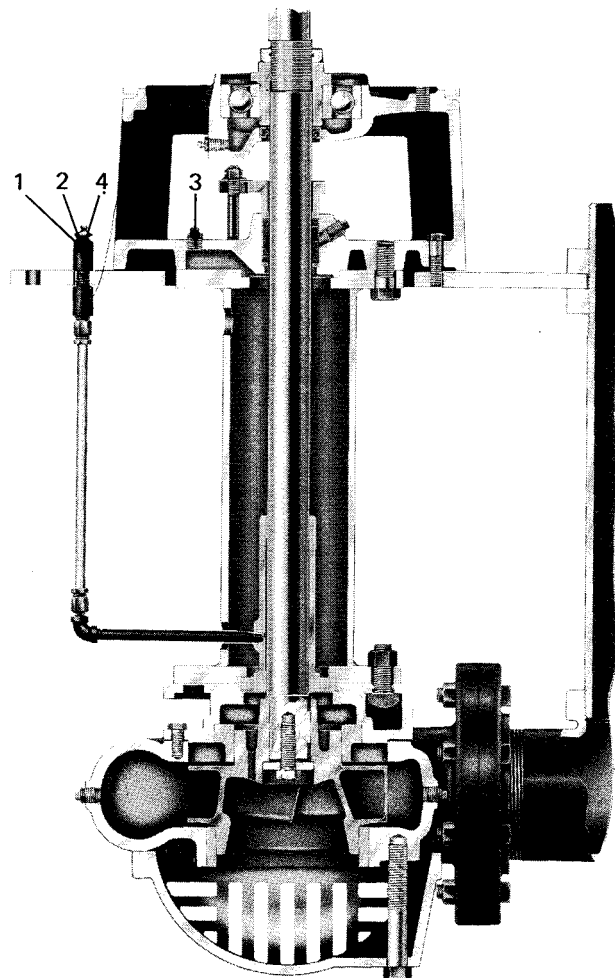
3. DRIP OILER

In lieu of lubrication lines to line bearings a drip oiler is available and mounts in a tap in the lower head.

4. SOLENOID WATER LUBRICATOR

A solenoid operated clear water valve can also be substituted for the zerk fittings. This option automatically provides water lubrication to pump and line shaft bearings while the pump is running.

PUMP AND LINE LUBRICATION BEARING METHODS



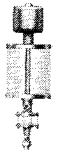
GREASE

1 ZERK FITTINGS



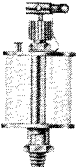
OIL

2 SOLENOID OILER

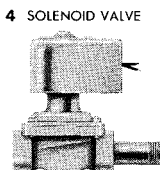


OIL

3 DRIP OILER

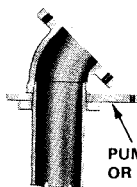


WATER



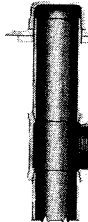
OPTIONAL EQUIPMENT

FLANGED DISCHARGE ELBOW



PUMP PLATE OR BASIN COVER

BELOW SURFACE DISCHARGE



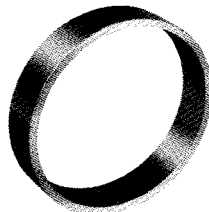
PUMP PLATE OR BASIN COVER

VENT



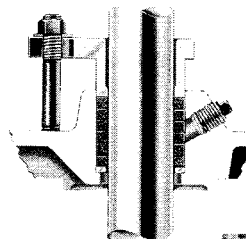
(28" BASEPLATES & LARGER - NOT AVAILABLE ON OVALS)

IMPELLER WEARING RINGS

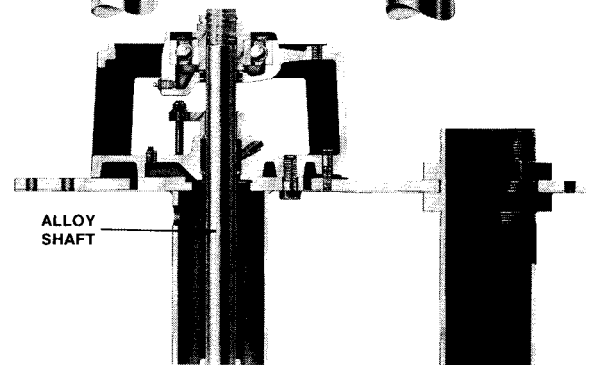
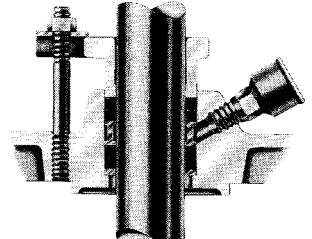


SEMI-OPEN IMPELLER

STANDARD PACKING



LANTERN RING



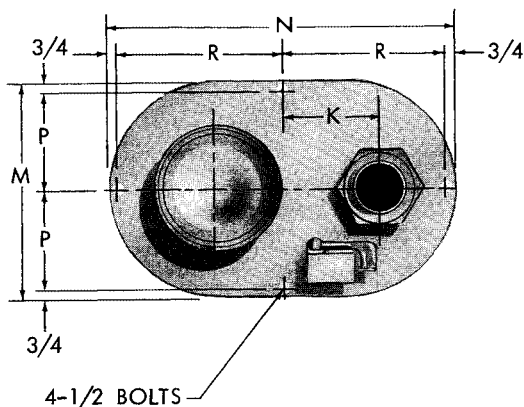
ALLOY SHAFT

AURORA MODEL 531 PUMP ON OVAL PLATE

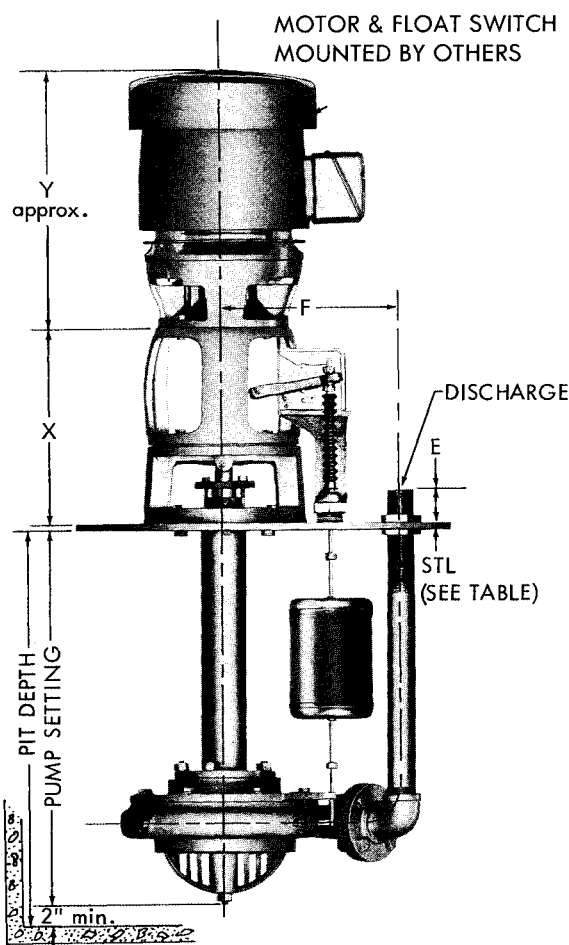
SECTION 530 PAGE 251

DATED OCTOBER 1992

SUPERSEDES PAGE 251
DATED MARCH 1989



PUMP SIZE			E	F	K	OVAL SIZE	THK. STL.
DISCH	SUCTION	CASE BORE					
1 1/4	1 1/2	7	3 1/2	8 3/16	5 1/16	20 X 24	3/8
1 1/4	1 1/2	9	3 1/2	9 15/16	7 1/16	20 X 24	3/8
1 1/2	2	7	3 7/16	8 1/2	6	20 X 24	3/8
1 1/2	2	9	3 7/16	10 1/4	7 3/4	20 X 24	3/8
1 1/2	2	11	4 1/8	13 1/8	7 7/8	22 X 28	1/2
1 1/2	2	12	3 5/16	12 1/16	9 1/16	22 X 28	1/2
2	2 1/2	7	4 1/16	10 5/16	7 13/16	20 X 24	3/8
2	2 1/2	9	4 1/2	12	9	22 X 28	1/2
2	2 1/2	12	3 13/16	13 1/16	10 11/16	22 X 28	1/2
2	3	11	3 15/16	13 1/4	7 3/4	22 X 28	1/2
2 1/2	3	7	4 3/16	11 1/4	8 1/4	22 X 28	1/2
2 1/2	3	9	4 1/16	12 15/16	9 15/16	22 X 28	1/2
2 1/2	3	12	3 15/16	14 1/2	9	22 X 28	1/2
3	4	9	4 5/16	13 1/16	8 5/16	22 X 28	1/2
3	4	11	4 1/4	15 1/2	10	22 X 28	1/2
3	4	12	4 3/16	15 5/16	9 13/16	22 X 28	1/2
4	4	7	4 5/16	13 5/8	8 1/2	22 X 28	1/2
4	5	9A	4 5/16	14 5/8	8 7/8	22 X 28	1/2
4	5	9B	4 5/16	15 1/4	9 3/4	22 X 28	1/2
4	5	11	4 5/16	16 5/8	11 1/8	26 X 36	1/2
5	6	11	5 7/16	16	10 1/2	26 X 36	1/2
6	6	9	5 1/2	14 1/4	8 3/4	22 X 28	1/2



OVAL	M	N	P	R
20 X 24	20	24	9 1/4	11 1/4
22 X 28	22	28	10 1/4	13 1/4
26 X 36	26	36	12 1/4	17 1/4

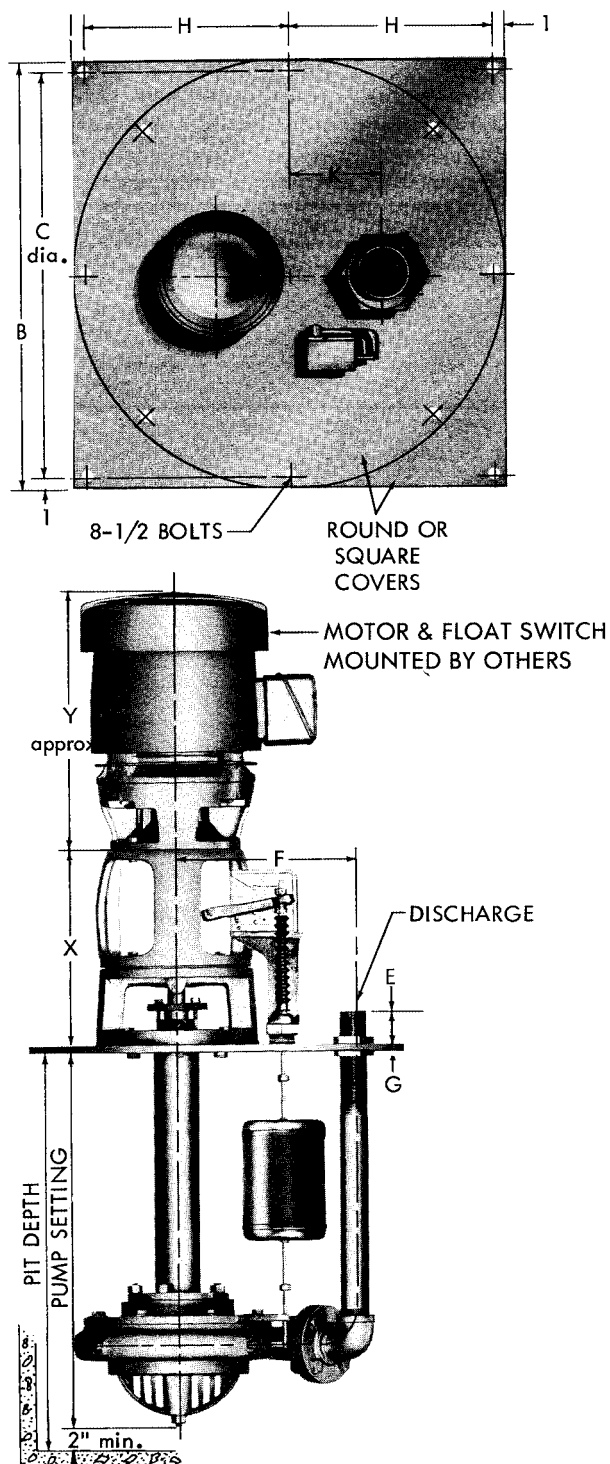
FRAME	X	Y
143HP	13 7/8	11
145HP	13 7/8	12
182HP	13 7/8	13
184HP	13 7/8	14
213HP	13 7/8	16
215HP	13 7/8	17
254HP	13 7/8	19
256HP	13 7/8	21
284HPH	15 5/8	21
286HPH	15 5/8	23
324HP	15 5/8	24

- NOTES: 1. ALL DIMENSIONS IN INCHES.
2. DIMENSIONS MAY VARY $\pm 3/8$.
3. NOT FOR CONSTRUCTION PURPOSES UNLESS CERTIFIED.
4. FLOAT SWITCH FURNISHED ONLY WHEN SPECIFIED.
5. LINE SHAFT BEARING FURNISHED ON 6' 2" PUMP SETTINGS AND LONGER.
6. 22 X 28 OVALS ARE ALSO AVAILABLE WHERE 20 X 24 OVALS ARE SHOWN.

DATED **JUNE 1994****ON SIMPLEX PLATE**

SUPERSEDES PAGE 252

DATED OCTOBER 1992



PUMP SIZE			E	F	K	MIN. COVER SIZE
DISCH	SUCTION	CASE BORE				
1 1/4	1 1/2	7	3 1/2	8 3/16	5 11/16	24
1 1/4	1 1/2	9	3 1/2	9 15/16	7 7/16	24
1 1/2	2	7	3 7/16	8 1/2	6	24
1 1/2	2	9	3 7/16	10 1/4	7 3/4	24
1 1/2	2	11	4 1/8	13 1/8	10 5/8	30
1 1/2	2	12	3 5/16	12 1/16	9 5/16	26
2	2 1/2	7	4 1/16	10 5/16	7 13/16	26
2	2 1/2	9	4 1/2	12	9 1/2	26
2	3	11	3 5/16	13 1/4	10 3/4	30
2	2 1/2	12	3 13/16	13 11/16	11 3/16	30
2 1/2	3	7	4 3/16	11 1/4	8 3/4	26
2 1/2	3	9	4 1/16	12 15/16	10 7/16	28
2 1/2	3	12	3 15/16	14 1/2	12	32
3	4	9	4 5/16	13 13/16	11 5/16	32
3	4	12	4 3/16	15 5/16	10 3/4	32

MAXIMUM PLATE DIAMETER AVAILABLE
WITHOUT OVAL IS 32".

COVER SIZE B	C	H	G
			STEEL
24	22	11	3/8
26	24	12	3/8
28	26	13	3/8
30	28	14	3/8
32	30	15	3/8

FRAME	X	Y
143HP	13 7/8	11
145HP	13 7/8	12
182HP	13 7/8	13
184HP	13 7/8	14
213HP	13 7/8	16
215HP	13 7/8	17
254HP	13 7/8	19
256HP	13 7/8	21
284HPH	15 5/8	21
286HPH	15 5/8	23
324HP	15 5/8	24

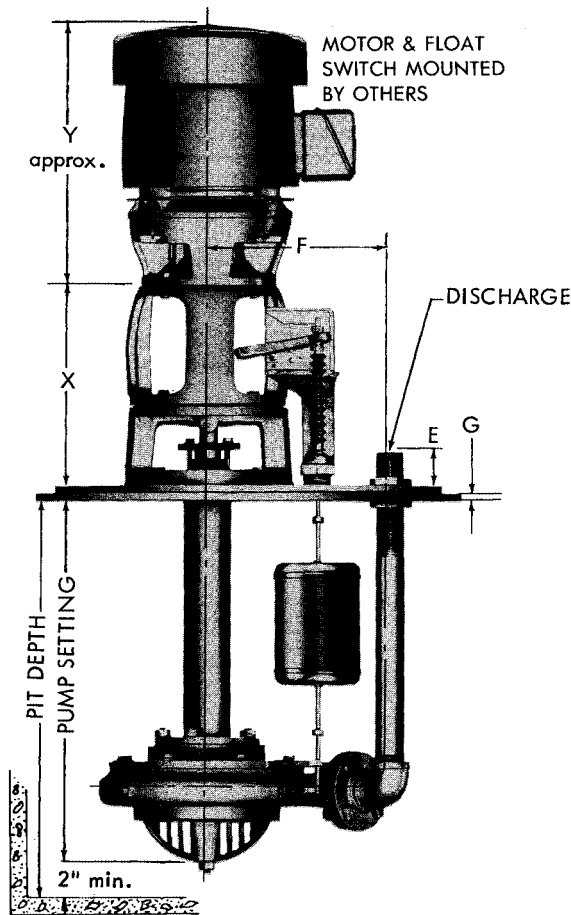
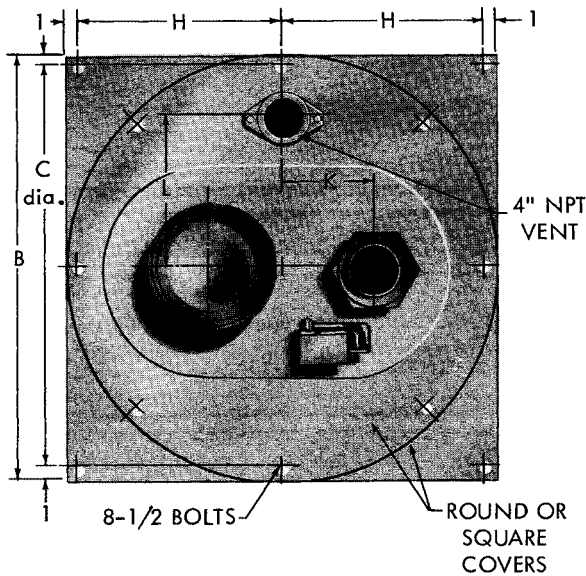
- NOTES: 1. ALL DIMENSIONS IN INCHES.
 2. DIMENSIONS MAY VARY $\pm 3/8$.
 3. NOT FOR CONSTRUCTION PURPOSES UNLESS CERTIFIED.
 4. FLOAT SWITCH FURNISHED ONLY WHEN SPECIFIED.
 5. LINE SHAFT BEARING FURNISHED ON 6' 2" PUMP SETTINGS AND LONGER.

AURORA MODEL 531 PUMP ON SIMPLEX PLATE WITH OVAL

SECTION 530 PAGE 253

DATED OCTOBER 1992

SUPERSEDES PAGE 253
DATED MARCH 1989



- NOTES: 1. ALL DIMENSIONS IN INCHES.
2. DIMENSIONS MAY VARY $\pm 3/8"$.
3. NOT FOR CONSTRUCTION PURPOSES UNLESS CERTIFIED.
4. FLOAT SWITCH FURNISHED ONLY WHEN SPECIFIED.
5. LINE SHAFT BEARING FURNISHED ON 6' 2" PUMP SETTINGS AND LONGER.

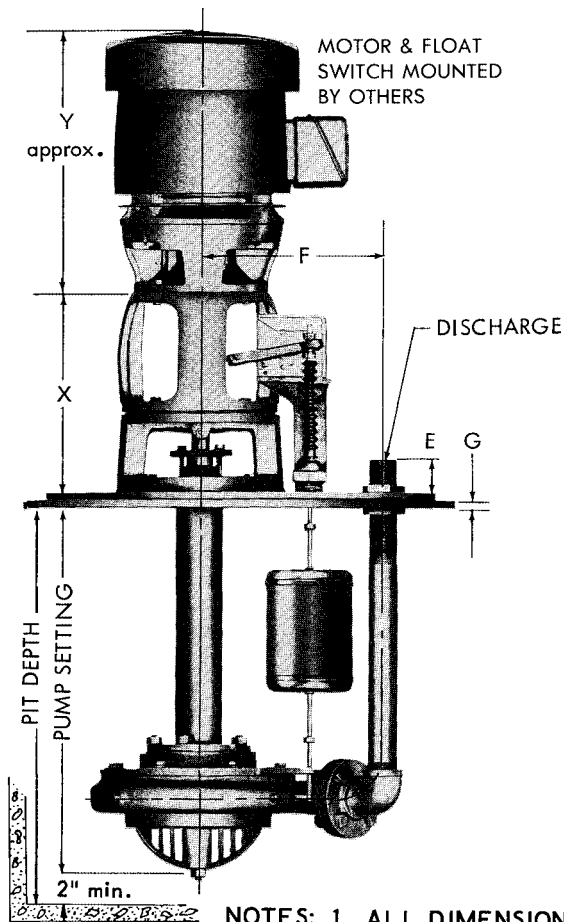
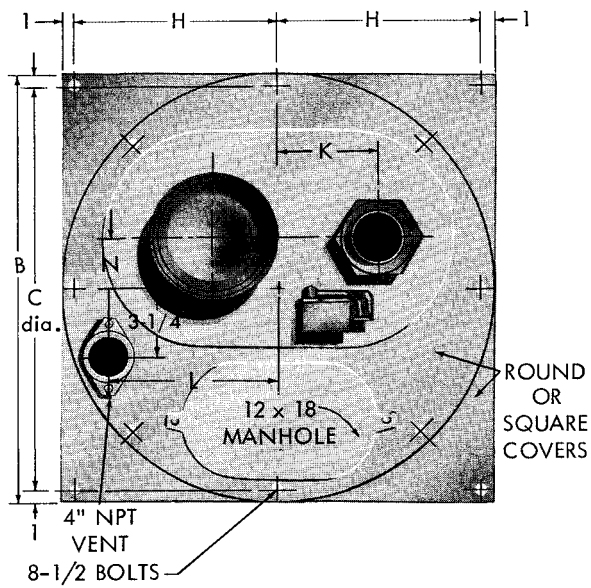
PUMP SIZE			E	F	K	MIN. COVER SIZE	OVAL SIZE
DISCH	SUCTION	CASE BORE					
1 1/4	1 1/2	7	3 1/2	8 3/16	5 11/16	34	H
1 1/4	1 1/2	9	3 1/2	9 15/16	7 1/16	34	H
1 1/2	2	7	3 1/16	8 1/2	6	34	H
1 1/2	2	9	3 1/16	10 1/4	7 3/4	34	H
1 1/2	2	11	4 1/8	13 1/8	7 5/8	36	J
1 1/2	2	12	3 5/16	12 1/16	9 1/16	36	J
2	2 1/2	7	4 1/16	10 5/16	7 13/16	34	H
2	2 1/2	9	4 1/2	12	9	36	J
2	2 1/2	12	3 13/16	13 11/16	10 11/16	36	J
2	3	11	3 15/16	13 1/4	7 3/4	36	J
2 1/2	3	7	4 3/16	11 1/4	8 1/4	36	J
2 1/2	3	9	4 1/16	12 15/16	9 15/16	36	J
2 1/2	3	12	3 15/16	14 1/2	9	36	J
3	4	9	4 3/16	13 13/16	8 5/16	36	J
3	4	11	4 1/4	15 1/2	10	36	J
3	4	12	4 3/16	15 5/16	9 13/16	36	J
4	4	7	4 1/16	13 3/8	8 1/8	36	J
4	5	9A	4 1/16	14 3/8	8 1/8	36	J
4	5	9B	4 1/16	15 1/4	9 3/4	36	J
4	5	11	4 1/16	16 3/8	11 1/8	46	M
5	6	11	5 1/16	16	10 1/2	46	M
6	6	9	5 1/8	14 1/4	8 3/4	36	J

OVAL SIZE	
20 X 24	H
22 X 28	J
26 X 36	M

COVER SIZE B	C	H	G	
			STEEL	L
34	32	16	3/8	12 3/4
36	34	17	3/8	13 3/4
40	38	19	3/8	14 1/2
46	44	22	1/2	16
53	51	25 1/2	1/2	17 3/4
60	58	29	5/8	19 1/2
66	64	32	5/8	21
78	76	38	5/8	24

FRAME	X	Y
143HP	13 7/8	11
145HP	13 7/8	12
182HP	13 7/8	13
184HP	13 7/8	14
213HP	13 7/8	16
215HP	13 7/8	17
254HP	13 7/8	19
256HP	13 7/8	21
284HPH	15 5/8	21
286HPH	15 5/8	23
324HP	15 5/8	24
326HP	15 5/8	25
364HP	15 5/8	29
365HP	15 5/8	30

DATED MAY 1996

SUPERSEDES PAGE 254
DATED OCTOBER 1992**ON SIMPLEX PLATE WITH
OVAL AND MANHOLE**

PUMP SIZE			E	F	K	N	MIN. COVER SIZE	OVAL SIZE
DISCH	SUCTION	CASE BORE						
1 1/4	1 1/2	7	3 1/2	8 3/16	5 11/16	7	40	H
1 1/4	1 1/2	9	3 1/2	9 15/16	7 7/16	7	40	H
1 1/2	2	7	3 1/16	8 1/2	6	7	40	H
1 1/2	2	9	3 1/16	10 1/4	7 3/4	7	40	H
1 1/2	2	11	4 1/8	13 1/8	7 5/8	7	42	J
1 1/2	2	12	3 3/16	12 1/16	9 1/16	7	42	J
2	2 1/2	7	4 1/16	10 5/16	7 13/16	7	40	H
2	2 1/2	9	4 1/2	12	9	7	42	J
2	2 1/2	12	3 13/16	13 11/16	10 11/16	7	42	J
2	3	11	3 5/16	13 1/4	7 3/4	7	42	J
2 1/2	3	7	4 3/16	11 1/4	8 1/4	7	42	J
2 1/2	3	9	4 1/16	12 5/16	9 15/16	7	42	J
2 1/2	3	12	3 15/16	14 1/2	9	7	42	J
3	4	9	4 3/16	13 13/16	8 5/16	7	42	J
3	4	11	4 1/4	15 1/2	10	7	42	J
3	4	12	4 3/16	15 5/16	9 13/16	7	42	J
4	4	7	4 3/16	13 3/8	8 1/8	7	42	J
4	5	9A	4 3/16	14 3/8	8 7/8	7	42	J
4	5	9B	4 3/16	15 1/4	9 3/4	7	42	J
4	5	11	4 3/16	16 3/8	11 1/8	6 1/2	46	M
5	6	11	5 1/16	16	10 1/2	6 1/2	46	M
6	6	9	5 1/8	14 1/4	8 3/4	7	42	J

OVAL SIZE	
20 X 24	H
22 X 28	J
26 X 36	M

COVER SIZE B	C	H	G	
			STEEL	L
40	38	19	3/8	14 1/2
42	40	20	1/2	16
46	44	22	1/2	17
53	51	25 1/2	1/2	18 3/4
60	58	29	5/8	20 1/2
66	64	32	3/8	22
78	76	38	3/8	25

FRAME	X	Y
143HP	13 7/8	11
145HP	13 7/8	12
182HP	13 7/8	13
184HP	13 7/8	14
213HP	13 7/8	16
215HP	13 7/8	17
254HP	13 7/8	19
256HP	13 7/8	21
284HPH	15 5/8	21
286HPH	15 5/8	23
324HP	15 5/8	24
326HP	15 5/8	25
364HP	15 5/8	29
365HP	15 5/8	30

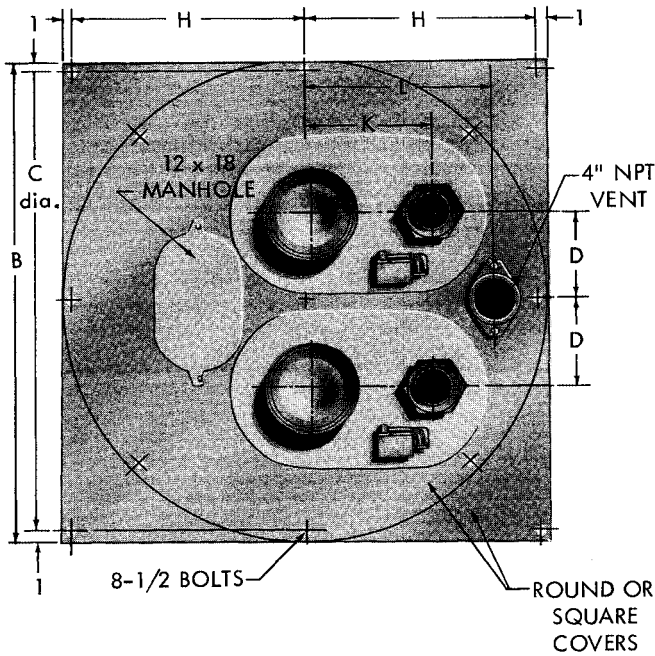
- NOTES: 1. ALL DIMENSIONS IN INCHES.
2. DIMENSIONS MAY VARY $\pm 3/8"$.
3. NOT FOR CONSTRUCTION PURPOSES UNLESS CERTIFIED.
4. FLOAT SWITCH FURNISHED ONLY WHEN SPECIFIED.
5. LINE SHAFT BEARING FURNISHED ON 6' 2" PUMP SETTINGS AND LONGER.

AURORA MODEL 532 PUMP ON DUPLEX PLATE WITH TWO OVALS AND MANHOLE

SECTION 530 PAGE 255

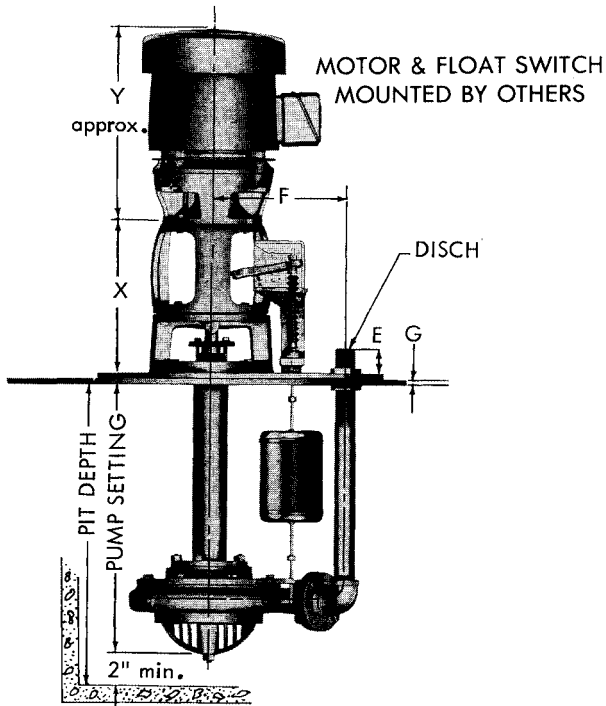
DATED OCTOBER 1992

SUPERSEDES PAGE 255
DATED MARCH 1989



8-1/2 BOLTS

ROUND OR
SQUARE
COVERS



- NOTES: 1. All dimensions in inches.
2. Dimensions may vary $\pm 3/8$ "
3. Not for construction purposes unless certified.
4. Float switch furnished only when specified.
5. Line shaft bearing furnished on 6'2" pump settings and longer.

PUMP SIZE			E	F	K	MIN. COVER SIZE	OVAL SIZE
DISCH	SUCTION	CASE BORE					
1 1/4	1 1/2	7	3 1/2	8 3/16	8 11/16	46	H
1 1/4	1 1/2	9	3 1/2	9 15/16	10 7/16	46	H
1 1/2	2	7	3 1/16	8 1/2	9	46	H
1 1/2	2	9	3 1/16	10 1/4	10 3/4	46	H
1 1/2	2	11	4 1/8	13 3/8	10 3/8	53	J
1 1/2	2	12	3 1/16	12 1/16	11 1/16	53	J
2	2 1/2	7	4 1/16	10 5/16	10 13/16	46	H
2	2 1/2	9	4 1/2	12	11 1/2	53	J
2	2 1/2	12	3 1/16	13 11/16	13 3/16	53	J
2	3	11	3 1/16	13 3/4	10 1/4	53	J
2 1/2	3	7	4 3/16	11 1/4	10 3/4	53	J
2 1/2	3	9	4 1/16	12 15/16	12 1/16	53	J
2 1/2	3	12	3 1/16	14 1/2	11 1/2	53	J
3	4	9	4 5/16	13 13/16	10 13/16	53	J
3	4	11	4 1/4	15 1/2	12 1/2	53	J
3	4	12	4 3/16	15 5/16	12 5/16	53	J
4	4	7	4 3/16	13 3/8	10 3/8	53	J
4	5	9A	4 3/16	14 3/8	11 3/8	53	J
4	5	9B	4 3/16	15 1/4	12 1/4	53	J
4	5	11	4 3/16	16 3/8	11 3/8	64	M
5	6	11	5 1/16	16	10 1/2	64	M
6	6	9	5 1/8	14 1/4	11 1/4	53	J

OVAL SIZE		D
20 X 24	H	10 1/2
22 X 28	J	11 1/2
26 X 36	M	15

COVER SIZE B	C	H	G	
			STEEL	L
46	44	22	1/2	17
53	51	25 1/2	5/8	19
60	58	29	5/8	19
64	62	31	5/8	19
66	64	32	3/4	19
78	76	38	3/4	19

FRAME	X	Y
143HP	13 7/8	11
145HP	13 7/8	12
182HP	13 7/8	13
184HP	13 7/8	14
213HP	13 7/8	16
215HP	13 7/8	17
254HP	13 7/8	19
256HP	13 7/8	21
284HPH	15 5/8	21
286HPH	15 5/8	23
324HP	15 5/8	24
326HP	15 5/8	25
364HP	15 5/8	29
365HP	15 5/8	30



A member of PENTAIR PUMP GROUP

INSTRUCTION MANUAL

INSTALLATION

VERTICAL WET PIT PUMP

2

GENERAL. The life of your Aurora Pump can be extended considerably by carefully following the installation instructions contained herein. Each step of the pump installation instructions plays a vital part in assuring long life, efficient operation and reduced maintenance, from the initial location of the pump through starting directions.

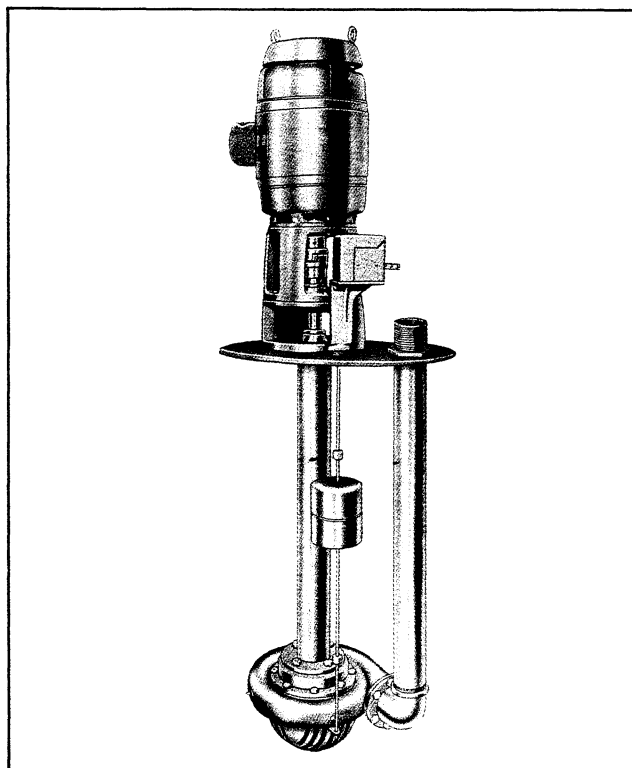


FIGURE 1. TYPICAL SUMP PUMP UNIT

UNPACKING YOUR PUMP. The crates containing your pump should be opened immediately upon receipt from the factory and the pump generally inspected for damage and shortage of parts. Look particularly for such damage as bent lengths of shafting, piping, damaged electrical components, and castings. Particular attention should be given to the discharge and suction nozzle threads or flanges. Any damage or shortage of parts should be reported to the carrier immediately.

CLEANING. If the pump is to be installed immediately, it will be necessary to clean the exposed metal parts thoroughly with white gasoline or other suitable solvent to remove the preservative coating, and to remove the protective covers from all openings. Cleaning of the pump should not be accomplished

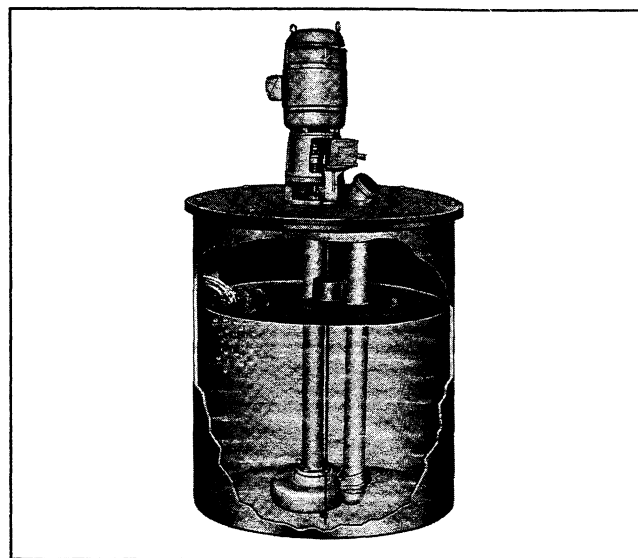


FIGURE 2. TYPICAL SEWAGE EJECTOR
IN A BASIN

until the basin and the outlet connections are completed and ready for the pump.

PLANNING THE PUMP LOCATION. It is important to know that your pump has been manufactured to your specific application, therefore you know where the pump will be located, where the outlet piping will run, and other pertinent data. However, you may have overlooked a factor which may affect your pump's operation, installation, or efficiency.

A hoist capable of lifting the assembled pump should be available to lower the pump into the basin. This will require head room that is at least equal to the depth of the basin plus approximately 3 feet. Considerable time and labor can be saved by preassembling the pump. Also, although the pump can be installed in a flooded pit, it is desirable to empty the basin if at all possible.

Adequate provisions should be made for electrical wiring to the pump motor and other electrical accessories included with your pump. Overload protection should be provided in the pump circuit. Precautions should be taken when the pump is installed to preclude the possibility of moisture entering the conduit or the motor and causing short circuits and grounding.

On applications where an extremely long driveshaft is required, it is advisable to use tie rods or some other means of supporting the pump unit in the basin.

VERTICAL WET PIT PUMP INSTALLATION

OUTLET PIPING. The outlet piping should be short and direct as possible with a minimum of elbows and fittings, to reduce head loss from friction. The outlet piping should be supported as close to the pump as possible, using either pipe hangers or supports. The outlet pipe diameter should be the same as or larger than the discharge pipe diameter. A flanged connection should be provided at the pump discharge pipe to simplify pump removal. An increaser if used, should be installed as close as possible to the discharge pipe. Straight taper increasers are satisfactory in discharge applications.

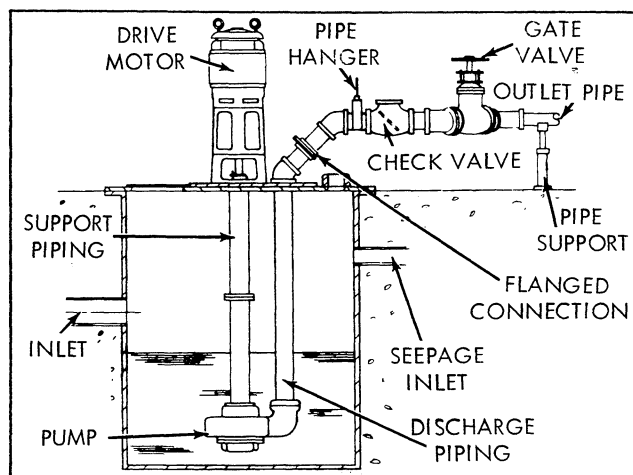


FIGURE 3. TYPICAL OUTLET PIPING

Piping should line up naturally when connected. Forcing pipes into line by using flange bolts can produce strain on the piping and on the shafting of the pump. Flange bolts when used, should be loosely installed, and the pipe alignment checked. When the alignment is satisfactory, tighten the flange bolts alternately until all are firmly secured.

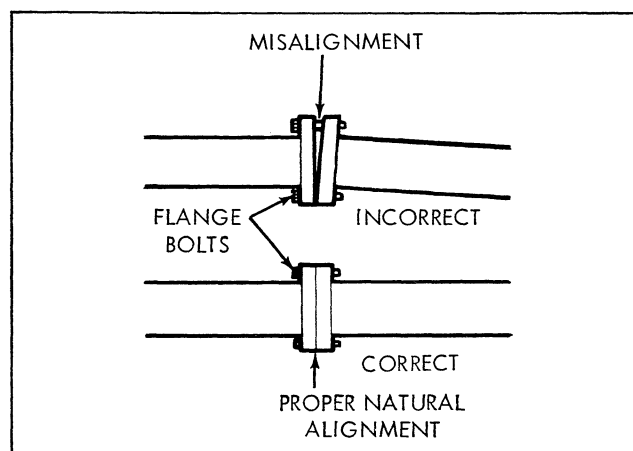


FIGURE 4. PIPE ALIGNMENT

The outlet piping should include a horizontal check valve and a gate valve. The check valve should be located between the gate valve and the pump discharge piping. The check valve protects against a reverse flow of the liquid if the driver fails. The

gate valve provides a means of throttling the pump's discharge. The gate valve should be nearly closed when starting the pump, because a centrifugal pump requires much less power with the gate valve closed than it does with the gate valve open. The gate valve also is closed when the pump is shut down for repairs or inspection.

MOUNTING THE PUMP. There are several methods of mounting vertical pumps to the foundations. The method of mounting that you choose will be based on your specific requirements.

CURB RINGS AND SOLE PLATES. In some applications, it may be desirable to use a curb ring for mounting your pump.

A curb ring can be either rectangular or circular. The curb ring should have sufficient clearance at the inside diameter to allow passage of all sections of the pump located below the support plate.

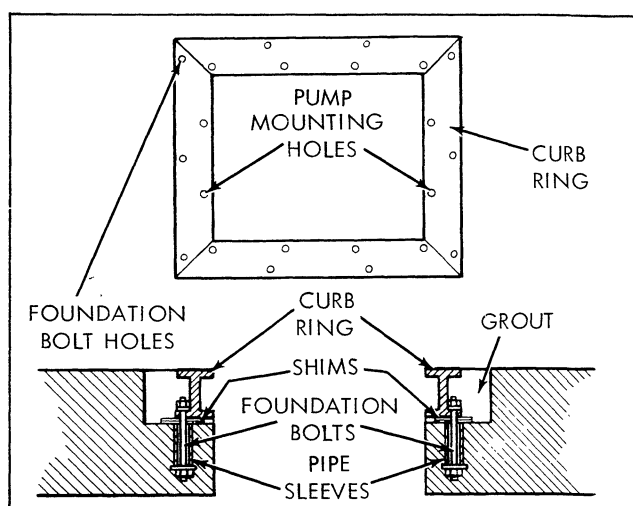


FIGURE 5. INSTALLATION OF RECTANGULAR CURB RING

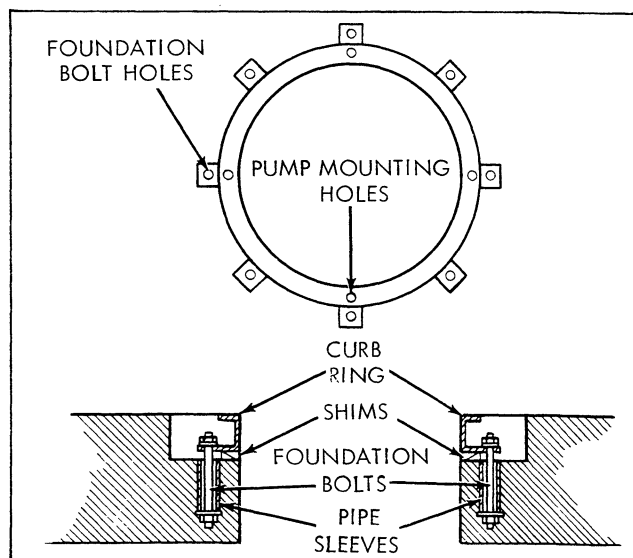


FIGURE 6. INSTALLATION OF CIRCULAR CURB RING

VERTICAL WET PIT PUMP INSTALLATION

FOUNDATION. The foundation for your pump should be heavy enough to withstand any vibration or stress encountered during pump operation.

The mounting bolts or studs for the curb ring should be imbedded in concrete and accurately located per the applicable Aurora dimension sheet. Foundation bolts should be inclosed by a sleeve two to four diameters larger than the bolt to allow movement for proper alignment with the curb ring.

LEVELING THE CURB RING. The curb ring should be set in place and leveled with shims. The mounting face of the curb ring is machined to an even flat surface and can be easily leveled with a spirit level. When the curb ring is leveled the foundation bolts should be tightened, but not too firmly. Waste material should be stuffed into the sleeves around the foundation bolts, to prevent grout from filling the sleeves during grouting.

GROUTING THE INSTALLATION. Grouting the curb ring prevents lateral movement of the ring and improves the vibration absorbing characteristics of the foundation. A wooden dam should be constructed around the sole plate to contain the grout while it is being poured. When a curb ring is to be used above the floor line it is necessary to construct a dam around the outside diameter of the ring to contain the grout. The entire area around the outside diameter of a curb ring should be filled with a non-shrinkable grout. The grout should be puddled frequently to remove any air bubbles from it.

The leveling shims should be grouted in place. Allow time for the grout to set, usually from 42 to 72 hours after pouring, before proceeding with the installation. After the grout has set, the curb ring levelness should again be checked and the foundation bolts firmly tightened down.

BASIN COVERS. Basin covers may be set in concrete either with or without a curb ring or they may be bolted to the top flange of a cast iron or steel basin. The pump may be mounted directly to the basin cover on installations where the cover is not too large. On installations where the basin cover is large, the pump normally is mounted on an oval pump plate which permits removal of the pump from the basin without removing the entire basin cover.

PREPARING TO INSTALL THE PUMP. Your wet pit pump is usually shipped in more than one crate. The pump is shipped completely assembled along with accessory equipment such as float controls, motor controllers and high water alarms in one crate and the pump motor in another. An exception to this is when the length of the pump or the method of transportation makes it necessary to ship in more than two crates.

The pump and motor should be uncrated at this time. All wrapping materials should be checked for small parts that were shipped separately. Adequate support should be provided at intervals along the length of the pump as the crate is removed.

If your installation requires a basin cover, the cover should be lowered on to the basin properly orientated to the outlet connections and securely bolted in place.

INSTALLING THE PUMP. If the pump cannot be lowered into the basin as a complete unit, it is necessary to assemble it by stages. To do this, the liquid end assembly must first be lowered into the basin before the rest of the pump can be assembled. A rope sling should be secured about the pump casing and the liquid end assembly carefully lowered into the basin while guiding the lengths of support piping through the basin cover opening. The liquid end assembly should be lowered far enough to bring the top of the support pipe within a foot or so of the top of the base plate. Additional sections of piping and shafting should be assembled as follows:

a. Slide a line shaft bearing down the pump shaft with the tapped opening toward the upper end, until it seats against the flange of the first section of support piping.

b. Thread a shaft coupling onto the threaded end of one shaft until the shaft is visible through the small hole drilled through the middle of the coupling. Thread the next length of shafting into the coupling.

NOTE

Do not use pipe wrenches on the shafting; it is not necessary to firmly tighten the shafts in their couplings because the torque of the pump motor will tighten them during operations.

c. If the line shaft bearing is to be lubricated through a oil or grease line, locate the bearing as required to align the tapped opening with the lubricant piping. Install a support pipe gasket against the pipe flange, and lower the next section of support piping into place. Align the vent openings with the tapped opening in the line shaft bearing, and bolt the support pipe together. If required, install a 1/8" nipple in the tap opening of the line bearing and connect it to the lubrication piping.

d. If necessary, assemble a discharge pipe coupling onto the threaded end of the previous section of discharge piping and thread the next section of piping into the coupling. Tighten the discharge piping with a pipe wrench. Each subsequent section of shafting support piping and discharge piping should be installed in this manner. As each successive section of piping and shafting is installed, the pump should be lowered by stages into the basin.

e. At the same time that the additional lengths of piping and shafting are being assembled, the additional sections of float control rod should be assembled. This is accomplished by installing successive lengths onto the threaded rod couplings. The lower float stop should be assembled to the rod with the flat side downward at the required distance from the liquid end. The float should be slipped onto the rod, and the upper float stop, flat side up, installed at the required distance from the bottom of the rod.

f. In a like manner, install lubrication piping and pressurization lines as required by your application.

After all of the piping has been assembled, a locknut should be installed on the upper end of the discharge

VERTICAL WET PIT PUMP INSTALLATION

pipe and the pump oval plate lowered into position. Position the gaskets on the support pipe flange, and slide the lower head into place. The lower head should be positioned so that access to the grease fitting will not be obstructed by the discharge, lubrication, or pressurization piping, or the float control. Bolt the lower head to the pump oval plate. Assemble the remaining locknut over the upper end of the discharge pipe. Carefully align and position the discharge pipe and tighten down the locknut on either side of the pump oval plate. It is essential that no strain be placed on either the discharge piping or the pump casing. Therefore it is necessary that alignment of the discharge piping should be done with great care. Any strain on the discharge piping may force the support pipe and shafting out of line and result in overloading the pump motor.

Assemble the float control mechanism to the pump oval plate and align the switch arm with the end of the float rod. Set the upper end lower float rod stops approximately 3/4" above and below the arm.

Assemble one-half of the flexible coupling with its key to the motor driveshaft. There is a clearance between the top of the pump shaft and the end face of the motor driveshaft when the motor is installed. Accordingly, the coupling halves must be secured to the motor shaft above the recess surfaces of the lower coupling half. Place the coupling insert in the lower coupling half on the pump shaft, and lower the motor into place engaging the upper coupling half with the lower half and the coupling insert. Locate the motor as required for the most convenient connections of the electrical leads and bolt it in place. Adjust the lower coupling half until the ends of the dogs in the lower half are approximately 1/8" from the recessed surface of the upper half.

The pump motor, upper head, and lower head have register fits which combined with accurate location of the pump base plate, make it unnecessary to align the flexible coupling at installation of the pump.

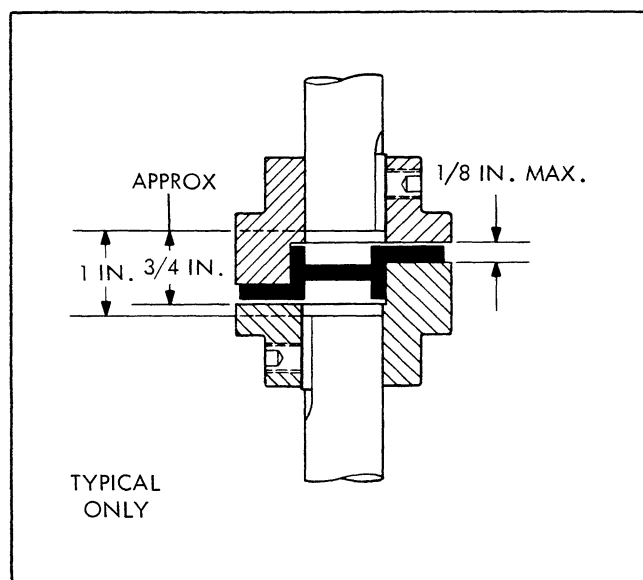


FIGURE 7. INSTALLING FLEXIBLE COUPLING

Connect the outlet piping to the pump discharge piping. For above ground discharge, two 45° elbows and flange connection are satisfactory. Check the outlet piping to make sure it is properly supported and lines up correctly before connecting it to the discharge of the pump. Misalignment of the piping can impose unnecessary loads on the discharge elbow and can cause distortion and strain of the support piping and shafting of the pump which can result in vibration, uneven bearing wear, or damage to the pump.

Connect the electrical wiring to the pump motor, the motor controller, float control and any other electrical accessories that were provided with your pump. Wiring instruction provided with the components should be followed exactly.

Connect flushing or pressurization water lines if required. Connect any vent piping to the basin cover.

Refer to the applicable maintenance manual for lubrication of liquid end bearings, head bearings, and intermediate shaft bearings.

PRESTARTING INSTRUCTION. Close the gate valve in the outlet piping. Rotate the pump shaft by hand to see that it turns freely without binding. Fill the basin to a depth at least sufficient to raise the float off the lower float stop and to cover the pump casing. Activate the float control arm and, as the pump motor starts, check the direction of rotation. The correct rotation is shown by the arrow on the lower head. As the pump motor approaches full speed open the outlet piping gate valve slowly.

Measure the effective discharge head by inserting a pressure gauge in any convenient place in the discharge head piping near the pump discharge outlet. The pounds per square inch (P.S.I.) reading can be converted to feet or head by multiplying by 2.31 and adding the height of the gauge above the basin liquid level as measured in feet. The result should be within 10% of the name plate head feet reading. Any wide variation from the head feet reading, can cause early failure of pump bearings, and should be corrected immediately. Refer to the applicable trouble shooting chart for your pump.

After several minutes of operation, the pump should be operating a quiet, vibrationless speed and neither the head bearing nor the motor casing should be exceedingly warm to the touch.

Shut down the pump and make sure that all bolts securing the pump, the pump oval plate and the basin cover are firmly tightened down.



INSTRUCTION MANUAL

INSTALLATION

CAST IRON & FIBERGLASS SUMP BASINS

2

Cast iron and fiberglass sump basins are installed in a similar manner except more care should be taken in providing a suitable anchorage for fiberglass basins.

The following chart illustrates the volumes of concrete to be placed with the various size fiberglass sumps available from Aurora Pump. This chart is

intended to aid you in providing suitable concrete anchoring to prevent floatation in wet soil.

With cast iron sump basins, floatation is usually not as critical as with fiberglass and the specific installation procedures outlined in many city building codes should be followed; consequently these instructions should be used to supplement the existing code in your area.

VOLUME OF CONCRETE REQ'D IN CUBIC FEET										
DIAMETER OF SUMP BASIN	FIBERGLASS BASINS ONLY									
	DEPTH									
	3'	4'	5'	6'	7'	8'	9'	10'	11'	12'
24"	4	6	7	8	10	11	13	14	16	17
30"	6	8	10	12	14	16	18	20	22	24
36"	9	12	15	17	20	23	26	29	32	35
42"	12	16	20	24	28	32	36	40	44	48
48"	17	22	28	34	39	45	50	56	61	67
60"	23	31	39	47	55	63	71	79	87	95
72"	30	41	52	63	74	85	96	107	118	129

Based on approx. 150 lb. per cu. ft. avg. wt. of concrete

NOTE: 27 cu. ft. — One yard concrete.

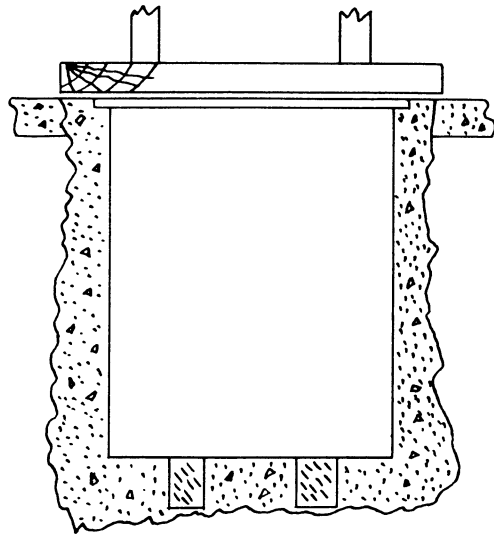
SUMP BASIN INSTALLATION

TYPICAL METHOD NO. 1

Set and shim basin to finish floor elevation.

Provide timber support to hold basin in position until concrete sets. Pour minimum amount of concrete required for anchor or completely encase basin in concrete.

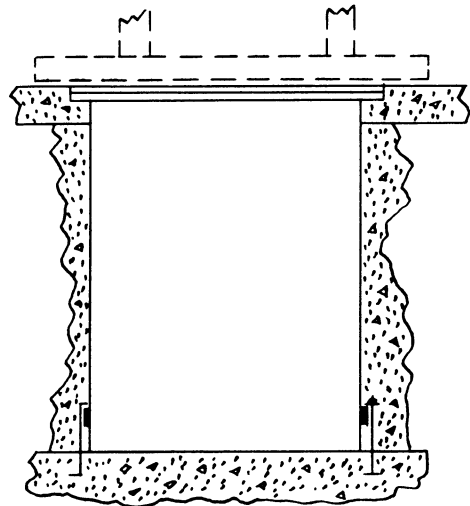
Sufficient weight for fiberglass basins can be provided by filling or partially filling the basin with water or concrete blocks, soil pipe, etc. and then pouring the concrete in two or more steps. Allow the first pour to set thereby anchoring the basin adequately for the second concrete pour or further encasement.



TYPICAL METHOD NO. 2

Pour concrete pad in bottom of hole slightly deeper than overall height of tank.

Allow for coverplate if same is to be flush with finish floor and also allow for thickness of sump bottom. Shim basin to suit after concrete pad has set and pour remainder of required concrete anchor.



NOTE: Some larger size fiberglass basins are equipped with anchoring ridges near the bottom. Reinforcing rods or threaded bolts and washers may be used to help prevent floatation until the second concrete pour has set.



A member of PENTAIR PUMP GROUP

INSTRUCTION MANUAL

REPAIR

MODEL 531-532

6

SERVICE

Your Aurora pump requires no maintenance other than periodic inspection, occasional cleaning and lubrication. The intent of inspection is to prevent breakdown, thus obtaining optimum service life. The pumped liquid determines the type of pump and line bearings supplied and method of bearing lubrication. Refer to lubrication section for specific instruction. The motor may also require lubrication, in which case the motor manufacturer's recommendation should be followed.

LUBRICATION (BALL BEARINGS)

Regreasable bearings will require periodic lubrication and can be accomplished by using the zerk or lubrication fittings in the lower head assembly. Lubricate the bearings at regular intervals using a grease of high quality. Lithium, lithium soda or calcium base grease is recommended as lubricants for pumps operating in both wet and dry locations. Mixing of different brands of grease should be avoided due to possible chemical reactions between the brands which could damage the bearing. Accordingly, avoid grease of vegetable or animal base which can develop acids, as well as grease containing rosin, graphite, talc and other impurities. Under no circumstances should grease be reused.

Over lubrication should be avoided as it may result in overheating and possible bearing failure. Under normal application, adequate lubrication is assured if the amount of grease is maintained at 1/3 to 1/2 the capacity of the bearing and adjacent space surrounding it.

In dry locations each bearing will need lubrication at least every 4,000 hours of running time or every 6 to 12 months, whichever is more frequent. In wet locations the bearings should be lubricated at least after every 2,000 hours of running time or every 4 to 6 months, whichever is more frequent. A unit is considered to be installed in a wet location if the head assembly and motor are exposed to dripping water, to the weather, or to heavy condensation such as is found in unheated and poorly ventilated underground locations.

At times it may be necessary to clean the bearings due to accumulated dirt or deteriorated lubricants. This can be accomplished by flushing the bearing with a light oil heated to 180 to 200° F. while rotating it on a spindle. Wipe the bearing housing with a clean rag soaked in a cleaning solvent, and flush all surfaces.

Dry bearing thoroughly before relubricating. Compressed air can be used to speed drying, but care should be taken not to let bearings rotate while being dried.

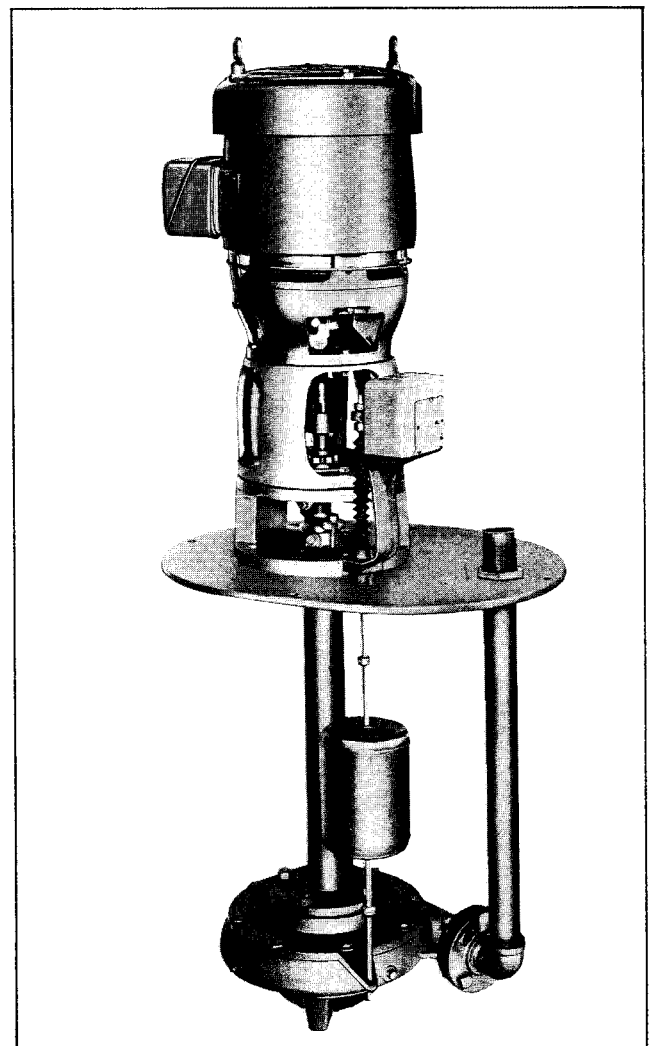
CAUTION

Use normal fire caution procedures when using any petroleum cleaner.

LUBRICATION (LINE SHAFT & PUMP BEARINGS)

Grease lubricated sleeve bearings (standard and relief type) will require frequent lubrication which can be accomplished by using the zerk fitting(s) located on the pump base. It is suggested that relubrication intervals be every 20 hours of running time.

Graphitar, cutless rubber and teflon bearings are lubricated with a water flush. The required number of lube line connections are provided on the pump base.



A. Complete unit assembly.

REPAIRS

The pump may be disassembled using the illustrations and text provided. Although complete disassembly is covered, it will seldom be necessary to completely disassemble your Aurora pump.

The illustrations accompanying the disassembly instructions show the pump at various stages of disassembly. The illustrations are intended to aid in the correct identification of the parts mentioned in the text.

Inspect removed parts at disassembly to determine their reusability. Pump or line shaft bearings that are scored or noticeably out of round should not be reassembled. Cracked castings should never be reused and scored or worn pump shafts should be replaced.

All packings and gaskets should be replaced with new ones at reassembly simply as a matter of economy. They are much less expensive to replace routinely than to replace singly as the need arises. In general, it is economical to return to the manufacturer for repair only the motor and motor controller.

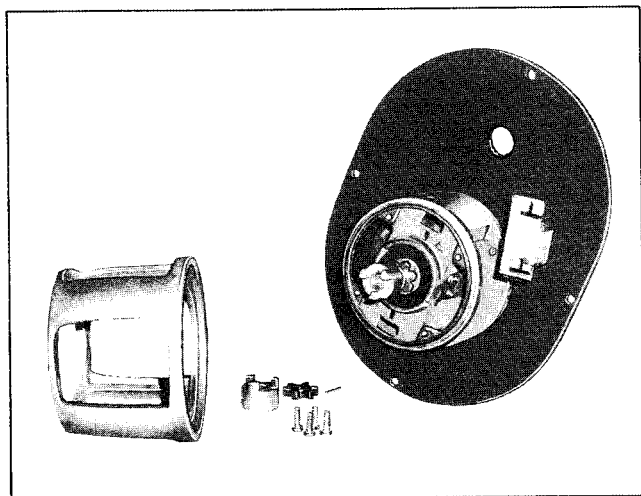
DISASSEMBLY

Disassemble only what is needed to make repairs or accomplish inspection. Proceed to disassemble the pump as follows: (Refer to figure 1.)

1. Disconnect wiring from motor control panel to motor and float switch. Take any other steps needed to prevent drive unit from being unintentionally energized during disassembly.

2. Remove the float switch. For instructions, refer to the repair notes on float switches.

3. Pump motor (52) and upper head (53) are best removed as a unit. The upper head serves to protect the motor output shaft from accidental damage. Therefore, remove capscrews (42) and lift the unit free from lower head (84) and lower half of coupling



B. Upper head, coupling half, key and insert removed.

(48). If necessary, upper head (53) may be removed from motor (52) by unthreading capscrews (51) and removing nuts (50).

4. Coupling half (48) is removed by loosening setscrew (47). Similarly, setscrew (44) will free upper coupling half (45). Remove coupling keys (46 and 49) and insert (43).

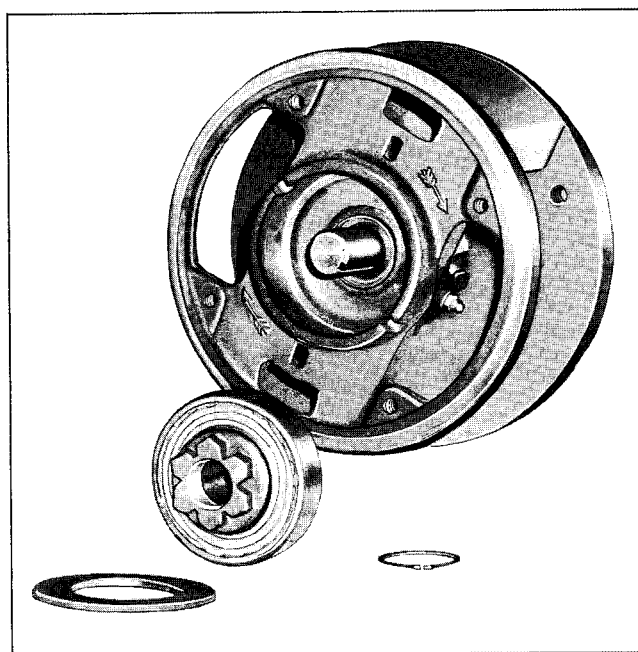
5. Remove remaining pump and connected parts from basin to continue disassembly.

NOTE

However, if ventilation piping is used, remove it before lifting off plate.

6. Locknut (55) can be unthreaded, exposing slinger (54) for removal. Then bearing collar (56) with ball bearing (58) is unthreaded from pump shaft. Retaining ring (57) must be removed from collar (56) with a pair of Truarc pliers, if bearing (58) is to be pressed off collar (56).

7. Remove grease seal (59) if necessary.

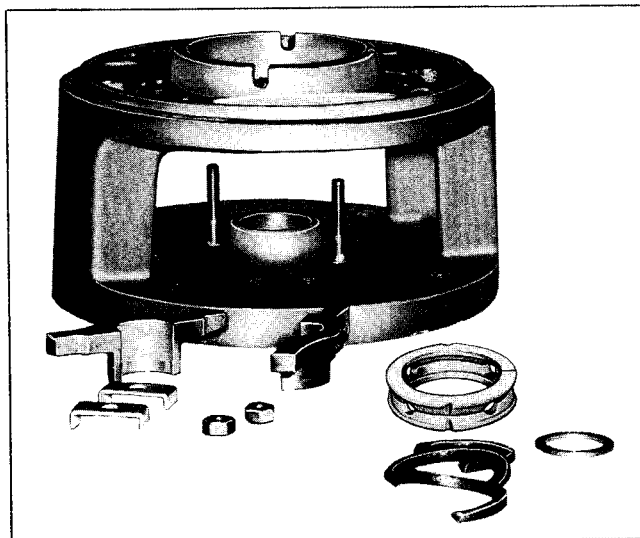


C. Slinger, bearing collar, bearing and retaining ring removed.

NOTE

Grease seal (59) should not be removed except for replacement because its case is easily damaged. When removal is necessary, it can be tapped out of its seat in the lower head with coupling key (49) used as a driving tool.

8. Remove nuts (66) and clamps (67) from studs (69) and slide gland (68) off shaft (61). Remove packing (70), lantern ring (72) and packing ring (71).



D. Nuts, clamps, gland halves, packing, lantern ring and packing ring removed from lower head.

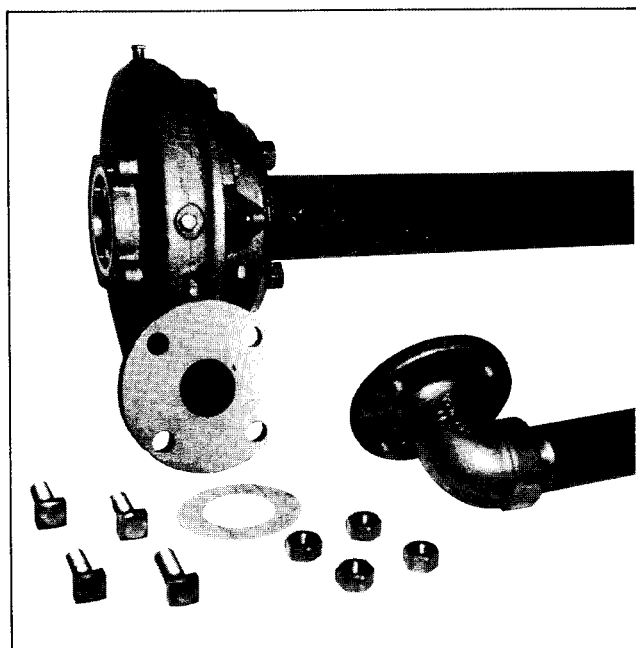
NOTE

This stuffing box arrangement is standard.

9. Remove oiler (73) if used and pipe plug (63). Also disconnect any lubrication line used to lubricate line shaft bearings or piping for pressurized support column water supply.

10. Unscrew cap screws (80 and 81) to remove lower head (84). Remove gasket (85).

11. Remove upper locknut (77) from discharge piping (78). Then plate can be lifted off.

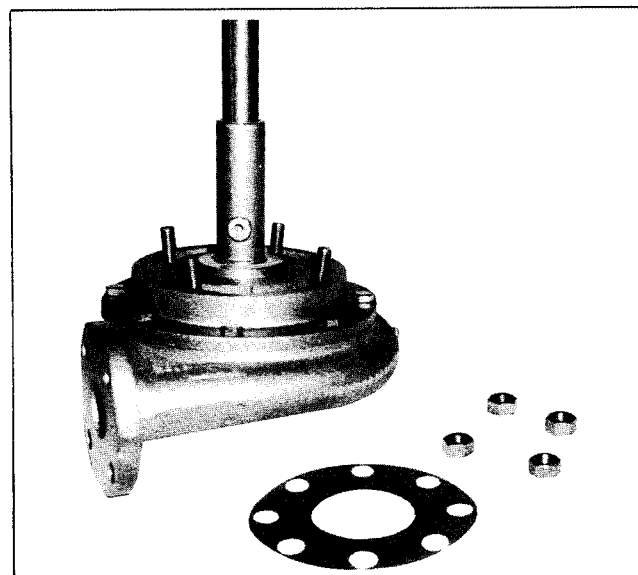


E. Nuts, cap screws and gasket removed to free discharge piping.

Remove gasket (23). Remove screws (83) and nameplate (82) only if replacement is necessary.

12. Successive lengths of piping and shafting are disassembled as follows:

- a. If a line shaft bearing is lubricated through a lubrication line, detach the line and elbow from pipe nipple in upper support section and then remove nipple.
- b. Unscrew cap screws (39) and nuts (38) to lift top support pipe section and expose shaft coupling (60). Use a wrench to hold shaft (61) and a second wrench to unscrew coupling (60). Remove gasket (23).
- c. Remove pipe plug (25) if used, then slide line shaft bearing (41) off shaft.
- d. For additional lengths of discharge pipe (78) use a large pipe wrench to hold discharge pipe and a second wrench to unscrew coupling (79).



F. Nuts, support piping and gasket removed from cover.

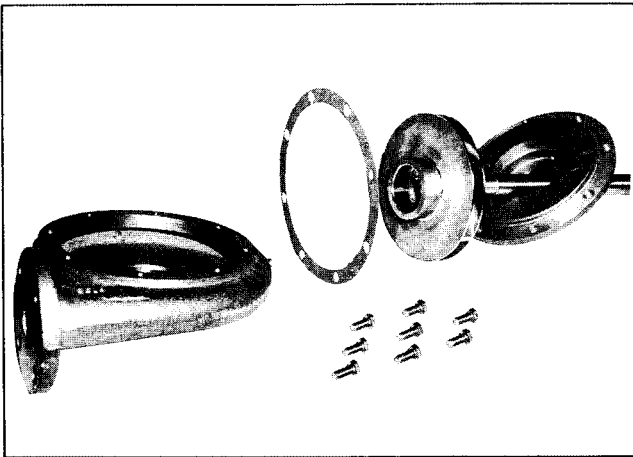
CAUTION

To protect a bearing that can be reused, tape the threaded section of the shaft end before removing bearing.

13. Discharge piping (78) and flanged elbow (76) can be removed from casing (8) by unthreading cap screws (5) and nuts (6). Remove gasket (9).

14. To lift off remaining support piping (40) unscrew nuts (20). Then remove gasket (23) and slide bolts (21) out.

15. Unthread cap screws (7) to remove cover (22) and gasket (10) exposing impeller.



G. Capscrews, cover, casing and gasket removed to reveal impeller.

16. Lift remaining shafting (61), impeller (15) and pump bearing (26) from casing (8). Remove pipe plug (25) from bearing (26), then slide bearing off end of the shaft, using the afore mentioned caution.

17. Unscrew impeller capscrew (13), remove gasket (14), impeller (15) and impeller key (16).

18. Case rings (11 and 24) are pressed into their housings with an interference fit and must be removed with a puller. New ring(s) should be used for reassembly since it is likely that during removal this fit will be lost.

19. Impeller wearing rings (optional - (18 and 19)) are pressed on and must be cut off if replacement is necessary. If they are turned off in a lathe, take care not to cut into the impeller.

20. To remove strainer (3) unscrew capscrews (1) and washers (2). For smaller size pumps unscrew strainer (3) and nipple (4) from casing (8).

REASSEMBLY

Reassembly will generally be in reverse order of disassembly. If disassembly was not complete, use only those steps related to your particular repair program.

1. Slide pump bearing (26) onto pump end of shafting (61) using the last caution mentioned in disassembly with the flanged end of bearing toward the bottom end of shaft. If bearing is not to be lubricated through a lubrication line, place pipe plug (25) in tapped hole in bearing.

2. Slide pump shaft (61) into pump end of support piping (40). Position pump bearing against pump flange of support piping. If bearing is to be lubricated through a lubrication line, align tapped opening in the bearing with vent opening in the support pipe, and install an 1/8 inch pipe nipple to maintain the alignment.

3. Press case rings (11 and 24) in casing (8) and cover (22). Rings should not be hammered into

place. Use a press, or clamp the parts in a bench vise, using wooden blocks to protect the rings. It may be necessary to pin or dowel the rings after assembly if the insert or casing has had rings replaced before, since each reassembly can stretch or tear metal and thereby loosen the fits. If the facilities are available, it is good practice to take a very light finish cut or to ream the inside diameter of the casing rings after pressing to restore roundness. When rings are pressed, they may get squeezed out of shape.

4. Replace wear ring(s) (optional - (18 and 19)) on impeller, using the same care as for the case wear ring(s). If the rings are to be trued on a lathe, do not clamp the impeller so tightly that it is permanently distorted.

5. Slide cover (22) onto shaft (61). Place impeller key (16) in shaft and replace impeller (15) on shaft. Secure impeller with impeller capscrew (13) and gasket (14).

6. Position gasket (10) on cover (22) and bolt to casing (8) with capscrews (7).

7. Place bolts (21) in slot in cover (22) and hold them in place with gasket (23). With discharge outlet aligned with vent opening in support pipe, bolt cover to flanged support pipe (40) with nuts (20).

8. Bolt discharge flanged elbow (76), with gasket (9) in place, to casing with capscrews (5) and nuts (6). Lengths of discharge pipe (78) may now be replaced in flanged elbow (76).

NOTE

If pump bearing is to be lubricated through a lubrication line, assemble the required elbow and tubing on previously installed nipple. If support column is to be pressurized with a flow of fresh water, connect the required 3/4 inch pipe nipple, elbow and pipe to support piping, and ascertain that other vent openings are plugged.

9. Successive lengths of piping and shafting are assembled as follows: (Pumps designed for pump settings* deeper than 6 feet, 2 inches are provided with multiple part discharge and support piping and with line shaft bearings at each support piping joint.)

- a. Slide a line shaft bearing (41) down pump shaft, with tapped opening toward upper end until it seats against the flange of the previously assembled section of support piping (40).
- b. To add successive lengths of pump shafting, thread shaft coupling (60) onto threaded end of one shaft (61). Start second piece of shafting into opposite end of coupling. Tighten both shafts evenly into coupling with pipe wrenches being careful not to score shafting excessively. There should be an even amount of shaft threads showing on either side of the coupling after tightening.

c. If line shaft bearing is to be lubricated through a lubrication line, turn bearing as required to align tapped opening with lubricant piping. Position support pipe gasket (23) against support pipe flange, and lower the next section of support piping into place. Turn it to align vent opening with tapped opening in line shaft bearing, and secure it by installing bolts (39) and nuts (38). Install any 1/8 inch pipe nipple in tapped opening of line bearing if required, and connect it to previously assembled lubrication piping.

d. If necessary, screw a discharge pipe coupling (79) onto threaded end of previously assembled section of discharge piping, and thread the next section of piping into coupling. Tighten with a pipe wrench, using a second wrench to hold the previously assembled section.

"Pump Setting" is the distance from bottom of strainer (3) to bottom of lower head (84). This measurement is normally 4 inches less than "Pit Depth," the distance from bottom of basin to top face of basin.

10. Place locknut (77) on discharge pipe (78) and thread down approximately 1 inch.

11. Lower pump support plate over support piping (40) and discharge piping (78). Position gasket (23) on support pipe flange, gasket (85) on lower head and slide lower head (84) into place.

NOTE

Install float control at this time if liquid end is not accessible when ejector is lowered into basin.

12. Lift pump support plate into position against lower head (84) and install capscrews (80 and 81). Place locknut (77) on discharge pipe (78) and tighten locknuts above and below the plate to secure discharge piping in place. Replace strainer (3) with either washers (2) and capscrews (1) or nipple (4). If pipe plugs (12) were removed, replace in casing (8). Pump support plate and pump assembly may now be lowered into place on basin cover and can be bolted down.

13. Install pump shaft packing ring (71)* around shaft in lower head. Assemble packing gland halves (68) on gland studs (69) and secure with gland clamps (67) and nuts (66). Do not tighten nuts more than finger tight unless pump support piping is to be pressurized with fresh water.

14. Seat grease seal (59) with sealing edge upward in its seat in lower head.

NOTE

Cover threads of pump shaft temporarily with a tape or some other means before sliding on grease seal to prevent threads from damaging seal.

*One ring of packing (70), lantern ring (72) and two more rings of packing (70).

15. Press ball bearing (58) onto bearing collar (56) with ball bearing seal facing flange on collar, and secure bearing on collar by installing retaining ring (57).

16. Thread bearing collar onto pump shaft with bearing surface downward. Turn collar clockwise until bearing seats in lower head, then turn it an additional one-half turn. This will raise shaft and impeller approximately 1/64 inch off suction cover, providing the correct clearance for efficient pump operation.

17. Hold bearing collar (56) and install locknut (55) against collar. Ascertain that pump shaft turns freely by hand. Press rubber slinger (54) into place on bearing collar.

NOTE

Connect pressurization or lubrication piping at this time by using opening provided in pump support plate. For pressurization piping, a 3/4 inch line to water supply is connected to tapped opening in lower head. For lubrication piping, line is connected to lubrication device. If no lubrication line is required and there are line shaft bearings, install oiler (73) and pipe plug (63) in openings provided in lower head.

18. Install coupling half (48) and key (49) on upper end of pump shaft, and tighten coupling setscrew (47) temporarily to prevent its slipping down shaft.

19. Position coupling insert (43) in lower half of coupling and secure upper coupling half (45) with its key (46) on motor output shaft. Align bottom end of key with key slot in the end surface of motor shaft, and secure by tightening setscrew (44).

20. If upper head (53) was removed from motor (52) replace with capscrews (51) and nuts (50). Lower motor (52) and upper head (53) carefully into position on lower head while engaging coupling halves with coupling insert. Bolt assembly to lower head with capscrews (42).

21. Loosen setscrew (47) in lower coupling half (48) and slide coupling half and key (49) upward until they engage coupling insert (43) with proper clearance as shown in Section 2, Item 4 of this Instruction Manual.

22. If nameplate (82) was removed replace at this time with screws (83).

NOTE

Install float switch at this time. For instructions refer to the repair notes on float switches.

23. Connect wiring from motor control panel to motor and float switch, following exactly the instructions provided by their respective manufacturers. Also connect solenoid valve or oiler at this time if used, using diagrams provided. All wiring must comply with applicable electrical code requirements for type of duty pump is to perform.

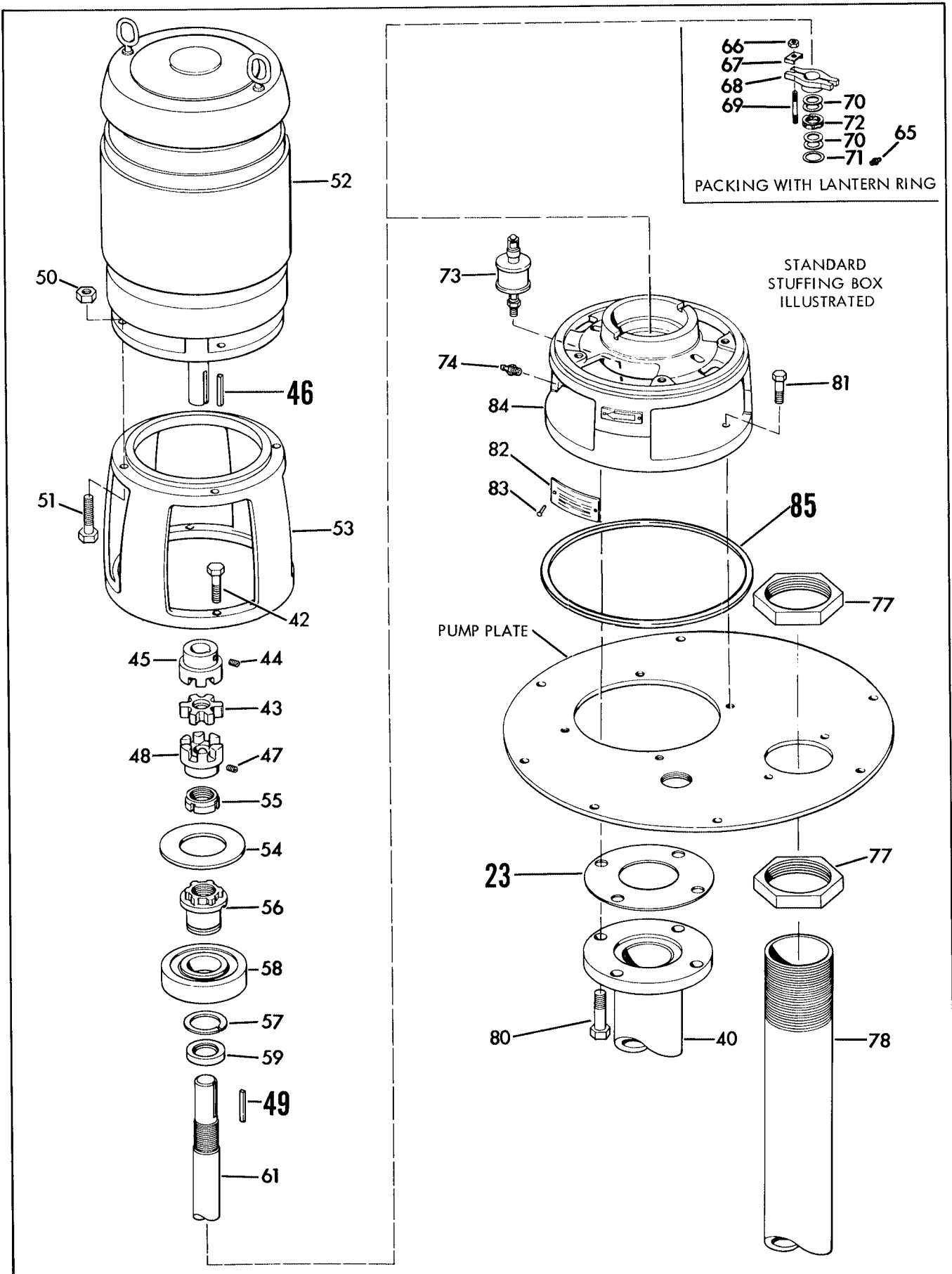
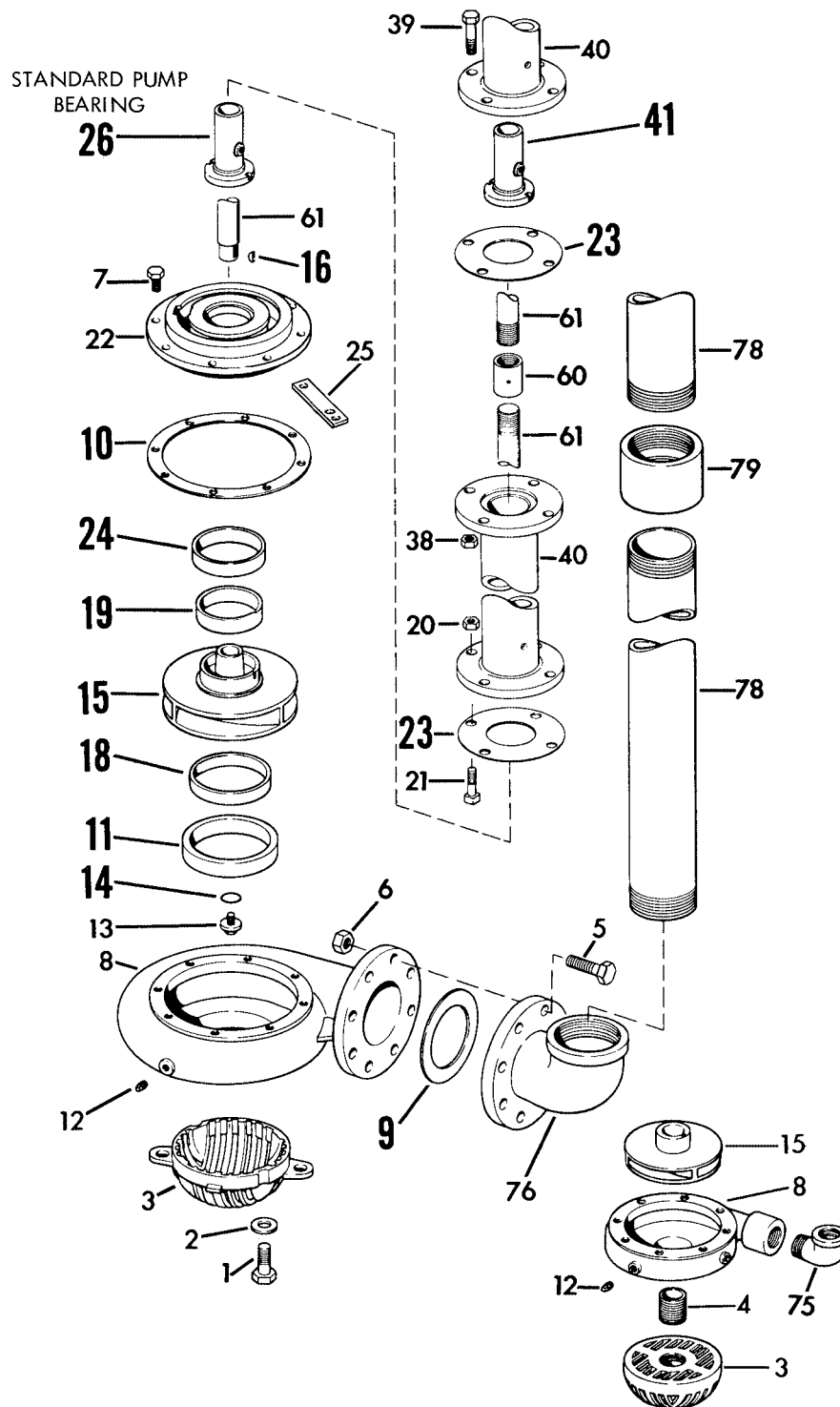


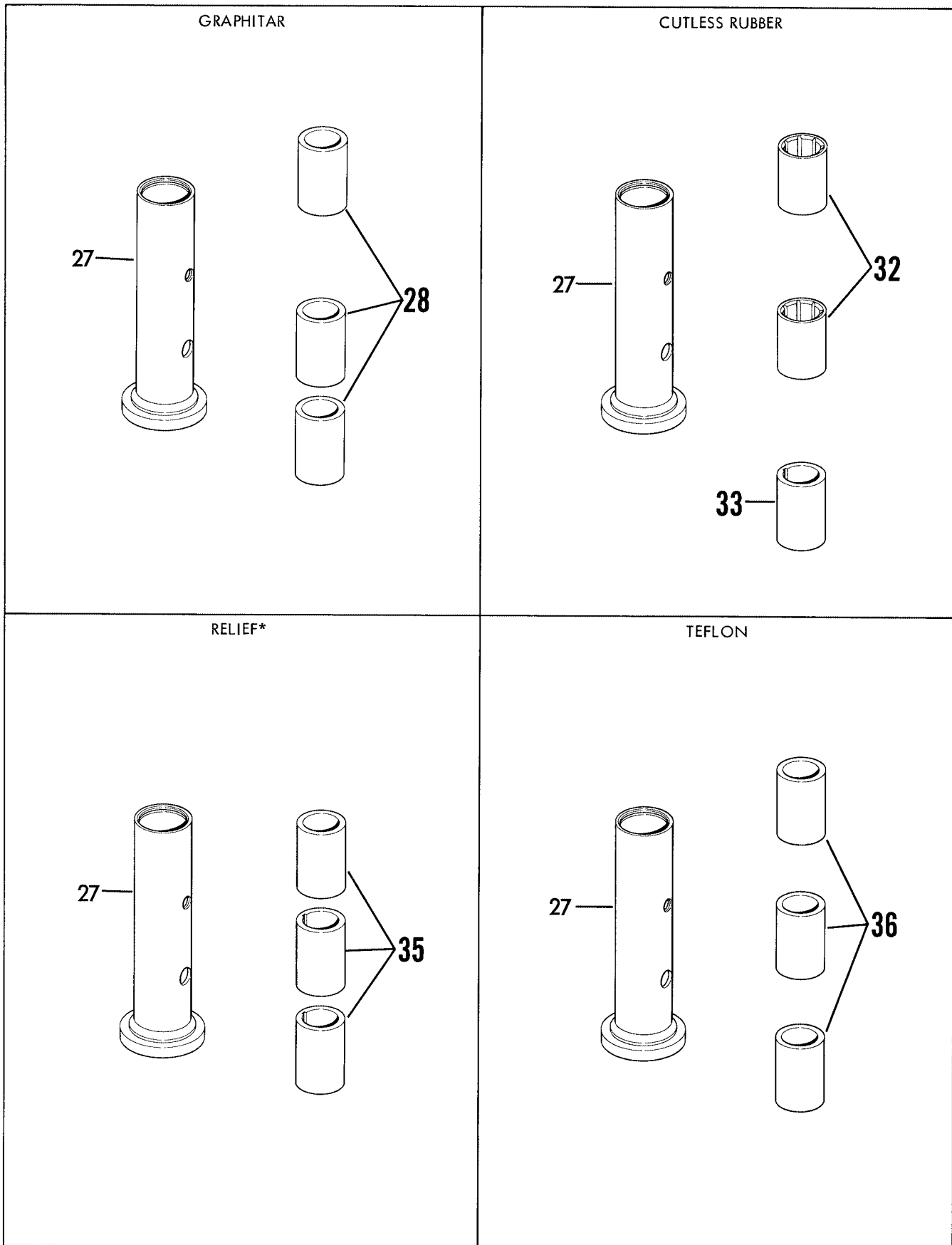
Figure 1. Model 531-532 Exploded View (Sheet 1 of 4)



NOTE: Recommended spare parts shown in bold face type.

Figure 1. Model 531-532 Exploded View (Sheet 2 of 4)

MODEL 531-532
OPTIONAL RELIEF HOUSING



*Standard for pump settings over 10 feet.

Figure 1. Model 531-532 Exploded View (Sheet 3 of 4)

MODEL 531-532
OPTIONAL SPOOL HOUSING

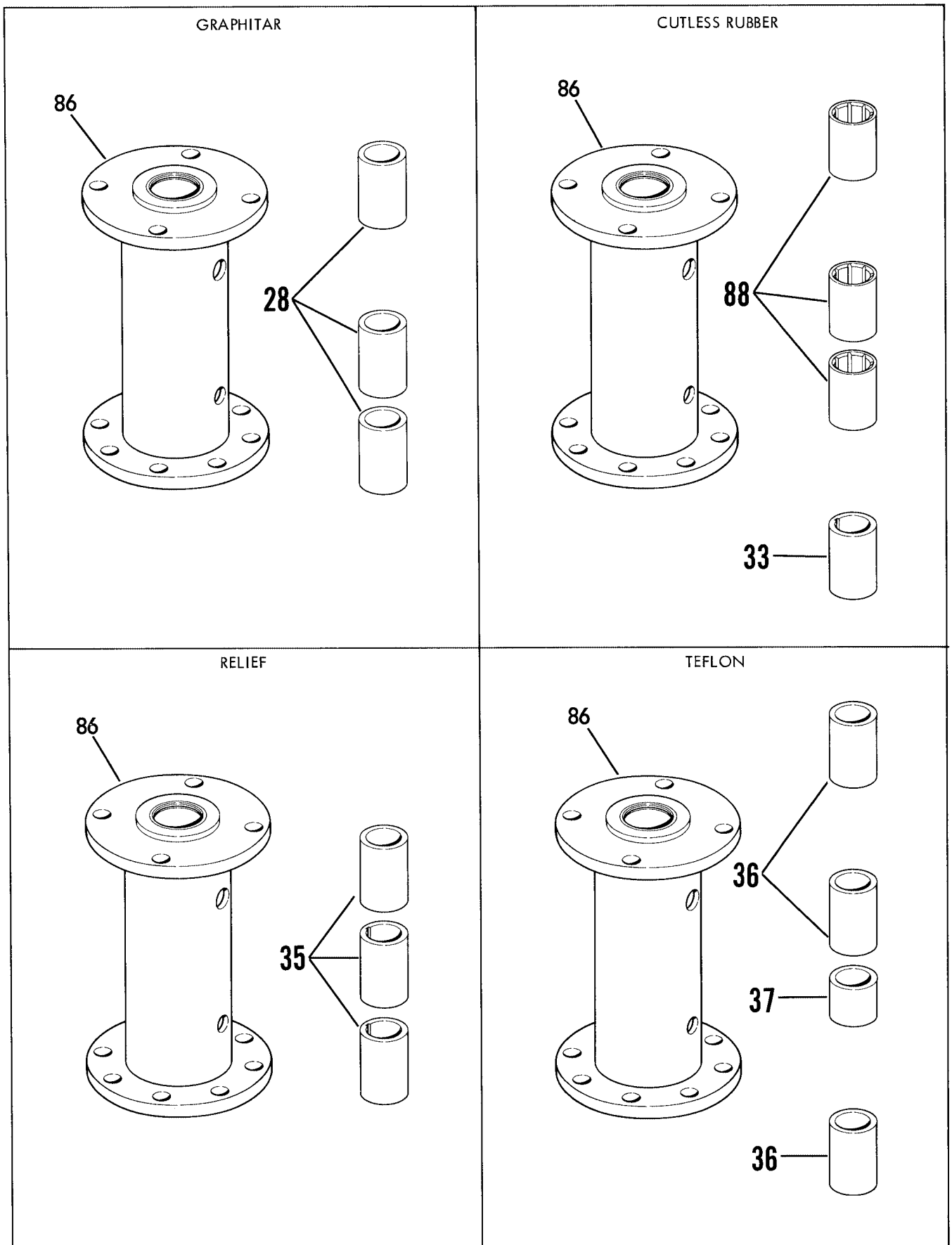


Figure 1. Model 531-532 Exploded View (Sheet 4 of 4)

Model 531-532 List of Parts (See Figures 1 & 2)

1. Capscrew	25. Float rod guide	52. Motor	78. Discharge pipe
2. Washer	26. Pump bearing	53. Upper head	79. Coupling, pipe
3. Strainer	27. Bearing housing (opt)	54. Slinger	80. Capscrew
4. Nipple	28. Bushing (opt)	55. Locknut	81. Capscrew
5. Capscrew	32. Bushing (opt)	56. Bearing collar	82. Nameplate
6. Nut	33. Bushing (opt)	57. Retaining ring	83. Screw
7. Capscrew	35. Bushing (opt)	58. Bearing	84. Lower head
8. Casing	36. Bushing (opt)	59. Seal	85. Gasket
9. Gasket	37. Bushing (opt)	60. Coupling, shaft	86. Spool bearing housing (opt)
10. Gasket	38. Nut	61. Shaft	88. Bushing (opt)
11. Case ring	39. Capscrew	65. Fitting	90. Grease fitting
12. Plug, pipe	40. Support pipe	66. Nut	91. Elbow
13. Impeller capscrew	41. Bearing	67. Clamp	92. Coupling
14. Gasket	42. Capscrew	68. Gland	93. Close nipple
15. Impeller	43. Insert	69. Stud	94. Nipple
16. Impeller key	44. Setscrew	70. Packing	95. Comp. fitting
18. Impeller ring (opt)	45. Coupling half	71. Packing ring	96. Comp. fitting
19. Impeller ring (opt)	46. Key	72. Lantern ring	97. Nylon tube
20. Nut	47. Setscrew	73. Oiler (opt)	
21. Bolt	48. Coupling half	74. Fitting (opt)	
22. Cover	49. Key	75. Street elbow	
23. Gasket	50. Nut	76. Flanged elbow	
24. Case ring	51. Capscrew	77. Locknut	

NOTE

WHEN ORDERING SPARE PARTS ALWAYS INCLUDE THE PUMP TYPE, SIZE, SERIAL NUMBER, AND THE PIECE NUMBER FROM THE EXPLODED VIEW IN THIS MANUAL.

ORDER ALL PARTS FROM YOUR LOCAL AUTHORIZED DISTRIBUTOR, FACTORY BRANCH SALES OFFICE OR THE FACTORY AT NORTH AURORA, ILLINOIS.

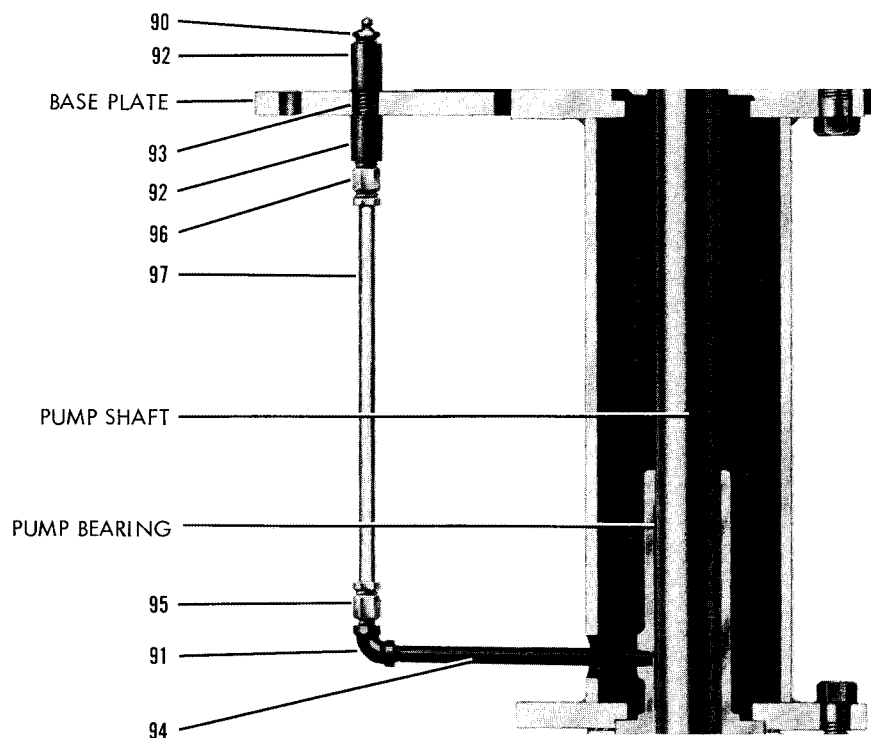


Figure 2.

530 SERIES

REPAIR PARTS INDEX

PARTS LISTED ARE FOR STANDARD PUMPS WITH SOME MODIFICATIONS SUCH AS PUMP BEARINGS, STUFFING BOXES AND HIGH THRUST BEARINGS. SEMI-OPEN IMPELLERS AND THEIR MATCHING CASINGS HAVE DIFFERENT PART NUMBERS.

SHAFT SIZE	PUMP SIZE	PAGE
1-3/16	1 x 7 THRU 4 x 7 1 x 9 AND 1½ x 9	6-9
1-7/16	2 x 9 THRU 6 x 9 1½ x 12 THRU 3 x 12	10-13

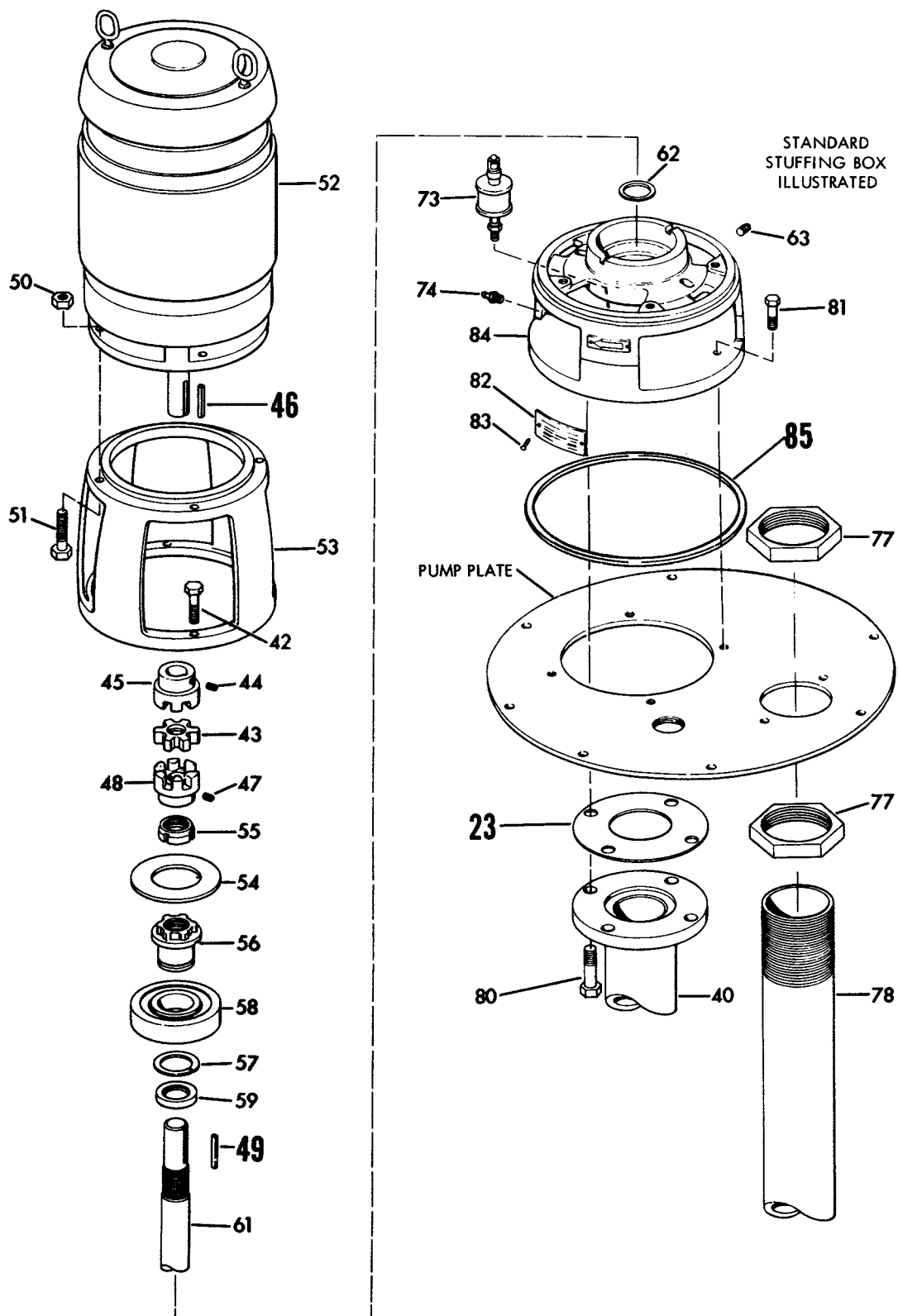
WHEN PART NUMBERS ARE NOT SHOWN, ORDER BY PIECE NUMBER AND DESCRIPTION.
PIECE NO.

- 22 - A ROD GUIDE IS REQUIRED WITH ALL REPLACEMENT COVERS. PC NO. 22A.
- 26 - STANDARD PUMP BEARING IS LISTED. SEE PART NUMBERS 28 THRU 37 FOR SPECIAL OPTION BEARINGS. ALL PUMPS FOR 10'6" PIT DEPTH AND DEEPER ARE MADE WITH RELIEF TYPE PUMP BEARING.
- 27, 31, 32 - ON PUMPS BEFORE APRIL 1978, THE BEARING HOUSING (27), RING (31),
33, 87 BUSHINGS (32 & 33) AND LANTERN RINGS (87) MUST ALL BE REPLACED
AT THE SAME TIME FOR CUTLESS RUBBER BEARINGS.
- 39 - ONE SET OF FOUR (4) CAPSCREWS AND NUTS REQUIRED FOR EACH GUIDE
BEARING JOINT.
- 40 - ONE SUPPORT PIPE IS REQUIRED FOR PIT DEPTHS UP TO 6'-0".
TWO SUPPORT PIPES ARE REQUIRED FOR PIT DEPTHS 6'-6" TO 11'-0".
THREE SUPPORT PIPES ARE REQUIRED FOR PIT DEPTHS 11'-6" TO 16'-0".
- 56, 58 - HIGH THRUST BEARINGS ARE STANDARD ON 1½ x 12 THRU 3 x 12 PUMPS
58A WHEN BUILT WITH SEMI-OPEN IMPELLERS. PUMPS WITH ENCLOSED
IMPELLERS ARE BUILT WITH THE STANDARD THRUST BEARING.
- 60 - PIT DEPTHS TO 11'-6" REQUIRE ONE PUMP SHAFT (61).
- 61 - PIT DEPTHS 12'-0" TO 17'-6" REQUIRE ONE PUMP SHAFT (61C), ONE
HEAD SHAFT (61A) AND ONE LINE COUPLING (60).

530 SERIES

MODEL 531A-532A

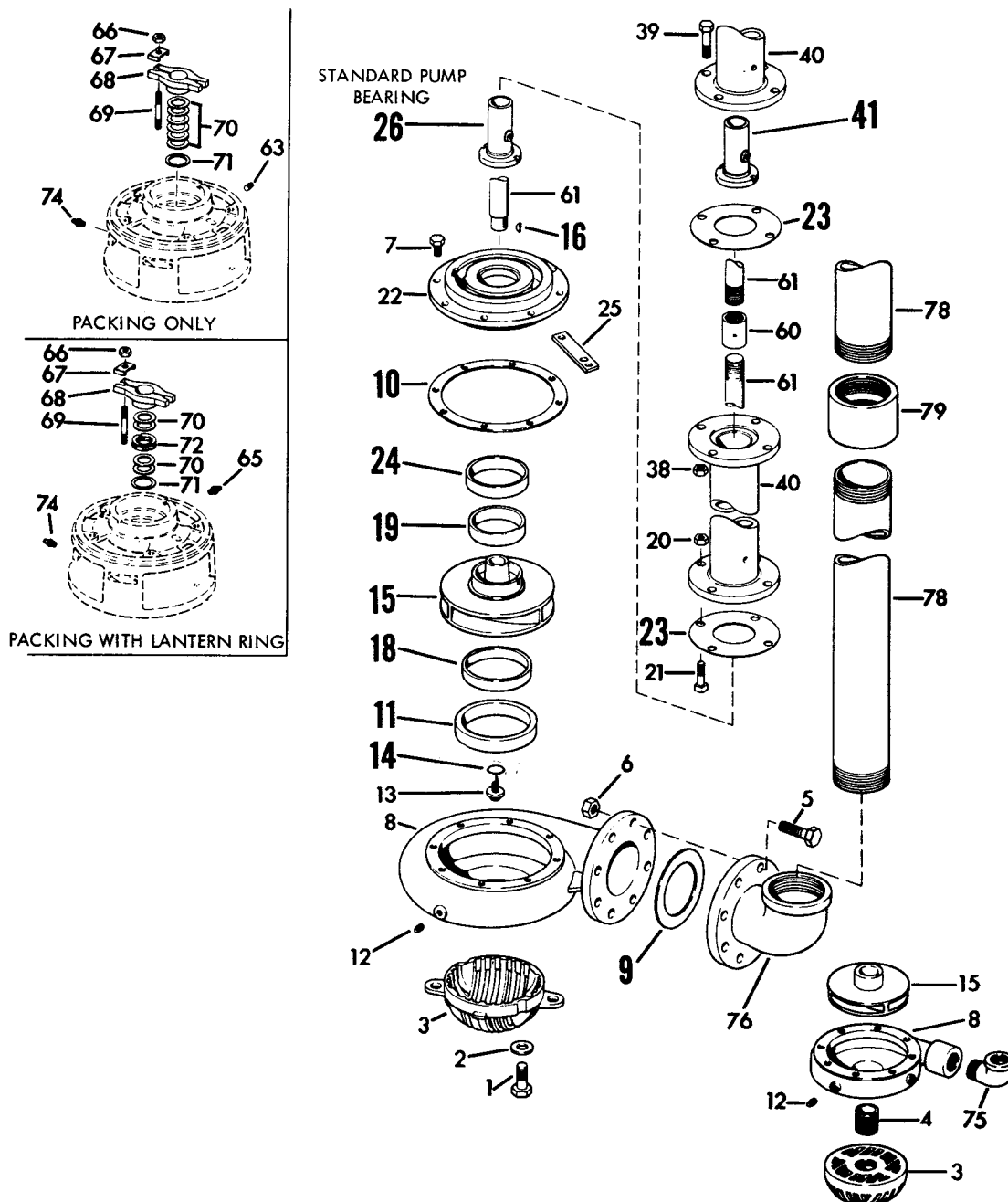
PIECE NUMBERS



530 SERIES

MODEL 531A-532A

PIECE NUMBERS



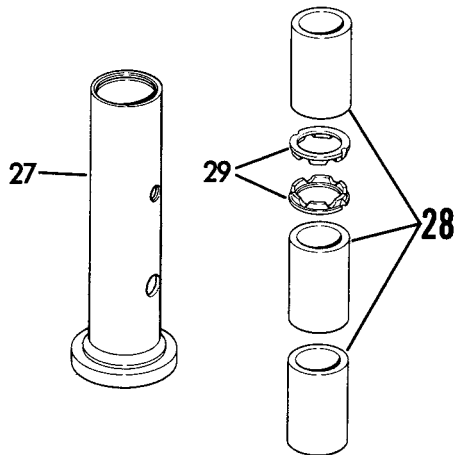
NOTE: Recommended spare parts shown in bold face type.

530 SERIES

MODEL 531A-532A PIECE NUMBERS

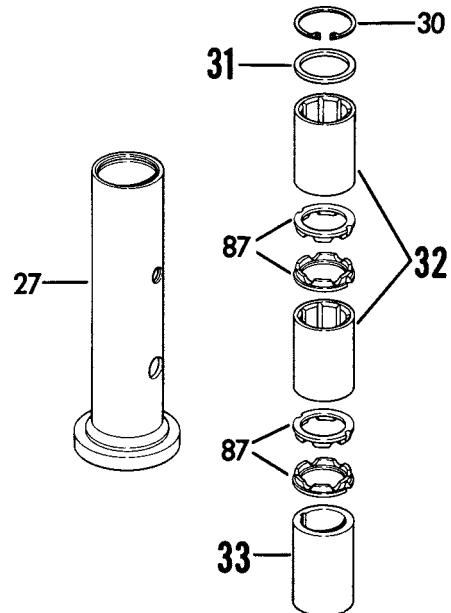
OPTIONAL RELIEF TYPE BEARINGS

GRAPHITAR



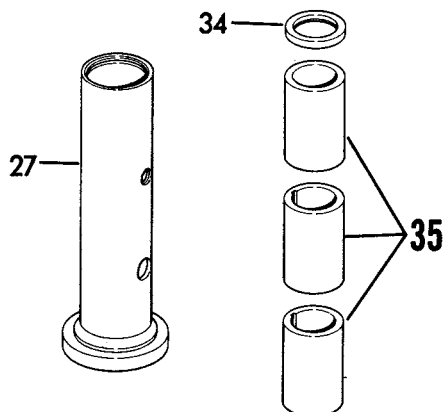
27A-COMPLETE ASSEMBLY

CUTLESS RUBBER



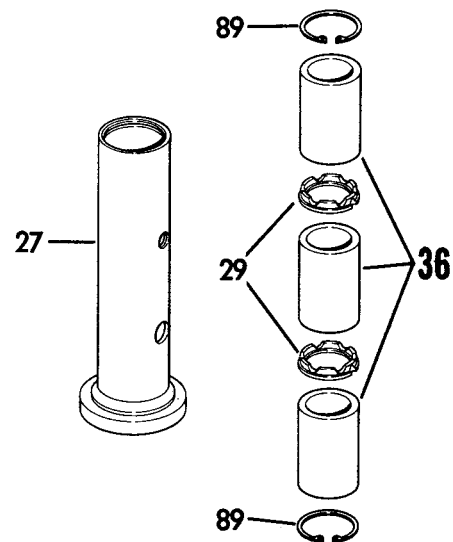
27B-COMPLETE ASSEMBLY

METAL BUSHING*



27C-COMPLETE ASSEMBLY

TEFLON



27D-COMPLETE ASSEMBLY

*Standard for pump settings over 10 feet.

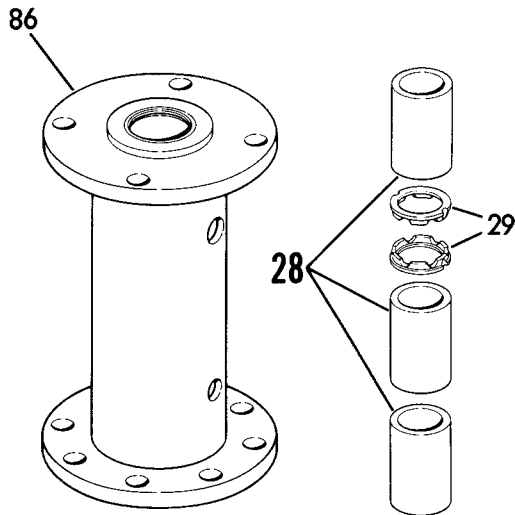
530 SERIES

SECTION **530P** PAGE 5
DATED NOVEMBER 1993
SUPERSEDES PAGE 5
DATED NOVEMBER 1988

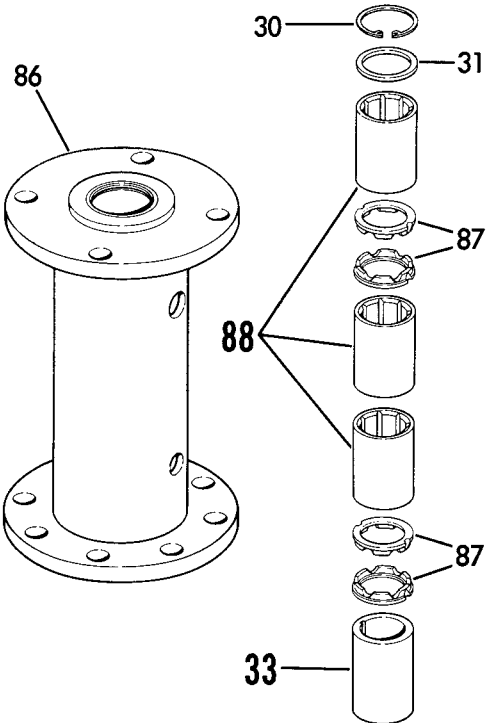
MODEL 531A-532A
PIECE NUMBERS

OPTIONAL SPOOL TYPE BEARINGS

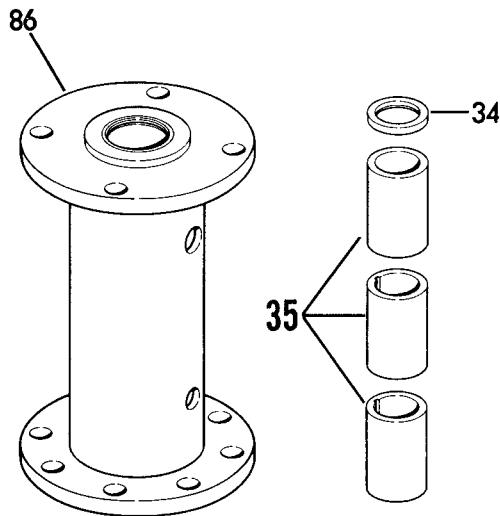
GRAPHITAR



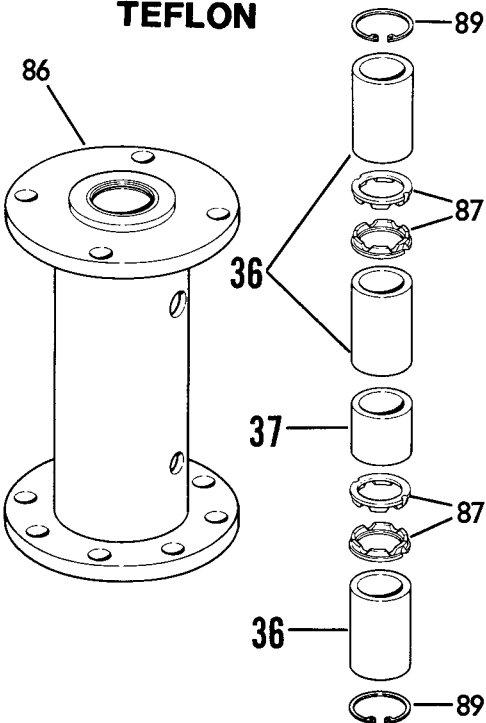
CUTLESS RUBBER



METAL BUSHING



TEFLON



530 SERIES

MODELS 531A-532A
1x7 - 4x7 - 1x9 - 1½x9

PARTS LIST

PC NO.	DESCRIPTION	QTY	PART NO.	MATERIAL			
				B.F.	A.B.	A.I.	S.S.
1	CAPSCREW						
	1x7, 1½x7, 1½x7		NOT REQUIRED				
	2x7, 2½x7, 4x7	2	168-0582	080	190	080	104
	1x9, 1½x9, 1½x9		NOT REQUIRED				
2	WASHER						
	1x7, 1½x7, 1½x7		NOT REQUIRED				
	2x7, 2½x7, 4x7	2	908-0116	360	190	360	104
	1x9, 1½x9, 1½x9		NOT REQUIRED				
3	STRAINER 1x7	1	796-0101	010	208	010	104
	1½x7	1	796-0102	010	208	010	104
	1½x7	1	796-0103	010	208	010	104
	2x7	1	796-0163	010	208	010	104
	2½x7	1	796-0163	010	208	010	104
	4x7	1	796-0163	010	208	010	104
	1x9	1	796-0101	010	208	010	104
	1½x9	1	796-0102	010	208	010	104
	1½x9	1	796-0103	010	208	010	104
4	NIPPLE 1x7	1	600-1108	087	190	387	104
	1½x7	1	600-1109	387	190	387	104
	1½x7	1	600-1110	387	190	387	104
	2x7, 2½x7, 4x7		NOT REQUIRED				
	1x9	1	600-1108	387	190	387	104
	1½x9	1	600-1109	387	190	387	104
	1½x9	1	600-1110	387	190	387	104
5	CAPSCREW						
	1x7, 1½x7, 1½x7		NOT REQUIRED				
	2x7	4	168-0568	080	190	080	104
	2½x7	4	168-0568	080	190	080	104
	4x7	8	168-0570	080	190	080	104
	1x9, 1½x9, 1½x9		NOT REQUIRED				
6	NUT						
	1x7, 1½x7, 1½x7		NOT REQUIRED				
	2x7	4	544-0115	080	190	080	104
	2½x7	4	544-0115	080	190	080	104
	4x7	8	544-0115	080	190	080	104
	1x9, 1½x9, 1½x9		NOT REQUIRED				
7	CAPSCREW 1x7-4x7	8	168-0377	080	190	080	104
	1x9, 1½x9, 1½x9	8	168-0487	080	190	080	104
8	CASING 1½x7	1	180-2138	010	208	010	104
	1½x7	1	180-2140	010	208	010	104
	2x7	1	180-2142	010	208	010	104
	2½x7	1	180-2144	010	208	010	104
	4x7	1	180-2146	010	208	010	104
	1½x9	1	180-2148	010	208	010	104
	1½x9	1	180-2149	010	208	010	104
9	GASKET						
	1x7, 1½x7, 1½x7		NOT REQUIRED				
	2x7	1	364-0603	603	603	603	603
	2½x7	1	364-0604	603	603	603	603
	4x7	1	364-0607	603	603	603	603
10	GASKET 1x7-4x7	1	364-1014	603	603	603	603
	1x9, 1½x9, 1½x9	1	364-1015	603	603	603	603
11	CASE RING 1x7	1	676-1150	208	208	010	104
	1½x7	1	676-1150	208	208	010	104
	1½x7	1	676-1151	208	208	010	104
	2x7	1	676-1152	208	208	010	104
	2½x7	1	676-1152	208	208	010	104
	4x7	1	676-1154	208	208	010	104
	1x9	1	676-1150	208	208	010	104
	1½x9	1	676-1150	208	208	010	104
	1½x9	1	676-1151	208	208	010	104
12	PIPE PLUG	3	600-0002	087	190	087	104
13	IMPELLER NUT	1	544-0039	104	104	104	104
15	IMPELLER 1x7	1	443-0405	208	208	010	104
	1½x7	1	443-0407	208	208	010	104
	1½x7	1	443-0409	208	208	010	104
	2x7A	1	443-0411	208	208	010	104
	2x7B	1	443-0415	208	208	010	104
	2½x7A	1	443-2034	208	208	010	104
	2½x7B	1	443-0417	208	208	010	104
	4x7A	1	443-0425	208	208	010	104
	4x7B	1	443-0423	208	208	010	104
	1x9	1	443-0429	208	208	010	104
	1½x9A	1	443-0433	208	208	010	104
	1½x9B	1	443-0431	208	208	010	104
	1½x9A	1	443-0437	208	208	010	104
	1½x9B	1	443-0435	208	208	010	104

530 SERIES

MODELS 531A-532A
1x7 - 4x7 - 1x9 - 1½x9

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DATED NOVEMBER 1993
SUPERSEDES PAGE 7
DATED NOVEMBER 1988

PARTS LIST

PC. NO.	DESCRIPTION	QTY	PART NO.	MATERIAL			
				B.F.	A.B.	A.I.	S.S.
15	IMPELLER (MACH. FOR OPT.RING #'S						
		18 & 19, IF REQ'D)					
	1½x7	1	443-0408	208	208	010	104
	1½x7	1	443-0410	208	208	010	104
	2x7A	1	443-0412	208	208	010	104
	2x7B	1	443-0416	208	208	010	104
	2½x7A	1	443-1775	208	208	010	104
	2½x7B	1	443-0418	208	208	010	104
	4x7A	1	443-0426	208	208	010	104
	4x7B	1	443-0424	208	208	010	104
	1½x9A	1	443-0434	208	208	010	104
	1½x9B	1	443-0432	208	208	010	104
	1½x9A	1	443-0438	208	208	010	104
	1½x9B	1	443-0436	208	208	010	104
16	IMPELLER KEY	1	472-0010	087	104	087	104
18	IMP. WEAR RING (OPTIONAL)						
	1½x7	1	676-1145	208	208	010	104
	1½x7	1	676-1146	208	208	010	104
	2, 2½x7A, 7B	1	676-1133	208	208	010	104
	4x7A, 7B	1	676-1140	208	208	010	104
	1½x9	1	676-1145	208	208	010	104
	1½x9A, 9B	1	676-1146	208	208	010	104
19	IMP. WEAR RING (OPTIONAL)						
	2, 2½, 4x7, A, B	1	676-1133	208	208	010	104
20	NUT	4	544-0115	080	190	080	104
21	BOLT 7"	4	100-0507	087	190	087	104
	9"	4	100-0511	087	190	087	104
22	COVER 1x7-4x7	1	260-0019	010	208	010	104
	1x9, 1½x9, 1½x9	1	260-0020	010	208	010	104
23	GASKET		364-1021	588	588	588	588
24	CASE RING						
	2x7, 2½x7, 4x7	1	676-1148	208	208	010	104
	ALL OTHER SIZES		NOT REQUIRED				
25	FLOAT ROD GUIDE (REQ'D WHEN #22 IS ORDERED)						
		1	396-0010	087	208	087	087
26	PUMP BEARING	1	136-1405	208	208	010	
27	BEARING HOUSING	1	260-0701	087	208	087	104
	OPTIONAL RELIEF TYPE BEARINGS - COMPLETE ASSY						
	BEFORE MARCH 1986						
27A	GRAPHITAR	1	032-0680	NOT			
27B	CUTLESS RUBBER	1	032-0679	AVAILABLE			
27C	METAL BUSHING	1	032-0681	USE NEW			
27D	TEFLON	1	032-0682	DESIGN			
28	BUSHING	3	136-1171	540	540	540	540
29	LANTERN RING	1	676-1680	512	512	512	512
30	SNAP RING	1	676-0220	088	104	088	104
31	RETAINING RING	1	676-1996	079	190	079	104
32	BUSHING	2	136-1378	457	457	457	457
33	BUSHING	1	136-1173	208	208	010	
34	SEAL	1	712-0069	653	653	653	
35	BUSHING	3	136-1173	208	208	010	
36	BUSHING	3	136-1591	522	522	522	522
37	BUSHING	1	136-1173	208	208	010	
	AFTER MARCH 1986						
27A	GRAPHITAR	1	032-0680	644	643	642	646
27B	CUTLESS RUBBER	1	032-0679	644	643	642	646
27C	METAL BUSHING	1	032-0681	644	643	642	
27D	TEFLON	1	032-0682	644	643	642	646
28	BUSHING	1	136-1171	540	540	540	540
32	BUSHING	2	136-1616	486	486	486	486
33	BUSHING	1	136-1173	208	208	010	104
35	BUSHING	3	136-1173	208	208	010	
36	BUSHING	3	136-1614	485	485	485	485
37	BUSHING	1	136-1624	485	485	485	485
38	NUT	4	544-0115	080	190	080	
39	CAPSCREW	4	168-0564	080	080	080	
40	SUPPORT PIPE		REFER TO	FACTORY			
41	GUIDE BEARING		136-1405	208	208	208	
42	CAPSCREW	4	168-0492	080	080	080	
43	COUPLING INSERT		REFER TO	SECTION 1000P			
44	SETSCREW		REFER TO	SECTION 1000P			
45	COUPLING HALF		REFER TO	SECTION 1000P			
46	COUPLING KEY		REFER TO	FACTORY			
47	SETSCREW		REFER TO	SECTION 1000P			
48	COUPLING HALF		REFER TO	SECTION 1000P			
49	COUPLING KEY	1	472-0250	087	087	087	
50	NUT		REFER TO	FACTORY			

530 SERIES
MODELS 531A-532A
1x7 - 4x7 - 1x9 - 1½x9

PARTS LIST

PC. NO.	DESCRIPTION	QTY	PART NO.	MATERIAL			
				B.F.	A.B.	A.I.	S.S.
51	CAPSCREW		REFER TO	FACTORY			
52	MOTOR		REFER TO	FACTORY			
53	UPPER HEAD		REFER TO	FACTORY			
54	SLINGER	1	764-0401	457	457	457	457
55	LOCKNUT	1	544-1107	080	080	080	080
56	BEARING COLLAR	1	224-0162	208	208	208	208
57	RETAINING RING	1	676-0289	088	088	088	088
58	BALL BEARING	1	068-2023	647	647	647	647
59	GREASE SEAL	1	712-0144	653	653	653	653
60	COUPLING		256-2013	062	104	062	104
61	SHAFT (ONE PIECE)		REFER TO	FACTORY			
61A	HEAD SHAFT						
	(2 OR 3 PIECE)		REFER TO	FACTORY			
61B	LINE SHAFT						
	(3 PIECE)		REFER TO	FACTORY			
61C	PUMP SHAFT						
	(2 OR 3 PIECE)		REFER TO	FACTORY			
62	SLINGER	1	764-1005	478	478	478	478
63	PIPE PLUG	1	600-0002	087	190	087	104
65	GREASE FITTING	1	508-0002	651	651	651	651
66	NUT	2	544-0109	080	190	080	104
67	GLAND CLAMP	2	204-0120	360	190	360	104
68	GLAND	1	372-0219	010	208	010	104
69	STUD	2	808-0112	082	082	082	104
70	PACKING	4	564-0120	802	802	802	802
71	RING	1	676-1231	190	190	087	104
72	LANTERN RING	1	676-1680	512	512	512	512
73	OILER (OPT)	1	552-0102	652	652	652	652
74	GREASE FITTING	1	508-0002	651	651	651	651
75	ELBOW 1x7	1	600-0207	387	190	387	104
	1½x7	1	600-0208	387	190	387	104
	1½x7	1	600-0209	387	190	387	104
	2x7		NOT REQUIRED				
	2½x7		NOT REQUIRED				
	4x7		NOT REQUIRED				
	1x9	1	600-0207	387	190	387	104
	1½x9	1	600-0208	387	190	387	104
	1½x9	1	600-0209	387	190	387	104
76	ELBOW 1x7		NOT REQUIRED	RED			
	1½x7		NOT REQUIRED	RED			
	1½x7		NOT REQUIRED	RED			
	2x7	1	300-0016	010	208	010	104
	2½x7	1	300-0010	010	208	010	104
	4x7	1	300-0012	010	208	010	104
	1x9		NOT REQUIRED	RED			
	1½x9		NOT REQUIRED	RED			
	1½x9		NOT REQUIRED	RED			
77	LOCKNUT 1x7	2	544-0955	028	190	028	104
	1½x7	2	544-0956	028	190	028	104
	1½x7	2	544-0957	028	190	028	104
	2x7	2	544-0958	028	190	028	104
	2½x7	2	544-0959	028	190	028	104
	4x7	2	544-2037	208	190	028	104
	1x9	2	544-0955	028	190	028	104
	1½x9	2	544-0956	028	190	028	104
	1½x9	2	544-0957	028	190	028	104
78	DISCHARGE PIPE		REFER TO	FACTORY			
79	COUPLING		REFER TO	FACTORY			
80	CAPSCREW	4	168-0562	080	080	080	080
81	CAPSCREW	4	168-0388	080	080	080	080
82	NAMEPLATE	1	532-0045	114	114	114	114
83	DRIVE SCREW	2	708-0013	365	365	365	365
84	LOWER HEAD	1	116-0439	010	010	010	010
		1	116-0440	010	010	010	010
		4	168-0378	080	080	080	080
85	GASKET	1	364-1254	481	481	481	481
	BEFORE MARCH 1986						
86	SPOOL HOUSING	1	260-0726	087	087	087	104
87	LANTERN RING	2	676-1680	512	512	512	512
88	BUSHING	3	136-1378	457	457	457	457
89	SNAP RING	2	676-0220	088	104	088	104
	AFTER MARCH 1986						
86	SPOOL HOUSING	1	260-0726	087	087	087	104
88	BUSHING	3	136-1616	486	486	486	486

MODELS 531A-532A
1x7 - 4x7 - 1x9 - 1½x9

PARTS LIST

[illegible]

530 SERIES
MODELS 531A-532A
2x9 - 6x9 - 1 1/2x11 - 5x11 - 1 1/2x12 - 3x12

PARTS LIST

PC. NO.	DESCRIPTION	QTY	PART NO.	MATERIAL			
				B.F.	A.B.	A.I.	S.S.
1	CAPSCREW						
	2x9-3x9 A, B	2	168-0582	080	190	080	104
	2x11-3x11	2	168-0582	080	190	080	104
	4x9 A, B	2	168-0566	080	190	080	104
	5x9-6x9	2	168-0632	080	190	080	104
	4x11-5x11	2	168-0652	080	190	080	109
	1 1/2x12-1 1/2x11	NOT REQUIRED					
	2x12-3x12	2	168-0582	080	190	080	104
2	WASHER						
	2x9-4x9 A, B	2	908-0116	360	190	360	104
	2x11-3x11	2	908-0116	360	190	360	104
	5x9-6x9	2	908-0117	360	190	360	104
	4x11-5x11	2	908-0117	360	190	360	104
	1 1/2x12 & 1 1/2x11	NOT REQUIRED					
	2x12-3x12	2	908-0116	360	190	360	104
3	STRAINER 2x9	1	796-0163	010	208	010	104
	2 1/2x9	1	796-0163	010	208	010	104
	3x9 A, B	1	796-0163	010	208	010	104
	4x9 A, B	1	796-0163	010	208	010	104
	5x9	1	796-0163	010	208	010	104
	6x9	1	796-0163	010	208	010	104
	1 1/2x12 & 1 1/2x11	1	796-0103	010	208	010	104
	2x12	1	796-0163	010	208	010	104
	2 1/2x12	1	796-0163	010	208	010	104
	3x12	1	796-0163	010	208	010	1094
4	NIPPLE 1 1/2x12 & 1 1/2x11	1	600-1110	387	190	387	104
	2x12-3x12	NOT REQUIRED					
5	CAPSCREW						
	2x9-3x9 A, B	4	168-0568	080	190	080	104
	2x11	4	168-0568	080	190	080	104
	4x9 A, B & 4x11	8	168-0570	080	190	080	104
	5x9 & 5x11	2	168-0634	080	190	080	104
	5x9	6	168-0642	080	190	080	104
	6x9	2	168-0634	080	190	080	104
	6x9	6	168-0646	080	190	080	104
	1 1/2x12, 1 1/2x11	NOT REQUIRED					
	2x12-3x12 & 3x11	4	168-0568	080	190	080	104
6	NUT						
	2x9-3x9 A, B & 2x11	4	544-0115	080	190	080	104
	4x9 A, B & 4x11	8	544-0115	080	190	080	104

PC. NO.	DESCRIPTION	QTY	PART NO.	MATERIAL			
				B.F.	A.B.	A.I.	S.S.
6	NUT (cont. from first column)						
	5x9-6x9 & 5x11	8	544-0117	080	190	080	104
	1 1/2x12 & 1 1/2x11	NOT REQUIRED					
	2x12-3x12	4	544-0115	080	190	080	104
7	CAPSCREW						
	1 1/2x11-5x11	8	168-0490	080	190	080	104
	2x9-6x9	8	168-0487	080	190	080	104
	1 1/2x12-3x12	8	168-0489	080	190	080	104
8	CASING 2x9	1	180-2152	010	208	010	104
	2 1/2x9	1	180-2153	010	208	010	104
	3x9 A, B	1	180-2155	010	208	010	104
	4x9A	1	180-2156	010	208	010	104
	4x9B	1	180-2157	010	208	010	104
	6x9	1	180-2159	010	208	010	104
	1 1/2x12	1	180-2161	010	208	010	104
	2x12	1	180-2163	010	208	010	104
	2 1/2x12	1	180-2164	010	208	010	104
	3x12	1	180-2166	010	208	010	104
	1 1/2x2x11	1	180-2353	010	208	010	104
	2x3x11	1	180-2354	010	208	010	104
	3x4x11	1	180-2355	010	208	010	104
	4x5x11	1	180-2356	010	208	010	104
	5x6x11	1	180-2357	010	208	010	104
9	GASKET						
	2x9	1	364-0603	603	603	603	603
	2 1/2x9	1	364-0604	603	603	603	603
	3x9 A, B	1	364-0605	603	603	603	603
	4x9 A, B & 4x11	1	364-0607	603	603	603	603
	5x9 & 5x11	1	364-0608	603	603	603	603
	6x9	1	364-0609	603	603	603	603
	1 1/2x12 & 1 1/2x11	NOT REQUIRED					
	2x12 & 2x11	1	364-0603	603	603	603	603
	2 1/2x12	1	364-0604	603	603	603	603
	3x12 & 3x11	1	364-0605	603	603	603	603
10	GASKET						
	2x9-6x9	1	364-1015	603	603	603	603
	1 1/2x11-5x11	1	364-2109	603	603	603	603
	1 1/2x12-3x12	1	364-1016	603	603	603	603
11	CASE RING						
	1 1/2x2x11	1	676-1151	208	208	010	104

530 SERIES

MODELS 531A-532A

2x9 - 6x9 - 1 1/2x11 - 5x11 - 1 1/2x12 - 3x12

SECTION 530P PAGE 11

DATED NOVEMBER 1993

SUPERSEDES PAGE 11

DATED NOVEMBER 1988

PARTS LIST

PC. NO.	DESCRIPTION	QTY	PART NO.	MATERIAL			
				B.F.	A.B.	A.I.	S.S.
	CASE RING (cont. from p.10)						
	2x3x11	1	676-1152	208	208	010	104
	3x4x11	1	676-1154	208	208	010	104
	4x5x11	1	676-1155	208	208	010	104
	5x6x11	1	676-1684	208	208	010	104
	2x9	1	676-1152	208	208	010	104
	2 1/2x9	1	676-1152	208	208	010	104
	3x9 A, B	1	676-1154	208	208	010	104
	4x9A	1	676-1154	208	208	010	104
	4x9B	1	676-1155	208	208	010	104
	5x9	1	676-1155	208	208	010	104
	6x9	1	676-1155	208	208	010	104
	1 1/2x12	1	676-1151	208	208	010	104
	2x12	1	676-1152	208	208	010	104
	2 1/2x12	1	676-1152	208	208	010	104
	3x12	1	676-1154	208	208	010	104
12	PIPE PLUG	3	600-0002	087	190	087	104
13	IMPELLER NUT	1	544-0040	104	104	104	104
15	IMPELLER						
	1 1/2x2x11	1	443-2513	208	208	010	104
	2x3x11	1	443-2399	208	208	010	104
	3x4x11	1	443-2400	208	208	010	104
	4x5x11	1	443-2401	208	208	010	104
	5x6x11	1	443-2402	208	208	010	104
	2x9	1	443-0443	208	208	010	104
	2 1/2x9	1	443-0447	208	208	010	104
	3x9A	1	443-1768	208	208	010	104
	3x9B	1	443-1764	208	208	010	104
	4x9A	1	443-1752	208	208	010	104
	4x9B	1	443-0459	208	208	010	104
	5x9	1	443-0463	208	208	010	104
	6x9	1	443-0467	208	208	010	104
	1 1/2x12	1	443-1725	208	208	010	104
	2x12	1	443-1726	208	208	010	104
	2 1/2x12	1	443-1727	208	208	010	104
	3x12	1	443-1728	208	208	010	104
15	IMPELLER (MACH. FOR OPT. RING(S))		#18 AND 19, IF REQUIRED.				
	1 1/2x2x11	1	443-2514	208	208	010	104
	2x3x11	1	443-2427	208	208	010	104

PC. NO.	DESCRIPTION	QTY	PART NO.	MATERIAL			
				B.F.	A.B.	A.I.	S.S.
15	IMPELLER (cont. from first column)						
	3x4x11	1	443-2428	208	208	010	104
	4x5x11	1	443-2429	208	208	010	104
	5x6x11	1	443-2430	208	208	010	104
	2x9	1	443-0444	208	208	010	104
	2 1/2x9	1	443-0448	208	208	010	104
	3x9A	1	443-1769	208	208	010	104
	3x9B	1	443-1765	208	208	010	104
	4x9A	1	443-1753	208	208	010	104
	4x9B	1	443-0460	208	208	010	104
	5x9	1	443-0464	208	208	010	104
	6x9	1	443-0468	208	208	010	104
	1 1/2x12	1	443-1739	208	208	010	104
	2x12	1	443-1740	208	208	010	104
	2 1/2x12	1	443-1741	208	208	010	104
	3x12	1	443-1742	208	208	010	104
16	IMPELLER KEY	1	472-0019	087	104	087	104
18	IMP. WEAR RING (OPTIONAL)						
	5x6x11	1	676-1143	208	208	010	104
	2x9, 2 1/2x9	1	676-1133	208	208	010	104
	3x9A, B, 4x9A	1	676-1140	208	208	010	104
	4x9B, 6x9 & 4x11	1	676-1141	208	208	010	104
	1 1/2x12 & 1 1/2x11	1	676-1146	208	208	010	104
	2x12, 2 1/2x12 & 2x11	1	676-1133	208	208	010	104
	3x12 & 3x11	1	676-1140	208	208	010	104
19	IMP. WEAR RING (OPTIONAL)						
	2x9, 2 1/2x9 & 2x11	1	676-1133	208	208	010	104
	3x9A, B, 3x11, 4x9A, B	1	676-1156	208	208	010	104
	6x9	1	676-1156	208	208	010	104
	1 1/2x12 & 1 1/2x11	NOT REQUIRED					
	2x12, 2 1/2x11	1	676-1133	208	208	010	104
	3x12, 4x11 & 5x11	1	676-1156	208	208	010	104
20	NUT						
	2x9-3x9-2x11-3x11	4	544-0115	080	190	080	104
	4x9-6x9-4x11-5x11	8	544-0115	080	190	080	104
	1 1/2x12-3x12-1 1/2x11	4	544-0115	080	190	080	104
21	BOLT						
	2x9-3x9-1 1/2x11-2x11	4	100-0511	087	190	087	104
	3x11	4	100-0511	087	190	087	104
	4x9-6x9-4x11-5x11	8	100-0511	087	190	087	104

530 SERIES

MODELS 531A-532A

2x9 - 6x9 - 1 1/2x11 - 5x11 - 1 1/2x12 - 3x12

PARTS LIST

PC. NO.	DESCRIPTION	QTY	PART NO.	MATERIAL			
				B.F.	A.B.	A.I.	S.S.
22	COVER						
	1 1/2x11-5x11	1	260-0039	010	208	010	104
	2x9-6x9	1	260-0020	010	208	010	104
	1 1/2x12-3x12	1	260-0021	010	208	010	104
23	GASKET		364-1021	588	588	588	588
24	CASE RING 2x9	1	676-1148	010	208	010	104
	2 1/2x9	1	676-1148	010	208	010	104
	3x9A	1	676-1149	208	208	010	104
	3x9B	1	676-1149	208	208	010	104
	4x9A	1	676-1149	208	208	010	104
	4x9B & 4x11	1	676-1149	208	208	010	104
	5x9 & 5x11	1	676-1149	208	208	010	104
	6x9	1	676-1149	208	208	010	104
	1 1/2x12		NOT REQUIRED				
	2x12 & 2x11	1	676-1148	208	208	010	104
	2 1/2x12	1	676-1148	208	208	010	104
	3x12 & 3x11	12	676-1149	208	208	010	104
25	FLOAT ROD GUIDE (REQ. WHEN #22 IS ORDERED)	1	396-0010	087	208	087	087
26	PUMP BEARING	1	136-1402	208	208	010	
	BEARING HOUSING	1	260-0701	087	208	087	104
	OPTIONAL RELIEF TYPE BEARINGS-COMplete ASSY. BEFORE MARCH 1986						
27A	GRAPHITAR	1	032-1246		NOT		
27B	CUTLESS RUBBER	1	032-1245		AVAILABLE		
27C	METAL BUSHING	1	032-1247		USE NEW		
27D	TEFLON	1	032-1248		DESIGN		
28	BUSHING	3	136-1170	540	540	540	540
29	LANTERN RING	1	676-1681	512	512	512	512
30	SNAP RING	1	676-0220	088	104	088	104
31	RETAINING RING	1	676-1996	079	190	079	104
32	BUSHING	2	136-1379	457	457	457	457
33	BUSHING	1	136-1172	208	208	010	104
34	SEAL	1	712-0047	653	653	653	
35	BUSHING	3	136-1172	208	208	010	
36	BUSHING	3	136-1585	522	522	522	522
37	BUSHING	1	136-1172	208	208	010	104
			AFTER MARCH 1986				
27A	GRAPHITAR	1	032-1246	644	643	642	646
27B	CUTLESS RUBBER	1	032-1245	644	643	642	646

PC. NO.	DESCRIPTION	QTY	PART NO.	MATERIAL			
				B.F.	A.B.	A.I.	S.S.
27C	METAL BUSHING	1	032-1247	644	643	642	
27D	TEFLON	1	032-1248	644	643	642	646
28	BUSHING	1	136-1170	540	540	540	540
32	BUSHING	2	136-1617	486	486	486	486
33	BUSHING	1	136-1172	208	208	010	104
35	BUSHING	3	136-1172	208	208	010	
36	BUSHING	3	136-1615	485	485	485	485
37	BUSHING	1	136-1625	485	485	485	485
38	NUT	4	544-0115	080	190	080	104
39	CAPSCREW	4	168-0564	080	190	080	104
40	SUPPORT PIPE		REFER TO FACTORY				
41	GUIDE BEARING		136-1402	208	208	010	
42	CAPSCREW	4	168-0490	080	080	080	104
43	COUPLING INSERT		REFER TO SECTION 1000P				
44	SETSCREW		REFER TO SECTION 1000P				
45	COUPLING HALF		REFER TO SECTION 1000P				
46	COUPLING KEY		REFER TO FACTORY				
47	SETSCREW		REFER TO SECTION 1000P				
48	COUPLING HALF		REFER TO SECTION 1000P				
49	COUPLING KEY	1	472-0250	087	087	087	
50	NUT		REFER TO FACTORY				
51	CAPSCREW		REFER TO FACTORY				
52	MOTOR		REFER TO FACTORY				
53	UPPER HEAD						
	143HP-256HP	1	116-0346	010	010	010	010
	284HP-326HP	1	116-0347	010	010	010	010
54	SLINGER	1	764-0401	457	457	457	457
55	LOCKNUT	1	544-1108	080	080	080	080
56	BRG. COLLAR (STD.)	1	224-0163	208	208	208	208
	(HIGH THRUST)	1	224-0161	208	208	208	208
57	RETAINING RING	1	676-0289	088	088	088	088
58	BALL BEARING (STD)	1	068-2023	647	647	647	647
	(HIGH THRUST)	1	068-0311	647	647	647	647
58A	SEAL						
	(HIGH THRUST)	1	712-0289	087	087	087	087
59	GREASE SEAL	1	712-0146	653	653	653	653
60	COUPLING		256-2014	062	104	062	104
61	SHAFT (ONE PIECE)		REFER TO FACTORY				
61A	HEAD SHAFT						
	(2 OR 3 PIECE)		REFER TO FACTORY				

530 SERIES

MODELS 531A-532A

2x9 - 6x9 - 1½x11 - 5x11 - 1½x12 - 3x12

SECTION 530P PAGE 13

DATED NOVEMBER 1993

SUPERSEDES PAGE 13

DATED NOVEMBER 1988

PARTS LIST

PC. NO.	DESCRIPTION	QTY	PART NO.	MATERIAL			
				B.F.	A.B.	A.I.	S.S.
61B	LINE SHAFT (3 PIECE)		REFER TO FACTORY				
61C	PUMP SHAFT (2 OR 3 PIECE)		REFER TO FACTORY				
62	SLINGER	1	764-1009	478	478	478	478
63	PIPE PLUG	1	600-0002	087	190	087	104
65	GREASE FITTING	1	508-0002	651	651	651	651
66	NUT	2	544-0109	080	190	080	104
67	GLAND CLAMP	2	204-0120	360	190	360	104
68	GLAND	1	372-0220	010	208	010	104
69	STUD	2	808-0112	082	082	082	104
70	PACKING	6	564-0037	802	802	802	802
71	RING	1	676-1232	190	190	087	104
72	LANTERN RING	1	676-1681	512	512	512	512
73	OILER (OPT)	1	552-0102	652	652	652	652
74	GREASE FITTING	1	508-0002	651	651	651	651
75	ELBOW						
	2x9-6x9		NOT REQUIRED				
	1½x12 & 1½x11	1	600-0209	387	190	387	104
	2x12-3x12		NOT REQUIRED				
76	ELBOW 2x9	1	300-0016	010	208	010	104
	2½x9	1	300-0010	010	208	010	104
	3x9 & 3x11	1	300-0011	010	208	010	104
	4x9 & 4x11	1	300-0012	010	208	010	104
	5x9 & 5x11	1	300-0017	010	208	010	104
	6x9	1	300-0015	010	208	010	104
	1½x12		NOT REQUIRED				
	2x12 & 2x11	1	300-0016	010	208	010	104
	2½x12	1	300-0010	010	208	010	104
	3x12	1	300-0011	010	208	010	104
77	LOCKNUT 2x9	2	544-0958	028	190	028	104
	2½x9	2	544-0959	028	190	028	104
	3x9	2	544-0960	028	190	028	104
	4x9	2	544-2037	087	190	087	104
	5x9	2	544-2038	087	190	087	104
	6x9	2	544-2039	087	190	087	104
	1½x12	2	544-0957	028	190	028	104
	2x12	2	544-0958	028	190	028	104
	2½x12	2	554-0959	028	190	028	104
	3x12	2	544-0960	028	190	028	104

PC. NO.	DESCRIPTION	QTY	PART NO.	MATERIAL			
				B.F.	A.B.	A.I.	S.S.
78	DISCHARGE PIPE		REFER TO FACTORY				
79	COUPLING		REFER TO FACTORY				
80	CAPSCREW	4	168-0562	080	190	080	104
81	CAPSCREW	4	168-0388	080	080	080	080
82	NAMEPLATE	1	532-0045	114	114	114	114
83	DRIVE SCREW	2	708-0013	365	365	365	365
84	LOWER HEAD	1	116-0439	010	010	010	010
		1	116-0440	010	010	010	010
		4	168-0378	080	080	080	080
85	GASKET	1	364-1254	481	481	481	481
	BEFORE MARCH 1986						
86	SPOOL HOUSING	1	260-0726	087	087	087	087
87	LANTERN RING	2	676-1681	512	512	512	512
88	BUSHING	3	136-1379	457	457	457	457
89	SNAP RING	2	676-0220	088	104	088	104
	AFTER MARCH 1986						
86	SPOOL HOUSING	1	260-0726	087	087	087	104
88	BUSHING	3	136-1617	486	486	486	486
	PARTS NOT SHOWN ON EXPLODED VIEW						
	SWITCH STAND		REFER TO				
	FLOAT ROD		SECTION 1020P				
	FLOAT STOPS		FOR FLOAT				
	FLOAT		SWITCH ASSY.				
	CASING FOR SEMI-OPEN IMPELLER						
	2x9	1	180-2193	010	208	010	104
	2½x9	1	180-2154	010	208	010	104
	3x9A	1	180-2194	010	208	010	104
	4x9B	1	180-2158	010	208	010	104
	6x9	1	180-2160	010	208	010	104
	1½x12	1	180-2162	010	208	010	104
	2x12	1	180-2195	010	208	010	104
	2½x12	1	180-2165	010	208	010	104
	3x12	1	180-2165	010	208	010	104
	SEMI-OPEN IMPELLER						
	2x9	1	443-2055	208	208	010	104
	2½x9	1	443-2057	208	208	010	104
	3x9A	1	443-2059	208	208	010	104
	4x9B	1	443-2061	208	208	010	104

(continued on next page)

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FOR ENCLOSED IMPELLERS

REFER TO SECTION **340**
PAGES **401** THRU **438** FOR INDIVIDUAL
PERFORMANCE CURVES BY
PUMP SIZE.

CAUTION:

1. SERIES 530 PUMPS ARE NOT AVAILABLE AT 3500 RPM.
2. CHECK APPLICABLE PUMP SIZES ONLY.

FOR SEMI-OPEN IMPELLERS

REFER TO SECTION **360**
PAGES **501** THRU **526** FOR INDIVIDUAL
PERFORMANCE CURVES BY
PUMP SIZE.

Performance Curves for the 340/360 Series

MODEL/SIZE	R.P.M.	CATALOG PAGE	PDF PAGE
1-1/4 x 1-1/2 x 7	3500/1750	401	2
1-1/4 x 1-1/2 x 9B	1750	402	3
1-1/2 x 2 x 7	3500/1750	403	4
1-1/2 x 2 x 9A	1750	404	5
1-1/2 x 2 x 9B	1750	405	6
1-1/2 x 2 x 9C	3500/1750	406	7
1-1/2 x 2 x 11	3500	406a	8
1-1/2 x 2 x 11	1750/1150	407	10
1-1/2 x 2 x 12	1750/1150	408	11
2 x 2-1/2 x 7A	3500/1750	409	12
2 x 2-1/2 x 7B	3500/1750	410	13
2 x 2-1/2 x 9	3500/1750	411	14
2 x 2-1/2 x 12	1750/1150	412	15
2 x 3 x 11	1750/1150	413	16
2-1/2 x 3 x 7A	3500/1750	414	17
2-1/2 x 3 x 7B	3500/1750	415	18
2-1/2 x 3 x 9	3500/1750	416	19
2-1/2 x 3 x 12	1750/1150	417	20
3 x 4 x 9A	3500/1750	418	21
3 x 4 x 9B	3500/1750	419	22
3 x 4 x 11	1750/1150	420	23
3 x 4 x 12	1750/1150	421	24
4 x 4 x 7A	3500/1750	422	25
4 x 4 x 7B	3500/1750	423	26
4 x 4 x 7B	3500/1750	424	27
4 x 5 x 9A	3500/1750	425	28
4 x 5 x 9B	1750	426	29
4 x 5 x 11	1750/1150	427	30
4 x 5 x 12	1750/1150	428	31
5 x 6 x 11	1750/1150	429	32
5 x 6 x 12	1750/1150	430	33
6 x 6 x 9	1750/1150	431	34
6 x 6 x 11	1750/1150	432	35
6 x 6 x 11A	1750/1150	433	36
6 x 6 x 12B	1750/1150	434	37
6 x 8 x 15	1775/1150	436	39
8 x 10 x 15	1750/1175	437	40

1-1/4 x 1-1/2 x 7 SERIES 340 OR 360

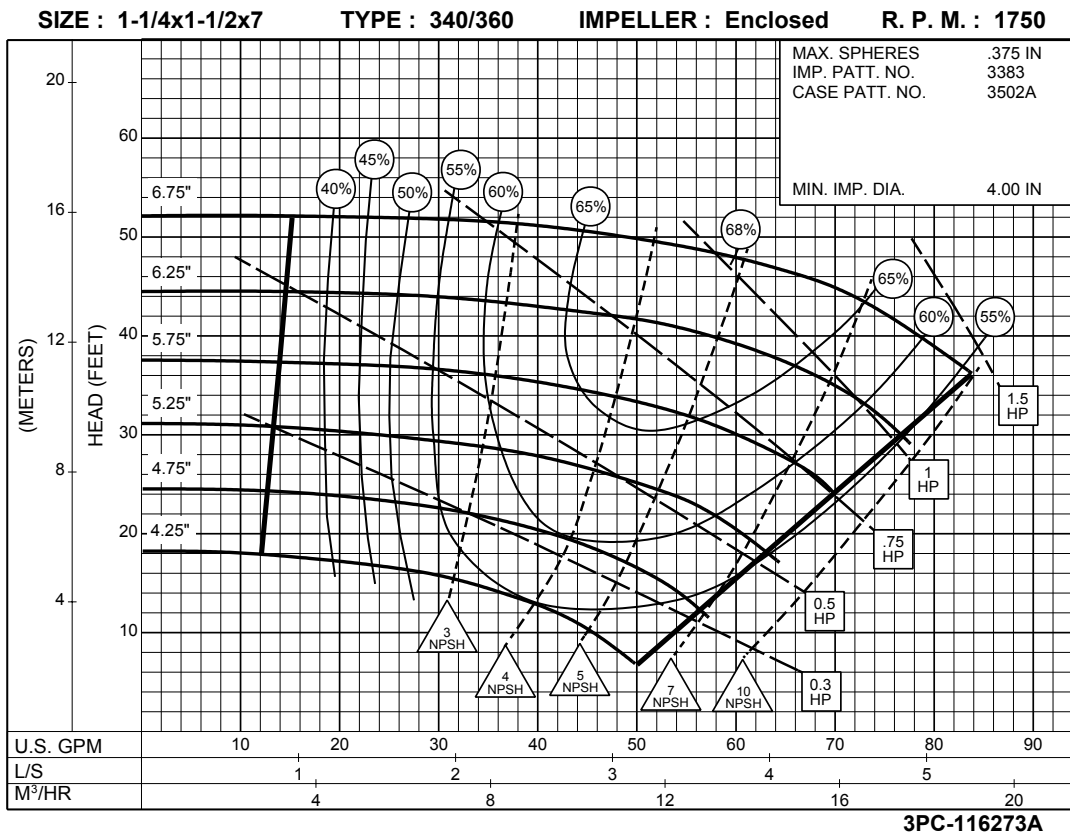
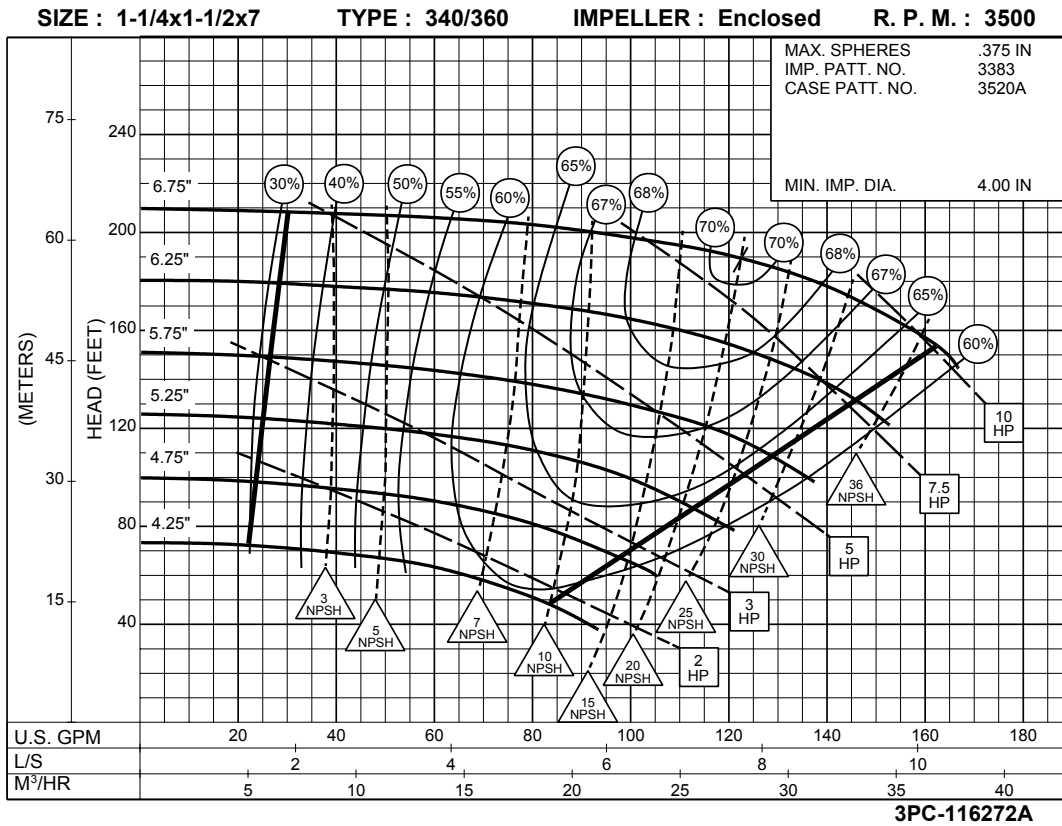
ENCLOSED IMPELLER

Section **340/360** Page **401**

Date **January 2001**

Supersedes Section 340/360 Page 401

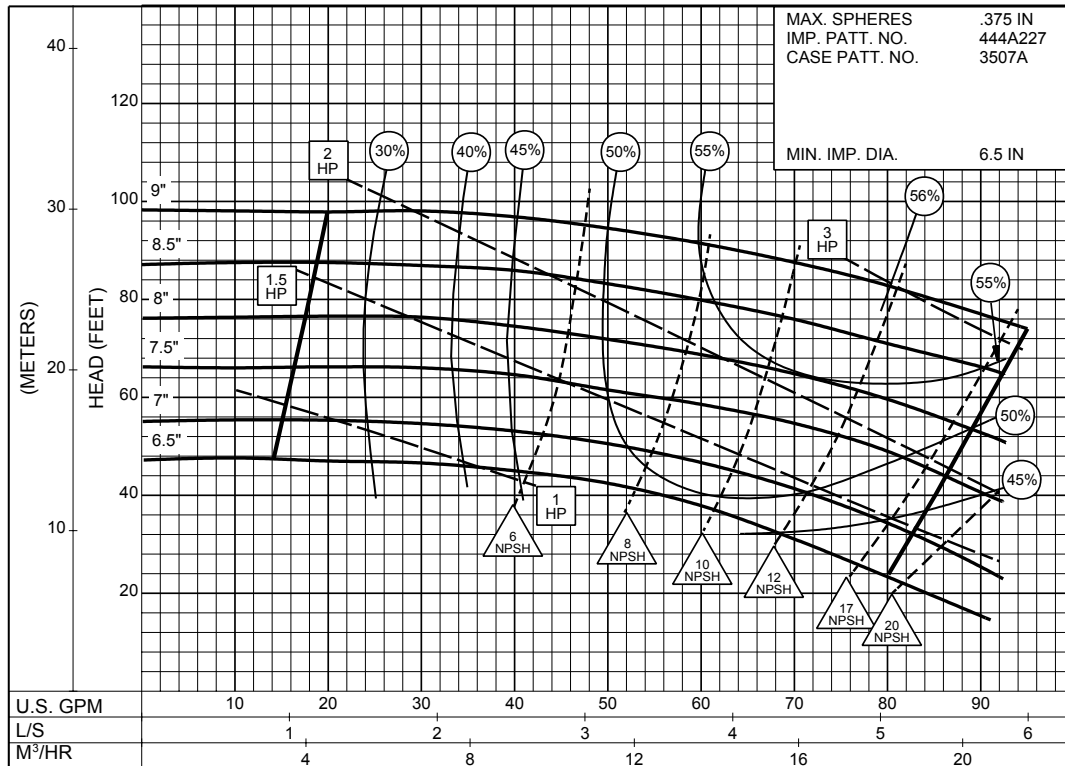
Dated January 1986



1-1/4 x 1-1/2 x 9B
Series 340 OR 360

ENCLOSED IMPELLER

SIZE : 1-1/4x1-1/2x9B TYPE : 340/360 IMPELLER : Enclosed R. P. M. : 1750



3PC-116274A

1750
 RPM

1-1/2 x 2 x 7 SERIES 340 OR 360

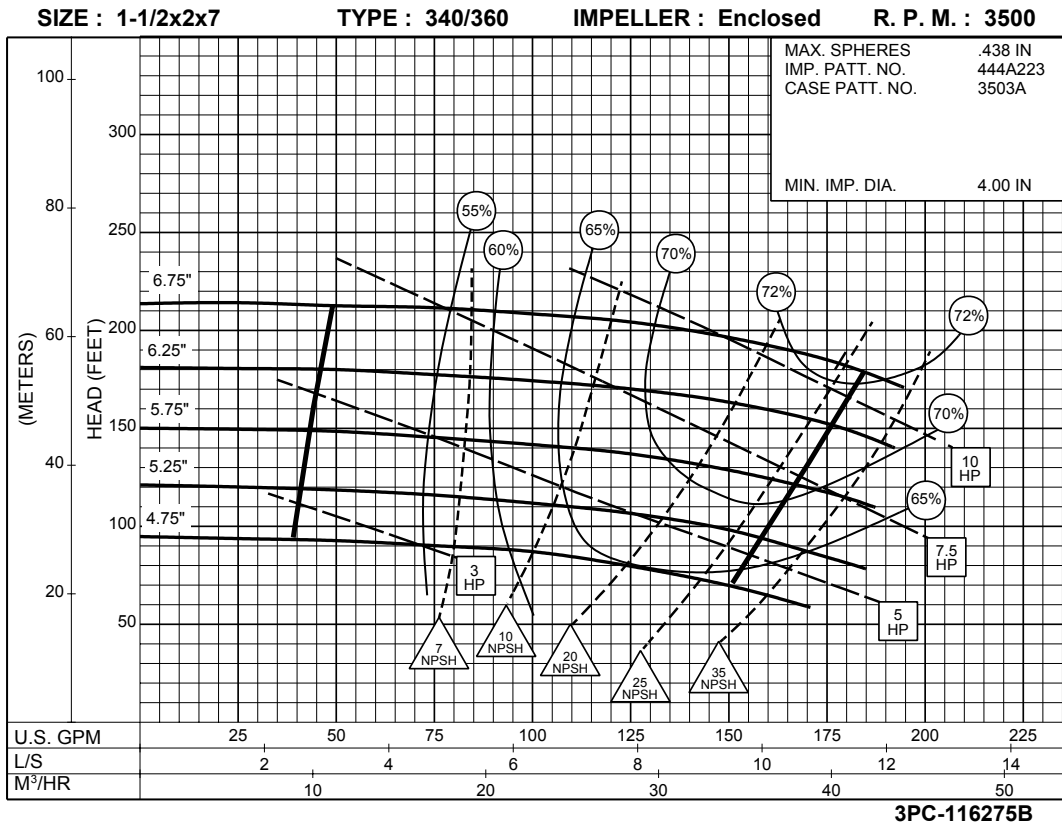
ENCLOSED IMPELLER

Section **340/360** Page **403**

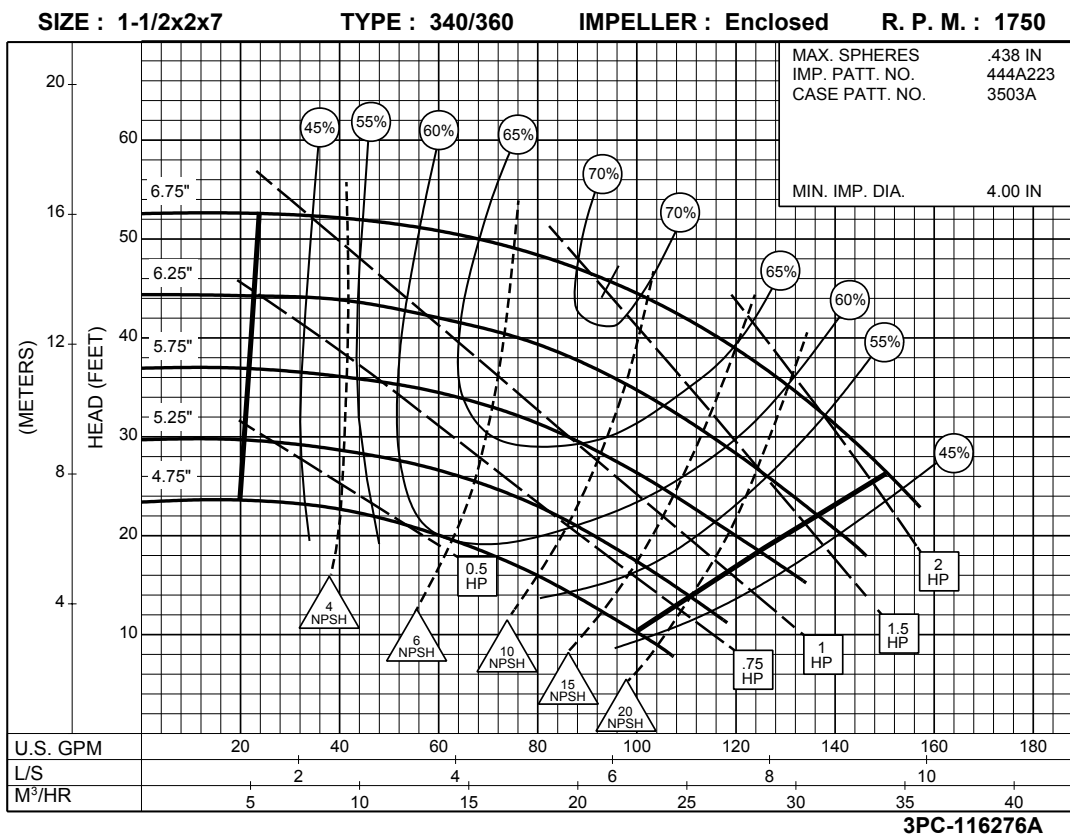
Date **January 2001**

Supersedes Section 340/360 Page 403

Dated January 1986



3500
RPM



1750
RPM

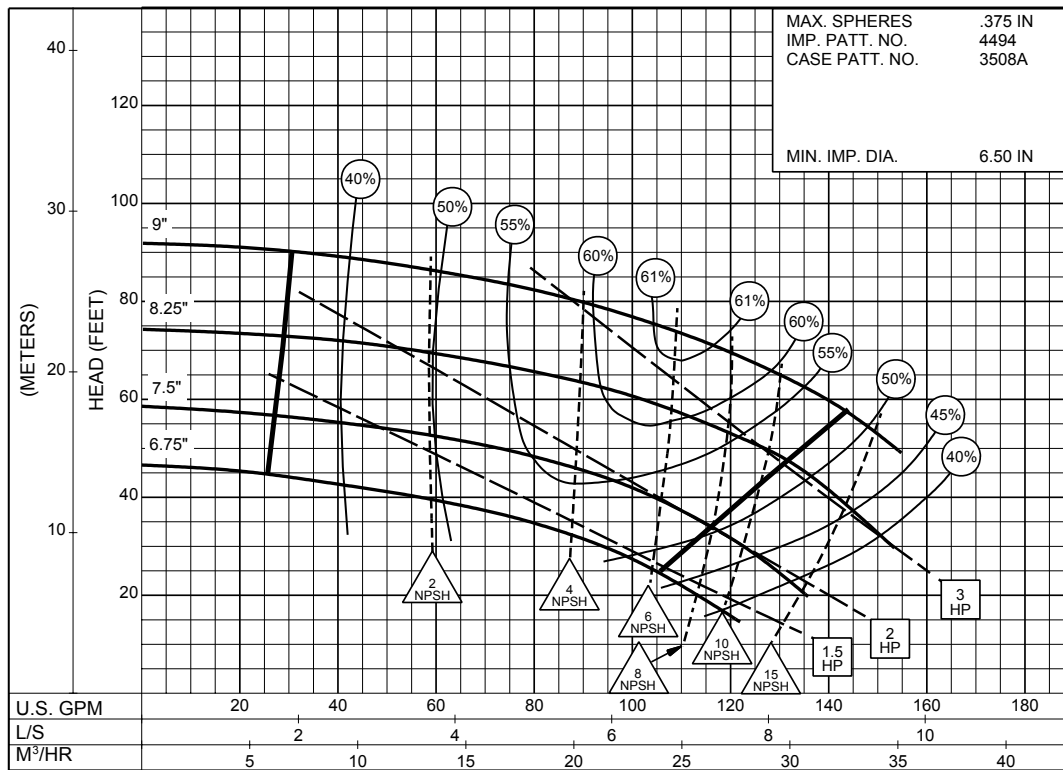
1-1/2 X 2 X 9A **SERIES 340 OR 360**

ENCLOSED IMPELLER

SIZE : 1-1/2x2x9A

TYPE : 340/360 IMPELLER : Enclosed

R. P. M. : 1750



3PC-116331

1750
RPM

**1-1/2 x 2 x 9B
SERIES 340 OR 360**

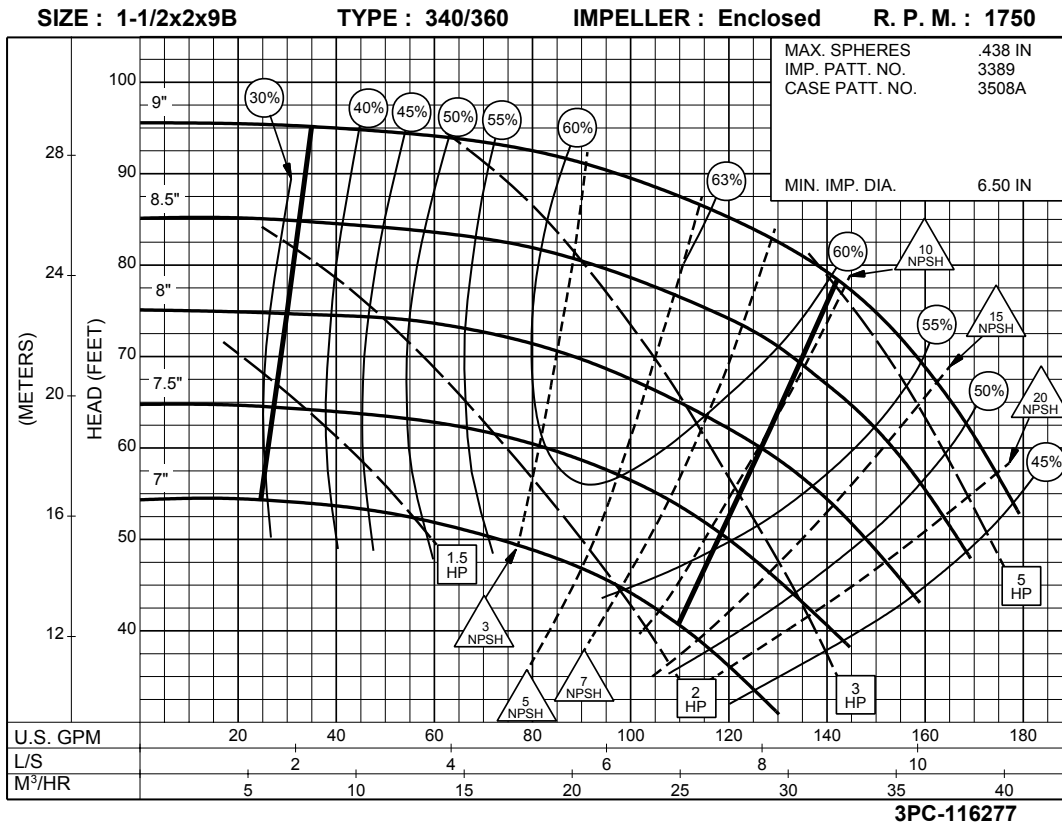
ENCLOSED IMPELLER

Section **340/360** Page **405**

Date **January 2001**

Supersedes Section 340/360 Page 405

Dated January 1986

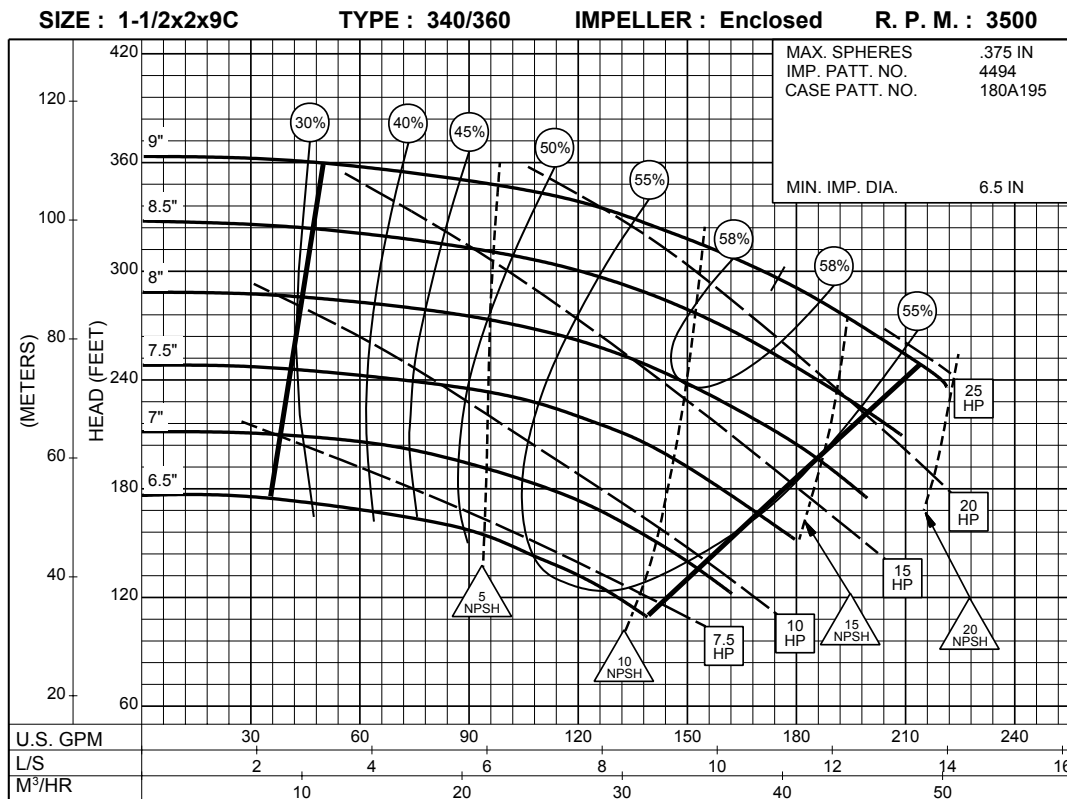


**1750
RPM**

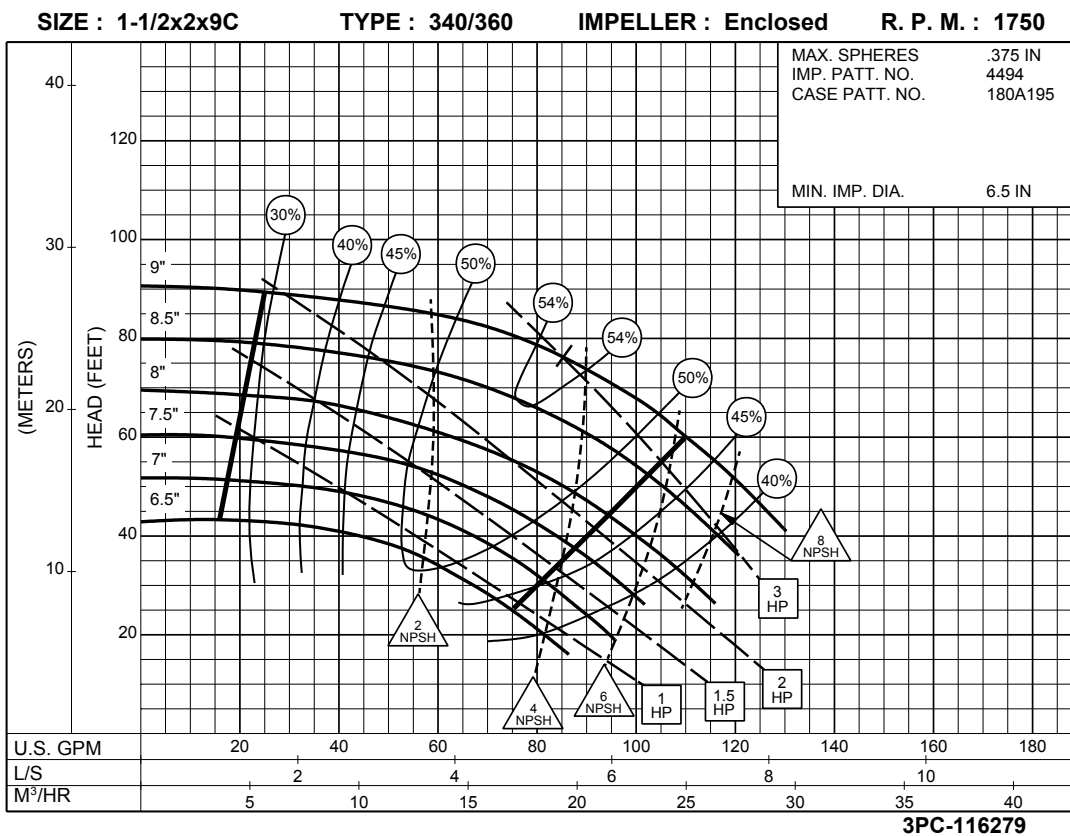
1-1/2 X 2 X 9C SERIES 340 OR 360

ENCLOSED IMPELLER

3500
RPM



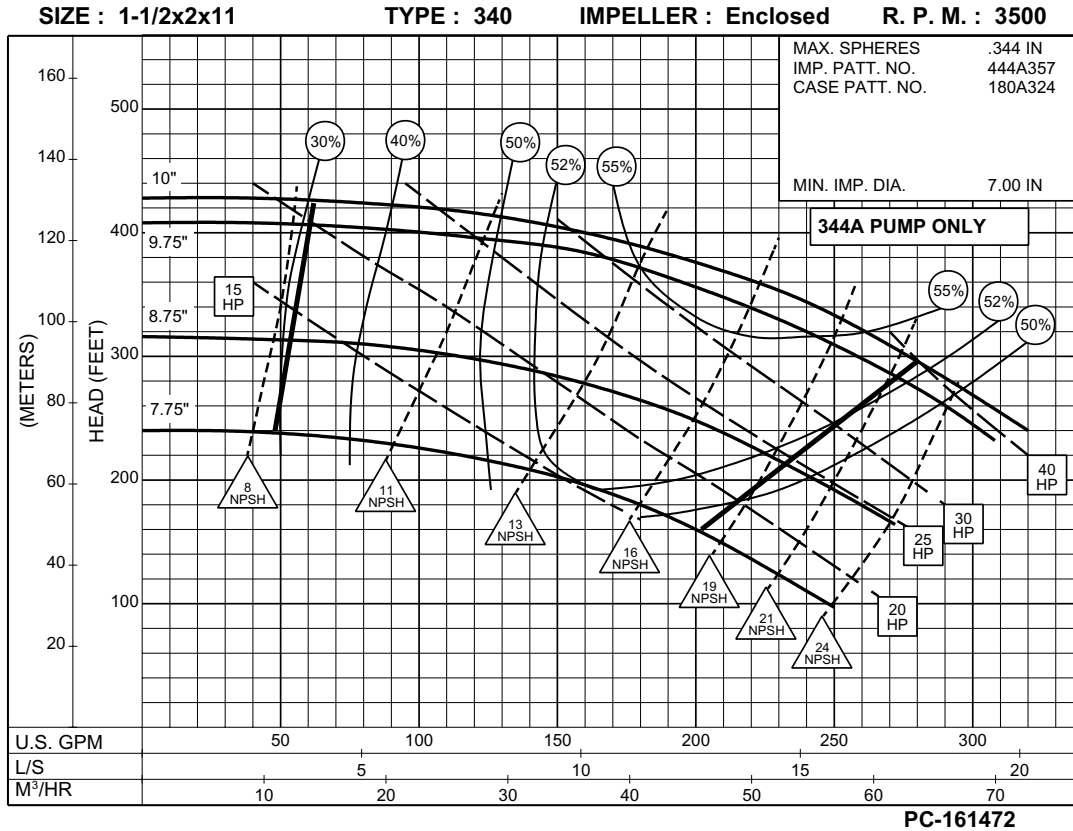
1750
RPM



1-1/2 x 2 x 11
SERIES 340 ONLY
ENCLOSED IMPELLER

Section **340/360** Page **406a**
Date **MARCH 2004**

Supersedes Section 340/360 Page 406a
Dated January 2001



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1-1/2 x 2 x 11 SERIES 340 OR 360

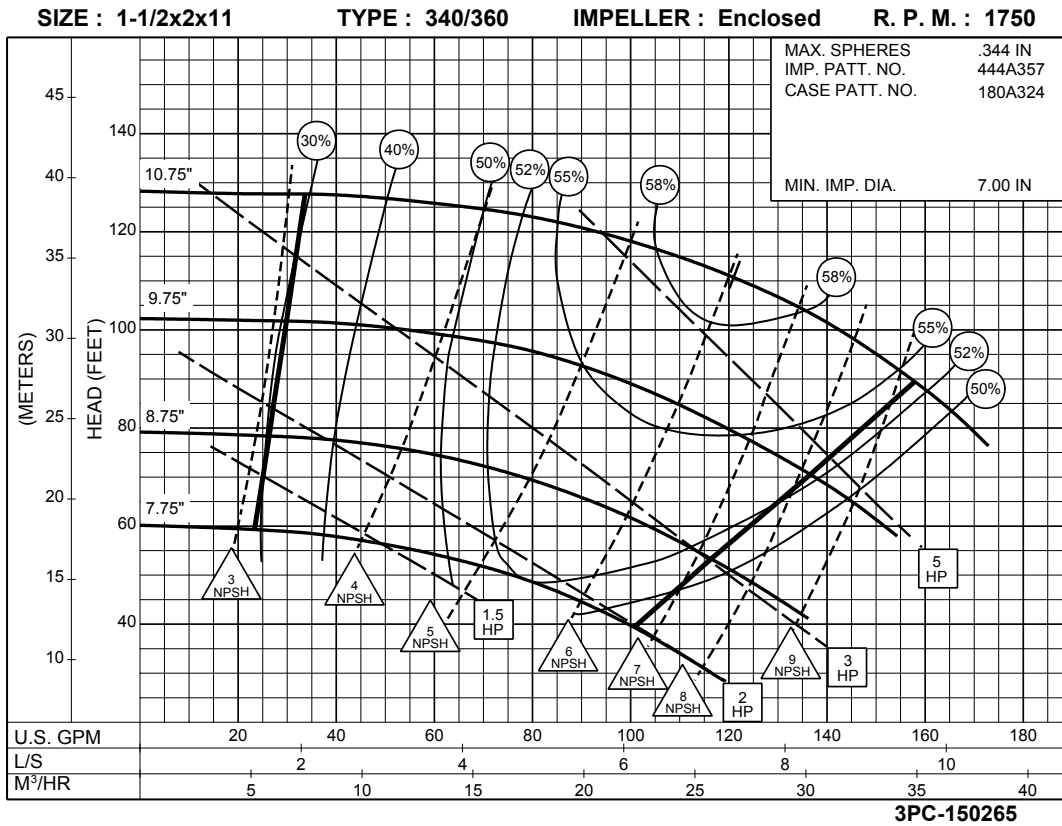
ENCLOSED IMPELLER

Section **340/360** Page **407**

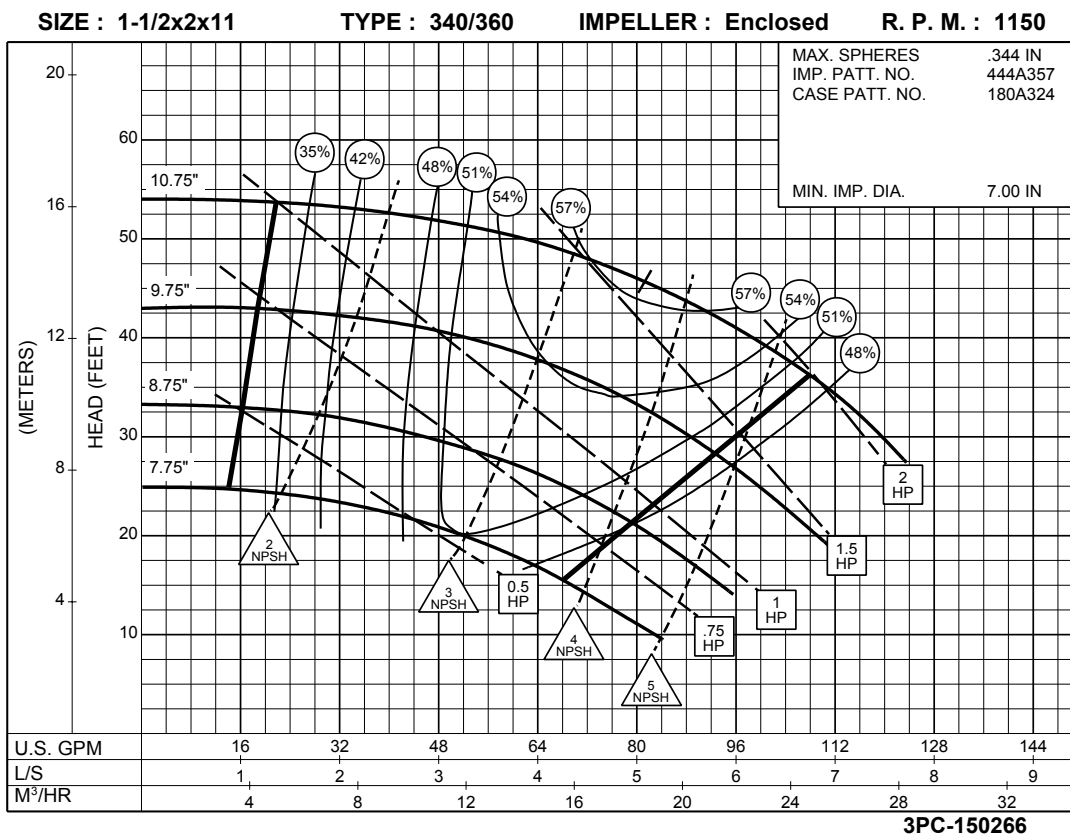
Date **January 2001**

Supersedes Section 340/360 Page 407

Dated April 1991



1750
RPM



1150
RPM

1-1/2 x 2 x 12 SERIES 340 OR 360

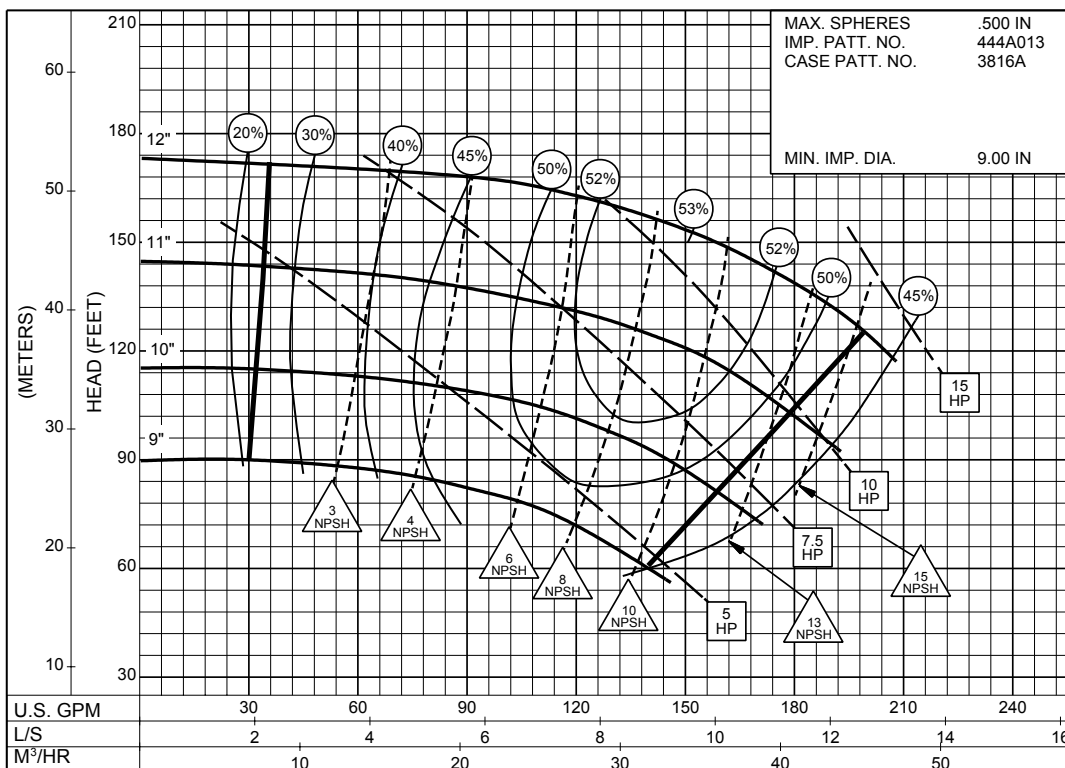
ENCLOSED IMPELLER

SIZE : 1-1/2x2x12

TYPE : 340/360

IMPELLER : Enclosed

R. P. M. : 1750



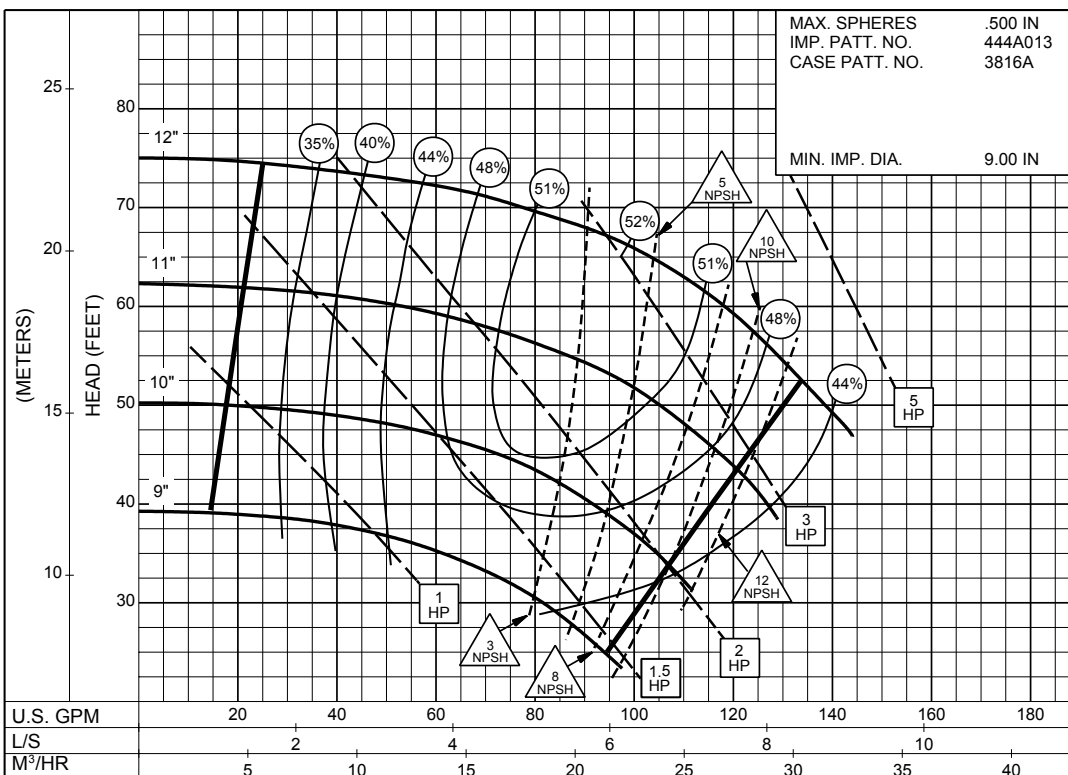
1750
RPM

SIZE : 1-1/2x2x12

TYPE : 340/360

IMPELLER : Enclosed

R. P. M. : 1150



1150
RPM

2 x 2-1/2 x 7A
SERIES 340 OR 360

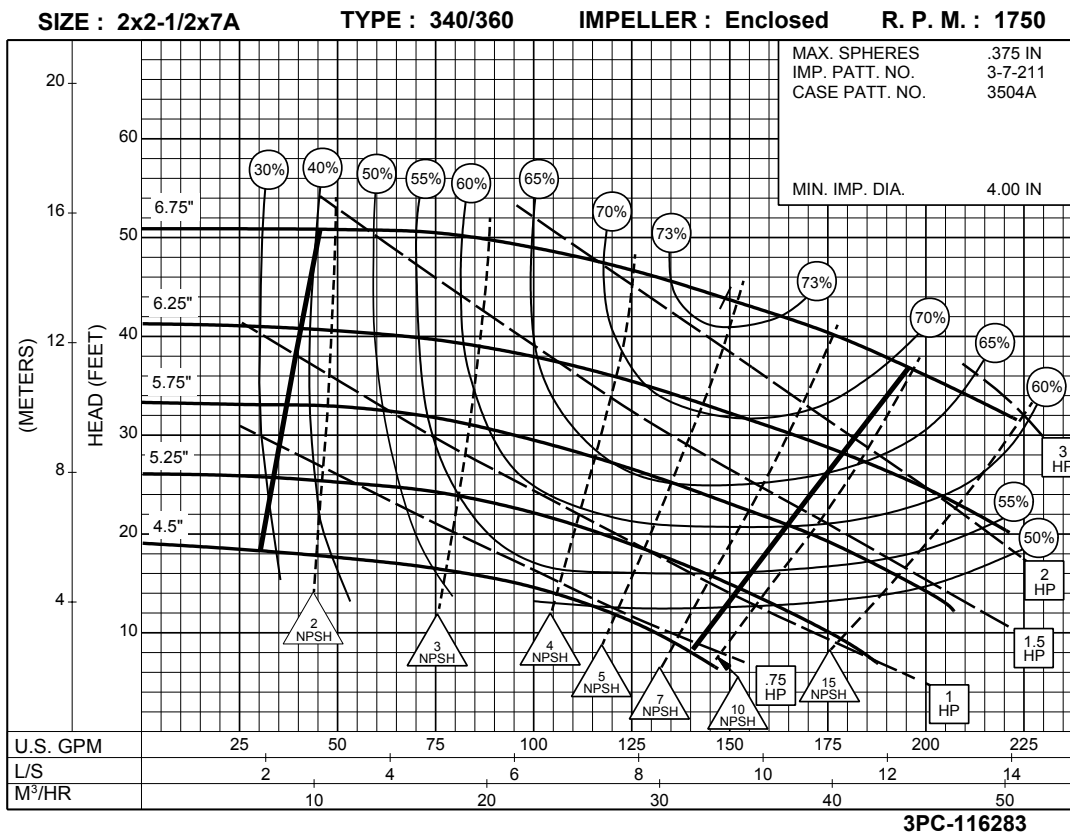
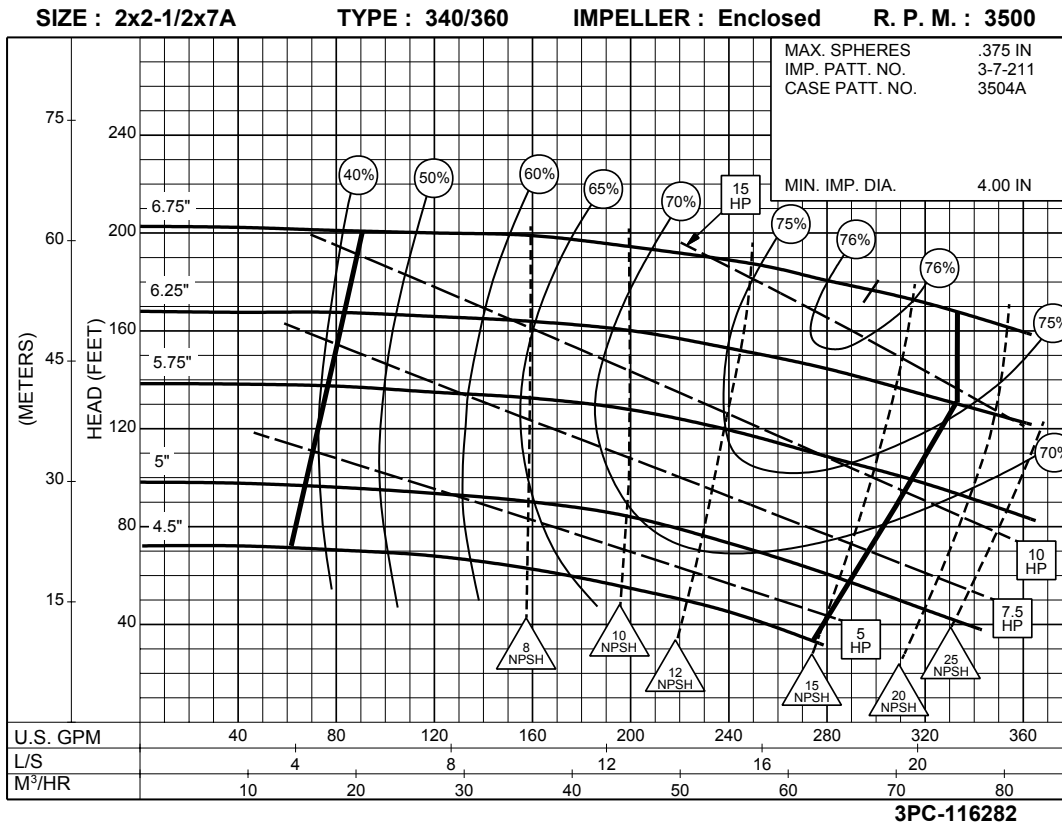
ENCLOSED IMPELLER

Section **340/360** Page **409**

Date **January 2001**

Supersedes Section 340/360 Page 409

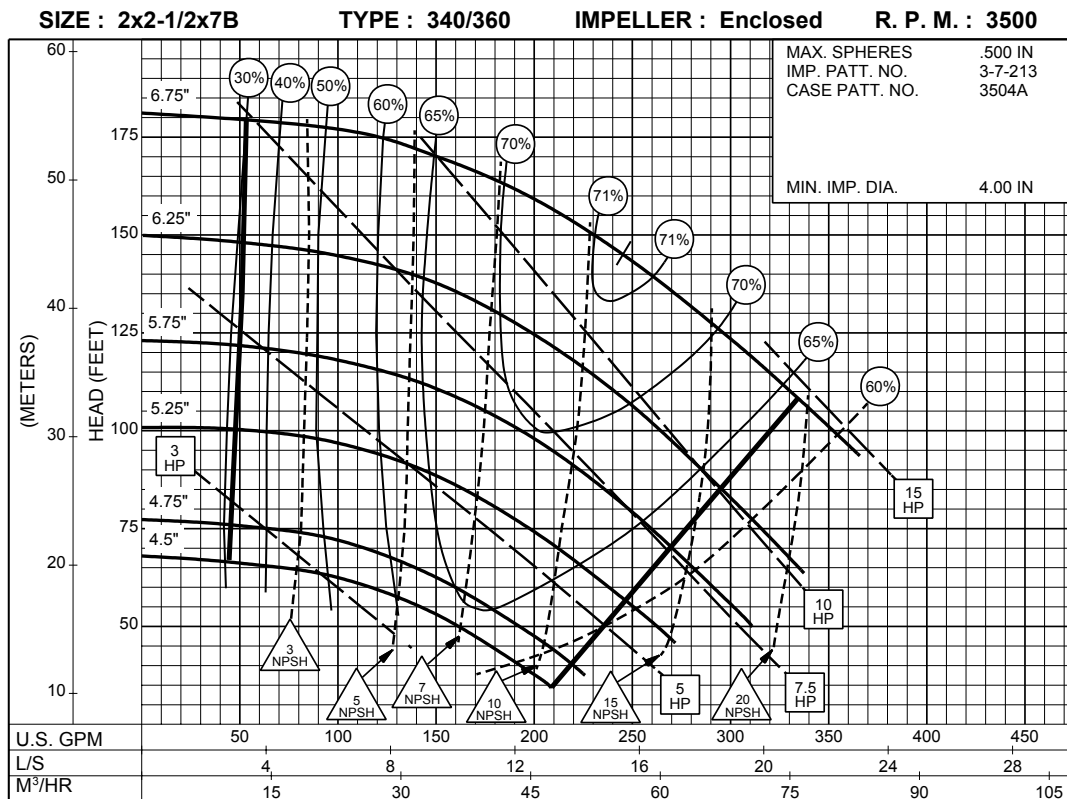
Dated June 1987



2 x 2-1/2 x 7B
SERIES 340 OR 360

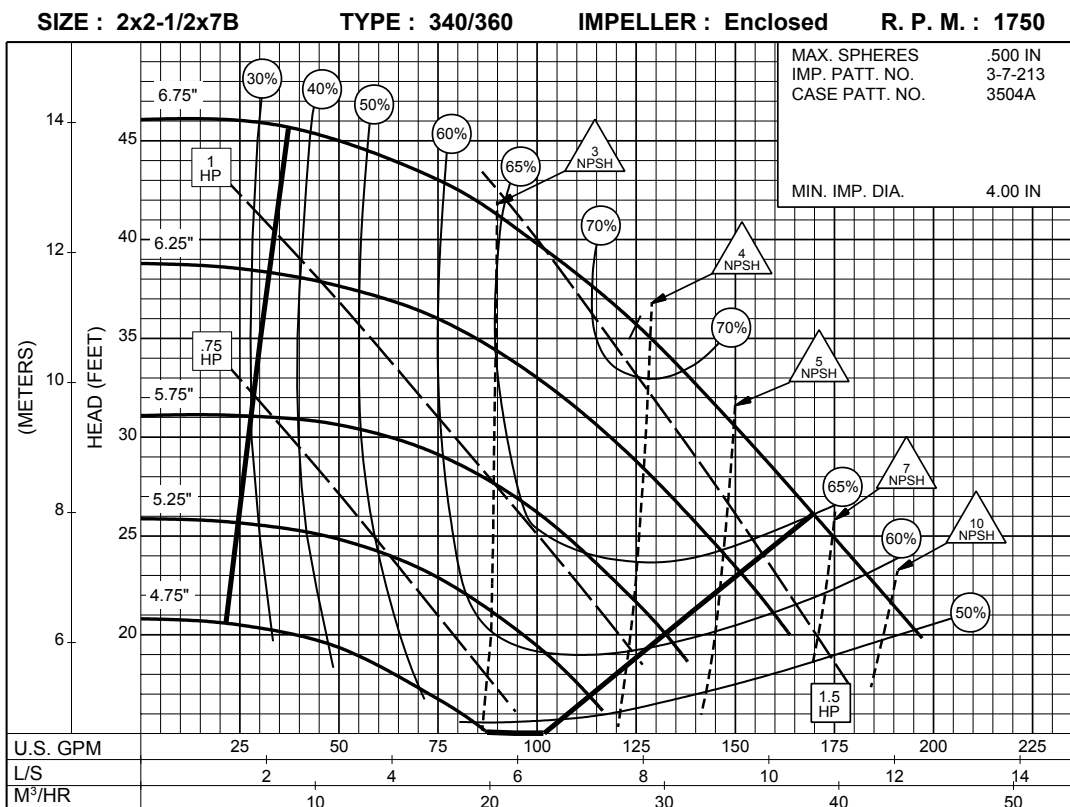
ENCLOSED IMPELLER

3500
RPM



3PC-116284

1750
RPM



3PC-116285

2 x 2-1/2 x 9
SERIES 340 OR 360

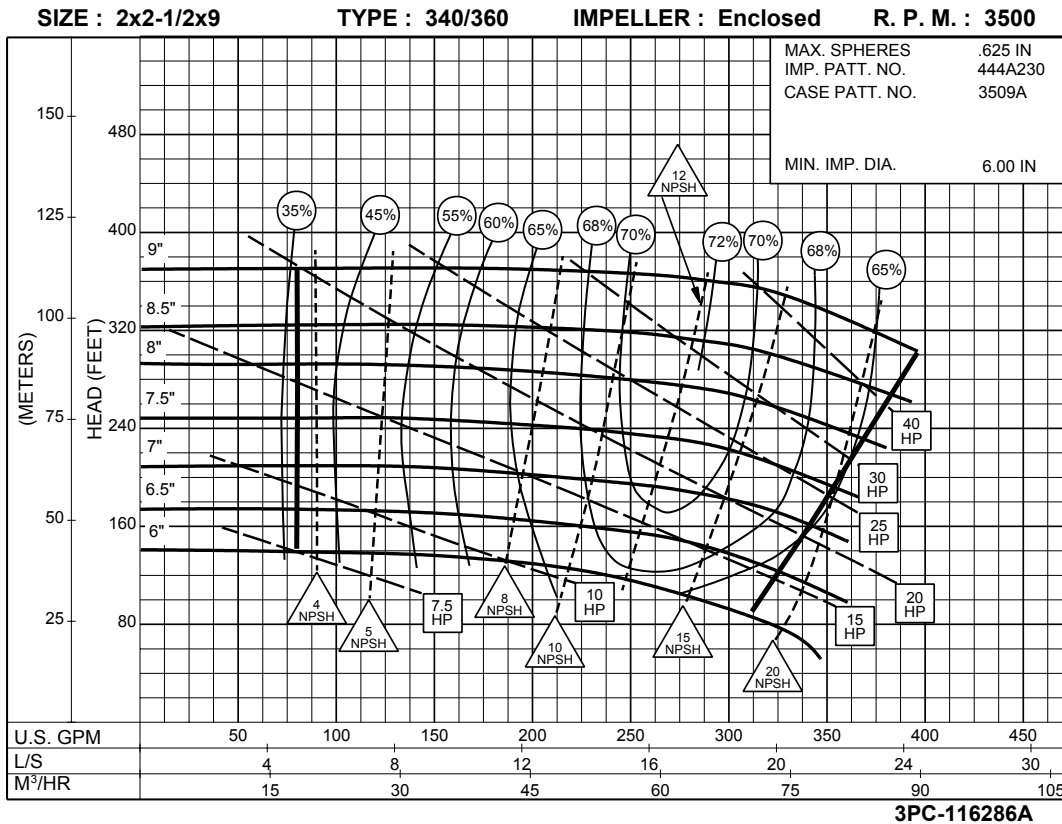
ENCLOSED IMPELLER

Section **340/360** Page **411**

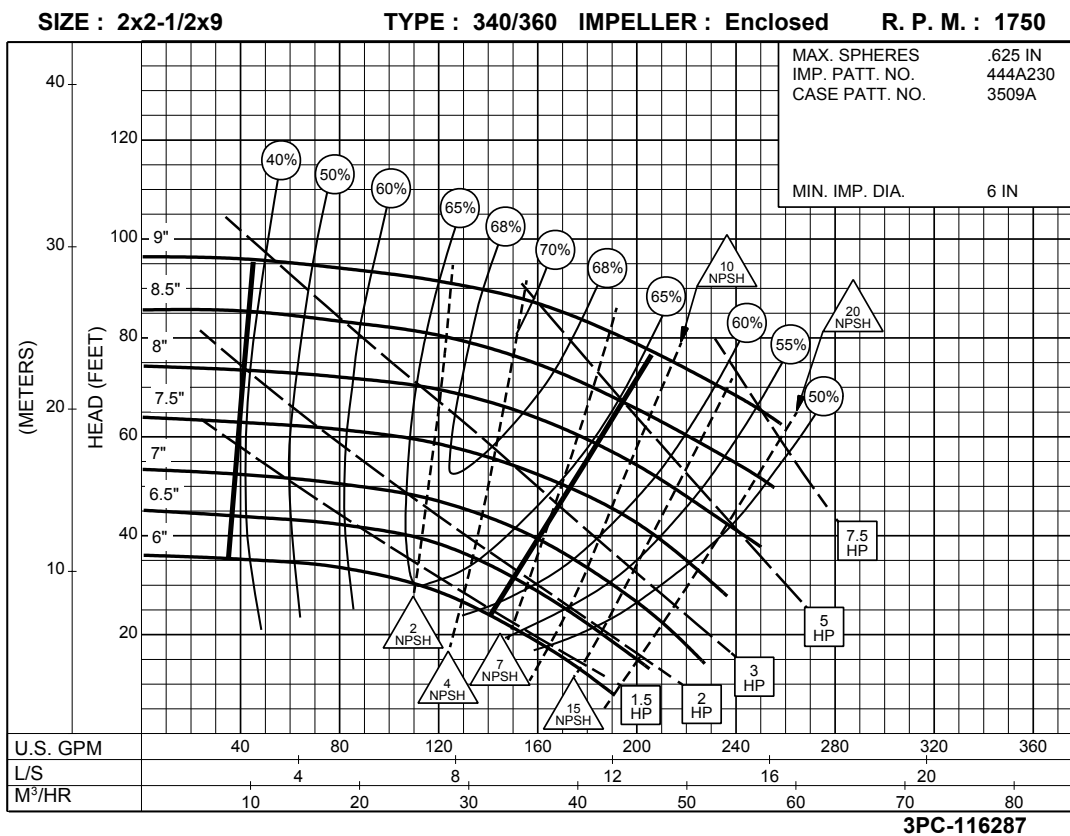
Date **January 2001**

Supersedes Section 340/360 Page 411

Dated June 1987



3500
RPM



1750
RPM

2 x 2-1/2 x 12 **SERIES 340 OR 360**

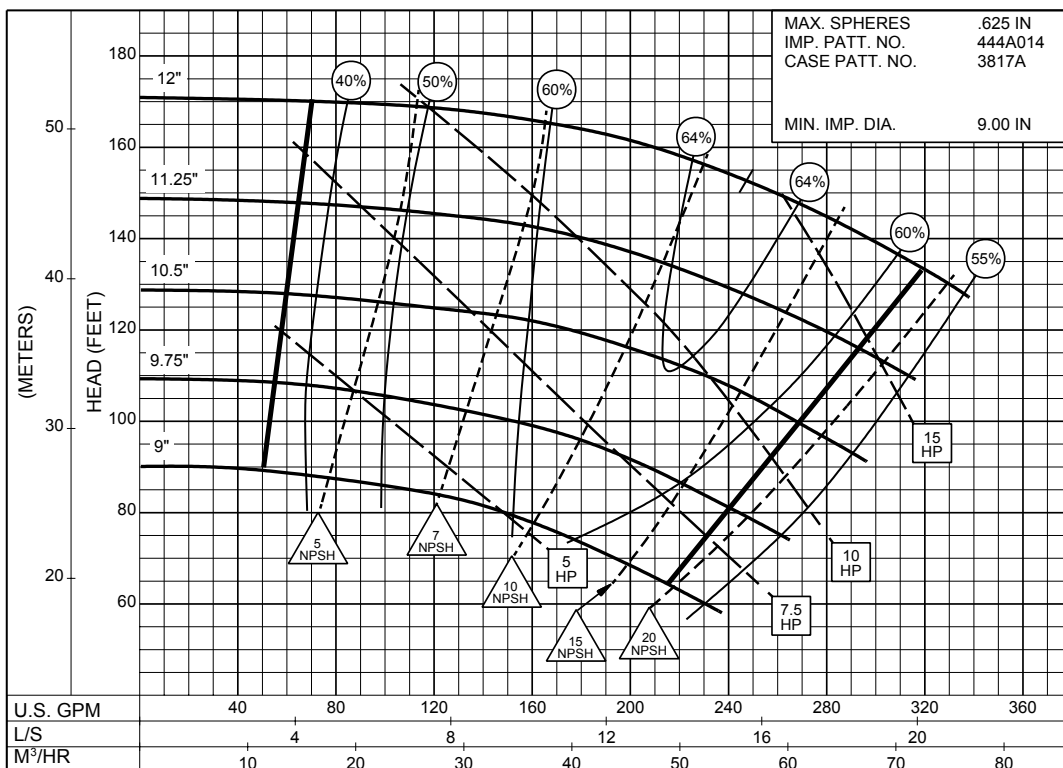
ENCLOSED IMPELLER

SIZE : 2x2-1/2x12

TYPE : 340/360

IMPELLER : Enclosed

R. P. M. : 1750



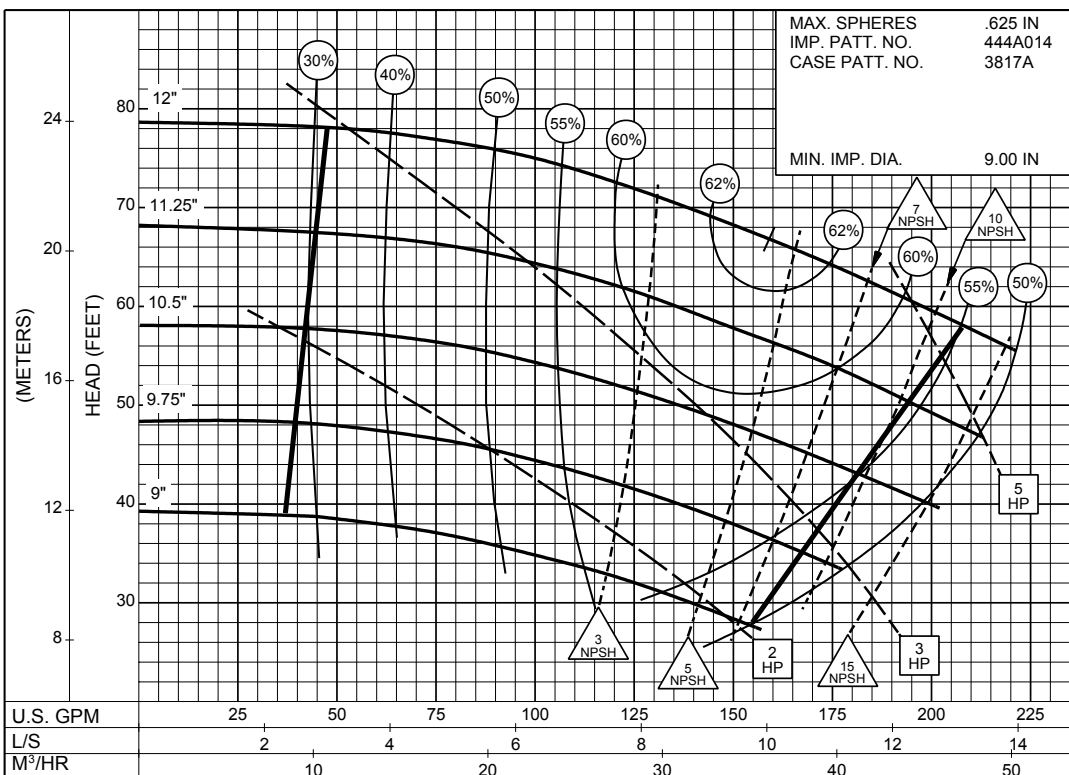
3PC-116288

SIZE : 2x2-1/2x12

TYPE : 340/360

IMPELLER : Enclosed

R. P. M. : 1150



3PC-116289

1750
RPM

1150
RPM

2 x 3 x 11 SERIES 340 OR 360

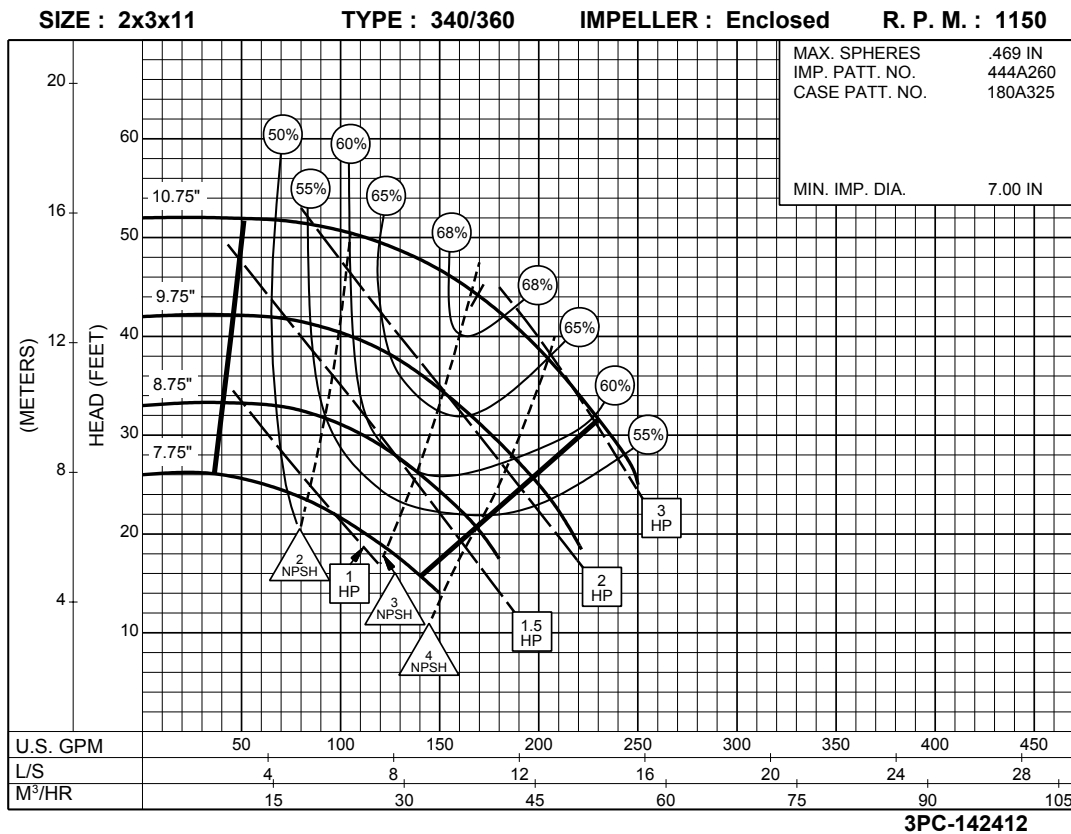
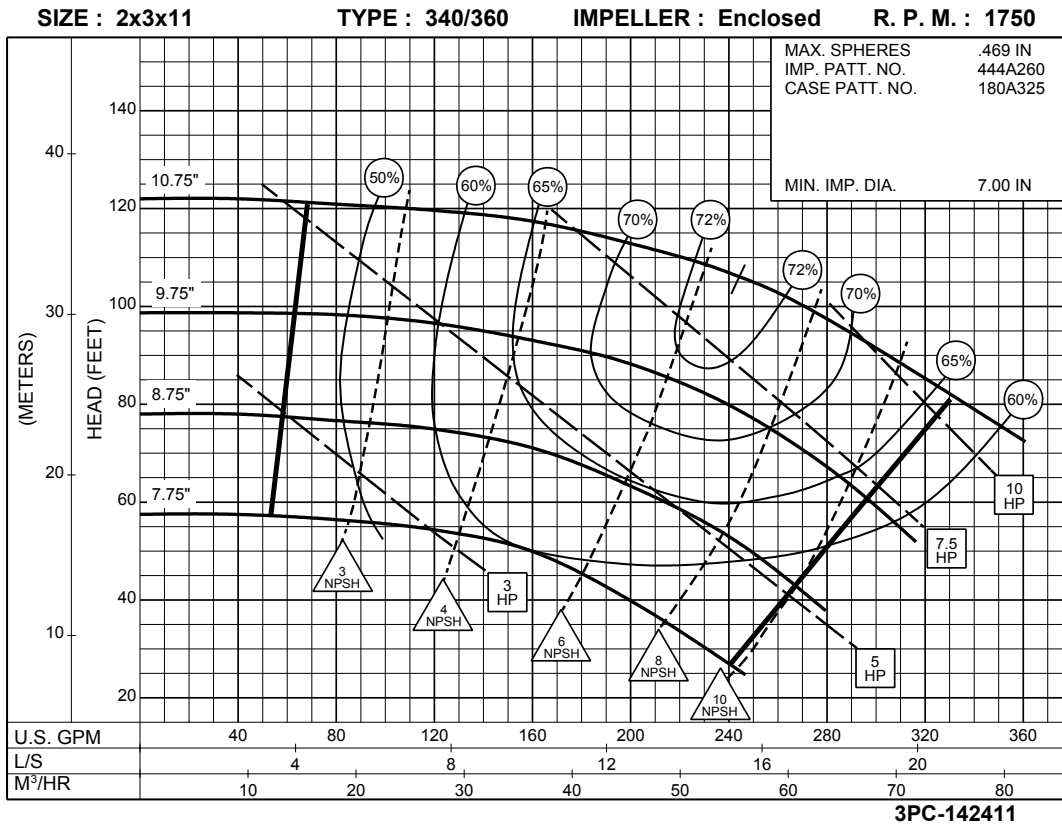
ENCLOSED IMPELLER

Section **340/360** Page **413**

Date **January 2001**

Supersedes Section 340/360 Page 413

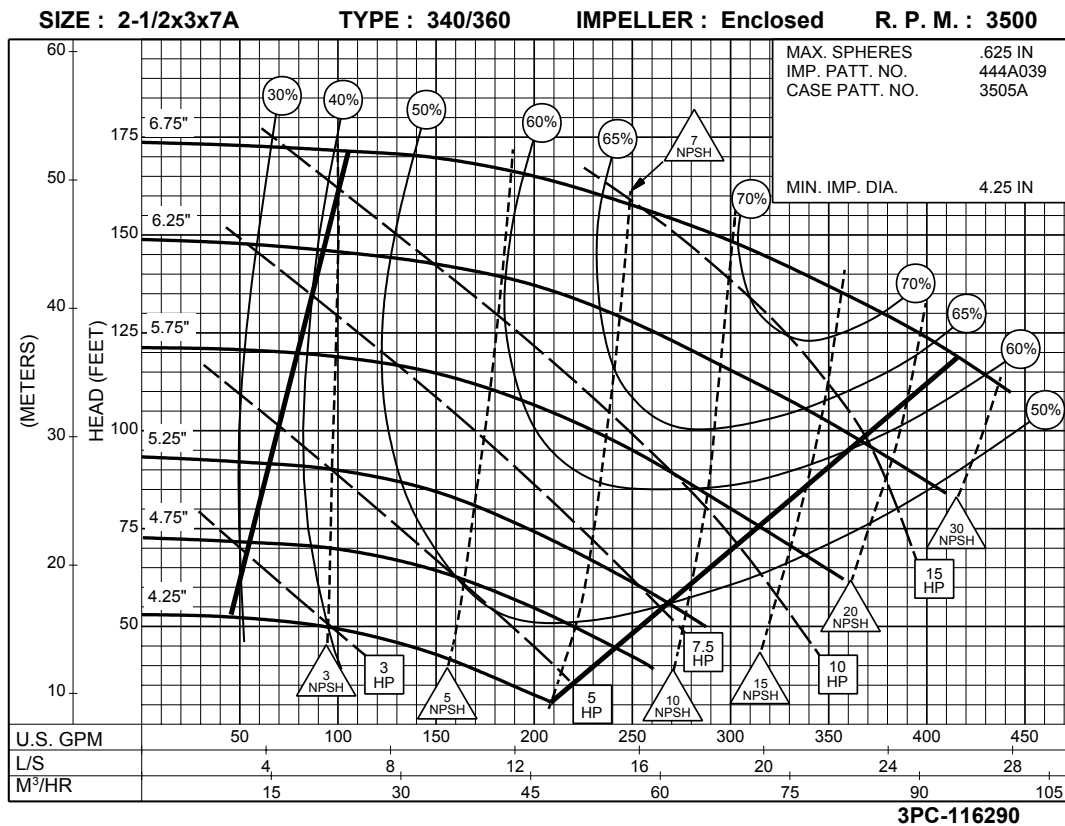
Dated January 1986



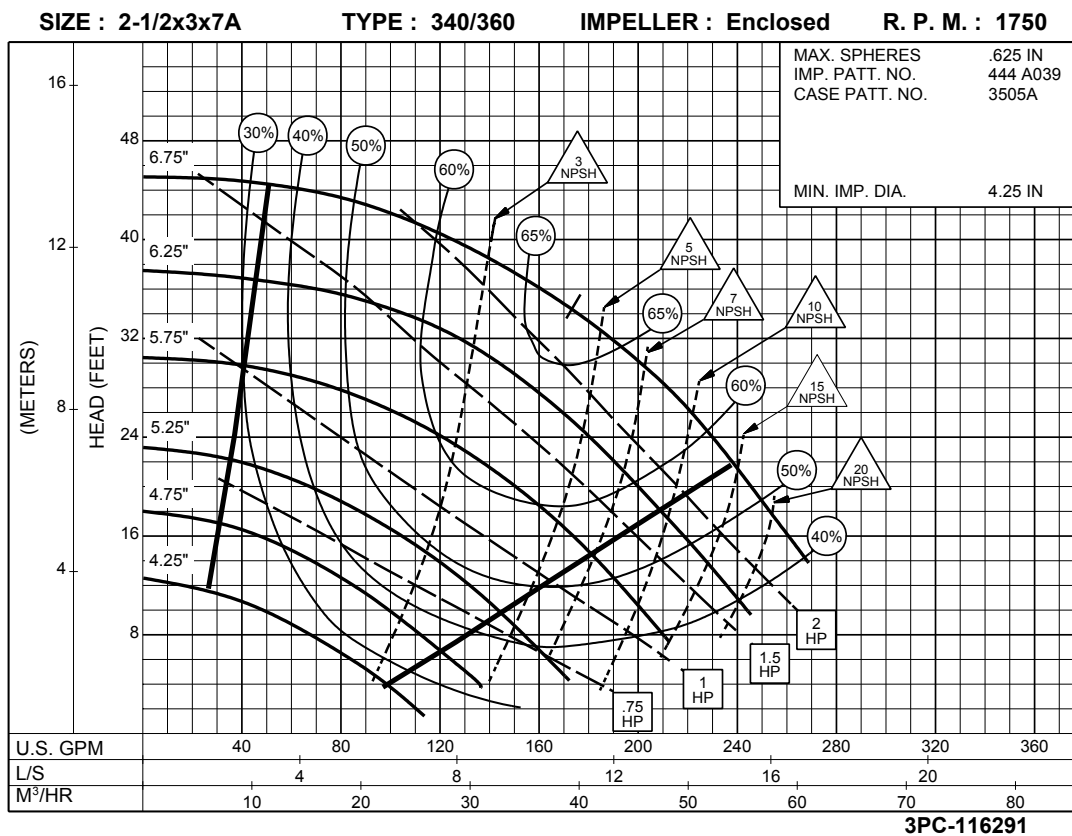
2-1/2 x 3 x 7A **SERIES 340 OR 360**

ENCLOSED IMPELLER

3500
RPM



1750
RPM



2-1/2 x 3 x 7B
SERIES 340 OR 360

ENCLOSED IMPELLER

Section **340/360** Page **415**

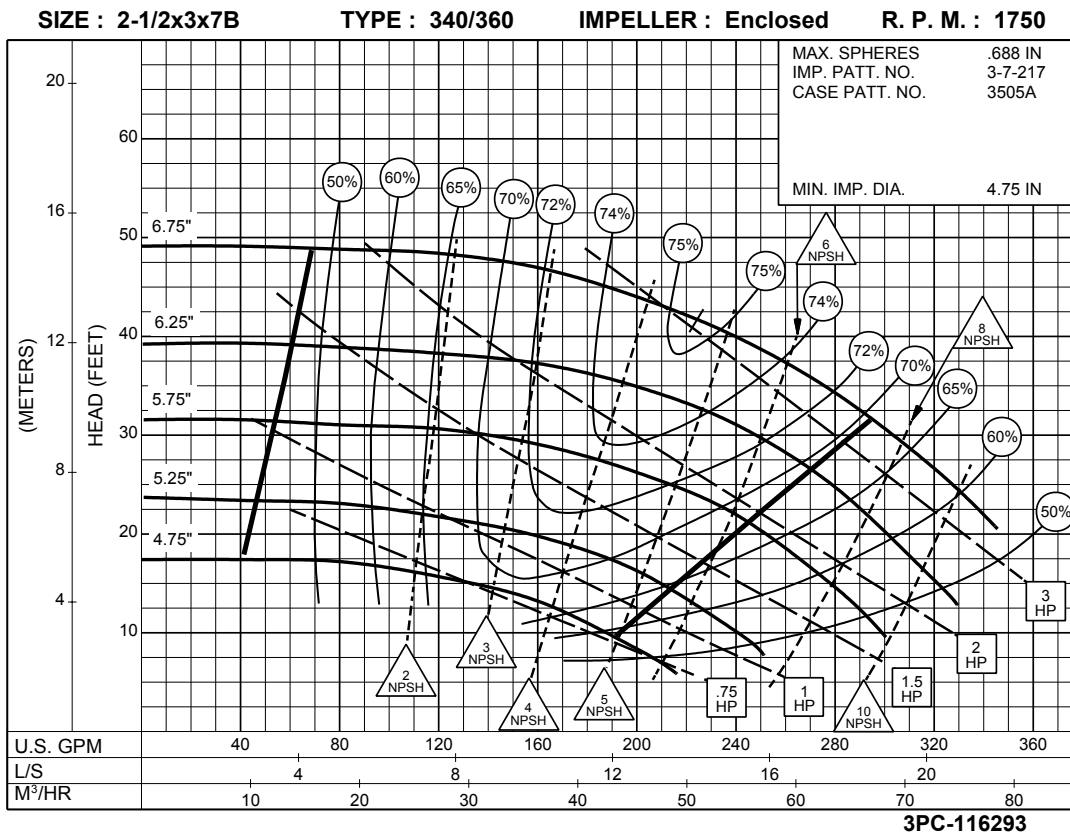
Date **January 2001**

Supersedes Section 340/360 Page 415

Dated January 1986



3500
RPM



1750
RPM

2-1/2 x 3 x 9
SERIES 340 OR 360

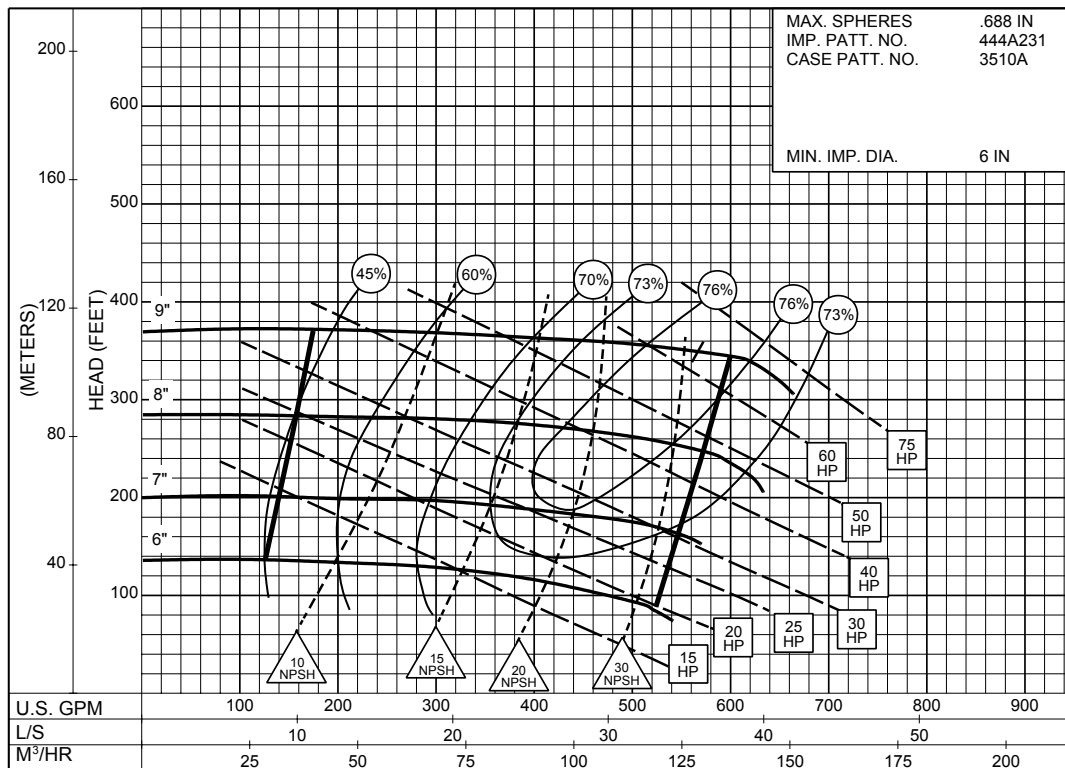
ENCLOSED IMPELLER

SIZE : 2-1/2x3x9

TYPE : 340/360

IMPELLER : Enclosed

R. P. M. : 3500



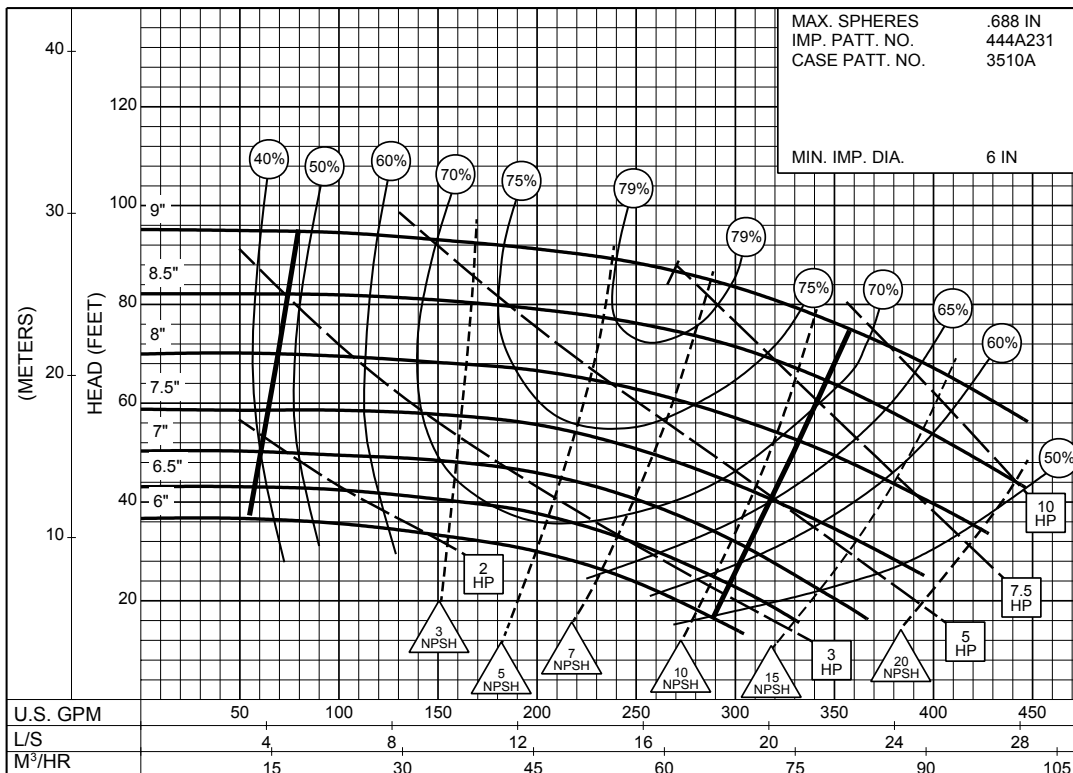
3PC-140728

SIZE : 2-1/2x3x9

TYPE : 340/360

IMPELLER : Enclosed

R. P. M. : 1750



3PC-116295

2-1/2 x 3 x 12 SERIES 340 OR 360

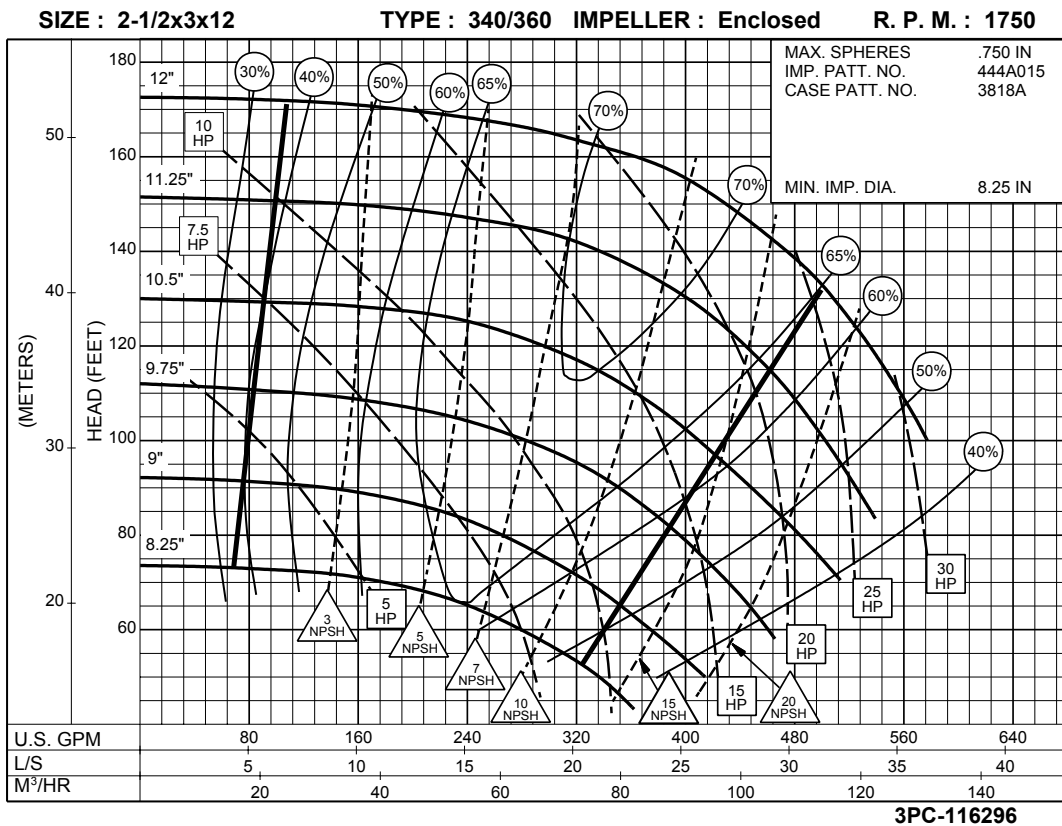
ENCLOSED IMPELLER

Section **340/360** Page **417**

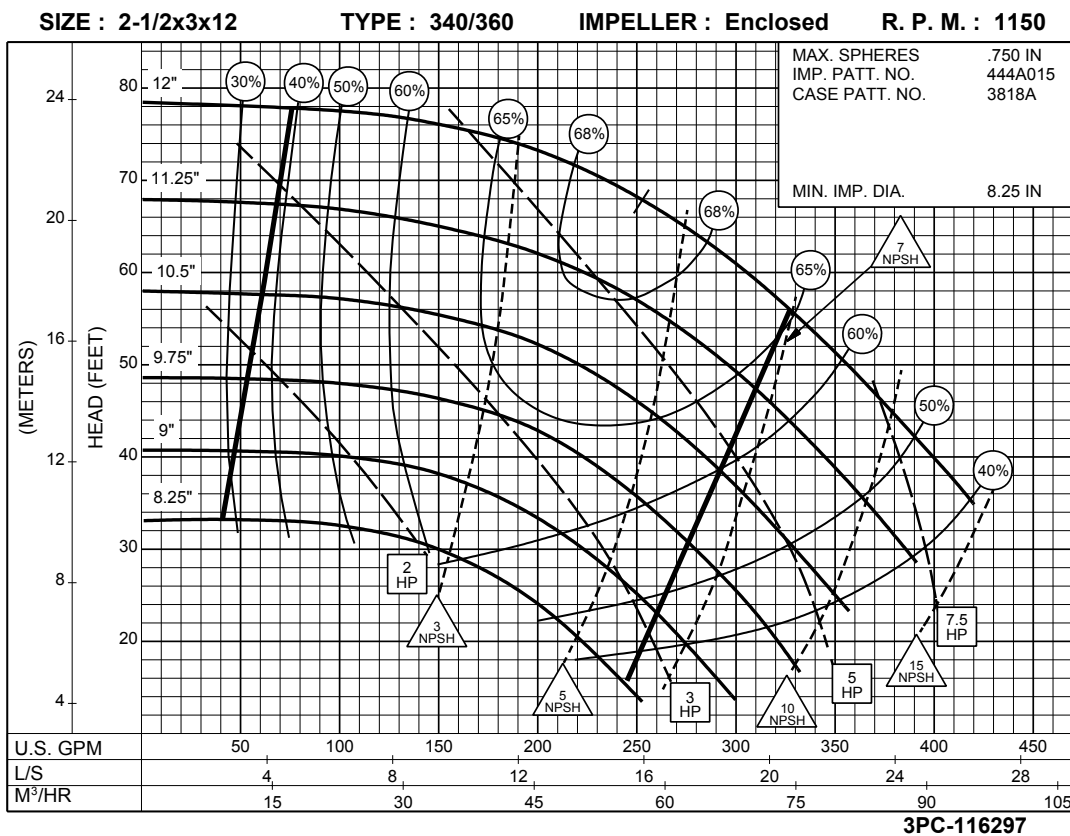
Date **January 2001**

Supersedes Section 340/360 Page 417

Dated January 1986



1750
RPM



1150
RPM

3 x 4 x 9A **SERIES 340 OR 360**

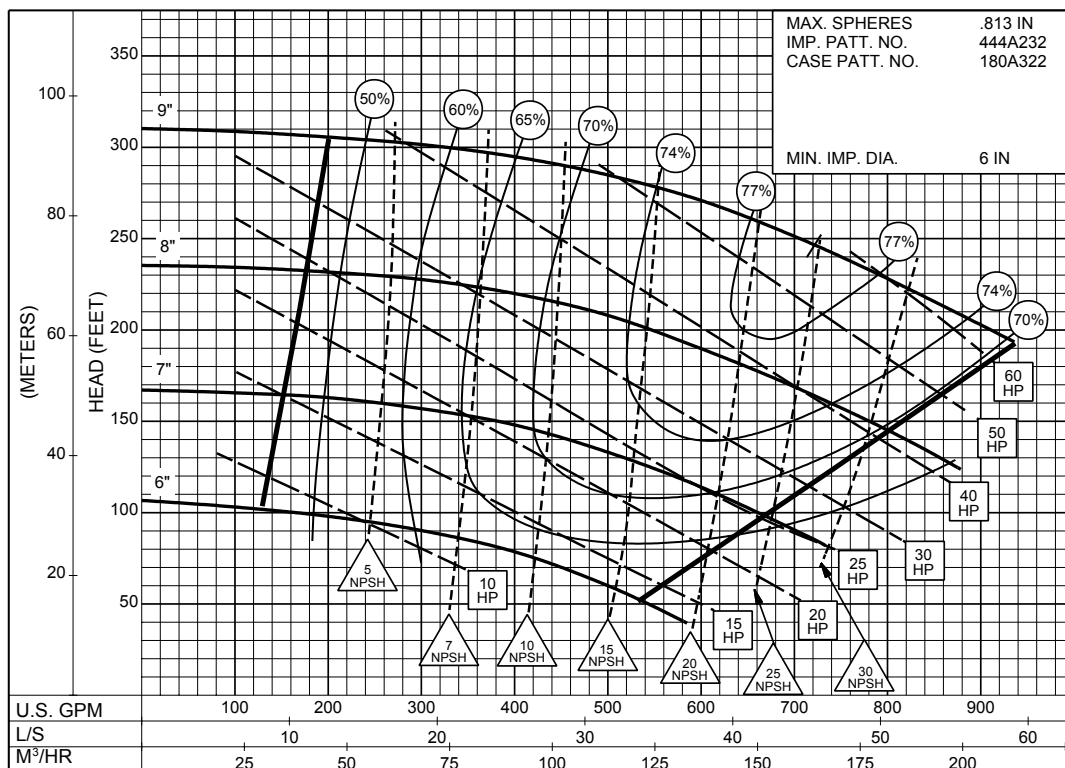
ENCLOSED IMPELLER

SIZE : 3x4x9A

TYPE : 340/360

IMPELLER : Enclosed

R. P. M. : 3500



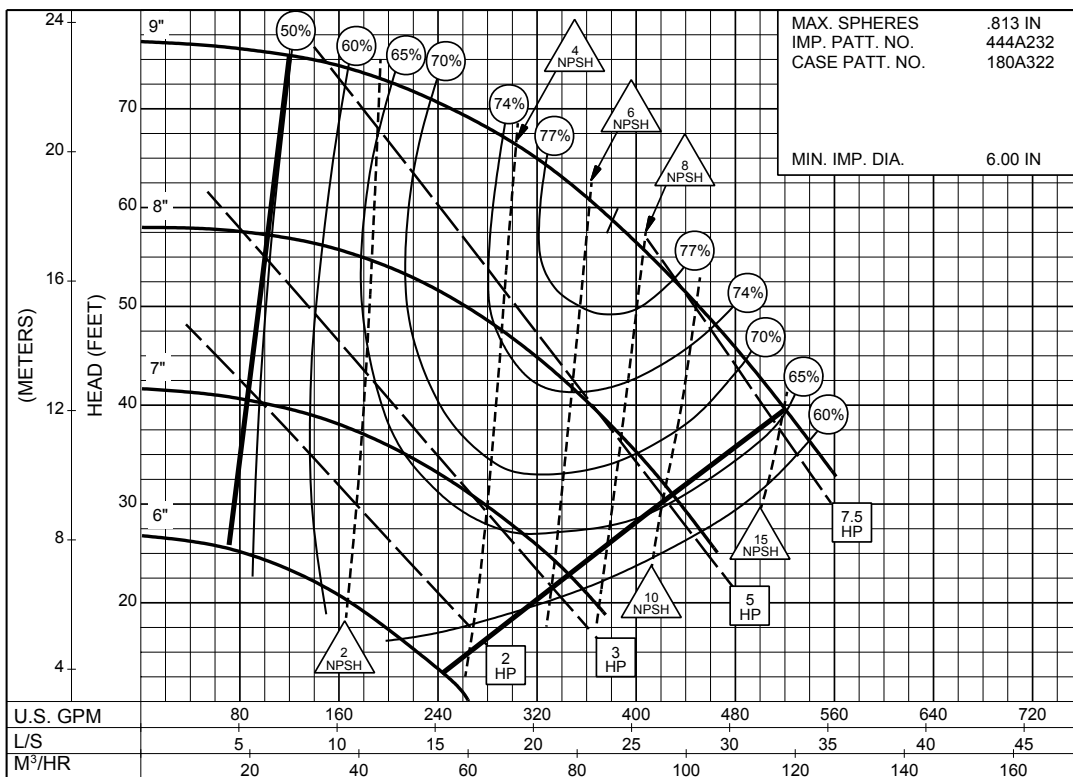
3500
RPM

SIZE : 3x4x9A

TYPE : 340/360

IMPELLER : Enclosed

R. P. M. : 1750



1750
RPM

3 x 4 x 9B **SERIES 340 OR 360**

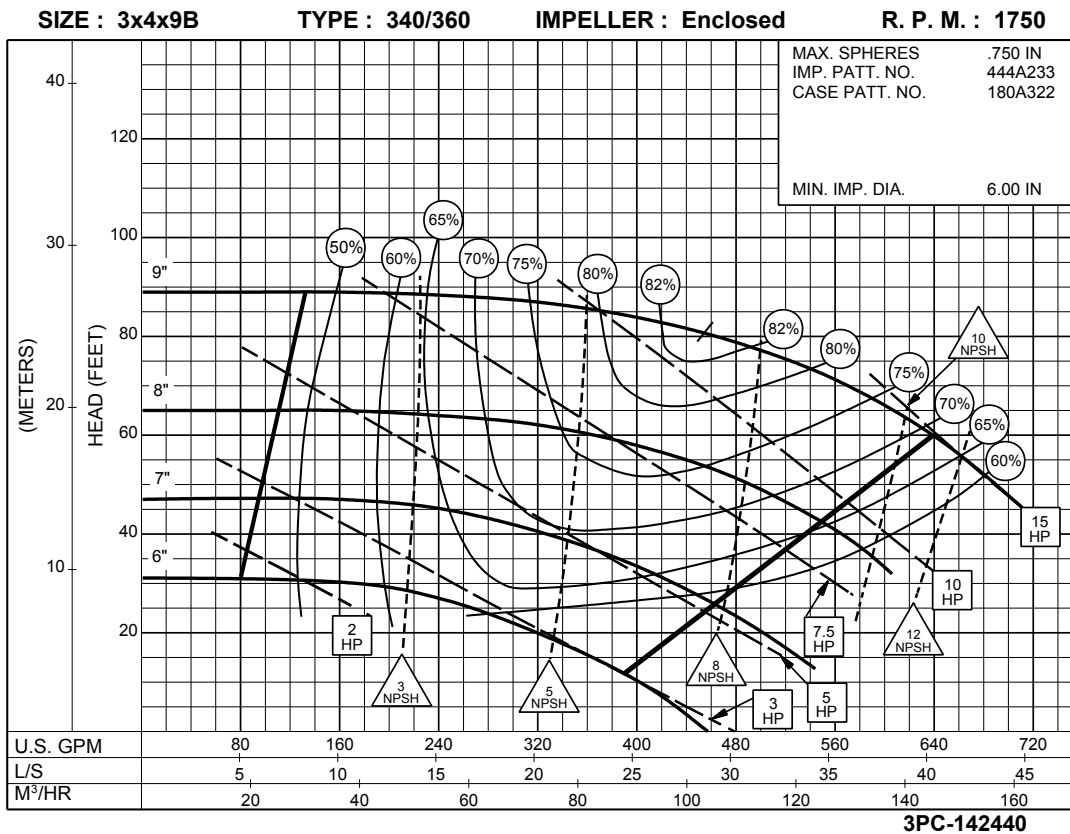
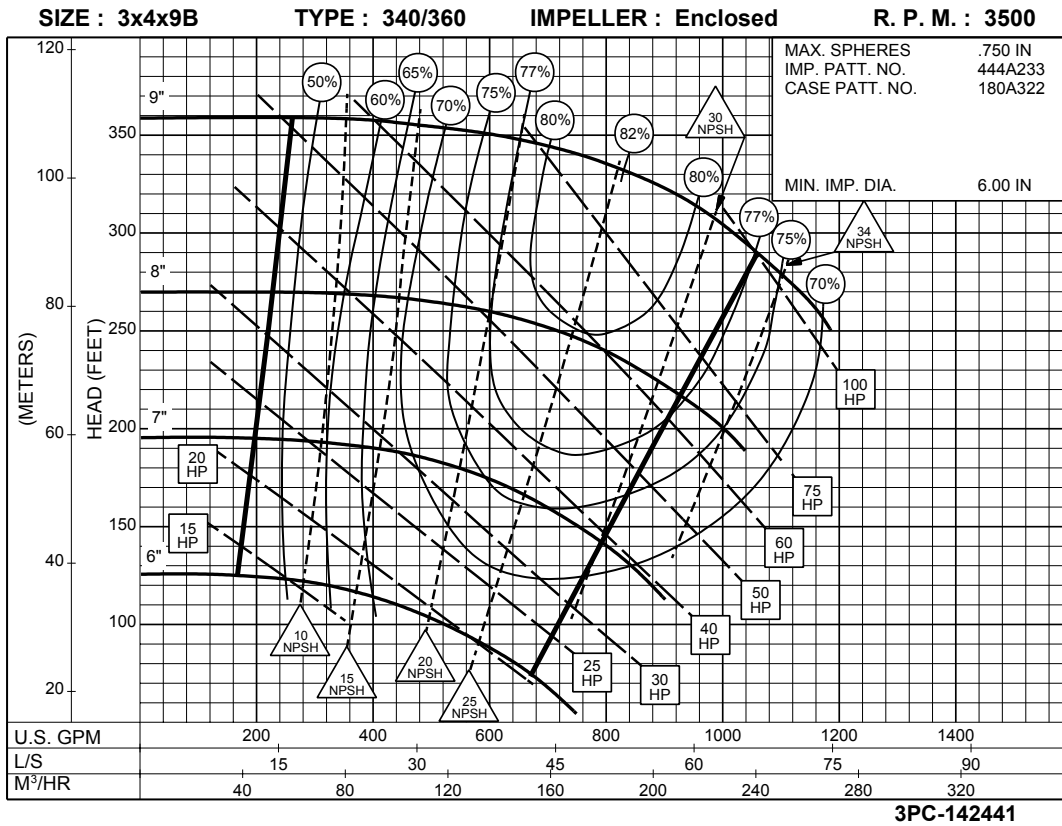
ENCLOSED IMPELLER

Section **340/360** Page **419**

Date **January 2001**

Supersedes Section 340/360 Page 419

Dated January 1986



3 x 4 x 11 **SERIES 340 OR 360**

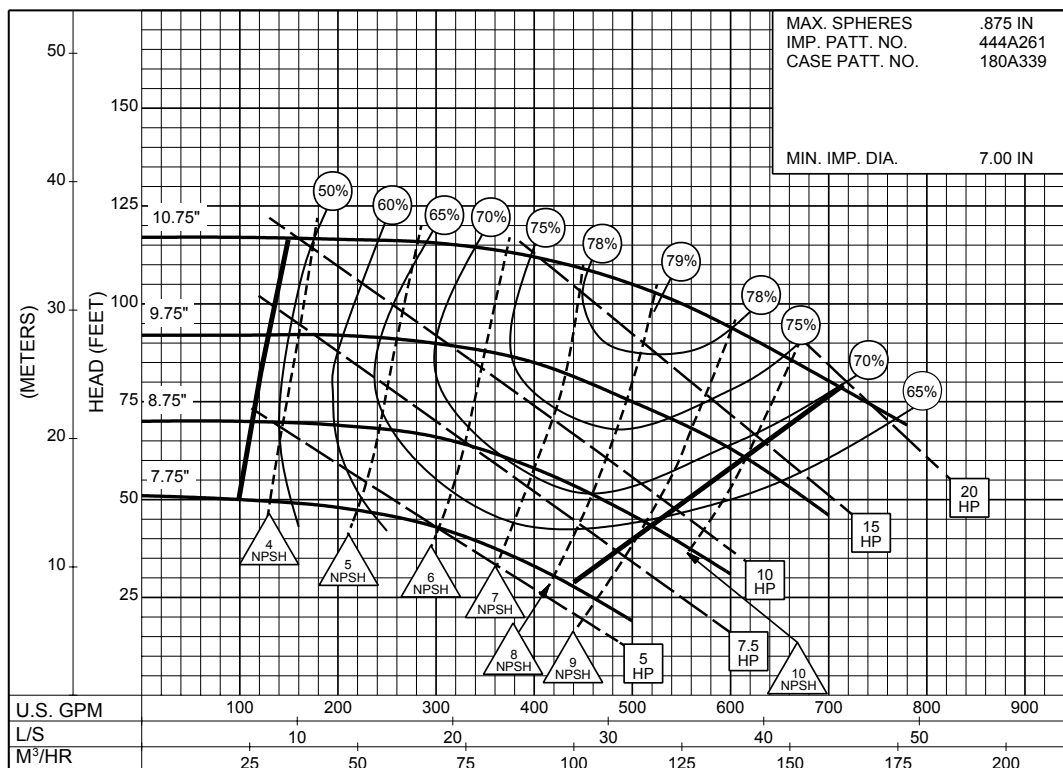
ENCLOSED IMPELLER

SIZE : 3x4x11

TYPE : 340/360

IMPELLER : Enclosed

R. P. M. : 1750



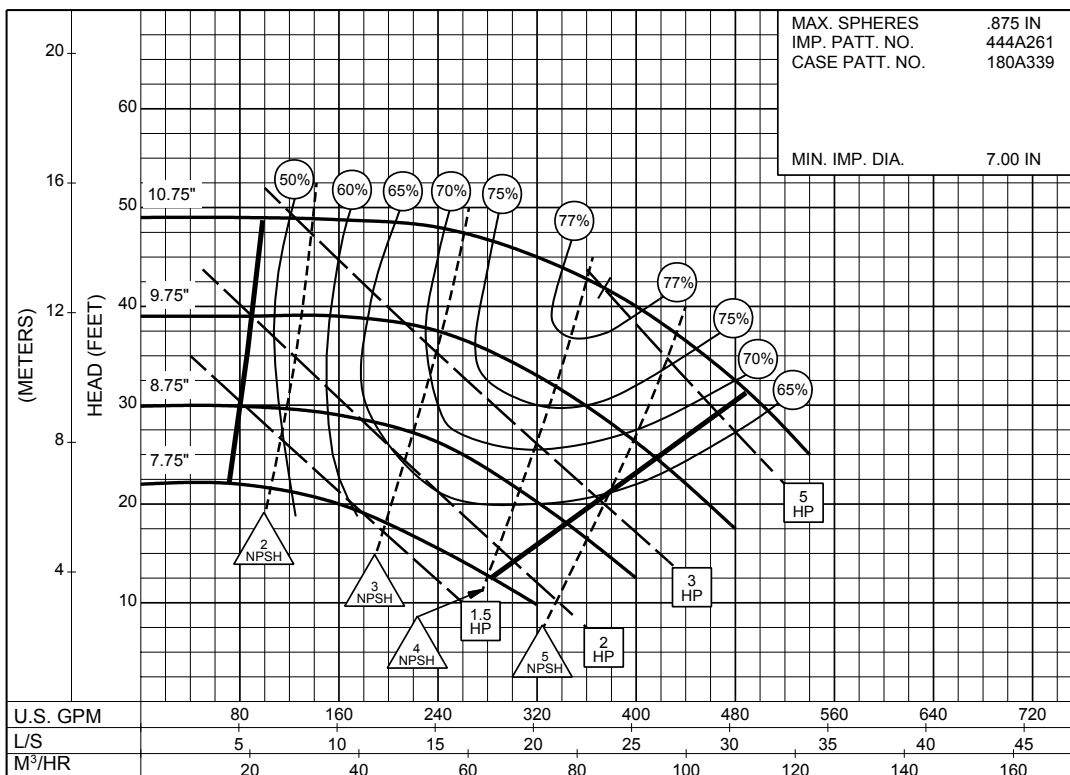
1750
RPM

SIZE : 3x4x11

TYPE : 340/360

IMPELLER : Enclosed

R. P. M. : 1150



1150
RPM

3 x 4 x 12 SERIES 340 OR 360

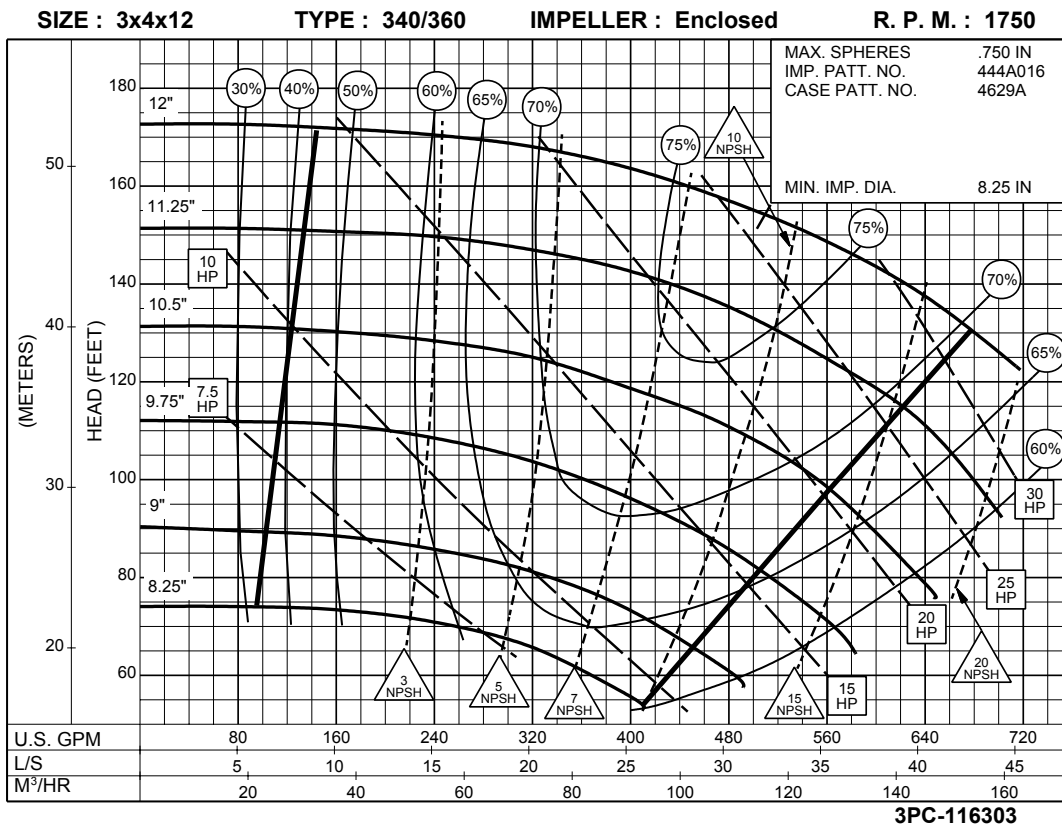
ENCLOSED IMPELLER

Section **340/360** Page **421**

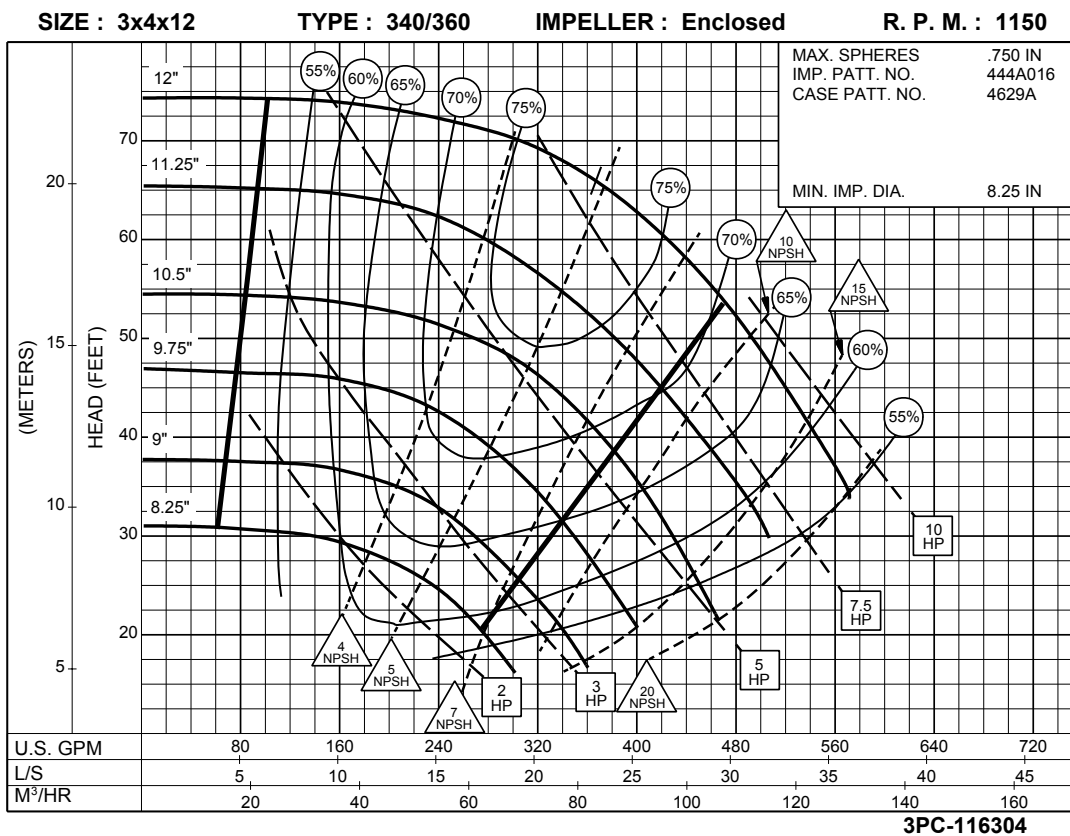
Date **January 2001**

Supersedes Section 340/360 Page 421

Dated January 1986



1750
RPM

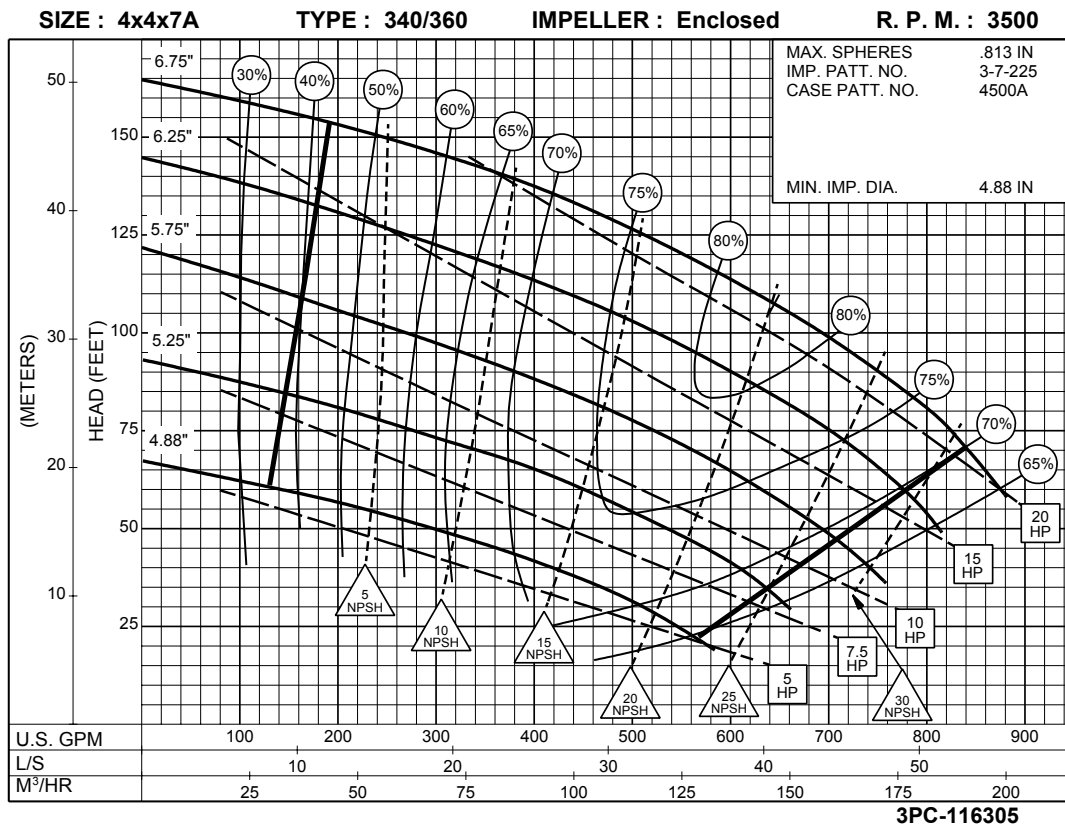


1150
RPM

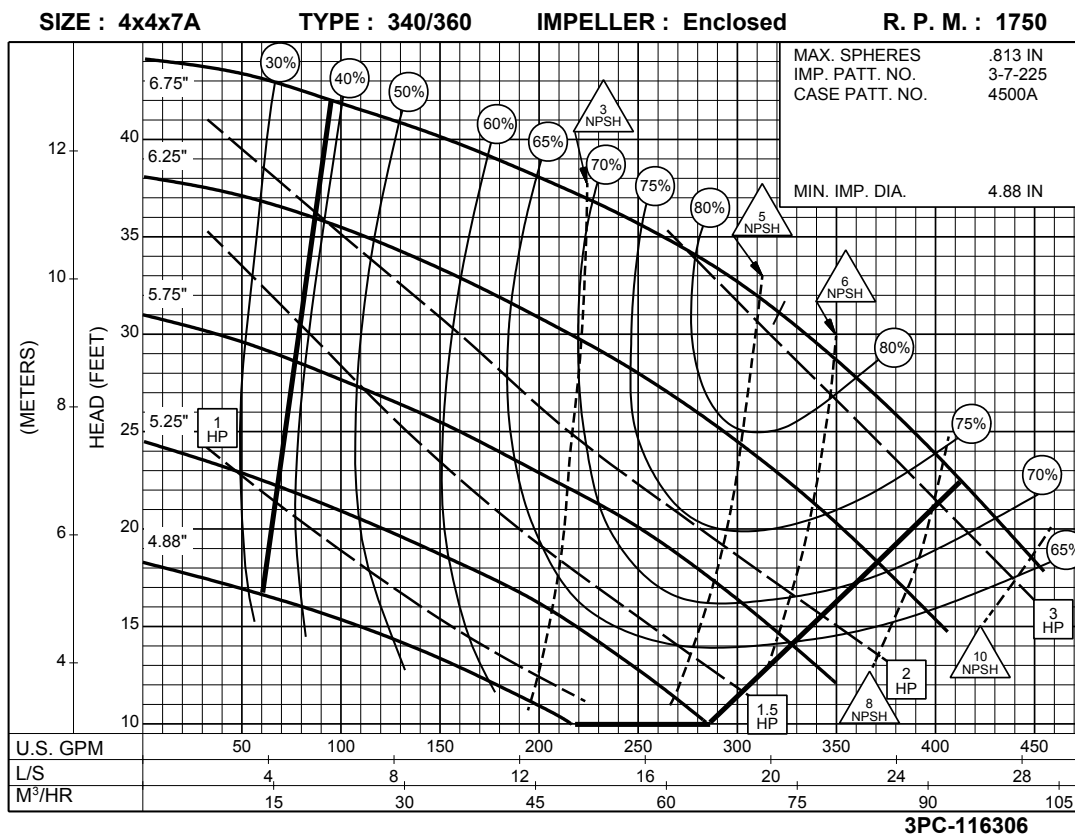
4 x 4 x 7A
SERIES 340 OR 360

ENCLOSED IMPELLER

3500
RPM



1750
RPM



4 x 4 x 7B SERIES 340 OR 360

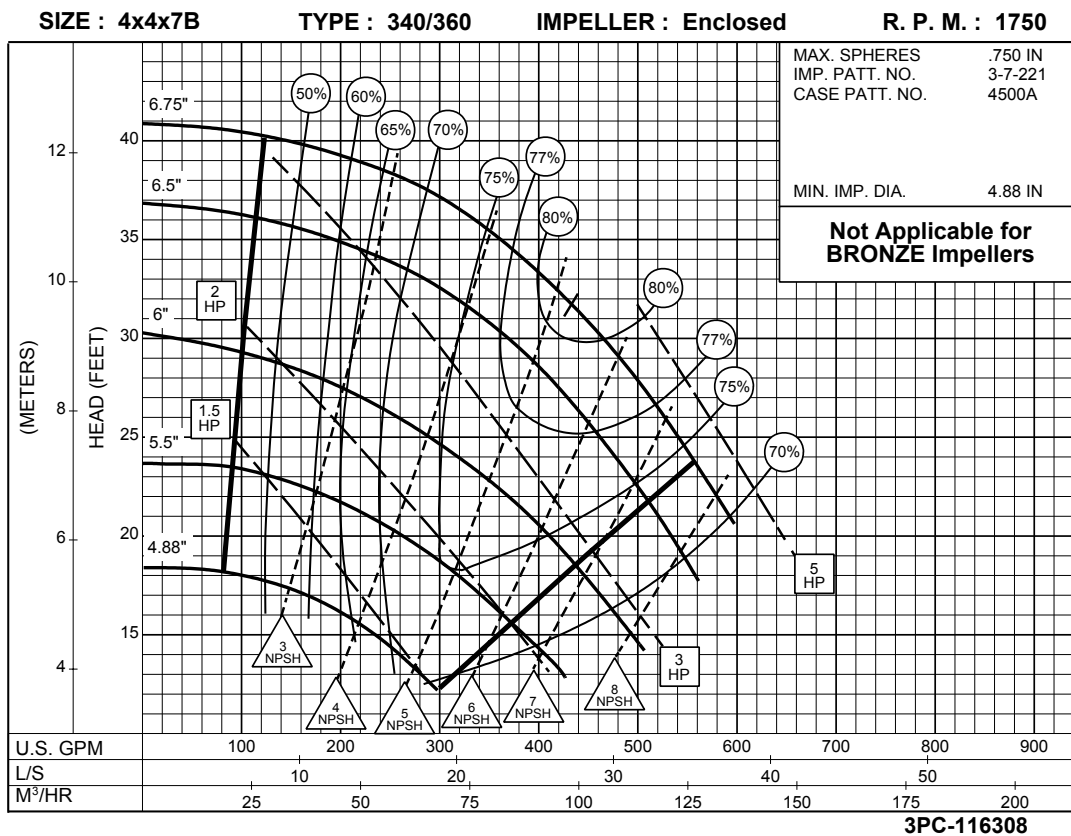
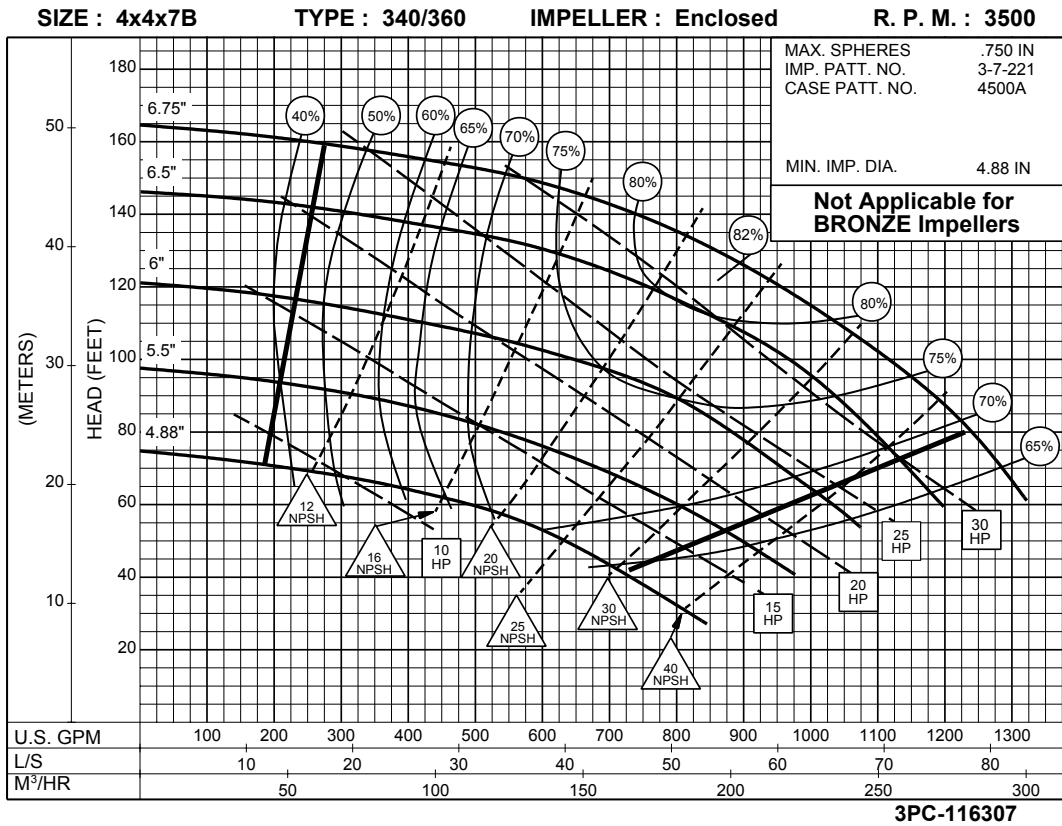
ENCLOSED IMPELLER

Section **340/360** Page **423**

Date **January 2001**

Supersedes Section 340/360 Page 423

Dated January 1986



4 x 4 x 7B **SERIES 340 OR 360**

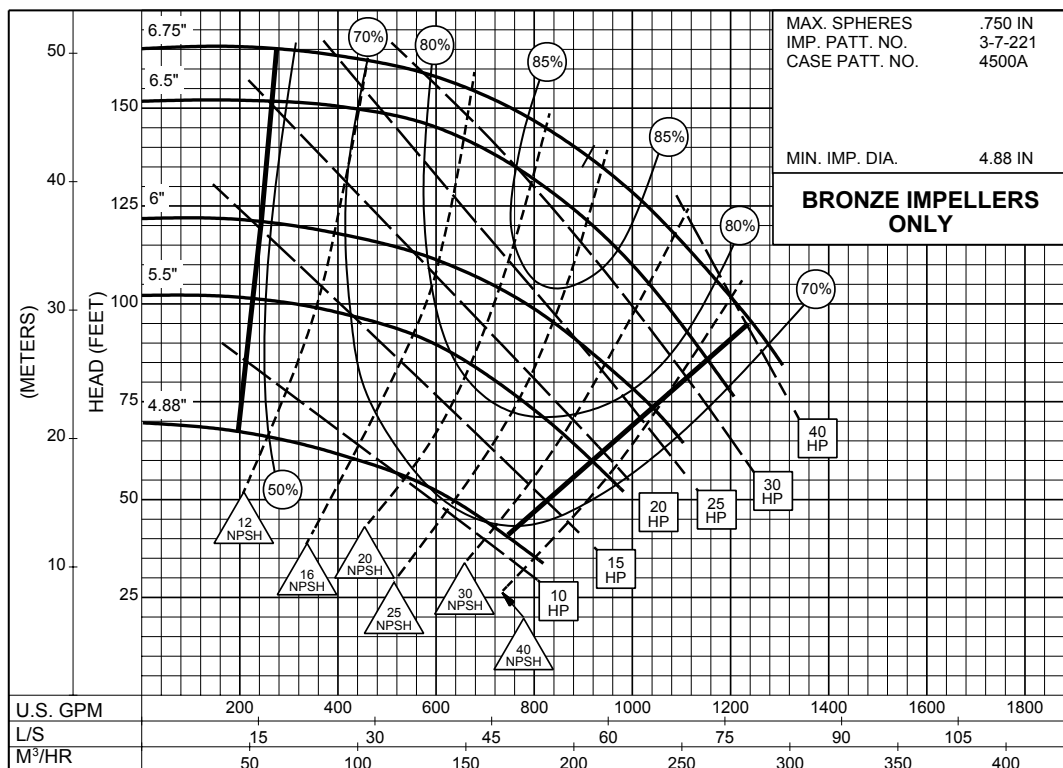
ENCLOSED IMPELLER

SIZE : 4x4x7B

TYPE : 340/360

IMPELLER : Enclosed

R. P. M. : 3500

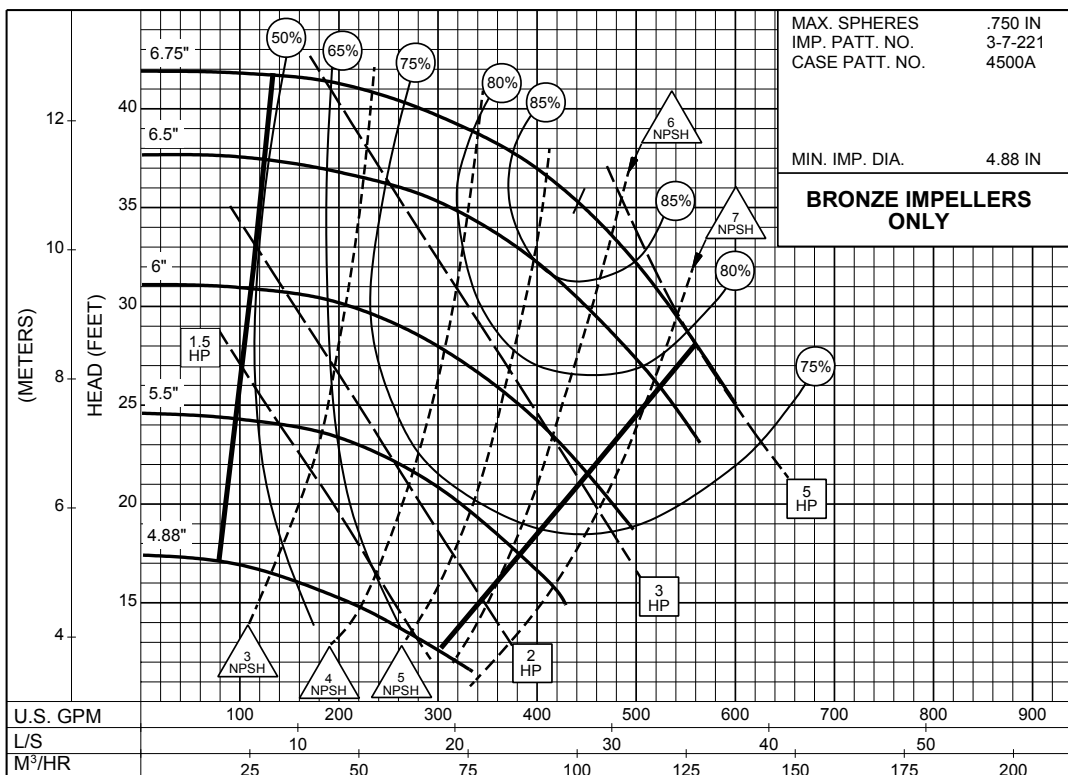


SIZE : 4x4x7B

TYPE : 360/360

IMPELLER : Enclosed

R. P. M. : 1750



4 x 5 x 9A SERIES 340 OR 360

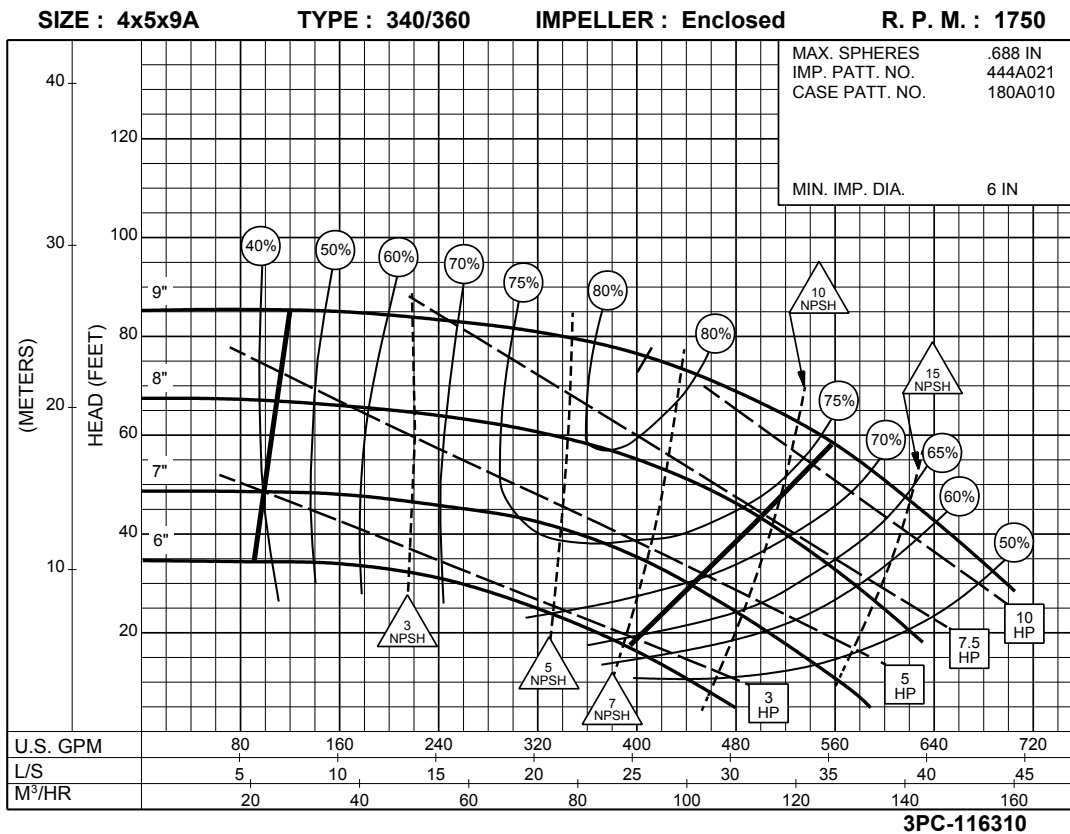
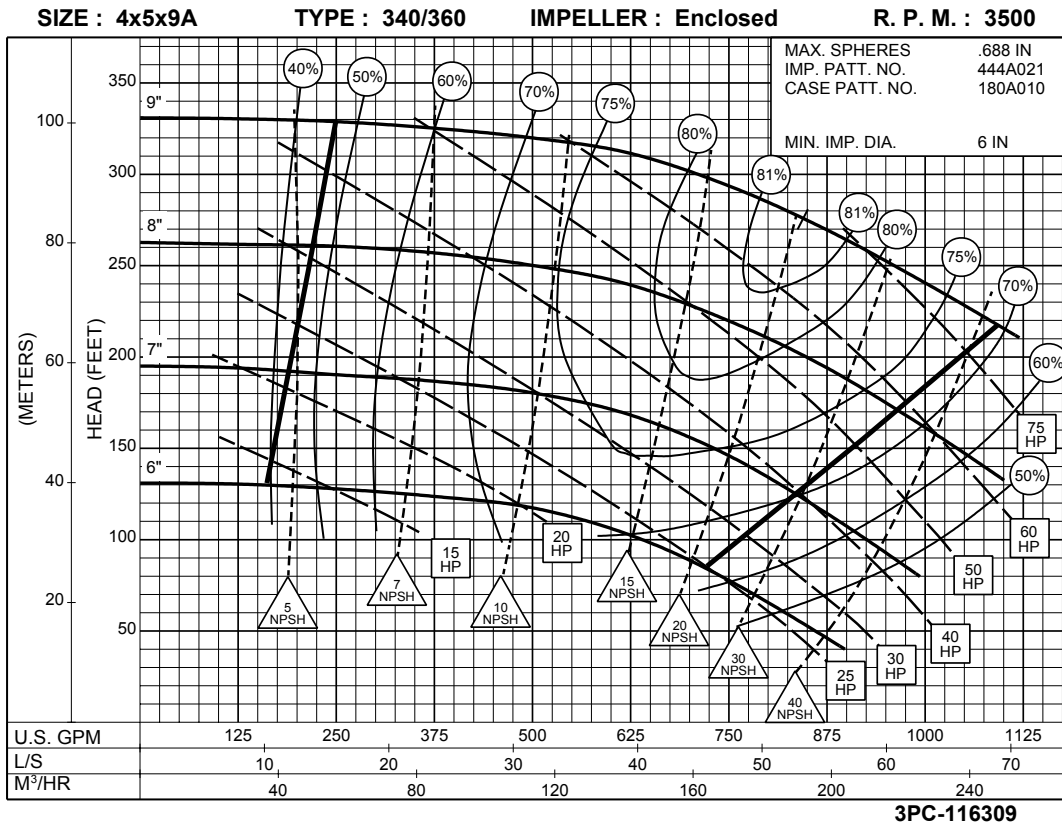
ENCLOSED IMPELLER

Section **340/360** Page **425**

Date **January 2001**

Supersedes Section 340/360 Page 425

Dated January 1986



4 x 5 x 9B
SERIES 340 OR 360

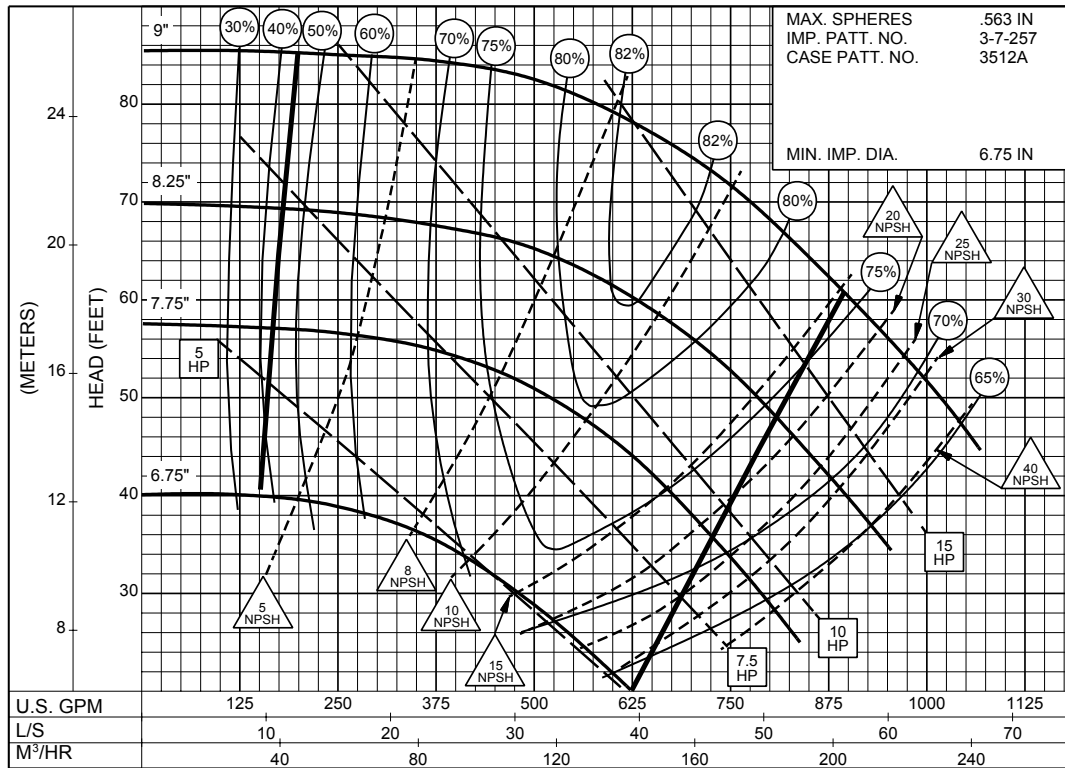
ENCLOSED IMPELLER

SIZE : 4x5x9B

TYPE : 340/360

IMPELLER : Enclosed

R. P. M. : 1750



3PC-116311

1750
RPM

4 x 5 x 11 SERIES 340 OR 360

ENCLOSED IMPELLER

Section **340/360** Page **427**

Date **January 2001**

Supersedes Section 340/360 Page 427

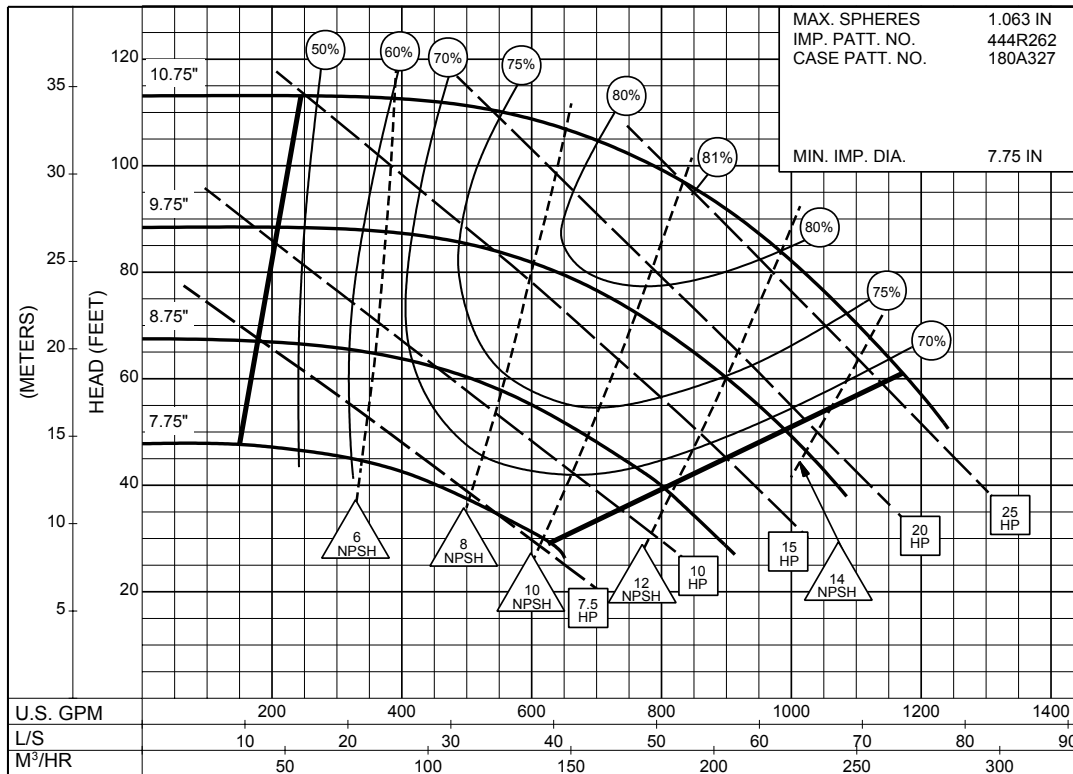
Dated July 1998

SIZE : 4x5x11

TYPE : 340/360

IMPELLER : Enclosed

R. P. M. : 1750



3PC-142471A

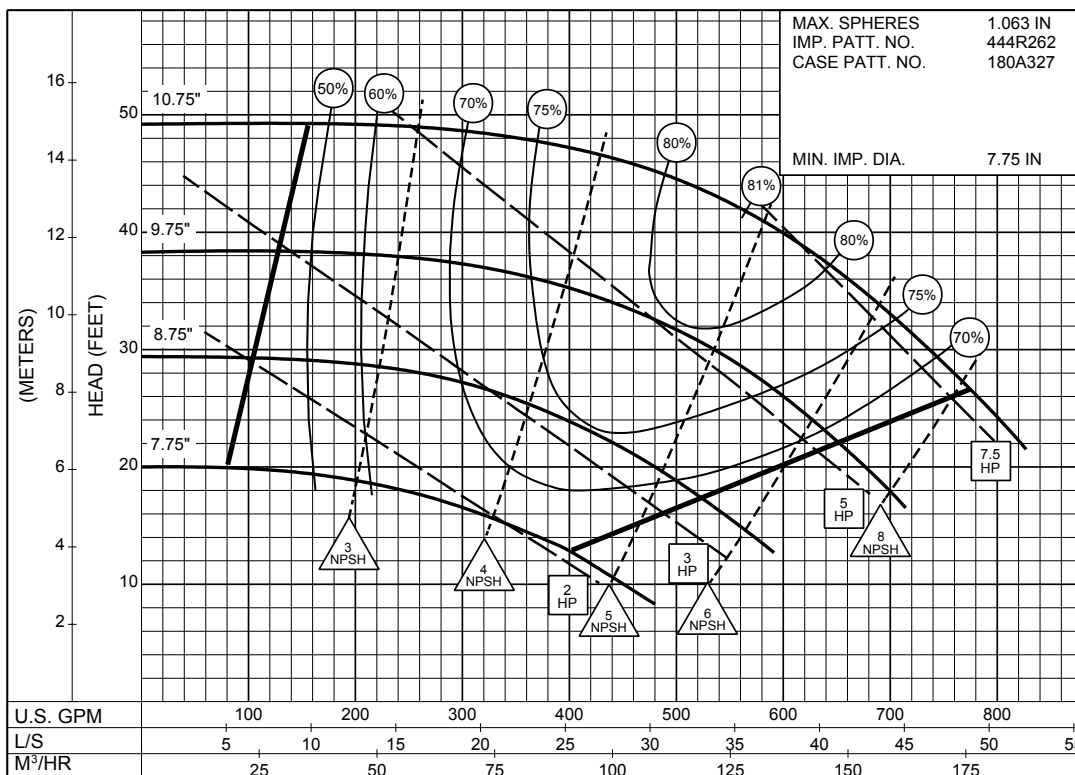
1750
RPM

SIZE : 4x5x11

TYPE : 340/360

IMPELLER : Enclosed

R. P. M. : 1150



3PC-142470A

1150
R.P.M

4 x 5 x 12 **SERIES 340 OR 360**

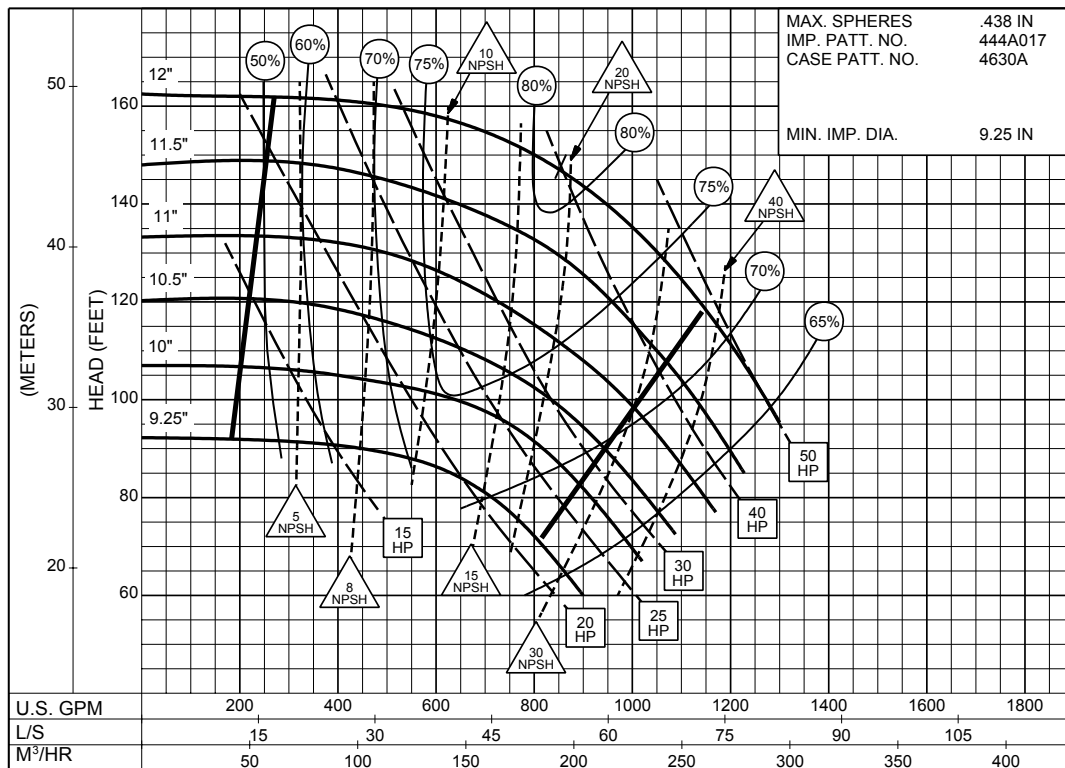
ENCLOSED IMPELLER

SIZE : 4x5x12

TYPE : 340/360

IMPELLER : Enclosed

R. P. M. : 1750

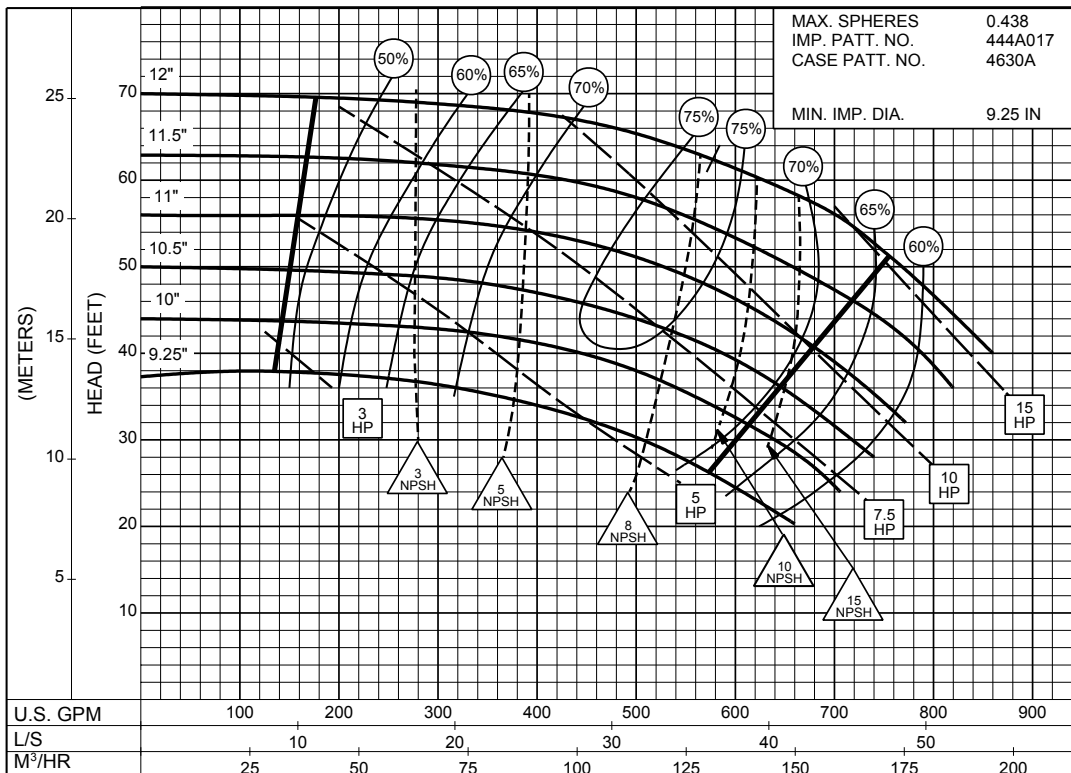


1750
R.P.M

SIZE : 4x5x12

TYPE : 340/360 IMPELLER : Enclosed

R. P. M. : 1150



1150
R.P.M

5 x 6 x 11 SERIES 340 OR 360

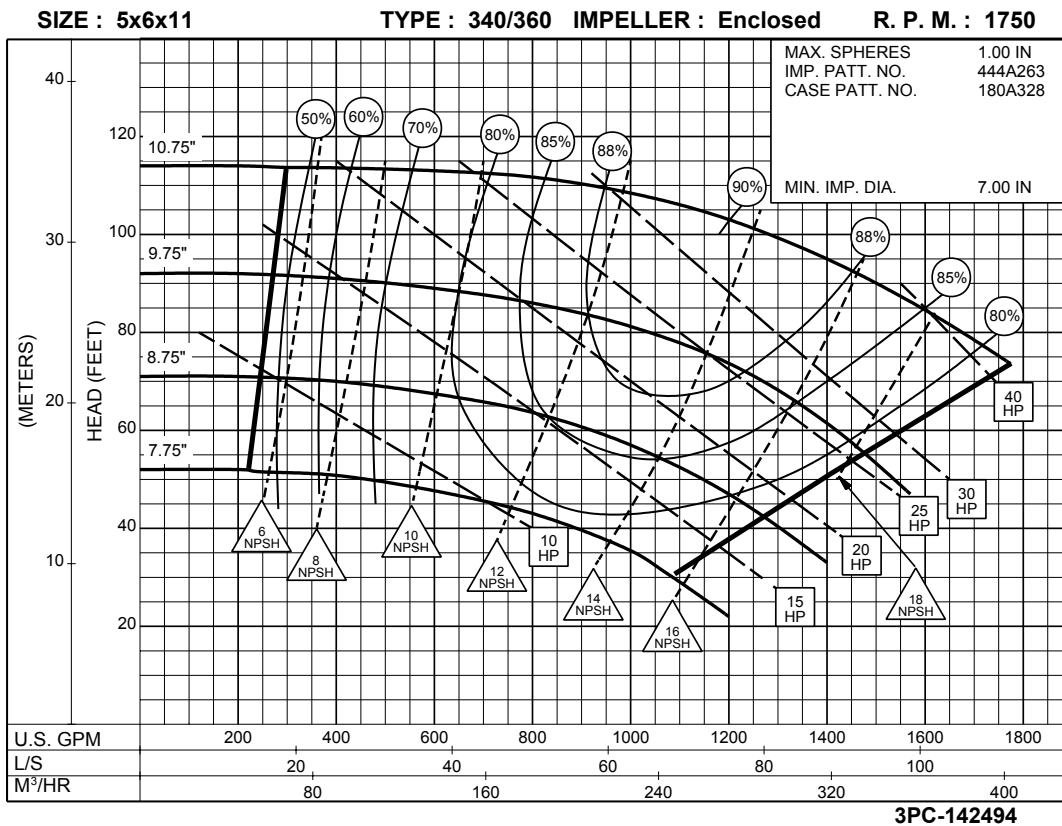
ENCLOSED IMPELLER

Section **340/360** Page **429**

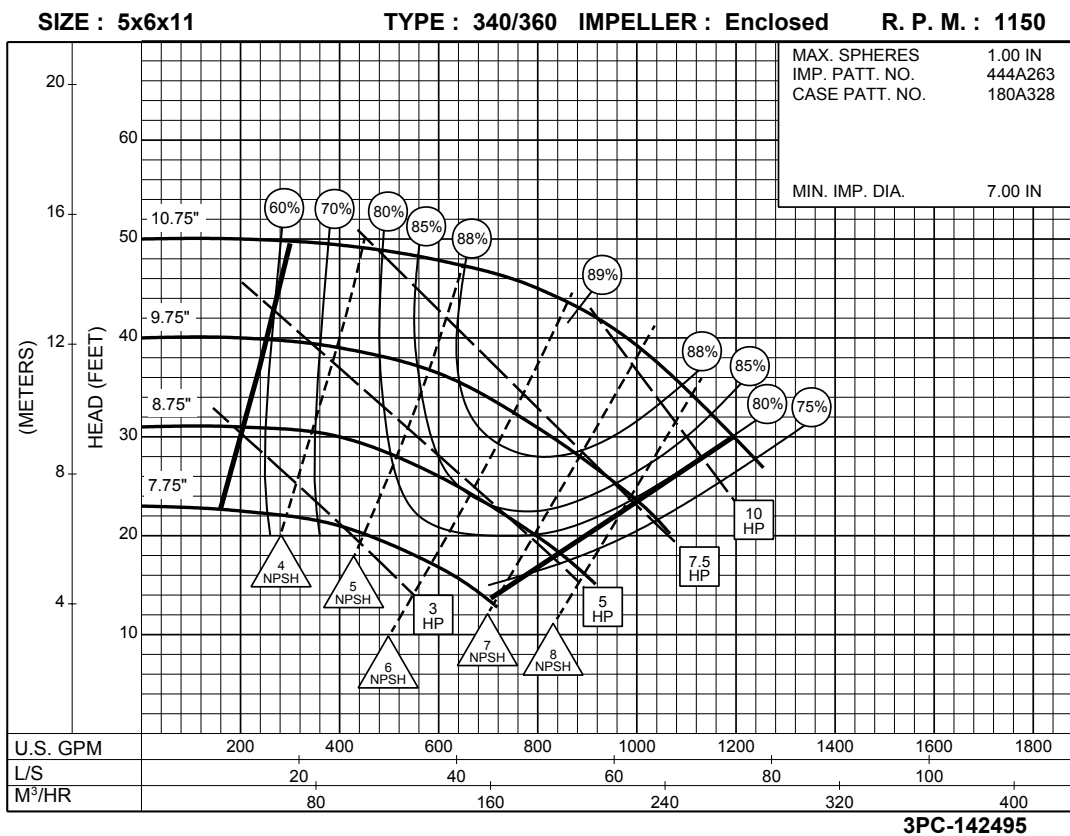
Date **January 2001**

Supersedes Section 340/360 Page 429

Dated January 1986



**1750
RPM**



**1150
RPM**

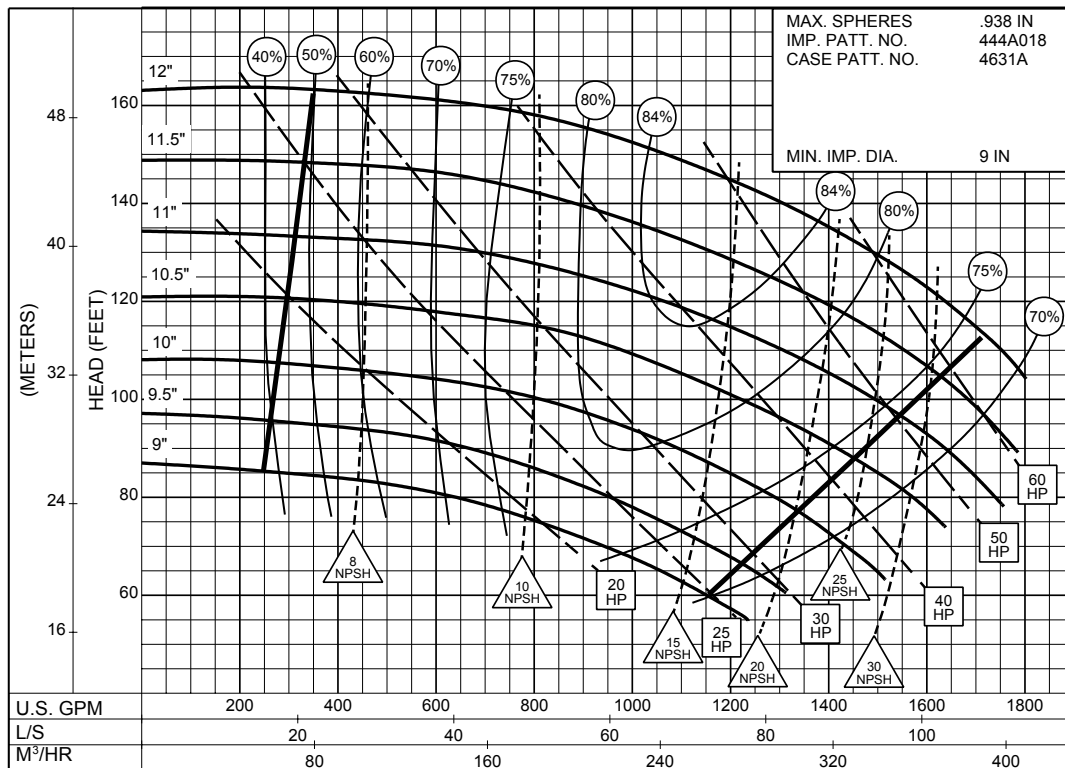
5 x 6 x 12 **SERIES 340 OR 360**

ENCLOSED IMPELLER

SIZE : 5x6x12

TYPE : 340/360 IMPELLER : Enclosed

R. P. M. : 1750

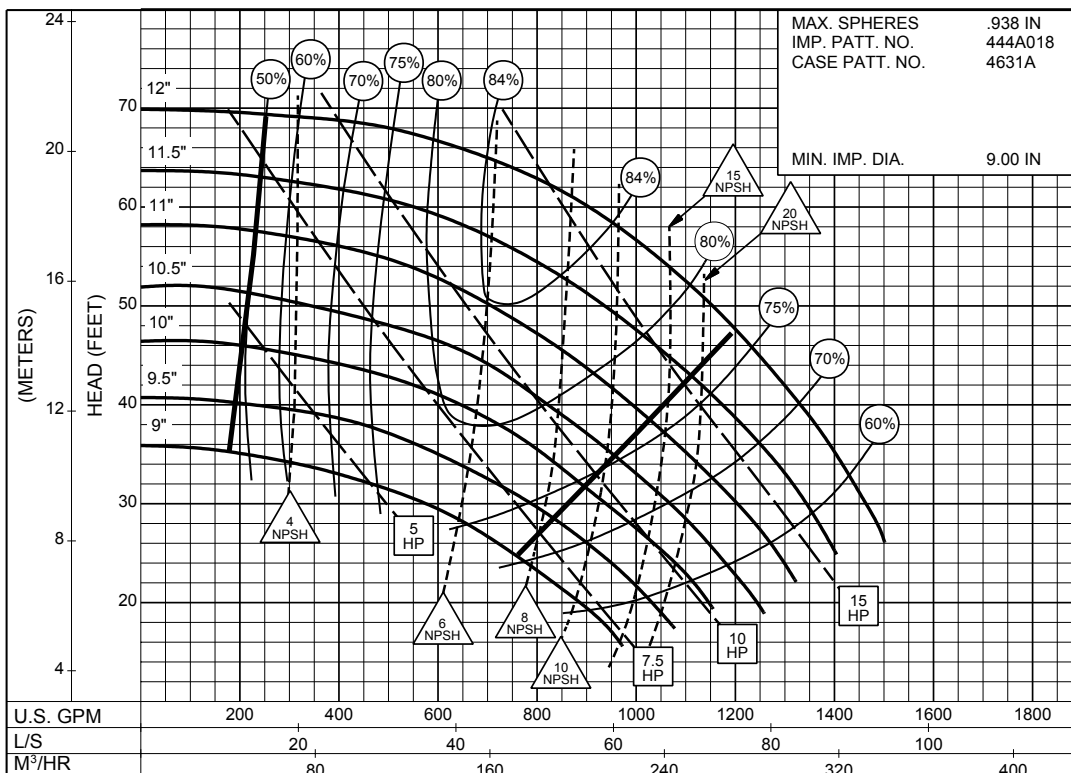


3PC-116314

SIZE : 5x6x12

TYPE : 340/360 IMPELLER : Enclosed

R. P. M. : 1150



3PC-116315

1750
RPM

1150
RPM

6 x 6 x 9 SERIES 340 OR 360

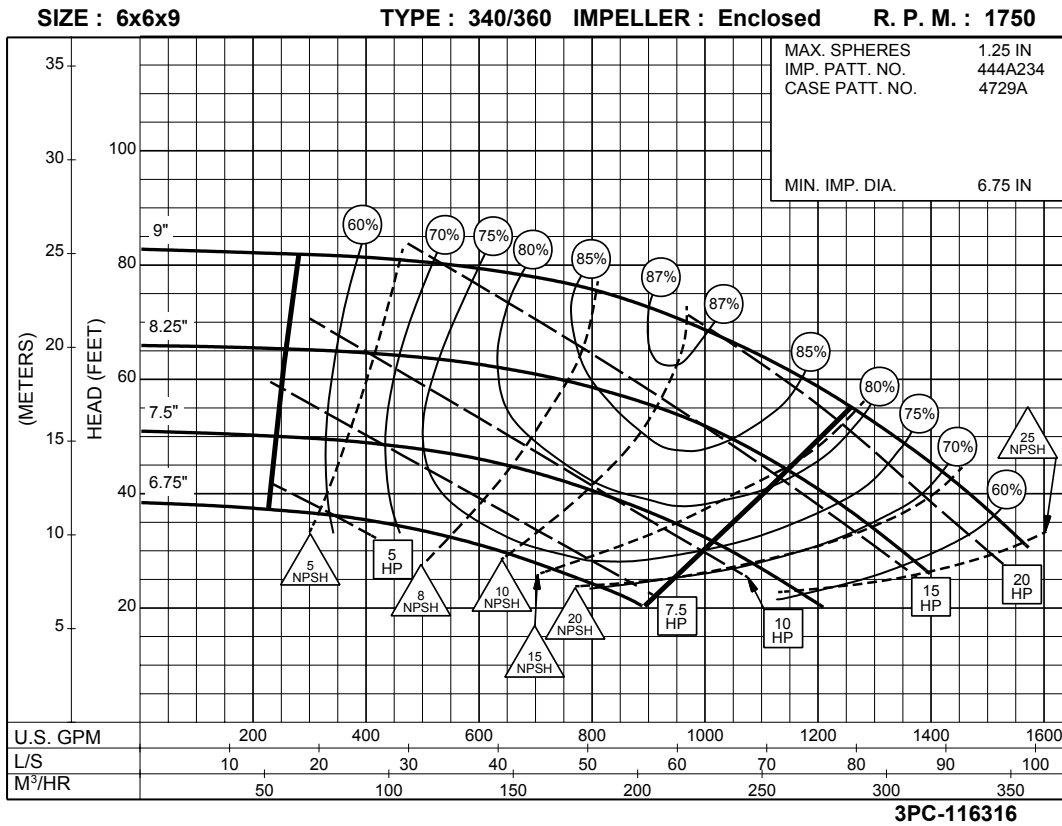
ENCLOSED IMPELLER

Section **340/360** Page **431**

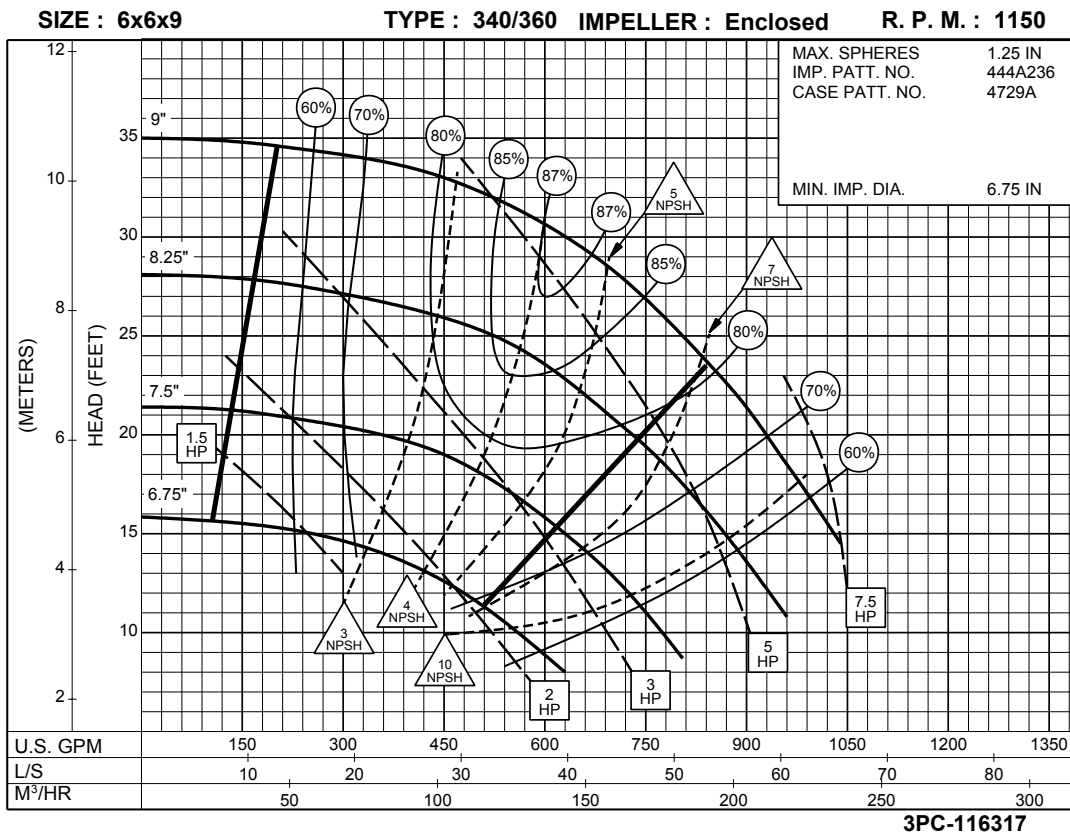
Date **January 2001**

Supersedes Section 340/360 Page 431

Dated January 1986



1750
RPM



1150
RPM

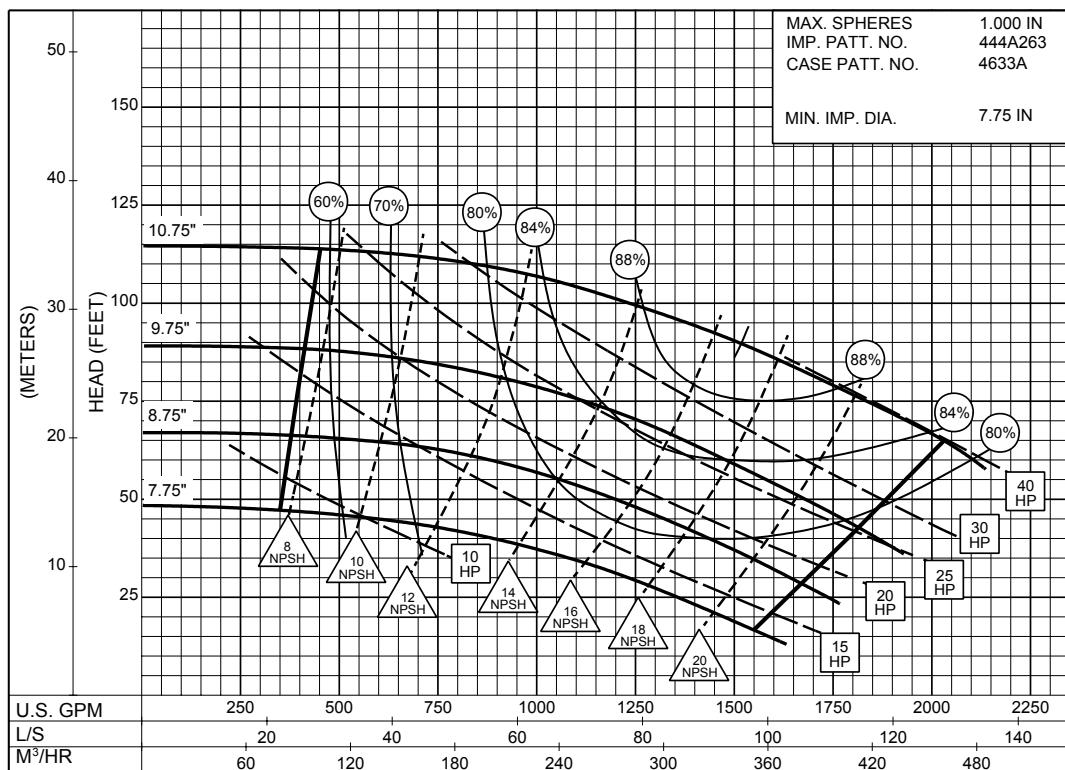
6 x 6 x 11 **SERIES 340 OR 360**

ENCLOSED IMPELLER

SIZE : 6x6x11

TYPE : 340/360 IMPELLER : Enclosed

R. P. M. : 1750

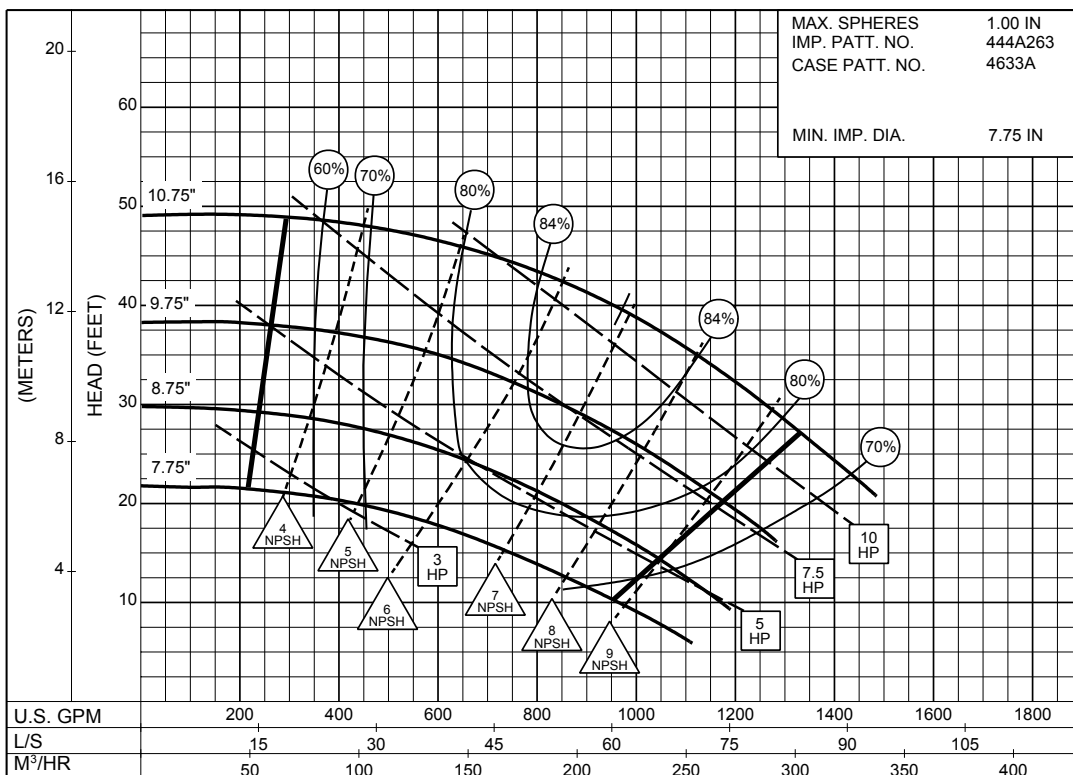


3PC-148716

SIZE : 6x6x11

TYPE : 340/360 IMPELLER : Enclosed

R. P. M. : 1150



PC-148715

1750
RPM

1150
RPM

6 x 6 x 11A SERIES 340 OR 360

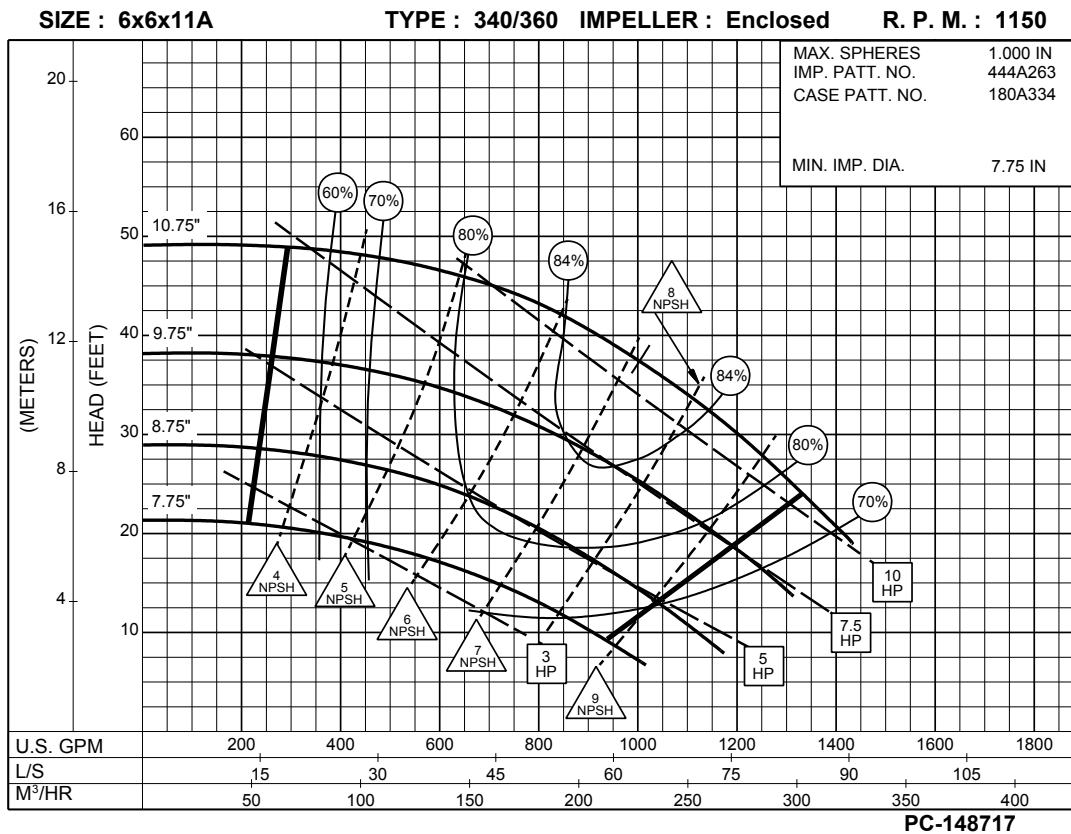
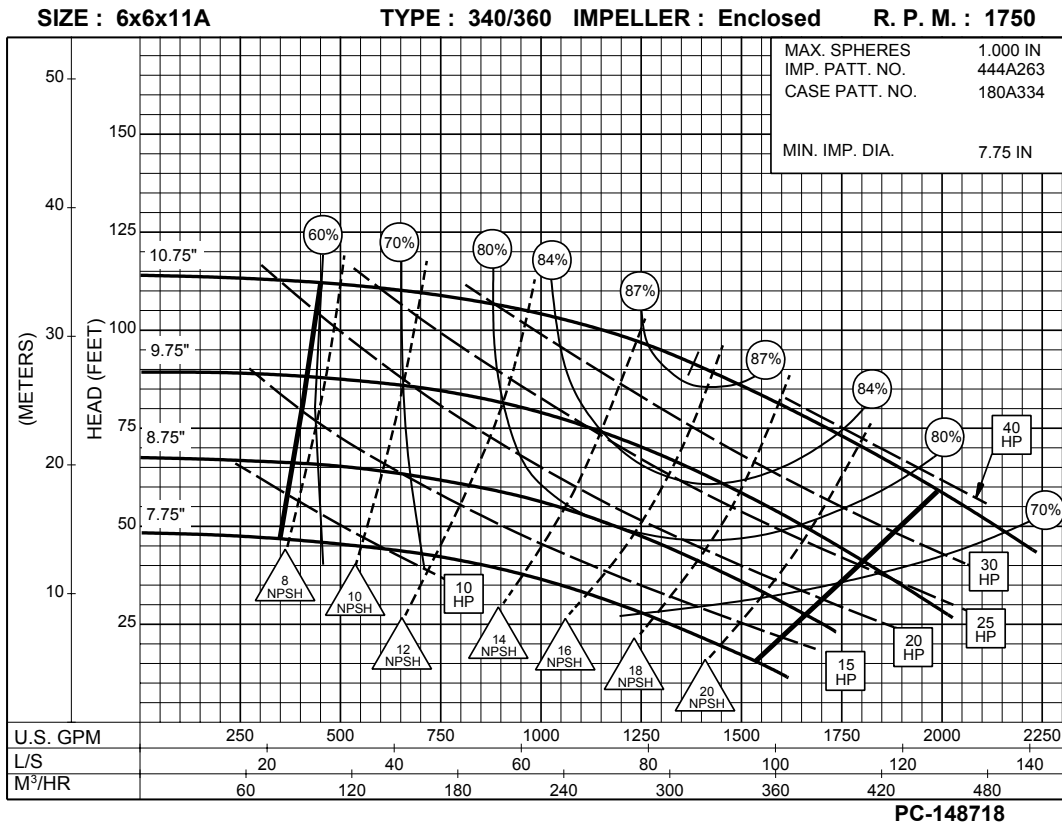
ENCLOSED IMPELLER

Section **340/360** Page **433**

Date **January 2001**

Supersedes Section 340/360 Page 433

Dated June 1989



6 x 6 x 12B
SERIES 340 OR 360

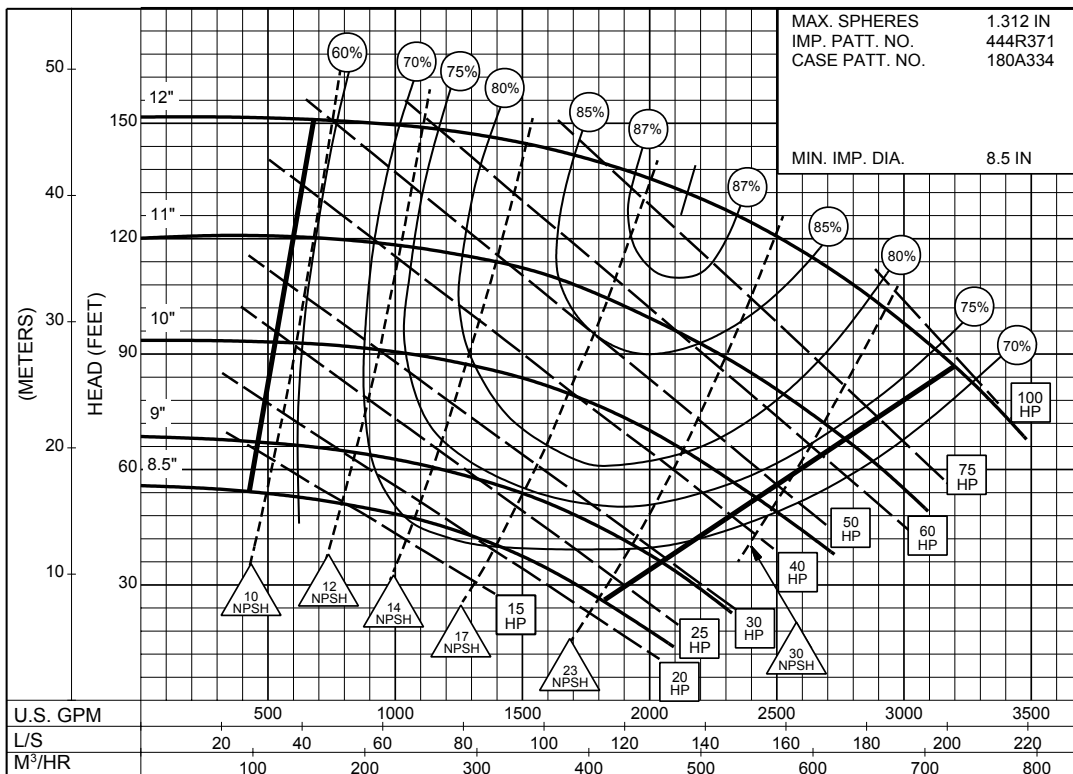
ENCLOSED IMPELLER

SIZE : 6x6x12B

TYPE : 340/360

IMPELLER : Enclosed

R. P. M. : 1750



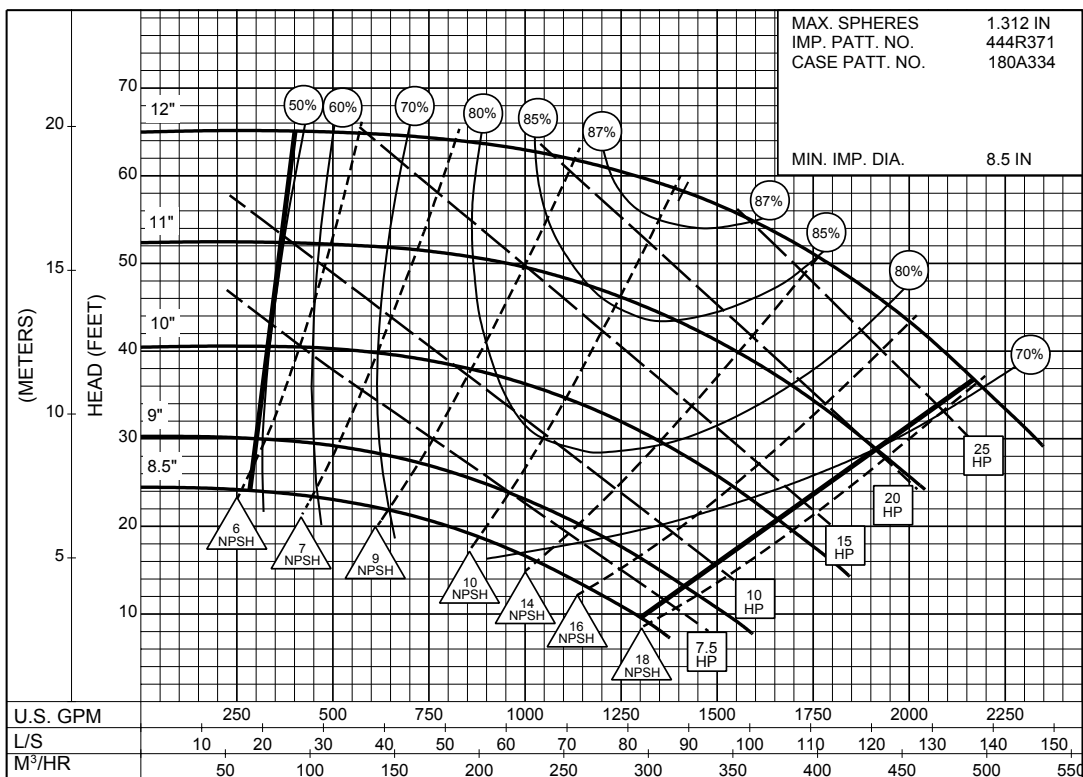
1750
RPM

SIZE : 6x6x12B

TYPE : 340/360

IMPELLER : Enclosed

R. P. M. : 1150



1150
RPM

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**6 x 8 x 15
SERIES 360**

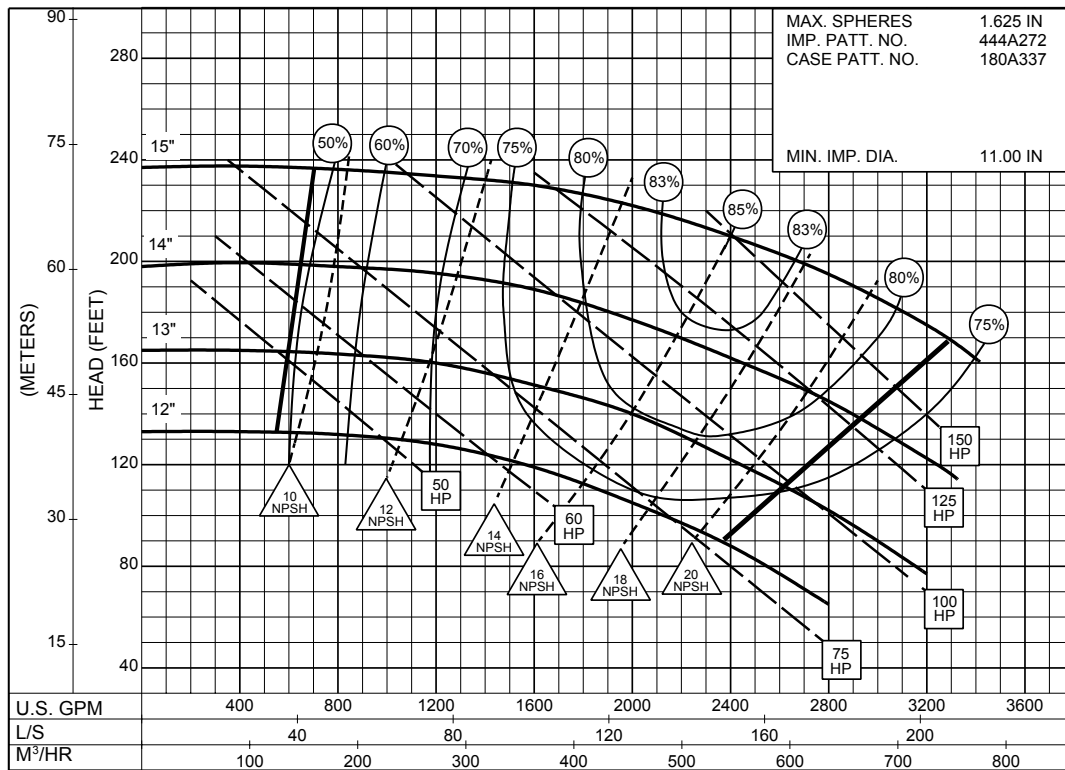
ENCLOSED IMPELLER
AVAILABLE AS MODEL 364 ONLY

SIZE : 6x8x15

TYPE : 360

IMPELLER : Enclosed

R. P. M. : 1775



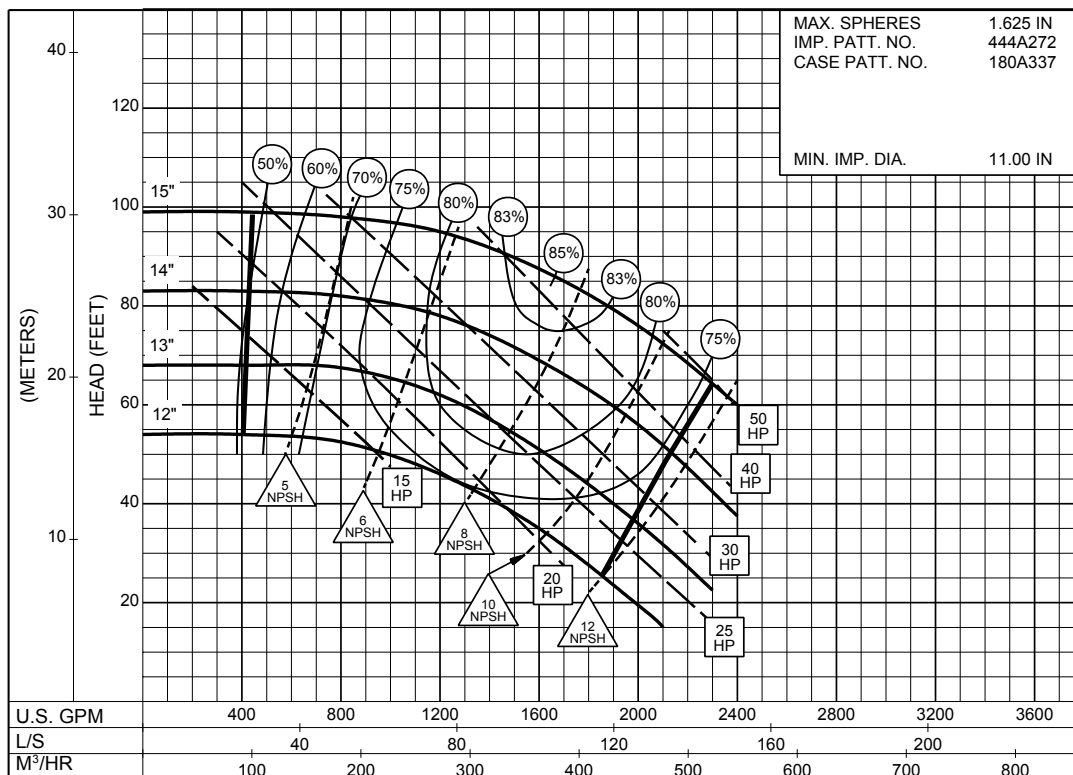
**1775
RPM**

SIZE : 6x8x15

TYPE : 360

IMPELLER : Enclosed

R. P. M. : 1150



**1150
RPM**

8 x 10 x 15 SERIES 360

ENCLOSED IMPELLER
AVAILABLE AS MODEL 364 ONLY

Section **340/360** Page **437**

Date **January 2001**

Supersedes Section 340/360 Page 437

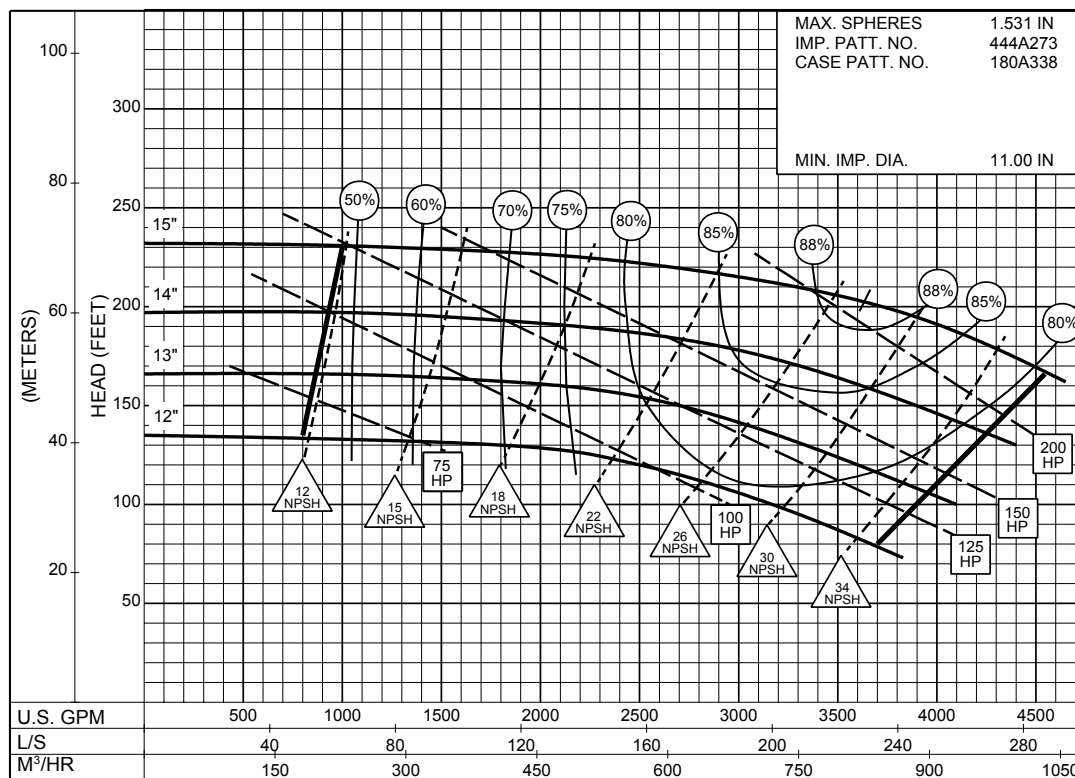
Dated July 1998

SIZE : 8x10x15

TYPE : 360

IMPELLER : Enclosed

R. P. M. : 1775



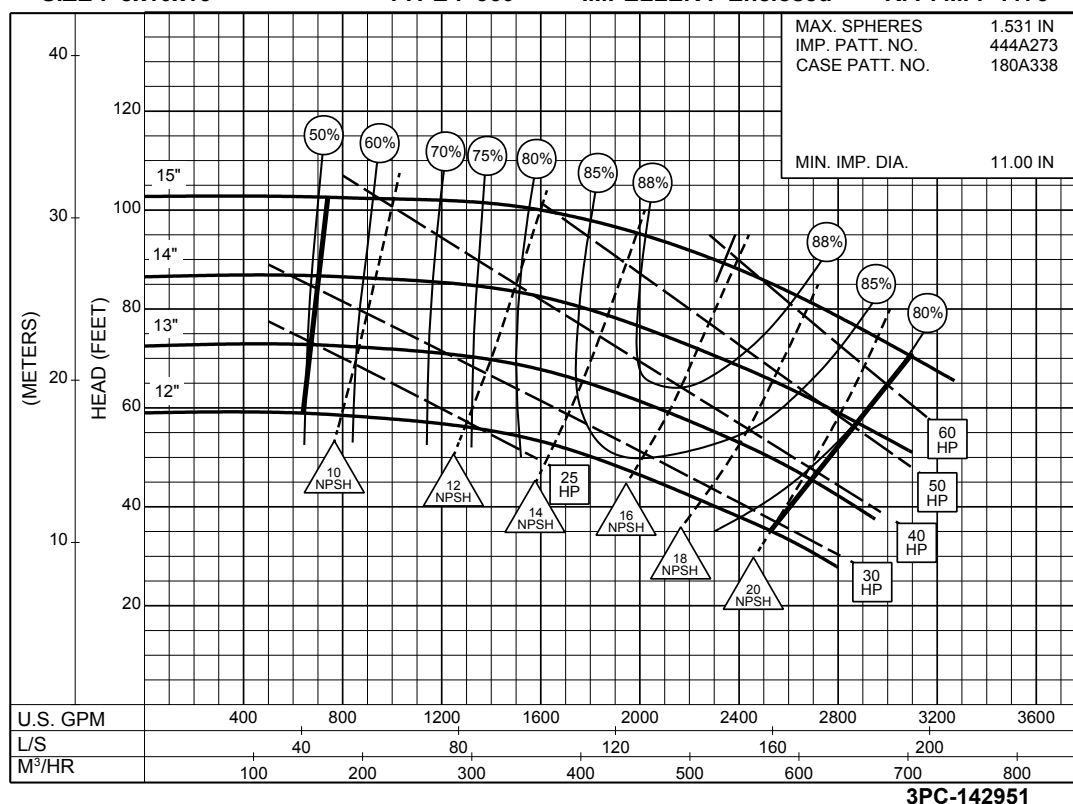
1775
RPM

SIZE : 8x10x15

TYPE : 360

IMPELLER : Enclosed

R. P. M. : 1175



1175
RPM

Section **340/360** Page **438**

Date **January 2001**

Supersedes Section 340/360 Page 438

Dated June 1989

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Performance Curves for the 530 Series (50 Hz)

MODEL/SIZE	R.P.M.	PDF PAGE
1-1/4x1-1/2x7	1440	2
1-1/4x1-1/2x9B	1440	3
1-1/2x2x7	1440	4
1-1/2x2x9A	1440	5
1-1/2x2x9B	1440	6
1-1/2x2x12	1440	7
1-1/2x2x12	960	8
2x2-1/2x7A	1440	9
2x2-1/2x7B	1440	10
2x2-1/2x9	1440	11
2x2-1/2x12	1440	12
2x2-1/2x12	960	13
2-1/2x3x7A	1440	14
2-1/2x3x7B	1440	15
2-1/2x3x9	1440	16
2-1/2x3x12	1440	17
2-1/2x3x12	960	18
3x4x9A	1440	19
3x4x9B	1440	20
3x4x12	1440	21
3x4x12	960	22
4x4x7A	1440	23
4x4x7B	1440	24-25
4x5x9A	1440	26
4x5x9B	1440	27
6x6x9	1440	28
6x6x9	960	29

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 Pentair Pump Group



AURORA®

Pentair Pump Group

1-1/4x1-1/2x7 - 1440 RPM

ENCLOSED IMPELLER

SECTION **530 (Metric 50Hz)**

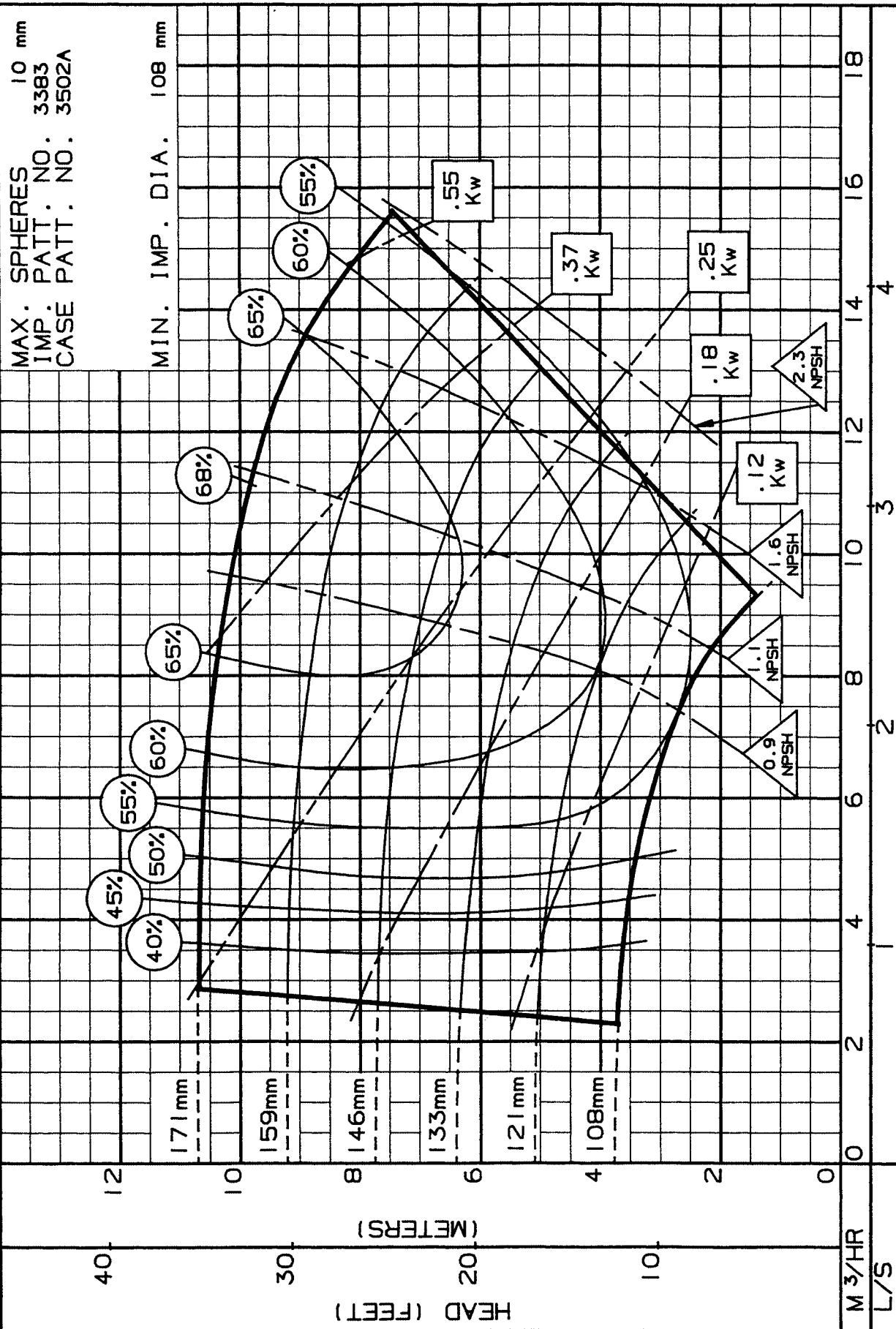
DATE **JULY 1994**

SUPERCEDES MARCH 1986

SIZE: 1 1/4x1 1/2x7 TYPE: 530 IMPELLER: ENCLOSED R.P.M.: 1440

MAX. SPHERES
IMP. PATT. NO. 3383
CASE PATT. NO. 3502A

MIN. IMP. DIA. 108 mm



M 3/HR
L/S
U.S. GPM

DRAWN BY: *RA/L* APPROVED BY: *DL* DATE: 7-90 PC-116273M

SECTION 530 (Metric 50Hz)

DATE JULY 1994

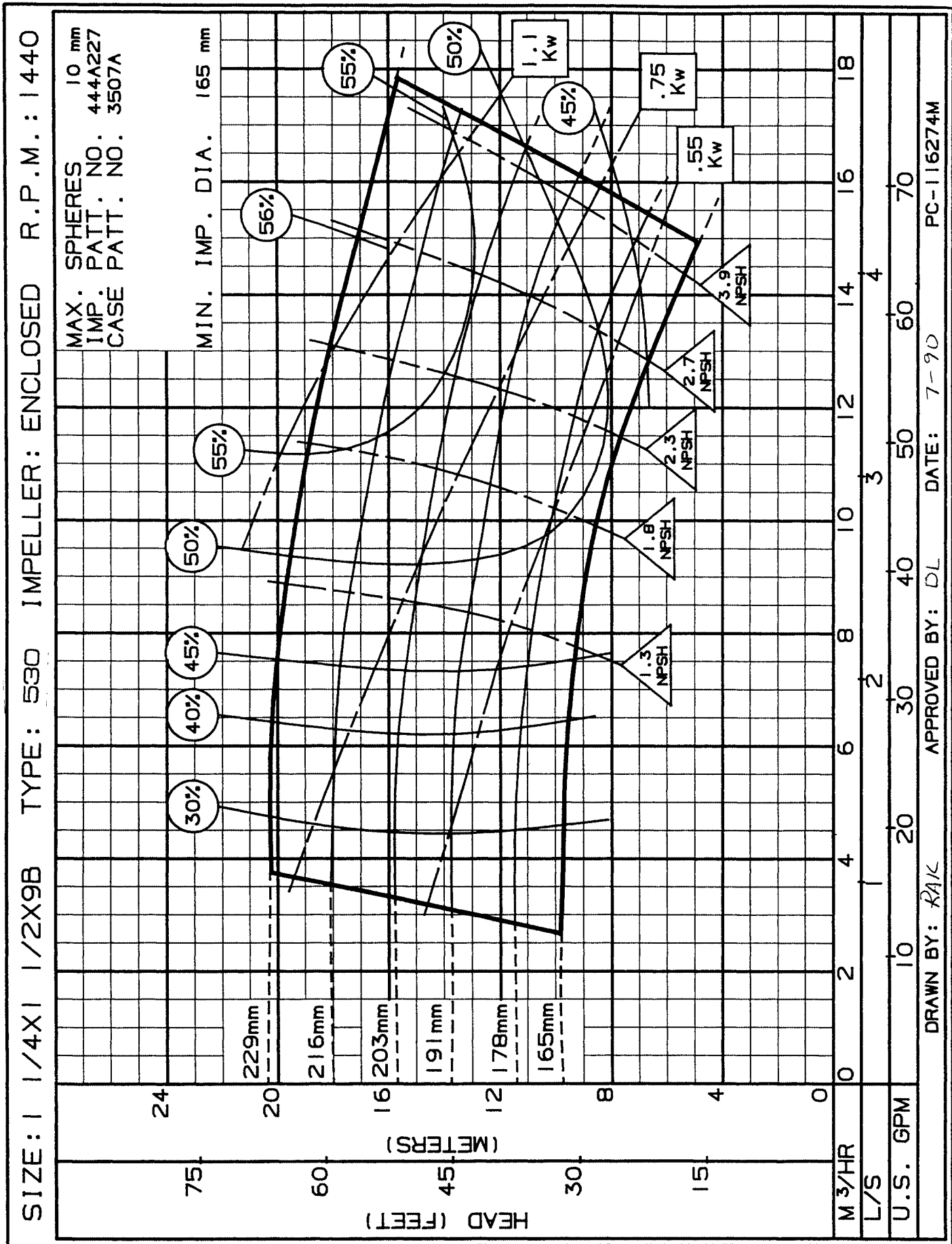
SUPERCEDES MARCH 1986

1-1/4x1-1/2x9B - 1440 RPM

ENCLOSED IMPELLER

ap AURORA®

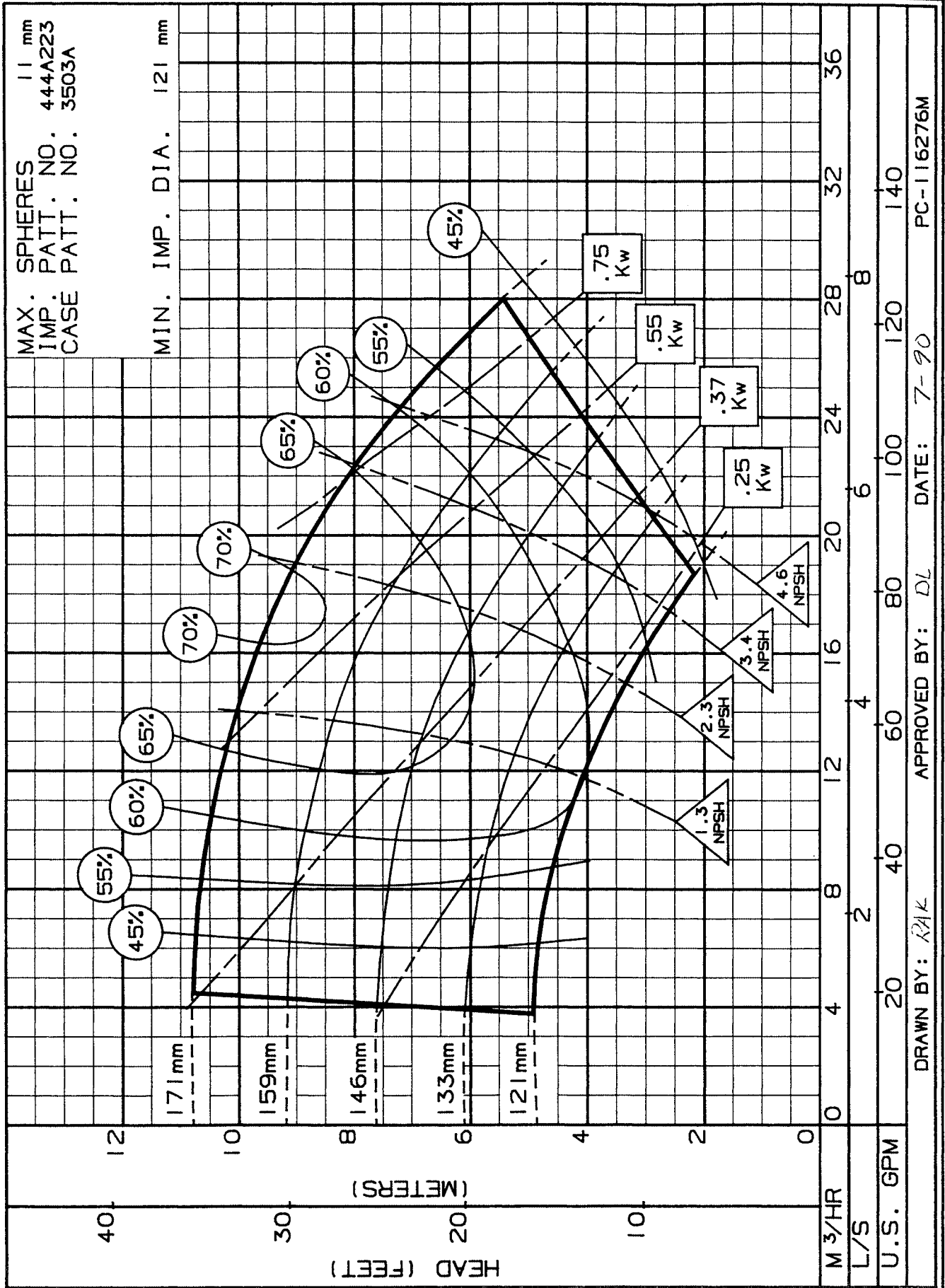
Pentair Pump Group



SIZE: 1 1/2X2X7
TYPE: 530 IMPELLER: ENCLOSED R.P.M.: 1440

MAX. SPHERES 11 mm
IMP. PATT. NO. 444A223
CASE PATT. NO. 3503A

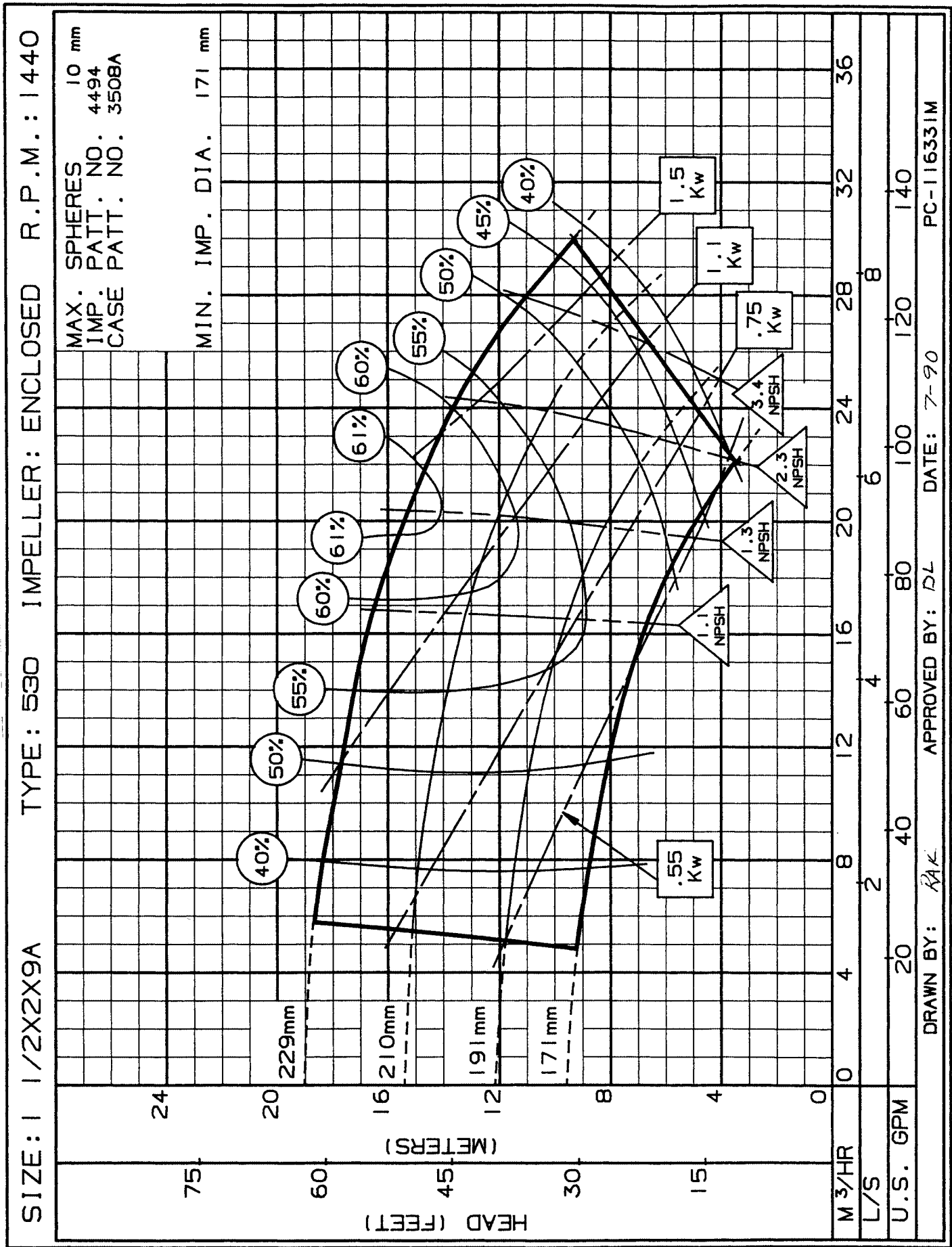
MIN. IMP. DIA. 121 mm



SECTION 530 (Metric 50Hz)
DATE JULY 1994
SUPERCEDES MARCH 1986

1-1/2x2x9A - 1440 RPM
ENCLOSED IMPELLER

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Pentair Pump Group

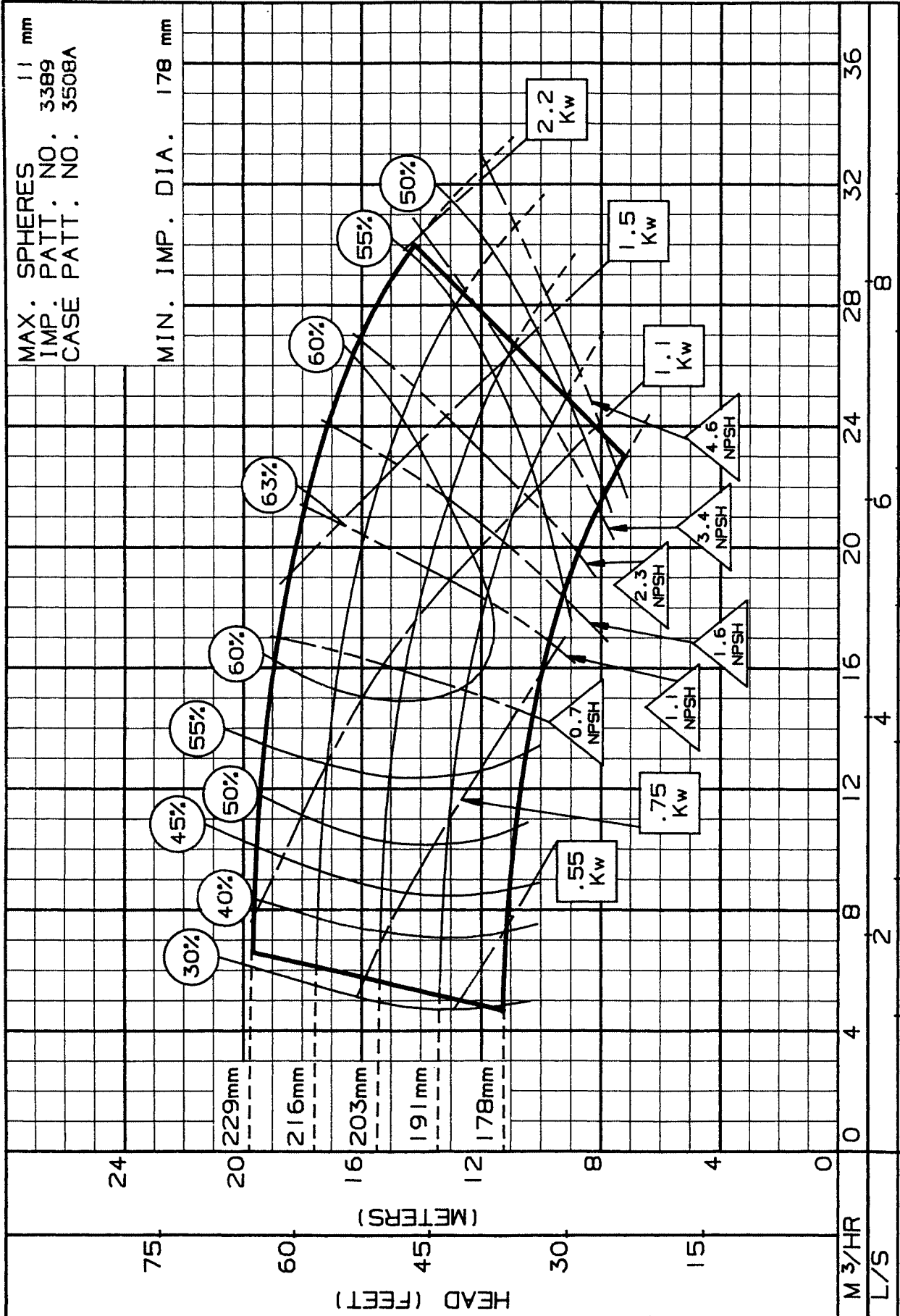
1-1/2x2x9B - 1440 RPM
ENCLOSED IMPELLER

SECTION **530 (Metric 50Hz)**
DATE **JULY 1994**
SUPERCEDES MARCH 1986

SIZE: 1 1/2x2x9B TYPE: 530 IMPELLER: ENCLOSED R.P.M.: 1440

MAX. SPHERES
IMP. PATT. NO. 3389
CASE PATT. NO. 3508A

MIN. IMP. DIA. 178 mm



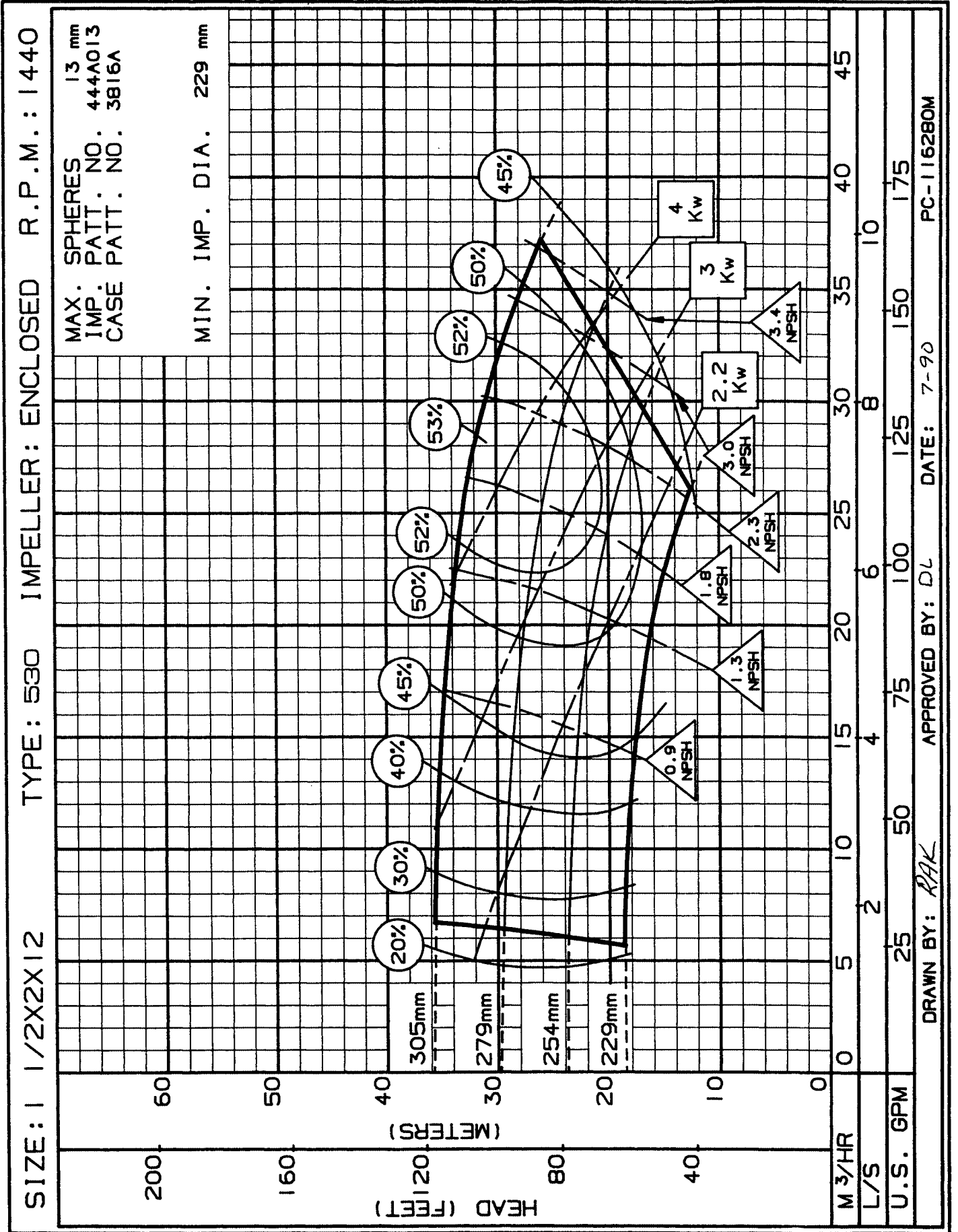
DRAWN BY: RAK APPROVED BY: DL DATE: 7-90 PC-116277M

SECTION 530 (Metric 50Hz)
 DATE JULY 1994
 SUPERCEDES MARCH 1986

1-1/2x2x12 - 1440 RPM

ENCLOSED IMPELLER

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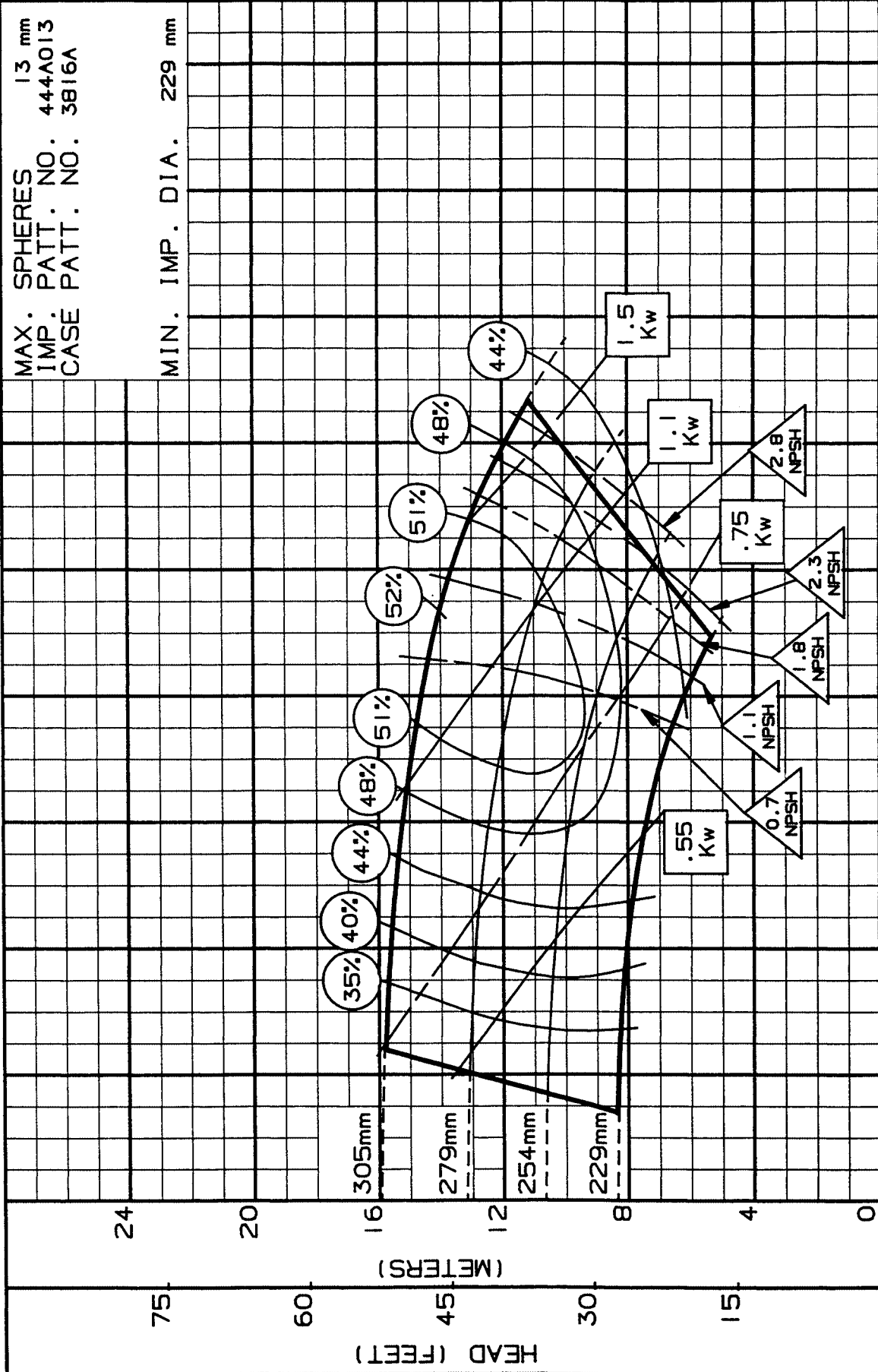
1-1/2x2x12 - 960 RPM ENCLOSED IMPELLER

SECTION **530 (Metric 50Hz)**
DATE **JULY 1994**
SUPERCEDES MARCH 1986

SIZE: 1 1/2X2X12 TYPE: 530 IMPELLER: ENCLOSED R.P.M.: 960

MAX. SPHERES
IMP. PATT. NO. 444A013
CASE PATT. NO. 3816A

MIN. IMP. DIA. 229 mm



M ³ /HR	0	4	8	12	16	20	24	28	32	36
L/S	2	4	6	8	10	12	14	16	18	20
U.S. GPM	20	40	60	80	100	120	140	160	180	200

DRAWN BY: RAK APPROVED BY: DL DATE: 7-90 PC-116281M

SECTION 530 (Metric 50Hz)

DATE JULY 1994

SUPERCEDES MARCH 1986

2x2-1/2x7A - 1440 RPM

ENCLOSED IMPELLER

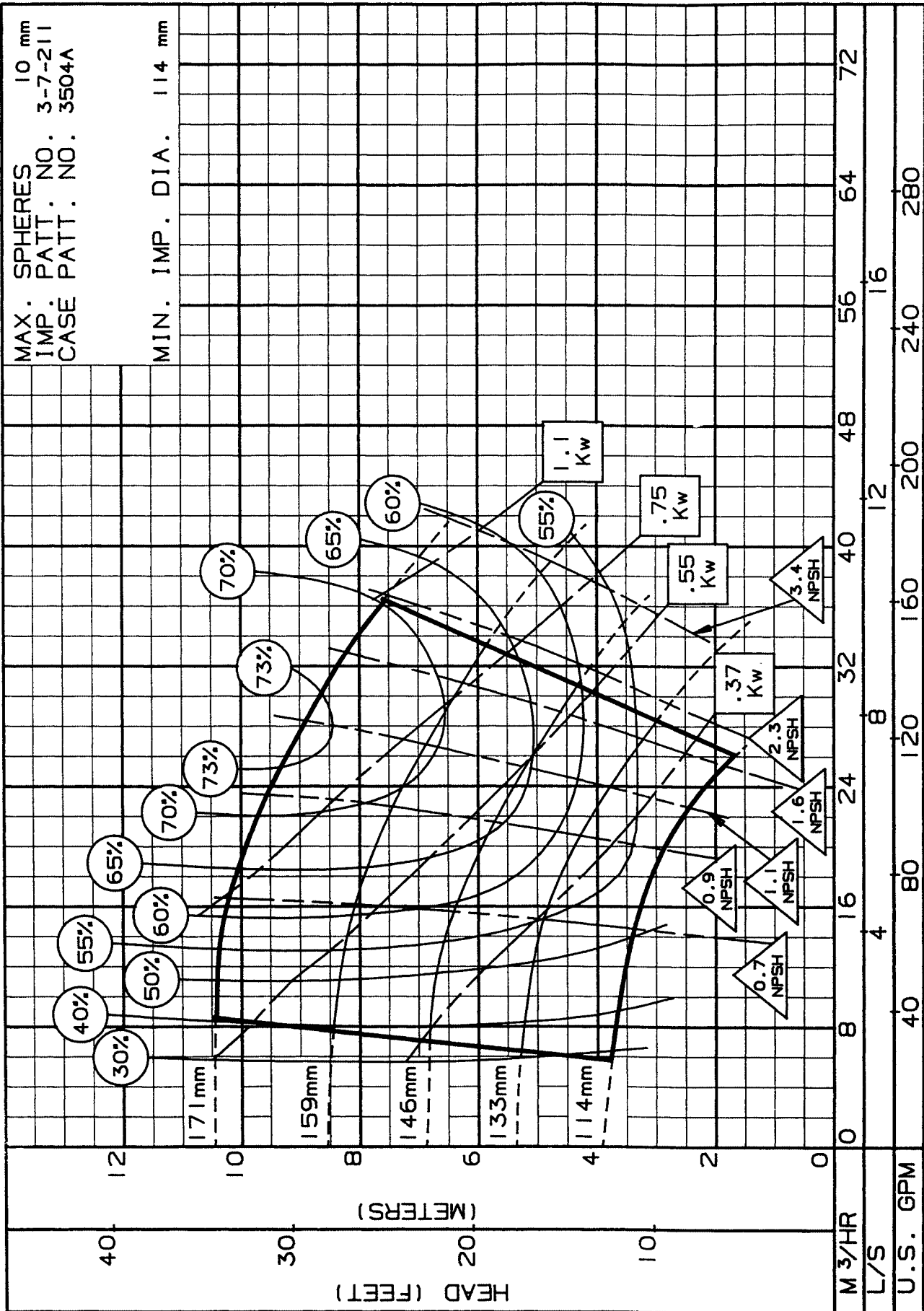
ap AURORA®

Pentair Pump Group

SIZE: 2X2 1/2X7A TYPE: 530 IMPELLER: ENCLOSED R.P.M.: 1440

MAX. SPHERES
IMP. PATT. NO. 3-7-211
CASE PATT. NO. 3504A

MIN. IMP. DIA. 114 mm



DRAWN BY: RAK APPROVED BY: DL DATE: 7-90 PC-116283M



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Pentair Pump Group

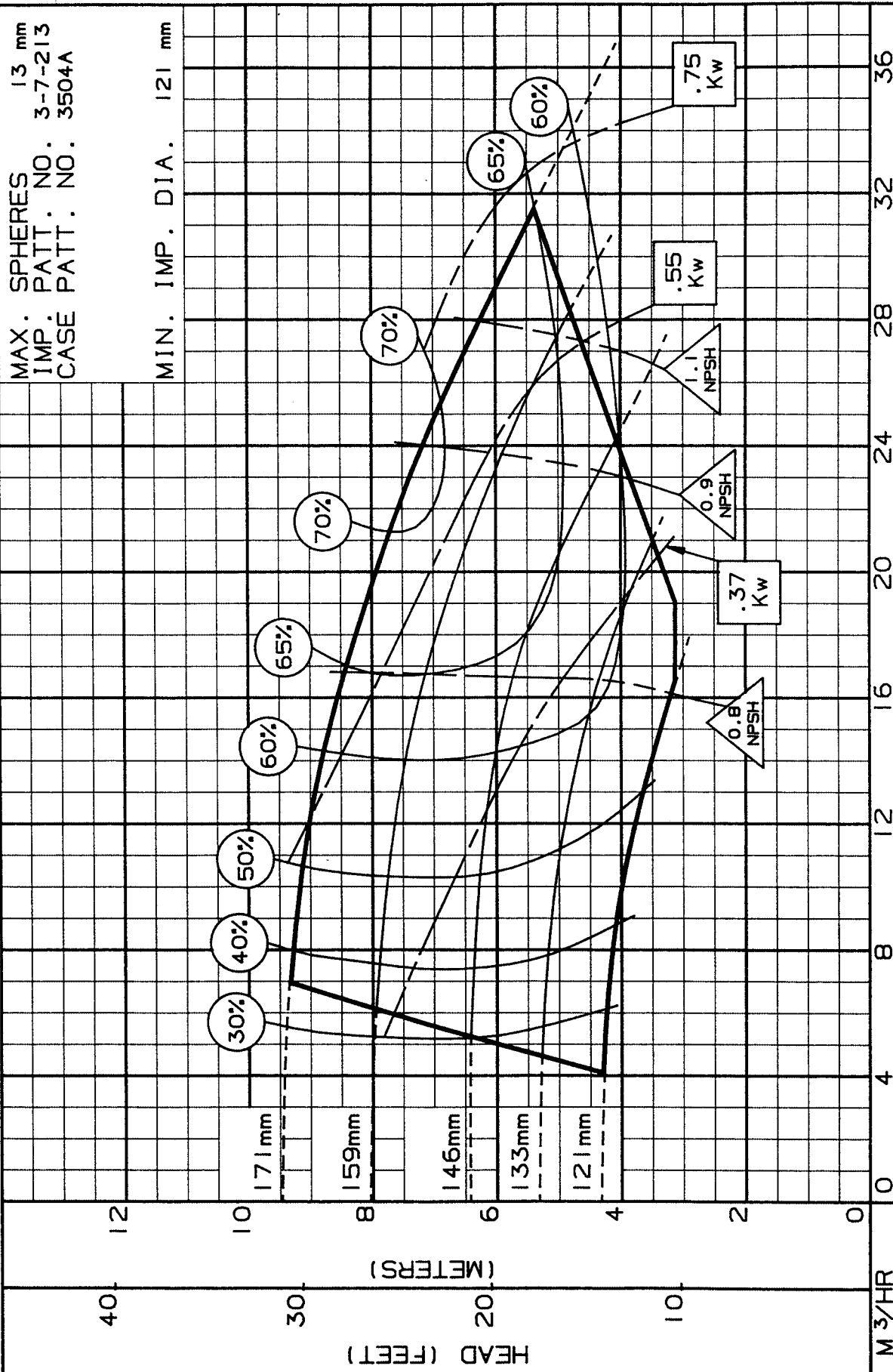
2x2-1/2x7B - 1440 RPM
ENCLOSED IMPELLER

SECTION **530 (Metric 50Hz)**
DATE **JULY 1994**
SUPERCEDES MARCH 1986

SIZE: 2X2 1/2X7B TYPE: 530 IMPELLER: ENCLOSED R.P.M.: 1440

MAX. SPHERES 13 mm
IMP. PATT. NO. 3-7-213
CASE PATT. NO. 3504A

MIN. IMP. DIA. 121 mm



M ³ /HR	0	4	8	12	16	20	24	28	32	36
L/S	0	2	4	6	8					
U.S. GPM	20	40	60	80	100	120	140			
DRAWN BY: <i>RAK</i> APPROVED BY: <i>DL</i> DATE: 7-90 PC-116285M										

SECTION 530 (Metric 50Hz)

DATE JULY 1994

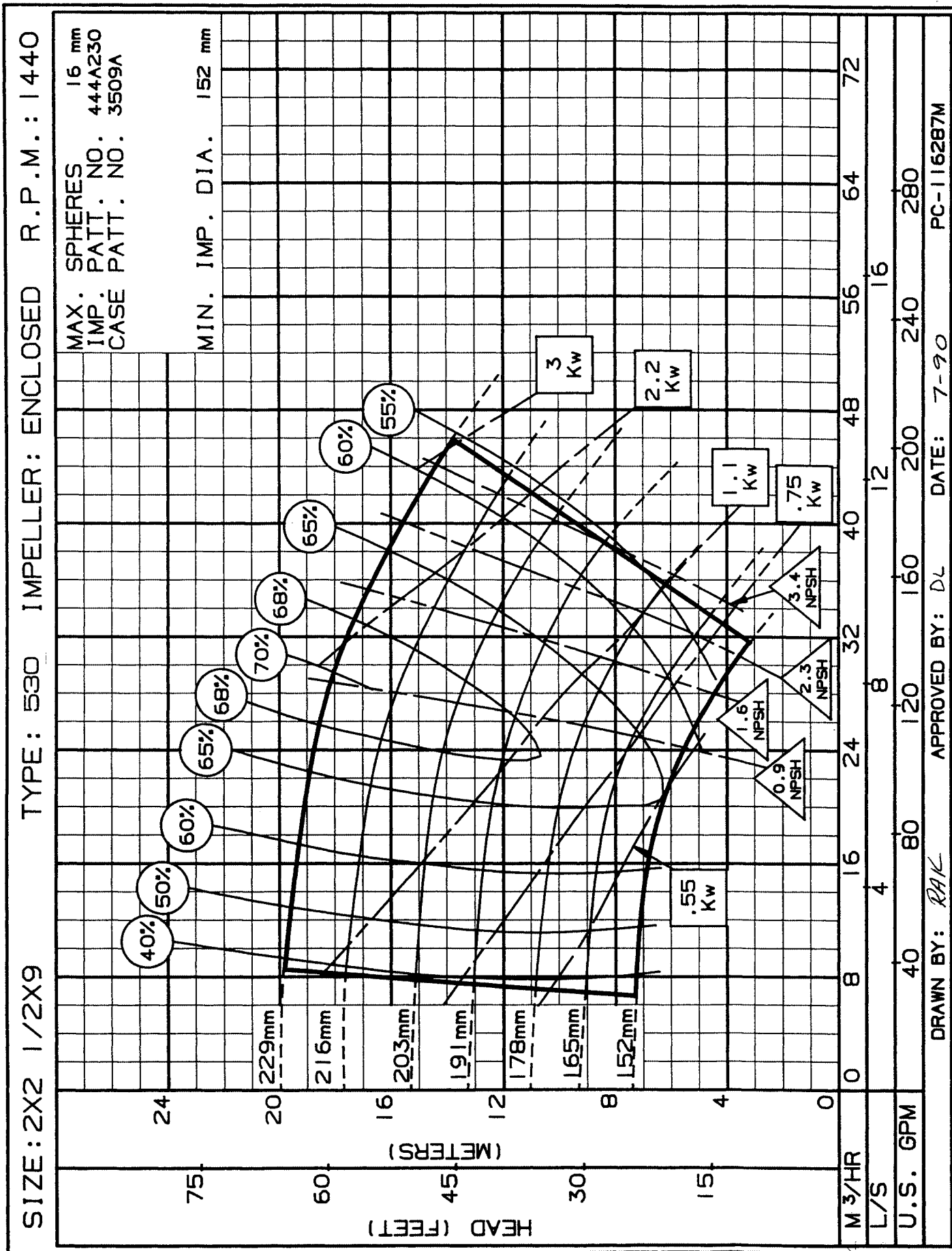
SUPERCEDES MARCH 1986

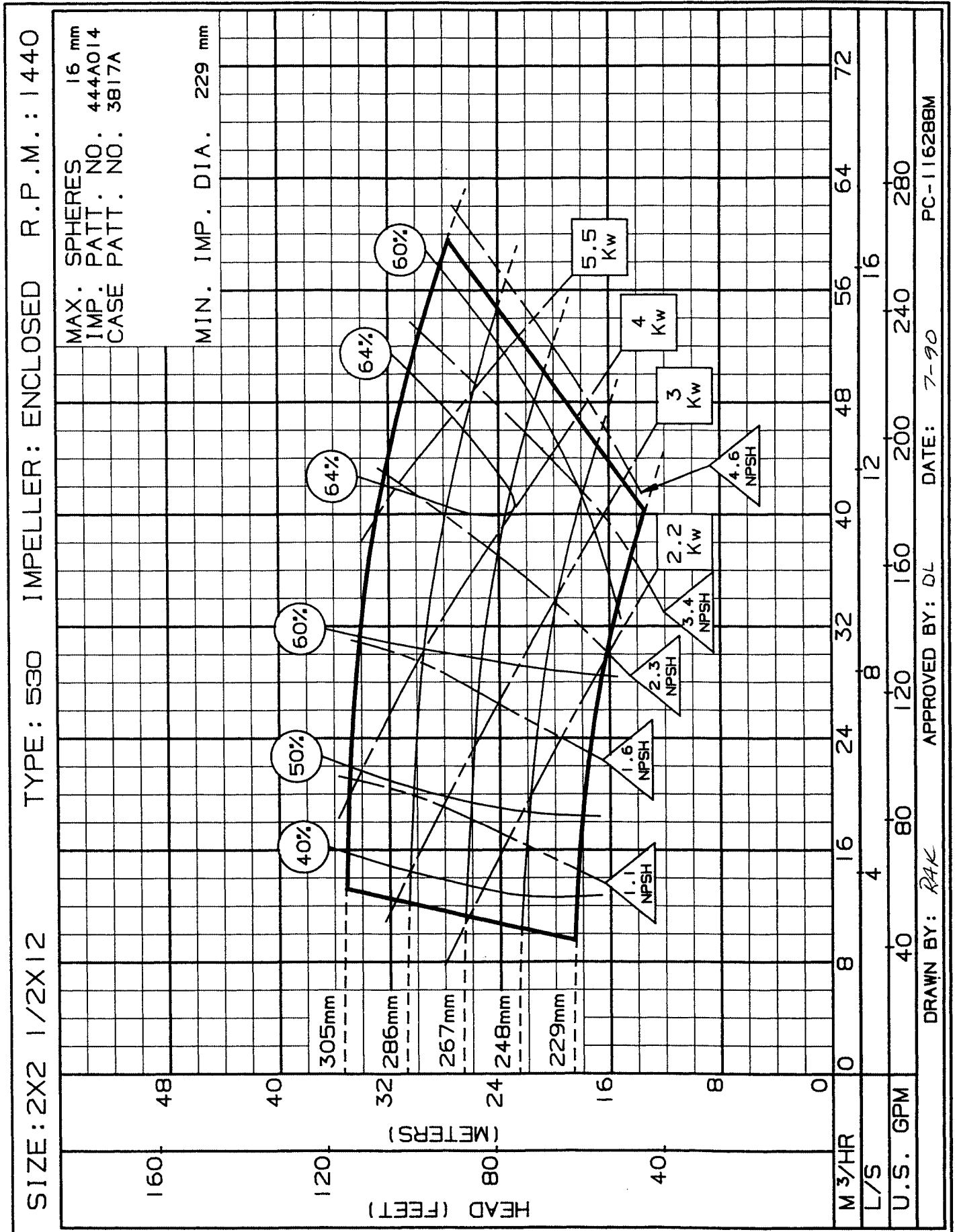
2x2-1/2x9 - 1440 RPM

ENCLOSED IMPELLER

ap AURORA®

Pentair Pump Group

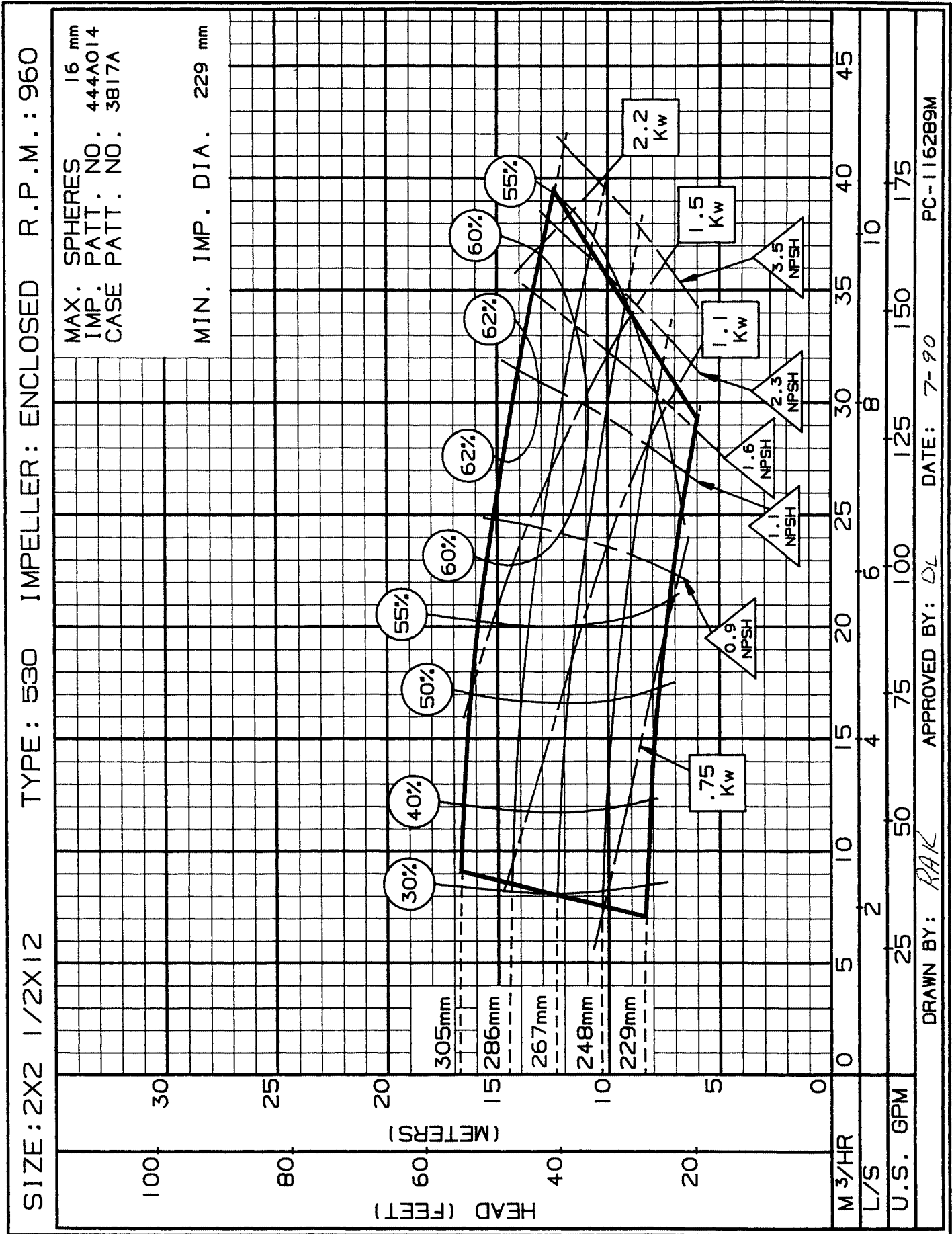




SECTION **530 (Metric 50Hz)**
 DATE **JULY 1994**
 SUPERCEDES MARCH 1986

2-2-1/2x12 - 960 RPM
ENCLOSED IMPELLER

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 Pentair Pump Group





AURORA®
Pentair Pump Group

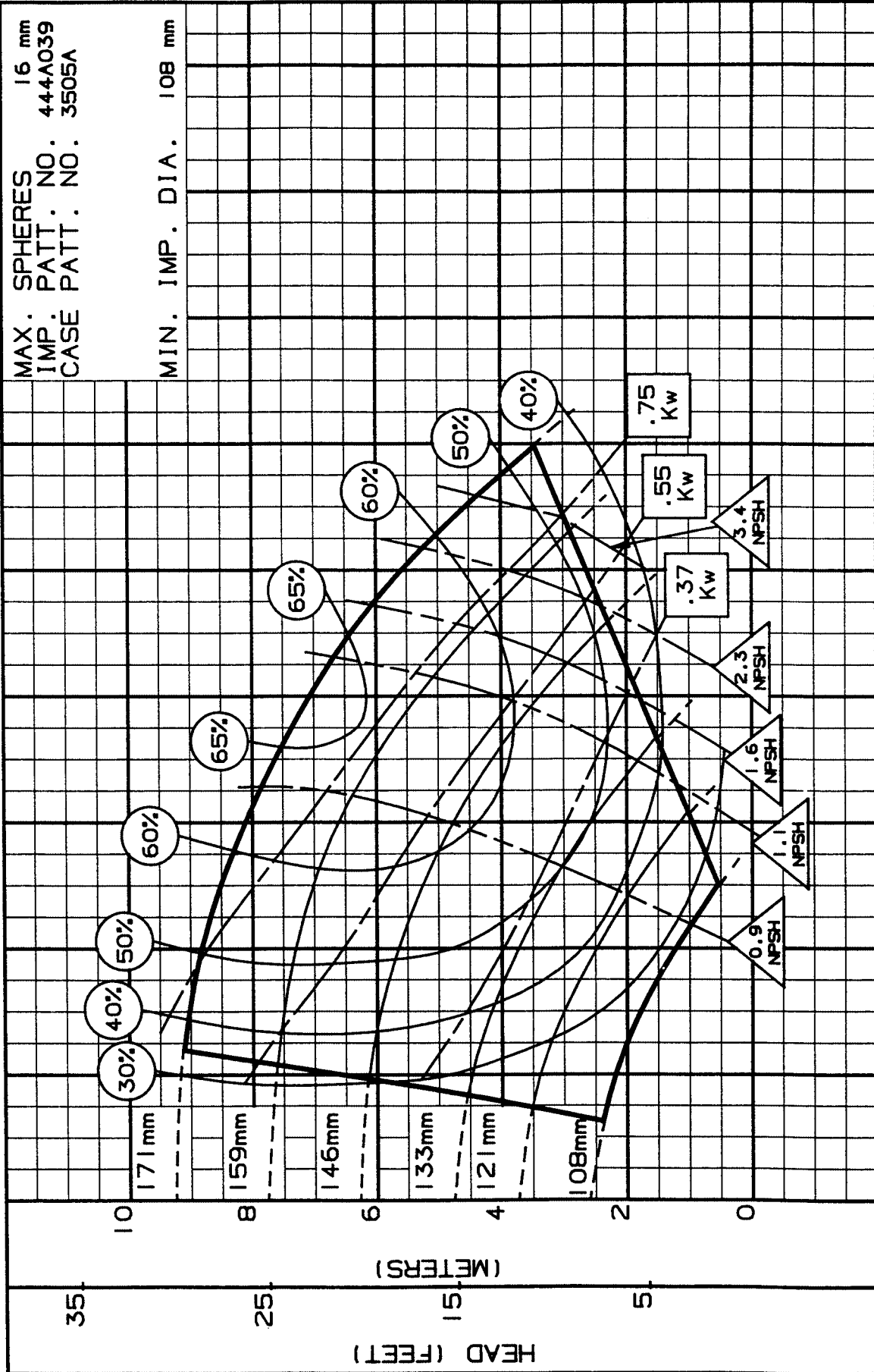
2-1/2x3x7A - 1440 RPM
ENCLOSED IMPELLER

SECTION **530 (Metric 50Hz)**
DATE **JULY 1994**
SUPERCEDES MARCH 1986

SIZE: 2 1/2x3x7A TYPE: 530 IMPELLER: ENCLOSED R.P.M.: 1440

MAX. SPHERES 16 mm
IMP. PATT. NO. 444A039
CASE PATT. NO. 3505A

MIN. IMP. DIA. 108 mm

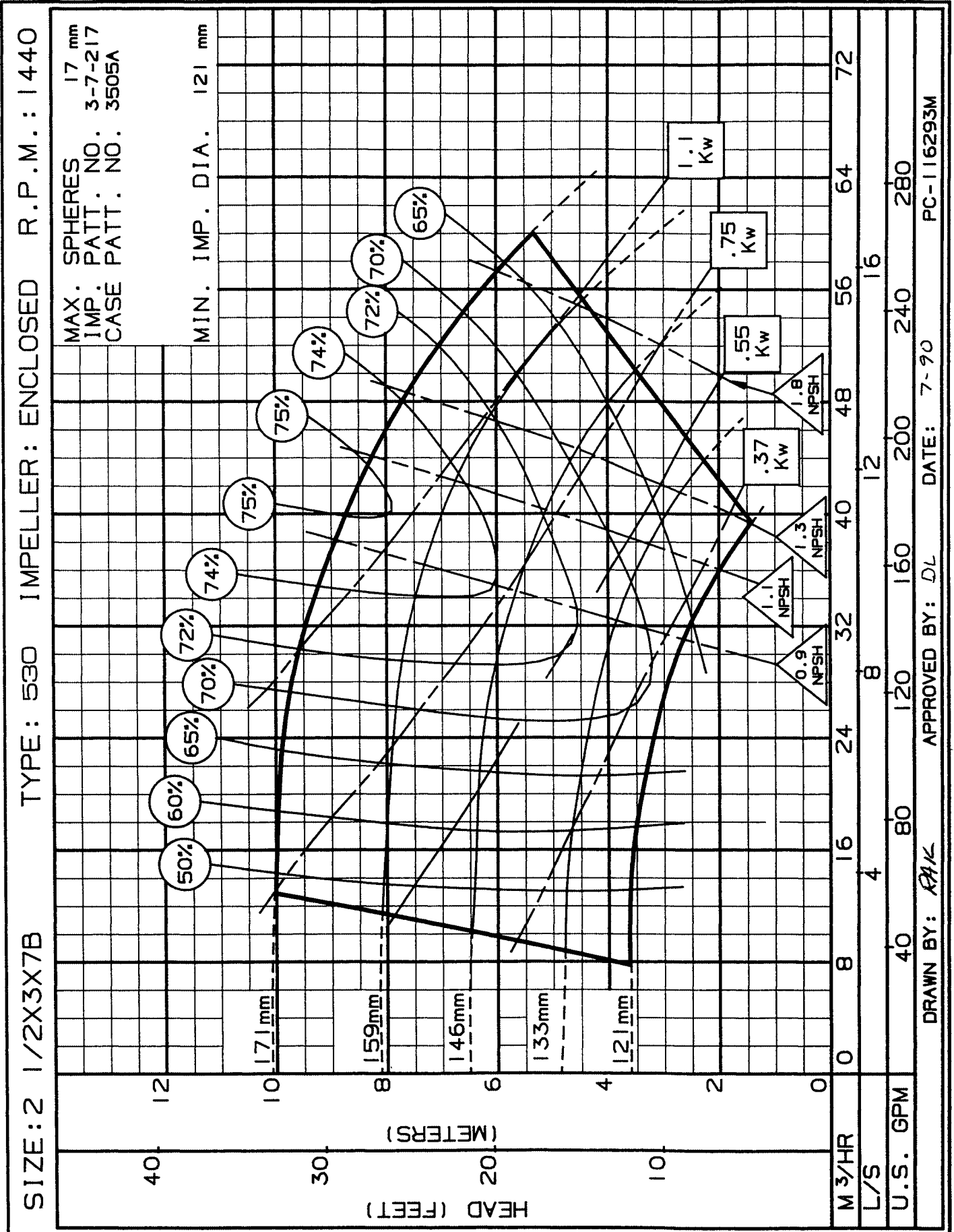


M³/HR	0	8	16	24	32	40	48	56	64	72
L/S	4	8	12	16	20	24	28	32	36	40
U.S. GPM	40	80	120	160	200	240	280	320	360	400
DRAWN BY: <i>Rax</i> APPROVED BY: <i>DL</i> DATE: 7-90										
PC-116291M										

SECTION 530 (Metric 50Hz)
 DATE JULY 1994
 SUPERCEDES MARCH 1986

2-1/2x3x7B - 1440 RPM ENCLOSED IMPELLER

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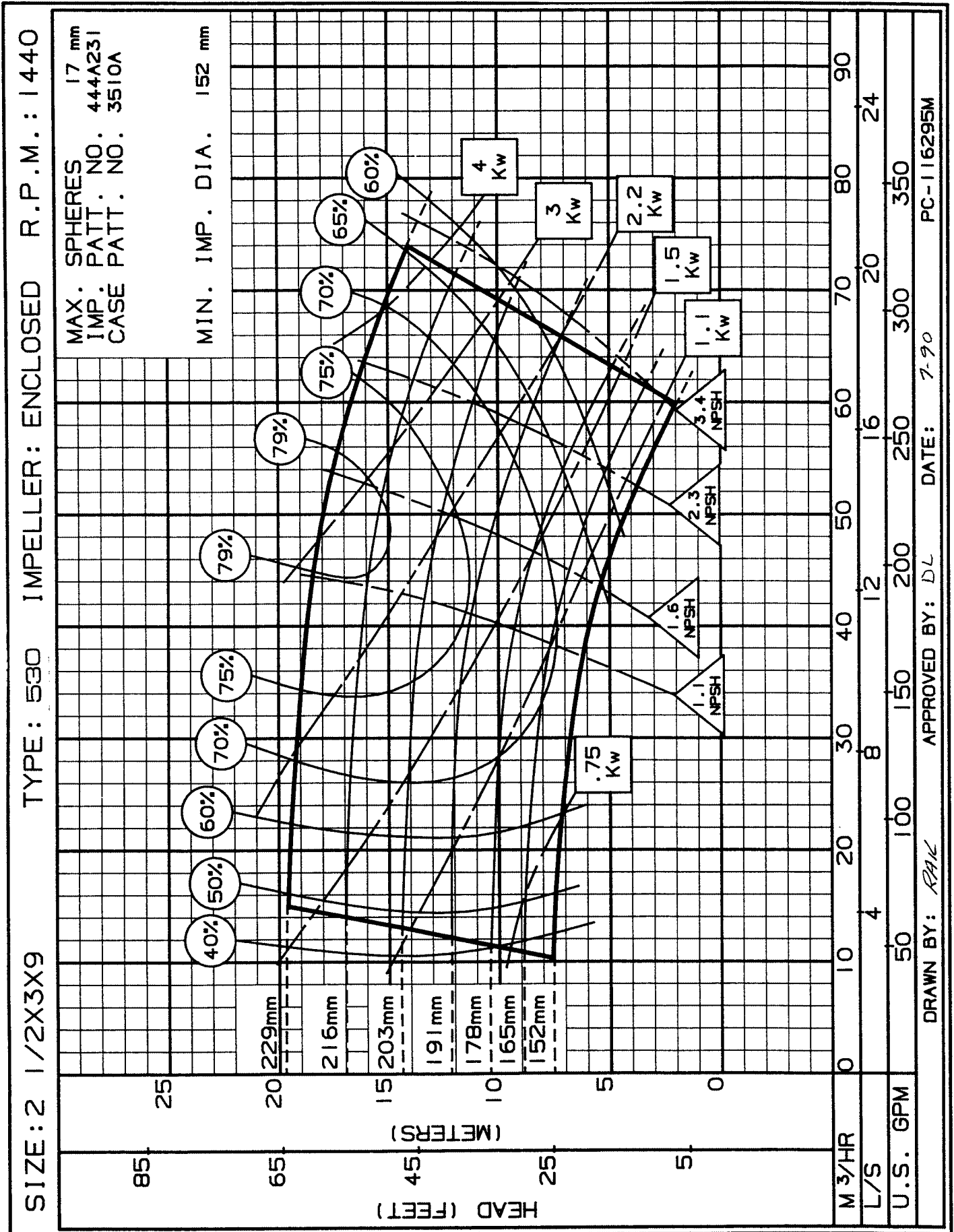
2-1/2x3x9 - 1440 RPM

ENCLOSED IMPELLER

SECTION **530 (Metric 50Hz)**

DATE **JULY 1994**

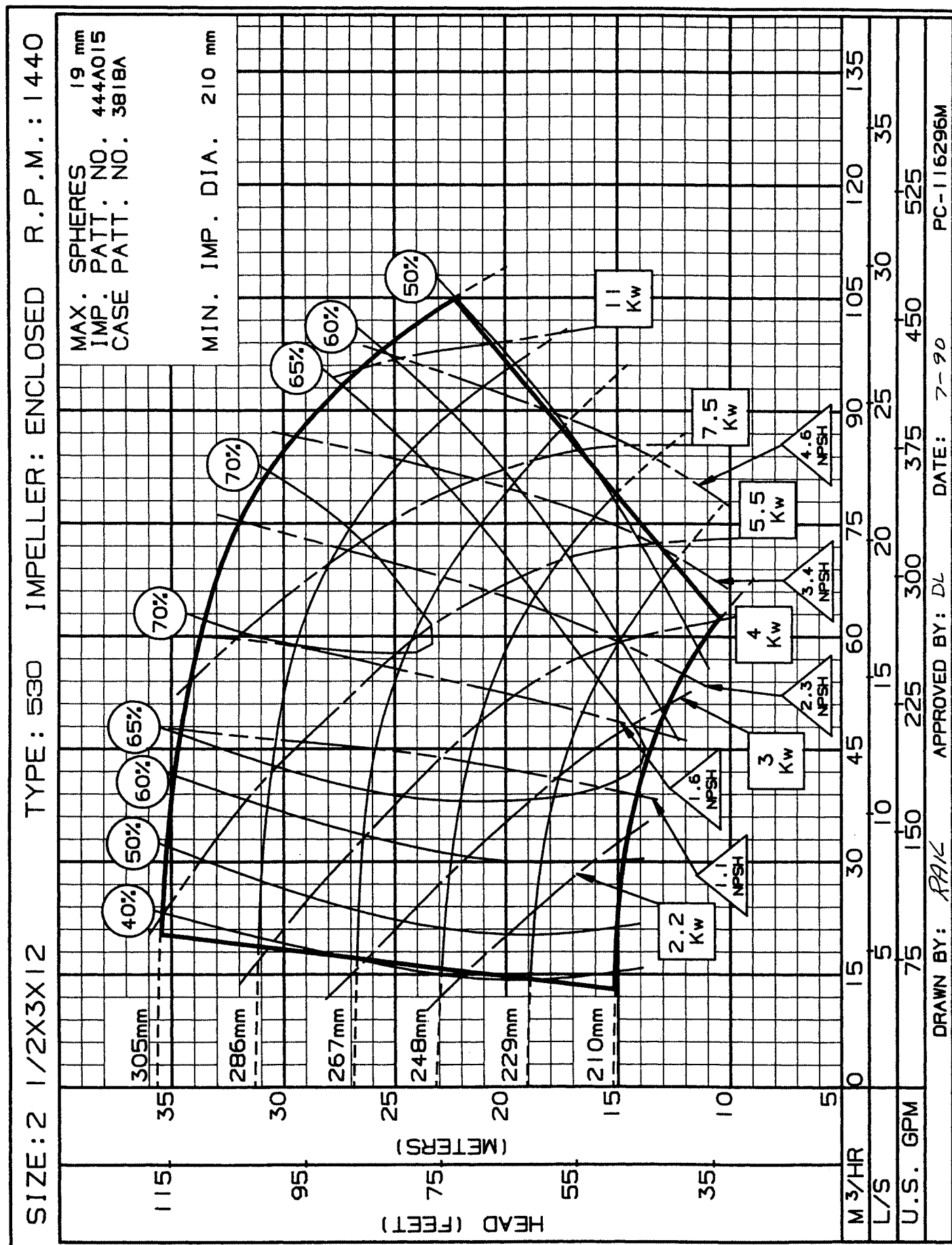
SUPERCEDES MARCH 1986



SUPERCEDES MARCH 1986

ENCLOSED IMPELLER

Pentair Pump Group

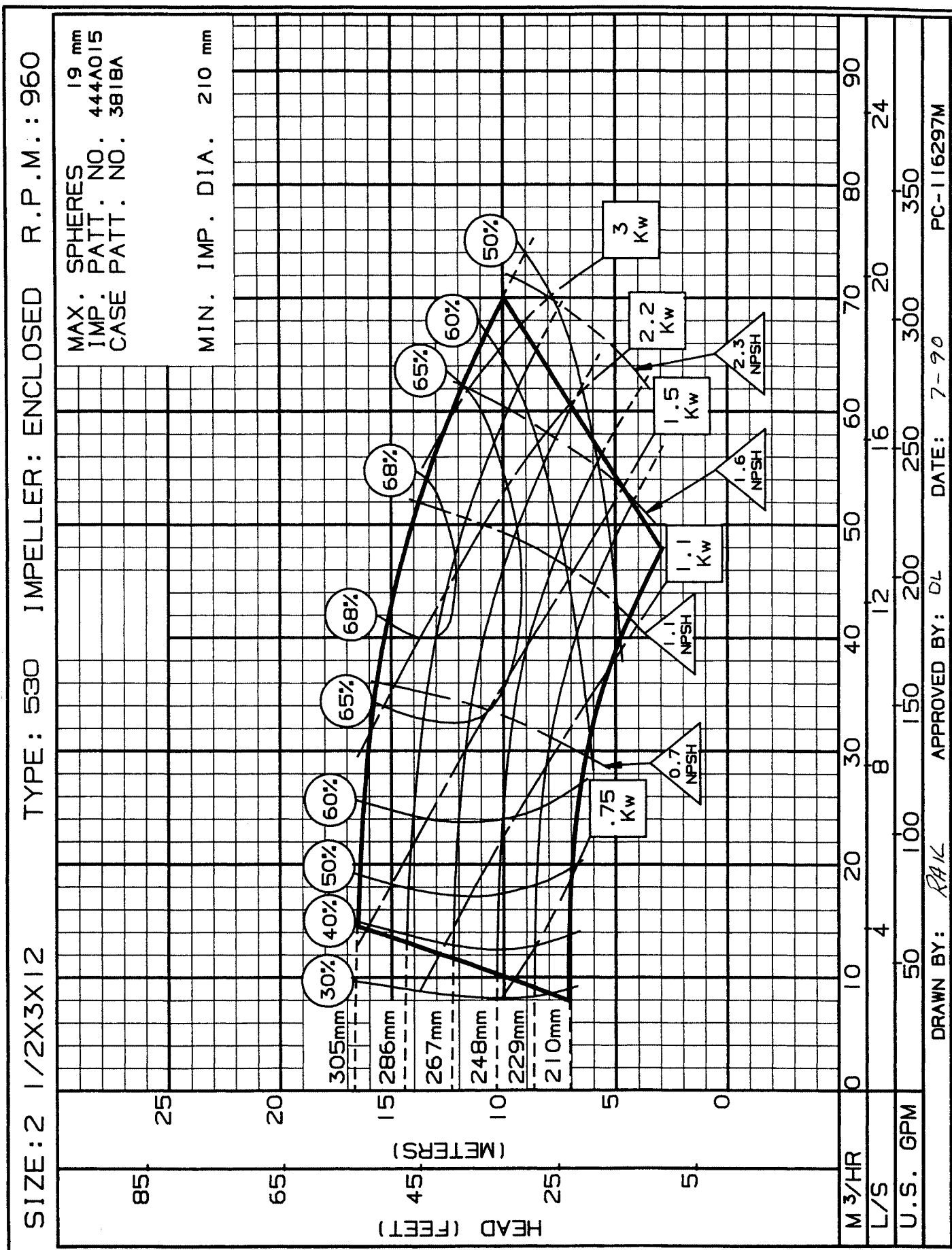




ENCLOSED IMPELLER

DATE **JULY 1994**

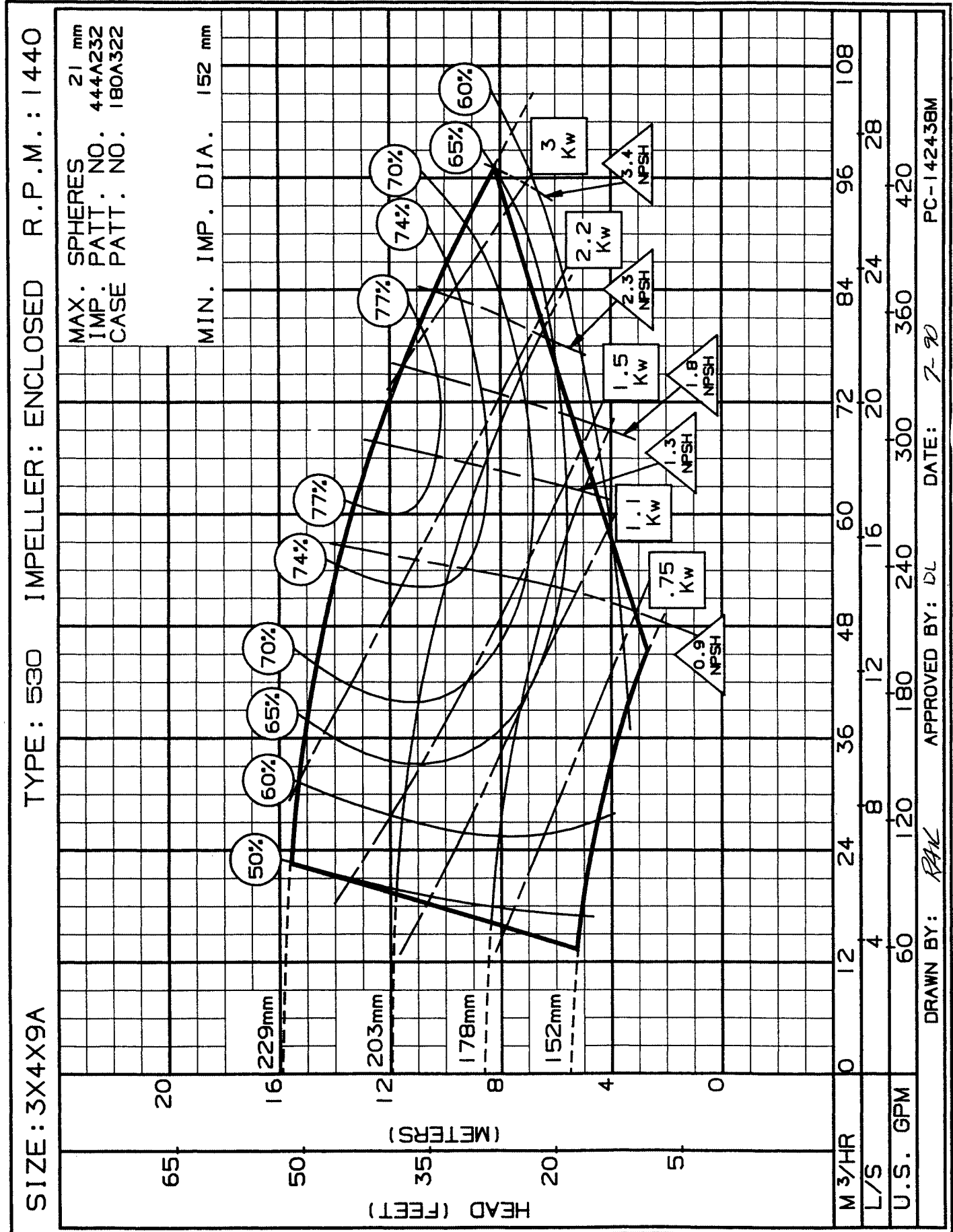
SUPERCEDES MARCH 1986



SECTION 530 (Metric 50Hz)
 DATE JULY 1994
 SUPERCEDES MARCH 1986

3x4x9A - 1440 RPM ENCLOSED IMPELLER

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ENCLOSED IMPELLER

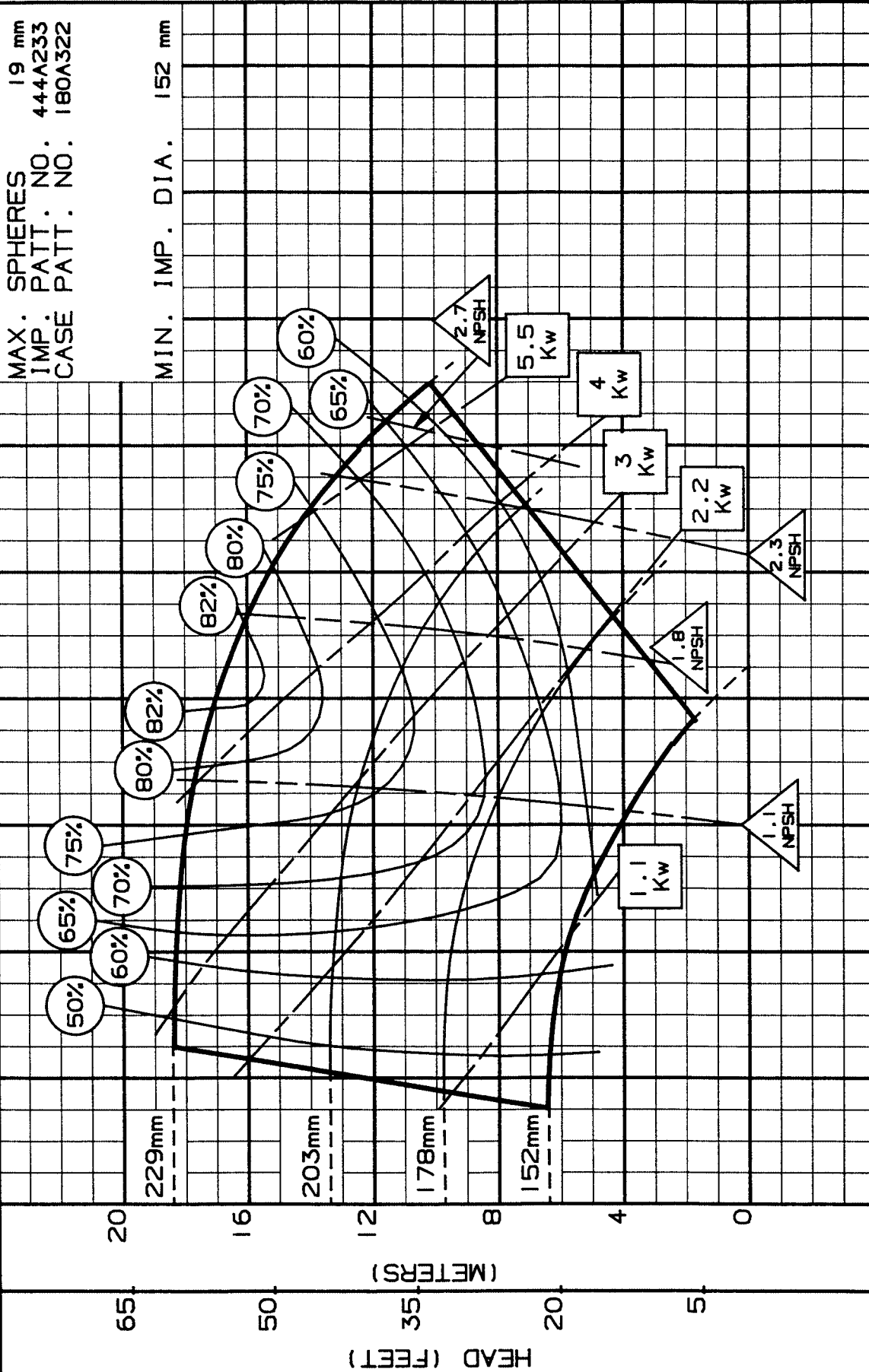
DATE **JULY 1994**

SUPERCEDES MARCH 1986

TYPE: 530 IMPELLER: ENCLOSED

MAX. SPHERES 19 mm
IMP. PATT. NO. 444A233
CASE PATT. NO. 180A322

MIN. IMP. DIA. 152 mm



M 3/HR	0	20	40	60	80	100	120	140	160	180
L/S		10	20	30	40					
U.S. GPM	100	200	300	400	500	600	700			
DRAWN BY: RAN		APPROVED BY: DL		DATE: 7-90		PC-142440M				

SECTION **530 (Metric 50Hz)**

DATE **JULY 1994**

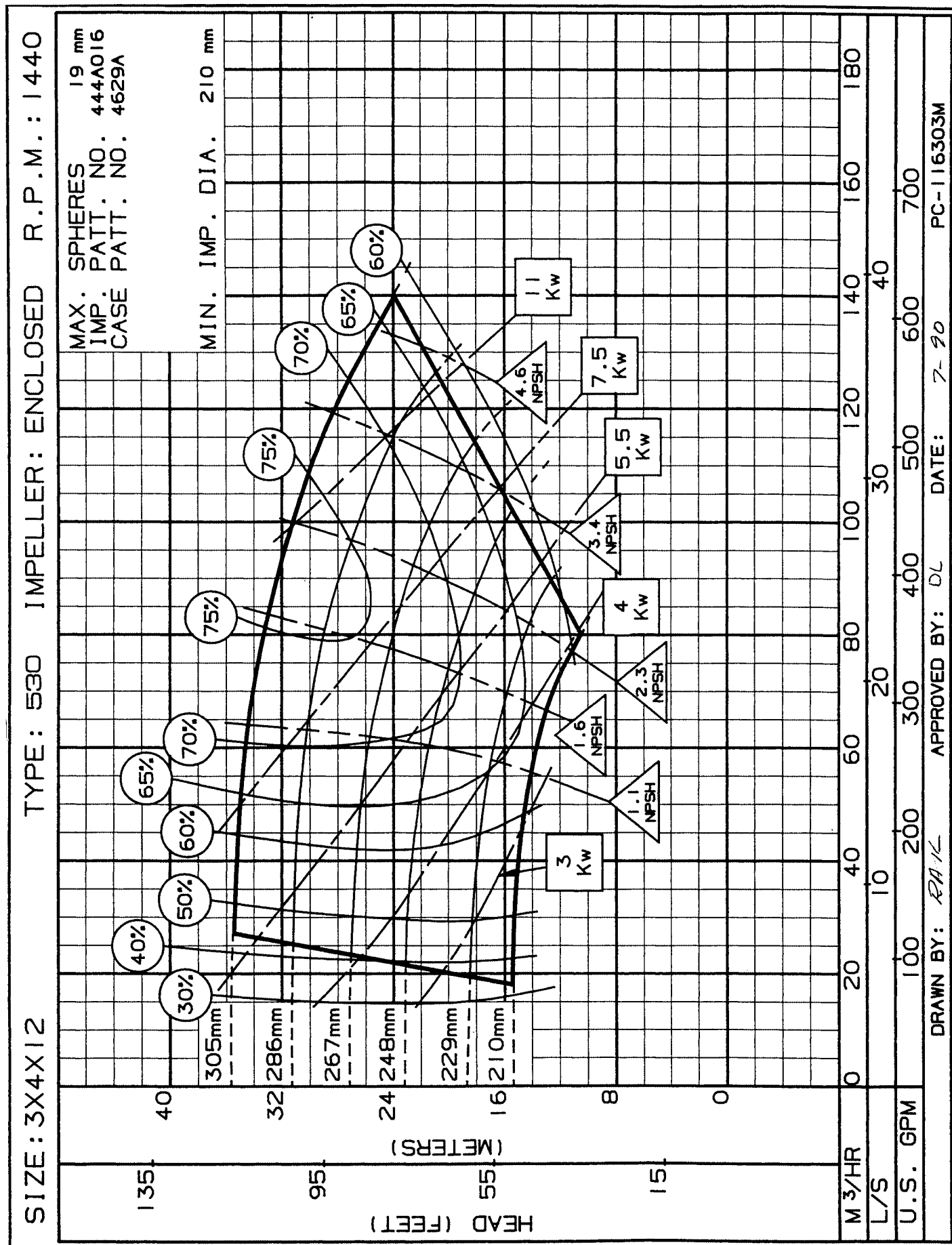
SUPERCEDES MARCH 1986

3x4x12 - 1440 RPM

ENCLOSED IMPELLER

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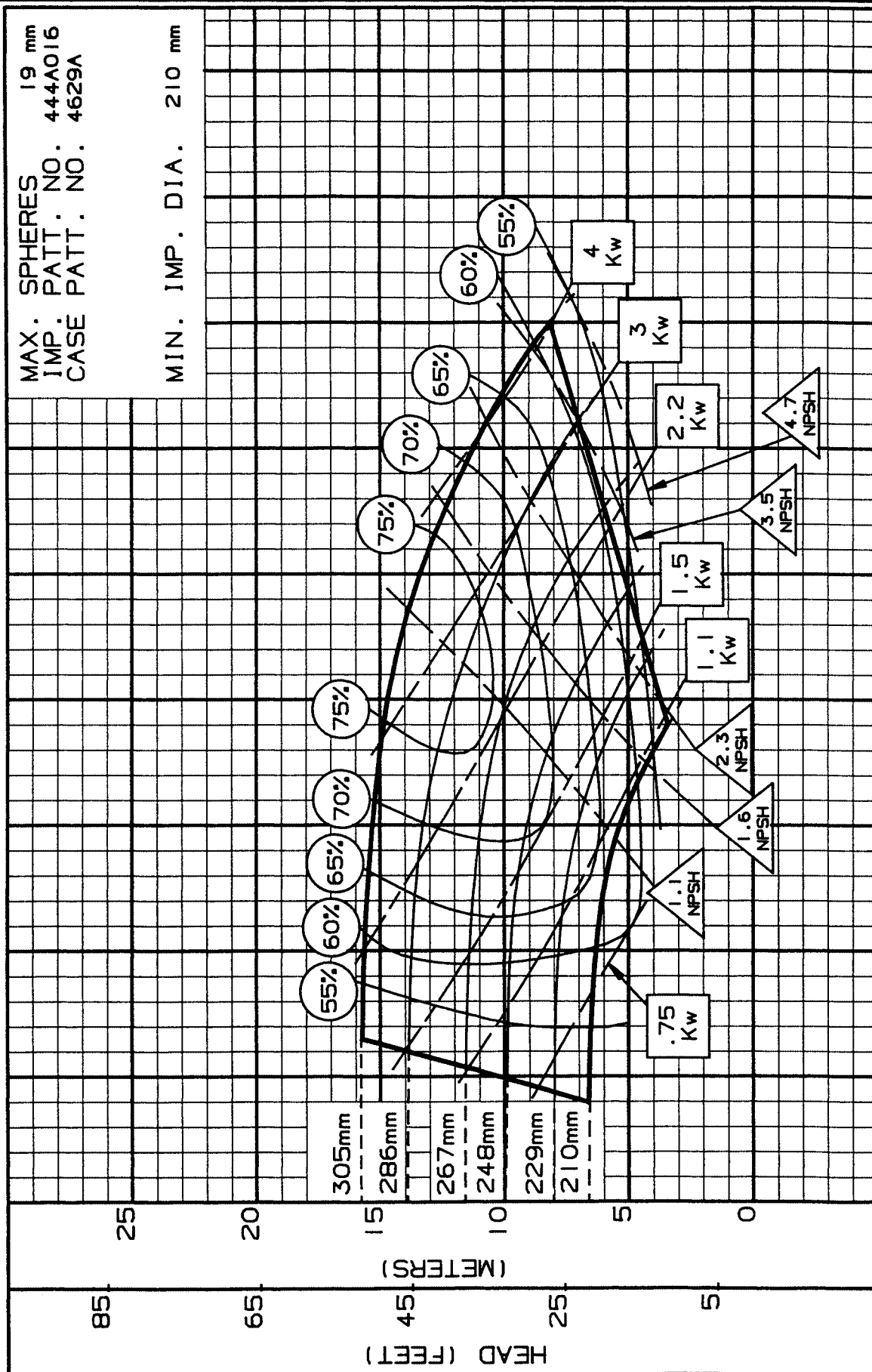
3x4x12 - 960 RPM
ENCLOSED IMPELLER

SECTION **530 (Metric 50Hz)**
DATE **JULY 1994**
SUPERCEDES MARCH 1986

SIZE: 3X4X12 TYPE: 530 IMPELLER: ENCLOSED R.P.M.: 960

MAX. SPHERES 19 mm
IMP. PATT. NO. 444A016
CASE PATT. NO. 4629A

MIN. IMP. DIA. 210 mm



M ³ /HR	0	15	30	45	60	75	90	105	120	135
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L/S	5	10	15	20	25	30	35
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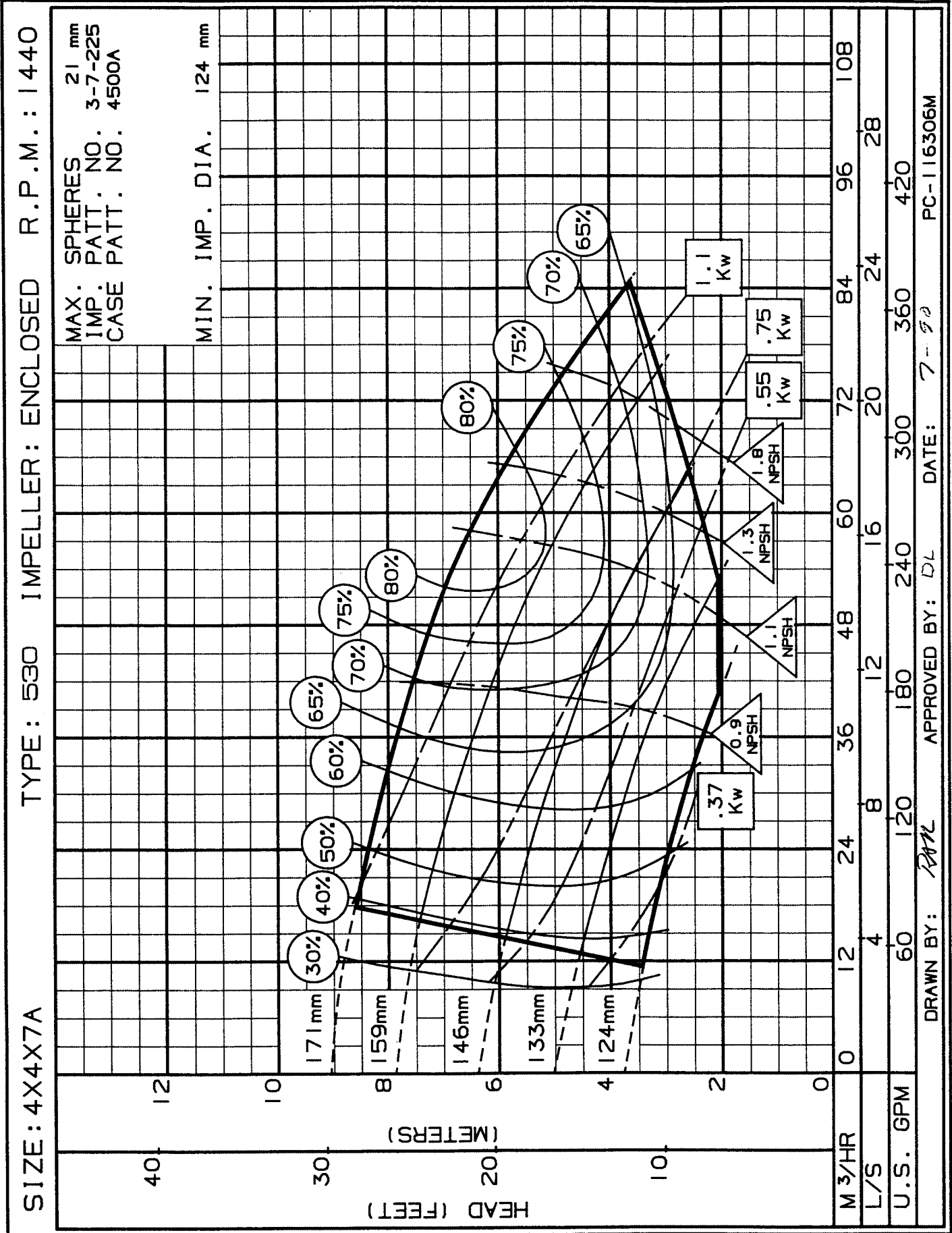
U.S. GPM	75	150	225	300	375	450	525
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DRAWN BY:	RAYL	APPROVED BY:	DL	DATE:	7-90	PC-116304M
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SECTION **530 (Metric 50Hz)**
 DATE **JULY 1994**
 SUPERCEDES MARCH 1986

4x4x7A - 1440 RPM **ENCLOSED IMPELLER**

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4x4x7B - 1440 RPM
ENCLOSED IMPELLER

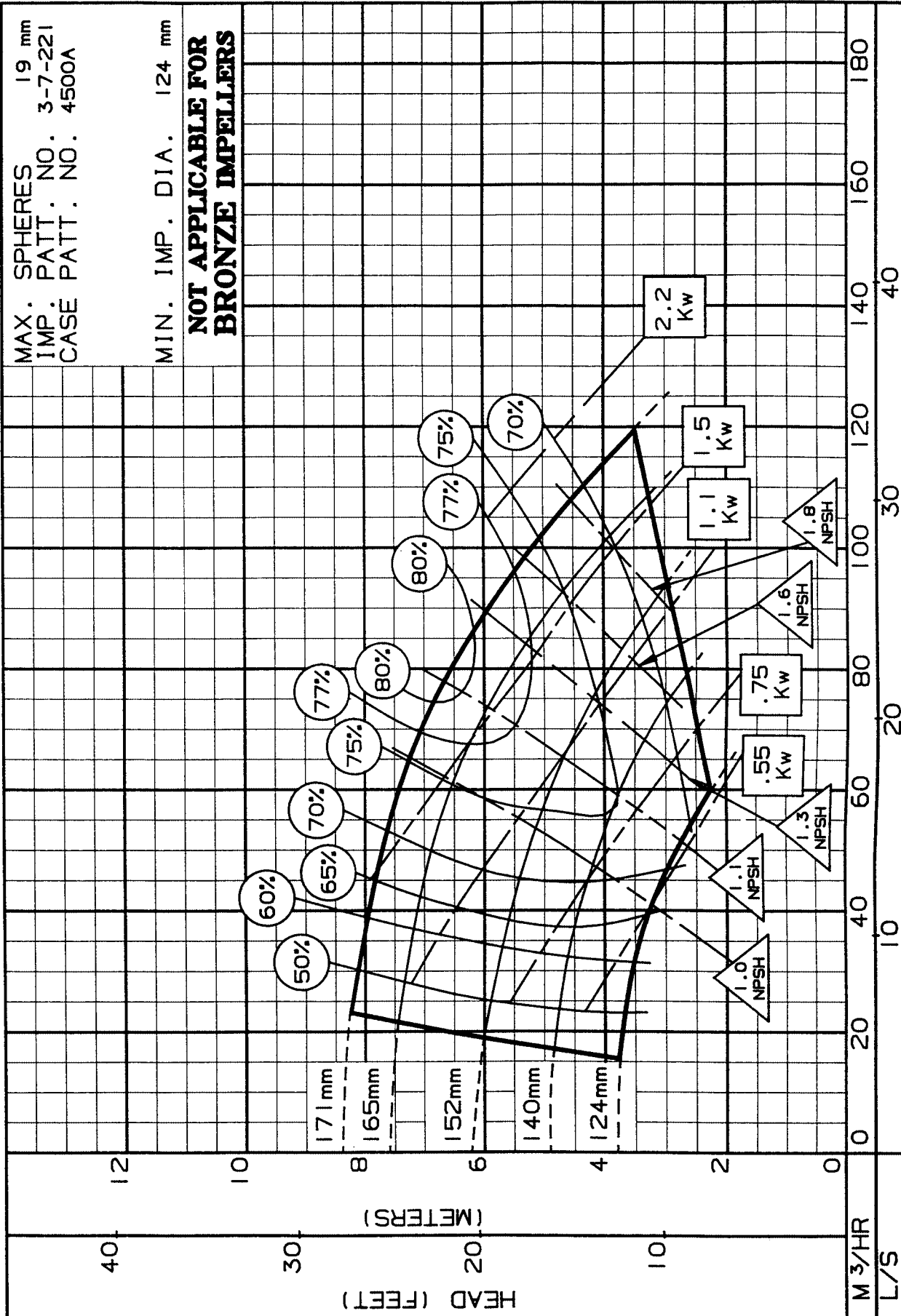
SECTION **530 (Metric 50Hz)**
DATE **JULY 1994**
SUPERCEDES MARCH 1986

SIZE: 4X4X7B TYPE: 530 IMPELLER: ENCLOSED R.P.M.: 1440

MAX. SPHERES 19 mm
IMP. PATT. NO. 3-7-221
CASE PATT. NO. 4500A

MIN. IMP. DIA. 124 mm

**NOT APPLICABLE FOR
BRONZE IMPELLERS**

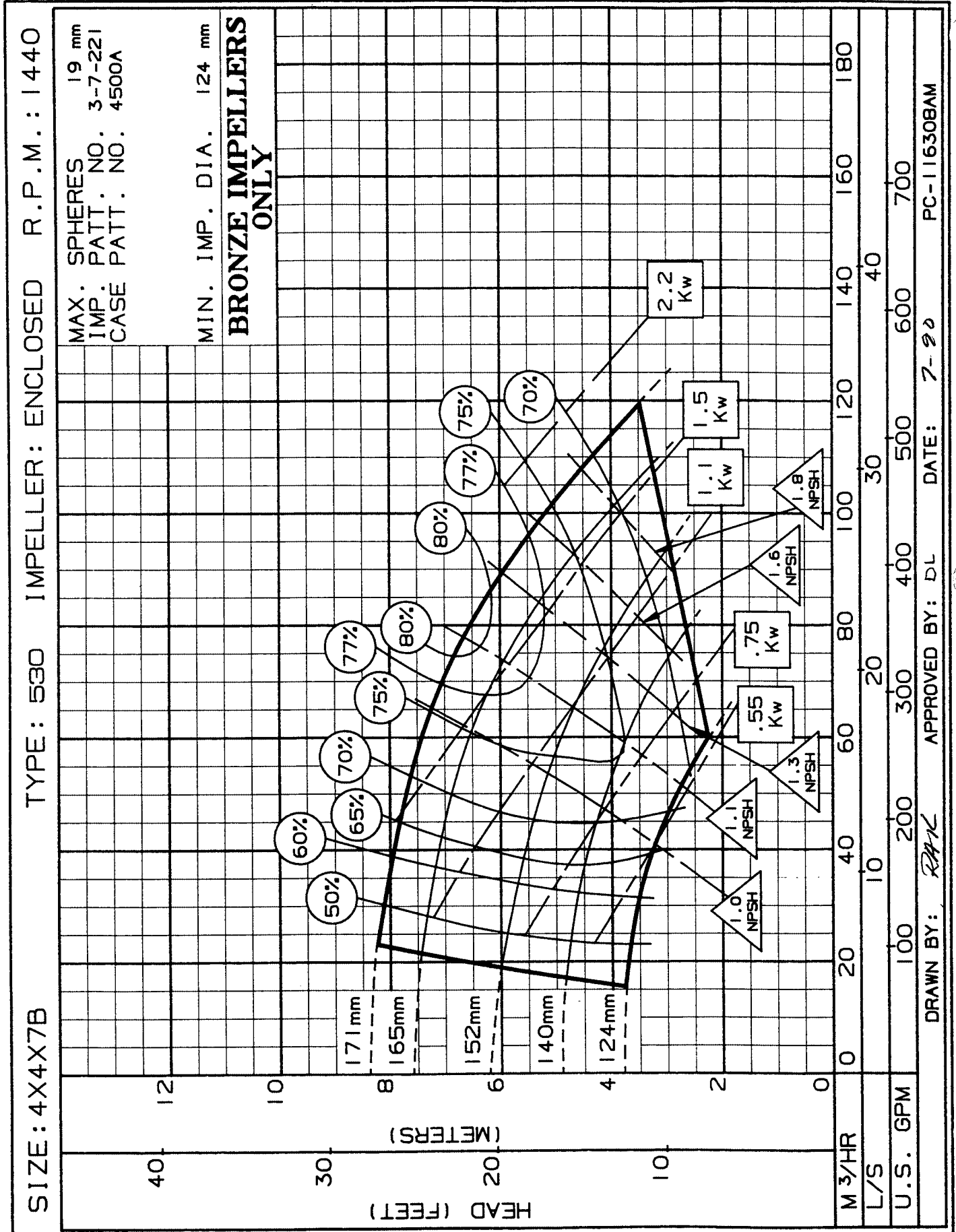


DRAWN BY: *RAK* APPROVED BY: *DL* DATE: *7-92* PC-116308M

SECTION 530 (Metric 50Hz)
 DATE JULY 1994
 SUPERCEDES MARCH 1986

4x4x7B - 1440 RPM ENCLOSED IMPELLER

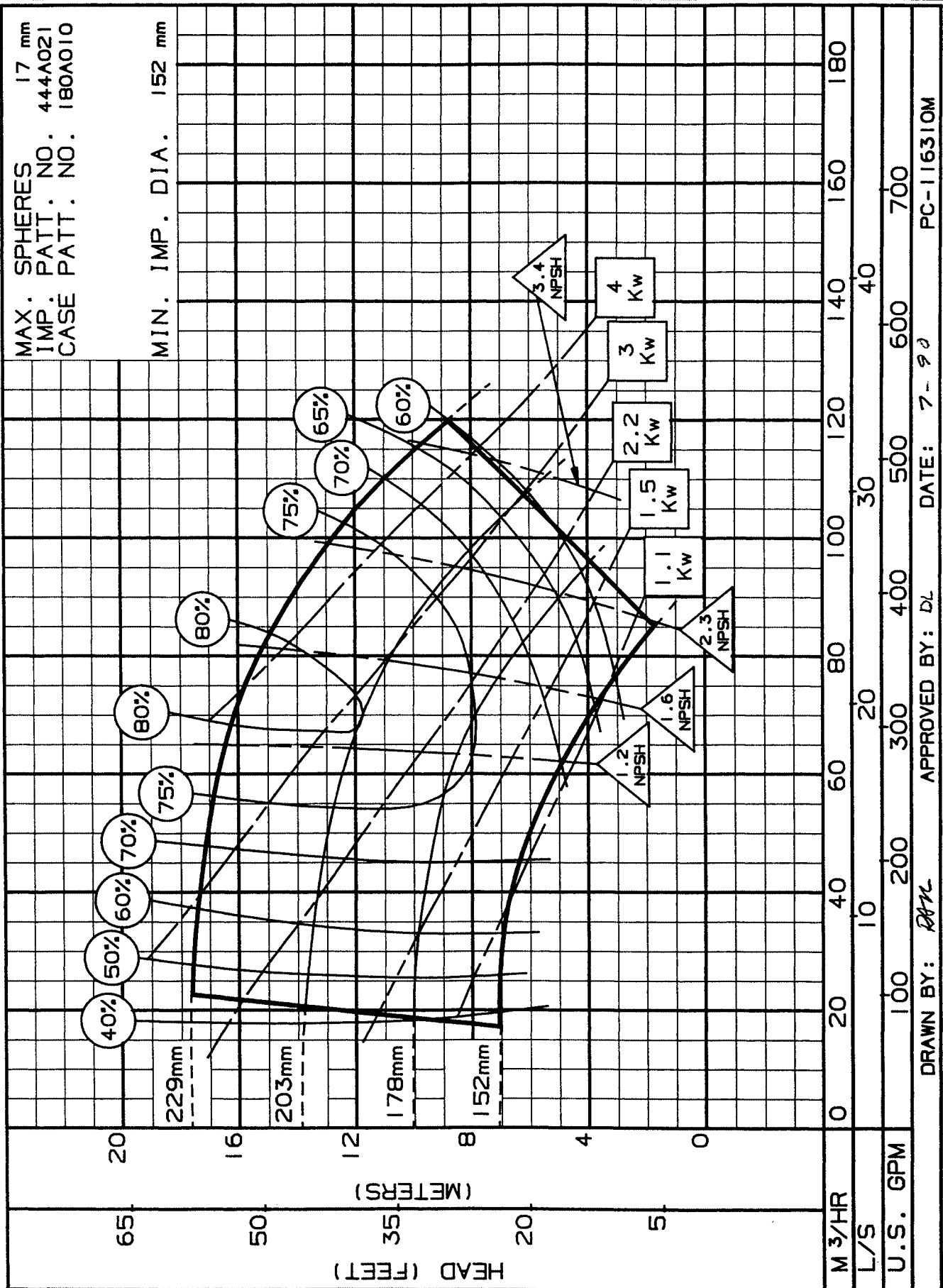
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SIZE: 4X5X9A TYPE: 530 IMPELLER: ENCLOSED R.P.M.: 1440

MAX. SPHERES	17 mm
IMP. PATT. NO.	444A021
CASE PATT. NO.	180A010

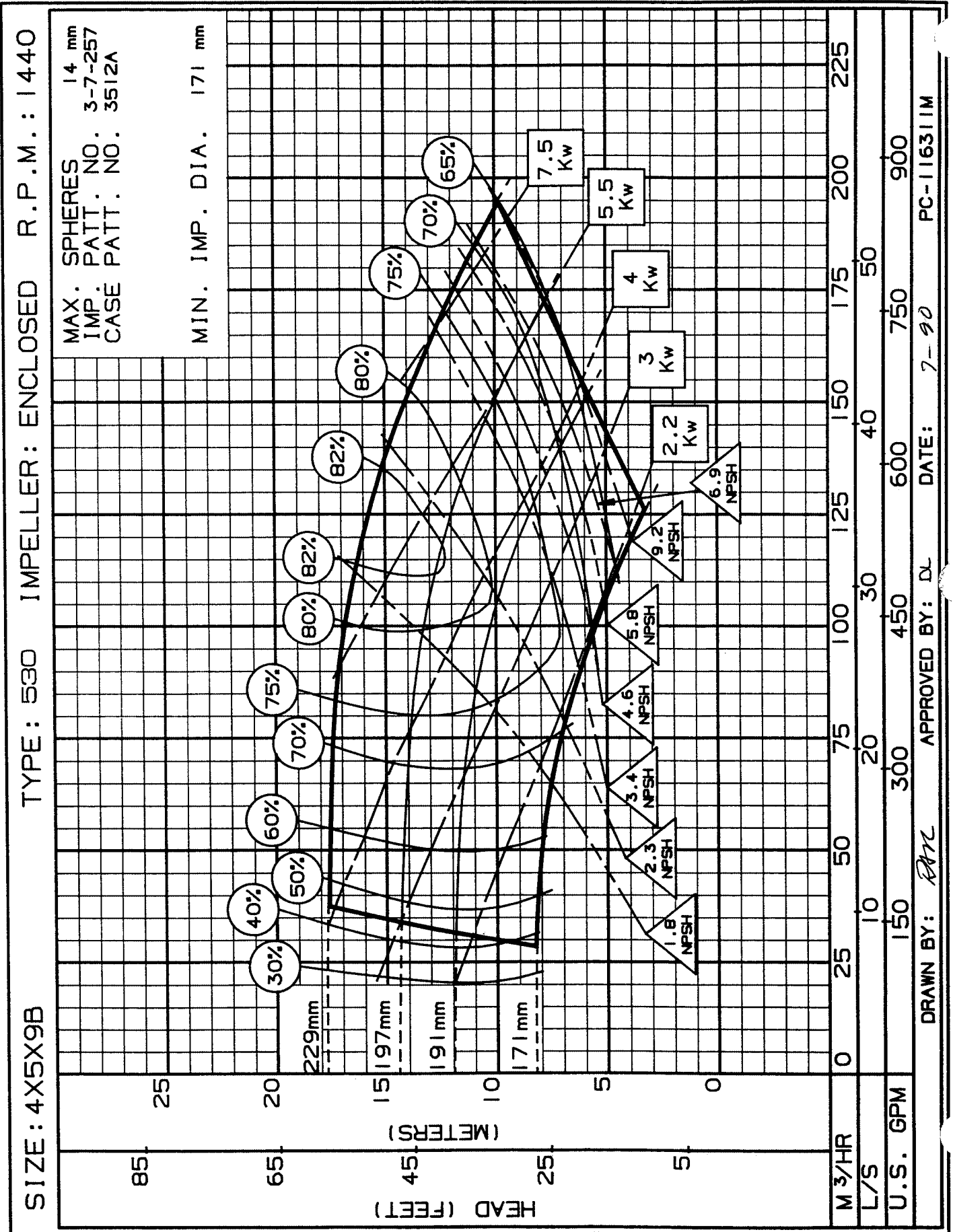
MIN. IMP. DIA. 152 mm



SECTION **530 (Metric 50Hz)**
 DATE **JULY 1994**
 SUPERCEDES MARCH 1986

4x5x9B - 1440 RPM
ENCLOSED IMPELLER

ap AURORA®
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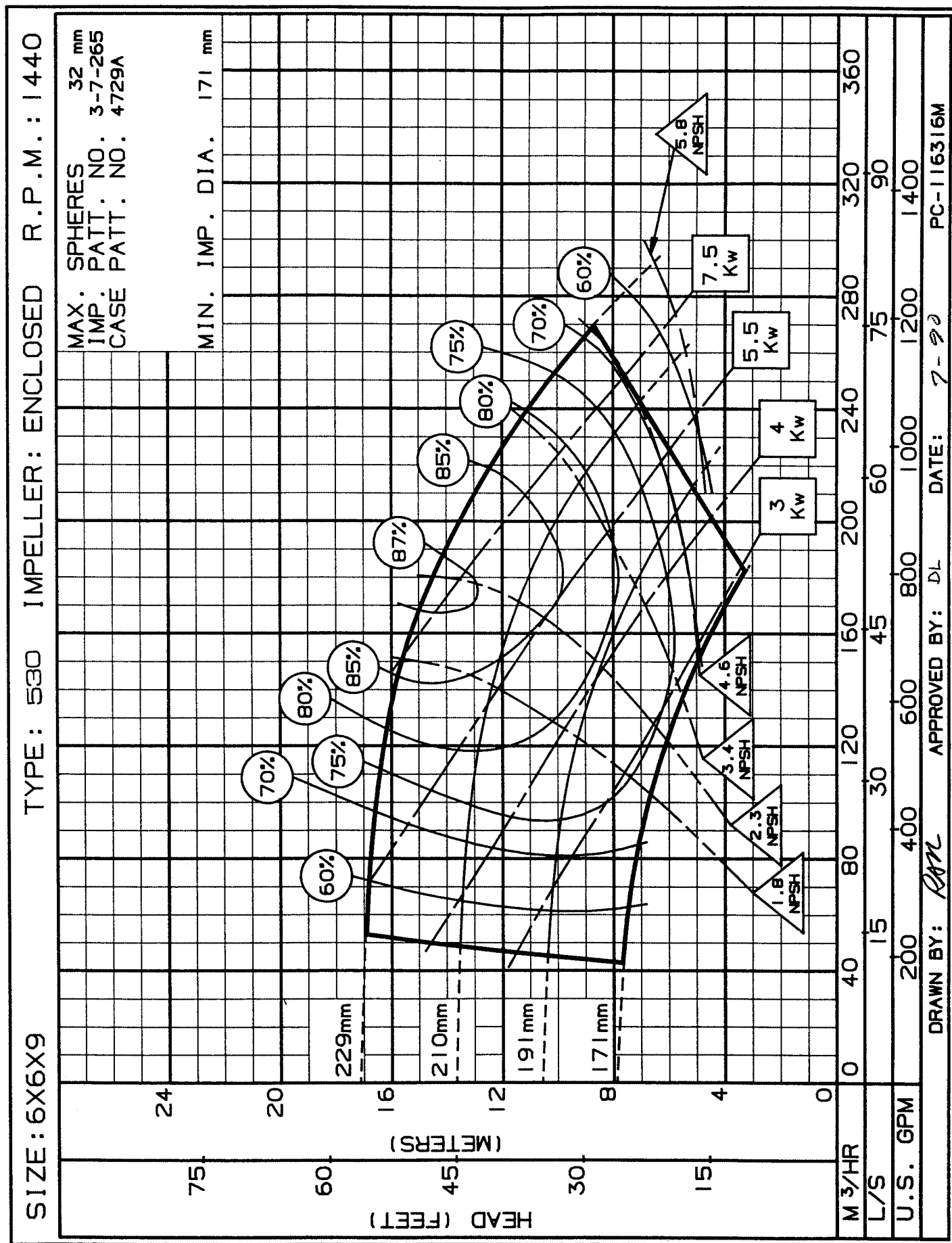




ENCLOSED IMPELLER

DATE **JULY 1994**

SUPERCEDES MARCH 1986



SECTION 530 (Metric 50Hz)

DATE JULY 1994

SUPERCEDES MARCH 1986

6x6x9 - 960 RPM ENCLOSED IMPELLER

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Pentair Pump Group

