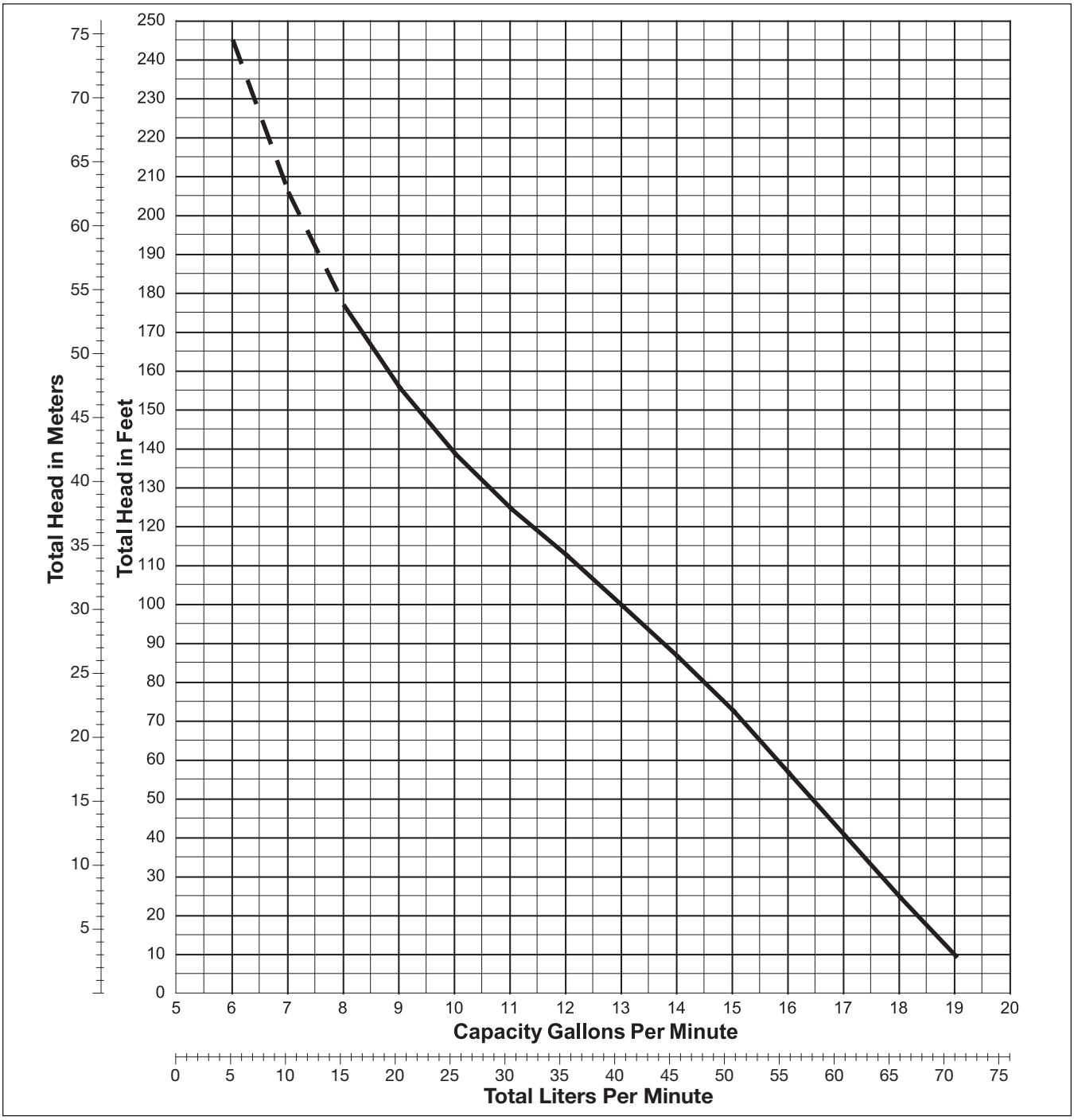
Performance Curve – HPD200

RPM: **1725** DISCHARGE: **1-1/4"**



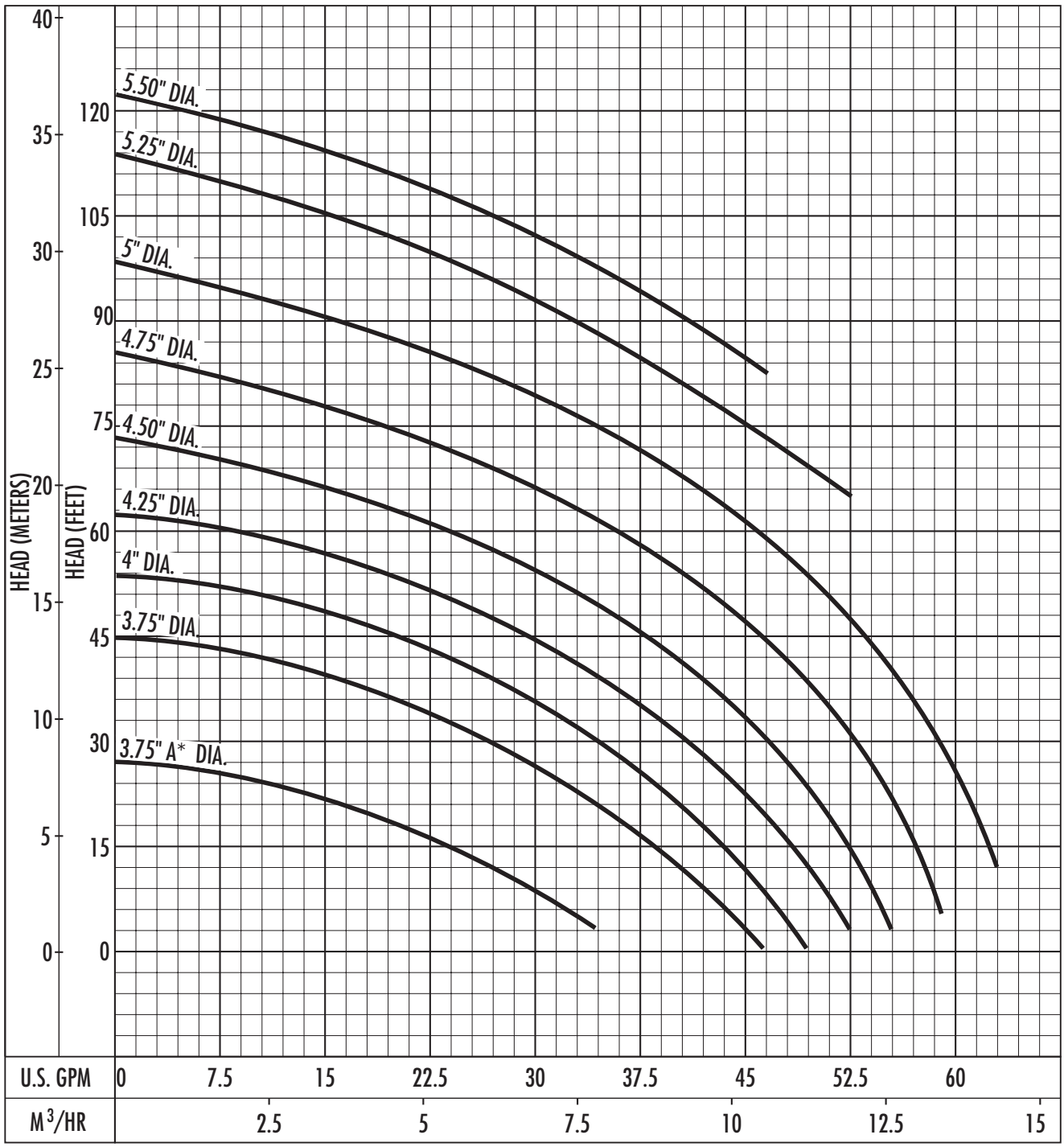
The curves reflect maximum performance characteristics without exceeding full load (Nameplate) horsepower. All pumps have a service factor of 1.0. Operation is recommended in the bounded area with operational point within the curve limit. Performance curves are based on actual tests with clear water at 70° F. and 1280 feet site elevation.

Conditions of Service:

GPM: _____ TDH: _____

Performance Curve – HPG200

RPM: **3450** DISCHARGE: **1-1/4"**



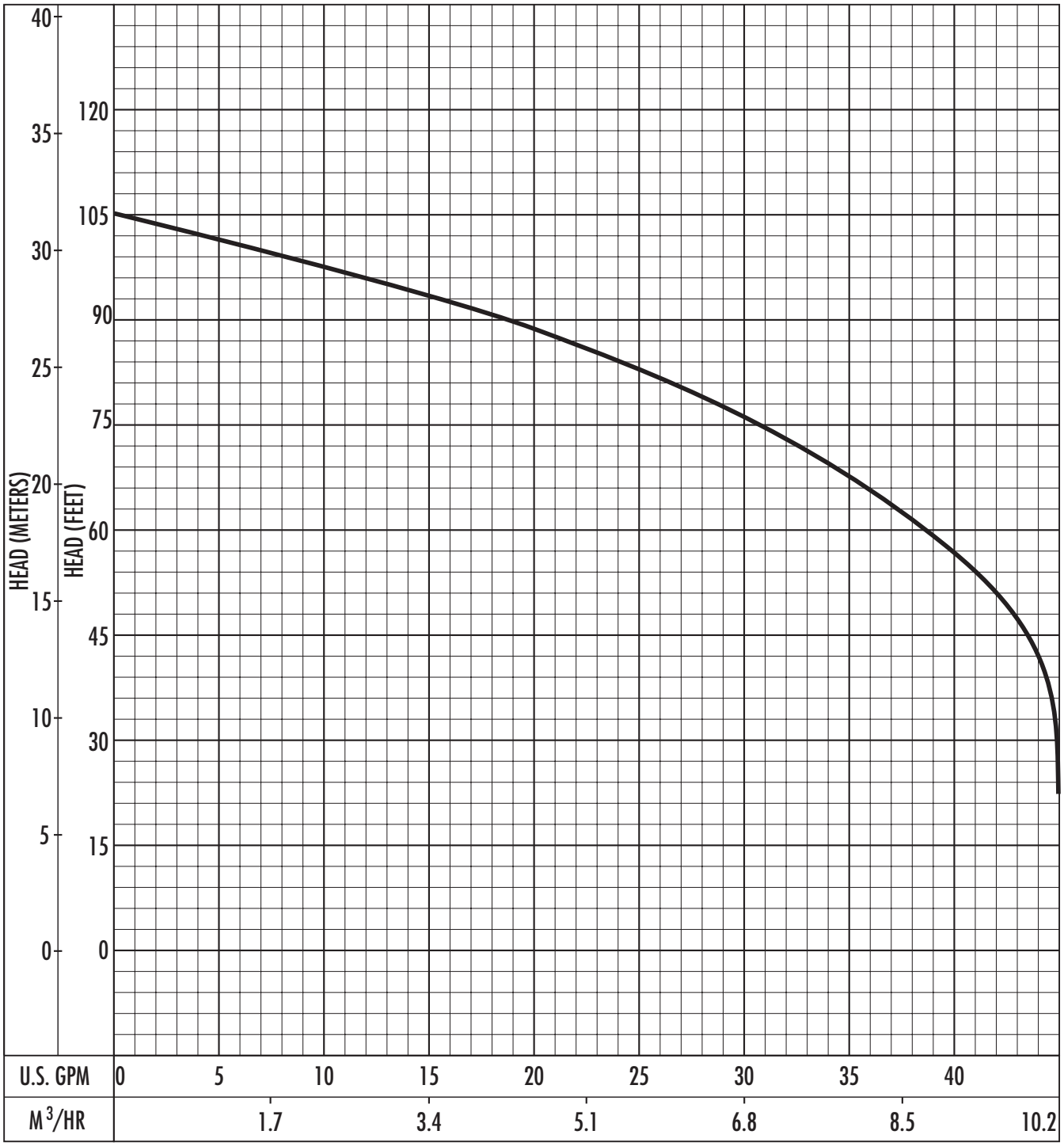
The curves reflect maximum performance characteristics without exceeding full load (Nameplate) horsepower. All pumps have a service factor of 1.2. Operation is recommended in the bounded area with operational point within the curve limit. Performance curves are based on actual tests with clear water at 70° F. and 1280 feet site elevation.

Conditions of Service:

GPM: _____ TDH: _____

Performance Curve – HGRS200

RPM: **3450** DISCHARGE: **1-1/4"**



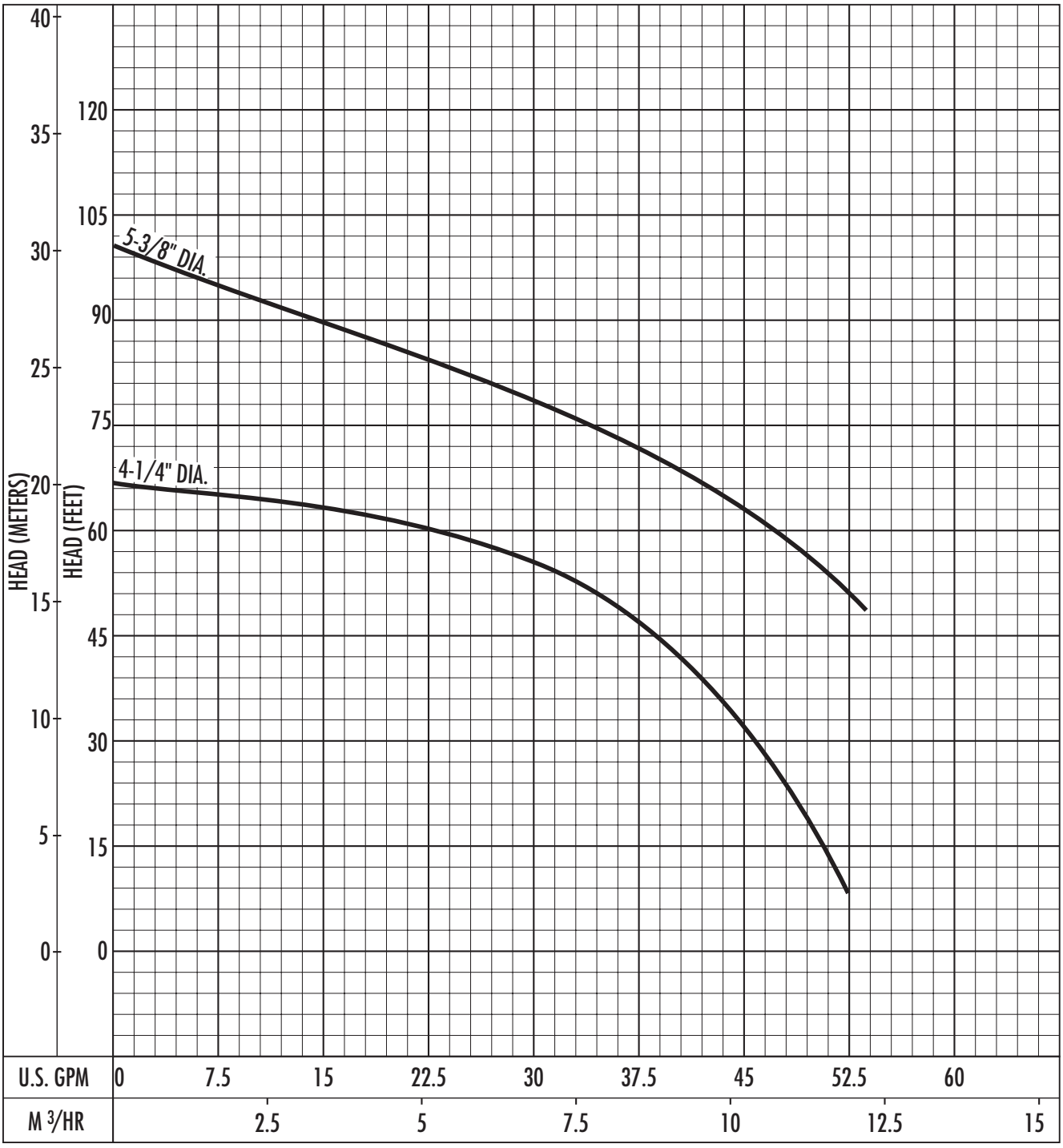
The curves reflect maximum performance characteristics without exceeding full load (Nameplate) horsepower. All pumps have a service factor of 1.2. Operation is recommended in the bounded area with operational point within the curve limit. Performance curves are based on actual tests with clear water at 70° F. and 1280 feet site elevation.

Conditions of Service:

GPM: _____ TDH: _____

Performance Curve – HPGR200

RPM: **3450** DISCHARGE: **1-1/4"**



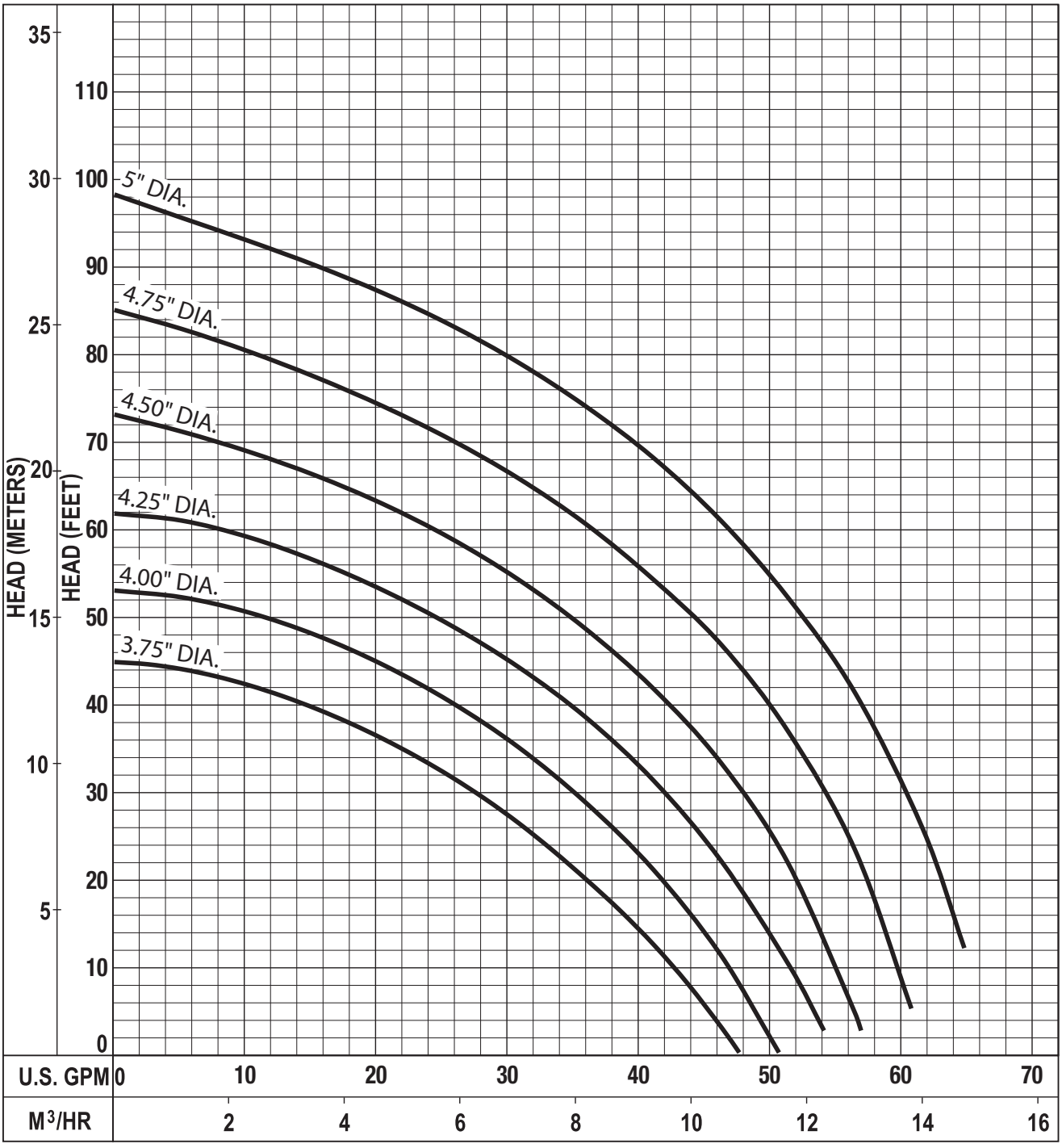
The curves reflect maximum performance characteristics without exceeding full load (Nameplate) horsepower. All pumps have a service factor of 1.2. Operation is recommended in the bounded area with operational point within the curve limit. Performance curves are based on actual tests with clear water at 70° F. and 1280 feet site elevation.

Conditions of Service:

GPM: _____ TDH: _____

Performance Curve – HPGX

RPM: **3450** DISCHARGE: **1-1/4"**



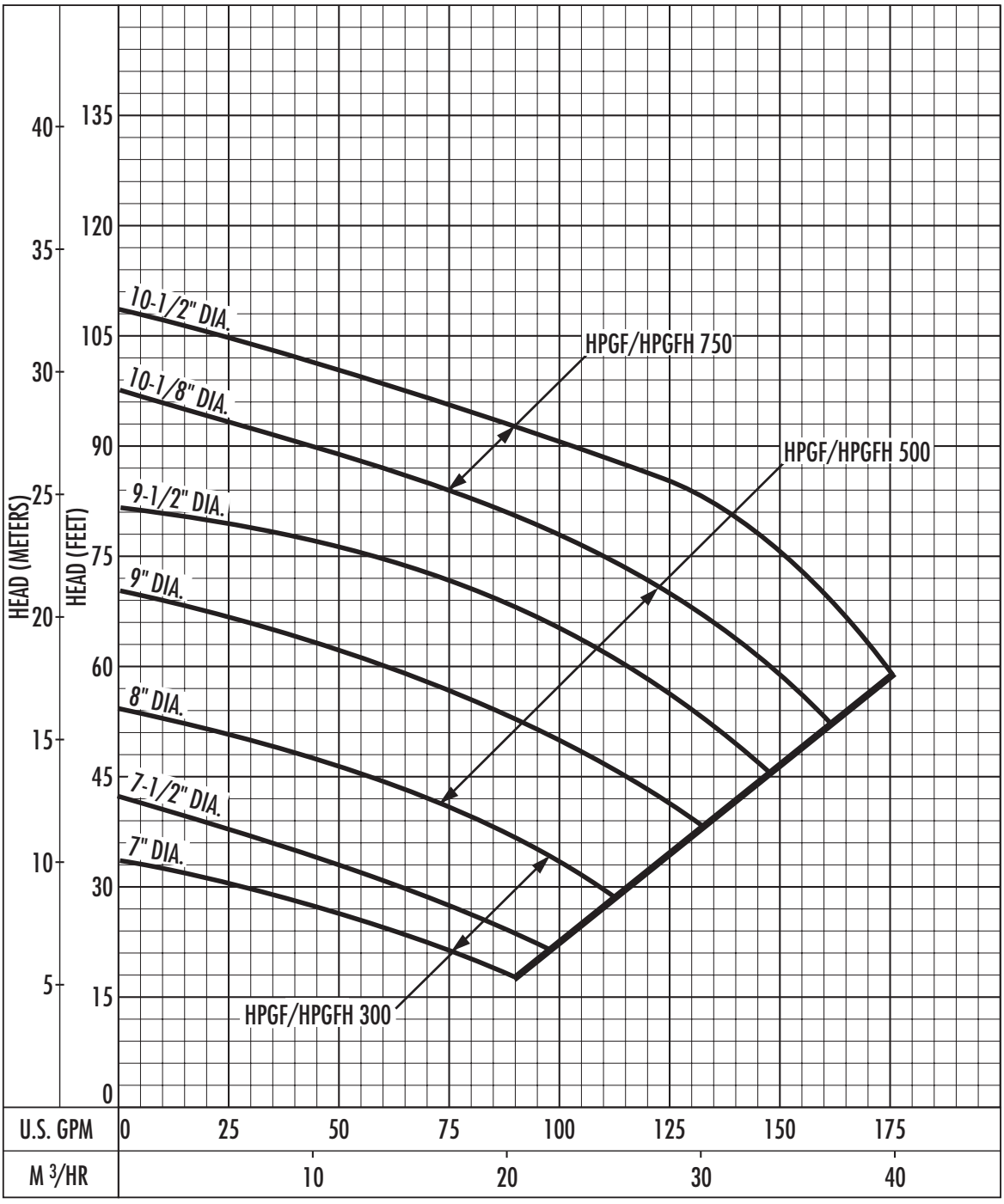
The curves reflect maximum performance characteristics without exceeding full load (Nameplate) horsepower. All pumps have a service factor of 1.2. Operation is recommended in the bounded area with operational point within the curve limit. Performance curves are based on actual tests with clear water at 70° F and 1280 feet site elevation.

Conditions of Service:

GPM: _____ TDH: _____

Performance Curve – HPGF(X)/HPGFH(X)

RPM: **1725** DISCHARGE: **2"**



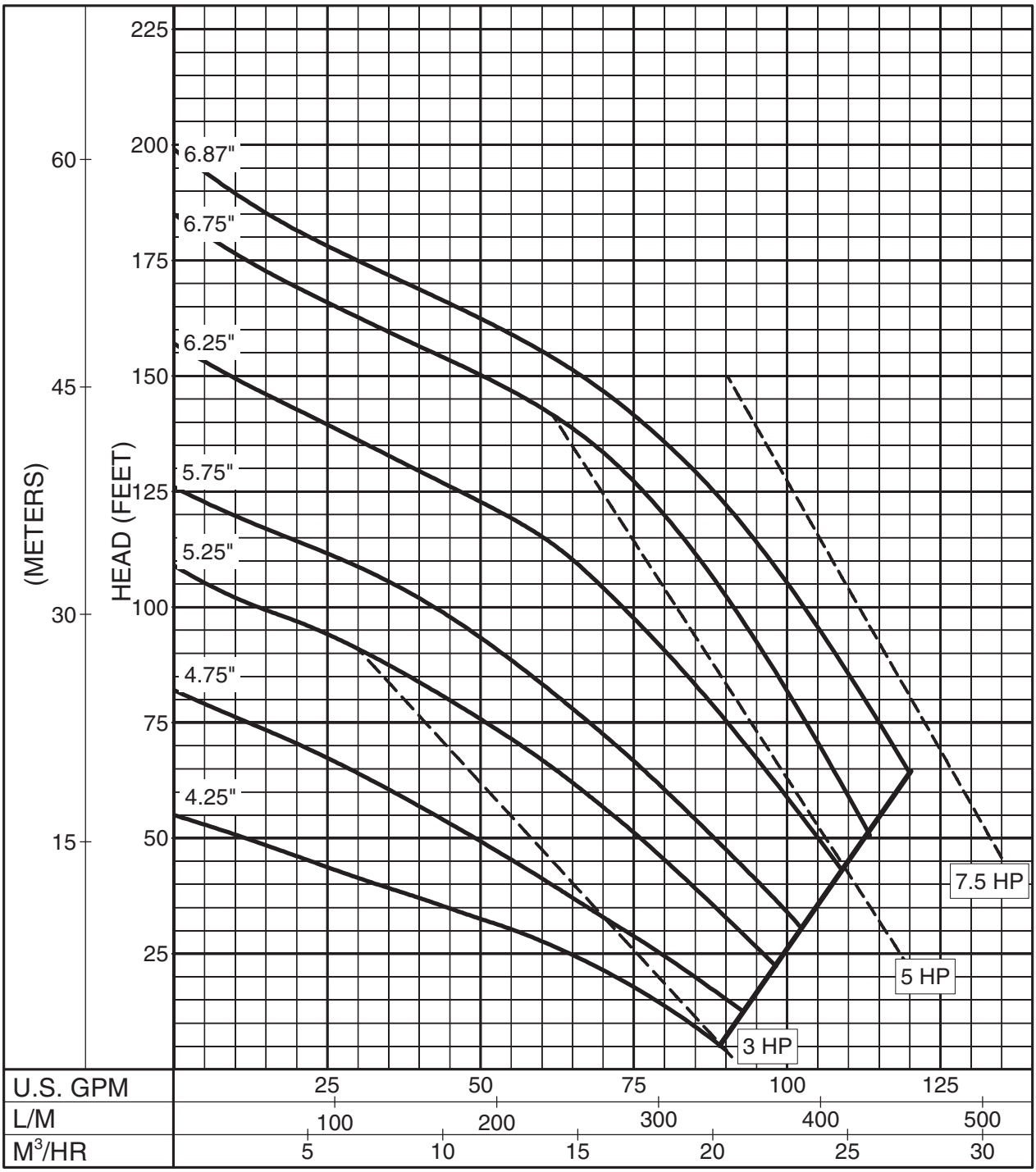
The curves reflect maximum performance characteristics without exceeding full load (Nameplate) horsepower. All pumps have a service factor of 1.2. Operation is recommended in the bounded area with operational point within the curve limit. Performance curves are based on actual tests with clear water at 70° F and 1280 feet site elevation.

Conditions of Service:

GPM: _____ TDH: _____

Performance Curve – HPGH(X)/HPGHH(X)

RPM: **3450** DISCHARGE: **2"**



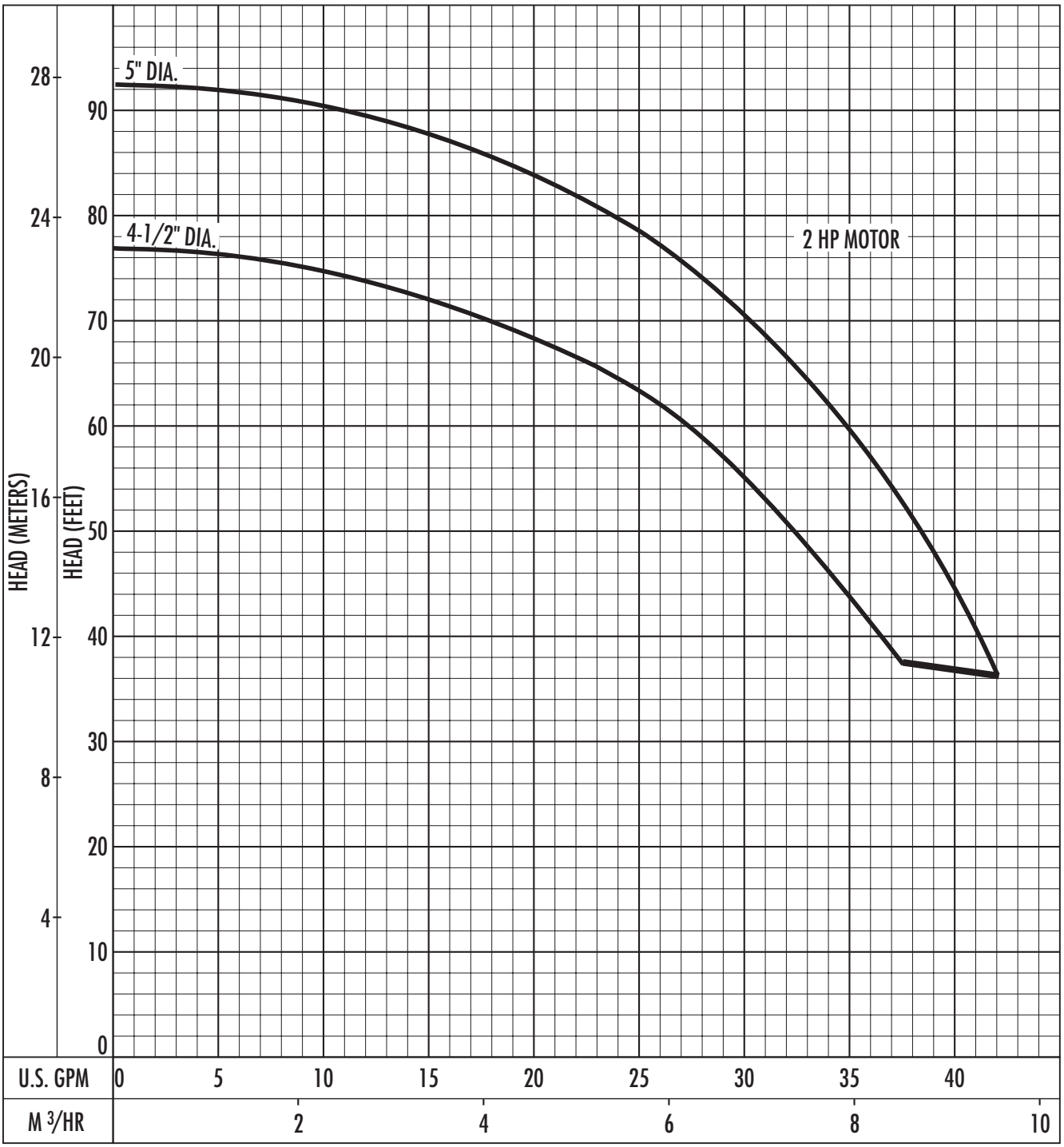
The curves reflect maximum performance characteristics without exceeding full load (Nameplate) horsepower. All pumps have a service factor of 1.2. Operation is recommended in the bounded area with operational point within the curve limit. Performance curves are based on actual tests with clear water at 70° F and 1280 feet site elevation.

Conditions of Service:

GPM: _____ TDH: _____

Performance Curve – PG/NPG

RPM: **3450** DISCHARGE: **1-1/4"**



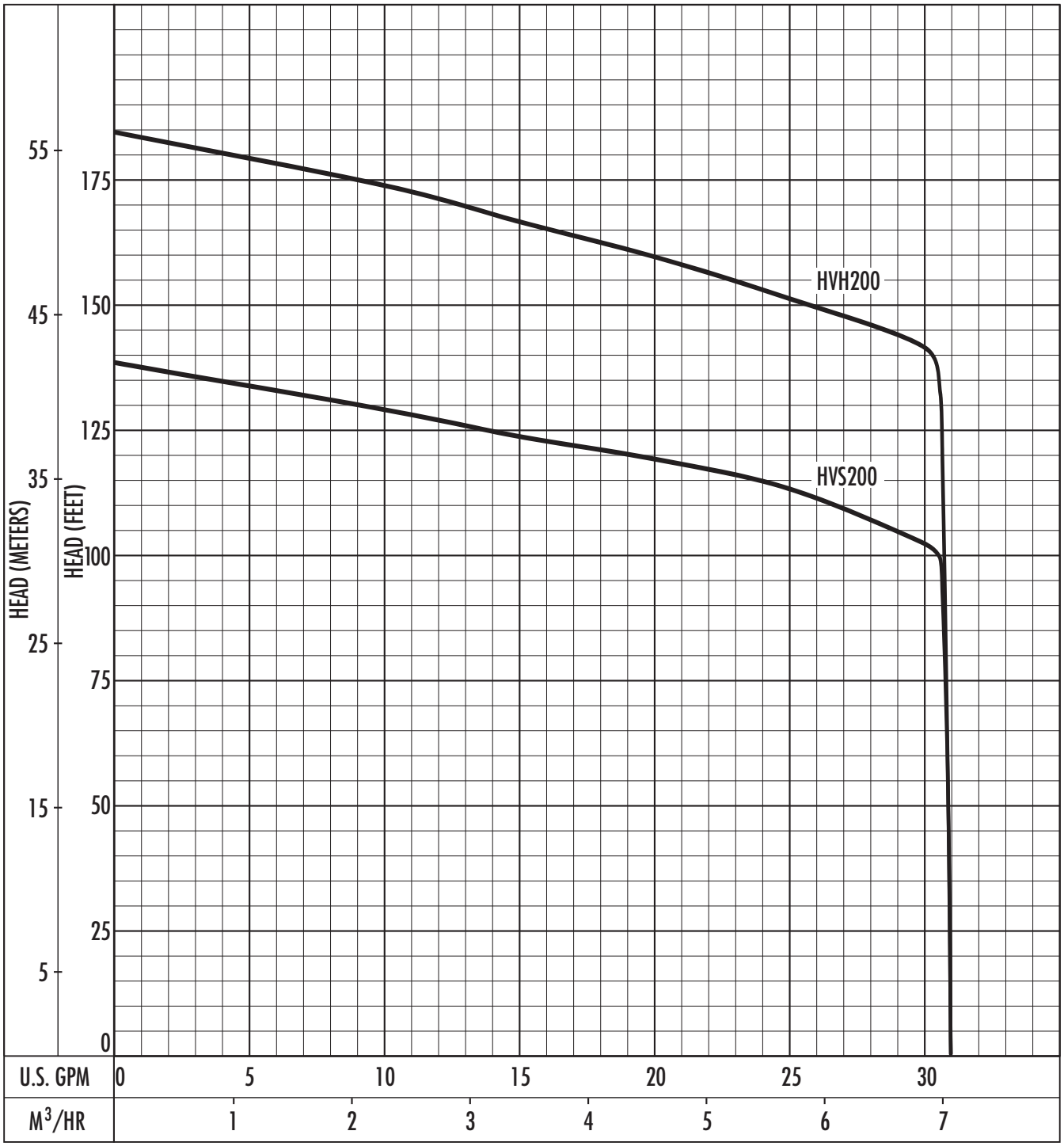
The curves reflect maximum performance characteristics without exceeding full load (Nameplate) horsepower. All pumps have a service factor of 1.2. Operation is recommended in the bounded area with operational point within the curve limit. Performance curves are based on actual tests with clear water at 70° F. and 1280 feet site elevation.

Conditions of Service:

GPM: _____ TDH: _____

Performance Curve – HVH/HVS200

RPM: **3450** DISCHARGE: **1-1/4"**



The curves reflect maximum performance characteristics without exceeding full load (Nameplate) horsepower. All pumps have a service factor of 1.2. Operation is recommended in the bounded area with operational point within the curve limit. Performance curves are based on actual tests with clear water at 70° F and 1280 feet site elevation.

Conditions of Service:

GPM: _____ TDH: _____

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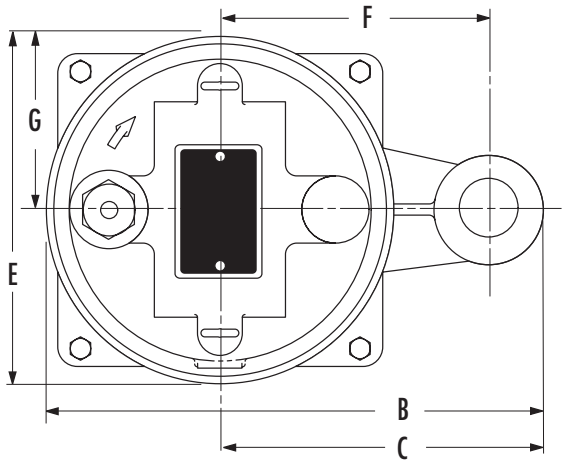
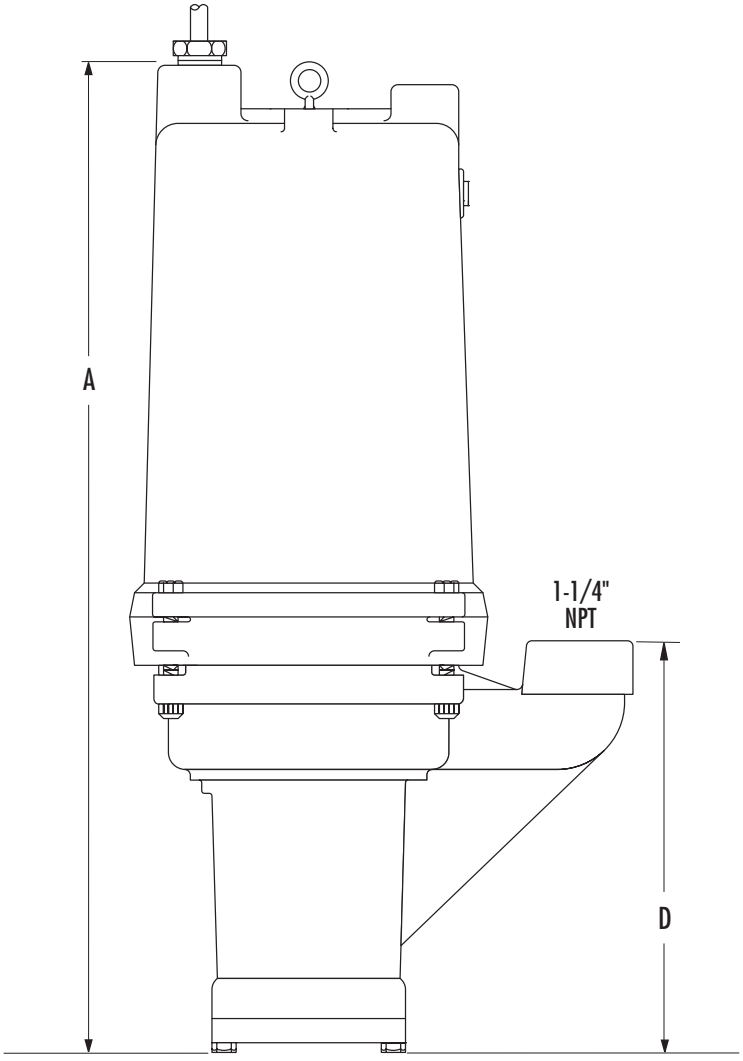
Dimensional Data – HPD200

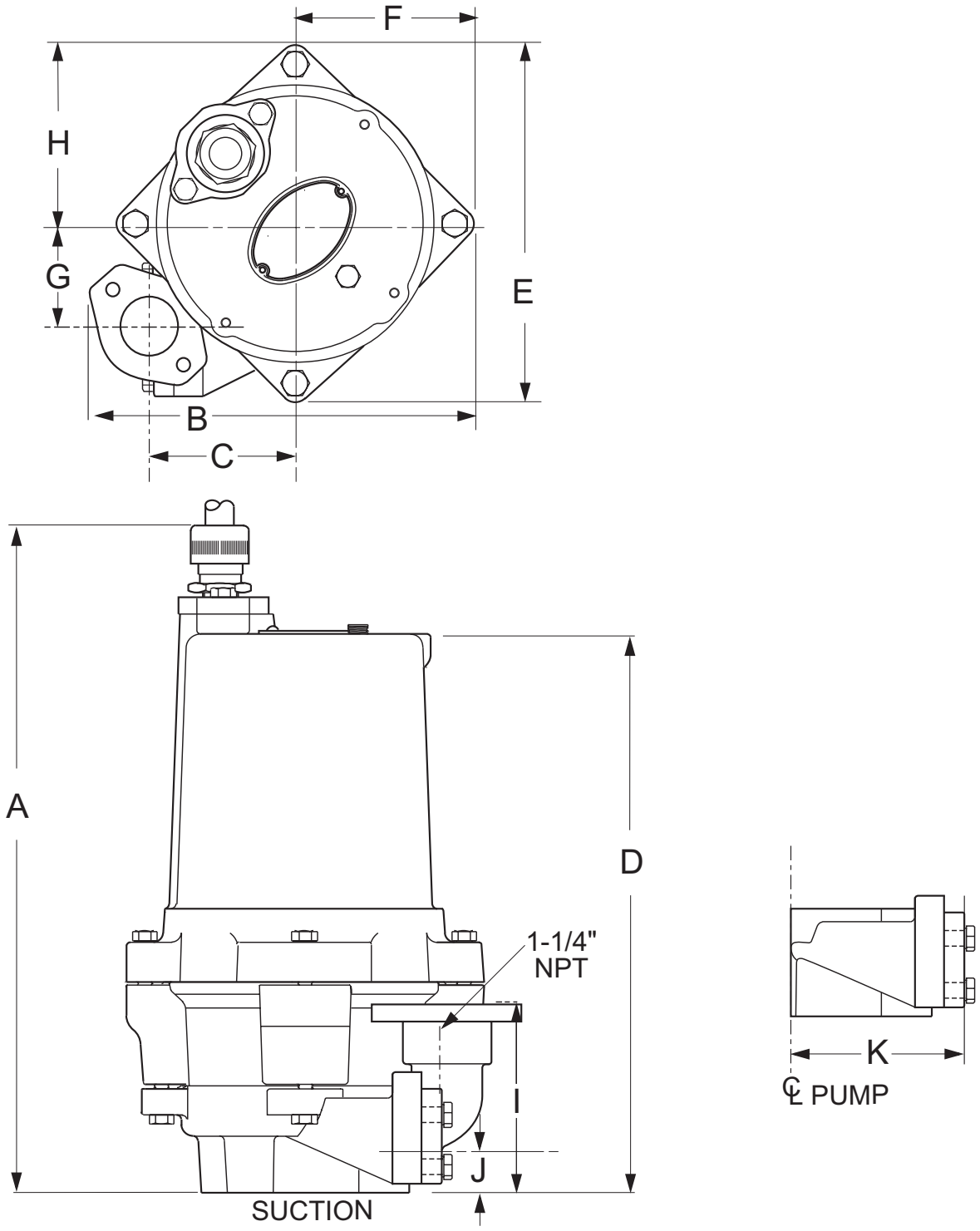




	A	B	C	D	E	F	G
HPD200	22-1/4	10-1/2	7-1/4	9-1/8	6-19/32	6	3-5/16

ALL DIMENSIONS IN INCHES
NOTE: CASTING DIMENSIONS MAY VARY ± 1/8"

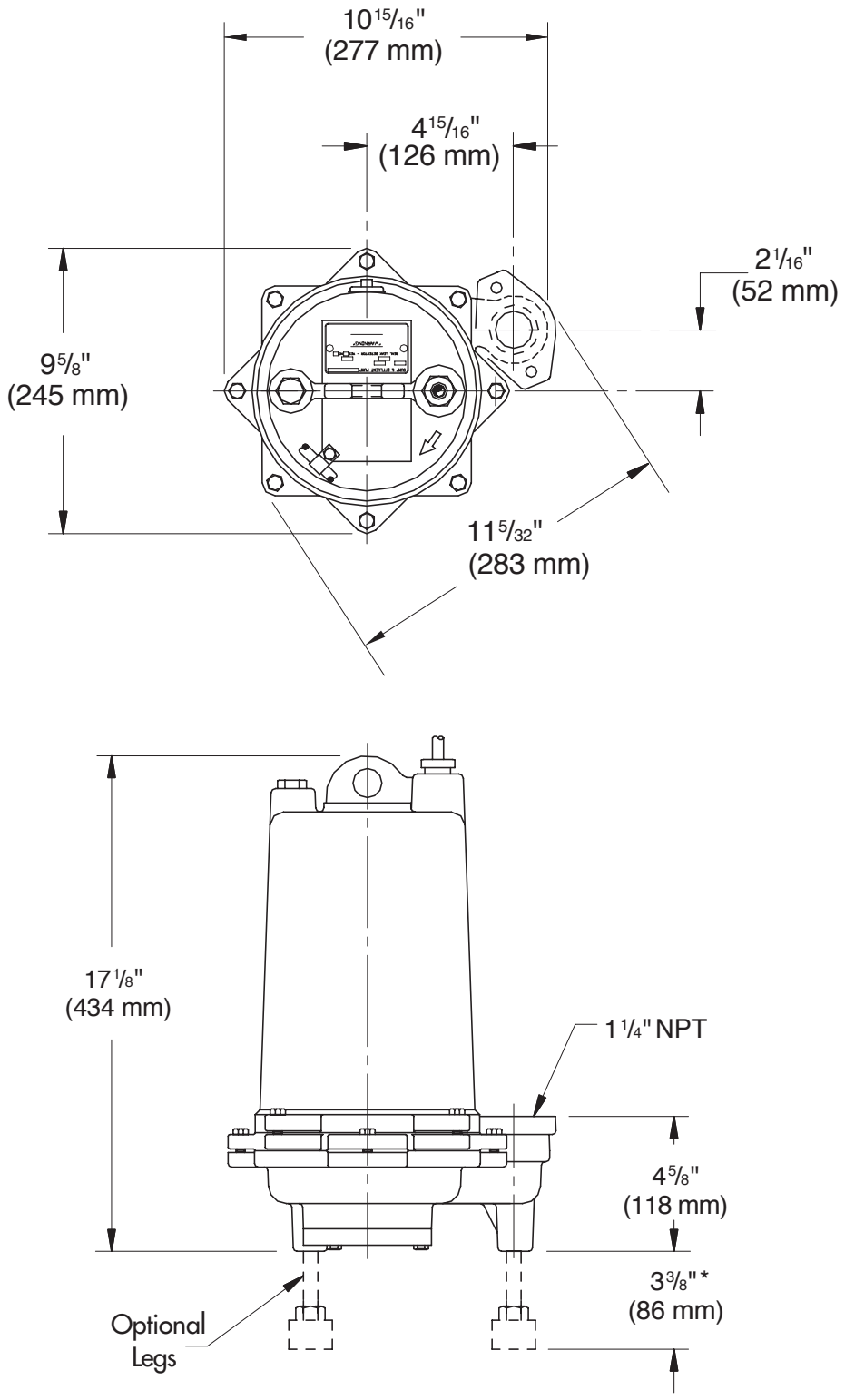
Dimensional Data – HPG200



	A	B	C	D	E	F	G	H	I	J	K
HPG200	17-1/4	11-21/32	5-39/64	14-9/32	9-1/4	4-5/8	2-21/32	4-5/8	4-44/64	29/32	4-7/16

ALL DIMENSIONS IN INCHES
NOTE: CASTING DIMENSIONS MAY VARY ± 1/8"

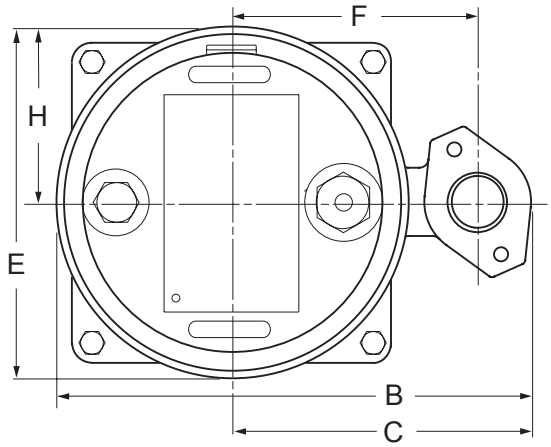
Dimensional Data – HGRS200

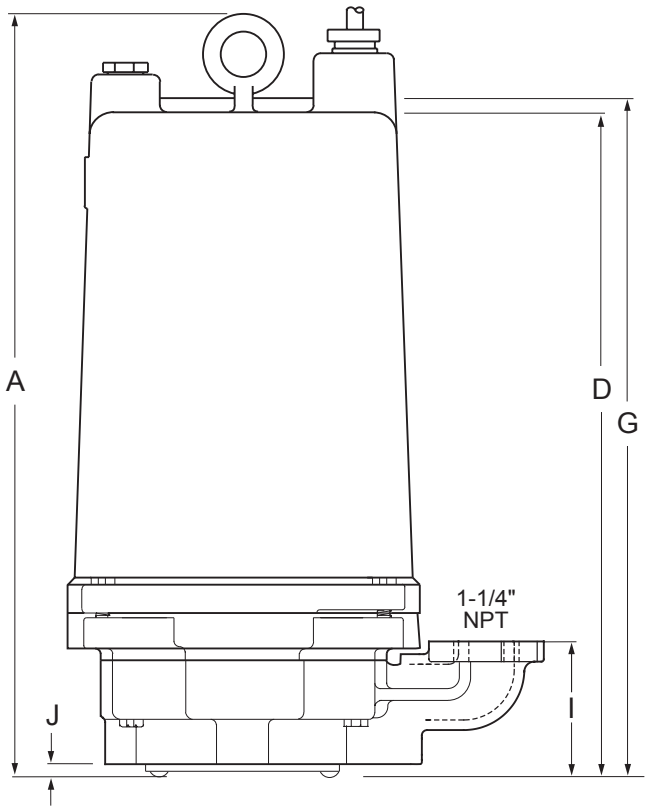


* Leg kit required when not using guide rail liftout system.

ALL DIMENSIONS IN INCHES
NOTE: CASTING DIMENSIONS MAY VARY ± 1/8"

Dimensional Data – HPGR200



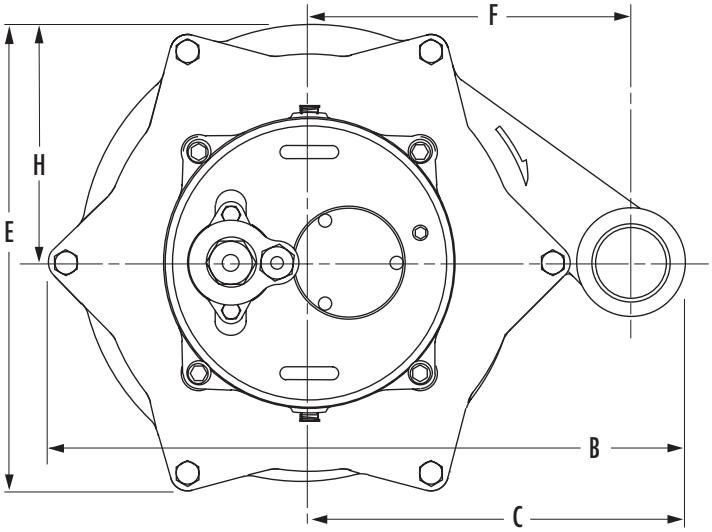


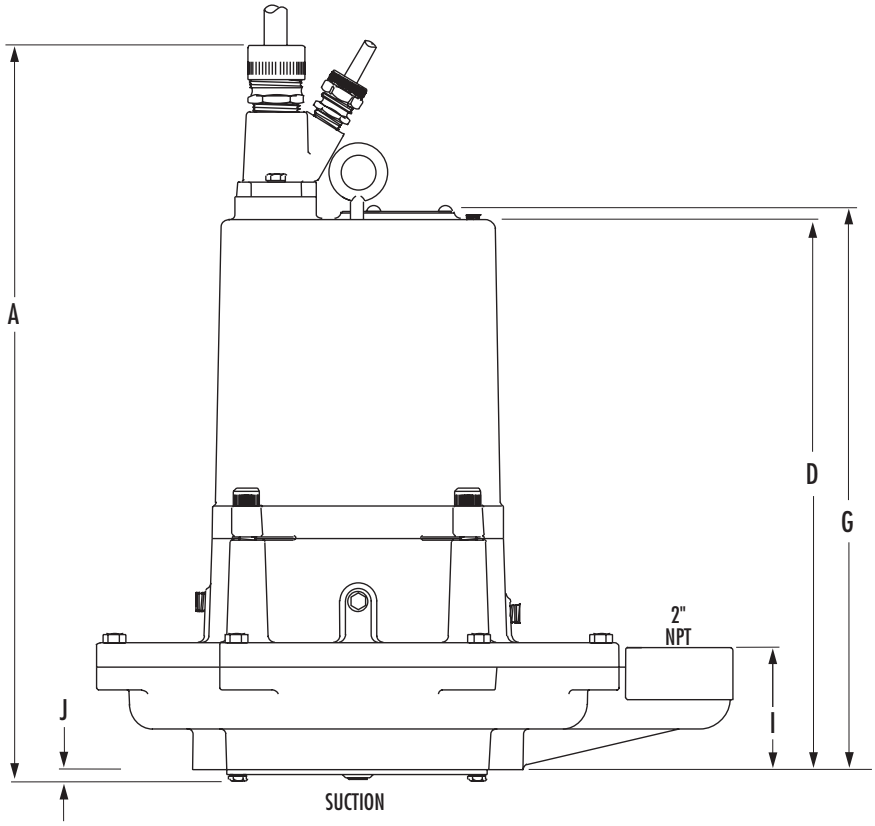
	A	B	C	D	E	F	G	H	I	J
HPGR	16-5/8	10-1/2	6-1/2	14-3/4	7-3/4	5-3/8	15-1/8	3-7/8	3-1/8	1/8

ALL DIMENSIONS IN INCHES
NOTE: CASTING DIMENSIONS MAY VARY ± 1/8"

Dimensional Data – HPGF

Vertical Discharge Standard





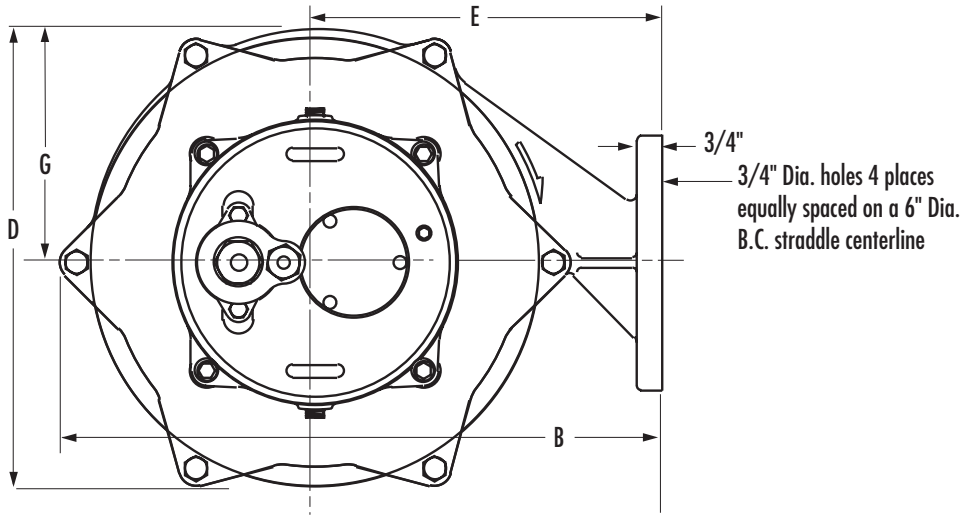
	A	B	C	D	E	F	G	H	I	J
HPGF	21-3/16	18-5/16	10-13/16	15-13/16	13-7/16	9-1/4	16-1/8	6-7/8	3-1/2	3/8

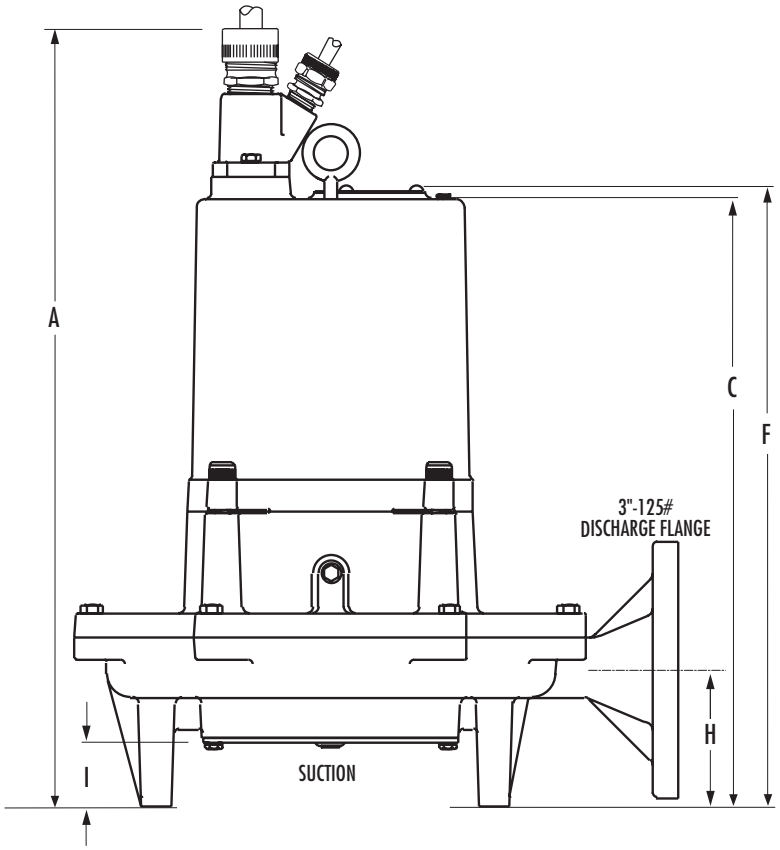
Vertical Discharge Standard

ALL DIMENSIONS IN INCHES
NOTE: CASTING DIMENSIONS MAY VARY ± 1/8"

Dimensional Data – HPGFH

Horizontal Discharge





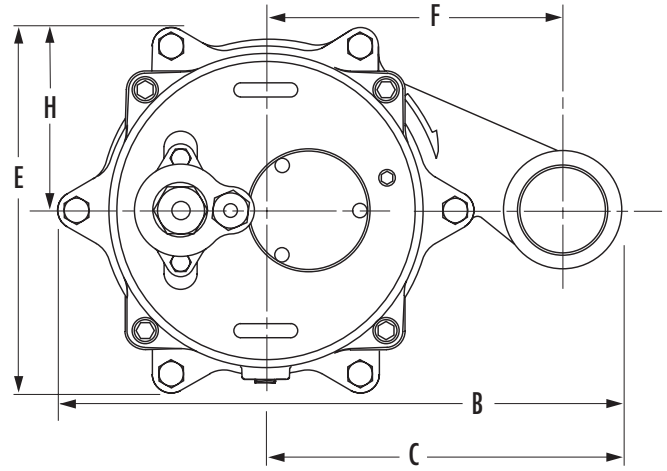
	A	B	C	D	E	F	G	H	I
HPGFH	20-3/4	17-11/16	17-7/8	13-7/16	10-3/16	18-1/8	6-7/8	4	2

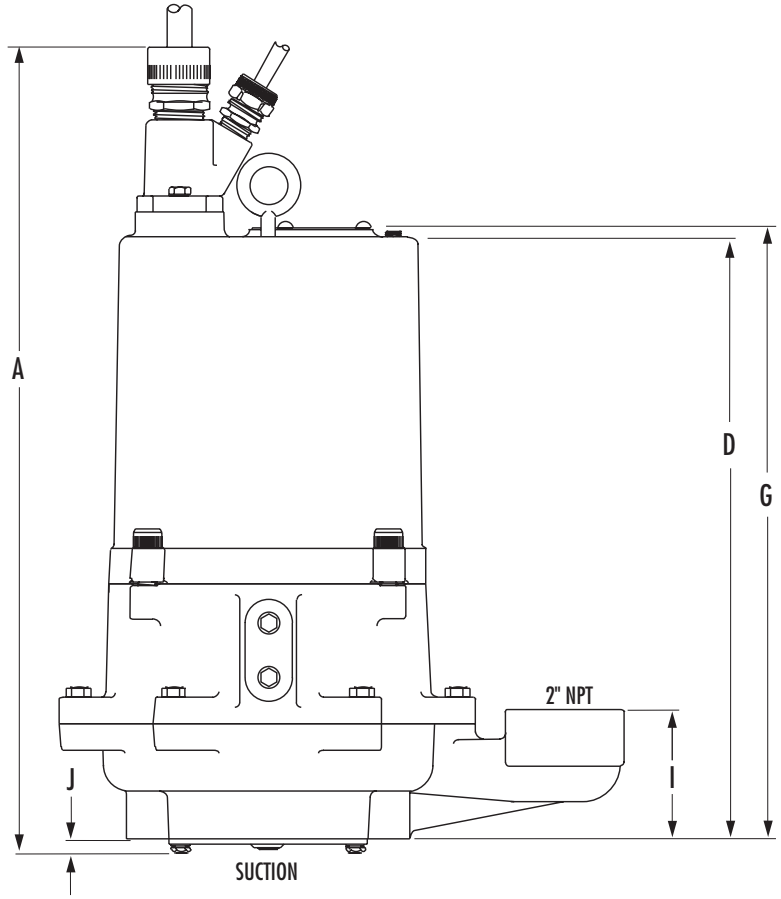
Horizontal Discharge

ALL DIMENSIONS IN INCHES
NOTE: CASTING DIMENSIONS MAY VARY ± 1/8"

Dimensional Data – HPGH

Vertical Discharge Standard





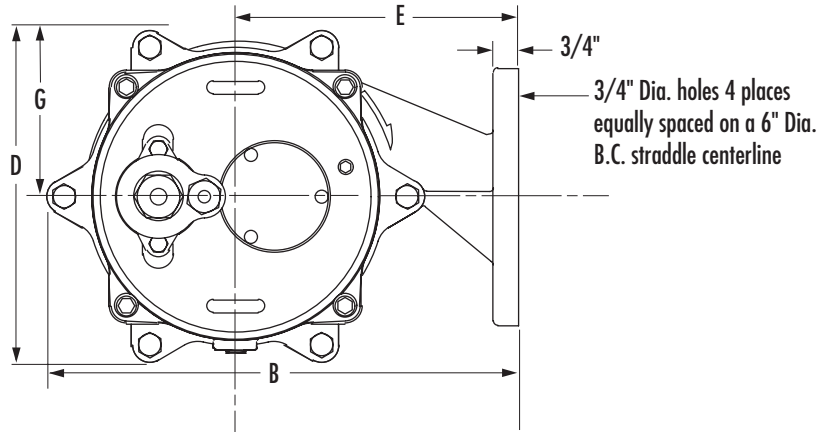
	A	B	C	D	E	F	G	H	I	J
HPGH	21-3/4	14-7/8	9-7/16	15-13/16	9-11/16	7-7/8	16-1/16	4-27/32	3-3/8	3/8

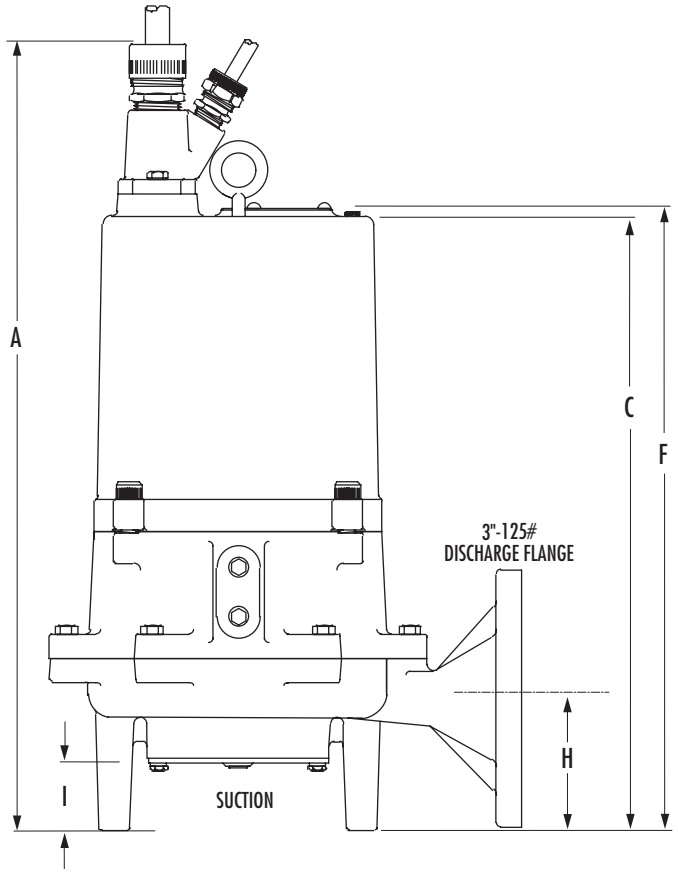
Vertical Discharge Standard

ALL DIMENSIONS IN INCHES
NOTE: CASTING DIMENSIONS MAY VARY ± 1/8"

Dimensional Data – HPGHH

Horizontal Discharge



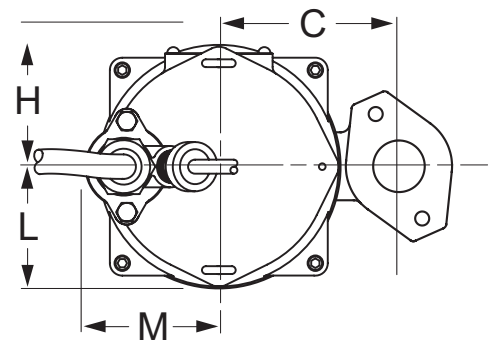


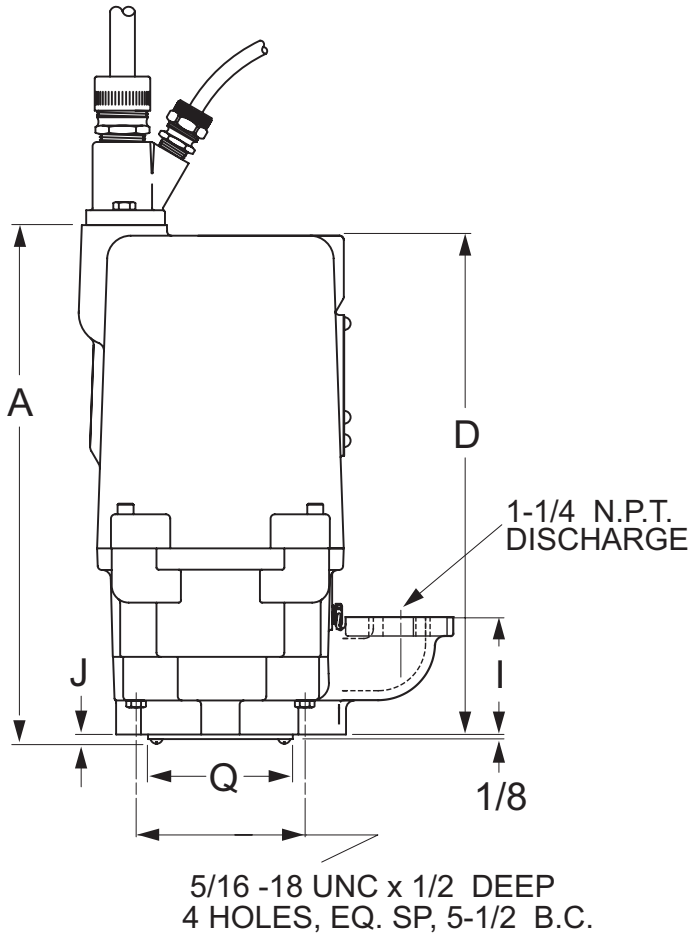
	A	B	C	D	E	F	G	H	I
HPGHH	22-7/8	13-3/4	17-7/8	9-11/16	8-1/4	18-1/8	4-27/32	4	2

Horizontal Discharge

ALL DIMENSIONS IN INCHES
NOTE: CASTING DIMENSIONS MAY VARY ± 1/8"

Dimensional Data – HPGX



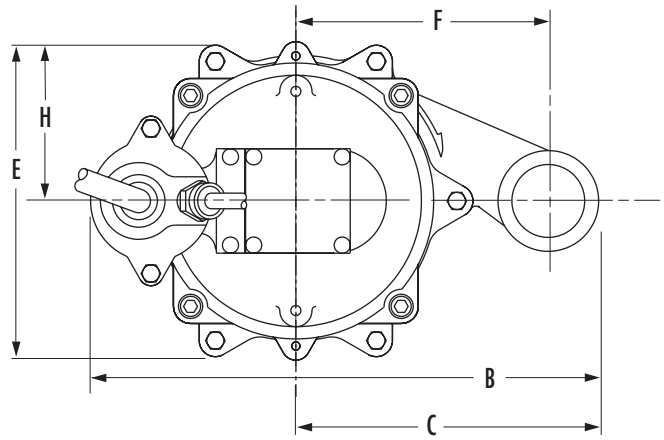


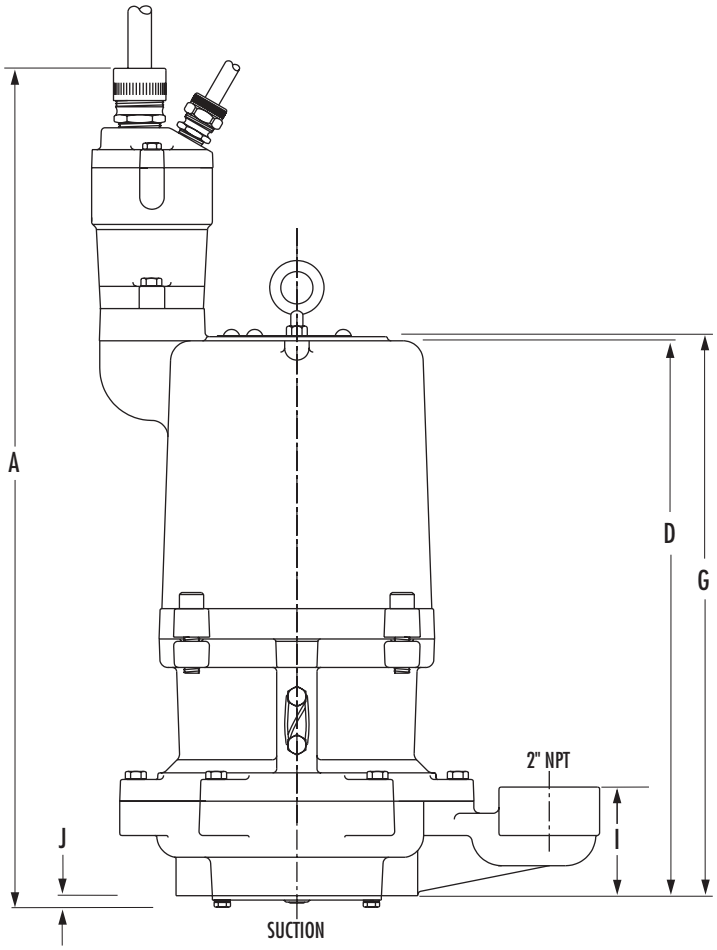
	A	C	D	I	J	H	L	M	Q
HPGX200	19-1/2	5-3/8	14-5/8	3-3/16	1/4	3-11/16	3-11/16	4-1/16	4-1/4

ALL DIMENSIONS IN INCHES
NOTE: CASTING DIMENSIONS MAY VARY ± 1/8"

Dimensional Data – HPGHX

Vertical Discharge Standard





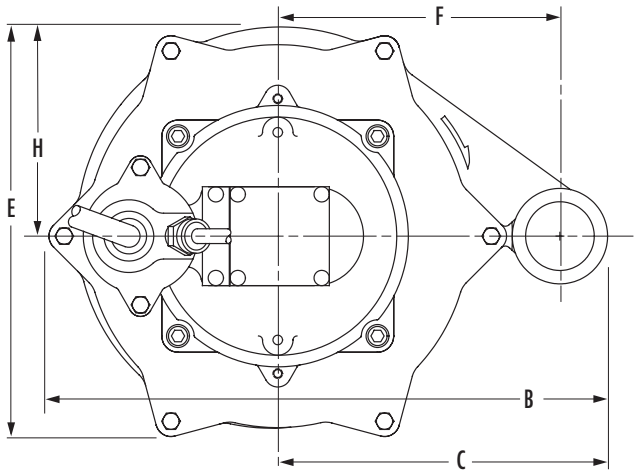
	A	B	C	D	E	F	G	H	I	J
HPGHX	26	14-7/8	9-7/16	17-1/4	9-11/16	7-7/8	17-9/16	4-27/32	3-3/8	3/8

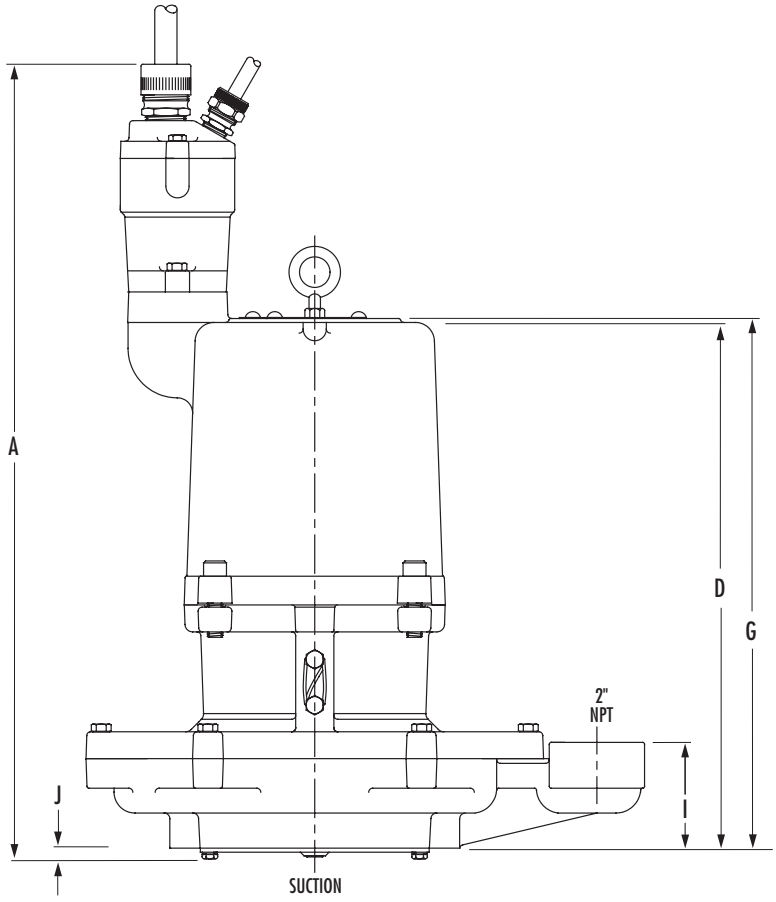
Vertical Discharge Standard

ALL DIMENSIONS IN INCHES
NOTE: CASTING DIMENSIONS MAY VARY ± 1/8"

Dimensional Data – HPGFX

Vertical Discharge Standard





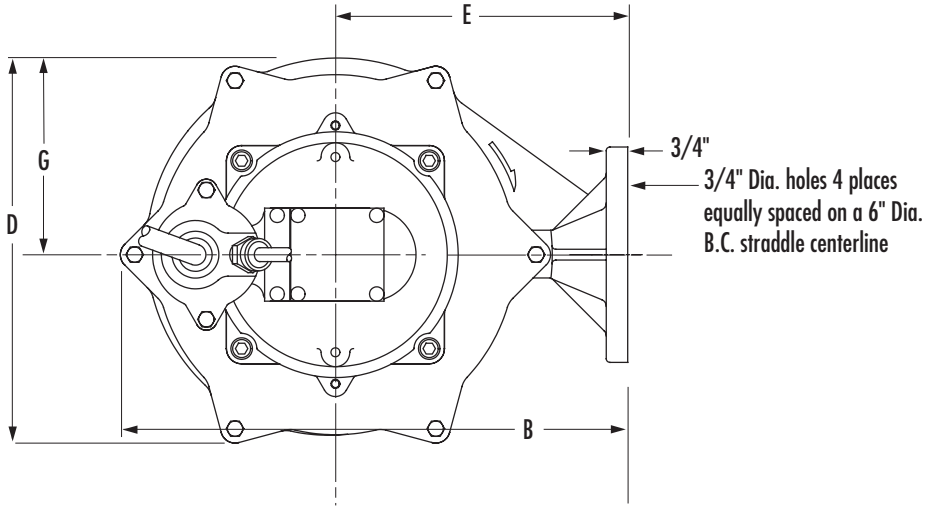
	A	B	C	D	E	F	G	H	I	J
HPGFX	26	18-5/16	10-13/16	17-1/4	13-7/16	9-1/4	17-9/16	6-7/8	3-1/2	3/8

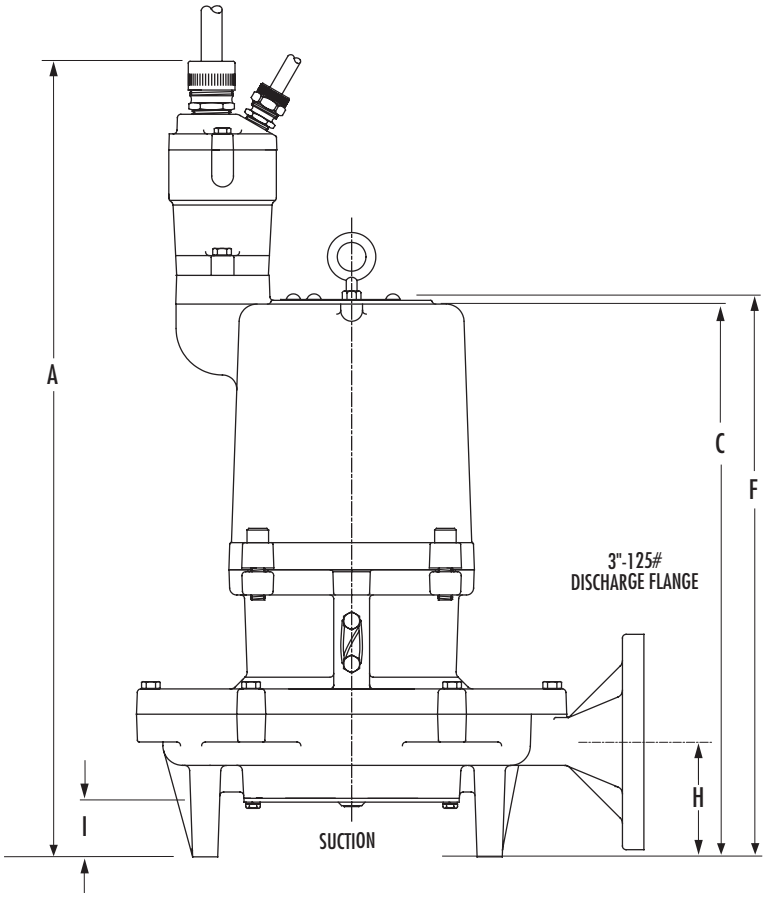
Vertical Discharge Standard

ALL DIMENSIONS IN INCHES
NOTE: CASTING DIMENSIONS MAY VARY ± 1/8"

Dimensional Data – HPGFHX

Horizontal Discharge





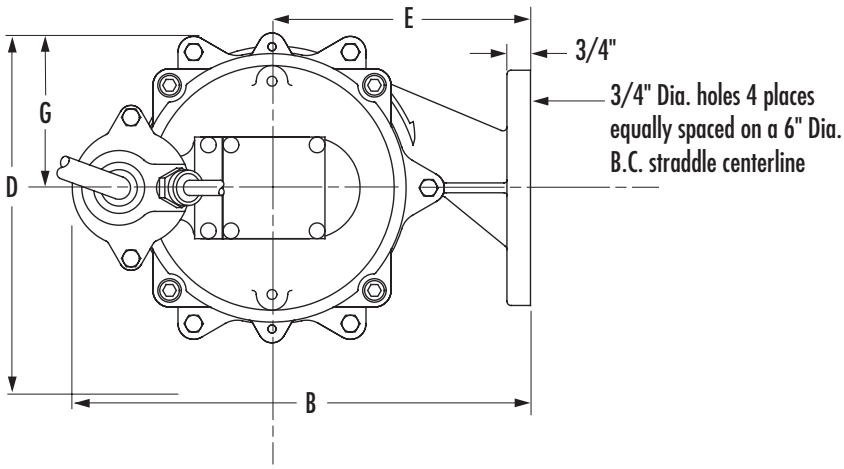
	A	B	C	D	E	F	G	H	I
HPGFHX	27-3/4	17-11/16	19-1/4	13-7/16	10-3/16	19-5/8	6-7/8	4	2

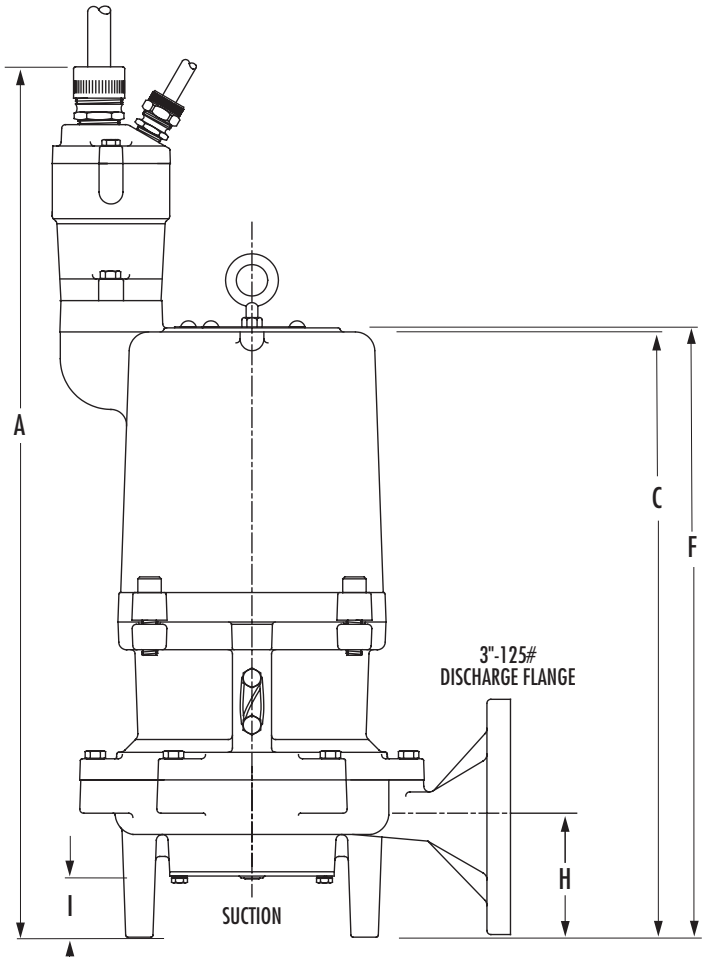
Horizontal Discharge

ALL DIMENSIONS IN INCHES
NOTE: CASTING DIMENSIONS MAY VARY ± 1/8"

Dimensional Data – HPGHHX

Horizontal Discharge



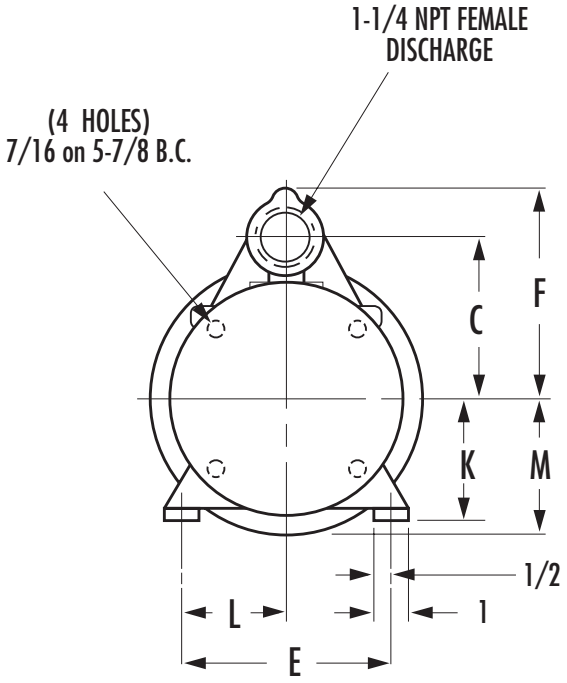


	A	B	C	D	E	F	G	H	I
HPGHHX	27-3/4	13-3/4	19-5/16	9-11/16	8-1/4	19-11/16	4-27/32	4	2

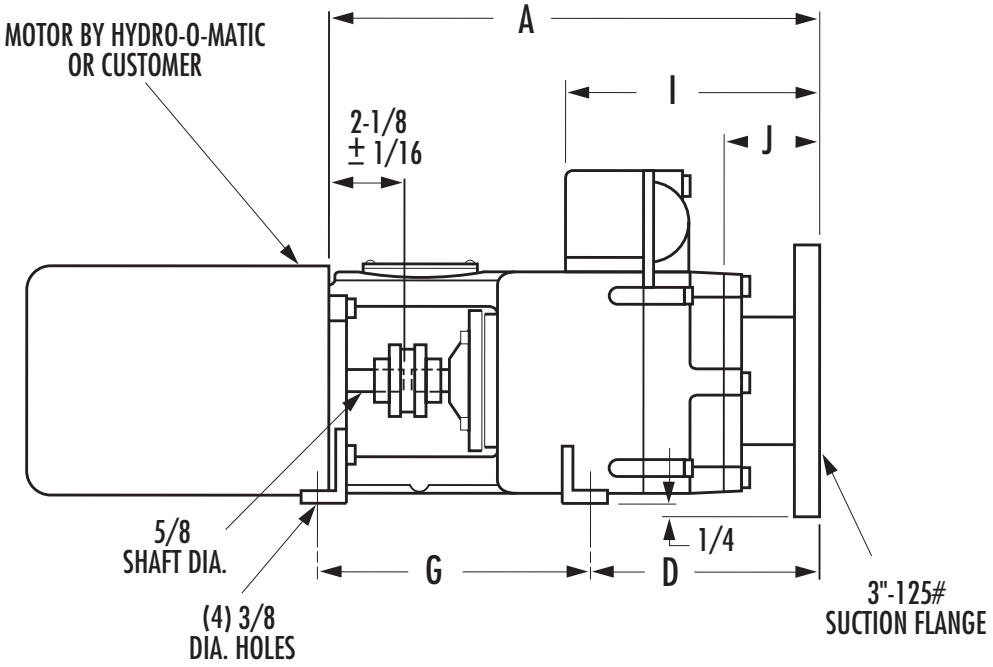
Horizontal Discharge

ALL DIMENSIONS IN INCHES
NOTE: CASTING DIMENSIONS MAY VARY ± 1/8"

Dimensional Data – PG/NPG



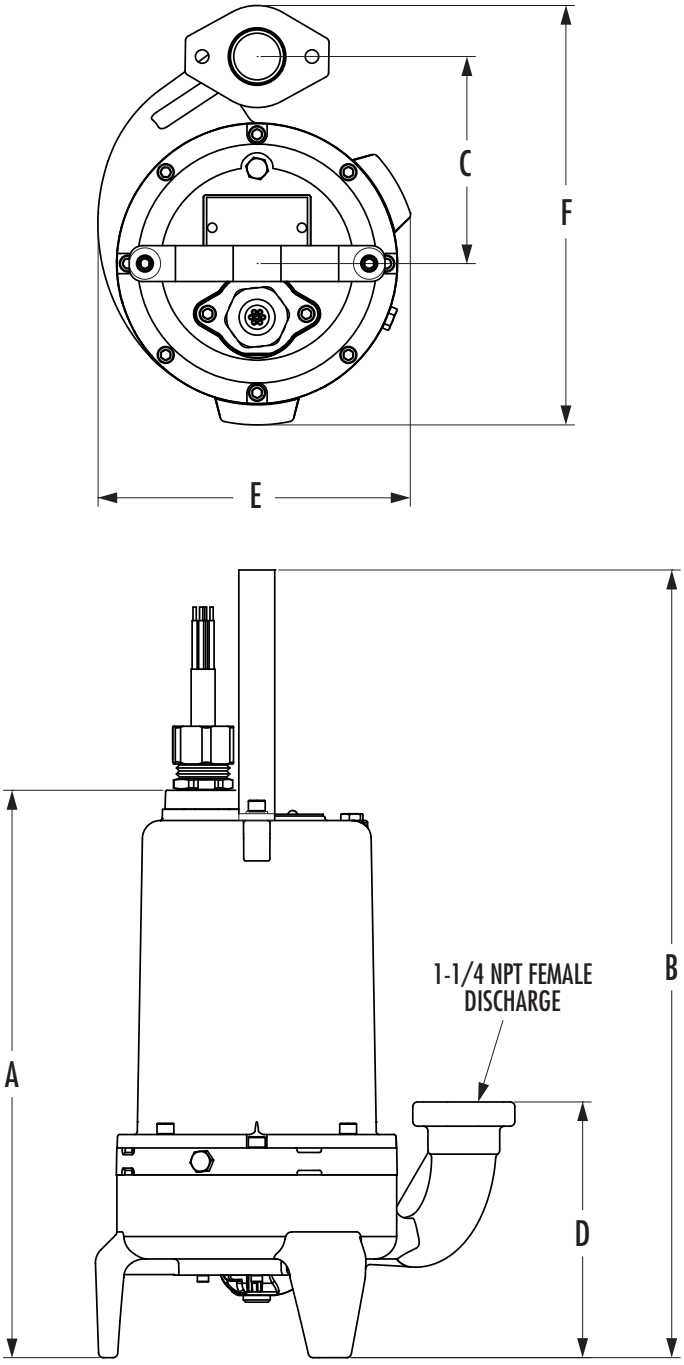
END VIEW FROM MOTOR



	A	C	D	E	F	G	I	J	K	L	M
PG200	14	4-5/8	6-13/16	6	6	7-1/2	7-1/4	2-3/4	3-1/2	3	3-3/4
NPG200	14	4-5/8	6-13/16	6	6	7-1/2	7-1/4	2-3/4	3-1/2	3	3-3/4

ALL DIMENSIONS IN INCHES
NOTE: CASTING DIMENSIONS MAY VARY ± 1/8"

Dimensional Data – HVH/HVS200



	A	B	C	D	E	F
HVH/HVS200	15.81	21.95	5.77	7.13	8.70	11.69

ALL DIMENSIONS IN INCHES
NOTE: CASTING DIMENSIONS MAY VARY ± 1/8"

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Electrical Data – HPD200

MODEL: HPD200 — Positive Displacement Grinder Pumps

R.P.M.	1750
MOTOR TYPE	ENCLOSED, OIL COOLED INDUCTION, CAP START; CAP RUN
MOTOR DESIGN NEMA TYPE	A (1ø)
GENERAL INSULATION CLASS	B
STATOR WINDING CLASS	F
MAXIMUM STATOR TEMPERATURE	130°C
VOLTAGE TOLERANCE	±10%

HP	VOLTAGE	PHASE	NEC CODE	SF	FULL LOAD AMPS	RUN KW	START KVA	RUN KVA
2	230	1	D	1.0	12.0	-	3.90	1.40

Electrical Data – HGRS200

MODEL: HGRS200 — Standard Grinder Pumps

R.P.M.	3450
MOTOR TYPE	ENCLOSED, OIL COOLED INDUCTION, CAP START
MOTOR DESIGN NEMA TYPE	A (1ø)
GENERAL INSULATION CLASS	B
STATOR WINDING CLASS	F
MAXIMUM STATOR TEMPERATURE	311°F (155°C)
VOLTAGE TOLERANCE	±10%

HP	VOLTAGE	PHASE	NEC CODE	SF	FULL LOAD AMPS	FULL LOAD KW	START KW	FULL LOAD KVA	LOCKED ROTOR AMPS
2	230	1	H	1.25	15.0	3.2	11.7	3.5	57

Electrical Data – HPGR200

MODEL: HPGR200 — Standard Grinder Pumps

R.P.M.	3450
MOTOR TYPE	ENCLOSED, OIL COOLED INDUCTION, CAP START
MOTOR DESIGN NEMA TYPE	A (1ø)
GENERAL INSULATION CLASS	B
STATOR WINDING CLASS	F
MAXIMUM STATOR TEMPERATURE	130°C
VOLTAGE TOLERANCE	±10%

HP	VOLTAGE	PHASE	NEC CODE	SF	FULL LOAD AMPS	FULL LOAD KW	START KW	FULL LOAD KVA	LOCKED ROTOR AMPS
2	230	1	H	1.0	15.0	3.2	11.7	3.5	57

Electrical Data – HPG(X)

MODEL: HPG(X) — Submersible Grinder Pumps

R.P.M.	3450				
MOTOR TYPE	ENCLOSED, OIL COOLED INDUCTION				
MOTOR DESIGN NEMA TYPE	B (3ø) L (1ø)				
GENERAL INSULATION CLASS	F				
STATOR WINDING CLASS	F				
MAXIMUM STATOR TEMPERATURE	130°C				
MOTOR PROTECTION	BI-METALLIC, TEMPERATURE SENSITIVE DISC, SIZED TO OPEN AT 120°C AND AUTOMATICALLY RESET @ 30–35°C DIFFERENTIAL, ONE IN SINGLE PHASE, TWO IN THREE PHASE				
ELECTRICAL RATINGS	HEAT SENSOR	24VDC 5AMPS	115VAC 5AMPS	230VAC 5AMPS	
	SEAL FAIL	300VAC 5mA			
VOLTAGE TOLERANCE	±10%				

HP	VOLTAGE	PHASE	NEC CODE	SF	FULL LOAD AMPS	LCKD. RTR. AMPS	RUN KW	START KVA	RUN KVA
2.0	200	1	G	1.2	HPG: 19.9 HPGX: 16.3	51.8	2.3	9.7	2.4
	230				15.6	48.0			
2.0	200	3	J	1.2	9.5	33.0	2.1	11.4	2.4
	230				8.3	28.7			
	460				HPG: 4.6 HPGX: 4.1	14.4			
	575				3.3	11.5			

Electrical Data – HPGF(X)/HPGFH(X)

MODEL: HPGF(X)/HPGFH(X) — Grinder Pumps

R.P.M.	1750				
MOTOR TYPE	ENCLOSED, OIL COOLED INDUCTION				
MOTOR DESIGN NEMA TYPE	B (3ø) L (1ø)				
GENERAL INSULATION CLASS	F				
STATOR WINDING CLASS	F				
MAXIMUM STATOR TEMPERATURE	155°C – 311°F				
MOTOR PROTECTION	BI-METALLIC, TEMPERATURE SENSITIVE DISC, SIZED TO OPEN AT 120°C AND AUTOMATICALLY RESET @ 30–35°C DIFFERENTIAL, ONE IN SINGLE PHASE, TWO IN THREE PHASE				
ELECTRICAL RATINGS	HEAT SENSOR	24VDC 5AMPS	115VAC 5AMPS	230VAC 5AMPS	
	SEAL FAIL	300VAC 5mA			
VOLTAGE TOLERANCE	±10%				

HP	VOLTAGE	PHASE	NEC CODE	SF	FULL LOAD AMPS	SF AMPS	LCKD. RTR. AMPS	RUN KW	START KVA	RUN KVA
3	200	1	G	1.2	19.6	22.9	91	3.3	18.2	3.9
	230				17.1	20	79			
5	230	1	G	1.2	29.5	35.4	125	5.7	28.8	6.8
3	200	3	J	1.2	10.9	12.8	64.5	3.1	22.3	3.8
	230				9.5	11.1	56			
	460				4.8	5.6	28			
	575				3.8	4.5	22.5			
5	200	3	J	1.2	17.6	20.6	108	4.8	37.4	6.1
	230				15.3	17.9	94			
	460				7.6	8.9	47			
	575				6.1	7.2	37.6			
7.5	200	3	J	1.2	29	32.9	194	7.2	67	10.1
	230				25.2	28.6	168			
	460				12.6	14.3	84			
	575				10.1	11.4	67.2			

Electrical Data – HPGH(X)/HPGHH(X)

MODEL: HPGH(X)/HPGHH(X) — Grinder Pumps

R.P.M.	3450			
MOTOR TYPE	ENCLOSED, OIL COOLED INDUCTION			
MOTOR DESIGN NEMA TYPE	B (3ø) L (1ø)			
GENERAL INSULATION CLASS	F			
STATOR WINDING CLASS	F			
MAXIMUM STATOR TEMPERATURE	155°C – 311°F			
MOTOR PROTECTION	BI-METALLIC, TEMPERATURE SENSITIVE DISC, SIZED TO OPEN AT 120°C AND AUTOMATICALLY RESET @ 30–35°C DIFFERENTIAL, ONE IN SINGLE PHASE, TWO IN THREE PHASE			
ELECTRICAL RATINGS	HEAT SENSOR	24VDC 5AMPS	115VAC 5AMPS	230VAC 5AMPS
	SEAL FAIL	300VAC 5mA		
VOLTAGE TOLERANCE	±10%			

HP	VOLTAGE	PHASE	NEC CODE	SF	FULL LOAD AMPS	SF AMPS	LCKD. RTR. AMPS	RUN KW	START KVA	RUN KVA
3.0	200	1	F	1.2	20.6	24.7	81	3.8	16.2	4.1
	230				17.9	21.5	70.5			
5.0	200	1	F	1.2	33.9	40.6	125	6.6	28.8	6.8
5.0	230	1	F	1.2	29.5	35.4	125	6.6	28.8	6.8
3.0	200	3	G	1.2	10.9	13.0	53	3.2	14.4	3.8
	230				9.4	11.2	46.2			
	460				4.7	5.6	23			
	575				3.8	4.5	18.5			
5.0	200	3	G	1.2	17.9	21.5	83	5.4	28.7	6.2
	230				15.6	18.7	72			
	460				7.8	9.4	36			
	575				6.2	7.4	28.8			
7.5	200	3	H	1.2	24.8	29.7	149.5	7.4	51.8	8.6
	230				21.5	25.8	130			
	460				10.8	12.9	65			
	575				8.6	10.3	52			

Electrical Data – HVH/HVS200

MODEL: HVH/HVS200 — Submersible Grinder Pumps

R.P.M.	3450			
MOTOR TYPE	ENCLOSED, OIL COOLED INDUCTION			
MOTOR DESIGN NEMA TYPE	B (3ø) L (1ø)			
GENERAL INSULATION CLASS	F			
STATOR WINDING CLASS	F			
MAXIMUM STATOR TEMPERATURE	140°C			
MOTOR PROTECTION	BI-METALLIC, TEMPERATURE SENSITIVE DISC, SIZED TO OPEN AT 130–140°C AND AUTOMATICALLY RESET @ 83–101°C DIFFERENTIAL, ONE IN SINGLE PHASE, TWO IN THREE PHASE			
ELECTRICAL RATINGS	HEAT SENSOR	24VDC 5AMPS	115VAC 5AMPS	230VAC 5AMPS
	SEAL FAIL	300VAC 5mA		
VOLTAGE TOLERANCE	±10%			

	HP	VOLTAGE	START AMPS	FULL LOAD AMPS	FULL LOAD KW	START KVA	FULL LOAD KVA	NEC CODE	SERVICE FACTOR	MODEL	STANDARD CORD 20'	STANDARD CORD 35'
HIGH HEAD	2	230/1/60	49	18.5	4.2	11.27	4.26	G	1	Catalog	HVH200M2-2-20	HVH200M2-2-35
										Eng	528330007	528330047
		200/3/60	53	12.5	3.9	18.3	4.33	L		Catalog	HVH200M6-2-20	HVH200M6-2-35
										Eng	528330017	528330057
		230/3/60	46	12	3.9	18.3	4.77	L		Catalog	HVH200M3-2-20	HVH200M3-2-35
										Eng	528330027	528330067
		460/3/60	23	6	3.9	18.3	4.77	L		Catalog	HVH200M4-2-20	HVH200M4-2-35
										Eng	528330037	528330077
STANDARD	2	200/1/60	66	16	3.2	13.2	3.2	G	1	Catalog	HVS200M7-2-20	HVS200M7-2-35
										Eng	528340217	528340237
		230/1/60	49	13.5	3.2	11.27	3.12	G		Catalog	HVS200M2-2-20	HVS200M2-2-35
										Eng	528340007	528340047
		200/3/60	53	10	3.2	18.3	3.46	L		Catalog	HVS200M6-2-20	HVS200M6-2-35
										Eng	528340017	528340057
		230/3/60	46	9	3.2	18.3	3.58	L		Catalog	HVS200M3-2-20	HVS200M3-2-35
										Eng	528340027	528340067
		460/3/60	23	4.2	3.2	18.3	3.35	L		Catalog	HVS200M4-2-20	HVS200M4-2-35
										Eng	528340037	528340077

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MODEL: HPD200 — Submersible Positive Displacement Grinder Pump

Physical Data:

DISCHARGE SIZE	1-1/4” NPT
PUMPING STATOR	DOUBLE HELIX
PUMPING ROTOR	300 SERIES SST; SINGLE LOBE
CABLE LENGTH	20’ STANDARD

Liquid Handling:

MAXIMUM LIQUID TEMP.	140ºF
ACCEPTABLE pH RANGE	6 – 9
SPECIFIC GRAVITY	0.9 – 1.1
VISCOSITY	28 – 35 SSU

Temperature:

MAXIMUM STATOR	266°F
OIL FLASH POINT	390°F
HEAT SENSOR Open: Closed:	257°F MAX./239°F MIN. 194°F MAX./149°F MIN.

Technical Data:

POWER CORD TYPE		SJOOW
MATERIALS OF CONSTRUCTION	MOTOR HOUSING	CAST IRON ASTM A-48 CLASS 30
	CASING	CAST IRON ASTM A-48 CLASS 30
	CUTTERS Stationary: Lower (Radial):	 440C STAINLESS STEEL HARDENED TO 55-60 ROCKWELL C 440C STAINLESS STEEL HARDENED TO 55-60 ROCKWELL C
	MOTOR SHAFT	416 STAINLESS STEEL
	HARDWARE	303 SERIES STAINLESS STEEL
	O-RINGS	NITRILE
MECHANICAL SEALS Standard:		 SINGLE CARBON/CERAMIC/NITRILE, TYPE 2100
UPPER BEARING		(RADIAL) SINGLE ROW BALL 6203
LOWER BEARING		(THRUST) SINGLE ROW BALL 6306
MIN. B-10 BEARING LIFE		50,000 Hrs

MODEL: HPG(X)200 — Submersible Centrifugal Grinder Pump

Physical Data:

DISCHARGE SIZE	1-1/4”
IMPELLER TYPE	SEMI-OPEN 5 VANE
CABLE LENGTH	20’ STANDARD

Liquid Handling:

MAXIMUM LIQUID TEMP.	140ºF
ACCEPTABLE pH RANGE	6 – 9
SPECIFIC GRAVITY	0.9 – 1.1
VISCOSITY	28 – 35 SSU

Temperature:

MAXIMUM STATOR	266°F
OIL FLASH POINT	390°F
HEAT SENSOR Open: Closed:	257°F MAX./239°F MIN. 194°F MAX./149°F MIN.

Technical Data:

POWER CORD TYPE		HPG: SOOW HPGX: SOOW, W
MATERIALS OF CONSTRUCTION	MOTOR HOUSING	CAST IRON ASTM A-48 CLASS 30
	CASING	CAST IRON ASTM A-48 CLASS 30
	IMPELLER	316 SST/CF8M (VALOX SEO WITH BRONZE INSERT ON HPG)
	CUTTERS Stationary: Upper (Axial): Lower (Radial):	 440C STAINLESS STEEL HARDENED TO 55-60 ROCKWELL C 440C STAINLESS STEEL HARDENED TO 55-60 ROCKWELL C 440C STAINLESS STEEL HARDENED TO 55-60 ROCKWELL C
	MOTOR SHAFT	416 STAINLESS STEEL
	HARDWARE	300 SERIES STAINLESS STEEL
	O-RINGS	NITRILE
MECHANICAL SEALS Standard: Optional:		 UPPER CARBON/CERAMIC/NITRILE, TYPE 21 HPG: LOWER TUNGSTEN CARBIDE/TUNGSTEN CARBIDE/NITRILE, TYPE 21 HPGX: LOWER TYPE 6A W/ STATIONARY CARBON/NITRILE AND ROTATING CERAMIC W/ VITON SEALING RING
UPPER BEARING		(RADIAL) SINGLE ROW BALL 6203
LOWER BEARING		(THRUST) SINGLE ROW BALL 6306
MIN. B-10 BEARING LIFE		50,000 Hrs

MODEL: HGRS200 — Standard Grinder Pumps

Physical Data:

DISCHARGE SIZE	1-1/4” NPT
IMPELLER TYPE	RECESSED
CABLE LENGTH	20’ STANDARD

Liquid Handling:

MAXIMUM LIQUID TEMP.	140ºF
ACCEPTABLE pH RANGE	6 – 9
SPECIFIC GRAVITY	0.9 – 1.1
VISCOSITY	28 – 35 SSU

Temperature:

MAXIMUM STATOR	311°F
OIL FLASH POINT	390°F
HEAT SENSOR Open: Closed:	257°F MAX./239°F MIN. 194°F MAX./149°F MIN.

Technical Data:

POWER CORD TYPE		SJOOW
MATERIALS OF CONSTRUCTION	MOTOR HOUSING	CAST IRON ASTM A-48 CLASS 30
	CASING	CAST IRON ASTM A-48 CLASS 30
	IMPELLER	50% GLASS FILLED NYLON WITH SST INSERT
	CUTTERS Stationary: Lower (Radial):	 440C STAINLESS STEEL HARDENED TO 55-60 ROCKWELL C 440C STAINLESS STEEL HARDENED TO 55-60 ROCKWELL C
	MOTOR SHAFT	416 STAINLESS STEEL
	HARDWARE	300 SERIES STAINLESS STEEL
	O-RINGS	NITRILE
MECHANICAL SEALS Standard:		SINGLE CARBON/CERAMIC/NITRILE, TYPE 21
UPPER BEARING		(RADIAL) SINGLE ROW BALL
LOWER BEARING		(THRUST) SINGLE ROW BALL
MIN. B-10 BEARING LIFE		50,000 Hrs

MODEL: HPGR200 — Standard Grinder Pumps

Physical Data:

DISCHARGE SIZE	1-1/4" NPT
IMPELLER TYPE	SEMI-OPEN 5 VANE
CABLE LENGTH	20' STANDARD

Liquid Handling:

MAXIMUM LIQUID TEMP.	140ºF
ACCEPTABLE pH RANGE	6 – 9
SPECIFIC GRAVITY	0.9 – 1.1
VISCOSITY	28 – 35 SSU

Temperature:

MAXIMUM STATOR	266°F
OIL FLASH POINT	390°F
HEAT SENSOR Open: Closed:	257°F MAX./239°F MIN. 194°F MAX./149°F MIN.

Technical Data:

POWER CORD TYPE		SOOW
MATERIALS OF CONSTRUCTION	MOTOR HOUSING	CAST IRON ASTM A-48 CLASS 30
	CASING	CAST IRON ASTM A-48 CLASS 30
	IMPELLER	VALOX SEO WITH BRONZE INSERT
	CUTTERS Stationary: Upper (Axial): Lower (Radial):	 440C STAINLESS STEEL HARDENED TO 55-60 ROCKWELL C 440C STAINLESS STEEL HARDENED TO 55-60 ROCKWELL C 440C STAINLESS STEEL HARDENED TO 55-60 ROCKWELL C
	MOTOR SHAFT	416 STAINLESS STEEL
	HARDWARE	300 SERIES STAINLESS STEEL
	O-RINGS	NITRILE
MECHANICAL SEALS Standard:		 SINGLE CARBON/CERAMIC/NITRILE, TYPE 21
UPPER BEARING		(RADIAL) SINGLE ROW BALL 6203
LOWER BEARING		(THRUST) SINGLE ROW BALL 6306
MIN. B-10 BEARING LIFE		50,000 Hrs

MODEL: HPGH(X)/HPGHH(X) — Grinder Pumps

Physical Data:

DISCHARGE SIZE	2” NPT ON HPGH(X), 3” 125 LB. FLANGE ON HPGHH(X)
IMPELLER TYPE	SEMI-OPEN 5 VANE
CABLE LENGTH	35’ STANDARD

Liquid Handling:

MAXIMUM LIQUID TEMP.	140ºF
ACCEPTABLE pH RANGE	6 – 9
SPECIFIC GRAVITY	0.9 – 1.1
VISCOSITY	28 – 35 SSU

Temperature:

MAXIMUM STATOR	311°F
OIL FLASH POINT	390°F
HEAT SENSOR Open: Closed:	257°F MAX./239°F MIN. 194°F MAX./149°F MIN.

Technical Data:

POWER CORD TYPE		SOOW, W
SENSOR CORD TYPE		SOOW
MATERIALS OF CONSTRUCTION	MOTOR HOUSING	CAST IRON ASTM A-48 CLASS 30
	CASING	CAST IRON ASTM A-48 CLASS 30
	IMPELLER	316 SST/CF8M
	CUTTERS Stationary: Upper (Axial): Lower (Radial):	 440C STAINLESS STEEL HARDENED TO 55-60 ROCKWELL C 440C STAINLESS STEEL HARDENED TO 55-60 ROCKWELL C 440C STAINLESS STEEL HARDENED TO 55-60 ROCKWELL C
	MOTOR SHAFT	416 STAINLESS STEEL
	HARDWARE	300 SERIES STAINLESS STEEL
	O-RINGS	NITRILE
MECHANICAL SEALS Standard: Optional:		 UPPER AND LOWER CARBON/CERAMIC/NITRILE, TYPE 21 LOWER TUNGSTEN CARBIDE/TUNGSTEN CARBIDE/NITRILE, TYPE 21
UPPER BEARING		(RADIAL) SINGLE ROW BALL (6303)
LOWER BEARING		(THRUST) SINGLE ROW BALL
MIN. B-10 BEARING LIFE		50,000 Hrs

MODEL: HPGF(X)/HPGFH(X) — Grinder Pumps

Physical Data:

DISCHARGE SIZE	2” NPT ON HPGF(X), 3” 125 LB. FLANGE ON HPGFH(X)
IMPELLER TYPE	SEMI-OPEN 5 VANE
CABLE LENGTH	35’ STANDARD

Liquid Handling:

MAXIMUM LIQUID TEMP.	140ºF
ACCEPTABLE pH RANGE	6 – 9
SPECIFIC GRAVITY	0.9 – 1.1
VISCOSITY	28 – 35 SSU

Temperature:

MAXIMUM STATOR	311°F
OIL FLASH POINT	390°F
HEAT SENSOR Open: Closed:	257°F MAX./239°F MIN. 194°F MAX./149°F MIN.

Technical Data:

POWER CORD TYPE		SOOW, W
SENSOR CORD TYPE		SOOW
MATERIALS OF CONSTRUCTION	MOTOR HOUSING	CAST IRON ASTM A-48 CLASS 30
	CASING	CAST IRON ASTM A-48 CLASS 30
	IMPELLER	316 SST/CF8M
	CUTTERS Stationary: Upper (Axial): Lower (Radial):	 440C STAINLESS STEEL HARDENED TO 55-60 ROCKWELL C 440C STAINLESS STEEL HARDENED TO 55-60 ROCKWELL C 440C STAINLESS STEEL HARDENED TO 55-60 ROCKWELL C
	MOTOR SHAFT	416 STAINLESS STEEL
	HARDWARE	300 SERIES STAINLESS STEEL
	O-RINGS	NITRILE
MECHANICAL SEALS Standard: Optional:		 UPPER AND LOWER CARBON/CERAMIC, TYPE 21 LOWER TUNGSTEN CARBIDE/TUNGSTEN CARBIDE/NITRILE, TYPE 21
UPPER BEARING		(RADIAL) SINGLE ROW BALL (6303)
LOWER BEARING		(THRUST) SINGLE ROW BALL
MIN. B-10 BEARING LIFE		50,000 Hrs

MODEL: NSPG, NSPGL — Grinder Pumps

Physical Data:

DISCHARGE SIZE	1-1/4”
IMPELLER TYPE	SEMI-OPEN 5 VANE

Liquid Handling:

MAXIMUM LIQUID TEMP.	140ºF
ACCEPTABLE pH RANGE	6 – 9
SPECIFIC GRAVITY	0.9 – 1.1
VISCOSITY	28 – 35 SSU

Temperature:

MAXIMUM STATOR	311°F
OIL FLASH POINT	390°F
HEAT SENSOR Open: Closed:	257°F MAX./239°F MIN. 194°F MAX./149°F MIN.

Technical Data:

POWER CORD TYPE		STW/STW-A WATER RESISTANT 600V, 60°C
SENSOR CORD TYPE		16-4 STW-A WATER RESISTANT 600V, 60°C, 10 AMPS
MATERIALS OF CONSTRUCTION	MOTOR HOUSING	ALUM BRONZE ALLOY 953 ASTM-148-76A
	CASING	NAVY M ASTM-143-922
	IMPELLER	NAVY M ASTM-143-922
	CUTTERS Stationary: Upper (Axial): Lower (Radial):	 440C STAINLESS STEEL HARDENED TO 55-60 ROCKWELL C 440C STAINLESS STEEL HARDENED TO 55-60 ROCKWELL C 440C STAINLESS STEEL HARDENED TO 55-60 ROCKWELL C
	MOTOR SHAFT	502 MONEL
	HARDWARE	300 SERIES STAINLESS STEEL
	O-RINGS	NITRILE
MECHANICAL SEALS Standard:		 UPPER CARBON/CERAMIC/NITRILE, TYPE 21
Standard:		LOWER TYPE 6A SEAL WITH STATIONARY CARBON FACE AND NITRILE SEAT, ROTATING CERAMIC WITH VITON SEALING RING
Optional:		LOWER TYPE 6A SEAL WITH STATIONARY CARBON FACE AND NITRILE SEAT, ROTATING CERAMIC WITH VITON SEALING RING

MODEL: NPG, NPGL — Grinder Pumps

Physical Data:

DISCHARGE SIZE	1-1/4”
IMPELLER TYPE	SEMI-OPEN 5 VANE

Liquid Handling:

MAXIMUM LIQUID TEMP.	140ºF
ACCEPTABLE pH RANGE	6 – 9
SPECIFIC GRAVITY	0.9 – 1.1
VISCOSITY	28 – 35 SSU

Technical Data:

POWER CORD TYPE		STW/STW-A WATER RESISTANT 600V, 60°C
SENSOR CORD TYPE		16-4 STW-A WATER RESISTANT 600V, 60°C, 10 AMPS
MATERIALS OF CONSTRUCTION	BEARING HOUSING	ALUM BRONZE ALLOY 953 ASTM-148-76A
	CASING	NAVY M ASTM-143-922
	IMPELLER	NAVY M ASTM-143-922
	CUTTERS Stationary: Upper (Axial): Lower (Radial):	 440C STAINLESS STEEL HARDENED TO 55-60 ROCKWELL C 440C STAINLESS STEEL HARDENED TO 55-60 ROCKWELL C 440C STAINLESS STEEL HARDENED TO 55-60 ROCKWELL C
	SHAFT	STAINLESS STEEL TYPE 416
	HARDWARE	300 SERIES STAINLESS STEEL
	O-RINGS	NITRILE
MECHANICAL SEALS Standard:		UPPER CARBON/CERAMIC/NITRILE, TYPE 21
Standard:		LOWER TYPE 6A SEAL WITH STATIONARY CARBON FACE AND NITRILE SEAT, ROTATING CERAMIC WITH VITON SEALING RING
Optional:		LOWER TYPE 6A SEAL WITH STATIONARY CARBON FACE AND NITRILE SEAT, ROTATING CERAMIC WITH VITON SEALING RING

MODEL: PG, PGL — Grinder Pumps

Physical Data:

DISCHARGE SIZE	1-1/4”
IMPELLER TYPE	SEMI-OPEN 5 VANE

Liquid Handling:

MAXIMUM LIQUID TEMP.	140°F
ACCEPTABLE pH RANGE	6 – 9
SPECIFIC GRAVITY	0.9 – 1.1
VISCOSITY	28 – 35 SSU

Technical Data:

MATERIALS OF CONSTRUCTION	BEARING HOUSING	ALUM BRONZE ALLOY 953 ASTM-148-76A
	CASING	CAST IRON ASTM A-48 CLASS 30
	IMPELLER	RED BRASS #85-5-5-5 ASTM B 584-836
	CUTTERS Stationary: Upper (Axial): Lower (Radial):	 440C STAINLESS STEEL HARDENED TO 55-60 ROCKWELL C 440C STAINLESS STEEL HARDENED TO 55-60 ROCKWELL C 440C STAINLESS STEEL HARDENED TO 55-60 ROCKWELL C
	MOTOR SHAFT	502 MONEL
	HARDWARE	300 SERIES STAINLESS STEEL
	O-RINGS	NITRILE
MECHANICAL SEALS Standard:		UPPER CARBON/CERAMIC/NITRILE, TYPE 21
Standard:		LOWER TYPE 6A SEAL WITH STATIONARY CARBON FACE AND NITRILE SEAT, ROTATING CERAMIC WITH VITON SEALING RING
Optional:		LOWER TYPE 6A SEAL WITH STATIONARY CARBON FACE AND NITRILE SEAT, ROTATING CERAMIC WITH VITON SEALING RING

Technical Data – HVH/HVS200

MODEL: HVH/HVS200 — Submersible Centrifugal Grinder Pump

Physical Data:

DISCHARGE SIZE	1-1/4”
IMPELLER TYPE	SEMI-OPEN 8 VANE
CABLE LENGTH	20’ STANDARD

Liquid Handling:

MAXIMUM LIQUID TEMP.	140ºF
ACCEPTABLE pH RANGE	6 – 9
SPECIFIC GRAVITY	0.9 – 1.1
VISCOSITY	28 – 35 SSU

Temperature:

MAXIMUM STATOR	284°F
OIL FLASH POINT	390°F
HEAT SENSOR Open: Closed:	284°F MAX./266°F MIN. 214°F MAX./181°F MIN.

Technical Data:

POWER CORD TYPE		HVH/HVS: SOOW
MATERIALS OF CONSTRUCTION	MOTOR HOUSING	CAST IRON ASTM A-48 CLASS 30
	CASING	CAST IRON ASTM A-48 CLASS 30
	IMPELLER	316 SST / CF8M
	CUTTERS Stationary: Rotating:	 440C STAINLESS STEEL HARDENED TO 55-60 ROCKWELL C 440C STAINLESS STEEL HARDENED TO 55-60 ROCKWELL C
	MOTOR SHAFT	416 STAINLESS STEEL
	HARDWARE	300 SERIES STAINLESS STEEL
	O-RINGS	NITRILE
MECHANICAL SEALS Standard: Optional:		 UPPER CARBON/CERAMIC/NITRILE, TYPE 21 HVH/HVS: LOWER TUNGSTEN CARBIDE/TUNGSTEN CARBIDE/NITRILE, TYPE 21
UPPER BEARING		(RADIAL) SINGLE ROW BALL 6203
LOWER BEARING		DOUBLE ROW ANGULAR CONTACT 3205A
MIN. B-10 BEARING LIFE		50,000 Hrs

SUBMERSIBLE SEWAGE GRINDER PUMPS

GENERAL

Contractor shall furnish all labor, materials, equipment and incidentals required to provide _____ (qty.) submersible centrifugal sewage grinder pump(s) as specified herein.

OPERATING CONDITIONS

Each pump shall be rated _____ hp, _____ volts, _____ phase, _____ hertz, and_____ rpm. The unit shall produce _____ U.S. GPM at _____ feet TDH.

CONSTRUCTION

Each pump shall be of the sealed submersible grinder type, manufactured by Pentair Hydromatic. The pump volute, motor and seal housing shall be high quality gray cast iron, ASTM A-48, Class 30. All external mating parts shall be machined and Nitrile O-ring sealed on a beveled edge. Gaskets shall not be acceptable. All fasteners exposed to the pumped liquid shall be 316 series stainless steel.

ELECTRICAL POWER/CONTROL CORD

Electric power/control cord shall be SOOW water resistant 600V, 90°C, UL and/or CSA approved. The single cord shall incorporate both power and sensor leads and shall be a minimum of seven (7) 12 gauge conductors.

The pump shall be protected with compression fitting and epoxy potted area at the power cord entry to the pump. A separation between the junction box areas of the pump and the motor by a stator lead sealing gland or terminal board shall not be acceptable.

The power cable entry into the cord cap assembly shall first be made with a compression fitting. Each individual lead shall be stripped down to bare wire, at staggered intervals, and each strand shall be individually separated. This area of the cord cap shall then be filled with an epoxy compound potting which will prevent water contamination to gain entry even in the event of wicking or capillary attraction.

The power cord leads shall then be connected to the motor leads with heavy duty connectors having copper inserts with a crimped wire-to-wire connection, rather than a terminal board that allows for possible leaks.

The cord cap assembly shall be sealed with a Nitrile O-ring on a beveled edge to assure proper sealing.

MOTOR

The stator, rotor and bearings shall be mounted in a sealed submersible type housing. The stator windings shall have Class F insulation (155°C or 311°F) and a dielectric oil-filled motor, NEMA B design (three-phase), NEMA L design (single-phase). Because air-filled motors do not dissipate heat as efficiently as oil-filled motors, they shall not be acceptable.

The pump and motor shall be specifically designed so that they may be operated partially dry or completely submerged in the liquid being pumped. The pump shall not require cooling water jackets. Dependence upon, or use of, water jackets for supplemental cooling shall not be acceptable.

Stators shall be securely held in place with a removable end ring and threaded fasteners. No special tools shall be required for pump and motor disassembly.

Pump shall be equipped with heat sensors. The heat sensor(s) (one on single-phase, two on three-phase) shall be a low resistance, bimetal disc that is temperature sensitive. It (they) shall be mounted directly in the stator and sized to open at 120°C or 130°C and automatically reset at 30–35°C differential. The sensor shall be connected in series with the motor starter coil so that the starter is tripped if a heat sensor opens. The motor starter shall be equipped with overload heaters so all normal overloads are protected by an external heater block.

BEARINGS AND SHAFT

An upper single row ball radial bearing and a lower single row ball thrust bearing shall be provided. Bearings shall be permanently lubricated by the dielectric oil that fills the motor housing.

The shaft shall be machined from solid 400 series stainless steel and be designed with large diameters and minimum overhang to reduce shaft deflection and prolong bearing and seal life.

SEALS AND SENSORS

The rotor and stator in the motor housing shall be separated and protected from the pumped liquid by an oil-filled seal housing incorporating two type 21 carbon ceramic mechanical seals mounted in tandem. The seal housing shall be equipped with a moisture sensing probe installed between the seals, and the sensing of moisture in the seal chamber shall be automatic, continuous and not require the pump be stopped or removed from the wet well.

IMPELLER

The impeller shall be designed for rough duty service and shall be of a five-vane, semi-open design with hydrodynamic sealing vanes on the rear shroud. The impeller shall be constructed of engineered thermoplastic, with a permanently molded, hexagonally locked bronze insert. The impeller shall be of a non-overloading design and be factory or field trimable to meet specific performance conditions.

Optional all stainless steel impeller available.

GRINDER CUTTERS

The combination centrifugal pump impeller and grinder unit shall be attached to the common motor and pump shaft made of 416 stainless steel. The grinder unit shall be on the suction side of the pump impeller and discharge directly into the impeller inlet, leaving no exposed shaft to permit packing of ground solids. The grinder shall consist of two stages. The cutting action of the second stage shall be perpendicular to the plane of the first cut for better control of the particle size. The grinder shall be capable of grinding normal domestic sewage. Both stationary and rotating cutters shall be made of 440C stainless steel hardened to Rockwell 60C and ground to close tolerance.

The upper (axial) cutter and stationary cutter ring shall be reversible to provide new cutting edges to double life. The stationary cutter ring shall be pressed into the suction opening of the volute and held in place by three (3) 300 series stainless steel screws. The lower (radial) cutter shall macerate the solids against the I.D. of the cutter ring and extrude them through the slots of the cutter ring. The upper (axial) cutter shall cut off the extrusions, as they emerge from the slots of the cutter ring to eliminate any roping effect that may occur in single stage cutting action. The upper (axial) cutter shall fit over the hub of the impeller and the lower (radial) cutter shall be slip-fit and secured by means of peg and hole and rotate simultaneously with the rotation of the shaft and impeller. The grinding mechanism shall be locked to the shaft by a 300 series stainless steel countersunk washer in conjunction with a 300 series stainless steel flat head cap screw threaded into the end of the shaft.

TESTING

Commercial testing shall be required and include the following:

The pump shall be visually inspected to confirm that it is built in accordance with the specifications as to hp, voltage, phase and hertz.

The motor and seal housing chambers shall be hi-potted to test for moisture content and/or insulation defects.

Pump shall be allowed to run dry to check for proper rotation.

Discharge piping shall be attached, the pump submerged in water, and amp readings taken in each leg to check for an unbalanced stator winding. If there is a significant difference in readings, the stator windings shall be checked with a bridge to determine if an unbalanced resistance exists. If so, the stator will be replaced.

PAINT

The pump shall be painted with waterborne hybrid acrylic/alkyd paint. This custom engineered, quick dry paint shall provide superior levels of corrosion and chemical protection.

HAZARDOUS LOCATION SUBMERSIBLE SEWAGE GRINDER PUMPS

GENERAL

Contractor shall furnish all labor, materials, equipment and incidentals required to provide _____ (qty.) submersible centrifugal hazardous location sewage grinder pump(s) for NEC class 1, division 1, groups C, D Hazardous locations, as specified herein.

OPERATION CONDITIONS

Each pump shall be rated _____ hp, _____ volts, _____ phase, _____ hertz, and_____ rpm. The unit shall produce _____ U.S. GPM at _____ feet TDH.

CONSTRUCTION

Each pump shall be of the sealed submersible type manufactured by Pentair Hydromatic. The pump volute, motor and seal housing shall be high quality gray cast iron, ASTM A-48, Class 30. All external mating parts shall be machined and Nitrile O-ring sealed on a beveled edge. Gaskets shall not be acceptable. All fasteners exposed to the pumped liquids shall be 300 series stainless steel.

ELECTRICAL POWER CORD

Electrical power cord shall be SOOW or W, water resistant 600V, 90°C, UL and/or CSA approved and applied dependent on amp draw for size.

The power cable entry into the cord cap assembly shall first be made with a compression fitting. Each individual lead shall be stripped down to bare wire, at staggered intervals, and each strand shall be individually separated. This area of the cord cap shall then be fitted with an epoxy compound potting which will prevent water contamination to gain entry even in the event of wicking or capillary attraction.

The power cord leads shall then be connected to the motor leads with extra heavy-duty crimp insulated connectors.

The cord cap assembly where bolted to the motor housing shall be sealed with a Nitrile O-ring on a beveled edge to assure proper sealing.

MOTOR

The stator, rotor and bearings shall be mounted in a sealed submersible type housing. The stator windings shall have Class F insulation (155°C or 311°F), and a dielectric oil-filled motor, NEMA B design (three-phase), NEMA L design (single-phase).

The pump and motor shall be specifically designed so that they may be operated partially dry or completely submerged in the liquid being pumped.

Stators shall be securely held in place with threaded fasteners. No special tools shall be required for pump and motor disassembly.

Pump shall be equipped with heat sensors. The heat sensor(s) (one on single-phase, two on three-phase) shall be a low resistance, bimetal disc that is temperature sensitive. It (they) shall be mounted directly in the stator and sized to open at 120°C or 130°C and automatically reset at 30–35°C differential. The sensor shall be connected in series with the motor starter coil so that the starter is tripped if a heat sensor opens. The motor starter shall be equipped with overload heaters so all normal overloads are protected by an external heater block.

BEARINGS AND SHAFT

An upper radial bearing and a lower thrust bearing shall be required. These shall be permanently lubricated by the dielectric oil that fills the motor housing. Three bearing system with lower sleeve.

The shaft shall be machined from a solid 416 stainless steel and be a design that is of large diameter with minimum overhand to reduce shaft deflection and prolong bearing life.

SEALS AND SENSORS

The rotor and stator in the motor housing shall be separated and protected from the pumped liquid by an oil-filled seal housing incorporating two carbon ceramic mechanical seals mounted in tandem. This seal housing shall be equipped with two moisture sensing probes installed between the seals, and the sensing of moisture in the seal chamber shall be automatic, continuous, and not require the pump be stopped or removed from the wet well. The sensor probes shall be electrically isolated, with a resistor between each probe to eliminate grounding to the casing.

IMPELLERS

Impeller shall be stainless steel multivane, semi-open, non-overloading design. They can either be factory or field trimmed to meet specific performance conditions. Impellers shall be dynamically balanced at the factory and machined for threading on to the pump shaft.

GRINDER CUTTERS

The combination centrifugal pump impeller and grinder unit shall be attached to the common motor and pump shaft made of 416 stainless steel. The grinder unit shall be on the suction side of the pump impeller and discharge directly into the impeller inlet, leaving no exposed shaft to permit packing of ground solids. The grinder shall consist of two stages. The cutting action of the second stage shall be perpendicular to the plane of the first cut for better control of the particle size. The grinder shall be capable of grinding normal domestic sewage. Both stationary and rotating cutters shall be made of 440C stainless steel hardened to Rockwell 55-60C and ground to close tolerance.

The upper (axial) cutter and stationary cutter ring shall be reversible to provide new cutting edges to double life. The stationary cutter ring shall be a slip-fit into the suction opening of the volute and held in place by three (3) 300 series stainless steel screws and a retaining ring. The lower (radial) cutter shall macerate the solids against the I.D. of the cutter ring and extrude them through the slots of the cutter ring. The upper (axial) cutter shall cut off the extrusions as they emerge from the slots of the cutter ring to eliminate any roping effect that may occur in single stage cutting action. The upper (axial) cutter shall fit over the hub of the impeller and the lower (radial) cutter shall be slip-fit and secured by means of peg and hole and rotate simultaneously with the rotation of the shaft and impeller. The grinding mechanism shall be locked to the shaft by a 300 series stainless steel countersunk washer in conjunction with a 300 series stainless steel hex serrated head screw threaded into the end of the shaft.

TESTING

Commercial testing shall be required and include the following:

The pump shall be visually inspected to confirm that it is built in accordance with the specification as to hp, voltage, phase and hertz.

The motor and seal housing chambers shall be hi-potted to test for moisture content and/or insulation defects.

Pump shall be allowed to run dry to check for proper rotation.

Discharge piping shall be attached, the pump submerged in water, and amp readings shall be taken in each leg to check for an unbalanced stator winding. If there is a significant difference in readings, the stator windings shall be checked with a bridge to determine if an unbalanced resistance exists. If so, the stator will be replaced.

PAINT

The pump shall be painted with waterborne hybrid acrylic/alkyd paint. This custom engineered, quick dry paint shall provide superior levels of corrosion and chemical protection.

Specifications – HPD200

SUBMERSIBLE POSITIVE DISPLACEMENT GRINDER PUMP

GENERAL

Contractor shall furnish all labor, materials, equipment and incidentals required to provide _____ (qty.) submersible positive displacement sewage grinder pump(s) as specified herein.

OPERATING CONDITIONS

Pump shall have a capacity of _____ GPM at a total head of _____ feet and shall use a 2 hp motor operating at 1725 rpm.

CONSTRUCTION

Pump shall be a positive displacement type with an integrally built-in grinder unit and submersible type motor. The grinder unit shall be capable of macerating normal domestic and commercial sewage. Discharge shall be 1-1/4" NPT.

NOTE: The following objects should not be introduced into the grinder sump as damage to the pump stator boot will result: glass, metal, seafood shells, plastic objects (toys, utensils, etc.) or other like sharp objects.

ELECTRICAL POWER/CONTROL CORD

The motor power cord shall be SJOOW. The cable jacket shall be sealed at the motor entrance by means of a rubber compression washer and compression nut. A heat shrink tube filled with epoxy shall seal the outer cable jacket and the individual leads to prevent water from entering the motor housing.

MOTOR

Pump motor shall be of the submersible type rated 2 hp at 1725 rpm. Motor shall be for 60 Hz, single-phase, 230V. Motor shall be capacitor start, capacitor run type for high starting torque. Stator winding shall be of the open type with Class F insulation, good for 130ºC (266ºF) maximum operating temperature. Winding housing shall be filled with a clean high dielectric oil that lubricates bearings and seals and transfers heat from windings and rotor to outer shell. Air-filled motors, that do not have the superior heat dissipating capabilities of oil-filled motors, shall not be considered equal.

Motor shall have an automatic reset line break overload attached to the top end of the motor windings to protect motor per UL 778. The high temperature shut-off will cause the pump to cease operation, should a control failure cause the pump to run continuously in a dry wet well. The thermal overload shall reset automatically when the motor cools to a safe operating temperature.

BEARINGS AND SHAFT

Motor shall have two heavy-duty ball bearings to support pump shaft and take radial and thrust loads. Ball bearings shall be designed for 50,000 hours B-10 life. Stator shall be bolted to seal/bearing housing for easy motor replacement.

The common motor pump and grinder shaft shall be of 400 series stainless steel threaded to take pump impeller and grinder impeller.

SEAL

Motor shall be protected by one rotary mechanical seal. Seal face shall be carbon and ceramic and lapped to a flatness of one light band.

POSITIVE DISPLACEMENT

The progressing cavity stator boot shall be designed for rough duty service and shall be of an axial double-helix positive displacement type. The stator boot shall be constructed of Nitrile, with the progressing cavity chamber molded integral to the stator boot. Stator boot shall be retained within the volute pumping chamber by means of a stainless steel retaining ring secured with 400 series fasteners.

The progressing cavity rotor shall be designed for rough duty service and shall be of a single-lobe axial helix type. The rotor shall be constructed of 300 series stainless steel designed for close slip-fit over motor shaft and retained on motor shaft by means of a lower roll pin.

GRINDER CUTTERS

The combination stator/rotor and grinder unit shall be attached to the common motor and pump shaft. The grinder unit shall be on the suction side of the pump discharge directly into the positive displacement inlet, leaving no exposed shaft to permit packing of ground solids. The grinder shall consist of a single stage. Both stationary and rotating cutters shall be made of 440C stainless steel hardened to Rockwell 60C and ground to close tolerance. The stationary cutter shall be slip- fit into the suction opening of the volute and held in place by three (3) 400 series stainless steel screws. The lower (radial) cutter shall macerate the solids against the I.D. of the cutter ring and extrude them through the slots of the cutter ring. The (radial) cutter shall be threaded to the common pump shaft and secured by means of a 300 series stainless steel washer and screw to the common pump shaft.

LEVEL CONTROL

An automatic control is provided by a heavy-duty UL/CSA listed float switch tethered to the side of the pump, having a piggyback plug on one end. This piggyback float switch operates the pump directly without the need of a control panel.

TESTING

Commercial testing shall be required and include the following:

The pump shall be visually inspected to confirm that it is built in accordance with the specifications as to hp, voltage, phase and hertz.

The motor and seal housing chambers shall be hi-potted to test for moisture content and/or insulation defects.

Pump shall run to check for proper rotation.

Discharge piping shall be attached, the pump submerged in water, and amp readings taken in each leg to check for an unbalanced stator winding. If there is a significant difference in readings, the stator windings shall be checked with a bridge to determine if an unbalanced resistance exists. If so, the stator will be replaced.

PAINT

The pump shall be painted with waterborne hybrid acrylic/alkyd paint. This custom engineered, quick dry paint shall provide superior levels of corrosion and chemical protection.

Specifications – HGRS200/HPGR200

SUBMERSIBLE SEWAGE GRINDER PUMPS

GENERAL

Contractor shall furnish all labor, materials, equipment and incidentals required to provide _____ (qty.) submersible centrifugal sewage grinder pump(s) as specified herein.

OPERATING CONDITIONS

Pump shall have a capacity of _____ GPM at a total head of _____ feet and shall use a 2 hp motor operating at 3450 rpm.

CONSTRUCTION

Pump shall be a centrifugal type with an integrally built-in grinder unit and submersible type motor. The grinder unit shall be capable of macerating all normal domestic and commercial sewage. Discharge shall be 1-1/4" NPT.

ELECTRICAL POWER/CONTROL CORD

The motor power cord shall be SJOOW. The cable jacket shall be sealed at the motor entrance by means of a rubber compression washer and compression nut. A heat shrink tube filled with epoxy shall seal the outer cable jacket and the individual leads to prevent water from entering the motor housing.

MOTOR

Pump motor shall be of the submersible type rated 2 hp at 3450 rpm. Motor shall be for 60 Hz, single-phase, 230V. Motor shall be capacitor start, capacitor run type for high starting torque. Stator winding shall be of the open type with Class F insulation, for 311°F maximum operating temperature. Winding housing shall be filled with a clean, high dielectric oil that lubricates bearings and seals and transfers heat from windings and rotor to outer shell. Air-filled motors, that do not have the superior heat dissipating capabilities of oil-filled motors, shall not be considered equal.

Motor shall have an automatic reset line break overload attached to the top end of the motor windings to protect motor per UL 778. The high temperature shut-off will cause the pump to cease operation, should a control failure cause the pump to run continuously in a dry wet well. The thermal overload shall reset automatically when the motor cools to a safe operating temperature.

BEARINGS AND SHAFT

Motor shall have two heavy-duty ball bearings to support pump shaft and take radial and thrust loads. Ball bearings shall be designed for 50,000 hours B-10 life. Stator shall be bolted to seal plate for easy motor replacement.

The common motor pump and grinder shaft shall be of 400 series stainless steel threaded to take pump impeller and grinder impeller.

SEAL

Motor shall be protected by one rotary mechanical seal. Seal face shall be carbon and ceramic and lapped to a flatness of one light band.

IMPELLER

The pump impeller shall be designed for rough duty service and shall be a recessed design on the HGRS and a five vane semi-open design on the HPGR with hydrodynamic sealing vanes on the rear shroud. The impeller shall be constructed of a glass filled engineered thermoplastic, with a permanently molded insert. The impeller shall be of a non-overloading design.

GRINDER CUTTERS

HGRS: The combination stator/rotor and grinder unit shall be attached to the common motor and pump shaft and shall consist of a single stage. The grinder unit shall be on the suction side of the pump discharge directly into the inlet, leaving no exposed shaft to permit packing of ground solids. Both stationary and rotating cutters shall be made of 440C stainless steel hardened to Rockwell 60C and ground to close tolerance. The stationary cutter shall be slip-fit into the suction opening of the volute and held in place by three (3) 400 series stainless steel screws. The lower (radial) cutter shall macerate the solids against the I.D. of the cutter ring and extrude them through the slots of the cutter ring. The (radial) cutter shall be threaded to the common pump shaft and secured by means of a 300 series stainless steel washer and screw to the common pump shaft.

HPGR: The combination centrifugal pump impeller and grinder unit shall be attached to the common motor and pump shaft. The grinder unit shall be on the suction side of the pump impeller and discharge directly into the impeller inlet, leaving no exposed shaft to permit packing of ground solids. The grinder shall consist of two stages. The cutting action of the second stage shall be perpendicular to the plane of the first cut for better control of the particle size. Both stationary and rotating cutters shall be made of 440C stainless steel hardened to Rockwell 60C and ground to close tolerance. The upper (axial) cutter and stationary cutter ring shall be reversible to provide new cutting edges to double life. The stationary cutter ring shall be pressed into the suction opening of the volute and held in place by three (3) 400 series stainless steel screws. The lower (radial) cutter shall macerate the solids against the I.D. of the cutter ring and extrude them through the slots of the cutter ring. The upper (axial) cutter shall cut off the extrusions, as they emerge from the slots of the cutter ring to eliminate any roping effect that may occur in a single stage cutting action. The upper (axial) cutter shall fit over the hub of the impeller and the lower (radial) cutter shall be threaded to the common pump shaft and secured by means of a 300 series stainless steel washer and screw to the common pump shaft.

LEVEL CONTROL

An automatic control is provided by a heavy-duty UL/CSA listed float switch tethered to the side of the pump, having a piggyback plug on one end. This piggyback float switch operates the pump directly without the need of a control panel.

TESTING

Commercial testing shall be required and include the following:

The pump shall be visually inspected to confirm that it is built in accordance with the specifications as to hp, voltage, phase and hertz.

The motor and seal housing chambers shall be hi-potted to test for moisture content and/or insulation defects.

Pump shall be allowed to run dry to check for proper rotation.

Discharge piping shall be attached, the pump submerged in water, and amp readings taken in each leg to check for an unbalanced stator winding. If there is a significant difference in readings, the stator windings shall be checked with a bridge to determine if an unbalanced resistance exists. If so, the stator will be replaced.

PAINT

The pump shall be painted with waterborne hybrid acrylic/alkyd paint. This custom engineered, quick dry paint shall provide superior levels of corrosion and chemical protection.

Specifications – HPGF/HPGFH/HPGH/HPGHH

SUBMERSIBLE SEWAGE GRINDER PUMPS

GENERAL

Contractor shall furnish all labor, materials, equipment and incidentals required to provide _____(qty.) submersible centrifugal sewage grinder pump(s) as specified herein.

OPERATION CONDITIONS

Each pump shall be rated _____ hp, _____ volts, _____ phase, _____ hertz, and _____ rpm. The unit shall produce _____ U.S. GPM at _____ feet TDH.

CONSTRUCTION

Each pump shall be a sealed submersible type, model _____ manufactured by Pentair Hydromatic. The pump volute, motor and seal housing shall be high quality gray cast iron, ASTM A-48, Class 30. All external mating parts shall be machined and Nitrile O-ring sealed on a beveled edge. Gaskets shall not be acceptable. All fasteners exposed to the pumped liquids shall be 300 series stainless steel.

ELECTRICAL POWER CORD

Electrical power cord shall be SOOW or W, water resistant 600V, 90°C, UL and/or CSA approved and applied dependent on amp draw for size.

The power cable entry into the cord cap assembly shall first be made with a compression fitting. Each individual lead shall be stripped down to bare wire, at staggered intervals, and each strand shall be individually separated. This area of the cord cap shall then be fitted with an epoxy compound potting which will prevent water contamination to gain entry even in the event of wicking or capillary attraction.

The power cord leads shall then be connected to the motor leads with extra heavy connectors having brass inserts with a screwed wire-to-wire connection.

MOTOR

The stator, rotor and bearings shall be mounted in a sealed submersible type housing. The stator windings shall have Class F insulation (155°C or 311°F) and a dielectric oil-filled motor, NEMA B design (three-phase), NEMA L design (single-phase).

The pump and motor shall be specifically designed so that they may be operated partially dry or completely submerged in the liquid being pumped.

Stators shall be securely held in place with a removable end ring and threaded fasteners. No special tools shall be required for pump and motor disassembly.

Pump shall be equipped with heat sensors. The heat sensor(s) (one on single-phase, two on three-phase) shall be a low resistance, bimetal disc that is temperature sensitive. It (they) shall be mounted directly in the stator and sized to open at 120°C or 130°C and automatically reset at 30–35°C differential. The sensor shall be connected in series with the motor starter coil so that the starter is tripped if a heat sensor opens. The motor starter shall be equipped with overload heaters so all normal overloads are protected by an external heater block.

BEARINGS AND SHAFT

An upper radial bearing and a lower thrust bearing shall be required. These shall be permanently lubricated by the dielectric oil that fills the motor housing.

The shaft shall be machined from a solid 416 stainless steel and be a design that is of large diameter with minimum overhand to reduce shaft deflection and prolong bearing life.

SEALS AND SENSORS

The rotor and stator in the motor housing shall be separated and protected from the pumped liquid by an oil-filled seal housing incorporating two type 21 carbon ceramic mechanical seals mounted in tandem. This seal housing shall be equipped with 2 moisture sensing probes installed between the seals, and the sensing of moisture in the seal chamber shall be automatic, continuous, and not require the pump be stopped or removed from the wet well.

PENTAIR HYDROMATIC®

IMPELLERS

Impeller shall be 316 Stainless Steel multivane, semi-open, non-overloading design. They can either be factory or field trimmed to meet specific performance conditions. Impellers shall be dynamically balanced at the factory and machined for threading on to the pump shaft.

GRINDER CUTTERS

The combination centrifugal pump impeller and grinder unit shall be attached to the common motor and pump shaft made of 416 stainless steel. The grinder unit shall be on the suction side of the pump impeller and discharge directly into the impeller inlet, leaving no exposed shaft to permit packing of ground solids. The grinder shall consist of two stages. The cutting action of the second stage shall be perpendicular to the plane of the first cut for better control of the particle size. The grinder shall be capable of grinding normal domestic sewage. Both stationary and rotating cutters shall be made of 440C stainless steel hardened to Rockwell 60C and ground to close tolerance.

The upper (axial) cutter and stationary cutter ring shall be reversible to provide new cutting edges to double life. The stationary cutter ring shall be a slip fit into the suction opening of the volute and held in place by three (3) 300 series stainless steel screws and a retaining ring. The lower (radial) cutter shall macerate the solids against the I.D. of the cutter ring and extrude them through the slots of the cutter ring. The upper (axial) cutter shall cut off the extrusions, as they emerge from the slots of the cutter ring to eliminate any roping effect that may occur in single stage cutting action. The upper (axial) cutter shall fit over the hub of the impeller and the lower (radial) cutter shall be slip fit and secured by means of peg and hole and rotate simultaneously with the rotation of the shaft and impeller. The grinding mechanism shall be locked to the shaft by a 300 series stainless steel countersunk washer in conjunction with a 300 series stainless steel flat head cap screw threaded into the end of the shaft.

TESTING

Commercial testing shall be required and include the following:

The pump shall be visually inspected to confirm that it is built in accordance with the specification as to HP, voltage, phase and hertz.

The motor and seal housing chambers shall be hi-potted to test for moisture content and/or insulation defects.

Pump shall be allowed to run dry to check for proper rotation.

Discharge piping shall be attached, the pump submerged in water and amp readings shall be taken in each leg to check for an unbalanced stator winding. If there is a significant difference in readings, the stator windings shall be checked with a bridge to determine if an unbalanced resistance exists. If so, the stator will be replaced.

PAINT

The pump shall be painted with waterborne hybrid acrylic/alkyd paint. This custom engineered, quick dry paint shall provide superior levels of corrosion and chemical protection.

HAZARDOUS LOCATION SUBMERSIBLE SEWAGE GRINDER PUMPS

GENERAL

Contractor shall furnish all labor, materials, equipment and incidentals required to provide _____ (qty.) submersible centrifugal hazardous location sewage grinder pump(s) for NEC class 1, division 1, groups C, D Hazardous locations, as specified herein.

OPERATION CONDITIONS

Each pump shall be rated _____ hp, _____ volts, _____ phase, _____ hertz, and _____ rpm. The unit shall produce _____ U.S. GPM at _____ feet TDH.

CONSTRUCTION

Each pump shall be of the sealed submersible type, model _____ as manufactured by Pentair Hydromatic. The pump volute, motor and seal housing shall be high quality gray cast iron, ASTM A-48, Class 30. All external mating parts shall be machined and Nitrile O-ring sealed on a beveled edge. Gaskets shall not be acceptable. All fasteners exposed to the pumped liquids shall be 300 series stainless steel.

ELECTRICAL POWER CORD

Electrical power cord shall be SOOW or W, water resistant 600V, 90°C, UL and/or CSA approved and applied dependent on amp draw for size.

The power cable entry into the cord cap assembly shall first be made with a compression fitting. Each individual lead shall be stripped down to bare wire, at staggered intervals, and each strand shall be individually separated. This area of the cord cap shall then be fitted with an epoxy compound potting which will prevent water contamination to gain entry even in the event of wicking or capillary attraction.

The power cord leads shall then be connected to the motor leads with extra heavy connectors having brass inserts with a screwed wire-to-wire connection.

MOTOR

The stator, rotor and bearings shall be mounted in a sealed submersible type housing. The stator windings shall have Class F insulation (155°C or 311°F) and a dielectric oil-filled motor, NEMA B design (three-phase), NEMA L design (single-phase).

The pump and motor shall be specifically designed so that they may be operated partially dry or completely submerged in the liquid being pumped.

Stators shall be securely held in place with a removable end ring and threaded fasteners. No special tools shall be required for pump and motor disassembly.

Pump shall be equipped with heat sensors. The heat sensor(s) (one on single-phase, two on three-phase) shall be a low resistance, bimetal disc that is temperature sensitive. It (they) shall be mounted directly in the stator and sized to open at 120°C or 130°C and automatically reset at 30–35°C differential. The sensor shall be connected in series with the motor starter coil so that the starter is tripped if a heat sensor opens. The motor starter shall be equipped with overload heaters so all normal overloads are protected by an external heater block.

BEARINGS AND SHAFT

An upper radial bearing and a lower thrust bearing shall be required. These shall be permanently lubricated by the dielectric oil that fills the motor housing.

The shaft shall be machined from a solid 416 stainless steel and be a design that is of large diameter with minimum overhand to reduce shaft deflection and prolong bearing life.

SEALS AND SENSORS

The rotor and stator in the motor housing shall be separated and protected from the pumped liquid by an oil-filled seal housing incorporating two type 21 carbon ceramic mechanical seals mounted in tandem. This seal housing shall be equipped with two moisture sensing probes installed between the seals, and the sensing of moisture in the seal chamber shall be automatic, continuous, and not require the pump be stopped or removed from the wet well.

IMPELLERS

Impeller shall be 316 Stainless Steel multi-vane, semi-open, non-overloading design. They can either be factory or field trimmed to meet specific performance conditions. Impellers shall be dynamically balanced at the factory and machined for threading on to the pump shaft.

GRINDER CUTTERS

The combination centrifugal pump impeller and grinder unit shall be attached to the common motor and pump shaft made of 416 stainless steel. The grinder unit shall be on the suction side of the pump impeller and discharge directly into the impeller inlet, leaving no exposed shaft to permit packing of ground solids. The grinder shall consist of two stages. The cutting action of the second stage shall be perpendicular to the plane of the first cut for better control of the particle size. The grinder shall be capable of grinding normal domestic sewage. Both stationary and rotating cutters shall be made of 440C stainless steel hardened to Rockwell 60C and ground to close tolerance.

The upper (axial) cutter and stationary cutter ring shall be reversible to provide new cutting edges to double life. The stationary cutter ring shall be a slip fit into the suction opening of the volute and held in place by three (3) 300 series stainless steel screws and a retaining ring. The lower (radial) cutter shall macerate the solids against the I.D. of the cutter ring and extrude them through the slots of the cutter ring. The upper (axial) cutter shall cut off the extrusions, as they emerge from the slots of the cutter ring to eliminate any roping effect that may occur in single stage cutting action. The upper (axial) cutter shall fit over the hub of the impeller and the lower (radial) cutter shall be slip fit and secured by means of peg and hole and rotate simultaneously with the rotation of the shaft and impeller. The grinding mechanism shall be locked to the shaft by a 300 series stainless steel countersunk washer in conjunction with a 300 series stainless steel flat head cap screw threaded into the end of the shaft.

TESTING

Commercial testing shall be required and include the following:

The pump shall be visually inspected to confirm that it is built in accordance with the specifications as to hp, voltage, phase and hertz.

The motor and seal housing chambers shall be hi-potted to test for moisture content and/or insulation defects.

Pump shall be allowed to run dry to check for proper rotation.

Discharge piping shall be attached, the pump submerged in water, and amp readings shall be taken in each leg to check for an unbalanced stator winding. If there is a significant difference in readings, the stator windings shall be checked with a bridge to determine if an unbalanced resistance exists. If so, the stator will be replaced.

PAINT

The pump shall be painted with waterborne hybrid acrylic/alkyd paint. This custom engineered, quick dry paint shall provide superior levels of corrosion and chemical protection.

LOW PRESSURE SEWAGE SYSTEMS

GENERAL

Contractor shall furnish all labor, materials, equipment and incidentals required to provide simplex/duplex pumping system as specified herein. The system shall be by the same manufacturer as that supplying the pump and motor control panel so as to ensure suitability and assurance of experience in matching the equipment together and to ensure single source responsibility for the equipment.

DESCRIPTION

System shall consist of sewage grinder pump(s), level control switches, discharge plumbing with hydraulically sealed discharge flange, pump mounting plates with bottom rail supports, upper rail supports, lifting chain, pedestal mount and cord sealing plate for panel or NEMA 4 junction box; to be installed in factory fabricated fiberglass basin with cover or on-site concrete basin. A NEMA 4X weatherproof control box shall be supplied for mounting at the sump site or remote from the basin as required.

OPERATING CONDITIONS

Each pump shall have a capacity of _____ GPM against a total head of _____ feet. Pump motor shall be _____ hp, _____ phase, _____ volts, _____ rpm and_____ hertz. Pump performance shall be as shown on curve _____. Separate specifications for pump and motor.

SUMP LEVEL CONTROLS

Float switches shall be supplied to control sump level and alarm signal, if furnished. The switches shall be sealed in a solid polypropylene float for corrosion and shock resistance. The support wire shall have a heavy neoprene jacket. A weight shall be attached to cord above the float to hold switch in place in sump and efficiently prevent sharp bends in the cord when the float operates. A quantity of _____ floats shall be provided to control level. An additional switch shall be provided with optional alarm.

OPERATION OF SYSTEM

SIMPLEX: On sump level rise lower switch shall first be energized, then upper level switch shall next energize and start pump. With pump operating, sump level shall lower to low switch turn-off setting and pump shall stop. If level continues to rise when pump is operating, alarm switch shall energize and signal the alarm, where used. All level switches shall be adjustable for level setting from the surface.

DUPLEX: On sump level rise lower switch shall first be energized, then upper level switch shall next energize and start lead pump. With lead pump operating, sump level shall lower to low switch turn-off setting and pump shall stop. Alternating relay shall index on stopping of pump so that lag pump will start first on next operation and become lead pump. If sump level continues to rise when lead pump is operating, override switch shall energize and start lag pump. Both lead and lag pump shall operate together until low-level switch turns off both pumps. If level continues to rise when both pumps are operating, alarm switch shall energize and signal the alarm, where used. If one pump should fail for any reason, the second pump shall operate on the override control and if level rises above override control, alarm shall signal, where used. All level switches shall be adjustable for level setting from the surface.

CHECK VALVE AND PIPING

The discharge piping shall include a ball-type check valve with hydraulically sealed discharge flange and a gate or true union ball valve for each pump. Discharge from station shall be fitted with NPT coupling(s). All piping external to the station shall be furnished and installed by the contractor.

BASIN

Basin shall be made from a fiberglass reinforced polyester resin. Resins used shall be commercial grade polyester and evaluated as a laminate test or determined by previous service to be acceptable for the intended environment. The reinforcing material shall be commercial grade glass fiber having a coupling agent to provide a suitable bond between the glass reinforcement and the resin. The manufacturer may supply either continuous strand, chopped-strand, continuous mat and/or non-continuous mat or non-continuous glass strands having fiber lengths from 0.5 to 2.0 inches. The basin shall be water-tight.

Surface – The inner surface shall be smooth and resin rich, free of cracks, exposed fibers, porosity and crazing. The exterior surface shall be relatively smooth with no exposed fibers or sharp projections. Foreign inclusions, dry spots, pinholes or pits, de-laminations, large dimples not meeting thickness requirements and air bubbles are not acceptable.

Tank – Wall thickness shall vary with the basin height to provide the aggregate strength necessary to meet the tensile and flexural physical properties requirements. The basin bottom shall be of sufficient thickness to withstand applicable hydrostatic uplift pressure. In saturated conditions, the center deflection of the empty basin bottom shall be less than 3/8" elastic deflection and shall not interfere with bottom pump mounting requirements. Any mounting studs, plates, cap screws into tank bottom should be stainless steel and resin covered except for threads.

Tank Collar (Anti-Flotation) – A means to counteract buoyancy forces shall be provided on the tank bottom in the form of a ring and shall extend a minimum of 2" beyond the O. D. of the basin wall. Wall and collar should be blended with a radius not to exceed 1-1/2" beyond wall O.D.

Top Flange – The top flange should be parallel to the tank bottom/collar and perpendicular to the tank wall. Corrosion resistant inserts shall be embedded in the top flange for securing the basin cover. The inserts shall be totally encapsulated to prevent turning, pullout and corrosion.

INLET FLANGE

A one-piece, flexible basin inlet fitting for 4" SCH 40 plastic pipe shall be shipped loose for field installation.

COVER

A one piece, solid polypropylene (24" dia. only) or fiberglass (24" or 30" dia.) cover shall be provided for each installation. The cover shall be constructed with a minimum thickness of 3/8". The cover surface shall have a non-skid design and shall be water-tight. Cover shall be bolted to the basin with stainless steel cap screws. All 24" and 30" diameter basin covers are designed for “light duty” loading. Design of cover allows for basin to be mounted flush with the ground.

Specifications – TG-PRO SYSTEM

GRINDER PACKAGE SYSTEM

GENERAL

The manufacturer shall furnish and deliver fully assembled grinder pump stations to the contractor or owner. Simplex units, containing one grinder pump and all necessary parts and equipment, shall be installed in fiberglass reinforced polyester tanks for outside installation. All equipment shall be factory installed, except for externally mounted control panel, gravity sewer inlet hubs and pump assembly, which are to be installed in the field.

Each preassembled simplex station shall include the basin, basin cover, complete grinder pump, quick disconnect system, check valve, junction box, start-stop level controls, motor high temperature shut-off, motor seal leak alarm, high water alarm, all internal wiring terminating into the junction box, shut-off valve, and flexible discharge piping.

The stations shall be by the same manufacturer as supplying the pump and control panel so as to ensure suitability and assurance of experience in matching the equipment required for a complete grinder pumping station together, and to ensure single source responsibility for the complete package.

BASIN AND COVER

The basin shall be 24" minimum diameter with a depth as shown on the plans. The basin shall be molded of fiberglass reinforced polyester resin manufactured by the filament wound technique to assure that the interior surface is smooth and resin rich. The basin shall have a minimum wall thickness of 1/4". An antiflotation ring base shall be molded as an integral part of the basin assembly and shall be a minimum of 3" in diameter.

The cover shall be of reinforced fiber filled to withstand 350 PSF live load rating. The cover shall be bolted to the basin with stainless steel cap screws. Stainless nuts shall be embedded in the fiberglass to prevent turning.

PIPING MODULE

Discharge piping shall be 1-1/4" flexible piping. Shut-off valve shall be 1-1/4" with shut-off extension handle that is operational without personnel entering the wet-well.

CHECK VALVE

Check valve shall be 1-1/4" cast threaded on one end with a hydraulic flange on the other end. Check valve shall be self-cleaning with a neoprene rubber ball and shall allow the pump to be removed from the station without making any disconnects.

JUNCTION BOX

A UL NEMA 6 junction box shall be provided. The junction box shall be formed from corrosion resistant, flame retardant thermoplastic. Junction box shall have a hinged cover for ease of service. Float switches shall be suspended from a stainless steel holder securely mounted to the basin wall or PVC float tree.

CONSTRUCTION

Each pump shall be of the sealed submersible type, model HPG, HPD, or HPGR as manufactured by Pentair Hydromatic. The pump volute, motor and seal housing shall be high quality gray cast iron, ASTM A-48, Class 30. All external mating parts shall be machined and Nitrile O-ring sealed on a beveled edge. Gaskets shall not be acceptable. All fasteners exposed to the pumped liquids shall be 300 series stainless steel.

POWER CORD

Electrical power cord shall be water resistant 600V, 90ºC, UL and/or CSA approved and applied dependent on amp draw for size.

The pump shall be protected with compression fitting and epoxy potted area at the power cord entry to the pump. A separation between the junction areas of the pump and the motor by a stator lead sealing gland or terminal board shall not be acceptable.

The power cable entry into the cord cap assembly shall first be made with a compression fitting. Each individual lead shall be stripped down to bare wire, at staggered intervals, and each strand shall be individually separated. This area of the cord cap shall then be filled with an epoxy compound potting which will prevent water contamination to gain entry even in the event of wicking or capillary attraction.

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The power cord leads shall then be connected to the motor leads with extra heavy connectors having brass inserts with a screwed wire-to-wire connection, rather than a terminal board that allows for possible leaks.

The cord cap assembly where bolted to the connection box assembly shall be sealed with a Nitrile o-ring on a beveled edge to assure proper sealing.

MOTOR

The stator, rotor and bearings shall be mounted in a sealed submersible type housing. The stator windings shall have Class F insulation (155°C or 311°F) and a dielectric oil-filled motor, NEMA B design (3 phase), NEMA L design (1 phase). Because air-filled motors do not dissipate heat as efficiently as oil-filled motors and air is an insulator, they shall not be acceptable.

The pump and motor shall be designed so that they may be operated partially dry or completely submerged in the liquid being pumped. The pump shall not require cooling water jackets. Dependence upon, or use of, water jackets for supplemental cooling shall not be acceptable.

Stators shall be secured and held in place with a removable end ring and threaded fasteners. No special tools shall be required for pump and motor disassembly.

Pumps shall be equipped with heat sensors. The heat sensors shall be a low resistance, bimetal disk that is temperature sensitive. It shall be mounted directly in the stator and sized to open at 120°C or 130°C and automatically reset at 30–35°C differential. The sensor shall be connected in series with the motor starter coil so that the starter is tripped if the heat sensor opens. The motor starter shall be equipped with overload heaters so all normal overloads are protected by external heater block.

BEARINGS AND SHAFT

An upper radial bearing and a lower thrust bearing shall be required. These shall be permanently lubricated by the dielectric oil that fills the motor housing. Sealed grease packed bearings shall not be acceptable. Bearings that require lubrication according to a prescribed schedule shall not be acceptable. Units that require the use of more than two bearings shall not be acceptable. Bearings shall be designed for a B-10 life of 50,000 hours.

SEALS

Seals shall be used with rotating seal faces being carbon and the stationary seal faces to be ceramic. The lower seal shall be replaceable without disassembly of the seal chamber and without the use of special tools. Units equipped with opposed mechanical seals shall not be acceptable.

IMPELLER

Impeller shall be of bronze or composite construction and non-overloading. Impeller shall be of the multi-vane, semi-open design with pump-out vanes on the backside of the impeller to prevent grit and other materials from collecting in the seal area. Impeller shall not require special coatings. Because most impeller coatings do not remain beyond the very early life of the impeller, performance data submitted shall be based on performance with an uncoated impeller. Attempts to improve efficiency by coating impeller shall not be acceptable. Impellers shall be dynamically balanced.

GRINDER CUTTERS

The combination centrifugal pump impeller and grinder unit shall be attached to the common motor and pump shaft made of 416 stainless steel. The grinder unit shall be on the suction side of the pump impeller and discharge directly into the impeller inlet, leaving no exposed shaft to permit packing of ground solids. The grinder shall consist of two stages. The cutting action of the second stage shall be perpendicular to the plane of the first cut for better control of the particle size. The grinder shall be capable of grinding normal domestic sewage. Both stationary and rotating cutters shall be made of 440C stainless steel hardened to Rockwell 60C and ground to close tolerance.

The upper (axial) cutter and stationary cutter ring shall be reversible to provide new cutting edges to double life. The stationary cutter ring shall be pressed into the suction opening of the volute and held in place by three (3) 300 series stainless steel screws.

The lower (radial) cutter shall macerate the solids against the I.D. of the cutter ring and extrude them through the slots of the cutter ring. The upper (axial) cutter shall cut off the extrusions as they emerge from the slots of the cutter ring to eliminate any roping effect that may occur in single stage cutting action. The upper (axial) cutter shall fit over the hub of the impeller and the lower (radial) cutter shall be slip-fit and secured by means of peg hole and rotate simultaneously with the rotation of the shaft and impeller. The grinding mechanism shall be locked to the shaft by a 300 series stainless steel countersunk washer in conjunction with a 300 series stainless steel flat head cap screw threaded into the end of the shaft.

TESTING

Commercial testing shall be required and include the following:

Pump shall be visually inspected to confirm that it is built in accordance with the specification as to horsepower, voltage, phase, and hertz.

The motor and seal housing chambers shall be hi-potted to test for moisture content and/or insulation defects.

Pumps shall be allowed to run dry to check for proper rotation.

Discharge piping shall be attached, the pump submerged in water, and amp readings shall be taken in each leg to check for any unbalance in stator winding. If there is a significant difference in readings, the stator windings shall be checked with a bridge to determine if an unbalanced resistance exists. If so, the stator will be replaced.

CONTROL PANEL (HPG model)

A Hydromatic control panel shall be supplied, compatible with package equipment specified herein. The motor control panel shall be assembled and tested by a shop meeting UL standard 508 for industrial controls.

CONSTRUCTION

The controls for the pump shall be contained in a noncorrosive fiberglass enclosure meeting NEMA 4X requirements with a hinged door and neoprene gasket. The enclosure shall have provisions for padlocking. A steel back panel with electroplated bright zinc and clear chromate finish shall be provided. A painted steel back panel will not be acceptable.

Run lights and hand-off-auto switches shall be provided. These switches shall be mounted on an electroplated bright zinc with clear chromate finish steel bracket and shall be properly labeled as to function. The hand-off-auto switch shall be rocker type with an electrical life of 50,000 operations. The run light shall match the hand-off-auto switch in appearance and have an electrical life of 5,000 hours. Run light shall be red.

The incoming power shall be _____ volts, _____ phase, 60 hertz service. Terminal blocks with box type lugs shall be supplied to terminate all wiring for floats and heat and seal sensors for the pump, if required. The pump leads shall be terminated at the overload relay or at box type terminal blocks. The terminal blocks for the float connections shall be on the pump controller.

A circuit breaker shall be used to protect from line faults and to disconnect the pump from the incoming power. Circuit breaker shall be thermal magnetic and sized to meet NEC requirements for motor controls.

The magnetic starters shall include a contactor with a minimum mechanical life of 3,000,000 operations and a minimum contact life of 1,000,000 operations. The magnetic starter shall include an overload relay that is ambient temperature compensated and bimetallic. The overload relay shall have test and reset buttons and be capable of being set in either manual or automatic reset mode.

Control voltage shall be 120VAC and may be accomplished by the means of a transformer or available line voltage. A control fuse and on/off switch shall protect and isolate the control voltage from the line.

All wiring shall be color-coded to facilitate maintenance and repair of the control panel. Where a color is repeated, number coding shall be added. All ground connections shall be made with ring tongue terminals and star washers to assure proper ground.

Pump controller shall have provisions for connecting float level controls and heat sensor monitors, where applicable, to box type lug connectors. Box type lug connectors shall be made of polyamide thermoplastic to exclude aging due to heat influences.

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Specifications – TH-PRO SYSTEM

SEMI-POSITIVE DISPLACEMENT PUMP AND JUNCTION BOX SYSTEM

GENERAL

The manufacturer shall furnish and deliver fully assembled grinder pump stations to the contractor or owner. Simplex units, containing one grinder pump and all necessary parts and equipment, shall be installed in fiberglass reinforced polyester tanks for outside installation. All equipment shall be factory installed, except for externally mounted control panel, gravity sewer inlet hubs and pump assembly, which are to be installed in the field.

Each preassembled simplex station shall include the basin, basin cover, complete grinder pump, quick disconnect system, check valve, junction box, start-stop level controls, motor high temperature shut-off, motor seal leak alarm, high water alarm, all internal wiring terminating into the junction box, shut-off valve, and flexible discharge piping.

The stations shall be by the same manufacturer as supplying the pump and control panel so as to ensure suitability and assurance of experience in matching the equipment required for a complete grinder pumping station together, and to ensure single source responsibility for the complete package.

PUMP CONSTRUCTION

Pump shall be a semi-positive displacement sealed grinder type, model HPD200 manufactured by Pentair Hydromatic. The pump castings shall be gray cast iron, ASTM A-48, Class 30. All external mating parts shall be machined with Nitrile O-ring seals. Fiber or paper gaskets shall not be acceptable. All fasteners exposed to the pumped liquid shall be 300 series stainless steel.

ELECTRICAL POWER/CONTROL CORD

The motor power cord shall be SJOOW water resistant and CSA and/or UL approved.

The power cable entry into the cord cap assembly shall first be made with a rubber compression washer and compression nut. Each individual lead shall be stripped down to bare wire, at staggered intervals, and each strand shall be individually separated. A heat shrink tube filled with epoxy shall seal the outer cable jacket and the individual leads to prevent water contamination to gain entry even in the event of wicking or capillary attraction.

MOTOR

Pump motor shall be oil-filled to promote superior cooling and longevity. Air-filled motors shall not be considered equal.

The stator, rotor and bearings shall be mounted in a sealed submersible frame. The stator winding shall be open type with Class F insulation (155˚ C or 311˚ F) and NEMA B design (three-phase) and NEMA L design (single-phase). Single-phase motors shall be capacitor start, capacitor run type for high start torque.

The motor shall be mounted in a three-quarter motor frame attached to the bearing housing with threaded fasteners.

The motor frame shall be filled with dielectric type oil for maximum heat dissipation. The pump and motor shall be specifically designed so that they may be operated two-thirds or completely submerged in the liquid being pumped. The pump shall not require cooling water jackets. Dependence upon, or use of, water jackets for supplemental cooling shall not be acceptable.

BEARINGS AND SHAFT

Motor shall have an upper single row ball radial bearing and a lower single row ball thrust bearing. Ball bearings shall be designed for 50,000 hours B-10 life. Bearings are to be permanently lubricated by the dielectric oil that fills the motor housing. Grease-packed ball bearings requiring periodic maintenance for lubrication shall not be acceptable.

The common motor pump and grinder shaft shall be machined from solid #400 series stainless steel and be designed for minimum shaft overhang to reduce shaft deflection and prolong bearing life.

The shaft shall be threaded to mount the pump impeller and grinder impeller.

SEALS

Motor shall be protected by one type 21 carbon ceramic mechanical seal. Seal face shall be carbon and ceramic and lapped to a flatness of one light band. All hardware is to be 300 series stainless steel.

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IMPELLER

Stator boot shall be designed for rough duty service and shall be an axial double-helix positive-displacement type. The stator boot shall be constructed of Nitrile, with the progressing cavity chamber molded integral to the stator boot. Stator boot shall be retained within the volute pumping chamber by means of a stainless steel retaining ring secured with 400 series fasteners.

Rotor shall be designed for rough duty service and shall be a single-lobe axial helix type. The rotor shall be constructed of 300 series stainless steel designed for close slip-fit over motor shaft and retained by a lower roll pin.

GRINDER CUTTERS

Grinder assembly shall consist of grinder impeller and shredding ring and be mounted directly below the volute passage. Grinder impeller shall be threaded onto stainless shaft and be locked with a screw and washer. The shredding ring shall be pressed into an iron holding flange for easy removal. Flange shall be provided with tapped back-off holes so that screws can be used to push the shredding ring from the housing. Cutter and shredding ring are 440 stainless steel hardened to Rockwell 60C.

BASIN AND COVER

The basin shall be 24" minimum diameter with a depth as shown on the plans. The basin shall be molded of fiberglass reinforced polyester resin manufactured by the filament wound technique to assure that the interior surface is smooth and resin rich. The basin shall have a minimum wall thickness of 1/4". An antiflotation ring base shall be molded as an integral part of the basin assembly and shall be a minimum of 3" in diameter.

The cover shall be of reinforced fiber filled to withstand 350 PSF live load rating. The cover shall be bolted to the basin with stainless steel cap screws. Stainless nuts shall be embedded in the fiberglass to prevent turning.

HARD PIPED ASSEMBLY

Discharge piping shall be 1-1/4" PVC hard piped. Piping shall connect to a 1-1/4" stainless steel discharge flange.

Check valve shall be ball type with a corrosion resistant neoprene ball. The ball shall move automatically out of the path of flow providing an unobstructed flow through the valve body. Upon pump shut-off the ball shall automatically roll to the closed position to provide a positive seal against back pressure or back flow. Valve shall be a single-union type.

INLET FLANGE

A one-piece, flexible basin inlet fitting for 4" SCH 40 plastic pipe shall be shipped loose for field installation.

JUNCTION BOX

A UL NEMA 6 junction box shall be provided. The junction box shall be formed from corrosion resistant, flame retardant thermoplastic. Junction box shall have a hinged cover for ease of service. Float switches shall be suspended from a stainless steel holder securely mounted to the basin wall or PVC float tree.

CONTROL PANEL

Control panel shall be a Hydromatic simplex 230V/60 Hz/1 ph operation. The control panel assembly shall be assembled and tested by a shop meeting UL Standard 508 for industrial controls. Panel shall be equipped for two normally open weighted float switches.

CONSTRUCTION

The controls for the pump shall be contained in a noncorrosive fiberglass enclosure meeting NEMA 4X requirements with a hinged door and neoprene gasket. The enclosure shall have provisions for padlocking. A steel back panel with electroplated bright zinc and clear chromate finish shall be provided. A painted steel back panel will not be acceptable.

Run lights and hand-off-auto switches shall be provided. These switches shall be mounted on an electroplated bright zinc with clear chromate finish steel bracket and shall be properly labeled as to function. The hand-off-auto switch shall be rocker type with an electrical life of 50,000 operations. The run light shall match the hand-off-auto switch in appearance and have an electrical life of 5,000 hours. Run light shall be red.

The incoming power shall be _____ volts, _____ phase, 60 hertz service. Terminal blocks with box type lugs shall be supplied to terminate all wiring for floats and heat and seal sensors for the pump, if required. The pump leads shall be terminated at the overload relay or at box type terminal blocks. The terminal blocks for the float connections shall be on the pump controller.

A circuit breaker shall be used to protect from line faults and to disconnect the pump from the incoming power. Circuit breaker shall be thermal magnetic and sized to meet NEC requirements for motor controls.

The magnetic starters shall include a contactor with a minimum mechanical life of 3,000,000 operations and a minimum contact life of 1,000,000 operations. The magnetic starter shall include an overload relay that is ambient temperature compensated and bimetallic. The overload relay shall have test and reset buttons and be capable of being set in either manual or automatic reset mode.

Control voltage shall be 120VAC and may be accomplished by the means of a transformer or available line voltage. A control fuse and on/off switch shall protect and isolate the control voltage from the line.

All wiring shall be color-coded to facilitate maintenance and repair of the control panel. Where a color is repeated, number coding shall be added. All ground connections shall be made with ring tongue terminals and star washers to assure proper ground.

Pump controller shall have provisions for connecting float level controls and heat sensor monitors, where applicable, to box type lug connectors. Box type lug connectors shall be made of polyamide thermoplastic to exclude aging due to heat influences.

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CENTRIFUGAL PUMP AND JUNCTION BOX SYSTEM

GENERAL

The manufacturer shall furnish and deliver fully assembled grinder pump stations to the contractor or owner. Simplex units, containing one grinder pump and all necessary parts and equipment, shall be installed in fiberglass reinforced polyester tanks for outside installation. All equipment shall be factory installed, except for externally mounted control panel, gravity sewer inlet hubs and pump assembly, which are to be installed in the field.

Each preassembled simplex station shall include the basin, basin cover, complete grinder pump, quick disconnect system, check valve, junction box, start-stop level controls, motor high temperature shut-off, motor seal leak alarm, high water alarm, all internal wiring terminating into the junction box, shut-off valve, and flexible discharge piping.

The stations shall be by the same manufacturer as supplying the pump and control panel so as to ensure suitability and assurance of experience in matching the equipment required for a complete grinder pumping station together, and to ensure single source responsibility for the complete package.

PUMP CONSTRUCTION

Pump shall be a semi-positive displacement sealed grinder type, model HGRS200 as manufactured by Pentair Hydromatic. The pump castings shall be gray cast iron, ASTM A-48, Class 30. All external mating parts shall be machined with Nitrile O-ring seals. Fiber or paper gaskets shall not be acceptable. All fasteners exposed to the pumped liquid shall be 300 series stainless steel.

ELECTRICAL POWER/CONTROL CORD

The motor power cord shall be SJOOW water resistant and CSA and/or UL approved.

The power cable entry into the cord cap assembly shall first be made with a rubber compression washer and compression nut. Each individual lead shall be stripped down to bare wire, at staggered intervals, and each strand shall be individually separated. A heat shrink tube filled with epoxy shall seal the outer cable jacket and the individual leads to prevent water contamination to gain entry even in the event of wicking or capillary attraction.

MOTOR

Pump motor shall be oil-filled to promote superior cooling and longevity. Air-filled motors shall not be considered equal.

The stator, rotor and bearings shall be mounted in a sealed submersible frame. The stator winding shall be open type with Class F insulation (155˚ C or 311˚ F) and NEMA B design (three-phase) and NEMA L design (single-phase). Single-phase motors shall be capacitor start, capacitor run type for high start torque.

The motor shall be mounted in a three-quarter motor frame attached to the bearing housing with threaded fasteners.

The motor frame shall be filled with dielectric type oil for maximum heat dissipation. The pump and motor shall be specifically designed so that they may be operated two-thirds or completely submerged in the liquid being pumped. The pump shall not require cooling water jackets. Dependence upon, or use of, water jackets for supplemental cooling shall not be acceptable.

BEARINGS AND SHAFT

Motor shall have an upper single row ball radial bearing and a lower single row ball thrust bearing. Ball bearings shall be designed for 50,000 hours B-10 life. Bearings are to be permanently lubricated by the dielectric oil that fills the motor housing. Grease-packed ball bearings requiring periodic maintenance for lubrication shall not be acceptable.

The common motor pump and grinder shaft shall be machined from solid #400 series stainless steel and be designed for minimum shaft overhang to reduce shaft deflection and prolong bearing life.

The shaft shall be threaded to mount the pump impeller and grinder impeller.

SEALS

Motor shall be protected by one type 21 carbon ceramic mechanical seal. Seal face shall be carbon and ceramic and lapped to a flatness of one light band. All hardware is to be 300 series stainless steel.

IMPELLER

The impeller shall be designed for rough duty service and shall be a five vane, semiopen design with hydrodynamic pump-out vanes on the rear shroud. The impeller shall be constructed of engineered thermoplastic, with a permanently molded, hexagonally locked bronze insert. The impeller shall be a non-overloading design and be factory or field trimmable to meet specific performance conditions. Impeller is to be threaded onto the pump/motor shaft.

GRINDER CUTTERS

Grinder assembly shall consist of grinder impeller and shredding ring and be mounted directly below the volute passage. Grinder impeller shall be threaded onto stainless shaft and be locked with a screw and washer. The shredding ring shall be pressed into an iron holding flange for easy removal. Flange shall be provided with tapped back-off holes so that screws can be used to push the shredding ring from the housing. Cutter and shredding ring are 440 stainless steel hardened to Rockwell 60C.

BASIN AND COVER

The basin shall be 24" minimum diameter with a depth as shown on the plans. The basin shall be molded of fiberglass reinforced polyester resin manufactured by the filament wound technique to assure that the interior surface is smooth and resin rich. The basin shall have a minimum wall thickness of 1/4". An antiflotation ring base shall be molded as an integral part of the basin assembly and shall be a minimum of 3" in diameter.

The cover shall be of reinforced fiber filled to withstand 350 PSF live load rating. The cover shall be bolted to the basin with stainless steel cap screws. Stainless nuts shall be embedded in the fiberglass to prevent turning.

HARD PIPED ASSEMBLY

Discharge piping shall be 1-1/4" PVC hard piped. Piping shall connect to a 1-1/4" stainless steel discharge flange.

Check valve shall be the ball type with a corrosion resistant neoprene ball. The ball shall move automatically out of the path of flow providing an unobstructed flow through the valve body. Upon pump shut-off the ball shall automatically roll to the closed position to provide a positive seal against back pressure or back flow. Valve shall be a single-union type.

INLET FLANGE

A one-piece, flexible basin inlet fitting for 4" SCH 40 plastic pipe shall be shipped loose for field installation.

JUNCTION BOX

A UL NEMA 6 junction box shall be provided. The junction box shall be formed from corrosion resistant, flame retardant thermoplastic. Junction box shall have a hinged cover for ease of service. Float switches shall be suspended from a stainless steel holder securely mounted to the basin wall or PVC float tree.

CONTROL PANEL

Control panel shall be a Hydromatic simplex 230V/60 Hz/1 ph operation. The control panel assembly shall be assembled and tested by a shop meeting UL Standard 508 for industrial controls. Panel shall be equipped for two normally open weighted float switches.

CONSTRUCTION

The controls for the pump shall be contained in a noncorrosive fiberglass enclosure meeting NEMA 4X requirements with a hinged door and neoprene gasket. The enclosure shall have provisions for padlocking. A steel back panel with electroplated bright zinc and clear chromate finish shall be provided. A painted steel back panel will not be acceptable.

Run lights and hand-off-auto switches shall be provided. These switches shall be mounted on an electroplated bright zinc with clear chromate finish steel bracket and shall be properly labeled as to function. The hand-off-auto switch shall be rocker type with an electrical life of 50,000 operations. The run light shall match the hand-off-auto switch in appearance and have an electrical life of 5,000 hours. Run light shall be red.

The incoming power shall be _____ volts, _____ phase, 60 hertz service. Terminal blocks with box type lugs shall be supplied to terminate all wiring for floats and heat and seal sensors for the pump, if required. The pump leads shall be terminated at the overload relay or at box type terminal blocks. The terminal blocks for the float connections shall be on the pump controller.

A circuit breaker shall be used to protect from line faults and to disconnect the pump from the incoming power. Circuit breaker shall be thermal magnetic and sized to meet NEC requirements for motor controls.

The magnetic starters shall include a contactor with a minimum mechanical life of 3,000,000 operations and a minimum contact life of 1,000,000 operations. The magnetic starter shall include an overload relay that is ambient temperature compensated and bimetallic. The overload relay shall have test and reset buttons and be capable of being set in either manual or automatic reset mode.

Control voltage shall be 120VAC and may be accomplished by the means of a transformer or available line voltage. A control fuse and on/off switch shall protect and isolate the control voltage from the line.

All wiring shall be color-coded to facilitate maintenance and repair of the control panel. Where a color is repeated, number coding shall be added. All ground connections shall be made with ring tongue terminals and star washers to assure proper ground.

Pump controller shall have provisions for connecting float level controls and heat sensor monitors, where applicable, to box type lug connectors. Box type lug connectors shall be made of polyamide thermoplastic to exclude aging due to heat influences.

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Specifications – TL-PRO SYSTEM

TL-PRO BASIN SYSTEM – 1-1/4" GRINDER PUMP LIFT-OUT RAIL SYSTEMS AND LIFT-OUT CHECK VALVE RAIL SYSTEMS

GENERAL

Furnish and install a complete grinder pump system consisting of _____ (qty) Hydromatic _____ (model number) submersible grinder pumps and _____ lift-out rail systems, valves, controls, access cover(s) and all other appurtenances to make a complete system.

COMPONENTS

Each lift-out system shall consist of a cast iron discharge base, stainless steel pump guide plate, and cast iron elbow. All exposed nuts, bolts, and fasteners shall be 300 series stainless steel. For hazardous locations, a nonsparking brass guide plate and elbow/check valve will be standard construction.

ELBOW

Discharge elbow shall be 1-1/4" x 2" NPT and shall be integral to the base assembly.

SEALING

Sealing plate/elbow has a female mating end and shall be bolted to pump. A simple downward sliding motion of the pump and guide plate on the guide rails shall cause the unit to be automatically connected and sealed to the base. The open face of the sealing plate shall have dovetailed groove machined into the face to hold a sealing O-ring. The O-ring shall provide a redundant leakproof seal at all operating pressures. For lift-out check valve rail systems, the elbow/check valve shall be bolted to the pump and the discharge flange seal shall provide a leakproof seal.

GUIDE RAILS

Two rail pipes shall be used to guide the pump from the surface to the discharge base connection. The guide rails shall be 1" Schedule 10 or Schedule 40 _____ pipe. The weight of the pump shall bear solely on the discharge base and not on the guide rails. Rail systems that require the pump to be supported by legs that might interfere with the flow of solids into the pump suction will not be considered equal. The guide rails shall be firmly attached to the access hatch frame. Systems deeper than 20 feet shall use an intermediate guide for each 12 feet of wetwell depth.

LIFTING CHAIN

An adequate length of _____ lifting chain shall be supplied for removing pump. The chain shall be of sufficient length to provide ease of pump removal.

CHECK VALVE SYSTEMS

The lift-out check valve shall be of the ball type with a corrosion resistant neoprene ball. The ball shall be the only moving part and shall move automatically out of the path of flow, thus providing an unobstructed smooth flow through the valve body. Upon pump shut-off, the ball shall automatically roll to the closed position to provide a positive seal against back pressure or back flow. A stainless steel check valve insert is required with the TL-PRO-CV only.

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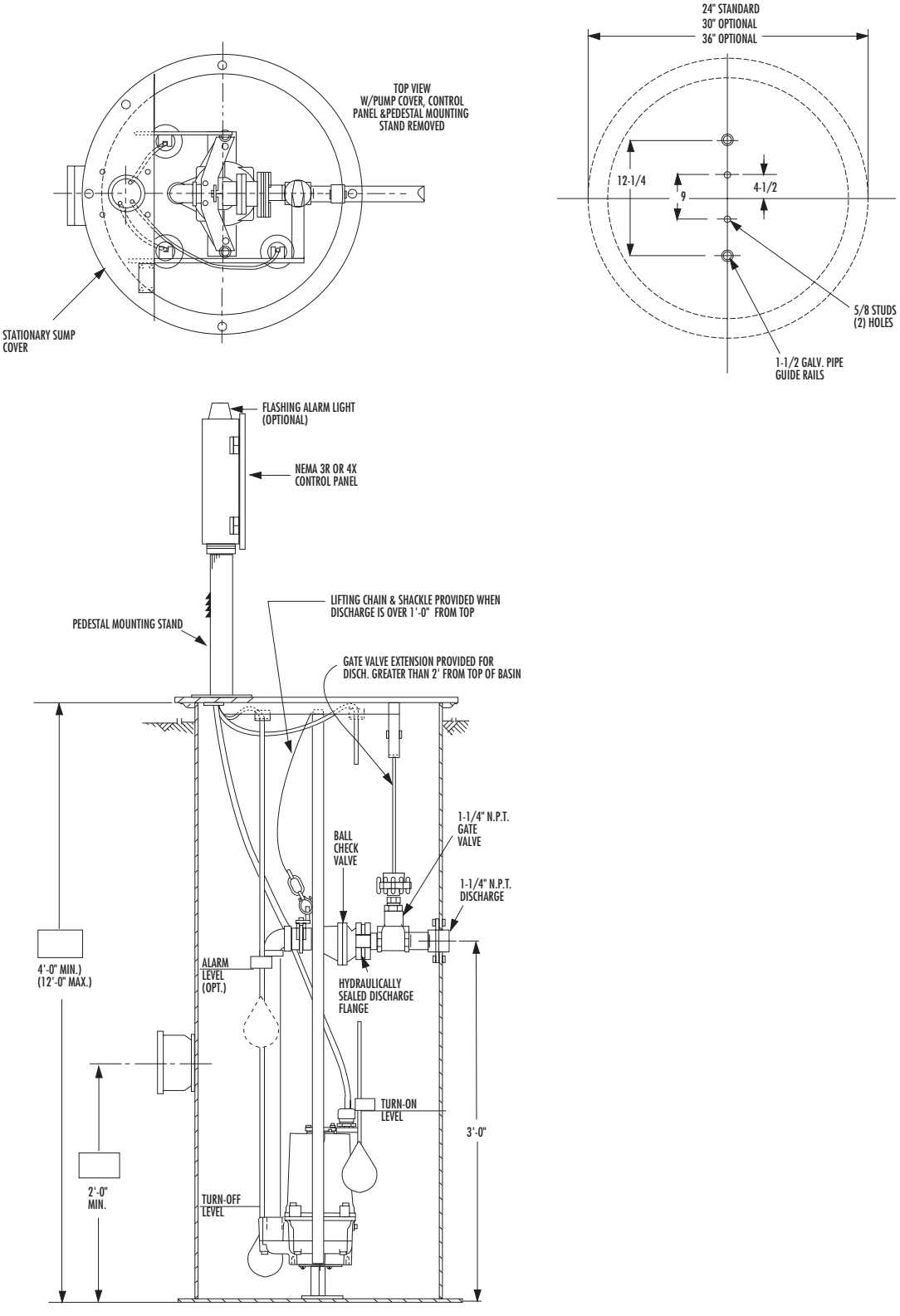
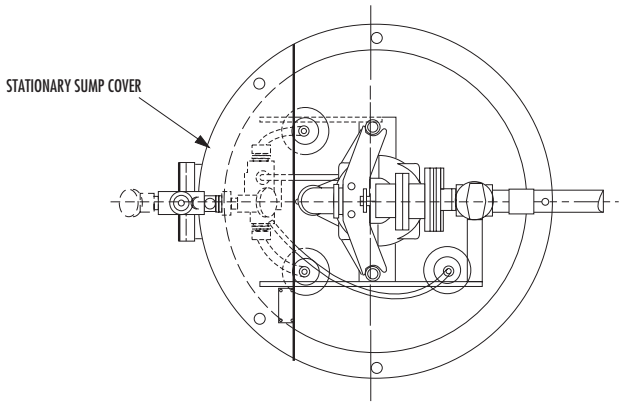
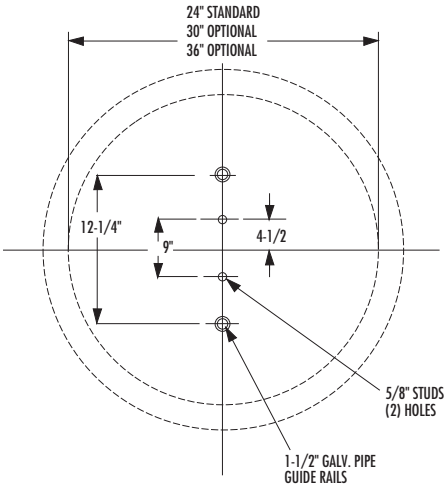
SIMPLEX INSTALLATION WITH PEDESTAL MOUNTED PANEL

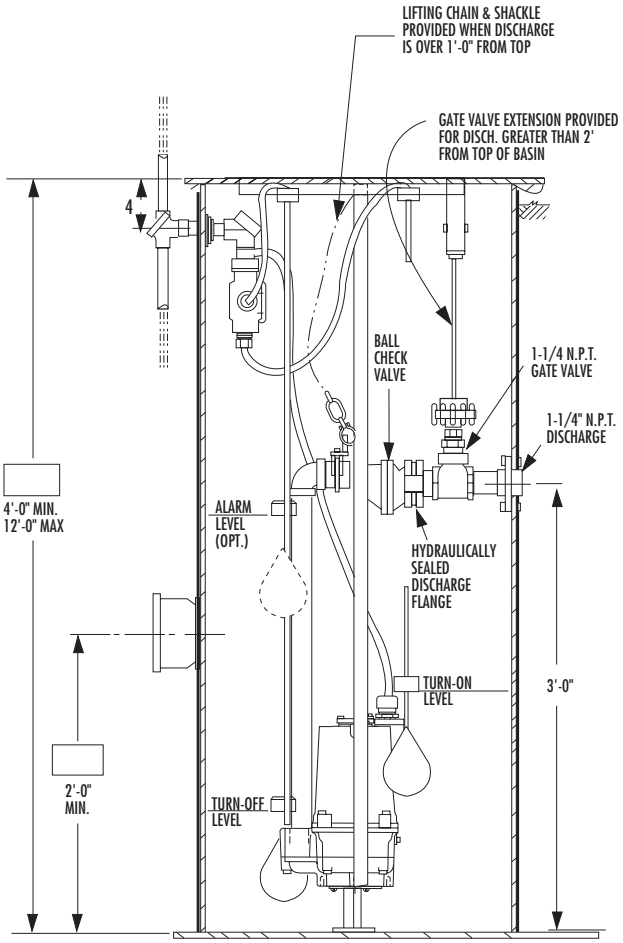


ALL DIMENSIONS IN INCHES

SIMPLEX INSTALLATION WITH J-BOX AND REMOTE PANEL

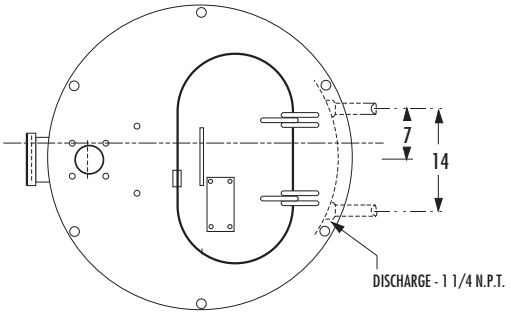


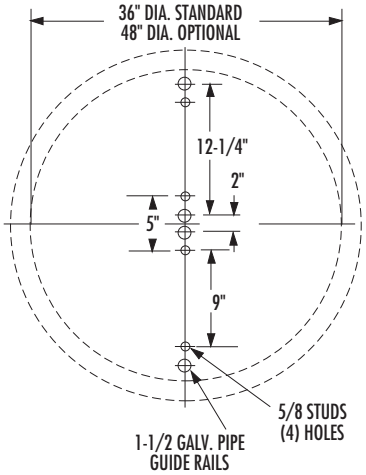


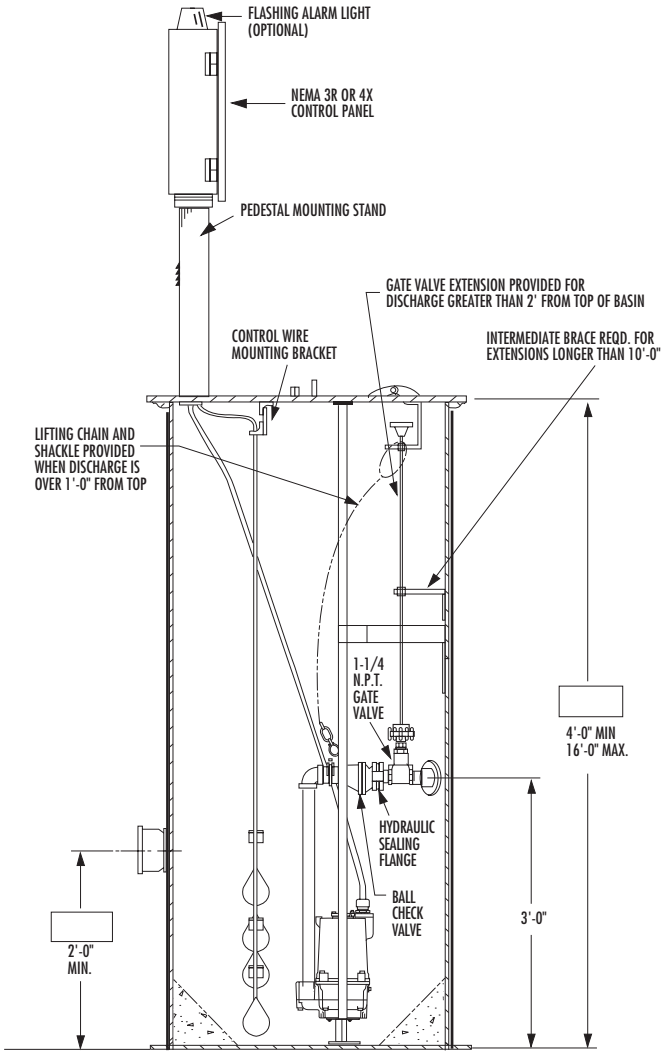


ALL DIMENSIONS IN INCHES

DUPLEX INSTALLATION WITH PEDESTAL MOUNTED PANEL







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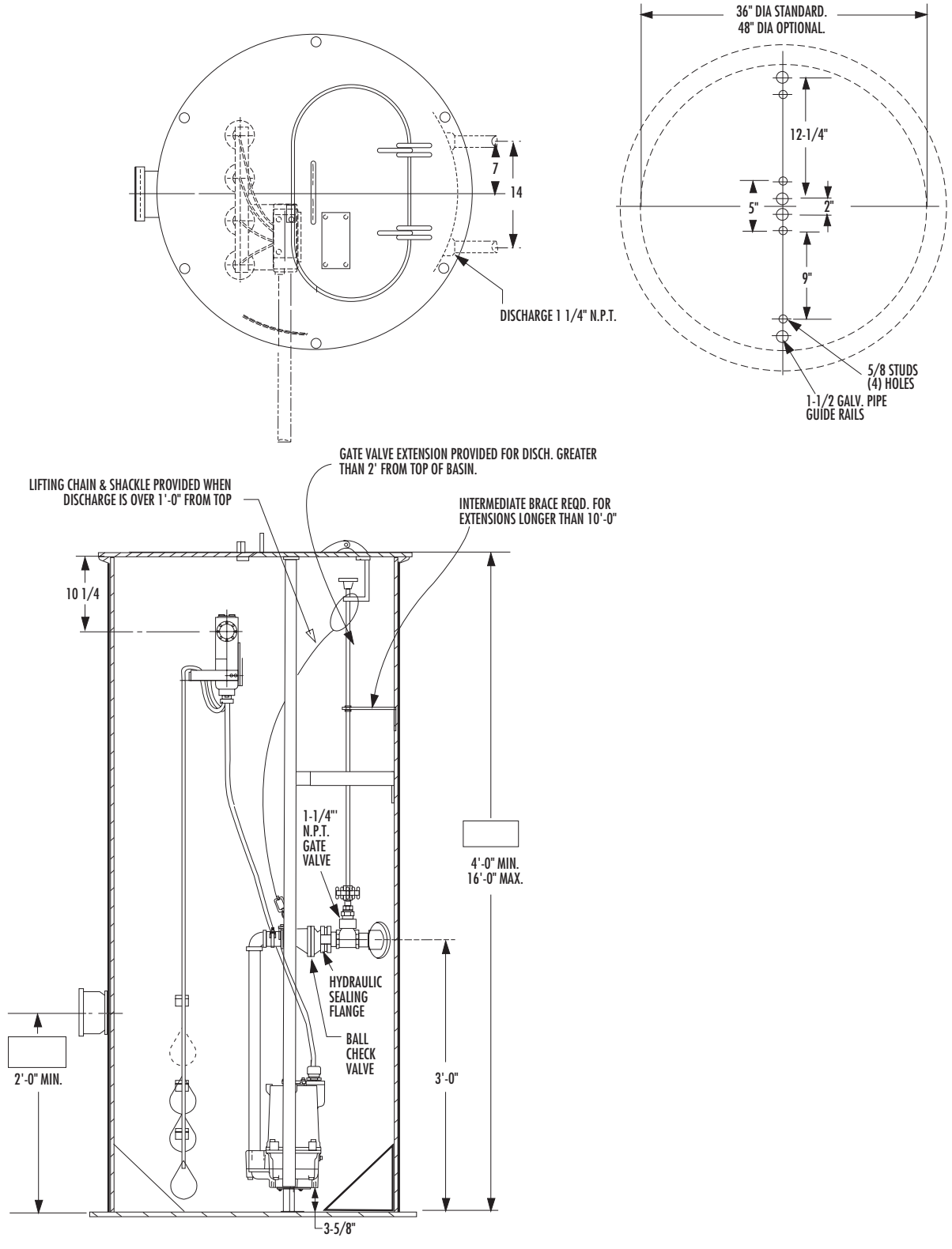
DUPLEX INSTALLATION WITH J-BOX AND REMOTE PANEL



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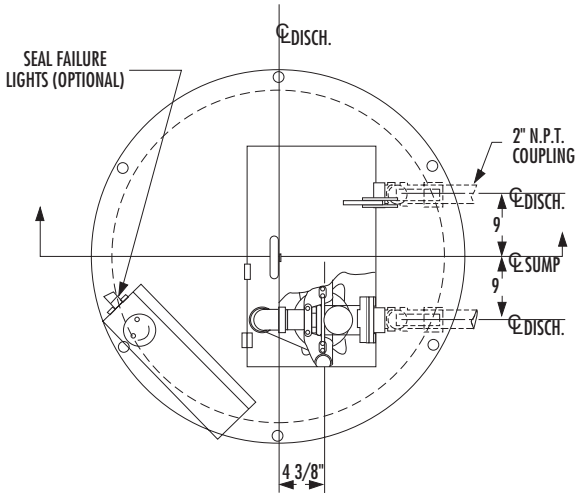
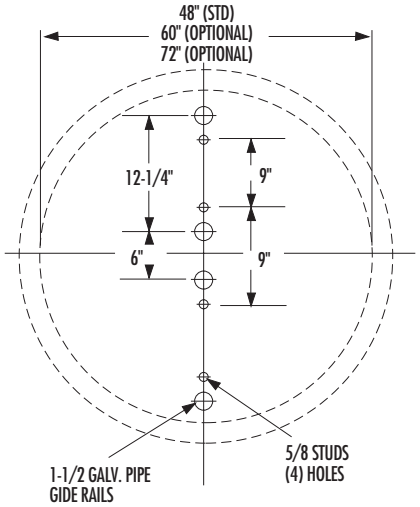
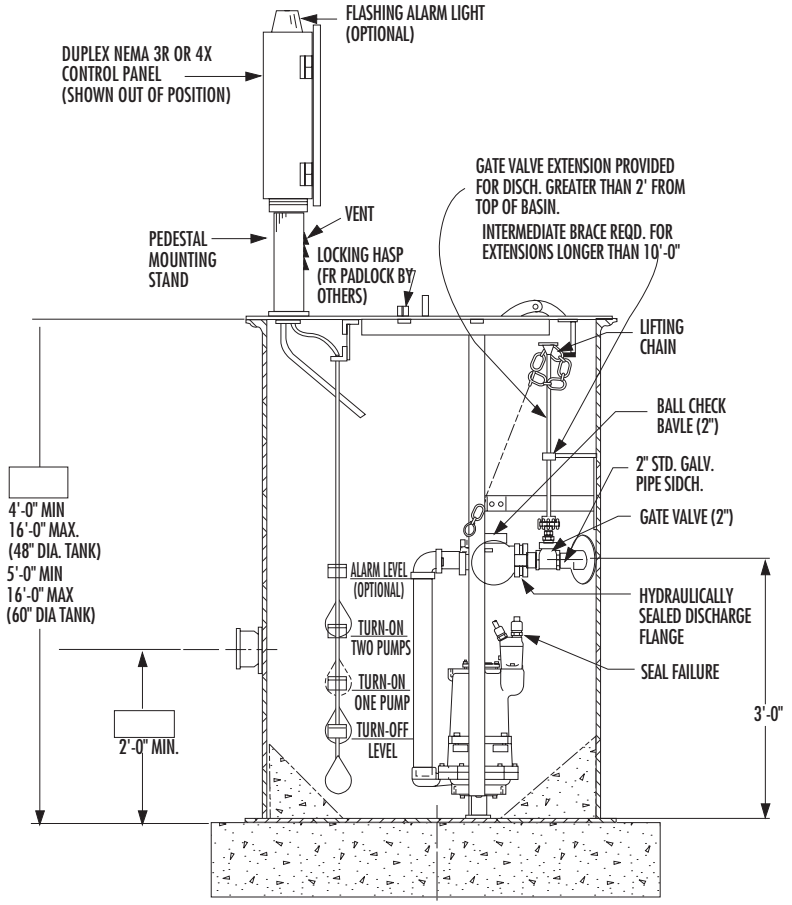
DUPLEX INSTALLATION WITH PEDESTAL MOUNTED PANEL







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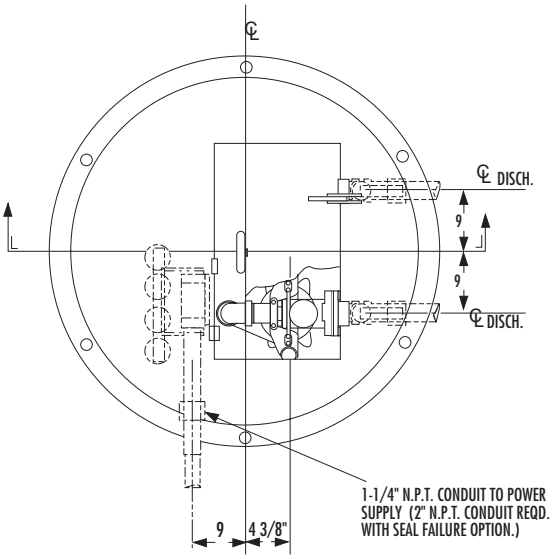
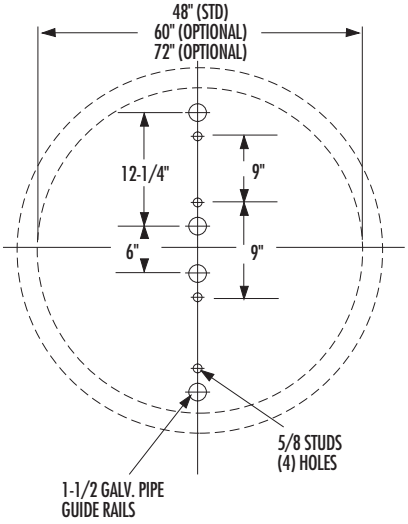
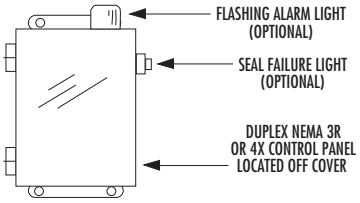
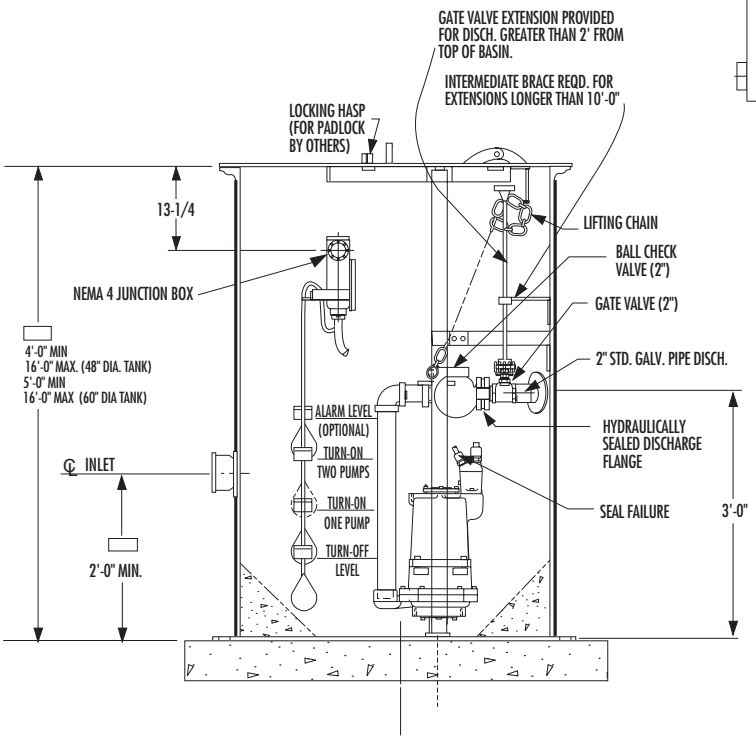
DUPLEX INSTALLATION WITH J-BOX AND REMOTE MOUNTED PANEL





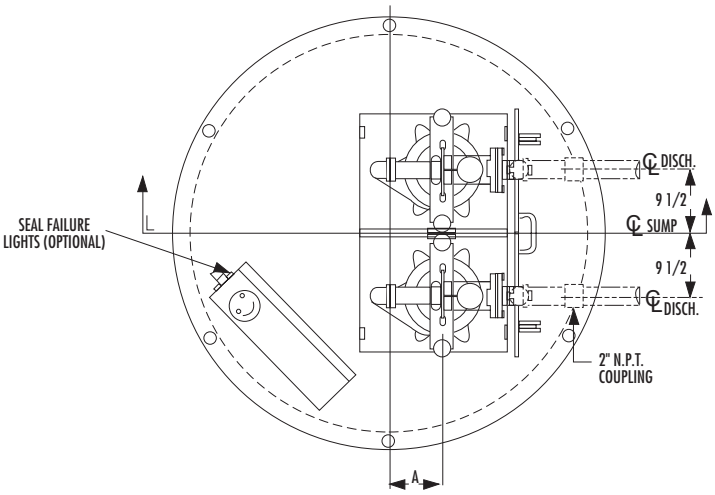


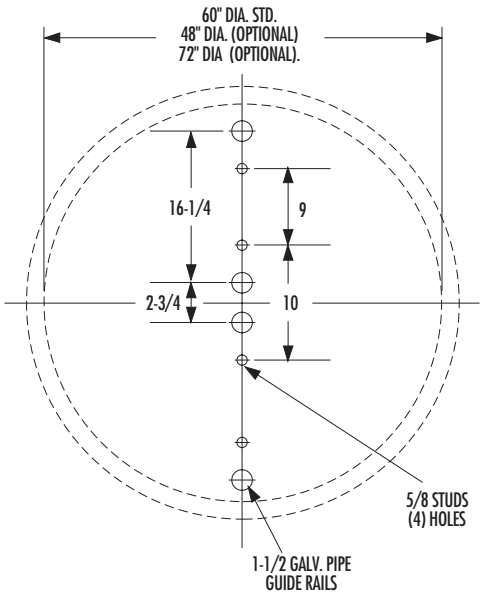


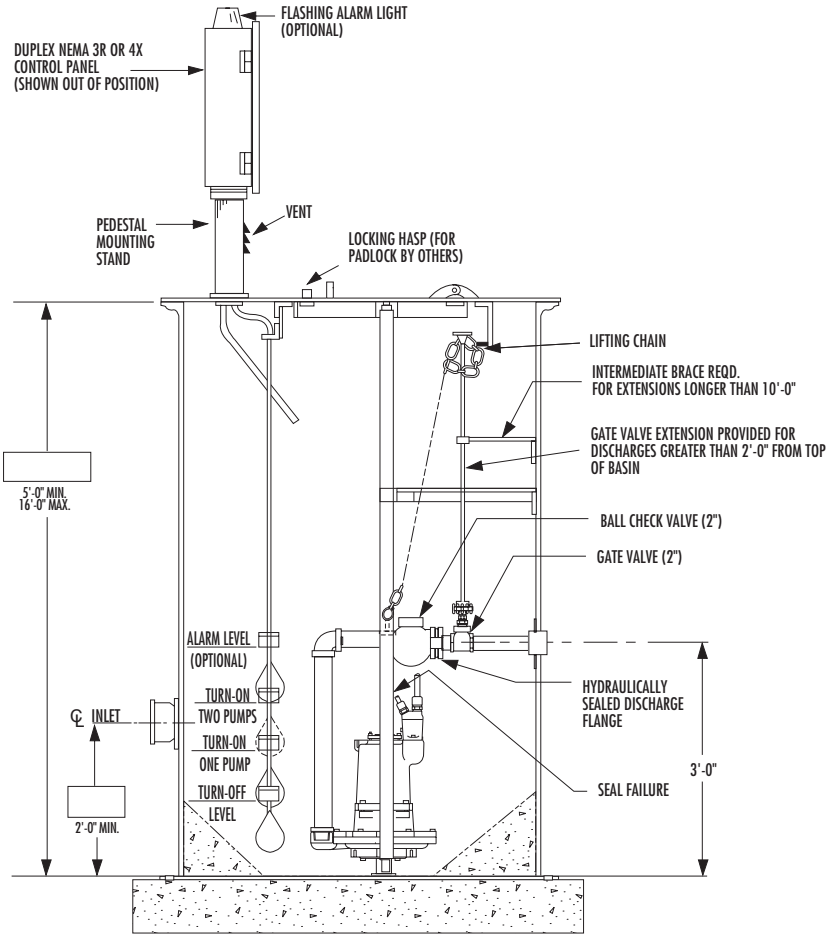
ALL DIMENSIONS IN INCHES

Installation – HPGF(X)

DUPLEX INSTALLATION WITH PEDESTAL MOUNTED PANEL



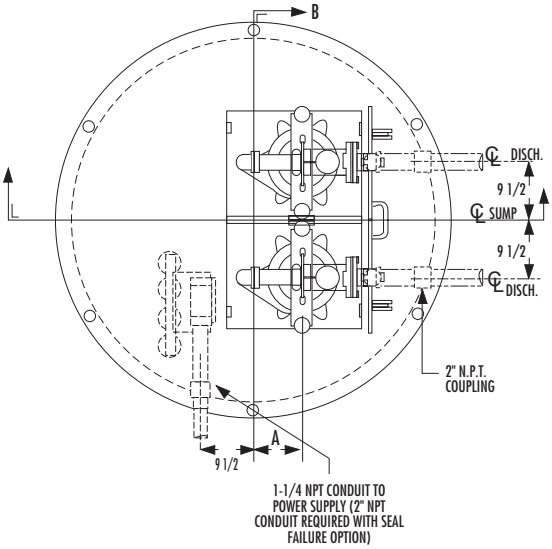


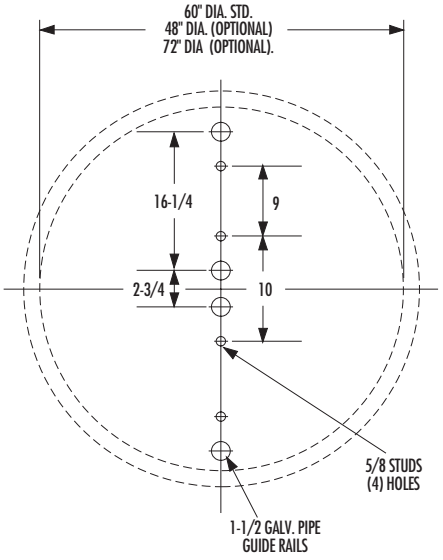


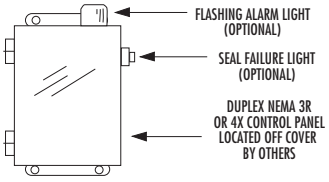
TANK DIA.	A
48"	1"
60"	8"
72"	8"

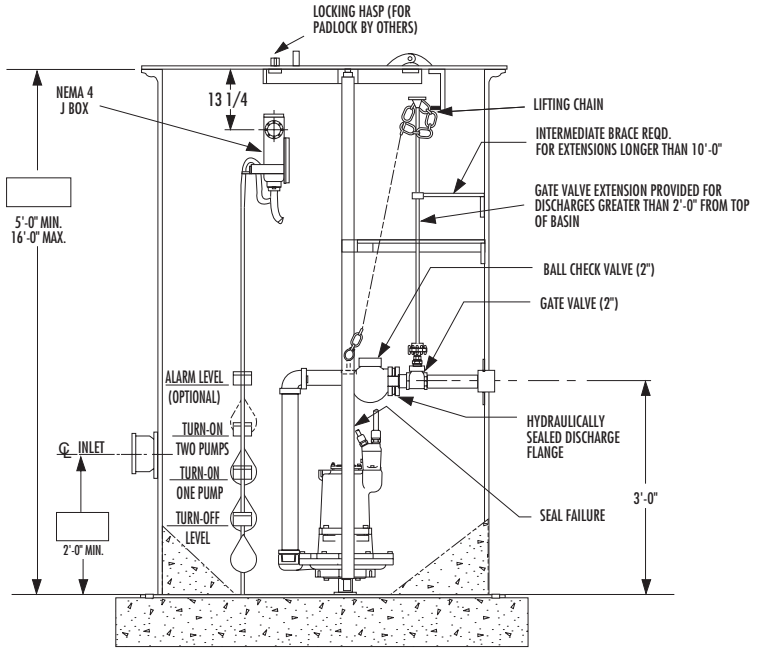
ALL DIMENSIONS IN INCHES

DUPLEX INSTALLATION WITH J-BOX AND REMOTE MOUNTED PANEL







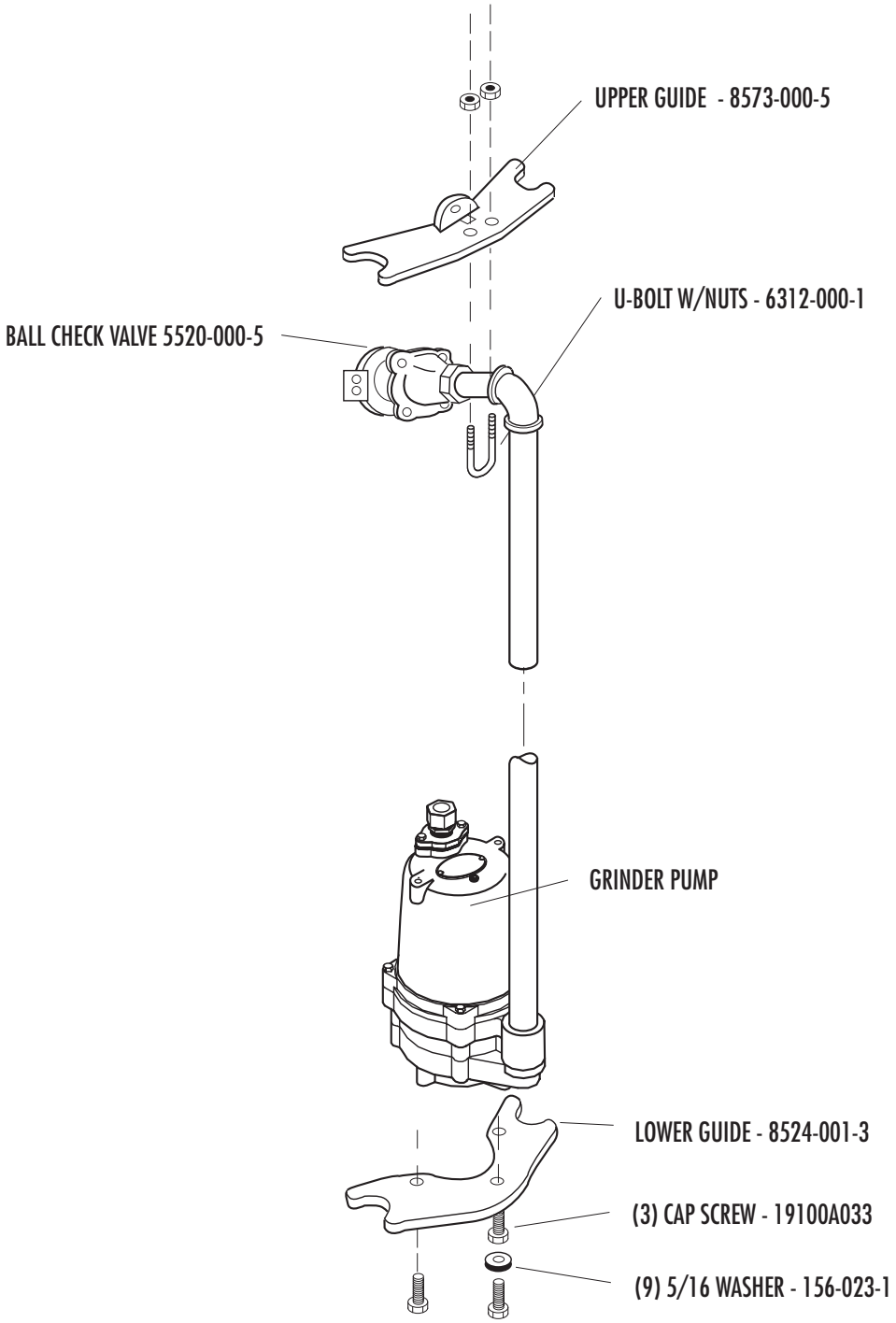


TANK DIA.	A
48"	1"
60"	8"
72"	8"

ALL DIMENSIONS IN INCHES

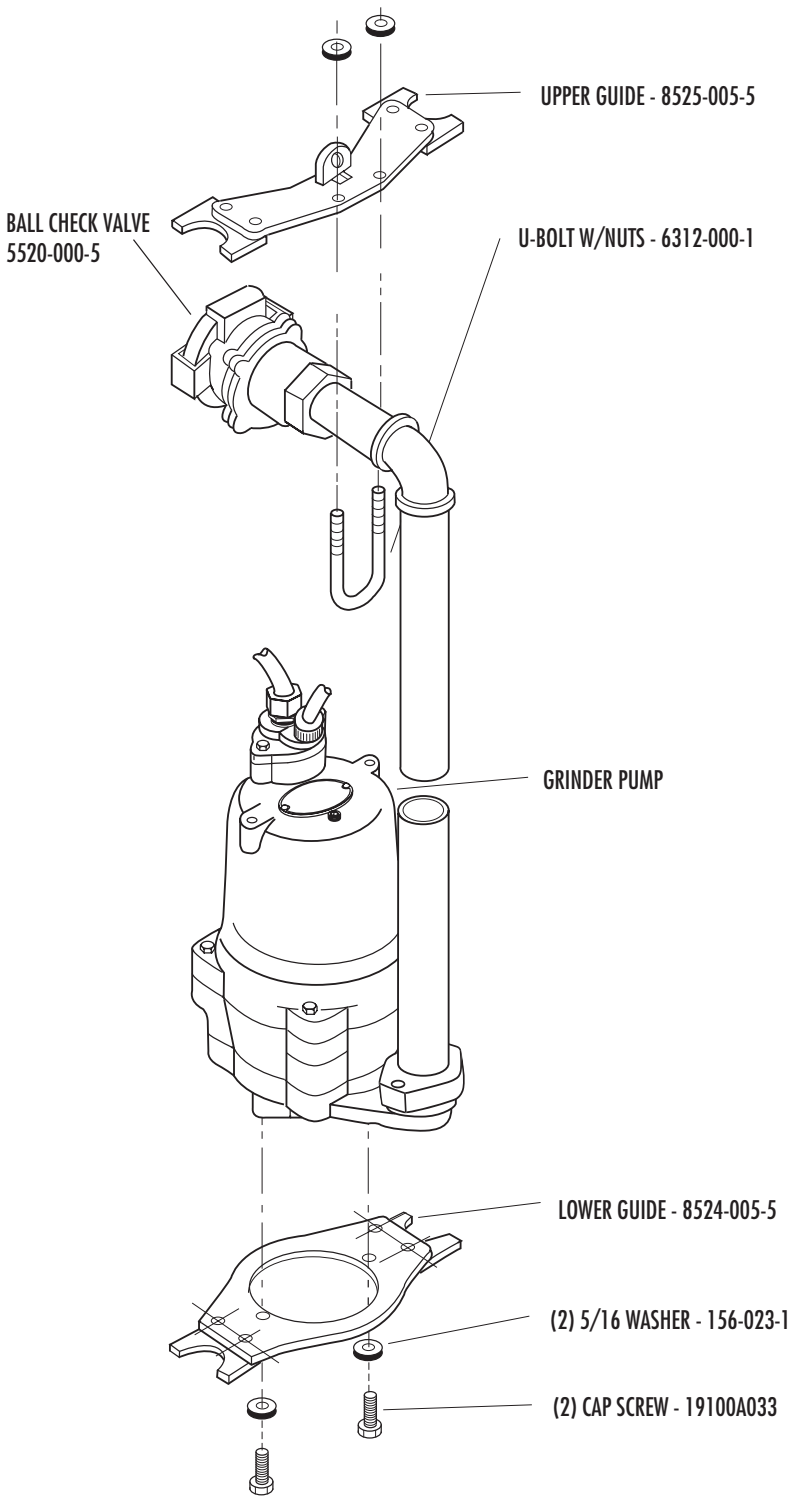
Installation – HPG

DISCHARGE PIPING AND RAIL GUIDE ASSEMBLY



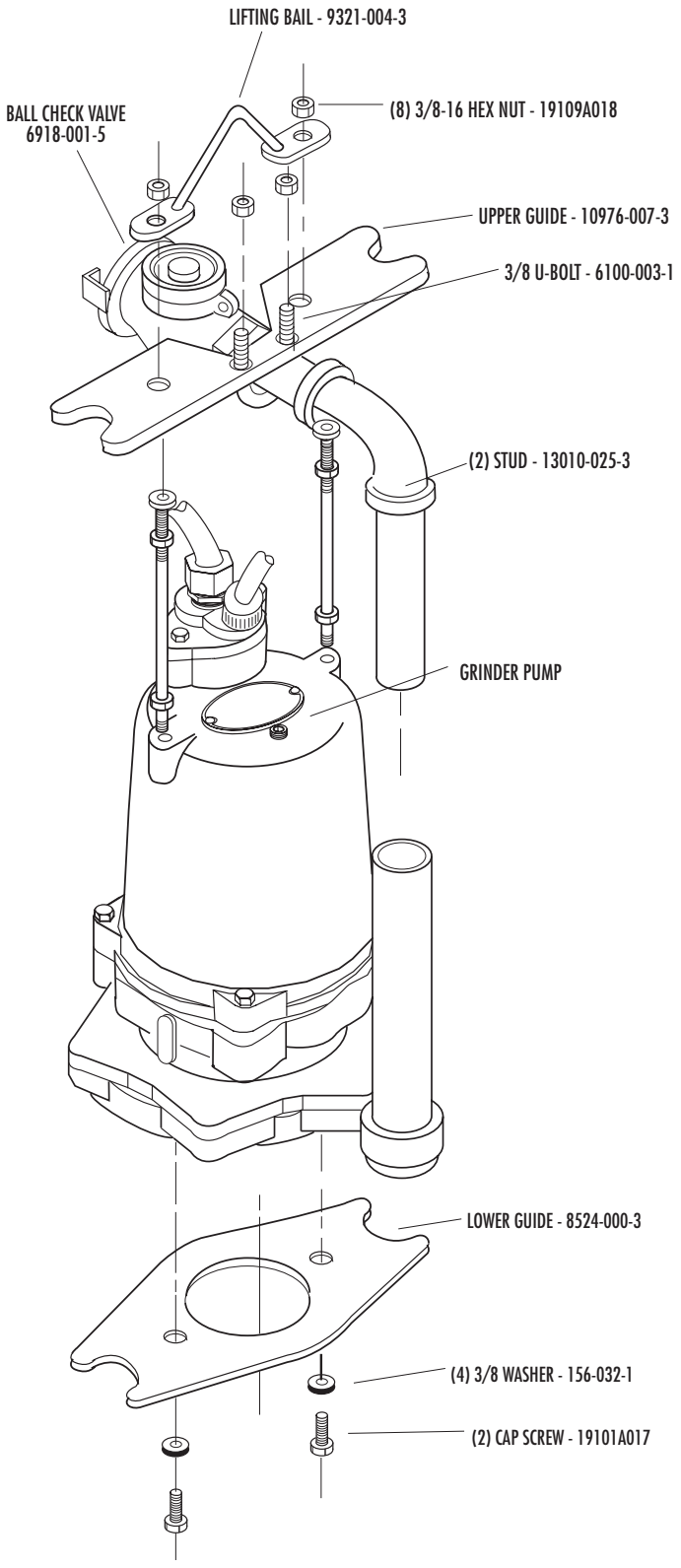
Installation – HPGX

DISCHARGE PIPING AND RAIL GUIDE ASSEMBLY

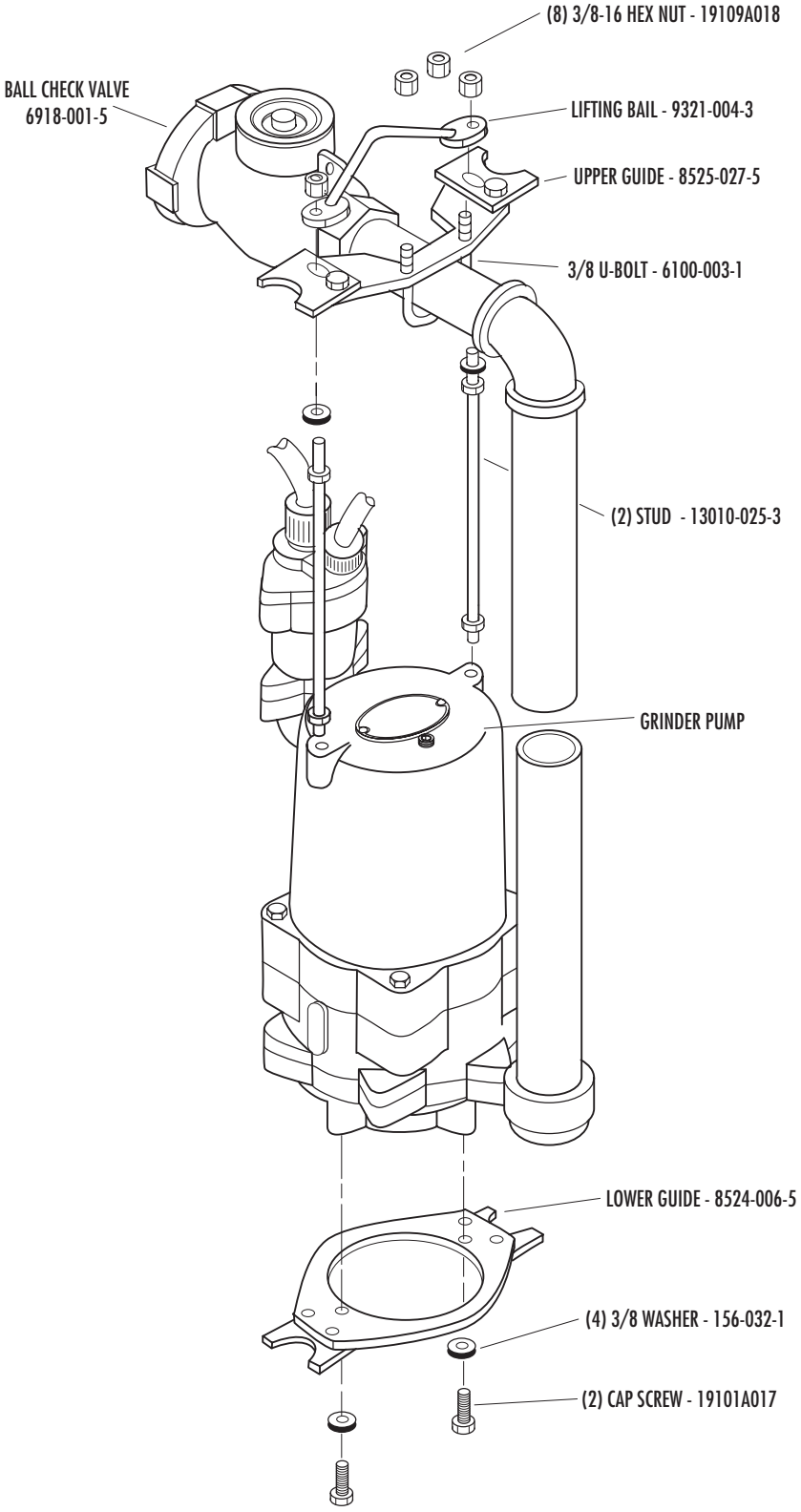


Installation – HPGH

DISCHARGE PIPING AND RAIL GUIDE ASSEMBLY

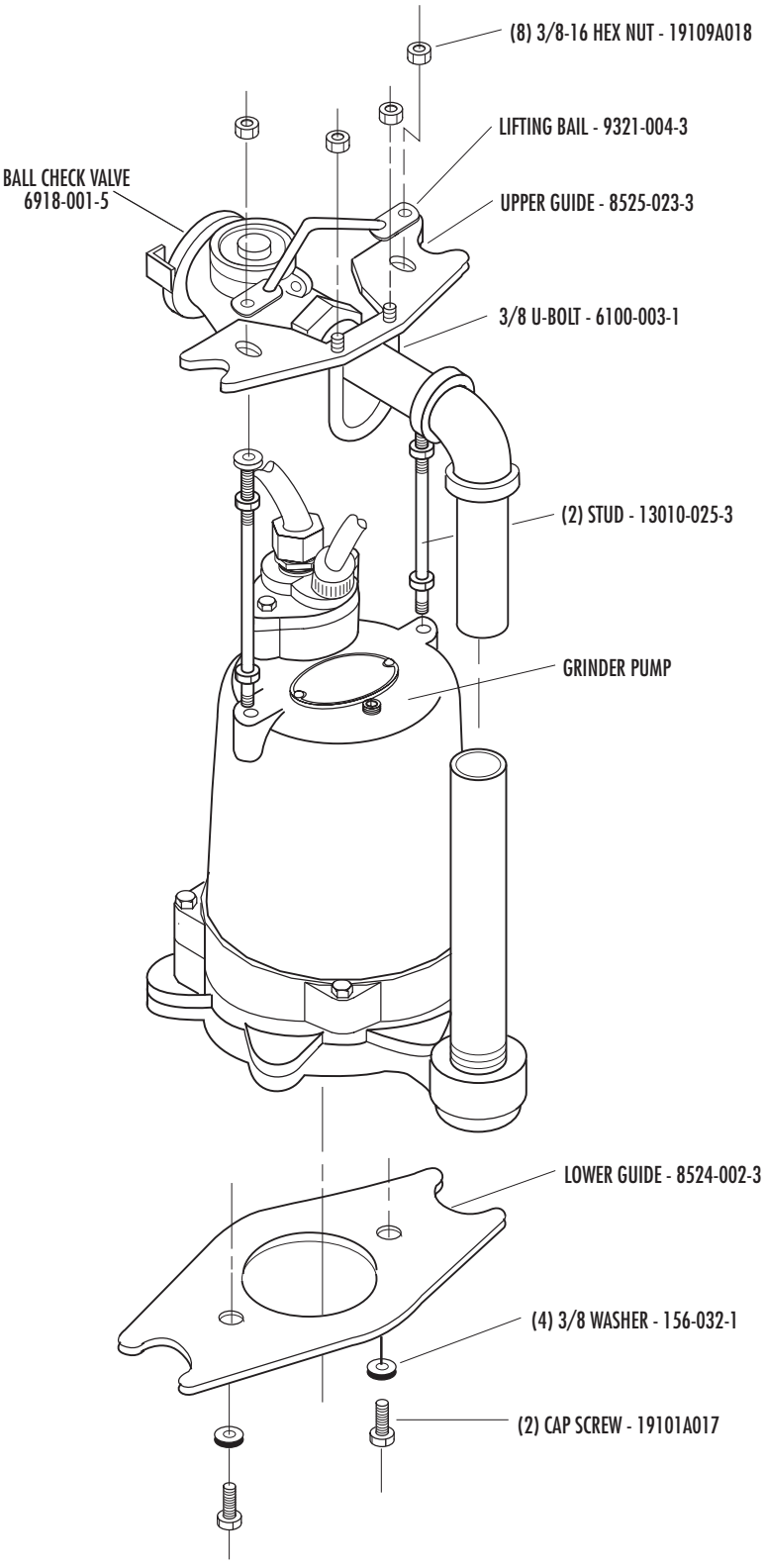


DISCHARGE PIPING AND RAIL GUIDE ASSEMBLY



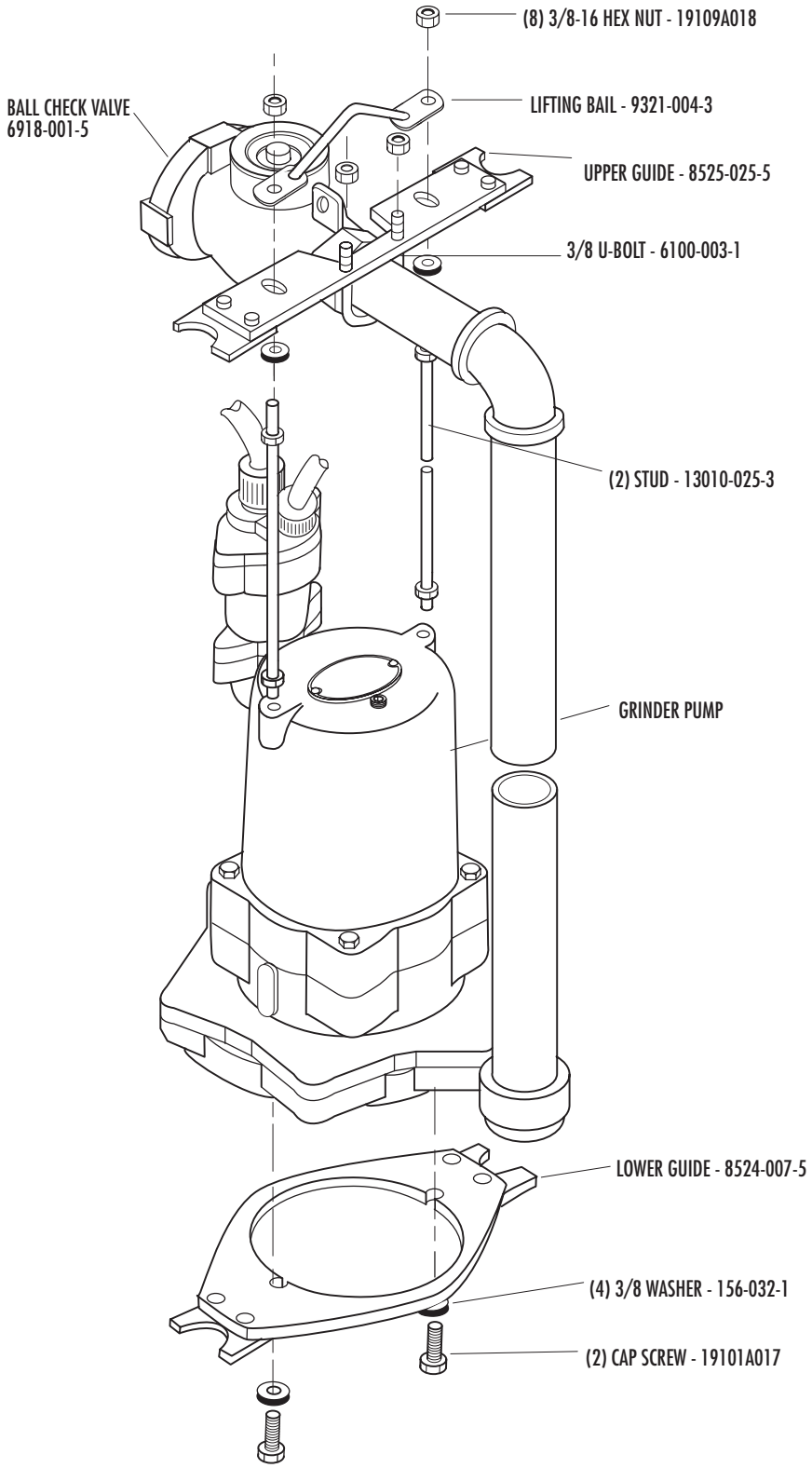
Installation – HPGF

DISCHARGE PIPING AND RAIL GUIDE ASSEMBLY



Installation – HPGFX

DISCHARGE PIPING AND RAIL GUIDE ASSEMBLY



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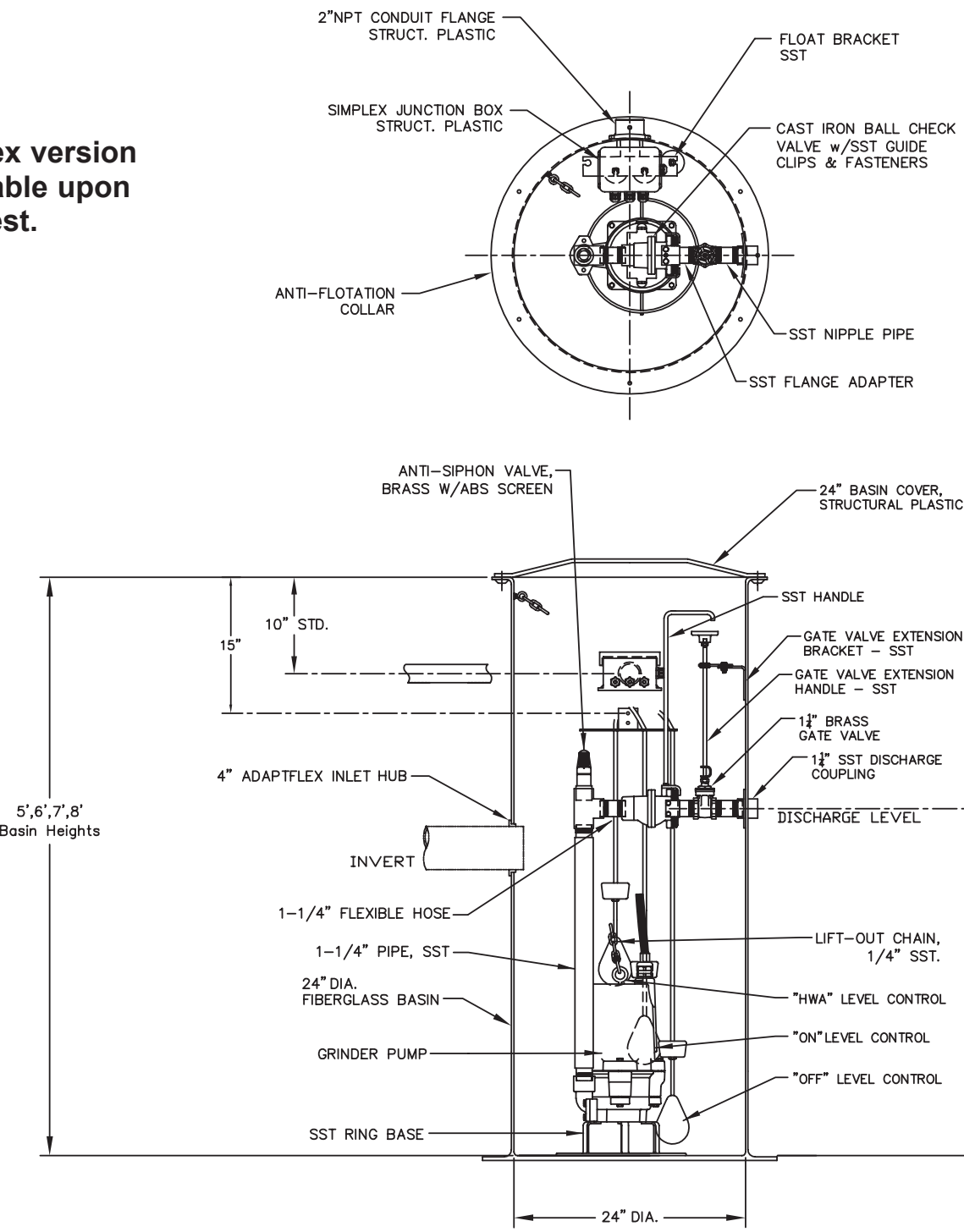
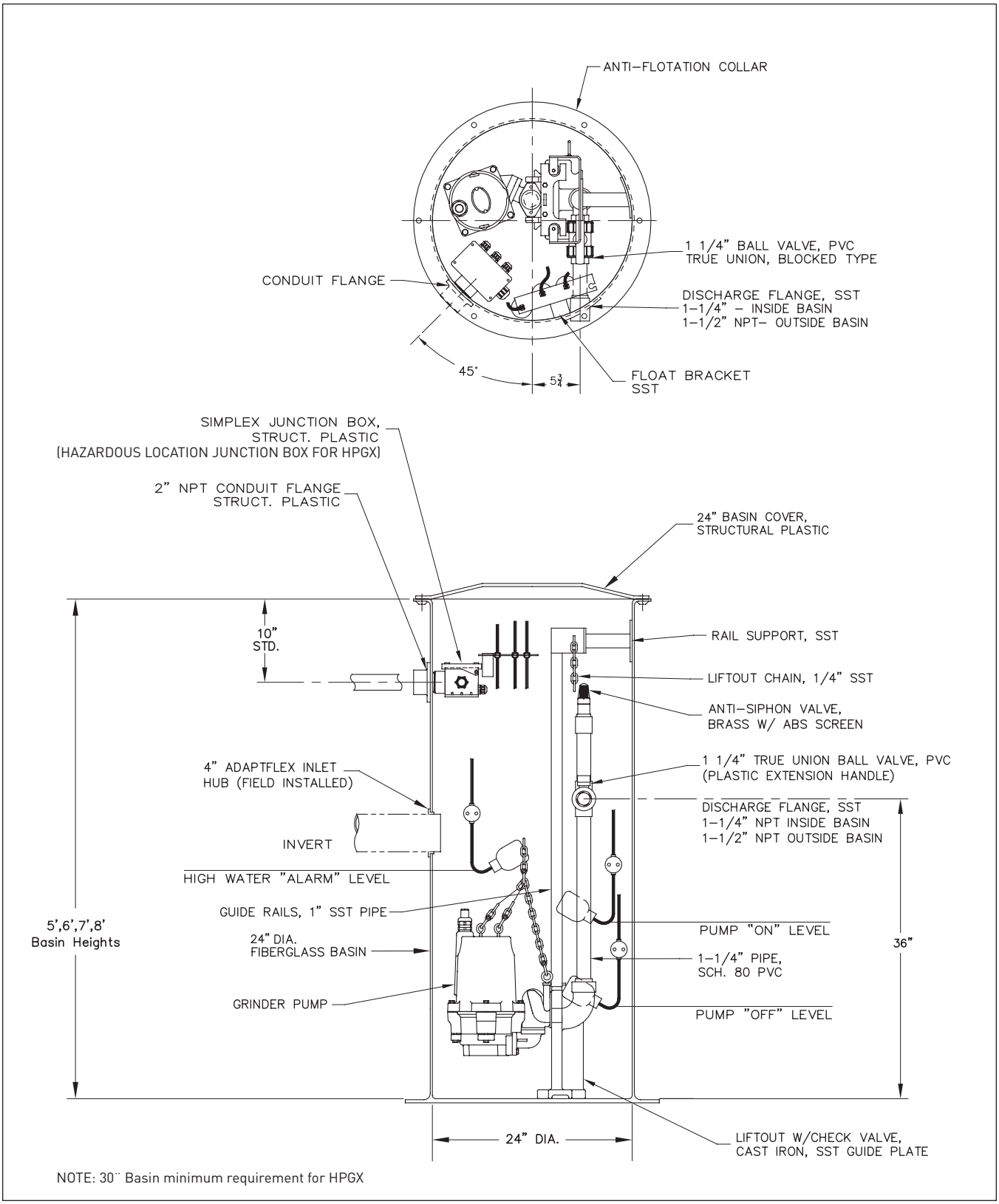
TG-PRO – SIMPLEX FIBERGLASS LOW PRESSURE SEWER SYSTEM

Duplex version available upon request.

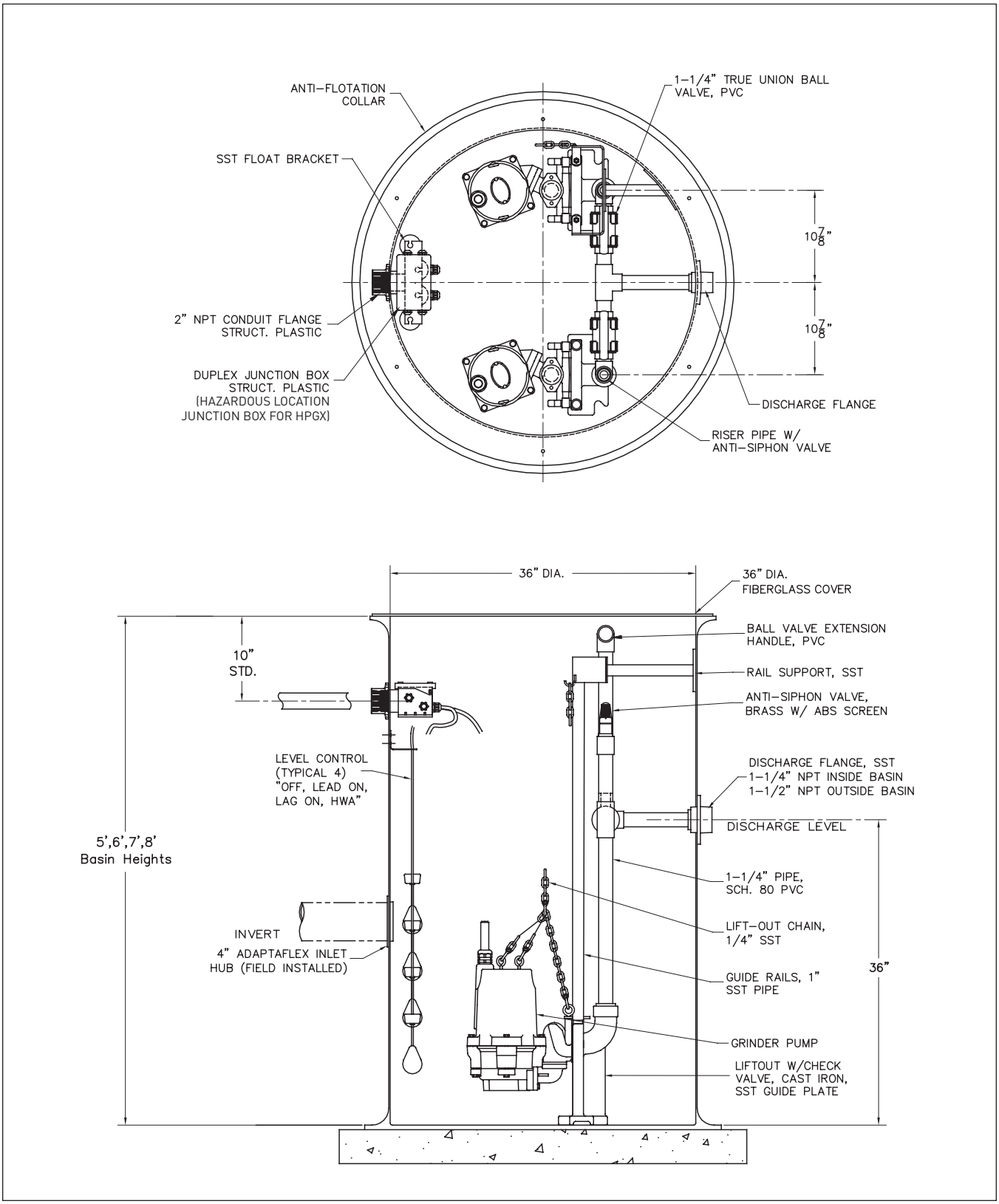


TL-PRO – SIMPLEX FIBERGLASS LOW PRESSURE SEWER SYSTEM



NOTE: 30" Basin minimum requirement for HPGX

TL-PRO – DUPLEX FIBERGLASS LOW PRESSURE SEWER SYSTEM



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