

# Fire Pump Databook



**Pumpsense Fluid Engineering Pvt. Ltd.**



**Underwriters  
Laboratories**



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## **A Brief Introduction**

History of PUMPSENSE goes back to 1995 when a group of professionals working in large international pumps companies decided to team together. At PUMPSENSE, we are united through a common vision to build an excellent pumps company through which we can express ourselves fully and freely. Each one of us has an abiding interest in one aspect or the other of the pumps business – right from hydraulic design to applications engineering, product development to marketing. We also share a common conviction that with our skills, passion and commitment, we can redefine the existing norms and standards of customer satisfaction. We wish to work, learn and create value in a nourishing and fulfilling environment for our customers, business associates and ourselves. PUMPSENSE exists to fulfill this collective dream, based on a core set of values which are our guiding philosophy in creating this organization.

The business of PUMPSENSE is to provide centrifugal pumps and related services. We will constantly strive to increase the delivered value to our customer by careful attention to details, by continuous improvement of our core capabilities and by our commitment to delight the customer at every point of contact. The quality of our products and services will reflect the improvement in the quality of life that we are able to bring to our employees – we will provide them with an informal and liberal work environment, where they can constantly learn and grow. We recognize that our suppliers play a key role in the quality of our products and services. We will work closely with our suppliers so that they share our energy and focus to serve the customer with excellence. Above all, we will strive to create an organization where there are no barriers amongst customers, employees and suppliers and all of us work together to create value, to grow, to learn and to enhance the quality of our lives.

# 1. Fire Pumps (Objectives for Development)

Fire pumps manufactured by Pumpsense are in full compliance with the requirements of NFPA20. In addition, these pumps meet all the clausal requirements of established fire pumps approval standards such as FM1311 of Factory Mutual and UL448 of Underwriters Laboratories.

In particular, fire pumps manufactured by PUMPSENSE has the following objectives.

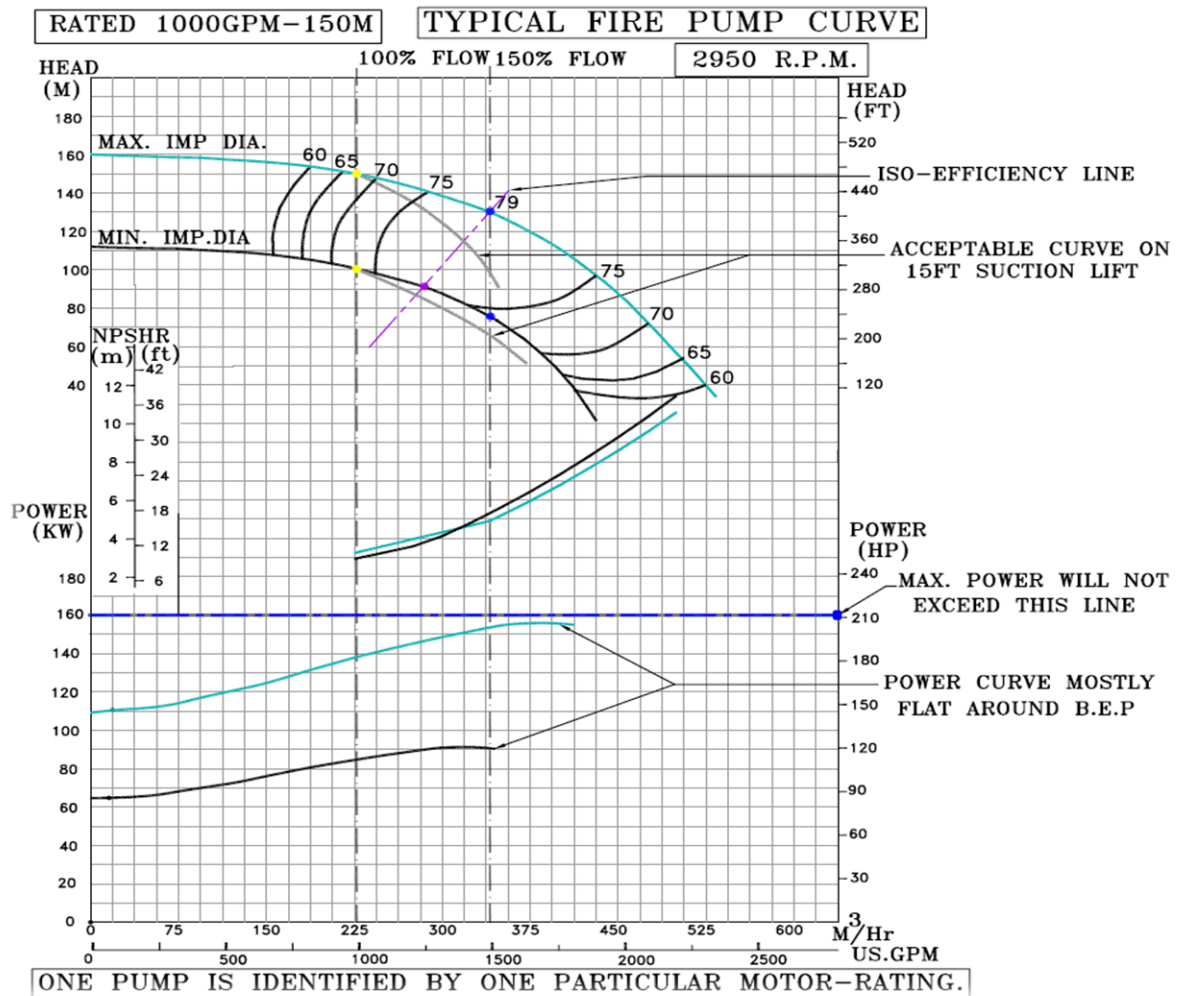
- a) Efficiency is not the hardest criteria.
- b) To obtain a steep H-Q characteristic and preferably, a non-overloading power curve characteristic in a low specific speed.
- c) Any fire pump shall be designed for rated capacities equal to or greater than 25USGPM. Rated pump pressure shall be at least 40 psi.
- d) The pump shall develop its rated pressure when delivering at rated capacity. The pump shall not exceed 140% of its rated pressure at any point along its characteristic curve, including the shut-off point. The shut-off head shall not be less than 99% of its rated head.
- e) The pump shall develop at least 65% of its rated pressure when operating at a suction lift of at least 15ft (4.6m), referred to sea level, and delivering 150% of rated capacity. If mechanical seals are used, they shall not allow air to leak into the pump at any point along the characteristic curve, not including the shut-off. This poses a design challenge, especially for lower trims.
- f) Design an economical unit which meets the high-test pressure requirement of UL (Maximum pressure + 75 PSI)  $\times$  2.
- g) Achieve increased mechanical reliability and driver rating optimization.
- h) The minimum internal dimensions of the passage at any point shall not be less than (**UL 448**). 5/16 inch (7.9mm) for a pump rated 500 gallons per minute (1893 L/min) or less; or 1/2 inch (12.7mm) for a pump rated more than 500 gallons per minute.
- i) All water passages shall be designed to minimize the possibility of foreign materials becoming lodged in them (**FM 1311**). The minimum width of these passages at the periphery or at any point within the impeller shall be at least 1/2 in. (12.7mm) for pumps rated 500 gallons per minute (1895 L/min) and larger. Passages in pumps having rated capacities of 100 to less than 500 gallons per minute (380 to less than 1895 L/min) shall be at least 3/8in. (9.5mm). Passages in pumps having rated capacities less than 100 gallons per minute (380 L/min) shall be at least 1/4 in. (6.3mm).

## 2. Mechanical Design (Criteria to be fulfilled)

Pumpsense always fulfill the following mechanical design criteria for its fire pump models.

- a) A casting shall be smooth and free from scale, lumps, cracks, blisters, sand holes, and defects of any nature that may affect the use for which it is intended. A casting shall not be plugged or filled but may be impregnated to remove porosity.
- b) A bolt, stud, cap screw, or gland swing bolt to assemble parts subject to stress due to water pressure shall not be less than 3/8 inch (9.5mm) in diameter.
- c) An interior bolt or screw that is exposed to pumped water shall be constructed of the corrosion resistant material or series 400 stainless steel.
- d) The maximum combined shear stress for a pump shaft, based upon the minimum diameter at the root of threads or an undercut (not including the undercutting for keys), shall not exceed 30 percent of the elastic limit in tension or be more than 18 percent of the ultimate tensile strength of the shafting steel used. For shafts with keyways, the allowable stress limits shall be 75 percent of the stresses calculated using the minimum shaft diameter at the key location (not including the undercut). Compliance with this requirement is to be verified by a review of manufacturers' stress calculation.
- e) The impellers shall be dynamically balanced to **G6.3** balance quality grade in accordance with the requirements for pump impellers in the **Standard for Mechanical Vibration - Balance Quality Requirements of Rigid Rotors, Part 1: Specification and Verification of Balance Tolerances, ISO 1940-1**.
- f) Flange dimensions and bolt layouts used in pipe connections shall comply with the requirements of one of the following standards.
  - 1) Standard for cast iron pipe flanges and flanged fittings, ANSI/ASME B16.1;
  - 2) Standard for ductile iron pipe flanges and flanged fittings: Classes 150 and 300, ANSI/ASME B16.42; or
  - 3) Standard for pipe flanges and flanged fittings: NPS ½ through 24, ANSI/ASME B16.5, when steel is used.
- g) A pump casing shall be constructed to permit examination of impellers and other interior parts without disturbing suction or discharge piping. The casing shall include means to facilitate disassembly of the casing, and the stuffing box cover (if provided), without requiring the use of wedges or prying elements, such as by provision of tapped holes for jackscrews.

- h) The pump shall be provided with feet or with provisions for accommodating feet or a fabricated base support such as bolt holes and a bearing surface for attaching the base to the pump.
- i) A drain opening shall be provided so that all parts of the pump casing can be drained. The opening shall be threaded to receive a plug, i.e.,
  - 1) Not smaller than ½ inch (12.7mm) nominal pipe size for pumps having rated capacities equal to or greater than 100 gallons per minute and ¼ inch (6.4mm) nominal pipe size for pumps having rated capacities less than 100 gallons per minute;
  - 2) Formed of corrosion – resistant material.
- j) A pump shall be provided with casing wear rings that are made of material that will not gall. The rings shall be secured to the casing in a manner that does not permit rotational or axial movement. Impeller wearing rings need not be provided.
- k) The radial clearance between a stationary and moving part of a pump shall not be less than 0.191mm.
- l) The impellers shall be secured in an axial direction, permitting no contact with the casing under operating conditions.
- m) The impellers shall be of the closed type; that is, they shall incorporate shrouds or sidewalls that completely enclose the impeller waterways from the suction eye to the periphery.
- n) Ball and roller bearings shall have an L-10 rating of not less than 5000 hours at maximum load in accordance with the Standard for Load Ratings and Fatigue Life for Ball Bearings, ANSI / ABMA 9, and load ratings and Fatigue Life for Roller Bearings, ANSI / ABMA 9, and Load Ratings and Fatigue Life for Roller Bearings, ANSI / ABMA 11, respectively.



### **3. Fire Pump Packages**

#### **3.1 FM Approved Fire pump packages**

The fire pump packages consist of the following components which are furnished by the pump manufacturer, alternate manufacturer, or a fire pump packager.

- 1) Fire pump (***FM Approved***);
- 2) Driver – diesel engine (***FM Approved***) or electric motor;
- 3) Pump controller (electric motor or diesel engine) (***FM Approved***);
- 4) Flexible coupling (not all elastomeric) or drive shaft;
- 5) Suction and discharge pressure gauges (***FM Approved***);
- 6) Pressure relief valve (FM Approved) and waste cone, when required;
- 7) Automatic air release valve (***FM Approved***);
- 8) Circulation relief valve (***FM Approved***);
- 9) Substantial bed plate for pump and driver;
- 10) Diesel engine accessories:
  - i) Starting batteries,
  - ii) Rigid cooling water and fuel lines (May have short flexible elements in close proximity to engine to minimize vibration),
  - iii) Exhaust piping and muffler,
  - iv) Fuel tank.
- 11) Instruction, operation and maintenance manual in local language,
- 12) Spare mechanical seals (optional, for pumps FM Approved with mechanical seal).

#### **3.2 UL Listed Fire pumps scope of supply**

Following accessories must be provided by the pump manufacturer along with the UL listed pumps.

- a) Automatic air-release valve (self-venting pumps excluded);
- b) Circulation relief valve (except for engine driven pumps for which engine cooling water is taken from the pump discharge) and;
- c) Pressure gauges.

## 4. Fire Pumps Technical Datasheet

<b>PUMPSense FLUID ENGINEERING PVT LTD</b>			
Datasheet For :			
	PARAMETERS	UNIT	VALUE
<b>RATED DUTY</b>	100% Rated Duty	usgpm	
	150% Rated Duty	usgpm	
	Head Range	psi	
	Speed	rpm	
	Type of Pump		NFPA-20 Single Stage Fire Pump
	Driver		
<b>PUMP DETAILS</b>	Make		<b>PUMPSense</b>
	Stages		
	Model No.		
	Discharge	mm	
	Flange Rating Discharge		
	Suction	mm	
	Suction Flange Rating		
	Type of Casing		
	Type of Impeller		
	Impeller Diameter Max	mm	
	Impeller Diameter Min	mm	
	Rotation		
<b>MECHANICAL DATA</b>	Bare Pump Weight	kg	
	Shaft dia. at coupling	mm	
	N.D.E. Bearing		
	D.E. Bearing		
<b>MATERIALS OF CONSTRUCTION</b>	Casing		CI FG 260 BS 1452
	Impeller		Bronze LG2 BS 1400
	Casing Wear Ring		Bronze LB2 BS 1400
	Shaft		AISI 410
	Shaft Sleeve & Nuts		Bronze CT1 BS 1400/ AISI 316
	Split Gland		Bronze LG2 BS 1400
	Lantern Ring		Bronze LG2 BS 1400
	Stuffing Box		Gland Packed Fitted
	Packing		CARRARA Make Soft Packing Style R4804
	Fastners		HTS GR. 10.9
NFPA 20 Performance Data -			
<b>AT RATED DUTY</b>	Speed	rpm	
	Rated Flow	usgpm	
	Rated Head	psi	
	Efficiency	%	
	Power Absorbed	kW	
<b>AT 150% OF RATED DUTY</b>	150% Rated Flow	usgpm	
	Approx. Head	psi	
	Head as % of Rated	%	
	Efficiency	%	
	BkW	kW	
	Motor Rating	kW	
	Closed Valve Head(Approx.)	psi	
	CV Head as % of Rated Head	psi	
	Working Pressure	psi	
	Test Pressure	psi	
	Rupture Pressure	psi	

## 5. UL Listed Fire Pumps, Split Case

PUMPSENSE UL Listed Centrifugal Fire Pumps, Split Case											
Sr. No.	Rated Capacity, usgpm	Size, in.	Model	Rated Net Pressure Range, psi	Approx. Speed, RPM	Max Working Pressure, psi	Impeller Diameter, mm.		Pump BkW, min to max		Remarks
							Minimum	Maximum	kW	hP	
1	300	6" x 4"	4HF12L	88-139	2600	300	260	310	30.97 to 50.85	41.53 to 68.19	Single Stage Pump
2	300	6" x 4"	4HF12L	104-161	2800	300	260	310	38.68 to 63.51	51.87 to 85.17	Single Stage Pump
3	300	6" x 4"	4HF12L	116-180	2950	300	260	310	45.24 to 74.27	60.67 to 99.59	Single Stage Pump
4	300	6" x 4"	4HF12L	120-186	3000	300	260	310	47.58 to 78.11	63.81 to 104.75	Single Stage Pump
5	400	6" x 4"	4HF12L	84-134	2600	300	260	310	30.97 to 50.85	41.53 to 68.19	Single Stage Pump
6	400	6" x 4"	4HF12L	99-157	2800	300	260	310	38.68 to 63.51	51.87 to 85.17	Single Stage Pump
7	400	6" x 4"	4HF12L	111-175	2950	300	260	310	45.24 to 74.27	60.67 to 99.59	Single Stage Pump
8	400	6" x 4"	4HF12L	115-182	3000	300	260	310	47.58 to 78.11	63.81 to 104.75	Single Stage Pump
9	400	4" x 3"	3HFT11	194-327	2930	410	230	295	91 to 137	122.03 to 183.72	Two Stage Pump
10	450	6" x 4"	4HF12L	81-132	2600	300	260	310	30.97 to 50.85	41.53 to 68.19	Single Stage Pump
11	450	6" x 4"	4HF12L	96-155	2800	300	260	310	38.68 to 63.51	51.87 to 85.17	Single Stage Pump
12	450	6" x 4"	4HF12L	108-173	2950	300	260	310	45.24 to 74.27	60.67 to 99.59	Single Stage Pump
13	450	6" x 4"	4HF12L	113-179	3000	300	260	310	47.58 to 78.11	63.81 to 104.75	Single Stage Pump
14	500	6" x 4"	4HF12L	78-129	2600	300	260	310	30.97 to 50.85	41.53 to 68.19	Single Stage Pump
15	500	6" x 4"	4HF12L	93-152	2800	300	260	310	38.68 to 63.51	51.87 to 85.17	Single Stage Pump



16	500	6" x 4"	4HF12L	105-171	2950	300	260	310	45.24 to 74.27	60.67 to 99.59	Single Stage Pump
17	500	6" x 4"	4HF12L	109-177	3000	300	260	310	47.58 to 78.11	63.81 to 104.75	Single Stage Pump
18	500	6" x 4"	4HF13	130-176	2600	300	305	350	60.85 to 86.83	81.6 to 116.44	Single Stage Pump
19	500	6" x 4"	4HF13	153-206	2800	300	305	350	76.01 to 108.45	101.93 to 145.43	Single Stage Pump
20	500	6" x 4"	4HF13	171-230	2950	300	305	350	88.89 to 126.83	119.2 to 170.08	Single Stage Pump
21	500	6" x 4"	4HF13	177-238	3000	300	305	350	93.48 to 133.38	125.36 to 178.87	Single Stage Pump
22	500	4" x 3"	3HFT11	187-320	2930	410	230	295	91 to 137	122.03 to 183.72	Two Stage Pump
23	750	6" x 4"	4HF12	79-124	2600	300	264	310	41.12 to 59.31	55.14 to 79.54	Single Stage Pump
24	750	6" x 4"	4HF12	96-149	2800	300	264	310	51.36 to 74.08	68.87 to 99.34	Single Stage Pump
25	750	6" x 4"	4HF12	106-169	2950	300	264	310	60.07 to 86.63	80.56 to 116.2	Single Stage Pump
26	750	6" x 4"	4HF12	109-176	3000	300	264	310	63.17 to 91.11	84.71 to 122.18	Single Stage Pump
27	750	6" x 4"	4HF13	114-162	2600	300	305	350	81.6 to 116.44	81.6 to 116.44	Single Stage Pump
28	750	6" x 4"	4HF13	137-192	2800	300	305	350	101.93 to 145.43	101.93 to 145.43	Single Stage Pump
29	750	6" x 4"	4HF13	155-215	2950	300	305	350	119.2 to 170.08	119.2 to 170.08	Single Stage Pump
30	750	6" x 4"	4HF13	162-224	3000	300	305	350	125.36 to 178.87	125.36 to 178.87	Single Stage Pump
31	1000	6" x 5"	5HF11	82-124	2600	300	252	310	54.3 to 84.58	72.82 to 113.42	Single Stage Pump
32	1000	6" x 5"	5HF11	97-147	2800	300	252	310	67.82 to 105.64	90.95 to 141.67	Single Stage Pump
33	1000	6" x 5"	5HF11	109-165	2950	300	252	310	79.31 to 123.55	106.36 to 165.68	Single Stage Pump

34	1000	6" x 5"	5HF11	113-171	3000	300	252	310	83.41 to 129.94	111.85 to 174.25	Single Stage Pump
35	1000	8" x 6"	6HF14K	127-175	2600	335	320	360	99 to 131	132.76 to 175.67	Single Stage Pump
36	1000	8" x 6"	6HF14K	151-206	2800	335	320	360	124 to 164	166.29 to 219.93	Single Stage Pump
37	1000	8" x 6"	6HF14K	169-230	2950	335	320	360	145 to 192	194.45 to 257.48	Single Stage Pump
38	1000	8" x 6"	6HF14K	175-239	3000	335	320	360	153 to 202	205.18 to 270.89	Single Stage Pump
39	1000	8" x 6"	6HFTD12L	179-262	2600	443	260	314	134 to 224	179.69 to 300.39	Two Stage Pump
40	1000	8" x 6"	6HFTD12L	210-306	2800	443	260	314	168 to 279	225.29 to 374.15	Two Stage Pump
41	1000	8" x 6"	6HFTD12L	240-347	2975	443	260	314	201 to 335	269.55 to 449.24	Two Stage Pump
42	1250	8" x 6"	6HF20	80-122	1500	271	428	520	95 to 137	127.39 to 183.72	Single Stage Pump
43	1250	8" x 6"	6HF20	113-173	1760	271	428	520	153 to 221	205.18 to 296.37	Single Stage Pump
44	1250	8" x 6"	6HF20	119-182	1800	271	428	520	164 to 236	219.93 to 316.48	Single Stage Pump
45	1250	8" x 6"	6HF12	113-180	3000	275	245	305	106 to 170	142.15 to 227.97	Single Stage Pump
46	1250	8" x 6"	6HFTD12L	229-342	2975	443	260	314	201 to 335	269.55 to 449.24	Two Stage Pump
47	1500	8" x 6"	6HF20	76-117	1500	271	428	520	95 to 137	127.39 to 183.72	Single Stage Pump
48	1500	8" x 6"	6HF20	109-167	1760	271	428	520	153 to 221	205.18 to 296.37	Single Stage Pump
49	1500	8" x 6"	6HF20	115-175	1800	271	428	520	164 to 236	219.93 to 316.48	Single Stage Pump
50	1500	8" x 6"	6HF12	106-172	3000	275	245	305	106 to 170	142.15 to 227.97	Single Stage Pump
51	2000	10" x 8"	8HF20	80-122	1500	272	425	515	124 to 186	166.29 to 249.43	Single Stage Pump

52	2000	10" x 8"	8HF20	115-172	1760	272	425	515	200 to 301	403.65	Single Stage Pump
53	2000	10" x 8"	8HF20	121-181	1800	272	425	515	214 to 322	286.98 to 431.81	Single Stage Pump
54	2000	10" x 8"	8HF13	120-148	2800	300	305	330	146.07 to 190.76	195.88 to 255.81	Single Stage Pump
55	2000	10" x 8"	8HF13	136-167	2950	300	305	330	170.82 to 223.09	229.07 to 299.17	Single Stage Pump
56	2000	10" x 8"	8HF13	141-173	3000	300	305	330	179.65 to 234.62	240.91 to 314.63	Single Stage Pump
57	2500	10" x 8"	8HF20	74-115	1500	272	425	515	124 to 186	166.29 to 249.43	Single Stage Pump
58	2500	10" x 8"	8HF20	110-166	1760	272	425	515	200 to 301	403.65	Single Stage Pump
59	2500	10" x 8"	8HF20	115-175	1800	272	425	515	214 to 322	286.98 to 431.81	Single Stage Pump

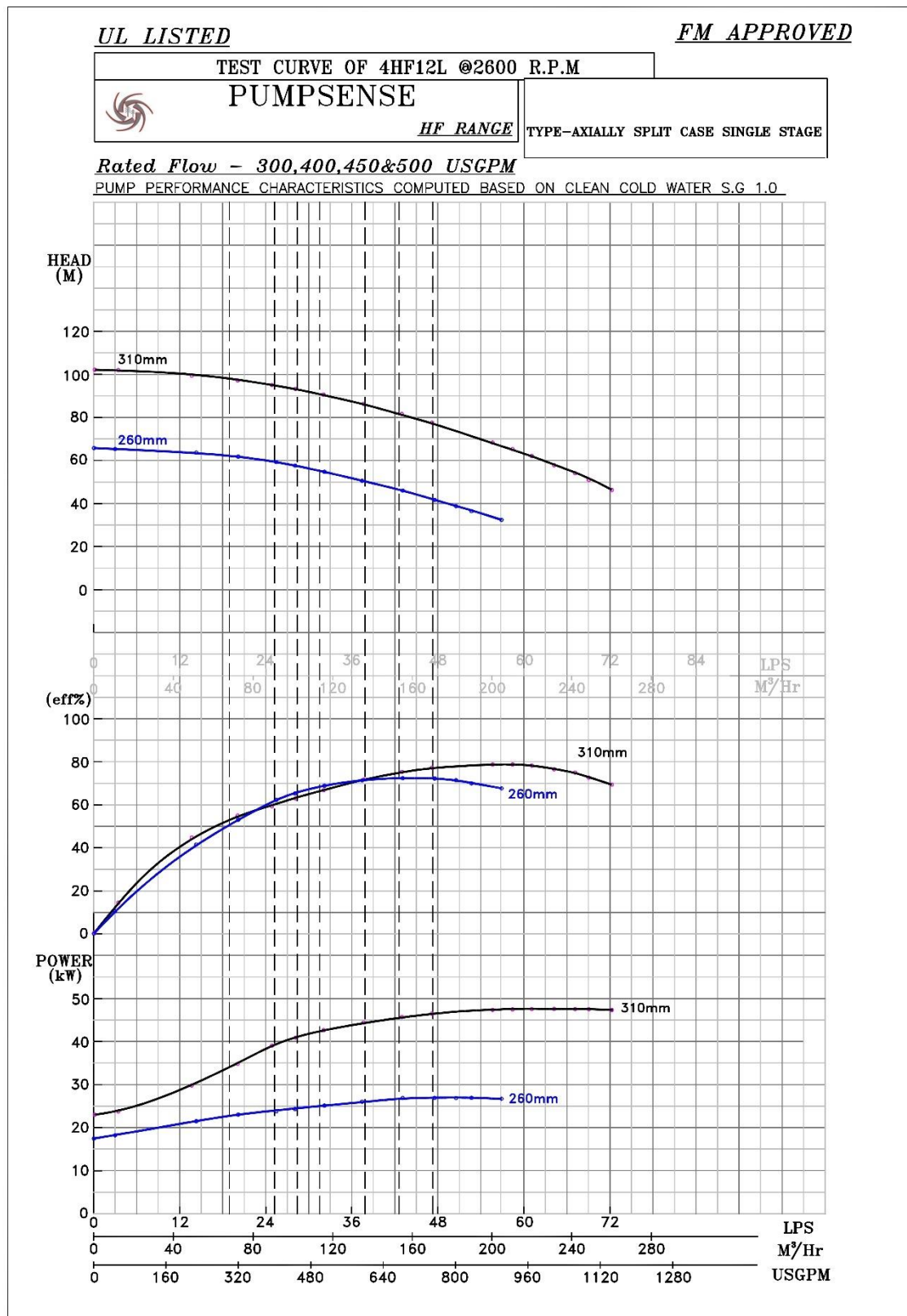
## 6. FM Approved Fire Pumps, Split Case

PUMPSENSE FM Approved Centrifugal Fire Pumps, Split Case											
Sr. No.	Rated Capacity, usgpm	Size, in.	Model	Rated Net Pressure Range, psi	Approx. Speed, RPM	Max Working Pressure, psi	Impeller Diameter, mm.		Pump BkW, min to max		Remarks
							Minimum	Maximum	kW	hP	
1	300	6" x 4"	4HF12L	88-139	2600	261.8	260	310	28-48	38-64	Single Stage Pump
2	300	6" x 4"	4HF12L	104-162	2800	261.8	260	310	38-63	51-84	Single Stage Pump
3	300	6" x 4"	4HF12L	116-180	2950	261.8	260	310	44-73	59-98	Single Stage Pump
4	300	6" x 4"	4HF12L	120-187	3000	261.8	260	310	46-77	62-103	Single Stage Pump
5	400	6" x 4"	4HF12L	85-135	2600	261.8	260	310	28-48	38-64	Single Stage Pump
6	400	6" x 4"	4HF12L	99-158	2800	261.8	260	310	38-63	51-84	Single Stage Pump
7	400	6" x 4"	4HF12L	111-177	2950	261.8	260	310	44-73	59-98	Single Stage Pump
8	400	6" x 4"	4HF12L	115-183	3000	261.8	260	310	46-77	62-103	Single Stage Pump
9	450	6" x 4"	4HF12L	82-133	2600	261.8	260	310	28-48	38-64	Single Stage Pump
10	450	6" x 4"	4HF12L	97-155	2800	261.8	260	310	38-63	51-84	Single Stage Pump
11	450	6" x 4"	4HF12L	109-174	2950	261.8	260	310	44-73	59-98	Single Stage Pump
12	450	6" x 4"	4HF12L	113-181	3000	261.8	260	310	46-77	62-103	Single Stage Pump
13	500	6" x 4"	4HF12L	78-129	2600	261.8	260	310	28-48	38-64	Single Stage Pump
14	500	6" x 4"	4HF12L	94-152	2800	261.8	260	310	38-63	51-84	Single Stage Pump
15	500	6" x 4"	4HF12L	106-171	2950	261.8	260	310	44-73	59-98	Single Stage Pump
16	500	6" x 4"	4HF12L	110-177	3000	261.8	260	310	46-77	62-103	Single Stage Pump

17	750	6" x 4"	4HF12	79-122	2600	265.2	264	310	41-55	55-74	Single Stage Pump
18	750	6" x 4"	4HF12	94-147	2800	265.2	264	310	48-74	64-99	Single Stage Pump
19	750	6" x 4"	4HF12	107-166	2950	265.2	264	310	55-87	74-117	Single Stage Pump
20	750	6" x 4"	4HF12	112-172	3000	265.2	264	310	58-90	78-121	Single Stage Pump
21	1000	6" x 5"	5HF11	80-126	2600	262.9	252	310	50-83	67-111	Single Stage Pump
22	1000	6" x 5"	5HF11	95-148	2800	262.9	252	310	67-108	90-145	Single Stage Pump
23	1000	6" x 5"	5HF11	107-167	2950	262.9	252	310	78-126	105-169	Single Stage Pump
24	1000	6" x 5"	5HF11	111-173	3000	262.9	252	310	82-132	110-177	Single Stage Pump
25	1250	8" x 6"	6HF12	83-132	2600	263.8	252	305	68-109	91-146	Single Stage Pump
26	1250	8" x 6"	6HF12	134-154	2800	263.8	252	305	86-136	115-182	Single Stage Pump
27	1250	8" x 6"	6HF12	115-170	2950	263.8	252	305	100-160	134-215	Single Stage Pump
28	1250	8" x 6"	6HF12	121-179	3000	263.8	252	305	105-167	141-224	Single Stage Pump
29	1500	8" x 6"	6HF12	108-165	2950	263.8	252	305	100-160	134-215	Single Stage Pump
30	1500	8" x 6"	6HF12	114-174	3000	263.8	252	305	105-167	141-224	Single Stage Pump
31	1500	8" x 6"	6HF18	101-124	1800	214.5	395	436	122-165	164-220	Single Stage Pump
32	1500	8" x 6"	6HF21	100-140	1480	217.3	438	520	123-185	165-250	Single Stage Pump
33	2000	10" x 8"	8HF13	120-146	2800	287.5	305	330	156-192	209-257	Single Stage Pump
34	2000	10" x 8"	8HF13	135-166	2950	287.5	305	330	182-225	244-302	Single Stage Pump

35	2000	10" x 8"	8HF13	138-173	3000	287.5	305	330	192-236	257-316	Single Stage Pump
36	2000	10" x 8"	8HF21	98-126	1480	210.2	455	520	141-191	189-255	Single Stage Pump
37	2000	10" x 8"	8HF17	110-140	1770	220.8	375	450	198-260	266-350	Single Stage Pump
38	2500	10" x 8"	8HF17	106-136	1770	220.8	375	450	198-260	266-350	Single Stage Pump

## 7. UL Listed // FM Approved Curves



**UL LISTED**

**FM APPROVED**

TEST CURVE OF 4HF12L @2800 R.P.M



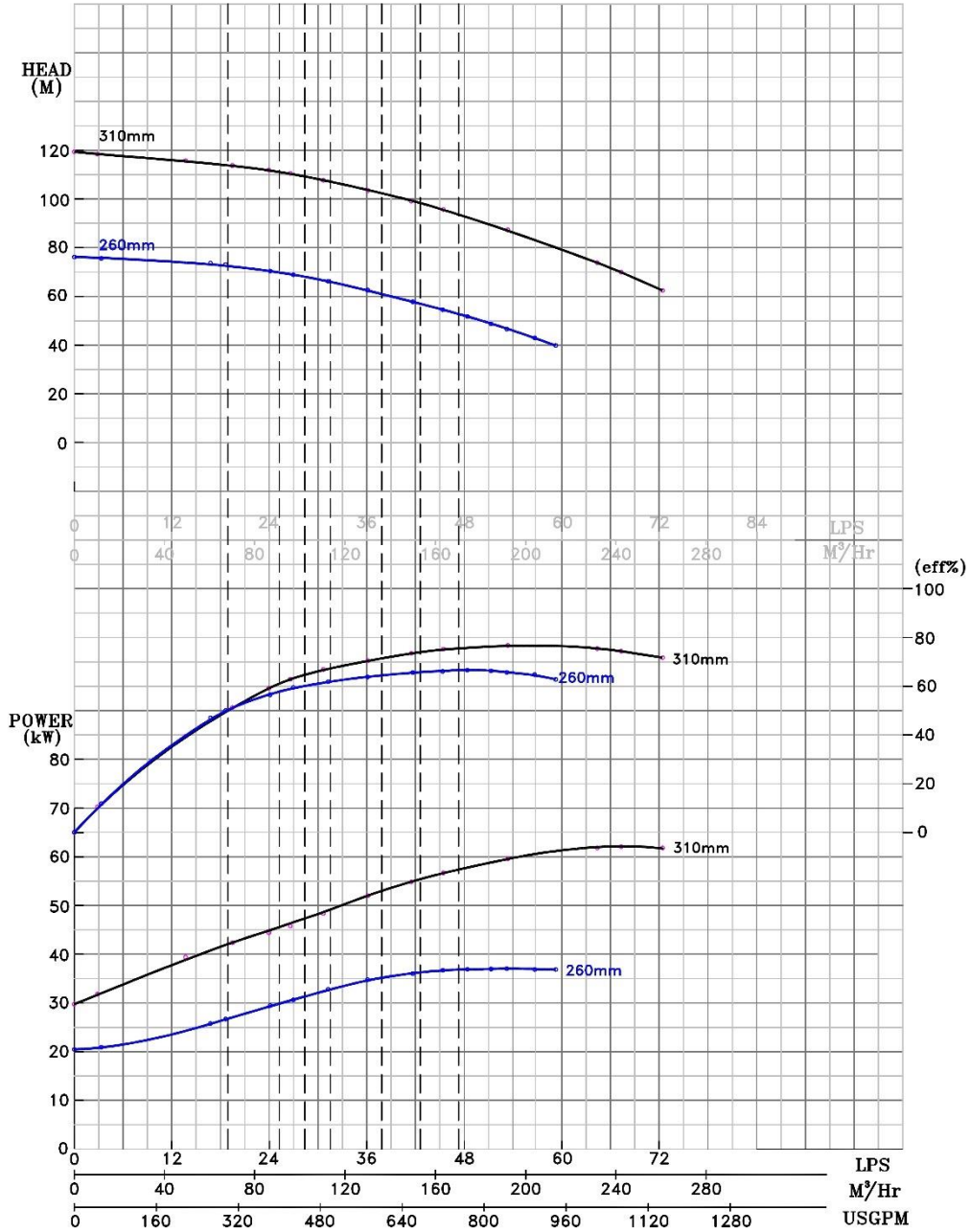
**PUMPSENSE**

**HF RANGE**

TYPE-AXIALLY SPLIT CASE SINGLE STAGE

**Rated Flow - 300,400,450&500 USGPM**

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0





**UL LISTED**

**FM APPROVED**

TEST CURVE OF 4HF12L @2950 R.P.M



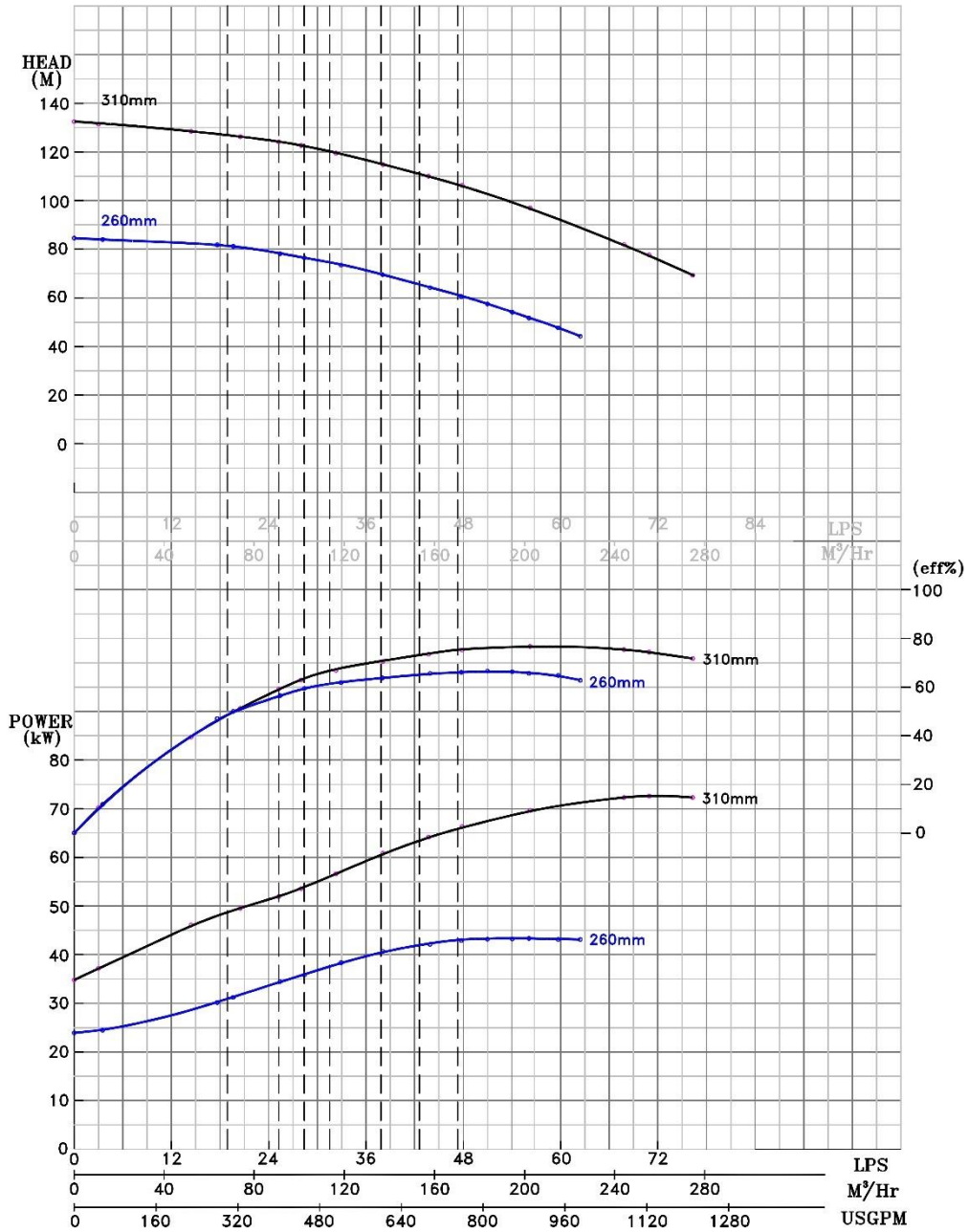
**PUMPSENSE**

**HF RANGE**

TYPE-AXIALLY SPLIT CASE SINGLE STAGE

**Rated Flow - 300,400,450&500 USGPM**

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0



**UL LISTED**

**FM APPROVED**

TEST CURVE OF 4HF12L @3000 R.P.M



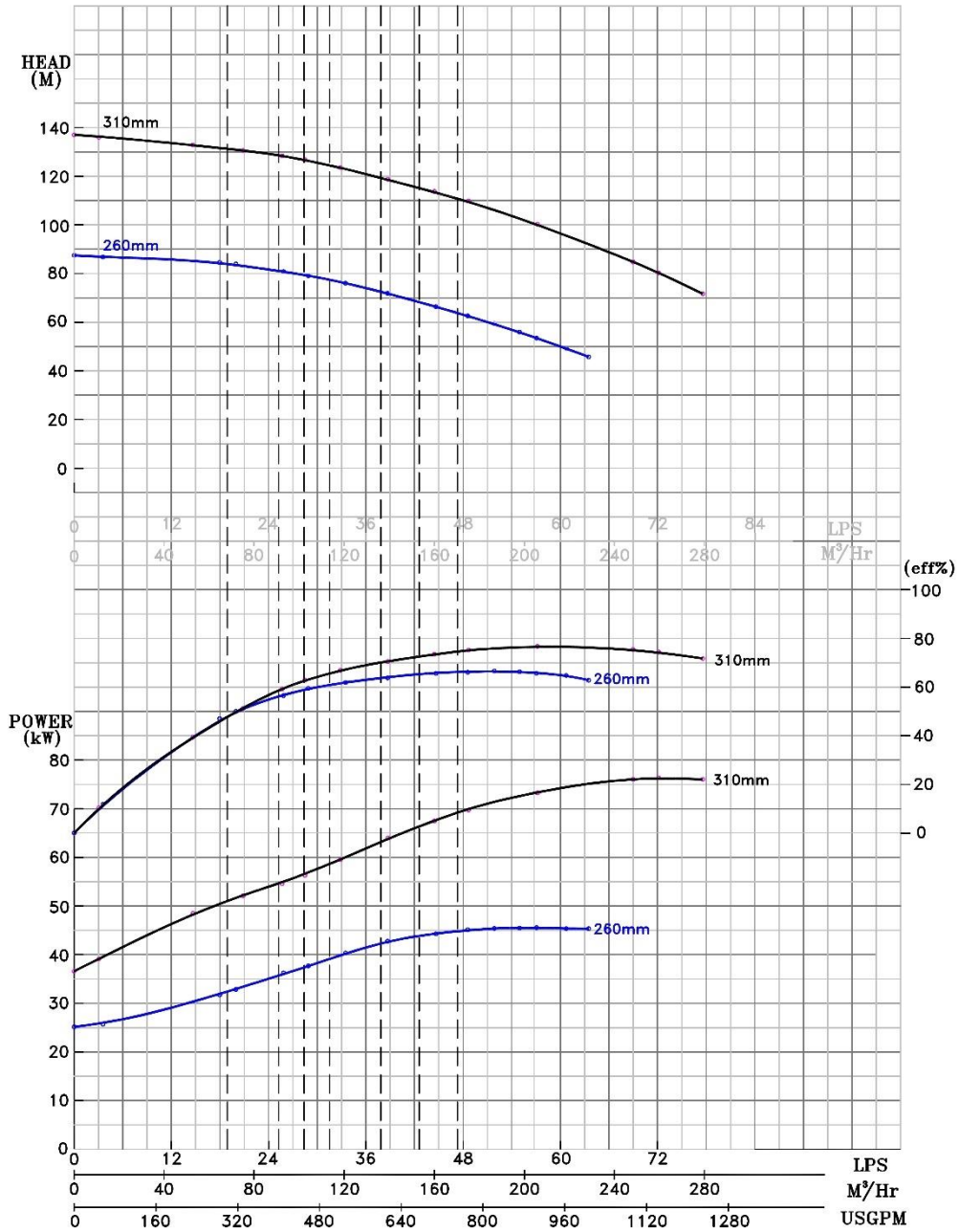
**PUMPSENSE**

**HF RANGE**

TYPE-AXIALLY SPLIT CASE SINGLE STAGE

**Rated Flow - 300,400,450&500 USGPM**

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0



UL LISTED

FM APPROVED

TEST CURVE OF 4HF12 @2600 R.P.M

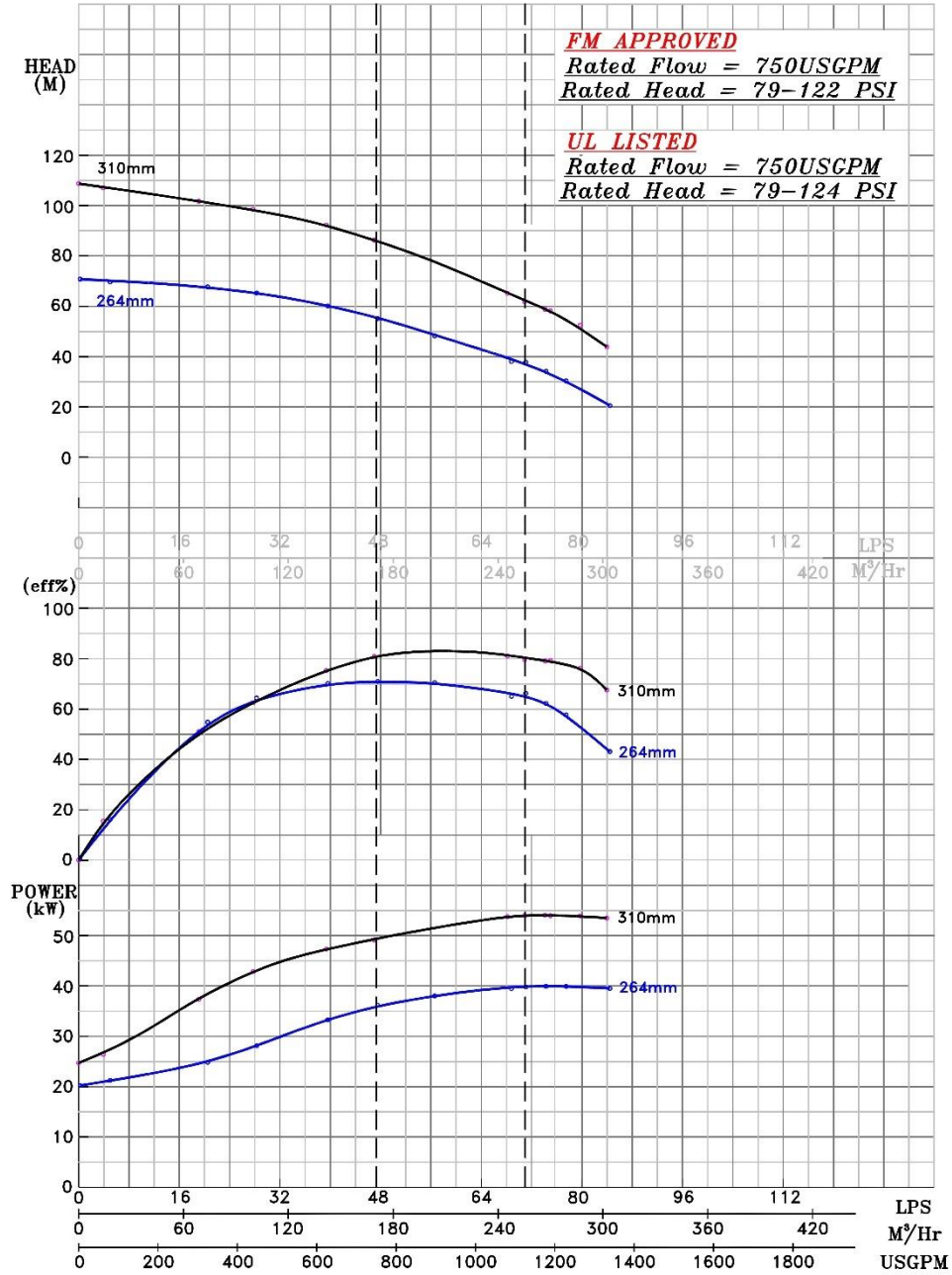


**PUMPSENSE**

HF RANGE

TYPE-AXIALLY SPLIT CASE SINGLE STAGE

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0



**UL LISTED**

**FM APPROVED**

TEST CURVE OF 4HF12 @2800 R.P.M

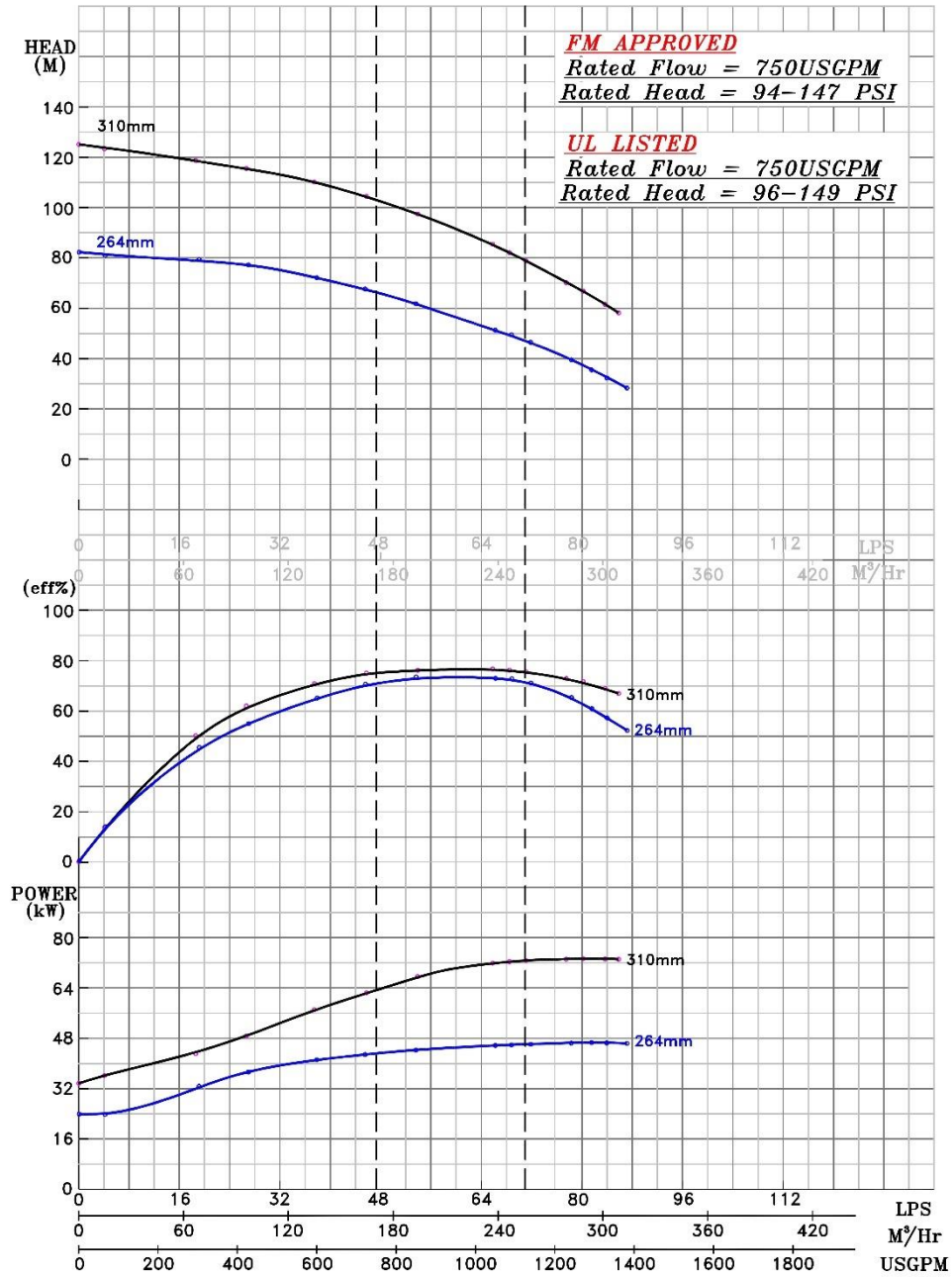


**PUMPSENSE**

**HF RANGE**

TYPE-AXIALLY SPLIT CASE SINGLE STAGE

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G. 1.0



**UL LISTED**

**FM APPROVED**

TEST CURVE OF 4HF12 @2950 R.P.M

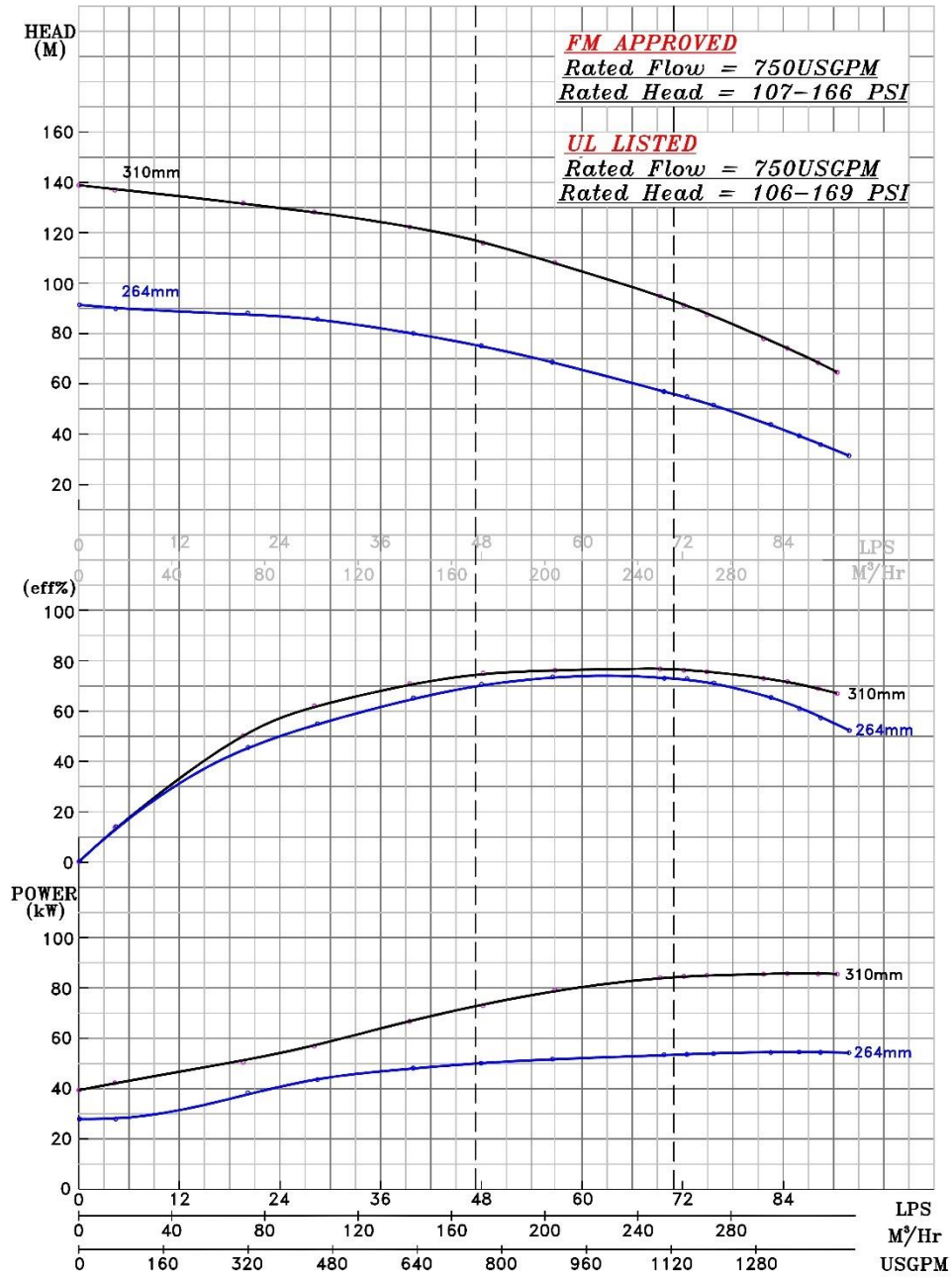


**PUMPSENSE**

**HF RANGE**

TYPE-AXIALLY SPLIT CASE SINGLE STAGE

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0



**UL LISTED**

**FM APPROVED**

PERFORMANCE CURVE OF 4HF12 @3000 R.P.M

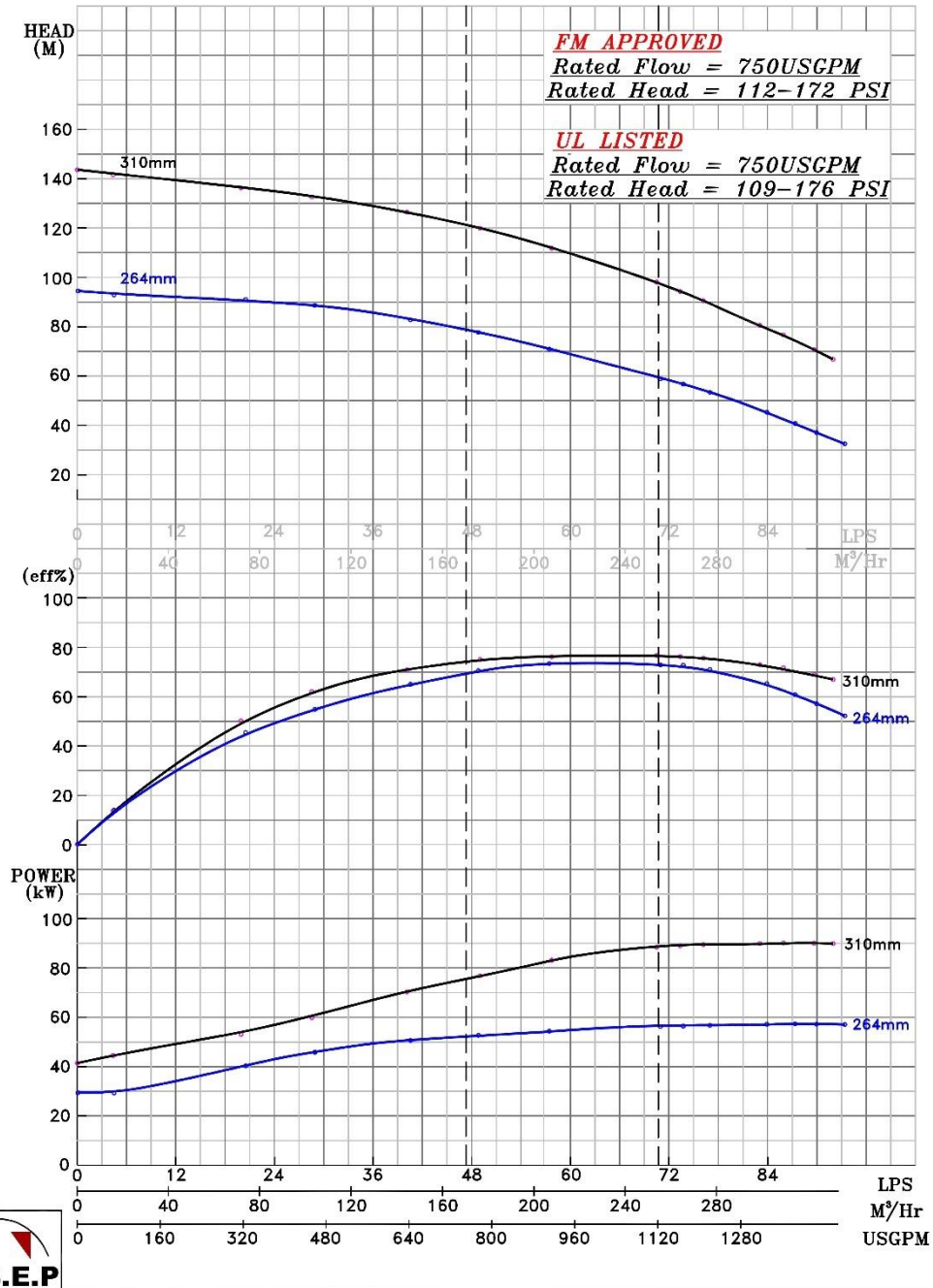


**PUMPSENSE**

**HF RANGE**

TYPE-AXIALLY SPLIT CASE SINGLE STAGE

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0





**UL LISTED**

PERFORMANCE CURVE OF 4HF13 @2600 R.P.M

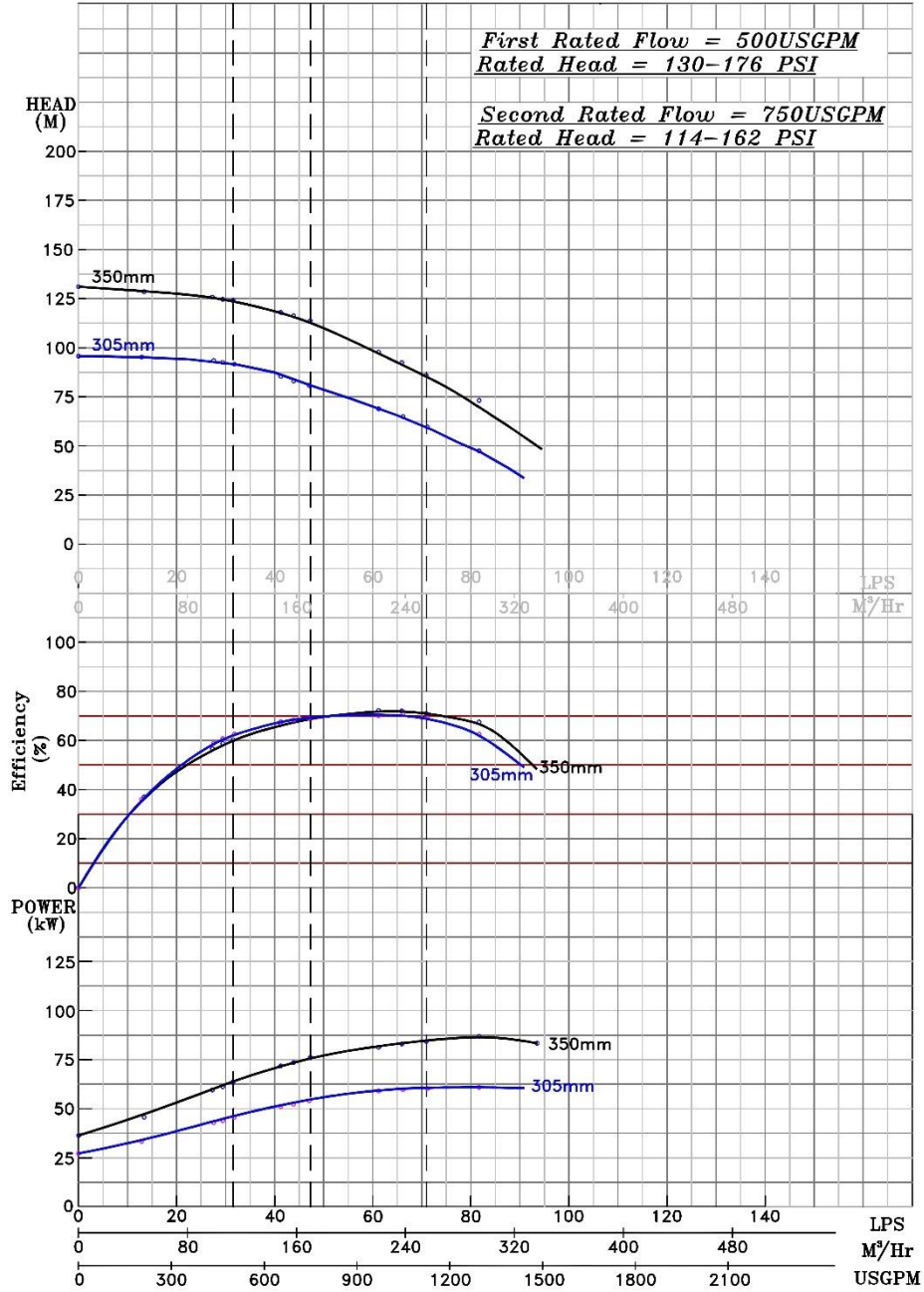


**PUMPSENSE**

**HF RANGE**

TYPE-AXIALLY SPLIT CASE SINGLE STAGE

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0



**UL LISTED**

PERFORMANCE CURVE OF 4HF13 @2800 R.P.M

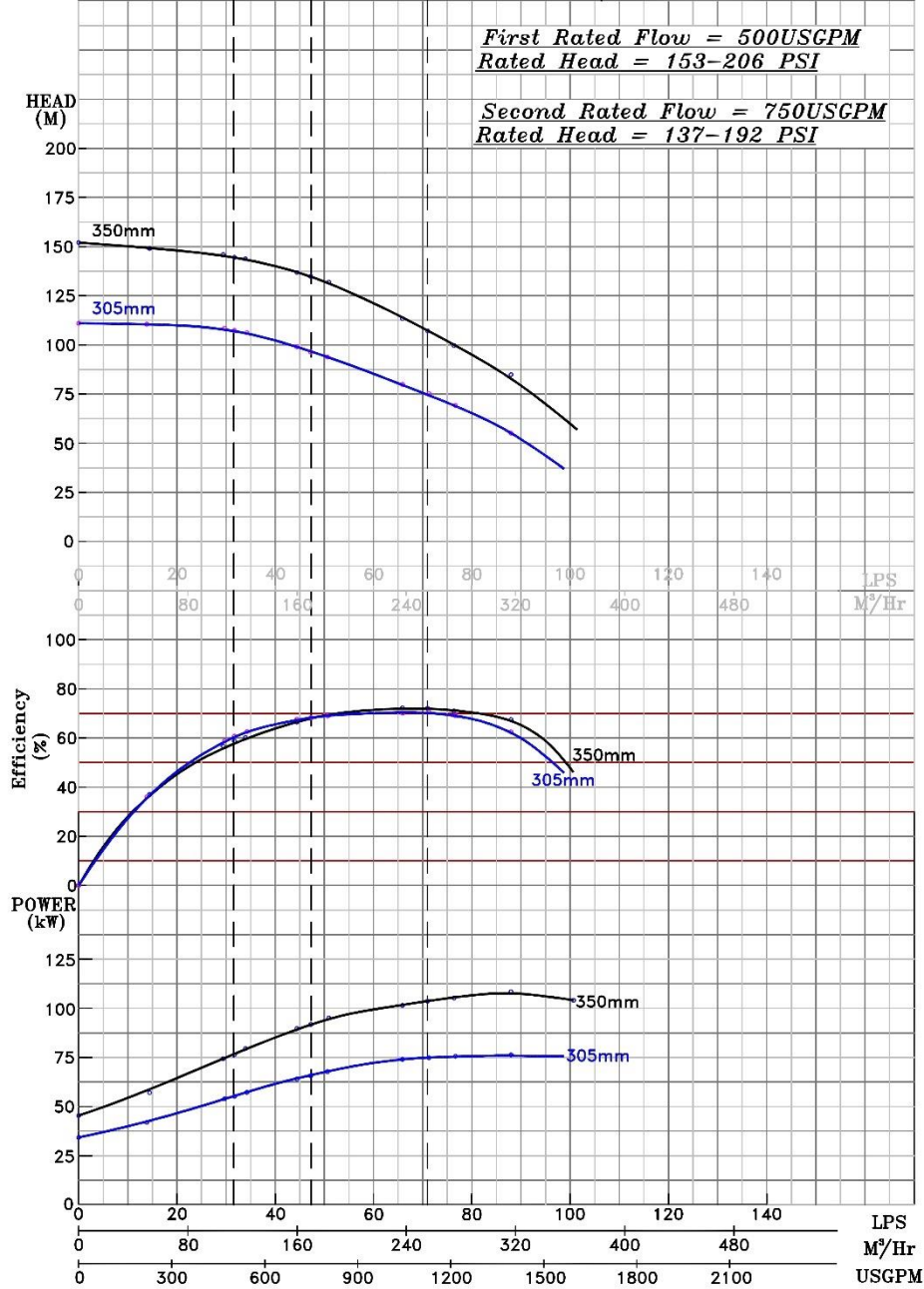


**PUMPSENSE**

**HF RANGE**

TYPE-AXIALLY SPLIT CASE SINGLE STAGE

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0





**UL LISTED**

PERFORMANCE CURVE OF 4HF13 @2950 R.P.M

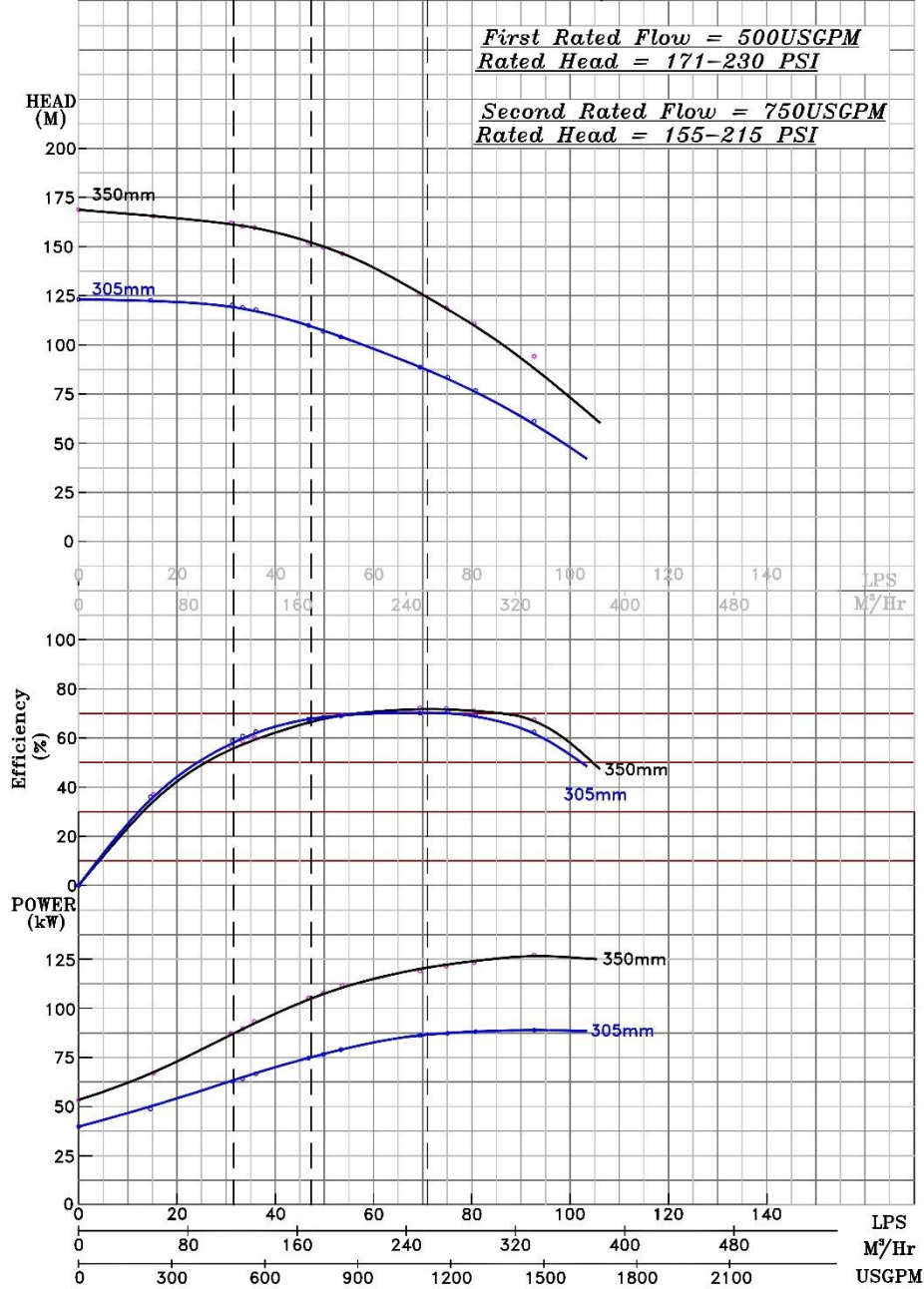


**PUMPSENSE**

**HF RANGE**

TYPE-AXIALLY SPLIT CASE SINGLE STAGE

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0



**UL LISTED**

PERFORMANCE CURVE OF 4HF13 @3000 R.P.M

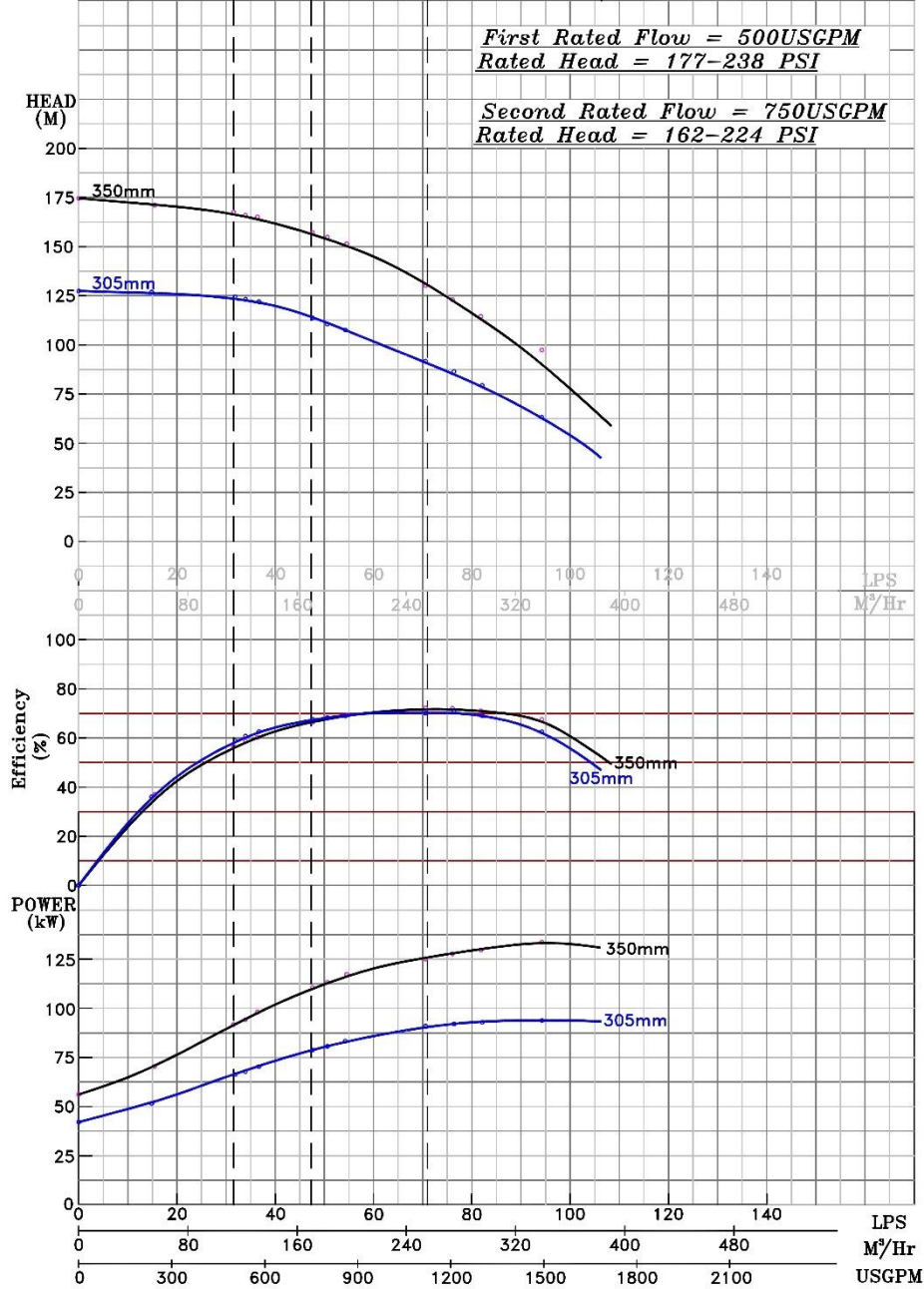


**PUMPSENSE**

**HF RANGE**

TYPE-AXIALLY SPLIT CASE SINGLE STAGE

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0



**UL LISTED**

**FM APPROVED**

TEST CURVE OF 5HF11 @2600 R.P.M

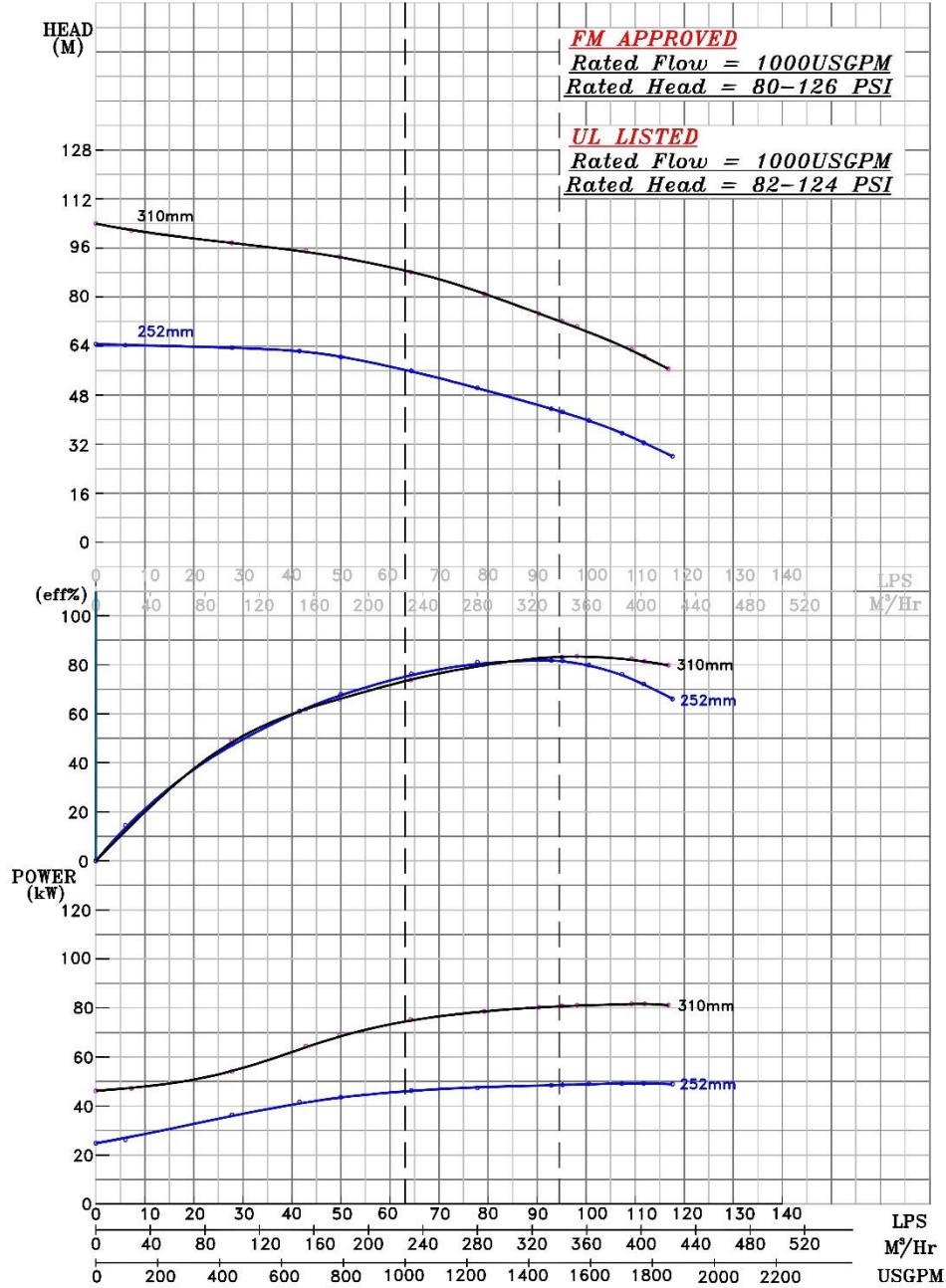


**PUMPSENSE**

**HF RANGE**

TYPE-AXIALLY SPLIT CASE SINGLE STAGE

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0



**UL LISTED**

**FM APPROVED**

TEST CURVE OF 5HF11 @2800 R.P.M

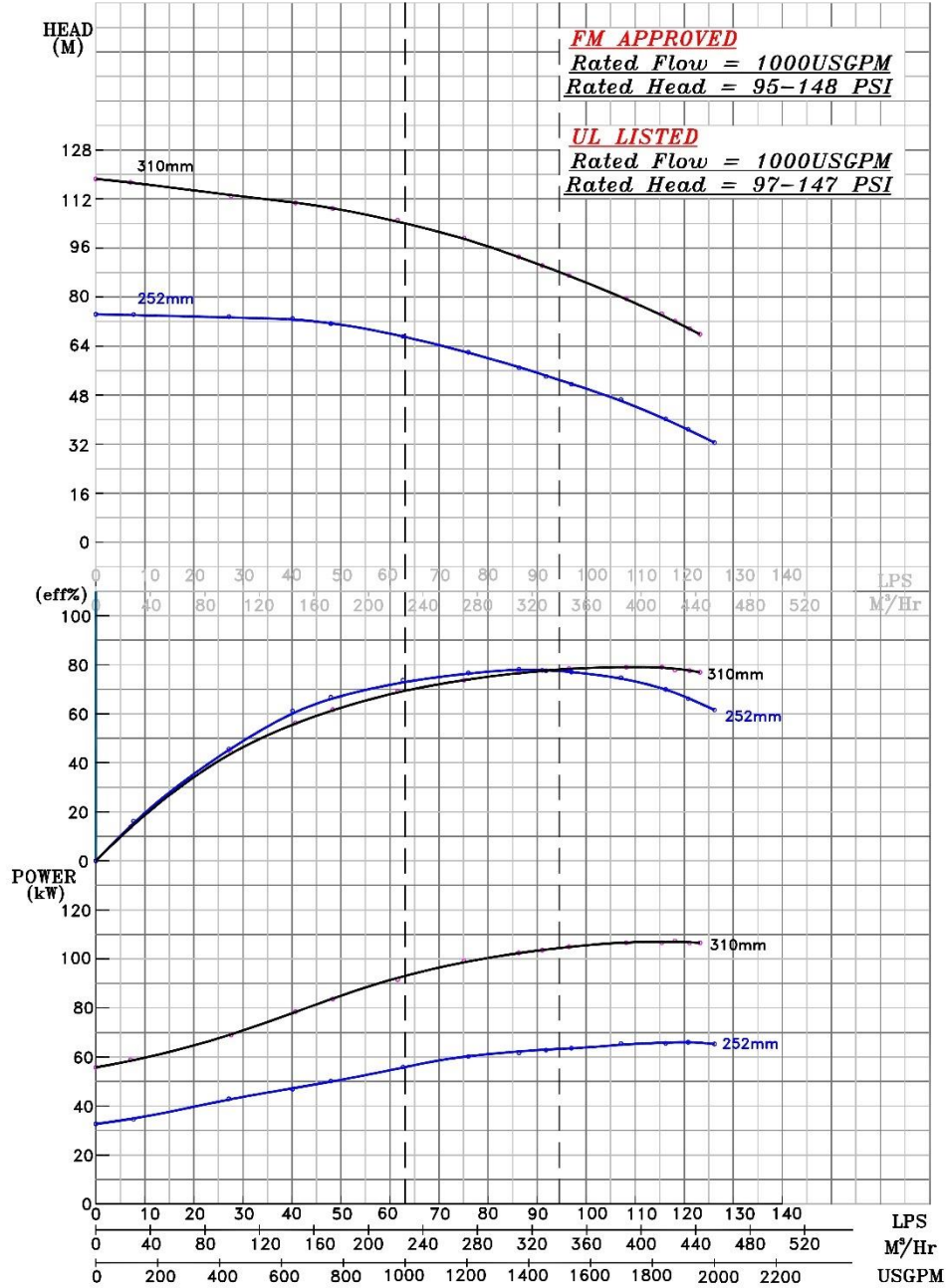


**PUMPSENSE**

**HF RANGE**

TYPE-AXIALLY SPLIT CASE SINGLE STAGE

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0



**UL LISTED**

**FM APPROVED**

TEST CURVE OF 5HF11 @2950 R.P.M

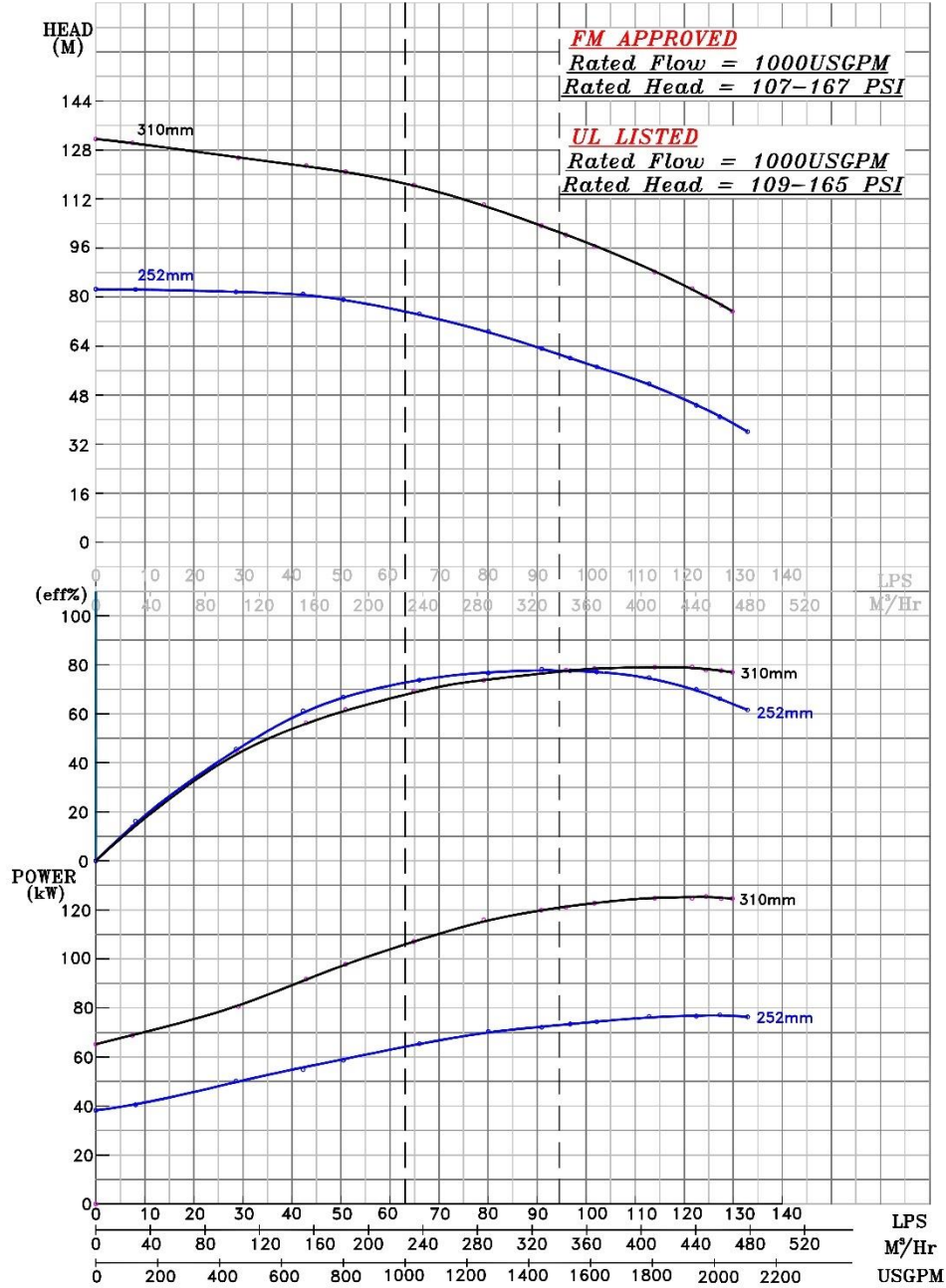


**PUMPSENSE**

**HF RANGE**

TYPE-AXIALLY SPLIT CASE SINGLE STAGE

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0



**UL LISTED**

**FM APPROVED**

PERFORMANCE CURVE OF 5HF11 @3000 R.P.M

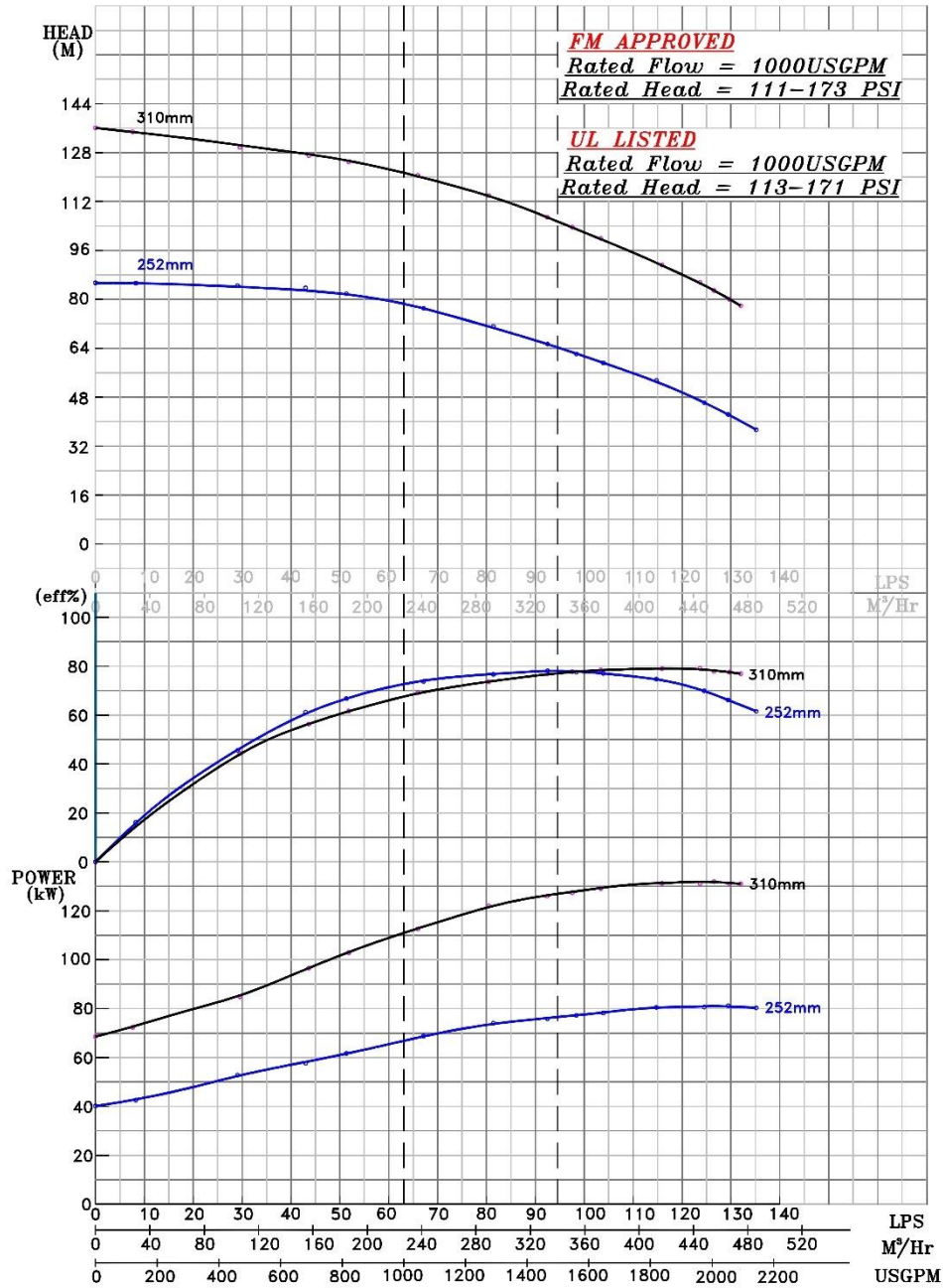


**PUMPSENSE**

**HF RANGE**

TYPE-AXIALLY SPLIT CASE SINGLE STAGE

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0





**UL LISTED**

**FM APPROVED**

TEST CURVE OF 6HF12 @2600 R.P.M

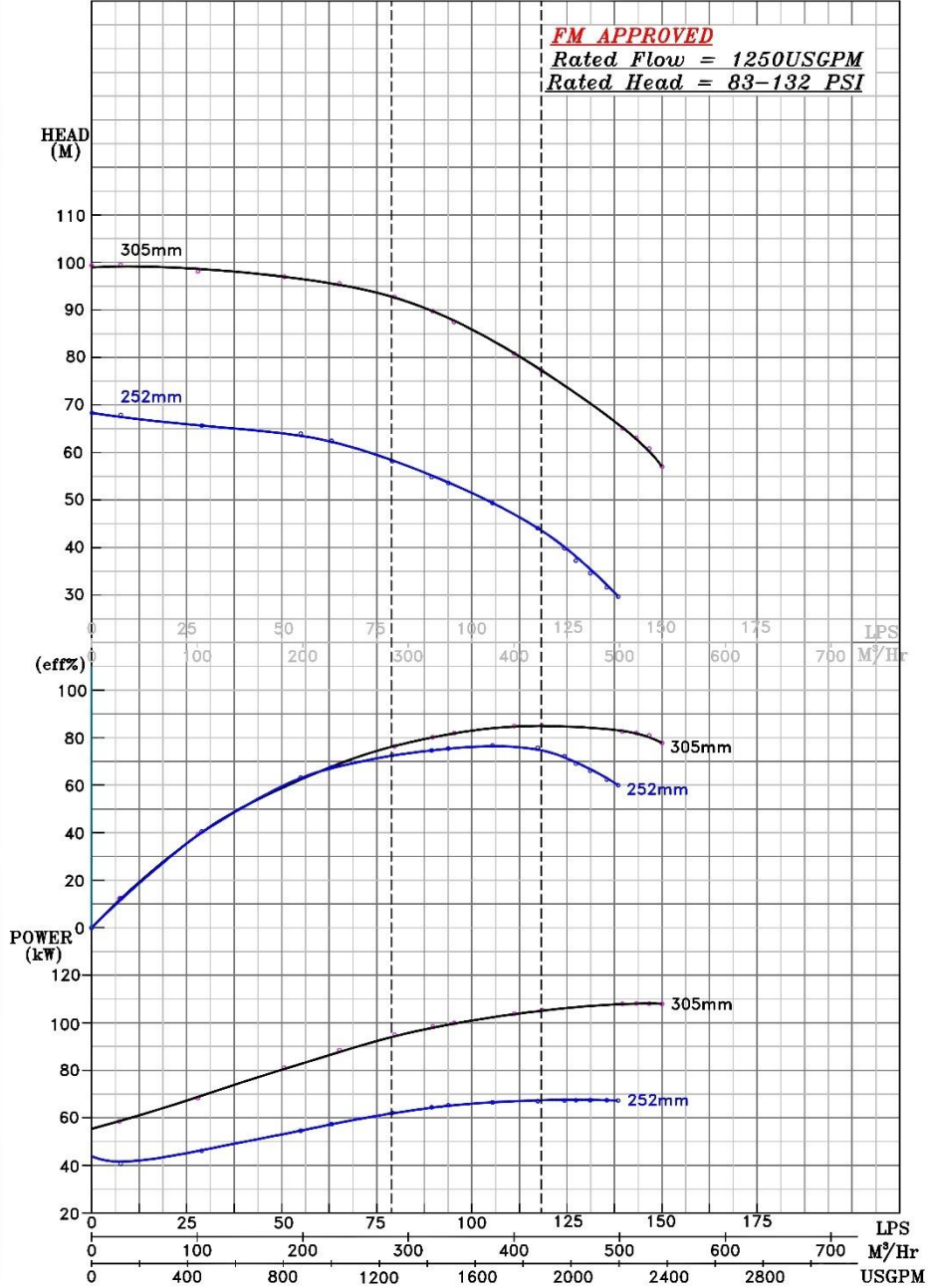


**PUMPSENSE**

**HF RANGE**

TYPE-AXIALLY SPLIT CASE SINGLE STAGE

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0



UL LISTED

FM APPROVED

TEST CURVE OF 6HF12 @2800 R.P.M

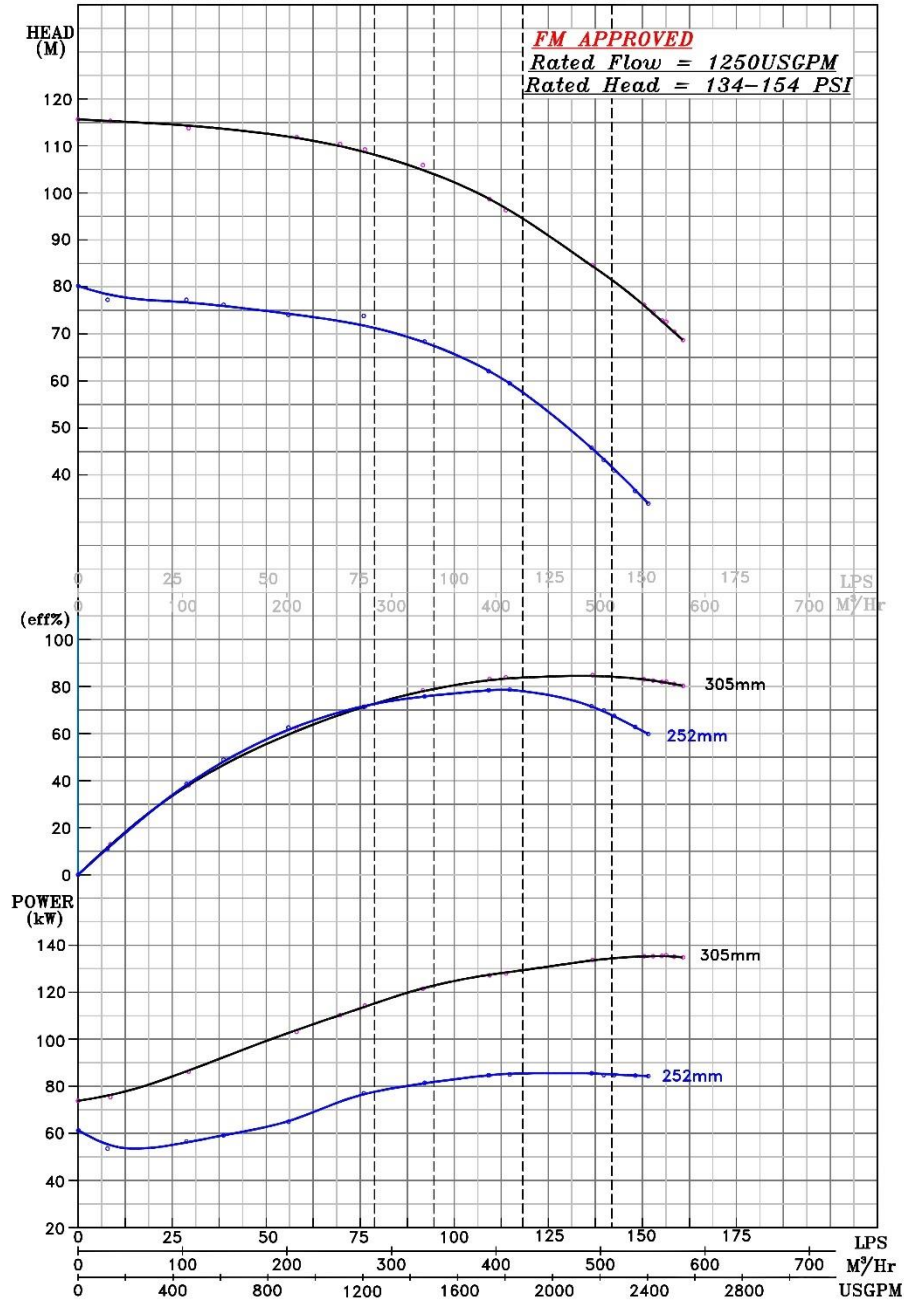


**PUMPSENSE**

HF RANGE

TYPE-AXIALLY SPLIT CASE SINGLE STAGE

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G. 1.0





**UL LISTED**

**FM APPROVED**

TEST CURVE OF 6HF12 @2950 R.P.M

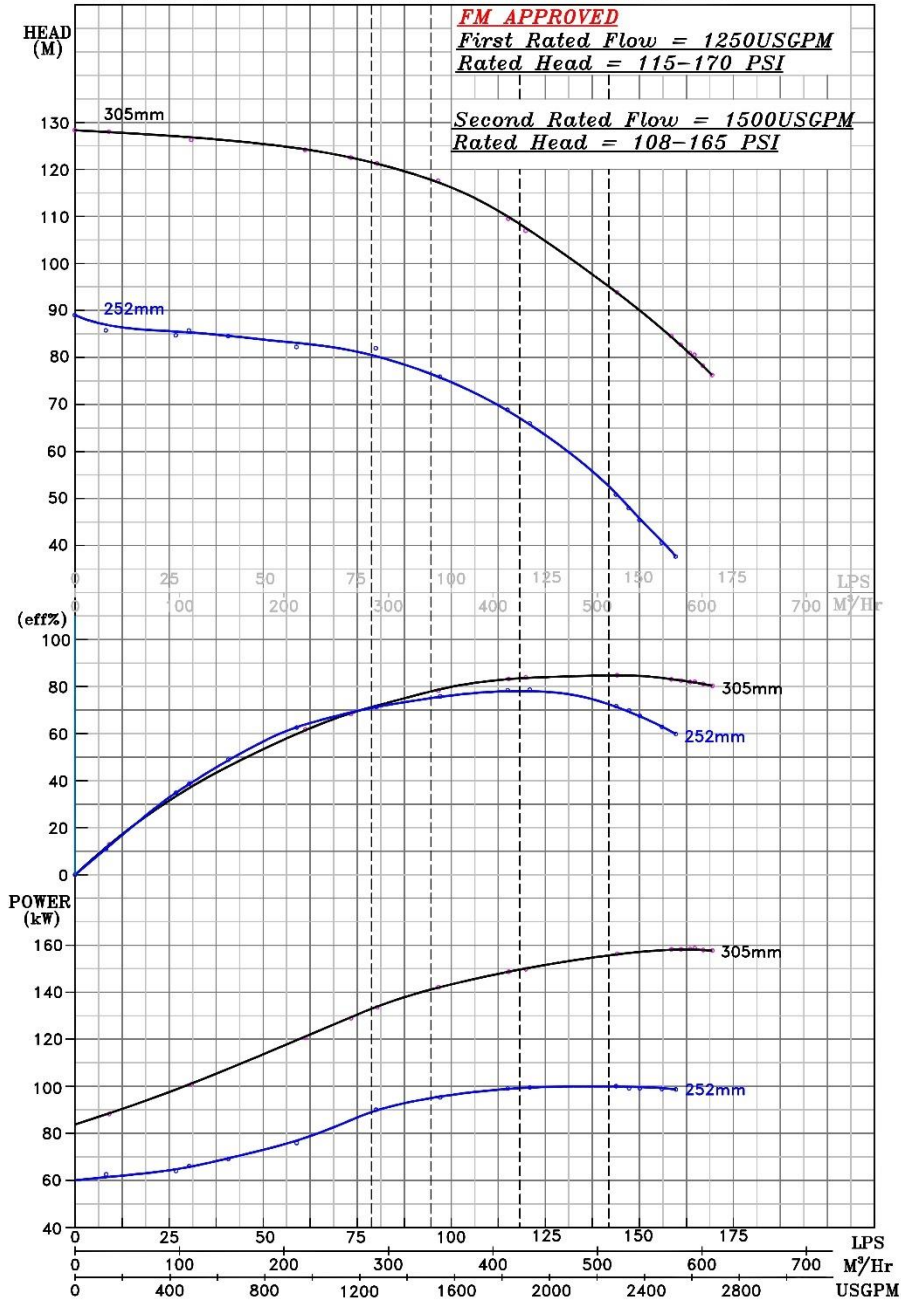


**PUMPSENSE**

**HF RANGE**

TYPE-AXIALLY SPLIT CASE SINGLE STAGE

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G. 1.0



**FM APPROVED**

PERFORMANCE CURVE OF 6HF12 @3000 R.P.M

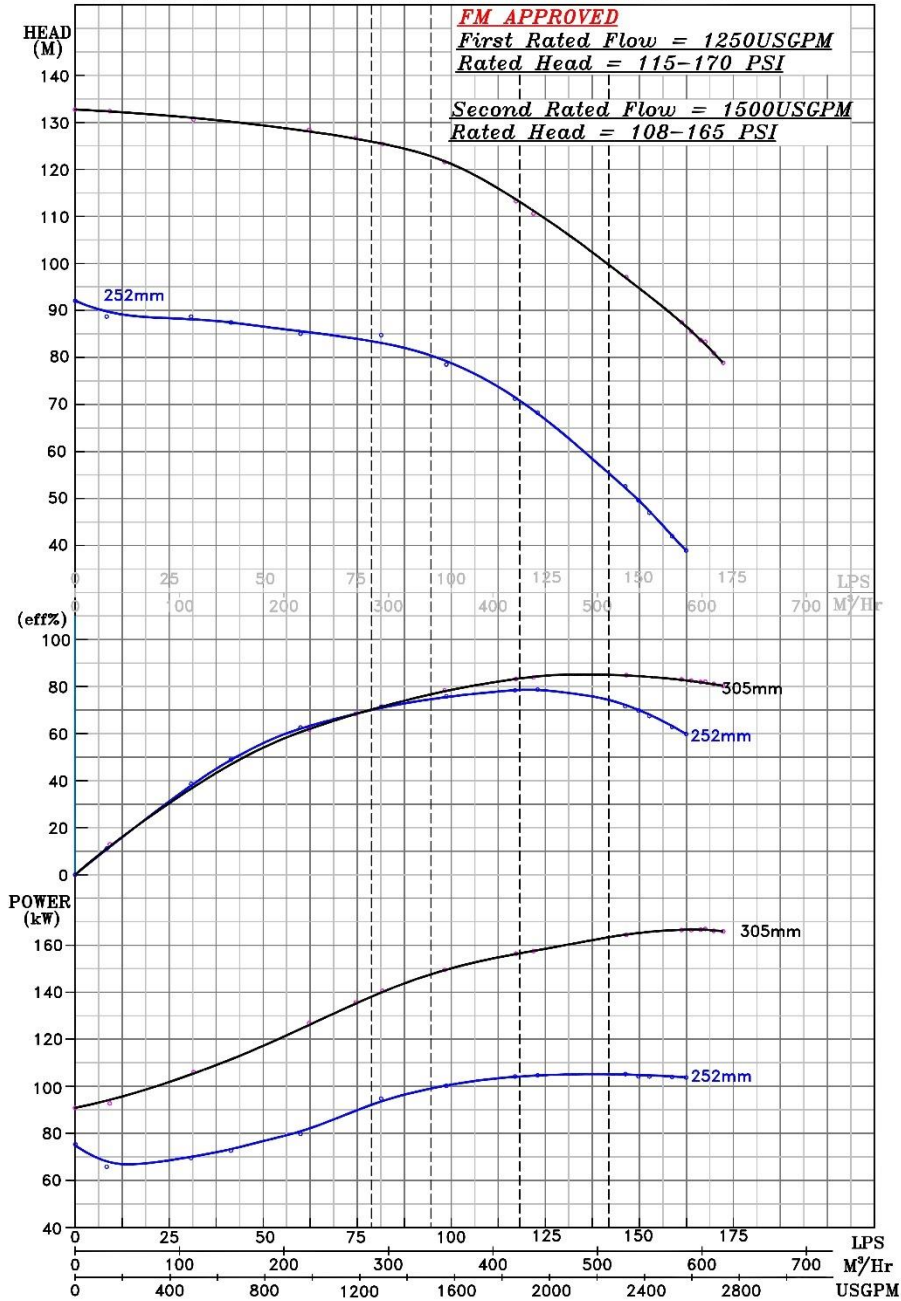


**PUMPSENSE**

**HF RANGE**

TYPE-AXIALLY SPLIT CASE SINGLE STAGE

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G. 1.0



UL LISTED

NOTE- PERFORMANCE AS PER ISO 9906 GRADE-2B

PERFORMANCE CURVE OF 6HF12 @3000 R.P.M

6HF12/Y/800752



PUMPSENSE

HF RANGE

SIZE 200x150-305

WORKING PRESS. 18 bar

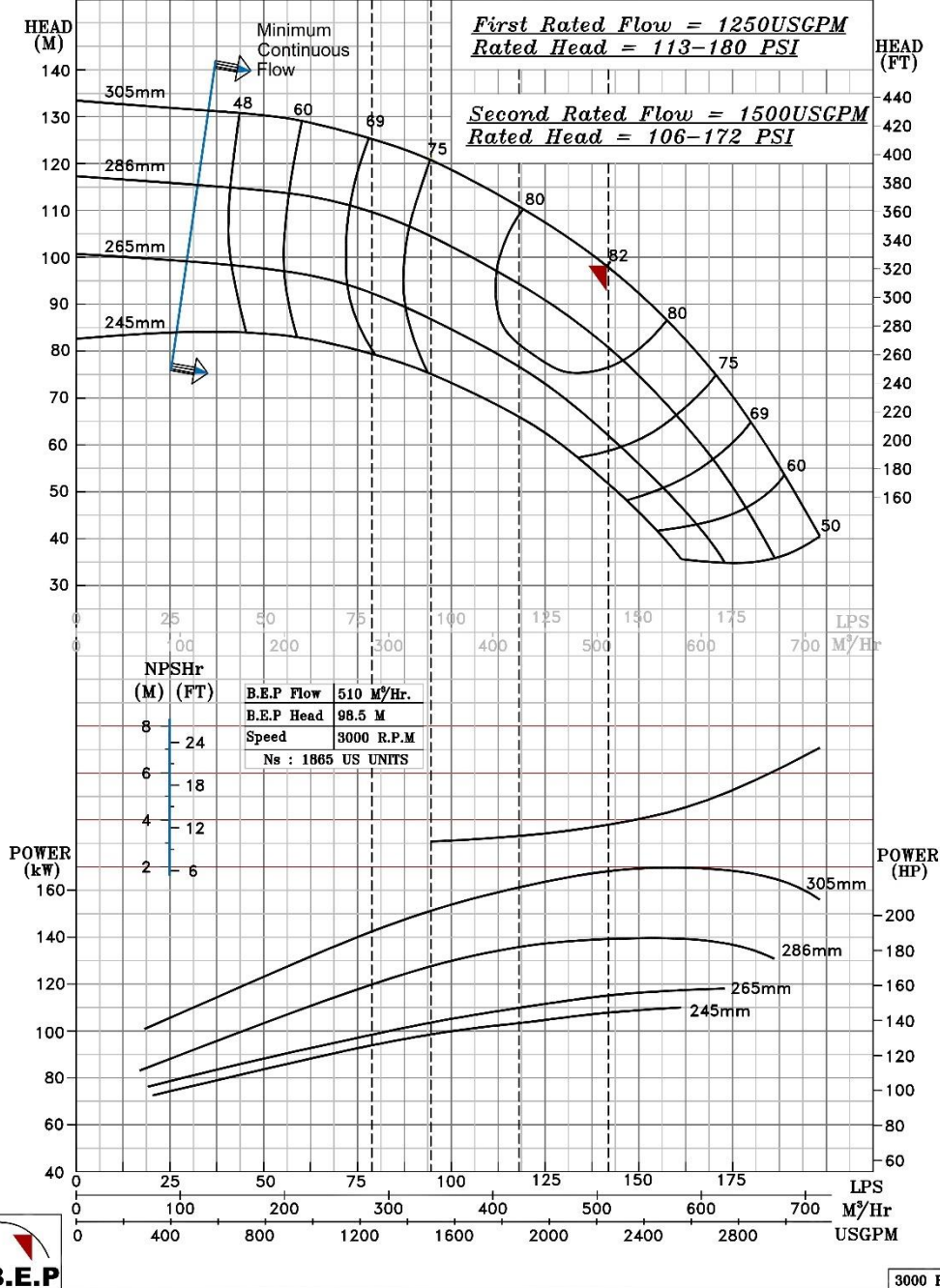
TEST PRESS. 27 bar

TYPE-AXIALLY SPLIT CASE SINGLE STAGE

SPEED 3000 rpm

DATE - 01.12.18

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0



UL LISTED

Impeller used- 6HF14KL

PERFORMANCE CURVE OF 6HF14K @2600 R.P.M

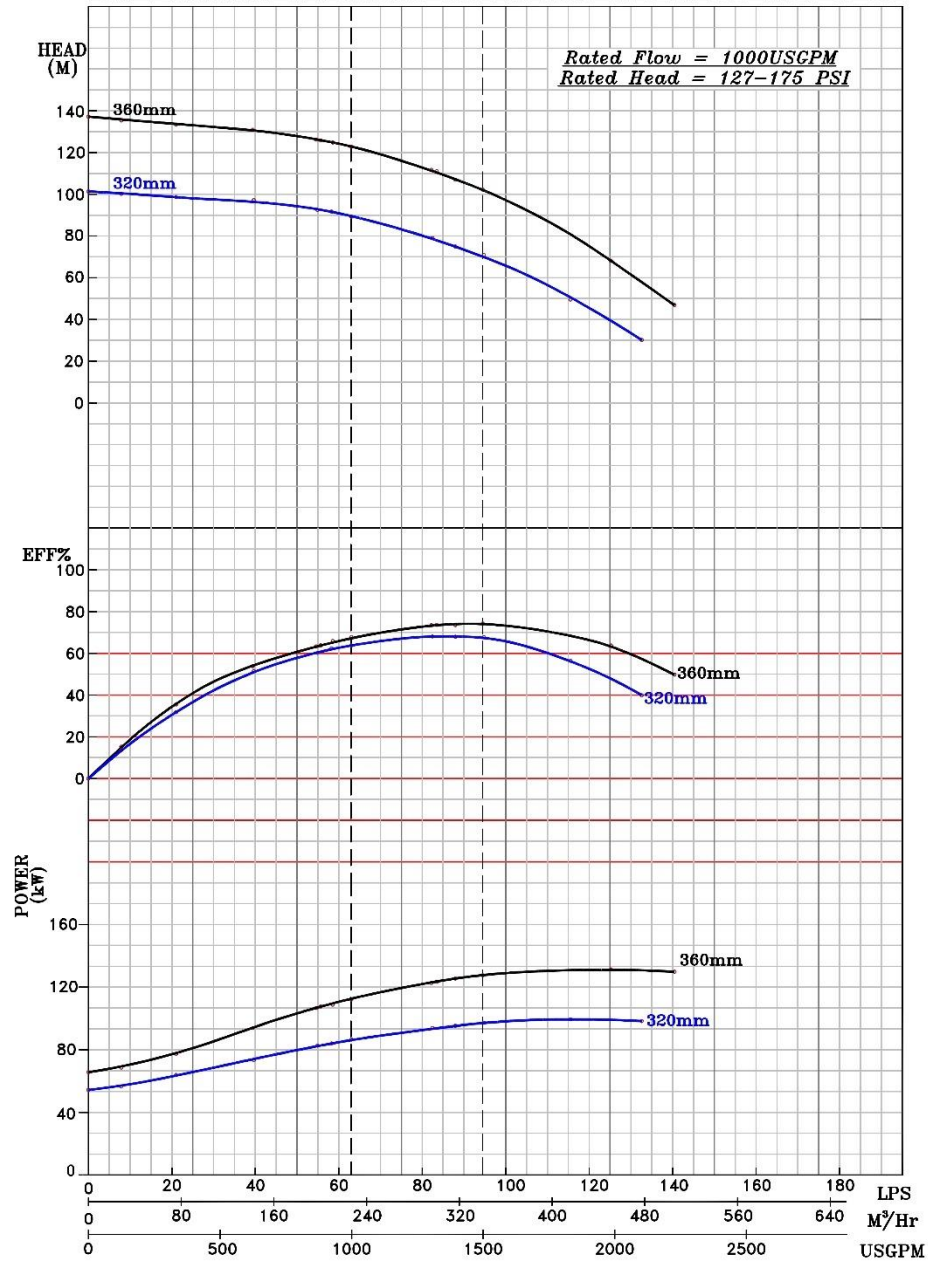


**PUMPSense**

HF RANGE

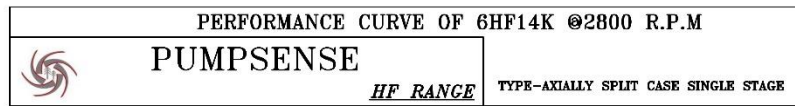
TYPE-AXIALLY SPLIT CASE SINGLE STAGE

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0

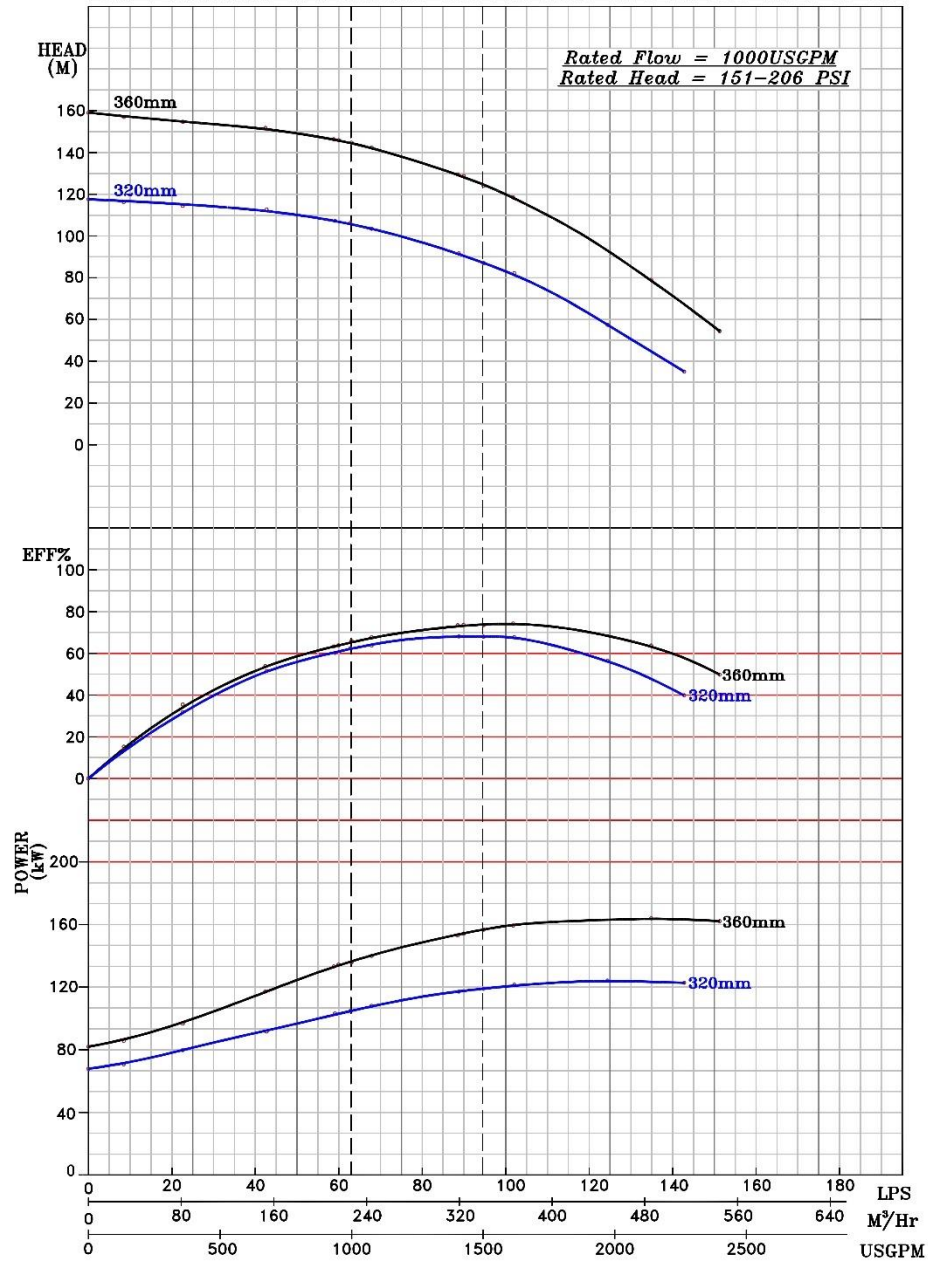


UL LISTED

Impeller used- 6HF14KL



PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0





UL LISTED

Impeller used- 6HF14KL

PERFORMANCE CURVE OF 6HF14K @2950 R.P.M

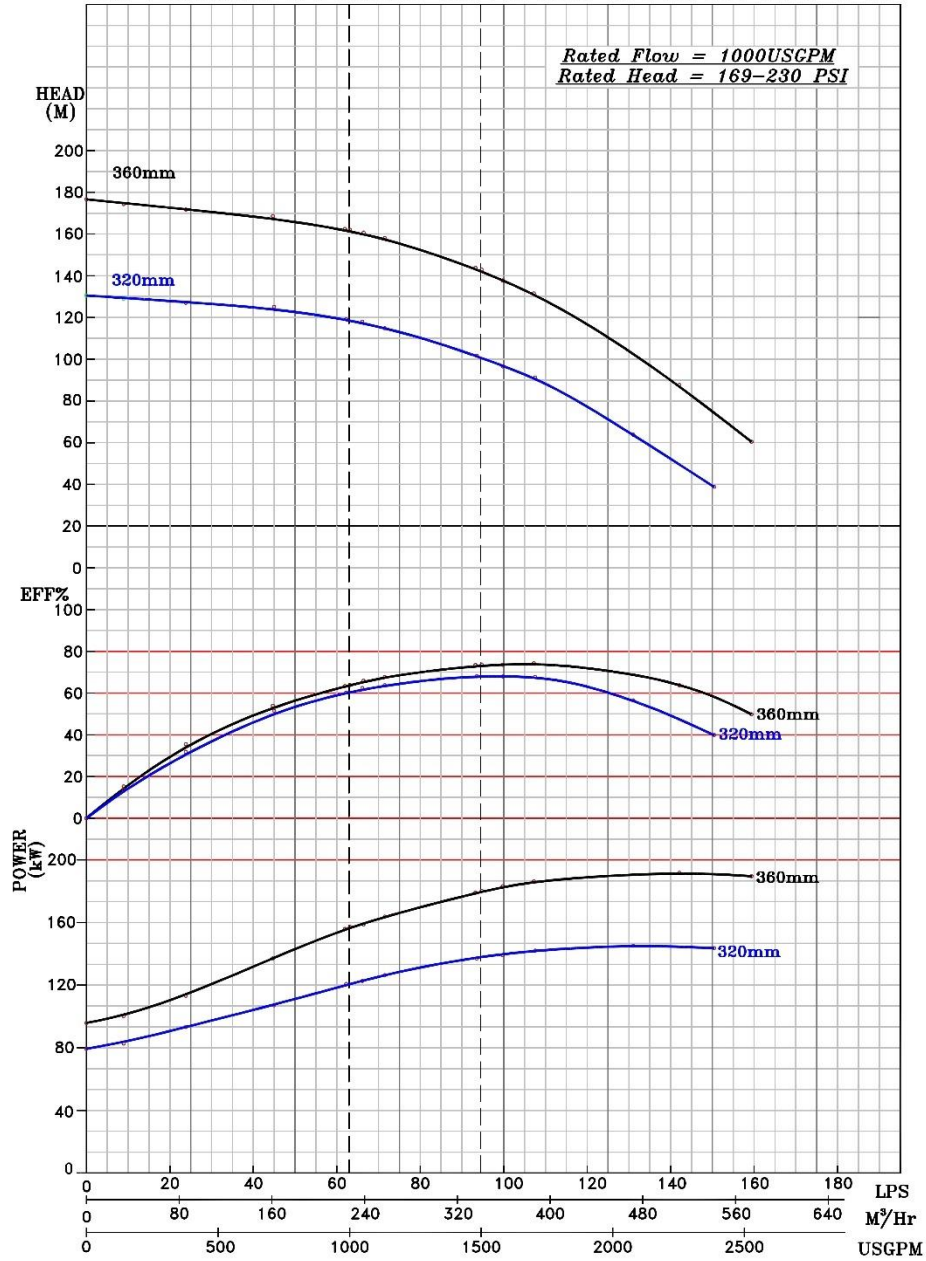


**PUMPSense**

HF RANGE

TYPE-AXIALLY SPLIT CASE SINGLE STAGE

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0



UL LISTED

Impeller used- 6HF14KL

PERFORMANCE CURVE OF 6HF14K @3000 R.P.M

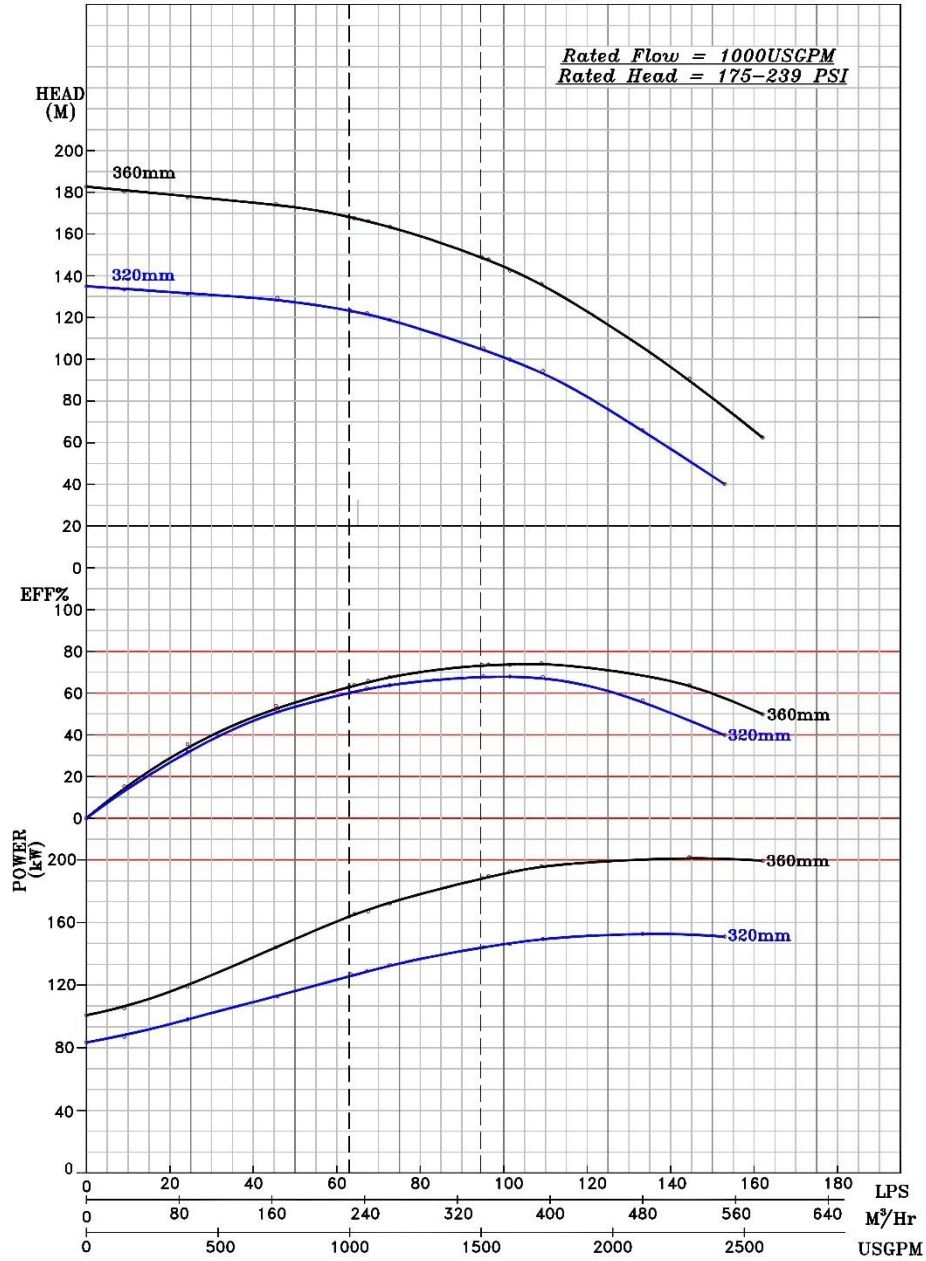


**PUMPSense**


HF RANGE

TYPE-AXIALLY SPLIT CASE SINGLE STAGE

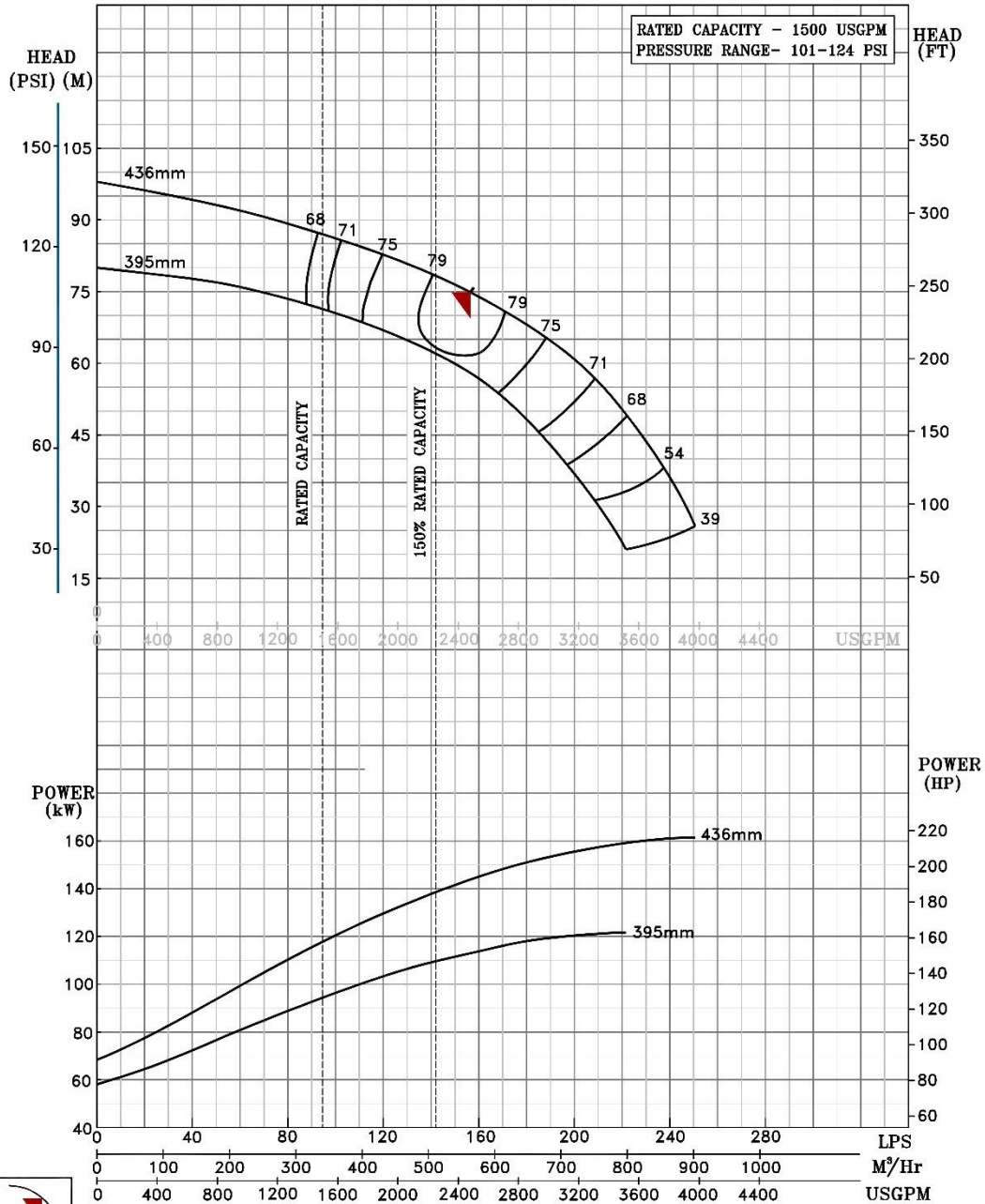
PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0



**FM APPROVED**

PERFORMANCE CURVE OF 6HF18 @1800 R.P.M		6HF18/Y/801064	
 <b>PUMPSENSE</b> <i>HF RANGE</i>	MODEL 6HF18	WORKING PRESS.	140 PSI
	SIZE 200x150-436	TEST PRESS.	215 PSI
	TYPE-AXIALLY SPLIT CASE SINGLE STAGE		
		SPEED 1800rpm	

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0





**UL LISTED**

PERFORMANCE CURVE OF 6HF20 @1500 R.P.M

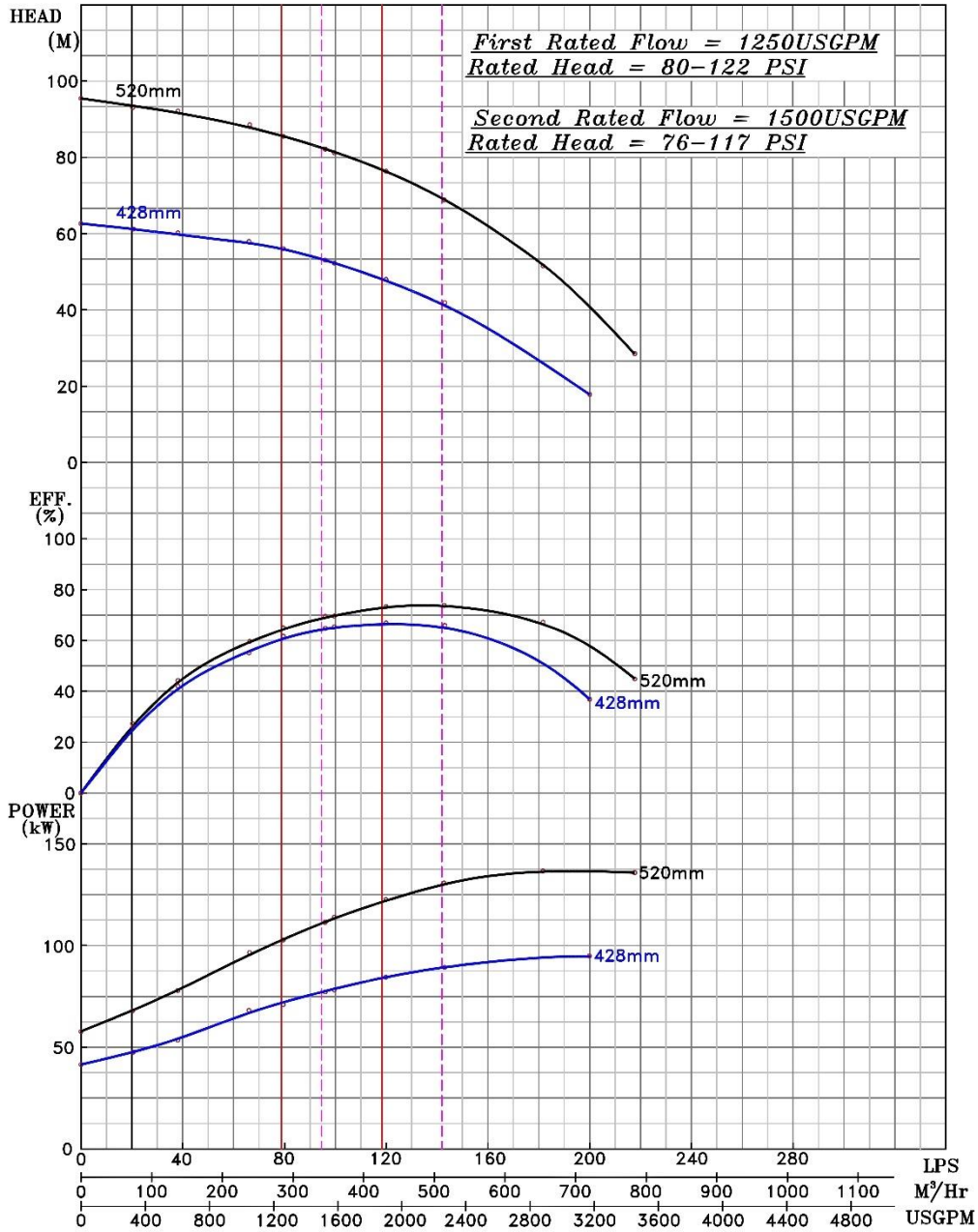


**PUMPSENSE**

HF RANGE

TYPE-AXIALLY SPLIT CASE SINGLE STAGE

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0



**UL LISTED**

PERFORMANCE CURVE OF 6HF20 @1760 R.P.M

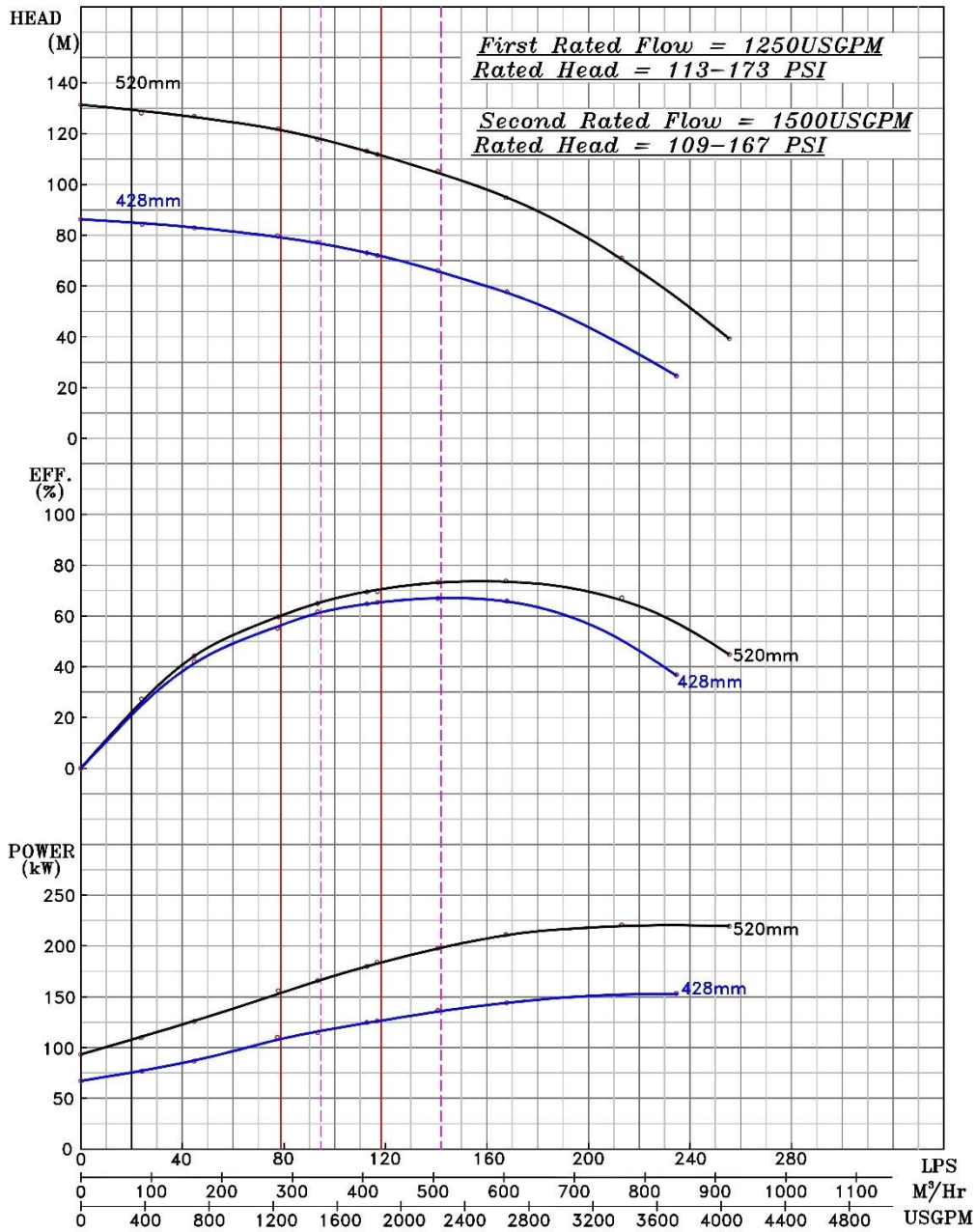


**PUMPSENSE**

HF RANGE

TYPE-AXIALLY SPLIT CASE SINGLE STAGE

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0



**UL LISTED**

PERFORMANCE CURVE OF 6HF20 @1800 R.P.M

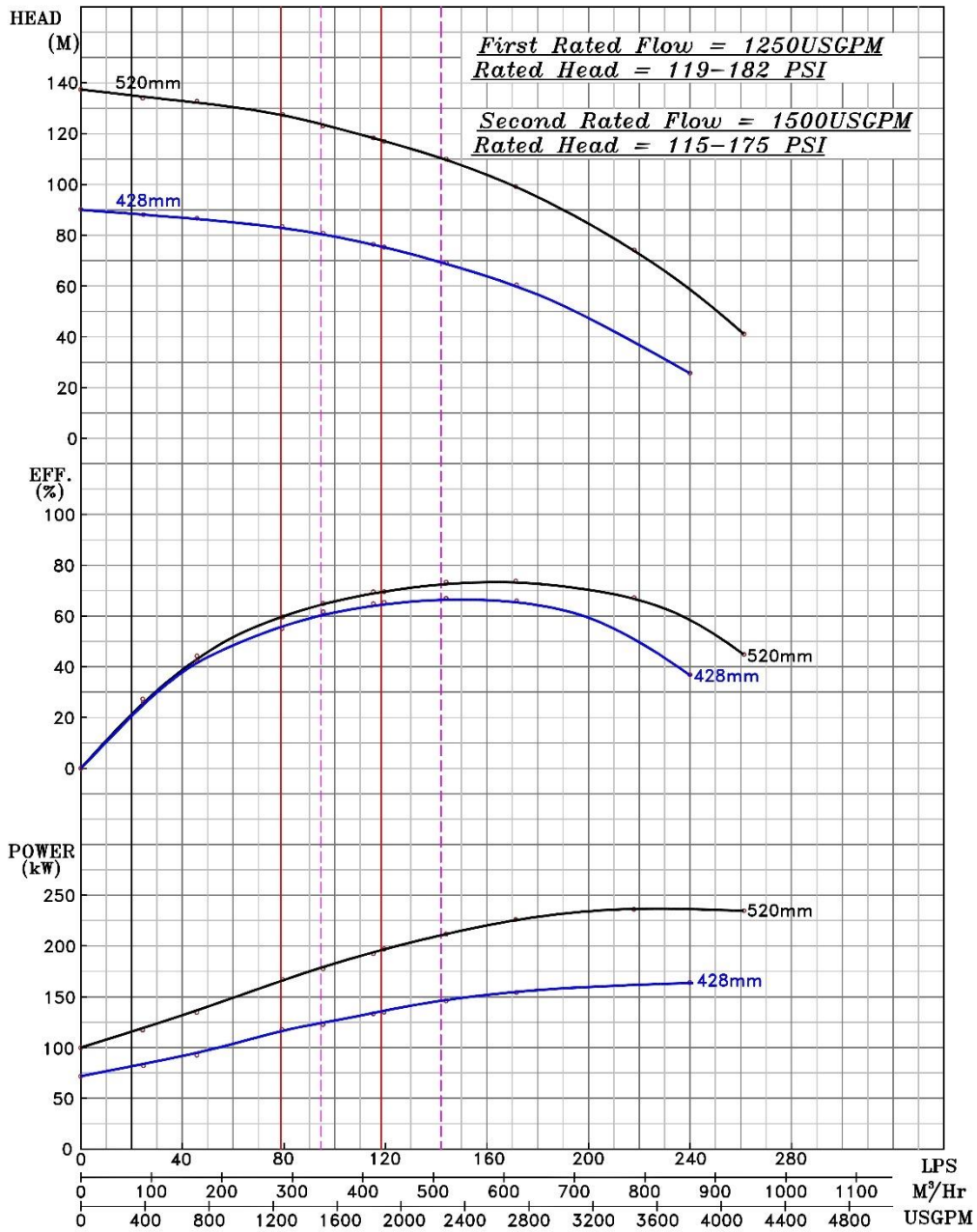



**PUMPSENSE**

HF RANGE

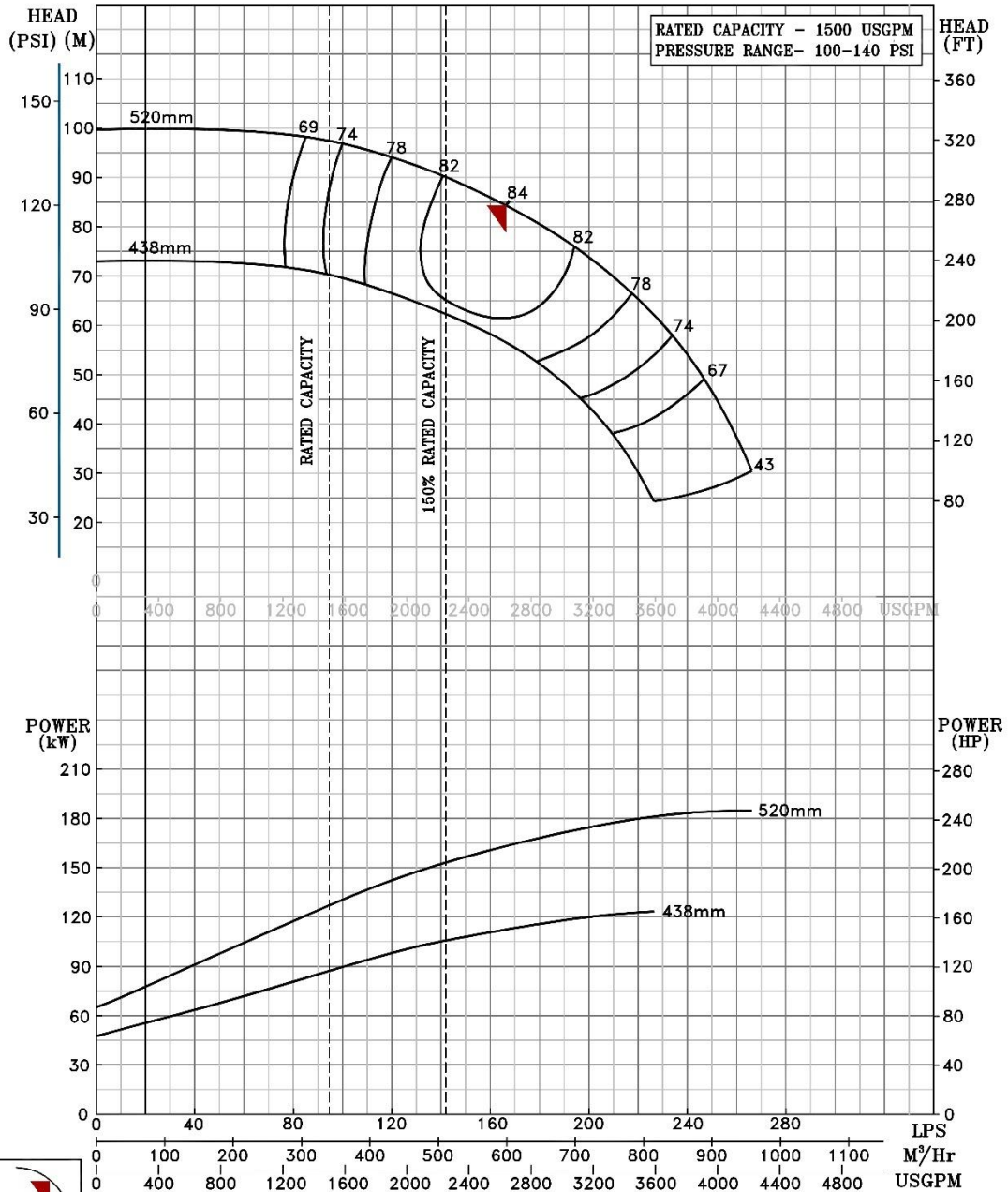
TYPE-AXIALLY SPLIT CASE SINGLE STAGE

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0



PERFORMANCE CURVE OF 6HF21 @1480 R.P.M		6HF21/Y/801754	
 <b>PUMPSENSE</b> <i>HF RANGE</i>	<b>MODEL</b> 6HF21	<b>WORKING PRESS.</b> 150 PSI	
	<b>SIZE</b> 200x150-520	<b>TEST PRESS.</b> 225 PSI	
	<b>TYPE</b> -AXIALLY SPLIT CASE SINGLE STAGE		
		<b>SPEED</b> 1480 rpm	

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0



UL LISTED

FM APPROVED

TEST CURVE OF 8HF13 @2800 R.P.M

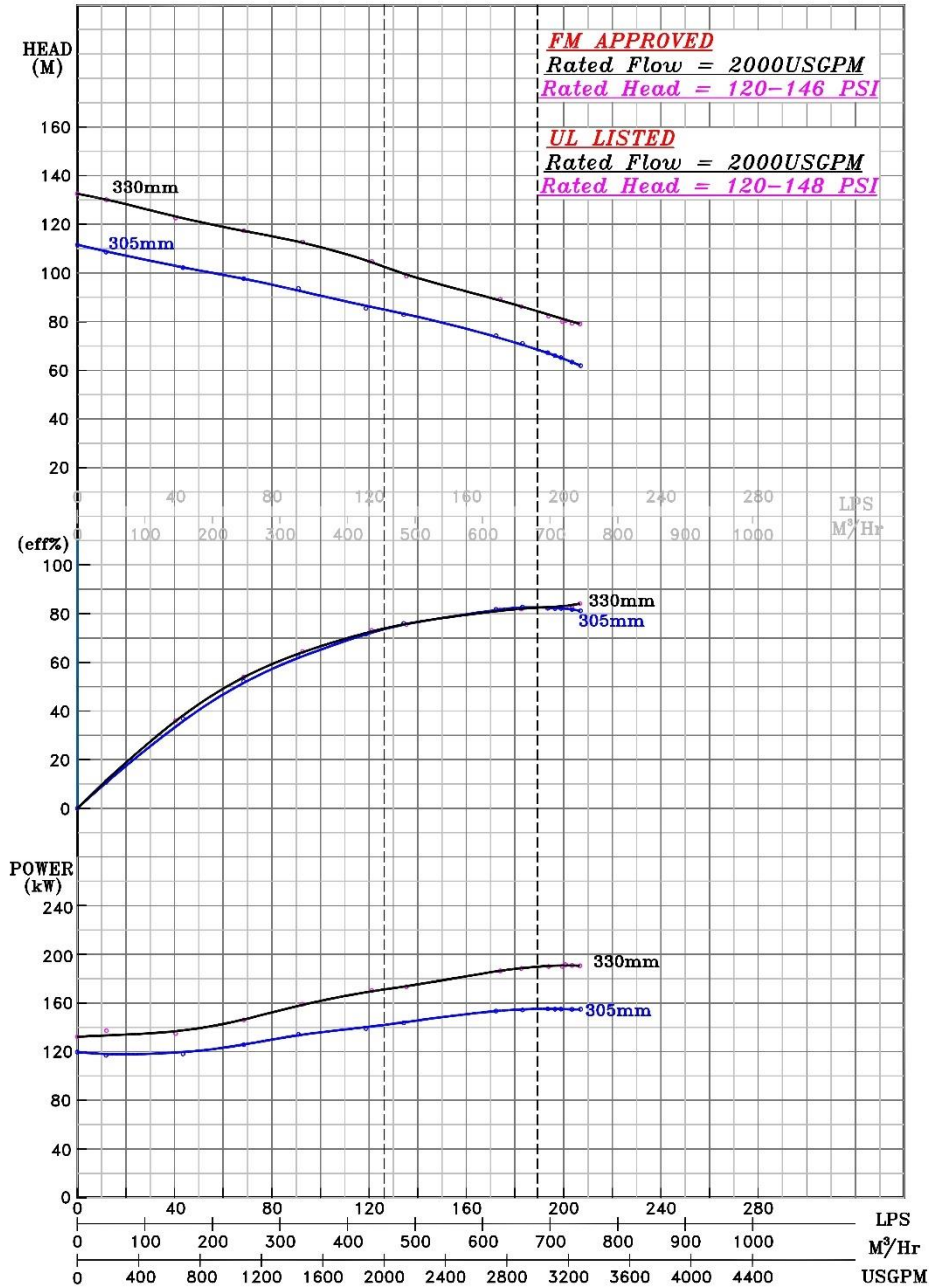


**PUMPSENSE**

HF RANGE

TYPE-AXIALLY SPLIT CASE SINGLE STAGE

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0



UL LISTED

FM APPROVED

TEST CURVE OF 8HF13 @2950 R.P.M

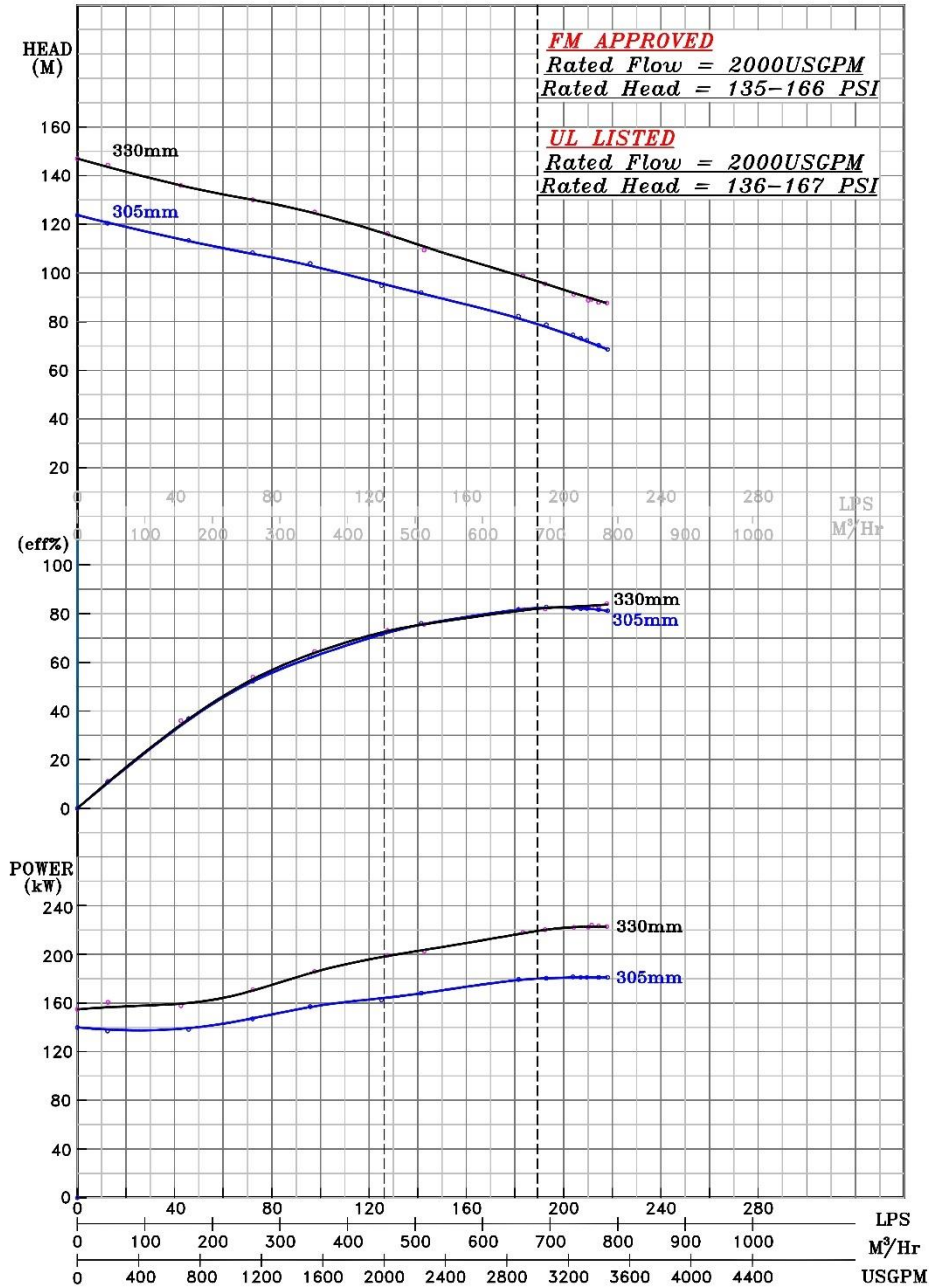


**PUMPSENSE**

HF RANGE

TYPE-AXIALLY SPLIT CASE SINGLE STAGE

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0





**UL LISTED**

**FM APPROVED**

TEST CURVE OF 8HF13 @3000 R.P.M

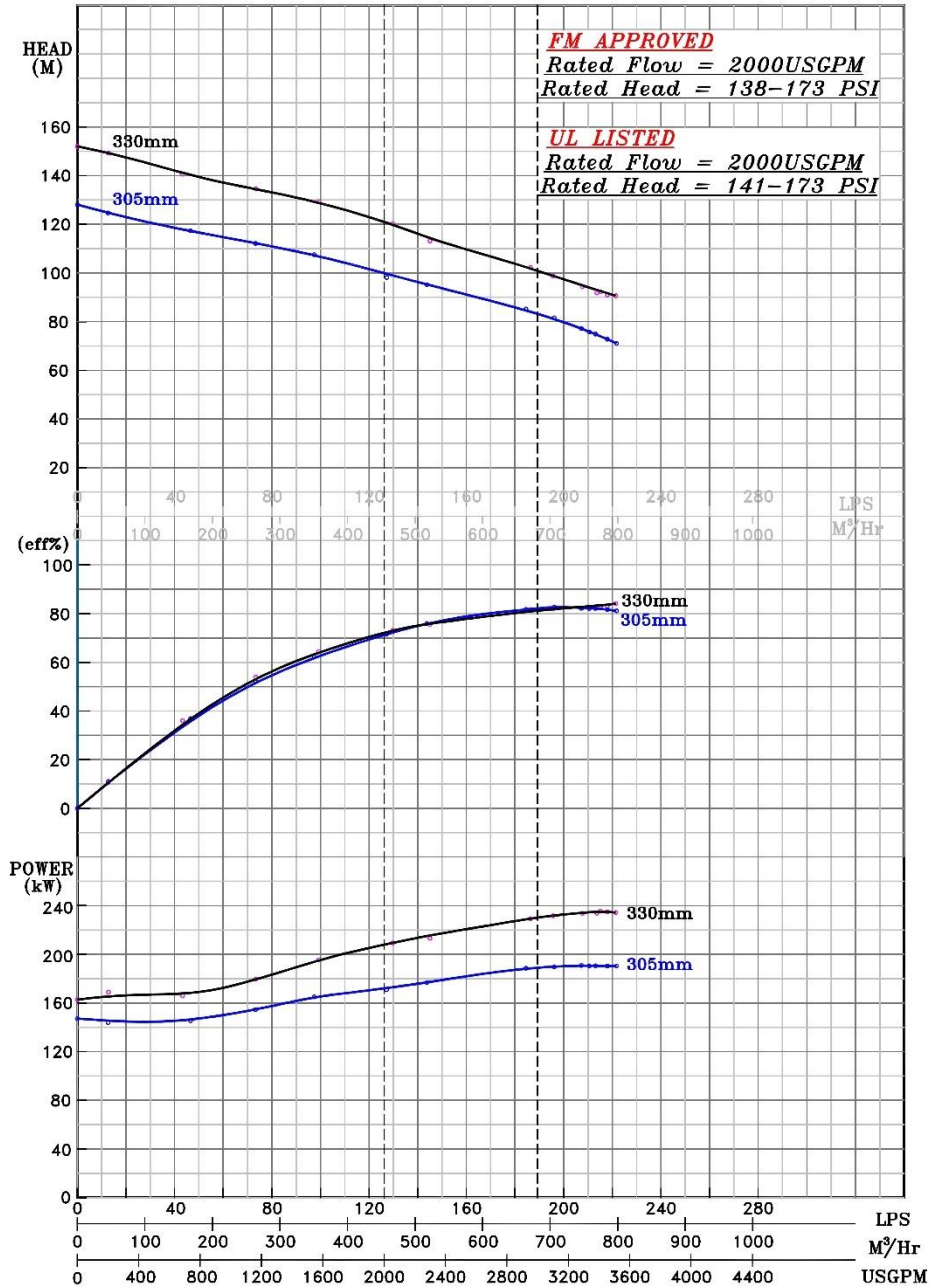


**PUMPSENSE**

**HF RANGE**

TYPE-AXIALLY SPLIT CASE SINGLE STAGE

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0



**FM APPROVED**

**PERFORMANCE CURVE OF 8HF17 @1800 R.P.M**

**8HF17/Y/801464**



**PUMPSENSE**

**HF RANGE**

**MODEL 8HF17**

**WORKING PRESS. 155 PSI**

**SIZE 250x200-450**

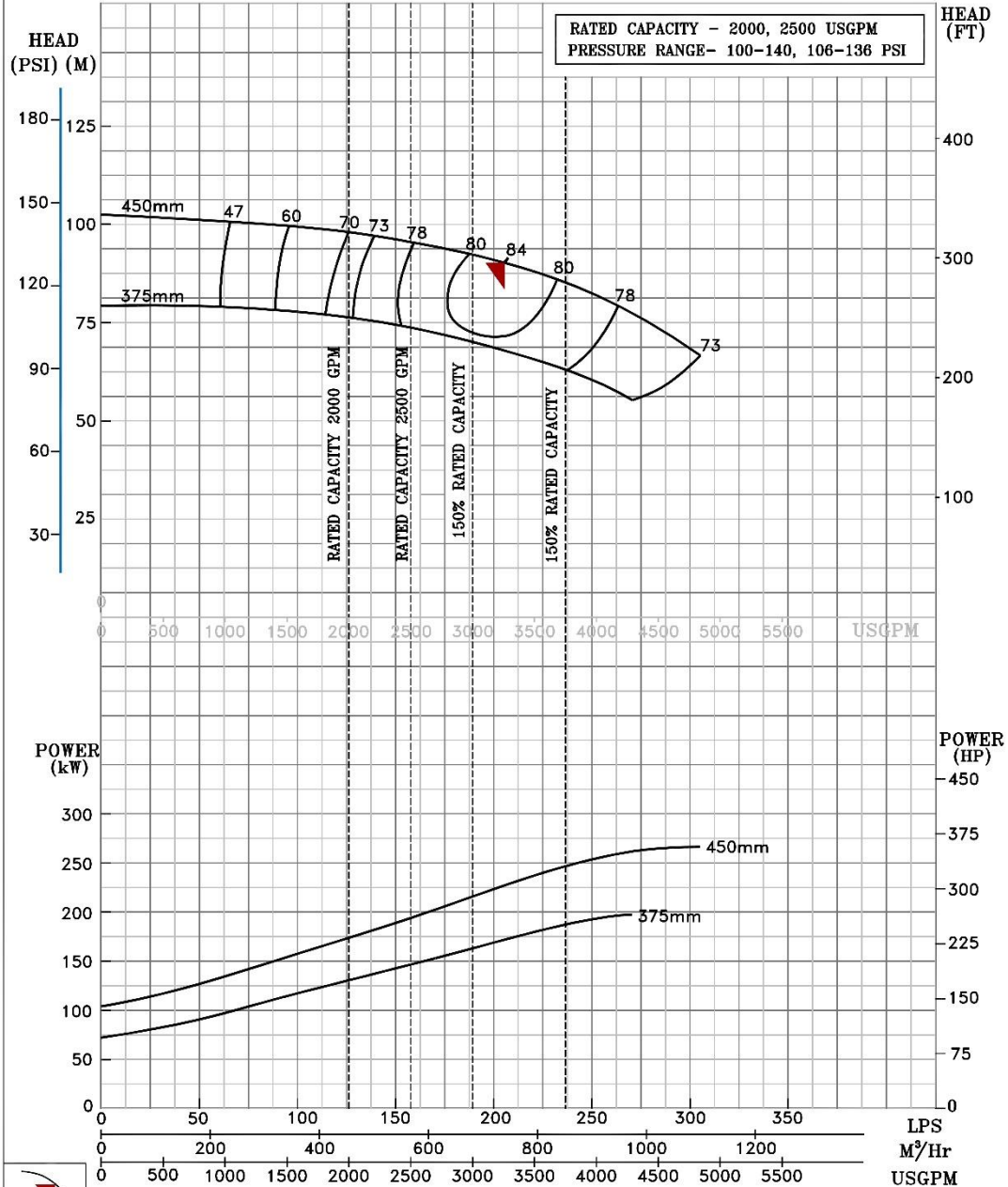
**TEST PRESS. 230 PSI**

**TYPE-AXIALLY SPLIT CASE SINGLE STAGE**

**SPEED 1800 rpm**

**RATED CAPACITY - 2000,2500 USGPM-FM APPROVED**

**PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0**



**RATED CAPACITY - 2000, 2500 USGPM  
PRESSURE RANGE- 100-140, 106-136 PSI**



**1800 RPM**



UL LISTED

PREDICTED PERFORMANCE CURVE OF 8HF20 @1500 R.P.M

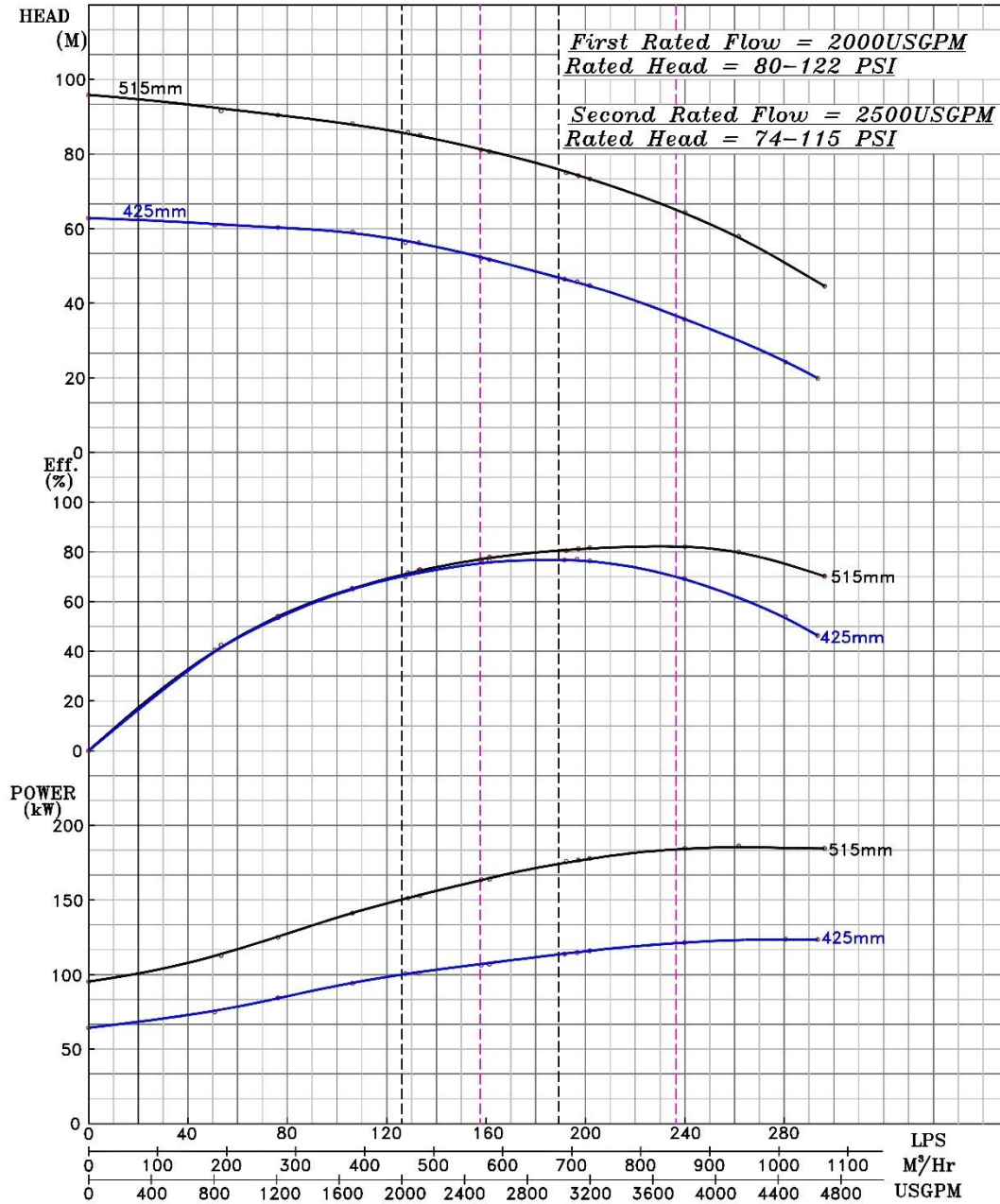


PUMPSENSE

HF RANGE

TYPE-AXIALLY SPLIT CASE SINGLE STAGE

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0



UL LISTED

PREDICTED PERFORMANCE CURVE OF 8HF20 @1760 R.P.M

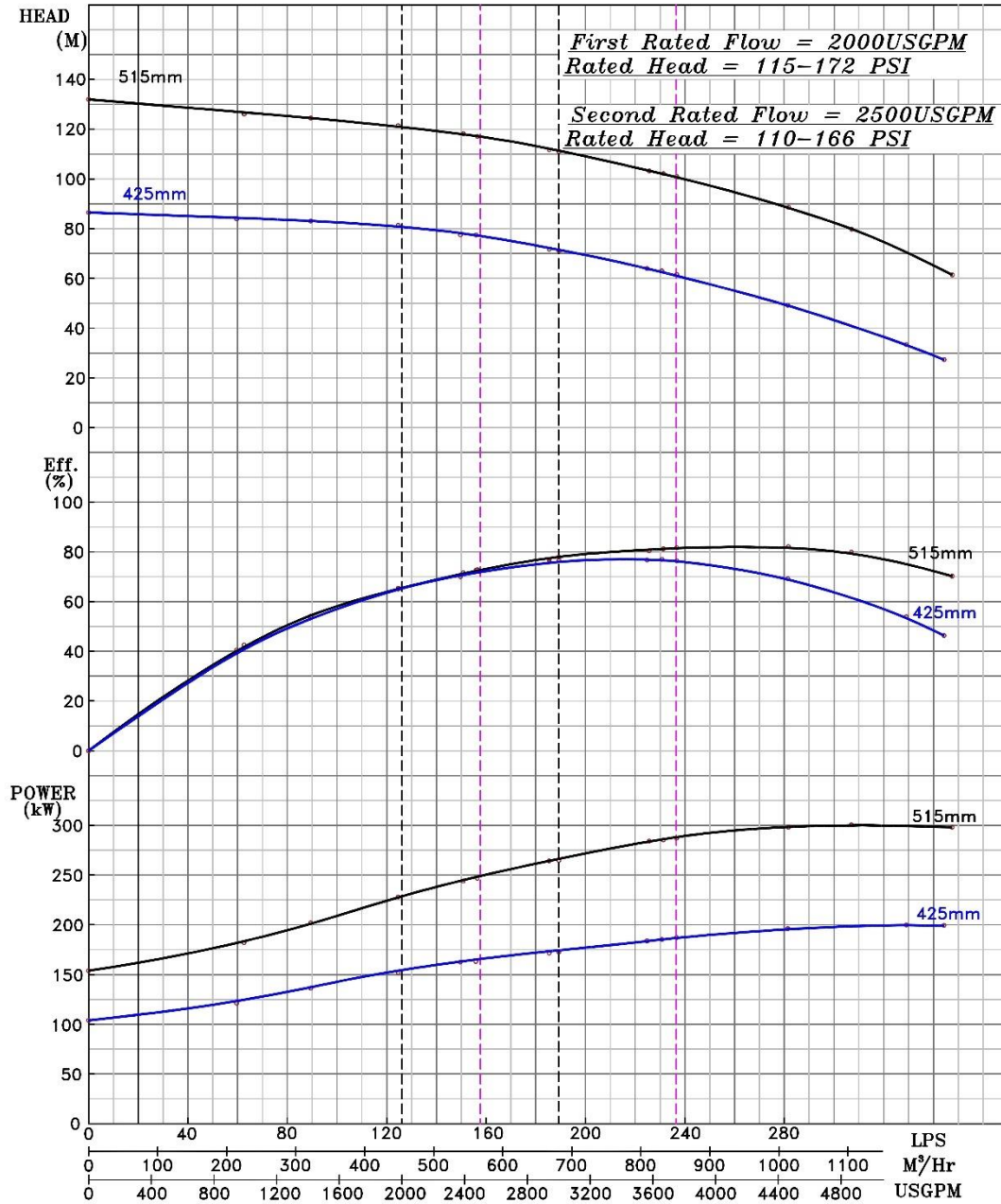


PUMPSENSE

HF RANGE

TYPE-AXIALLY SPLIT CASE SINGLE STAGE

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0



**UL LISTED**

PREDICTED PERFORMANCE CURVE OF 8HF20 @1800 R.P.M

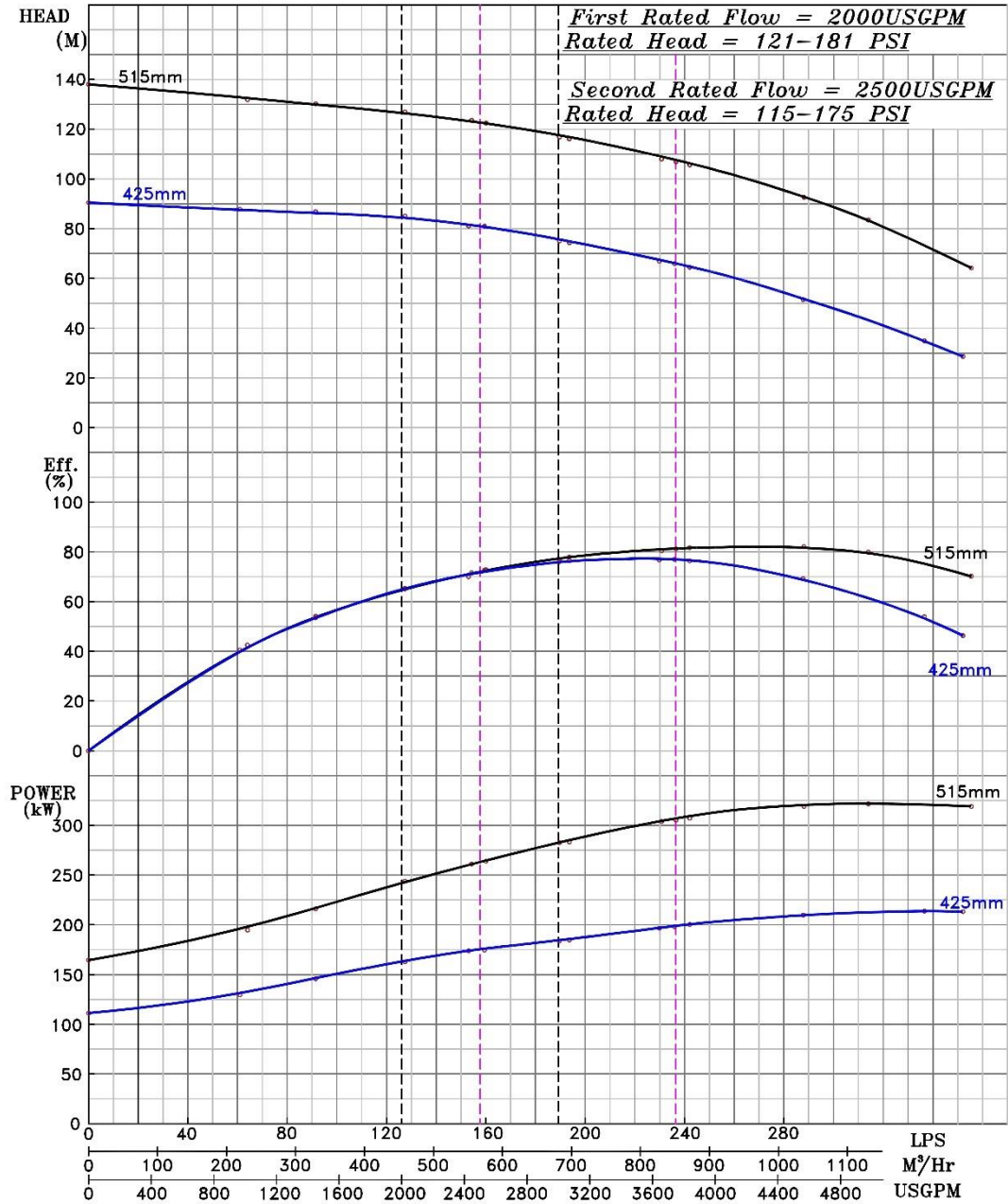


**PUMPSENSE**

**HF RANGE**

TYPE-AXIALLY SPLIT CASE SINGLE STAGE

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0



**FM APPROVED**

PERFORMANCE CURVE OF 8HF21 @1480 R.P.M

8HF21/Y/801554



**PUMPSENSE**

HF RANGE

MODEL 8HF21

WORKING PRESS. 140 PSI

SIZE 250x200-520

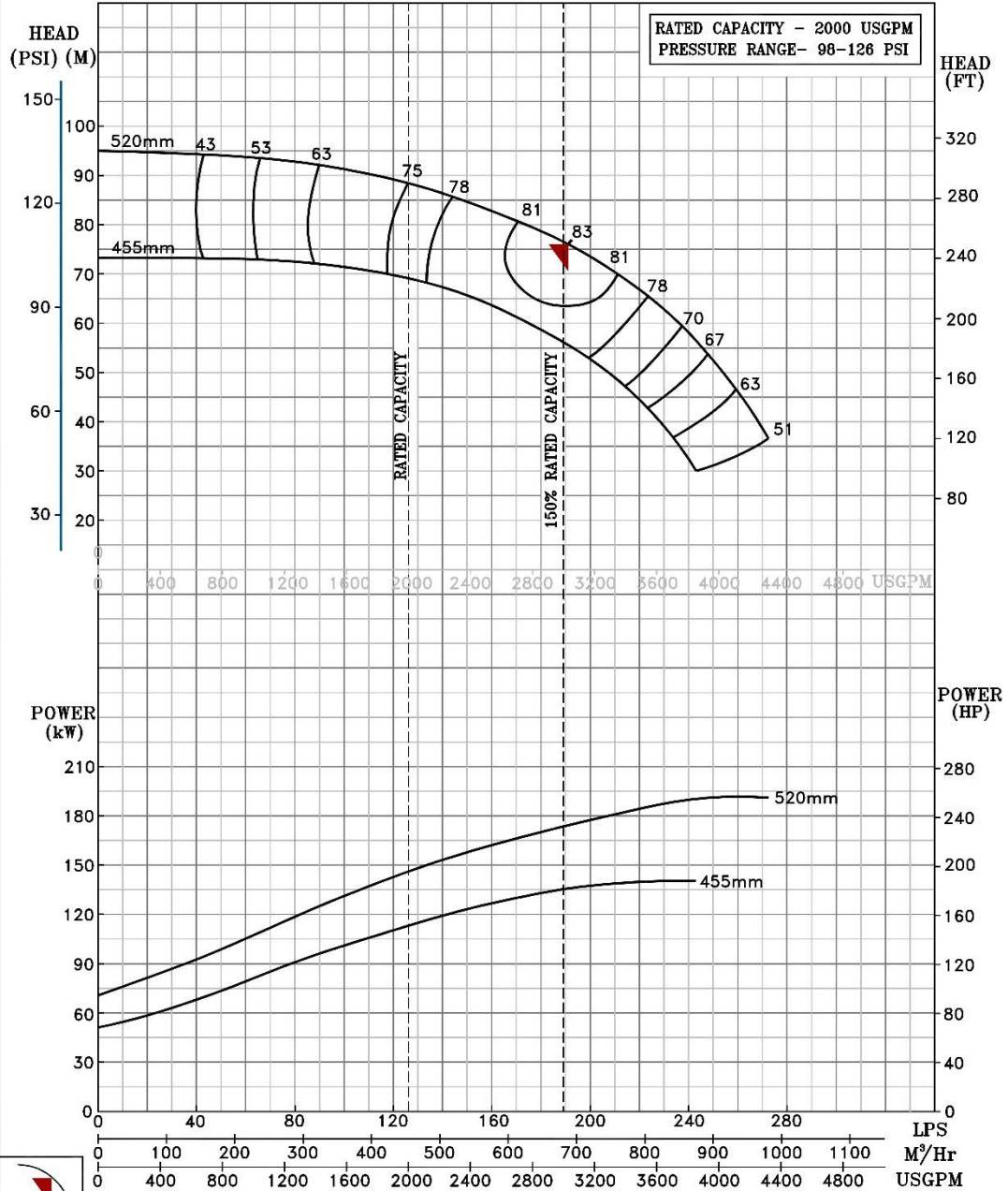
TEST PRESS. 215 PSI

TYPE-AXIALLY SPLIT CASE SINGLE STAGE

SPEED 1480 rpm

RATED CAPACITY - 2000 USGPM-FM APPROVED

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0



RATED CAPACITY - 2000 USGPM  
PRESSURE RANGE- 98-126 PSI



1480 RPM

UL LISTED

NOTE- PERFORMANCE AS PER ISO 9906 GRADE-2B

PERFORMANCE CURVE OF 3HFT11 @2930 R.P.M

3HFT11/Y/910252

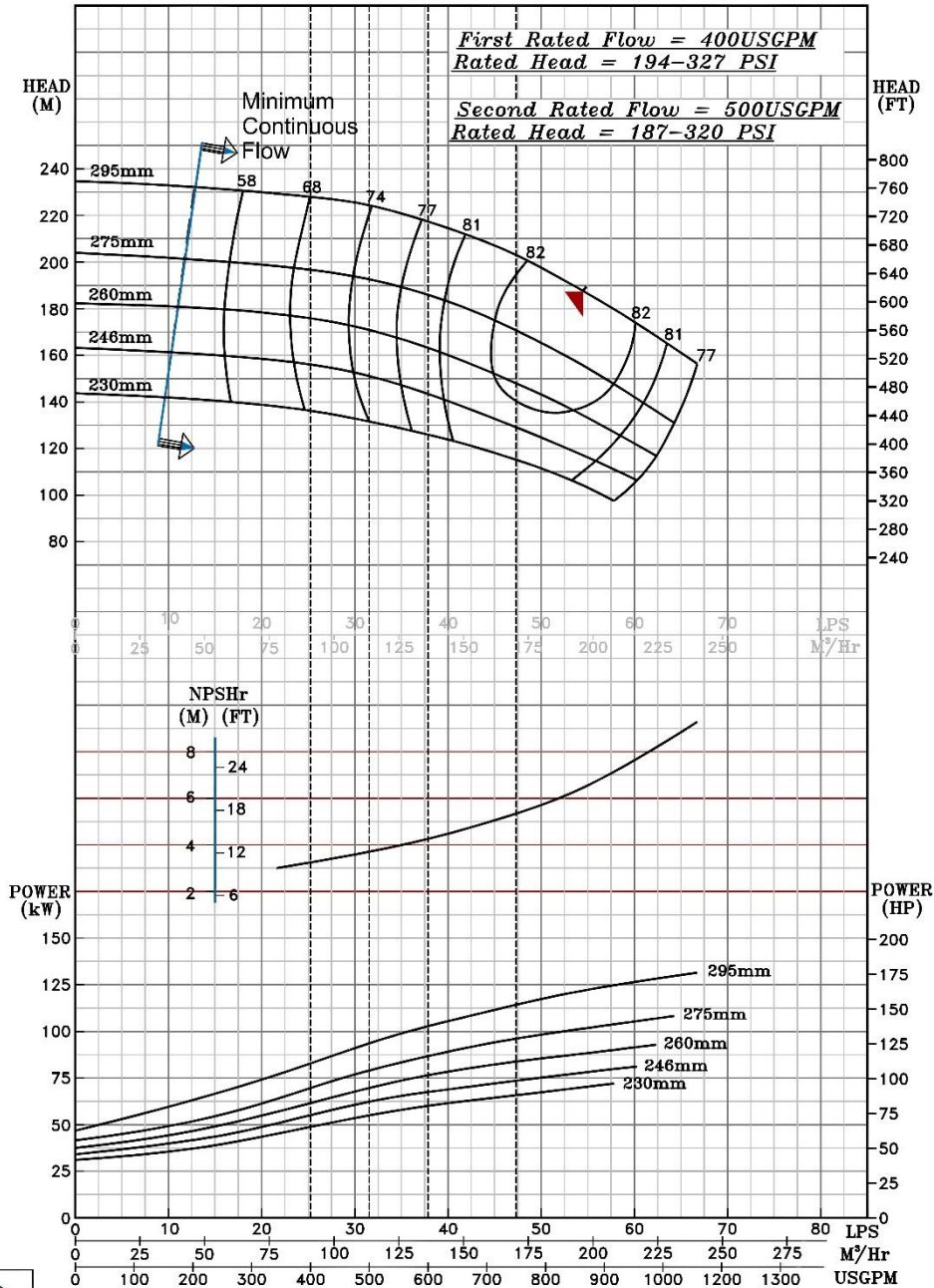


PUMPSENSE

HFT RANGE

MODEL 3HFT11	WORKING PRESS 350 PSI
SIZE 100x80-295	TEST PRESS. 520 PSI
TYPE-AXIALLY SPLIT CASE TWO STAGE	SPEED 2930rpm
	DATE - 23.02.19

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0



2930 RPM



**UL LISTED**

PERFORMANCE CURVE OF 6HFTD12L @2600 R.P.M

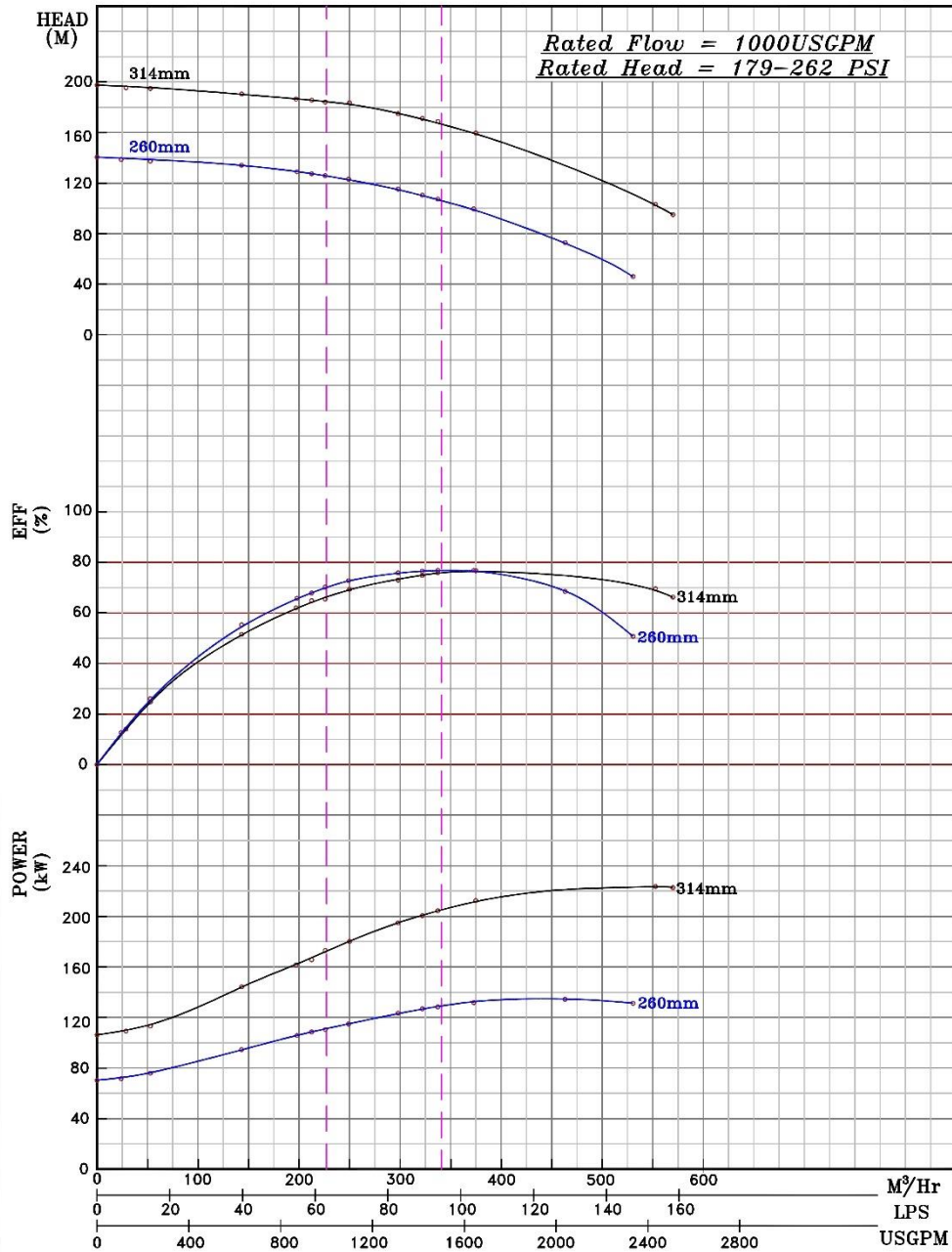


**PUMPSENSE**

HFT RANGE

TYPE-AXIALLY SPLIT CASE TWO STAGE

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0



UL LISTED

PERFORMANCE CURVE OF 6HFTD12L @2800 R.P.M

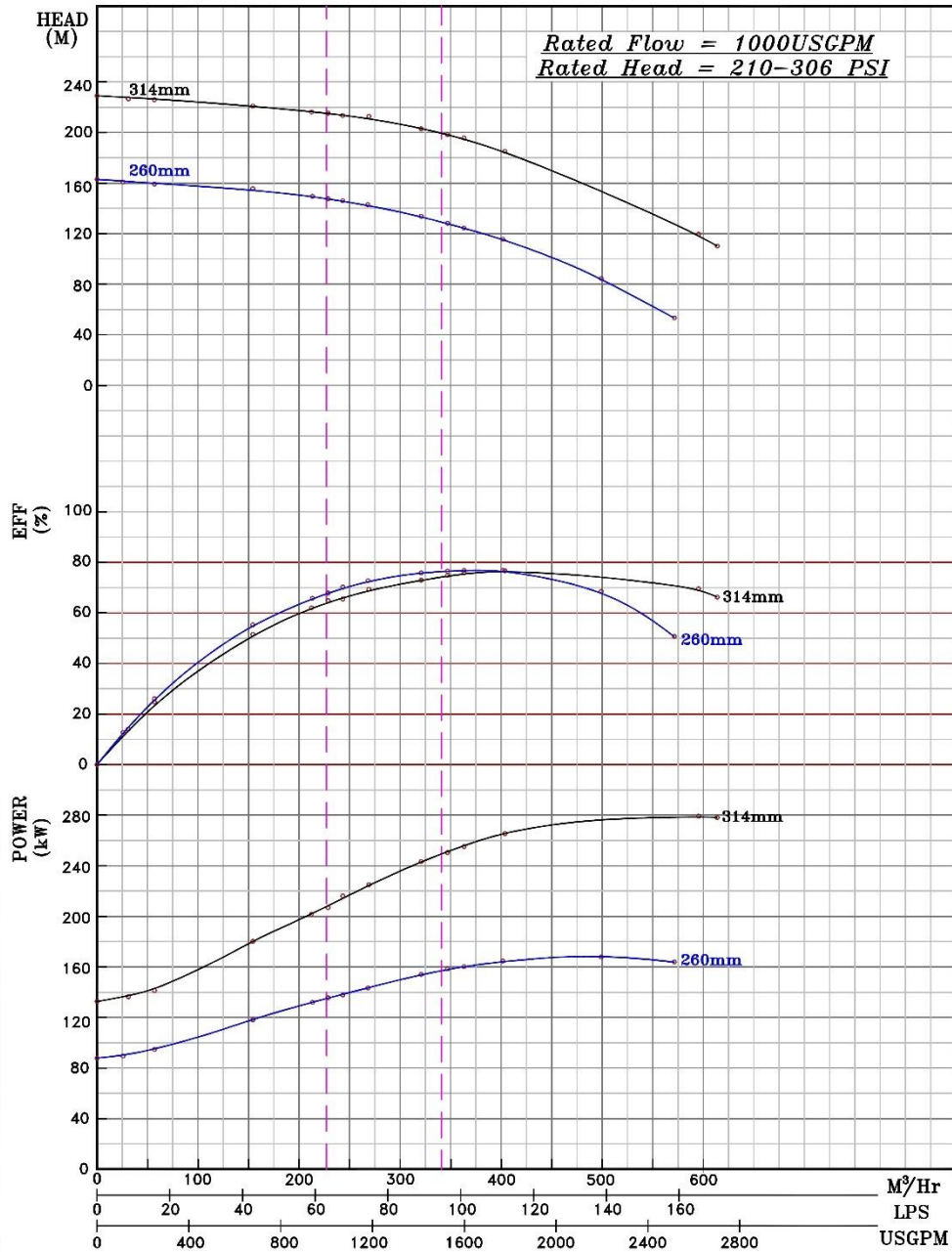


PUMPSENSE

HFT RANGE

TYPE-AXIALLY SPLIT CASE TWO STAGE

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0



UL LISTED

PERFORMANCE CURVE OF 6HFTD12L @2975 R.P.M

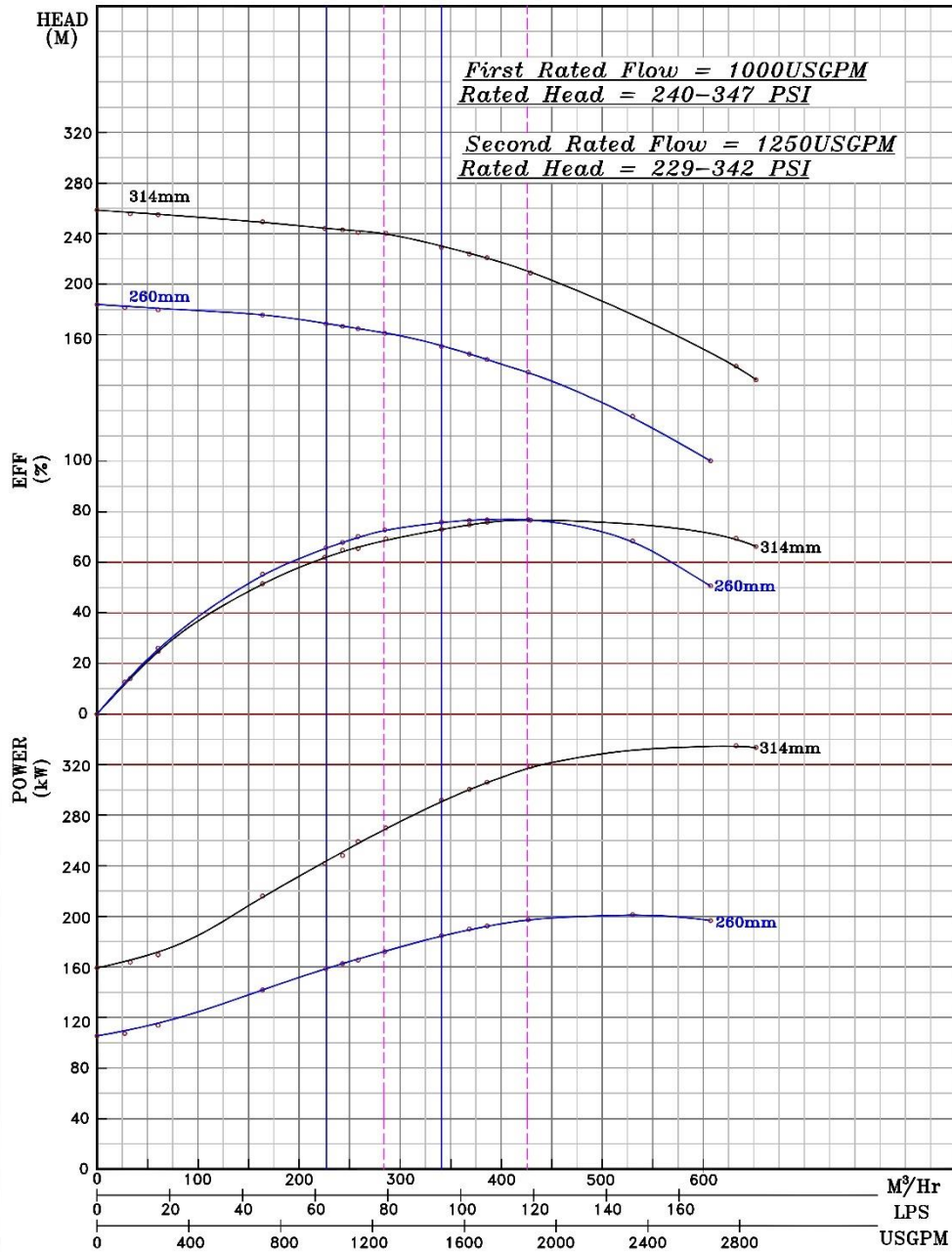


PUMPSENSE

HFT RANGE

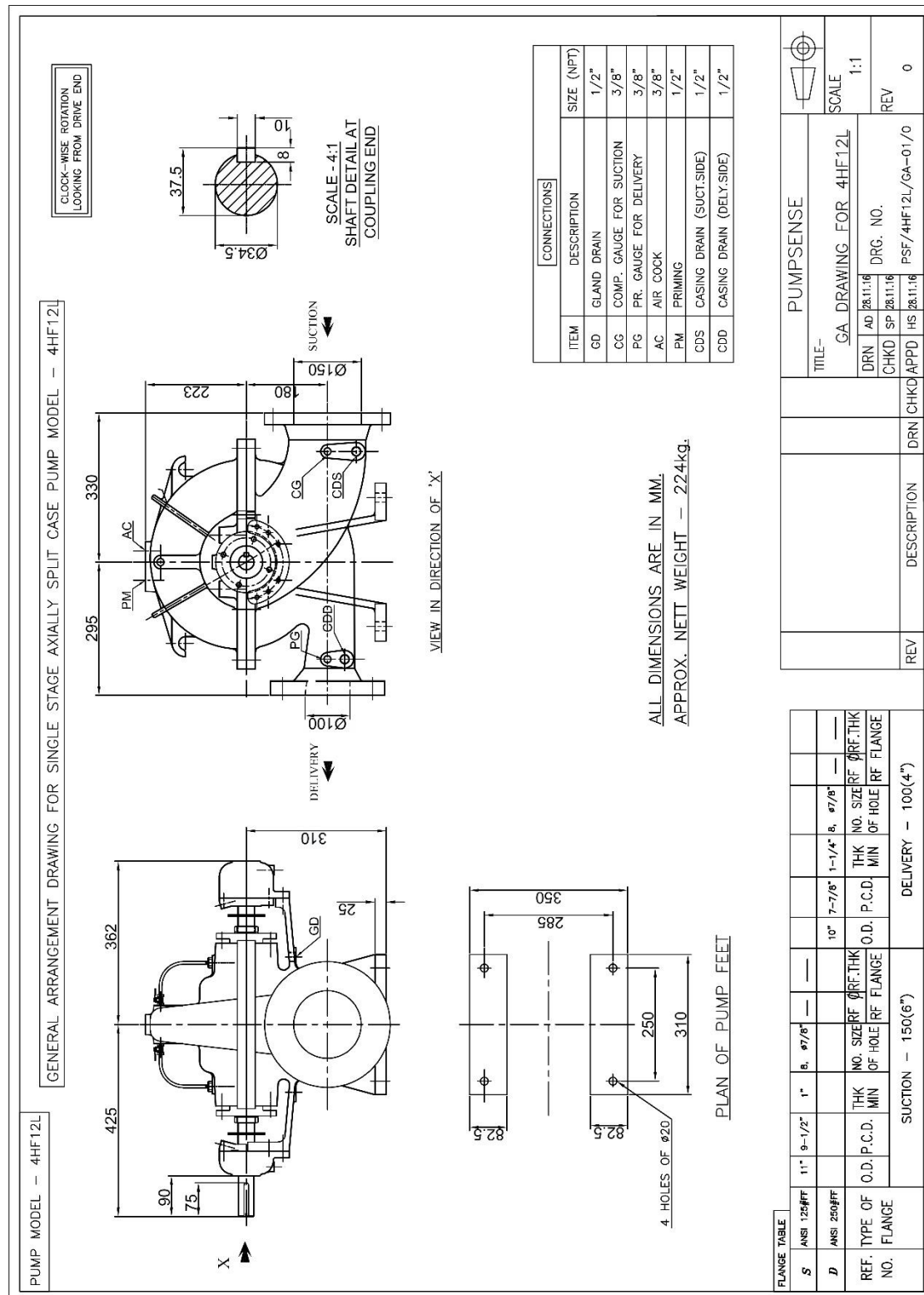
TYPE-AXIALLY SPLIT CASE TWO STAGE

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0

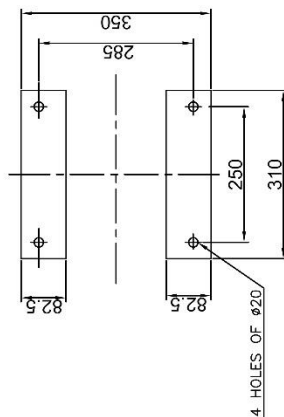




## 8. UL Listed // FM Approved GA Drawings



GENERAL ARRANGEMENT DRAWING FOR SINGLE STAGE AXIALLY SPLIT CASE PUMP MODEL - 4HF12



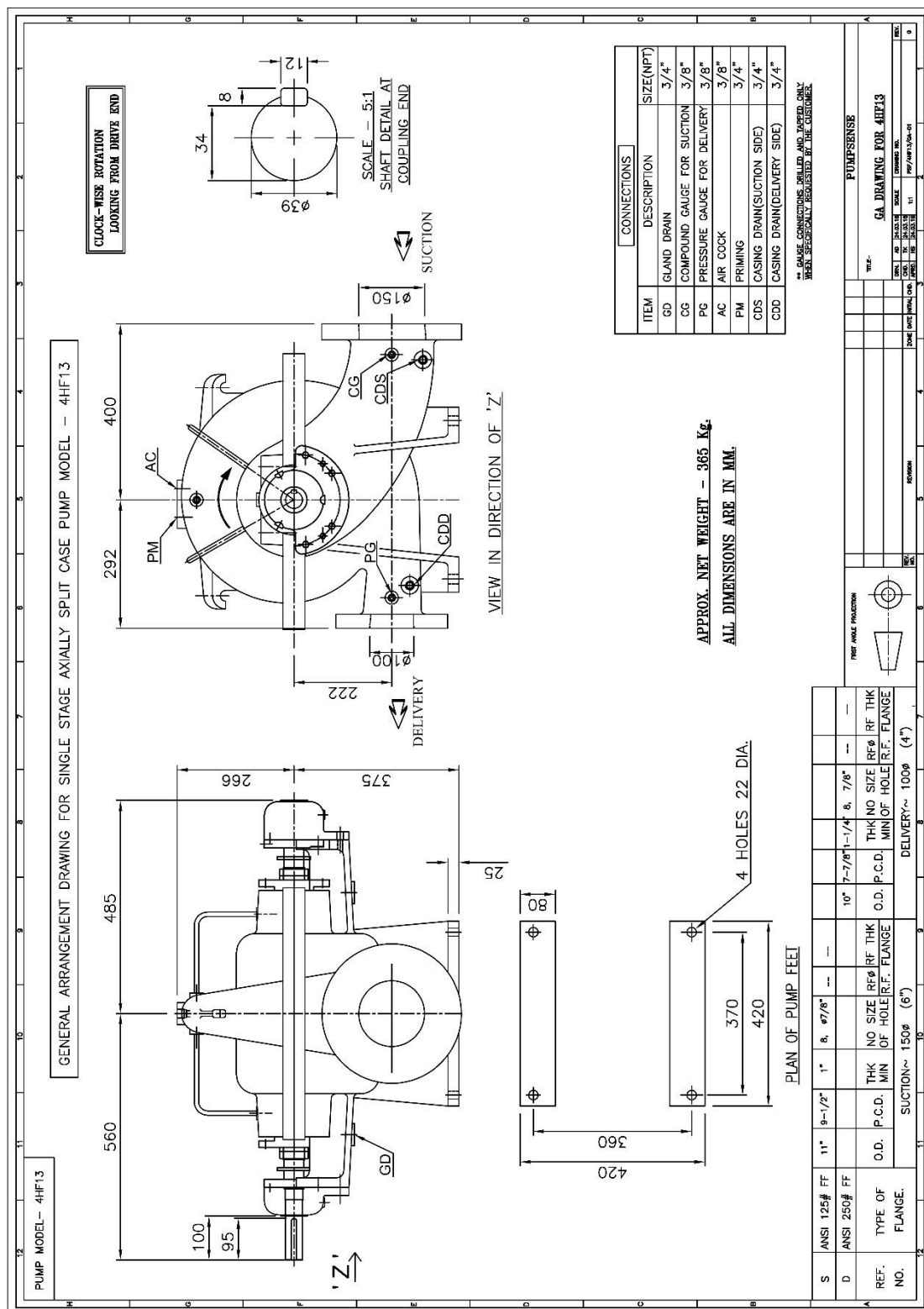
PLAN OF PUMP FEET

ALL DIMENSIONS ARE IN MM.  
APPROX. NETT WEIGHT - 224kg.

CONNECTIONS		
ITEM	DESCRIPTION	SIZE (NPT)
GD	GLAND DRAIN	1/2"
CG	COMP. GAUGE FOR SUCTION	3/8"
PG	PR. GAUGE FOR DELIVERY	3/8"
AC	AIR COCK	3/8"
PM	PRIMING	1/2"
CDS	CASING DRAIN (SUCTION SIDE)	1/2"
DD	DISCH. DRAIN (DELIVERY SIDE)	1/2"

FLANGE TABLE									
<i>S</i>	ANSI 125#FF	11"	9-1/2"	1"	$\phi$ , $\phi$ 7/8"	—	—	—	—
<i>D</i>	ANSI 250#FF						10"	7-7/8"	1-1/4" $\phi$ , $\phi$ 7/8"
REF.	TYPE OF	O.D.	P.C.D.	THK	NO. SIZE OF HOLE	RF	THK	NO. SIZE OF HOLE	RF
NO.	FLANGE			MIN	MIN	FLANGE	O.D.	P.C.D.	MIN
SUCTION — 150(6")							DELIVERY — 100(4")		

[illegible]

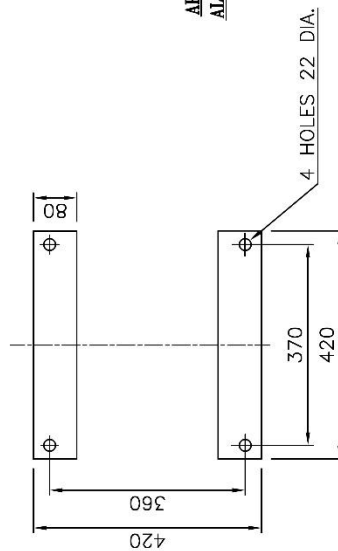


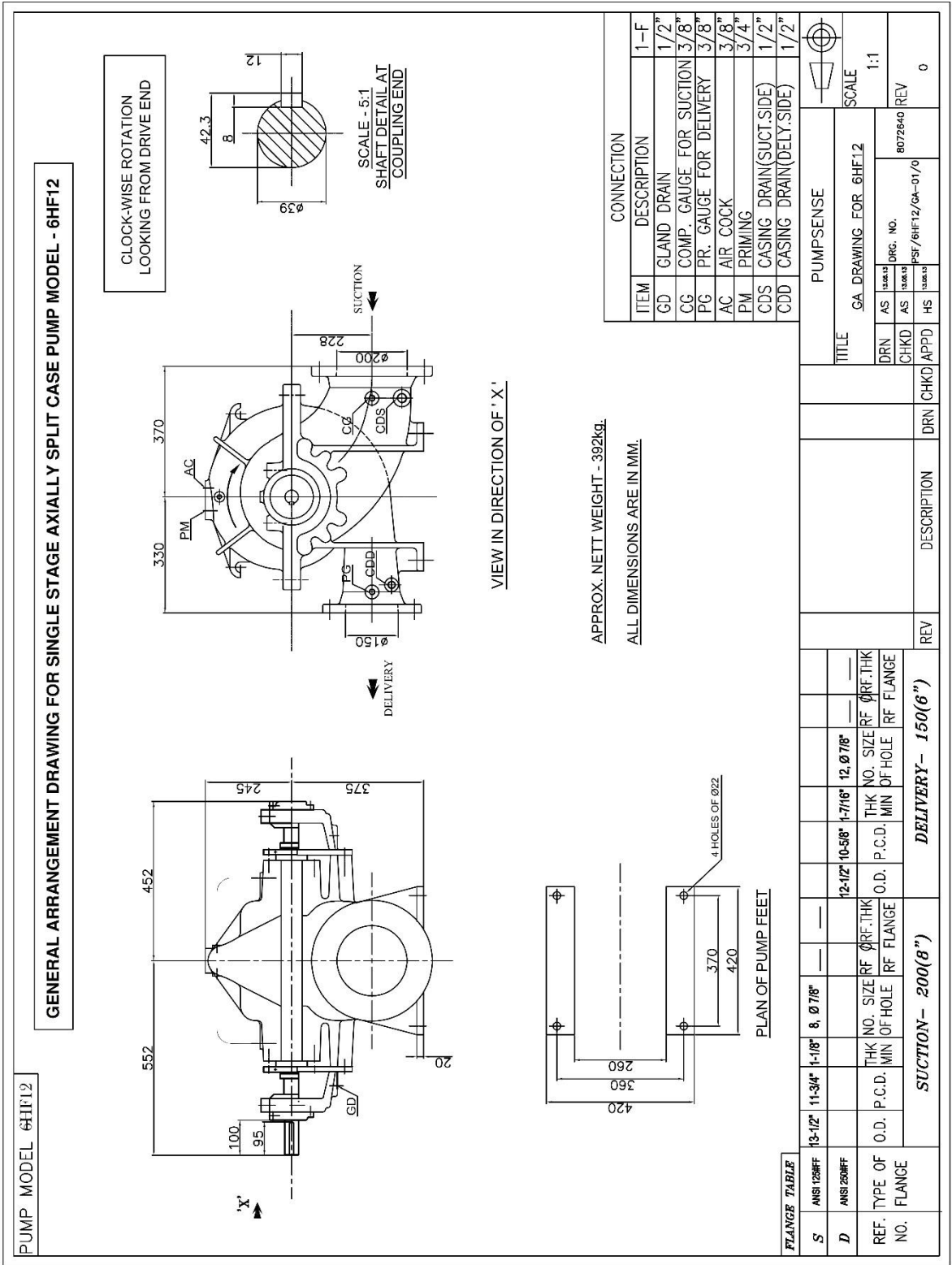
GENERAL ARRANGEMENT DRAWING FOR SINGLE STAGE AXIALLY SPLIT CASE PUMP MODEL - 5HF11



CONNECTIONS			SIZE(NPT)
ITEM	DESCRIPTION		
GD	GLAND DRAIN		3/4"
CG	COMPOUND GAUGE FOR SUCTION		3/8"
PG	PRESSURE GAUGE FOR DELIVERY		3/8"
AC	AIR COCK		3/8"
PM	PRIMING		3/4"
CDS	CASING DRAIN(SUCTION SIDE)		3/4"
CDD	CASING DRAIN(DELIVERY SIDE)		3/4"

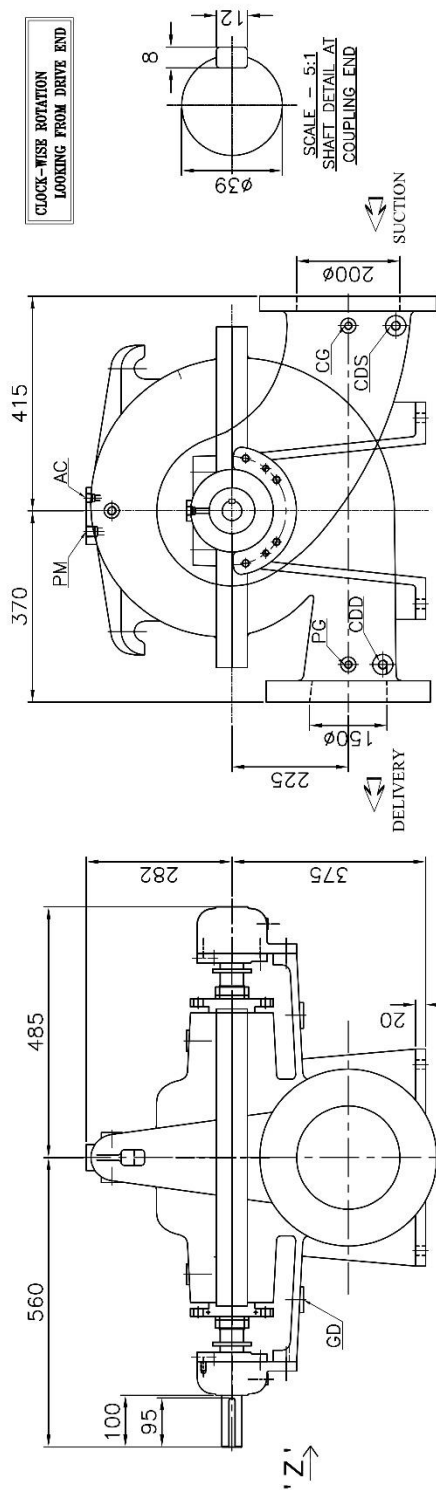
APPROX. NET WEIGHT -353Kg.  
ALL DIMENSIONS ARE IN MM.

[illegible][illegible]

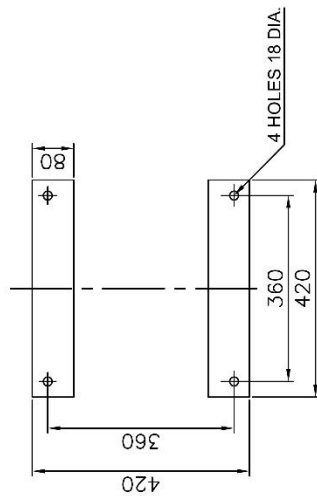


PUMP MODEL- 6HF14K

GENERAL ARRANGEMENT DRAWING FOR SINGLE STAGE AXIALLY SPLIT CASE PUMP MODEL - 6HF14K



VIEW IN DIRECTION OF ' Z '



PLAN OF PUMP FEET

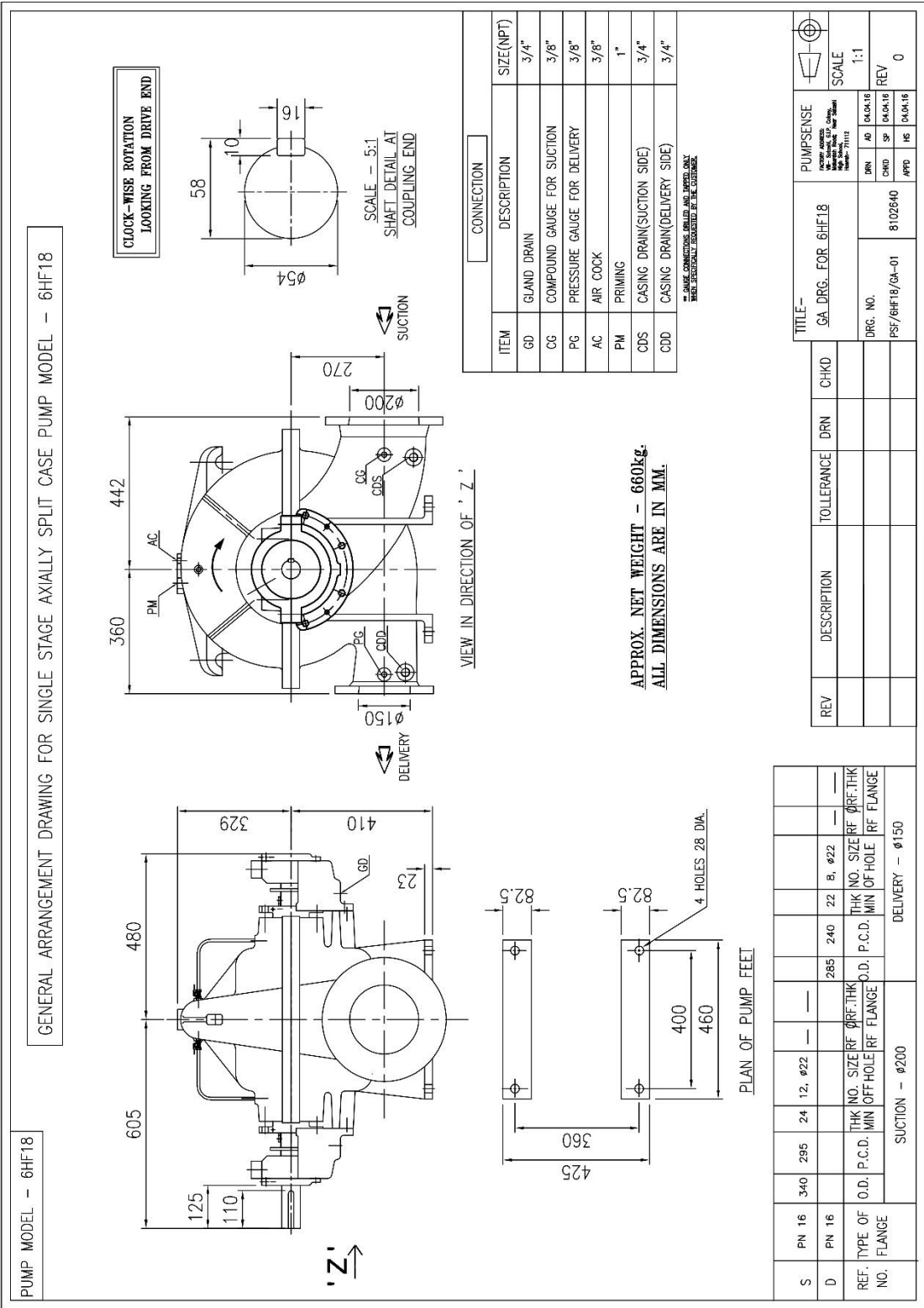
APPROX. NET WEIGHT - 407kg.

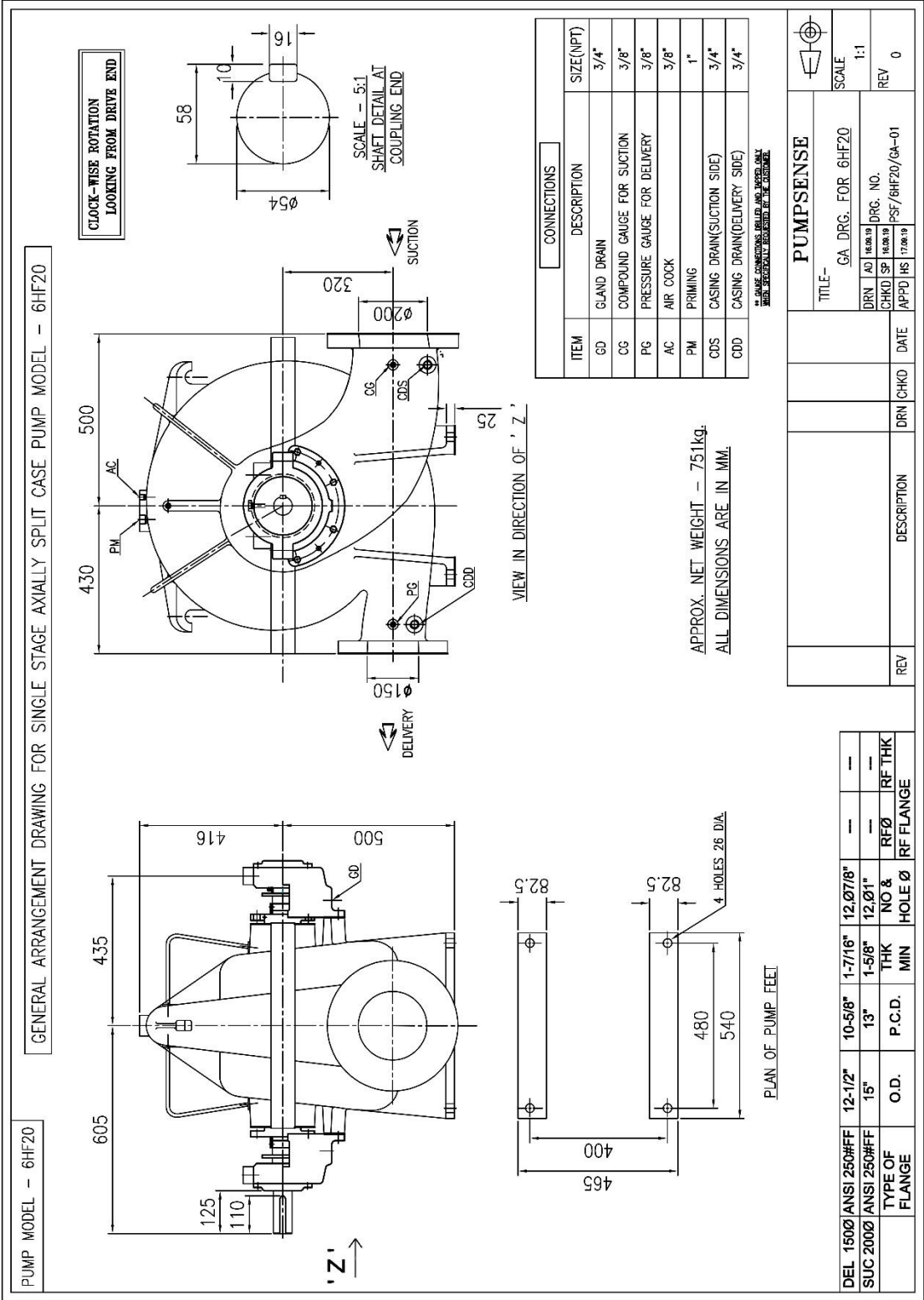
ALL DIMENSIONS ARE IN MM.

CONNECTIONS	
ITEM	DESCRIPTION
GD	GLAND DRAIN
CG	COMPOUND GAUGE FOR SUCTION
PG	PRESSURE GAUGE FOR DELIVERY
AC	AIR COCK
PM	PRIMING
CDS	CASING DRAIN(SUCTION SIDE)
CDD	CASING DRAIN(DELIVERY SIDE)

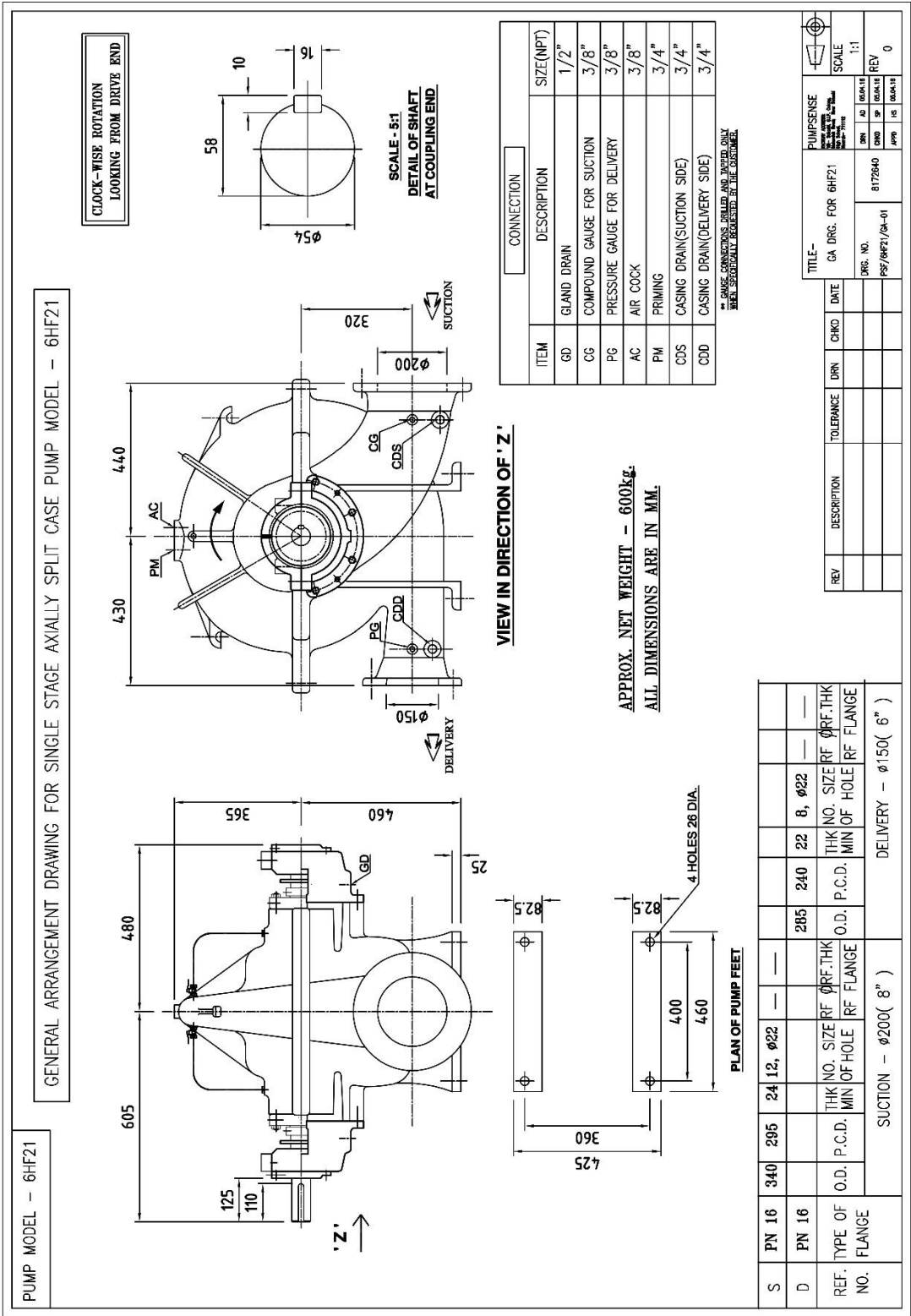
S	D	REF. NO.	ANSI 125# FF	ANSI 250# FF	SUCTION ~ 200# (8")				DELIVERY ~ 150# (6")			
					13-1/2"	11-3/4"	1-7/8"	8, 47/8"	12-1/2"	10-5/8"	1-7/16"	12, 47/8"
					O.D.	P.C.D.	THK MIN	NO SIZE OF HOLE	REF. THK R.F.	THK MIN	NO SIZE OF HOLE	REF. THK R.F.

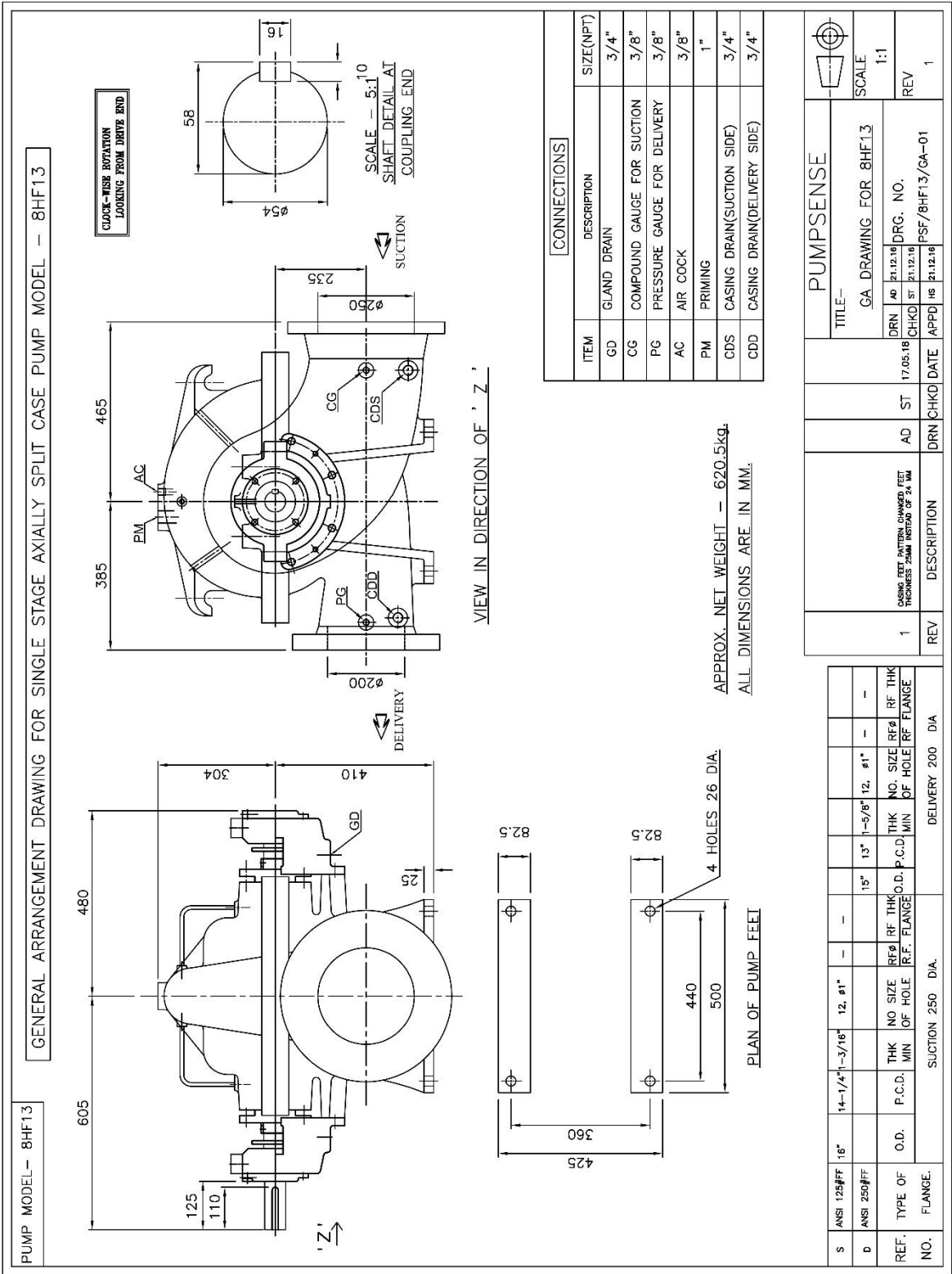
PUMPENSE				SCALE			
TITLE: GA DRAWING FOR 6HF14K				1:1			
DRN: AD 05.08.17				REV			
CHKD: ST 05.08.17				REV			
APPD: HS 05.08.17				REV			

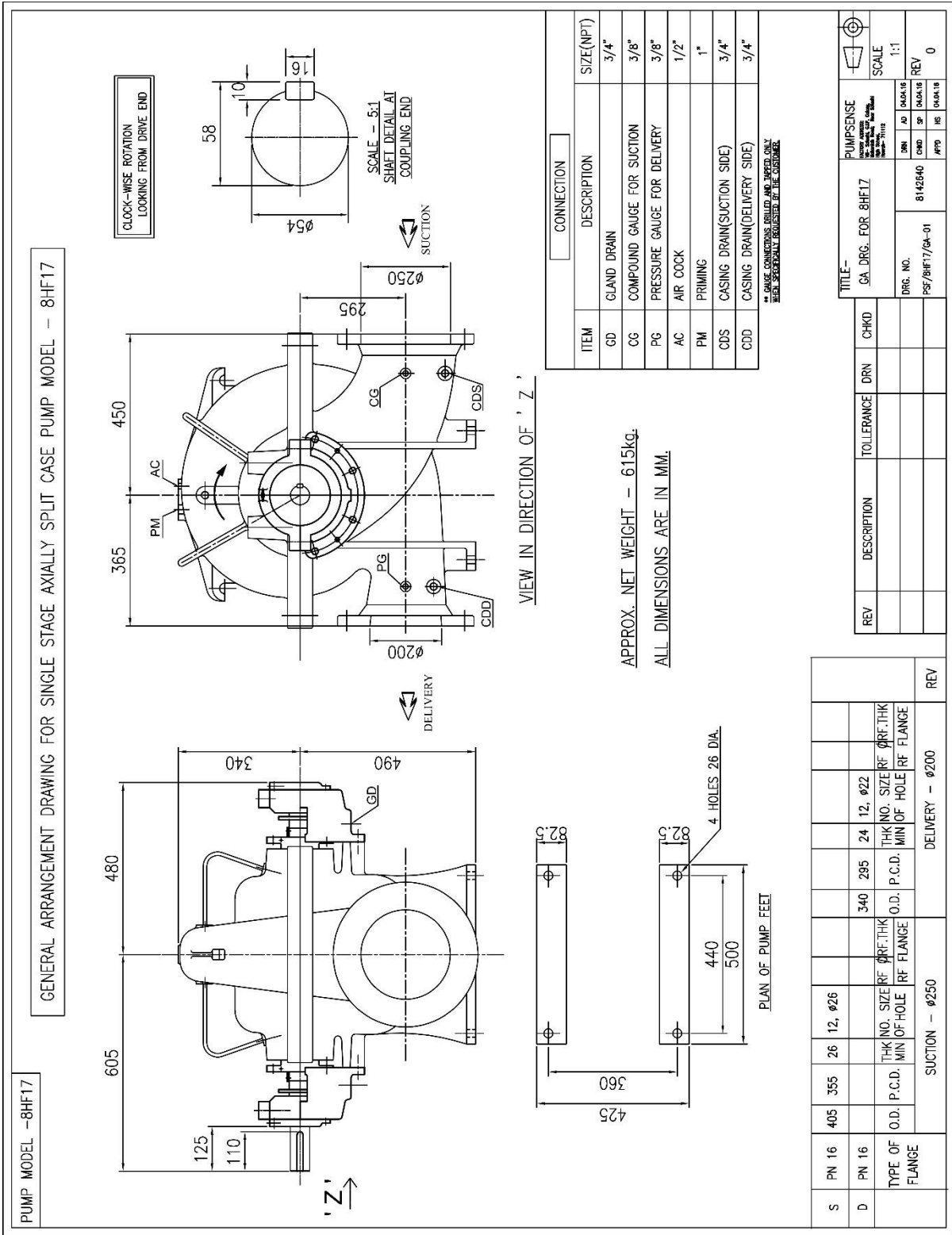


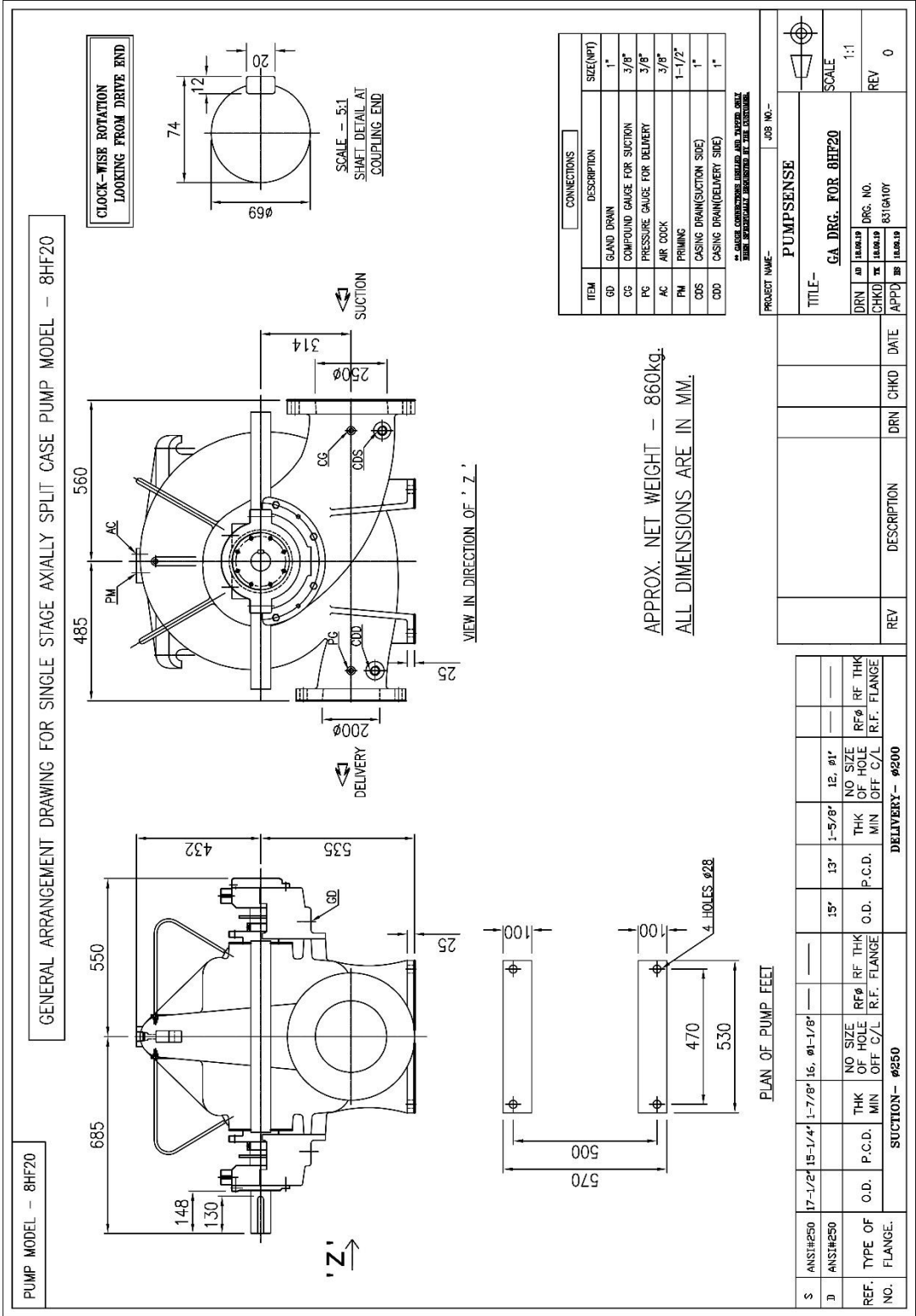


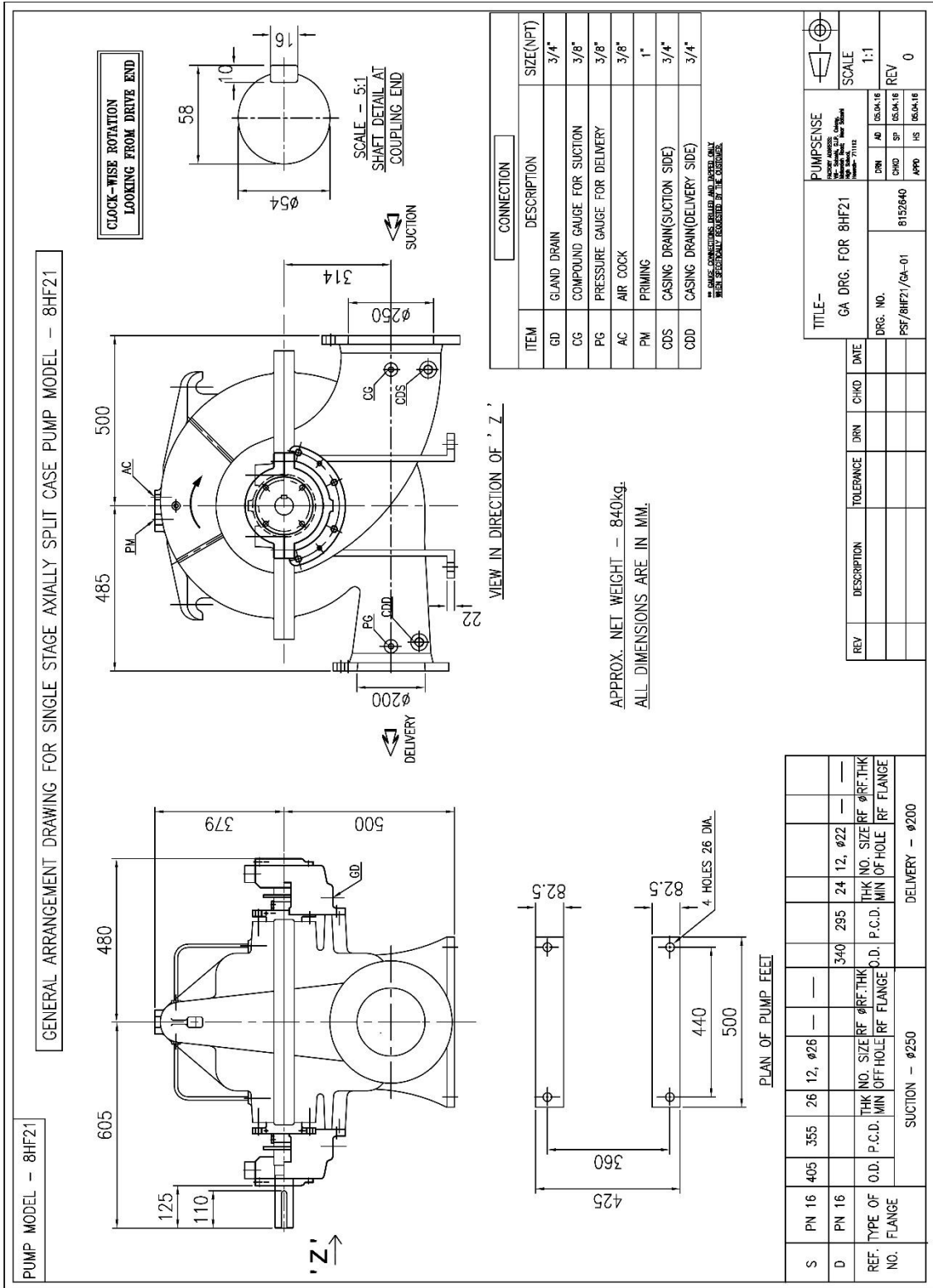


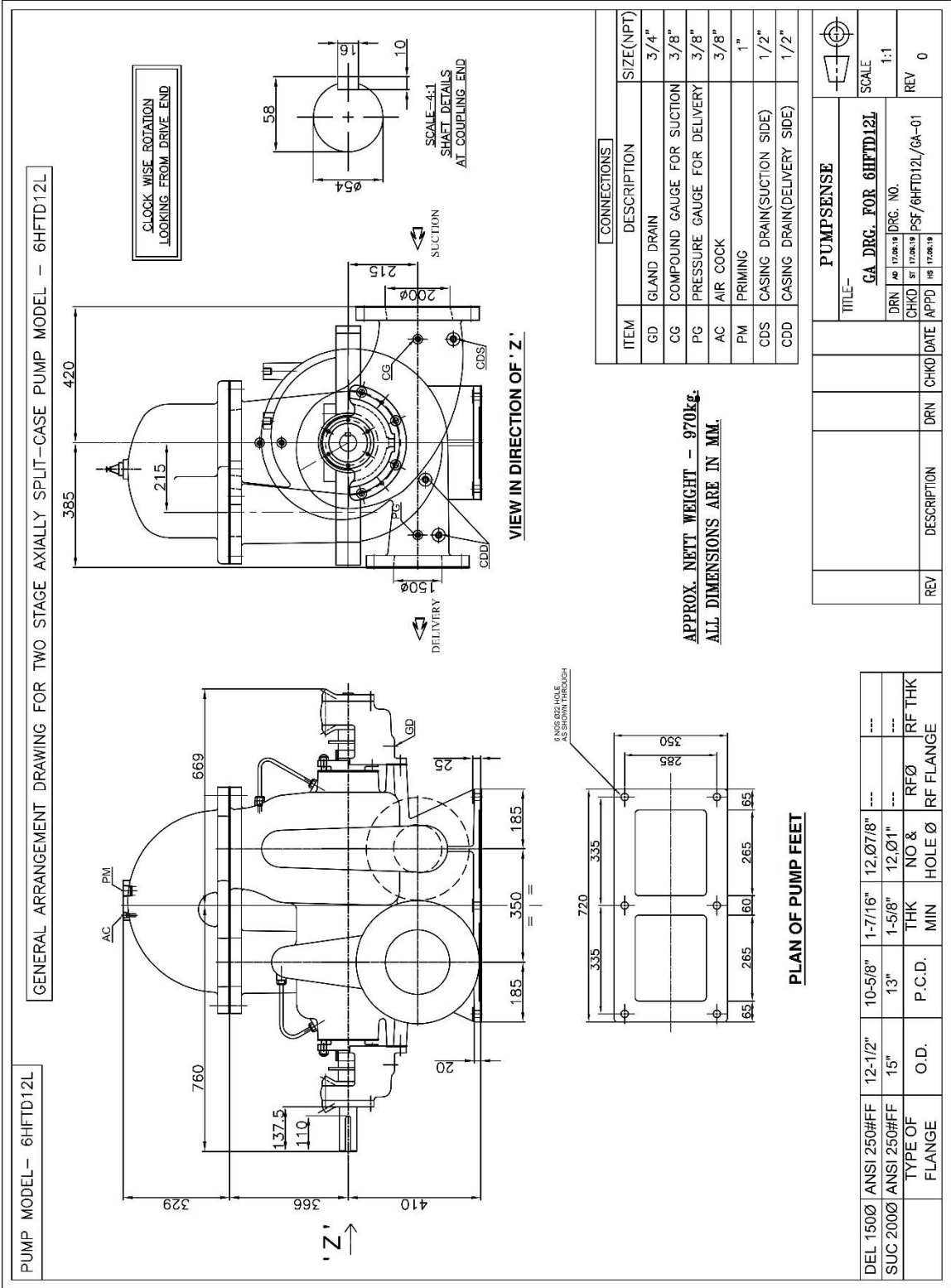




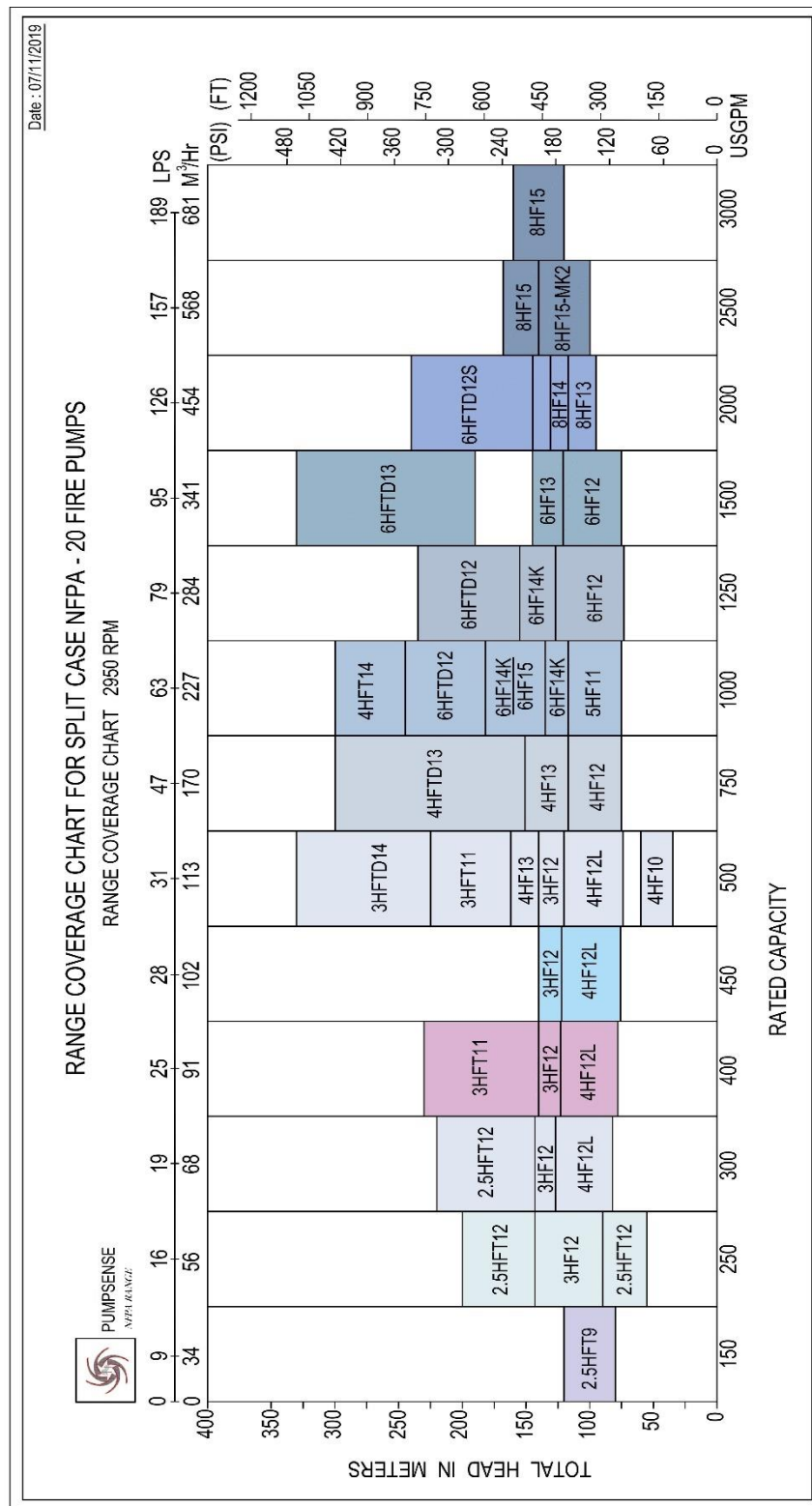








## 9. NFPA20 Fire Pumps Stack Chart





## 10. NFPA20 Selection Chart

PUMPSENSE Centrifugal Fire Pumps, Split Case, NFPA20 SELECTION CHART										
Sr. No.	Rated Capacity, gpm	Size, in.	Model	Rated Net Pressure Range,		Approx. Speed, RPM	Max Working Pressure, psi	Impeller Diameter, mm.		Pump Type
				Meter	psi			Minimum	Maximum	
1	150	3"X2.5"	2.5HFT9	80-140	115-200	2950	300	150	220	Two Stage Pump
2	250		2.5HFT12	55-232	78-330	2950	400	171	305	Two Stage Pump
3		4"X3"	3HF12	90-143	130-203	2950	320	256	320	Single Stage Pump
4				95-148	135-210	3000	320	256	320	Single Stage Pump
5				120-149	170-212	3600	320	256	280	Single Stage Pump
6	300	4"X3"	3HF12	92-143	130-203	2950	320	256	320	Single Stage Pump
7				95-148	135-210	3000	320	256	320	Single Stage Pump
8				120-149	170-212	3600	320	256	320	Single Stage Pump
9		6"X4"	4HF12L	62-98	88-139	2600	300	260	310	Single Stage Pump
10				73-114	104-162	2800	300	260	310	Single Stage Pump
11				82-127	116-180	2950	300	260	310	Single Stage Pump
12				84-131	120-187	3000	300	260	310	Single Stage Pump
13		3"X2.5"	2.5HFT12	120-220	170-313	2950	400	230	305	Two Stage Pump
14	400	4"X3"	3HF12	80-140	115-200	2950	320	256	320	Single Stage Pump
15				84-144	120-205	3000	320	256	320	Single Stage Pump
16				112-144	160-205	3600	320	256	278	Single Stage Pump
17			3HFT11	136-230	194-327	2930	410	230	295	Two Stage Pump
18		6"X4"	4HF12L	59-94	84-134	2600	300	260	310	Single Stage Pump
19				70-110	99-157	2800	300	260	310	Single Stage Pump
20				78-123	111-175	2950	300	260	310	Single Stage Pump
21				81-128	115-182	3000	300	260	310	Single Stage Pump

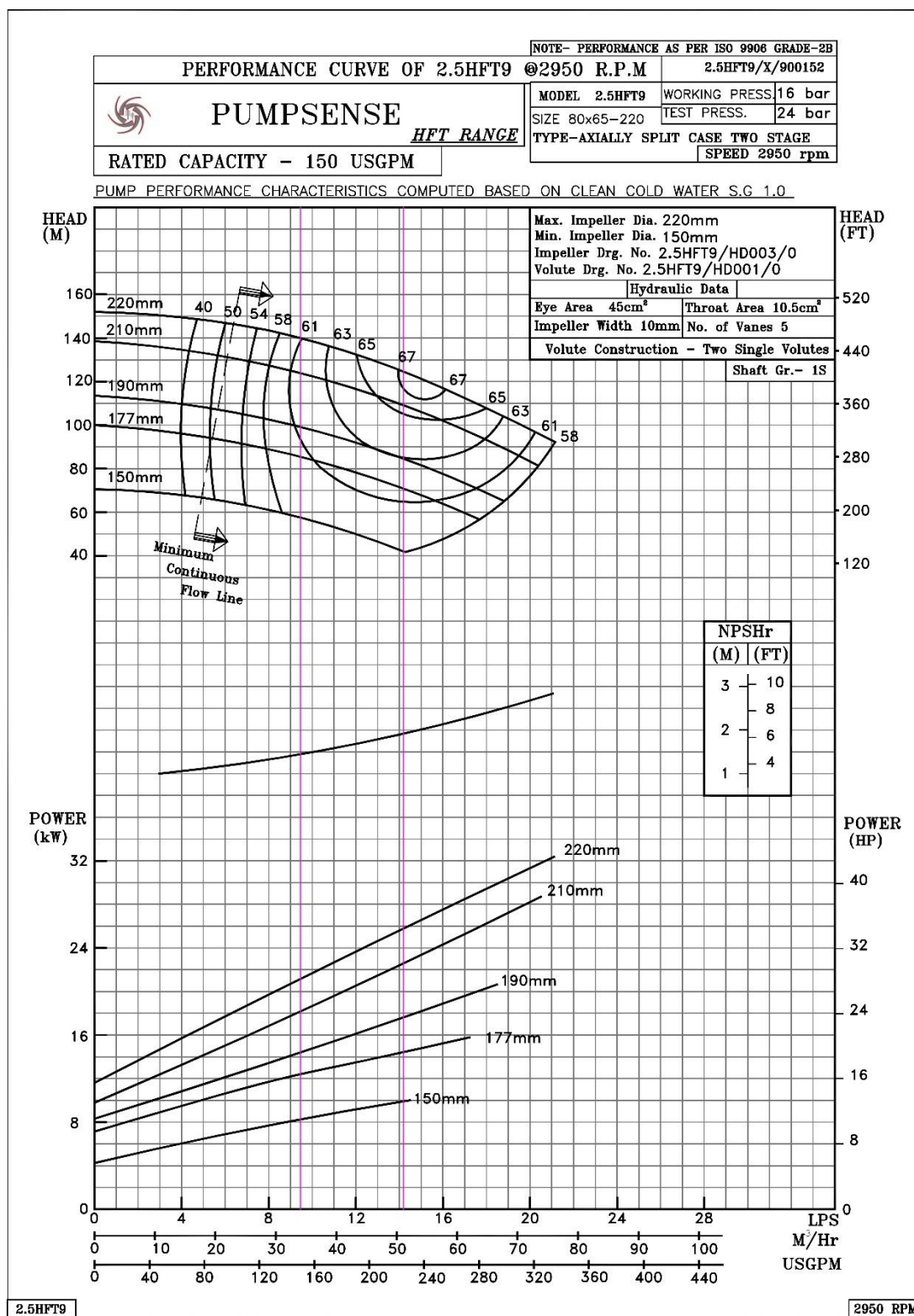
22	450	4"X3"	3HF12	80-140	115-200	2950	320	256	320	Single Stage Pump
23				84-144	120-205	3000	320	256	320	Single Stage Pump
24				112-144	160-205	3600	320	256	276	Single Stage Pump
25		6"X4"	4HF12L	57-93	81-132	2600	300	260	310	Single Stage Pump
26				67-109	96-155	2800	300	260	310	Single Stage Pump
27				76-122	108-173	2950	300	260	310	Single Stage Pump
28				79-126	113-179	3000	300	260	310	Single Stage Pump
29	500	4"X3"	3HF12	80-140	115-200	2950	320	256	320	Single Stage Pump
30				84-144	120-205	3000	320	256	320	Single Stage Pump
31				112-144	160-205	3600	320	256	274	Single Stage Pump
32		6"X4"	4HF10	35-60	50-85	2950	185	180	230	Single Stage Pump
33			4HF12L	55-91	78-129	2600	300	260	310	Single Stage Pump
34				65-107	93-152	2800	300	260	310	Single Stage Pump
35				74-120	105-171	2950	300	260	310	Single Stage Pump
36				77-124	109-177	3000	300	260	310	Single Stage Pump
37			4HF13	91-124	130-176	2600	300	305	350	Single Stage Pump
38				108-145	153-206	2800	300	305	350	Single Stage Pump
39				120-162	171-230	2950	300	305	350	Single Stage Pump
40				124-167	177-238	3000	300	305	350	Single Stage Pump
41		4"X3"	3HFT11	131-225	187-320	2930	410	230	295	Two Stage Pump
42		5"X3"	3HF1D14	200-330	284-469	2970	585	280	350	Two Stage Pump
43	750	6"X4"	4HF12	56-86	79-122	2600	300	260	310	Single Stage Pump
44				66-103	94-147	2800	300	260	310	Single Stage Pump
45				75-117	107-166	2950	300	260	310	Single Stage Pump
46				79-121	112-172	3000	300	260	310	Single Stage Pump

47			4HF13	80-114	114-162	2600	300	305	350	Single Stage Pump
48				96-135	137-192	2800	300	305	350	Single Stage Pump
49				109-151	155-215	2950	300	305	350	Single Stage Pump
50				114-157	162-224	3000	300	305	350	Single Stage Pump
51		5"X4"	4HF16	80-120	113-171	2350	270	316	395	Single Stage Pump
52		6"X4"	4HFT19	150-230	213-327	1780	600	383	470	Two Stage Pump
53				210-315	299-448	2100	600	383	470	Two Stage Pump
54			4HFTD13	125-300	178-427	2950	550	230	350	Two Stage Pump
55	1000	6"X5"	5HF11	56-89	80-126	2600	260	252	310	Single Stage Pump
56				67-104	95-148	2800	260	252	310	Single Stage Pump
57				75-117	107-167	2950	260	252	310	Single Stage Pump
58				78-122	111-173	3000	260	252	310	Single Stage Pump
59		8"X6"	6HF15	135-182	192-259	2950	355	320	370	Single Stage Pump
60				127-165	180-235	2800	360	320	370	Single Stage Pump
61			6HFTD12	160-245	227-348	2950	440	240	300	Two Stage Pump
62			6HF14K	120-162	170-230	2950	325	300	355	Single Stage Pump
63				105-148	150-210	2800	325	300	355	Single Stage Pump
64		6"X4"	4HFT19	240-375	341-533	2300	600	383	470	Two Stage Pump
65			4HFT14	180-300	256-427	2950	550	280	352	Two Stage Pump
66	1250	8"X6"	6HF12	80-127	113-180	2950	275	245	305	Single Stage Pump
67			6HF13	90-150	128-213	2950	285	264	330	Single Stage Pump
68			6HF14K	110-155	156-220	2950	315	300	355	Single Stage Pump
69				113-141	160-200	2800	325	300	355	Single Stage Pump
70			6HF15	128-175	182-249	2950	355	320	370	Single Stage Pump
71			6HFTD12	140-235	199-334	2950	440	240	300	Two Stage Pump

72			6HFTD18	82-126	117-179	1480	490	390	465	Two Stage Pump
73				128-188	178-267	1800	490	390	465	Two Stage Pump
74				182-268	259-381	2100	490	390	465	Two Stage Pump
75	1500	8"X6"	6HF12	75-121	106-172	2950	275	245	305	Single Stage Pump
76			6HF13	90-145	128-206	2950	285	264	330	Single Stage Pump
77			6HF18	70-88	101-124	1800	140	395	436	Single Stage Pump
78			6HF20	75-120	107-171	1800	220	440	520	Single Stage Pump
79			6HF21	70-102	100-145	1480	150	438	520	Single Stage Pump
80			6HFTD18	120-180	171-256	1800	490	390	465	Two Stage Pump
81				178-262	253-373	2100	490	390	465	Two Stage Pump
82		8"X8"	8HF12H	40-72	56-102	2350	200	300	340	Single Stage Pump
83		8"X6"	6HFTD13	190-330	270-469	2950	550	270	334	Two Stage Pump
84	2000	10"X8"	8HF13	84-103	120-146	2800	300	305	330	Single Stage Pump
85				95-117	135-166	2950	300	305	330	Single Stage Pump
86				97-122	138-173	3000	300	305	330	Single Stage Pump
87			8HF17	70-98	100-140	1800	155	375	450	Single Stage Pump
88			8HF20	80-125	114-178	1800	280	430	515	Single Stage Pump
89			8HF21	70-91	100-130	1480	140	455	520	Single Stage Pump
90		8"X6"	6HFTD21	120-200	170-284	1480	375	430	540	Two Stage Pump
91			6HFTD12S	140-240	199-341	2950	505	264	330	Two Stage Pump
92		10"X8"	8HF14	116-131	165-186	2950	305	320	340	Single Stage Pump
93	2500	12"X8"	8HF15	108-168	154-239	2950	350	305	380	Single Stage Pump
95		10"X8"	8HF17	75-96	106-136	1800	155	375	450	Single Stage Pump
96		10"X8"	8HF20	75-120	107-171	1800	280	430	515	Single Stage Pump

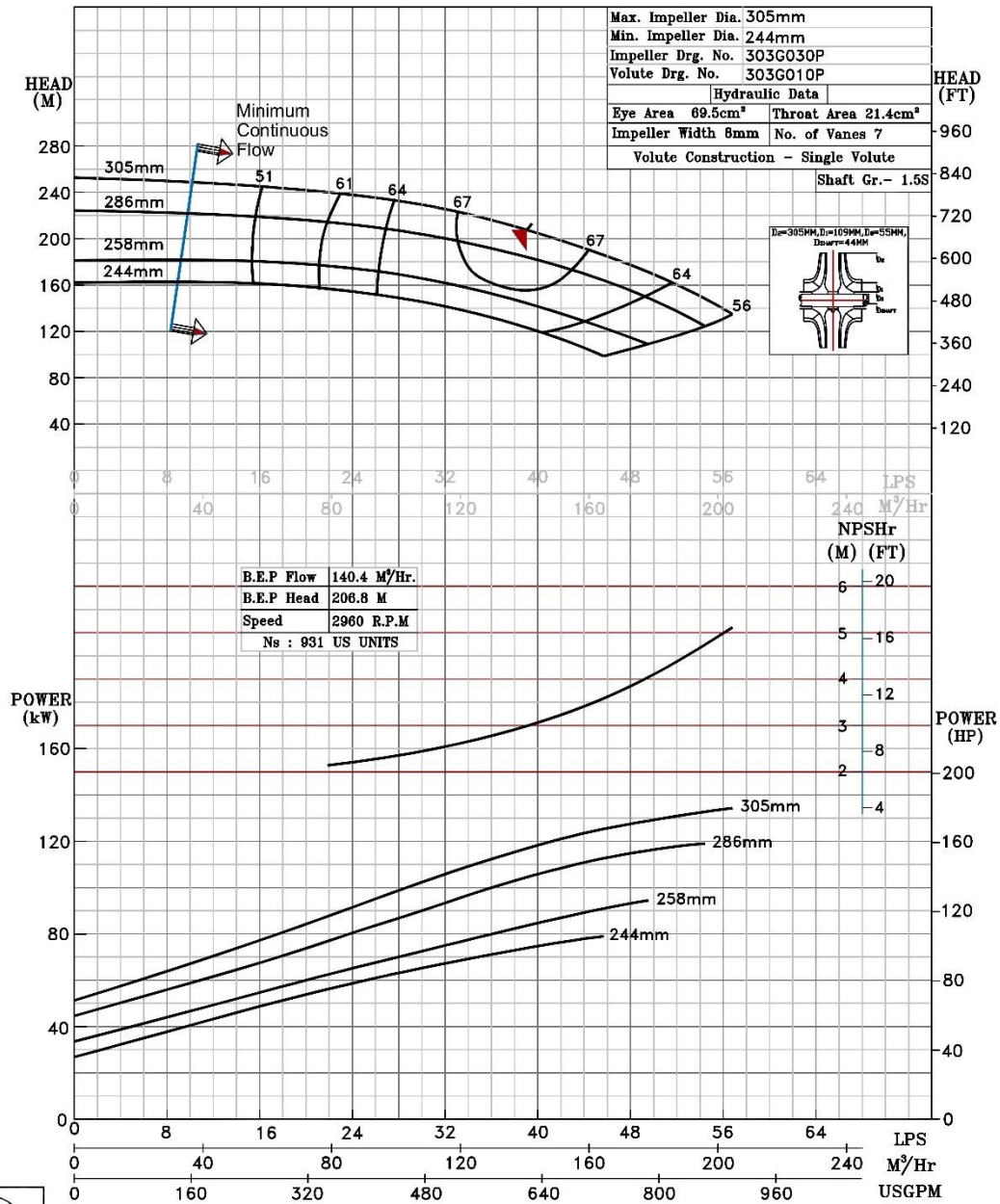
97	3000	12"X8"	8HF15	120-160	171-228	2950	350	330	380	Single Stage Pump
98		14"X10"	10HF20	52-83	74-118	1480	270	410	510	Single Stage Pump
99				80-122	114-174	1800	270	410	510	Single Stage Pump
100			10HF22	68-89	97-127	1480	300	490	561	Single Stage Pump
101		12"X10"	10HF27	105-165	149-235	1480	440	560	690	Single Stage Pump
102	4000	14"X10"	10HF20	48-80	68-114	1480	270	410	510	Single Stage Pump
103				75-120	107-171	1800	270	410	510	Single Stage Pump
104			10HF22	100-131	142-186	1800	300	490	561	Single Stage Pump
105	5000			95-125	135-178	1800	300	490	561	Single Stage Pump

## 11. NFPA20 Curves



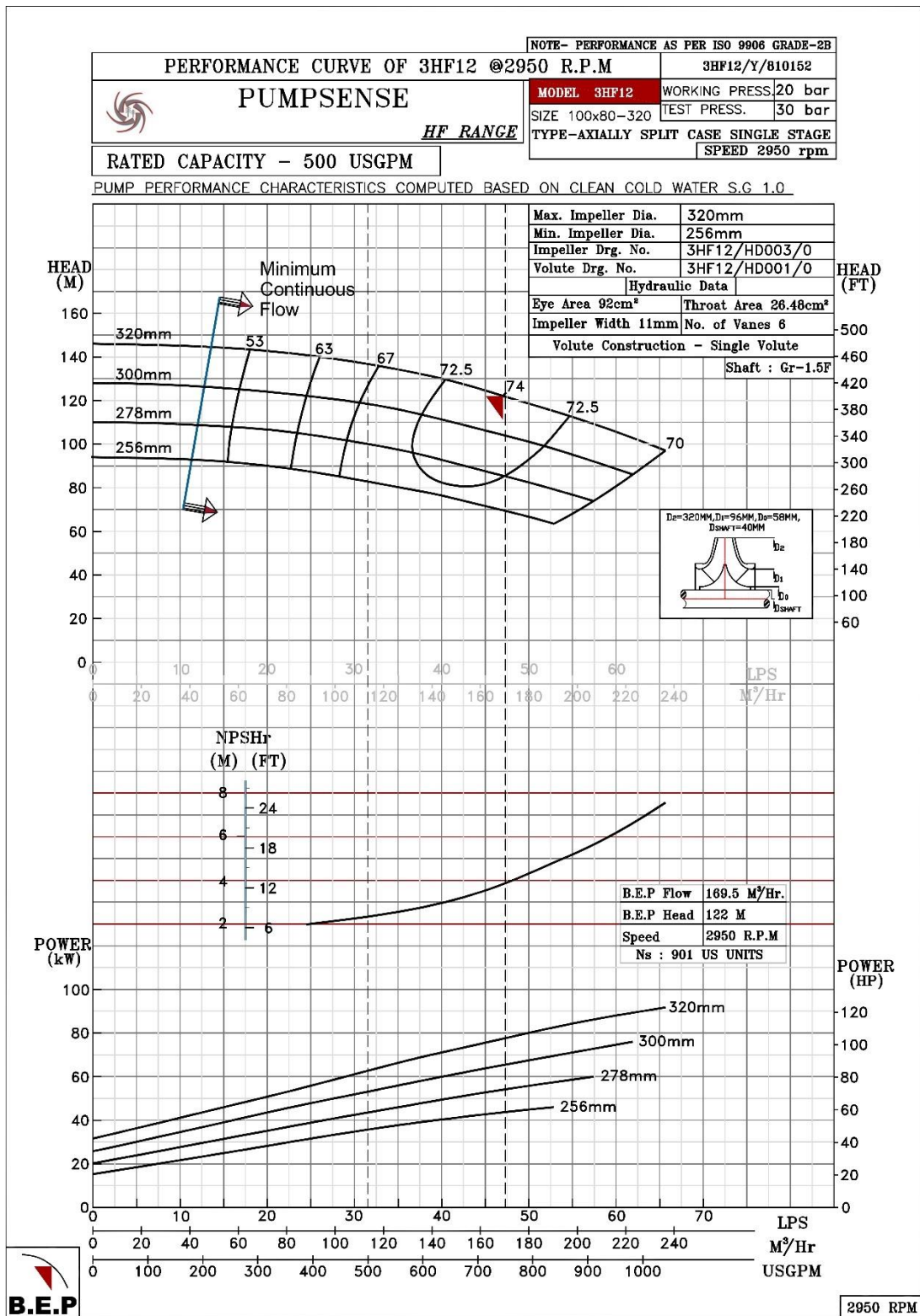
NOTE- PERFORMANCE AS PER ISO 9906 GRADE-2B	
PERFORMANCE CURVE OF 2.5HFT12 @2960 R.P.M	2.5HFT12/X/310352
 <b>PUMPSENSE</b> HST RANGE	MODEL 2.5HFT12
	WORKING PRESS. 12 bar
	SIZE 80x65-305
	TEST PRESS. 18 bar
TYPE-AXIALY SPLIT CASE TWO STAGE	
SPEED 2960 rpm	
DATE - 25.09.19	

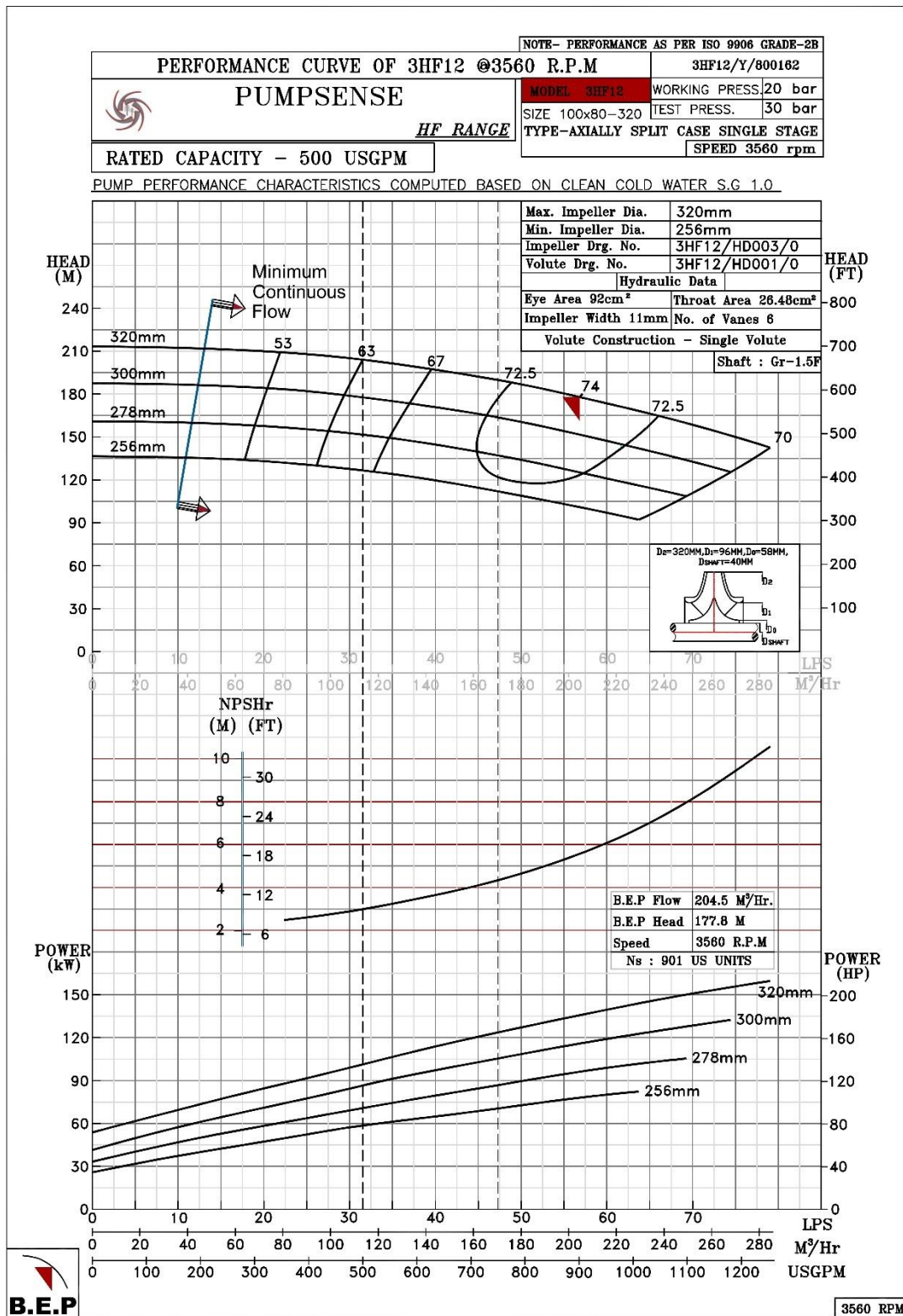
PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0



2960 RPM







**UL LISTED**

**FM APPROVED**

TEST CURVE OF 4HF12L @2600 R.P.M



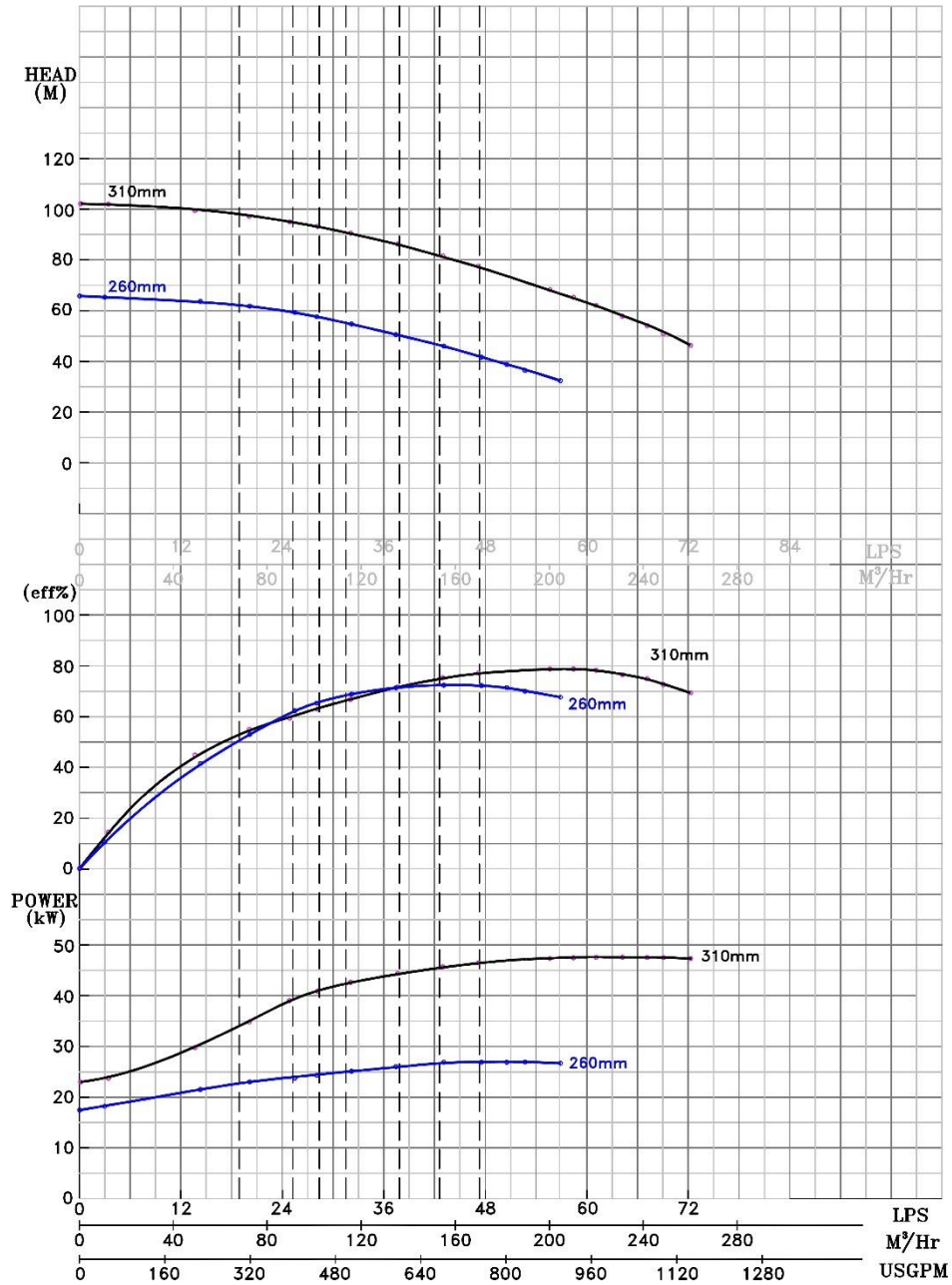
**PUMPSENSE**

**HF RANGE**

TYPE-AXIALLY SPLIT CASE SINGLE STAGE

**Rated Flow - 300,400,450&500 USGPM**

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0



**UL LISTED**

**FM APPROVED**

TEST CURVE OF 4HF12L @2800 R.P.M



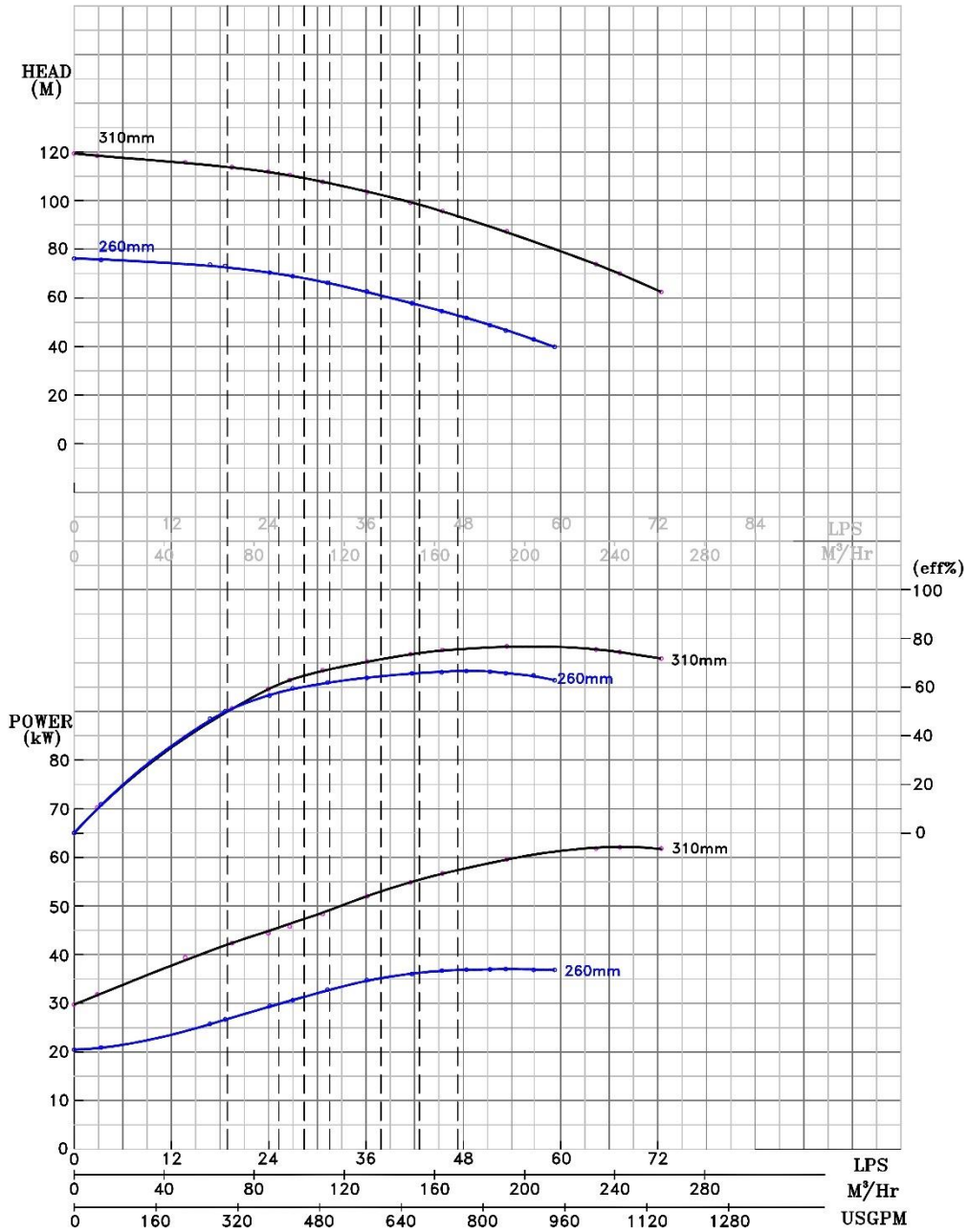
**PUMPSENSE**

**HF RANGE**

TYPE-AXIALLY SPLIT CASE SINGLE STAGE

**Rated Flow - 300,400,450&500 USGPM**

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0



**UL LISTED**

**FM APPROVED**

TEST CURVE OF 4HF12L @2950 R.P.M



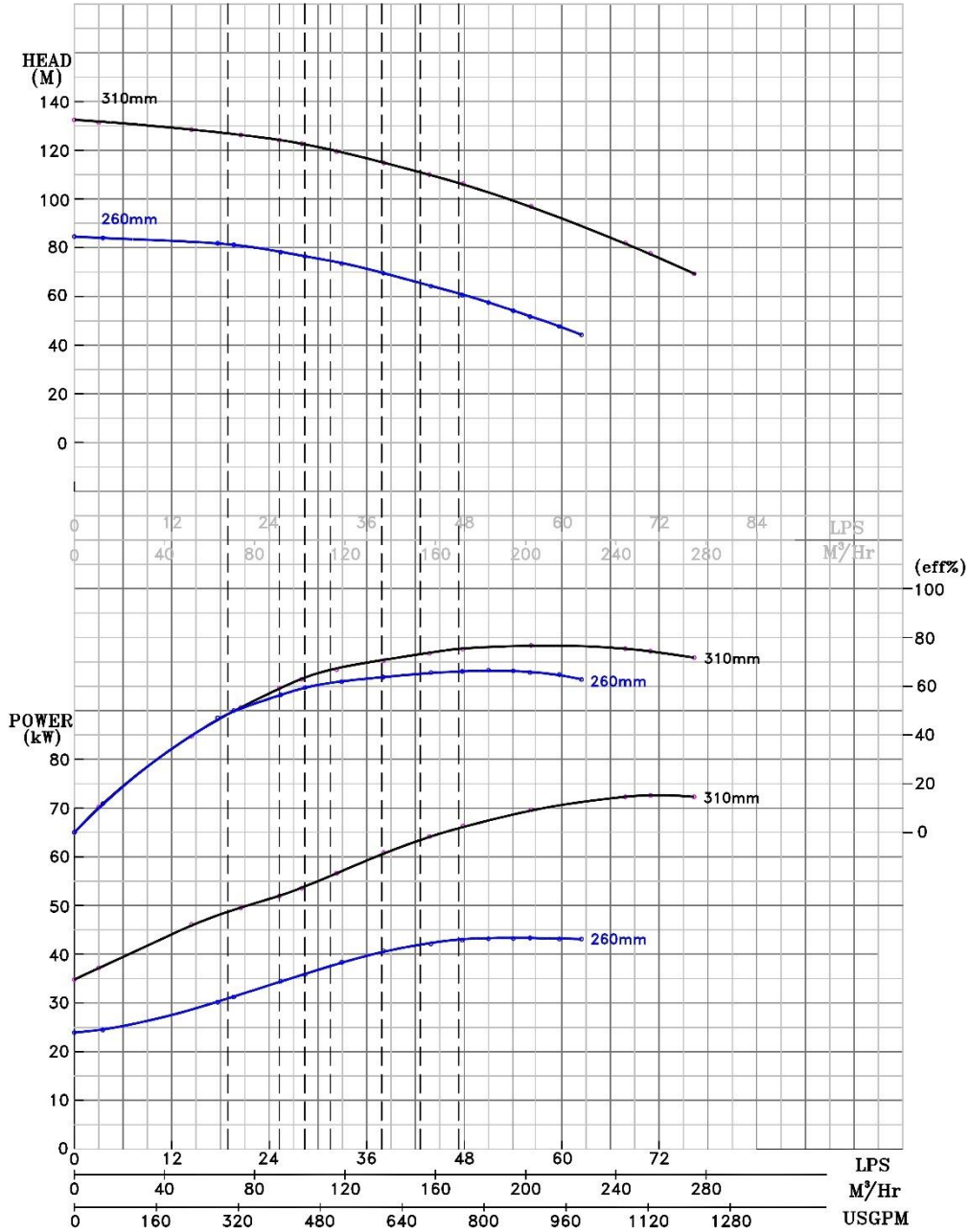
**PUMPSENSE**

**HF RANGE**

TYPE-AXIALLY SPLIT CASE SINGLE STAGE

**Rated Flow - 300,400,450&500 USGPM**

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0





**UL LISTED**

**FM APPROVED**

TEST CURVE OF 4HF12L @3000 R.P.M



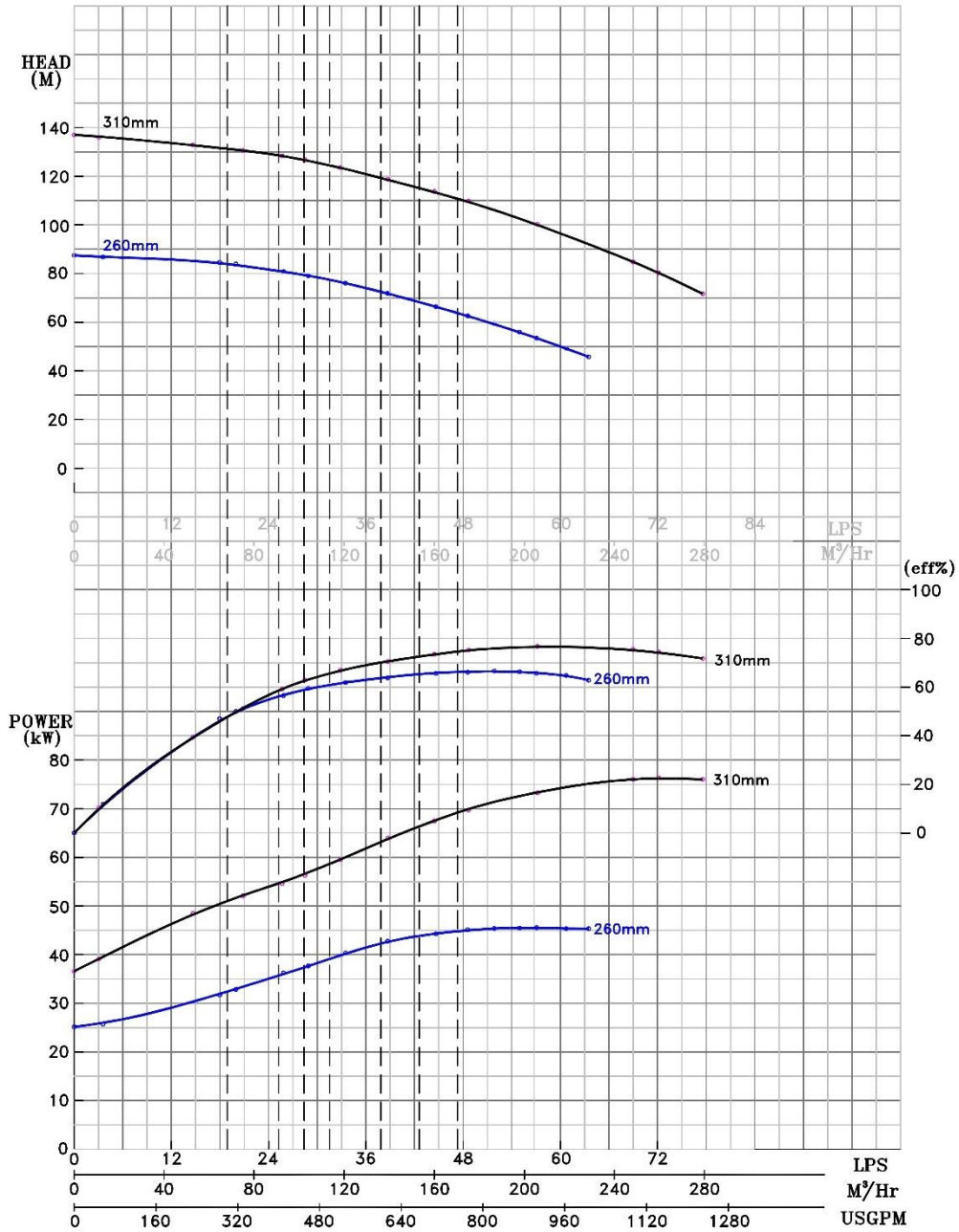
**PUMPSENSE**

**HF RANGE**


TYPE-AXIALLY SPLIT CASE SINGLE STAGE

**Rated Flow - 300,400,450&500 USGPM**

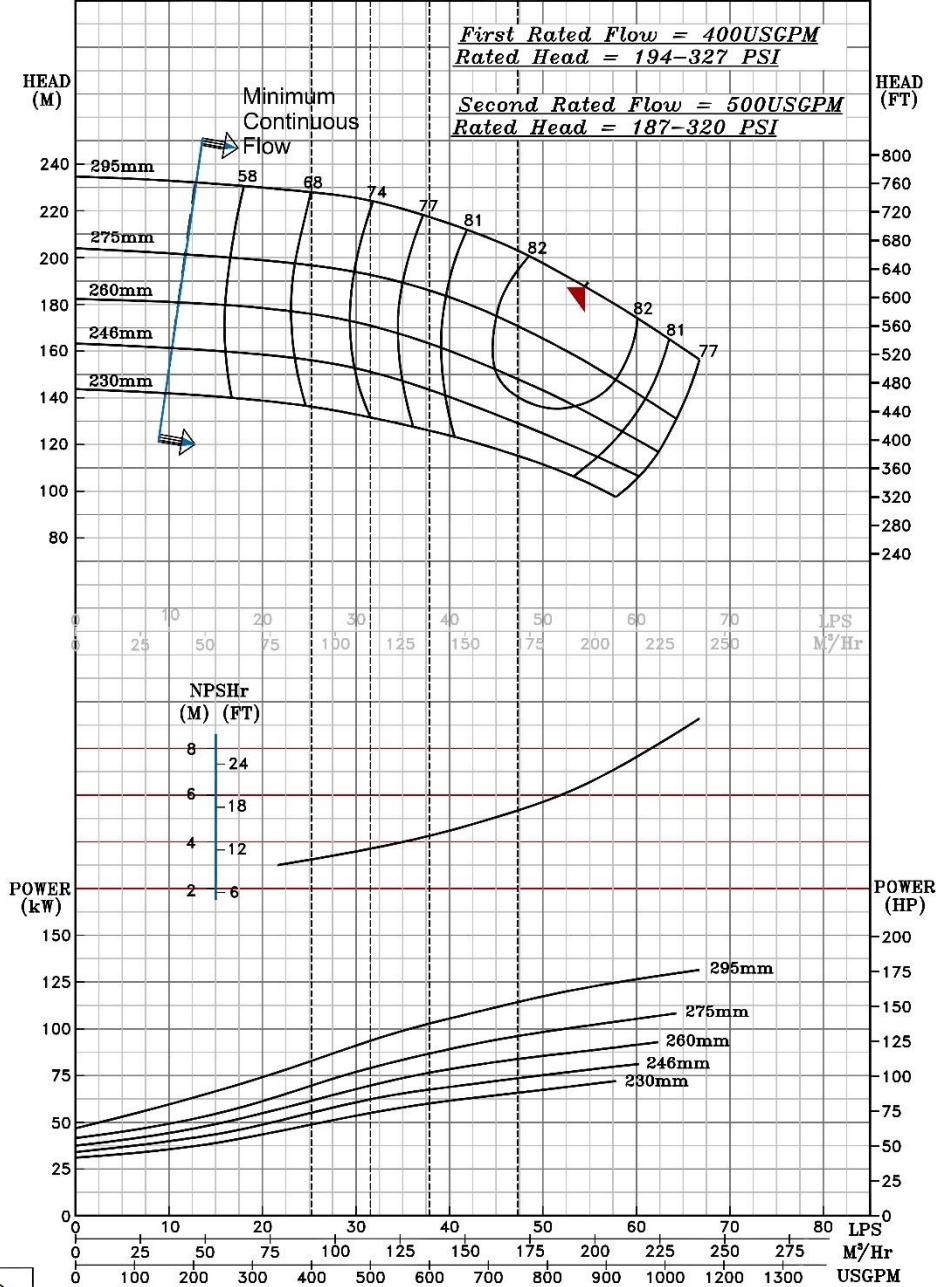
PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0



UL LISTED

PERFORMANCE CURVE OF 3HFT11 @2930 R.P.M		3HFT11/Y/910252	
	PUMPSENSE	MODEL 3HFT11	WORKING PRESS 350 PSI
		SIZE 100x80-295	TEST PRESS. 520 PSI
		HFT RANGE	
	TYPE-AXIALLY SPLIT CASE TWO STAGE		
	SPEED 2930rpm		
	DATE - 23.02.19		

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0



2930 RPM



**UL LISTED**

PERFORMANCE CURVE OF 4HF13 @2600 R.P.M

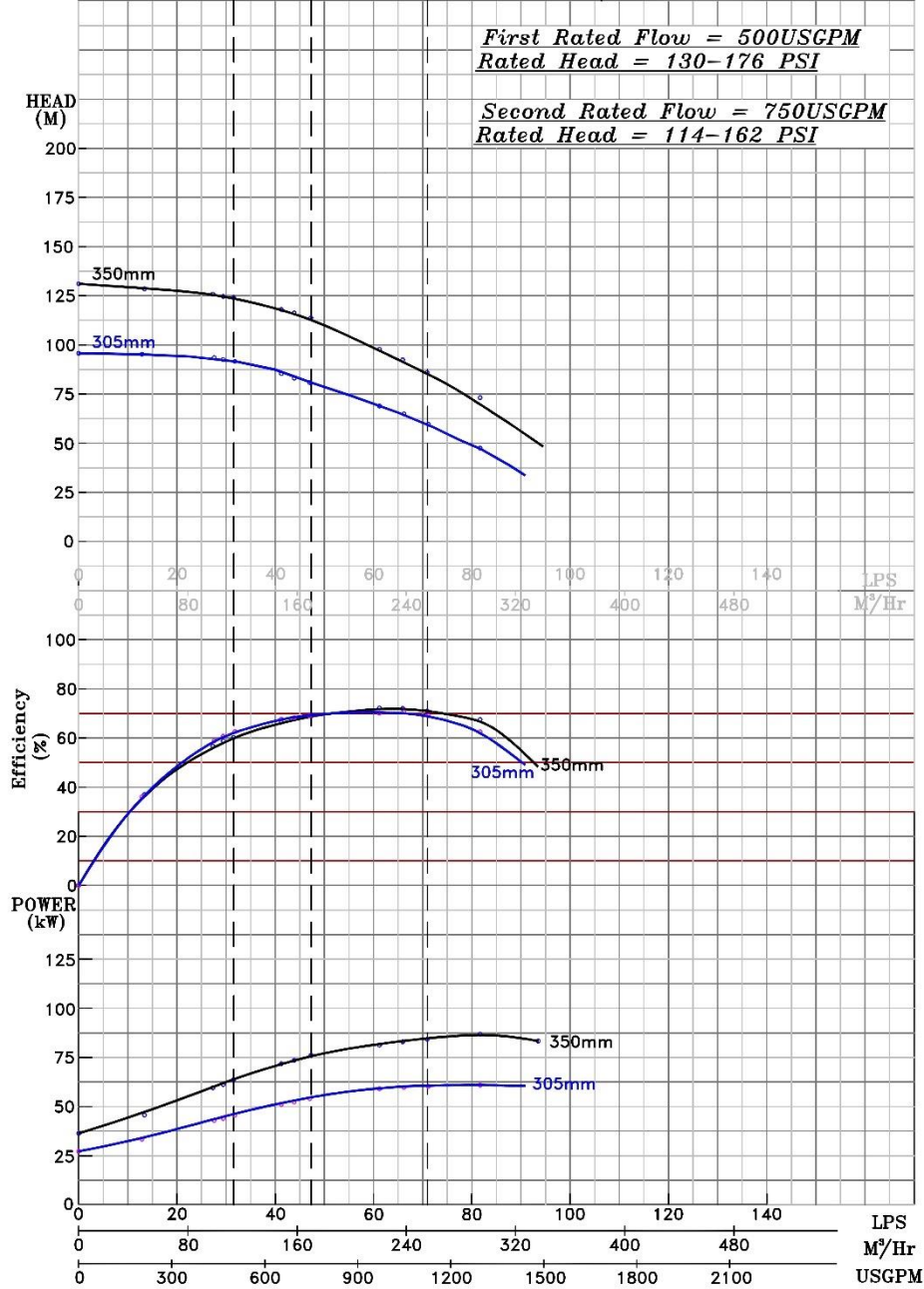


**PUMPSense**

**HF RANGE**

TYPE-AXIALLY SPLIT CASE SINGLE STAGE

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0



**UL LISTED**

PERFORMANCE CURVE OF 4HF13 @2800 R.P.M

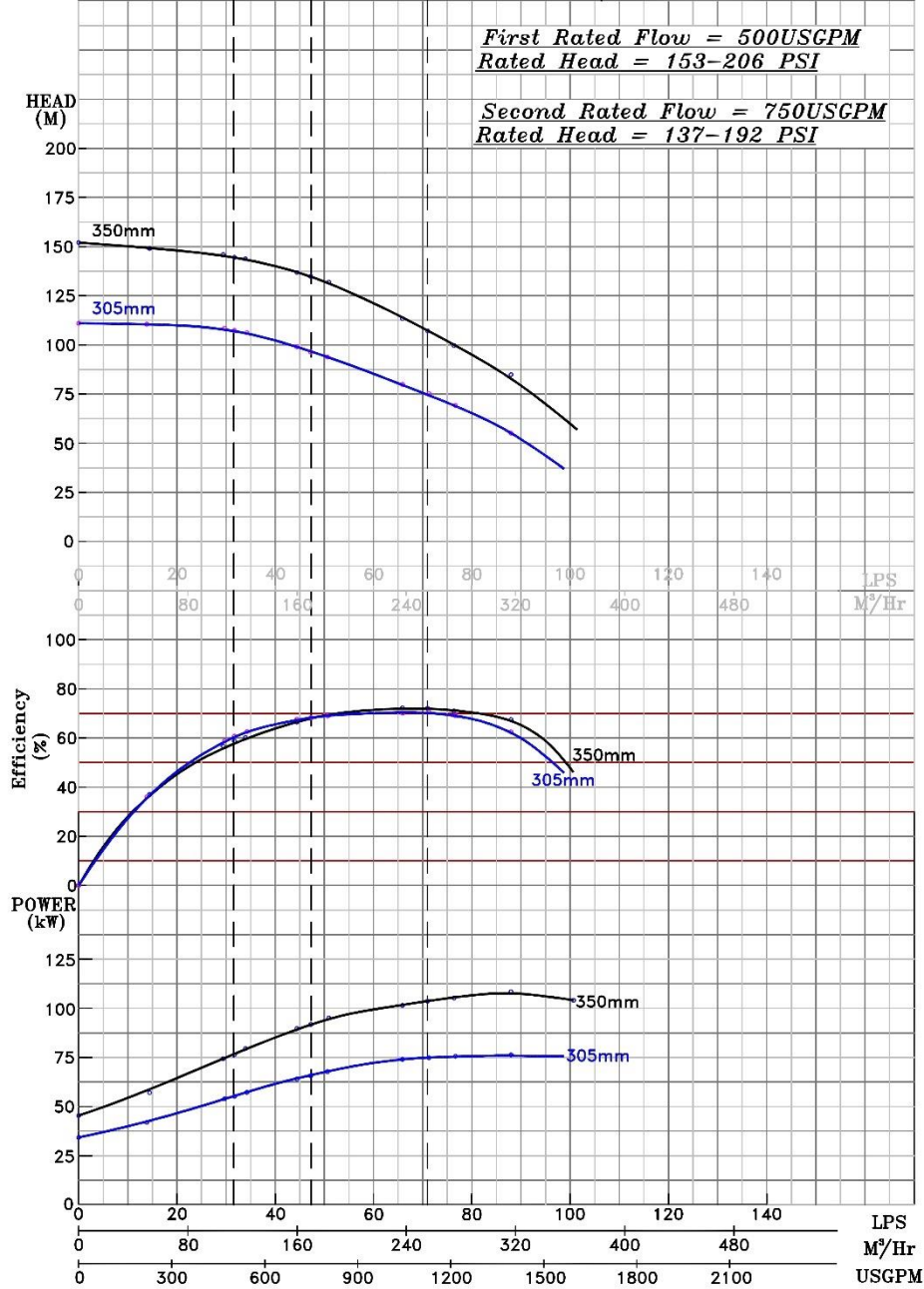


**PUMPSENSE**

**HF RANGE**

TYPE-AXIALLY SPLIT CASE SINGLE STAGE

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0



**UL LISTED**

PERFORMANCE CURVE OF 4HF13 @2950 R.P.M

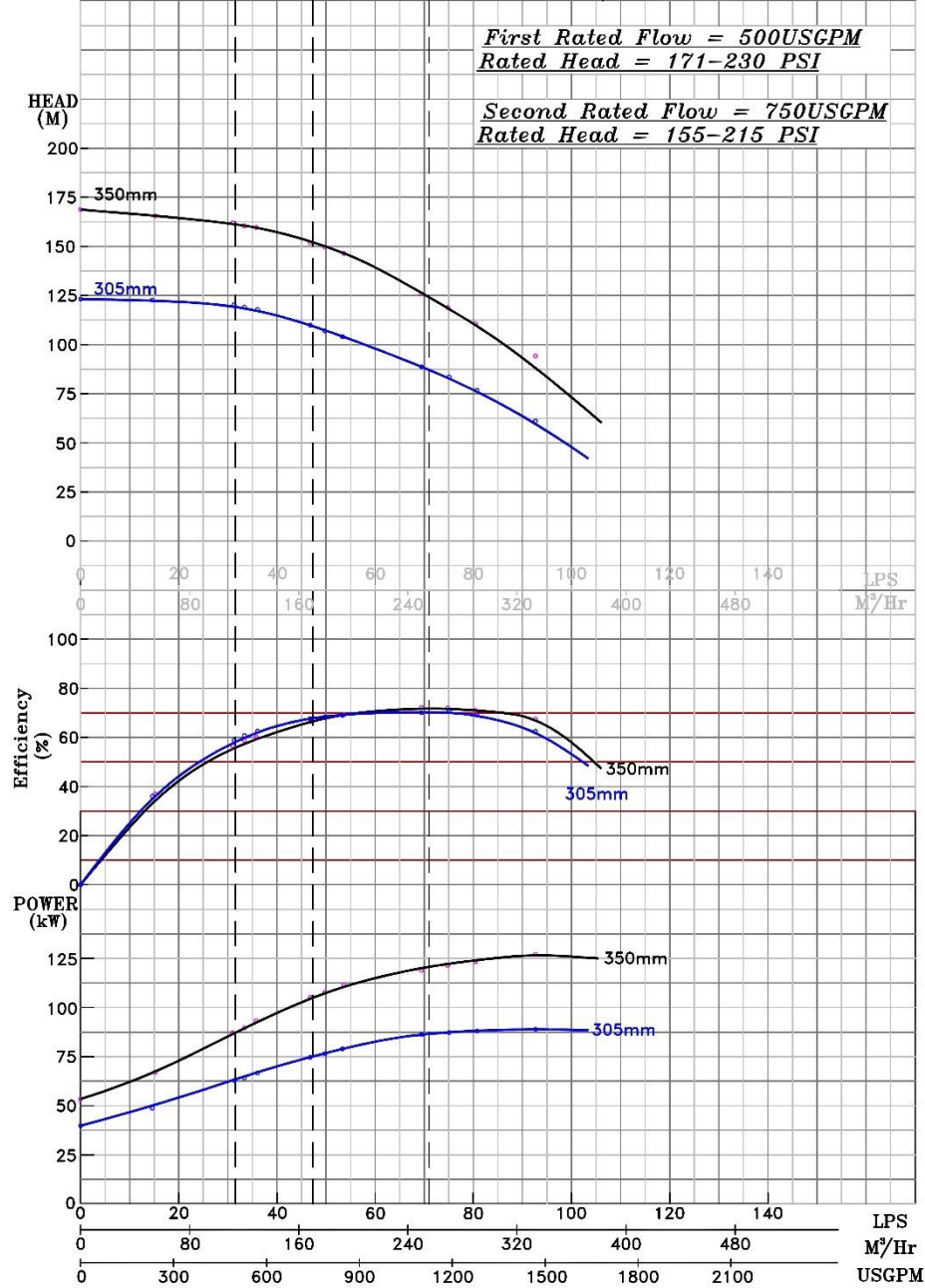


**PUMPSENSE**

**HF RANGE**

TYPE-AXIALLY SPLIT CASE SINGLE STAGE

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0



**UL LISTED**

PERFORMANCE CURVE OF 4HF13 @3000 R.P.M

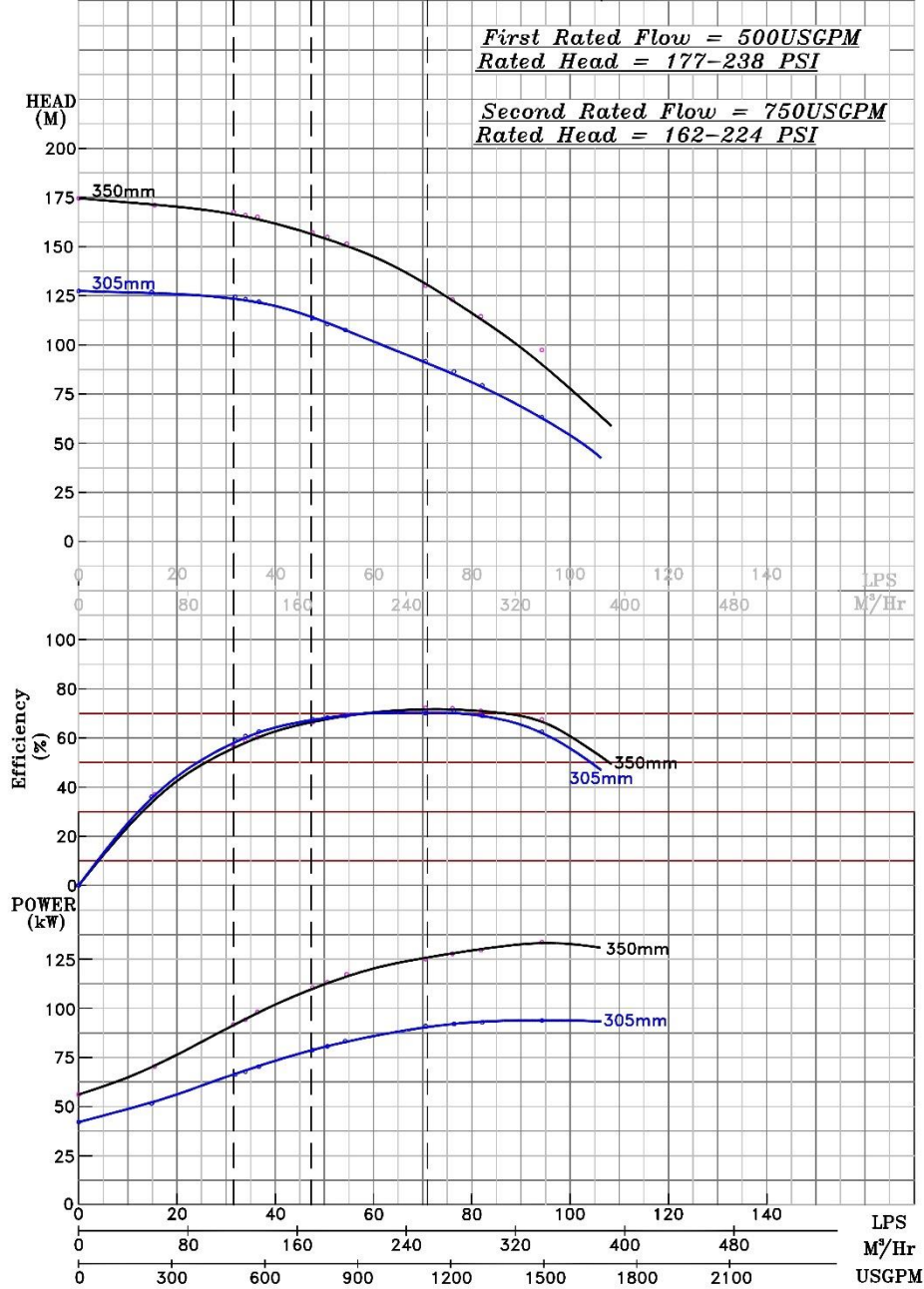


**PUMPSENSE**

**HF RANGE**

TYPE-AXIALLY SPLIT CASE SINGLE STAGE

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0



**UL LISTED**

**FM APPROVED**

TEST CURVE OF 4HF12 @2600 R.P.M

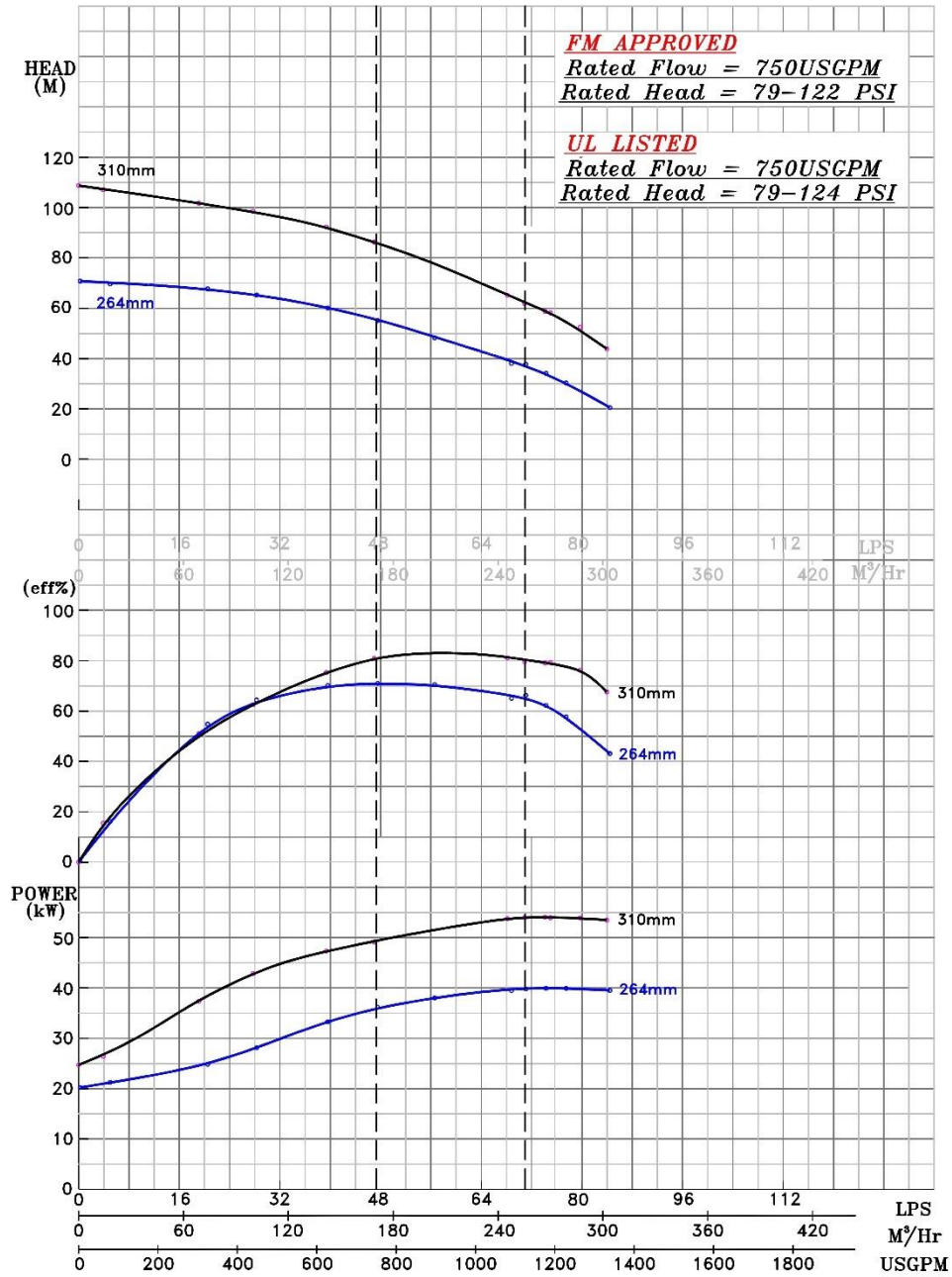


**PUMPSENSE**

**HF RANGE**

TYPE-AXIALLY SPLIT CASE SINGLE STAGE

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0



**UL LISTED**

**FM APPROVED**

TEST CURVE OF 4HF12 @2800 R.P.M

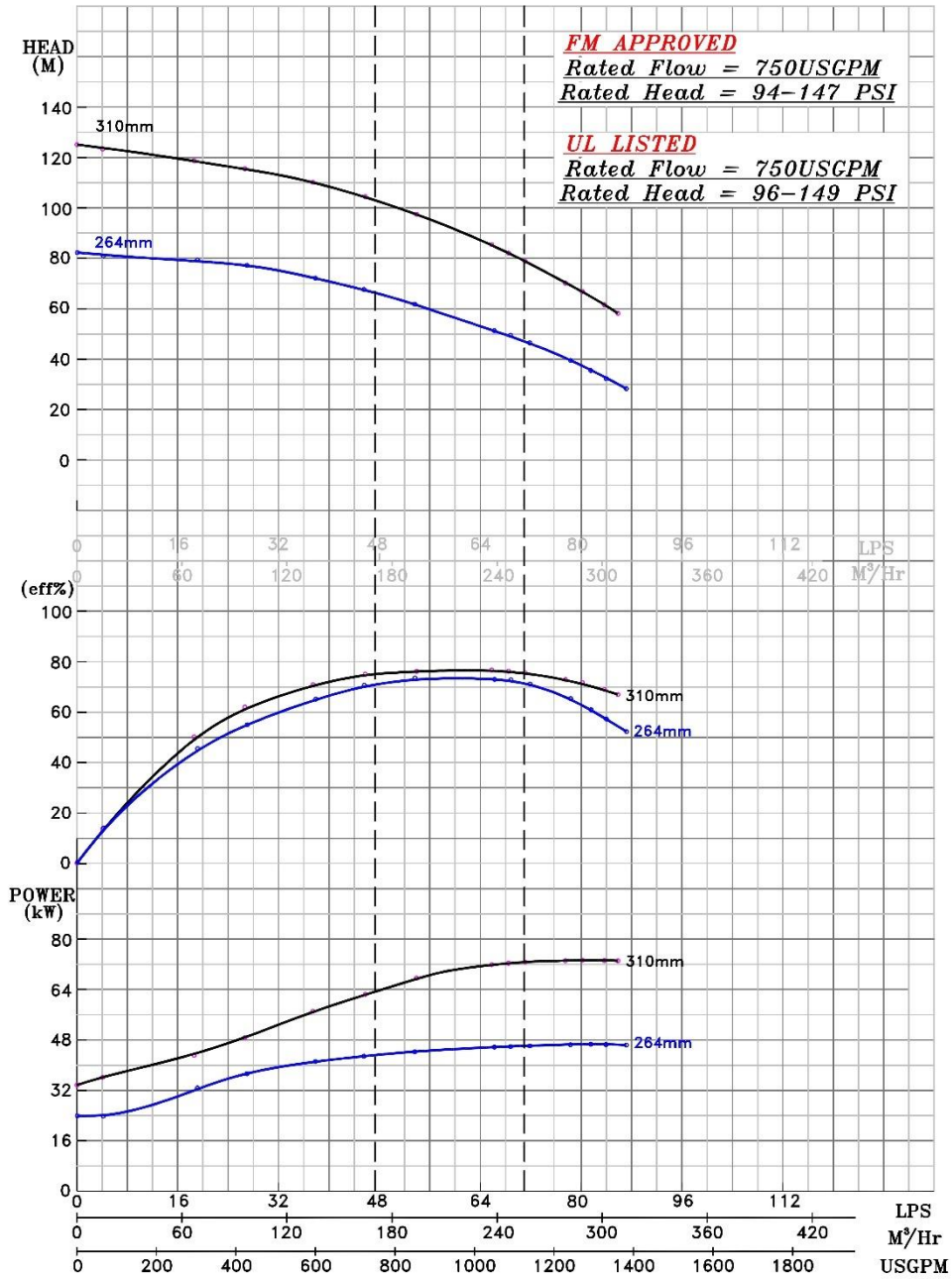


**PUMPSENSE**

**HF RANGE**

TYPE-AXIALLY SPLIT CASE SINGLE STAGE

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G. 1.0





**UL LISTED**

**FM APPROVED**

TEST CURVE OF 4HF12 @2950 R.P.M

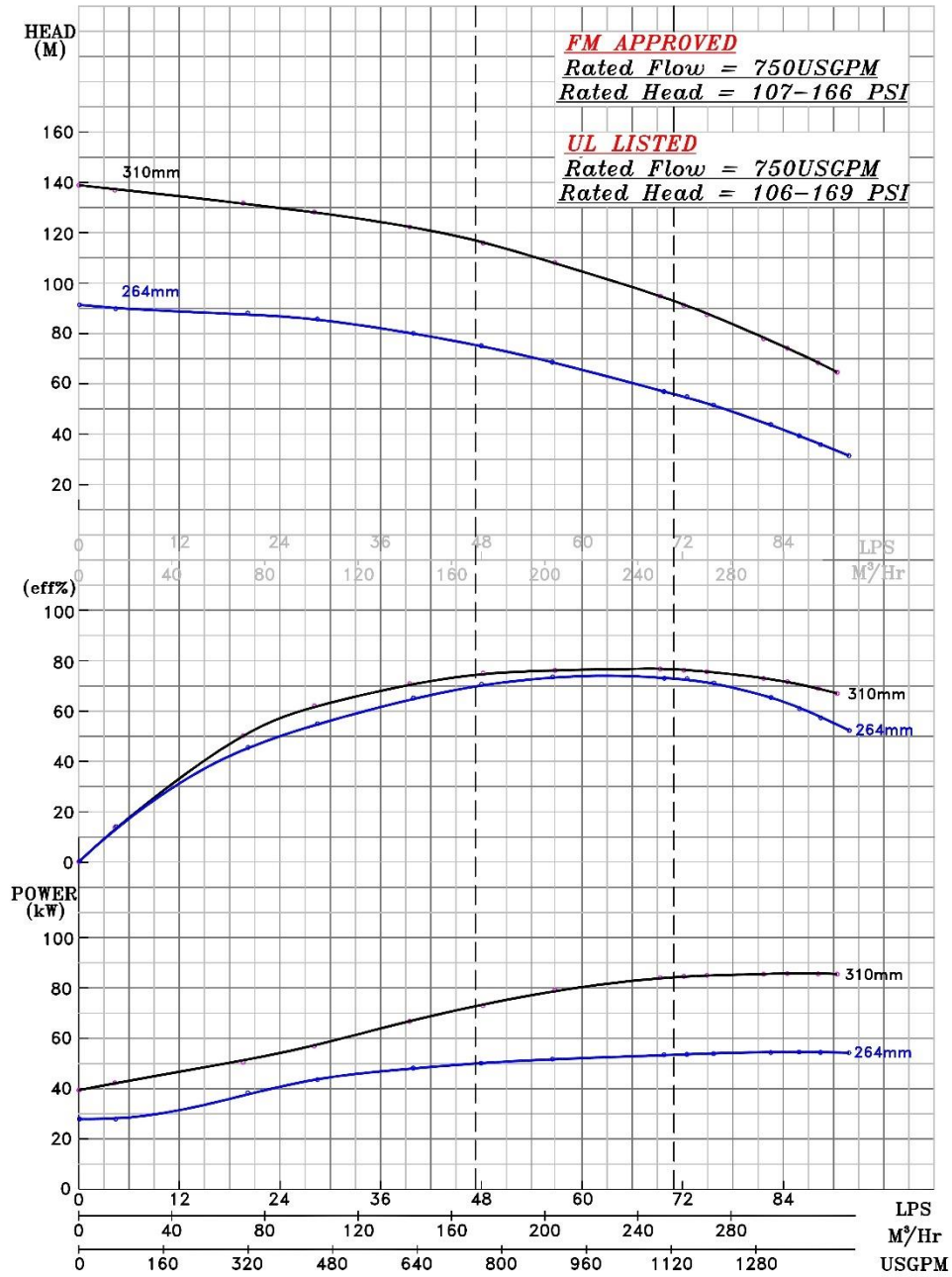


**PUMPSENSE**

**HF RANGE**

TYPE-AXIALLY SPLIT CASE SINGLE STAGE

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0





**UL LISTED**

**FM APPROVED**

PERFORMANCE CURVE OF 4HF12 @3000 R.P.M

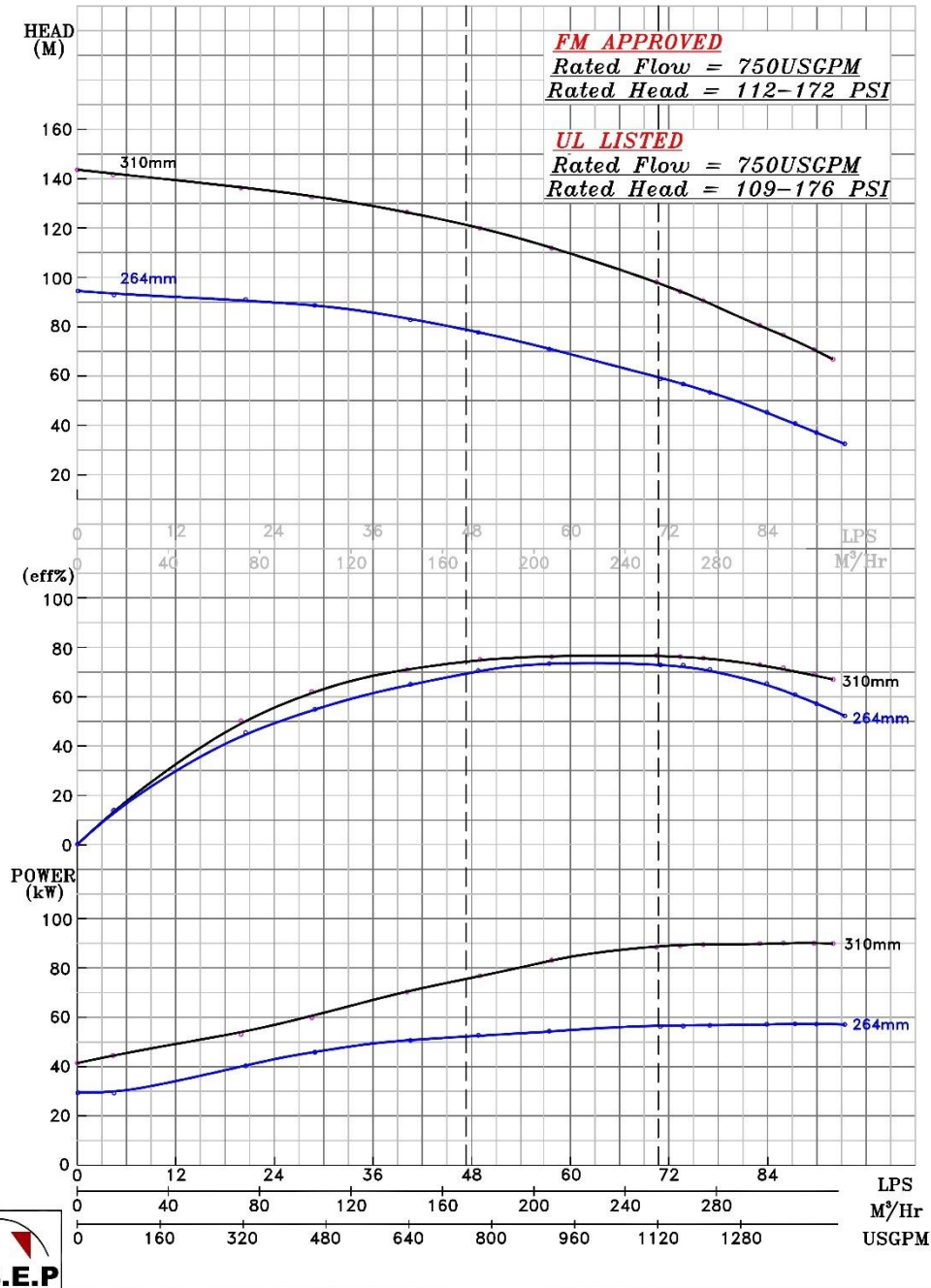


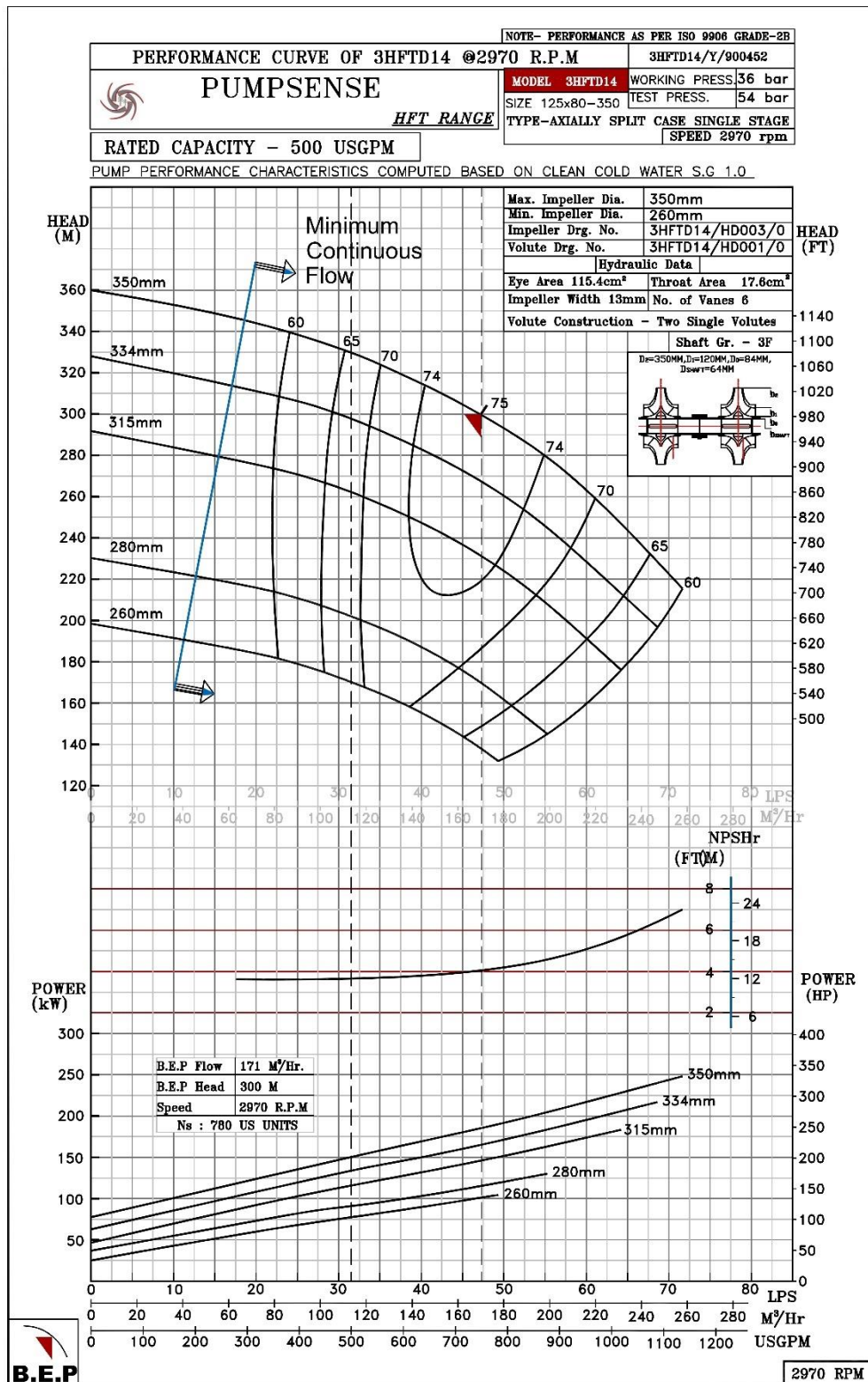
**PUMPSENSE**

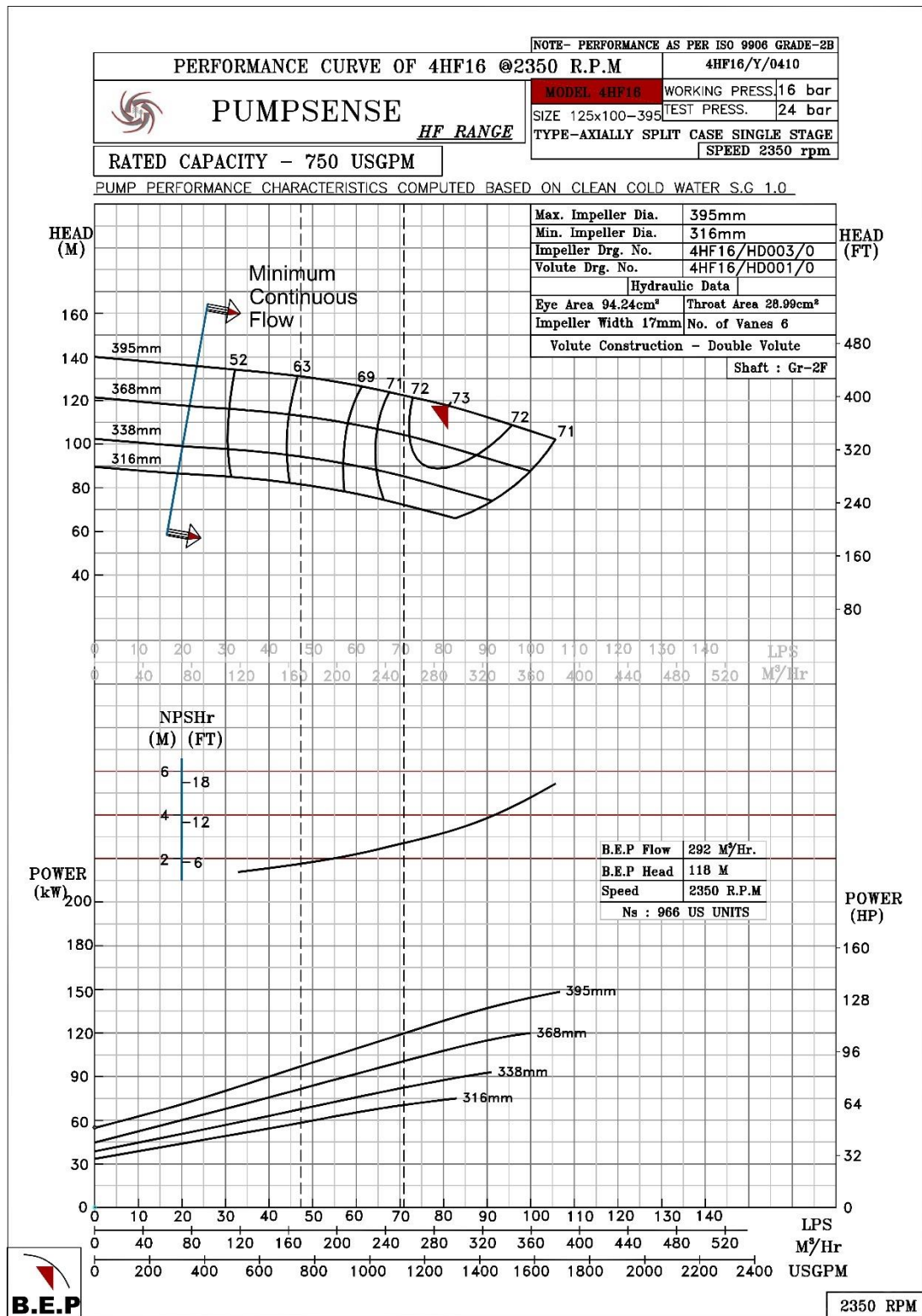
**HF RANGE**

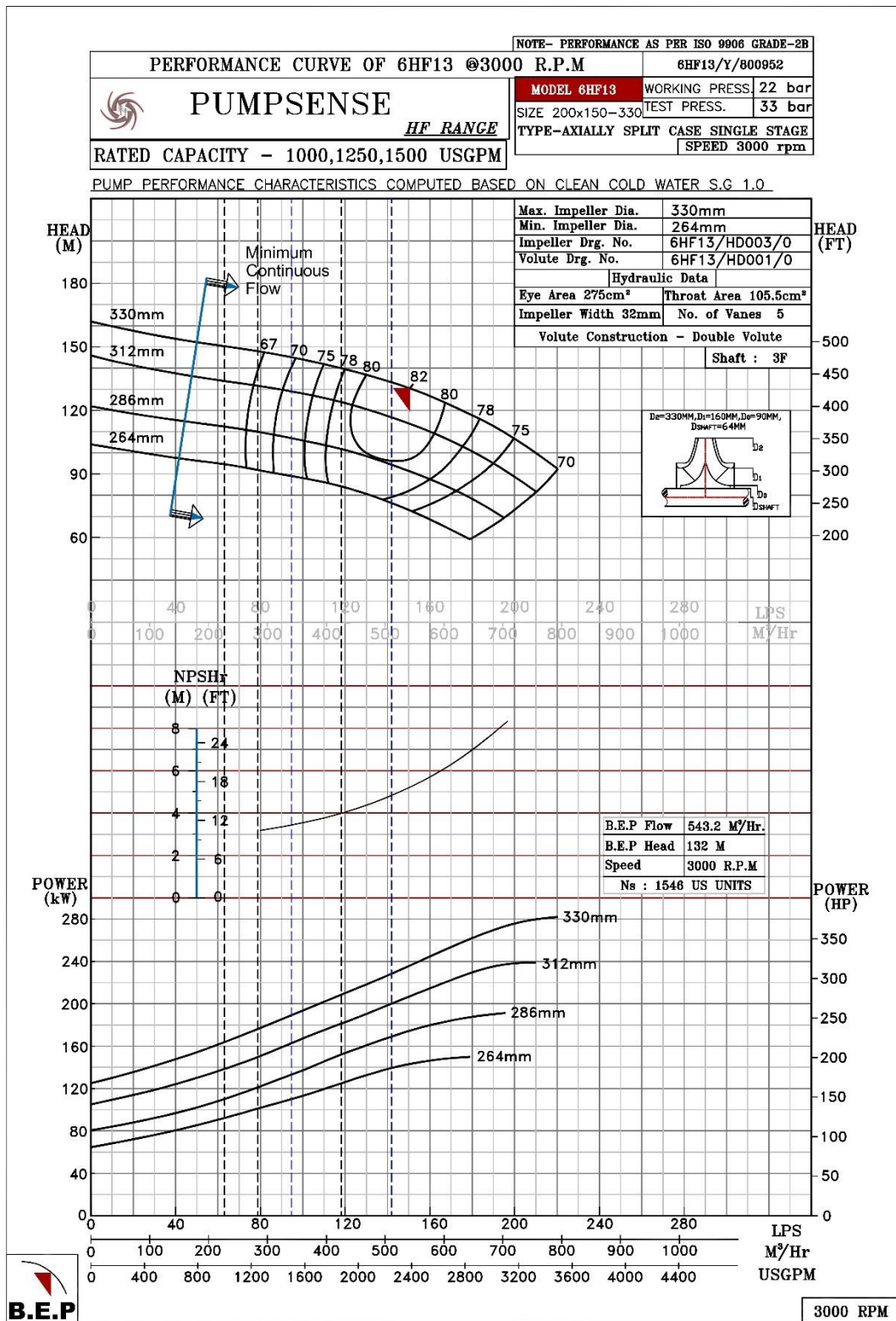
TYPE-AXIALLY SPLIT CASE SINGLE STAGE

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0

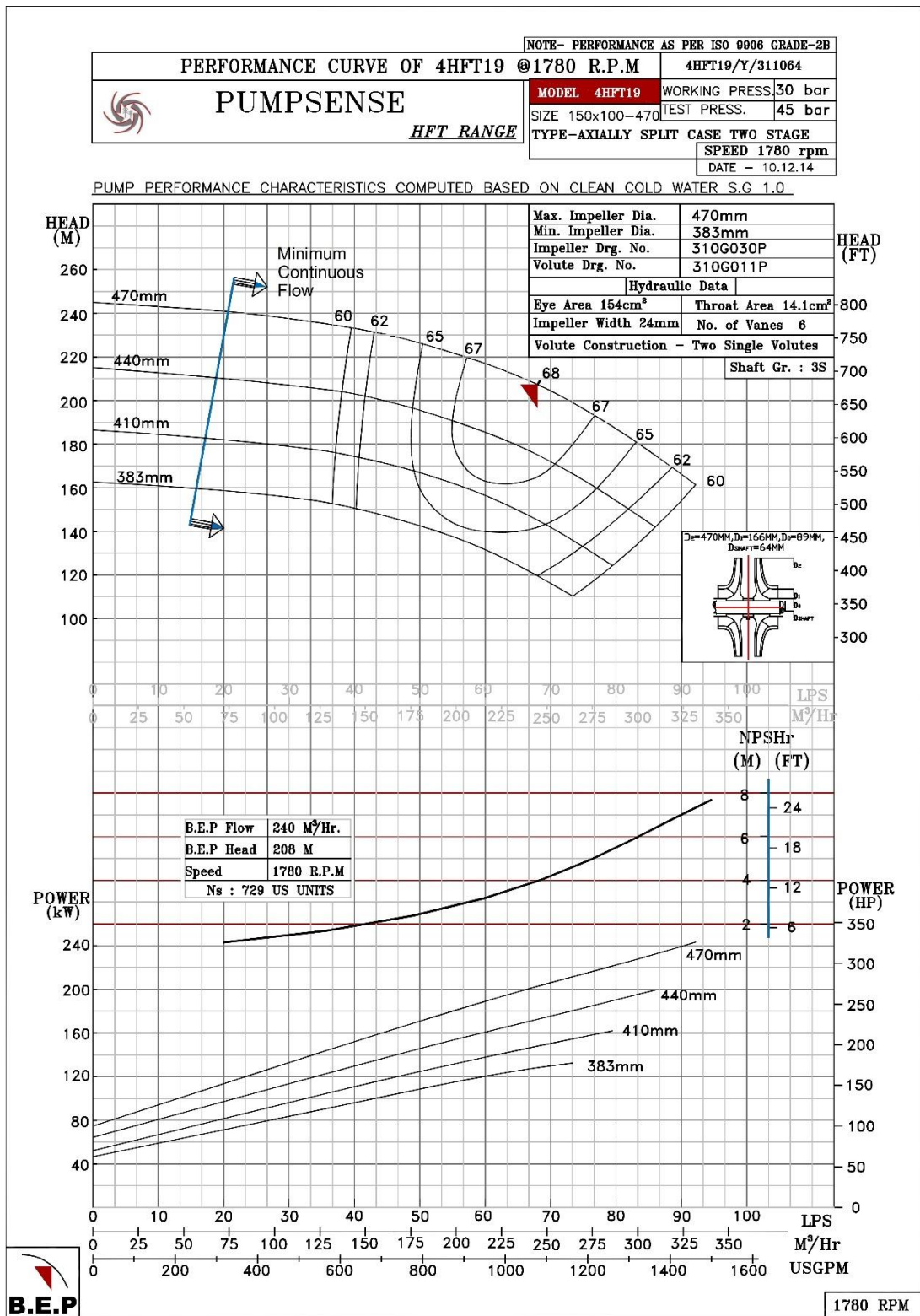







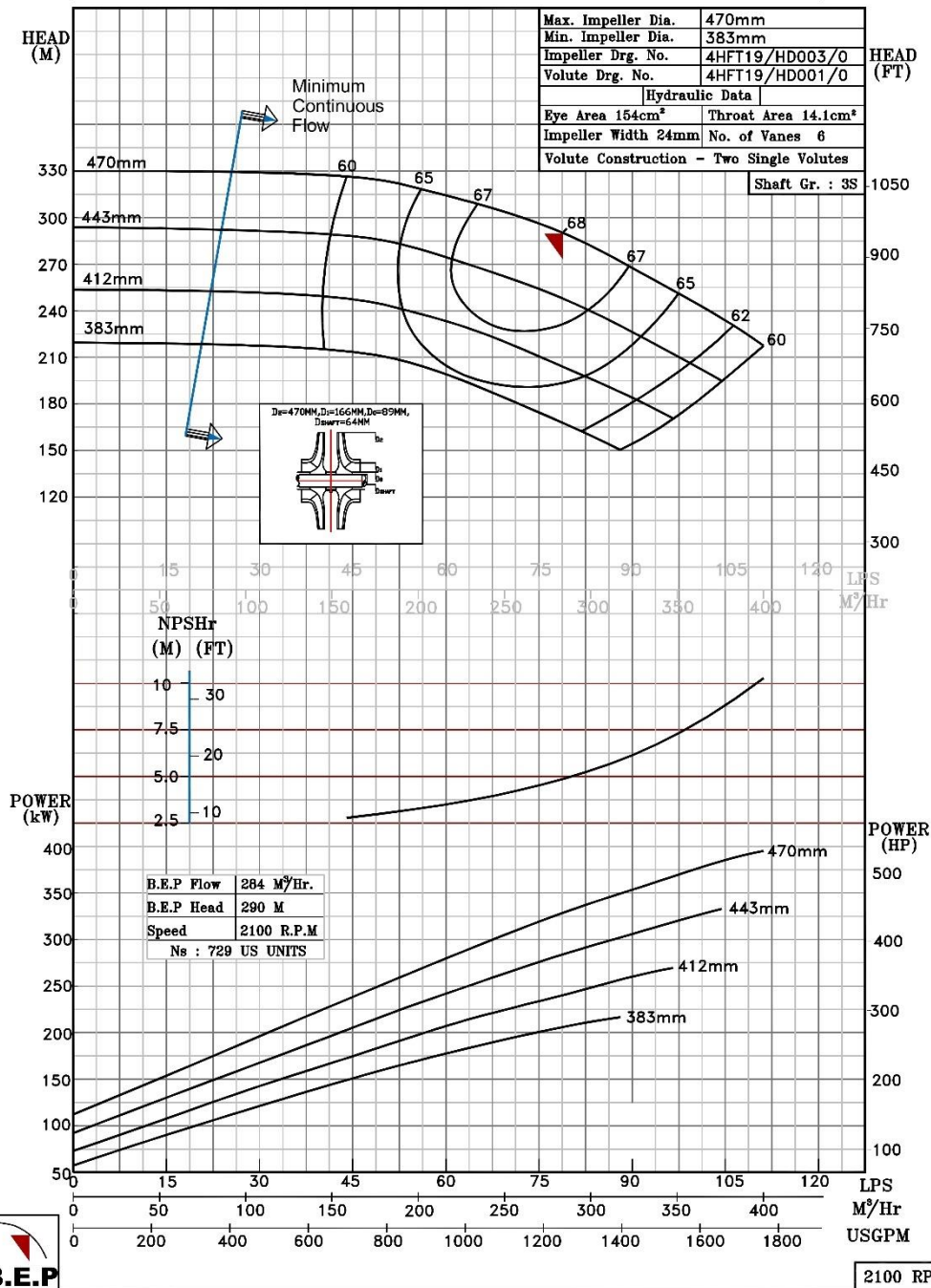







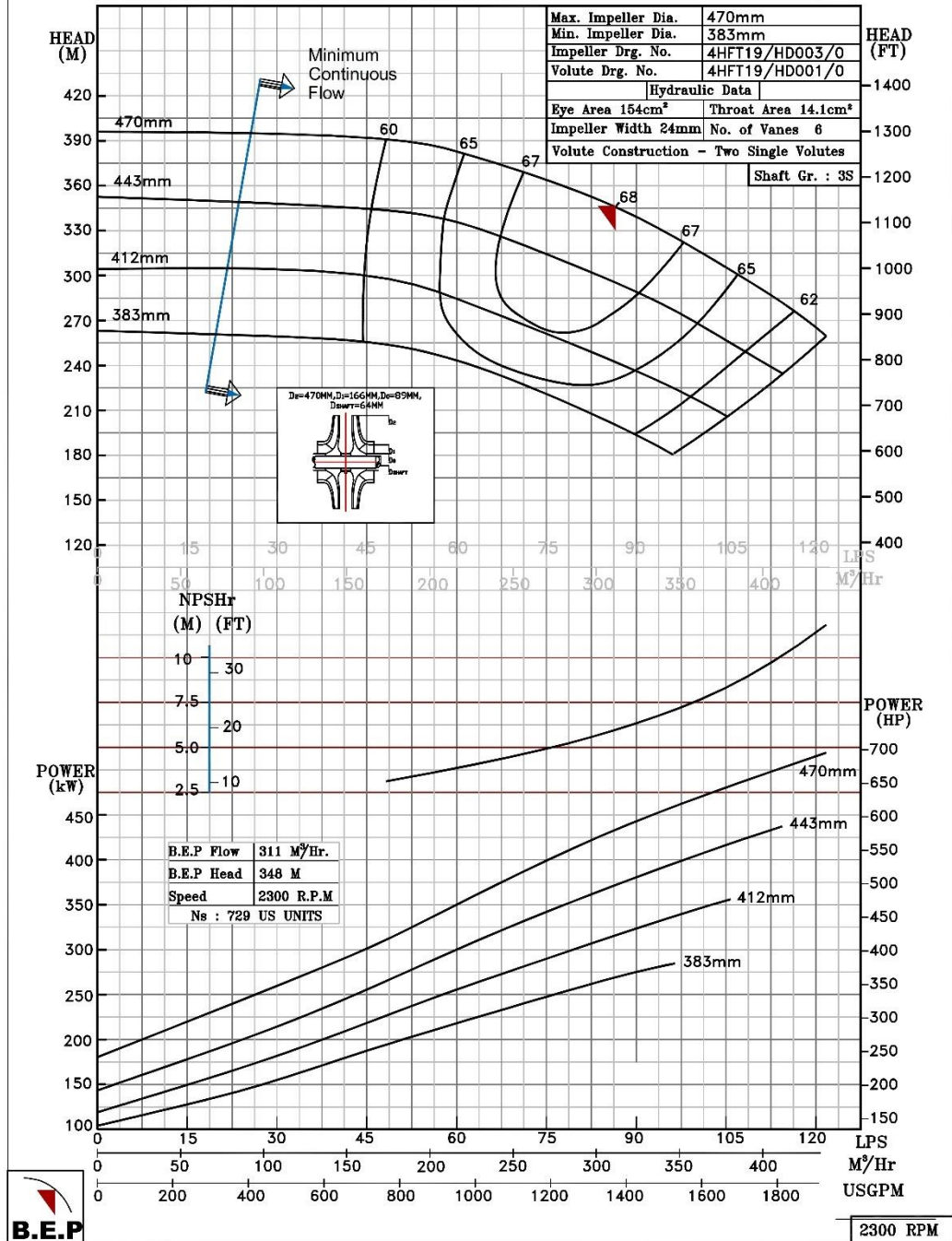
NOTE- PERFORMANCE AS PER ISO 9906 GRADE-2B	
PERFORMANCE CURVE OF 4HFT19 @2100 R.P.M	
4HFT19/Y/0111	
 <b>PUMPSENSE</b> HFT RANGE	MODEL 4HFT19
	WORKING PRESS. 30 bar
	TEST PRESS. 45 bar
SIZE 150x100-470	TYPE-AXIALLY SPLIT CASE TWO STAGE
SPEED 2100 rpm	

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0




NOTE- PERFORMANCE AS PER ISO 9906 GRADE-2B	
PERFORMANCE CURVE OF 4HFT19 @2300 R.P.M	
4HFT19/Y/0111	
 <b>PUMPSENSE</b> <i>HFT RANGE</i>	MODEL 4HFT19
	WORKING PRESS. 30 bar
	TEST PRESS. 45 bar
SIZE 150x100-470	TYPE-AXIALLY SPLIT CASE TWO STAGE
SPEED 2300 rpm	

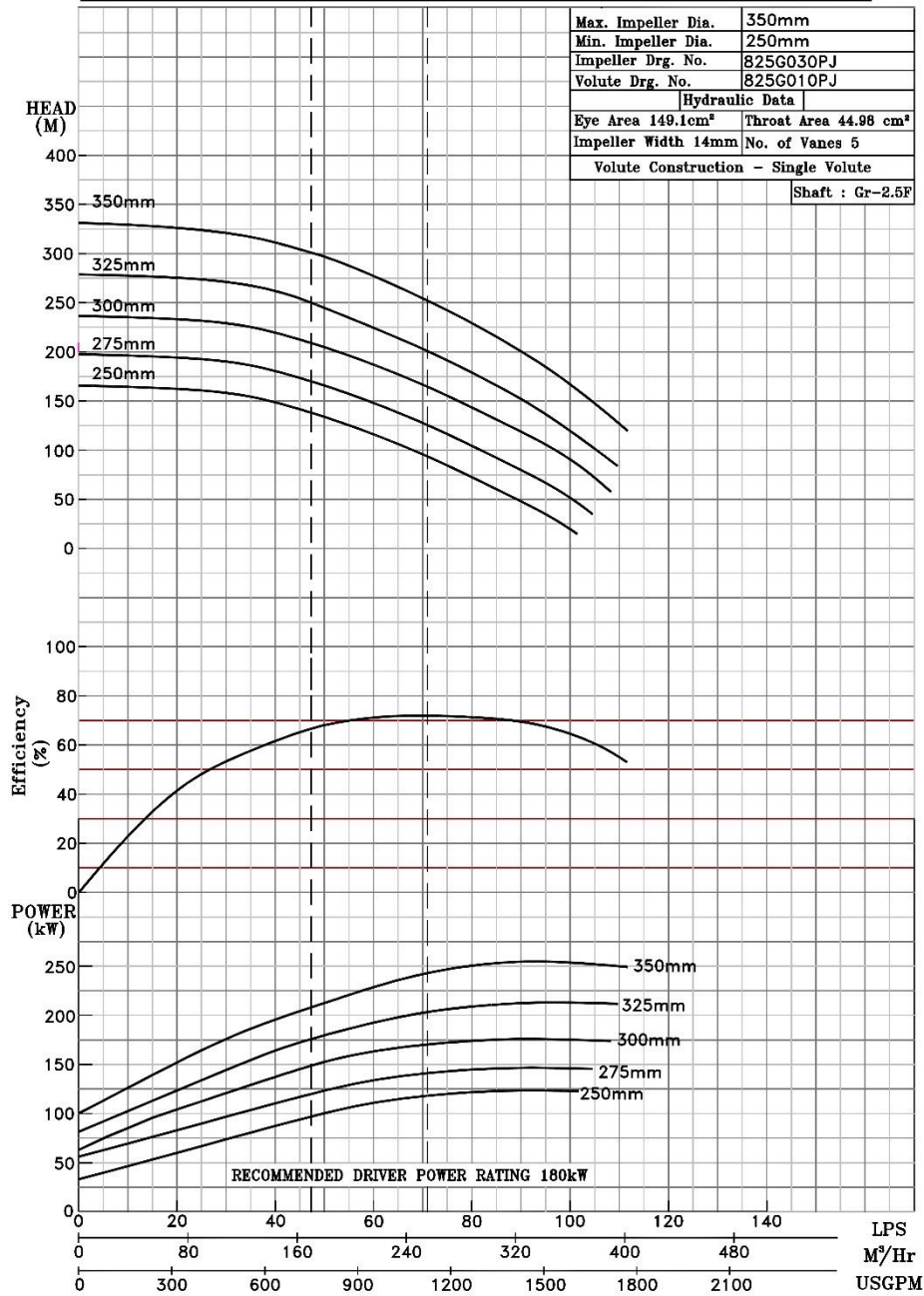
PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0





<b>PERFORMANCE CURVE OF 4HFTD13 @2950 R.P.M</b>  <b>PUMPSENSE</b> <i>HF RANGE</i>		NOTE- PERFORMANCE AS PER ISO 9906 GRADE-2B 4HFTD13/Y/002552 MODEL 4HFTD13 WORKING PRESS. 20 bar SIZE 150x100-350 TEST PRESS. 30 bar TYPE-AXIALLY SPLIT CASE SINGLE STAGE SPEED 2950 rpm DATE - 01.01.19
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PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0



2950 RPM

**UL LISTED**

**FM APPROVED**

TEST CURVE OF 5HF11 @2600 R.P.M

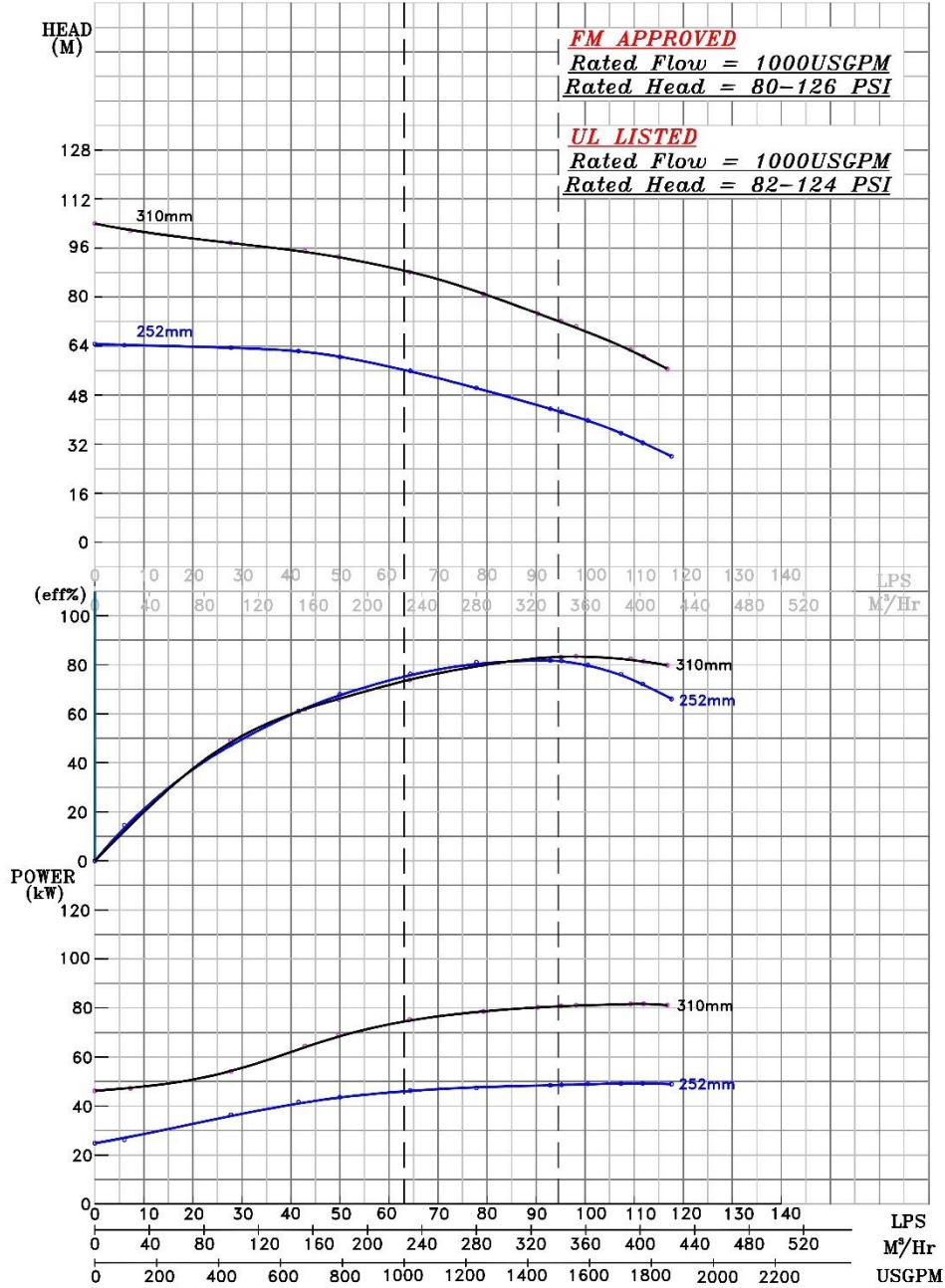


**PUMPSENSE**

**HF RANGE**

TYPE-AXIALLY SPLIT CASE SINGLE STAGE

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0



**UL LISTED**

**FM APPROVED**

TEST CURVE OF 5HF11 @2800 R.P.M

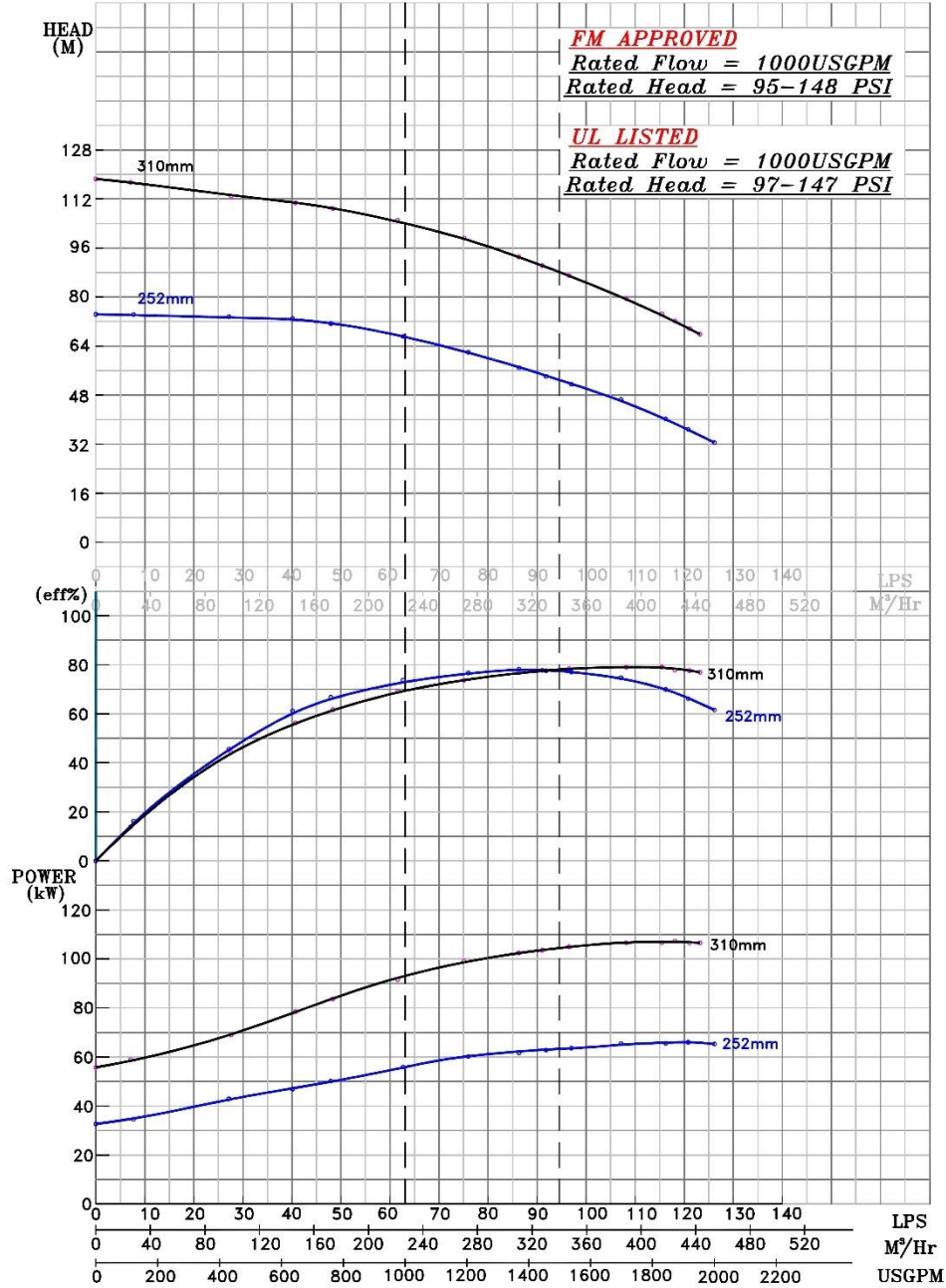


**PUMPSENSE**

**HF RANGE**

TYPE-AXIALLY SPLIT CASE SINGLE STAGE

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0



**UL LISTED**

**FM APPROVED**

TEST CURVE OF 5HF11 @2950 R.P.M

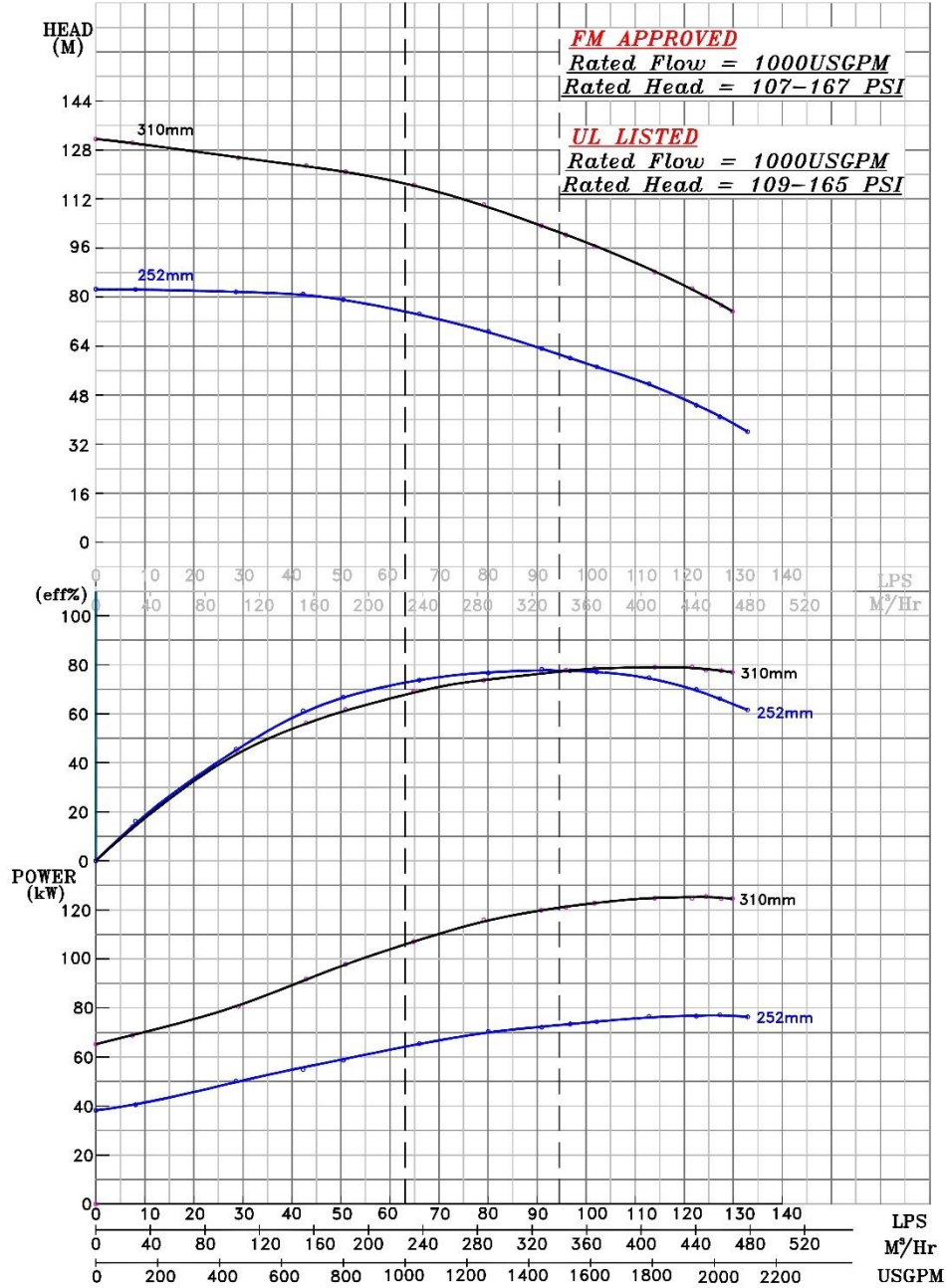


**PUMPSENSE**

**HF RANGE**

TYPE-AXIALLY SPLIT CASE SINGLE STAGE

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0



**UL LISTED**

**FM APPROVED**

PERFORMANCE CURVE OF 5HF11 @3000 R.P.M

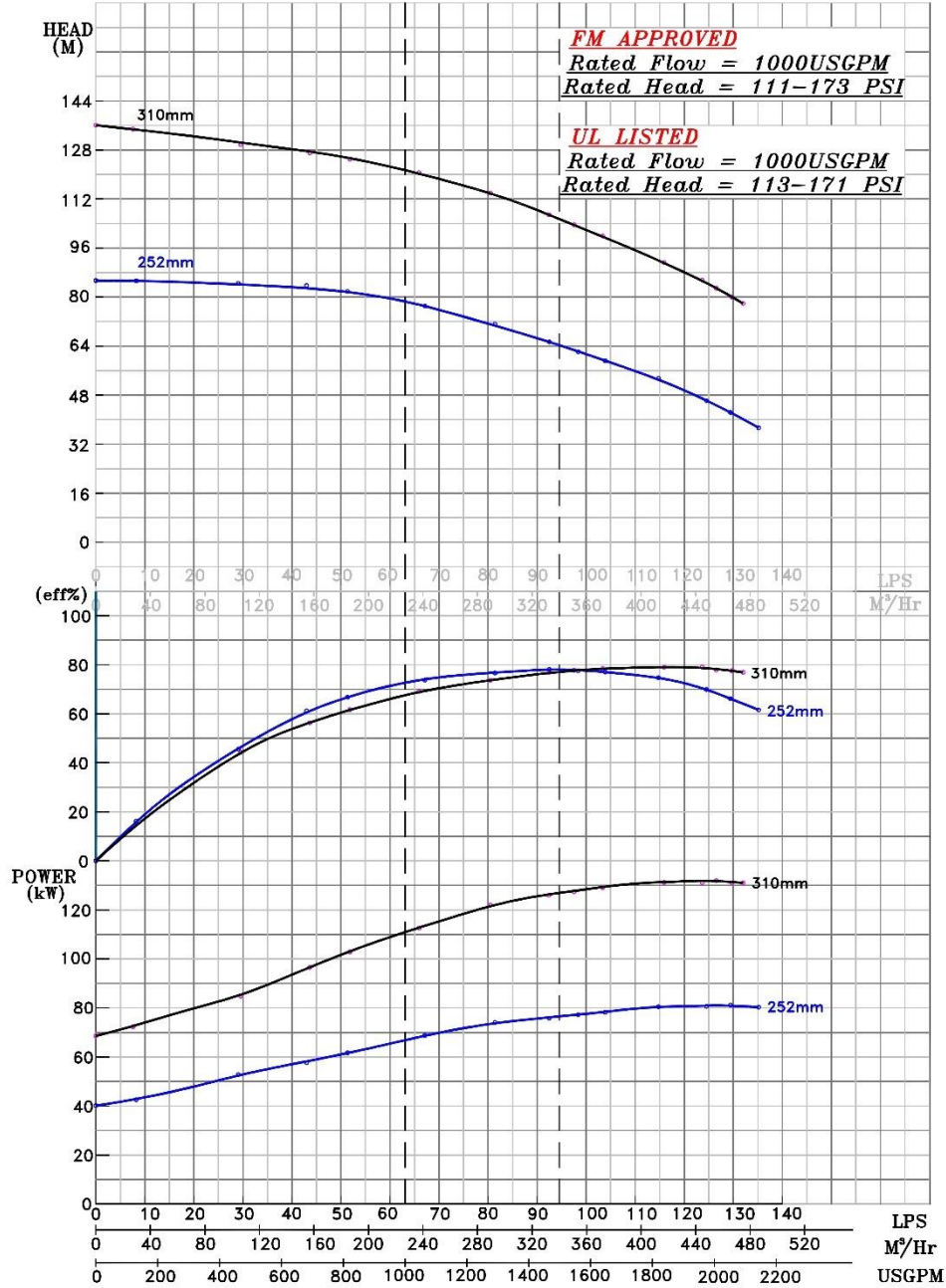


**PUMPSENSE**

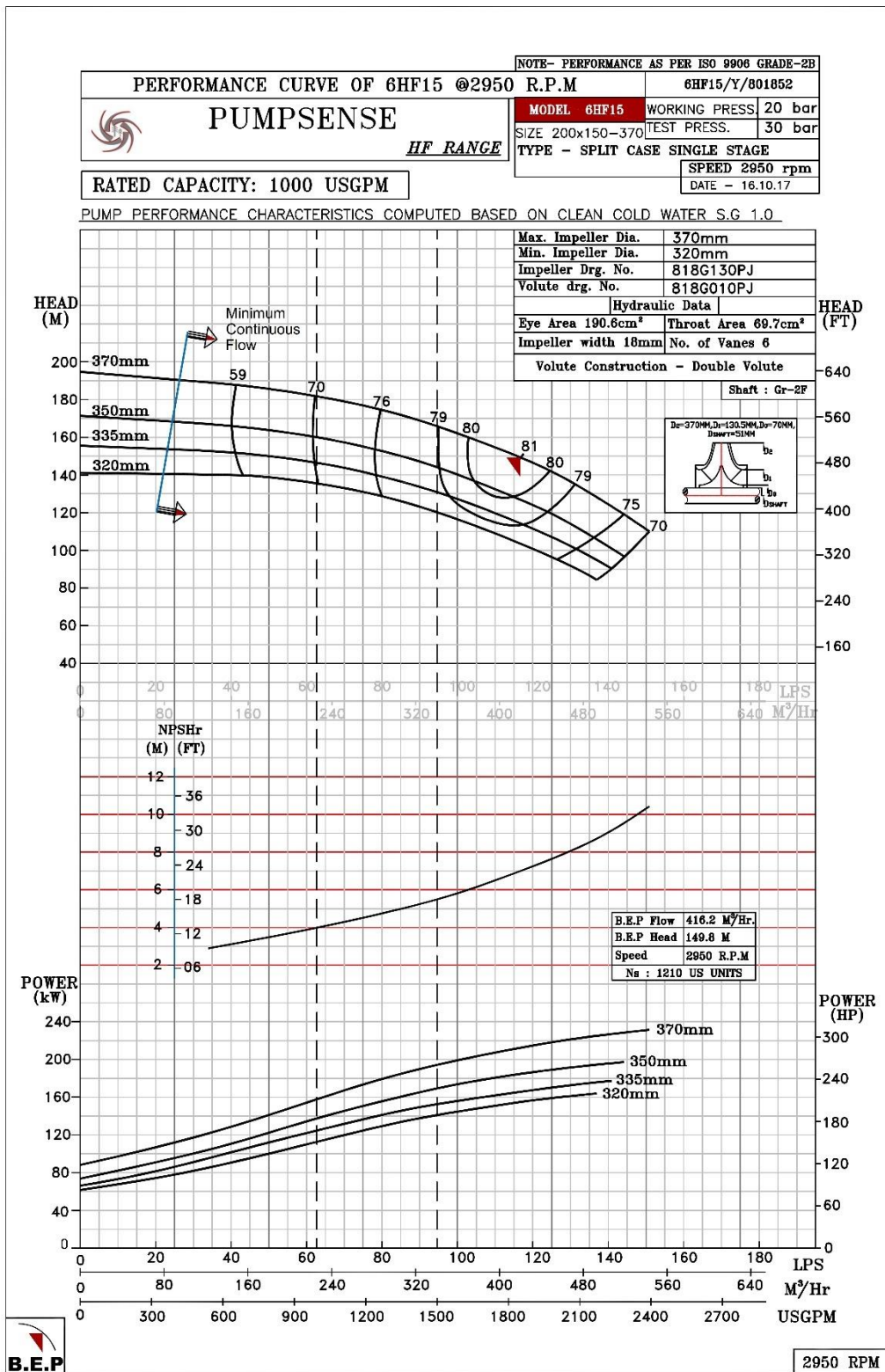
**HF RANGE**

TYPE-AXIALLY SPLIT CASE SINGLE STAGE

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0





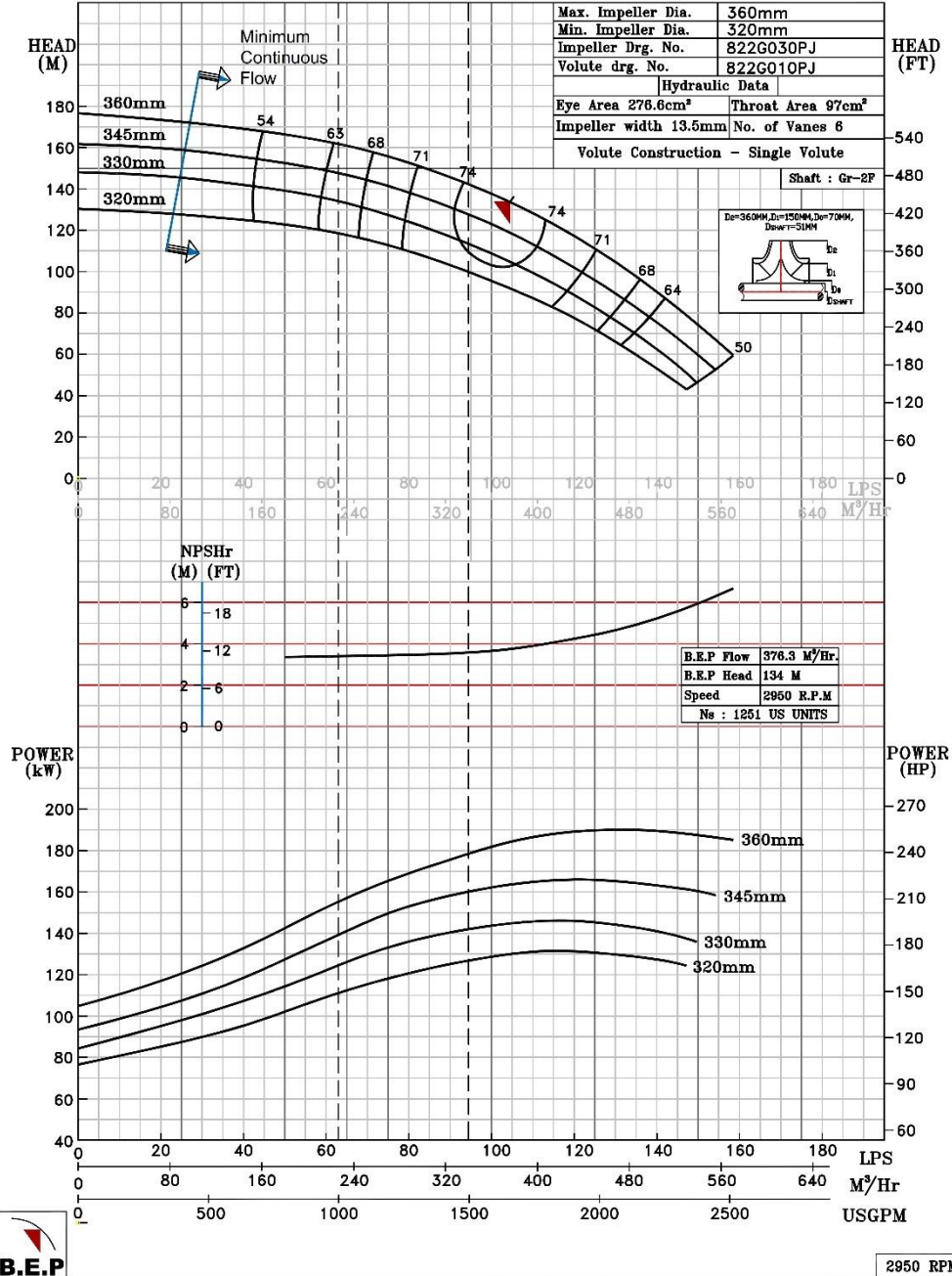


UL LISTED

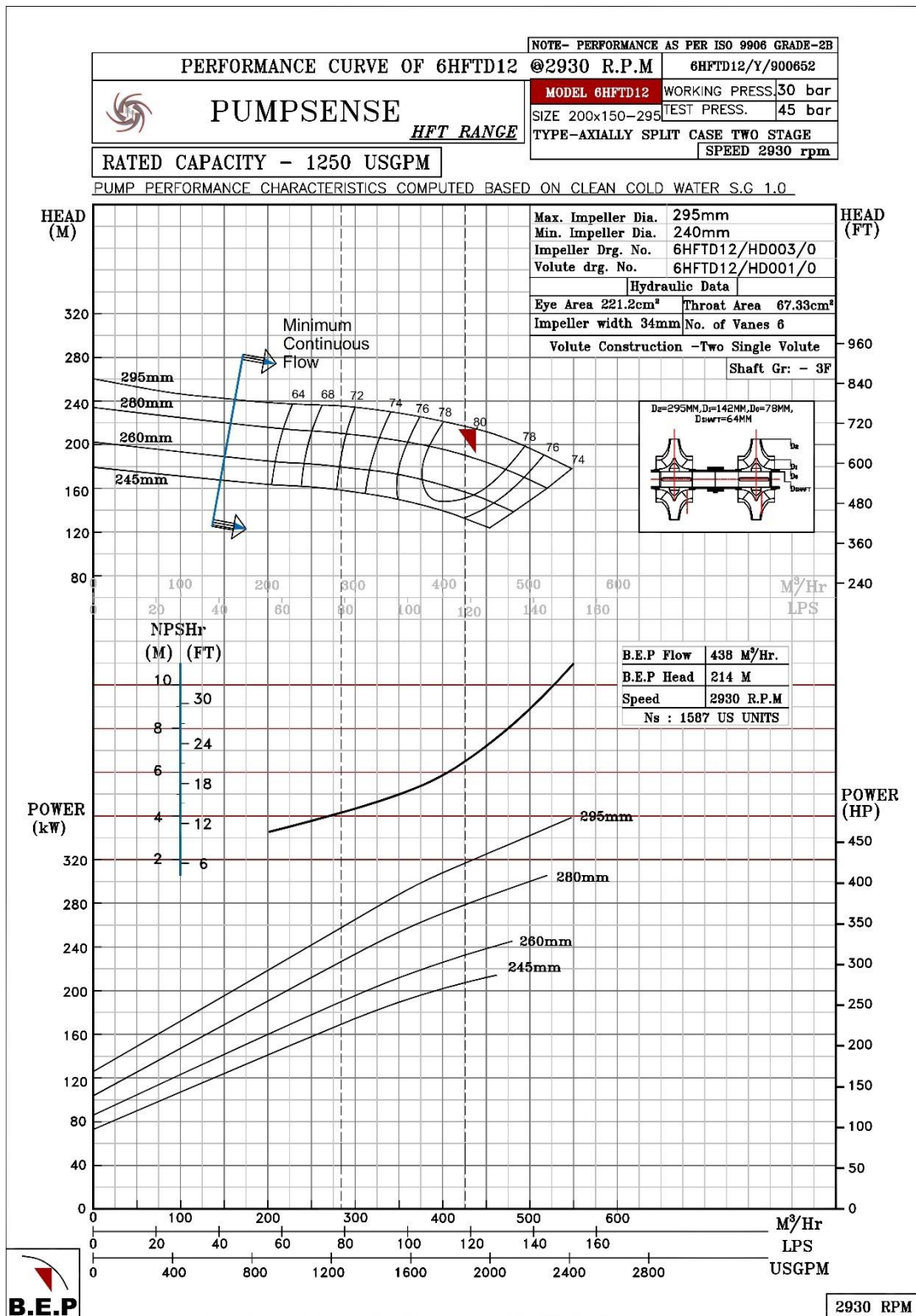
NOTE- PERFORMANCE AS PER ISO 9906 GRADE-2B

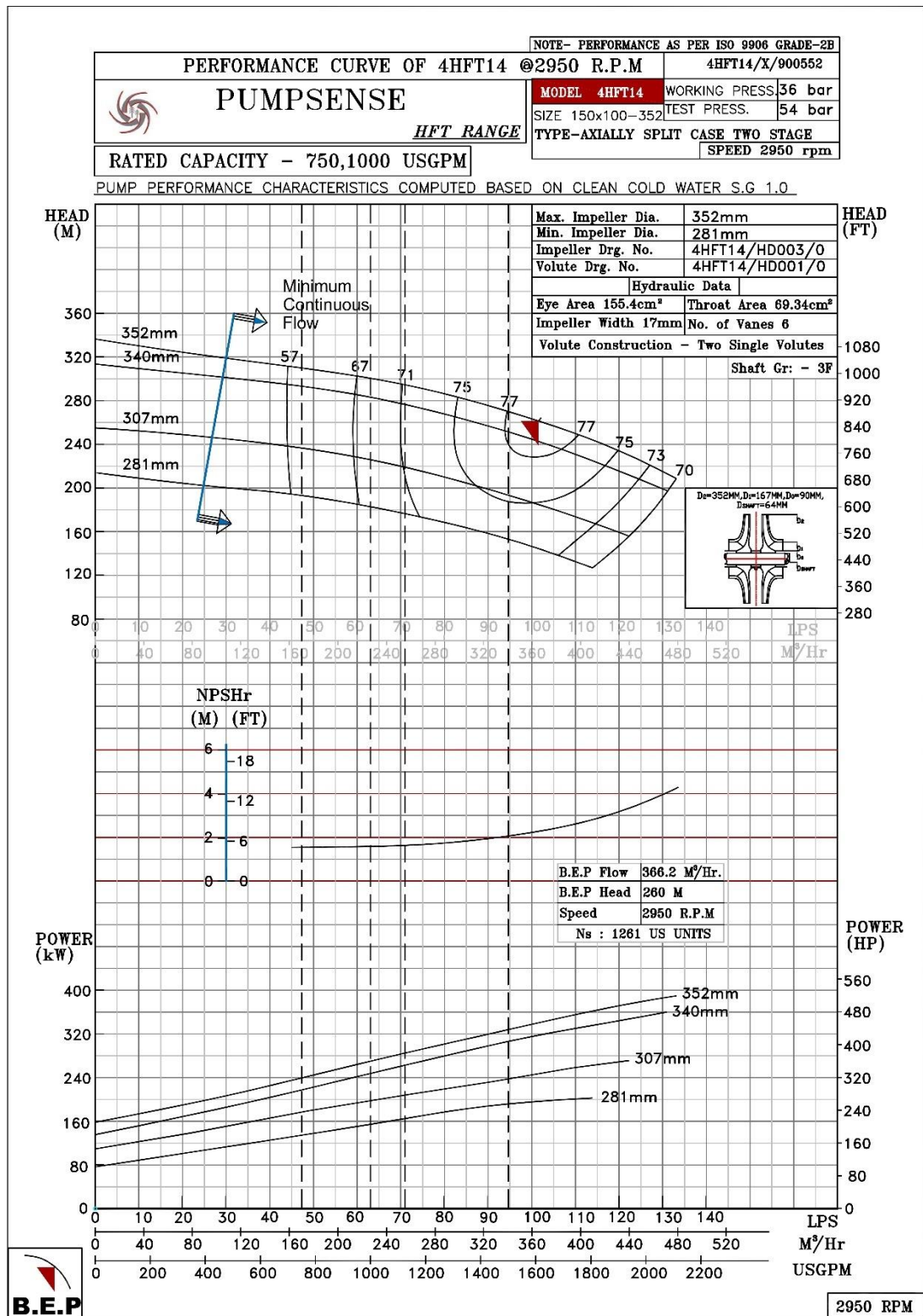
PERFORMANCE CURVE OF 6HF14K @2950 R.P.M			6HF14K/Y/0111	
 <div>PUMPSENSE</div> <div>HF RANGE</div>	MODEL	6HF14K	WORKING PRESS	20 bar
	SIZE	150x100-360	TEST PRESS.	30 bar
	TYPE - SPLIT CASE SINGLE STAGE			
	SPEED 2950 rpm			

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0









UL LISTED

NOTE- PERFORMANCE AS PER ISO 9906 GRADE-2B

PERFORMANCE CURVE OF 6HF12 @3000 R.P.M

6HF12/Y/800752



PUMPSENSE

HF RANGE

SIZE 200x150-305

WORKING PRESS. 18 bar

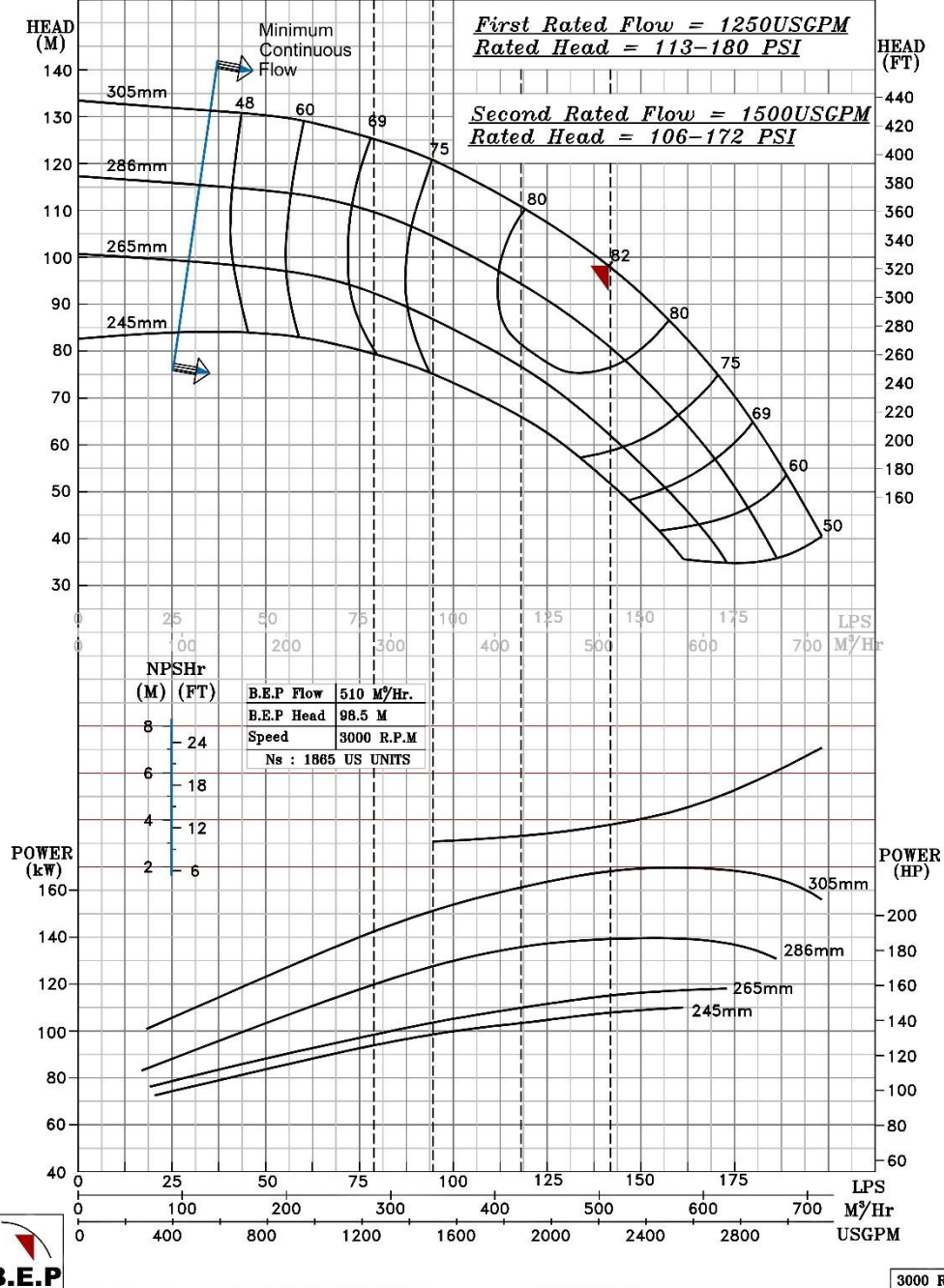
TEST PRESS. 27 bar

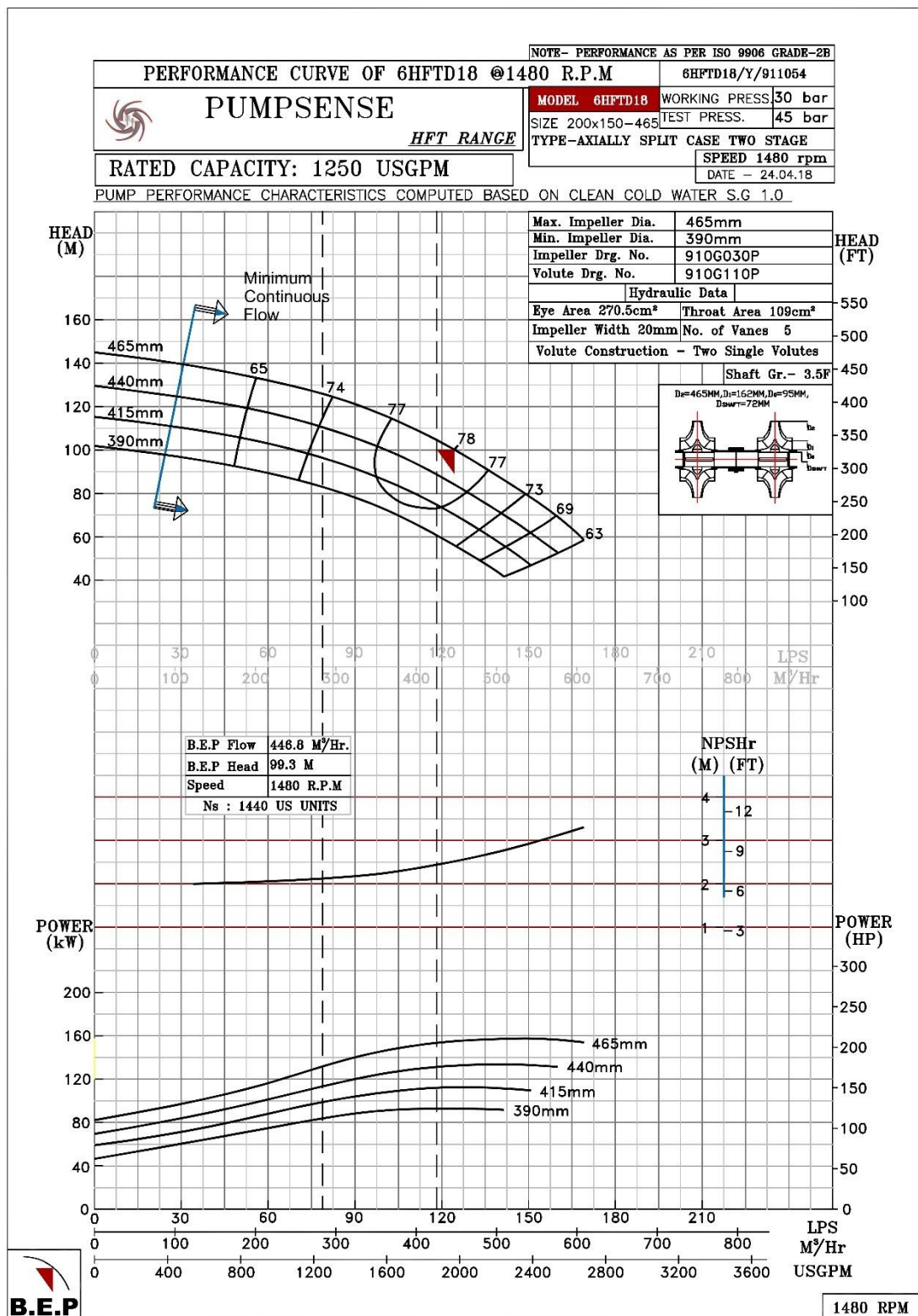
TYPE-AXIALLY SPLIT CASE SINGLE STAGE

SPEED 3000 rpm

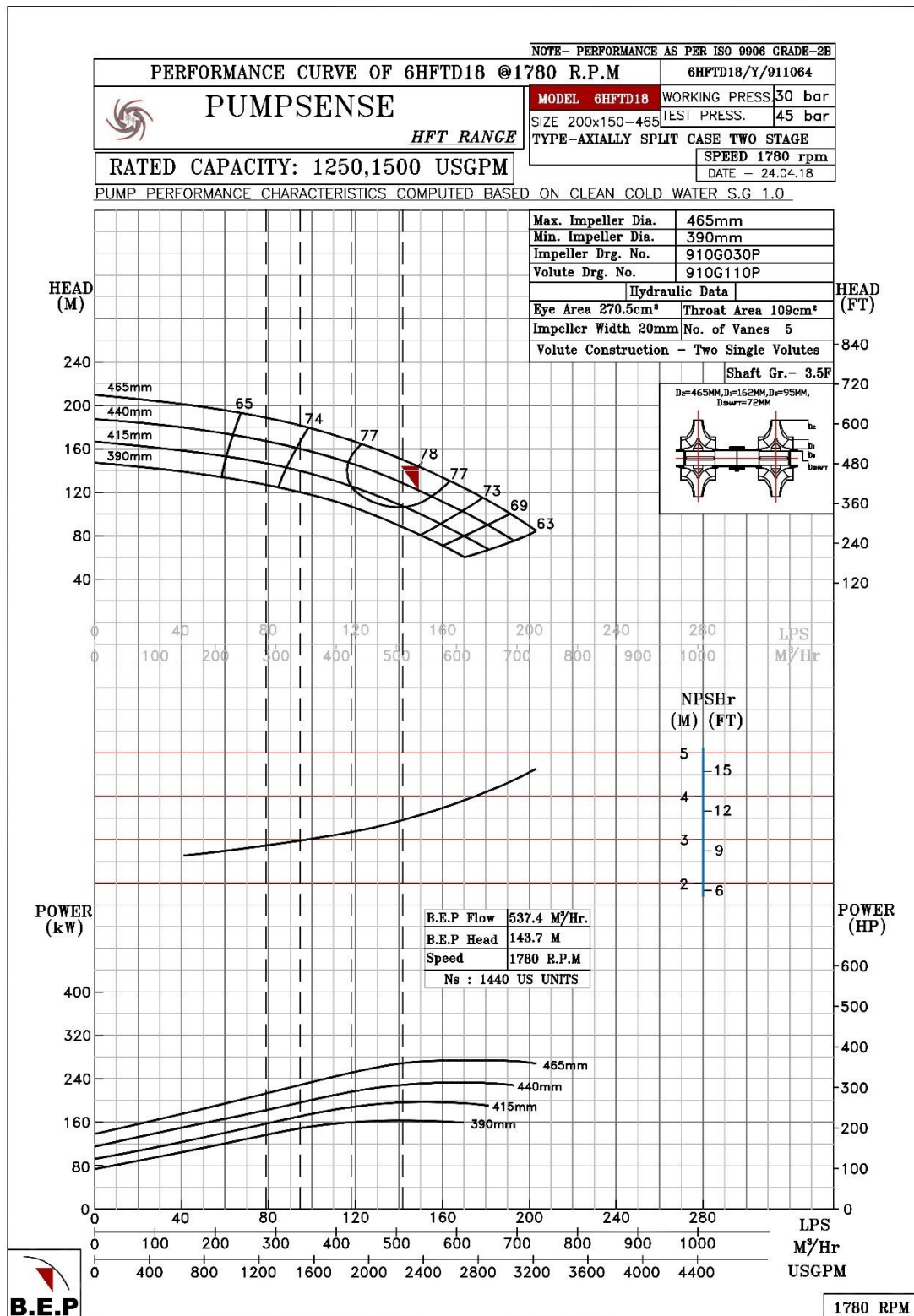
DATE - 01.12.18

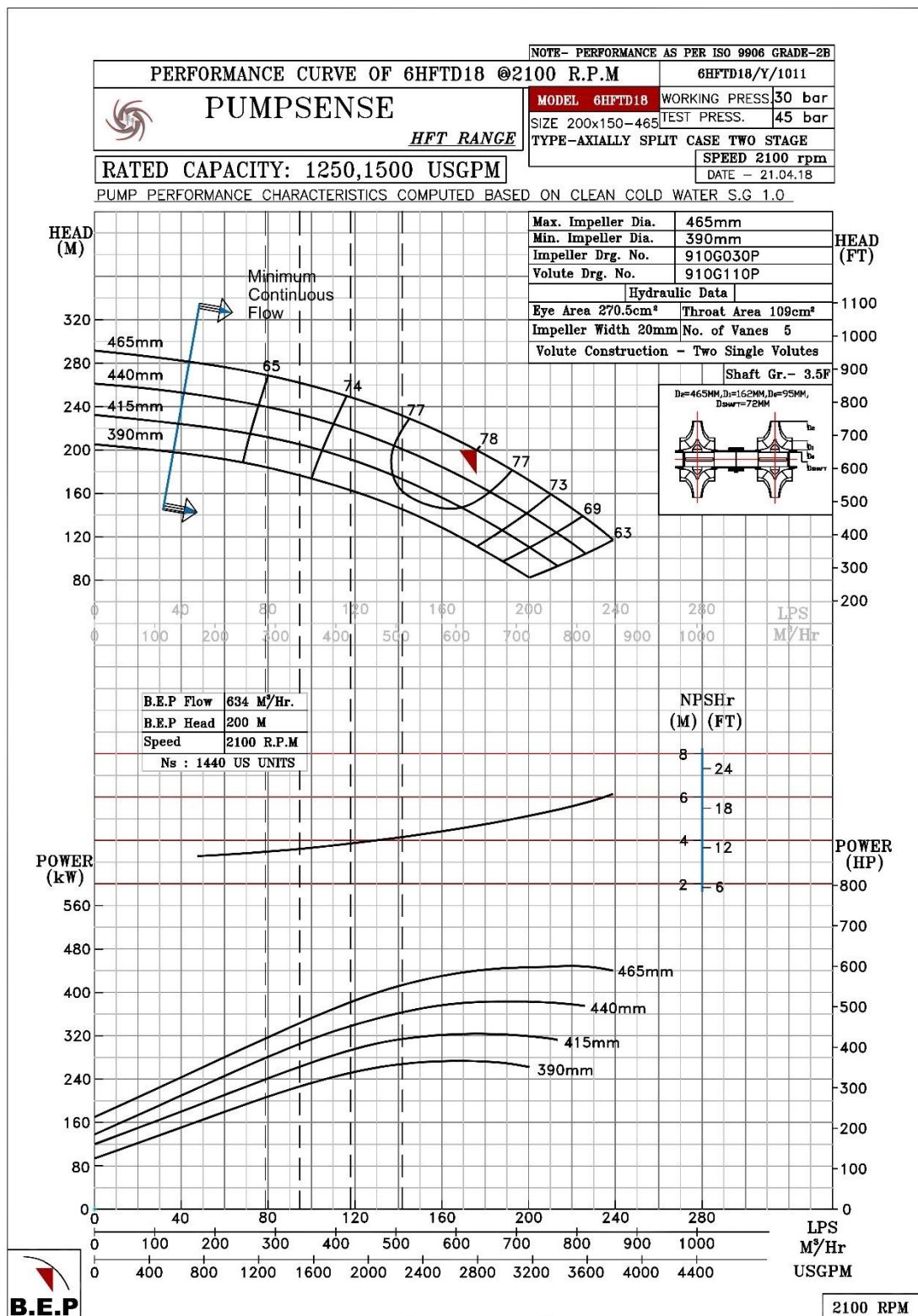
PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G. 1.0

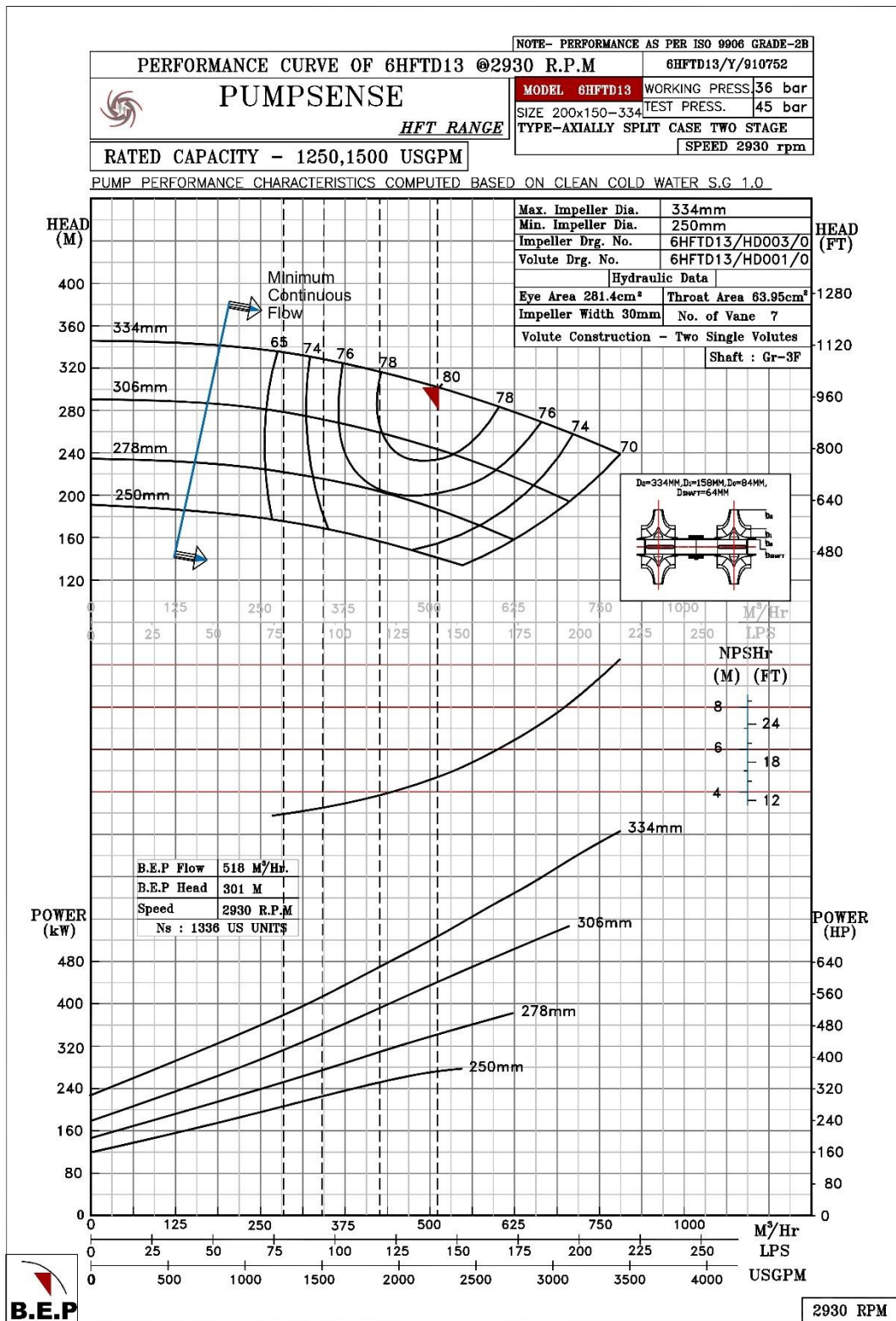














UL LISTED

FM APPROVED

TEST CURVE OF 8HF13 @2800 R.P.M

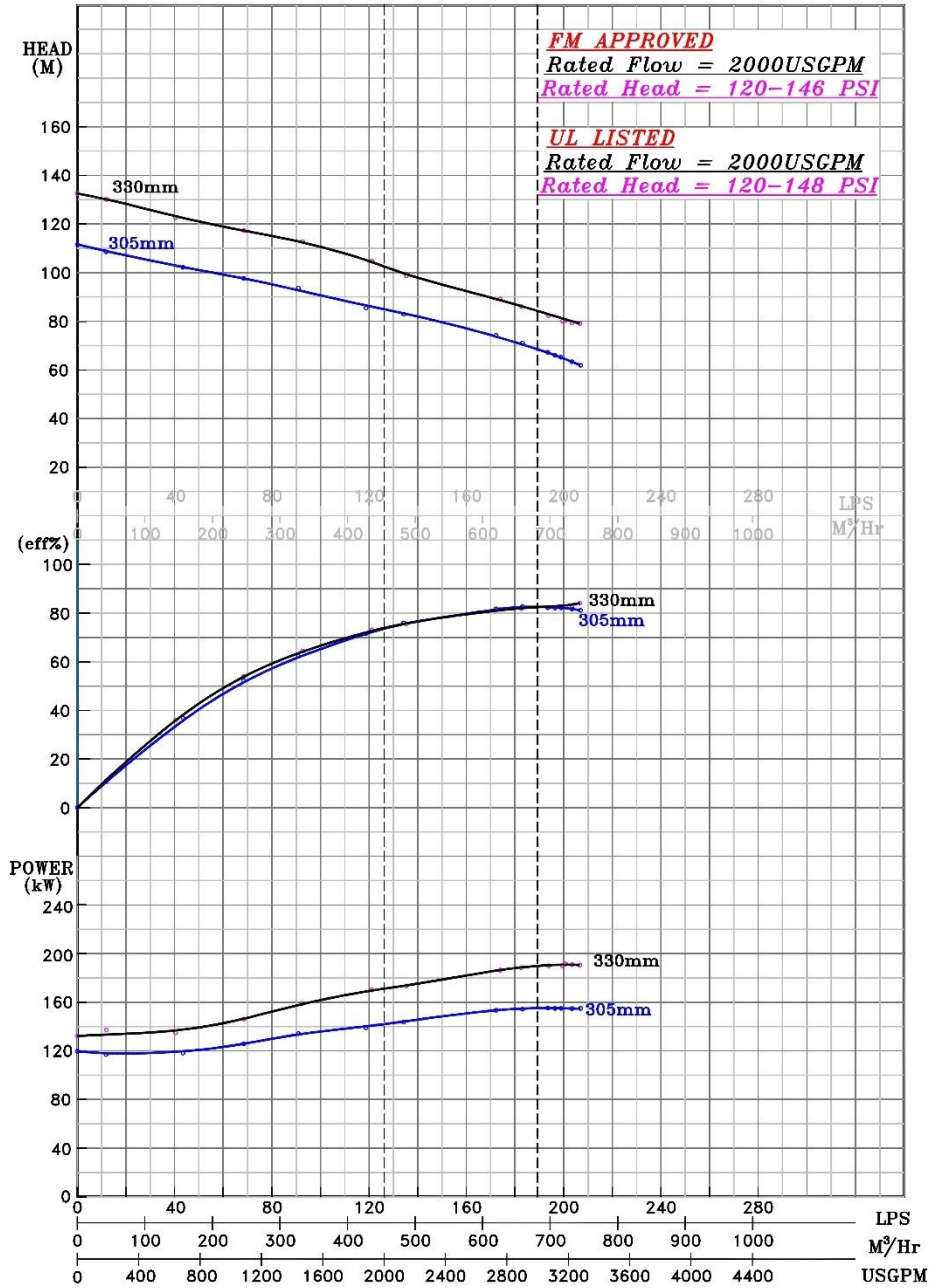


**PUMPSENSE**

HF RANGE

TYPE-AXIALLY SPLIT CASE SINGLE STAGE

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0



UL LISTED

FM APPROVED

TEST CURVE OF 8HF13 @2950 R.P.M

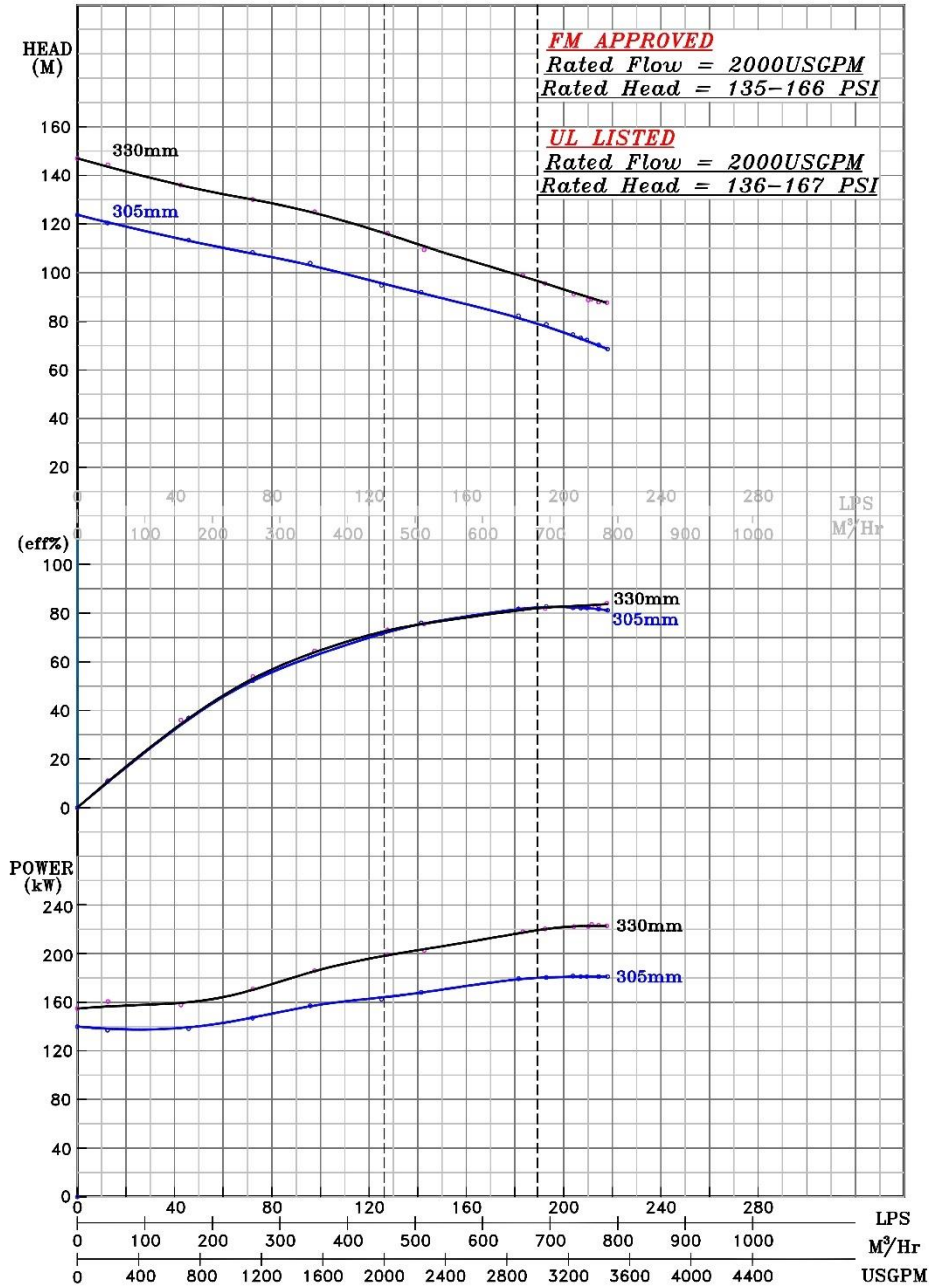


**PUMPSENSE**

HF RANGE

TYPE-AXIALLY SPLIT CASE SINGLE STAGE

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0



UL LISTED

FM APPROVED

TEST CURVE OF 8HF13 @3000 R.P.M

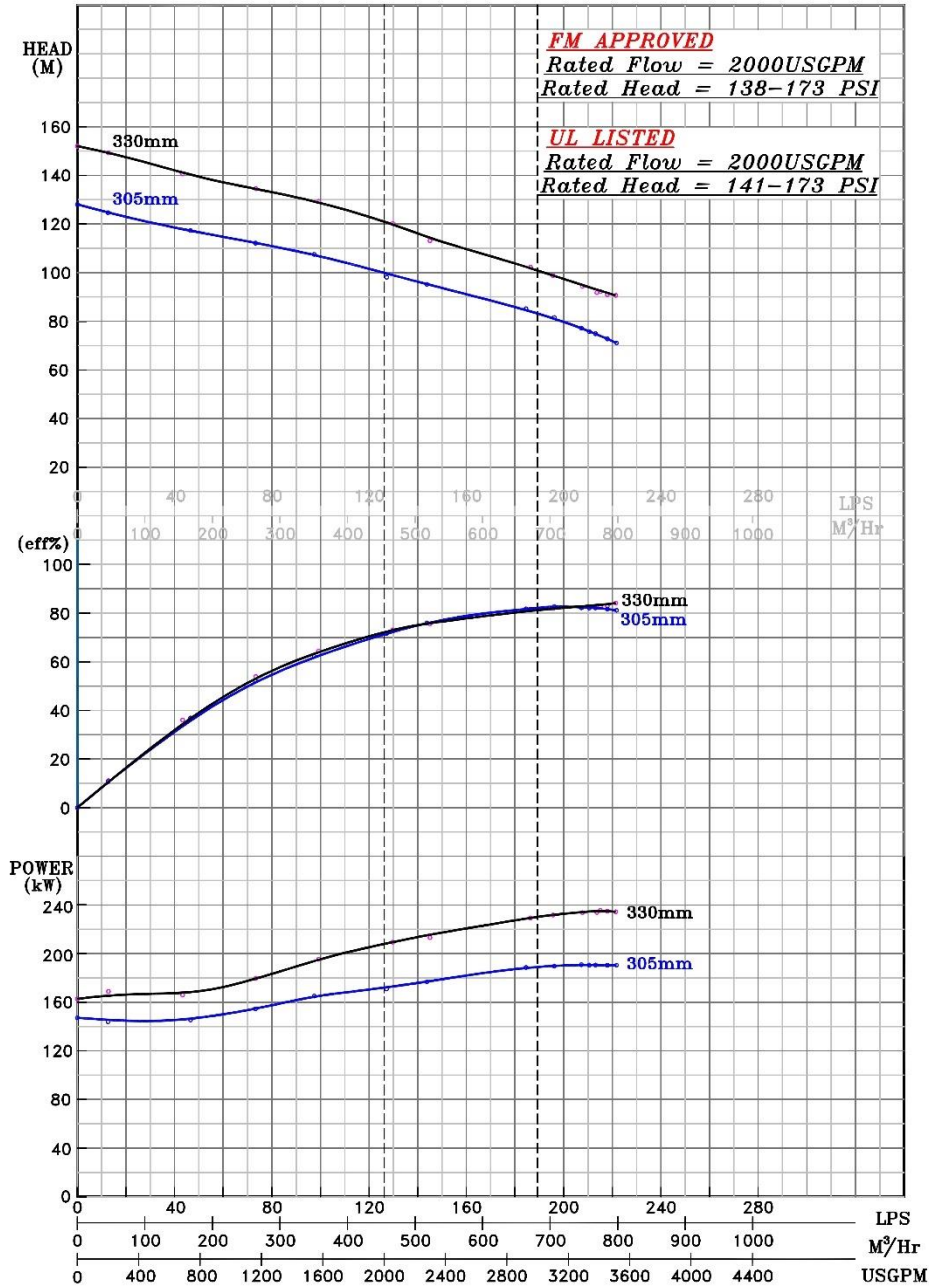


**PUMPSENSE**

HF RANGE

TYPE-AXIALLY SPLIT CASE SINGLE STAGE

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0



**FM APPROVED**

PERFORMANCE CURVE OF 8HF17 @1800 R.P.M

8HF17/Y/801464



**PUMPSENSE**

**HF RANGE**

MODEL 8HF17

WORKING PRESS. 155 PSI

SIZE 250x200-450

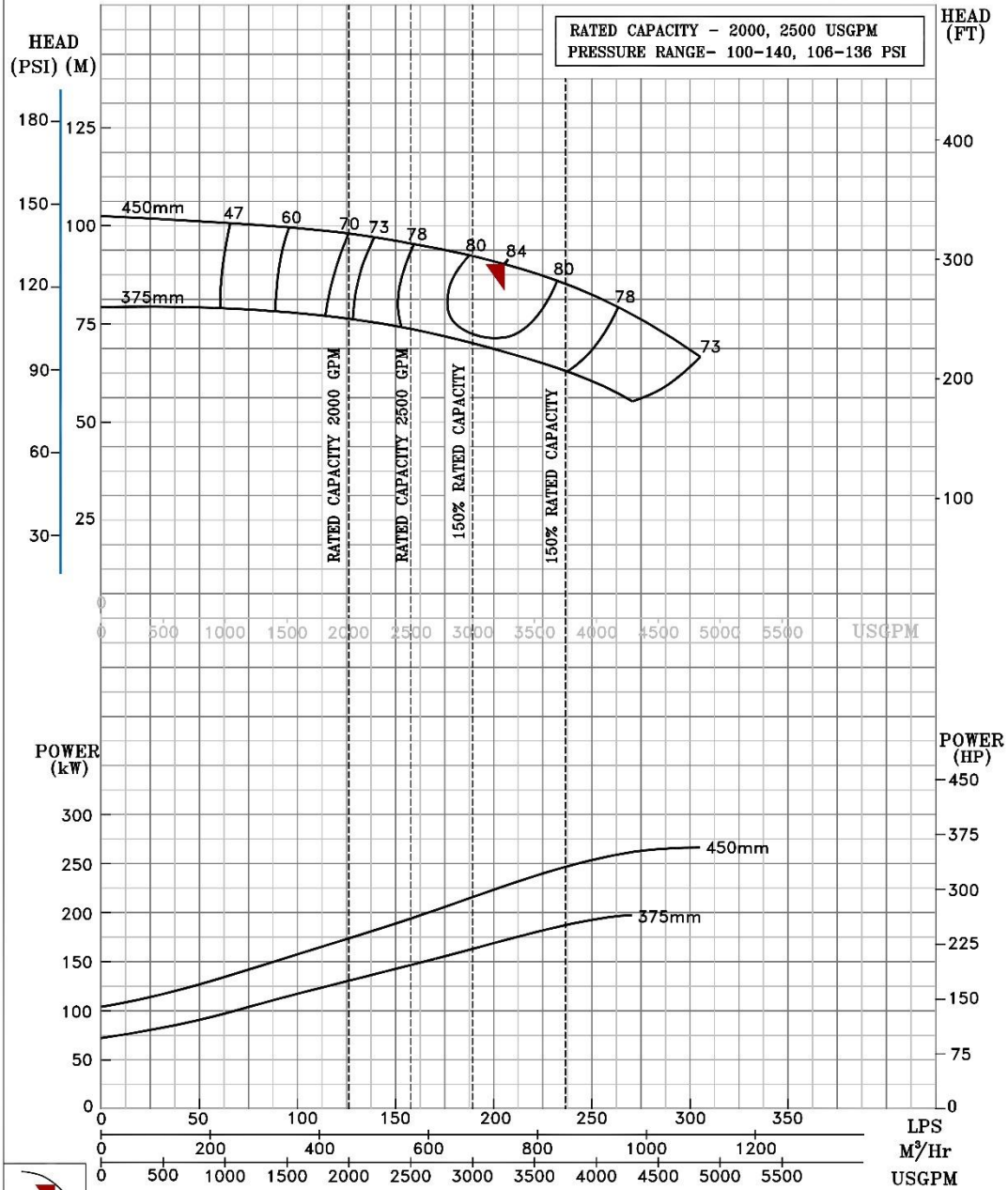
TEST PRESS. 230 PSI

TYPE-AXIALLY SPLIT CASE SINGLE STAGE

SPEED 1800 rpm

RATED CAPACITY - 2000,2500 USGPM-FM APPROVED

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0



1800 RPM

UL LISTED

PREDICTED PERFORMANCE CURVE OF 8HF20 @1800 R.P.M

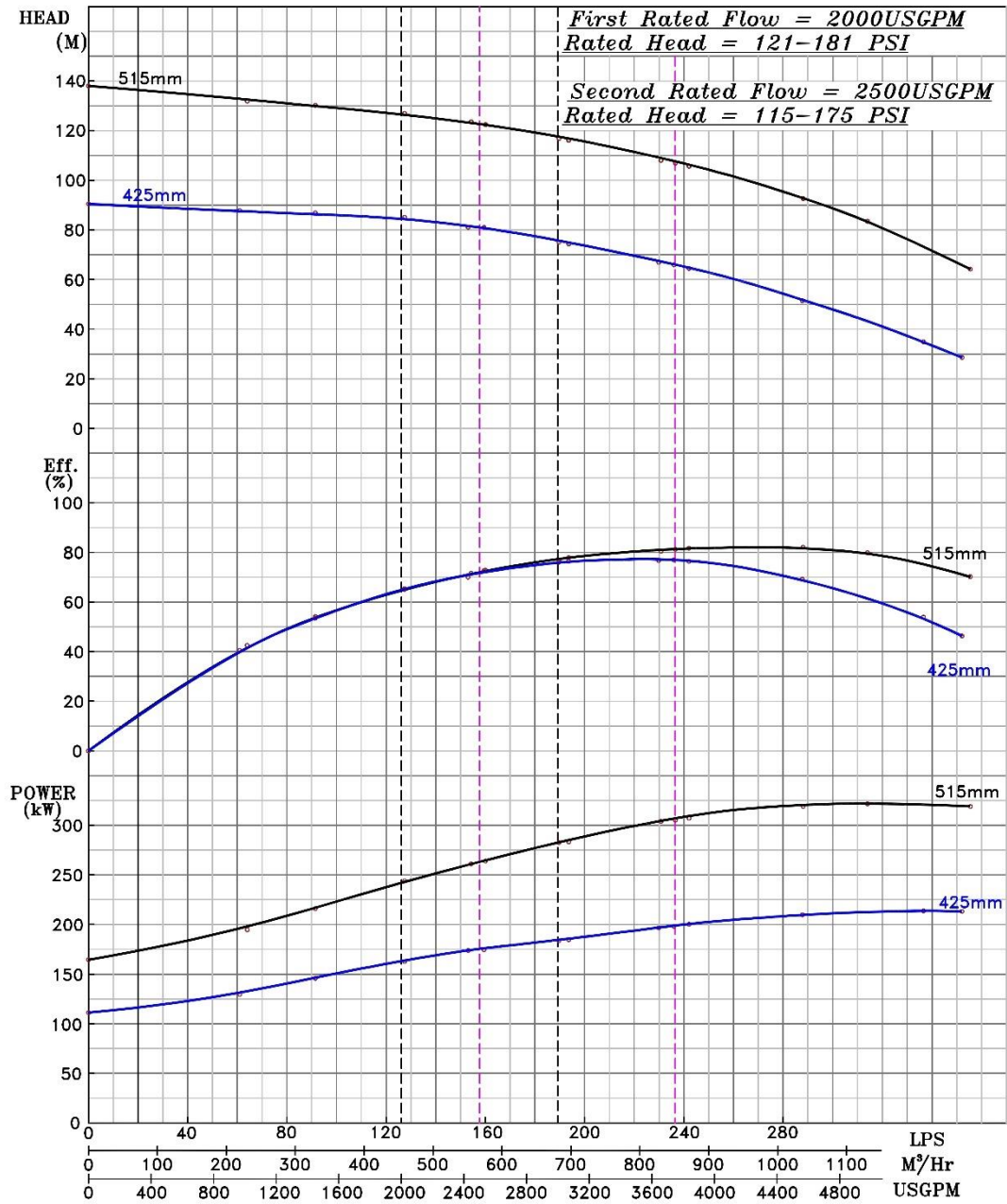


PUMPSENSE

HF RANGE

TYPE-AXIALLY SPLIT CASE SINGLE STAGE

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0





**FM APPROVED**

PERFORMANCE CURVE OF 8HF21 @1480 R.P.M

8HF21/Y/801554



**PUMPSENSE**

HF RANGE

MODEL 8HF21

WORKING PRESS. 140 PSI

SIZE 250x200-520

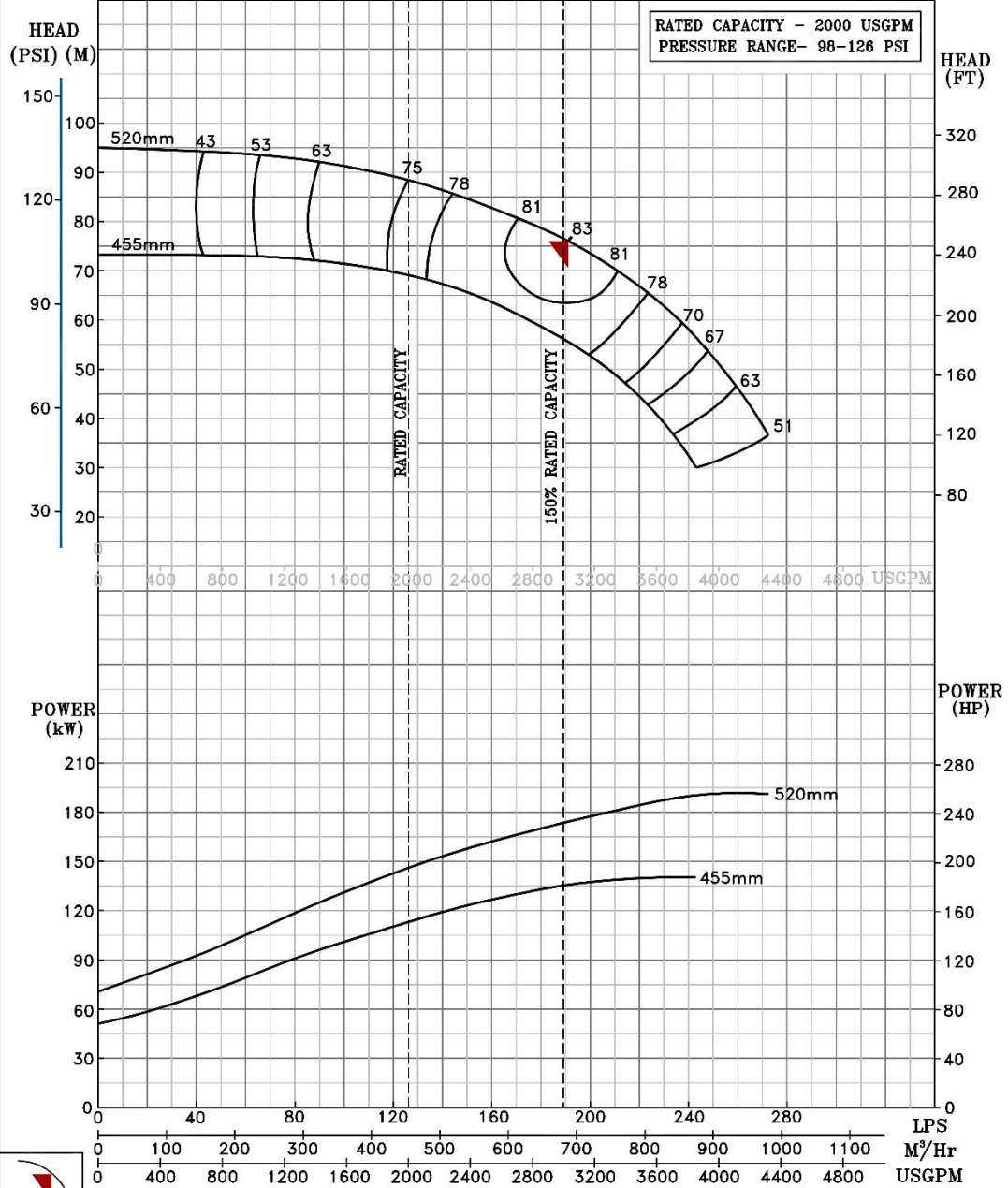
TEST PRESS. 215 PSI

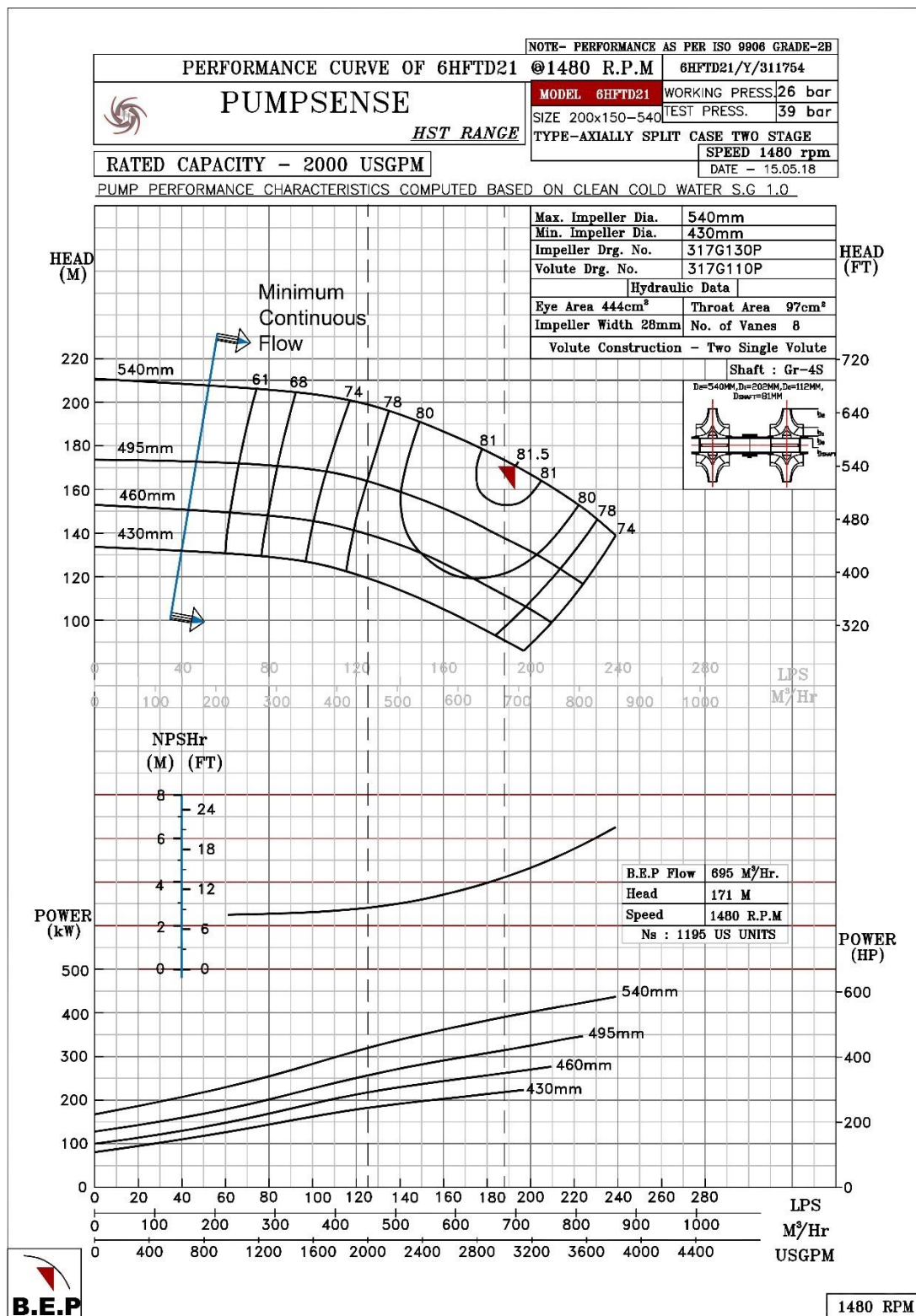
TYPE-AXIALLY SPLIT CASE SINGLE STAGE

SPEED 1480 rpm

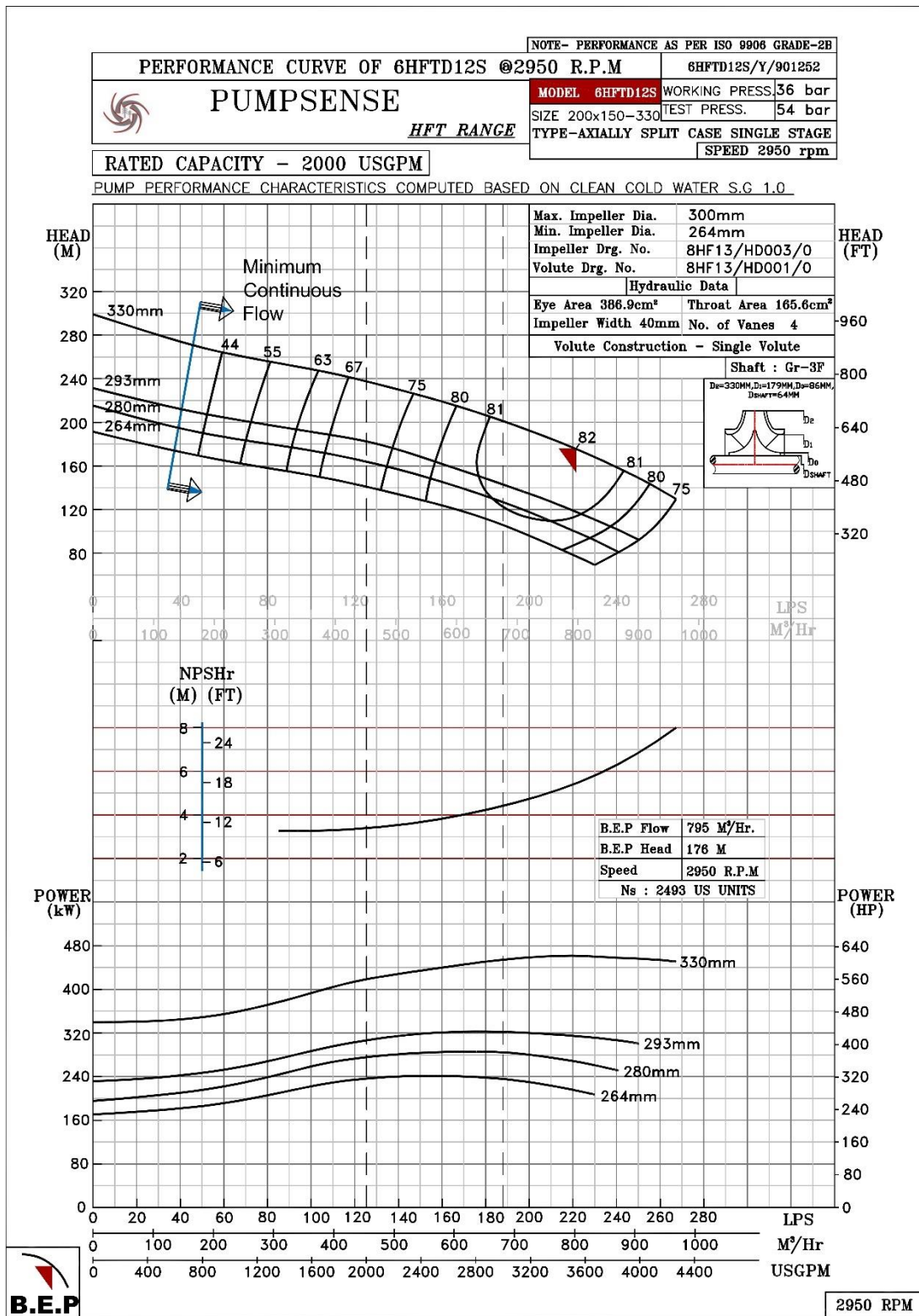
RATED CAPACITY - 2000 USGPM-FM APPROVED

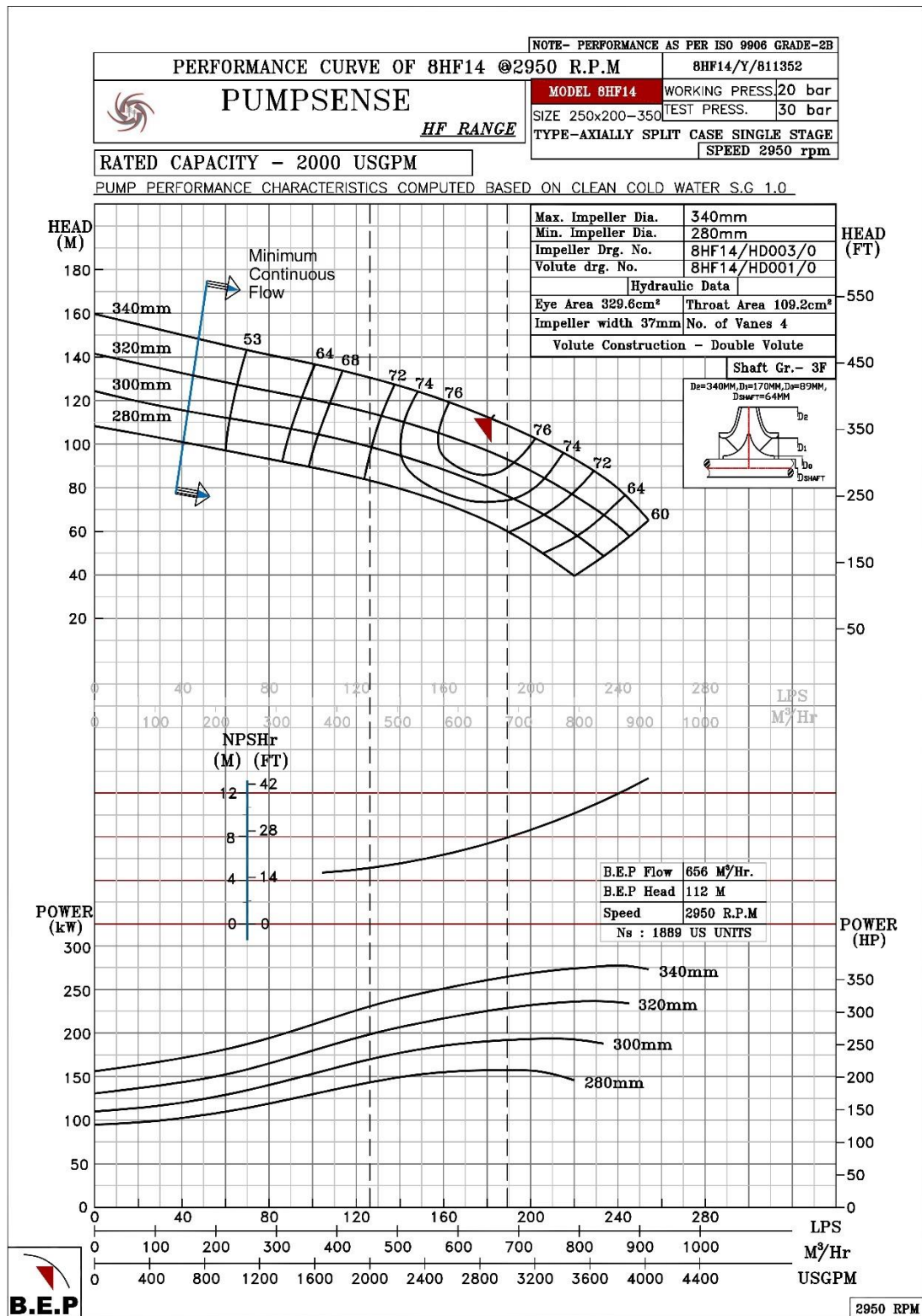
PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G. 1.0

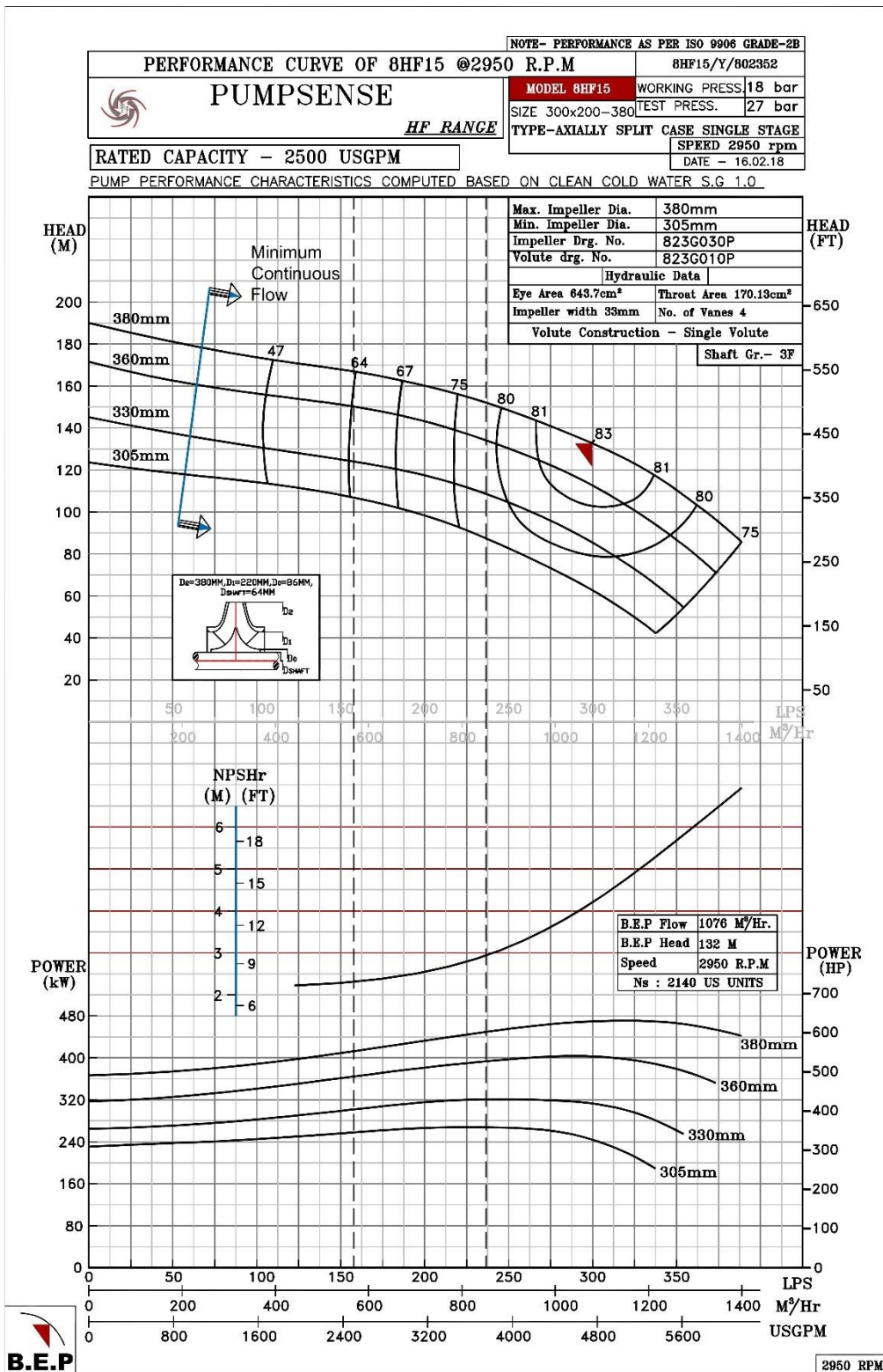


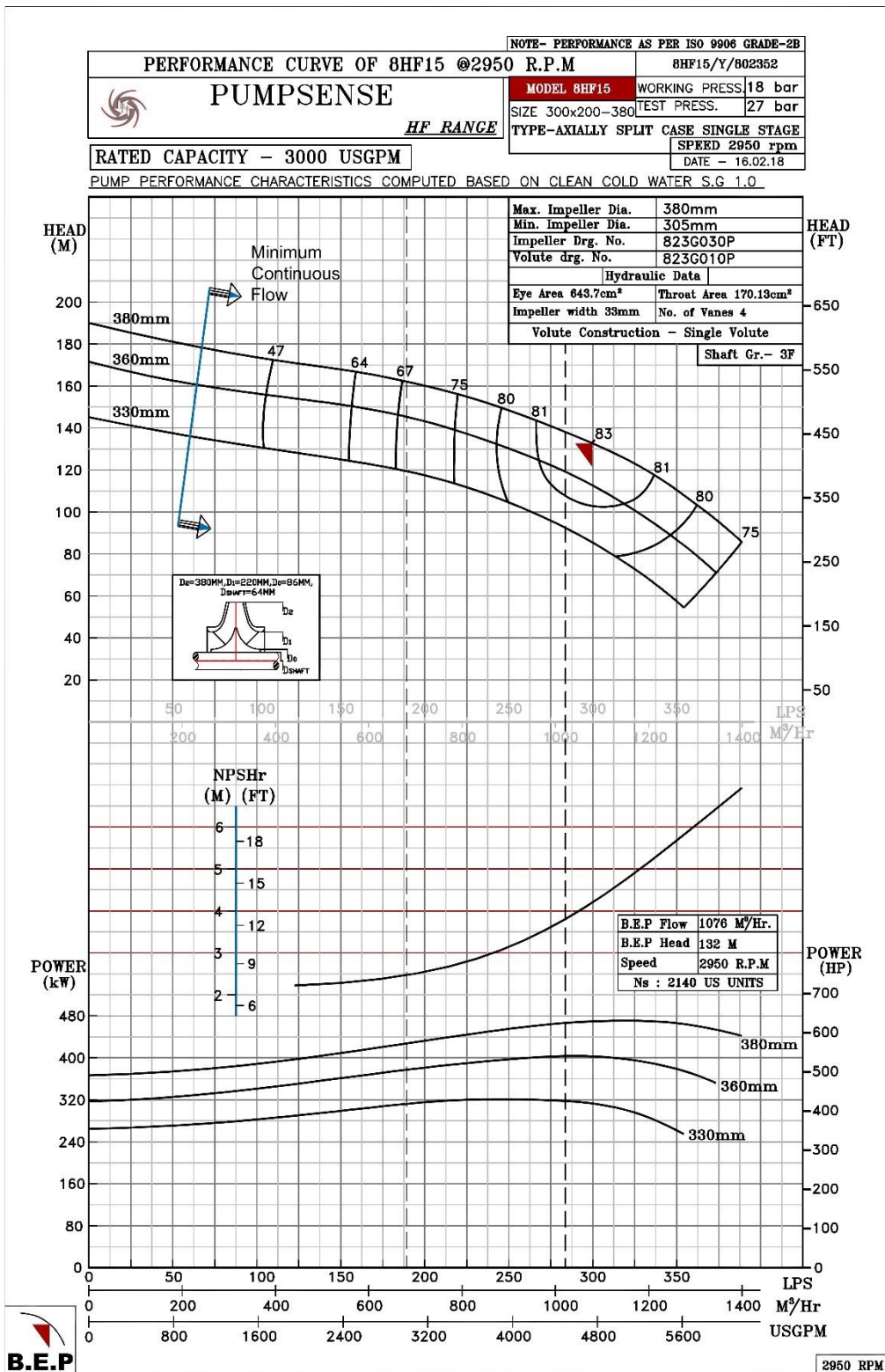











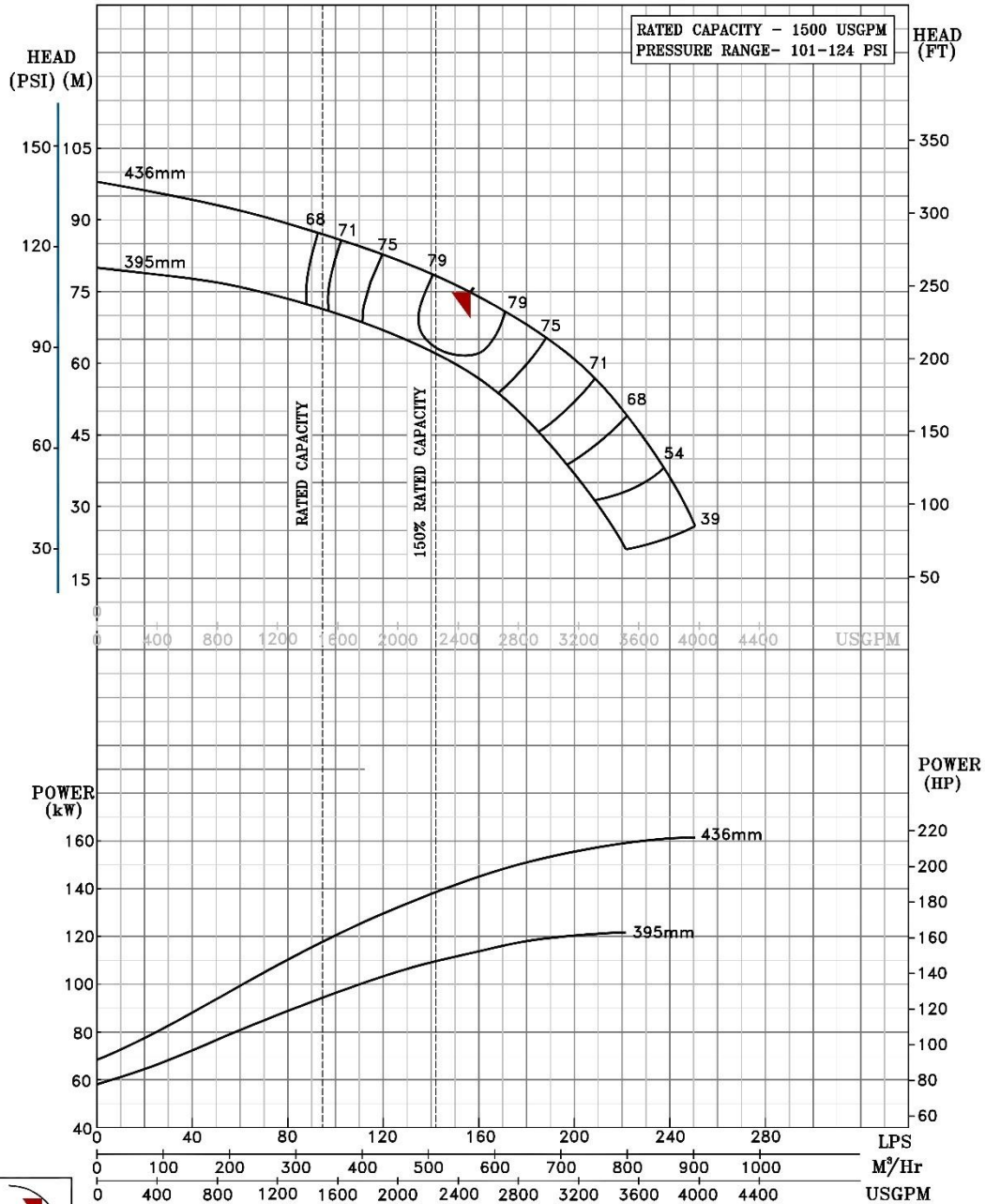




**FM APPROVED**

PERFORMANCE CURVE OF 6HF18 @1800 R.P.M		6HF18/Y/801064	
 <div>PUMPSENSE</div> <div>HF RANGE</div>	MODEL 6HF18	WORKING PRESS.	140 PSI
	SIZE 200x150-436	TEST PRESS.	215 PSI
	TYPE-AXIALLY SPLIT CASE SINGLE STAGE		
	SPEED 1800rpm		

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0



**UL LISTED**

PERFORMANCE CURVE OF 6HF20 @1800 R.P.M

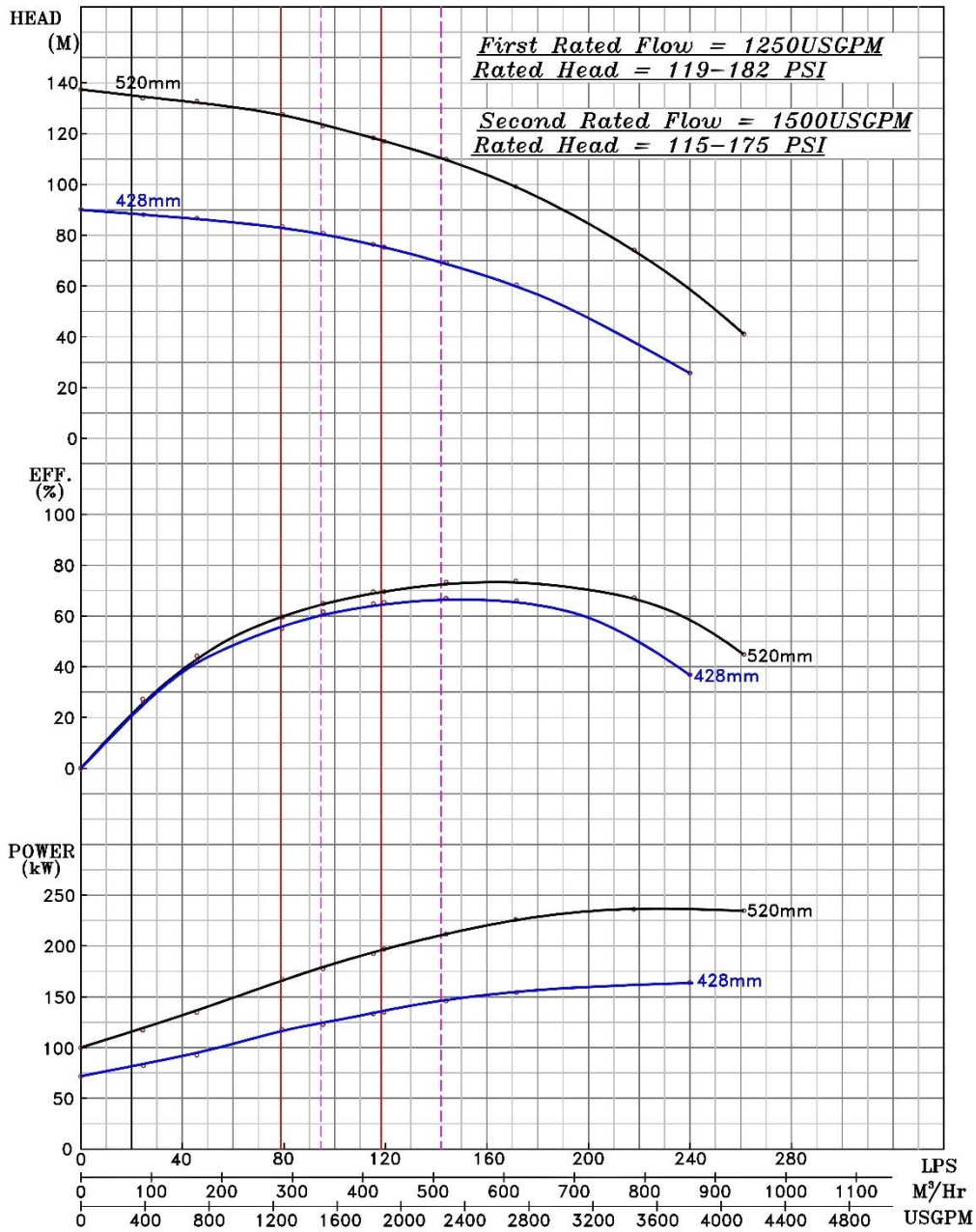


**PUMPSENSE**


HF RANGE

TYPE-AXIALLY SPLIT CASE SINGLE STAGE

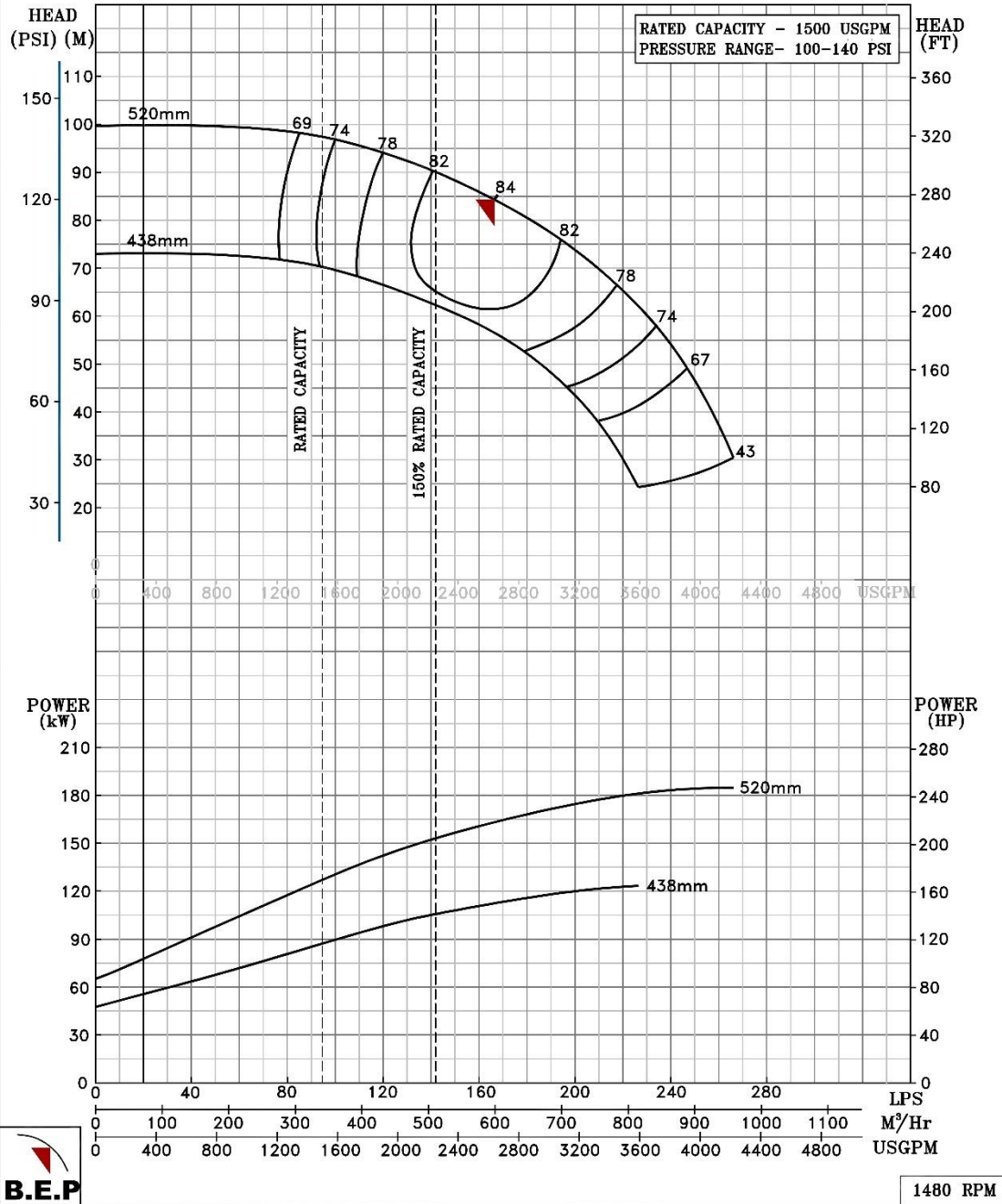
PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0

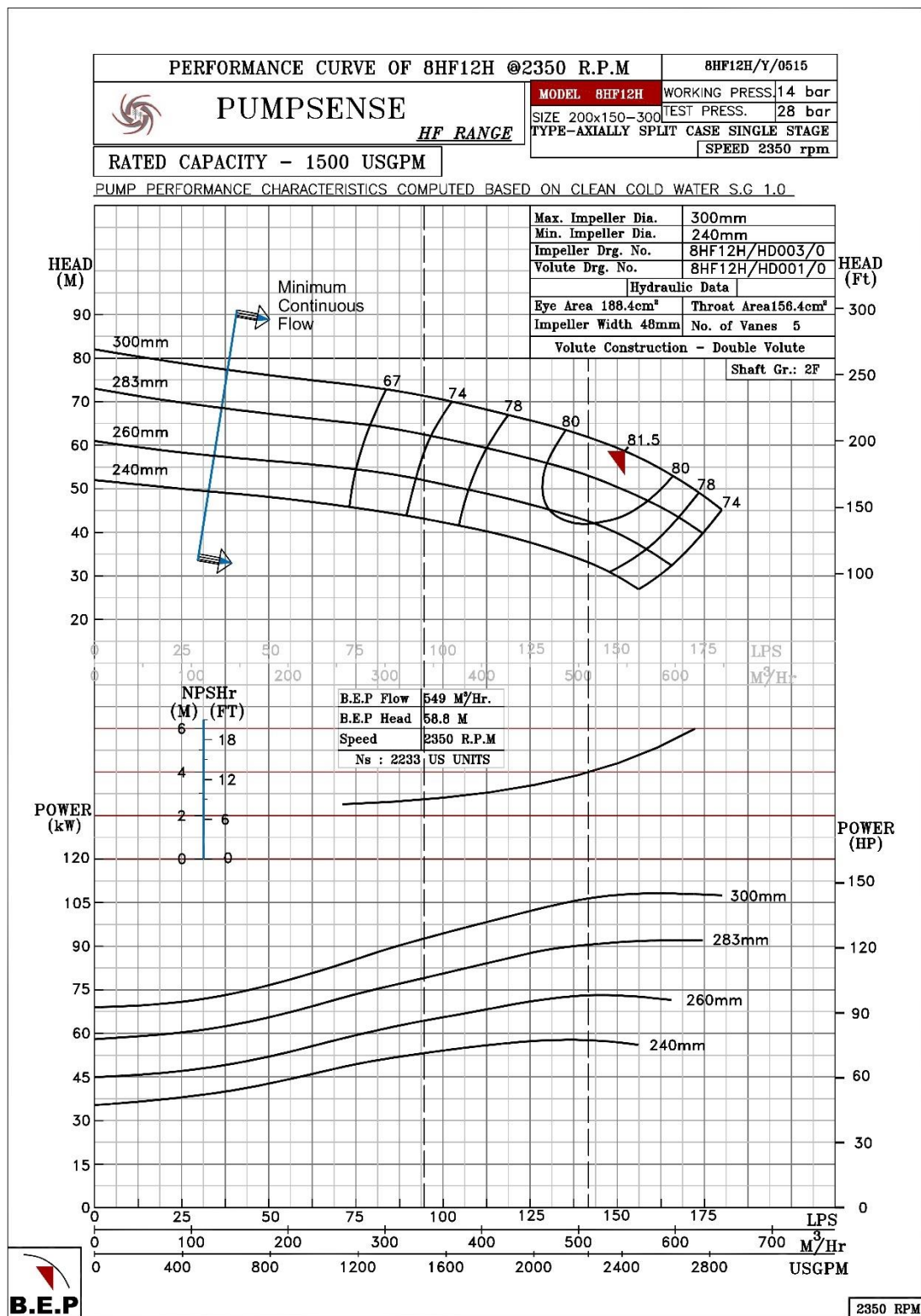





PERFORMANCE CURVE OF 6HF21 @1480 R.P.M		6HF21/Y/801754	
 <b>PUMPSENSE</b> <i>HF RANGE</i>	<b>MODEL</b> 6HF21	<b>WORKING PRESS.</b> 150 PSI	
	<b>SIZE</b> 200x150-520	<b>TEST PRESS.</b> 225 PSI	
	<b>TYPE</b> -AXIALLY SPLIT CASE SINGLE STAGE		
		<b>SPEED</b> 1480 rpm	

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G. 1.0

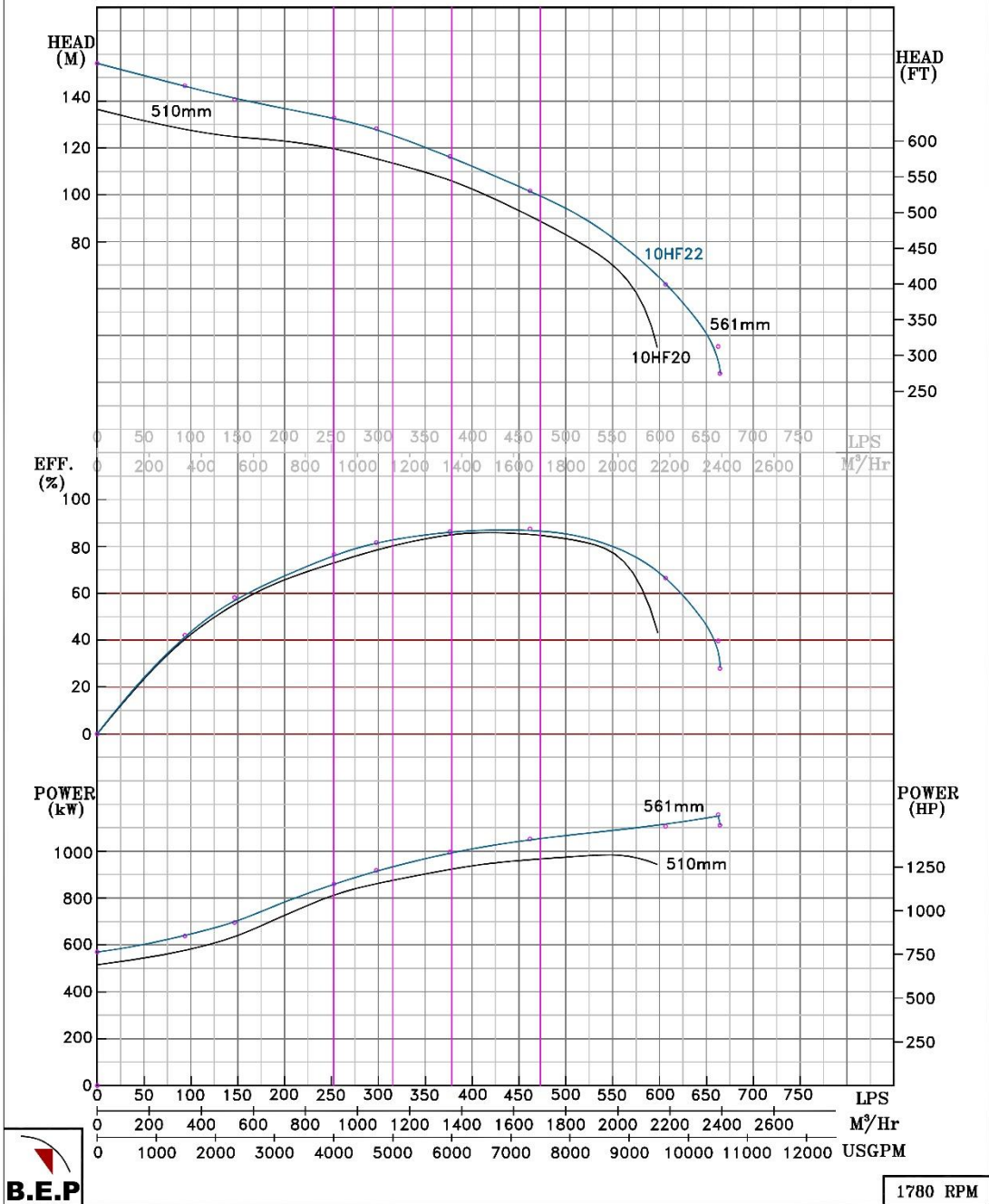


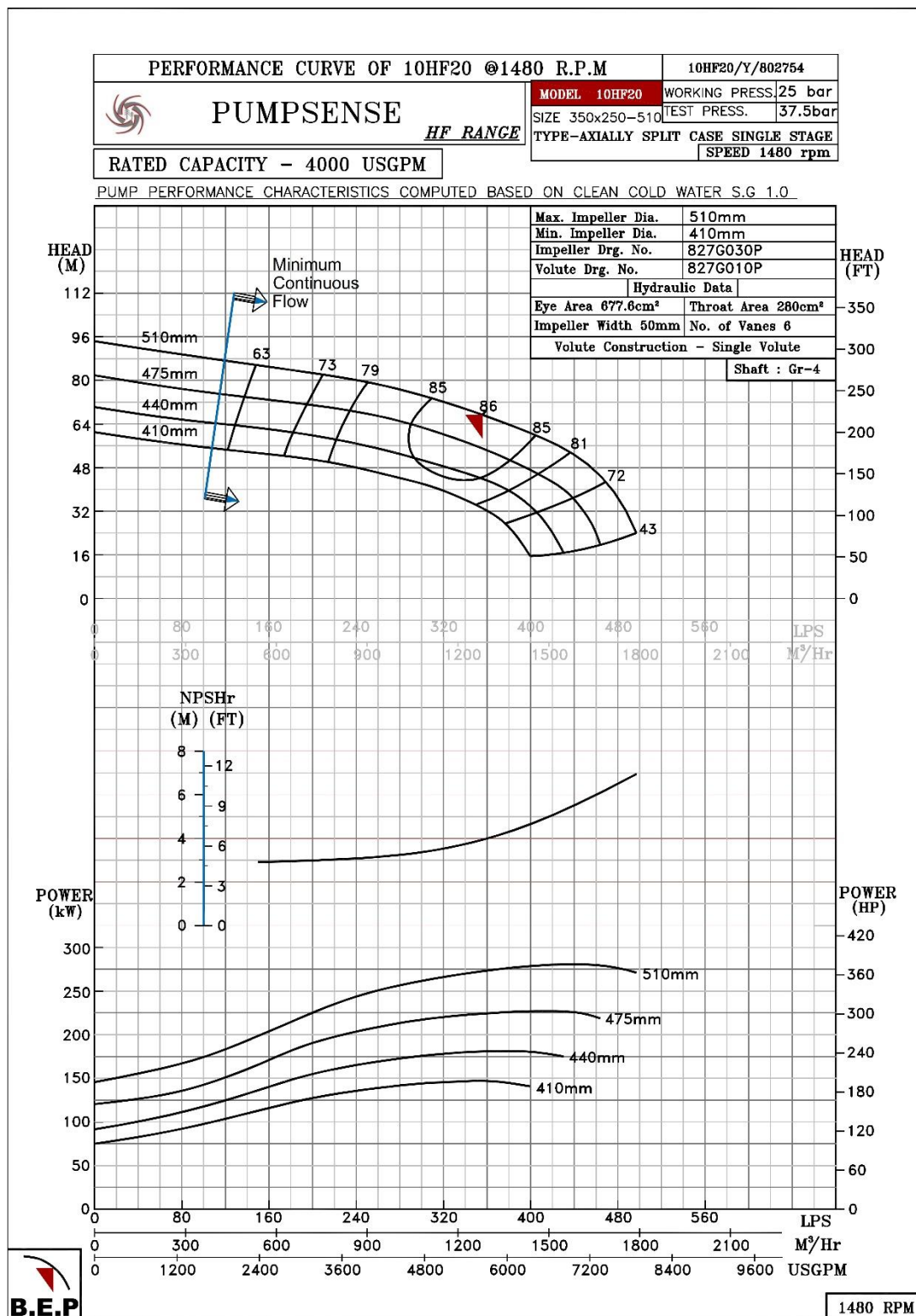


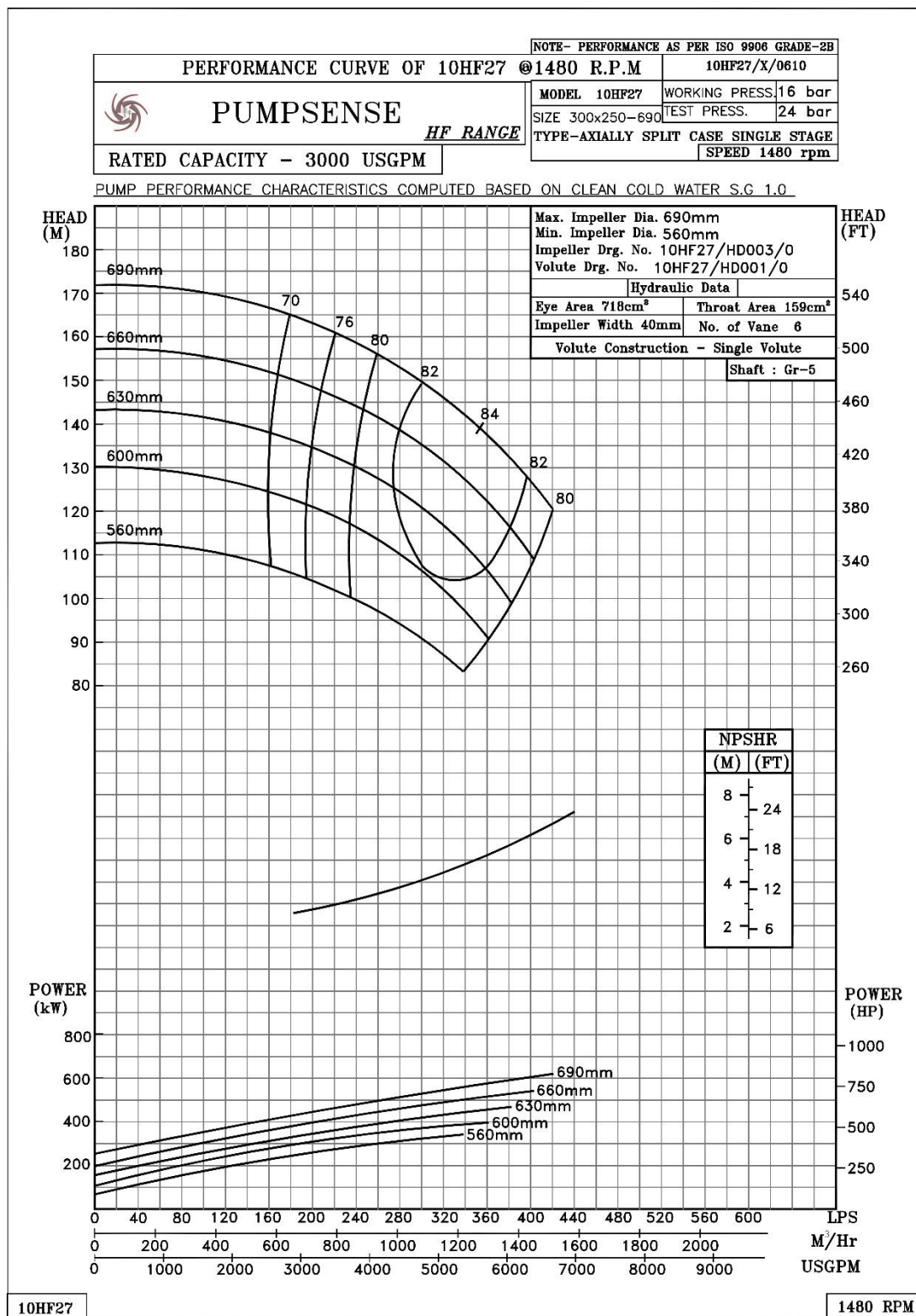
NOTE- PERFORMANCE AS PER ISO 9906 GRADE-2B  
**PERFORMANCE CURVE OF 10HF20 Vs. 10HF22 @1780 R.P.M**  

**PUMPSENSE**  
*HS RANGE*

10HF22-MK2/Y/103764  
**MODEL 10HF22-MK2** WORKING PRESS. 20 bar  
SIZE 300x250-568 TEST PRESS. 30 bar  
TYPE-AXIALLY SPLIT CASE SINGLE STAGE  
SPEED 1780 rpm

PUMP PERFORMANCE CHARACTERISTICS COMPUTED BASED ON CLEAN COLD WATER S.G 1.0

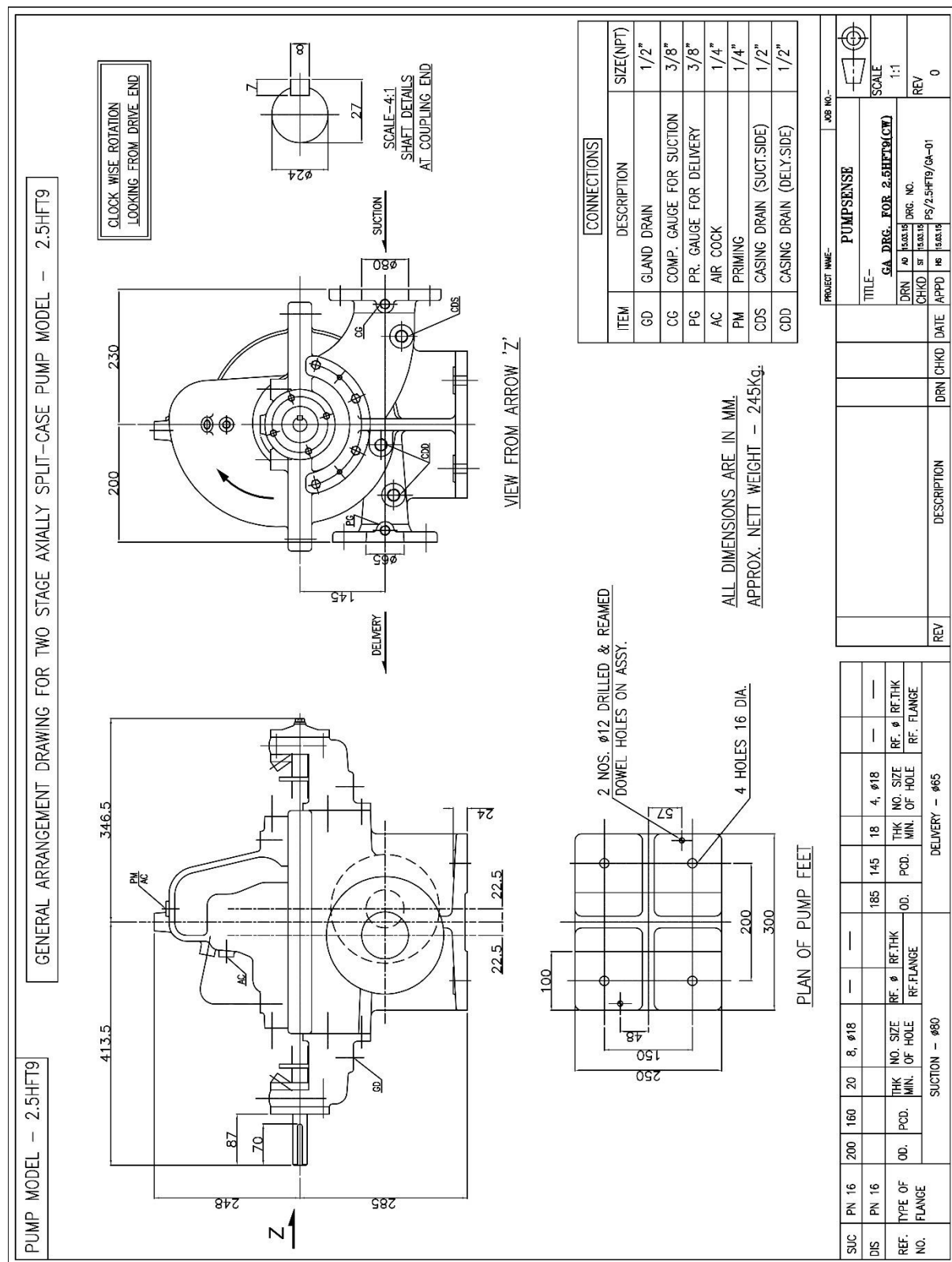








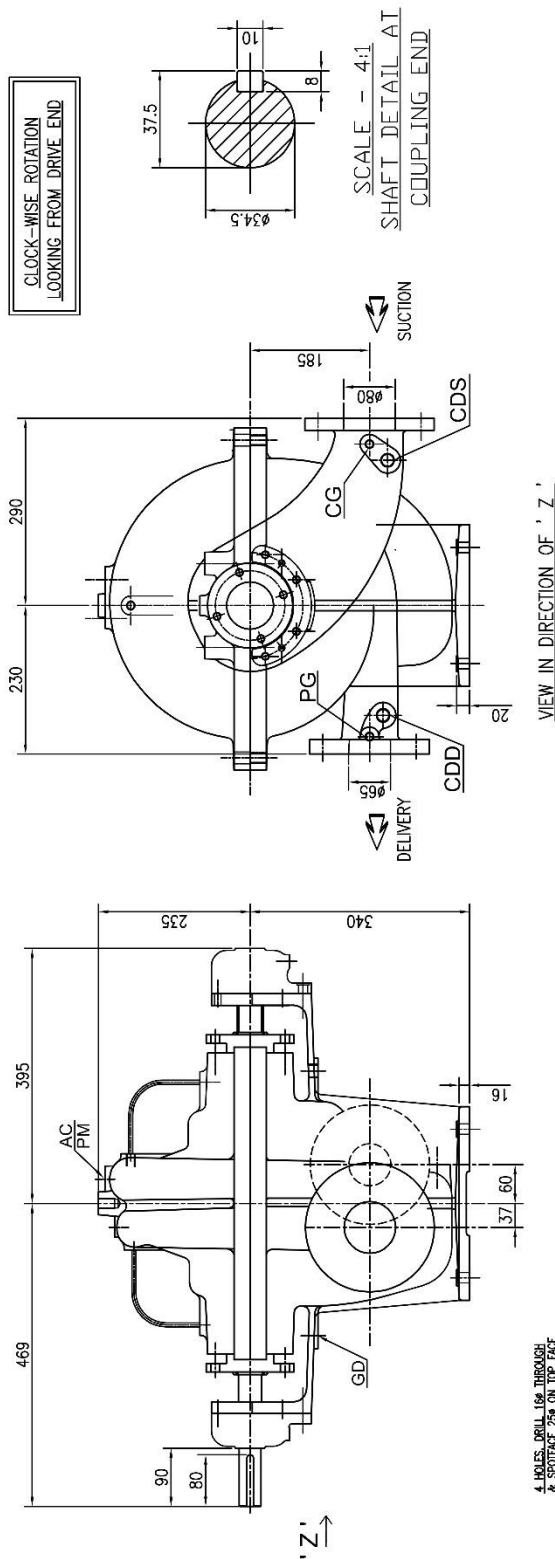
## 12. NFPA20 Fire Pumps GA Drawings







PUMP MODEL - 2.5HFT12

GENERAL ARRANGEMENT DRAWING FOR TWO STAGE AXIALLY SPLIT-CASE PUMP MODEL - 2.5HFT12

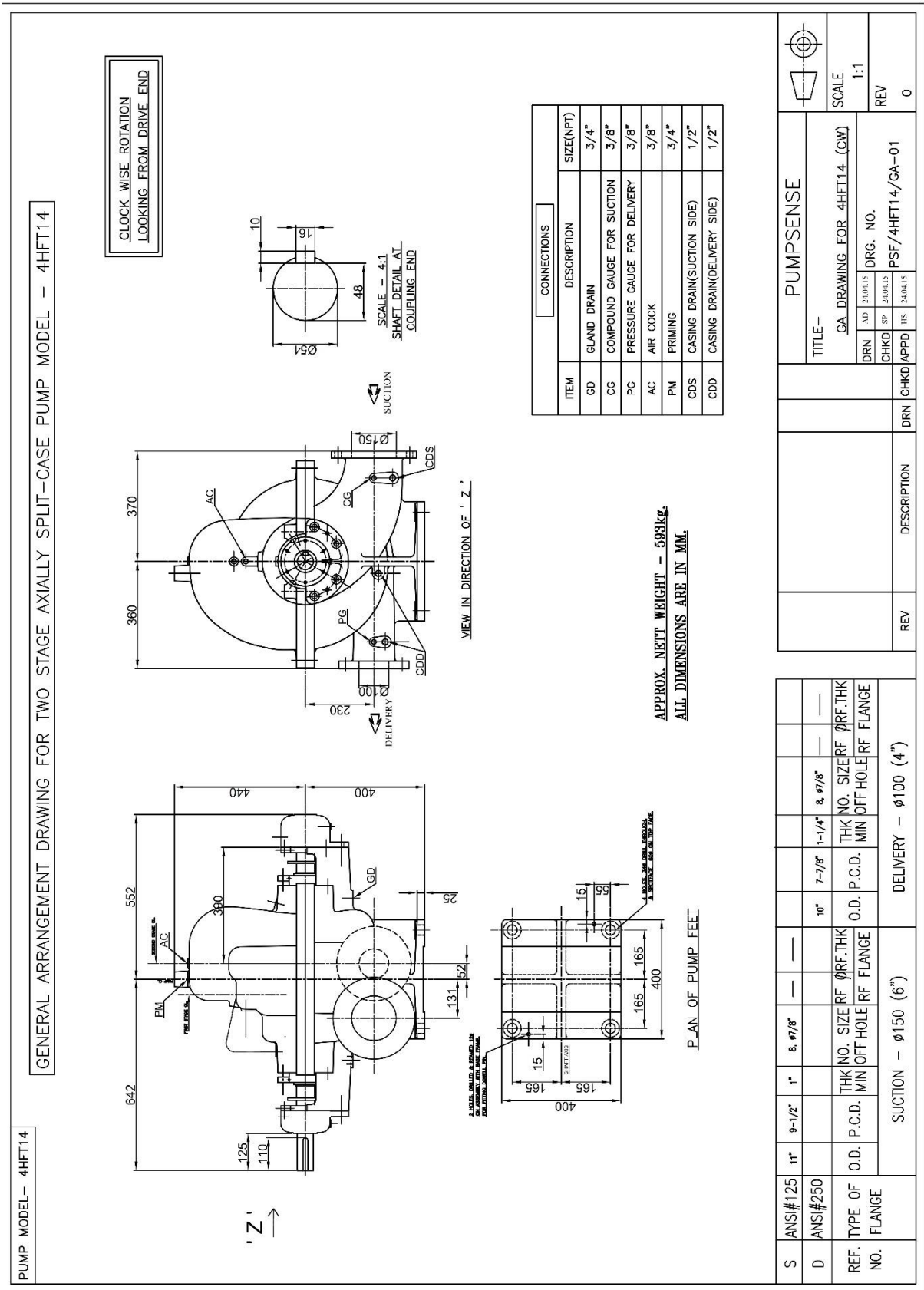


CONNECTIONS		
ITEM	DESCRIPTION	SIZE(NPT)
GD	GLAND DRAIN	1/2"
CG	COMPOUND GAUGE FOR SUCTION	3/8"
PG	PRESSURE GAUGE FOR DELIVERY	3/8"
AC	AIR COCK	3/8"
PM	PRIMING	3/4"
CDS	CASING DRAIN(SUCTION SIDE)	1/2"
CDD	CASING DRAIN(DELIVERY SIDE)	1/2"

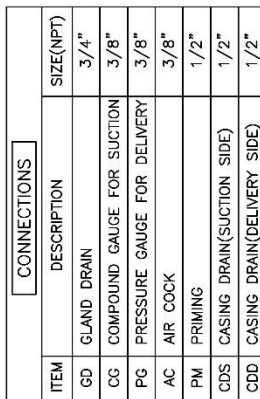
ALL DIMENSIONS ARE IN MM.

SUC	PN 16	200	160	20	8, Ø18	—	—	—	—	—	—	—	—	—	PUMPSENSE		TITLE- GA DRAWING FOR 2.5HFT12	SCALE 1:1						
	DIS	PN 16																						
REF. NO.	TYPE OF FLANGE	OD.	PCD.	THK MIN.	NO. SIZE OF HOLE	RF. Ø RF. THK		OD.	PCD.	THK MIN.	NO. SIZE OF HOLE	RF. Ø RF. THK	RF. FLANGE	DELIVERY — Ø65	DRN	CHKD	APPD	HS	03.01.17	2.5HFT12/GA-01/0	REV	0		
						RF. FLANGE	RF. THK																	
		SUCTION — Ø80														DESCRIPTION	DRN	CHKD	APPD	HS	03.01.17	2.5HFT12/GA-01/0	REV	0

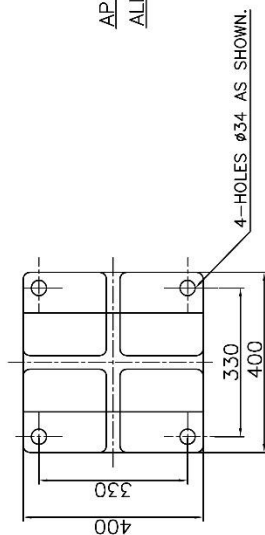




GENERAL ARRANGEMENT DRAWING FOR TWO STAGE AXIALLY SPLIT-CASE PUMP MODEL - 4HST19




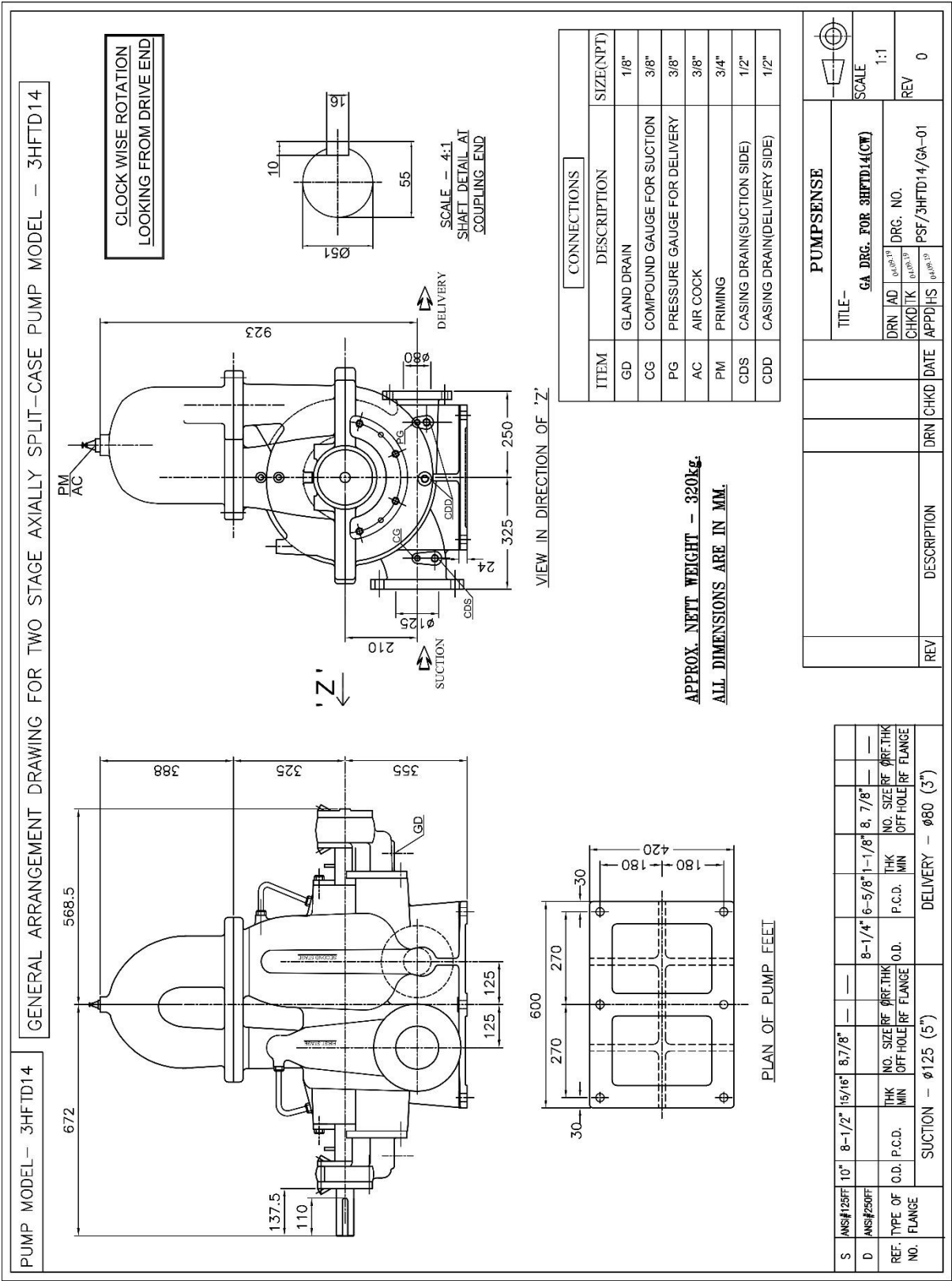
APPROX. NETT WEIGHT - 725kg.  
ALL DIMENSIONS ARE IN MM.



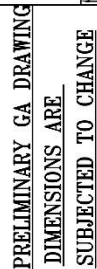
DETAIL OF PUMP FEET

[illegible]

PROJECT NAME--		JOB NO. --	
		PUMPSENSE	
		TITLE	
		GA DRG. FOR 4HST19(CW)	
		DRN	AS 12.04.13
			DRG. NO.
		CHKD	AS 12.04.13
			PSF/4HST19/GA-01
REV	DESCRIPTION	DRN	CHKD/APPD
			AS 12.04.13
			REV
			0
			SCALE
			1:1
			



GENERAL ARRANGEMENT DRAWING FOR TWO STAGE AXIALLY SPLIT-CASE PUMP MODEL - 4HFTD13



**APPROX. NETT WEIGHT - 800kg.**  
**ALL DIMENSIONS ARE IN MM.**

[illegible]

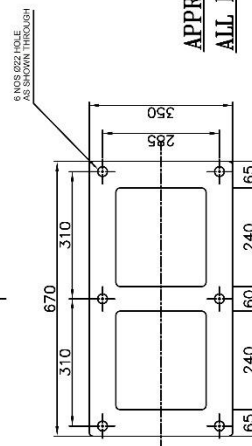


GENERAL ARRANGEMENT DRAWING FOR TWO STAGE AXIALLY SPLIT-CASE PUMP MODEL - 6HFTD12



CONNECTIONS		
ITEM	DESCRIPTION	SIZE(NPT)
GD	GLAND DRAIN	3/4"
CG	COMPOUND GAUGE FOR SUCTION	3/8"
PG	PRESSURE GAUGE FOR DELIVERY	3/8"
AC	AIR COCK	3/8"
PM	PRIMING	3/8"
CDS	CASING DRAIN(SUCTION SIDE)	1/2"
CDD	CASING DRAIN(DELIVERY SIDE)	1/2"

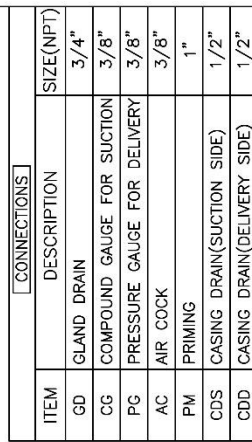
APPROX. NETT WEIGHT - 684kg.  
ALL DIMENSIONS ARE IN MM.



**PLAN OF PUMP FEET**

[illegible]

GENERAL ARRANGEMENT DRAWING FOR TWO STAGE AXIALLY SPLIT-CASE PUMP MODEL - 6HFTD12S

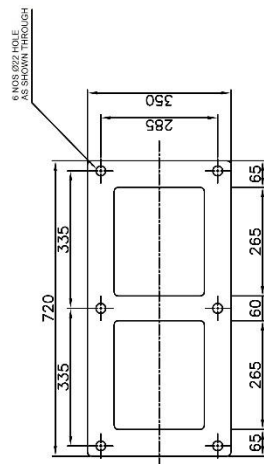
[illegible]

GENERAL ARRANGEMENT DRAWING FOR TWO STAGE AXIALLY SPLIT-CASE PUMP MODEL - 6HFTD12L




CONNECTIONS			SIZE(NIPT)
ITEM	DESCRIPTION		
GD	GLAND DRAIN		3/4"
CG	COMPOUND GAUGE FOR SUCTION		3/8"
PG	PRESSURE GAUGE FOR DELIVERY		3/8"
AC	AIR COCK		3/8"
PM	PRIMING		1"
CDS	CASING DRAIN(SUCTION SIDE)		1/2"
CDD	CASING DRAIN(DELIVERY SIDE)		1/2"

**APPROX. NETT WEIGHT - 850kg.**  
**ALL DIMENSIONS ARE IN MM.**

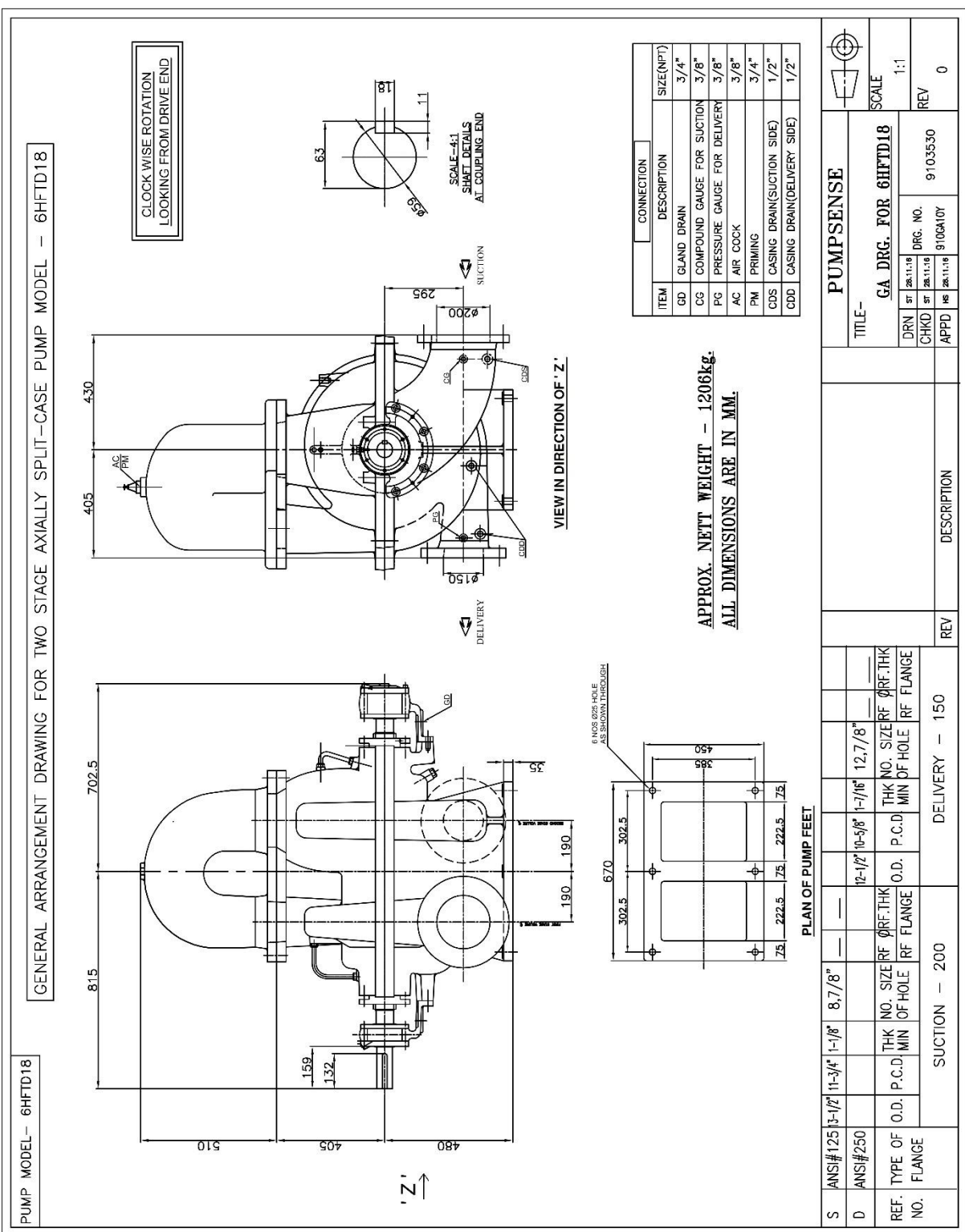


## PLAN OF PUMP FEET

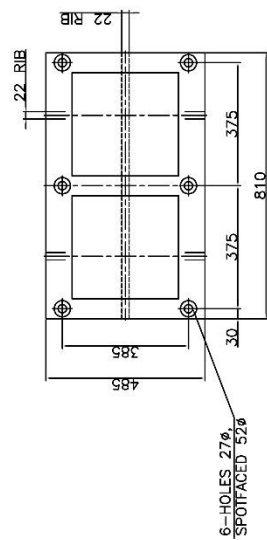
							PUMPSENSE	
TITLE-								
<u>GA DRG. FOR 6HFTD12L</u>								SCALE 1:1
DRN	AD	17.00.10	DRG. NO.					
CHKD	SF	17.00.10						
APPD	DATE	17.00.10	PSF / 6HFTD12L / GA-01					REV 0

DEL 1500	ANSI 250#FF	12-1/2"	10-5/8"	1-7/16"	12, Ø7/8"	
SUC 2000	ANSI 250#FF	15"	13"	1-5/8"	12, Ø1"	
	TYPE OF FLANGE	O.D.	P.C.D.	THK MIN	NO & HOLE Ø	RF THK RF FLANGE

[illegible]



GENERAL ARRANGEMENT DRAWING FOR TWO STAGE AXIALLY SPLIT-CASE PUMP MODEL - 6HFTD21



**APPROX. NETT WEIGHT - 1220kg.**  
**ALL DIMENSIONS ARE IN MM.**

CONNECTIONS			SIZE (NPT)
ITEM	DESCRIPTION		
GD	GLAND DRAIN		1"
CG	COMPOUND GAUGE FOR SUCTION		3/8"
PG	PRESSURE GAUGE FOR DELIVERY		3/8"
AC	AIR COCK		3/8"
PM	PRIMING		1"
CDS	CASING DRAIN(SUCTION SIDE)		1/2"
CDD	CASING DRAIN(DELIVERY SIDE)		1/2"

PUMP FOOT PRINT

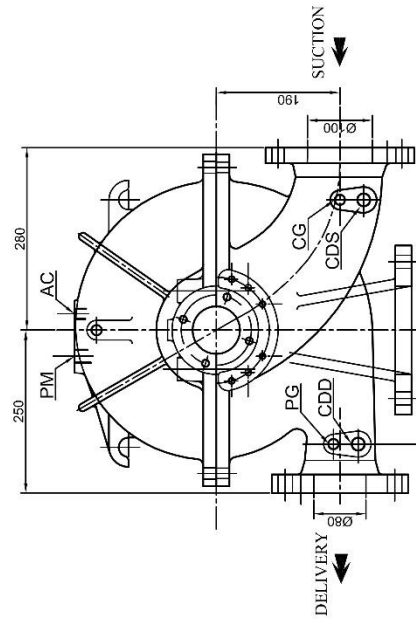
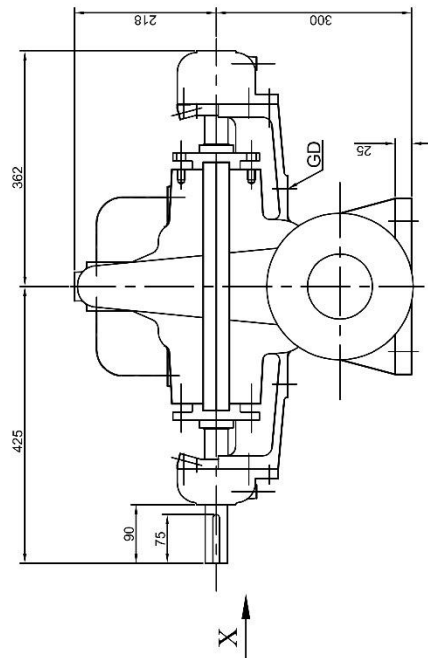
[illegible]

					PROJECT NAME:-		JOB NO. -		
					PUMPSENSE				
					TITLE GA DRG. FOR 6HFTD21				
					DRN	AD	04.04.17	DRG. NO.	
					CHKD	TK	04.04.17	PS/6HFTD21/GA-01	
REV					APPD	HS	04.04.17	REV 0	
					DRN	CHKD			
					DESCRIPTION				

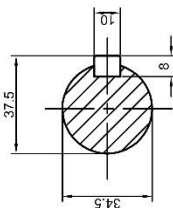


PUMP MODEL - 3HF12

GENERAL ARRANGEMENT DRAWING FOR SINGLE STAGE AXIALLY SPLIT CASE PUMP MODEL - 3HF12

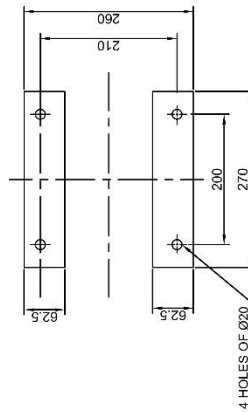


CLOCK-WISE ROTATION  
LOOKING FROM DRIVE END



SCALE - 4:1  
SHAFT DETAIL AT  
COUPLING END

VIEW IN DIRECTION OF ' X ' ,



PLAN OF PUMP FEET

APPROX. NETT WEIGHT - 200kg.  
ALL DIMENSIONS ARE IN MM.

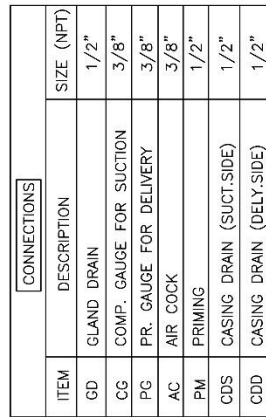
CONNECTIONS	
ITEM	DESCRIPTION
GD	GLAND DRAIN
CG	COMP. GAUGE FOR SUCTION
PG	PR. GAUGE FOR DELIVERY
AC	AIR COCK
PM	PRIMING
CDS	CASING DRAIN (SUCTION SIDE)
CDD	CASING DRAIN (DELIVERY SIDE)
	SIZE (NPT)
	1/2"
	3/8"
	3/8"
	3/8"
	1/2"
	1/2"

S	ANSI#125	9"	7-1/2"	15/16"	8, 3/4"	--	--	--	--
D	ANSI#250	--	--	--	--	8-1/4"	6-5/8"	1-1/8"	8, 7/8"
REF. NO.	TYPE OF FLANGE.	O.D.	P.C.D.	THK MIN	NO SIZE OF HOLE	O.D.	P.C.D.	THK MIN	NO. SIZE OF HOLE
					SUCTION 100Ø		DELIVERY 80Ø		

PUMPSENSE		TITLE		GA. DRAWING FOR 3HF12		SCALE		REV	
1	NEW CASING GA	AD	ST	17.05.18	DRN	AD	11.04.15	DRG. NO.	1:1
REV	DESCRIPTION	DRN	CHKD	DATE	APPD	HS	11.04.15	REV	0
					PFS/3HF12/GA-01(0)/Q 8012640-1				




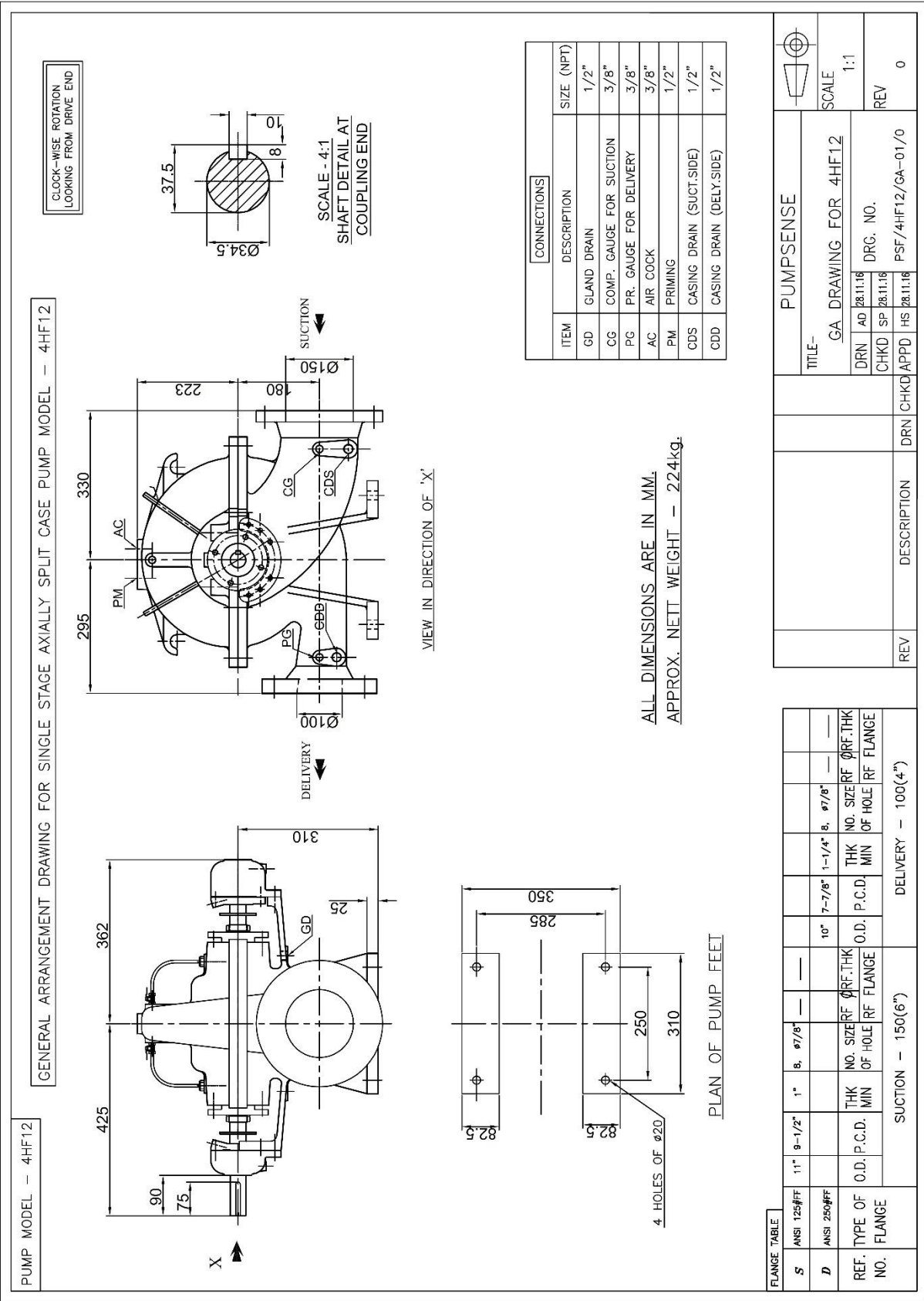
GENERAL ARRANGEMENT DRAWING FOR SINGLE STAGE AXIALLY SPLIT CASE PUMP MODEL - 4HF12L

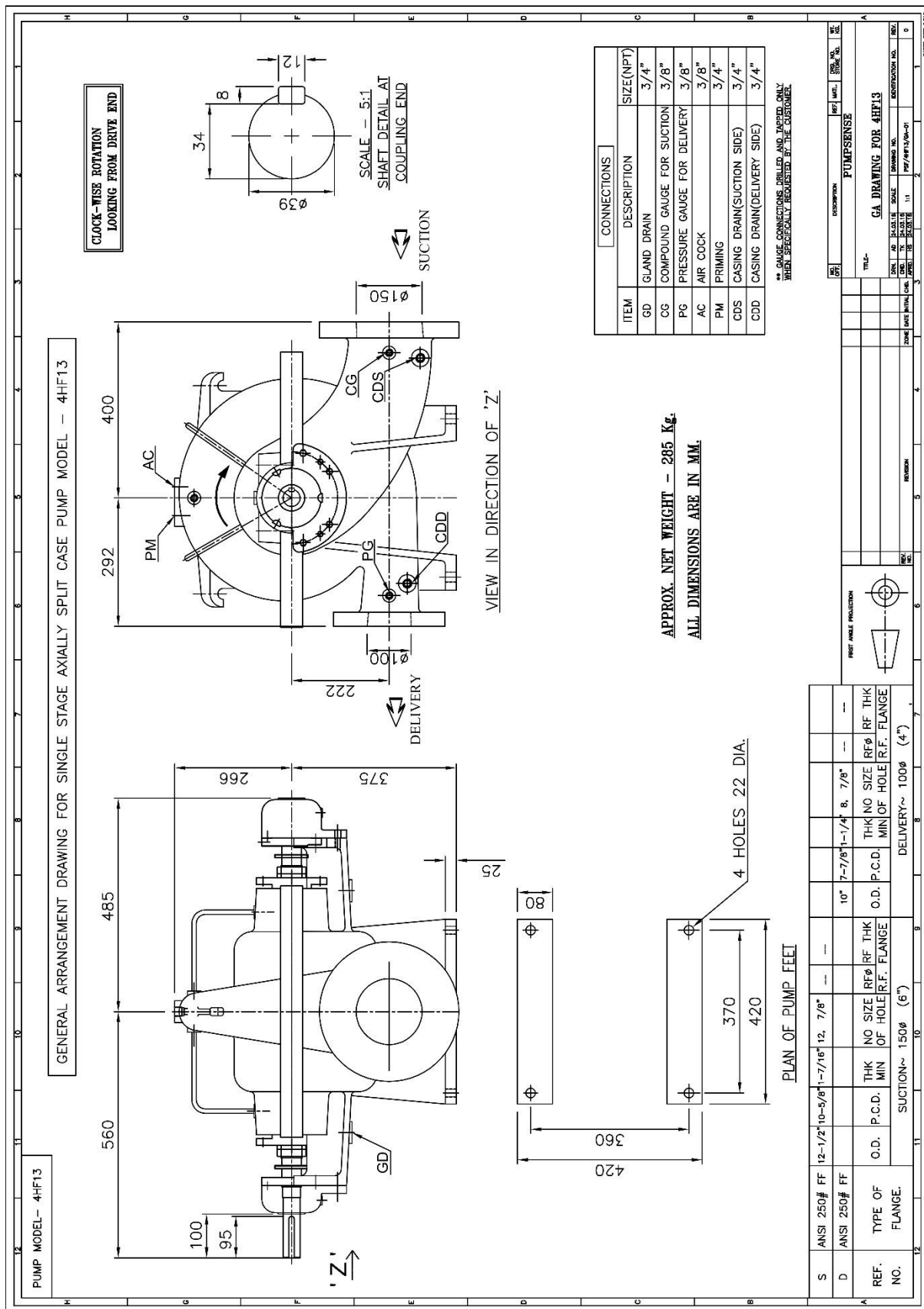


ALL DIMENSIONS ARE IN MM.  
APPROX. NETT WEIGHT - 224kg.

FLANGE TABLE		S					
		ANSI 125#FF	11"	9-1/2"	1"	8, Ø7/8"	—
D		ANSI 250#FF	—				
REF. TYPE OF FLANGE		O.D. P.C.D.	THK MIN	NO. SIZE OF HOLE	RF THK	10"	1-1/4" 8, Ø7/8"
NO.							

REV	DESCRIPTION	DRN	CHKD	APPD	HS	PSF / 4HF12L / GA-01/0	0	REV
						DRN	AD	28.11.16
						CHKD	SP	28.11.16
						<div style="text-align: center;"> <b>PUMPSENSE</b>  <hr/> <b>TITLE-</b>  <b>GA DRAWING FOR 4HF12L</b> </div>		
						<div style="text-align: center;">   <b>SCALE</b>  <b>1:1</b> </div>		







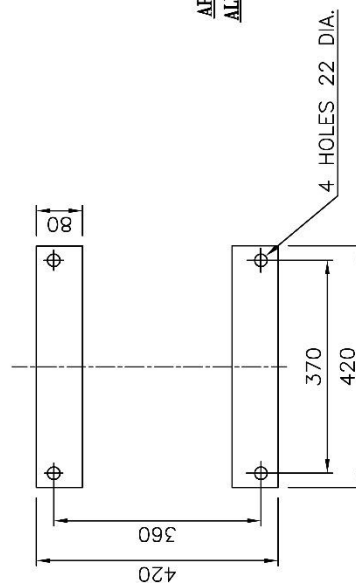


GENERAL ARRANGEMENT DRAWING FOR SINGLE STAGE AXIALLY SPLIT CASE PUMP MODEL - 5HF11




APPROX. NET WEIGHT -353Kg.  
ALL DIMENSIONS ARE IN MM.

CONNECTIONS		
ITEM	DESCRIPTION	SIZE(NPT)
GD	GLAND DRAIN	3/4"
CG	COMPOUND GAUGE FOR SUCTION	3/8"
PG	PRESSURE GAUGE FOR DELIVERY	3/8"
AC	AIR COCK	3/8"
PM	PRIMING	3/4"
COS	CASING DRAIN(SUCTION SIDE)	3/4"
CD	CASING DRAIN(DELIVERY SIDE)	3/4"



S	ANSI 125# FF	1"	8, 7/8"
D	ANSI 250# FF	11"	9-1/4" 1-3/8" 8, 7/8"
REF.	TYPE OF FLANGE.	O.D. P.C.D.	THK NO SIZE OF HOLE R.F. FLANGE
NO.		SUCTION~ DELIVERY~	150# 250# (5")

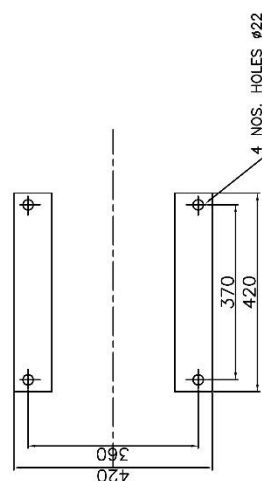
REV	DESCRIPTION	QPN	CHKD	DATE				
0	PSF/5HF11/GA-0							
REV	SCALE							
1:1								
		<b>PUMP PENSE</b>						
		TITLE:-- GA DRG. FOR 5HF11						
		DRN	AD	05.01.17	DRG. NO.			
		CHKD	ST	08.01.17				
		APRD	18					

GENERAL ARRANGEMENT DRAWING FOR SINGLE STAGE AXIALLY SPLIT CASE PUMP MODEL - 6HF12



CONNECTIONS		
ITEM	DESCRIPTION	SIZE (NPT)
GD	GLAND DRAIN	1/2"
CG	COMP. GAUGE FOR SUCTION	3/8"
PG	PR. GAUGE FOR DELIVERY	3/8"
AC	AIR COCK	3/8"
PM	PRIMING	3/4"
CD	CASING DRAIN (SUCTION SIDE)	1/2"
CDD	CASING DRAIN (DELIVERY SIDE)	1/2"

**APPROX. NETT WEIGHT - 392kg.**  
**ALL DIMENSIONS ARE IN MM.**

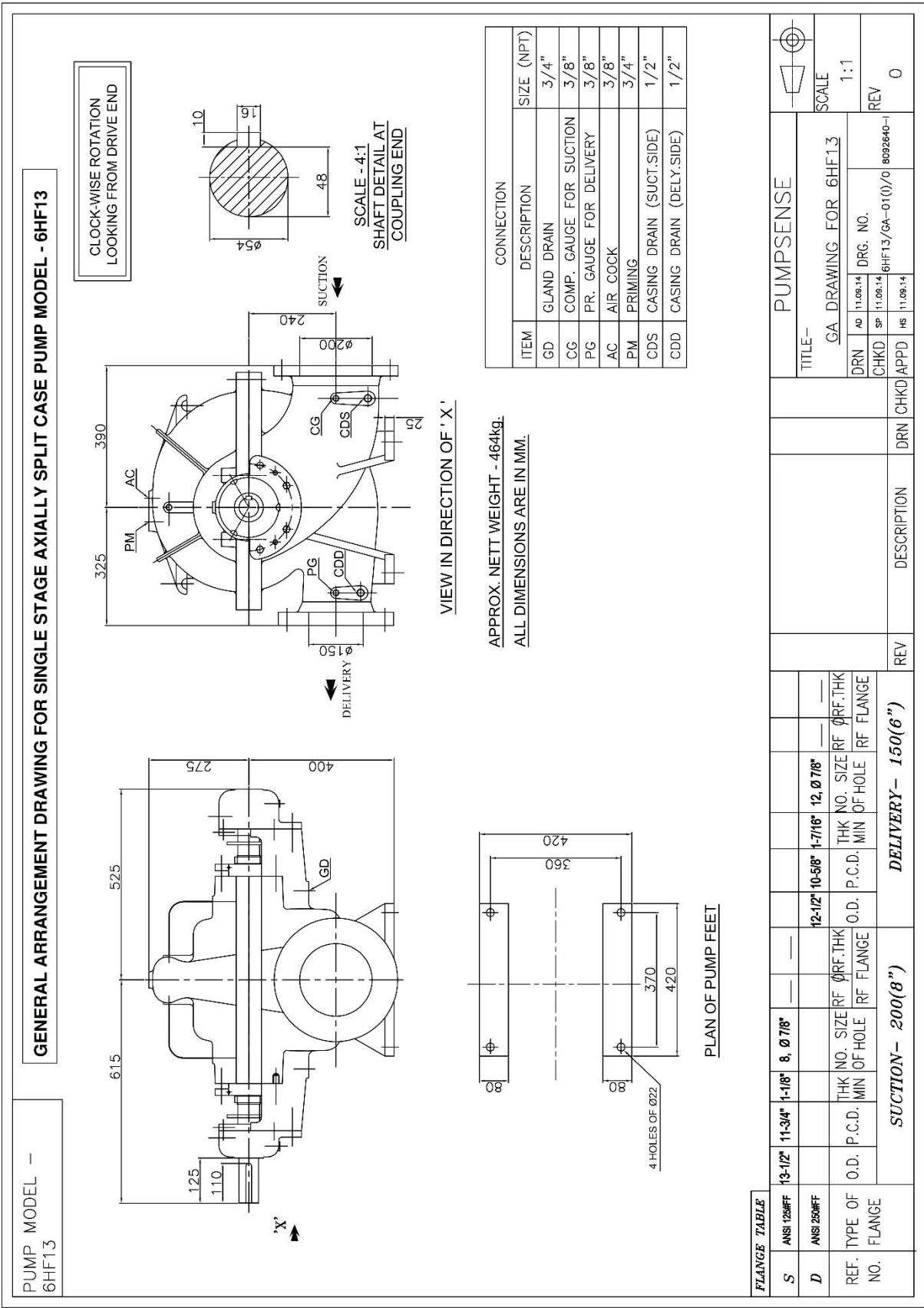


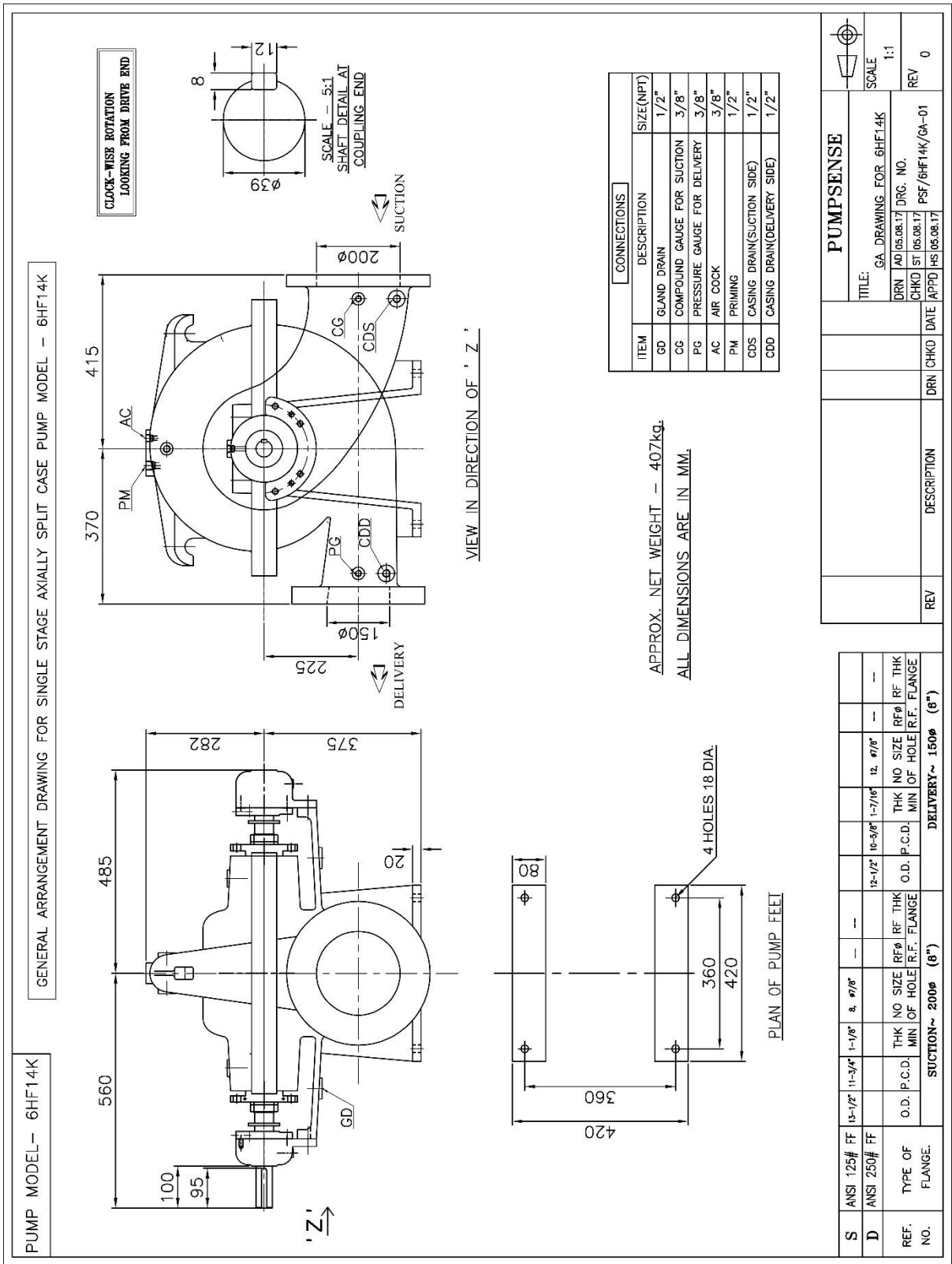
PLAN OF PUMP FEET

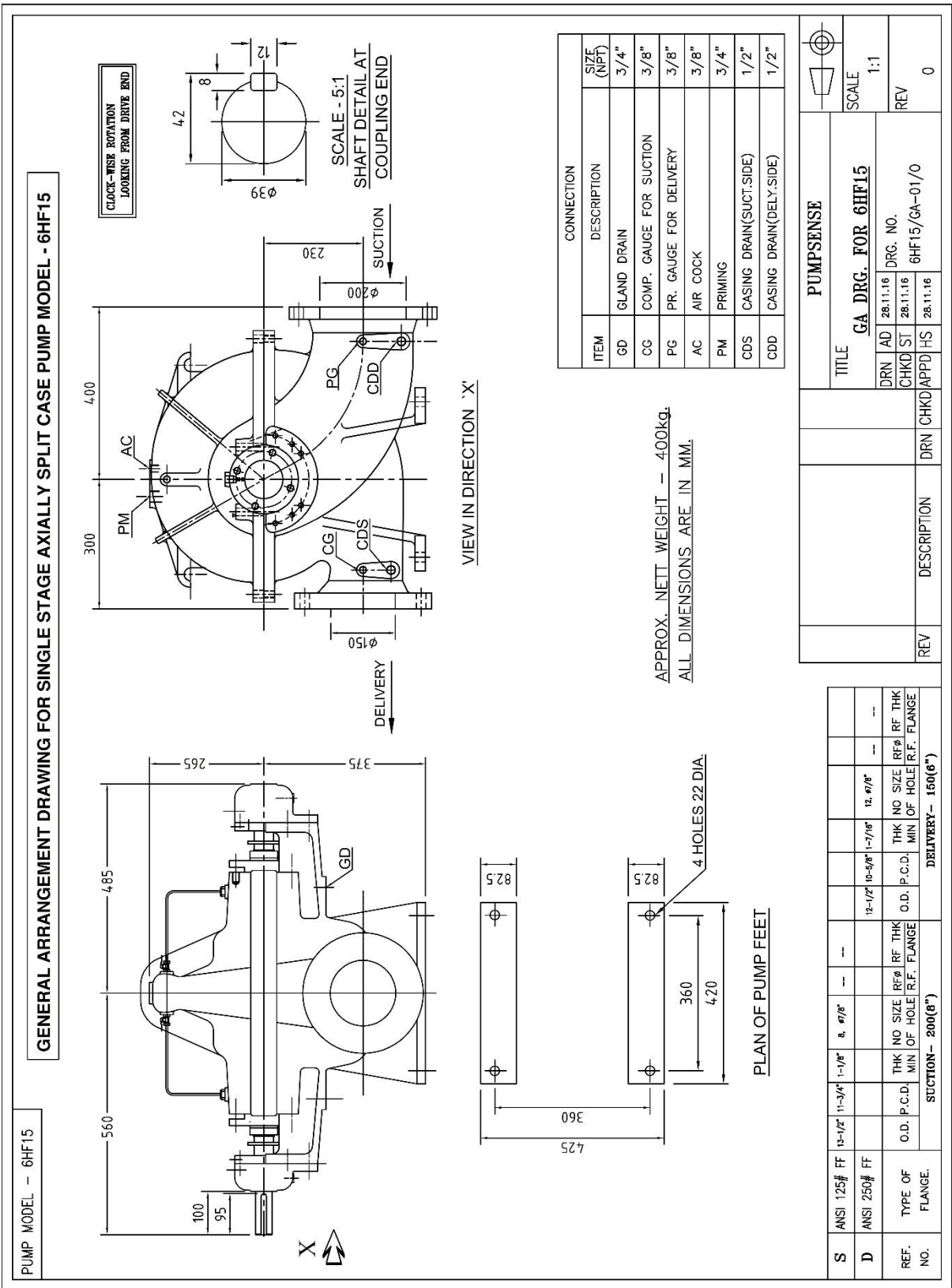
FLANGE TABLE

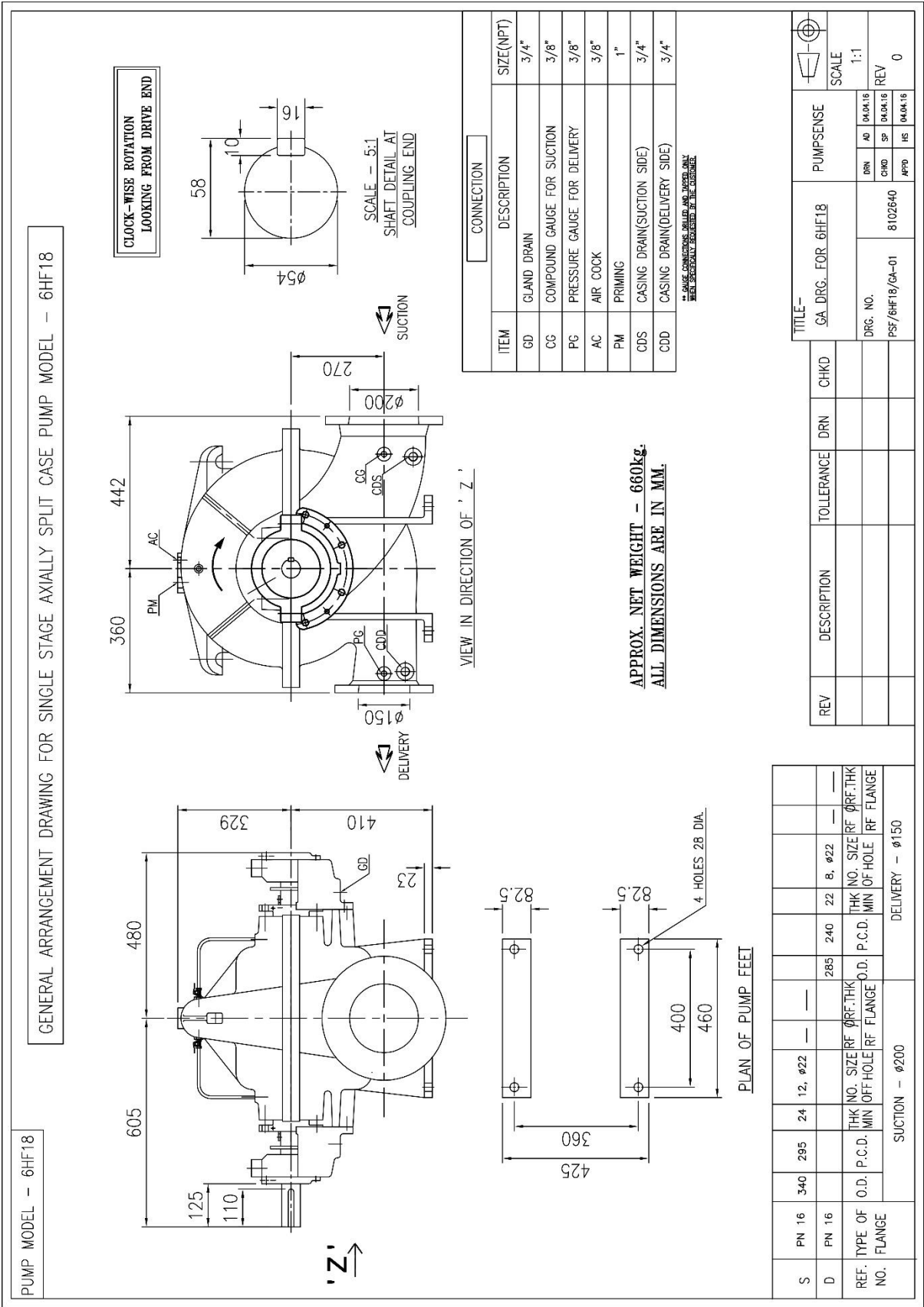
S	ANSI 125#FF	13-1/2"	11-3/4"	1-1/8"	8, Ø 7/8"				
		13-1/2"	11-3/4"	1-1/8"	8, Ø 7/8"	12-1/2"	10-5/8"	1-7/16"	12, Ø 7/8"
D	ANSI 250#FF								
REF. NO.	TYPE OF FLANGE	O.D.	P.C.D.	THK MIN	NO. SIZE OF HOLE	RF	Ø RF	THK MIN	NO. SIZE OF HOLE
						RF FLANGE	RF FLANGE		RF FLANGE

[illegible]



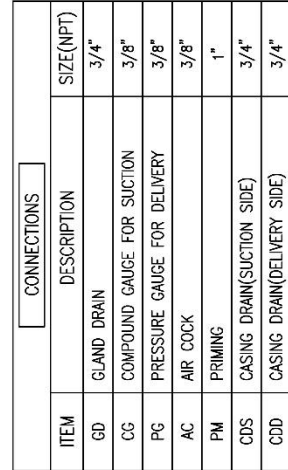








GENERAL ARRANGEMENT DRAWING FOR SINGLE STAGE AXIALLY SPLIT CASE PUMP MODEL - 6HF20



APPROX. NET WEIGHT - 550kg.  
ALL DIMENSIONS ARE IN MM.

**\*\* GAUGE CONNECTIONS DRILLED AND TAPPED ONLY WHEN SPECIFICALLY REQUESTED BY THE CUSTOMER.**

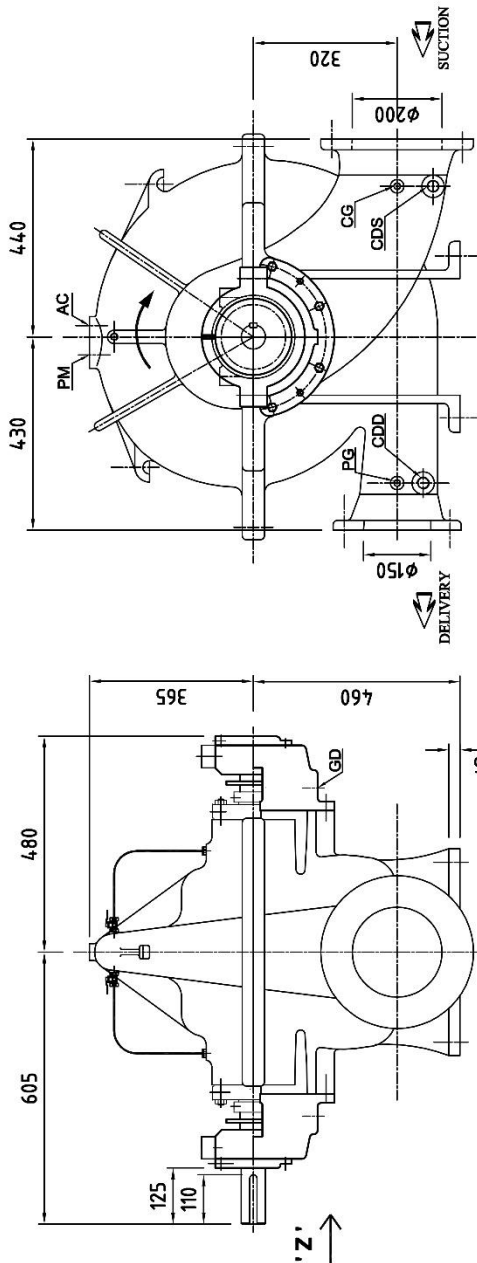
## PUMPSENSE

				TITLE--	GA DRG. FOR 6HF20						SCALE 1:1
					DRN	AD	18.09.19	DRG. NO.			
					CHKD	SP	18.09.19				
					APPD	HS	17.09.19	PSF/6HF20/GA-01			REV 0
REV				DESCRIPTION	DRN	CHKD	DATE				

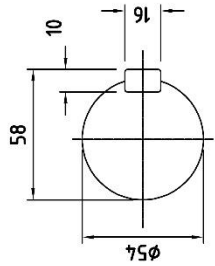
DEL 1500	ANSI 250#FF	12-1/2"	10-5/8"	1-7/16"	12, Ø7/8"	---	---
SUC 2000	ANSI 250#FF	15"	13"	1-5/8"	12, Ø1"	---	---
	TYPE OF FLANGE	O.D.	P.C.D.	THK MIN	NO & HOLE Ø	RFØ	RF THK
							RF FLANGE

PUMP MODEL - 6HF21

GENERAL ARRANGEMENT DRAWING FOR SINGLE STAGE AXIALLY SPLIT CASE PUMP MODEL - 6HF21



CLOCK-WISE ROTATION  
LOOKING FROM DRIVE END



SCALE - 5:1  
DETAIL OF SHAFT  
AT COUPLING END

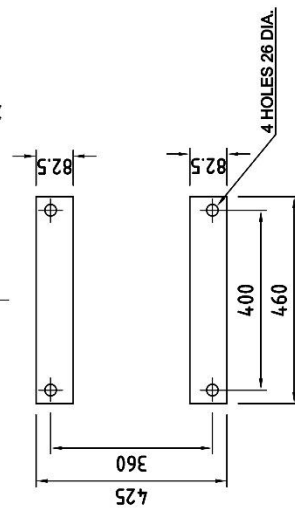
VIEW IN DIRECTION OF 'Z'

APPROX. NET WEIGHT - 600kg.  
ALL DIMENSIONS ARE IN MM.

CONNECTION	
ITEM	DESCRIPTION
GD	GLAND DRAIN
CG	COMPOUND GAUGE FOR SUCTION
PG	PRESSURE GAUGE FOR DELIVERY
AC	AIR COCK
PM	PRIMING
CDS	CASING DRAIN(SUCTION SIDE)
CDD	CASING DRAIN(DELIVERY SIDE)

\*\* GAUGE CONNECTIONS DRILLED AND TAPPED ONLY  
WHEN SPECIFICALLY REQUESTED BY THE CUSTOMER.

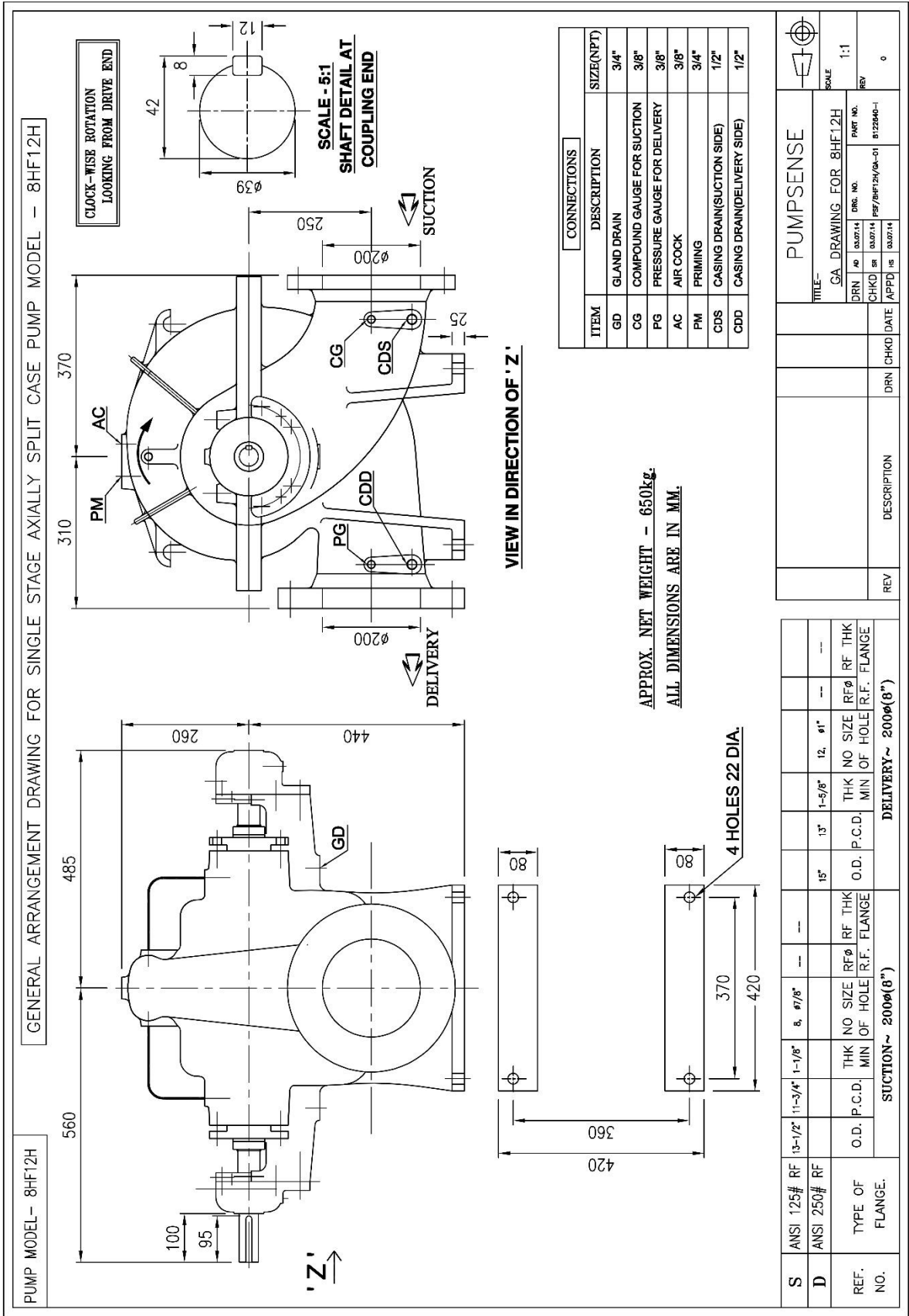
PLAN OF PUMP FEET



S	PN 16	340	295	24	12, Ø22	—	—	—	—	—	—	—	—
D	PN 16	—	—	—	—	285	240	22	8, Ø22	—	—	—	—
REF. TYPE OF NO. FLANGE		O.D.	P.C.D.	THK NO. SIZE RF ØRF.THK MIN OF HOLE RF FLANGE		O.D.	P.C.D.	THK NO. SIZE RF ØRF.THK MIN OF HOLE RF FLANGE		DELIVERY - Ø150( 6" )			

REV	DESCRIPTION	TOLERANCE	DRN	CHKD	DATE

TITLE-		PUMPSE		SCALE	
GA DRG. FOR 6HF21		1:1		REV	
DRG. NO.	8172640	REV	0		
PS/6HF21/GA-01					

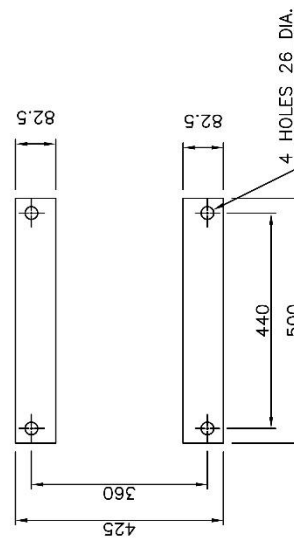


GENERAL ARRANGEMENT DRAWING FOR SINGLE STAGE AXIALLY SPLIT CASE PUMP MODEL – 8HF13



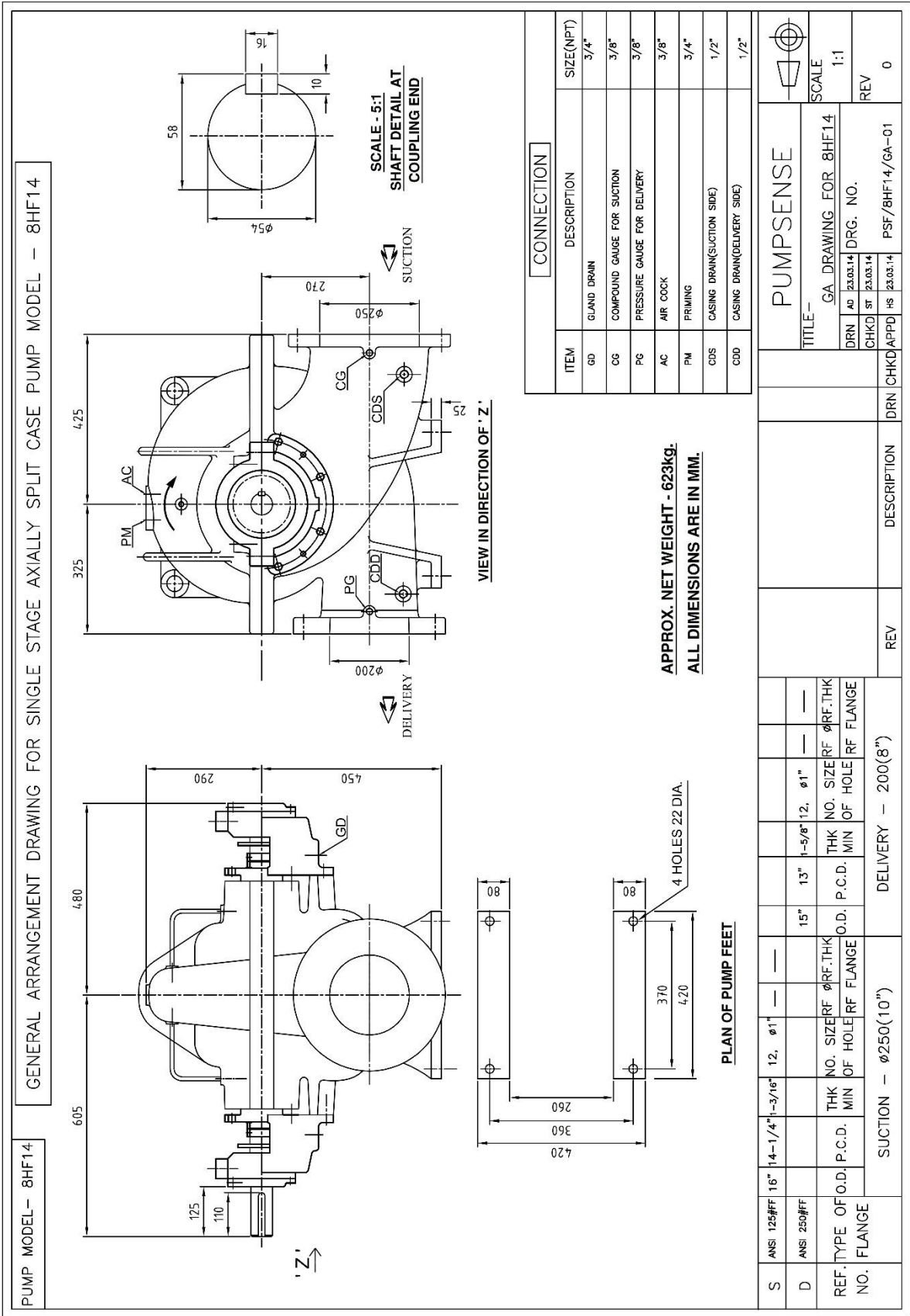
CONNECTIONS		
ITEM	DESCRIPTION	SIZE(NPT)
GD	GLAND DRAIN	3/4"
CG	COMPOUND GAUGE FOR SUCTION	3/8"
PG	PRESSURE GAUGE FOR DELIVERY	3/8"
AC	AIR COCK	3/8"
PM	PRIMING	1"
CDS	CASING DRAIN(SUCTION SIDE)	3/4"
CDD	CASING DRAIN(DELIVERY SIDE)	3/4"

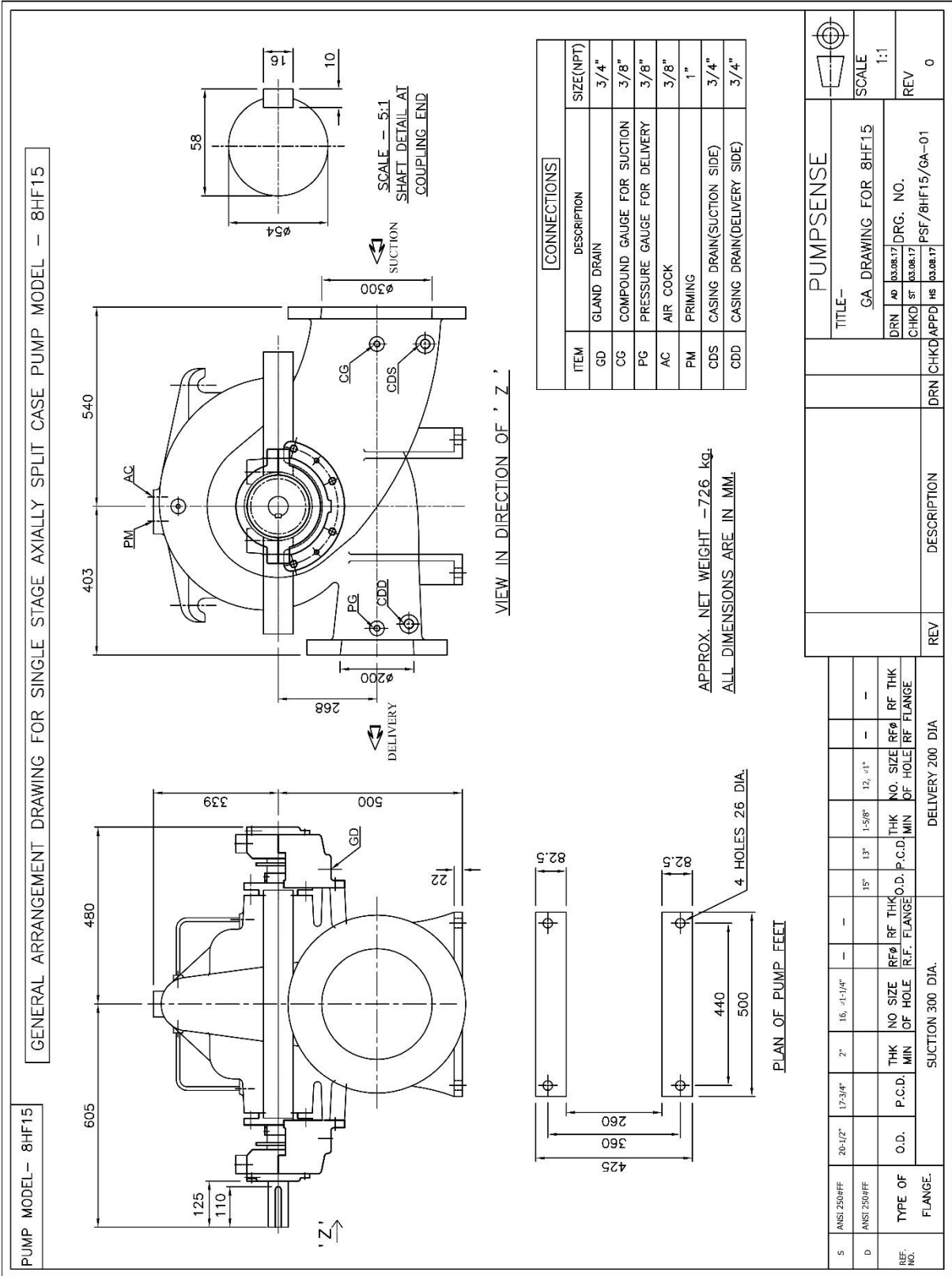
APPROX. NET WEIGHT - 620.5kg.  
ALL DIMENSIONS ARE IN MM.



PLAN OF PUMP FEET

[illegible]



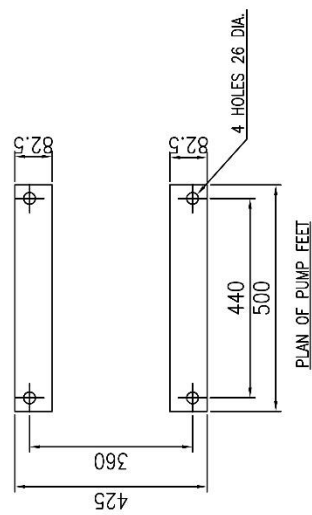




GENERAL ARRANGEMENT DRAWING FOR SINGLE STAGE AXIALLY SPLIT CASE PUMP MODEL - 8HF17



APPROX. NET WEIGHT - 615kg.  
ALL DIMENSIONS ARE IN MM.

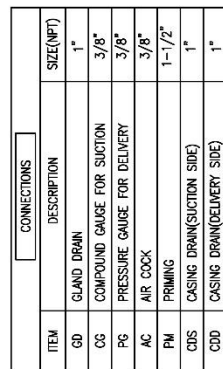


CONNECTION			SIZE(NPT)
ITEM	DESCRIPTION		
GD	GLAND DRAIN		3/4"
CG	COMPOUND GAUGE FOR SUCTION		3/8"
PG	PRESSURE GAUGE FOR DELIVERY		3/8"
AC	AIR COCK		3/8"
PM	PRIMING		1"
CDS	CASING DRAIN(SUCTION SIDE)		3/4"
CDD	CASING DRAIN(DELIVERY SIDE)		3/4"

**\*\* GAUGE CONNECTIONS DRILLED AND TAPPED ONLY WHEN SPECIFICALLY REQUESTED BY THE CUSTOMER.**

[illegible]

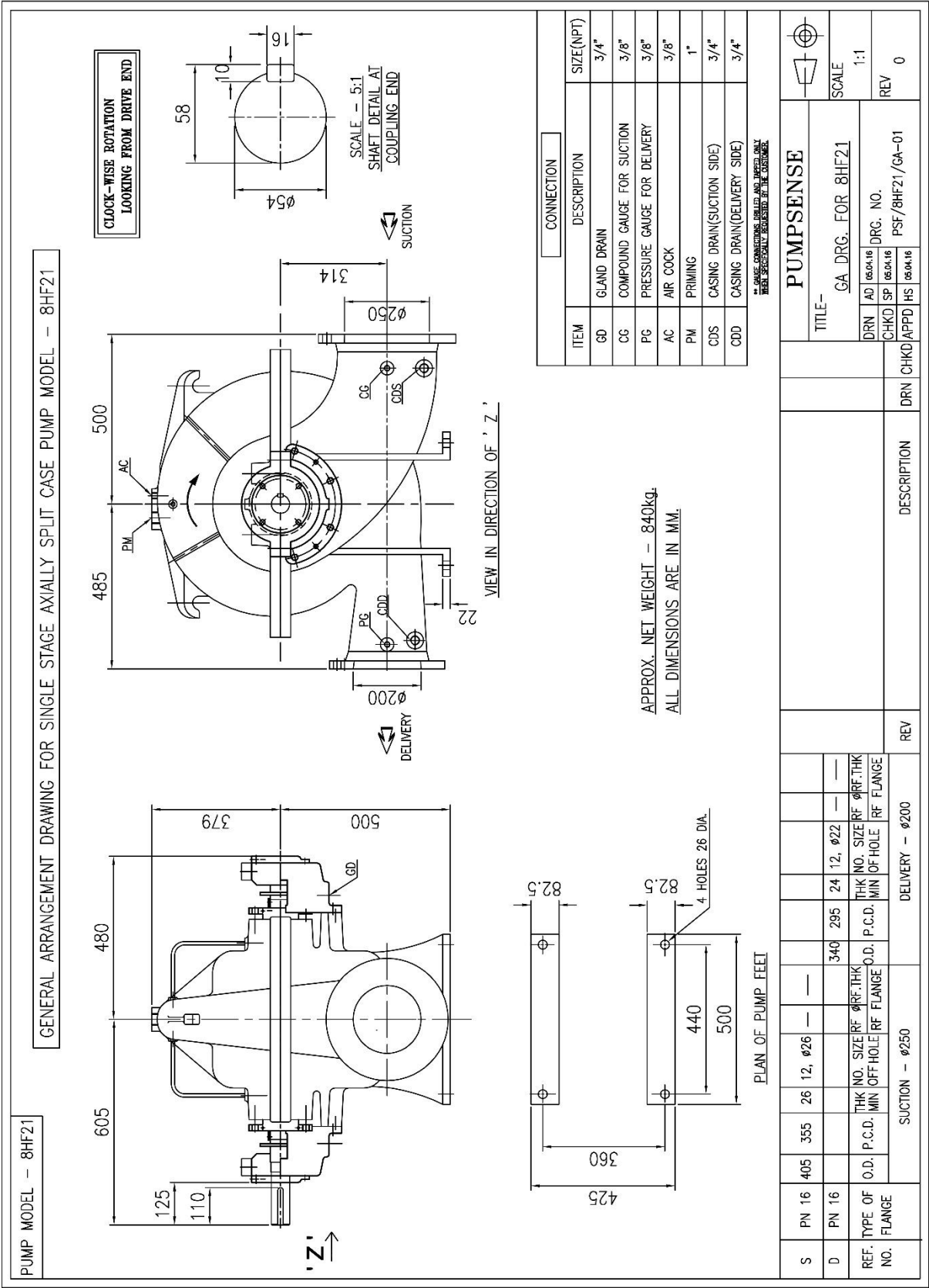
GENERAL ARRANGEMENT DRAWING FOR SINGLE STAGE AXIALLY SPLIT CASE PUMP MODEL - 8HF20



APPROX. NET WEIGHT - 750kg.  
ALL DIMENSIONS ARE IN MM.

PLAN OF PUMP FEET												
S	ANSI#250	17-1/2'	15-1/4'	1-7/8'	16, Ø1-1/8"	—	—	—	—	—	—	—
D	ANSI#250											
REF.	TYPE OF	O.D.	P.C.D.	THK	NO SIZE OF HOLE	RFØ	RF THK	P.C.D.	13"	1-5/8"	12, Ø1'	RF THK
NO.	FLANGE.				MIN OFF C/L	R.F.	FLANGE	O.D.			MIN OFF C/L	R.F. FLANGE
SUCTION – Ø250							DELIVERY – Ø200					

PROJECT NAME-		JOB NO. -	
PUMPSENSE			
TITLE-			
GA DRG. FOR 8HF20			
SCALE		1:1	
DRN		DRG. NO.	
AD	18.06.19	CHKD	18.06.19
APPD	18.06.19	DATE	18.06.19
REV	0	REV	0



GENERAL ARRANGEMENT DRAWING FOR SINGLE STAGE AXIALLY SPLIT CASE PUMP MODEL – 10HF20



**PUMP WEIGHT = 1000kg**  
**ALL DIMENSIONS ARE IN MM.**

CONNECTIONS		ITEM	DESCRIPTION	SIZE(NPT)
		GD	GLAND DRAIN	1"
		CG	COMPOUND GAUGE FOR SUCTION	3/8"
		PG	PRESSURE GAUGE FOR DELIVERY	3/8"
		AC	AIR COCK	3/8"
		PM	PRUING	1-1/2"
		CDS	CASING DRAIN(SUCTION SIDE)	1"
		DD	CASING DRAIN(DELIVERY SIDE)	1"

**\*\* CABLE CONNECTIONS REQUIRED AND TAPPED ONLY WHEN SPECIFICALLY REQUESTED BY THE CUSTOMER.**

S	ANSI#250	23"	20-1/4"	2-1/8"	Ø1-1/4"	—	—	—	—	—	—	—
D	ANSI#250											
REF.	TYPE OF FLANGE.	O.D.	P.C.D.	THK MIN	NO SIZE OFF C/L	R.F. THK R.F. FLANGE	RF Ø	RF THK	NO SIZE OFF HOLE	THK MIN	Ø1-7/8"	RF THK R.F. FLANGE
NO.												

**SUCTION - ø350      DELIVERY - ø250**

PROJECT NAME-						JOB NO.-	
PUMPSENSE							
TITLE-							
GA DRG. FOR 10HF20							
DRN	REV	DATE	CHKD	APPD	DRG. NO.	SCALE	
18.09.14	18.09.14	18.09.14	18.09.14	18.09.14	BZ7G41CY	1:1	
						REV	0

GENERAL ARRANGEMENT DRAWING FOR SINGLE STAGE AXIALLY SPLIT CASE PUMP MODEL – 10HF22



**PUMP WEIGHT = 1208 kg**  
**ALL DIMENSIONS ARE IN MM.**

CONNECTIONS			SIZE(WPT)
ITEM	DESCRIPTION		
G0	GLAND DRAIN		1"
G5	COMPOUND GAUGE FOR SUCTION		3/8"
PG	PRESSURE GAUGE FOR DELIVERY		3/8"
AC	AIR COCK		3/8"
PM	PRIMING		1-1/2"
C05	CASING DRAIN(SUCTION SIDE)		1"
C00	CASING DRAIN(DELIVERY SIDE)		1"

**ALL GAUGE CONNECTIONS MUST BE MADE AND TAPPED ONLY FROM BOTTOM OF GAUGE. NEVER REACHED BY THE CONTROLLER.**

S	ANSI#250	23"	20-1/4"	2-1/8"	20, Ø1-1/4"	—	—	17-1/2"	15-1/4"	1-7/8"	16, Ø1-1/8"	—	—
D	ANSI#250												
REF.	TYPE OF FLANGE.	O.D.	P.C.D.	THK MIN	NO SIZE OF HOLE	RF Ø	RF THK	O.D.	P.C.D.	THK MIN	NO SIZE OF HOLE	RF Ø	RF THK
NO.													

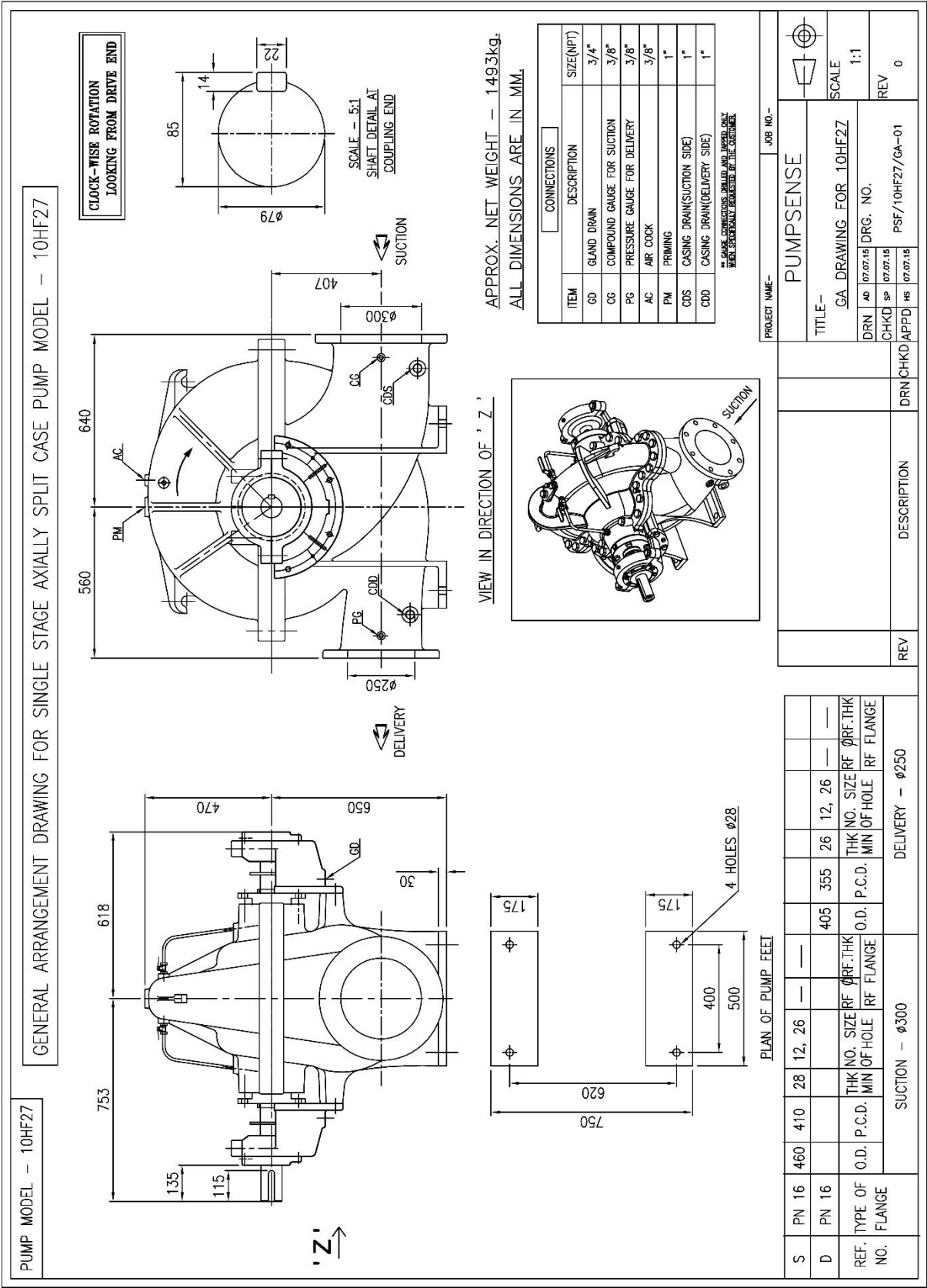
**SECTION - ø350**

**DELIVERY - ø250**

**GA DRG. FOR 10HP22**

**SCALE 1:1**

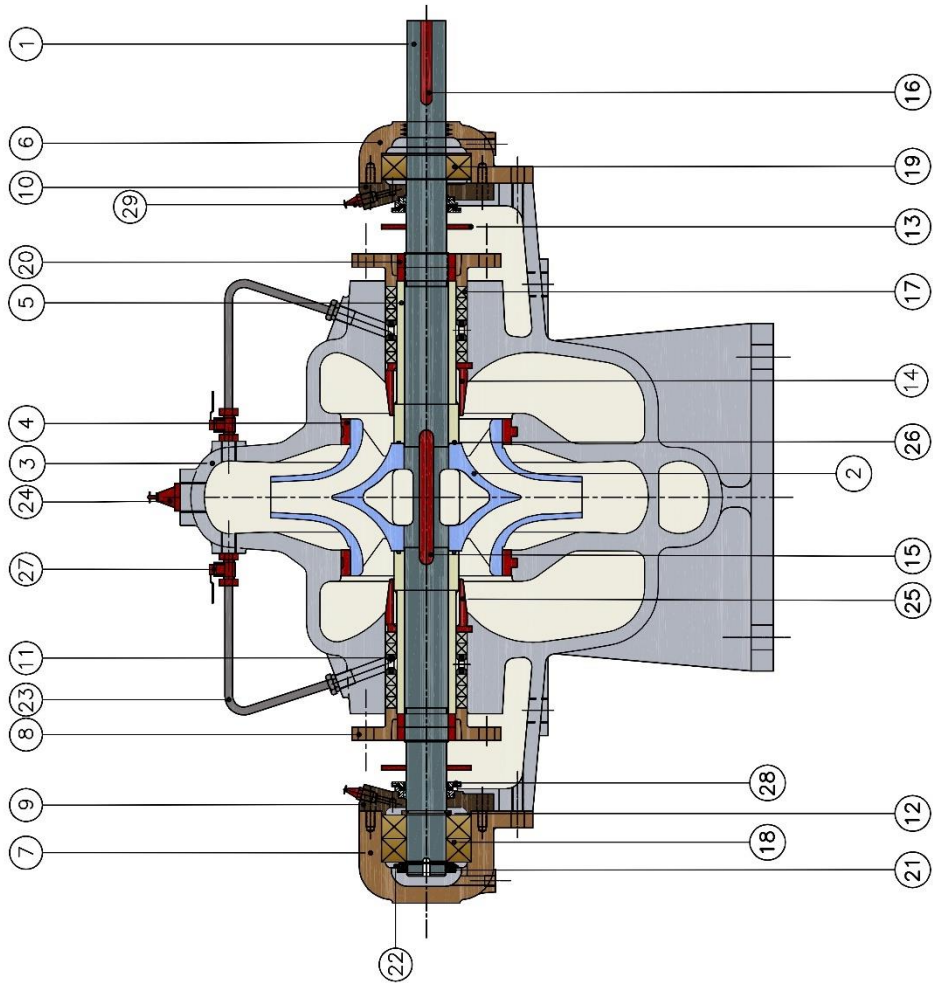
**REV 0**





13. Sectional Drawings

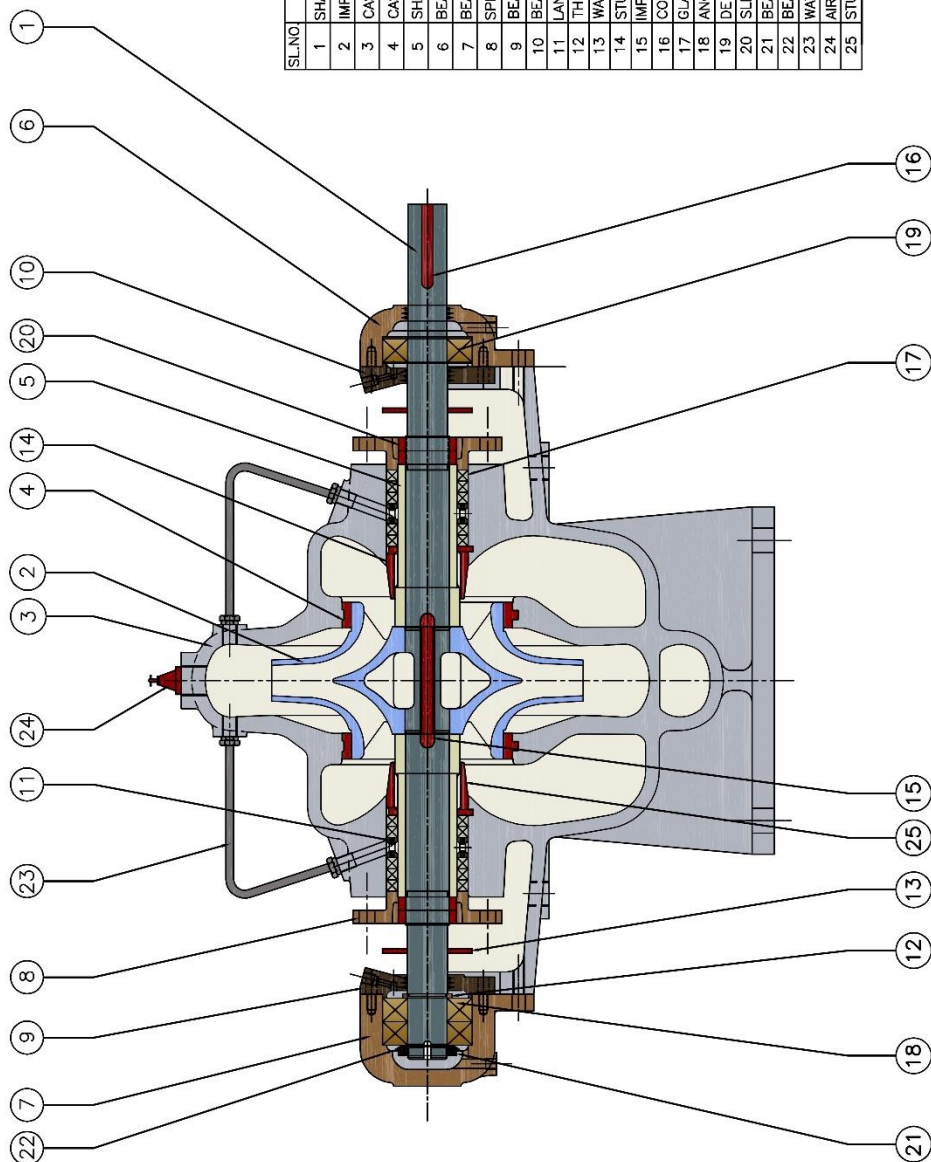
CROSS SECTIONAL DRAWING FOR SINGLE STAGE NFPA20 HORIZONTAL SPLIT CASE PUMP WITH  
PACKED GLAND & STUFFING BOX BUSH AND ISOLATOR



SL.NO	DESCRIPTION	QTY.	PART NO.
1	SHAFT	1	101-I
2	IMPELLER	1	102-I
3	CASING	1	183-I
4	CASING WEAR RING	2	129-I
5	SHAFT SLEEVE	2	150-I
6	BEARING HOUSING (P.E)	1	256-I
7	BEARING HOUSING (F.E)	1	270-I
8	SPLIT GLAND	2	144-I
9	BEARING END COVER (F.E.) INNER	1	277-I
10	BEARING END COVER (P.E.) INNER	1	276-I
11	LANTERN RING	2	149-I
12	THRUST COLLAR	1	125-I
13	WATER THROWER	2	145-I
14	STUFFING BOX BUSH (P.E)	1	260-I
15	IMPELLER KEY	1	180-I
16	COUPLING KEY	1	138-I
17	GLAND PACKING	-	143-I
18	ANGULAR CONTACT BALL BEARING (F.E)	2	257-I
19	DEEP GROOVE BALL BEARING (P.E)	1	272-I
20	SLEEVE NUT (L.H & R.H)	2+2	146-I
21	BEARING LOCK NUT	1	141-I
22	BEARING LOCK WASHER	1	142-I
23	WATER SEALING PIPE	2	118-I
24	AIR RELEASE COCK	1	114-I
25	STUFFING BOX BUSH (F.E)	1	292-I
26	O' RING FOR SLEEVE	2	156-I
27	BALL VALVE	2	-
28	BEARING ISOLATOR	2	-
29	GREASE NIPPLE	2	258-I

\*\* P.E- POWER END , F.E -FREE END.

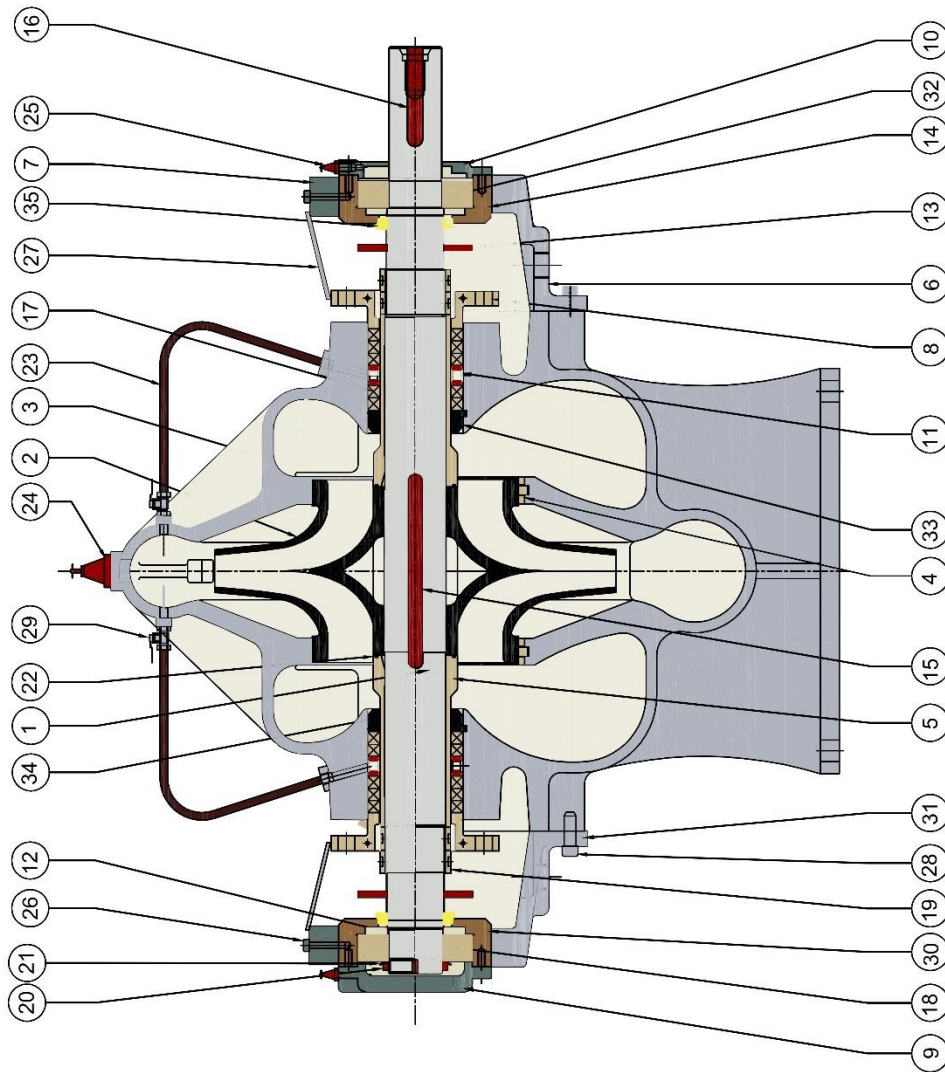
# CROSS-SECTIONAL DRAWING FOR NFPA 20 SINGLE STAGE FIRE PUMP WITH PACKED GLAND



SL.NO	DESCRIPTION	QTY.	PART NO.
1	SHAFT	1	101-I
2	IMPELLER	1	102-I
3	CASING	1	183-I
4	CASING WEAR RING	2	129-I
5	SHAFT SLEEVE	2	150-I
6	BEARING HOUSING (P.E)	1	256-I
7	BEARING HOUSING (F.E)	1	270-I
8	SPLIT GLAND	2	144-I
9	BEARING END COVER (F.E.) INNER	1	277-I
10	BEARING END COVER (P.E.) INNER	1	276-I
11	LANTERN RING	2	149-I
12	THRUST COLLAR	1	125-I
13	WATER THROWER	2	145-I
14	STUFFING BOX BUSH (P.E)	1	260-I
15	IMPELLER KEY	1	180-I
16	COUPLING KEY	1	138-I
17	GLAND PACKING	-	143-I
18	ANGULAR CONTACT BALL BEARING (F.E)	2	257-I
19	DEEP GROOVE BALL BEARING (P.E)	1	272-I
20	SLEEVE NUT (L.H & R.H)	2+2	146-I
21	BEARING LOCK NUT	1	141-I
22	BEARING LOCK WASHER	1	142-I
23	WATER SEALING PIPE	2	118-I
24	AIR RELEASE COCK	1	114-I
25	STUFFING BOX BUSH (F.E)	1	292-I

\*\* P.E.-POWER END ; F.E.-FREE END.

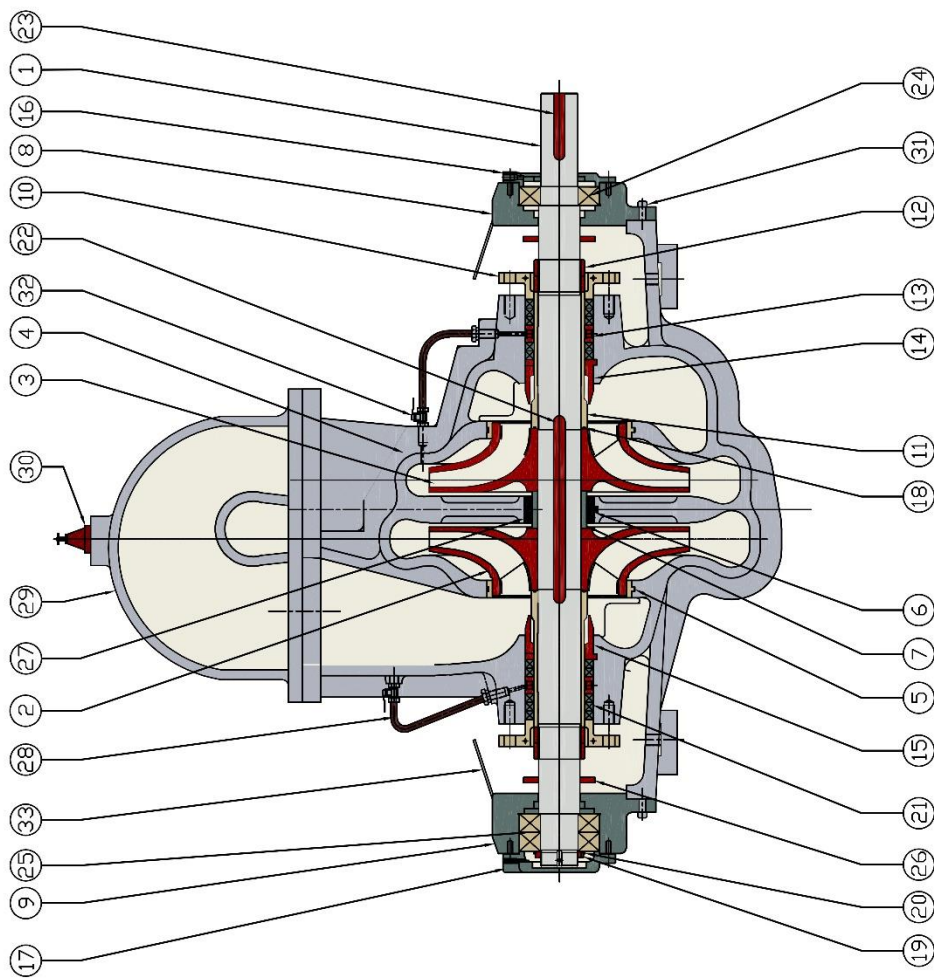
CROSS SECTIONAL DRAWING FOR SINGLE STAGE HORIZONTAL SPLIT CASE PUMP WITH PACKED GLAND & STUFFING BOX BUSH AND ISOLATOR



SL.NO	DESCRIPTION	QTY.	PART NO.
1	SHAFT	1	101
2	IMPELLER	1	102
3	CASING	1	183
4	CASING WEAR RING	2	129
5	SHAFT SLEEVE	2	150
6	BEARING BRACKET (P.E)	1	254
7	BEARING BRACKET TOP CLAMP	2	255
8	SPLIT GLAND	2	144
9	BEARING END COVER (F.E.)	1	133
10	BEARING END COVER (P.E.)	1	134
11	LANTERN RING	2	149
12	THRUST COLLAR	1	125
13	WATER THROWER	2	145
14	BEARING HOUSING (P.E)	1	256
15	IMPELLER KEY	1	180
16	COUPLING KEY	1	138
17	GLAND PACKING	—	143
18	DEEP GROOVE BALL BEARING (F.E)	1	257
19	SLEEVE NUT (L-H & R.H)	2+2	146
20	LOCK NUT	1	141
21	LOCK WASHER	1	142
22	O-RING (SLEEVE)	2	156
23	WATER SEALING PIPE	2	118
24	AIR RELEASE COCK	1	114
25	GREASE NIPPLE	2	258
26	LOCKING PIN FOR TOP CLAMP	2	259
27	SHAFT GUARD	2	252
28	DOWEL PIN FOR BEARING BRACKET	4	245
29	BALL VALVE	2	—
30	BEARING HOUSING (F.E)	1	270
31	BEARING BRACKET (F.E)	1	271
32	DEEP GROOVE BALL BEARING (P-E)	1	272
33	STUFFING BOX BUSH (P.E)	1	260
34	STUFFING BOX BUSH (F.E)	1	282
35	BEARING ISOLATOR	2	—

\*\* P.E- POWER END , F.E -FREE END.

CROSS SECTIONAL DRAWING FOR SINGLE ENTRY IMPELLER WITH EXTERNAL  
CROSS-OVER TWO STAGE PUMP WITH PACKED GLAND

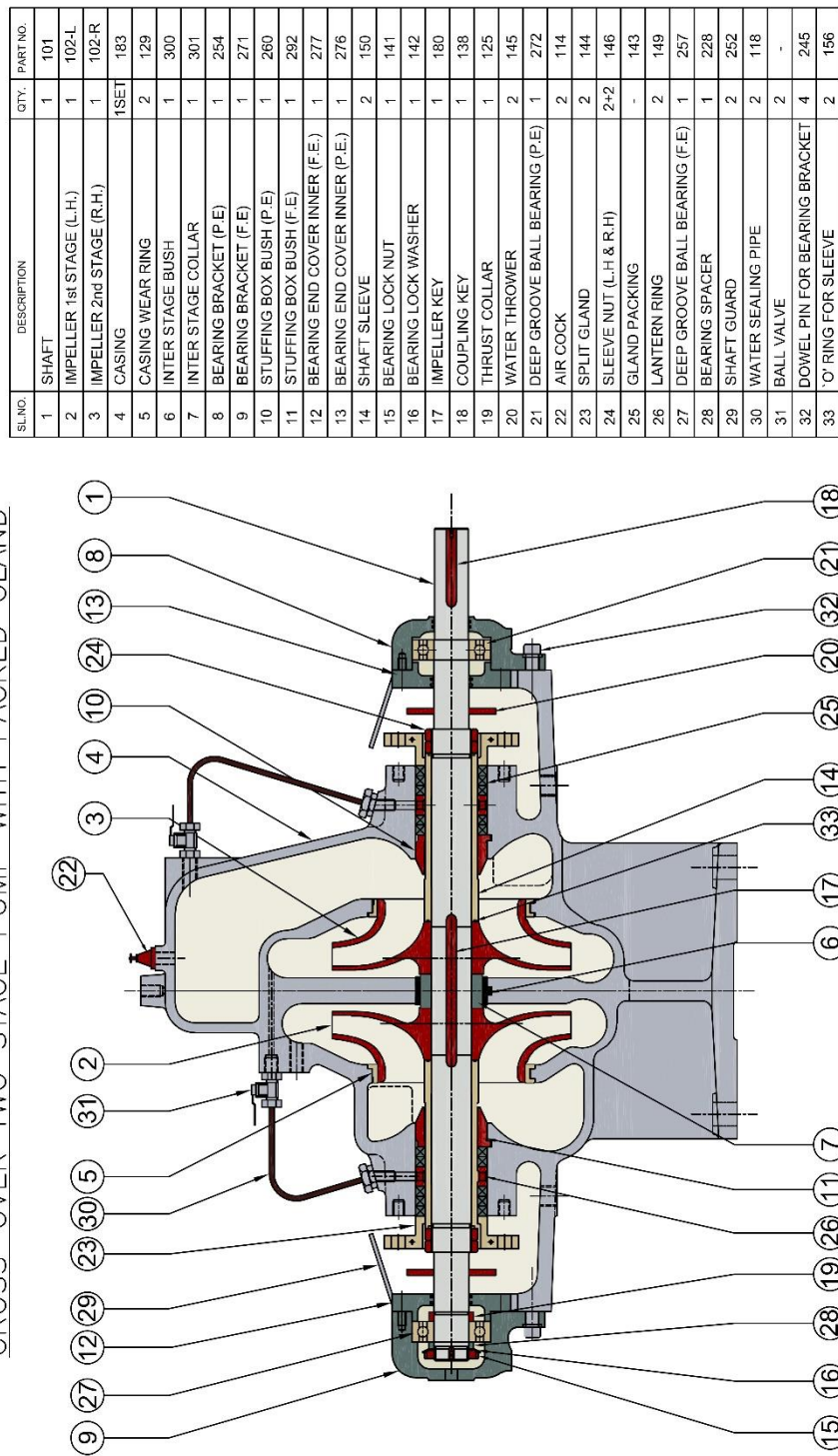


SL. NO.	DESCRIPTION	QTY.	PART NO.
1	SHAFT	1	101
2	IMPELLER 1st STAGE (L.H.)	1	102-L
3	IMPELLER 2nd STAGE (R.H.)	1	102-R
4	CASING	1	183
5	CASING WEAR RING	2	129
6	INTER STAGE BUSH	1	300
7	INTER STAGE COLLAR	1	301
8	BEARING BRACKET (P.E)	1	254
9	BEARING BRACKET (F.E)	1	271
10	SPLIT GLAND	2	144
11	SHAFT SLEEVE	2	150
12	SLEEVE NUT (L.H & R.H)	2+2	146
13	LANERN RING	2	149
14	STUFFING BOX BUSH (P.E)	1	260
15	STUFFING BOX BUSH (F.E)	1	292
16	BEARING END COVER OUTER (P.E)	1	134
17	BEARING END COVER OUTER (F.E)	1	133
18	'O' RING FOR SLEEVE	2	156
19	BEARING LOCK NUT	1	141
20	BEARING LOCK WASHER	1	142
21	GLAND PACKING	-	143
22	IMPELLER KEY	1	180
23	COUPLING KEY	1	138
24	BEARING AT POWER END	1	272
25	BEARING AT FREE END	2	257
26	WATER THROWER	2	145
27	'O' RING FOR INTER STAGE BUSH	1	305
28	WATER SEALING PIPE	2	118
29	EXTERNAL CROSS OVER	1	306
30	AIR COCK	1	114
31	DOWEL PIN FOR BEARING BRACKET	4	245
32	BALL VALVE	2	-
33	SHAFT GUARD	2	252

\*\* P.E- POWER END , F.E -FREE END.

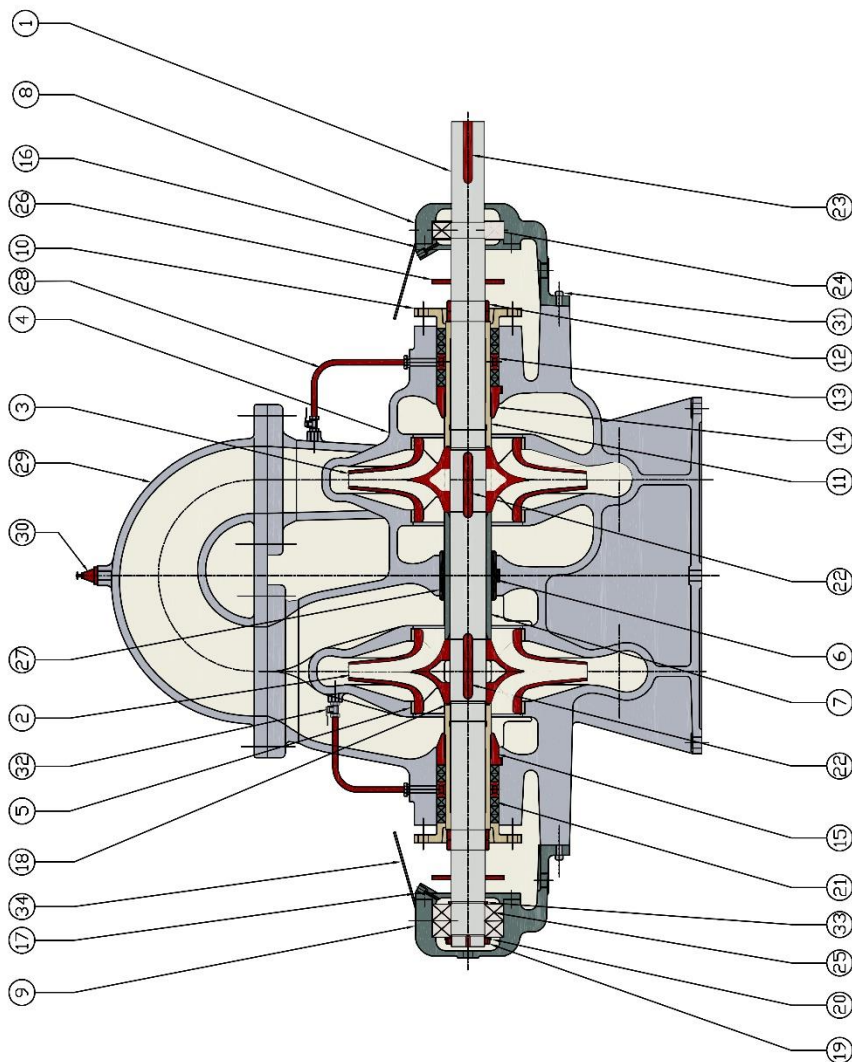


CROSS SECTIONAL DRAWING FOR SINGLE ENTRY IMPELLER WITH INTERNAL  
CROSS-OVER TWO STAGE PUMP WITH PACKED GLAND



\*\* P.E. - POWER END , F.E. -FREE END.

TWO STAGE FIRE PUMP WITH TWO DOUBLE ENTRY IMPELLERS WITH PACKED GLAND



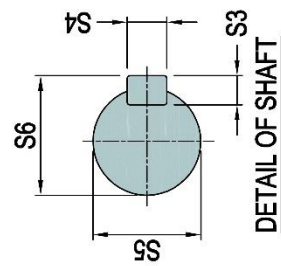
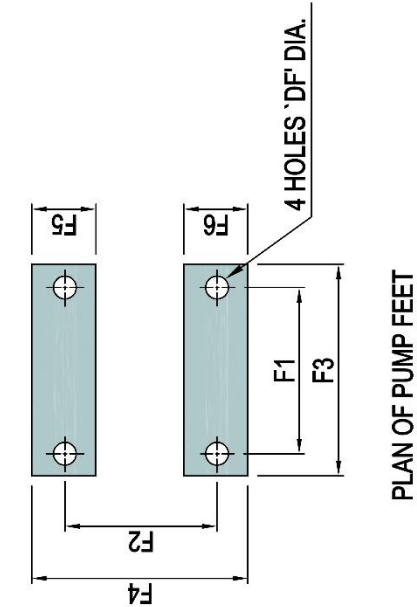
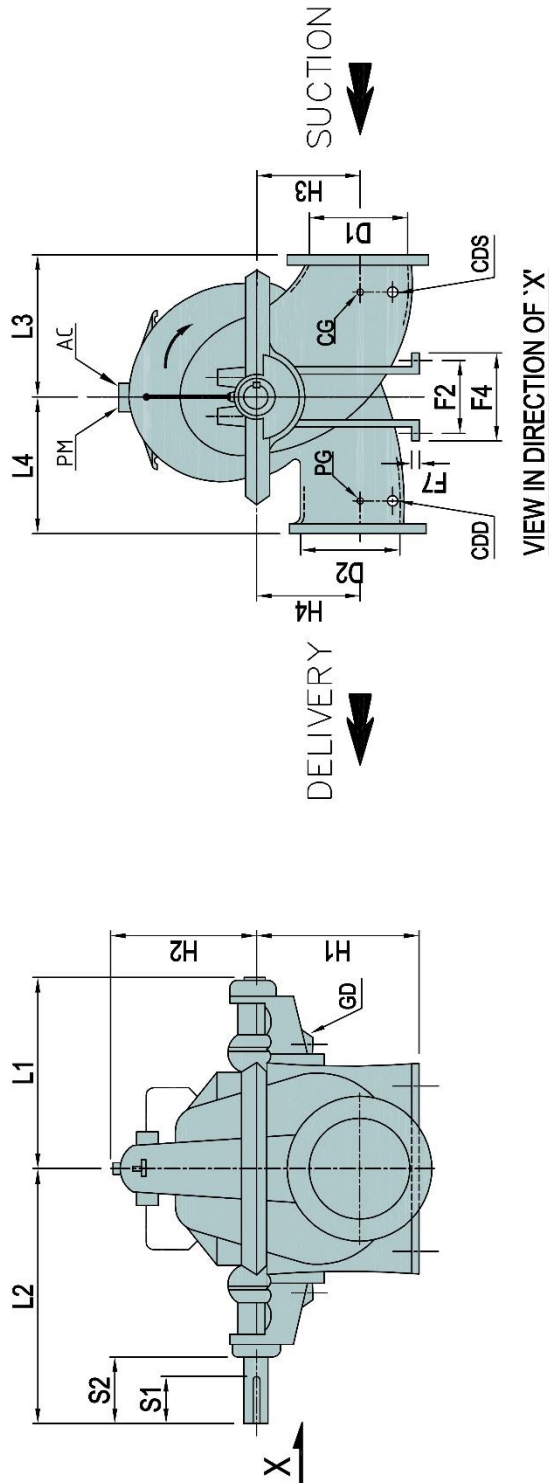
SL NO.	DESCRIPTION	QTY.	PART NO.
1	SHAFT	1	101
2	IMPELLER 1st STAGE (L.H.)	1	102-L
3	IMPELLER 2nd STAGE (R.H.)	1	102-R
4	CASING	1	183
5	CASING WEAR RING	4	129
6	INTER STAGE BUSH	1	300
7	INTER STAGE COLLAR	1	301
8	BEARING BRACKET (P.E)	1	254
9	BEARING BRACKET (F.E)	1	271
10	SPLIT GLAND	2	144
11	SHAFT SLEEVE	2	150
12	SLEEVE NUT (L.H & R.H)	2+2	146
13	LANTERN RING	2	149
14	STUFFING BOX BUSH (P.E)	1	260
15	STUFFING BOX BUSH (F.E)	1	292
16	BEARING END COVER INNER (P.E)	1	276
17	BEARING END COVER INNER (F.E)	1	277
18	'O' RING FOR SLEEVE	2	156
19	BEARING LOCK NUT	1	141
20	BEARING LOCK WASHER	1	142
21	GLAND PACKING	-	143
22	IMPELLER KEY	2	180
23	COUPLING KEY	1	138
24	BEARING AT POWER END	1	272
25	BEARING AT FREE END	2	257
26	WATER THROWER	2	145
27	'O' RING FOR INTER STAGE BUSH	1	305
28	WATER SEALING PIPE	2	118
29	EXTERNAL CROSS OVER	1	306
30	AIR COCK	1	114
31	DOWEL PIN FOR BEARING BRACKET	4	245
32	BALL VALVE	2	-
33	THRUST COLLAR	1	125
34	SHAFT GUARD	2	252

\*\* P.E - POWER END , F.E -FREE END.



# 14. Common GA and Dimensional Sheet

## DIMENSIONS OF NFPA20 SINGLE STAGE HORIZONTAL SPLITCASE PUMPS - SERIES HF



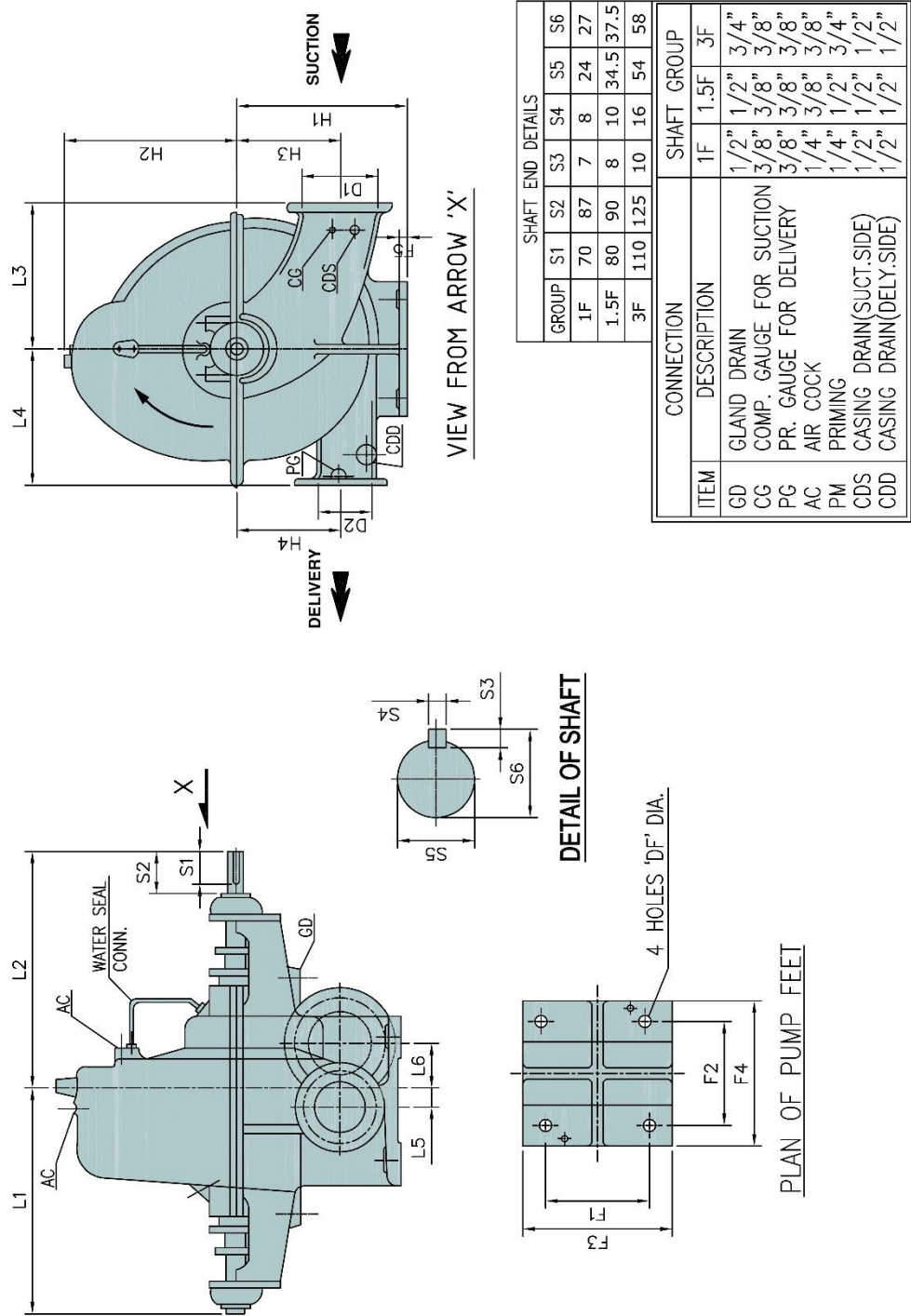
SHAFT END DETAILS						
GROUP	S1	S2	S3	S4	S5	S6
1.5F	75	90	8	10	34.5	37.5
2F	95	100	8	12	39	42
3F	110	125	10	16	54	58
4F	130	148	12	20	69	74
5F	115	135	14	22	79	85

CONNECTION		SHAFT GROUP				
ITEM	DESCRIPTION	1.5F	2F	3F	4F	5F
GD	GLAND DRAIN	1/2"	3/4"	3/4"	1"	3/4"
CG	COMP. GAUGE FOR SUCTION	3/8"	3/8"	3/8"	3/8"	3/8"
PG	PR. GAUGE FOR DELIVERY	3/8"	3/8"	3/8"	3/8"	3/8"
AC	AIR COCK	3/8"	3/8"	3/8"	3/8"	3/8"
PM	PRIMING	1/2"	3/4"	1"	1 1/2"	1"
CDS	CASING DRAIN (SUC. SIDE)	1/2"	3/4"	3/4"	1"	1"
CDD	CASING DRAIN (DEL. SIDE)	1/2"	3/4"	3/4"	1"	1"

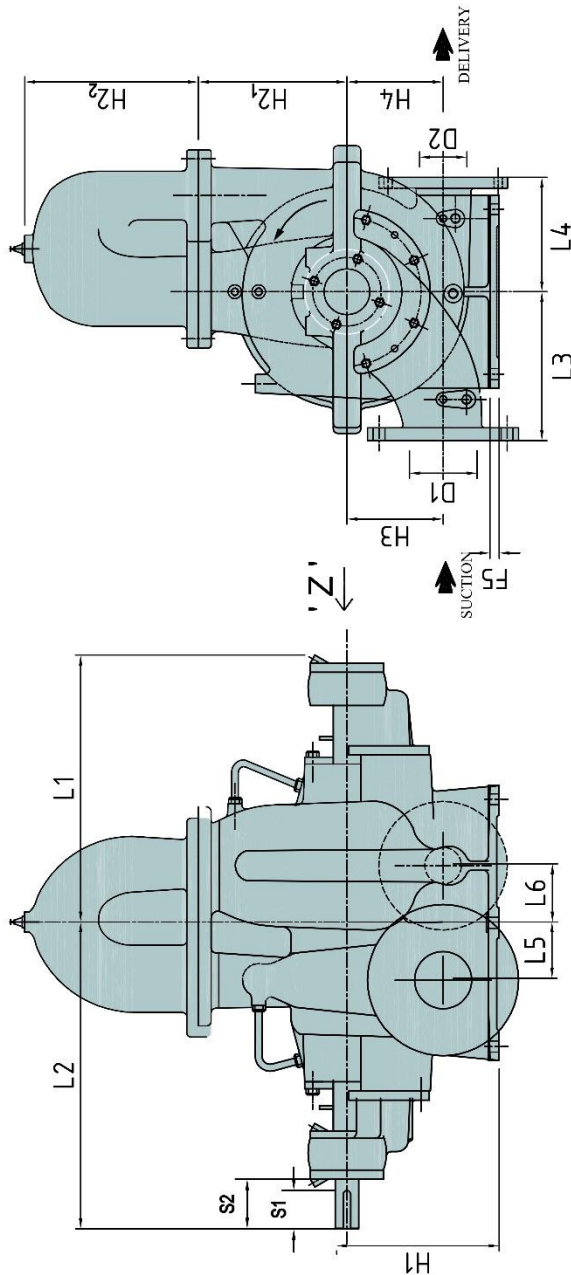
**DIMENSION SHEET FOR NFPA20 SINGLE STAGE HORIZONTAL SPLIT CASE PUMPS**

No	PUMP MODEL	SIZE		SHAFT GROUP	OVERALL DIMENSIONS								MOUNTING DIMENSIONS										SHAFT END						APPROX WT(Kg)
		D1	D2		H1	H2	H3	H4	L1	L2	L3	L4	F1	F2	F3	F4	F5	F6	F7	DF	S1	S2	S3	S4	S5	S6			
1	3HF12	100	80	1.5F	300	218	190	190	362	425	280	250	200	210	270	260	62.5	62.5	25	20	75	90	8	10	34.5	37.5	200		
2	4HF10	150	100	1.5F	280	200	180	180	362	425	280	250	200	210	270	260	62.5	62.5	25	20	75	90	8	10	34.5	37.5	150		
3	4HF12L	150	100	1.5F	310	223	180	180	362	425	330	295	250	285	310	350	82.5	82.5	25	20	75	90	8	10	34.5	37.5	224		
4	4HF12	150	100	1.5F	310	223	180	180	362	425	330	295	250	285	310	350	82.5	82.5	25	20	75	90	8	10	34.5	37.5	224		
5	4HF13	150	100	2F	375	266	222	222	485	560	400	292	370	360	420	420	80	80	25	22	95	100	8	12	39	42	285		
6	4HF16	150	100	2F	350	275	230	230	485	560	415	310	370	360	420	420	80	80	25	22	95	100	8	12	39	42	230		
7	5HF11	150	125	2F	375	253	212	212	485	560	345	270	370	360	420	420	80	80	25	22	95	100	8	12	39	42	353		
8	6HF12	200	150	2F	375	245	228	228	452	552	370	330	370	360	420	420	80	80	20	22	95	100	8	12	39	42	392		
9	6HF13	200	150	3F	400	275	240	240	525	615	390	325	370	360	420	420	80	80	25	22	110	125	10	16	54	58	464		
10	6HF14K	200	150	2F	375	282	225	225	485	560	415	370	360	360	420	420	80	80	20	18	95	100	8	12	39	42	407		
11	6HF15	200	150	2F	375	265	230	230	485	560	400	300	360	360	420	425	82.5	82.5	25	22	95	100	8	12	39	42	400		
12	6HF18	200	150	3F	410	329	270	270	480	605	442	360	400	360	460	425	82.5	82.5	23	28	110	125	10	16	54	58	660		
13	6HF20	200	150	3F	500	416	320	320	435	605	500	430	480	400	540	465	82.5	82.5	25	26	110	125	10	16	54	58	550		
14	6HF21	200	150	3F	460	365	320	320	480	605	440	430	400	360	460	425	82.5	82.5	23	28	110	125	10	16	54	58	600		
15	8HF12H	200	200	2F	440	260	250	250	485	560	370	310	370	360	420	420	80	80	25	22	95	100	8	12	39	42	650		
16	8HF13	250	200	3F	410	304	235	235	480	605	465	385	440	360	500	425	82.5	82.5	25	26	110	125	10	16	54	58	620		
17	8HF14	250	200	3F	450	290	270	270	480	605	425	325	370	360	420	420	80	80	25	22	110	125	10	16	54	58	623		
18	8HF15	300	200	3F	500	339	268	268	480	605	540	403	440	360	500	425	82.5	82.5	22	26	110	125	10	16	54	58	726		
19	8HF17	250	200	3F	490	340	295	295	480	605	450	365	440	360	500	425	82.5	82.5	25	26	110	125	10	16	54	58	615		
20	8HF20	250	200	4F	535	432	314	314	550	685	560	485	470	500	530	570	100	100	25	28	130	148	12	20	69	74	750		
21	8HF21	250	200	3F	500	379	314	314	480	605	500	485	440	360	500	425	82.5	82.5	22	26	110	125	10	16	54	58	840		
22	10HF20	350	250	4F	600	452	355	355	550	685	660	610	470	500	530	570	100	100	25	28	130	148	12	20	69	74	1000		
23	10HF22	350	250	4F	600	452	355	355	550	685	660	610	470	500	530	570	100	100	25	28	130	148	12	20	69	74	1208		
24	10HF27	300	250	5F	650	470	407	407	618	753	640	560	400	620	500	750	175	175	30	28	115	135	14	22	79	85	1493		

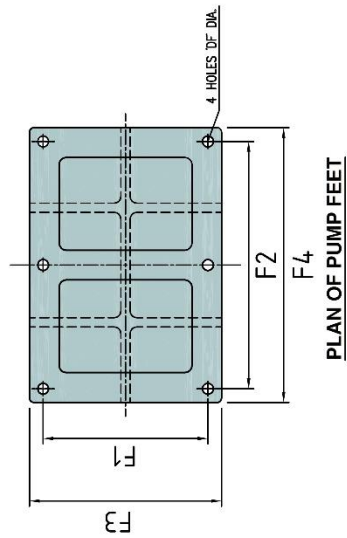
DIMENSIONS OF TWO STAGE HORIZONTAL SPLITCASE PUMPS WITH INTERNAL CROSS-OVER - SERIES HFT



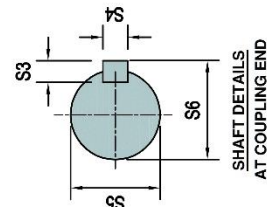
# **DIMENSIONS OF NFPA20 TWO STAGE HORIZONTAL SPLIT CASE PUMP WITH EXTERNAL CROSS-OVER-SERIES HFT**



**VIEW IN DIRECTION OF 'Z'**



**PLAN OF PUMP FEET**



**SHAFT DETAILS  
AT COUPLING END**

CONNECTION		SHAFT END DETAILS						SHAFT GROUP	
		ITEM	DESCRIPTION	2.5F	3F	3.5F	4F		
GD	GLAND DRAIN			3/4"	3/4"	3/4"	1"		
CG	COMP. GAUGE FOR SUCTION			3/8"	3/8"	3/8"	3/8"		
PG	PR. GAUGE FOR DELIVERY			3/8"	3/8"	3/8"	3/8"		
AC	AIR COCK			3/8"	3/8"	3/4"	3/8"		
PM	PRIMING			3/8"	1"	3/4"	1"		
CDS	CASING DRAIN(SUCT.SIDE)			1/2"	1/2"	1/2"	1/2"		
CDD	CASING DRAIN(DEL.SIDE)			1/2"	1/2"	1/2"	1/2"		

GROUP		S1	S2	S3	S4	S5	S6
		125	150	8	12	43	45.3
2.5F		110	138	10	16	54	58
3F		132	159	11	18	59	63
3.5F		140	185	12	20	74	78.9
4F							

**DIMENSIONAL SHEET FOR TWO STAGE PUMPS WITH TWO SINGLE SUCTION IMPELLERS HAVING INTERNAL CROSS OVER**

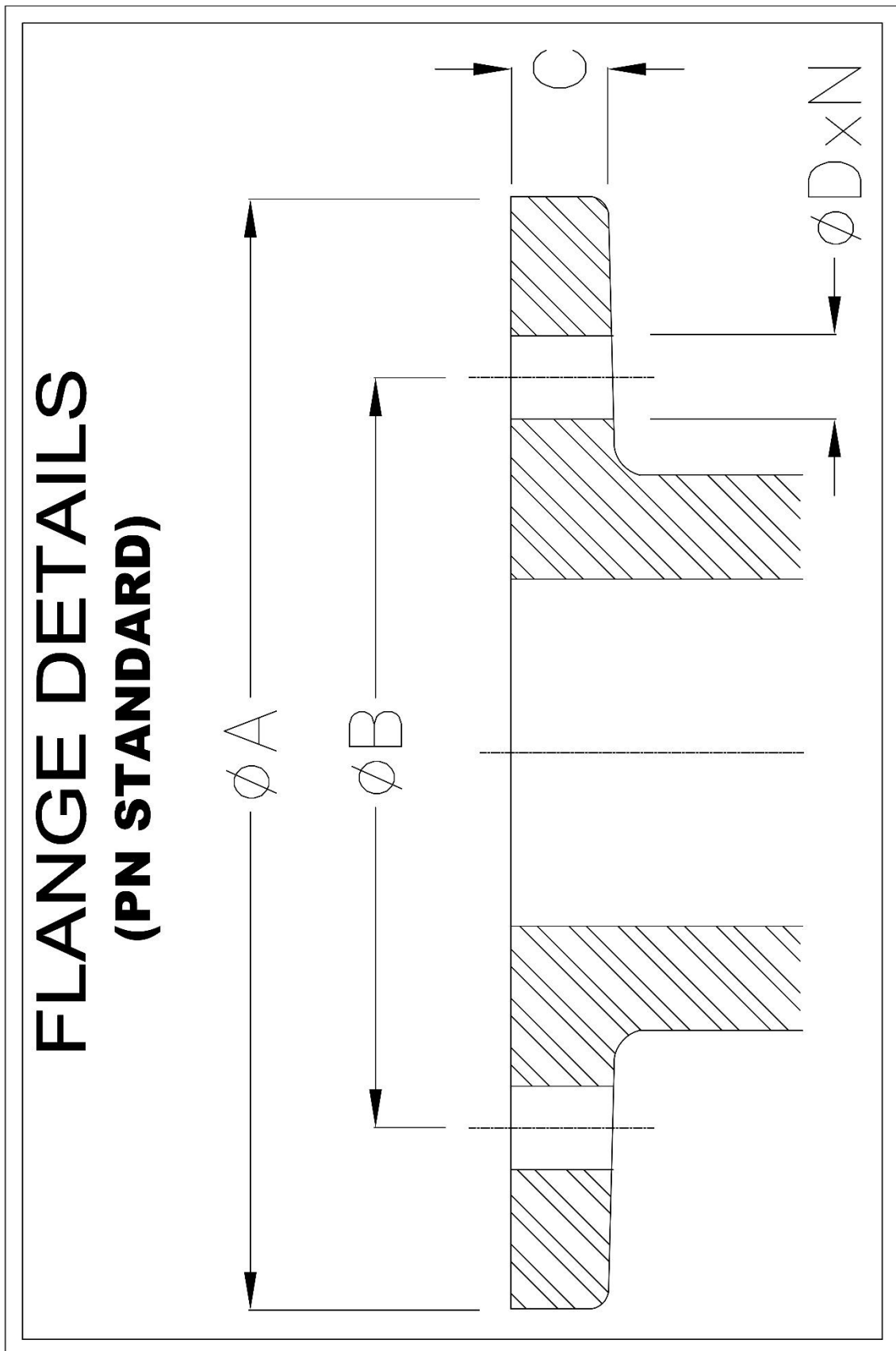
NO.	PUMP		SIZE	SHAFT	OVERALL DIMENSIONS								MOUNTING DIMENSIONS								SHAFT END						APPROX. WT. (kg)
	MODEL	D1	D2	GROUP	H1	H2	H3	H4	L1	L2	L3	L4	L5	L6	F1	F2	F3	F4	F5	DF	S1	S2	S3	S4	S5	S6	
1	2.5HFT9	80	65	1F	285	248	145	145	347	414	230	200	22.5	22.5	150	200	250	300	24	16	70	87	7	8	24	27	245
2	2.5HFT12	80	65	1.5F	340	235	185	185	395	469	290	230	60	37	180	230	250	300	20	16	80	90	8	10	34.5	37.5	225
3	3HFT11	100	80	1.5F	290	315	180	180	395	469	270	250	40	40	250	250	300	300	20	24	80	93	8	10	34.5	37.5	312
4	4HFT14	150	100	3F	400	440	230	230	552	642	370	360	52.0	131	330	330	400	400	25	34	110	125	10	16	54	58	593
5	4HFT19	150	100	3F	455	470	270	270	508	636	400	360	45.0	95	330	330	400	400	25	34	110	140	10	16	54	58	725

**DIMENSIONAL SHEET FOR TWO STAGE PUMPS WITH TWO DOUBLE SUCTION IMPELLERS HAVING EXTERNAL CROSS OVER**

NO.	PUMP MODEL	SIZE		SHAFT GROUP	OVERALL DIMENSIONS										MOUNTING DIMENSIONS								SHAFT END					APPROX. WT. (kg)
		D1	D2		H1	H2 <sub>1</sub>	H2 <sub>2</sub>	H3	H4	L1	L2	L3	L4	L5	L6	F1	F2	F3	F4	F5	DF	S1	S2	S3	S4	S5	S6	
1	3HFTD14	125	80	3F	355	325	388	210	210	569	672	325	250	125	125	360	540	420	600	24	24	110	138	10	16	51	55	320
2	4HFTD13	150	100	2.5F	375	342	325	222	222	670	764	400	292	183	183	290	726	350	786	24	18	125	150	8	12	43	45.3	525
3	6HFTD12	200	150	3F	375	325	370	190	190	602	705	325	325	150	150	285	620	350	670	24	22	110	138	10	16	54	58	684
4	6HFTD12S	200	150	3F	410	385	348	245	245	724	816	450	325	195	195	290	660	350	720	22	24	110	138	10	16	54	58	1300
5	6HFTD12L	200	150	3F	410	366	329	215	215	669	760	420	385	175	175	285	670	350	720	25	22	110	138	10	16	54	58	850
6	6HFTD13	200	150	3F	410	390	611	215	215	641	745	390	390	170	170	285	650	350	710	20	24	110	138	10	16	54	58	940
7	6HFTD18	200	150	3.5F	480	405	510	295	295	703	815	430	405	####	190	385	606	450	670	35	25	132	159	11	18	59	63	1206
8	6HFTD21	200	150	4F	525	450	389	320	320	859	1020	500	430	####	215	385	750	485	810	28	27	140	185	12	20	74	78.9	1220



## 15. Flange Details



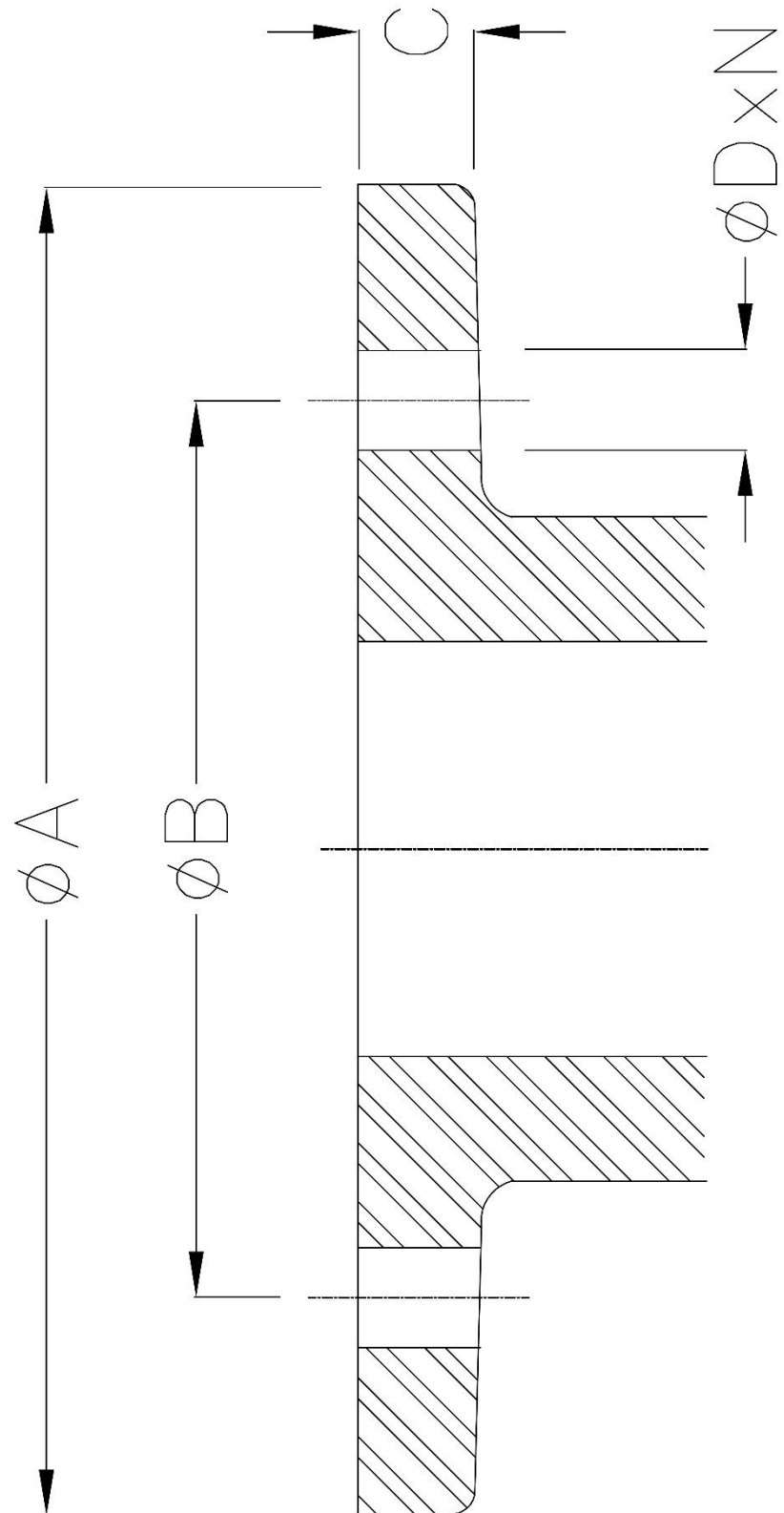


FLANGES TO PN10														
NOMINAL FLANGE SIZE		50	65	80	100	125	150	200	250	300	350	400	450	500
FLANGE DIAMETER	A	165	185	200	220	250	285	340	395	445	505	565	615	670
HOLE P.C.D.	B	125	145	160	180	210	240	295	350	400	460	515	565	620
FLANGE THICKNESS	C	18	18	20	20	22	22	24	26	26	26	32	32	34
HOLE DIAMETER	D	18	18	18	18	18	22	22	22	22	22	25	25	25
NUMBER OF HOLES	N	4	4	4	8	8	8	8	12	12	16	16	20	20

FLANGES TO PN16															
NOMINAL FLANGE SIZE		50	65	80	100	125	150	200	250	300	350	400	450	500	
FLANGE DIAMETER		A	165	185	200	220	250	285	340	405	460	520	580	640	715
HOLE P.C.D.		B	125	145	160	180	210	240	295	355	410	470	525	585	650
FLANGE THICKNESS		C	18	18	20	20	22	22	24	26	28	30	32	34	34
HOLE DIAMETER		D	18	18	18	18	18	22	22	26	26	30	30	33	33
NUMBER OF HOLES		N	4	4	8	8	8	8	12	12	12	16	16	20	20

FLANGES TO PN25														
NOMINAL FLANGE SIZE		50	65	80	100	125	150	200	250	300	350	400	450	500
FLANGE DIAMETER	A	165	185	200	235	270	300	360	425	485	555	620	670	730
HOLE P.C.D.	B	125	145	160	190	220	250	310	370	430	490	550	600	660
FLANGE THICKNESS	C	20	22	24	24	26	28	30	32	34	38	40	42	44
HOLE DIAMETER	D	18	18	18	22	26	26	26	30	30	33	36	36	36
NUMBER OF HOLES	N	4	8	8	8	8	8	12	12	16	16	16	20	20

# FLANGE DETAILS (ANSI STANDARD)



### FLANGES TO ANSI#125

Nominal Pipe Size	Flange Diameter (A)	Flange Thickness (C)	PCD (B)	No. of Bolts (N)	Diameter of Bolt Holes (D)
2	6	5/8	4-3/4	4	3/4
2-1/2	7	11/16	5-1/2	4	3/4
3	7-1/2	3/4	6	4	3/4
4	9	15/16	7-1/2	8	3/4
5	10	15/16	8-1/2	8	7/8
6	11	1	9-1/2	8	7/8
8	13-1/2	1-1/8	11-3/4	8	7/8
10	16	1-3/16	14-1/4	12	1
12	19	1-1/4	17	12	1
14	21	1-3/8	18-3/4	12	1-1/8
16	23-1/2	1-7/16	21-1/4	16	1-1/8
18	25	1-9/16	22-3/4	16	1-1/4
20	27-1/2	1-11/16	25	20	1-1/4

### FLANGES TO ANSI#250

Nominal Pipe Size	Flange Diameter (A)	Flange Thickness (C)	PCD (B)	No. of Bolts (N)	Diameter of Bolt Holes (D)
2	6-1/2	7/8	5	8	3/4
2-1/2	7-1/2	1	5-7/8	8	7/8
3	8-1/4	1-1/8	6-5/8	8	7/8
4	10	1-1/4	7-7/8	8	7/8
5	11	1-3/8	9-1/4	8	7/8
6	12-1/2	1-7/16	10-5/8	12	7/8
8	15	1-5/8	13	12	1
10	17-1/2	1-7/8	15-1/4	16	1-1/8
12	20-1/2	2	17-3/4	16	1-1/4
14	23	2-1/8	20-1/4	20	1-1/4
16	25-1/2	2-1/4	22-1/2	20	1-3/8
18	28	2-3/8	24-3/4	24	1-3/8
20	30-1/2	2-1/2	27	24	1-3/8

## 16. Material equivalence chart

MATERIAL EQUIVALENT CHART						
PART NO	PART NAME	STANDARD FITTED PUMP	BRITISH STANDARD	ASTM STANDARD	DIN STANDARD	DIN MATERIAL NUMBER
1	Bearing Housing	Cast Iron	BS1452 Gr 260	A48 Class 25	GG20	0.602
2	Split Gland	Bronze	BS1400 LG2	B584 C83600	G -CuSn 5 ZnPb	2.1096.01
3	Casing	Cast Iron	BS1452 Gr 260	A48 Class 35	GG25	0.6025
4	Impeller	Bronze	BS1400 LG2	B584 C83600	G-CuSn 5 ZnPb	2.1096.01
5	Casing Wear Ring	Bronze	BS1400 LB2	B584 C93700	G-CuPb 15 Sn	2.1096.01
6	Lantern Ring	Bronze	BS1400 LG2	B584 C83600	G-CuSn 5 ZnPb	2.182.01
7	Impeller Key	Stainless Steel	BS970 410 S21	A 182 Type 410	X 10 Cr 13	2.1096.01
8	Coupling Key	Stainless Steel	BS970 410 S21	A182 Type 410	X 10 Cr 13	2.1096.01
9	Gland Packing	Graphite Impregnated				
10	Shaft	Stainless Steel	BS970 410 S21	A182 Type 410	X 10 Cr 13	2.1096.01
11	Thrust Collar	MS				
12	Bearing End Cover Inner	Cast Iron	BS1452 Gr 260	A 48 Class 25	GG20	0.602
14	Shaft Sleeve & nuts	Bronze	BS1400 CT1	B30 C 90700	G-CuSn10	2.1050.01
15	Water Thrower	Neoprene				
16	Deep Groove Ball Bearing	SKF				
16A	Angular Contact Ball Bearing	SKF				
17	Lock Nut	SKF				
18	Locking Washer	SKF				
20	Baering End Cover Outer	Cast Iron	BS1452 Gr 260	A48 Class 25	GG20	0.602
21	Seal piping	Stainless Steel				
						DIN1691

## 17. Recommended spare parts

Recommended spare parts for Split-case Pumps (Series HF) PACKED GLAND PUMPS				
Recommended spare parts for two years operation				
Sr. No.	Component	Material Specification	No of Set	Qty in each set
1	Bearings (Drive end and non-drive end) & lock nut & lock washer	SKF make bearing (6300 / 7300 series), lock nut(KM series) and lock washer(MB series)	1 Set	1 set of bearings, 1 no of lock nut and 1 no of lock washer
2	Casing Wear Rings	Bronze LB2 BS 1400	1 Set	2 nos
3	Casing Gaskets	0.4 mm Vegetable Fibre	1 Set	
4	Gland Packing s	Non-Asbestos Packing	1 Set	10 nos
5	'O' Rings	Nitrile Rubber	1 Set	2 nos
Recommended spare parts for five years operation				
1	Bearings (Drive end and non-drive end) & lock nut & lock washer	SKF make bearing (6300 / 7300 series), lock nut(KM series) and lock washer(MB series)	3 Sets	3 sets of bearings, 3 nos of lock nut and 3 nos of lock washer
2	'O' Rings	Nitrile Rubber	3 Sets	6 nos
3	Impellers	Bronze LG2	1 Set	1 no
4	Casing Wear Rings	Bronze LB2	2 Sets	4 nos
5	Shaft with keys	AISI 410	1 Set	1 no each
6	Shaft Sleeves	Bronze CT1	1 Set	2 nos
7	Sleeve Nuts	Bronze CT1	1 Set	4 nos
8	Stuffing Box Bushes	Bronze LB2	1 Set	2 nos
9	Split Glands	Bronze LG2	1 Set	2 nos
10	Lantern Rings	Bronze LG2	1 Set	2 nos
11	Gland Packing	Non-Asbestos Packing	3 Sets	30 Nos
12	Casing Gaskets	0.4 mm Vegetable Fibre	3 Sets	