English

MONO™ Agricultural Products

SUBROTOR™ - Product Manual

Section 5

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DESCRIPTION:

The MONO Subrotor pump offers the first real alternative to multi-stage centrifugal borehole pumps. Mono's positive displacement, progressing cavity principle provides significant advantages over the centrifugal in reliability, performance life and versatility.

APPLICATION:

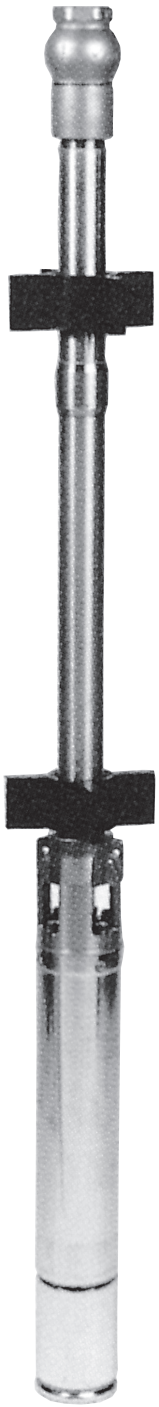
All models in the Subrotor range are suitable for installing in 4" diameter bores. They can also be easily adapted to pump from rivers where suction lift constraints make it impossible to use a surface mounted pump.

FEATURES:

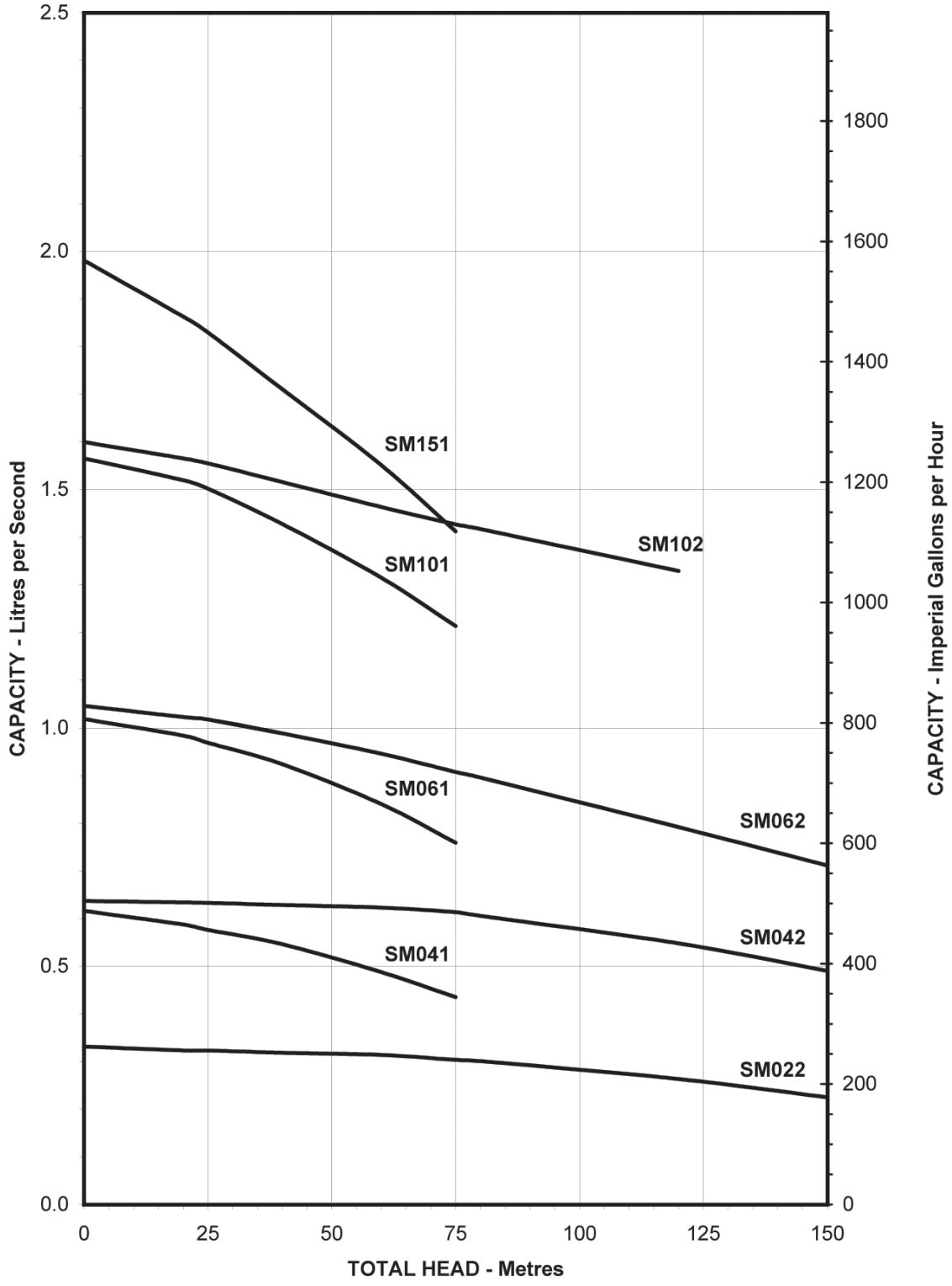
- Flows from 20 to 150 lpm (250 to 2000 GPH)
- Heads to 150m (500 ft)
- Single or three phase motors
- Stainless steel construction
- Hard chrome plated rotor
- "New" anti-rotation non return valve
- "New" plug in electrical cable

BENEFITS:

- Stable pump curve. Small variations to the pump head due to seasonal fluctuations or depth of the water table, or perhaps just a simple personal miscalculation of the pump total head, could have a serious effect to the performance of a centrifugal pump. No such problem arises if you have chosen the forgiving Mono Subrotor pump. Positive pumping of the progressing cavity action delivers sufficient water when it's needed most, even during the dry season and likely drop in water table. Conversely it will not over pump the well if water table rises and therefore pump head drops.
- More water, lower energy bills. Mono Subrotor pumps waste the least possible energy on internal friction, especially compared to multi-stage and jet pumps.
- Easy Maintenance. Unlike centrifugal pumps, the Subrotor has only one moving pump part - the rotor. Its companion, the rubber stator is also very resistant to wear and can easily be replaced with just a wrench.
- Self Cleaning. The rotor sweeps the full surface of the rubber stator every turn. It's impossible for growth or iron oxide deposits etc to develop there.
- Harder Stainless. Mono chrome plated, stainless rotors are up to 4 times harder than the stainless you find in centrifugal pumps.



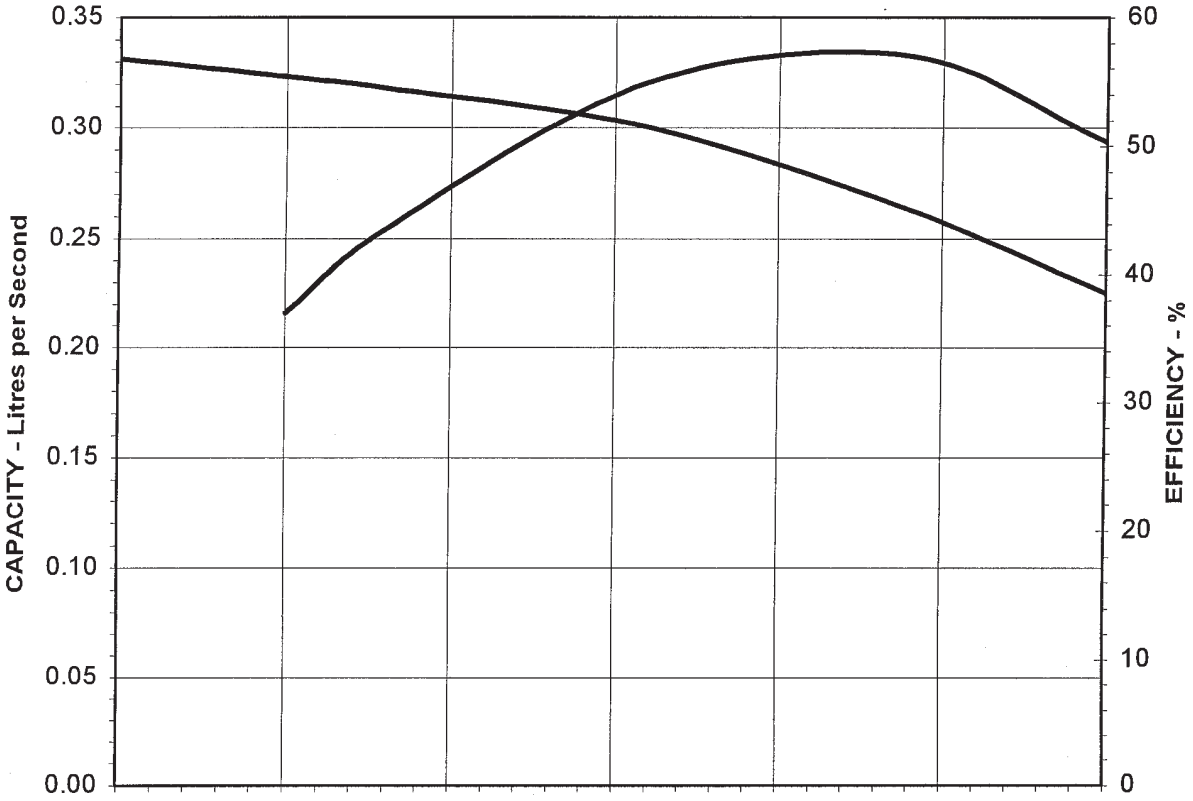
SUB-ROTOR PRESELECTION CURVE

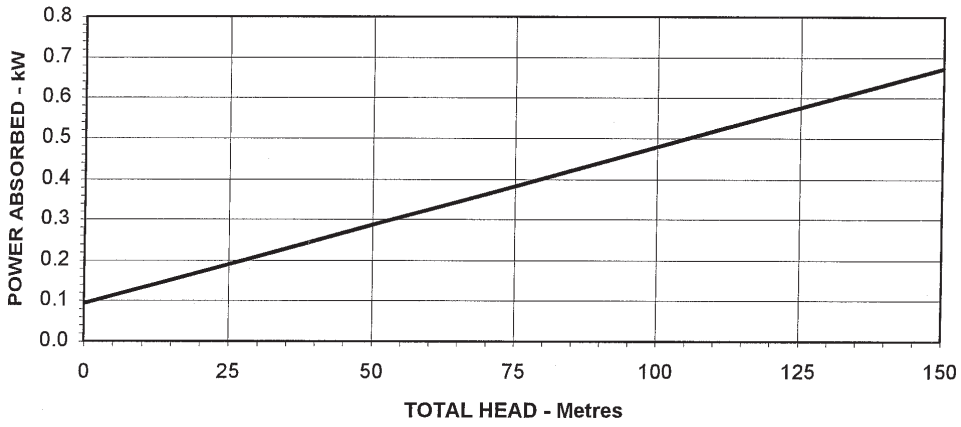


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MONO™ Agricultural Products	SELECTION SM022 Series 250	Title: Subrotor Section: 5 Page: 5 Date: April 2014

Bareshaft pump performance efficiency and power absorbed curves





Motor Size: 0.75 kW (1 hp)
Pump Speed: 2800 rpm
Minimum Bore Size: 100m (4")m

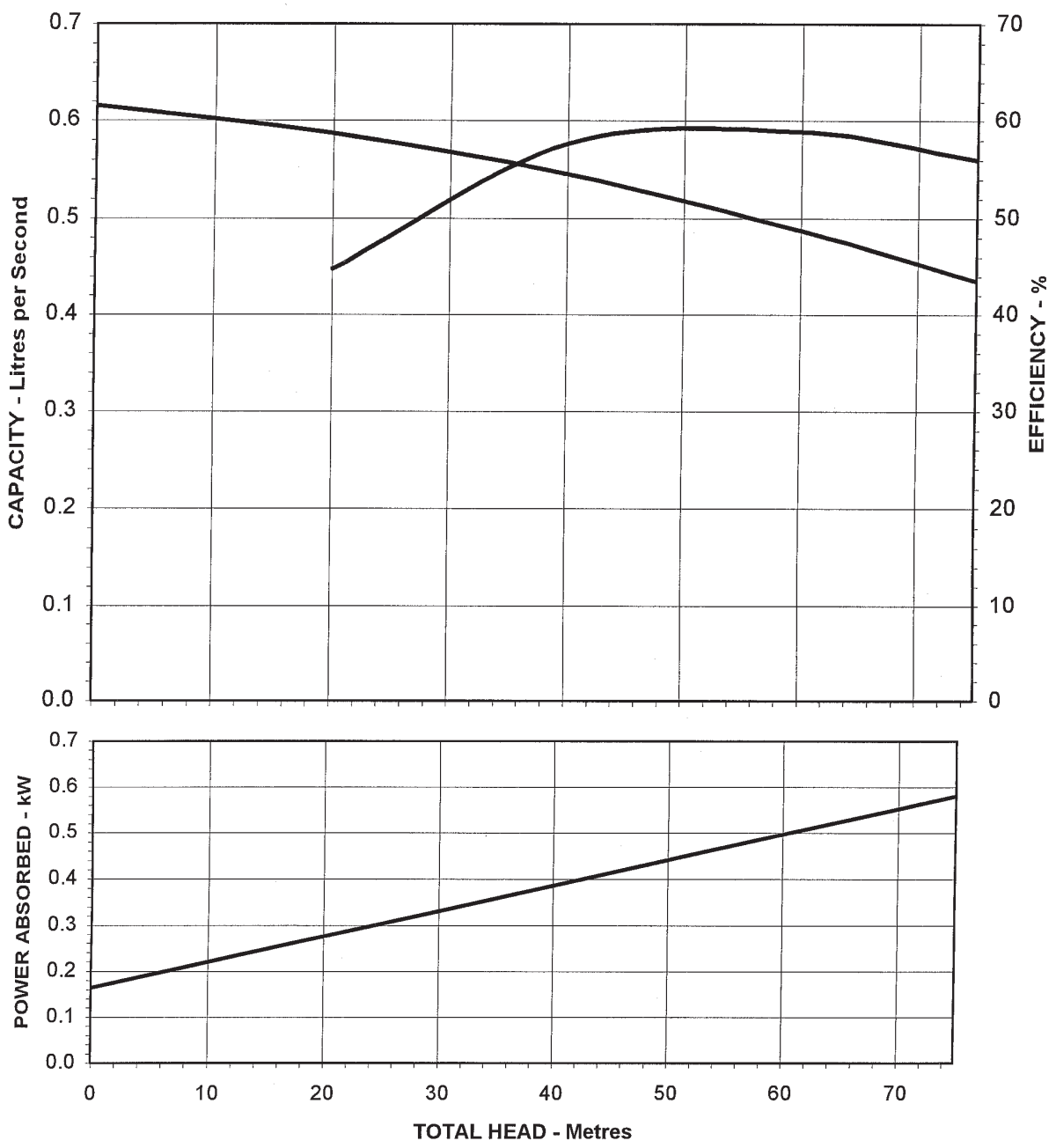
Head	Metres	0	20	40	60	80	100	120	150
FLOW	GPH	281	274	270	266	255	239	233	191
FLOW	LPS	0.36	0.35	0.34	0.33	0.32	0.30	0.28	0.24

- Test curve and table are typical only figures at 20°C performance may vary with temperature and field condition.
- NOV use and recommend Rovatti Submersible motors, which use ball bearings to adequately take all pumping loads and forces. Use of any other motor voids warranty.

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MONO™ Agricultural Products	SELECTION SM041 Series 500	Title: Subrotor Section: 5 Page: 6 Date: April 2014

Bareshaft pump performance efficiency and power absorbed curves



Motor Size: 0.75 kW (1hp)
Pump Speed: 2800 rpm
Minimum Bore Size: 100mm (4")

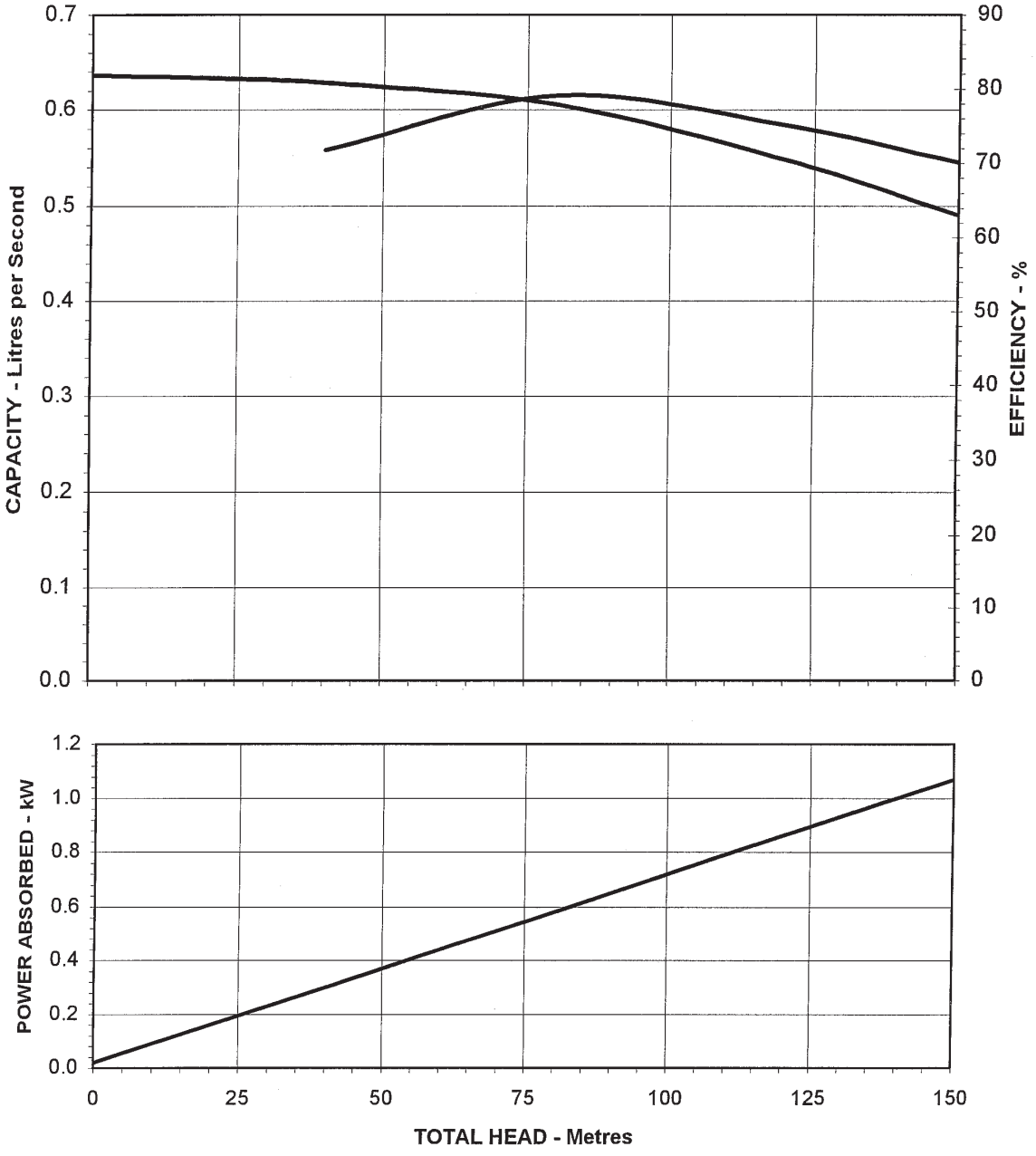
Head	Metres	0	20	40	60	75
FLOW	GPH	523	498	463	413	369
FLOW	LPS	0.66	0.63	0.59	0.52	0.47

- Test curve and table are typical only figures at 20°C performance may vary with temperature and field condition.
- NOV use and recommend Rovatti Submersible motors, which use ball bearings to adequately take all pumping loads and forces. Use of any other motor voids warranty.

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MONO™ Agricultural Products	SELECTION SM042 Series 500	Title: Subrotor Section: 5 Page: 7 Date: April 2014

Bareshaft pump performance efficiency and power absorbed curves



Motor Size: 1.5 kW (2 hp)
Pump Speed: 2800 rpm
Minimum Bore Size: 100mm (4")

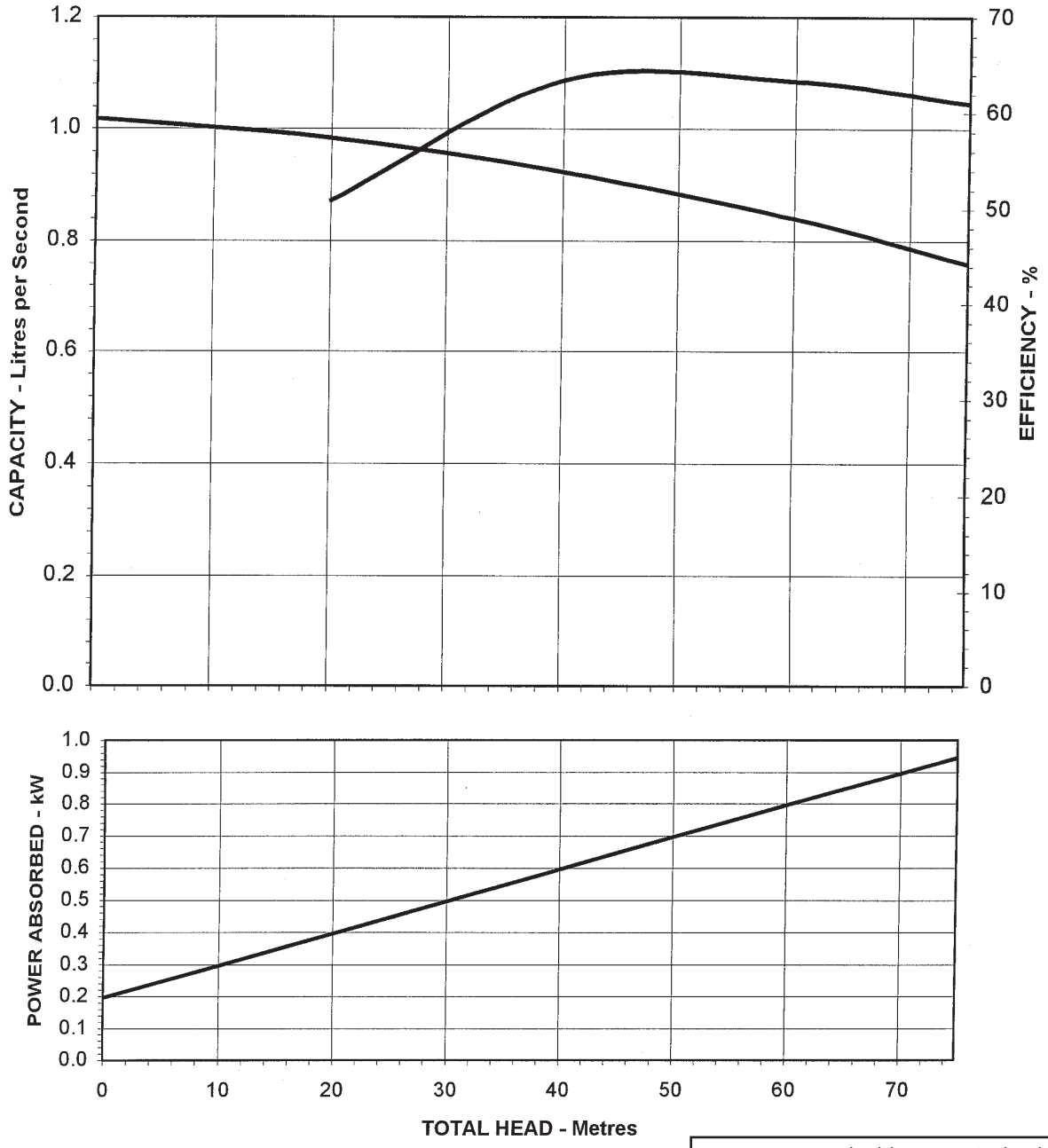
Head	Metres	0	20	40	60	80	100	120	150
FLOW	GPH	540	538	533	528	514	489	465	416
FLOW	LPS	0.68	0.68	0.67	0.67	0.65	0.62	0.59	0.53

- Test curve and table are typical only figures at 20°C performance may vary with temperature and field condition.
- NOV use and recommend Rovatti Submersible motors, which use ball bearings to adequately take all pumping loads and forces. Use of any other motor voids warranty.

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MONO™ Agricultural Products	SELECTION SM061 Series 800	Title: Subrotor Section: 5 Page: 8 Date: April 2014

Bareshaft pump performance efficiency and power absorbed curves



Motor Size: 1.1 kW (1.5 hp)
Pump Speed: 2800 rpm
Minimum Bore Size: 100mm (4")

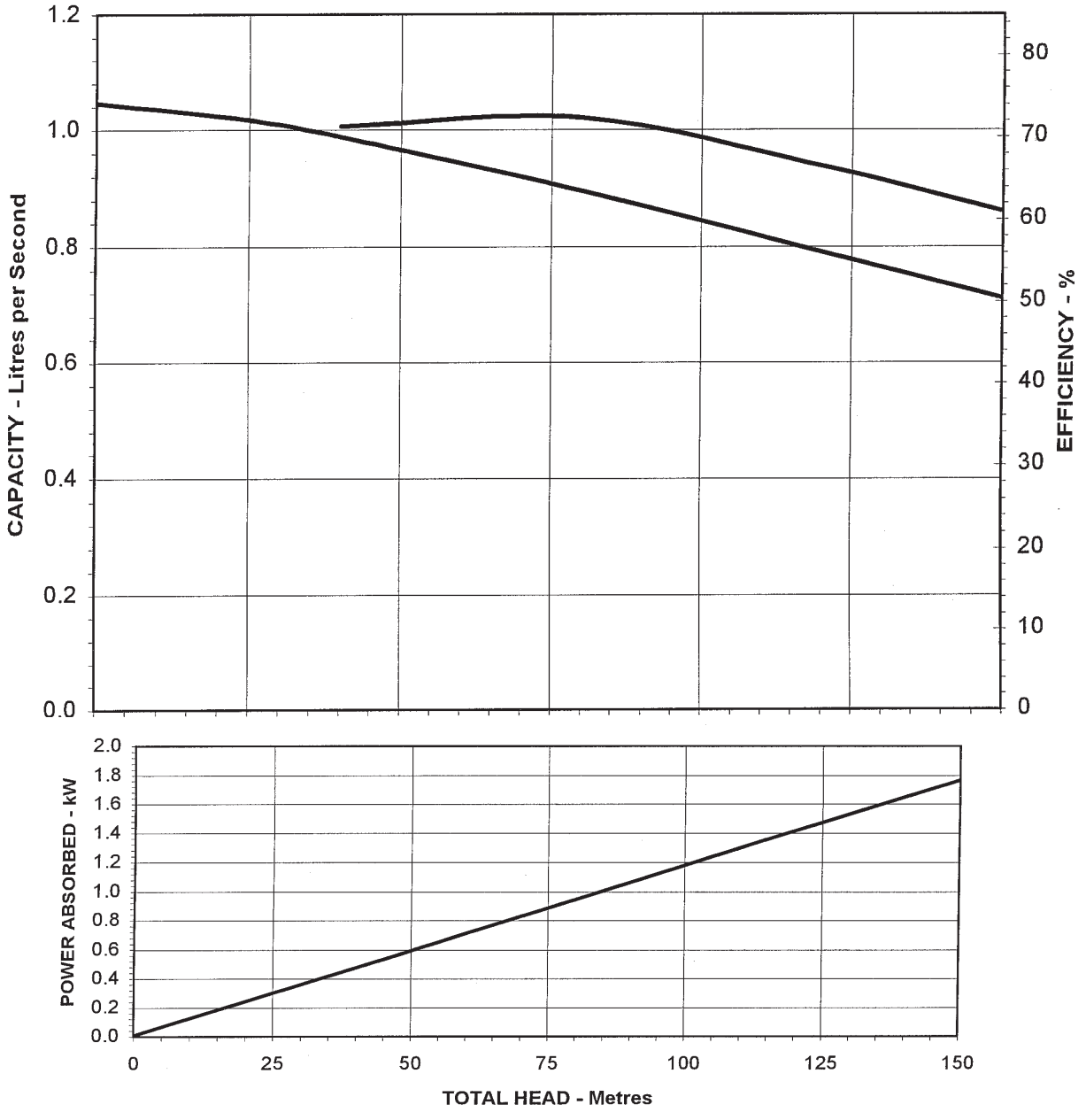
Head	Metres	0	20	40	60	75
FLOW	GPH	864	835	784	713	644
FLOW	LPS	1.09	1.05	0.99	0.90	0.81

- Test curve and table are typical only figures at 20°C performance may vary with temperature and field condition.
- NOV use and recommend Rovatti Submersible motors, which use ball bearings to adequately take all pumping loads and forces. Use of any other motor voids warranty.

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MONO™ Agricultural Products	SELECTION SM062 Series 800	Title: Subrotor Section: 5 Page: 9 Date: April 2014

Bareshaft pump performance efficiency and power absorbed curves



Motor Size: 2.2 kW (3 hp)
Pump Speed: 2800 rpm
Minimum Bore Size: 100mm (4")

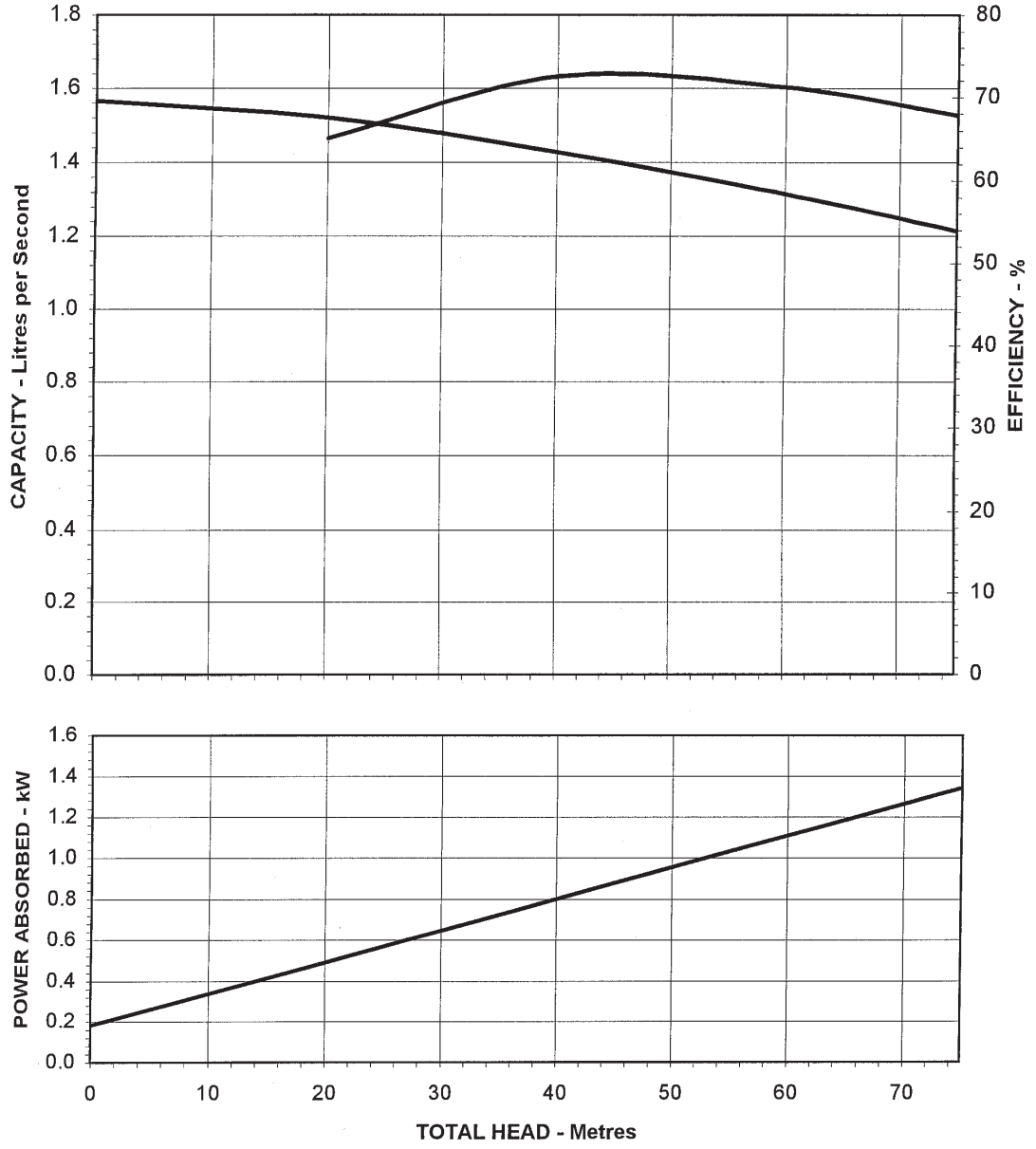
Head	Metres	0	20	40	60	80	100	120	150
FLOW	GPH	888	868	836	802	760	716	672	603
FLOW	LPS	1.12	1.01	1.06	1.01	0.96	0.90	0.85	0.76

- Test curve and table are typical only figures at 20°C performance may vary with temperature and field condition.
- NOV use and recommend Rovatti Submersible motors, which use ball bearings to adequately take all pumping loads and forces. Use of any other motor voids warranty.

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MONO™ Agricultural Products	SELECTION SM101 Series 1250	Title: Subrotor Section: 5 Page: 10 Date: April 2014

Bareshaft pump performance efficiency and power absorbed curves



Motor Size: 1.5 kW (2 hp)
Pump Speed: 2800 rpm
Minimum Bore Size: 100mm (4")

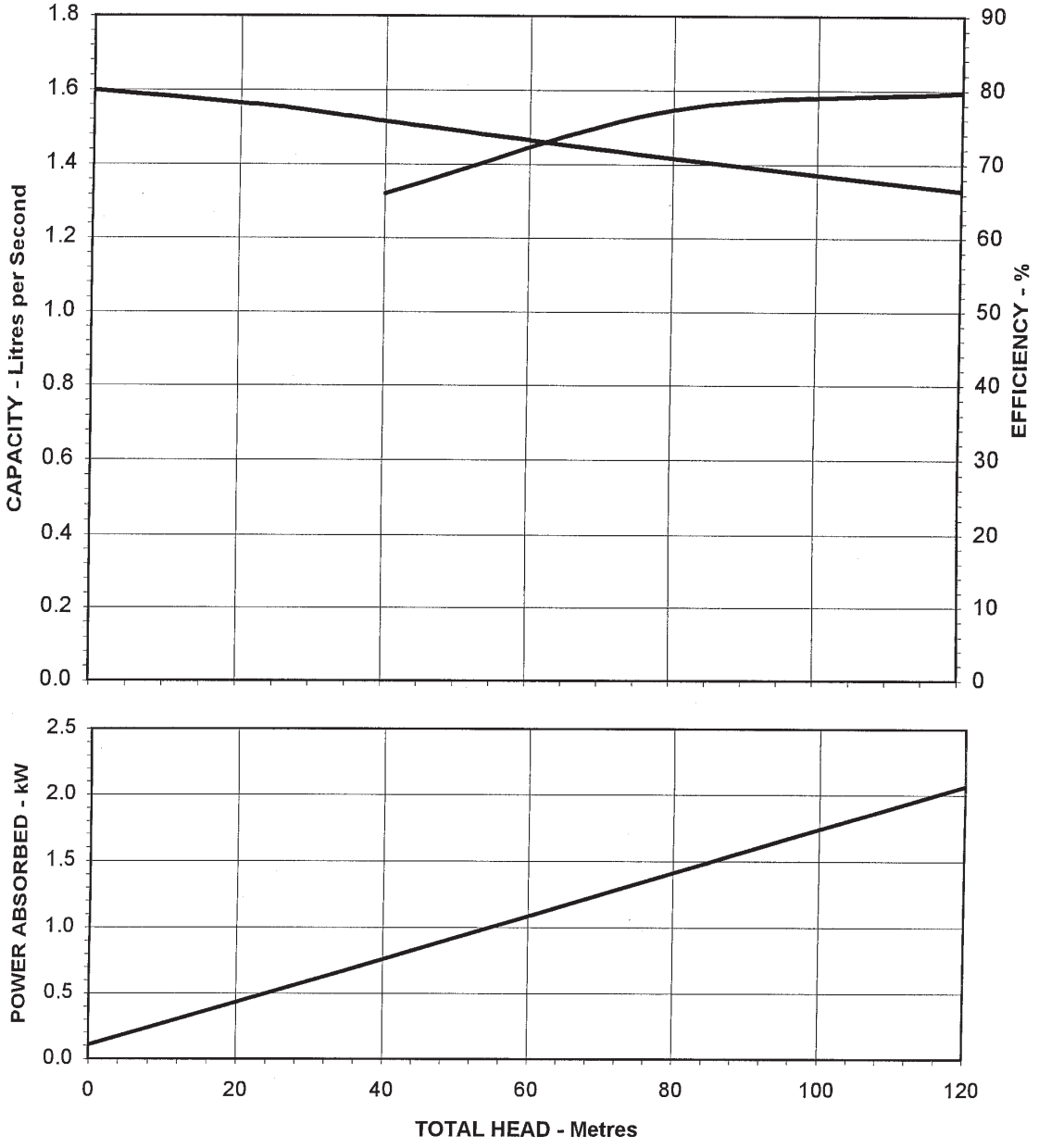
Head	Metres	0	20	40	60	75
FLOW	GPH	1328	1289	1212	1116	1028
FLOW	LPS	1.68	1.63	1.53	1.41	1.30

- Test curve and table are typical only figures at 20°C performance may vary with temperature and field condition.
- NOV use and recommend Rovatti Submersible motors, which use ball bearings to adequately take all pumping loads and forces. Use of any other motor voids warranty.

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MONO™ Agricultural Products	SELECTION SM102 Series 1250	Title: Subrotor Section: 5 Page: 11 Date: April 2014

Bareshaft pump performance efficiency and power absorbed curves



Motor Size: 2.2 kW (3 hp)
Pump Speed: 2800 rpm
Minimum Bore Size: 100mm (4")

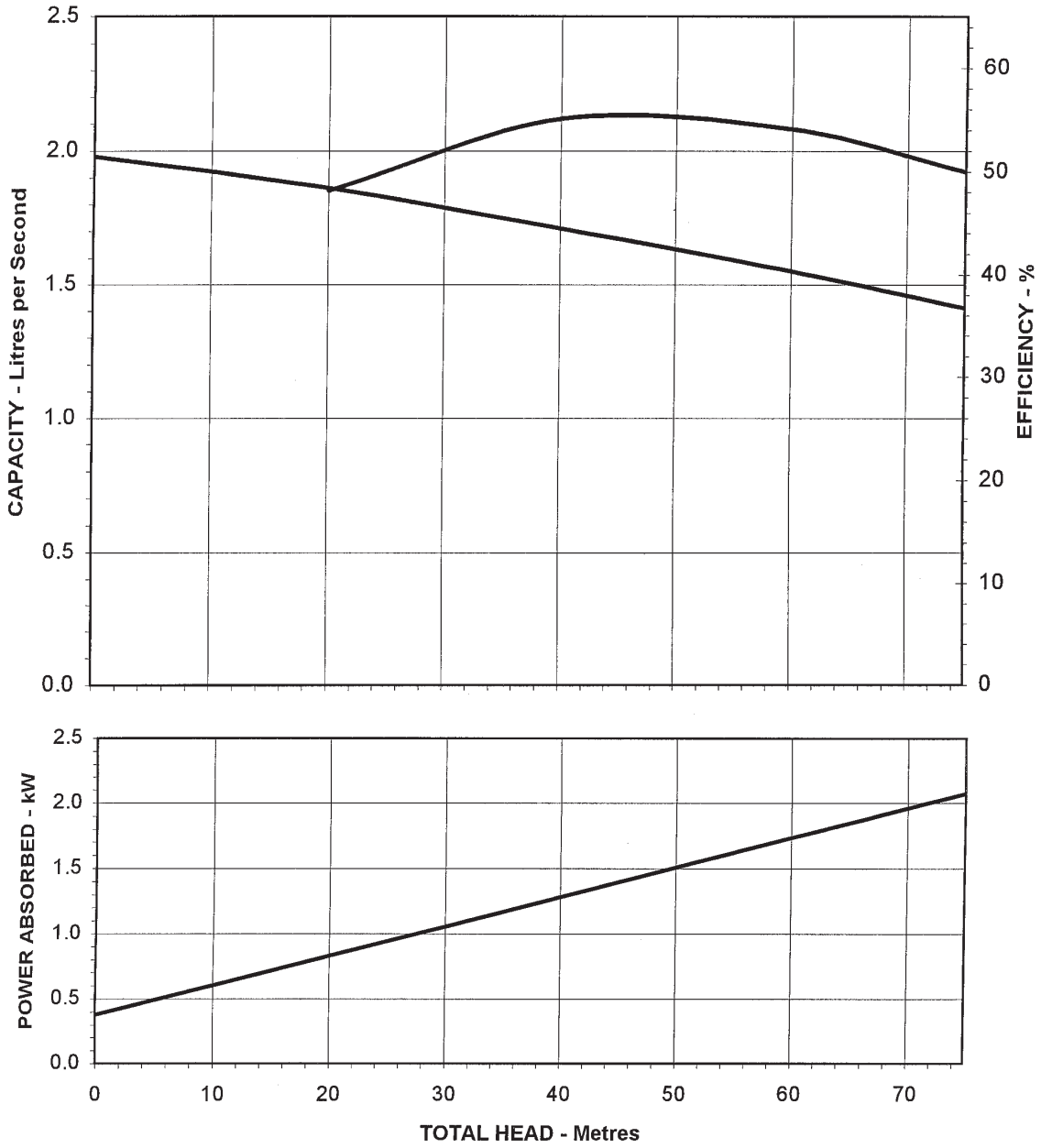
Head	Metres	0	20	40	60	80	100	120
FLOW	GPH	1357	1328	1286	1242	1202	1165	1128
FLOW	LPS	1.71	1.68	1.62	1.57	1.52	1.47	1.42

- Test curve and table are typical only figures at 20°C performance may vary with temperature and field condition.
- NOV use and recommend Rovatti Submersible motors, which use ball bearings to adequately take all pumping loads and forces. Use of any other motor voids warranty.

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MONO™ Agricultural Products	SELECTION SM151 Series 1800	Title: Subrotor Section: 5 Page: 12 Date: April 2014

Bareshaft pump performance efficiency and power absorbed curves



Motor Size: 2.2 kW (3 hp)
Pump Speed: 2800 rpm
Minimum Bore Size: 100mm (4")

Head	Metres	0	20	40	60	75
FLOW	GPH	1680	1589	1452	1316	1198
FLOW	LPS	2.12	2.00	1.83	1.66	1.51

- Test curve and table are typical only figures at 20°C performance may vary with temperature and field condition.
- NOV use and recommend Rovatti Submersible motors, which use ball bearings to adequately take all pumping loads and forces. Use of any other motor voids warranty.

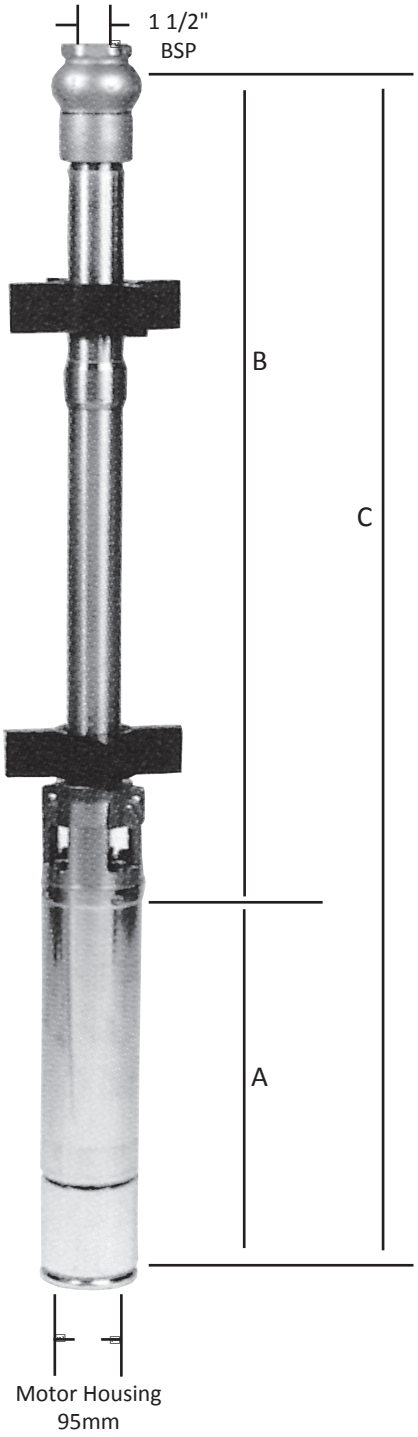
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SERIES NO.	POWER	VOLT	AMPS		A	B	C
			RUN	START			
SM0222101	.75kw/1.0hp	240v	6.1	22	370	860	1230
SM0222103	.75kw/1.0hp	415v	2.2	8.5	340	860	1200
SM0412101	.75kw/1.0hp	240v	6.1	22	370	850	1220
SM0412103	.75kw/1.0hp	415v	2.2	8.5	340	850	1190
SM0422201	1.5kw/2.0hp	240v	10	34	440	940	1380
SM0422203	1.5kw/2.0hp	415v	3.9	19.7	400	940	1340
SM0612151	1.1kw/1,5hp	240v	7.9	28	400	850	1250
SM0612153	1.1kw/1.5hp	415v	3.2	16	370	850	1120
SM0622301	2.2kw/3.0hp	240v	15	52.5	480	940	1420
SM0622303	2.2kw/3.0hp	415v	5.3	26.5	480	940	1420
SM1012201	1.5kw/2.0hp	240v	10	34	440	890	1330
SM1012203	1.5kw/2.0hp	415v	3.9	19.7	400	890	1290
SM1022301	2.2kw/3.0hp	240v	15.0	52.5	480	1010	1490
SM1022303	2.2kw/3.0hp	415v	5.3	26.5	480	1010	1490
SM1512301	2.2kw/3.0hp	240v	15.0	52.5	480	900	1380
SM1512303	2.2kw/3.0hp	415v	5.3	26.5	480	900	1380

Typical Motor weight: 13.5 kg

Typical Wet end weight: 7.90 kg

Dimensions in mm.



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SINGLE PHASE 240V:

NOV Subrotor 240V single phase control box. Models: SMA100101/151/201 and 301.

For reliable operation of this control box and pump, the power supply must conform to the following:

No load line voltage - 228V minimum
Pump running line voltage - 220V minumum as measured at the control box input terminals.

Maximum permissible length of drop cable (metres) (control box to pump).

Motor kw	Max Run Amps	Start Amps Approx	Conductor Size - mm²			
			2.5	4.0	6.0	10.0
0.75	5.4	30	65	105	160	-
1.1	8.7	34	50	75	115	190
1.5	10.8	45	36	60	90	145
2.2	14	55	25	40	60	100

THREE PHASE 415V:

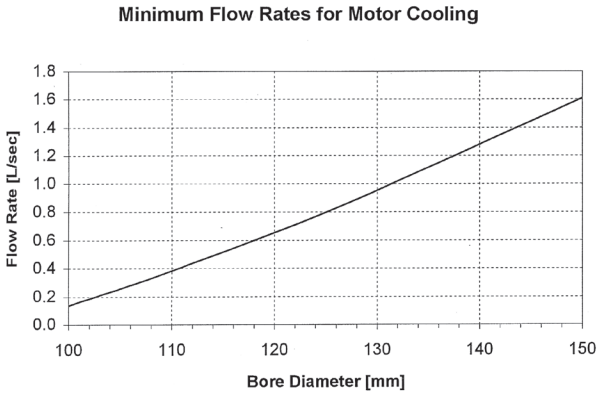
Maximum permissible length of drop cable (metres) (control box to pump).

Motor kw	Current Amps	Conductor Size - mm²	
		2.5	4.0
0.75	2.0	-	-
1.1	2.9	285	-
1.5	3.8	225	360
2.2	5.3	165	255

Note for single and three phase: All electrical connections should be carried out by an authorised electrician in accordance with local regulations and the diagrams for the motor protection and other control components used.

Earth Leakage through the bore water can be the cause of accelerated corrosion in the motor or pump particularly on SWER supply. It is recommended that an earth stake be fitted close to the bore and connected to the earth terminal in the control box.

FLOW INDUCER TUBES:
The submersible motors are designed to operate with a minimum water velocity past the motor of 0.08m/sec. Under these conditions the maximum water temperature for the motor is 30°C. The following chart shows the required pump flow rate needed to achieve 0.08m/sec past the motor. A flow inducer tube should be fitted if the water enters the bore above the pump or if the flow rate is below the required flow in the following chart.



Flow inducer tubes are available in the following sizes to redirect the water flow past the motor.

Part Number	Suitable for discharge poly size
ESA601500	60mm
ESA501500	50mm
ESA401500	40mm

FAILURE TO COMPLY WITH THESE INSTRUCTIONS MAY VOID WARRANTY.

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The flow inducer tube is attached to subrotor pumps above the non-return valve and has a PVC tube that enshrouds the entire pump and motor assembly. As the pump draws water through the base of the flow inducer tube it passes over the electric motor cooling the motor.

All of the tubes are 1.5m long and have an outside diameter of 115mm and an inside diameter of 110mm.

When a flow inducer is used the minimum bore size is 5 inch or 125mm.

Water quality.

Maximum conductivity level 5mS/cm

pH range 6 - 8.5.

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