Monoset Water Pumps

PRODUCT CODE	:	356303039
QUALITY AND STANDARDS	:	IS 90791:1989 Monoset Pumps for clear, cold water for agricultural purposes
PRODUCTION CAPACITY	:	Qty.: 0.25 H.P.- 0.50 H.P.,1500 Nos. (per annum) 1.00 H.P. - 2.00 H.P., 2000 Nos. 3.00 H.P. - 6.50 H.P. ,120 Nos. 7.50 H.P. - 10.00 H.P., 100 Nos. 12.50 H.P. - 15.00 H.P., 75 Nos. Total: 3795 Nos. Value : Rs. 129.5 Lakhs (approx.)
MONTH AND YEAR OF PREPARATION	:	March, 2003
PREPARED BY	:	Small Industries Service Institute Harsiddha Chambers, 4th Floor, Ashram Road, Ahmedabad–380014 Tel. Nos.: 7543147, 7544248 Fax No. : 079-7540619

Introduction

Monoset Pumps are one of the widely used devices for agricultural purposes in preference to other type of pumps on account of their low cost, simplicity of construction and easy maintenance.

The advantage of Monoset pump is that the pump is mounted on the extended shaft of the prime mover, i.e. pump and prime mover are mounted on the same shaft that is why this arrangement is called monoset pump. This pump is also of centrifuge type, but advantage of this pump over coupled centrifuge is that it gives better efficiency and requires less maintenance as the mechanical transmission loss due to coupling is avoided and there is no question of non-alignment.

There are various type of centrifugal pumps used for different purposes like industrial, domestic, agricultural etc. Prime mover can be either diesel engine or eletric motor. The running cost of electrical driving is less than the diesel engine. So in market, normally monoset pump with electric prime mover are available. In the smaller range i.e. from 0.5 to 1.0 H.P., the pumps available are of self priming type, which are widely used for domestic purposes. Monoset pumps are available in different sizes from 1/2" × ½" to 4" × 4" and operating range of head 20 Ft. to 110 Ft. and in discharge 9 LPM to 1250 LPM. Monoset are basically foundry items. Almost 80% of the parts are cast with pig iron and cast iron scrap. In the domestic range

for 0.5 H.P. to 1.0 H.P., the conventional C.I. Body is replaced by Aluminium extruded body, which not only reduces the weight of the pump but also makes it non-corrosive.

Market Potential

There is good potential for marketing this item, if a competitive price is offered. The demand of this pump emerges mostly from state irrigation departments, farmers, land owners, domestic users, co-operative societies, etc.

Basis and Presumptions

(i) The efficiency of the unit is considered 75% i.e. six hours working per shift of eight hours with twenty five working days per month, three hundred working days per annum for full capacity utilization.

(ii) The unit is envisaged to achieve 75% capacity utilization in the 1st year, 80% in the 2nd year, 90% in the 3rd year and full capacity utilization in the 4th year of production.

(iii) Labour wages are taken as per those prevailing under the Minimum Wages Act.

(iv) Interest rate for capital is taken @ 16% per annum.

(v) Margin Money depends upon the norms of financing Institutes.

(vi) Pay back period of the project is considered six years.

Implementation Schedule

Sl.No.	Activity	Period
1.	Preparation of Project Report	30 days
2.	Selection of site	30 days
3.	Registration as SSI	1 week
4.	Availability of finance/loan	90 days
5.	Procurement, erection, commissioning and trial run of machinery	30 days
6.	Recruitment of labour*	2 months

Can be done simultaneously with the procurement, erection, commissioning and trial run of machinery.

Technical Aspects

Process of Manufacture

These pumps are available from 0.25 HP to 15.0 HP rating. The following items are main components of a Monoset pump:

(i) Cast Iron/Aluminium Extruded Section as a body.

(ii) Electrical Stampings and enamelled copper wire windings

(iii) En-8 Shaft.

(iv) C.I./Gun Metal/NORYL impeller

(v) C.I. Pump body

(vi) Mechanical Seal

(vii) Precision ball bearings

(viii) Cast Iron/Plastic foot valve (No foot valve is required in the case of self priming pumps)

Production Process

(a) Main Cast Iron body machining

(b) Stator Lamination Staking

(c) Stator Winding

(d) Rotor Shaft machining

(e) Rotor Core Staking

(f) Brazing of rotor core with copper conductors and end rings

(g) Pressing of rotor core with shaft

(h) Insulation coating in Rotor

(i) Machining of pump body, including two halved C.I. Castings

(j) Machining of impeller

(k) Assembly of Motor and testing

(l) Fitting of pump body over the main pumpset body

(m) Testing of pumpset on the testing station

(n) Painting of pumpset and name plate fixing

(o) Brand Name of the pump is marked either in the C.I. Pump body itself while casting or separate metal plate is fixed over the pump body.

Quality Control and Standards

IS 9079:1989 Monoset Pumps for Clear, Cold Water for agricultural purposes.

Production Capacity

Sl. No.	Rating	Price/ Unit	Qty. Nos.	Total (In Rs.)
(i)	0.25 H.P. to 0.5 H.P.	1,700	1500	25,50,000
(ii)	1.0 H.P. to 2.0 H.P.	3,400	2000	68,00,000
(iii)	3.0 H.P. to 6.5 H.P.	10,000	120	12,00,000
(iv)	7.5 H.P. to 10.0 H.P.	12,250	100	12,25,000
(v)	12.5 H.P. to 15.0 H.P.	15,625	75	11,71,875
		Total	3795	1,29,46,875

Motive Power 75 HP.

Pollution Control

Not required.

Energy Conservation

No special measures required.

FINANCIAL ASPECTS

A. Fixed Capital

(i) Land and Building	(In Rs.)
Land: 1200 Sq. mtr. @ 300/Sq. Mt.	3,60,000
Built up Area:	
(a) Office, Store etc. = 700 Sq. mt. @ Rs. 1600/Sq.mt.	11,20,000
(b) Working shed = 950 Sq.mt. @ Rs. 2,000/Sq.mt.	19,00,000
Total	33,80,000

(ii) Machinery and Equipments

(a) Production Unit

Sl. No.	Description	Ind./ Imp.	Qty. Nos.	Total (In Rs.)
1.	High Precision CNC Lathe Swing over bed, dia - 570mm Admit between the Centres-750mm with 20 HP Motor and other accessories	Ind.	1	30,00,000
2.	Heavy duty cone pulley lathe Centre Height - 305 mm. Centre distance - 1035 mm with 5 HP Motor and other accessories	Ind.	4	10,00,000
3.	Lathe machine 155 mm x 730mm with 1.5 HP Motor and other accessories	Ind.	2	1,20,000
4.	Hydraulic press with 1.0 HP Motor cap. 40 Tonne	Ind.	1	70,000
5.	Hydraulic press with 1.0 HP Motor cap. 25 Tonne	Ind.	1	45,000
6.	Hydraulic Cylindrical Grinding Machine	Ind.	1	6,10,000

Sl. No.	Description	Ind./ Imp.	Qty. Nos.	Total (In Rs.)
	Centre Height - 150 mm, Max. grinding length - 800 mm with accessories			
7.	Lapping Machine	Ind.	1	1,00,000
8.	Slotting machine	-do-	1	40,000
9.	Number punching machine	-do-	1	25,000
10.	Dynamic balancing machine 50 kg.	-do-	1	75,000
11.	Computer with colour monitor and Colour Printer	-do-	1	1,25,000
12.	Software for designing of pump set	-do-	5	70,000
13.	Oven 300°C	-do-	1	50,000
14.	Hydraulic pallet truck and stockier One Tonne cap. each	-do-	2	46,000
15.	Chain electrical hoist 5 Tonne	-do-	1	25,000
16.	Hydraulic Hacksaw machine cap. 8" with std. accessories	-do-	2	40,000
17.	Arc Welding transformer 3 phase 400 A with all standard accessories	-do-	2	50,000
18.	Pillar type drilling machine 25 mm cap.	-do-	2	30,000
19.	Bench type drilling machine 12.5 mm cap. with 0.5 HP Motor	-do-	2	12,000
20.	Bench grinder 200 mm wheel dia. with 1 HP/ 2880 rpm motor	-do-	2	8,000
21.	Air Compressor with 3 HP Motor	-do-	2	20,000
22.	Hand drills, grinders etc.	-do-	4	20,000
23.	Earth Leakage Tester	-do-	1	4,000
24.	Vernier Caliper 0-300 mm	Imp.	2	28,000
25.	Vernier caliper 0-200mm	-do-	2	28,000
26.	Micrometer Screw Gauge 0-25 mm	-do-	1	7,000

(b) Testing Equipment

Sl. No.	Description	Ind./ Imp.	Qty. Nos.	Total (In Rs.)
1.	Water Collection Tank and underground water sump construction	Ind.	1	90,000
2.	Slip/Speed meter, 1" dia, 1 1/4" dia, 1 1/2" dia, 2" dia, 2 1/2" dia and 3" dia. gaivanized pipes, bends, gate valves connection etc.	-do-	LS	20,000
3.	Pressure gauge connections, rubber hose pipes, pressure gauges of various ranges and other miscellaneous items like nuts, bolts, gaskets, thermometers, etc.	-do-	LS	30,000
4.	Electro magnetic flow meter	-do-	1	45,000
5.	Pump testing control panel with current transformer - 3 Nos. and Frequency Meter - 1 Nos. Ammeter - 1 No. Wattmeter - 2 Nos. etc.	-do-	1	1,10,000
6.	Dimmer motorized 3-phase 50 Amp.	-do-	1	25,000
7.	Pump set testing panel 1" dia	-do-	1	12,000
8.	Hydraulic test pump motorized	-do-	1	15,000
9.	Chain pulley block 3 T. cap.	-do-	1	10,000
10.	Technometer	-do-	2	8,000
11.	Dead Weight Pressure gauge tester	-do-	1	20,000
12.	Vibration Meter	-do-	1	15,000
13.	Torque stand with spring balances etc.	-do-	1	20,000
14.	Electric motor 3 phase, 1440 rpm: (i) 5 H.P. - 1 No. (ii) 2 H.P. - 1 No (iii) 1.5 H.P. - 1 No.	-do-	5	20,000

Sl. No.	Description	Ind./ Imp.	Qty. Nos.	Total (In Rs.)
	(iv) 1 H.P. - 1 No. and			
	(v) 0.5 H.P. - 1 No.			
			Total	60,88,000
(c)	*Pollution Control Equipments*			Not required
(d)	*Energy Conservation Facilities/Equipment*			-do-
(e)	*Cost of electrification and installation @ 10% of machinery and equipment*			6,08,800
(f)	*Cost of moulds and other fixtures*			50,000
(g)	Cost of office equipments/ working tables etc.			68,46,800
			Total	68,46,800
(iii)	Pre-operative Expenses (Project cost, non-refundable deposits etc.)			25,000

Total Fixed Capital (i+ii+iii) Rs. 1,02,51,800

B. Working Capital (per month)

(i) Personnel

Sl. No.	Designation	Nos.	Salary (Rs.)	Total (Rs.)
1.	Managers	3	5,000	15,000
2.	Engineer	1	4,000	4,000
3.	Supervisors	4	3,000	12,000
4.	Skilled Workers	20	2,500	50,000
5.	Un-skilled Workers	20	1,800	36,000
	Total	48		1,17,000
	Add Perquisites @ 15% of salaries			17,550
			Total	1,34,550

(ii) Raw Materials Including Packaging Requirement

Sl. No.	Particulars	Ind./ Imp.	Qty.	Rate (Rs.)	Total (In Rs.)
1.	Stampings	Ind.	2 T.	60,000	1,20,000
2.	En-8 Shafts etc.	-do-	1 T.	28,000	28,000
3.	GM parts	-do-	0.1 T.	95,000	9,500
4.	C.I. Castings	-do-	4 T.	17,000	68,000
5.	Winding wire	-do-	0.7MT	2,00,000	1,40,000
6.	Other miscellaneous items like wood, paints etc.	-do-	LS		25,000
				Total	3,90,500

(iii) Utilities	(In Rs.)
(a) Power consumption 8000 KWH @ Rs. 4.50/KWH	36,000
(b) Water	1,000
Total	37,000

(iv) Other Contingent Expenses (per month)	(In Rs.)
Postage and stationery	2,000
Telephone	6,000
Consumable stores	2,000
Repair and maintenance	3,000
Transportation charges	5,000
Advertisement and publicity	6,000
Insurance	5,500
Taxes	2,500
Sales expenses	300
Miscellaneous expenditure	500
Total	32,800

(v) Total Recurring Expenditure (per month)

= (i) + (ii) + (iii) + (iv)

= Rs. 1,34,550 + 3,90,500 + 37,000 + 32,800

= Rs. 5,94,850

(vi) Total Working Capital (for 3 Months)

3 x 5,94,850

= Rs. 17,84,550

C. Total Capital Investment

(i) Fixed Capital	Rs. 1,02,51,800
(ii) Working Capital (for 3 Months)	Rs. 17,84,550
Total	Rs. 1,20,36,350

MACHINERY UTILIZATION

The unit is envisaged to achieve 75% capacity utilization in the 1st year of production, 80% in the 2nd year, 90% in the 3rd year and full capacity utilization in the 4th year of the production.

FINANCIAL ANALYSIS

(1) Cost of Production (per year)	(In Rs.)
(i) Total recurring expenditure	71,38,200
(ii) Depreciation on building @ 5%	1,51,000
(iii) Depreciation on machinery and equipment @ 10%	6,69,680
(iv) Depreciation on moulds and other fixtures @ 25%	12,500
(v) Depreciation on office equipment @20%	20,000
(vi) Interest on fixed capital @ 16%	16,40,288
(vii) Interest on working capital @ 16%	2,85,528
Total	99,17,196
Say	99,17,000

(2) Turnover (per year)

Sl. No.	Particulars	Price/ Unit(Rs.)	Qty.	Total (In Rs.)
(i)	Monoset Water Pumps 0.25 HP to 0.5 HP	1,700	1500	25,50,000
(ii)	1.0 HP to 2.0 HP	3,400	2000	68,00,000
(iii)	3.0 HP to 6.5 HP	10,000	120	12,00,000
(iv)	7.5 HP to 10.0 HP	12,250	100	12,25,000
(v)	12.5 HP to 15.0 HP	15,625	75	11,71,875
		Total	3795	1,29,46,875

(3) Net Profit (per year) *(Before Income Tax)*

= Turnover - Cost of production

= Rs. 1,29,46,875 - 99,17,000

= Rs. 30,29,875

(4) Net Profit Ratio $= \frac{\text{Net Profit per year} \times 100}{\text{Turnover per year}}$

$= \frac{30,29,875 \times 100}{1,29,46,875}$

$= 23.4\%$

(5) Rate of Return $= \frac{\text{Net Profit per year} \times 100}{\text{Total investment}}$

$= \frac{30,29,875 \times 100}{1,20,36,350}$

$= 25.17\%$

(6) Break-even Point

(i) Fixed Cost	(Rs.)
(a) Depreciation	8,53,180
(b) Interest on total investment	19,25,816
(c) Insurance	66,000
(d) 40% of salaries and wages	6,45,840
(e) 40% of other contingent expenses (excluding insurance)	1,31,040
Total	36,21,876

(ii) Net Profit (per year) = Rs. 30,29,875

B.E.P. $= \frac{\text{Fixed Cost} \times 100}{\text{Fixed Cost+Net Profit/ year}}$

$= \frac{36,21,876 \times 100}{36,21,876 + 30,29,875}$

$= 54.4\%$

Addresses of Machinery and Equipment Suppliers

1. M/s. Bharat Machine Tools
   Jamnagar - 361002
2. M/s. HMT Limited
   Machine Tool Marketing Division
   Karaka Building No. 1.,
   Ashram Road,
   Ahmedabad–380009.
3. M/s. Toshniwal Ind. Pvt. Ltd.
   Industrial Estate,
   Makhupura,
   Ajmer - 305002.
4. M/s. Blue Star Limited
   Band Box House,
   Prabhadevi,
   Mumbai - 400025.

5. M/s. Associated Electricals
   Satrang Apartment, 1st Floor,
   New Kothi Road,
   P. Box No. 266,
   Barodara- 390001.
6. M/s. Indo-Air Compressor Spares
   L-462/463, GIDC, Odhav,
   Ahmedabad - 382415.
7. M/s. K.M. Panchal and Co.
   B/6, Chinai Baug Industrial Estate
   Near Dudheshwar Water Tank,
   Dudheshwar,
   Ahmedabad - 380004.
8. M/s. Royal Trading Co.
   Mehbub Society Building,
   Near Zakaria Masjid,
   Kadia Kui, Relief Road,
   Ahmedabad - 380001.
9. M/s. Voltas Limited
   Machine Tool Division,
   'Pushpak', II Floor,
   Khanpur,
   Ahmedabad–380001.
10. M/s. Godrej and Boyce Mfg. Co. Ltd.
    Pirojshanagar, Vikhroli,
    Mumbai - 400079.
11. M/s. Taparia Tools Limited
    A-2/423-424,
    Shah and Nahar,
    Lower Parel (W),
    Mumbai - 400013.
12. M/s. Site Control Gauges and Tools Pvt. Ltd.
    Kalagar Building,
    Shed No. 25,
    Parvati Ind. Estate,
    Pune - 411009.
13. M/s. Blaze Process Engineers
    306, Kalyan Chambers,
    Nava Darwaja Road,
    Khadia,
    Ahmedabad - 380001.

Addresses of Raw Material Suppliers

1. M/s. Roshni Engineering Works
   32, Parmeshwar Estate,
   Memco Tolnaka, Naroda Road,
   Ahmedabad.
2. M/s. Hi-Silicon Stamping Industries
   Naroda Road, Saijpur,
   Ahmedabad.
3. Local Foundries.