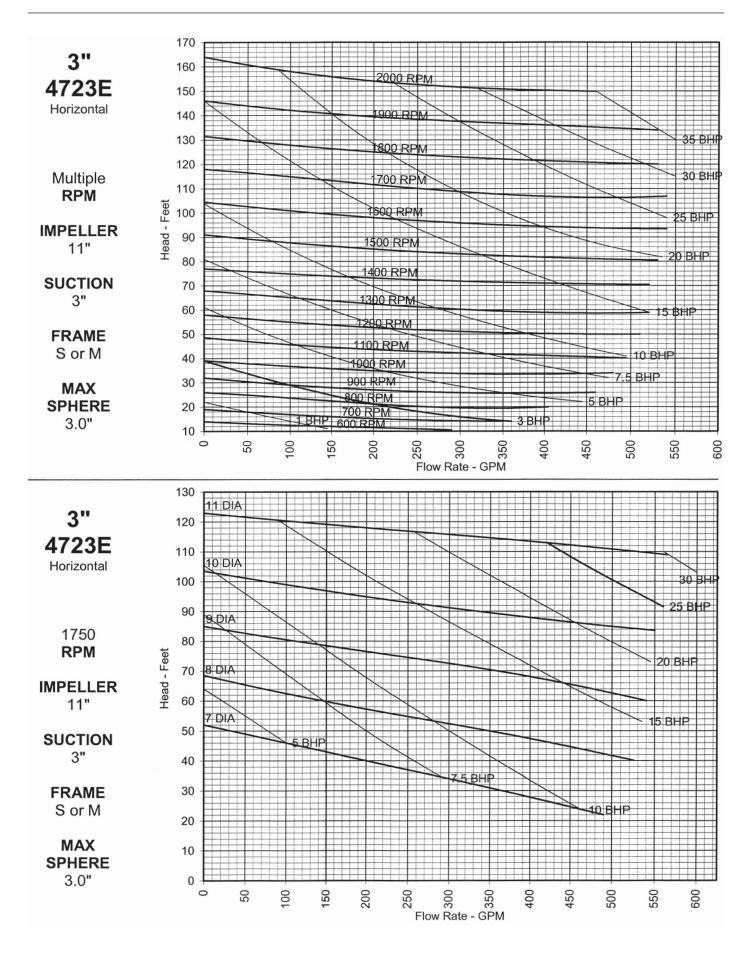
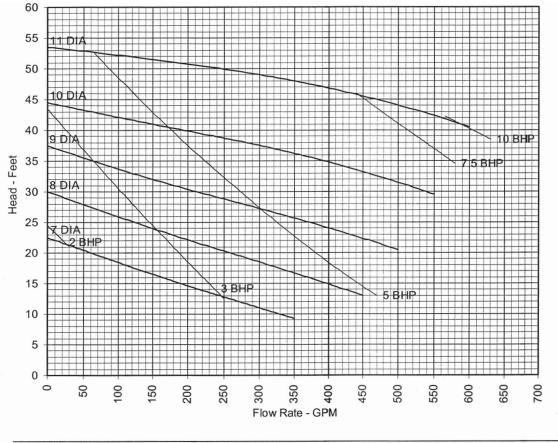
# 4700E Series Vortex Pumps

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6" x 6" x 11" - 4723E, 860 RPM 057 4700E Construction Features
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3" 4723E Horizontal

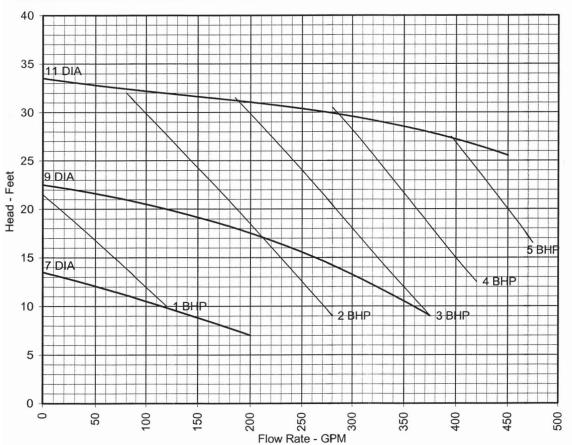
> 1170 **RPM**

IMPELLER 11"

SUCTION 3"

FRAME S or M

MAX SPHERE 3.0"



3" 4723E Horizontal

> 860 **RPM**

IMPELLER 11"

SUCTION 3"

FRAME S or M

MAX SPHERE 3.0"



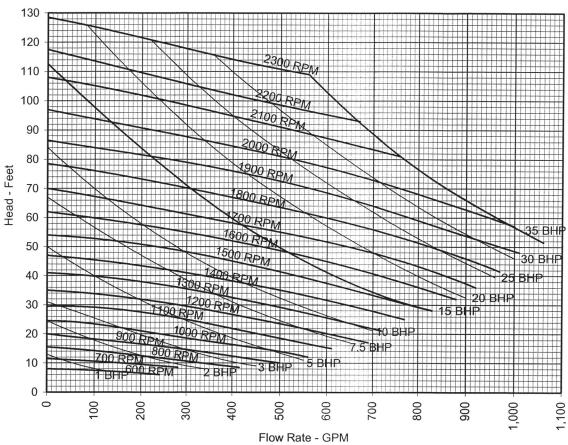
Multiple **RPM** 

**IMPELLER** 9"

SUCTION 4"

**FRAME** S

MAX SPHERE 4.0"





Horizontal

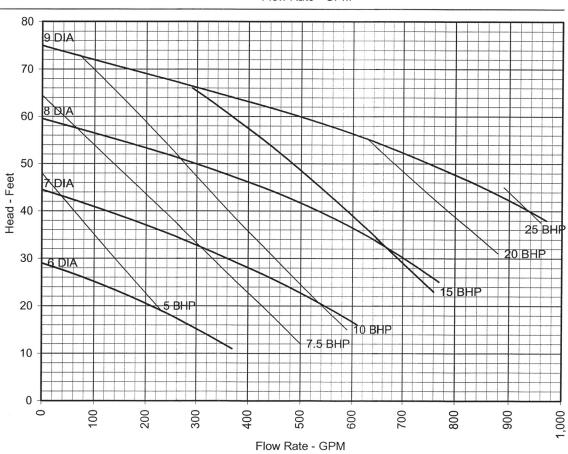
1750 **RPM** 

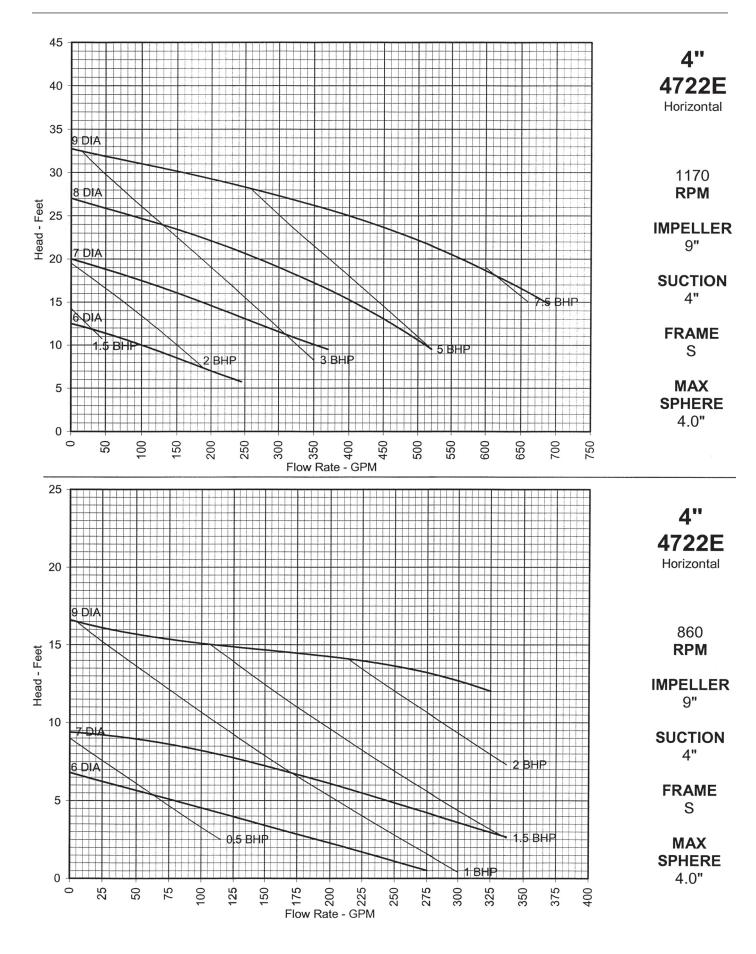
**IMPELLER** 9"

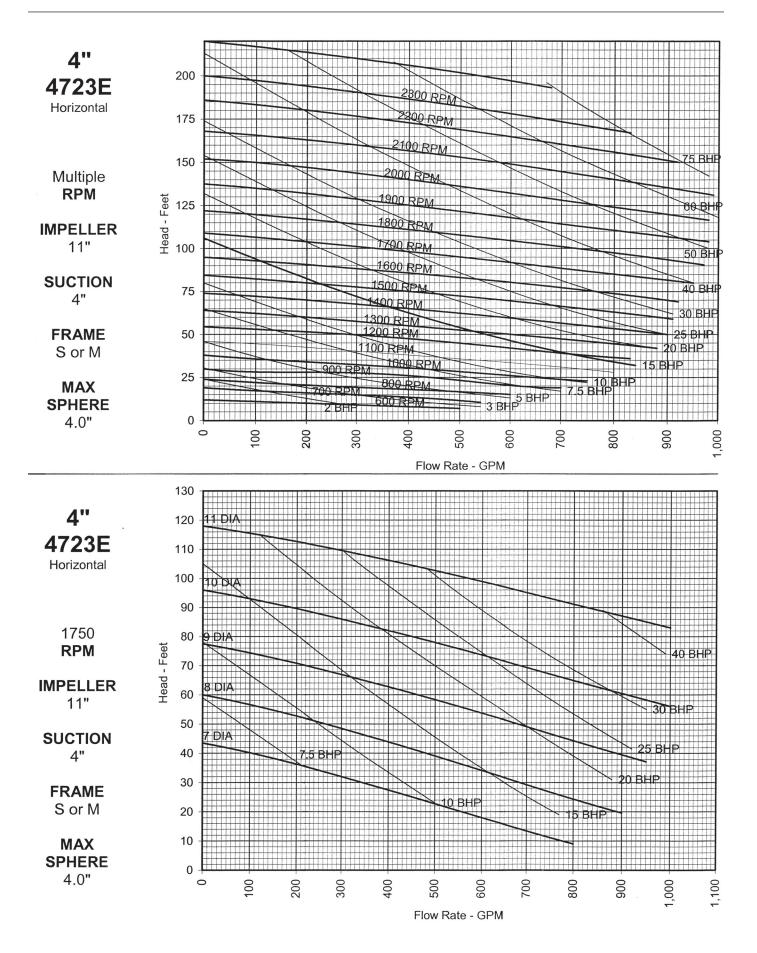
SUCTION 4"

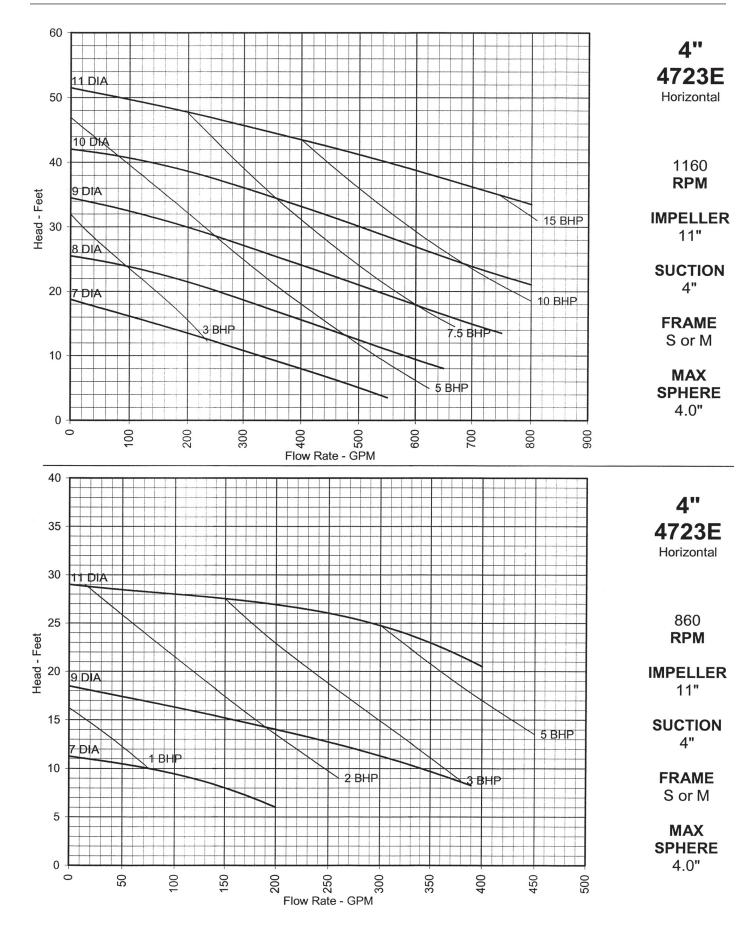
FRAME S

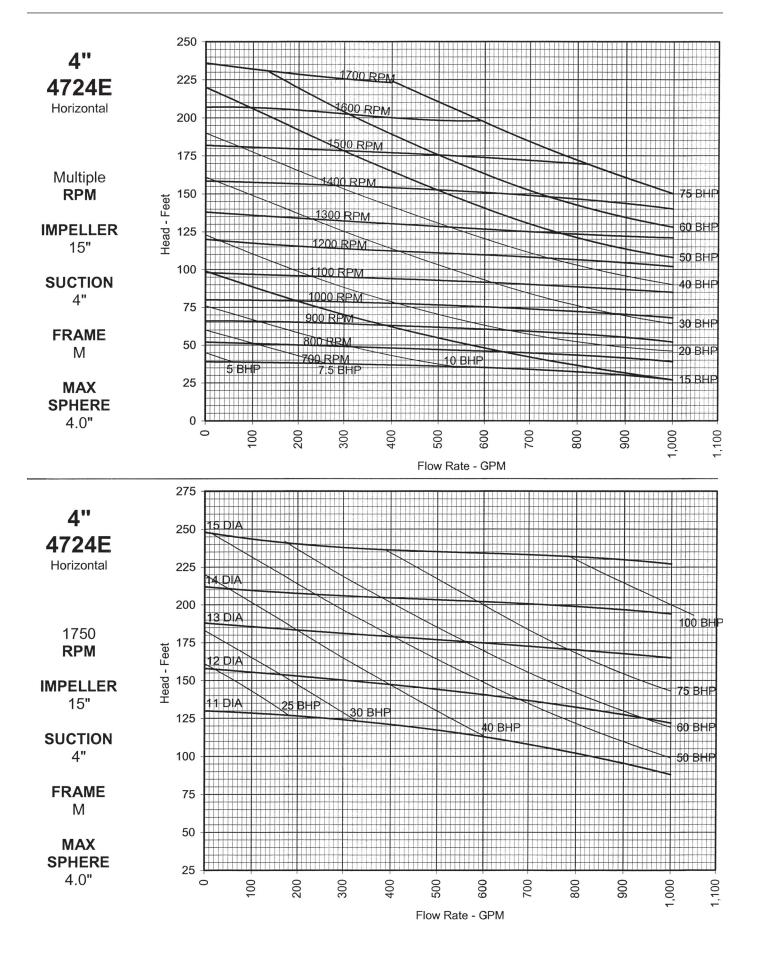
MAX SPHERE 4.0"

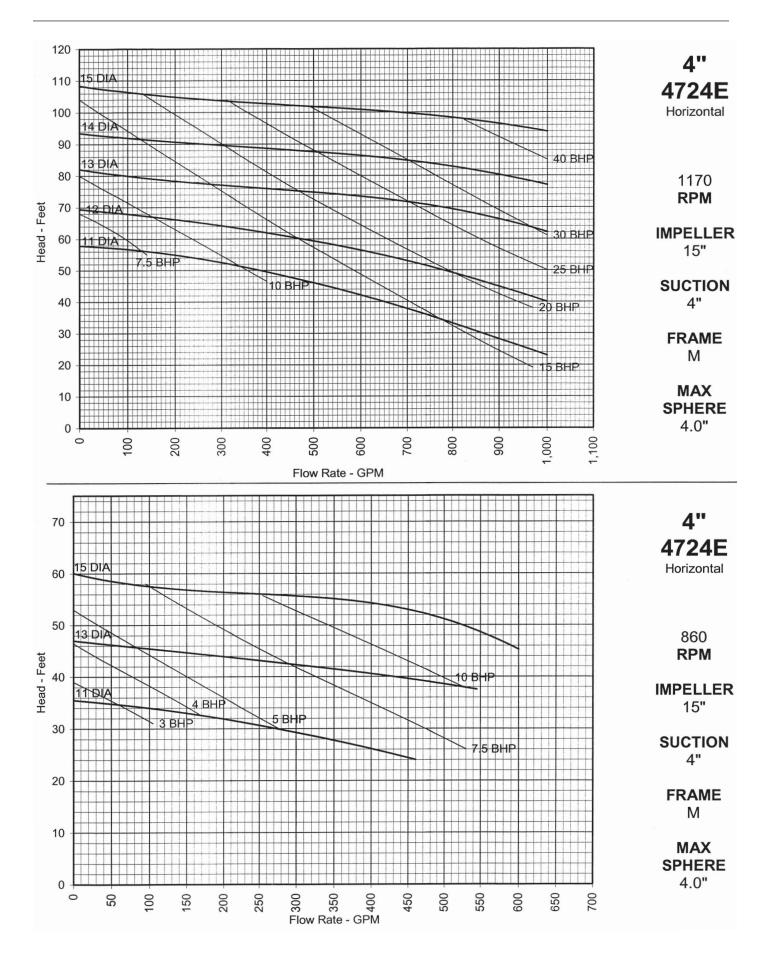


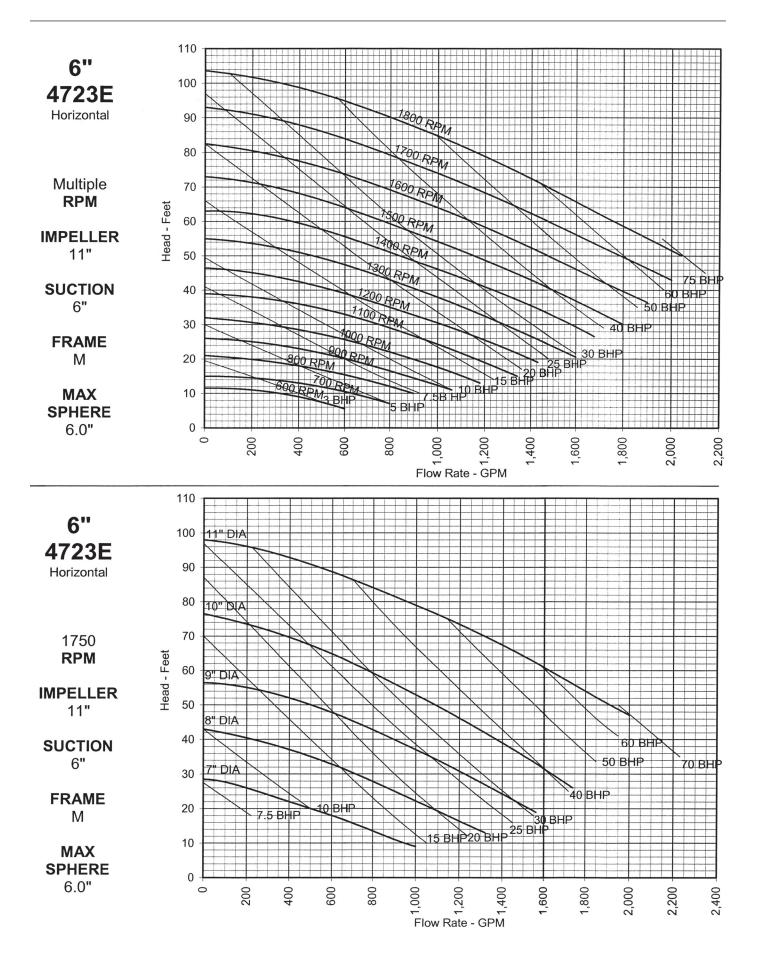


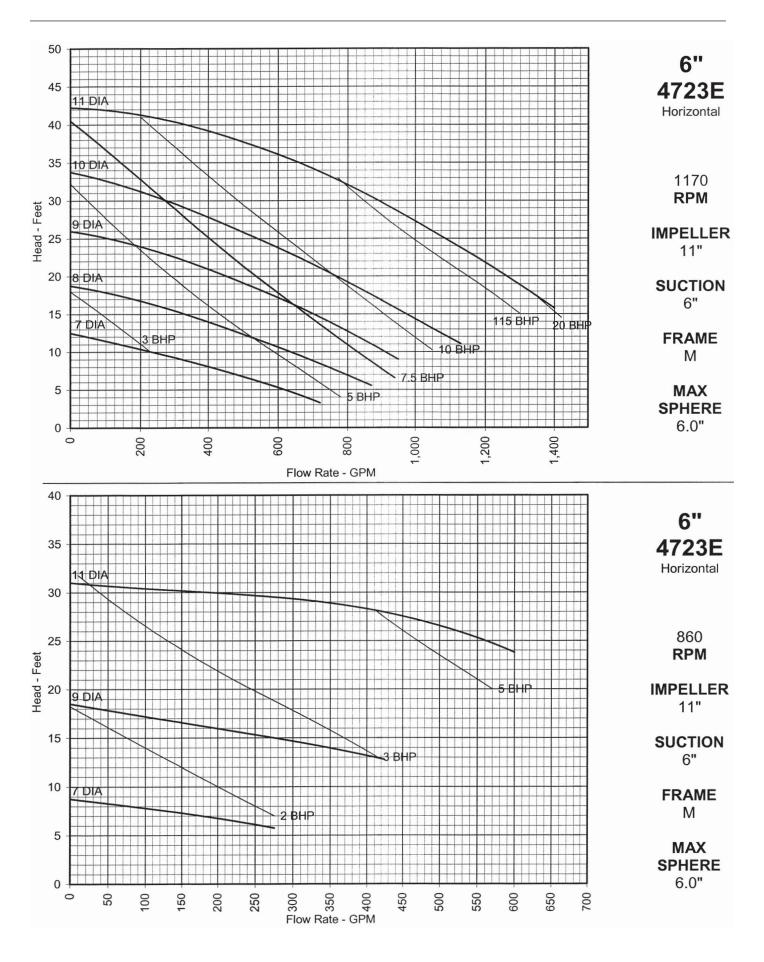












### **4700E Vortex Pumps**

		Standard	Options
Туре	Horizontal, single-stage, radial-vane impeller, frame mounted	Х	
Rotation	CW as viewed from driver end	Х	
Volute	One-piece, radially split and flanged side tangential discharge, reversible for opposite rotation	Х	
Impeller	Radial vane, vortex-type	Х	
Shaft	Accurately machined over entire length for straight bore	Х	
Shaft Sleeve	Straight type, affixed and gasketed to prevent leakage between sleeve and shaft	×	
Gland Housing	Separate one-piece casting	х	
Gland	2-piece, 2-bolt, split type	х	
Bearing - Radial (Outboard)	Single row, ball-type	х	
Bearing - Thrust (Inboard)	Double row, angular contact-type	х	
Lubrication	Grease	х	
Auxiliary Connections	Gland Housing lantern ring or vent		Х
Baseplate	Bent form or welded structural steel, pedestal mounts, and guard		х
V-Belt Drives	Variable Speed - Stationary Control	х	
	Variable Speed - Motion Control, Spring Loaded		Х
Coupling	Flexible, pin and buffer or flexible sleeve (mfg. Option)	X	
	Steelflex type		Х
	Spacer type		Х

## HEAVY DUTY 4720E RECESSED IMPELLER PUMP SPECIFICATION (HORIZONTAL MOUNTED)

#### **PART 1, GENERAL**

1.01 The following specification describes the design of \_\_\_\_ horizontal vortex-type slurry pumping unit(s). The design of these units shall be such that they are capable of pumping slurries, which may contain trash, stringy material, organic solids and grit without becoming clogged.

#### 1.02 QUALITY ASSURANCE

- A. Pump(s) shall be supplied by the manufacture as specified herein or by an approved equal and shall be designed for use intended in the application described.
- B. Pump(s) shall be furnished with correctly sized motor, V-belt drive and drive guards and be mounted on a common base, as well as supply any other accessories as specifically called out in these specifications. All equipment shall carry a manufacturers warranty.
- C. All of the pumps supplied per these specifications shall be the product of a single manufacturer.

#### 1.03 PERFORMANCE

- A. The pumps shall be designed for continuous operation and will be operated continuously under normal service.
- **B. OPERATION CRITERIA**

	Capacity (GPM)	Total Dynamic Head (FT)	Max. Pump Speed (RPM)	Solids Size	Min. Suction Dia. (in.)	Min. Disch. Dia. (in.)	Min. Motor Size (HP)
Design Condition							
Secondary Condition							

#### **PART 2, PRODUCTS**

#### 2.01 A. PUMPS

#### 1. Manufacturers

a. Pump(s) shall be the product of Fairbanks Morse Pump.

#### 2. Design

- a. Pump(s) shall be specifically designed to pump slurries that may contain solids rags and
- b. This vortex pump design shall be such that trash and solids do not have to pass through the impeller. The impeller shall be recessed from the path of flow from the pump suction to pump discharge. All flow paths shall be equal to or greater than the pump suction size.
- c. The impeller shall be made from ASTM A48 CL30 cast iron. The radial design impeller(s) shall incorporate pump-out vanes on the rear shroud.

- d. The pump casing shall be ASTM A48 CL30 cast iron material. It shall be of the radially split type design such that the impeller can be removed without disturbing the piping.
- e. The pump hydraulic curve shall slope continuously upward to shutoff. Pumps with curves that contain a dip or dogleg are not acceptable.
- f. Suction and discharge flanges shall be 125-lb. and shall be incorporated into the volute design. These flanges shall be machined smooth to ensure an accurate fit with the piping.

#### 3. Bearing Housing

- a. The bearing housing material shall be ASTM A48CL-30 cast iron.
- b. A hardened shaft sleeve shall protect the shaft throughout the sealing area. The shaft material shall be ASTM A108, Grade 4140 heat-treated steel.
- c. The double row angular contact thrust ball bearings and the single-row radial ball bearings shall be grease lubricated.

#### 4. Shaft Sealing

a. Packing and HardMetal Sleeve. Synthetic fiber graphite-impregnated packing and a Teflon water seal ring shall be used to seal the shaft. An adjustable split bronze gland shall hold the packing in the gland housing. The bearing housing shall incorporate a taped ¾" NPT hole to which drain piping can be connected to carry off any leakage through the packing. To prevent leakage between the shaft an sleeve, an O-ring sealed shaft sleeve shall be provided. The sleeve shall be ASTM A276 heat treated to 450 BHN. Stainless steel sleeves will not be acceptable.

#### - ALTERNATE -

b. Mechanical Seal. A single cartridge mechanical seal requiring no external flushing or a water flush shall be furnished in the pump. The seal shall utilize a single high-reliability cartridge seal with tungsten carbide versus silicon carbide seal faces, Viton elastomers, and 316 stainless steel parts. The base of the packing box shall be fitted with a SpiralTrac flow modification device to remove large solids from the gland housing and eject them behind the impeller. Seals that utilize large open areas with the seal faces exposed to the pumpage shall not be acceptable. A sleeve shall be provided to protect the shaft from abrasive wear and be O-ring sealed to prevent leakage between the shaft and the sleeve. The sleeve shall be stainless steel construction of 300-350 Bhn. Seals requiring a water or product flush may be furnished in lieu of the non-flushed seal, provided the contractor furnishes all of the external auxiliary equipment necessary for the flushing system. This systems shall include, but not be limited to stainless steel tubing, pressure gauge, flowmeter, shutoff and isolation valves, manual throttle valve, strainer, pump, isolated water supply system, solenoid valve in a suitable enclosure, associated wiring, and modifications to the motor control center to actuate the solenoid valve.

#### 5. Horizontal Mounting with V-Belt Drives between Motor and Pump.

- a. A fabricated steel base with a minimum thickness of 3/8" shall be provided that is suitable to adequately support the weight of the pump, motor, drive and drive guard.
- b. An adjustable motor base shall be furnished whose design is such that the motor can easily be moved to accommodate appropriate tensioning of the V-belt drive.
- c. A "stationary control" variable speed drive complete with belts and sheaves shall be installed on the base with the pump and motor. This type of drive is to provide a means to adjust speeds while the drive is not operating.
- d. An enclosed and approved metal belt guard shall be provided.

e Testing formance Test Option #1)  n pump shall be factory certified tested in accordance with the latest edi ydraulic Institute codes. At least six test points shall be taken including gn condition and shutoff. Test results shall include capacity, head, efficie
formance Test Option #1)  n pump shall be factory certified tested in accordance with the latest edi ydraulic Institute codes. At least six test points shall be taken including
formance Test Option #1)  n pump shall be factory certified tested in accordance with the latest edi ydraulic Institute codes. At least six test points shall be taken including
ydraulic Institute codes. At least six test points shall be taken including
horsepower from shutoff to 150% of rated capacity.
formance Test Option #2)
gistered Professional Engineer shall review and certify the test results pripment.
formance Test Option #3)
owner or his representative shall witness the certified performance test.
e manufactured by companies whose management system is registered
1

## HEAVY DUTY 4740E RECESSED IMPELLER PUMP SPECIFICATION (VERTICAL MOUNTED)

#### **PART 1, GENERAL**

1.01 The following specification describes the design of \_\_\_\_ vertical vortex-type slurry pumping unit(s). The design of these units shall be such that they are capable of pumping slurries, which may contain trash, stringy material, organic solids and grit without becoming clogged.

#### 1.02 QUALITY ASSURANCE

- A. Pump(s) shall be supplied by the manufacture as specified herein or by an approved equal and shall be designed for use intended in the application described.
- B. Pump(s) shall be furnished with correctly sized motor and coupling. An appropriate coupling guard as well as supply any other accessories as specifically called out in these specifications shall be provided. All equipment shall carry a manufacturers warranty.
- C. All of the pumps supplied per these specifications shall be the product of a single manufacturer.

#### 1.03 PERFORMANCE

- A. The pumps shall be designed for continuous operation and will be operated continuously under normal service.
- **B. OPERATION CRITERIA**

	Capacity (GPM)	Total Dynamic Head (FT)	Max. Pump Speed (RPM)	Solids Size	Min. Suction Dia. (in.)	Min. Disch. Dia. (in.)	Min. Motor Size (HP)
Design Condition							
Secondary Condition					4		

#### **PART 2, PRODUCTS**

#### 2.01 A. PUMPS

#### 1. Manufacturers

a. Pump(s) shall be the product of Fairbanks Morse Pump.

#### 2. Design

- a. Pump(s) shall be specifically designed to pump slurries that may contain solids rags and grit.
- b. This vortex pump design shall be such that trash and solids do not have to pass through the impeller. The impeller shall be recessed from the path of flow from the pump suction to pump discharge. All flow paths shall be equal to or greater than the pump suction size.
- c. The impeller shall be made from ASTM A48 CL30 cast iron. The radial design impeller(s) shall incorporate pump-out vanes on the rear shroud.

- d. The pump casing shall be ASTM A48 CL30 cast iron material. It shall be of the radially split type design such that the impeller can be removed without disturbing the piping.
- e. The pump hydraulic curve shall slope continuously upward to shutoff. Pumps with curves that contain a dip or dogleg are not acceptable.
- f. Suction and discharge flanges shall be 125-lb. and shall be incorporated into the volute design. These flanges shall be machined smooth to ensure an accurate fit with the piping.

#### 3. Bearing Housing

- a. The bearing housing material shall be ASTM A48CL-30 cast iron.
- b. A hardened shaft sleeve shall protect the shaft throughout the sealing area. The shaft material shall be ASTM A108, Grade 4140 heat-treated steel.
- c. The double row angular contact thrust ball bearings and the single-row radial ball bearings shall be grease lubricated.

#### 4. Shaft Sealing

a. Packing and HardMetal Sleeve. Synthetic fiber graphite-impregnated packing and a Teflon water seal ring shall be used to seal the shaft. An adjustable split bronze gland shall hold the packing in the gland housing. The bearing housing shall incorporate a taped ¾" NPT hole to which drain piping can be connected to carry off any leakage through the packing. To prevent leakage between the shaft an sleeve, an O-ring sealed shaft sleeve shall be provided. The sleeve shall be ASTM A276 heat treated to 450 BHN. Stainless steel sleeves will not be acceptable.

#### - ALTERNATE -

b. Mechanical Seal. A single cartridge mechanical seal requiring no external flushing or a water flush shall be furnished in the pump. The seal shall utilize a single high-reliability cartridge seal with tungsten carbide versus silicon carbide seal faces, Viton elastomers, and 316 stainless steel parts. The base of the packing box shall be fitted with a SpiralTrac flow modification device to remove large solids from the gland housing and eject them behind the impeller. Seals that utilize large open areas with the seal faces exposed to the pumpage shall not be acceptable. A sleeve shall be provided to protect the shaft from abrasive wear and be O-ring sealed to prevent leakage between the shaft and the sleeve. The sleeve shall be stainless steel construction of 300-350 Bhn. Seals requiring a water or product flush may be furnished in lieu of the non-flushed seal, provided the contractor furnishes all of the external auxiliary equipment necessary for the flushing system. This systems shall include, but not be limited to stainless steel tubing, pressure gauge, flowmeter, shutoff and isolation valves, manual throttle valve, strainer, pump, isolated water supply system, solenoid valve in a suitable enclosure, associated wiring, and modifications to the motor control center to actuate the solenoid valve.

#### 5. Vertical Mounting with Flexible Coupled Motor.

- a. A fabricated steel base shall be provided that is suitable to adequately support the weight of the pump, motor, drive and drive guard.
- b. A fabricated steel motor high ring base shall be of adequate height to permit access to the coupling and furnished with a coupling guard

6.	Motor.	The motor	provided	shall	meet	NEMA	standards	and	shall	be	 type,
	HP,	P	hase,		_ Hert	z,	Volts,			RPM.	

#### - OPTIONAL TESTING -

#### 7. Tests

a. Performance Testing
(Performance Test Option #1)

1. Each pump shall be factory certified tested in accordance with the latest edition of Hydraulic Institute codes. At least six test points shall be taken including the design condition and shutoff. Test results shall include capacity, head, efficiency and horsepower from shutoff to 150% of rated capacity.

(Performance Test Option #2)

2. A registered Professional Engineer shall review and certify the test results prior to shipment.

(Performance Test Option #3)

- 3. The owner or his representative shall witness the certified performance test.
- 8. Pumps shall be manufactured by companies whose management system is registered to ISO-9001: 2000.

4 -	^	^	
$\Lambda$	"	"	_
	u	u	

Model	4722E			4723E			4724E
Frame Size	S	S	М	S	M	M	M
Pump Size (Discharge Size)	4	3	3	4	4	6	4
Suction Size (Standard)	4	3	3	4	4	6	4
Maximum Impeller Diameter	9	11	11	11	11	11	15
Shaft Diameter:							
at Impeller	1.188	1.188	1-1/2	13188	1-1/2	1-1/2	1-1/2
at Sleeve	1-3/16	1-3/16	1-1/2	1-3/16	1-1/2	1-1/2	1-1/2
at Coupling	1-3/8	1-3/8	1-7/8	1-3/8	1-7/8	1-7/8	1-7/8
Thrust Bearing No. (2)	(3)	(3)	(4)	(3)	(4)	(4)	(4)
Radial Bearing No. (2)	(5)	(5)	(6)	(5)	(6)	(6)	(6)
Gland Housing:							
Packing:							
Size	3/8	3/8	3/8	3/8	3/8	3/8	3/8
No. Rings per Box	5	5	5	5	5	5	5
Lantern Ring Width	3/4	3/4	3/4	3/4	3/4	3/4	3/4
Mechanical Seal: (7)							
Type (Standard)	(8)	(8)	(8)	(8)	(8)	(8)	(8)
Recommended flush water:							
Pressure	(9)	(9)	(9)	(9)	(9)	(9)	(9)
Flow (GPM)	1/2 - 1	1/2 - 1	1/2 - 1	1/2 - 1	1/2 - 1	1/2 - 1	1/2 - 1
Sleeve OD	1-1/2	1-1/2	1-3/4	1-1/2	1-3/4	1-3/4	1-3/4
Box ID	2-1/4	2-1/4	2-1/2	2-1/4	2-1/2	2-1/2	2-1/2
Box Depth	2.75	2.75	2.75	2.75	2.75	2.75	2.75
Dist. to nearest obstruction	1.5	1.5	1.75	1.5	1.75	1.75	1.75
(10)							
Gland Bolt Size	.375 - 16	.375 - 16	.375 - 16	.375 - 16	.375 - 16	.375 - 16	.375 - 16
No. of Gland Bolts	4	4	4	4	4	4	4
Casing Working, PSI (11)	75	75	75	75	75	75	75
Nominal Casting Thickness:	3/8	3/8	3/8	3/8	3/8	3/8	3/8
Shipping Wt. (Basic Pump) (lbs.)	220	235	260	250	275	350	420

- (1) All Dimensions are in inches.
- (2) Grease lubricated only.
- (3) Bearing No. = NTN W5308ZNR
- (4) Bearing No. = NTN W5310ZNR
- (5) Bearing No. = FAFNIR 308WD
- (6) Bearing No. = FAFNIR 310WD
- (7) Different seal housing required.
- (8) Standard mechanical seal is a John Crane Type 1 or equal double seal (flushed NOT deadheaded) with Viton O-ring, stainless steel wetted parts, and carbon on ceramic upper faces and carbon on ceramic lower faces. Contact the factory for other types of mechanical seals availability.
- (9) Shutoff pressure or 10 PSI above operating pressure whichever is greater. (Not required with a slurry seal.)
- (10) Distance from top of stuffing box to face of bearing cap.
- (11) These are maximum values based on standard construction. If higher values are required, contact the factory.

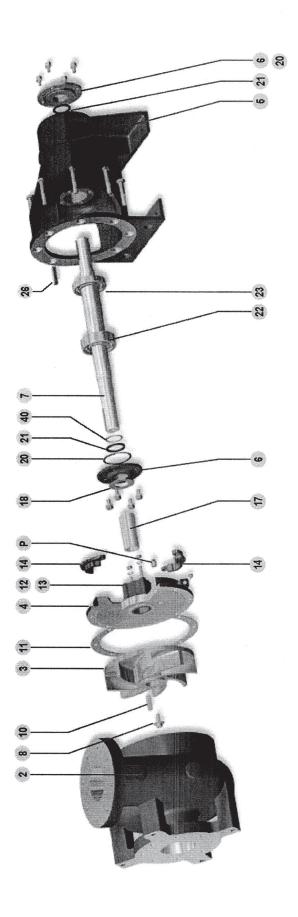
4700E Standard Fitted Pumps

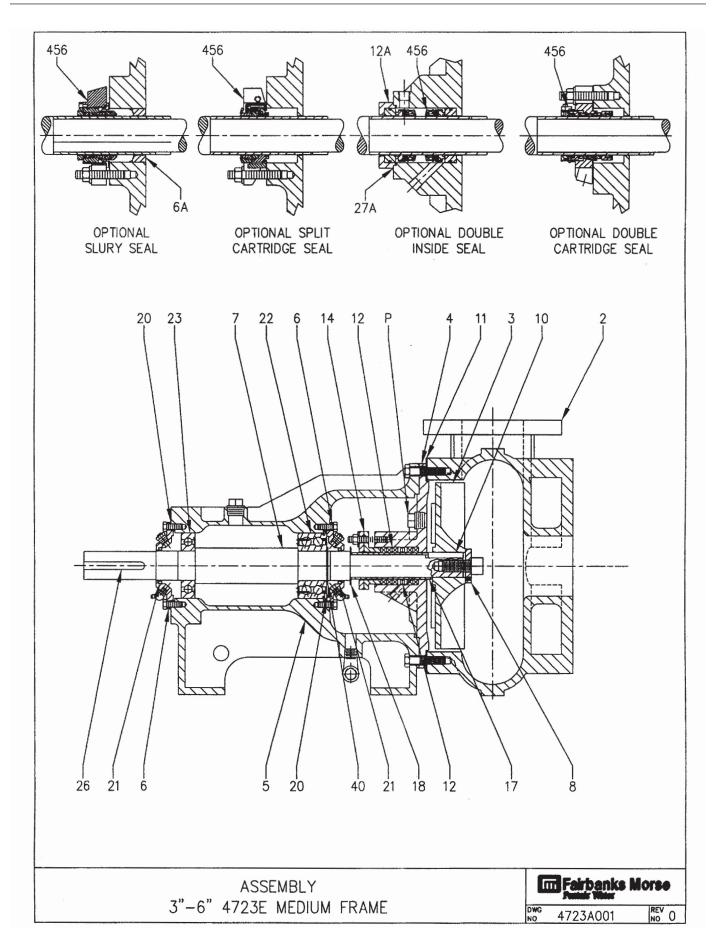
Ref.	Description	Material	Specifications (1)
No.	-		(-)
2	Case	Cast Iron	ASTM A48 CL 30
3	Impeller	Cast Iron	ASTM A48 CL 30
4	Housing, Backplate & Packing	Cast Iron	ASTM A48 CL 30
5	Housing, Bearing	Cast Iron	ASTM A48 CL 30
6	Cap, Bearing	Cast Iron	ASTM A48 CL 30
7	Shaft	Steel	AISI 4140
8	Lockscrew, Impeller	Steel	Commercial
10	Key, Impeller	Steel	Commercial
11	Gasket, Case	Tagboard	Commercial
12	Ring, Lantern *	Teflon	Commercial
13	Ring, Packing *	Synthetic, Graphite Impregnated	Commercial
14	Gland, Split	Bronze	
17	Sleeve, Shaft	Stainless Steel	ASTM 276 (Heat treated to 450 Bhn)
18	Gasket/Slinger, Sleeve (S & M frames)	Teflon	Commercial
20	Gasket, Bearing Cap (S frame Only)	Teflon	Commercial
21	Seal, Oil	Rubber	Neoprene
22	Bearing, Thrust	Steel	Commercial
23	Bearing, Radial	Steel	Commercial
26	Key, Shaft	Steel	Commercial
40	Ring, Snap	Steel	Commercial
Р	Plug	Steel	Commercial

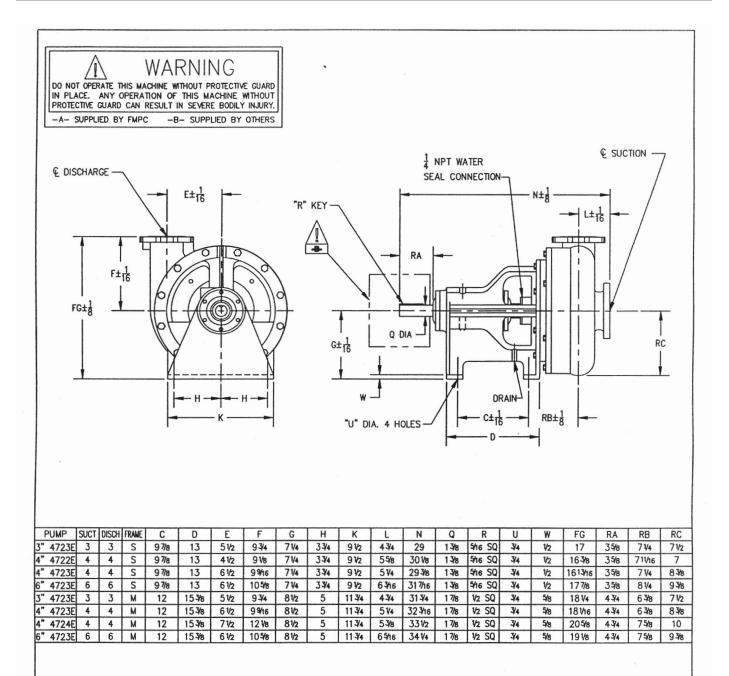
**Options to Basic Pumps** 

Ref. Description Material Specifications (1)										
Ref.	Description	Specifications (1)								
No.		Wyst st								
2	Case	Mehanite (475 Bhn)	Cast Iron							
2	Case	Stainless Steel	AISI 316							
2	Case	Stainless Steel	CD4							
3	Impeller	Mehanite (475 Bhn)	Cast Iron							
3	Impeller	Stainless Steel	AISI 316							
3	Impeller	Stainless Steel	CD4							
4	Housing, Backplate & Packing	Mehanite (475 Bhn)	Cast Iron							
4	Housing, Backplate & Packing	Stainless Steel	AISI 316							
4	Housing, Backplate & Packing	Stainless Steel	CD4							
11	Sleeve, Shaft	HardMetal	620 Brinell							
28	Mechanical Seal									

<sup>\*</sup> Not Shown



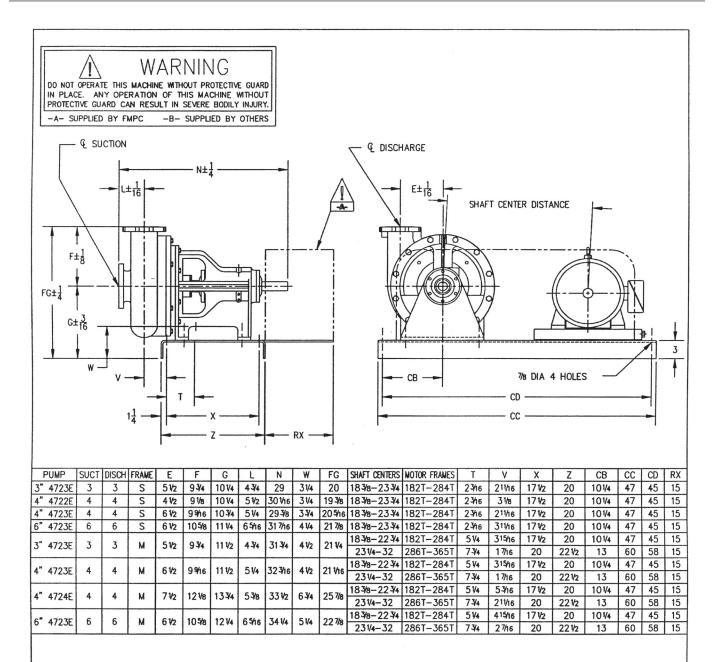




#### NOTES:

- (1) ALL FLANGES ARE 125# ANSI DRILLING UNLESS NOTED.
- (2) ALL DIMENSIONS ARE IN INCHES UNLESS NOTED OTHERWISE.
- (3) SUCTION AND DISCHARGE GAUGE CONNECTIONS ARE NOT AVAILABLE AND SHOULD BE LOCATED ON ADJACENT PIPING.
- (4) NOT FOR CONSTRUCTION, INSTALLATION, OR APPLICATION PURPOSES UNLESS CERTIFIED. DIMENSIONS SHOWN MAY VERY DUE TO NORMAL MANUFACTURING TOLERANCES.
- (5) AVAILABLE IN CLOCKWISE ROTATION ONLY.

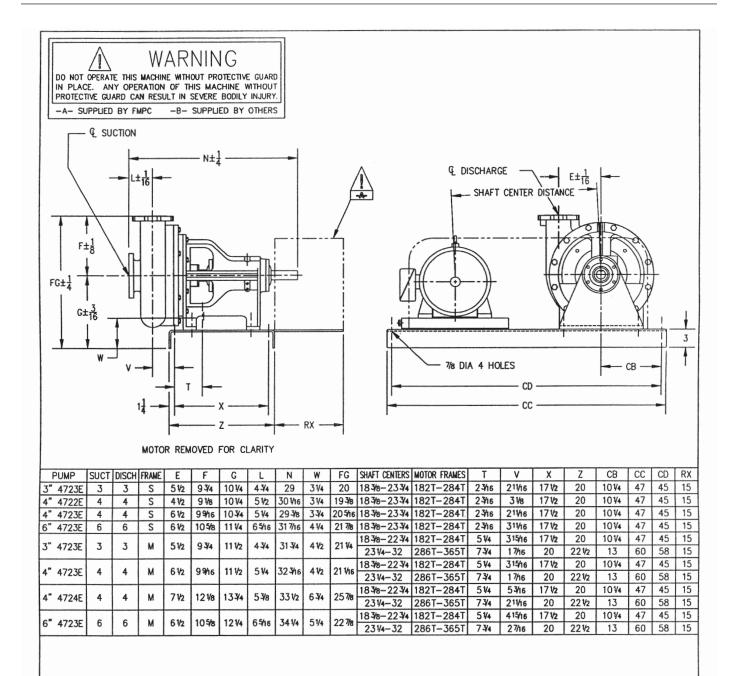
CUSTOMER					P.O. NO.			Fairbanks Morse		
JOB NAME					TAG NAME			PENTAIR PUMP GR	OUP	
PUMP SIZE AND MODEL CPM			TDH	RPM	ROTATION	DISCH POS		BASIC PUMP DIMENSIONS		
MOTOR HP FRAME		PHASE HERTZ VOLTS			ENCLOSURE	4720E				
CERTIFIED FOR			CERTIFIED BY		DATE		DWG NO	4720S012	REV 1	



#### NOTES:

- (1) ALL FLANGES ARE 125# ANSI DRILLING UNLESS NOTED.
- (2) ALL DIMENSIONS ARE IN INCHES UNLESS NOTED OTHERWISE.
   (3) SUCTION AND DISCHARGE GAUGE CONNECTIONS ARE NOT AVAILABLE AND SHOULD BE LOCATED ON ADJACENT PIPING.
- (4) BASES ARE DESIGNED TO BE COMPLETELY FILLED WITH GROUT.
- (5) NOT FOR CONSTRUCTION, INSTALLATION, OR APPLICATION PURPOSES UNLESS CERTIFIED. DIMENSIONS SHOWN MAY VERY DUE TO NORMAL MANUFACTURING TOLERANCES.

	THE DESIGNED TO								
CUSTOMER					P.O. NO.		Fairbanks Morse		
JOB NAME	TAG NAME				PENTAIR PUMP GROUP				
PUMP SIZE AND MODE	ı	GPM	TDH	RPM	ROTATION	DISCH POS	SETTING PLAN 4720F		
MOTOR	HP	FRAME	PHASE	HERTZ	VOLTS	ENCLOSURE	R.H. ARRANGEMENT		
CERTIFIED FOR			CERTIFIED BY		DATE		DWG 4720S040 REV 1		



#### NOTES

- (1) ALL FLANGES ARE 125# ANSI DRILLING UNLESS NOTED.
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(5) NOT FOR CONSTRUCTION, INSTALLATION, OR APPLICATION PURPOSES UNLESS CERTIFIED. DIMENSIONS SHOWN MAY VERY DUE TO NORMAL MANUFACTURING TOLERANCES.

(4) BASES ARE DESIGNED TO BE COMPLETELY FILLED WITH GROUT.							
CUSTOMER					P.O. NO.		Fairbanks Morse
JOB NAME					TAG NAME		PLNIAIR PUMP GROUP
PUMP SIZE AND MODEL GPM			TDH	RPM	ROTATION	DISCH POS	SETTING PLAN 4720E
MOTOR	HP	FRAME	PHASE	HERTZ	VOLTS	ENCLOSURE	L.H. ARRANGEMENT
CERTIFIED FOR			CERTIFIED BY		DATE		DWG 4720S041 REV 1

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