



DE-CP PREMIUM 250 CENTRIFUGAL PUMP

Maintenance & Operation Manual

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HOW TO USE THIS “e-MANUAL”

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NAVIGATIONAL TOOLS

A portion of the menu bar and associated navigation tools for Adobe Acrobat is shown below. A brief description of these tools is presented below. Additional information concerning other features and navigational tools is available by selecting “Acrobat Help” or “Adobe on line” from the “Help” drop-down menu provided at the top of the screen.

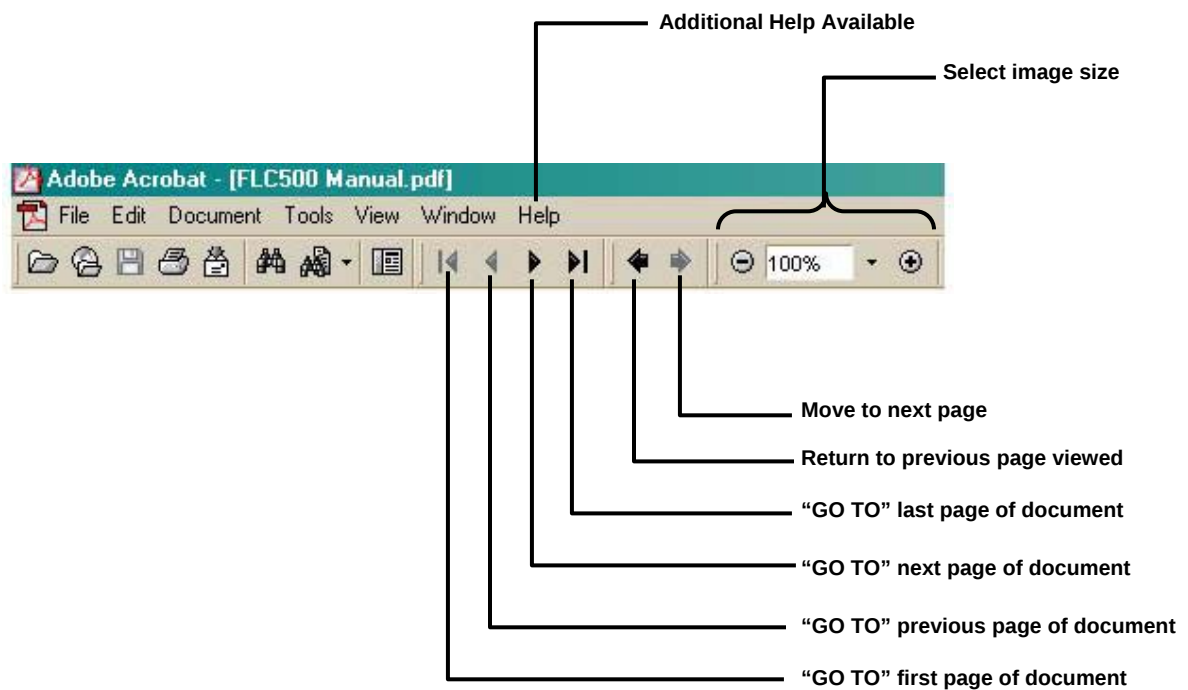




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INSTALLATION, OPERATION, AND MAINTENANCE

MODEL DE-CP PREMIUM 250 PUMP

GENERAL INFORMATION

INTRODUCTION

This manual contains instructions for the installation, operation, and maintenance of the Derrick Model DE-CP Premium 250 Centrifugal Pump (Figure 8251-1). After reviewing this manual, if you have questions, please contact your local Derrick representative for further assistance.

The DE-CP pump is designed to replace some older and existing 2.5" pumps, with a similar but superior product. We have designed this pump keeping in mind a longer life, reliability, and easier maintenance. Some of its outstanding features that contribute to its popularity and success are:

- Pump casing with a replaceable wear pad
- Stainless steel shaft sleeves
- Stainless steel casing nuts
- Grease lubricated bearings
- Leakage and contamination prevention through labyrinth seals

It is very important to closely follow proper installation, operation, and maintenance guidelines in order to ensure a smooth and efficient pumping operation and a longer equipment life.



Figure 8251-1. Model DE-CP Premium 250 Pump

GENERAL INSTRUCTIONS

1. The motor/driver must operate the pump in a manner that the rotation of the pump impeller when viewed from the suction (front) side of the pump is counterclockwise. The pump must not be operated in the reverse direction if damage to the pump is to be avoided.
2. The suction and discharge valves must not be completely closed when operating the pump.
3. The packing should be adjusted in a manner that a small amount of leakage remains for lubrication and cooling purposes.

Note: Packing should remain loose on pumps with mechanical seals until tightening is required due to mechanical seal failure.

4. For drilling mud operations, take care to prevent drying out and coagulation of seepage from the packing in the areas of the front seal and the slinger.

Note: This potential accumulation of dried seepage applies to lip seal applications.

5. Do not operate the pump outside its designed performance envelope.

EQUIPMENT USE

The DE-CP centrifugal pump is designed expressly for pumping mud. Personnel responsible for transporting, installing, operating, or maintaining this equipment should be required to read and understand the instructions in this manual. One copy of this manual should be available and accessible at the equipment location.

For maximum safety and performance, no additions and/or changes may be made to the equipment without the explicit written permission of Derrick Equipment Company. Genuine Derrick repair/replacement parts are required.

CONTACT INFORMATION

CONTACT INFORMATION			
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INSTALLATION

COMPATIBILITY

The DE-CP pump has been designed to ensure that it can replace existing pumps of the same nominal size. To this end, its outside dimensions are guaranteed to match up to the existing bases, piping, couplings, etc.

LOCATION

To eliminate the need for priming, the pump suction should be at a lower level than the level of the liquid in the supply tank/reservoir.

FOUNDATION

It is recommended to pour a concrete foundation on a solid base and it should be big enough to support the whole pump unit. The rigidity of the base plate will play an important role in damping out structural vibrations so the foundation must be thick enough to accomplish that. Refer to Hydraulic Institute's Standard ANSI/HI 1.4-2000 for guidelines on this subject. Care must be taken to level the base plate in a horizontal position. Also, when the application dictates the use of fabricated bases, the foundation design must account for it properly, so that it can effectively dampen the resulting resonant vibrations.

COUPLING ALIGNMENT

For any rotating machinery, the alignment of power transmitting and power consuming parts is critical for its safe and long lasting service. ***Even if the motor and the pump were aligned before shipping, it is very important to check the alignment after installation to ensure that the arrangement has not moved during transportation or handling.*** We cannot overemphasize proper alignment since it can mean the difference between a smooth and long lasting pump operation as opposed to high vibrations and even failure of bearings, coupling, pump or the motor. ***It should be noted that one must not try to align the pump and the motor until its flange and mounting bolts have been tightened.***

To perform the coupling alignment with dial indicators, which are the instruments of choice for such procedures, the dial indicator is attached to one coupling half with the indicator dial button resting on the outside diameter (OD) of the other coupling half (Figures 8251-2 and 8251-3). This will give the offset misalignment between the two shafts. In order to find out the angular misalignment, let the dial indicator button ride on the face of the other coupling half, instead of its OD. A TIR of 0.005" or less is usually considered acceptable by most manufacturers. If the TIR is excessive, it can be adjusted by loosening the pump or driver mounting bolts, adding or removing shims accordingly and then re-tightening the bolts.

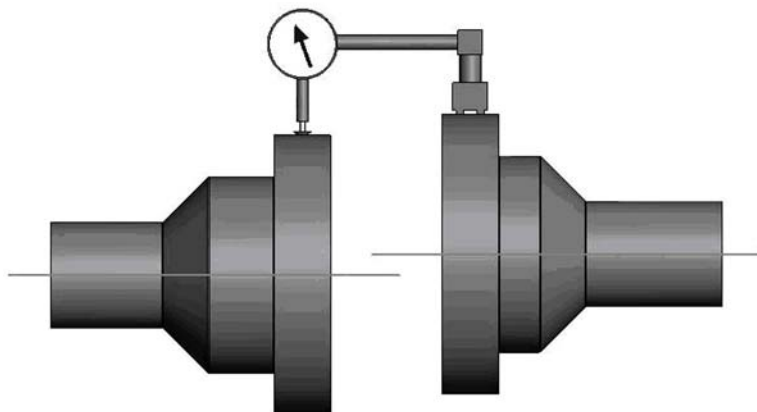


Figure 8251-2. Checking Offset Alignment with a Dial Indicator

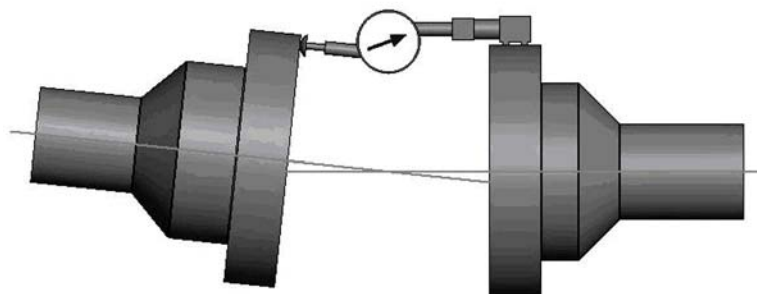


Figure 8251-3. Checking Angular Alignment with a Dial Indicator

If a dial indicator is not available, a straight edge can be used to perform a reasonable alignment. This method works better when the coupling has a rubber or a flexible drive element.

To check for offset misalignment, place the straight edge on the OD of the couplings. If they are aligned there will not be any gaps under the straight edge. A max gap of $1/64$ " is allowed. This procedure should be repeated for at least one more location on the circumference of the coupling 90 degrees from the first position.

To check for angular misalignment, the two coupling mating faces should not have a variation in the gap, all around the faces. A maximum variation of $1/64$ " is permissible (Figures 8251-4 and 8251-5).

More information on coupling alignment can be found in the Hydraulic Institute's Standard ANSI/HI 1.4-2000.

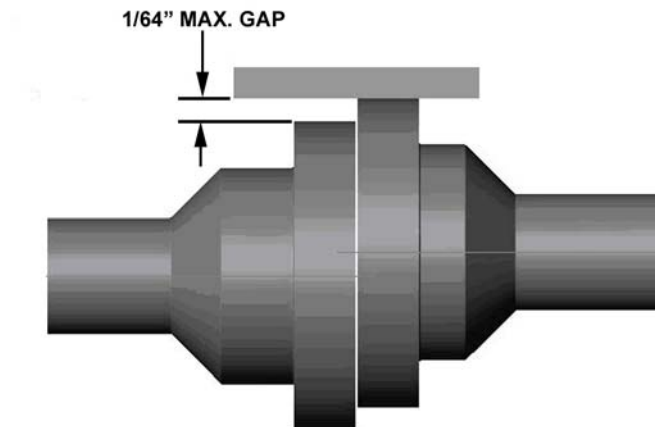


Figure 8251-4. Checking Offset Alignment With Straight Edge

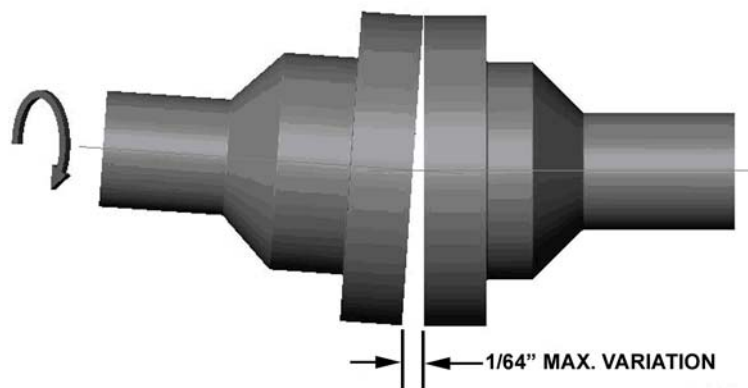


Figure 8251-5. Checking Angular Alignment with Straight Edge

PIPING

It is important that the piping should line up to the pump without it having to be drawn closer by tightening the companion flange bolts. Also, the pump should not have to support the weight of the piping. For this to happen, it is better to have the piping anchored independently but as close to the pump as possible. It should also be pointed out that the piping should not be connected to the pump until the grout has hardened and after the motor and pump mounting bolts have been tightened.

Suction Piping

Suction piping can not only play a critical role in causing vibration and cavitation in centrifugal pumps, but can also be responsible for causing packing and mechanical seal failures as well as putting extreme loads on the bearings. It is therefore very important that the size of the suction piping be at least the same or larger than the suction port of the pump.

Suction Piping (Cont'd)

To eliminate air pockets in the suction line, the suction line should slope gradually from the supply tank or source.

It is recommended that the flow through the pump should not be controlled by adjusting a valve in the suction line. However, this does not preclude the use of a suction line shutoff valve to be used when the pump requires inspection or removal for maintenance purposes.

In order to have a relatively turbulence free flow into the pump, it is good practice to have a straight length of pipe, at least twice its diameter in length e.g. a 6" suction pipe should have at least one foot of straight pipe just before the pump.

In situations that might require a flexible hose in the suction line, a non-collapsing type flexible hose is required, since it is not uncommon to have suction pressures which are below atmospheric pressure. In such cases, the pump may be starved causing it to overheat.

Discharge Piping

As for the suction piping, a shutoff valve should be used in the discharge piping to facilitate pump removal for maintenance purposes. A throttle valve can be used in the discharge line to operate the pump at its design point, if the exact operating conditions are not known.

In case of a closed pressurized loop, a check valve is required between the pump and the throttle valve to prevent the product from flowing back into the pump discharge. In the absence of the check valve, such a circumstance can cause the impeller to come loose and cause damage to the pump. It can also result in leakage beneath the shaft sleeve.

OPERATING INSTRUCTIONS

GENERAL

Before starting the pump, it is good practice to always go through the following simple checks;

1. Check for impeller's free rotation by turning the shaft manually.
2. Make sure that the suction line and the pump are full of fluid and that the suction valve is fully open.
3. Slightly open the discharge valve and then open it fully once the pump is running.

PRELIMINARY LUBRICATION

Our standard pumps come pre lubricated with grease (oil lubrication is available as an option). The operators / customers do not have to worry about lubricating the pump for the first year of operation. At that time, the pump can be lubricated through the grease fittings on the outboard and inboard bearing covers.

Usually, labyrinth seals are provided at both bearing ends, and they serve to keep the temperature from rising, by also acting as vents. But in cases where the labyrinth seals are not provided, it is recommended to keep the air vent clean.

MECHANICAL SEAL PUMPS

It is vital that these pumps are never started dry otherwise it will cause irreparable damage to the seal faces. The factory installs and adjusts the mechanical seals before shipping the pumps. The mechanical seal models currently being provided with the DE-CP 250 pump do not require external flush.

Pumps with mechanical seals come with three rings of backup packing which should be kept completely loose until a seal failure occurs. Only then should they be tightened down to minimize leakage.

PACKED PUMPS

When starting packed pumps, the packing should be loose and the packing gland nuts should only be hand tight. Once the pump starts running, slowly tighten the packing down. Make sure that there is some leakage through the packing, otherwise it will overheat and fail.

If outside flushing is required, the flush lines should be connected and checked for flow through them before starting the pump.

DIRECTION OF ROTATION

Before running the pump it is important to learn the direction of rotation. This is mandatory since not all Derrick pumps are equipped with the anti-rotation safety device, and starting the pump in the reverse direction can unscrew its impeller and thereby cause damage to the pump and the seal. The direction of rotation can be checked in two ways:

- The motor can be uncoupled from the pump and then started to check its direction of rotation.
- An operator can start and immediately shut off (bump start) the coupled motor and pump assembly while an assistant watches the shaft rotation.

PUMP PRIMING

To prevent damage to the mechanical seals or packing, there must be liquid in the suction line and the casing, before the pump is started. Fill the suction line with the liquid and vent out any air that might be present in the line. The discharge valve should be barely open when the pump is started and only after the flow and pressure have stabilized that it should be adjusted to the required flow conditions. If the pressure fails to build, close the discharge valve and then reopen it to build discharge pressure. If flow difficulties continue, it may be an indication of improper installation or pump selection (refer to *Suction Piping* in **Installation**).

Operators must not run the pump with the suction valve closed under any circumstances, as it will immediately overheat the pump and cause major damage to various components.

Also, running the pump with the discharge valve closed should be allowed only for short durations as the energy being imparted to the pumped product by the impeller, will raise the temperature. If for some reason there is a need to keep the discharge valve closed for an extended length of time, then it is recommended to run a small (0.25" or 0.50") line, starting between the pump and the discharge valve and going back to the fluid supply tank.

OPERATING CONDITION ENVELOPE

This section only applies to pumps which do not have any external insulation and are exposed to the room temperature.

The maximum safe working pressure for cast iron is 175 psig at 150°F (65°C) or 150 psig at 250°F (121°C). The conditions in between can be accordingly calculated. Whenever a high-temperature—150°F (65°C) plus fluid is being pumped, cooling water should be passed not only through the lantern ring but also over the exposed shaft, so as to dissipate the heat being generated at the labyrinth seal or lip seal and the bearings.

DOCUMENTATION

It is always helpful to maintain a documentation history of the pump as it can improve Derrick's customer service response time. To assist in this effort, an identification plate is installed on the pump pedestal. This plate contains information to help service personnel identify the pump quickly. In addition, however, it would be helpful to keep a record of the following information:

1. Motor horsepower
2. Operating frequency
3. Maintenance records and pertinent information on any replacement parts

LUBRICATION

Your pump was lubricated with grease when it is shipped from the factory and should be lubricated every six months after the first year of service. The recommended grease is Lubri Plate 1200-2. When using different types of grease, care should be taken to use only those types of grease which are well suited to operate with each other.

Oil-Lubricated Bearings

Oil lubrication for bearings is available as an option but the pumps must be mounted in a horizontal position for oil lubricated pumps to work. This option is typically exercised when it is desired to lower the bearing temperature and hence reduce its wear.

It is recommended to use 10W30 non-detergent motor oil. The oil can be filled through the hole provided on the top of the pedestal. After removing the plug positioned directly above the drain plug in the side of the pedestal, oil should be added from the top until it starts to flow out from the side hole. This will indicate that the level of oil is correct. Adding more oil than recommended can actually be harmful to the pump.

Grease-Lubricated Bearings

The outboard and inboard bearing covers are provided with a grease fitting (Figure 8251-1). It is recommended to add five shots of grease through the grease port at least once every six months, after the first year of service.

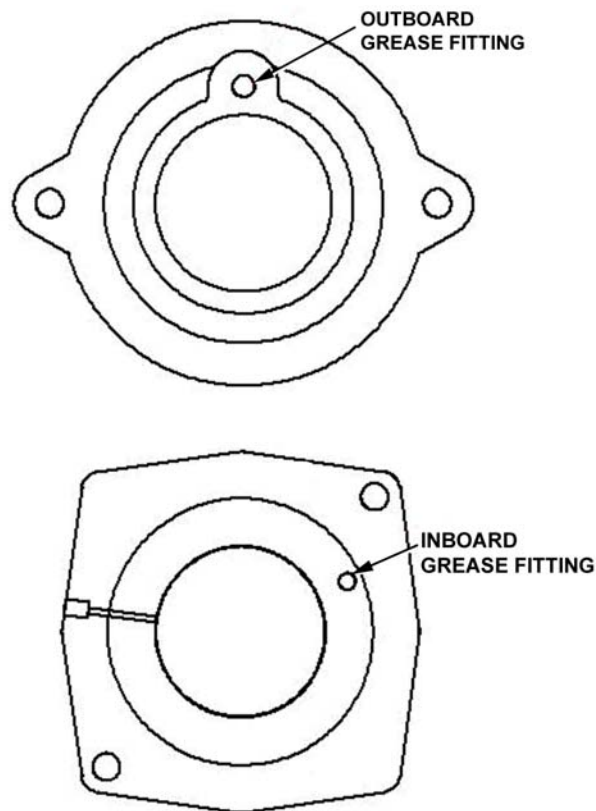


Figure 8251-6. Outboard and Inboard Bearing Covers With Grease Fitting

Grease-Lubricated Packing

For packed pumps, the stuffing box cover has a drilled hole for lubricating the packing rings. It is fitted with a grease fitting. It is recommended to lubricate the packing rings at least once a day. Derrick offers an optional self-lubricating mechanism which only needs to be filled from time to time.

Grease should be added while turning the shaft. A good indication of the sufficient grease in the packing is that it will start to come out around the packing gland. If the packing rings are worn and/or the leakage is deemed excessive, a more viscous variety of grease like the ones used in water pumps should be used rather than a general-purpose grease.

Water Lubrication for Packing

It is recommended that whenever drilling mud is being pumped, water should be fed to the packing through the lantern ring, not only for lubrication purposes but also to prevent fluid being pumped from coming through the packing rings. Such fluids can reduce the life of the packing as well as cause abrasion of the shaft.

GENERAL OPERATING AND STORAGE INSTRUCTIONS

Some important factors to check during pump operation are as follows:

1. The packing should not be over tightened, as it will become hard and brittle and will fail to perform its function. But it is also important that rings not be too loose when a water flush system is employed to lubricate the packing rings. Excessive looseness could result in flush water seeping into the drilling mud and changing its density. This situation can also occur due to a gap between the shaft and the packing, which results due to the flexing of the shaft about its own axis during pump operation and thus causing deformation of the packing. This predicament can be solved by either manually shutting off the water whenever the pump is not running or installing a solenoid valve for the purpose.
2. Another factor that should be controlled to limit the amount of water from getting into the drilling mud is the pressure of water for the flush system. Pressure as small as 5psi is usually enough to provide the required lubrication for the packing rings. A pressure regulator should be preferably incorporated into the water flush system for this purpose.
3. Bearing failure is the biggest contributor to pump maintenance costs. So it is imperative that care be taken not to run the pump if the bearing condition is suspect. A quick check that can be easily performed is to estimate the temperature of the pump housing by placing a hand on it. Usually if the pump housing can be touched briefly, the temperature is not more than 150° F (65° C). A higher temperature indicates that the bearings have started to fail, lubrication is insufficient, or bearings are over lubricated. Replacing bearings at this stage is more cost effective than waiting for a failure, which may require replacement of a number of other parts as well.
4. One of the most common reasons for bearing failure is misalignment between the pump and the motor. Hence it is very important to check alignment not only before starting the pump for the first time but to also do it periodically.
5. Care should be taken not to increase the suction line velocity beyond 10ft/sec because that can result in turbulence as well as cavitation. These conditions will adversely affect the efficiency and the life of the pump components.

6. Perhaps the most important factor for predictable pump performance is the Available Net Positive Suction Head (NPSH_A). Simply put, it means that the height of the fluid in the supply tank above the suction level of the pump should be enough to prevent the fluid from entering the pump at a pressure which is below its vapor pressure at that temperature. Cavitation occurs if such flow conditions cannot be avoided. Cavitation is the boiling of the fluid at the operating temperature and the bubbles created during the boiling process implode and damage the various pump and system components. Thus, to prolong the life of the pump, always ensure that the pump has the recommended NPSH_A.
7. In case of both indoor and outdoor storage of the pumps, the party responsible for storing the pumps must ensure that the equipment is not exposed to temperature extremes, excessive moisture or vibrations.
8. If the pumps are to be stored outdoors for an extended period of time, it is good practice to properly seal off the suction and discharge openings, to prevent rust from attacking the pump casing and impeller.
9. Please note the maximum operating RPM listed on the nameplate of each pump. For grease lubricated pumps it is 2200 RPM while oil lubricated pumps can operate at speeds up to 3600 RPM. Operating a pump at higher than recommended speeds can cause premature failure of the bearings which can result in catastrophic failures.

Note: A written record of all the storage procedure and actions should be maintained.

PUMP SKID PACKAGE OPERATING AND STORAGE INSTRUCTIONS

Sometimes Derrick DE-CP pumps are provided as part of a skid package, which consists of a motor, coupling, coupling guard, and an electric starter as an option. The following instructions apply for such skid packages:

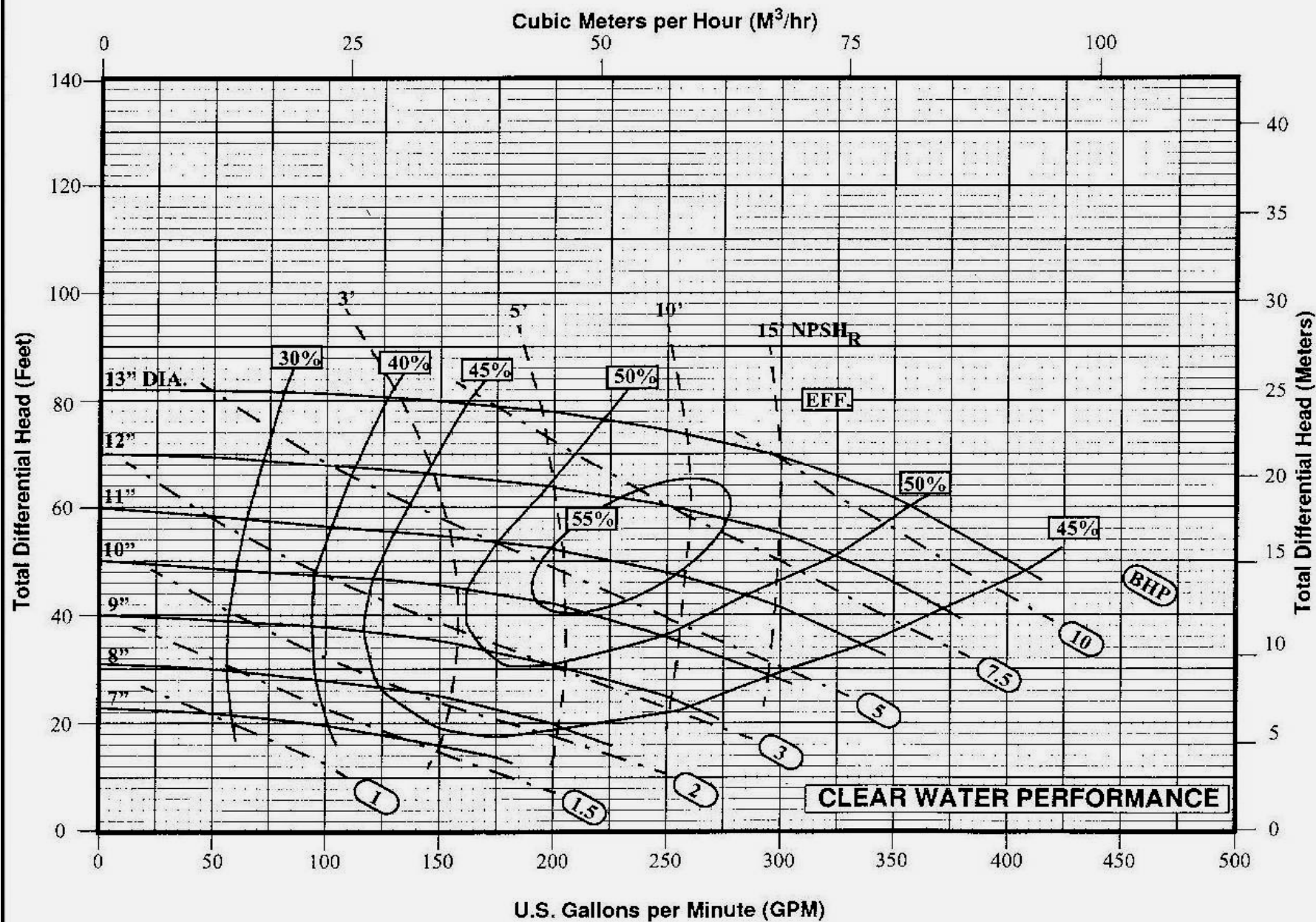
1. The lifting eye on the pump and/or the motor should not be used to lift the complete skid package. These lifting eyes are provided for lifting that particular piece of equipment only.
2. If the skid is provided with an electric starter wired to the motor, it is the customer's responsibility to install a local lockout switch on or near the starter per the local and applicable safety regulations.
3. It should be standard procedure to check the resistance of motor windings at the time of placing a motor in storage and again when it is removed from storage. A difference of more than 50 percent necessitates drying the windings before the pump is operated.
4. If the pump is stored for more than 36 months, after removing the pump and motor from storage it is recommended to remove all old grease from the bearings and replenish with fresh new grease.
5. It is the user's responsibility to manually turn the shafts of the motor and the pump at least once every two months while the pump is in storage.
6. In case of both indoor and outdoor storage of the pumps, the personnel responsible for storing the pumps must ensure that the equipment is not exposed to temperature extremes, excessive moisture, or vibration.

Note: A written record of all storage procedures and actions should be maintained.

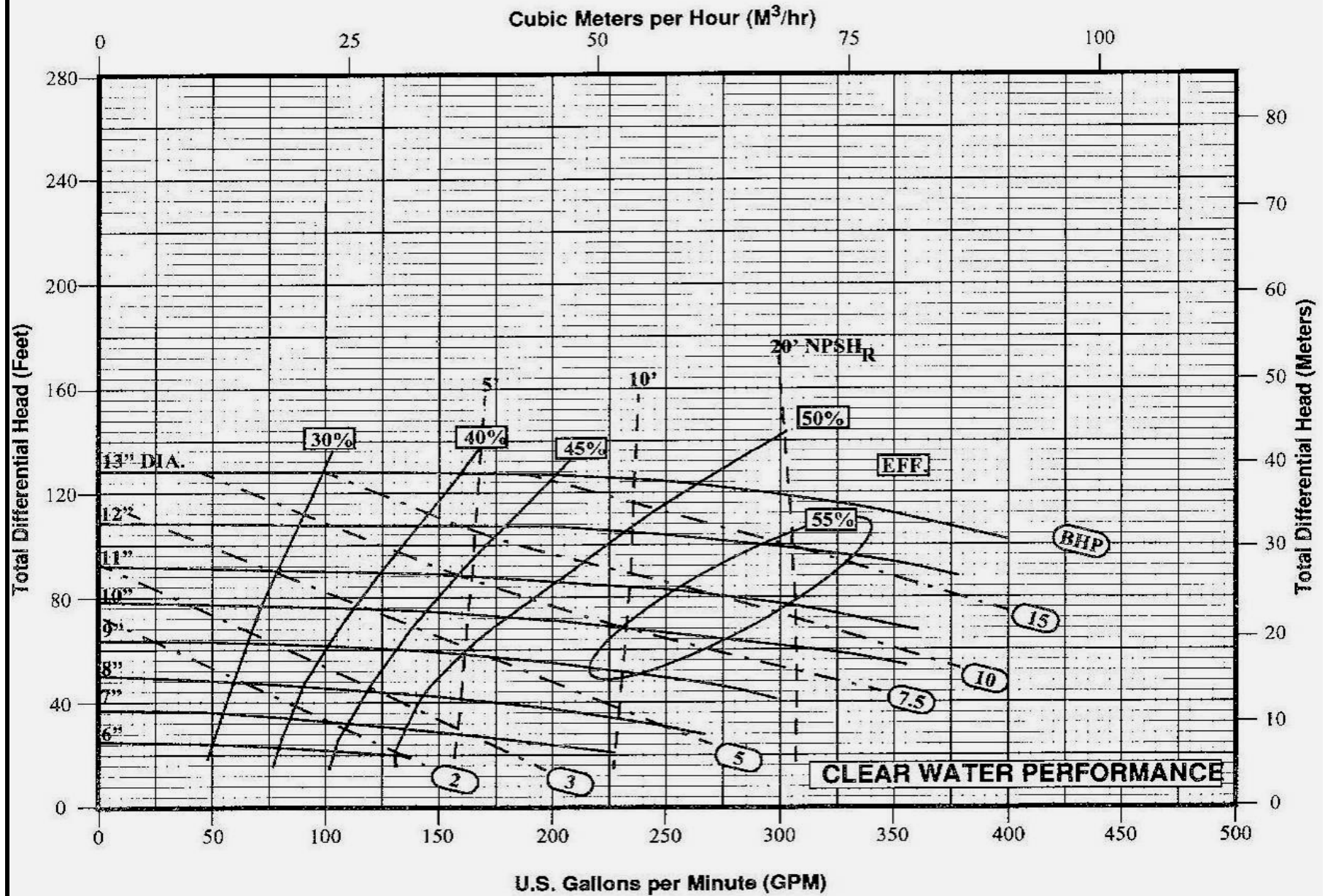
DP-CP Premium 250 Pump Curves



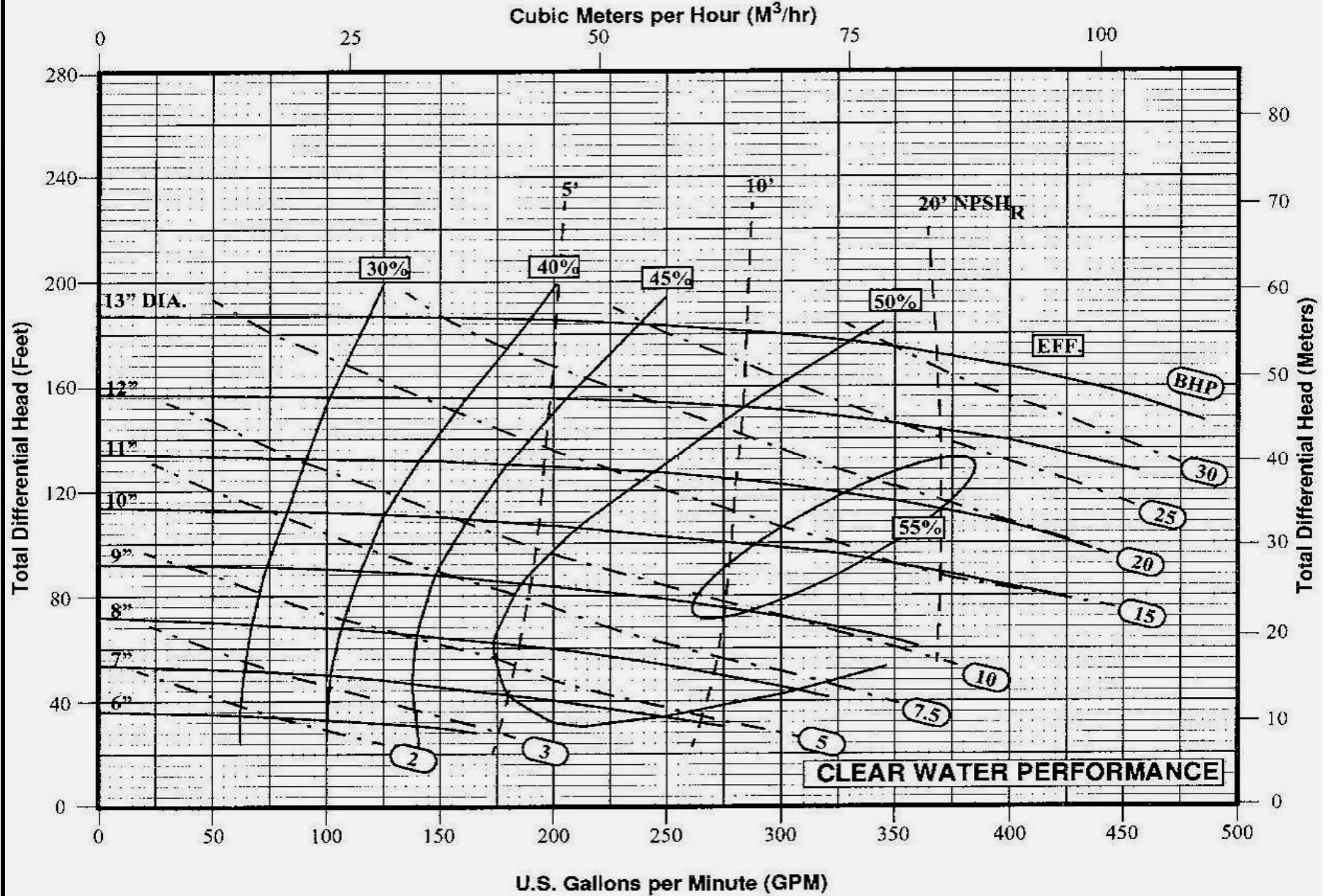
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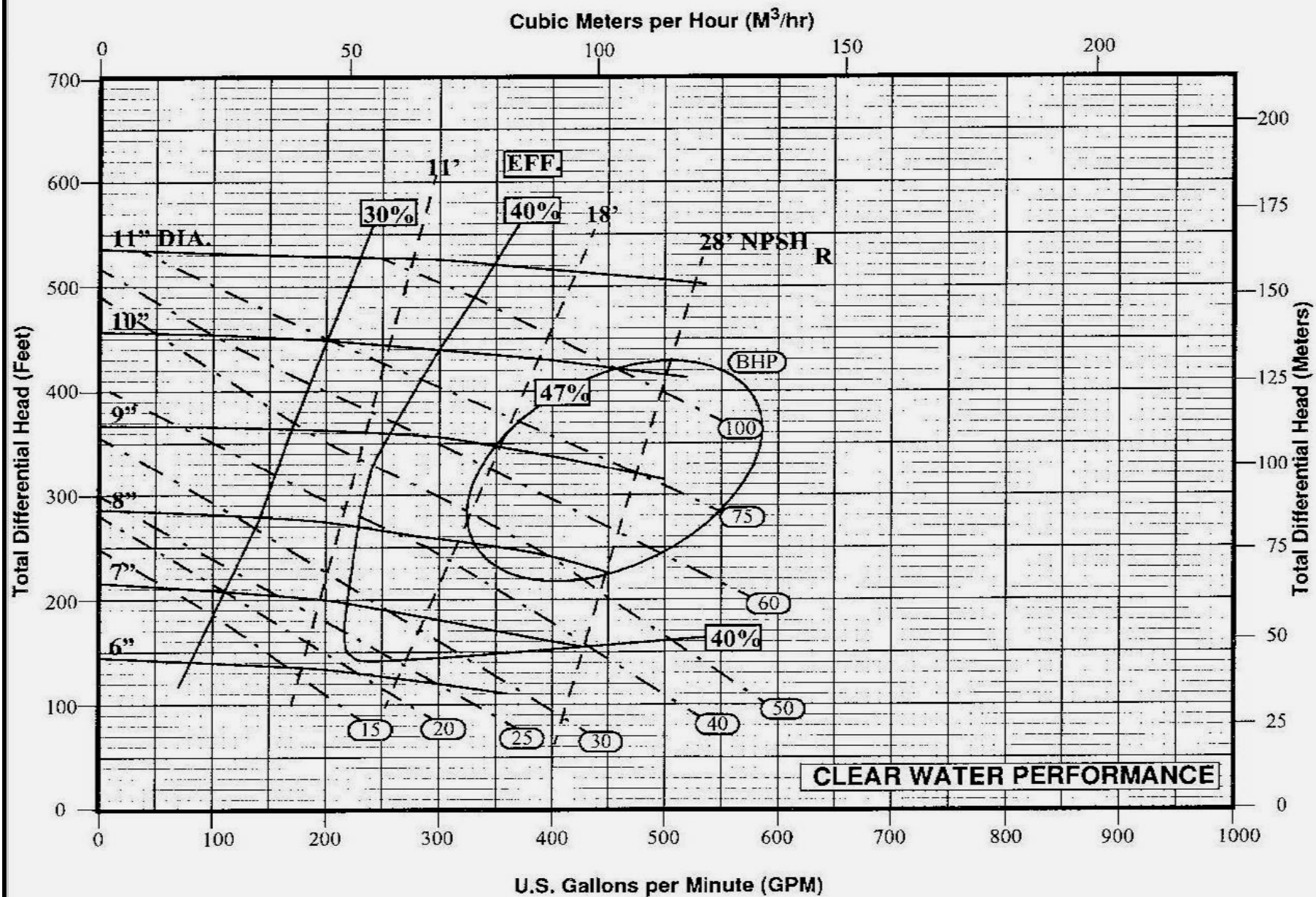
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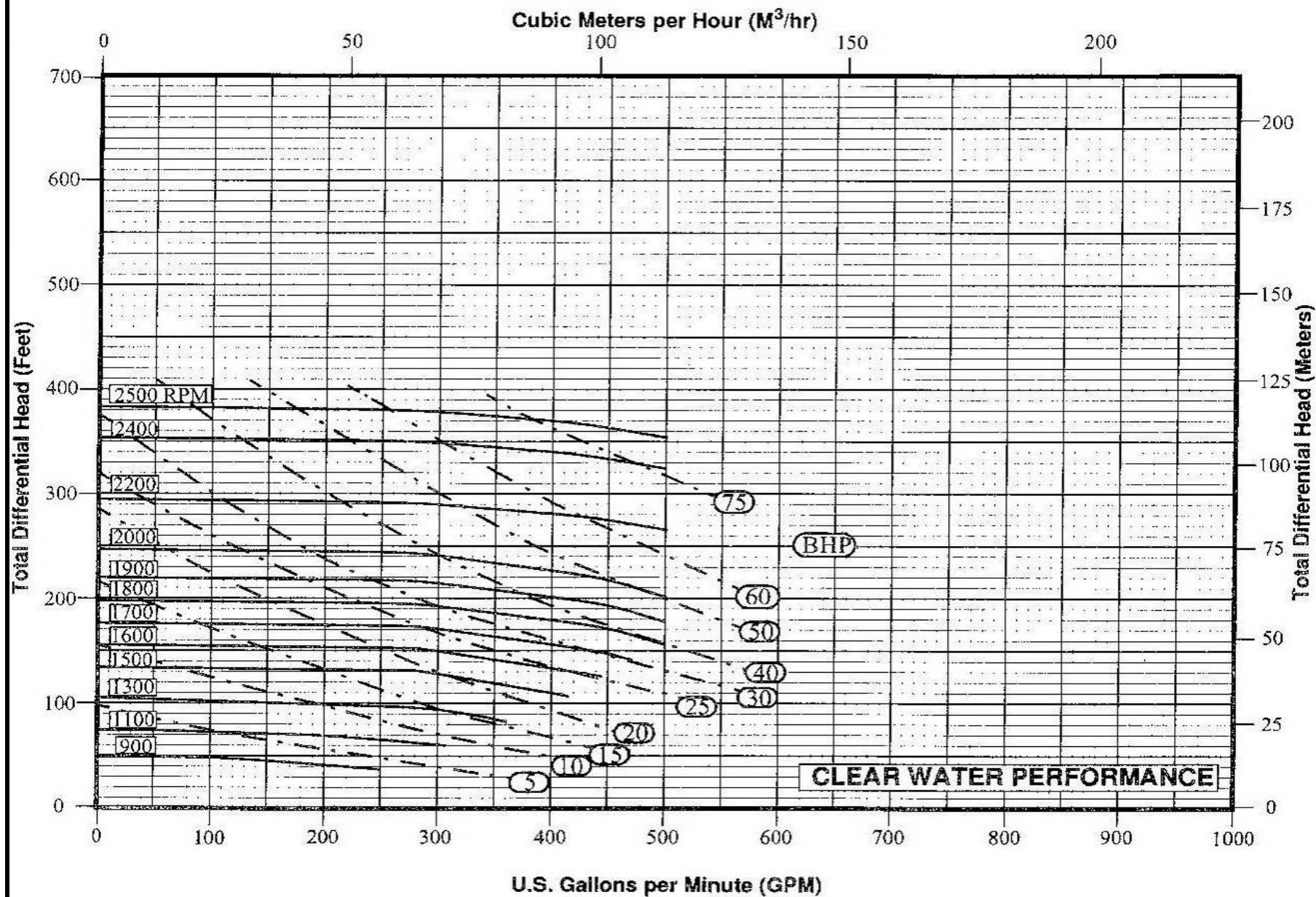
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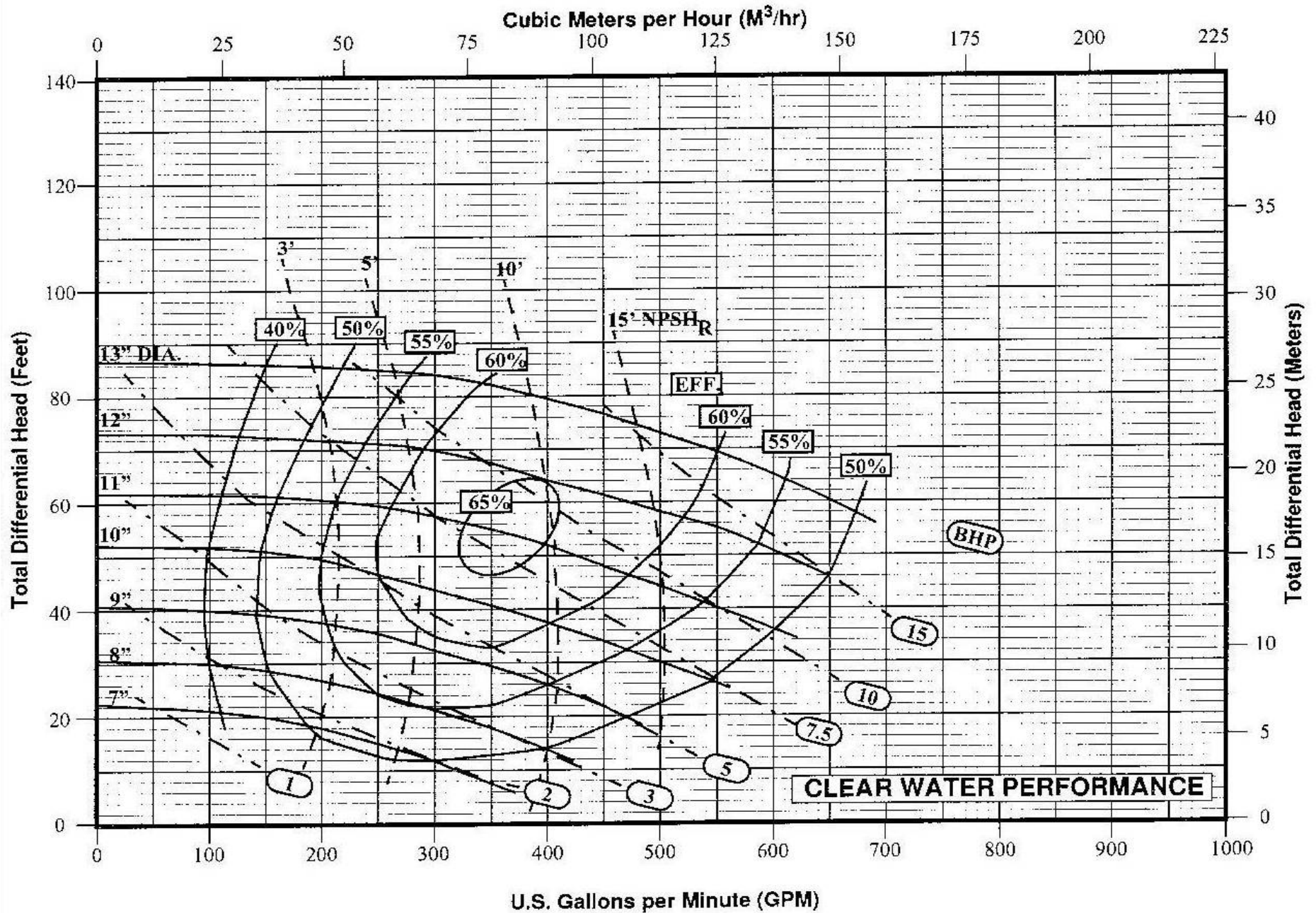
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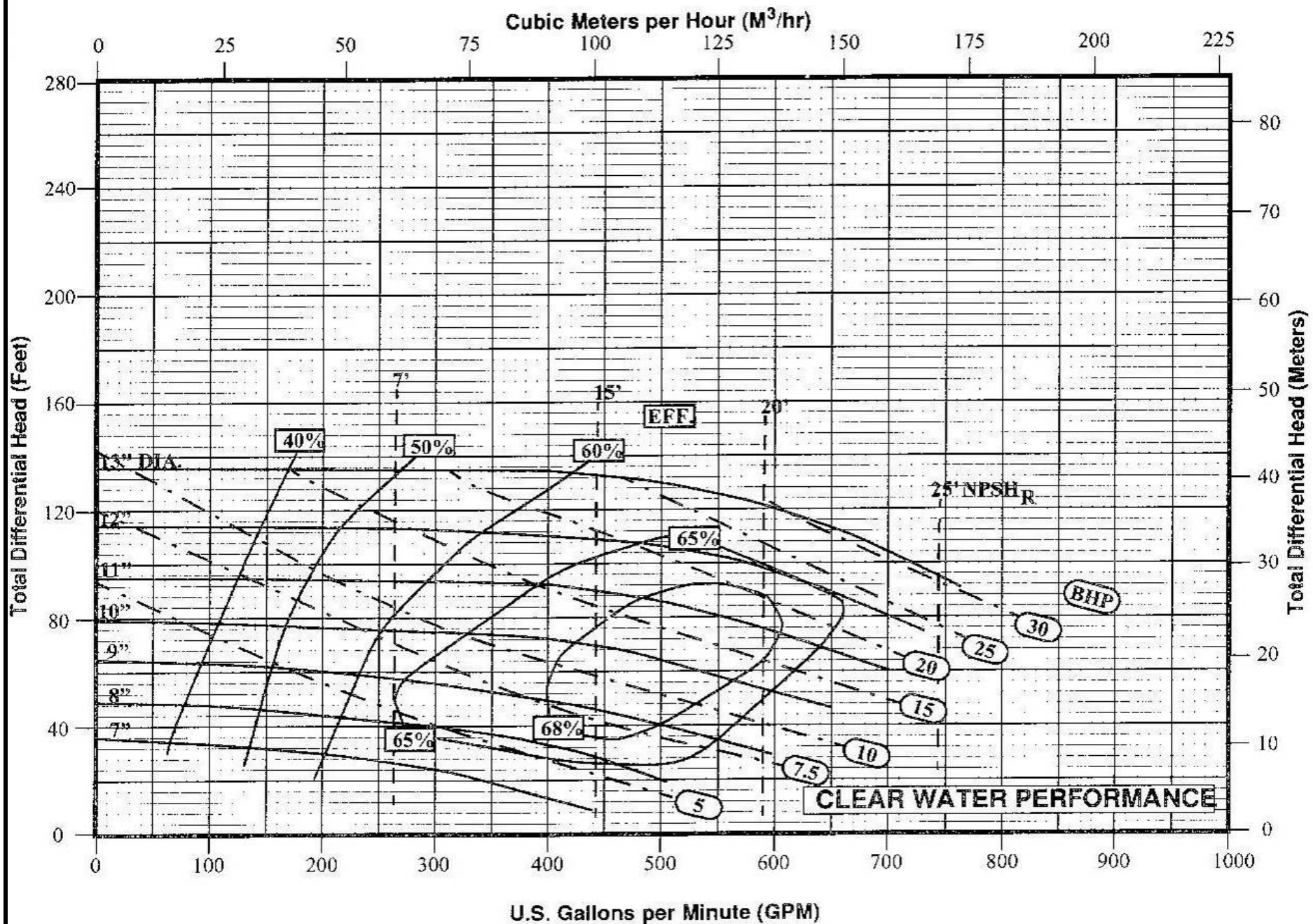
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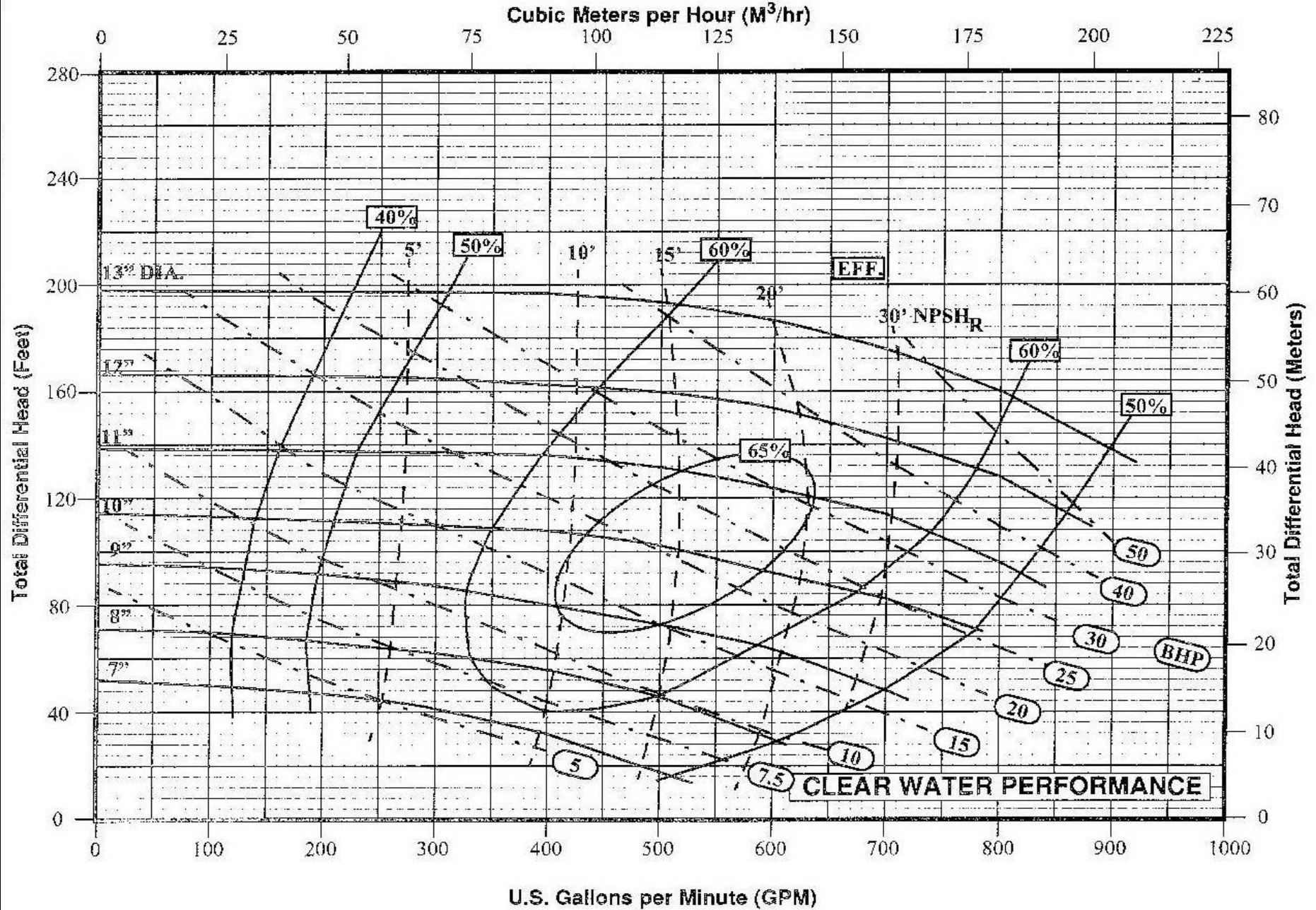
4 × 3 × 13 1150 RPM



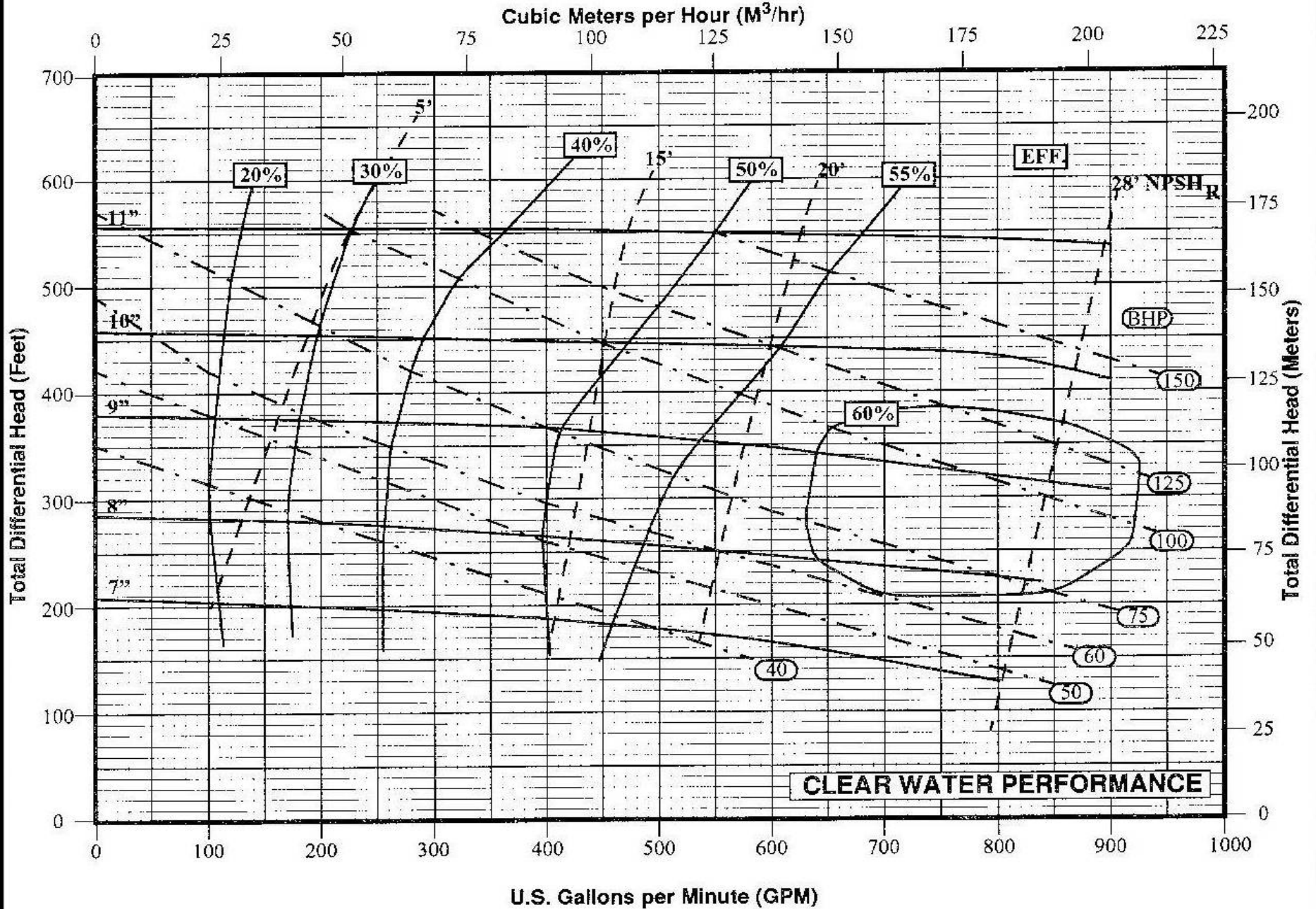
4 × 3 × 13 1450 RPM



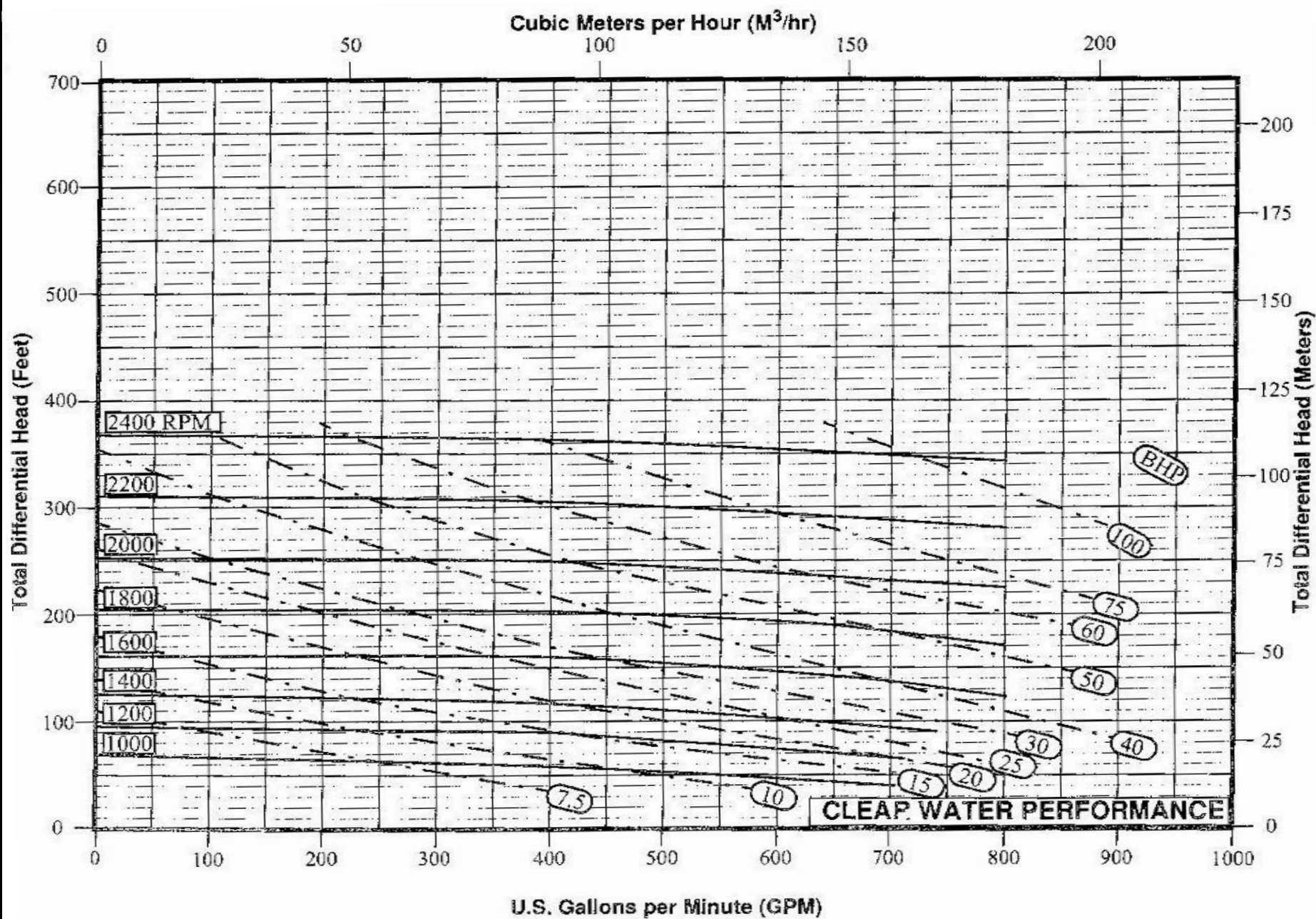
4 × 3 × 13 1750 RPM



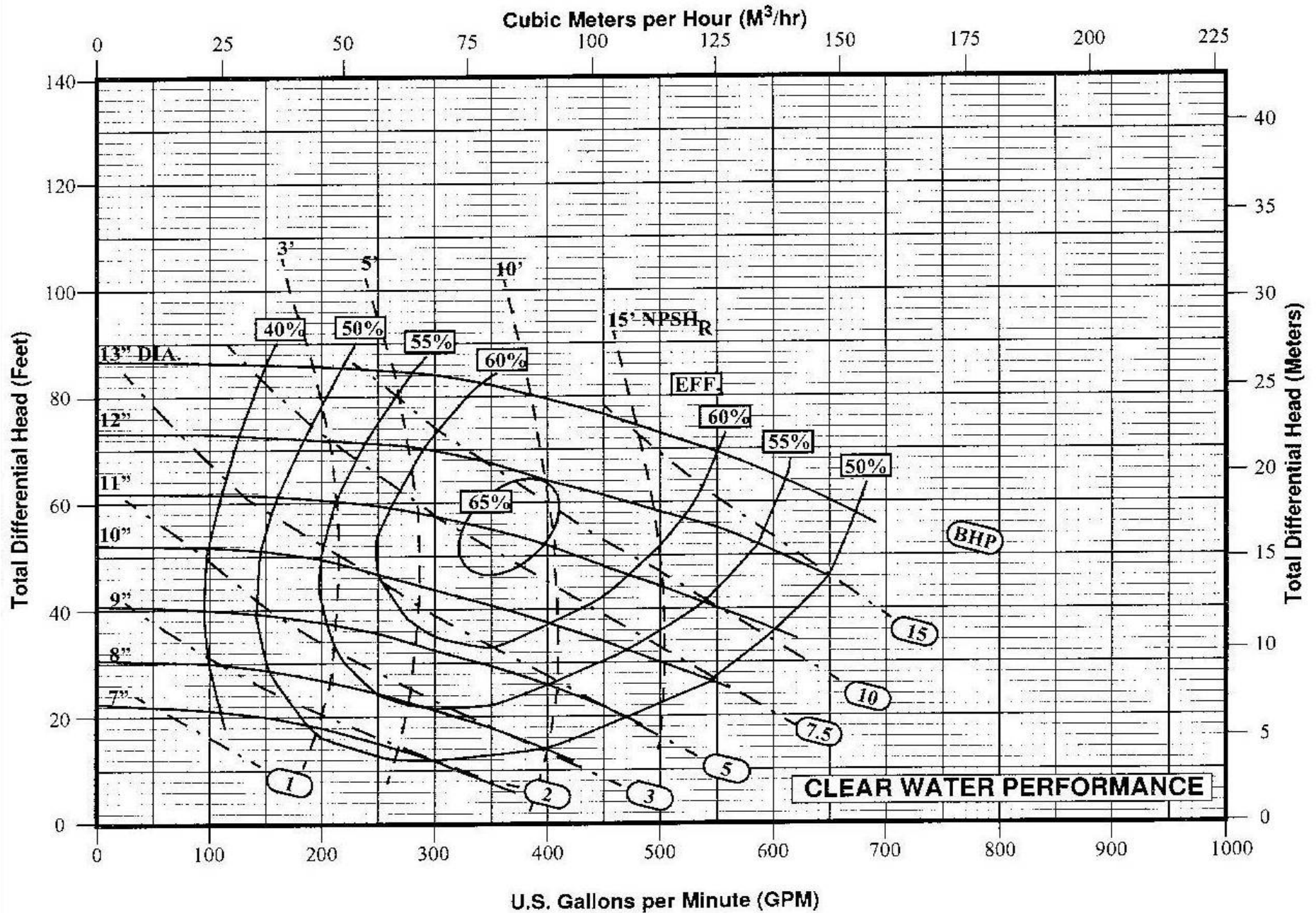
4 × 3 × 13 3500 RPM



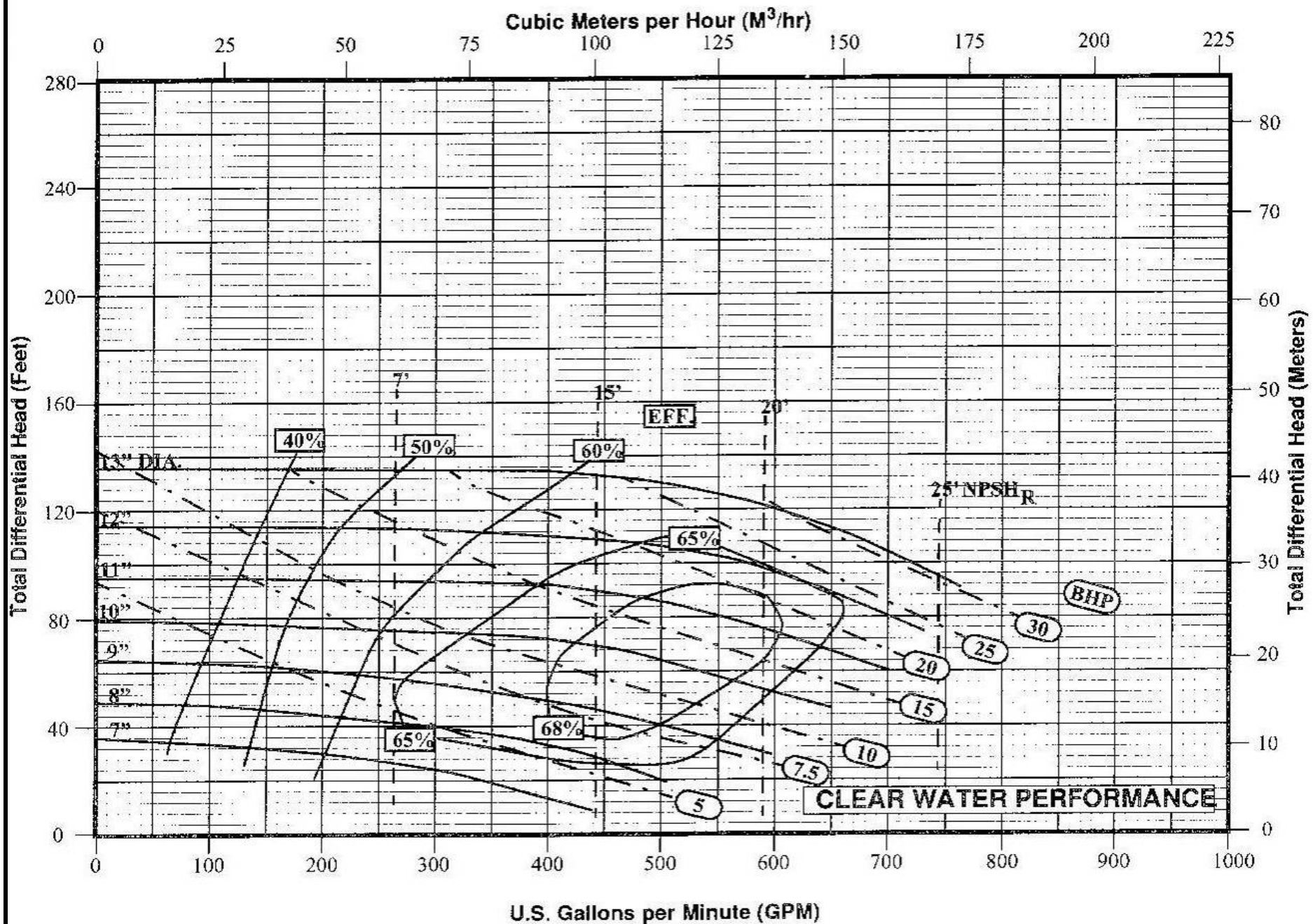
4 × 3 × 13 VARIABLE RPM



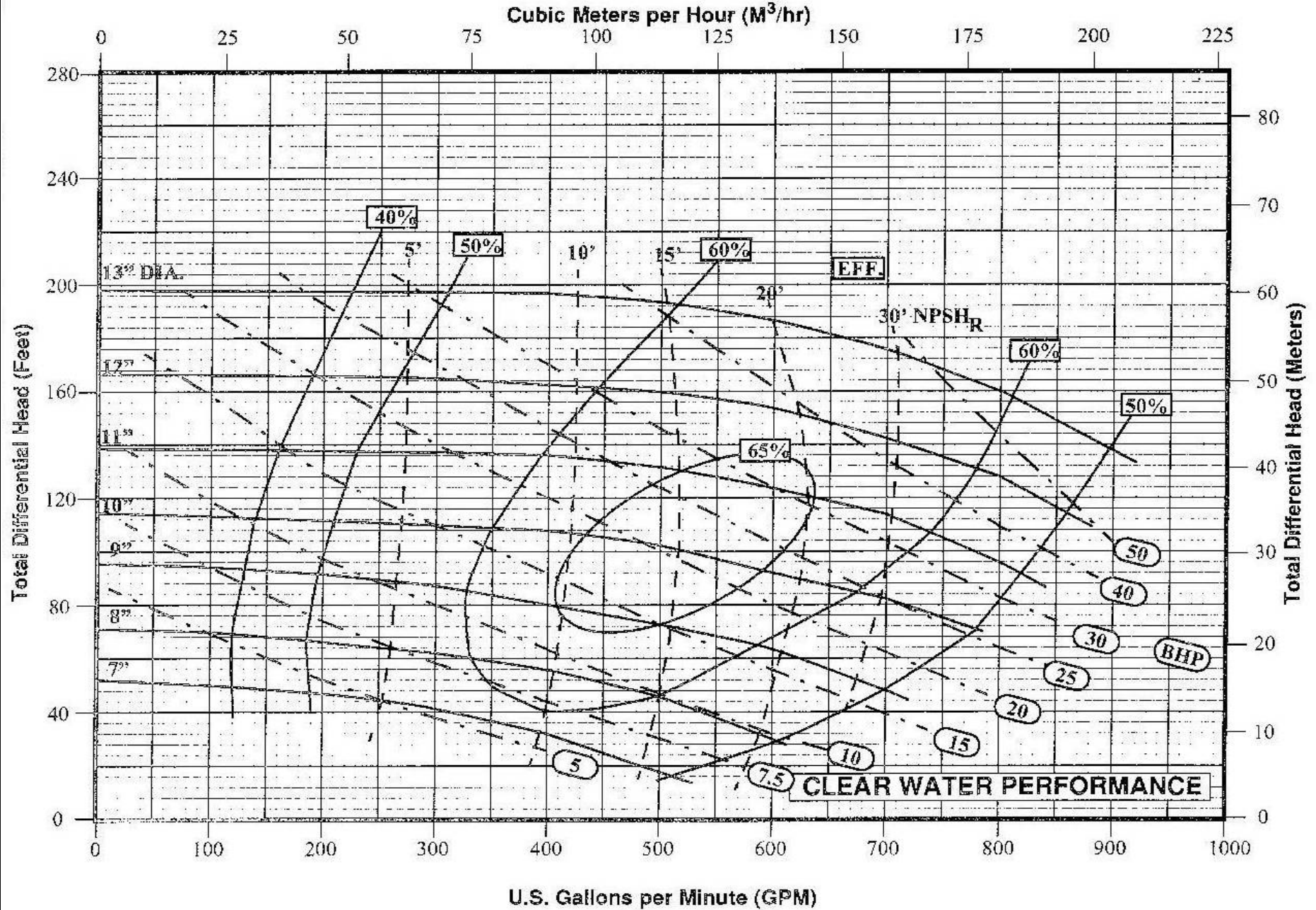
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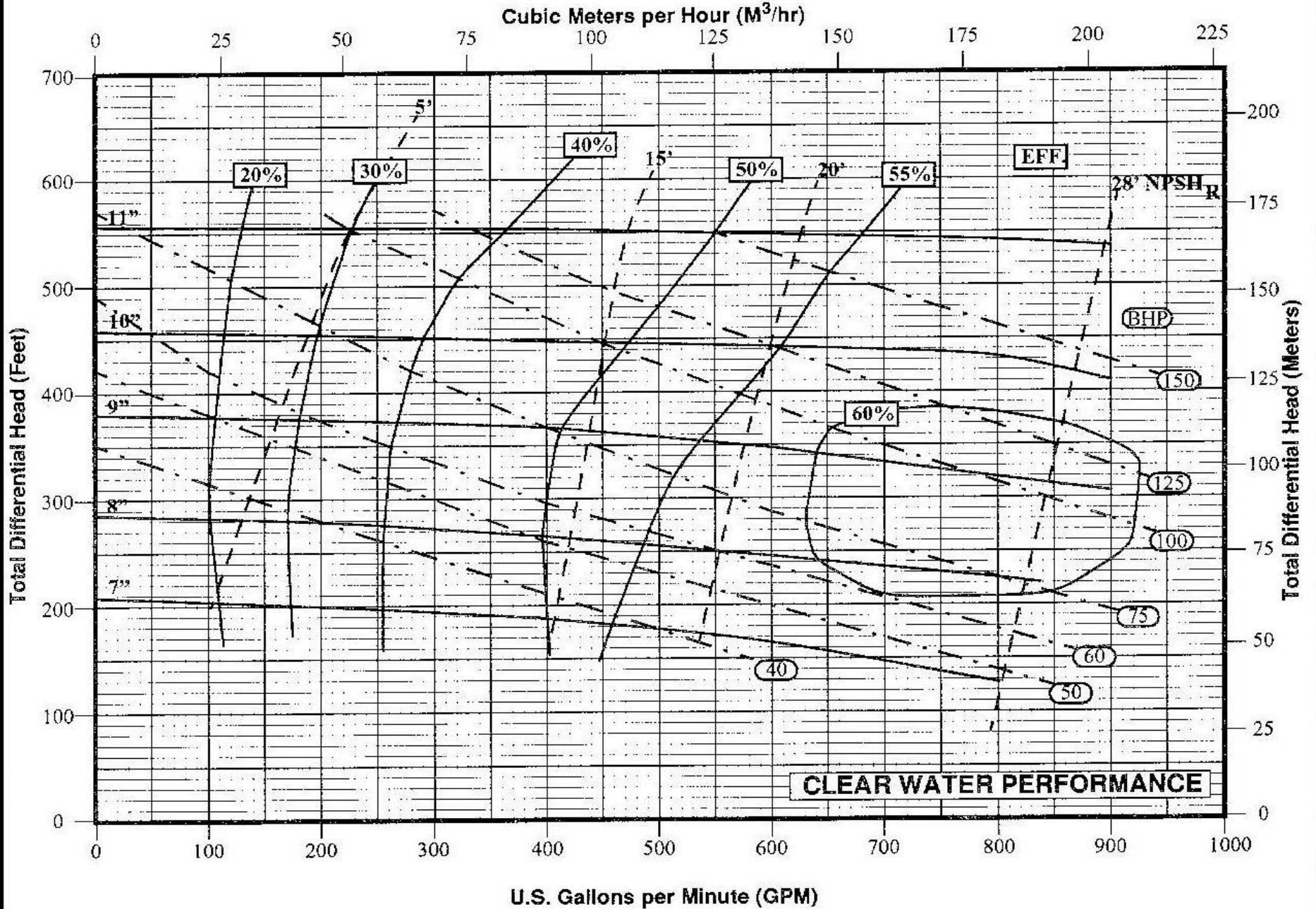
4 × 3 × 13 1450 RPM



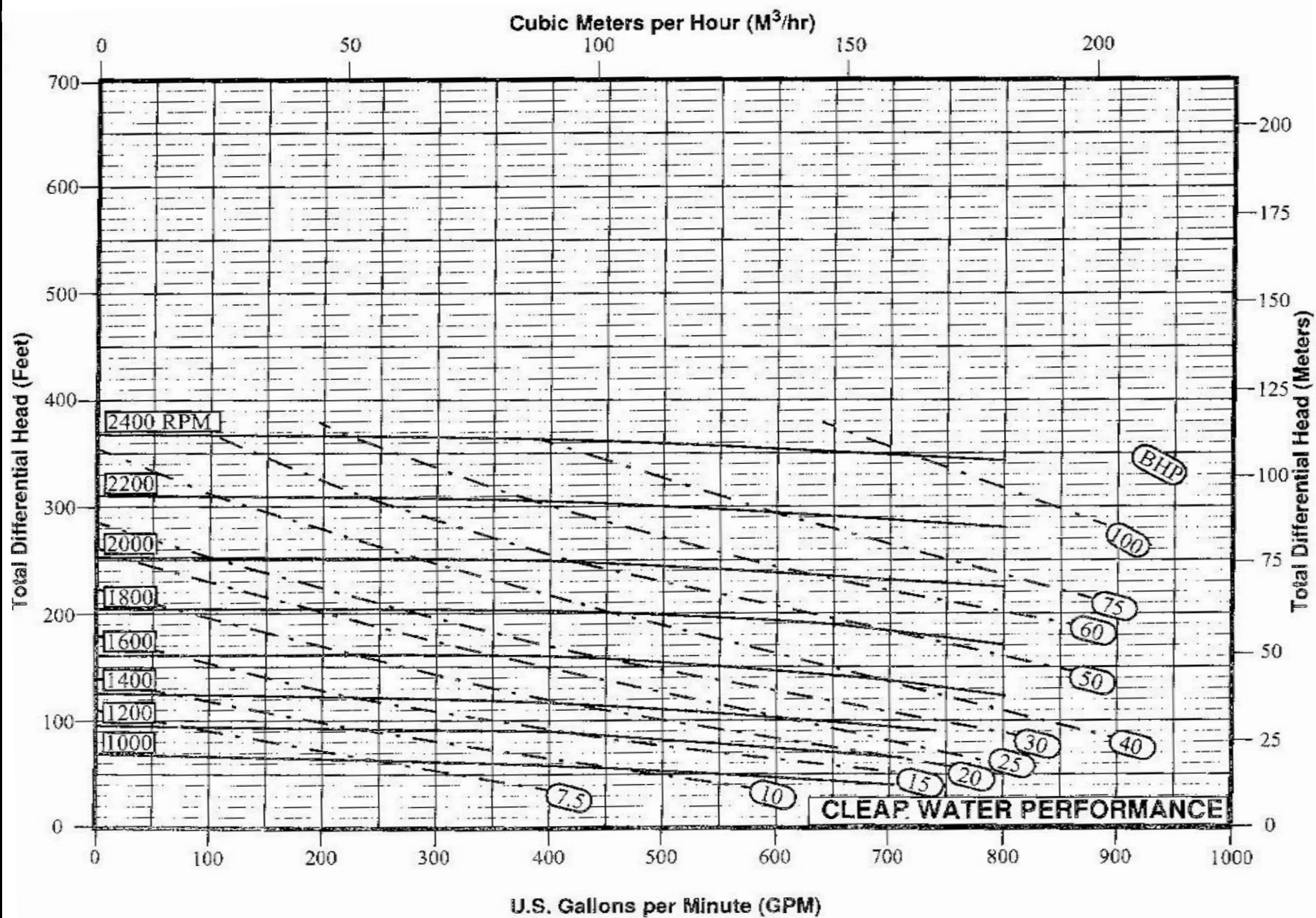
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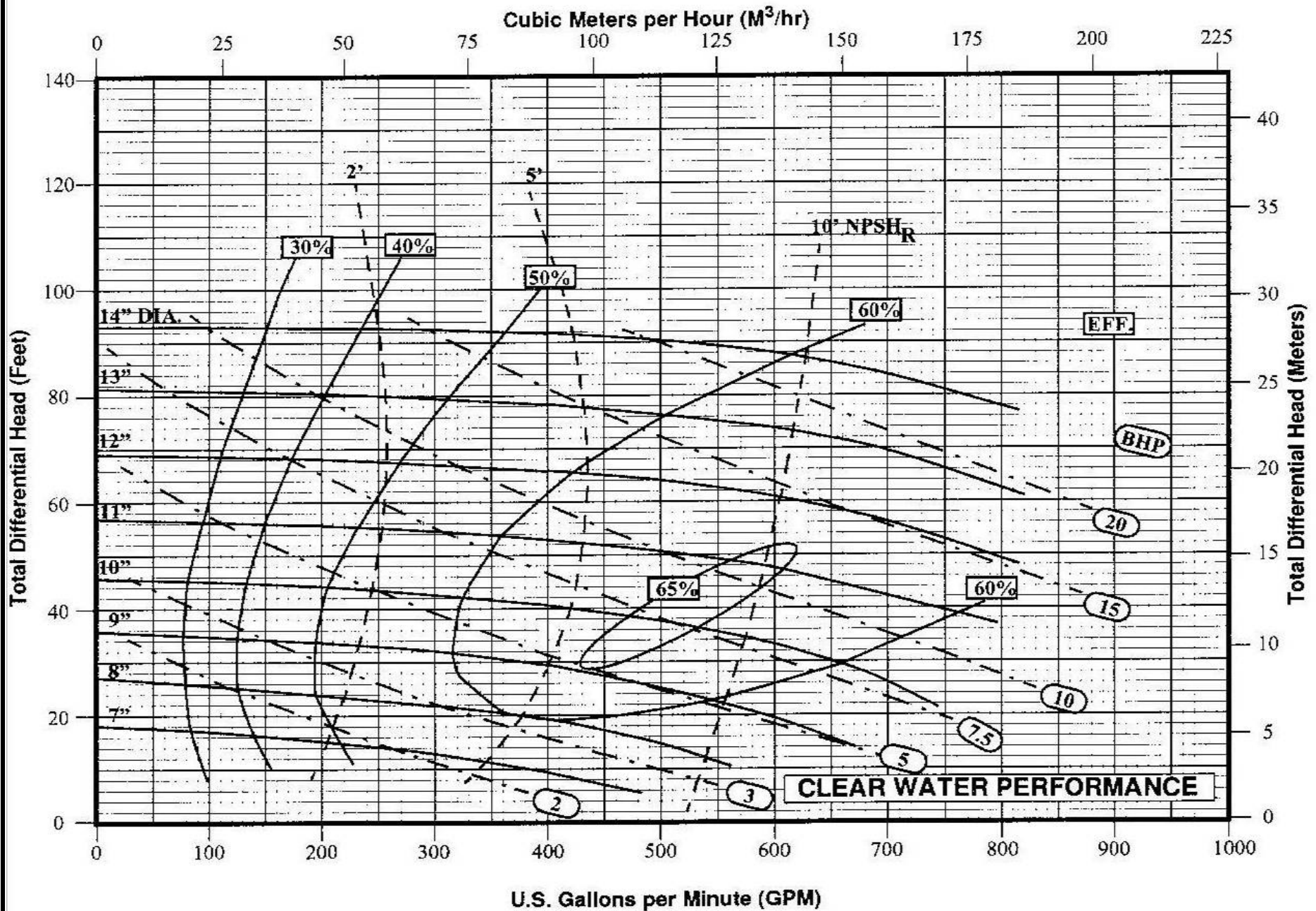
4 × 3 × 13 3500 RPM



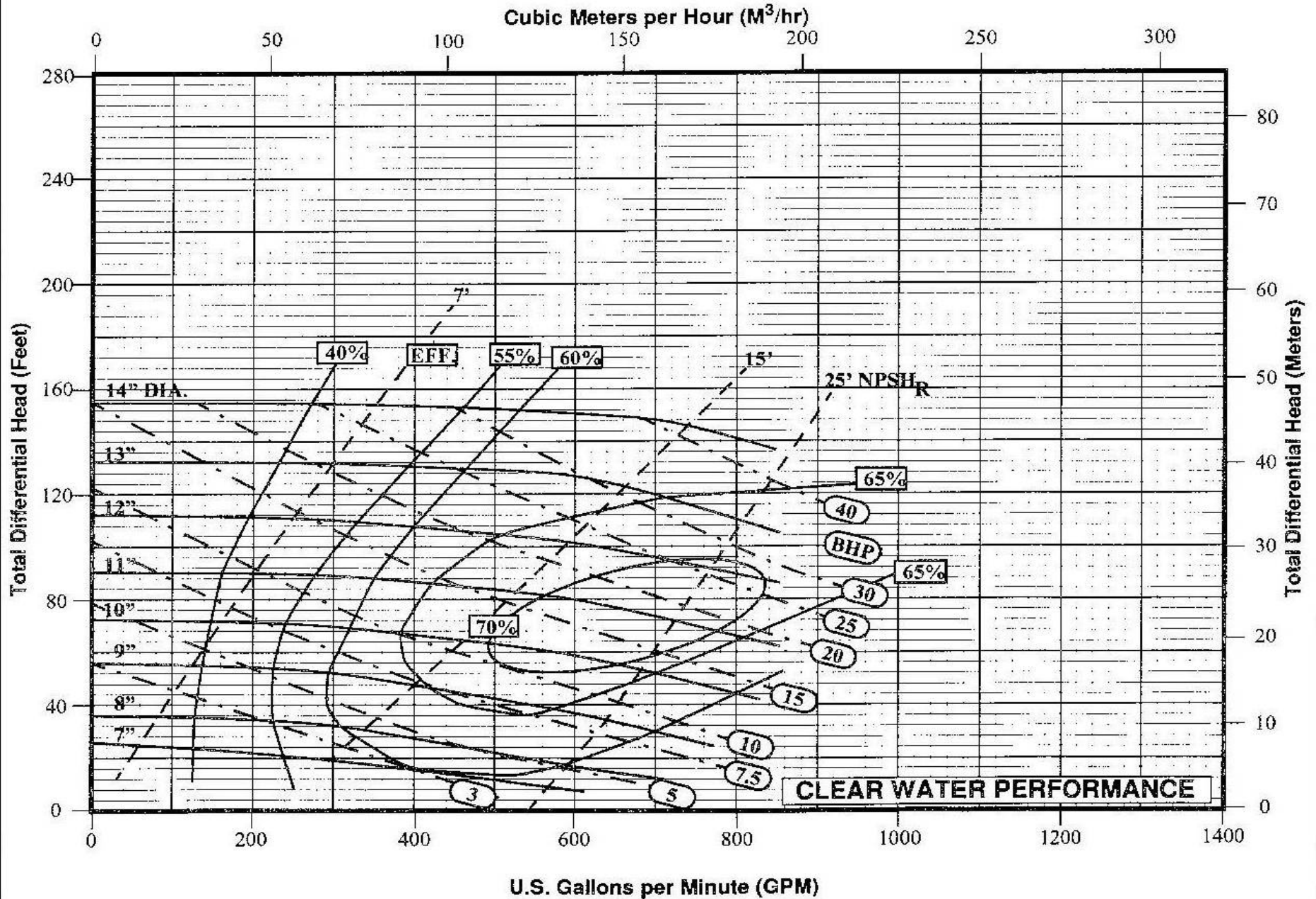
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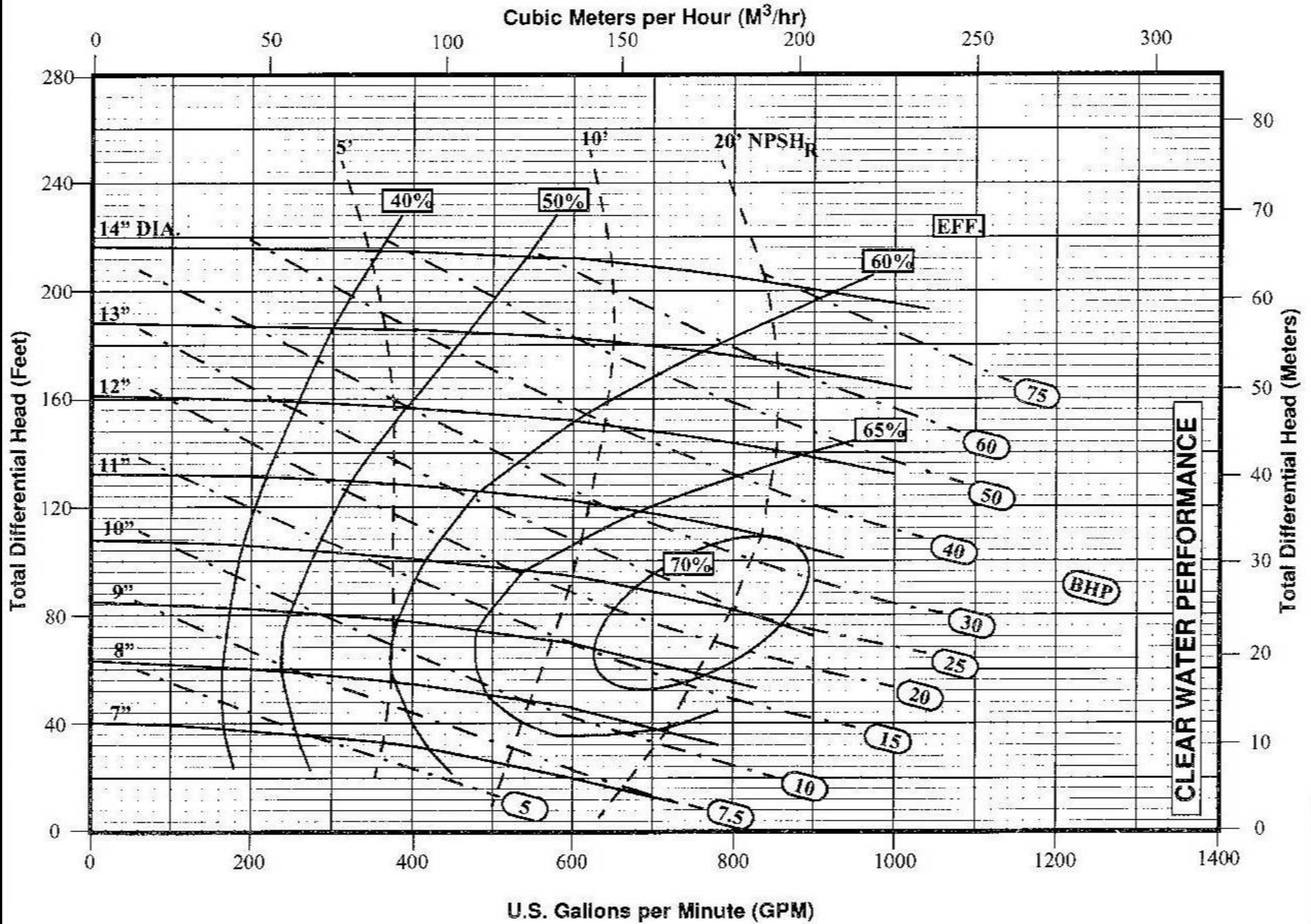
5 × 4 × 14 1150 RPM



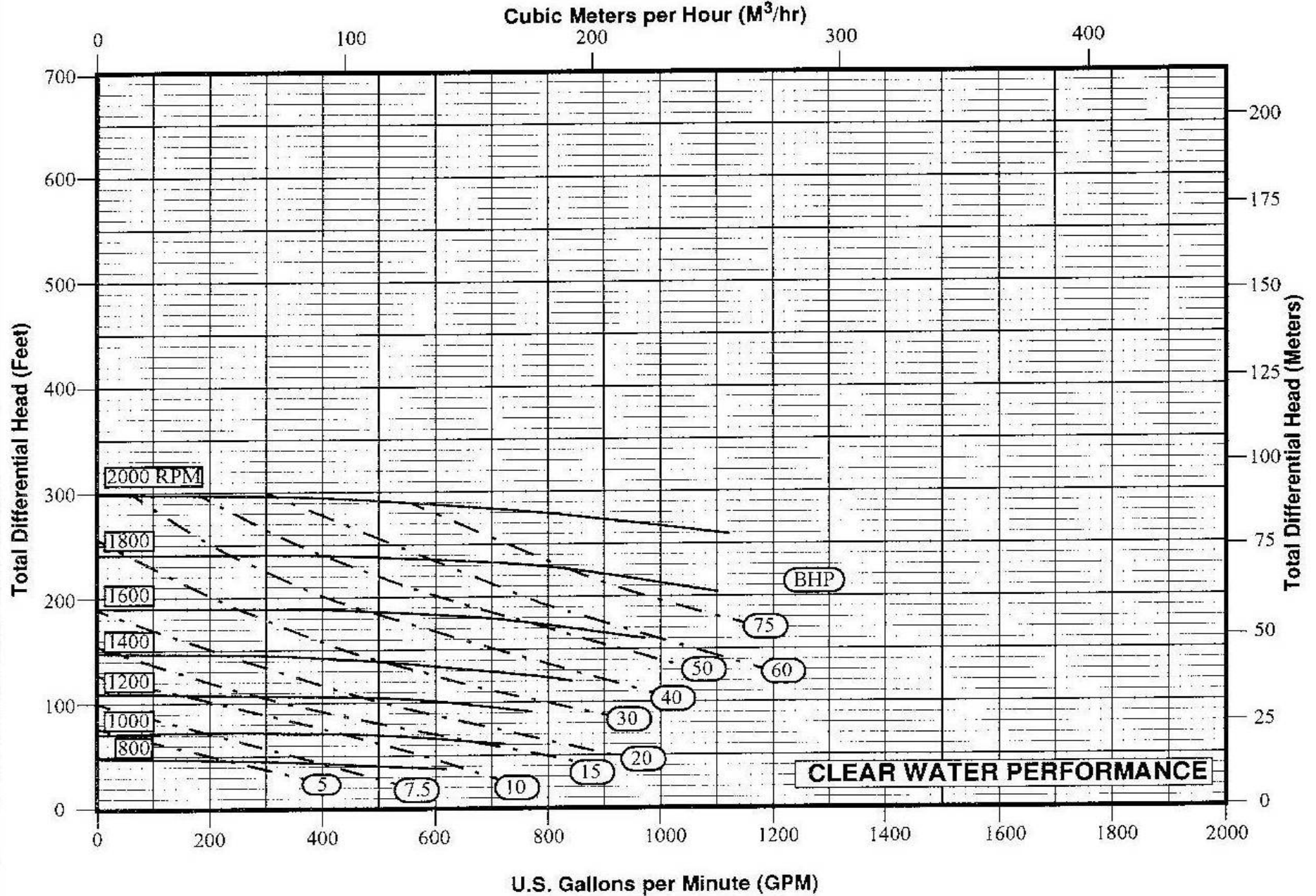
5 × 4 × 14 1450 RPM



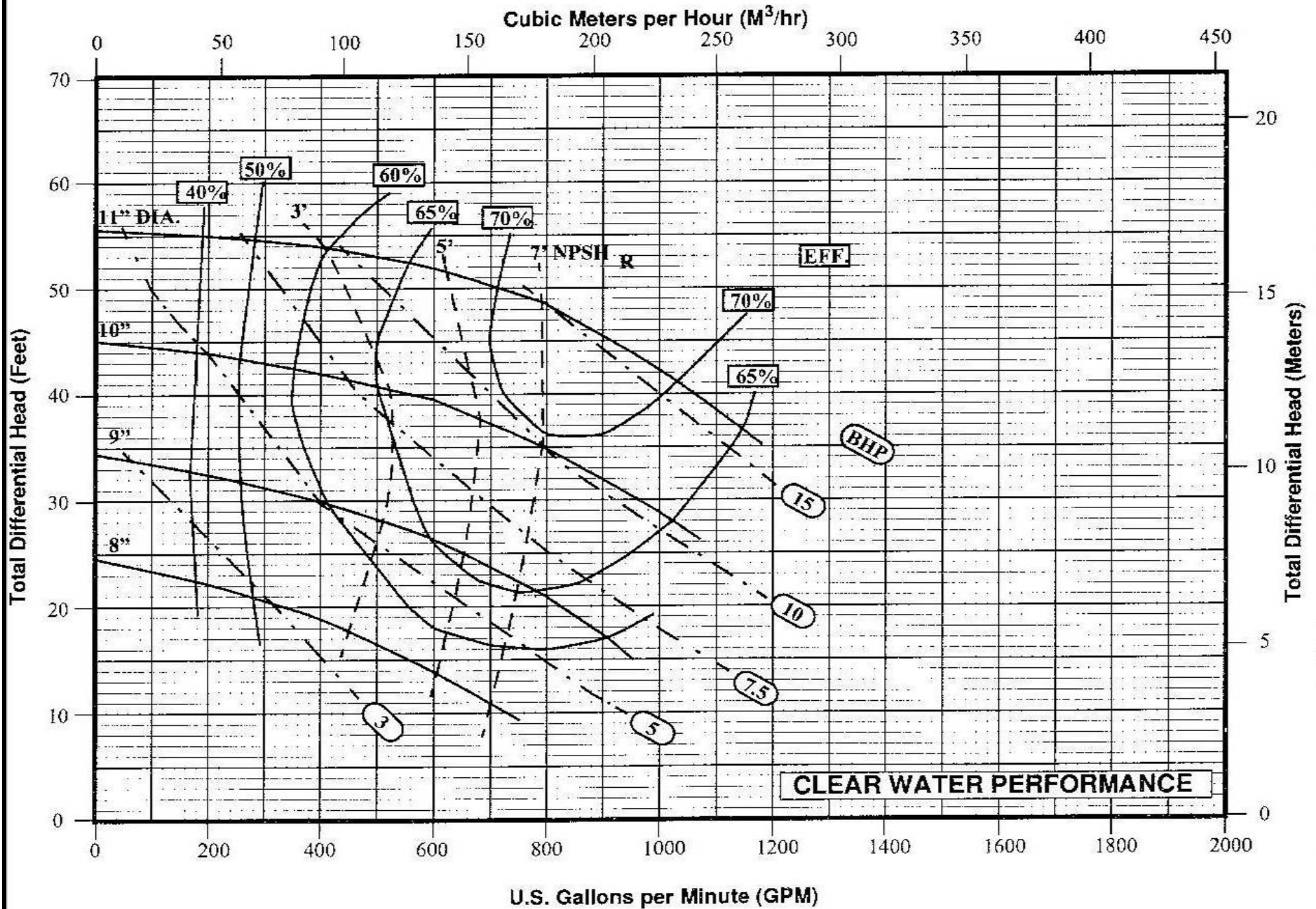
5 × 4 × 14 1750 RPM



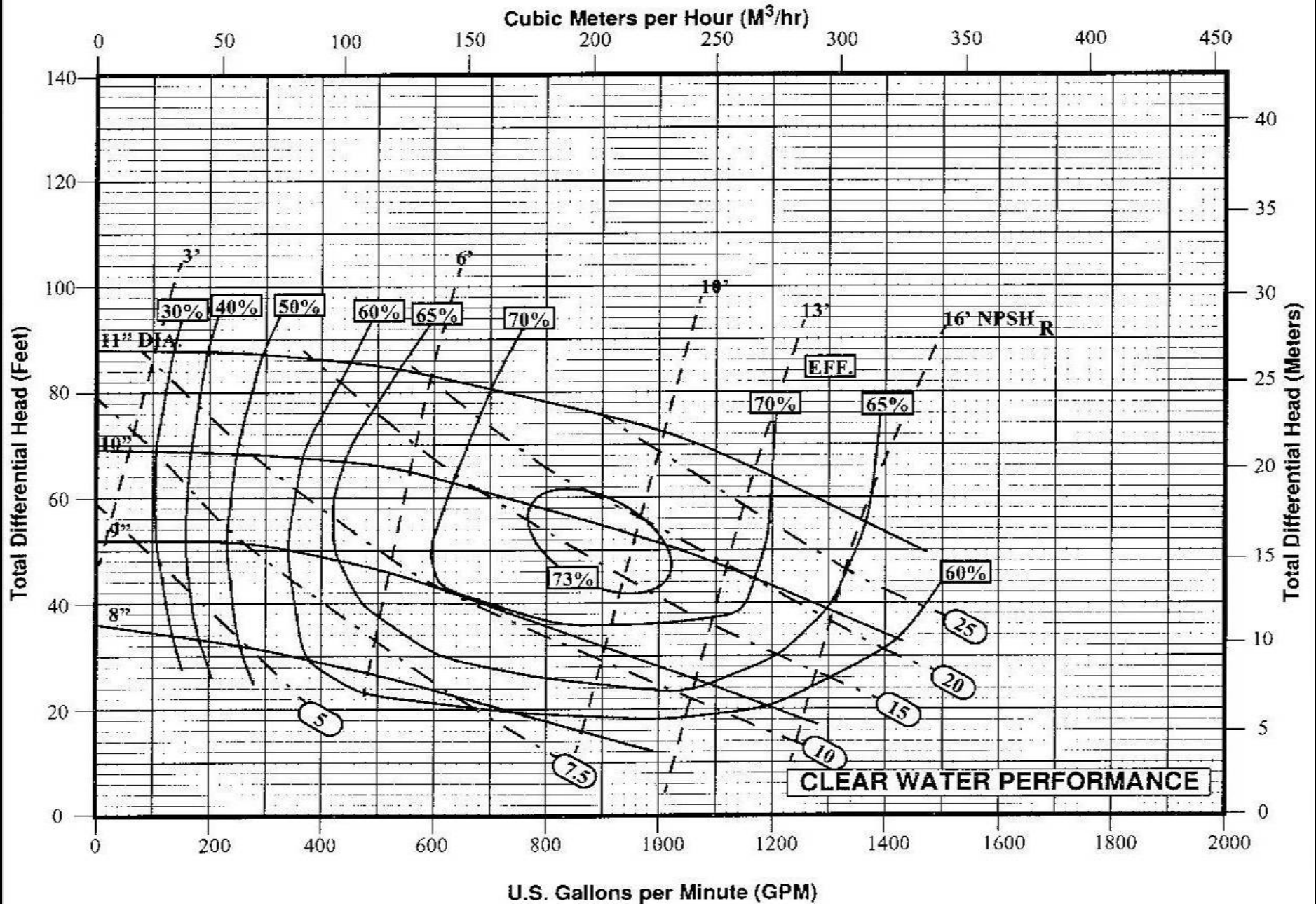
5 × 4 × 14 VARIABLE RPM



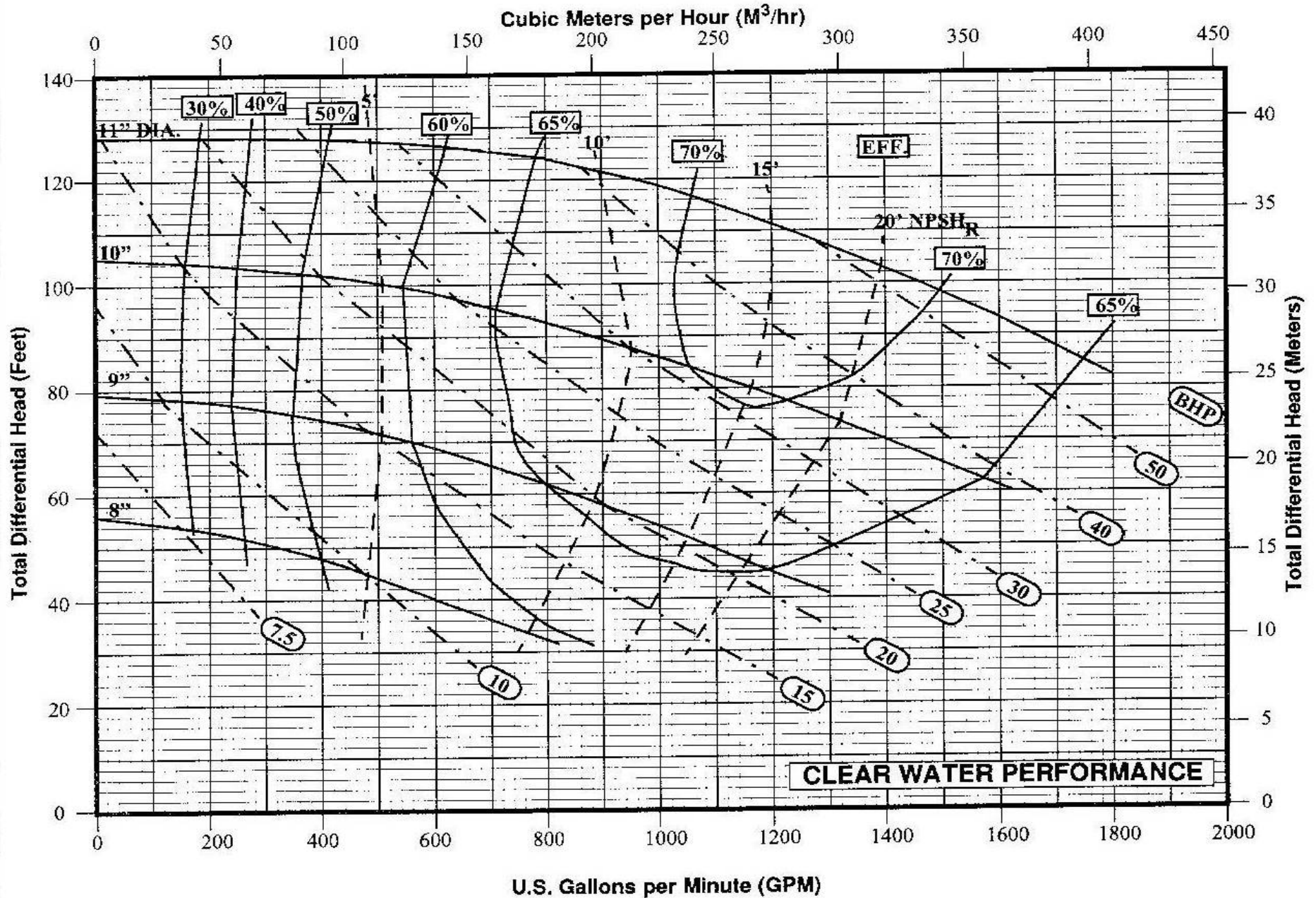
6 × 5 × 11 1150 RPM



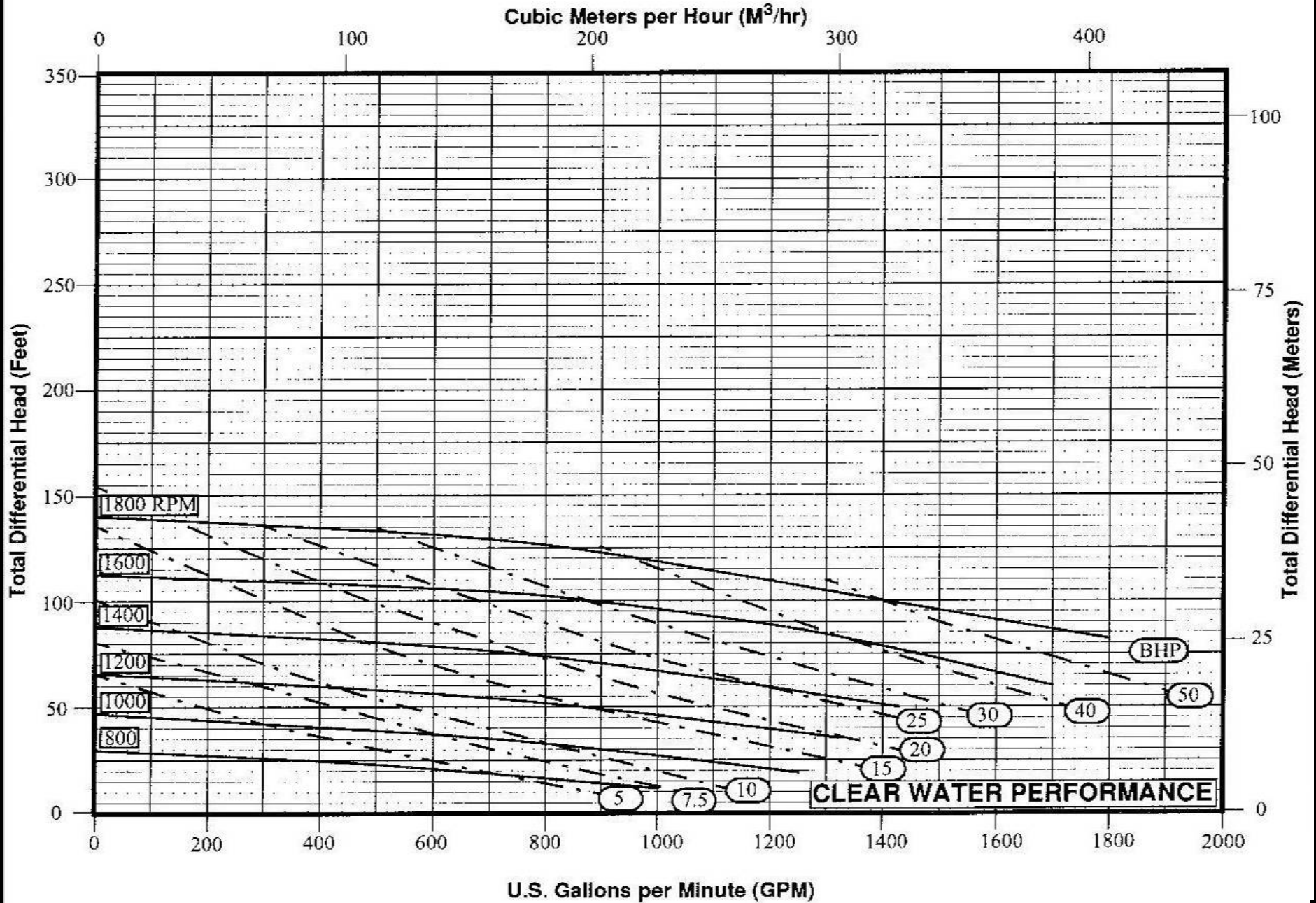
6 × 5 × 11 1450 RPM



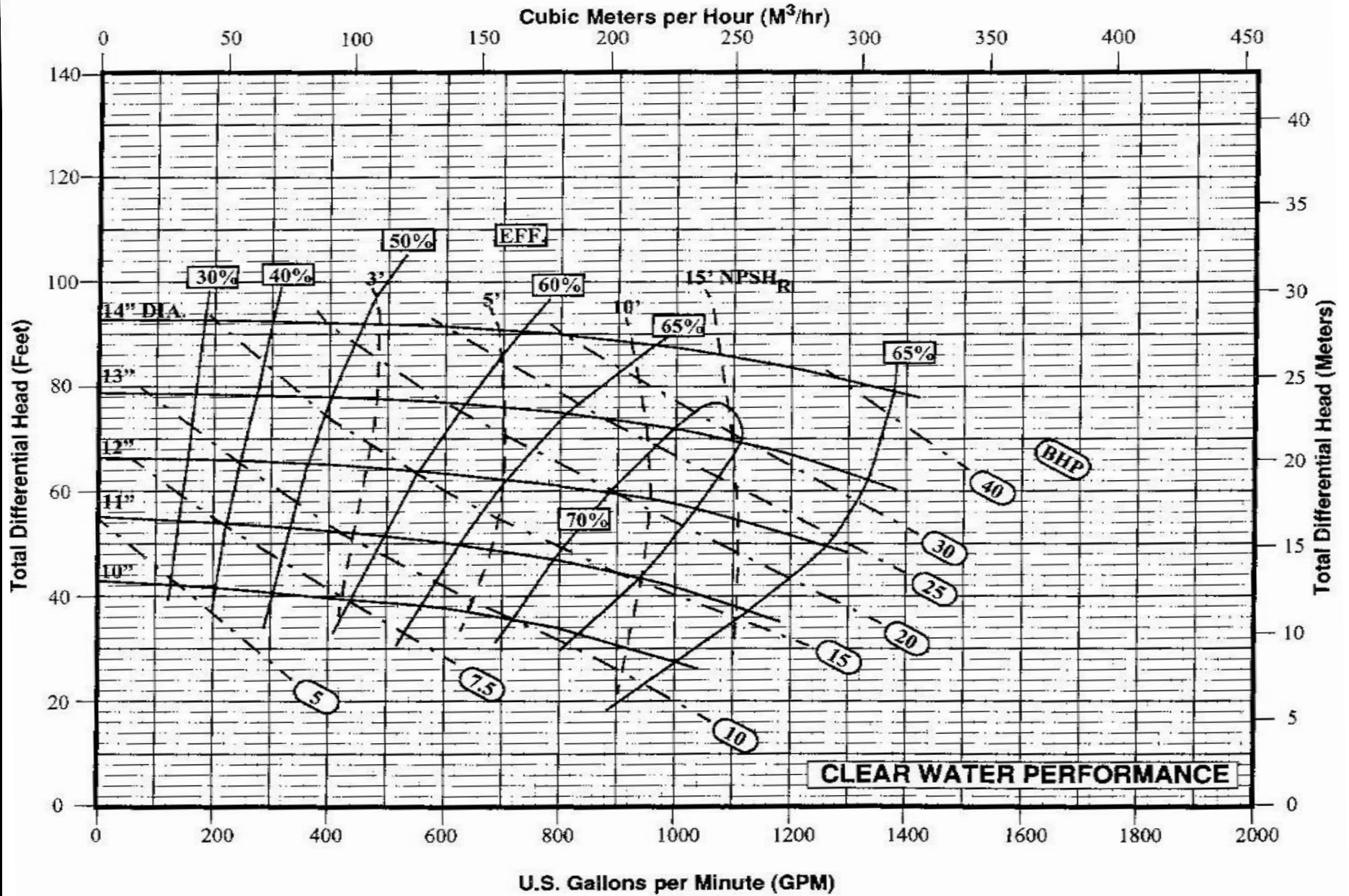
6 × 5 × 11 1750 RPM



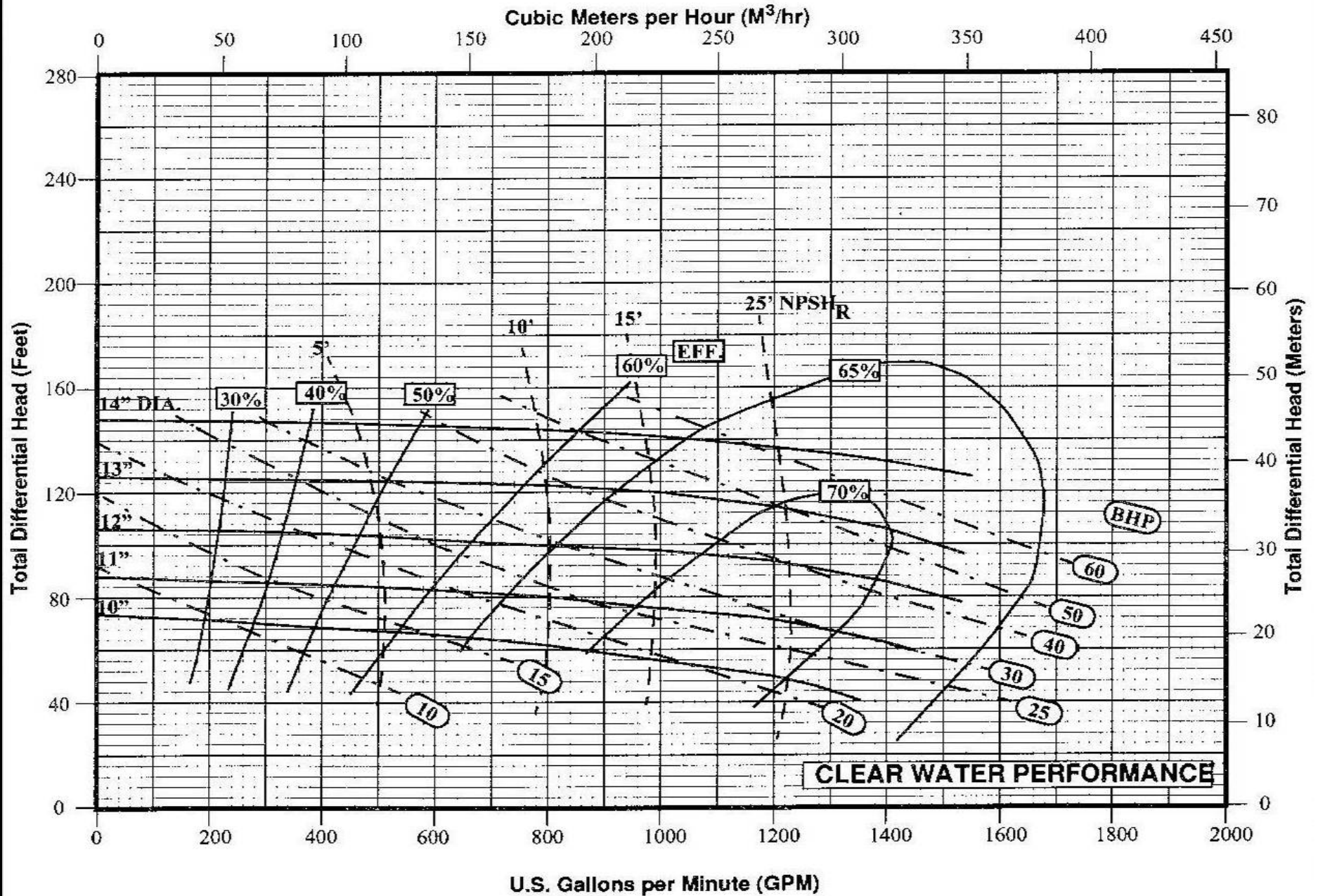
6 × 5 × 11 VARIABLE RPM



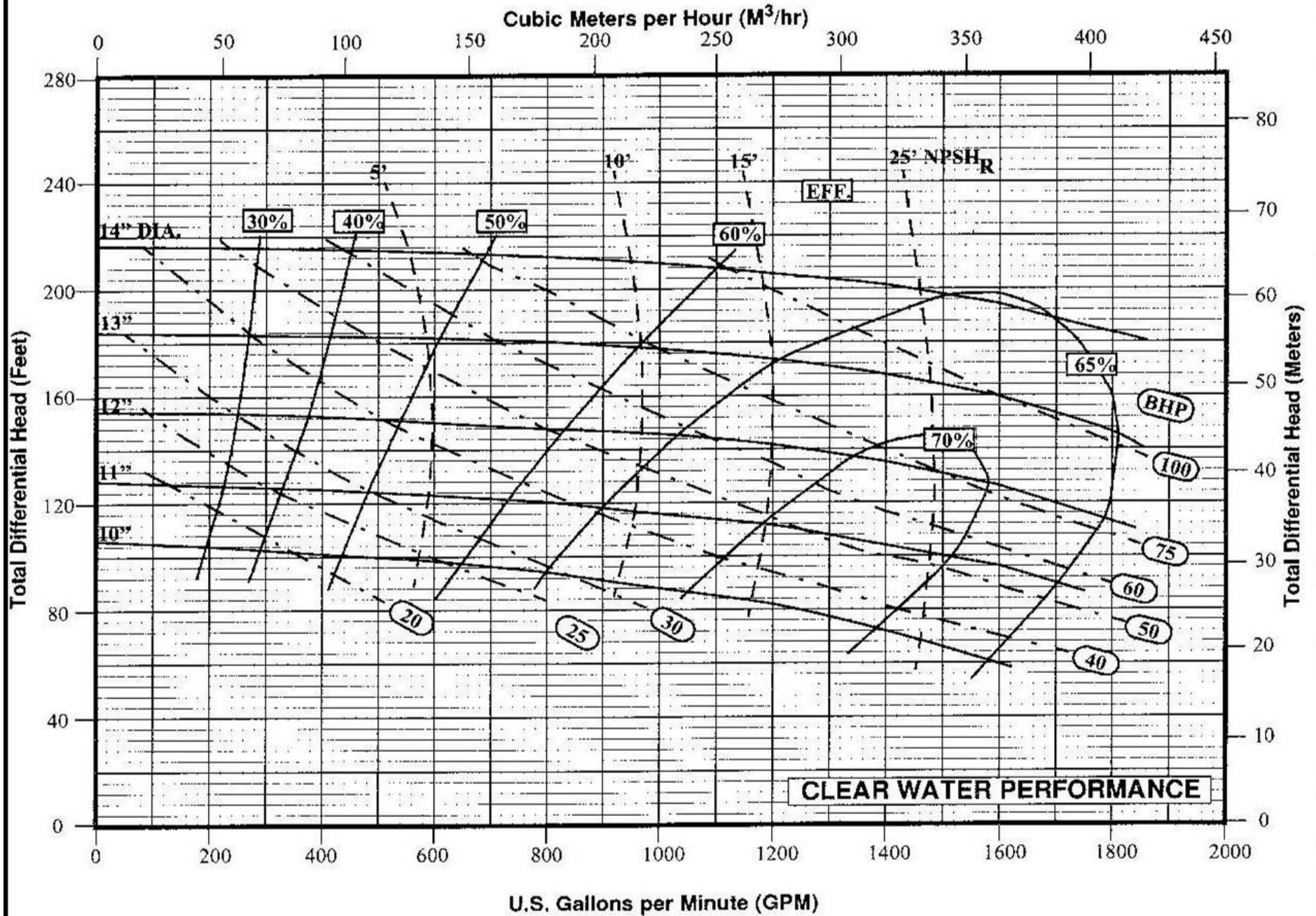
6 × 5 × 14 1150 RPM



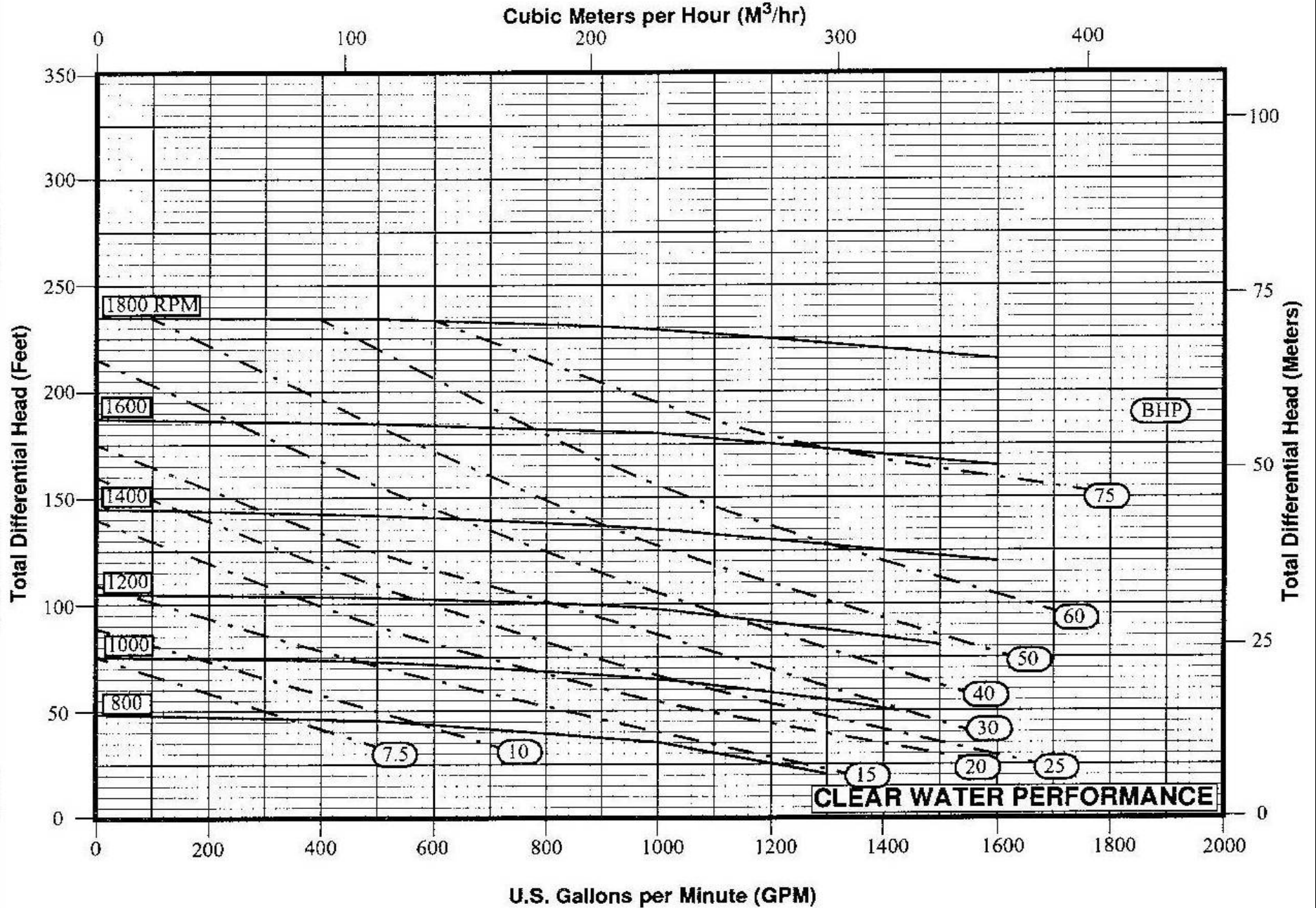
6 × 5 × 14 1450 RPM



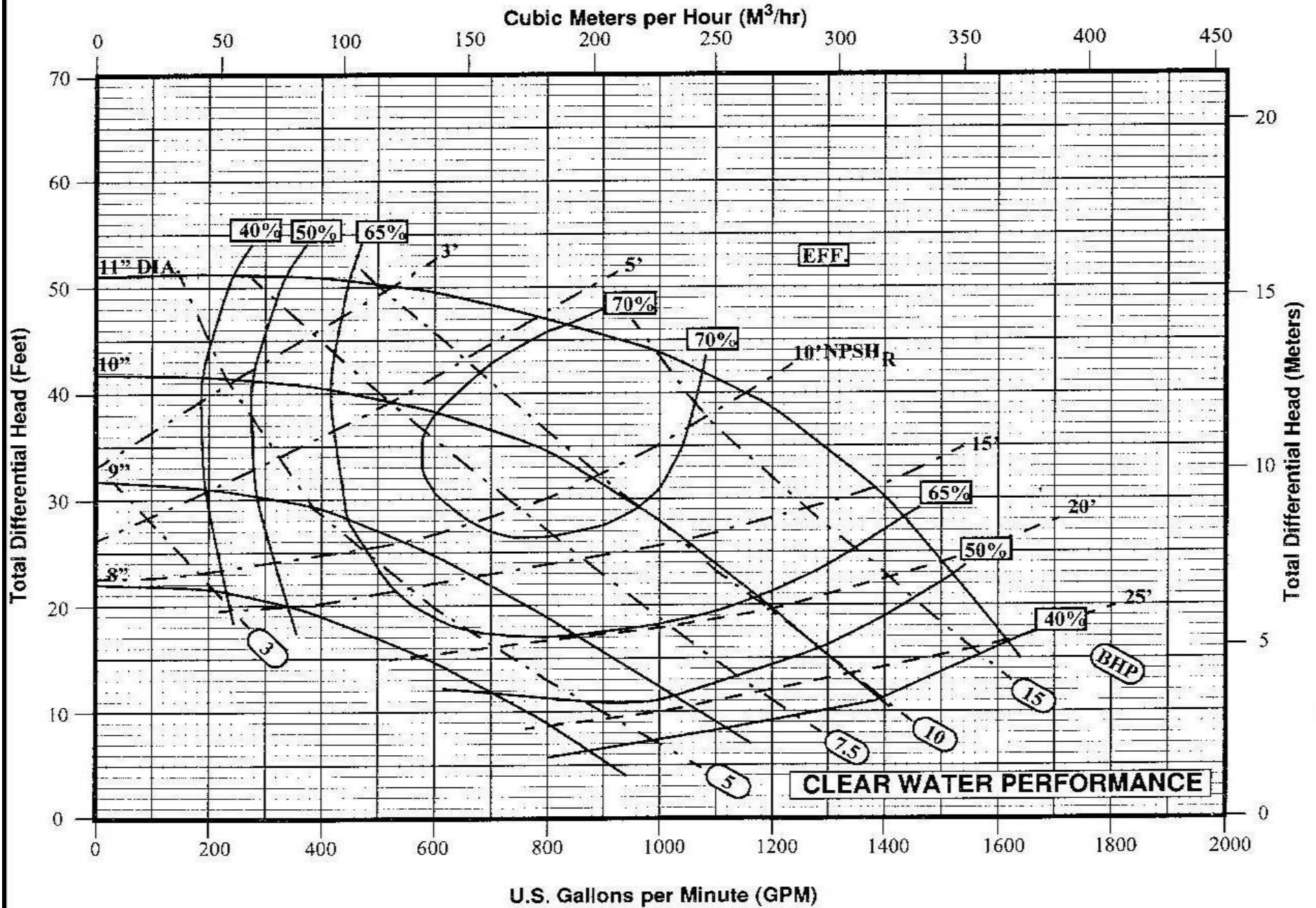
6 × 5 × 14 1750 RPM



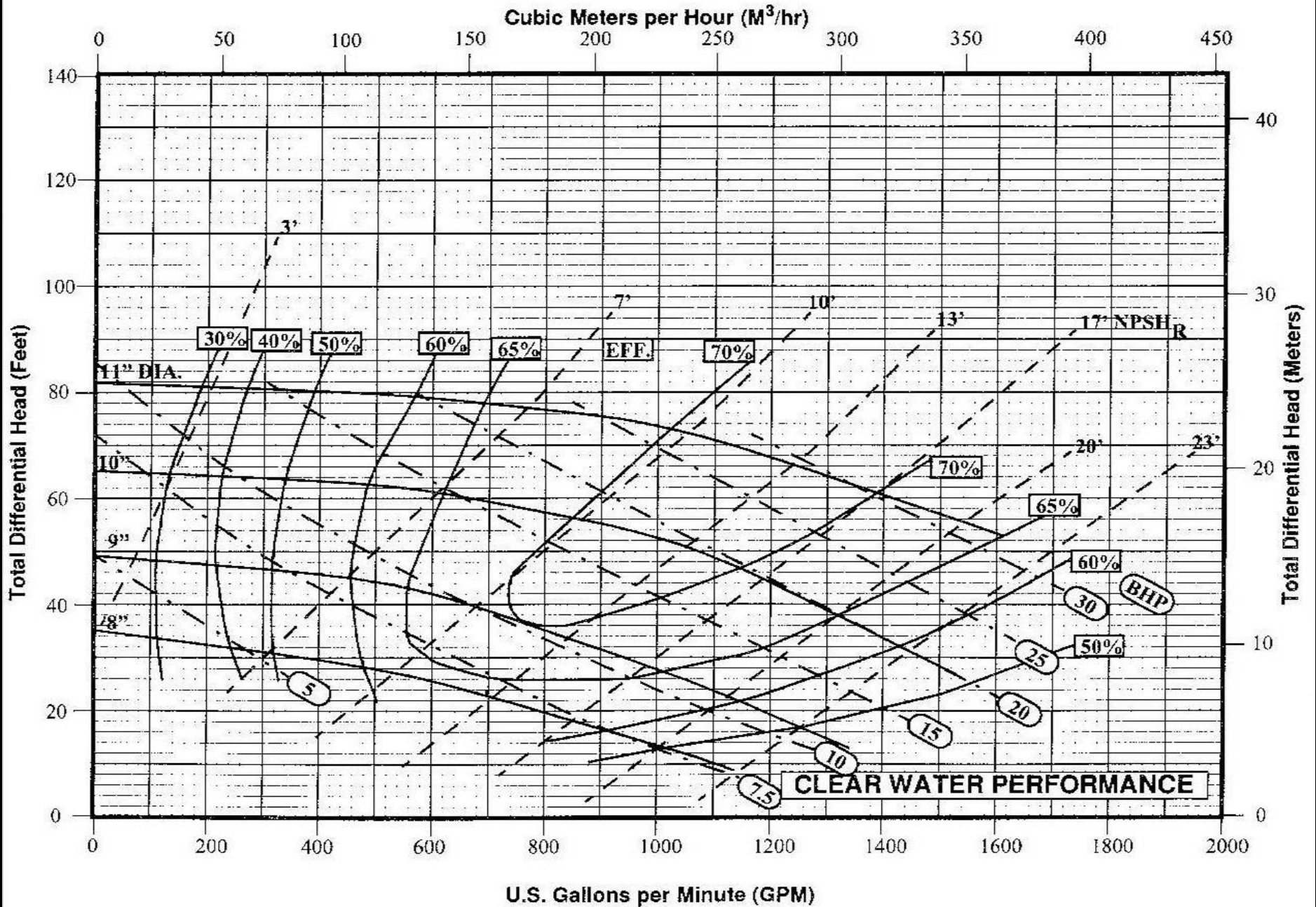
6 × 5 × 14 VARIABLE RPM



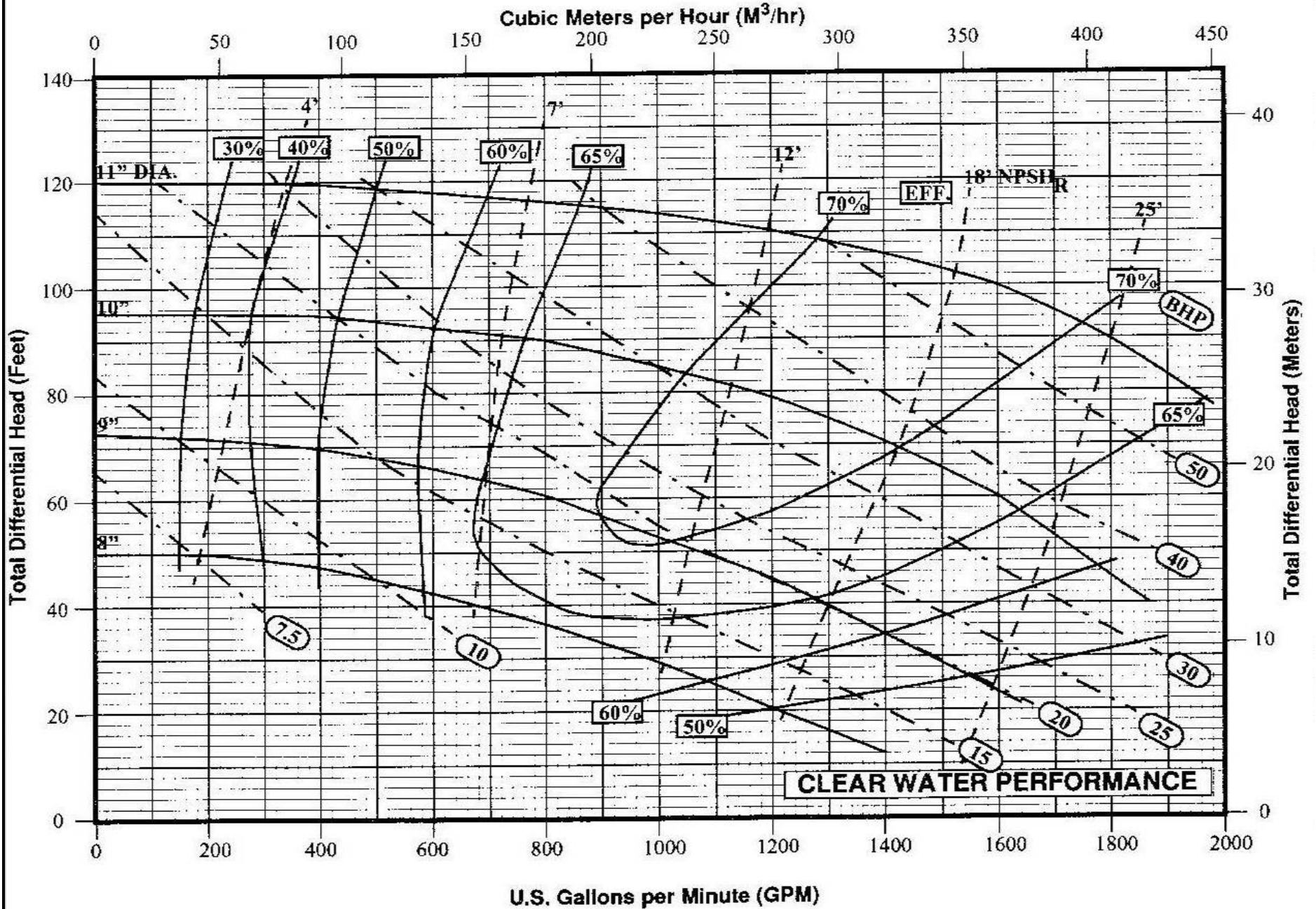
8 × 6 × 11 1150 RPM



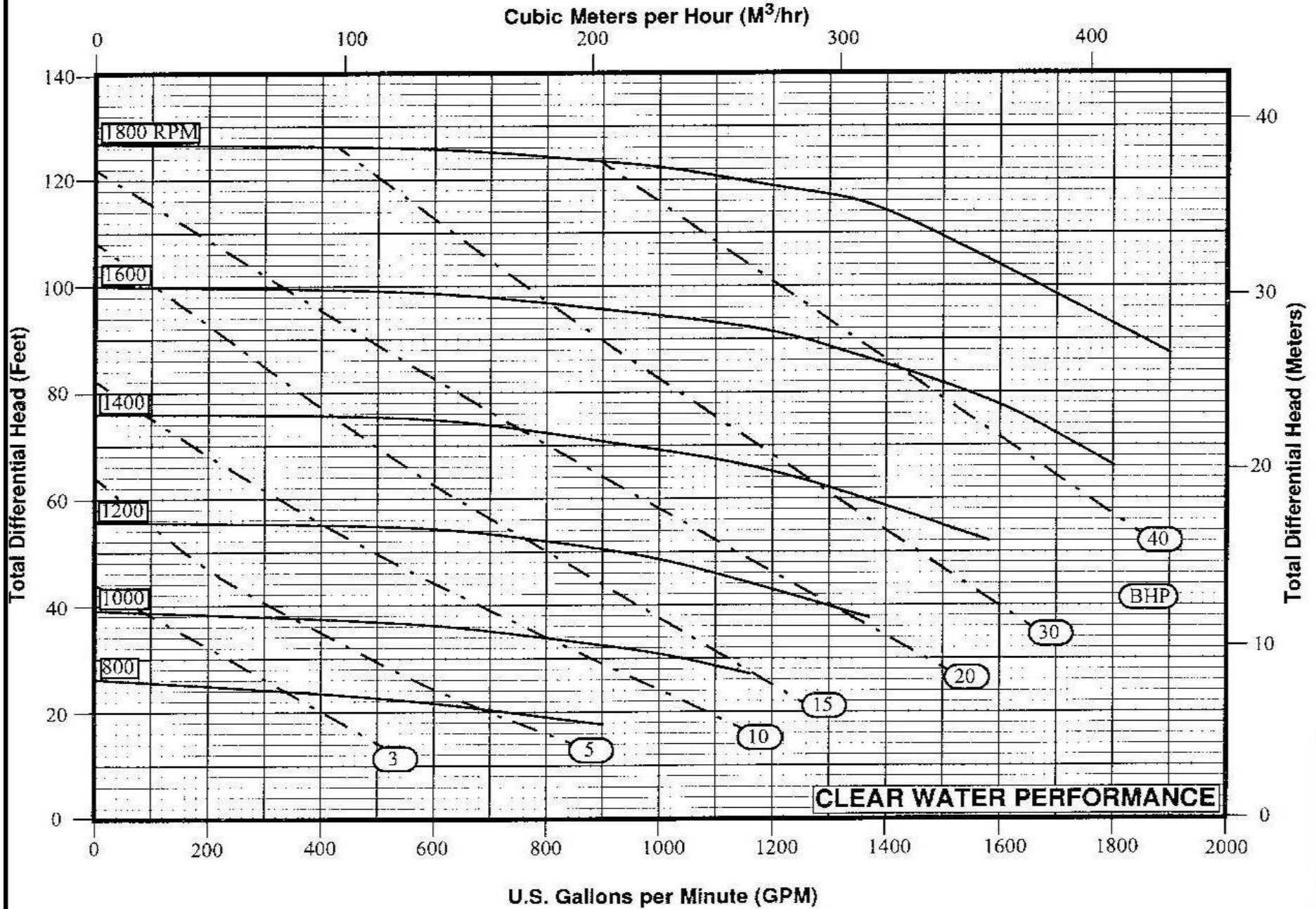
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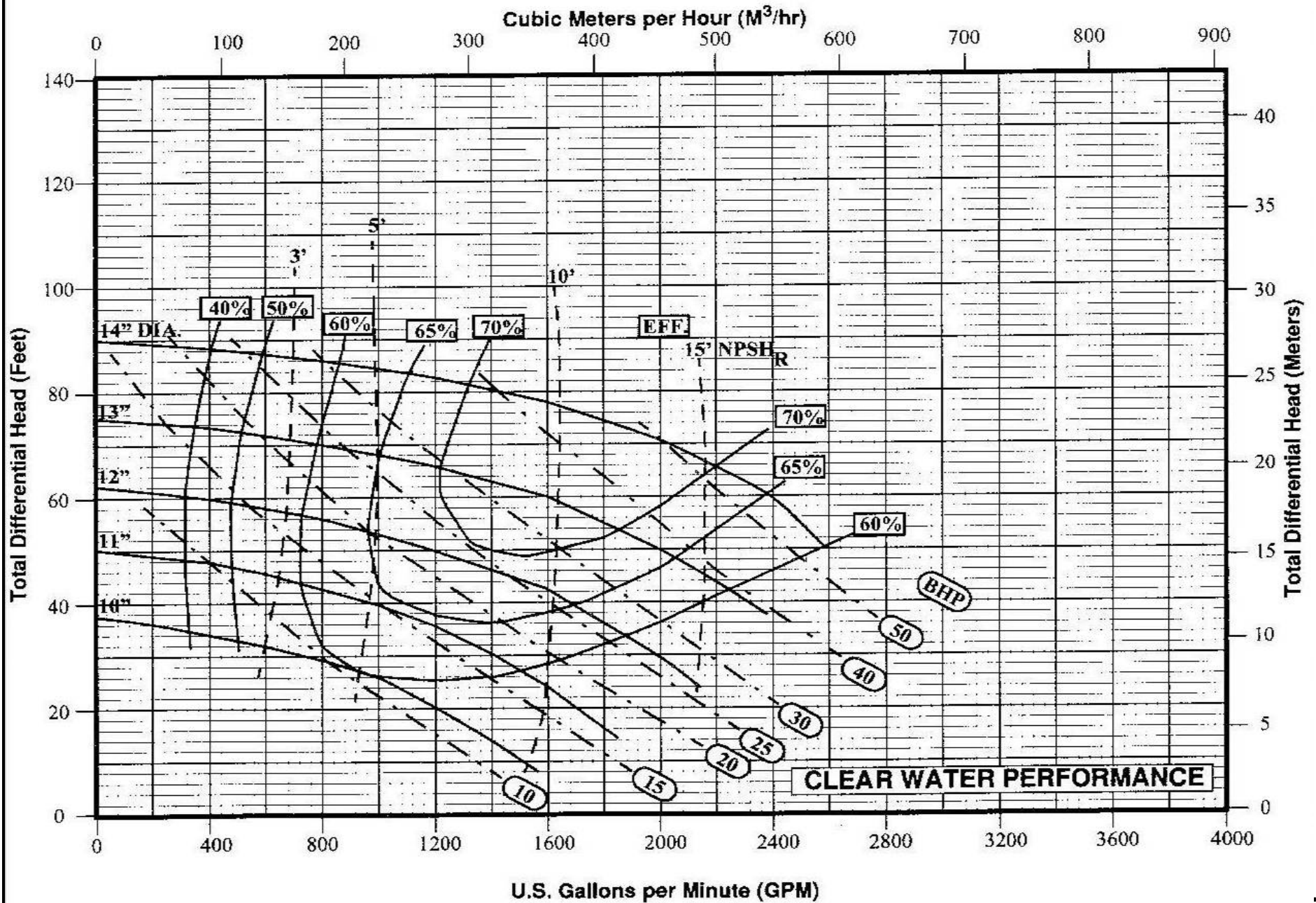
8 × 6 × 11 1750 RPM



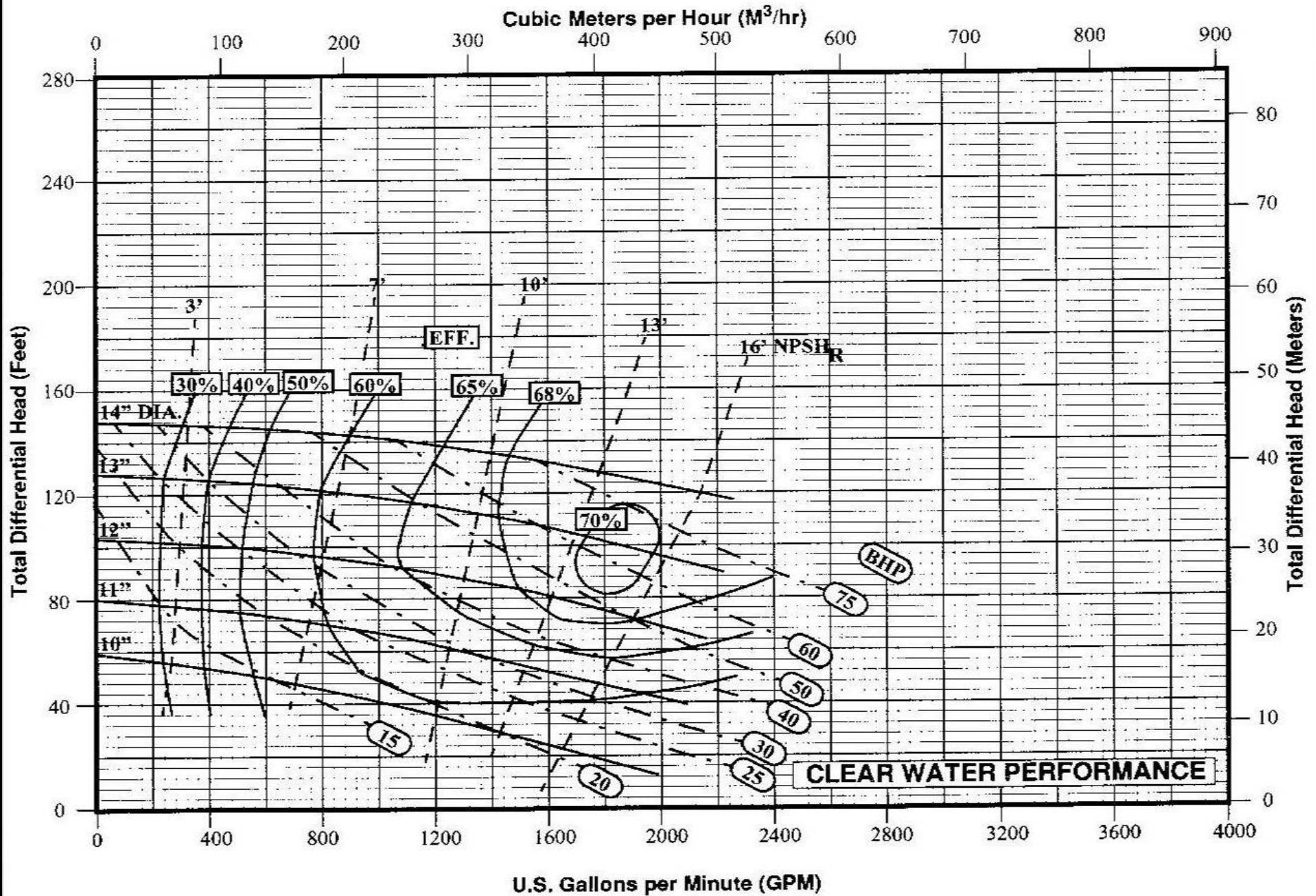
8 × 6 × 11 VARIABLE RPM



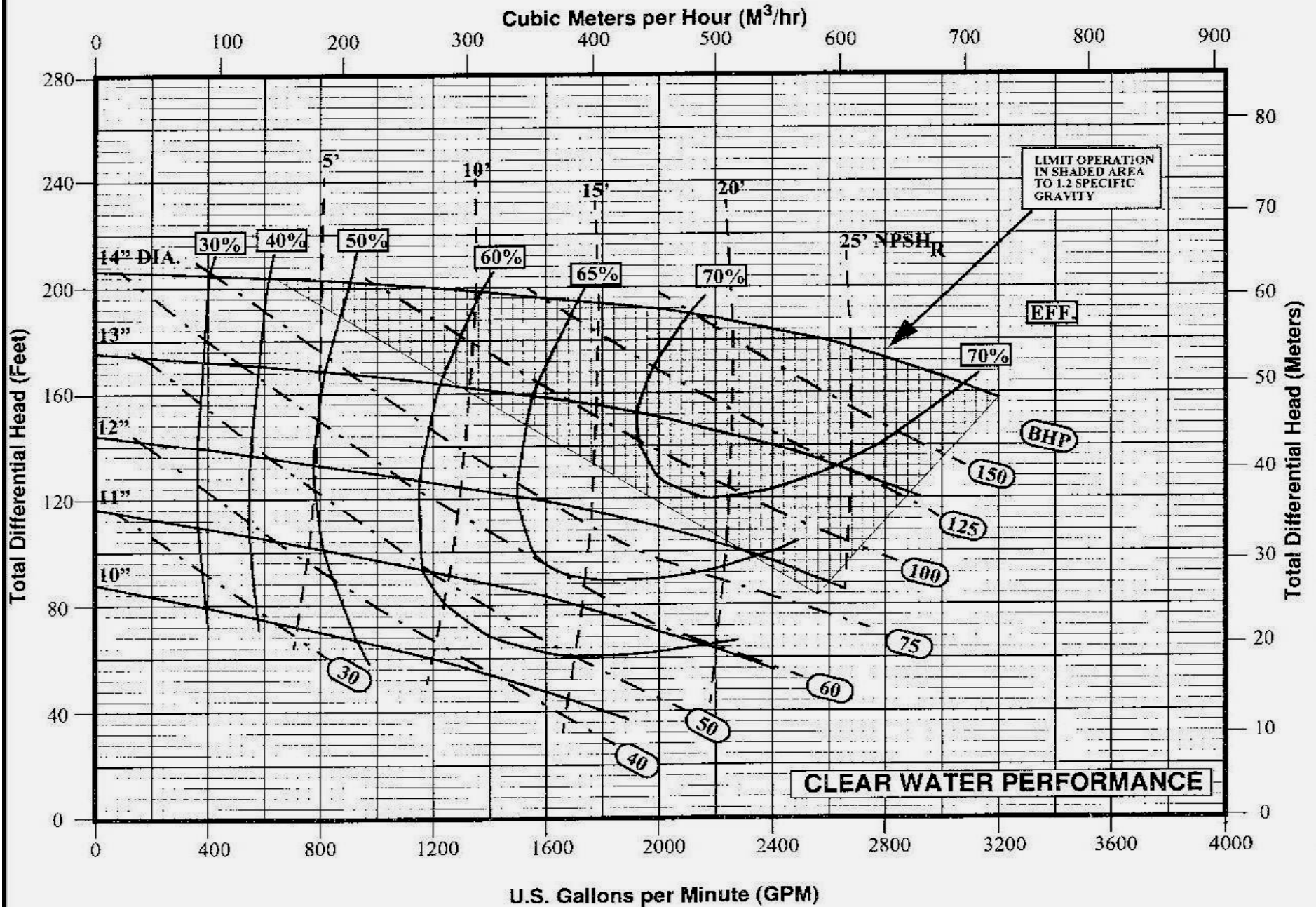
8 × 6 × 14 1150 RPM



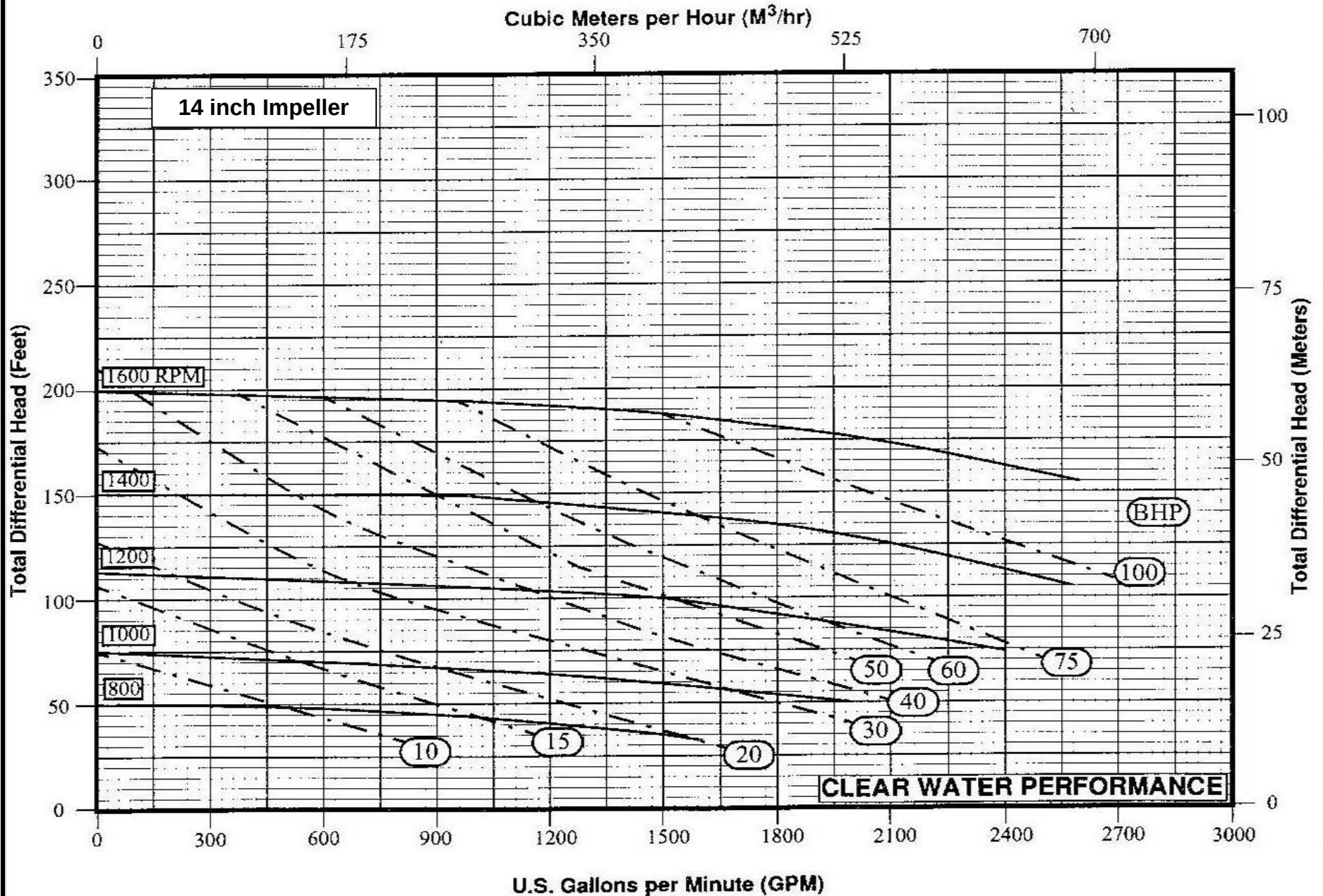
8 × 6 × 14 1450 RPM



8 × 6 × 14 1750 RPM



8 × 6 × 14 VARIABLE RPM



MAINTENANCE

GENERAL

Refer to Figure 8251-7 and Table 8251-1 for assistance with disassembly.

DISASSEMBLY

1. Remove the packing gland halves (4) by loosening the gland bolts (11) and then moving the packing gland bolts (11) to the side.
 2. Remove the housing (15) after removing the housing nuts (16B).
 3. Impeller (14) can now be removed as follows:
 - a. Restrain the shaft near the coupling end to prevent rotation, and then jam a block of wood against the impeller vanes.
 - b. Strike the block of wood with a hammer to turn the impeller counterclockwise, when looking at the pump from the suction end.
 4. The stuffing box cover (13) does not require removal if the mechanical seal does not warrant replacement. However, if replacement is required, remove the gland bolts (11) and push out the stuffing box cover by striking on its rear side. The packing rings (10) may then easily be removed from the stuffing box bore.
 5. The next step is to slide off the shaft sleeve (12) using a wedge, if needed, and taking care not to damage or drop the seal, especially if the seal does not need to be replaced. If the only repair being done is the mechanical seal replacement, no further disassembly is required.
 6. Remove the two bolts (28) securing the outboard bearing housing (3) to the pedestal (1).
 7. The shaft/bearing assembly can then be removed from the pedestal (1).
 8. Remove the outboard bearing housing cover (9).
 9. The locknut and lockwasher (26) can be removed by bending the lockwasher tabs outward from the locknut.
 10. Remove the outboard bearing housing (3). The outboard bearings (8) can be removed from the shaft (2) by striking the key end of the shaft against a wood surface. Similarly, the inboard bearing (5) can be forced off the shaft by striking its inner race with a pipe of an appropriate size.
- Note:** Avoid applying force against the outer race of the bearing.
11. The inboard bearing labyrinth seal (38) can then be removed.

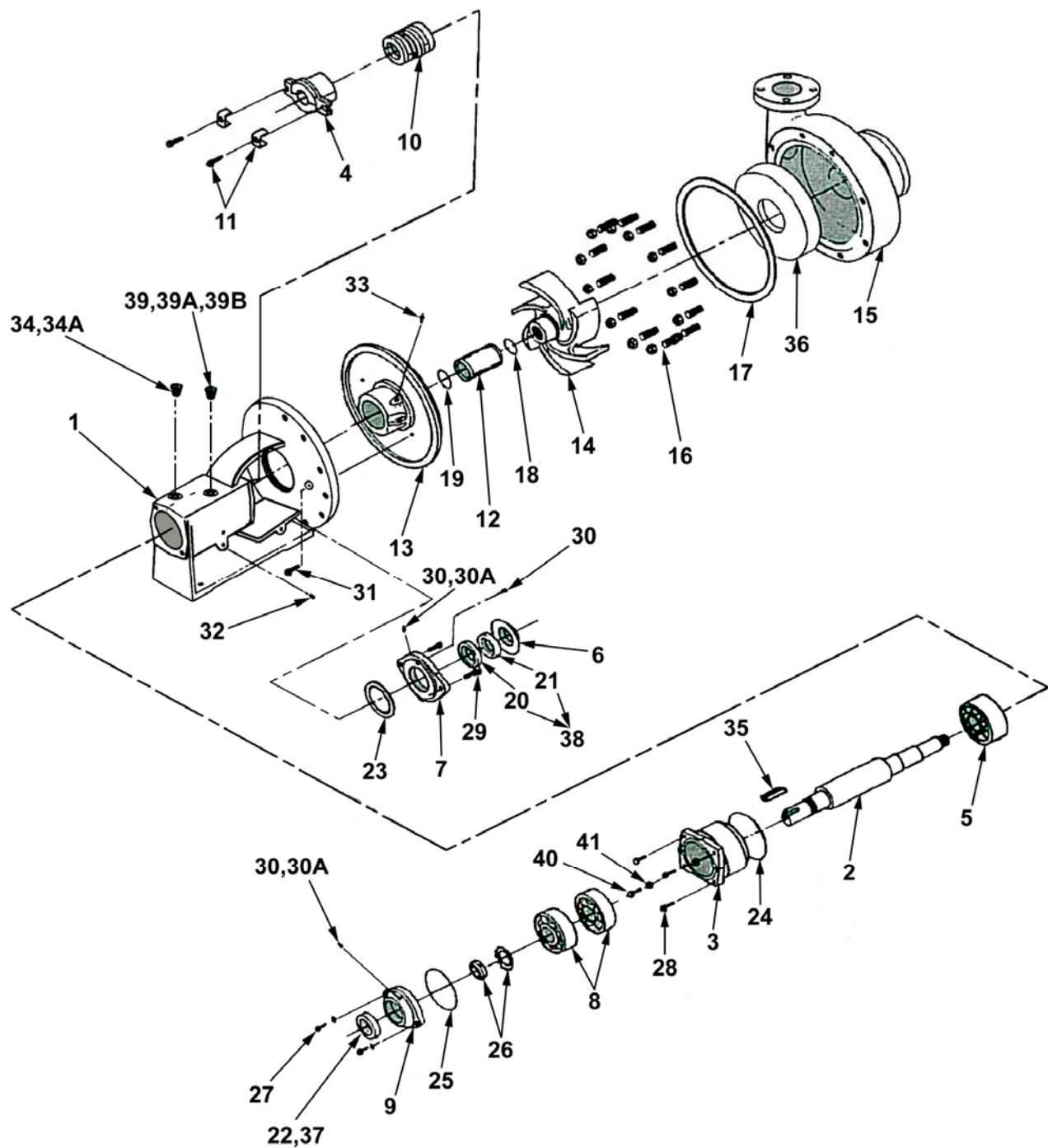


Figure 8251-7. DE-CP Premium 250 Pump Exploded View

Table 8251-1. DE-CP Premium 250 Pump Parts List			
Item No.	Part No.	Description	Qty
1	G0006001	Pedestal	1
2	G0006002	Shaft	1
2A	G0006055	Shaft and Bearing Assembly (Incl. 2, 3, 5, 8, 24, 28, 35, 40, & 41)	1
3	G0006003	Outboard Bearing Housing	1
4	G0006004	Packing Gland	1
5	G0006005	Inboard Bearing	1
6	G0006006	Slinger Ring, Water (Optional)	1
7	G0006007	Inboard Bearing Cover	1
8	G0006008	Outboard Bearing	2
9	G0006009	Outboard Bearing Cover	1
10	G0006010	Graphite Packing	1
-	G0006011	King Packing	1
-	G0006012	Teflon Packing	1
-	G0006013	Mechanical Seal	1
11	G0006014	Gland Bolt Assembly	2
12	G0006015	Shaft Sleeve, Ceramic	1
-	G0006311	Shaft Sleeve, Stainless Steel	1
13	G0006016	Stuffing Box F/Packing	1
-	G0006017	Stuffing Box F/Mech Seal	1
14	G0006184	Impeller, 3x2x13.00	1
-	G0006183	Impeller, 3x2x12.50	1
-	G0006182	Impeller, 3x2x12.00	1
-	G0006181	Impeller, 3x2x11.50	1
-	G0006180	Impeller, 3x2x11.00	1
-	G0006179	Impeller, 3x2x10.50	1
-	G0006178	Impeller, 3x2x10.00	1
-	G0006177	Impeller, 3x2x9.50	1
-	G0006176	Impeller, 3x2x9.00	1
-	G0006175	Impeller, 3x2x8.50	1
-	G0006018	Impeller, 3x2x8.00	1
-	G0006194	Impeller, 4x3x13.00	1
-	G0006193	Impeller, 4x3x12.50	1
-	G0006192	Impeller, 4x3x12.00	1
-	G0006191	Impeller, 4x3x11.50	1

Table 8251-1. DE-CP Premium 250 Pump Parts List

Item No.	Part No.	Description	Qty
-	G0006190	Impeller, 4x3x11.00	1
-	G0006189	Impeller, 4x3x10.50	1
-	G0006188	Impeller, 4x3x10.00	1
-	G0006187	Impeller, 4x3x9.50	1
-	G0006186	Impeller, 4x3x9.00	1
-	G0006185	Impeller, 4x3x8.50	1
-	G0006019	Impeller, 4x3x8.00	1
-	G0006204	Impeller, 5x4x14.00	1
-	G0006203	Impeller, 5x4x13.50	1
-	G0006202	Impeller, 5x4x13.00	1
-	G0006201	Impeller, 5x4x12.50	1
-	G0006200	Impeller, 5x4x12.00	1
-	G0006199	Impeller, 5x4x11.50	1
-	G0006198	Impeller, 5x4x11.00	1
-	G0006197	Impeller, 5x4x10.50	1
-	G0006196	Impeller, 5x4x10.00	1
-	G0006195	Impeller, 5x4x9.50	1
-	G0006020	Impeller, 5x4x9.00	1
-	G0006168	Impeller, 6x5x11.00 and 8x6x11.00	1
-	G0006167	Impeller, 6x5x10.50 and 8x6x10.50	1
-	G0006166	Impeller, 6x5x10.00 and 8x6x10.00	1
-	G0006165	Impeller, 6x5x9.50 and 8x6x9.50	1
-	G0006164	Impeller, 6x5x9.00 and 8x6x9.00	1
-	G0006163	Impeller, 6x5x8.50 and 8x6x8.50	1
-	G0006021	Impeller, 6x5x8.00 and 8x6x8.00	1
-	G0006214	Impeller, 6x5x14.00	1
-	G0006213	Impeller, 6x5x13.50	1
-	G0006212	Impeller, 6x5x13.00	1
-	G0006211	Impeller, 6x5x12.50	1
-	G0006210	Impeller, 6x5x12.00	1
-	G0006209	Impeller, 6x5x11.50	1
-	G0006224	Impeller, 8x6x14.00	1
-	G0006223	Impeller, 8x6x13.50	1
-	G0006222	Impeller, 8x6x13.00	1

Table 8251-1. DE-CP Premium 250 Pump Parts List			
Item No.	Part No.	Description	Qty
-	G0006221	Impeller, 8x6x12.50	1
-	G0006220	Impeller, 8x6x12.00	1
-	G0006219	Impeller, 8x6x11.50	1
-	G0006218	Impeller, 8x6x11.00	1
-	G0006217	Impeller, 8x6x10.50	1
-	G0006216	Impeller, 8x6x10.00	1
15	G0006025	Housing Assembly, 3x2x13	1
-	G0006026	Housing Assembly, 4x3x13	1
-	G0006027	Housing Assembly, 5x4x14	1
-	G0006028	Housing Assembly, 6x5x11	1
-	G0006029	Housing Assembly, 6x5x14	1
-	G0006030	Housing Assembly, 8x6x11	1
-	G0006031	Housing Assembly, 8x6x14	1
16	G0006032	Housing Stud With Nut	12
16A	G0006309	Housing Stud	12
16B	G0006310	Housing Nut	12
17A	G0006033	Fluid End Gasket Kit (Incl. 17, 18, & 19)	N/A
17	G0006034	Housing Gasket	1
18	G0006035	Impeller Seal, O-Ring	1
19	G0006036	Shaft Sleeve Seal, O-Ring	1
20A	G0006037	Oil Seal Kit (Incl. 20, 21, & 22)	N/A
20	G0006038	Inboard Bearing Oil Seal (Optional)	1
21	G0006039	Inboard Exclusion Seal (Optional)	1
22	G0006040	Outboard Bearing Oil Seal (Optional)	1
23A	G0006041	Power End Gasket Kit (Incl. 23, 24, & 25)	N/A
23	G0006042	Inboard Bearing Cover Gasket	1
24	G0006043	Outboard Bearing Housing Seal, O-Ring	1
25	G0006044	Outboard Bearing Cover Seal, O-Ring	1
26	G0006045	Bearing Lock Nut Kit (Incl. 26A & 26B)	1
26A	G0006280	Bearing Lockwasher	1
26B	G0006281	Bearing Lock Nut	1
27	G0006279	Outboard Bearing Cover Bolt	2
28	G0006106	Bearing Housing Bolt	2
29	G0006282	Inboard Bearing Cover Bolt	2

Table 8251-1. DE-CP Premium 250 Pump Parts List

Item No.	Part No.	Description	Qty
30	G0006284	Bearing Cover Plug	2
30A	G0006315	Grease Fitting, Zerk, 1/16" NPT	2
31	G0006106	Stuffing Box Bolt	2
32	G0006278	Oil Plug	2
33	G0006315	Grease Fitting, Zerk	1
34**	G0006278	Plug, Grease Lubed Pump, 1/4" NPT	1
34A*	G0006160	Breather Plug	1
35	G0006283	Coupling Key	1
36	G0006047	Casing Wear Plate, 4x3x13	1
-	G0006048	Casing Wear Plate, 5x4x14	1
-	G0006049	Casing Wear Plate, 6x5x11	1
-	G0006050	Casing Wear Plate, 6x5x14	1
-	G0006051	Casing Wear Plate, 8x6x11	1
-	G0006052	Casing Wear Plate, 8x6x14	1
37	G0006158	Outboard Labyrinth Seal (Standard)	1
38	G0006159	Inboard Labyrinth Seal (Standard)	1
39**	G0006277	Rubber Plug	1
39A*	G0006314	Oil Dip Stick, Push In	1
39B*	G0006156	Oil Dip Stick, Threaded	1
40	G0006282	Outboard Bearing Housing Adjusting Bolt	2
41	G0006316	Outboard Bearing Housing Adjusting Nut	2

*Oil-lubricated pump only

**Grease-lubricated pump only

INSPECTION

In general, whenever disassembling a pump, always clean the retaining rings, O-ring grooves, surfaces of the gaskets, threads, and bearings.

Impeller - Inspect the impeller both the front and back vanes for excessive erosion and/or vane breakage. Replace if any of these conditions exist.

Shaft and Shaft Sleeve - A maximum run out of 0.002" is allowed on the shaft, and the shaft threads must be in a good condition. The bearing seating surfaces must be smooth and free of scratches. Replace shaft if any of these conditions are present. Similarly, the surface of the sleeve should be checked for scoring and replaced if necessary.

Mechanical Seal - To prevent excessive leakage, the condition of the seal faces, gaskets, and shaft sealing members must be checked and part(s) replaced if necessary.

Ball Bearings - The bearings must rotate smoothly and quietly. Bearings should be replaced if noisy when rotated. New bearings should not be unpacked until ready to perform installation.

Gaskets and O-Rings - It is always good practice to replace all the gaskets and O-rings before reassembly of the pump.

ASSEMBLY

Refer to Figure 8251-7 for assistance with assembly procedure.

Shaft and Bearing Subassembly

Note: Installation of the bearings with a press is acceptable in lieu of heating the bearings.

1. Pack the inboard bearing (5) and both outboard bearings (8) with Chevron Duralith EP No. 2 or Lubriplate 1200-2 grease. Heat the inboard bearing and the two outboard bearings to 240°F (115°C) max.
2. After heating the inboard bearing (5), position it to be installed. Check to see if the marking "5313" is on the bearing. Slide the bearing onto the impeller end of the shaft (2), and seat the bearing.
3. Install the outboard bearing housing seal (24) onto the outboard bearing housing (3). Slide the outboard bearing housing onto the shaft (2) from the coupling end of the shaft. The flanged end of the outboard bearing housing should face the coupling end of the shaft.
4. After heating one of the outboard bearings (8), position it to be installed. Slide the bearing onto the shaft (2) with the "7311" marking facing the coupling end of the shaft, and seat the bearing.
5. After heating the other outboard bearing (8), orient it to be installed. Slip the bearing onto the shaft (2) with the "7311" marking on this bearing, facing the "7311" marking on the previously installed bearing and seat the bearing.
6. Check for proper outboard bearing (8) installation. The "7311" markings on both outboard bearings should be facing each other. The balls and races on both bearings should be clearly visible.
7. Install the bearing lockwasher (26A) onto the shaft (2) with the tabs toward the coupling end of the shaft.
8. Install the bearing lockwasher and locknut (26B) onto the shaft (2) with the bevel toward the bearing lockwasher. Tighten the bearing locknut to 250 ft-lb. Bend one tab of the bearing lockwasher to engage one cutout of the bearing locknut.

Note: If the tab on the bearing lockwasher (26A) does not align with a slot directly, loosen the bearing locknut until the closest tab/slot combination is aligned.

9. Lightly grease the outboard bearing (8) outside diameters. Shoulder the outboard bearing housing (3) against the outboard bearings.
10. Install the outboard / inboard bearing grease fitting (30A) into the outboard bearing cover (9) with the nipple facing the outside of the outboard bearing cover. Press the outboard bearing labyrinth seal (37) with drain cutout down or rotated 180° from the 1/8" NPT hole in the outboard bearing cover and with the drain on the inside of the outboard bearing cover.

Shaft and Bearing Subassembly (Cont'd)

11. Apply grease to the shaft (2). Assemble the outboard bearing cover (9) to the outboard bearing housing (3). Install the outboard bearing cover bolts (27) and torque to 20 ft-lbs.

Caution: Do not over tighten the outboard bearing cover bolts (27). Proper installation will produce a 0.015" to 0.030" gap between the outboard bearing housing (3) and the outboard bearing cover (9).

Pedestal Subassembly

1. Install the outboard / inboard bearing grease fitting (30A) into the inboard bearing housing cover (7).
2. Orient the inboard bearing labyrinth seal (38) with its drain cutout down and to the inside. Press the seal into the inboard bearing cover (7).
3. Install the inboard bearing cover grease plug (30) into the inboard bearing cover, and place the inboard bearing cover gasket (23) onto the inboard bearing cover.
4. Install the inboard bearing cover (7) into the pedestal (1) with the labyrinth seal drain side down. Install the inboard bearing cover bolts (29) into the pedestal, leaving two threads of each bolt exposed.

Note: Do not tighten the bolts at this time.

5. Lightly grease the outboard bearing housing bore and inboard bearing bores in the pedestal (1). Install the shaft / bearing subassembly from the previous paragraph into the pedestal, leaving 1/4" between the outboard bearing housing (3) flange and the pedestal.
6. Install two outboard bearing housing bolts (40) and nuts (41). Thread the outboard bearing housing bolts and nuts into the outboard bearing housing (3) and hand tighten. Thread two outboard bearing housing bolts through the outboard bearing housing and into the pedestal (1), and hand tighten.
7. Torque the inboard bearing cover bolts (29) to 20 ft-lbs.

Note: After proper installation, a 0.015" to 0.030" gap will occur between the inboard bearing cover (7) and the pedestal (1).

8. Install two oil plugs (32), the plug for the breather port (39), and the plastic plug (34A) into the pedestal (1). Install the jack bolts into the pedestal (1).

Stuffing Box and Components

Mechanical Seal Configuration

1. Grease the 3-ring packing set (10). Install the 3-ring packing set and the shaft sleeve (12) into the stuffing box cover (13) bore by installing each of the three rings with the splits 180 degrees apart.
2. Install the gland assembly bolts (11) into the stuffing box cover (13) and torque to 20 ft-lbs.

Packing Ring Configuration

1. The packing rings (10) will usually be either Teflon® or King.
2. Make sure that the shaft sleeve OD and the stuffing box cover ID are clean, smooth, and free of any burrs and scratches.
3. Grease should be applied to all the packing rings.
4. Insert three packing rings, taking care to align splits in the rings 180 degree apart and the split on the first ring at the bottom. In case of King packing, install the rings so that their lips are facing the suction side of the pump.
5. The lantern ring should be installed next, making sure that the split in the lantern ring is oriented vertically.
6. The remaining two rings should now be installed with the split in the last ring at the bottom. However, in case of King packing, the final King ring should be installed so that the lip is facing the coupling end and its split is at the top. The last square ring of packing can then be installed with the split facing downward.
7. The packing gland halves (4) should now be installed and pressed in slightly by tightening the gland assembly bolts (11).

Note: Since packing can burn easily if excessively tight around the rotating element. Consequently, after seating the packing, the gland assembly bolts (11) may be loosened and then hand-tightened only. This is the recommended condition before starting the pump. Once the pump has been running for a brief time, re-tighten the gland assembly bolts so that leakage is only 10 to 15 drops per minute.

Fluid End Assembly

1. Slide shaft sleeve seal (19) onto the shaft (2) and seat.
2. Coat the stuffing box bore in the pedestal (1) with sealing compound. Install the stuffing box cover (13) into the pedestal with the word 'Top' toward the lifting eye or up. Install the stuffing box cover bolts (31) and fully tighten to 50 ft-lbs.
3. Apply a coat of grease to the shaft sleeve (12) to the inside of the rubber bellows and the sealing face of the labyrinth seal (38).
4. Grease the impeller seal groove on the impeller (14). Place the impeller seal (18) into the impeller groove. Screw the impeller onto the shaft (2) and torque to a minimum of 160 ft-lbs.
5. Install one gland set (4), snug the gland set against the 3-ring packing (10), and back off until hand tight.
6. Set the clearance between the stuffing box cover (13) and the impeller (14) to 0.070" to 0.075" by adjusting the outboard bearing housing bolts and nuts (28, 40, and 41). Tighten the outboard bearing housing nuts.

Caution: Ensure that the impeller turns freely. Tighten the remaining two outboard bearing bolts (28) to 20 ft-lbs.

Fluid End Assembly (Cont'd)

7. If required, install wear pad studs into the wear pad (36). Install wear pad (36) into the casing (15).

Note: This step is not required for 3 X 2 housings.

8. Install the housing studs (16A) into housing (15). Install the housing gasket (17) onto the stuffing box cover (13). Apply sealing compound to the two locating surfaces on the stuffing box cover (13). Install the housing onto the stuffing box cover. Install housing stud nuts (16B) onto the housing studs (16A), and torque evenly to 140 ft-lbs.

The content of this document is subject to change at any time. Information provided does not cover all details or variations possible with DERRICK equipment, nor does it cover every contingency that may be met in conjunction with installation, operation, maintenance, or troubleshooting of the equipment. Should additional information be required, or should situations arise that are not covered by this manual, bring the matter to the attention of your local DERRICK representative or the Service Department at DERRICK Corporation in Buffalo, New York.

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