

VERSIL
PUMPS & MOTORS

Innovation For Better Future...

Solar PMSM Pump-set



Solar Products With Best Efficiency

COMPANY PROFILE

VERSIL Pumps is a prime manufacturer of pump sets based in Rajkot. We are having a modern pumps and motors manufacturing set up, with our own in house research and development set up. It is backed by a tool room and a manufacturing set up of high precision machines. Having ISO-9001 accreditation, our focus is on continuous and consistent quality pump manufacturing. Our product range include self priming pumps, centrifugal pumps, open well submersible pumps and bore well submersible pumps. We also have a set up for manufacturing of fully stainless steel fabricated bore well submersible pump sets.

We have developed a special **Permanent Magnet Synchronous Motor (PMSM)** for solar application. These motors with our fully stainless steel pumps are used for solar application. These PMSM pumps are far more superior in terms of work performance, life, low voltage working and efficiency than regular pumps. These pumps work on lowest radiation of sun, hence start early and stop late in a day giving higher daily water out put. These pumps are low in maintenance cost with negligible breakdown possibility because of its sturdy designs. PMSM work on wider voltage bands than any regular motors.

We have also designed and developed controller drives for these pump sets which are so tuned to enhance the efficiency of the entire solar system through our pumps. These drives are hybrid in nature and can help the pump run on solar as well as other source of power like electricity or generator supply. These drives protect the PMS motors from over loading, dry running and extreme low or higher voltages. These drives can be used to monitor the pump functioning remotely from any location and any basic support can be provided for any distant location through GPS system. These controller drives are manufactured at our main plant in Rajkot.

A state of the art testing facility is installed at our plant using a sun radiation simulator. With the help of this simulator we test the products at any condition, of any state, any country, any location specific which make our products readily adaptable to different sun radiation conditions. It is our endeavor to get this PMSM technology in centrifugal as well as openwell pump designs to enable the use of solar technology in these products also, more effectively and efficiently.

VERSIL PMSM solar products are revolutionary in the solar pumping field. Our focus is to make the benefits of these products available to the society as a whole, in India and Abroad.

PERFORMANCE COMPARISON

	PMSM Motor	BLDC Motor	Induction Motor
Rotation	0-3600 RPM Speed, Constant Speed	0-3600 RPM Speed, Constant Speed	0-3420 RPM Speed, decrease with load increment
Power Source	50/60 Hz AC, DC and Solar Power	50/60 Hz AC, DC and Solar Power	Only 50 or 60 Hz Single / Three Phase AC or Solar Power
Voltage Level	Low and High voltage both are possible	Low Voltage Only	High Voltage Only
Operating Voltage Range	50% to 110% of rated voltage (wide range)	80% to 110% of rated voltage (moderate range)	90% to 110% of rated voltage (narrow range)
Current Require for same Load	Less due to high voltage and vector control	High due to less voltage	High due to less efficiency
Pump Motor	Permanent magnet synchronous motor	Brushless DC Motor	AC Single / Three Phase asynchronous motor
Frequency	0 to 250 Hz	0 to 250 Hz	0 to 50 Hz
Motor Efficiency	83 to 92%	80 to 90%	Single Phase = 63%, Three Phase = 75%
Good Performance Zone	Wide, 50% to 125% of rated load	Moderate, 70% to 110% of rated load	Narrow, 90% to 110% of rated load
Overload Capacity	150%	120%	120%
Unit Efficiency (Motor and Pump Combine Efficiency)	2-10% higher than Induction Motor Pump (include controller)	2-8% higher than induction motor pump (include controller)	2-10% lower than PMSM pump (include controller)
Torque Ripple	Less	More	Less
Volume	20% to 50% Smaller	20% to 50% Smaller	Larger
Weight	20% to 50% Lighter	20% to 50% Lighter	Heavier
Functionally	Multi functional and automatic	Multi Functional and automatic	Unitary



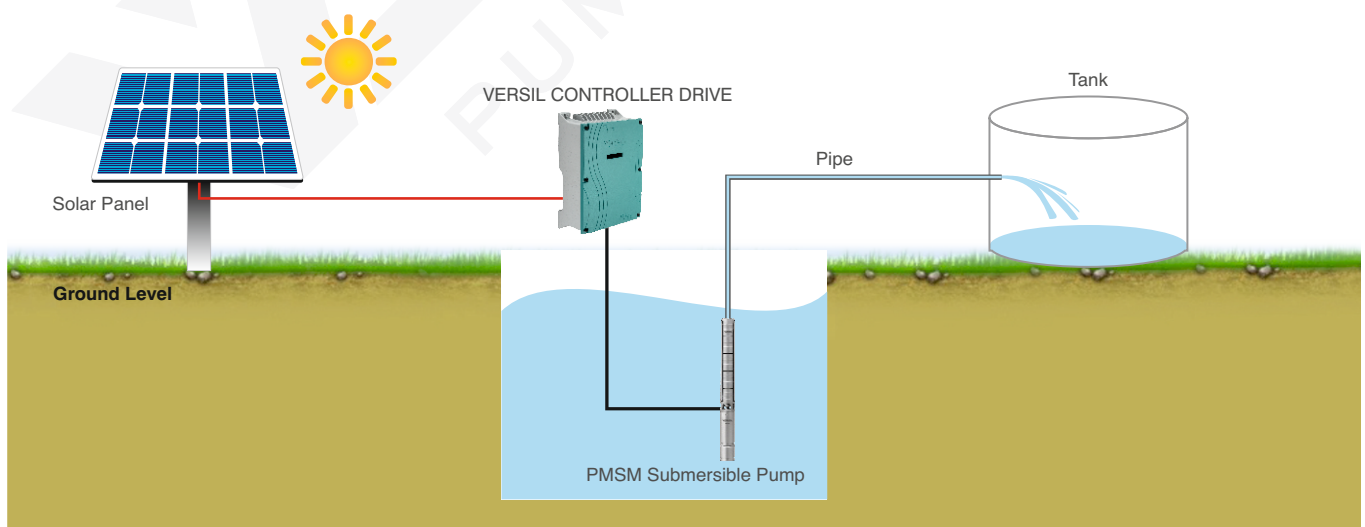
FEATURES OF PMSM

The permanent magnet synchronous motor is cross between an Induction motor and brushless DC motor. Like a brushless DC motor, it has a permanent magnet rotor and windings on the stator. However, the stator structure with windings constructed to produce a sinusoidal flux in the air gap of the machine resembles that of an induction motor. Permanent magnet synchronous motor's power density is higher than induction motors with the same ratings. Today, these motors are more powerful while having a lower mass and lower moment of inertia.

- High-efficiency permanent magnet motor requires less solar arrays.
- Motors are in Smaller Size, lighter weight still gives longer service life, Higher Efficiency.
- Wider speed range (0-3600rpm)
- Permanent Magnet Synchronous Motor give more output @ +25% to 35%.
- Can be used in AC & DC supply.
- With the technology of DC to AC conversion, It owns the advantage of low noise and can start under low voltage and low radiation.
- Soft start : Motor starts with high torque and smooth acceleration.
- The Motor Structure is made up of stainless steel with imported Alloy mechanical seal which is durable in use.
- Can be used with centrifugal pump for big flow or a helical rotor pump for high lift.

CONTROLLER DRIVE

- New Design, Smart / Intelligent controller Drive.
- MPPT function that is maximum solar power point tracking will adjust work speed automatically. So motor can extract maximum power from panels and provides maximum water output according to solar radiation.
- Intelligent control provides dry run protection, if there is no water in sump for 1 minute, solar pump will stop working automatically. In addition, it has intelligent overload protection when the abnormal situation appeared during the work, the pump automatically shut down.
- It offers Protection from high-voltage, low-voltage, single phasing, over current and overload.
- It also offers automatic ON / OFF.
- Remote monitoring System : RMS will keep record of operational data and provides access to it remotely through mobile phone or computer, for maintenance support.



4" (100 mm)Stainless Steel Submersible pumps

General Data

Versil VF 4" range of submersible pumps are made of corrosion and abrasion resistant stainless –steel and have been developed in accordance with state of art technology. The VF 4" pumps are manufactured to highest standard for energy efficiency, dependable performance, rugged construction, and long service life.

Capacity (m³/h) min 0.8 max 10.8

Total Head: 218m

Application

- Portable water supply from deep well
- Agricultural-irrigation, Livestock watering. Etc.
- Municipal and industrial
- Pressure boosting
- Fountains, etc.

Pumped Liquids

Clean, non-corrosive and non-abrasive liquids

Operating Condition

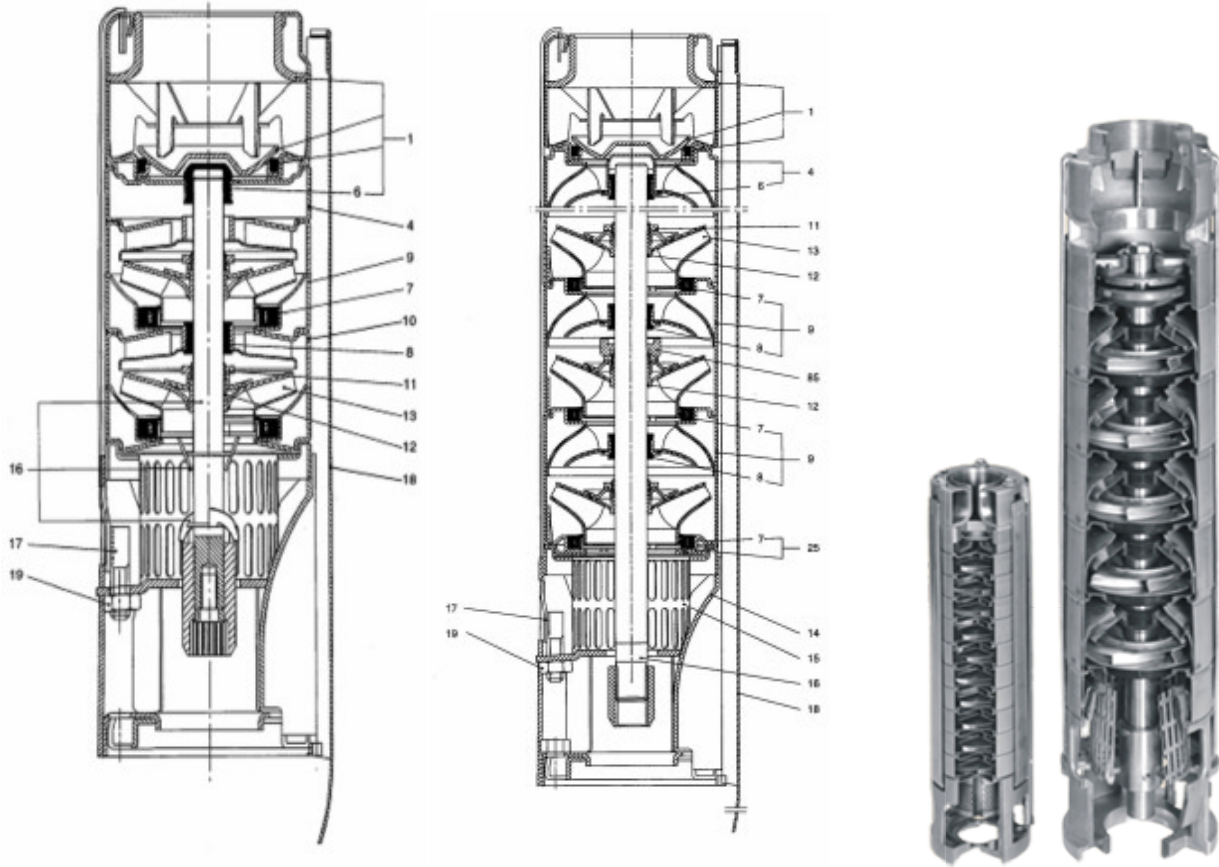
Max. ambient temperature liquid 30C

Sand Content: max 50g/m³

Features

- Stainless steel construction designed and built for year of trouble free operation
- All metal parts are made of 304 stainless steel, except for the shaft which is made of 410 stainless steel
- Heavy duty stainless steel discharge head with built in check valve for long life and ease of installation
- Smooth safety hook
- Mounting specification according to NEMA standards
- High quality shaft bearing providing low friction and high wear resistance
- Heavy duty stainless steel impellers & diffusers ensuring optimal performance
- Stainless steel strainer to restrict the entry of sand and other extraneous material

**Material Of Construction 4" (100 mm)
Sectional View**



1	Valve casing	SS-304
4	Top diffuser cup	SS-304
6	Top bearing bush	NBR
7	Neckring	NBR + SS-304
8	Stage bearing bush	NBR
9	Diffuser cup	SS-304
10	Ist stage cup	SS-304
11	Split cone nut	SS-304
12	Split cone	SS-304
13	Impeller	SS-304
14	Suc.case	SS-304
15	Strainer	SS-304
16	Pump Shaft Comp.	SS-304
17	Strap	SS-304
18	Cable guard	SS-304
19	Nut	SS-304
19a	Nut	SS-304

6" (150 mm) Stainless Steel Submersible pumps

General Data

Versil VF 6" range of submersible pumps are made of corrosion and abrasion resistant stainless –steel and have been developed in accordance with state of art technology. The VF 6" pumps are manufactured to highest standard for energy efficiency, dependable performance, rugged construction, and long service life.

Capacity (m³/h) min 8.4 max 84

Total Head: 700m

Application

- Portable water supply from deep well
- Agricultural-irrigation, Livestock watering. Etc.
- Municipal and industrial
- Pressure boosting
- Fountains, etc.

Pumped Liquids

Clean, non-corrosive and non-abrasive liquids

Operating Condition

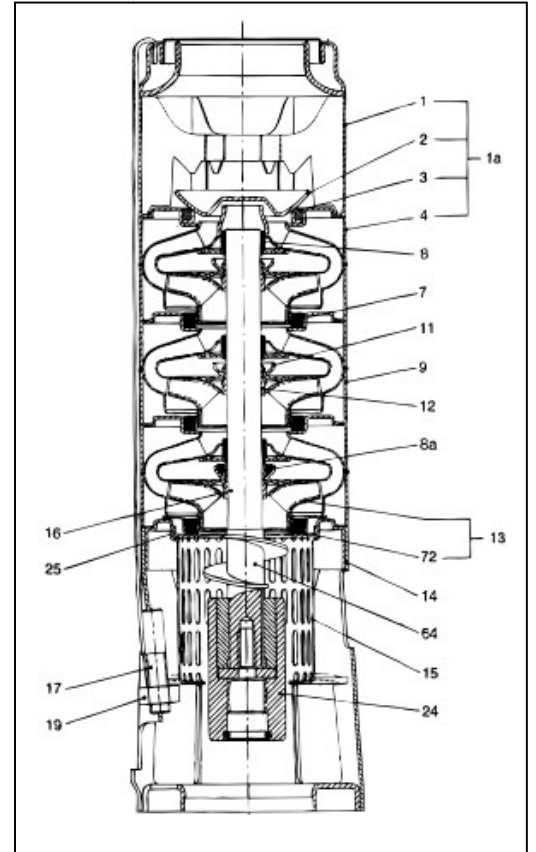
Max. ambient temperature liquid 30C

Sand Content: max 50g/m³

Features

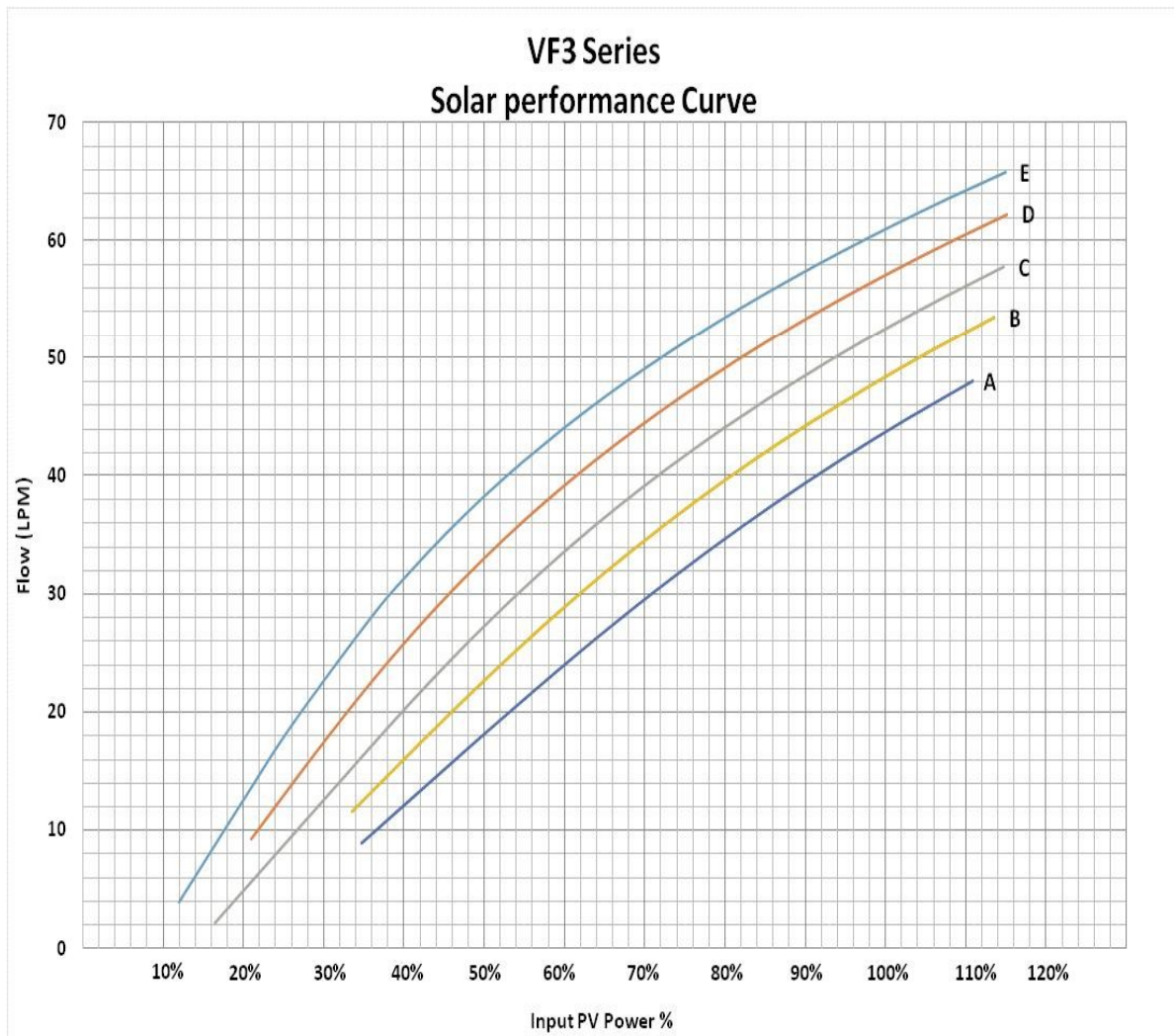
- Stainless steel construction designed and built for year of trouble free operation
- Heavy duty stainless steel discharge head with built in check valve for long life and ease of installation
- Mounting specification according to NEMA standards
- High quality shaft bearing providing low friction and high wear resistance
- Heavy duty stainless steel impellers & diffusers ensuring optimal performance
- Stainless steel strainer to restrict the entry of sand and other extraneous material

**Material Of Construction 6" (150 mm)
Sectional View**



S.No.	Components	Material	Standard
1	Valve casing	Stainless steel	304
1a	Discharge chamber complete	Stainless steel	304
2	Valve cup	Stainless steel	304
3	Valve seat	Stainless steel	
4	Top intermediate chamber	Stainless steel	304
7	Neck ring	NBR/PPS	
8	Intermediate bearing	NBR	
9	Spacing washer	Cabron /graphite Hy 22 in PTFE mass	
8a	Intermediate chamber	Stainless steel	304
11	Split cone nut	Stainless steel	304
12	Split cone	Stainless steel	304
13	Impeller	Stainless steel	304
14	Suction interconnector	Stainless steel	304
15	Strainer	Stainless steel	304
16	Pump shaft	Stainless steel	431
17	Strap	Stainless steel	304
18	Cable guard	Stainless steel	304
72	Wear ring	Stainless steel	304
75	Spacer ring	Stainless steel	304
78	Nameplate	Stainless steel	304

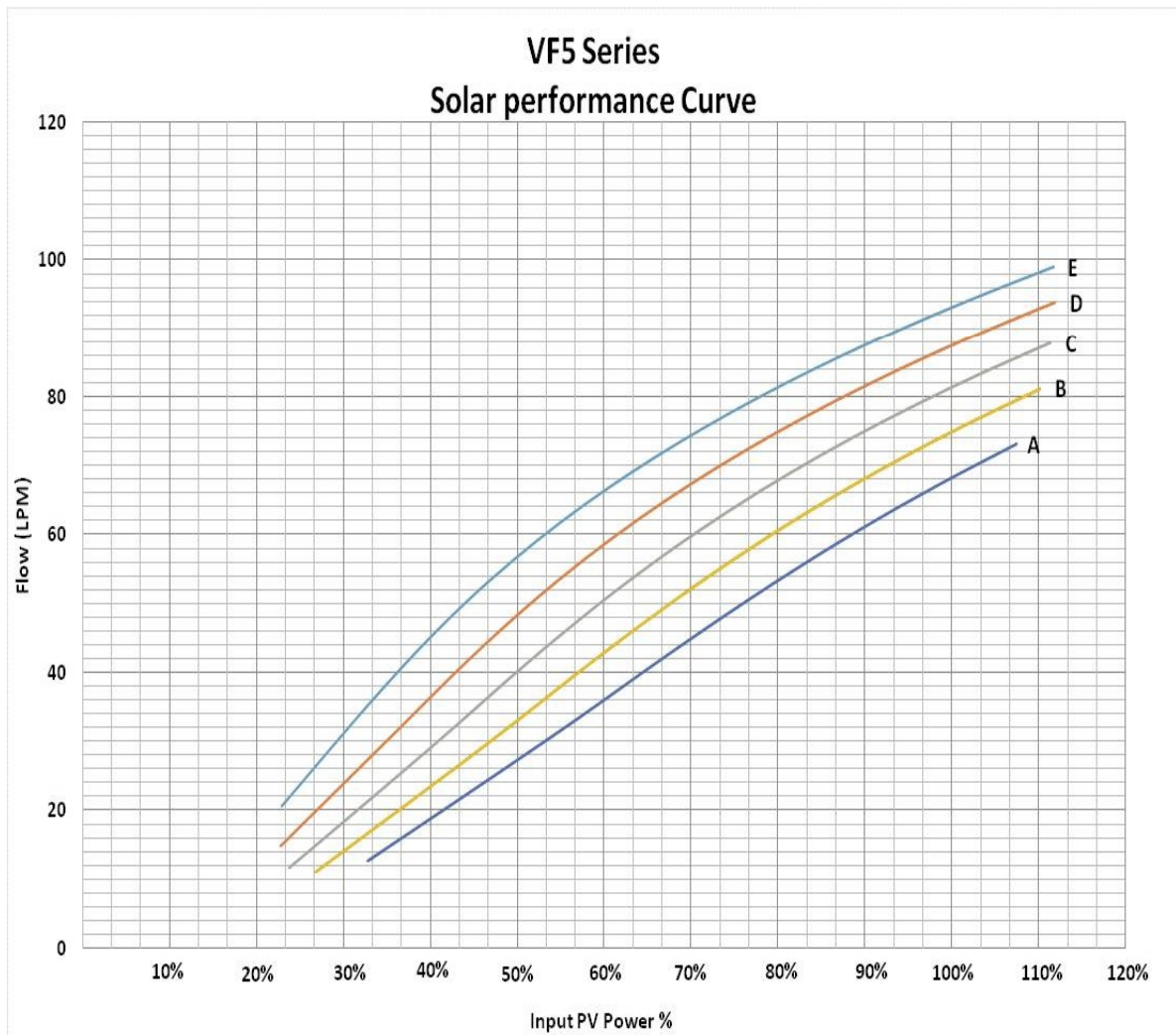
Solar Performance Chart For SS V-4 Submersible Pumpset Suitable For 100 MM Borewell										
Sr. No	Model	HP	Stage	Nominal PV Power Array	Del- 32mm	Flow Q @ PV Module STC				
					LPM	42	48	52	57	61
1	VF3-8	0.75	8	1200	Head (m)	36	32	28	24	20
2	VF3-10	1	10	1200		45	40	35	30	25
3	VF3-15	1.5	15	1500		68	60	53	45	38
4	VF3-22	2	22	2000		100	88	78	66	56
5	VF3-29	3	29	3000		131	116	102	87	73
6	VF3-39	4	39	4000		177	156	138	117	99
7	VF3-52	5	52	4800		236	208	184	156	132
					A	B	C	D	E	



Note:

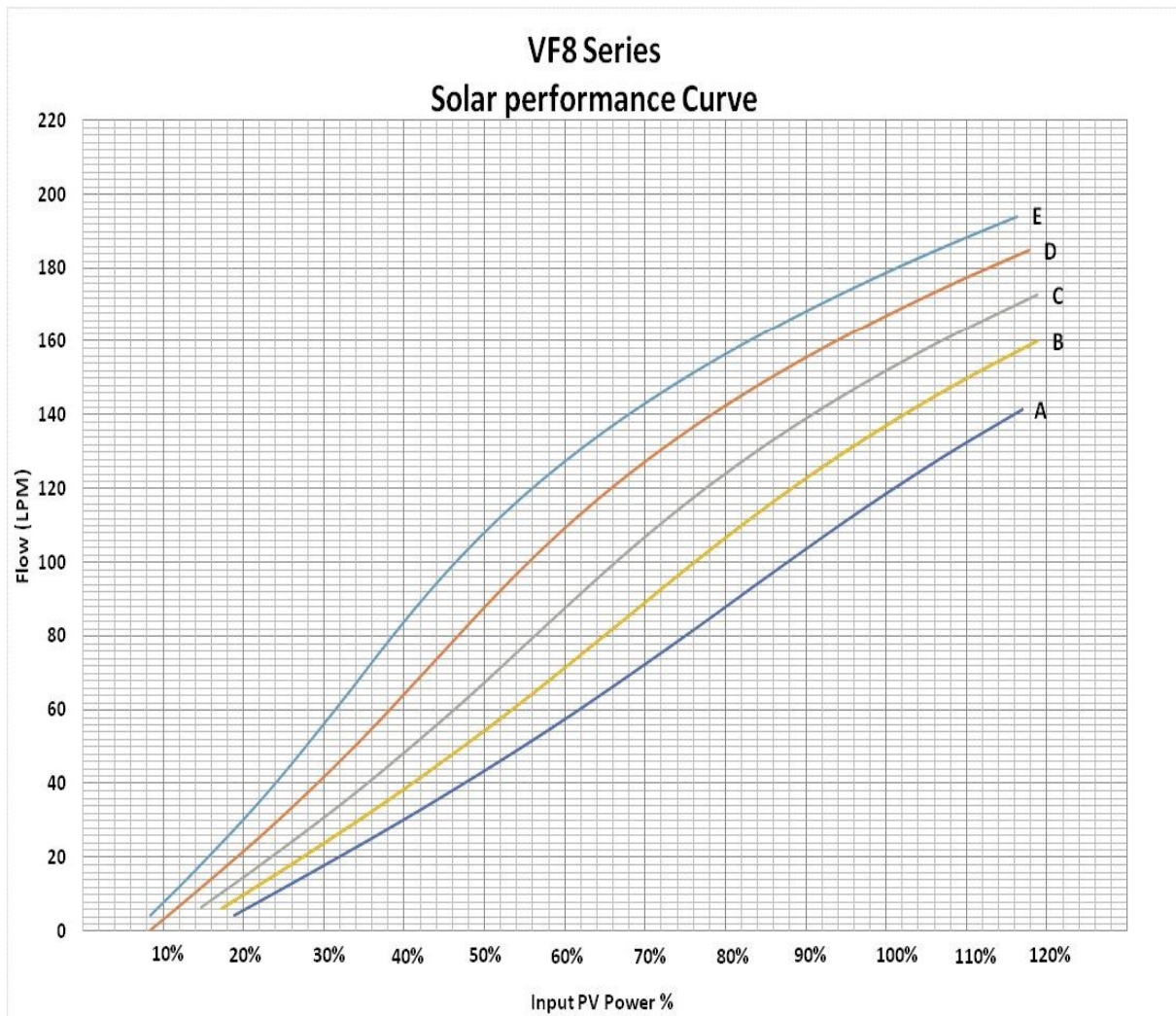
- 1) Above Values are measured at model nominal power at Standard test condition
- 2) The highlighted rows indicate the recommended pump range
- 3) Intermediate stage are available on demand, also consult with our representative for supply of PV power other than nominal rating.

Solar Performance Chart For SS V-4 Submersible Pumpset Suitable For 100 MM Borewell										
Sr. No	Model	HP	Stage	Nominal PV Power Array	Del- 40mm	Flow Q @ PV Module STC				
					LPM	68	74	82	88	94
1	VF5-08	1	8	1200	Head (m)	40	36	32	28	24
2	VF5-12	1.5	12	1500		60	54	48	42	36
3	VF5-17	2	17	2000		85	77	68	60	51
4	VF5-25	3	25	3000		125	113	100	88	75
5	VF5-33	4	33	4000		165	149	132	116	99
6	VF5-38	5	38	4800		190	171	152	133	114
7	VF5-60	7.5	60	6875		300	270	240	210	180
8	VF5-75	10	75	9000		375	338	300	263	225
						A	B	C	D	E



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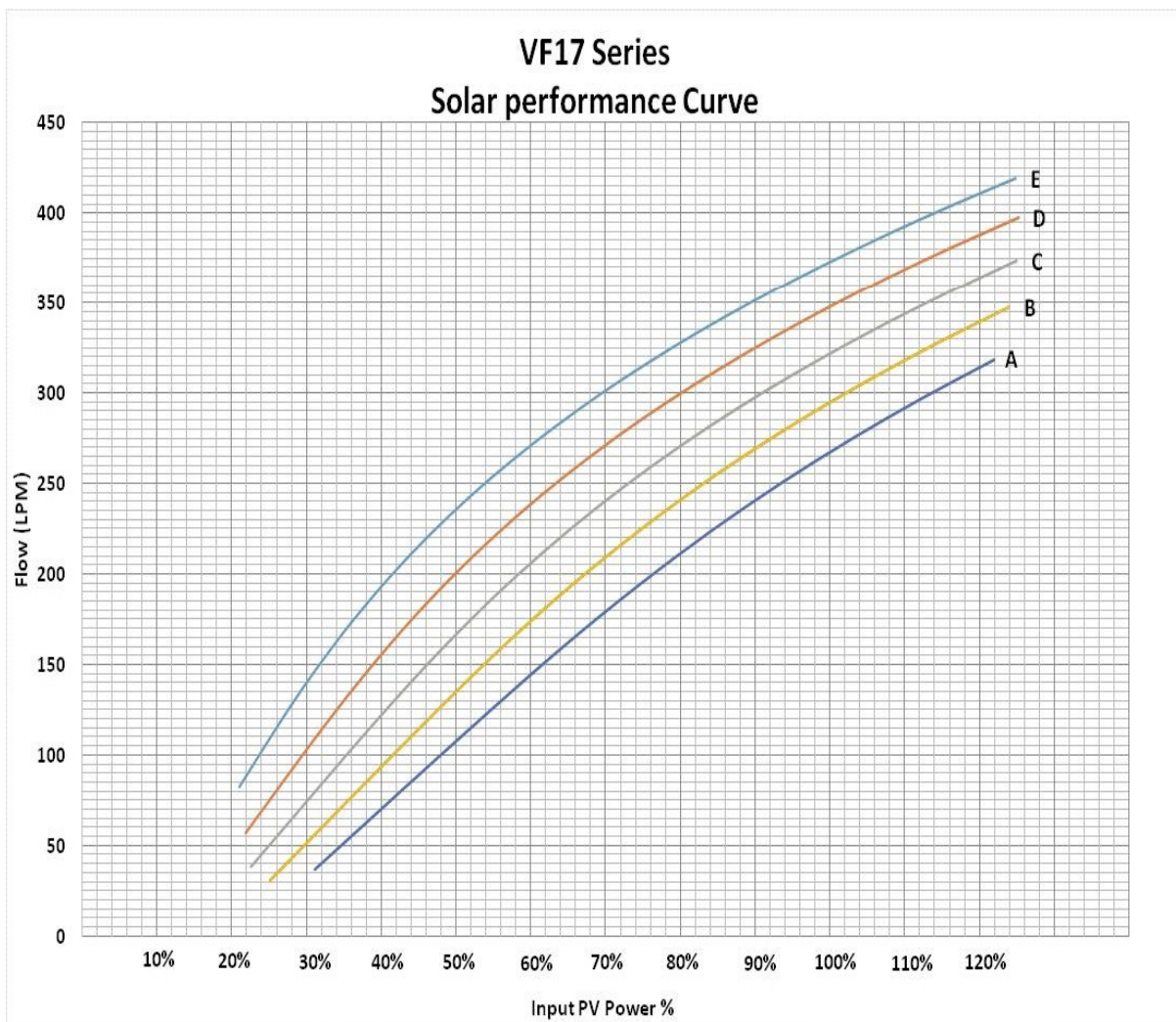
Solar Performance Chart For SS V-4 Submersible Pumpset Suitable For 100 MM Borewell										
Sr. No	Model	HP	Stage	Nominal PV Power Array	Del- 50mm	Flow Q @ PV Module STC				
					LPM	118	138	150	168	180
1	VF8-5	1	5	1200	Head (m)	23	20	18	15	13
2	VF8-7	1.5	7	1500		32	28	25	21	18
3	VF8-10	2	10	2000		45	40	35	30	25
4	VF8-15	3	15	3000		68	60	53	45	38
5	VF8-18	4	18	4000		82	72	64	54	46
6	VF8-25	5	25	4800		113	100	88	75	63
7	VF8-37	7.5	37	6875		168	148	131	111	93
8	VF8-50	10	50	9000		227	200	177	150	127
						A	B	C	D	E



- Note:
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6" Stainless Steel Borewell Submersible Pumpset

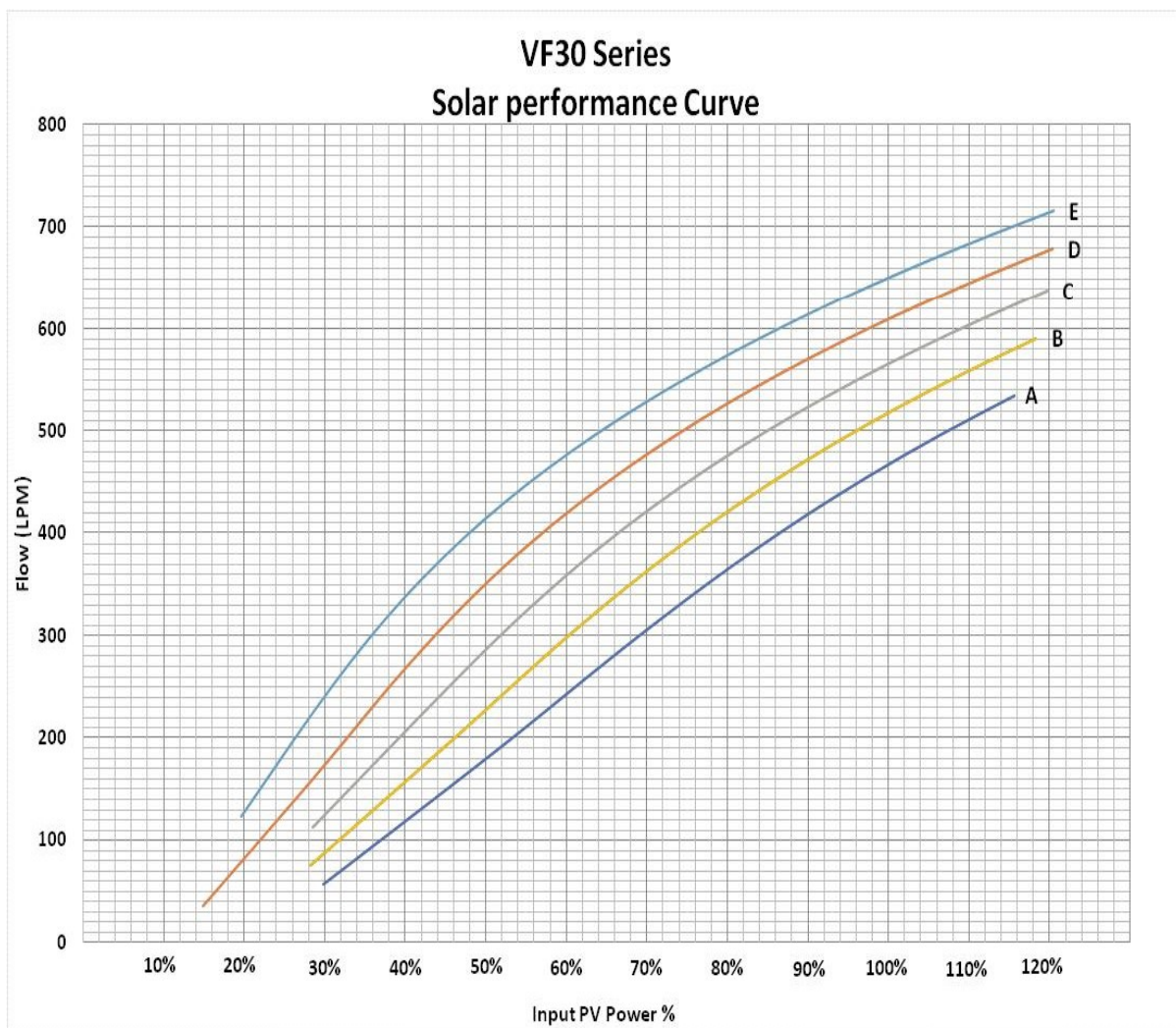
Solar Performance Chart For SS V-6 Submersible Pumpset Suitable For 150 MM Borewell										
Sr. No	Model	HP	Stage	Nominal PV Power Array	Del- 65mm	Flow Q @ PV Module STC				
					LPM	275	295	320	350	370
1	VF17-4	3	4	3000	Head (m)	36	32	28	24	20
2	VF17-5	4	5	4000		45	40	35	30	25
3	VF17-7	5	7	4800		63	56	49	42	35
4	VF17-10	7.5	10	6875		90	80	70	60	50
5	VF17-13	10	13	9000		117	104	91	78	65
6	VF17-17	12.5	17	11700		153	136	119	102	85
7	VF17-20	15	20	14000		180	160	140	120	100
8	VF17-22	17.5	22	15000		198	176	154	132	110
9	VF17-26	20	26	18000		234	208	182	156	130
						A	B	C	D	E



Note:

- 1) Above Values are measured at model nominal power at Standard test condition
- 2) The highlighted rows indicate the recommended pump range
- 3) Intermediate stage are available on demand, also consult with our representative for supply of PV power other than nominal rating.

Solar Performance Chart For SS V-6 Submersible Pumpset Suitable For 150 MM Borewell										
Sr. No	Model	HP	Stage	Nominal PV Power Array	Del- 80mm	Flow Q @ PV Module STC				
					LPM	470	520	570	610	650
1	VF30-2	3	2	3000	Head (m)	18	16	14	12	10
2	VF30-3	4	3	4000		27	24	21	18	15
3	VF30-4	5	4	4800		36	32	28	24	20
4	VF30-6	7.5	6	6875		54	48	42	36	30
5	VF30-7	10	7	9000		63	56	49	42	35
6	VF30-9	12.5	9	11700		81	72	63	54	45
7	VF30-11	15	11	14000		99	88	77	66	55
8	VF30-12	17.5	12	15000		108	96	84	72	60
9	VF30-14	20	14	18000		126	112	98	84	70
					A	B	C	D	E	



Note:

- 1) Above Values are measured at model nominal power at Standard test condition
- 2) The highlighted rows indicate the recommended pump range
- 3) Intermediate stage are available on demand, also consult with our representative for supply of PV power other than nominal rating.

ASSEMBLY LINE



STAINLESS STEEL PUMP SECTION



TOOL ROOM



WINDING AREA

