



PUMPSENSE

Fluid Engineering Pvt. Ltd



NFPA 20 **FIRE** PUMPS

COMPLETE PUMPING SOLUTIONS FOR FIRE PROTECTION SYSTEMS

- Horizontal Split Case Single Stage and Two Stage Electric Motor Driven Fire Pumps
- Horizontal Split Case Single Stage and Two Stage Diesel Engine Driven Fire Pumps
- Vertical Split Case Electric Motor Driven Fire Pumps
- End Suction Fire Pumps
- Single Stage Inline Fire Pumps
- Fifi-Pumps for external fire fighting in ships and FPSO Fire Pumps units
- Packaged Fire Pumps Systems
- Approved and Listed Fire Pumps



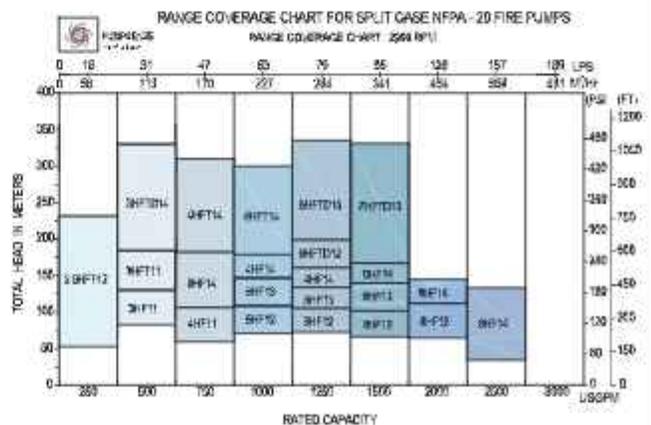
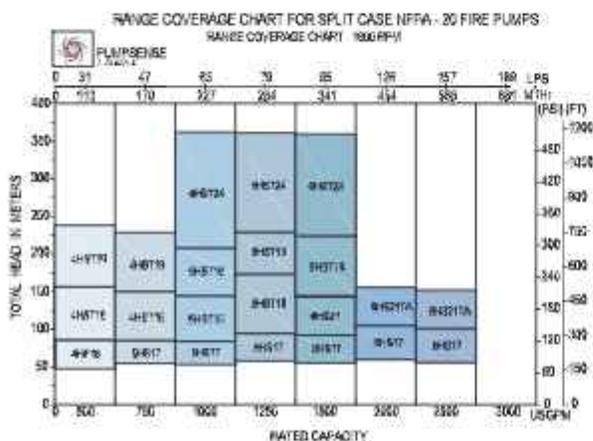
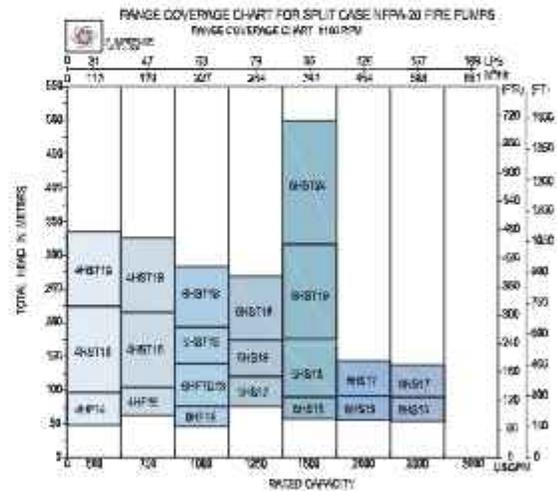
A BRIEF INTRODUCTION

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.

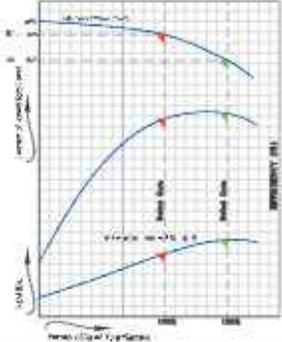
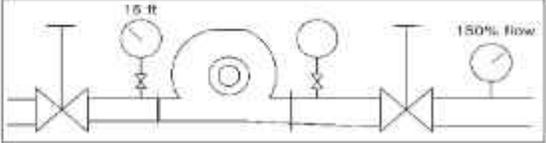
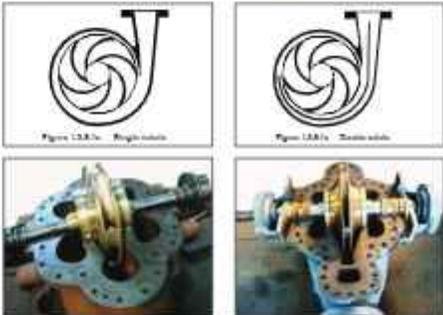
RANGE CHARTS

RANGE IDENTIFICATION



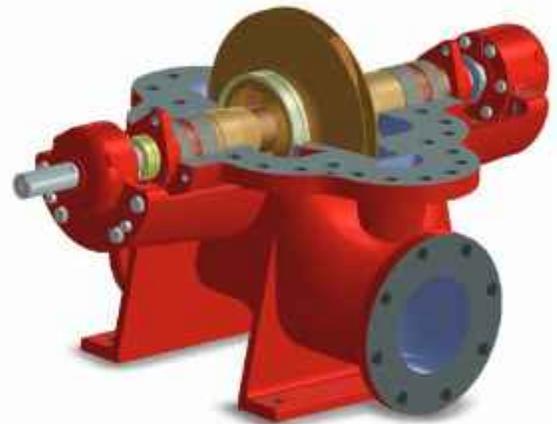
Fire pumps manufactured by Pumpsense are in full compliance with the requirements of NFPA-20. In addition, these pumps meet all the clausal requirements of established fire pumps approval standards such as FM1311 of Factory Mutual and UL448 of Underwriters Laboratories.

In particular, NFPA-20 fire pumps manufactured by Pumpsense conform to the following:

<p>PERFORMANCE CHARACTERISTICS</p> <p>SHUT-OFF HEAD</p> <p>MAXIMUM POWER</p>	<p>All pumps provide not less than 150% of the rated capacity at not less than 65% of the total rated head.</p> <p>The closed valve head is less than 140% of the rated head and more than 99% of the rated head.</p> <p>For all NFPA-20 fire pumps maximum power is determined for the largest and smallest impeller and specified in the documentation to help in selecting an optimum prime mover. Most pumps have flat/ non-overloading power characteristics.</p>	
<p>CERTIFIED SHOP TEST REPORT</p>	<p>All NFPA-20 fire pumps are supplied by us with certified shop test report showing head, capacity, brake horse power and efficiency of the pumps.</p>	
<p>HYDROSTATIC TEST (RUPTURE TEST)</p>	<p>All pumps are tested with a pressure equal to, or greater than, twice the sum of the maximum shutoff pressure of the pumps plus a maximum allowable suction pressure specified by the pumps manufacturer. The test pressure shall be held for five minutes. In no case shall the maximum allowable suction pressure, be less than 75 psi, or the test be run at a pressure less than 400 psi.</p>	
<p>SUCTION LIFT CAPABILITY</p>	<p>All pumps belonging to this range are type tested to ensure that they are capable of 15 ft total suction lift at 150% of the rated flow with total head not less than 65% of the rested head.</p>	
<p>MECHANICAL RIGIDITY</p>	<p>Shaft design, bolt stress, bearing life, casing thickness and other mechanical indication of pumps reliability conform and exceed the minimum values stipulated in UL448 and FM1311. As a result the pumps have high mechanical reliability.</p>	
<p>DOUBLE VOLUTE</p>	<p>Single Stage Pumps with delivery branch size of 4" and above are generally provided with a double volute casing design to ensure minimum radial thrust over the entire operating range. This factor enhances shaft, bearing and packing life and overall pump reliability.</p>	

SELECTION TABLE: HORIZONTAL SPLIT CASE (HSC) FIRE PUMPS

INDUSTRIAL NFPA-20 DUTIES						
DUTY DETAILS				PUMPS MODEL S		
Flow		Head		2500 RPM	1800 RPM	2100 RPM
USGPM	M ³ /HR.	PSI	M			
500	114	118	80	3HF11	4HF16	4HF14
		203	140	3HF11	4HST16	4HST16
		290	200	3HFT11	4HST19	4HST19
		435	300	3HFTD14	-	-
750	170	118	80	4HF11	5HS17	4HF16
		203	140	4HFT12	4HST16	4HST16
		290	200	4HFT12	4HST19	4HST19
		435	300	4HFT14	-	-
1000	227	118	80	5HF12	5HS17	6HF14
		203	140	6HF14H	5HST15	6HFT13
		290	200	4HFT14	6HST18	5HST15
		435	300	4HFT14	6HST24	6HST19
1250	294	118	80	6HF12	6HS17	5HS17
		203	140	6HF14H	6HST18	5HS19
		290	200	6HFT12	6HST12	6HST19
		435	300	6HFT13	6HST24	-
1500	341	118	80	6HF12	6HS17	6HS15
		203	140	6HF14H	6HS21	5HS19
		290	200	6HFT13	6HST19	6HST19
		435	300	6HFT13	6HST24	6HST24
2000	454	118	80	8HF12	8HS17	8HS15
		203	140	8HF14	8HS21TA	8HS17
2500	568	118	80	8HF14	8HS17	8HS15
		203	140	8HF14	8HS21TA	8HS17



INDUSTRIAL (FM) DUTIES						
DUTY DETAILS				PUMPS MODEL S		
Flow		Head		1500 RPM	1800 RPM	
USGPM	M ³ /HR.	PSI	M			
1500	341	100-125	70-88	6HF21	-	6HF15
2000	341	100-140	70-96	-	-	6HF17
2000	454	100-125	70-88	8HF21	-	-
2500	568	100-135	70-93	-	-	8HF17

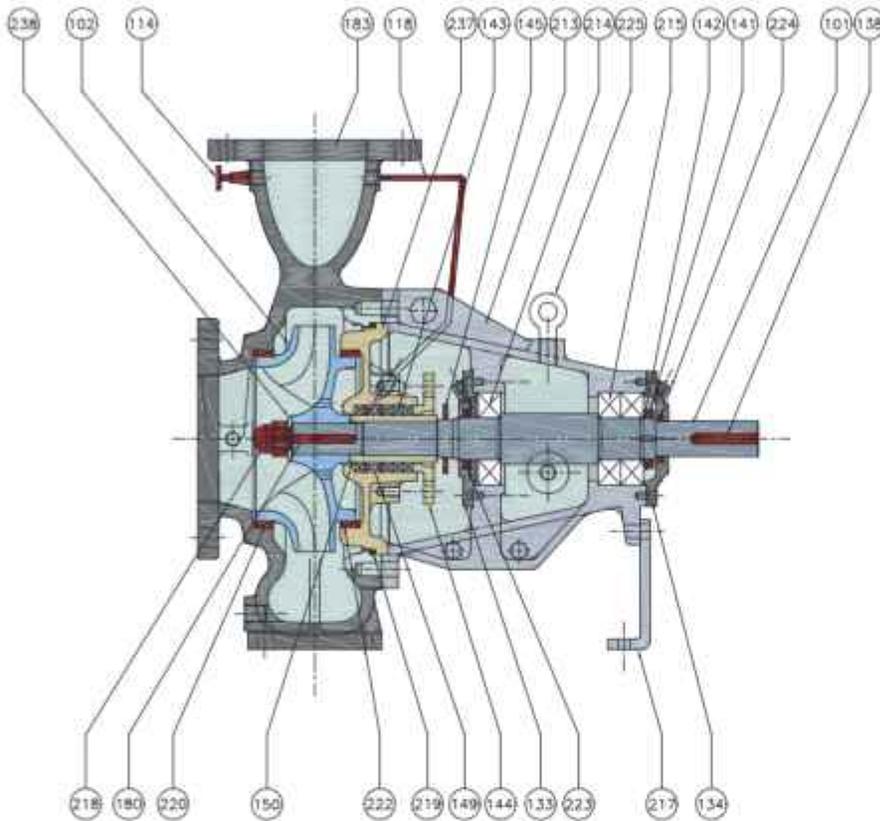
SELECTION TABLE – END SUCTION (ES) FIRE PUMPS

DUTY DETAILS					PUMPS MODEL
Flow		Pressure Range			
USGPM	M ³ /HR.	PSI	M		
1780 RPM					
250	57	38-51	26-35	ES 80-250	
500	114	66-84	45-58	ES 80-315	
500	114	35-51	24-35	ES 100-250	
750	170	66-83	47-57	ES 100-315	
1000	227	32-48	22-33	ES 125-250	
1000	227	65-84	45-58	ES 125-315	
1900 RPM					
250	57	41-58	28-40	ES 80-250	
500	114	70-98	48-68	ES 80-315	
750	170	62-86	38-39	ES 100-250	
750	170	72-94	50-65	ES 100-315	
1000	227	33-55	23-38	ES 125-250	
1000	227	68-94	47-65	ES 125-315	
2100 RPM					
250	57	61-70	35-48	ES 80-250	
500	114	80-120	55-63	ES 80-315	
500	114	64-76	37-52	ES 100-250	
750	170	87-120	60-82	ES 100-315	
1000	227	44-68	30-47	ES 125-250	
1000	227	78-118	54-81	ES 125-315	

DUTY DETAILS					PUMPS MODEL
Flow		Pressure Range			
USGPM	M ³ /HR.	PSI	M		
2350 RPM					
500	114	70-84	48-58	ES 80-250	
750	170	98-150	66-104	ES 80-315	
750	170	68-90	47-62	ES 100-250	
750	170	100-184	69-102	ES 100-315	
1250	284	60-84	35-58	ES 125-250	
1250	284	108-145	73-100	ES 125-315	
2500 RPM					
500	114	75-105	52-72	ES 80-250	
750	170	138-176	95-122	ES 80-315	
750	170	75-112	52-77	ES 100-250	
750	170	116-178	80-122	ES 100-315	
1250	284	65-104	45-72	ES 125-250	
1250	284	119-180	82-124	ES 125-315	
2550 RPM					
500	114	83-132	64-91	ES 80-250	
750	170	165-228	115-158	ES 80-315	
750	170	88-140	60-97	ES 100-250	
750	170	148-225	102-155	ES 100-315	
1250	284	84-134	58-92	ES 125-250	
1250	284	150-228	104-158	ES 125-315	

CROSS-SECTIONAL DRAWING OF GLAND PACKED ES FIRE PUMPS

CROSS-SECTION OF SMALL END SUCTION FIRE PUMPS (PACKED GLAND FITTED)



DESCRIPTION	QTY.	PART NO.
Shaft	1	101
Impeller	1	102
Casing	1	183
Back Cover	1	237
Bearing Bracket	1	213
Cylindrical Roller Ball Brg. (Inner) SKF NU XXX	1	214
Angular Contact Ball Brg. (Outer) SKF BEOB XXXX	2	215
Water Thrower	1	146
Coupling Key	1	138
Bearing End Cover (F.E.)	1	133
Bearing End Cover (P.E.)	1	134
Support Foot	1	217
Impeller Key	1	180
Impeller Nose Cap / Nut	1	218
O' Ring For Back Cover	1	219
Casing Wear Ring (Front)	1	220
Gland Packing	1 Set	145
Shaft Sleeve	1	150
Casing Wear Ring (Back)	1	222
Oil Seal For Inner Cover	1	223
Oil Seal For Outer Cover	1	224
Bearing Lock Nut (KM XX)	1	141
Bearing Lock Washer (MB XX)	1	142
Air Cock	1	114
Eye Bolt	1	225
Seal Flushing Line	1	118
Split Gland	1	144
Lantern Ring	1	149
Washer For Impeller Nut	1	238

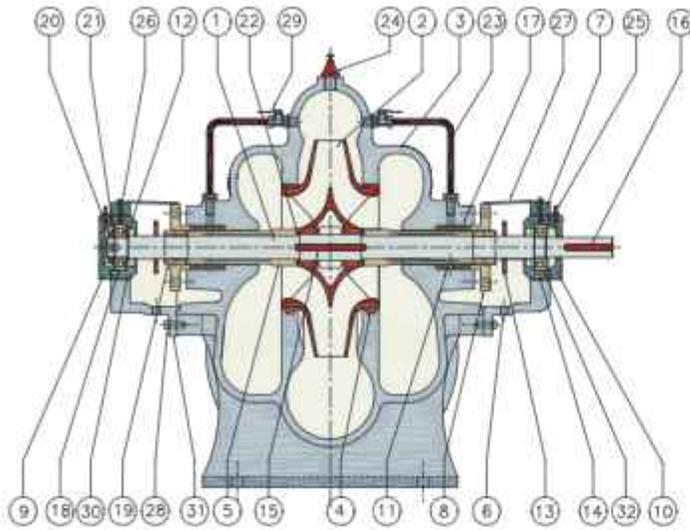
--- (P.E.) Power End, (F.E.) Free End

EXPLODED VIEW: END SUCTION (ES) FIRE PUMPS



HSC FIRE PUMPS: CROSS SECTIONAL DRAWINGS

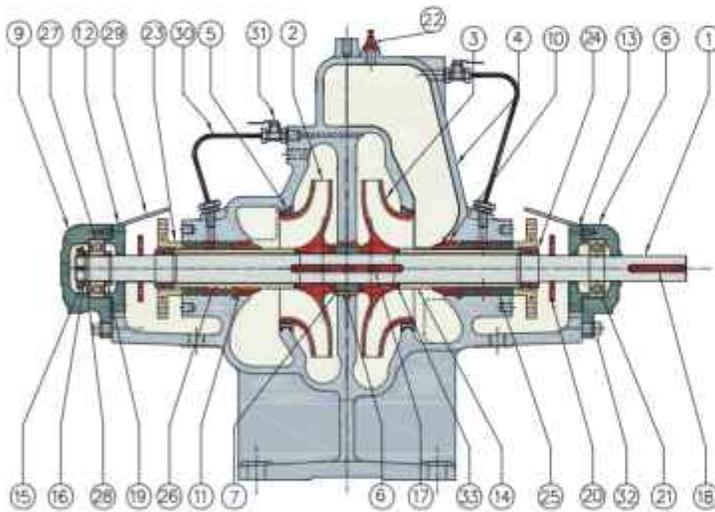
PACKED GLAND SINGLE STAGE HORIZONTAL SPLIT-CASE (HSC) FIRE PUMPS



SL.No.	DESCRIPTION	QTY.	PART NO.
1	Shaft	1	101
2	Impeller	1	102
3	Casing	1	103
4	Casing Wear Ring	2	120
5	Shaft Sleeve	2	120
6	Bearing Bracket (P.E.)	1	256
7	Bearing Bracket Top Clamp	2	255
8	Split Gland	2	144
9	Bearing End Cover (P.E.)	1	122
10	Bearing End Cover (P.E.)	1	124
11	Lantern Ring	2	149
12	Thrust Collar	1	126
13	Water Thrower	2	145
14	Bearing Housing (P.E.)	1	258
15	Impeller Key	1	100
16	Coupling Key	1	128
17	Gland Packing	2 Set	143
18	Deep Groove Ball Bearing (P.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 (Seals)	2	150
23	Seal Pushing Line	2	118
24	Air Release Cock	1	114
25	Grease Nipple	2	259
26	Locking Pin For Top Clamp	2	259
27	Shaft Guard	2	252
28	Cone Pin For Bearing Bracket	4	245
29	Ball Valve	2	-
30	Bearing Housing (P.E.)	1	270
31	Bearing Bracket (P.E.)	1	271
32	Deep Groove Ball Bearing (P.E.)	1	272

(P.E.) Power End, (R.E.) Free End

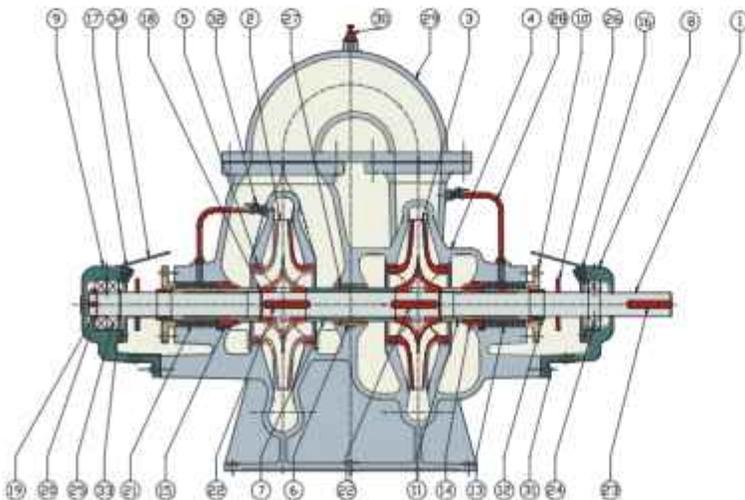
PACKED GLAND TWO STAGE HSC FIRE PUMPS WITH INTERNAL CROSS-OVER



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	103
5	Casing Wear Ring	2	120
6	Inter Stage Bush	1	300
7	Inter Stage Collar	1	301
8	Bearing Bracket (P.E.)	1	256
9	Bearing Bracket (P.E.)	1	271
10	Stuffing Box Bush (P.E.)	1	280
11	Stuffing Box Bush (P.E.)	1	282
12	Bearing End Cover Inner (P.E.)	1	277
13	Bearing End Cover Inner (P.E.)	1	276
14	Shaft Sleeve	2	120
15	Bearing Lock Nut	1	141
16	Bearing Lock Washer	1	142
17	Impeller Key	1	100
18	Coupling Key	1	128
19	Thrust Collar	1	126
20	Water Thrower	2	145
21	Deep Groove Ball Bearing (P.E.)	1	272
22	Air Cock	2	114
23	Split Gland	2	144
24	Sleeve Nut (L.H. & R.H.)	2-2	146
25	Gland Packing	2 Set	143
26	Lantern Ring	2	149
27	Deep Groove Ball Bearing (P.E.)	1	257
28	Bearing Spacer	1	220
29	Shaft Guard	2	252
30	Water Sealing Pipe	2	118
31	Ball Valve	2	-
32	Cone Pin for Bearing Bracket	4	245
33	O - Ring for Sleeve	2	150

(P.E.) Power End, (P.E.) Free End

PACKED GLAND TWO STAGE HSC FIRE PUMPS WITH EXTERNAL CROSS-OVER



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	103
5	Casing Wear Ring	2	120
6	Inter Stage Bush	1	300
7	Inter Stage Collar	1	301
8	Bearing Bracket (P.E.)	1	256
9	Bearing Bracket (P.E.)	1	271
10	Split Gland	2	144
11	Shaft Sleeve	2	120
12	Sleeve Nut (L.H. & R.H.)	2-2	146
13	Lantern Ring	2	149
14	Stuffing Box Bush (P.E.)	1	280
15	Stuffing Box Bush (P.E.)	1	282
16	Bearing End Cover Inner (P.E.)	1	276
17	Bearing End Cover Inner (P.E.)	1	277
18	O - Ring for Sleeve	2	150
19	Bearing Lock Nut	1	141
20	Bearing Lock Washer	1	142
21	Gland Packing	2 Set	143
22	Impeller Key	2	100
23	Coupling Key	1	128
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	220
30	Air Cock	1	114
31	Cone Pin for Bearing Bracket	4	245
32	Ball Valve	2	-
33	Thrust Collar	1	126
34	Shaft Guard	2	252

(P.E.) Power End, (P.E.) Free End

For each order executed by Pumpsense, detailed quality plan is drawn up to reflect special conditions of the order and customers specific QA requirements. As a minimum, the following QA documents are available for each pumps manufactured by Pumpsense and the customer may access these documents at any time:

- 🔥 Seal integrity test report
- 🔥 Performance test report
- 🔥 Dynamic balancing report for the rotating element
- 🔥 Hydrostatic pressure (Rupture test wherever applicable) test report
- 🔥 Dimensional conformance report & As Built General Arrangement drawing
- 🔥 Physical and chemical test certificates for major pumps components such as casing, impeller and shaft.



|| IN-HOUSE NON-DESTRUCTIVE TEST FACILITIES ||

- 🔥 Dynamic balancing machine
- 🔥 Liquid penetrant test arrangement
- 🔥 Ultrasonic test equipment

|| HYDROSTATIC PRESSURE TEST & SEAL INTEGRITY TEST ||

- 🔥 All pumps casings are pressure tested as per applicable code/customer's order.
- 🔥 Fully assembled mechanical seal fitted pumps are subjected to a second hydrostatic test at the maximum allowable seal pressure or casing hydrostatic test pressure, whichever is lower, to check leak free operation of seals under pressure.

|| PERFORMANCE TEST ||

All pumps are tested for performance as per ISO 9906 Grade 1. Pumpsense is equipped with a state of the art test bed with the following key features:

- 🔥 **Test Tank** - The tank which is partly underground and partly over ground ensures adequate NPSHA for performance test. The tank size is 23ft(L) X 10ft(W) X 12ft(W) and holds 80 m³ of potable water for testing. The test tank has been specially designed as per the guidelines of the Hydraulic Institute Standards and is provided with necessary flow stabilizers, separate return chambers, etc. in order to ensure vortex free suction condition.
- 🔥 **Test Lines** - There are two test lines of 300 mm and 150 mm capable of measuring flows up to 2000 m³/hr.
- 🔥 **Flow Measurement** - Flow measurement is done primarily by magnetic flow meters. However, the test lines are also equipped with orifice meters supported by differential pressure transducers for flow measurements/calibration. Ultrasonic flow meter provides a third means of flow measurement in the test bed.
- 🔥 **Pressure Measurement** - This is done by both pressure transducers and bourdon type pressure gauge.
- 🔥 **Power Measurement** - Power is measured by YOKOGAWA power meter. For non-synchronous motor speeds the power is also measured by S. HIMMELSTEIN make torque meter.
- 🔥 **Speed** - Pumps speed is measured by stroboscope.
- 🔥 **Vibration** - Vibration data is obtained by a Bruel & Kjaer vibration analyzer.
- 🔥 **Speed Variation** - Speed variation for testing is achieved through a 280kW/132kW VFD supplied by Fuji.
- 🔥 **Flow control** - Flow control is achieved by actuator operating globe and butterfly valves.
- 🔥 **Data acquisition and control panel** - A specially designed control panel with the state-of-the-art instrumentation is used for data acquisition and test sheet/test curve generation. The system uses proprietary software for pumps testing.
- 🔥 **NPSH test** - NPSH test is conducted by a 3% head-decay method by throttling the suction globe valves.

NFPA-20 FIRE PUMPS FOR FPSO AND FSO

Pumpsense offers customised fire pumps solutions for FPSO & FSO units. These specialised fire pumps play a crucial role in ensuring the safety of FPSO/FSO installations. We supply atleast three different configurations for FPSO fire duties:

- 1) **Electric motor driven Fire pumps** - These pumps are generally double suction vertical shaft axially split case pumps.
- 2) **Direct diesel engine driven fire pumps** - These pumps are used where they can be installed below the draught line . Pumps are axially split-case with side-suction & top delivery configuration for ease of installation.
- 3) **Diesel and Hydraulic driven Fire-pumps** - In this system a hydraulic motor driven lift pumps takes suction from the sea chest and supplies to the main engine driven fire pumps.

PUMPS TYPES FOR FPSO/FSO FIRE DUTIES : HS / VHS / SF / SFM

Materials of Construction –

- 1) Bronze 2) Nickel Al. Bronze 3) Ductile Ni Resist

Capacity Range – 300, 600, 1200, 2400 m³/hr.

Head range – 120 – 180 m

Speed – 1800 rpm – 2100 rpm for main fire pumps
900 rpm – 1500rpm for lift pumps



Selection Table for NFPA-20 Split Case Fire Pumps - 3000 GPM to 5000 GPM							
Flow		DUTY DETAILS		SPEED RPM	PUMPS MODEL	DRIVER RATING	
USGPM	M ³ /HR.	Head				Kw	HP
		PSIG	M				
3000	682	30-44	21-31	1500	10HS13	180	214
		47-71	33-50		10HS16	180	241
		64-92	45-65		10HS17	225	302
		108-163	75-115		10HS22	450	603
		185-298	130-210	1800	10HSTD22	675	905
		85-199	60-140		8HS22	475	637
		199-312	140-220	8HS28	650	871	
		284-440	200-310	10HSTD22	1050	1407	
		114-185	80-130	2100	8HS17	375	503
		199-298	140-210		8HS22	700	938
90-152	63-107	3000	8HF12	350	469		
47-88	33-48		10HS16	180	241		
3500	795	62-89	44-63	1500	10HS17	250	335
		71-99	50-70		12HS18	275	369
		102-165	72-118		10HS22	475	637
		142-227	100-160		10HS27	600	804
		170-290	120-204	1800	10HSTD22	725	972
		84-104	45-73		10HS16	300	402
		104-163	73-115	10HS18	450	603	
		183-241	115-170	10HS22	800	1072	
		284-428	200-300	10HSTD22	1150	1541	
		48-85	34-60	2100	10HS13L	225	302
188-297	131-209	8HS22	775		1039		
4000	909	61-86	43-63	1500	10HS17	275	369
		68-96	48-68		12HS18	275	369
		100-163	70-115		10HS22	500	670
		163-220	115-155		10HS27	675	905
		68-101	48-71	1800	10HS15	300	402
		98-138	68-96		10HS17	450	603
		105-148	74-103	12HS18	450	603	
		213-338	150-238	10HS27	1100	1474	
		270-426	190-300	10HSTD22	1250	1675	
		4500	1022	35-49	50-70	1500	12HS18
53-70	75-100			12HS22	450		603
63-105	90-150			1800	12HS28	800	1072
35-49	50-70				12HS16	325	438
49-70	70-100			12HS18	475	637	
81-105	115-150			12HS22	850	1139	
105-178	150-250	10HS27	1100	1474			
5000	1138	42-68	30-48	1500	12HS16	225	302
		64-92	45-65		12HS18	315	422
		99-147	70-104		12HS22	550	737
		113-184	80-130		14HS24	700	938
		118-213	83-150	1800	12HS28	800	1072
		39-59	28-42		12HS13	225	302
		65-93	47-68	12HS16	350	469	
		71-99	50-70	12HS18	400	536	
		99-137	70-97	12HS18	500	670	
		156-225	110-180	12HS22	875	1173	

*** Please contact with PSF for rated capacity more than anything mentioned above

FIRE PUMPS SKIDS & COMPLETE FIRE PUMPS PACKAGES

Pumpsense fire pump packages are designed and built complying to NFPA-20 standards. Wherever required, we incorporate customers specifications, including hazardous and non-hazardous area specifications. The pumps can be provided in various materials of construction: Ductile Ni-Resist, Nickel Al. Bronze, AISI 316 Stainless Steel and/or Duplex Stainless Steel.

|| FIRE PUMPS UNITS & PACKAGED SYSTEMS ||

Electric motor driven and Diesel engine driven fire pumps can be furnished for any combination of pumps, drives, controls and accessories for listed, approved and non-listed fire service applications.

Packaged units and systems lower fire pumps installation costs and offer many advantages:

- 🔥 Pumps, driver and controller are mounted on a common base.
- 🔥 Common baseplate unit eliminates the need for separate mounting surfaces.
- 🔥 Common unit minimizes the need for interconnecting wiring and assembly.
- 🔥 Equipment arrives in a consolidated shipment, allowing faster and simplified installation and handling.
- 🔥 Custom designed system, including accessories, fittings, and layouts available to meet the customer's specifications.
- 🔥 In-house engineering and design expertise to ensure design requirements are realized.



|| A STANDARD LIST OF COMPONENTS OF PUMPSENSE FIRE PUMP SKID/ PACKAGES ||

- 🔥 Listed/Approved or Non-listed Fire Pumps/Jockey Pumps
- 🔥 Automatic Casing Air Release Valve
- 🔥 Listed/Approved or Non-listed Fire Pumps/Jockey Pumps Controller
- 🔥 Casing Pressure Relief Valve (Electric Packages)
- 🔥 Pressure Sensing Lines Complete as per NFPA 20
- 🔥 Hose Header with Valves, Caps & Chains
- 🔥 Suction and Discharge Pressure Gauges
- 🔥 Suction and Discharge Piping as per NFPA 20
- 🔥 Removable Lifting Lugs



Our ESFX range of marine fire-fighting pumps (FIFILITE range) offers following advantages:

Sl.	Features	Advantages
1	Very small foot print	Ideal for engine room installations
2	Light weight	This has a very positive impact on vessel speed
3	Optimized hydraulics	Smallest possible impeller diameter for the head range. This reduces the pump size
4	Large shaft diameter	To reduce shaft deflection and to enhance mechanical reliability
5	High capacity bearings	Double row angular contact thrust bearings and "Thorndon" front-end bush bearing for long bearing life
6	Material options	Available in DI, Bronze, NAB & duplex materials
7	Direction of rotation	Pumps are available with CW & CCW rotation
8	Certifications	Pumps can be supplied with third party certificates such as those from ABS/Lloyds etc.

OTHER PRODUCTS FROM PUMPSENSE



Bottom suction side discharge split case pumps for water supply. Pumps Size: 500X400-640. All our pumps can be supplied with customized branch orientation.



Sewage pumps having capacities up to 4000 m³/hr. are available with horizontal / vertical / cardan shaft mounting. All pumps are non-clog design with two/three vane impellers.



Pumpsense all bronze pumps for sea water application are very popular. This series of pumps can be offered as clutch mounted product, and are often supplied as kits for assembly by the gear box makers.



In vertical IL pumps, suction and discharge connections are in-line and are of the same size to simplify piping. The pump is provided with its own thrust bearing and is flexibly coupled to the motor shaft.



Split-case marine external fire (FIF) pumps are available in various branch orientations and MOCs. They are supplied with certifications by ABS, Lloyds, CCS and other marine surveyors.



ES series small end suction pumps conform to ISO 2868 as well as ISO 5199. Over 37 frames ensures optimum selection for all duties. Quick Customization possible to ensure optimum operation.



Two stage pumps with integral cross-over passages provide high efficiency and stable head-capacity characteristics. Axial & radial thrust loads are fully balanced for this class of pumps.



Test Bed at Pumpsense is fully compliant with the requirements of ISO 9906 / HI 14.6. Test set up is completely automated for data acquisition.



Large end suction pumps cover sizes between 150 and 400mm for flows up to 3200 m³/hr and heads up to 200 mtr. These pumps are available for air conditioning, industrial cooling water supply, and marine fire services.



High head two stage split-case pumps with external cross-over passages are used to ensure optimum performance. Two single or double entry impellers are placed back to back to eliminate axial thrust.



Single stage standard split-case range of pumps for capacity up to 3000 m³/hr and heads up to 200 m with many customised options are available. Pumps can be supplied in wide variety of material to suit the application and liquid to be pumped.



CSC series pumps are required for long uninterrupted service with minimum of maintenance. Where, the energy costs constitute a significant portion of the life-cycle cost of an industrial plant like Industrial & Urban Water Supply, Air-conditioning, Process Industry.

We upgrade our product continuously. The information contained in this brochure should be used for general guidelines only since they are subject to change without notice.

PUMPSENSE FLUID ENGINEERING PVT. LTD

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PUMPSENSE
Fluid Engineering Pvt. Ltd



**CENTRIFUGAL PUMPS FOR INDUSTRY, MARINE
BUILDING TRADE AND MUNICIPAL SERVICES**

- ▶ Axially Split Case Pumps – Single & Two Stage
- ▶ End Suction Pumps - ISO2858 and Larger Sizes
- ▶ Horizontal Mixed Flow Pumps
- ▶ Vertical Inline Pumps
- ▶ Fifi Pumps for external fire fighting in ships and FPSO Fire Pumps
- ▶ Vertical and Horizontal Dry Pit Sewage Pumps
- ▶ Pump Services

Beginnings

History of PUMPSENSE goes back to 1995 when a group of professionals working in large international pump companies decided to team together. At PUMPSENSE, we are united through a common vision to build an excellent pump 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 pump 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.

Guiding Philosophy

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 customer, employees and suppliers and all of us work together to create value, to grow, to learn and to enhance the quality of our lives.

Products

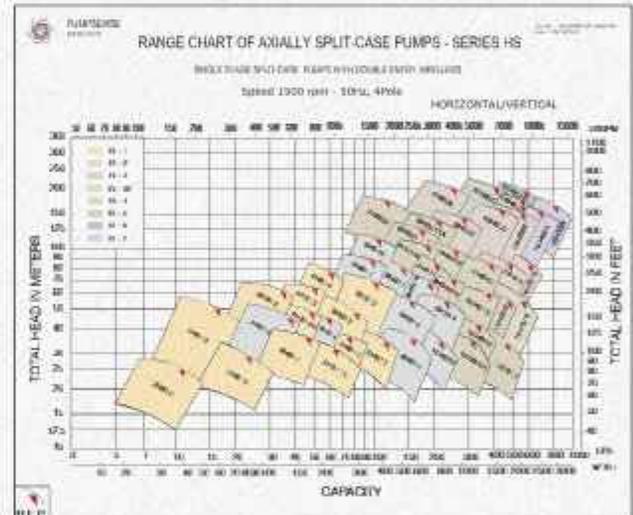
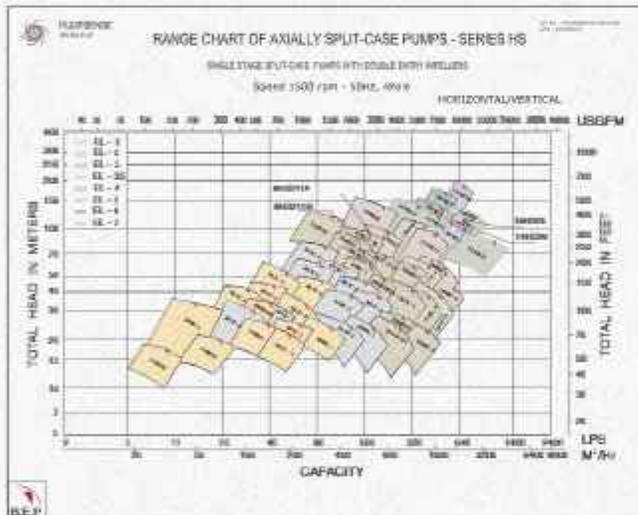
The present product range of PUMPSENSE includes the following :

Product Group	Approximate no of sizes	Capacity up to m ³ /hr.	Head up to m	Speed up to RPM	Application Areas	Representative Pump
Standard Split Case Pumps. Series - HS	67	4300	200	3000	Air-conditioning Water Supply Industrial Applications	
Compact Split Case Pumps. Series - CSC	29	1400	85	2100	Air-conditioning Water Supply Industrial Applications	
Two Stage Split Case Pumps. Series - HST	20	1250	400	1800	High Pressure Cleaning Water Supply Industrial Applications	
Split Case NFPA 20 Fire Pumps. Series - HF/HFT	15	2000	280	3000	Fire Protection of Buildings and Industrial Installations	
Large End Suction Pumps. Series - ESL	31	3200	200	1800	Air-conditioning Water Supply Industrial Applications	
ISO 2858 End Suction Pumps. Series - ES	37	500	150	3000	Air-conditioning Fire Protection Industrial Applications	
Horizontal and Vertical Dry Pit Sewage Pumps. Series -SW	20	3000	100	1800	Municipal Sewage Industrial Effluent	
Vertical Inline Pumps. Series - IL	8	350	120	3600	Air-conditioning Fire Protection	
External Fire Pumps for ships (FIFI pumps) Split Case and End Suction Pumps-SF/SFM/ESF	24	3000	170	2600	Used in ships for external fire fighting	
End Suction Mixed Flow Pumps -EMF	4	1600	13	1500	Flood Irrigation Water Harvesting Drainage	

Services

- **Pump specification and pump selection services** – We assist large pump users to prepare detailed pump specifications and to select and procure right centrifugal pumps for critical applications.
- **Training in centrifugal pumps** – We offer structured and group- specific training programs in the selection, operation and maintenance of centrifugal pumps.
- **Retrofit & pump upgrade services** – This service also includes performance and energy audit of existing pumping installations.
- **Trouble-shooting** - Diagnostics of problems in pumping systems & their resolution.
- **Repair Services** – This service includes performance testing of repaired pumps in our fully equipped test bed.

Series HS – Single Stage Split Case Pumps – Horizontal/Vertical



Range Description

- Discharge NB : 50 to 500 mm
- Capacity : Up to 4300 m³/hr.
- Head : Up to 200 m
- Speed : Up to 3000 rpm

Applications

1. Air Conditioning
2. Water Supply
3. Fire Protection
4. Drainage
5. Industrial Application
6. Irrigation

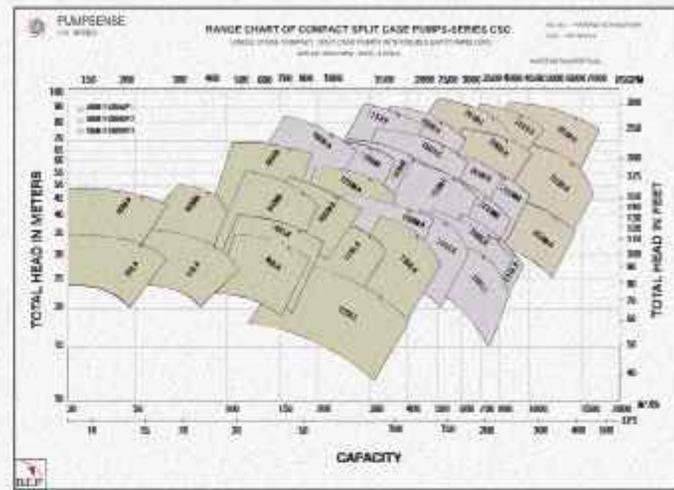
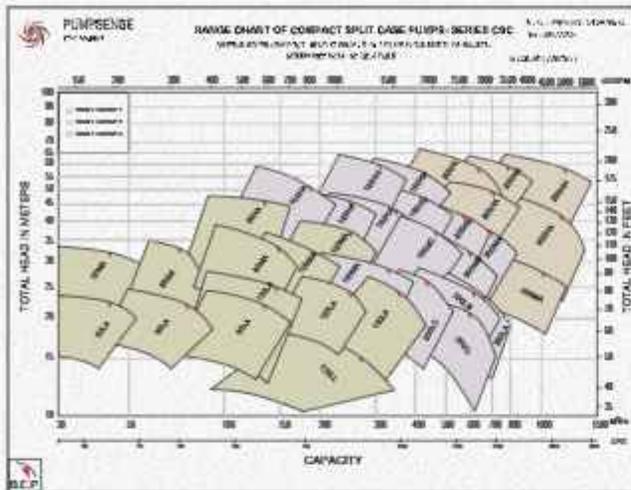
Options

- Materials- CI, Ductile Iron, Bronze, Stainless Steel, Ni Resist
- Stuffing Box - Packed Gland, Mechanical Seal
- Orientation - Horizontal/Vertical
- Constructional Features - Foot/Center line mounting, Bearing options, Cooling options, Staggered vane and special impellers

Features

1. Optimum efficiency
2. Low NPSHr
3. Stable characteristics
4. Over 67 sizes ensure optimum selection for all duties
5. Quick customization possible to meet special system requirements.
6. High head units have double volute casings to reduce radial thrust.

Series CSC - Compact Split Case Pumps - Horizontal / Vertical



DEVELOPMENT OBJECTIVES

Environmental concerns increasingly demand highest possible efficiency in pumps.

Universal efforts to reduce or eliminate stand-by units for energy and life-cycle-cost optimization demand optimum hydraulic and mechanical reliability.

Application Areas:

Where, the pumps are required for long un-interrupted service with minimum of maintenance. Where, mechanical seal fitted pumps are a natural choice. Where, the energy costs constitute a significant portion of the life-cycle cost of an industrial plant:

- Industrial & Urban Water Supply
- Air-conditioning
- Process Industry



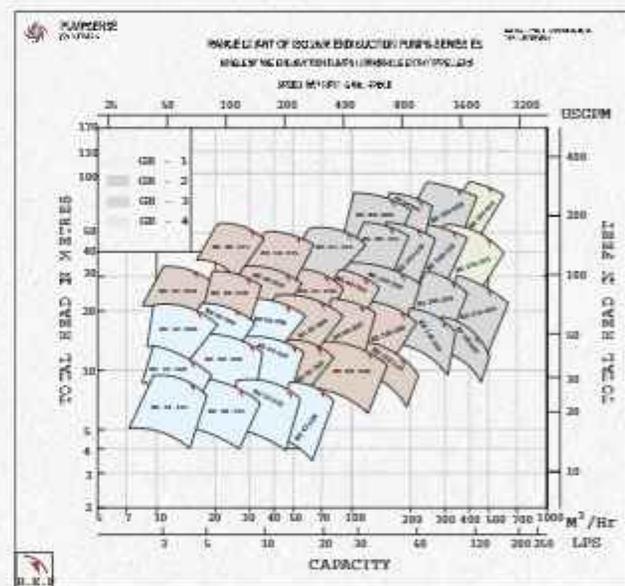
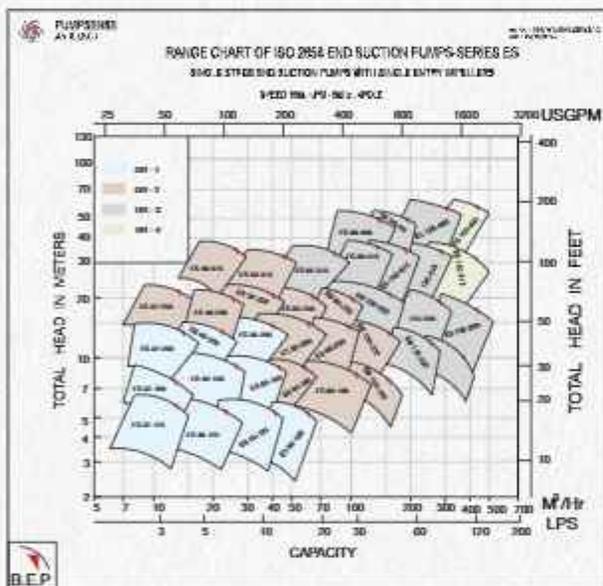
DESIGN FEATURES

- Compact Design - Shorter shaft span reduces shaft deflection and increases seal and bearing lives. Casing machining is simplified, eliminating chances of machining errors and reducing machining time. Requires lesser installation space - releases expensive retail space for revenue generation. Permits faster assembly & dismantling.
- Optimum Efficiency - Hydraulic Institute norms have been used as bench mark. Established hydraulic designs have been used where the benchmark was achieved or exceeded.
- Optimized Selection - A large number of sizes help to find a pump with optimum efficiency for any duty cluster. Pump selection is always possible in the B.E.P zone (+10% to -15% of B.E.P).
- Use of Double Volute Casing - Double volute casing design has been adopted for 100 mm delivery branch size & above, to minimize radial thrust. This is a distinct advantage for air-con applications where over-specification of head and varying load leads to operation of pump at part or over flow conditions.

CONSTRUCTION OPTIONS

- High-pressure (HP) version for high working pressure in tall buildings. HP version is equipped with external bearing brackets and cartridge balanced mechanical seals.
- Vertical Version (VE) is available as a pre-engineered unit.
- Packed Gland Version (PG) is available with external bearing bracket.

Series ES - ISO 2858 End Suction Pumps



Range Description

Discharge NB : 32 to 150 mm
Capacity : Up to 500 m³/hr.
Head : Up to 150m
Speed : Up to 3000 rpm

Applications

1. Air Conditioning
2. Water Supply
3. Fire Protection
4. Process Industries

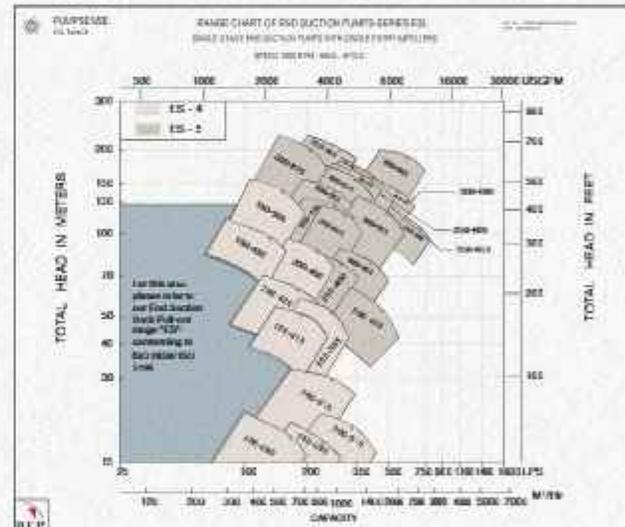
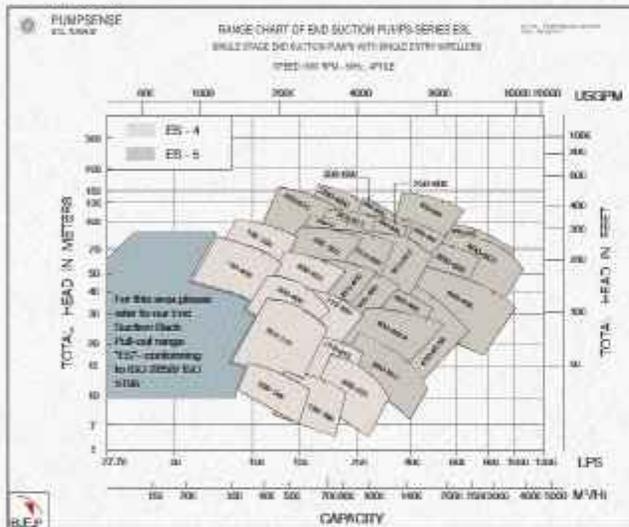
Options

Materials - CI, DI, Bronze, SS, Ni Resist
Stuffing Box- Packed Gland, Mechanical Seal
Constructional Features - Foot/Center Line Mounting,
Bearing options, cooling options, Open & semi-open
impellers

Features

1. Conforms to ISO 2858
2. Conforms to ISO 5199
3. High Efficiency, Low NPSHr
4. Over 37 frames ensures optimum selection for all duties
5. Quick Customization possible to ensure optimum operation.

Series ESL - Large End Suction Pumps



Range Description

- Size : 150 to 400 mm
- Capacities : Up to 3200 m³/hr.
- Head : Up to 200m
- Speed : Up to 1800 rpm

Applications

1. Air Conditioning
2. Water Supply
3. Fire Protection
4. Process Industries
5. Mine Dewatering
6. Power Generation

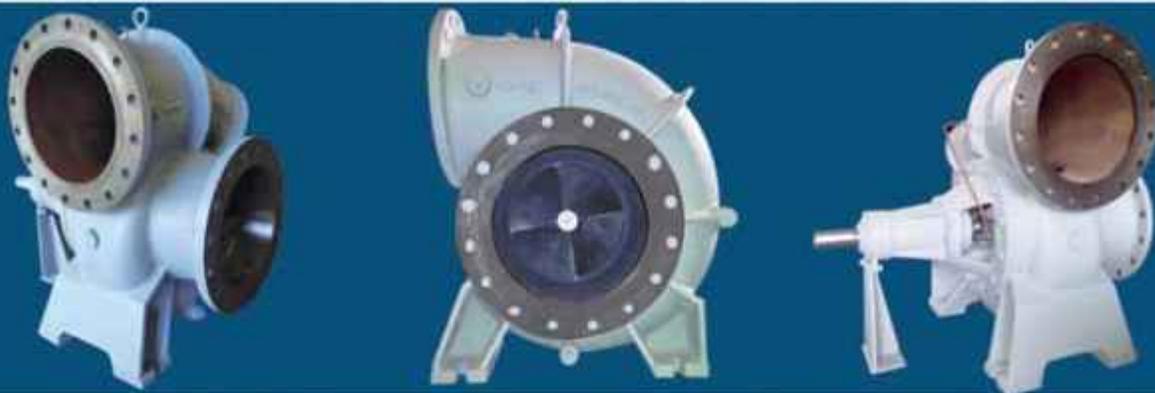
Options

- Materials - CI, DI, Bronze, SS, Ni Resist
- Stuffing Box - Packed Gland, Mechanical Seal
- Constructional Features - Foot/Center Line Mounting, Bearing options, cooling options, Open & semi-open impellers

Features

1. High head pumps incorporate double volute design to reduce radial load and improve seal /bearing lives.
2. Conforms to ISO 5199
3. High Efficiency, Low NPSHr
4. Over 31 frames ensures optimum selection for all duties
5. Quick Customization possible to ensure optimum operation.

Series EMF - End Suction Mixed Flow Pumps



General

Series EMF (End Suction Mixed Flow) pumps have been designed for efficiently handling large volumes of water at low and medium heads – they are available in sizes 8", 10", 12" and 16".

Operational Limits

Pumps are suitable for clean, chemically and mechanically non-aggressive liquids

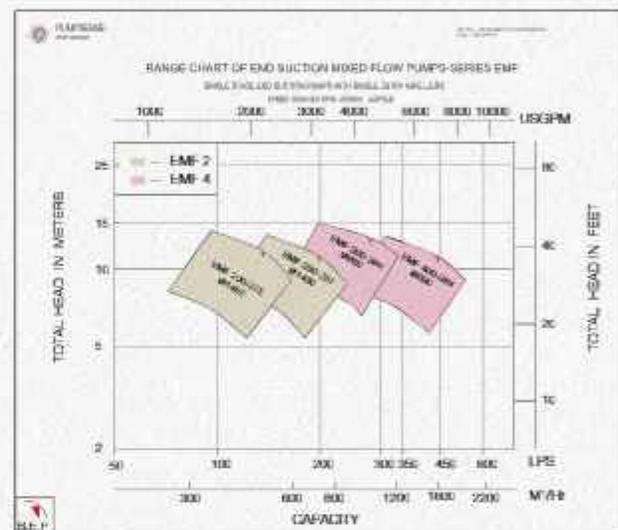
- maximum content of suspended solids, with hardness and granulometry of slit: 40 gm/m³
- maximum temperature of pumped liquids: 80°C
- maximum operating pressure: 10 bar
- coaxial drive only, by flexible coupling or cardan shaft

Range Description

Size : 200 to 400 mm
Capacities : Up to 1650 m³/hr.
Head : Up to 16m
Speed : Up to 1500 rpm

Applications

1. Flood Irrigation
2. Water Harvesting
3. Drainage
4. Waste Disposal



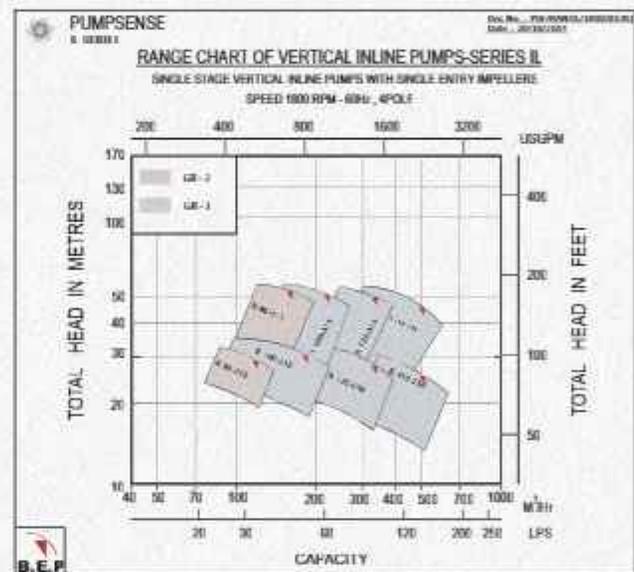
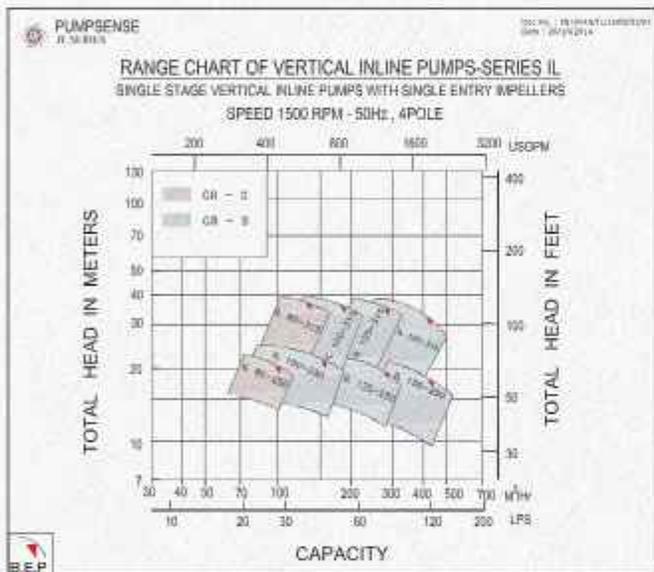
Options

Materials - CI, DI, Bronze, SS, Ni Resist
Stuffing Box - Packed Gland, Mechanical Seal
Constructional Options - Bearing options, cooling options, special impellers

Features

1. Stable head-capacity characteristics
2. Non-overloading power curve
3. High Efficiency, Low NPSHr
4. Rugged heavy duty construction
5. Quick Customization possible for specific applications.

Series IL - Vertical Inline Pumps



Range Description

Discharge NB : 80 to 150 mm
 Capacities : Up to 350 m³/hr.
 Head : Up to 120m
 Speed : Up to 3600 rpm

Applications

1. General Water Supply
2. Water Circulation for air conditioning systems
3. Petro-Chemical Industry
4. Industrial Cooling System
5. Process Industry

Options

Materials - CI, DI, Bronze, SS, Ni Resist
 Stuffing Box - Packed Gland, Mechanical Seal
 Constructional Features - Horizontal & vertical orientation, Compact close-coupled design is an optional construction.

Features

1. Suction and discharge connections are in-line and are of the same size to simplify piping. This enabling easy installation and minimizes installation space.
2. Pump is provided with its own independent thrust bearing and is flexibly coupled to the motor shaft
3. Smallest foot print - utilizes the least amount of floor space.
4. Quick Customization possible to ensure optimum operation.

NFPA20 FIRE PUMP SELECTION TABLE

We offer one of the most comprehensive range of NFPA 20 fire pumps from the smallest to the largest high capacity/high head unit. The range is constantly being upgraded to optimize fire rating, range coverage and reliability.



NFPA 20 Fire Pump Selection Table - 500 GPM to 5000 GPM (SPLIT CASE)

Flow		Head		SPEED	PUMP MODEL		DRIVER RATING				
USGPM	M3HR	PSIG	M	RPM	PUMP MODEL	PUMP TYPE	Kw	HP			
500	114	50-85	35-60	1000	4HS16	HSC SINGLE STAGE	45	60			
		50-102	35-72		4HS17	HSC TWO STAGE	45	60			
		95-100	68-105		4HS16	HSC TWO STAGE	75	101			
		128-208	90-160		4HS19	HSC TWO STAGE	110	147			
		57-89.5	40-70	1800	4HS15	HSC SINGLE STAGE	45	60			
		85-170	80-130		4HS13	HSC TWO STAGE	75	101			
		170-227	120-160		4HS18	HSC TWO STAGE	110	147			
		50-78	35-55		4HF11	HSC SINGLE STAGE	37	50			
		71-135	50-85	2100	3HF15	HSC SINGLE STAGE	55	74			
		114-230	80-155		3HF10	HSC SINGLE STAGE	90	121			
		57-163	40-115		3HF11	HSC SINGLE STAGE	60	80			
		163-291	115-205		3HF15	HSC SINGLE STAGE	132	177			
		127-258	90-210	3000	3HFT12	HSC TWO STAGE	132	177			
		291-489	205-330		3HFTD14	HSC TWO STAGE	200	268			
		95-241	70-170		3HF11	HSC SINGLE STAGE	110	147			
		750	170		28-07	20-40	1000	5HS13	HSC SINGLE STAGE	30	40
77-115	54-81			5HS14	HSC TWO STAGE	75		101			
95-109	95-140			5HS18	HSC TWO STAGE	132		177			
213-355	150-250			5HS24	HSC TWO STAGE	275		369			
50-85	35-60			1800	5HS13	HSC SINGLE STAGE	55	74			
85-114	60-80				5HS15	HSC SINGLE STAGE	75	101			
123-178	87-125				5HS14	HSC TWO STAGE	110	147			
213-312	150-220				4HST15	HSC TWO STAGE	225	302			
54-114	45-80			2100	4HF14	HSC SINGLE STAGE	75	101			
95-184	70-130				4HF14	HSC SINGLE STAGE	132	177			
97-157	68-110				4HF11	HSC SINGLE STAGE	110	147			
157-270	110-190				3HF15	HSC SINGLE STAGE	132	177			
143-305	100-215			3000	4HFT12	HSC TWO STAGE	200	268			
149-238	105-168				4HF11	HSC SINGLE STAGE	150	201			
1000	227				50-83	35-60	1000	5HS17	HSC SINGLE STAGE	75	101
					74-118	52-83		5HS19	HSC SINGLE STAGE	90	121
		121-180	85-127	5HS23	HSC SINGLE STAGE	130		201			
		227-348	160-245	5HST24	HSC TWO STAGE	350		469			
		78-135	55-85	1800	5HS17	HSC SINGLE STAGE	132	177			
		121-185	85-130		5HS19	HSC SINGLE STAGE	150	201			
		185-270	130-190		5HS23	HSC SINGLE STAGE	275	369			
		348-540	245-380		5HST24	HSC TWO STAGE	550	737			
		45-85	32-60	2100	5HF12	HSC SINGLE STAGE	75	101			
		112-227	79-180		5HFTD13	HSC TWO STAGE	180	241			
		106-177	75-125		5HF14	HSC SINGLE STAGE	180	241			
		58-949	62-105		4HF11	HSC SINGLE STAGE	132	177			
		114-187	80-132	3000	5HF12	HSC SINGLE STAGE	160	214			
		130-234	95-165		4HF14	HSC SINGLE STAGE	180	241			
		227-341	160-240		5HFTD12	HSC TWO STAGE	180	241			
		177-284	125-200		5HF12	HSC SINGLE STAGE	250	335			
1250	294	60-88	42-62	1000	5HS17	HSC SINGLE STAGE	90	121			
		90-139	64-88		5HS21	HSC SINGLE STAGE	130	201			
		227-348	160-245		5HST24	HSC TWO STAGE	400	536			
		90-135	65-95		5HS17	HSC SINGLE STAGE	132	177			
		116-175	82-126	1800	5HS19	HSC SINGLE STAGE	180	241			
		179-270	128-190		5HS23	HSC SINGLE STAGE	315	422			
		340-540	240-380		5HST24	HSC TWO STAGE	575	765			
		257-386	181-272		5HST18	HSC TWO STAGE	425	570			
		65-100	45-70	2350	5HF12H	HSC SINGLE STAGE	110	147			
		108-200	78-141		5HS15	HSC SINGLE STAGE	225	302			
		95-173	70-122		5HF14	HSC SINGLE STAGE	180	241			
		52-258	65-120		5HF12	HSC SINGLE STAGE	180	241			
		126-220	90-155	3000	4HF14	HSC SINGLE STAGE	200	268			
		227-324	160-235		5HFTD12	HSC TWO STAGE	350	469			
		134-454	235-320		5HFTD13	HSC TWO STAGE	575	771			
		1500	341		61-89	43-70	1000	5HS17	HSC SINGLE STAGE	132	177
88-138	62-97			5HS21	HSC SINGLE STAGE	180		241			
227-340	160-240			5HST24	HSC TWO STAGE	450		603			
88-135	62-95			5HS17	HSC SINGLE STAGE	180		241			
142-217	100-163			1800	5HS21	HSC SINGLE STAGE	275	369			
241-270	170-190				5HS23	HSC SINGLE STAGE	350	469			
336-540	237-380				5HST24	HSC TWO STAGE	725	972			
65-100	45-70				2350	5HF12H	HSC SINGLE STAGE	110	147		
105-196	74-138			5HS15		HSC SINGLE STAGE	250	335			
95-163	70-115			5HF14		HSC SINGLE STAGE	180	241			
95-170	60-120			5HF12		HSC SINGLE STAGE	180	241			
142-213	100-150			3000	5HF14	HSC SINGLE STAGE	250	335			
128-200	90-140				5HF14H	HSC SINGLE STAGE	275	369			
227-326	160-230				5HFTD12	HSC TWO STAGE	400	536			
227-454	160-320				5HFTD13	HSC TWO STAGE	575	771			

NFPA20 FIRE PUMP SELECTION TABLE



DUTY DETAILS				PUMP MODEL		DRIVER RATING				
Flow	Head	SPEED	PUMP MODEL	PUMP TYPE	W	F.P				
USGPM	FT/HR	RPM								
1500	341	1500	P893	H	BHS17	HSC SINGLE STAGE	170	117		
			51-88	43-70	BHS21	HSC SINGLE STAGE	170	241		
			88-138	82-97	BH124	HSC TWO STAGE	450	603		
			217-340	160-240	BH17	HSC SINGLE STAGE	180	241		
			88-138	82-97	BHS21	HSC SINGLE STAGE	270	369		
			143-217	100-153	BHS23	HSC SINGLE STAGE	300	489		
			241-320	170-190	BH124	HSC TWO STAGE	720	972		
		136-240	237-380	BH-F12H	HSC SINGLE STAGE	110	147			
		45-100	45-70	BHS10	HSC SINGLE STAGE	250	336			
		105-198	74-138	BH-F14	HSC SINGLE STAGE	180	241			
		99-163	70-115	BH-F12	HSC SINGLE STAGE	180	241			
		85-170	80-120	BH-F14H	HSC SINGLE STAGE	250	336			
		143-213	100-150	BH-F12H	HSC SINGLE STAGE	400	536			
		128-200	90-140	BH-F10H	HSC SINGLE STAGE	270	369			
227-325	160-230	BH-F12H	HSC TWO STAGE	400	536					
227-324	160-230	BH-F10H	HSC TWO STAGE	675	771					
2000	454	1500	P893	M	BHS17	HSC SINGLE STAGE	180	201		
			57-82	40-65	BHS18	HSC SINGLE STAGE	180	241		
			85-105	57-75	BHS21	HSC SINGLE STAGE	250	315		
			112-145	80-102	BHS16	HSC SINGLE STAGE	180	241		
			64-106	45-75	BHS17	HSC SINGLE STAGE	250	315		
			108-142	70-100	BHS21	HSC SINGLE STAGE	325	436		
			143-210	100-148	BH-F12	HSC SINGLE STAGE	270	369		
		171-199	85-140	BH-F14	HSC SINGLE STAGE	375	503			
		102-139	65-107	BH-F12	HSC SINGLE STAGE	270	369			
		143-183	70-115	BH-F14	HSC SINGLE STAGE	375	503			
		123-224	100-160							
		2500	568	1500	P893	M	BHS17	HSC SINGLE STAGE	270	369
					105-148	65-100	BHS18	HSC SINGLE STAGE	415	552
					125-213	80-120	BHS21	HSC SINGLE STAGE	675	904
195-312	140-220				BHS16	HSC SINGLE STAGE	180	241		
57-81	40-67				BHS17	HSC SINGLE STAGE	250	336		
81-138	57-97				BHS21	HSC SINGLE STAGE	425	570		
169-213	115-150				BHS23	HSC SINGLE STAGE	675	906		
185-320	130-225			BHS17	HSC SINGLE STAGE	350	489			
114-193	80-136			BH-F12	HSC SINGLE STAGE	315	429			
87-155	68-109			BH-F14	HSC SINGLE STAGE	400	536			
123-223	87-167									
3000	682			1500	P893	M	BHS17	HSC SINGLE STAGE	160	214
					30-44	21-31	BHS18	HSC SINGLE STAGE	180	241
					47-71	33-50	BHS21	HSC SINGLE STAGE	225	302
		64-90	45-65		BHS16	HSC SINGLE STAGE	415	603		
		105-160	75-115		BHS22	HSC SINGLE STAGE	415	603		
		165-258	130-210		BHS23	HSC SINGLE STAGE	675	906		
		80-199	60-140		BH-F12	HSC SINGLE STAGE	475	637		
		109-312	140-220	BHS16	HSC SINGLE STAGE	681	917			
		165-340	200-210	BHS22	HSC TWO STAGE	1000	1407			
		112-188	80-130	BHS17	HSC SINGLE STAGE	315	429			
		159-298	140-210	BHS22	HSC SINGLE STAGE	700	938			
		80-173	60-107	BH-F14	HSC SINGLE STAGE	350	489			
		3500	790	1500	P893	M	BHS17	HSC SINGLE STAGE	180	241
					47-68	33-58	BHS18	HSC SINGLE STAGE	250	336
62-85	44-62				BHS21	HSC SINGLE STAGE	270	369		
74-99	50-70				BHS22	HSC SINGLE STAGE	415	637		
102-165	72-116				BHS16	HSC SINGLE STAGE	415	637		
142-227	100-160				BHS22	HSC SINGLE STAGE	675	904		
170-280	120-204				BHS23	HSC TWO STAGE	720	972		
64-104	45-75			BH-F12	HSC SINGLE STAGE	300	402			
104-163	73-115			BH-F14	HSC SINGLE STAGE	450	603			
163-241	115-170			BH-F12	HSC SINGLE STAGE	600	1072			
284-428	200-300			BH-F10	HSC TWO STAGE	1150	1541			
48-65	34-60			BHS16	HSC SINGLE STAGE	225	302			
185-287	131-209			BHS22	HSC SINGLE STAGE	770	1030			
4000	900			1500	P893	M	BHS17	HSC SINGLE STAGE	270	369
		58-86	48-68		BHS18	HSC SINGLE STAGE	415	552		
		100-163	70-115		BHS21	HSC SINGLE STAGE	500	670		
		163-220	115-150		BHS22	HSC SINGLE STAGE	675	906		
		60-101	48-71		BHS16	HSC SINGLE STAGE	330	442		
		86-136	58-86		BHS17	HSC SINGLE STAGE	450	603		
		105-145	76-103		BHS18	HSC SINGLE STAGE	450	603		
		213-328	150-230	BH-F12	HSC SINGLE STAGE	1100	1474			
		213-328	150-230	BH-F10	HSC TWO STAGE	1250	1679			
		4500	1022	1500	P893	M	BHS17	HSC SINGLE STAGE	330	442
					35-49	30-70	BHS22	HSC SINGLE STAGE	450	603
					53-70	70-100	BHS23	HSC SINGLE STAGE	650	872
					83-105	80-120	BHS16	HSC SINGLE STAGE	800	1072
					35-48	30-70	BHS18	HSC SINGLE STAGE	225	302
49-70	70-100				BHS16	HSC SINGLE STAGE	475	637		
81-105	115-150				BHS22	HSC SINGLE STAGE	250	336		
105-175	150-250			BH-F12	HSC SINGLE STAGE	1100	1474			
5000	1136			1500	P893	M	BHS17	HSC SINGLE STAGE	220	302
					42-66	30-48	BHS18	HSC SINGLE STAGE	315	429
					64-80	45-65	BHS21	HSC SINGLE STAGE	500	670
					89-147	70-104	BHS22	HSC SINGLE STAGE	600	810
					113-188	80-130	BHS23	HSC SINGLE STAGE	700	938
					118-213	85-150	BHS16	HSC SINGLE STAGE	800	1072
		35-50	38-42		BHS18	HSC SINGLE STAGE	225	302		
		66-93	47-66	BHS16	HSC SINGLE STAGE	330	442			
		71-99	50-70	BHS16	HSC SINGLE STAGE	400	536			
		99-137	70-97	BHS18	HSC SINGLE STAGE	600	810			
		166-240	110-160	BHS22	HSC SINGLE STAGE	675	917			

For the selection of NFPA-20 End Suction Fire Pump please refer to PUMPSENSE.

MARINE EXTERNAL FIRE PUMPS (FIFI PUMPS)



Range Coverage - Pumpsense has the most extensive range of ships external firefighting pumps. The hydraulics of the range is based on our very successful split-case and end suction range of pumps. A large number of pump sizes allow us to optimize selection based on available engine rating and speed.

Pump Types and product variants - Pumps are offered in a large variety of construction options, such as:

- Axially split case -Side Suction/Side Delivery - CW /CCW
- Axially split case -Side Suction/ Top Delivery - CW/CCW
- Axially split case - Bottom Suction/ Side Delivery - CW/CCW
- Axially Split Case - Bottom Suction/ Top Delivery - CW/CCW
- Axially Split Case Vertical Shaft

End Suction Pumps - CW/CCW with several suction branch options.

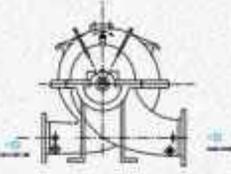
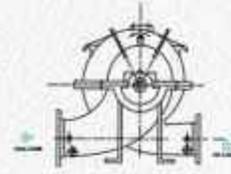
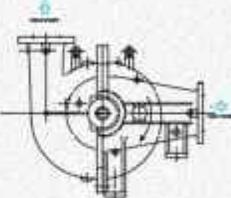
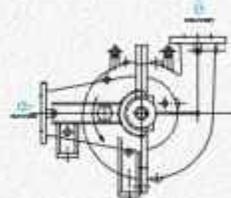
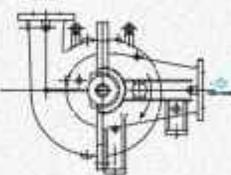
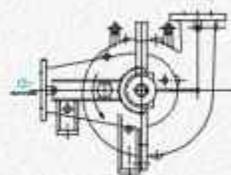
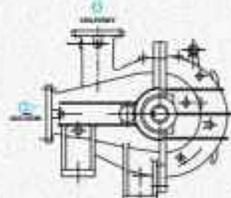
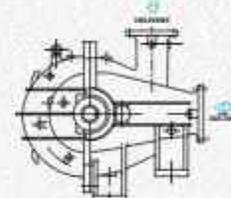
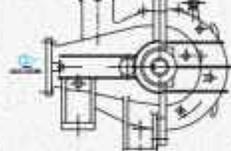
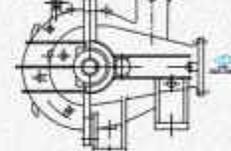
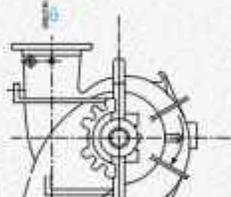
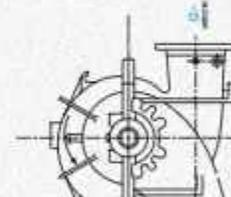
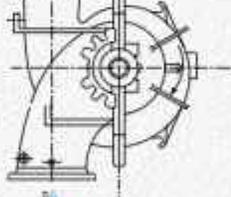
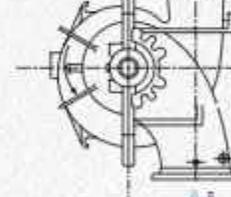
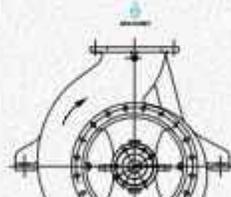
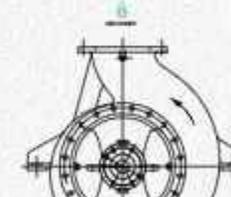
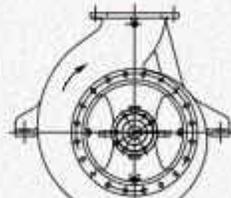
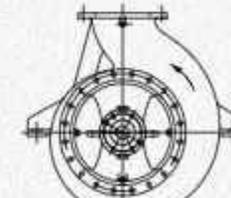
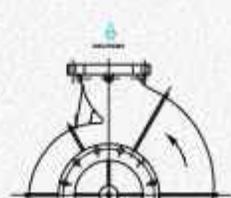
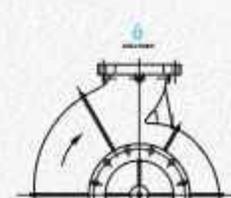
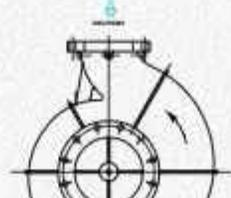
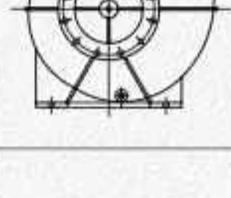
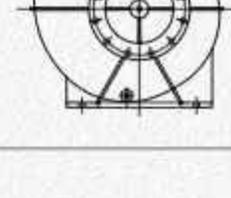
Customization/Special Design - We work closely with customers to design "space optimized" special designs such as clutch mounted pumps, pumps with lip seals in place of conventional packing/ mechanical seal, pumps specially designed for a specific engine rating or speed, etc.

Material of Construction - Pumps are offered in a variety of material options such as Ductile Iron, Nickel Aluminum Bronze, Duplex Stainless Steel, etc.

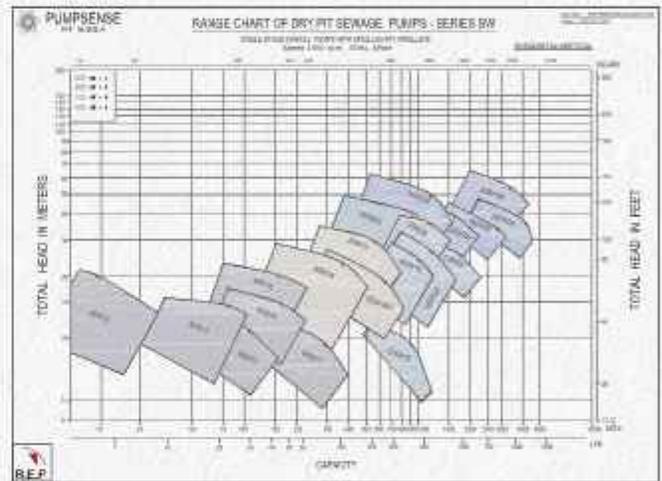
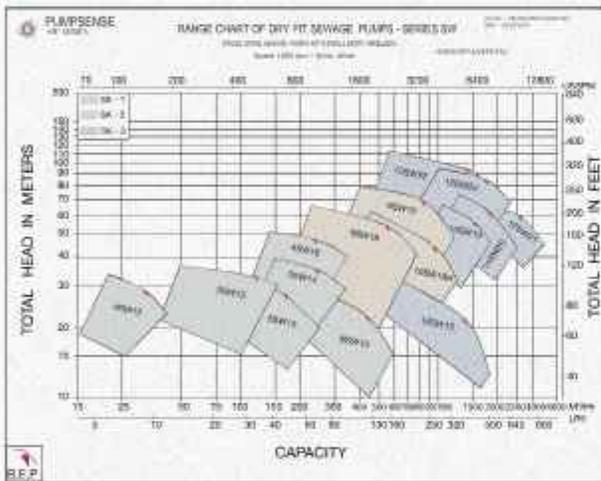
Certification - Pumps are certified by agencies such as ABS, Lloyds, BV, DNV, KR, CCS, etc. When required product/type approvals are also obtained from these agencies.

FPSO Fire Pumps - Our Range include engineered NFPA20 FPSO fire and lift pumps in a variety of material options.



Product Available					Available option for marine fire pump flange orientation		
Capacity (m ³ /hr.)	Head Range (Bar)	End Suction (ESF Range)	Split Case (HS/SF/SFM) Range	Speed Range	Type	CW looking from DE	CCW looking from DE
300	12-14	ESF 125-500	5SF20	1800-2100	Horizontally Split Case		
400	12-14	ESF 150-500	5SF19	1800-2100			
600	12-14	ESF 150-500	6SF21	1800-2100			
750	12-14	ESF 200-500	8SF22	1800-2100	Side Suction/ Side Delivery		
	12-14	ESF 200-550	8SF22	1800-2100			
900	12-14	ESF 200-500	8SF22	1800-2100	Horizontally Split Case		
	12-14	ESF 200-550	8SF26	1800			
1200	12-14	ESF 250-500	10SF22	1800	Side Suction/ Top Delivery		
	12-14	ESF 250-600	10SF27	1800			
1500	12-14	ESF 250-500	10SF22	1800	Horizontally Split Case		
	12-14	ESF 250-600	10SF27	1800			
1600	12-14	ESF 250-500	10SF22	1800	Side Suction/ Top Delivery (Mirror version)		
	12-14	ESF 250-600	10SF27	1800			
1800	12-14	ESF 300-550	10SF22	1800	Horizontally Split Case		
	12-14	ESF 300-600	10SF27	1800			
1800	12-14	ESF 300-550	12SF23	1800	Bottom Suction/ Top Delivery		
	12-14	ESF 300-665	12SF23	1800			
2100	12-14	ESF 300-665	12SF23	1800	End Suction Pumps		
2400	12-14	ESF 400-500	12SF23	1800	End Suction/ Top Delivery (Center Mounted)		
	12-14	ESF 400-600	12SF23	1800			
2700	12-14	ESF 400-500	16SF26	1800	End Suction Pumps		
	12-14	ESF 400-600	16SF28	1800			
3000	12-14	ESF 400-500	16SF26	1800	End Suction/ Top Delivery (Foot Mounted)		
	12-14	ESF 400-600	16SF28	1800			
3600	12-14	ESF 400-600	16SF26	1800	End Suction/ Top Delivery (Foot Mounted)		
	12-14	ESF 400-600	16SF28	1800			

Series SW - Non-clog Dry Pit Sewage Pumps



Range Description

- Size : 80 to 600 mm
- Capacities : Up to 4000 m³/hr.
- Head : Up to 100m
- Speed : Up to 1800 rpm

Applications

1. General Water Supply
2. Water Circulation for air conditioning system
3. Petro-Chemical Industry
4. Industrial Cooling System
5. Light Textile Industry

Options

Materials - CI, DI, Bronze, SS, Ni Resist

Stuffing Box - Packed Gland, Mechanical Seal

Constructional Features - Centrifugal, Horizontal/vertical model, open shrouded design with supplementary vanes, minimum no of vanes for solid handling capacity.



Two Vane Non-Clog Impeller

Features

1. High Energy Efficiency
2. Optimum Mechanical Reliability
3. Large Solid Handling Capacity
4. Large Number of Pumps for optimum selection
5. Horizontal, Vertical and Cardan Shaft option

Quality Assurance & Testing



For each order executed by Pumpsense, detailed quality plan is drawn up to reflect special conditions of the order and customers specific QA requirements. As a minimum, the following QA documents are available for each pump manufactured by Pumpsense and the customer may access these documents at any time:

1. Dimensional conformance report & "as built" general arrangement drawing.
2. Physical and chemical test certificates for major pump components such as casing, impeller and shaft.
3. Dynamic balancing report for the rotating element.
4. Hydrostatic pressure test report
5. Seal integrity test report
6. Performance test report

In-house Non-destructive test facilities -

1. Dynamic balancing machine
2. Liquid penetrant test arrangement
3. Ultrasonic test equipment

Hydrostatic Pressure Test & Seal Integrity Test -

- All pump casings are pressure tested as per applicable code/customer's order.
- Fully assembled mechanical seal fitted pumps are subjected to a second hydrostatic test at the maximum allowable seal pressure or casing hydrostatic test pressure, whichever is lower, to check leak free operation of seals under pressure.

Performance Test - All pumps are tested for performance as per ISO 9906 Grade 1. Pumpsense is equipped with a state of the art test bed with the following key features:

1. Test Tank - The tank which is partly underground and partly overground ensures adequate NPSHA for performance test. The tank size is 23ft(L) X 10ft(W) X 12ft(W) and holds 80 m3 of potable water for testing. The test tank has been specially designed as per the guidelines of the Hydraulic Institute Standards and is provided with necessary flow stabilizers, separate return chambers, etc. in order to ensure vortex free suction condition.
2. Test Lines - There are two test lines of 250 mm and 150 mm capable of measuring flows up to 1500 m3/hr.
3. Flow Measurement - Flow measurement is done primarily by magnetic flow meters. However, the test lines are also equipped with orifice meters supported by differential pressure transducers for flow measurements/calibration. Ultrasonic flow meter provides a third means of flow measurement in the test bed.
4. Pressure Measurement - This is done by both pressure transducers and bourdon type pressure gauge.
5. Power Measurement - Power is measured by YOKOGAWA power meter. For non-synchronous motor speeds the power is also measured by S. HIMMELSTEIN make torque meter.
6. Speed - Pump speed is measured by stroboscope.
7. Vibration - Vibration data is obtained by a Bruel & Kjaer vibration analyzer
8. Speed Variation - Speed variation for testing is achieved through a 132kW VFD supplied by Fuji
9. Flow control - Flow control is achieved by actuator operating globe and butterfly valves.
10. Data acquisition and control panel - A specially designed control panel with the state-of-the-art instrumentation is used for data acquisition and test sheet/test curve generation. The system uses proprietary software for pump testing.
11. NPSH test - NPSH test is conducted by a 3% head-decay method by throttling the suction globe valves.



PUMPSENSE - RETROFIT SERVICES

RETROFIT PROCEDURE

Condition monitoring
Analysis of problems
Establish system characteristics

↓
Identification of constraints
– Prime mover rating
– Available NPSH
– Range of operation

↓
Measurement of Internal dimensions
of the pump
Inspection of the pump internals for
diagnostics and material/
design parameter selection

↓
Estimation of performance of new
Impeller/rotating element, energy
consumption, suction performance

↓
Design and Development

↓
Testing and commissioning



PUMPSENSE – CORE VALUE PROPOSITION

1. Over 35 years of accumulated learning and experience in the field of centrifugal pumps.
2. Sophisticated understanding of the pump business.
3. Highly experienced hydraulic designers with a large pool of proven pump designs.
4. Ability to develop new pumps quickly and competitively.
5. Over five thousand pumps in operation in Asia Pacific, Middle East, Europe, Americas and South Asia.
6. Ability to quickly customize pumps and offer product variants competitively.
7. Well developed supply chain, experienced pattern makers, specialized foundries, pump serviceproviders.

SPECIAL PUMPS AND SERVICES

PACKAGED PUMP SETS– Packaged pump sets are supplied with fabricated steel base plates, couplings and guards. Driver selection includes speed torque and rotor dynamic analysis.

SPECIAL PUMPS – special pumps are designed and built to meet specific needs of customers.

DESIGN & DEVELOPMENT – We have developed split case, end suction, vertical and horizontal inline pumps for other pump makers. This service includes complete hydraulic and mechanical design, development of patterns and prototype. The service usually extends to commercial production on behalf of the customer.

RETROFIT – Retrofit division of PUMPSENSE provides performance enhancement of your existing pumps.

PUMP COMPONENTS – Supply of fully machined pump components.

PUMPSENSE FLUID ENGINEERING PVT. LTD

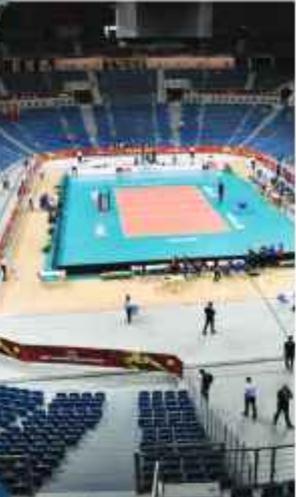
5/F, Hastings Court, Tower A, 96, Garden Reach Road, Kolkata 700023, INDIA

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Web: worldofpumps.com email: enquiries@worldofpumps.com



PUMPSENSE



SERVING HVAC PUMPING

**PUMPS FOR CENTRAL
AIR CONDITIONING AND
DISTRICT COOLING SYSTEMS**



PUMPSENSE



The Beginning

History of PUMPSense goes back to 1995 when a group of professionals working in large international pump companies decided to team together. At PUMPSense, we are united through a common vision to build an excellent pump 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 pump 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.





PUMPSENSE

The Guiding Philosophy

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 customer, employees and suppliers and all of us work together to create value, to grow, to learn and to enhance the quality of our lives





Facilities: Test Bed

Test Bed Highlights

- Flow- Up to 4000 m³/hr
- Pressure – Up to 300 meters water column
- Speed- Up to 3600 RPM
- 5 Test Lines
- Flow measured by – 6", 8", 10", 12", 16", 20" magnetic flow meter
- Real time data acquisition – SCADA system
- Test bed volume - 58000 gallons / 220 m³

The testbed is fully equipped for multiple validations of pump efficiency.

Products – Split Case For Air Conditioning Applications

RANGE OF OUR SPLIT-CASE PUMPS:

Flow : upto 1022.061 m³/hr

Head: upto 103.63 m

Speed: upto 1800 rpm

FEATURES:

- Optimum efficiency.
- Low NPSHr.
- Stable Characteristics H-Q for all duties.
- Over 80 sizes ensure optimum selection for all duties.
- Quick customization possible to meet special system requirements.
- High head units have double volute casings to reduce radial thrust.

PRODUCT VARIANTS:

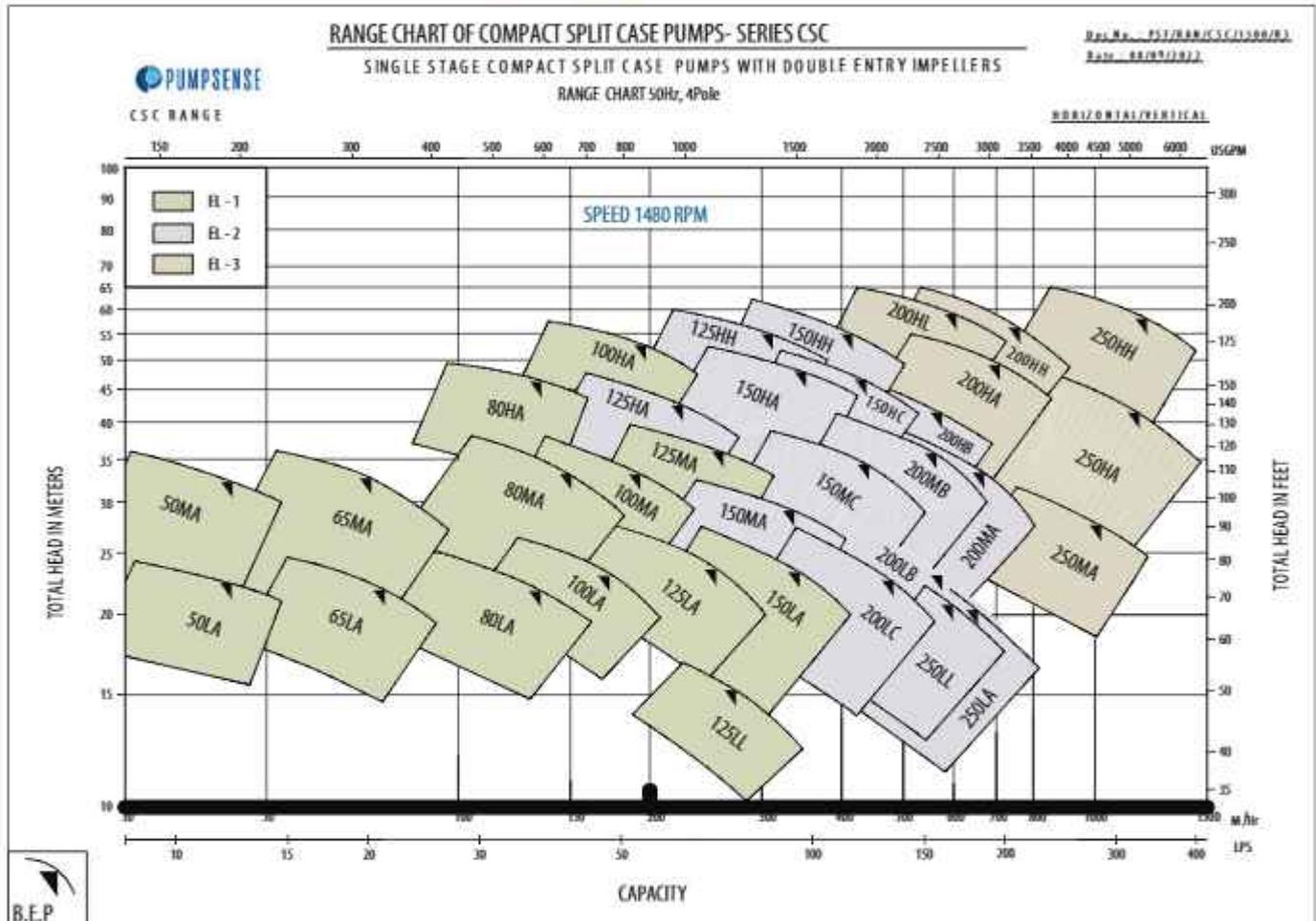
- Single Stage Pumps
- Two Stage Pumps
- Packed Gland Pumps
- Mechanical Seal Fitted Pumps
- Side Suction – Side Delivery Pumps
- Side Suction – Top Delivery Pumps
- Bottom Suction – Top Delivery Pumps
- Vertically Mounted Pumps
- And more..





PUMPSENSE

Series CSC - Compact Split Case Pumps - Horizontal / Vertical For Air Conditioning Applications



DEVELOPMENT OBJECTIVES

Environmental concerns increasingly demand highest possible efficiency in pumps. Universal efforts to reduce or eliminate stand-by units for energy and life-cycle-cost optimization demand optimum hydraulic and mechanical reliability.

DESIGN FEATURES

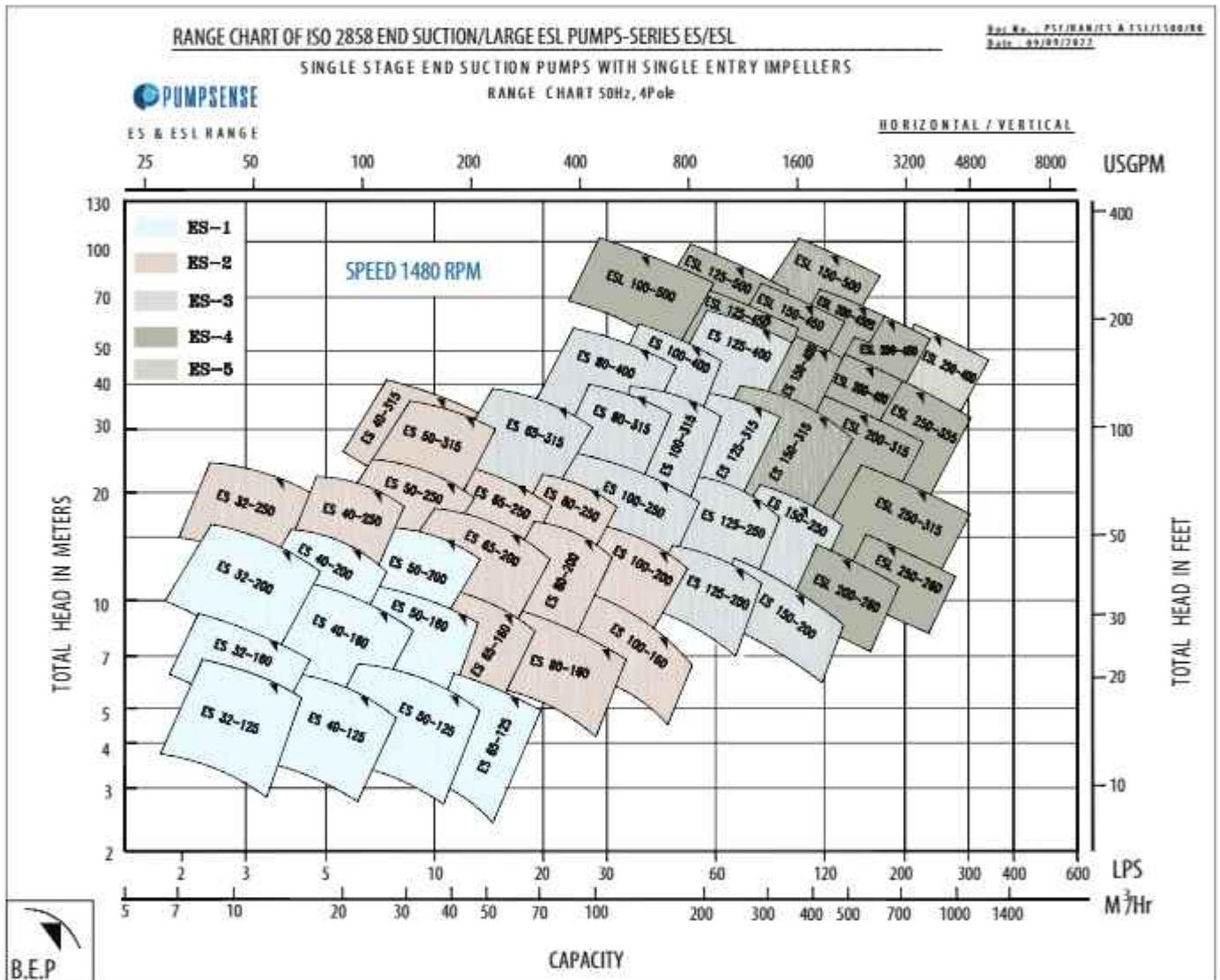
Compact Design - Shorter shaft span reduces shaft deflection and increases seal and bearing lives. Casing machining is simplified, eliminating chances of machining errors and reducing machining time. Requires lesser installation space – releases expensive retail space for revenue generation. Permits faster assembly & dismantling.

Optimum Efficiency – Hydraulic Institute norms have been used as bench mark. Established hydraulic designs have been used where the benchmark was achieved or exceeded.

Optimized Selection - A large number of sizes help to find a pump with optimum efficiency for any duty cluster. Pump selection is always possible in the B.E.P zone (+10% to -15% of B.E.P).

Use of Double Volute Casing - Double volute casing design has been adopted for 100 mm delivery branch size & above, to minimize radial thrust. This is a distinct advantage for air-con applications where over-specification of head and varying load leads to operation of pump at part or over flow conditions.

Series ES/ESL - ISO 5199 End Suction Pumps/Large End Suction Pumps



NOTE -

For Duties not covered in this range chart, please write to us and we will find the right end suction back pull out pump for you. Our combined range of ES/ESL/EMF pumps have over 70 sizes covering most air conditioning duties



PUMPSENSE

PUMPS FOR AIR CONDITIONING Products – End Suction Pumps

RANGE OF OUR END SUCTION PUMPS:

- **Flow:** upto 1022.061 m³/hr
- **Head:** upto 118.87 m
- **Speed:** upto 1800 rpm

FEATURES:

- Small end Suction range conforms to ISO 2858/ ISO 5199
- Design optimized to produce maximum flow for a given size
- Efficiency optimised as per Hydraulic Institute & Europump Norms
- Customized units for higher speed and special applications
- Many material and flange options.
- High head pumps incorporate double volute design to reduce radial load and improve seal /bearing lives

PRODUCT VARIANTS:

- End Suction Range ISO 2858 Compliant
- Large End Suction Pumps – up to 16" size
- Packed Gland Pumps
- Mechanical Seal Fitted Pumps
- Centreline Mounted Pumps.
- Pumps with Strengthened Bearing
- Bottom Suction – Top Delivery Pumps etc
- Vertically mounted pumps in OH3A configuration

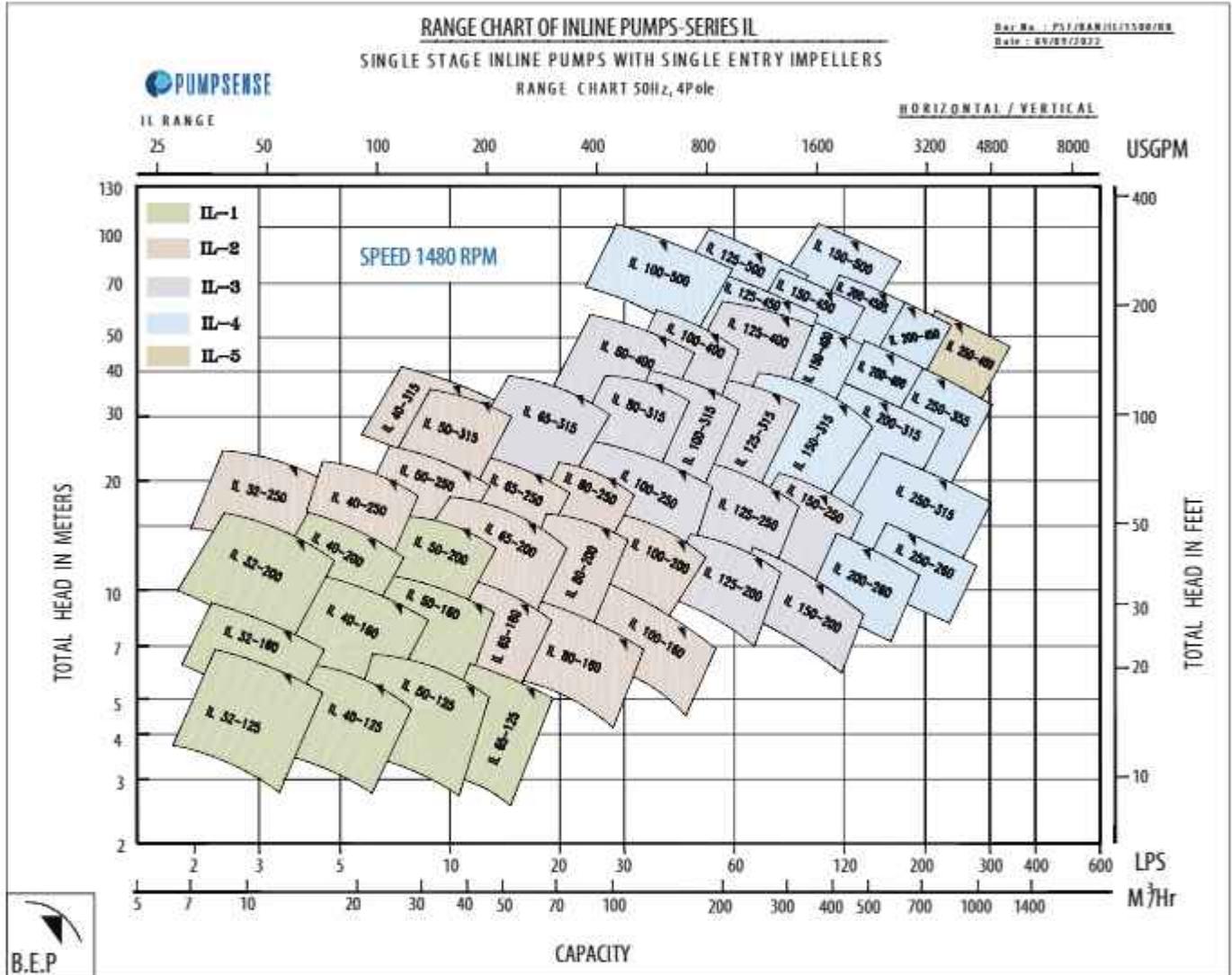




PUMPSENSE

PUMPS FOR AIR CONDITIONING

Series IL - Vertical Inline Pumps



Note- for duties not covered in the range chart, please refer to Pumpsense
For section of pumps at 60hz (1800 rpm / 1200 rpm), please visit our
webpage www.worldofpumps.com

Products – Series II - Vertical Inline Pumps

RANGE OF OUR VERTICAL INLINE PUMPS:

- **Flow:** 40 9.084 - 1022.030 m³/hr
- **Head:** 3.048 - 118.90 m
- **Speed:** UPTO 1800 RPM

FEATURES:

- Suction and discharge connections are in-line enables to simplify piping. This enabling easy installation and minimizes installation space.
- Pump is provided with its own independent thrust bearing and is flexibly coupled to the motor shaft
- Smallest foot print – utilizes the least amount of floor space.
Quick Customization possible to ensure optimum operation.

PRODUCT VARIANTS:

- Materials - CI, DI, Bronze, SS, Ni Resist
- Stuffing Box - Packed Gland, Mechanical Seal
- Constructional Features - Horizontal & vertical orientation, Compact close-coupled design is an optional construction.



Pumpsense USP for Air-Conditioning Pump Applications

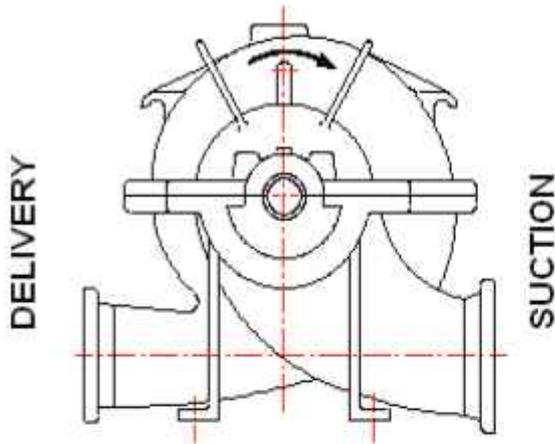
Product variants and customization capabilities

- ✓ **Vertical Split case/Vertical End Suction Variants**
- ✓ **Pumps Designed for High Suction Pressure**
- ✓ **Orientations Offered to Suit Installation Requirements**
- ✓ **Different seal and flange options**
- ✓ **Different material options**
- ✓ **1:1 Replacement of existing Pumps**



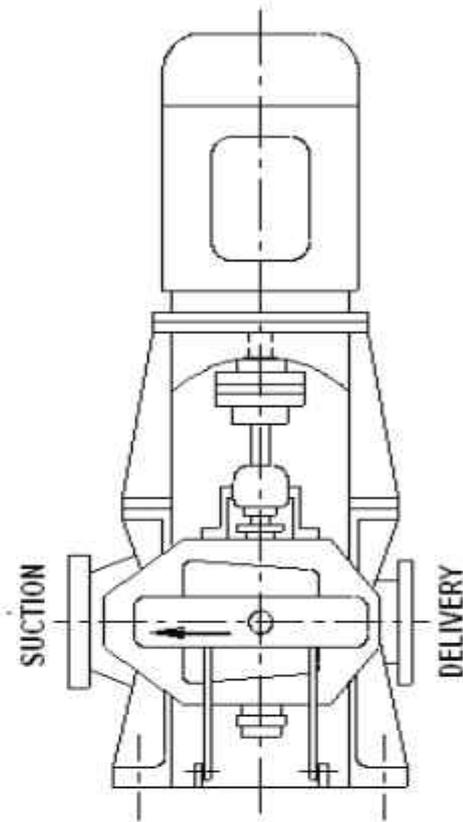


Product Variants

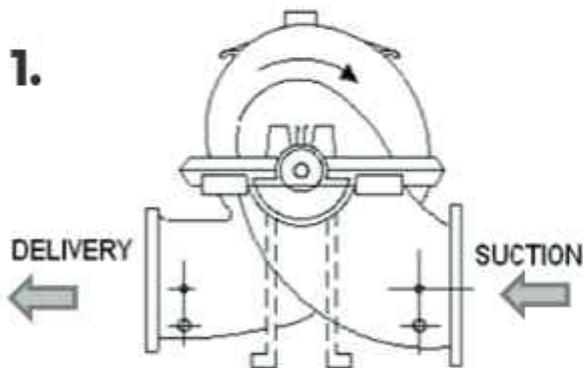


Standard Horizontal Split-case Pump

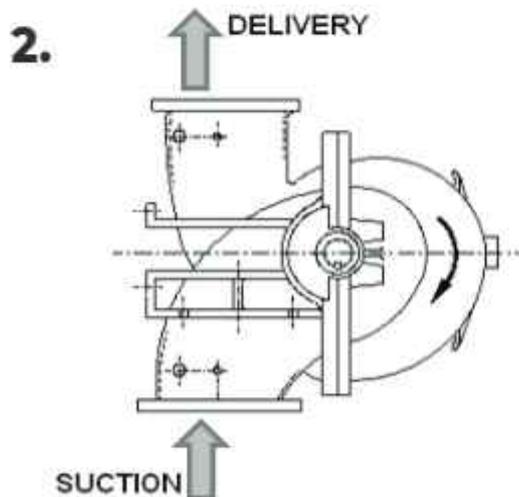
Pumpsense Offers Many Variants of The Standard Product



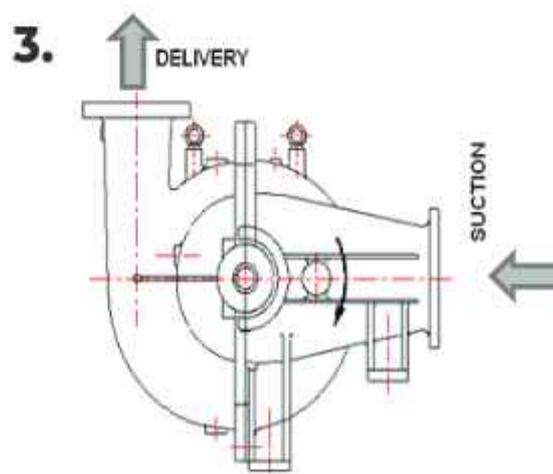
Vertical Split-case Pump



CW/CCW Rotation



Bottom Suction Top Delivery



SIDE SUCTION TOP DELIVERY

Custom-built Split Case Products

Various Suction/Delivery Orientations



Special 3 Stage
Design



Products – End Suction



ISO 2858 16 bar back pullout : ES



Large End Suction : ESL



Vertical ESL



**Compact Marine
External Fire : ESF**



Mixed Flow : EMF



Ideal Attributes of a Good Air-conditioning Pump

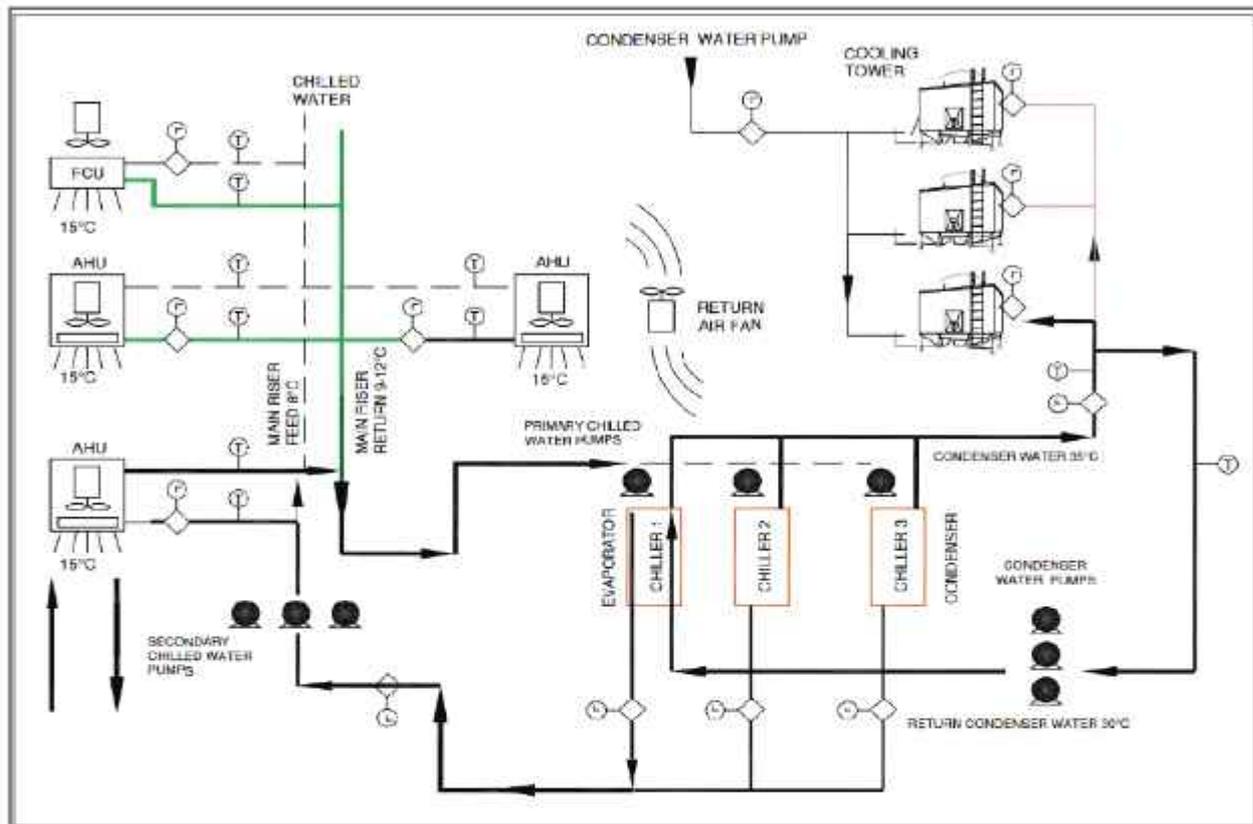
Energy Efficiency- Pumps for air-conditioning must achieve highest possible efficiency on a sustained basis. Pumps must be designed to leave lowest carbon foot-print

Reliability- These pumps are required to run continuously and hence must be designed to ensure highest reliability. A good guideline is to design the pump in such a way that it can be run continuously for four years without having to open the impeller.

Space- Pumps must be as compact as possible so that the pump room does not occupy much of expensive commercial/ public space.

Quick/Inexpensive customization- It should be possible to offer variants of the basic products to suit specific requirements of site- pump with vertical shaft, pump with different flange construction, pumps suitable for very high working pressure, pumps with different material specifications etc.

HVAC Systems



Importance of high efficiency for HVAC Systems

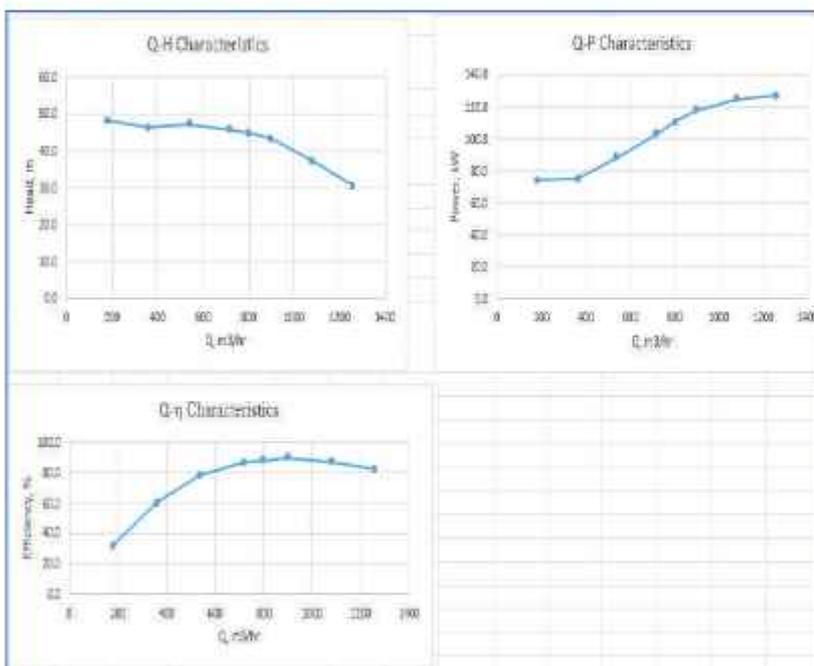
These systems run continuously and are a major contributor to global warming due to their large carbon footprint. High-efficiency pumps leave a significantly smaller carbon footprint and ensure the lowest life cycle cost simultaneously. Therefore, developing air conditioning pumps with the highest operating efficiency is a matter of global priority.



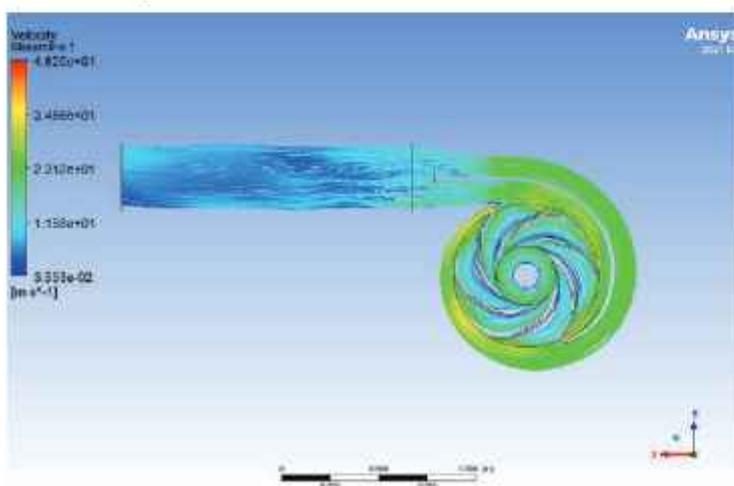
PUMPSENSE

How have we achieved efficiencies for our pumps for air conditioning?

Design parameters were chosen very carefully to optimize on hydraulic efficiency and we did extensive CFD analysis to verify and reconfirm our design. We also built the prototype with extreme care so that the mechanical, leakage and disc friction losses remain low.



This helped us achieve the benchmark efficiency on prototype test





PUMPSENSE

PUMPSENSE FLUID ENGINEERING PVT. LTD

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