

Detergent Powder and Cake

PRODUCT CODE	: N.A.
QUALITY AND STANDARDS	: IS 4955:1993 and IS 8180:1982
PRODUCTION CAPACITY	: Powder – 240 MT, Cake – 200 MT
MONTH AND YEAR OF PREPARATION	: January, 2003
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INTRODUCTION

Synthetic detergents have developed in the beginning of 20th Century and started making in-roads into the area earlier served by washing compounds i.e. soaps made traditionally from oils/fats and caustic soda. Since soaps have comparatively lesser washing characteristics in hard water than synthetic detergents, synthetic washing compounds have been able to occupy a significant market which was enjoyed by washing soaps earlier. The term detergent originated from the latin word *detergine* (i.e. wipe off), is now-a-days applied to all synthetic washing compounds. Synthetic detergent is not only used as household cleaning material but also have industrial applications in textiles, pesticide industry as carriers, etc.

MARKET POTENTIAL

Marketing is an important area of management in an industrial enterprise.

It is a comprehensive term and includes all resources and economic activities necessary to direct the flow of manufactured goods from producers to consumers. The old concept of marketing was product-oriented whereas the new concept is customer-oriented. Customers are the champions whose needs, tastes, purchasing power, etc. are the guiding factors for products sale.

Synthetic detergent being a mass consumption item has shown a dramatic growth since its inception in 1957. Presently, detergents are available to the consumers in the form of powders and cake/bars. Bulk of the production of these items is done in the small scale sector. The per capita consumption of both soaps and detergents in India is much lower than that of some of the developing countries. The trend is likely to change with the changing habits of the consumers. There is, therefore, a tremendous scope for detergents in the near future. The demand of detergents is likely to be 26 lakhs MT by the end of 2005.

Presently, the low priced detergents are becoming more popular on the market scene. These detergents have now penetrated in the rural areas substantially and are available in every nook and corner of the country. Synthetic detergents are more efficient washing material than the conventional oil based soaps. With the rise in the standards of living and changing market structure for detergent cakes as well as powders, and with the entry of low priced detergent cakes demand explosion in the fabric washing product is quite likely. The increased demand of synthetic detergent is likely to be shared by both organised and small scale sector. Synthetic detergents (both powder and cake) cover about 50% of total production of washing products. During the last decade and a half, the demand of synthetic detergents has been growing at the rate of 15%. The growth is mainly attributed to the increase in the per capita income and rise in the standards of living. Synthetic detergents which were earlier used in the urban areas have now entered almost in all the rural areas. This impact has been perhaps due to wide publicity through TV network, radio, press, cinema, etc. since these play a vital role in creating consumer awareness for a particular product.

The present strategy employed for introducing a detergent in the market comprises:

- (i) Appointment of distributors in various regions.
- (ii) Selection of wholesalers/retailers/agents in the various cities/towns.
- (iii) Publishing through advertisements, press media, like radio, television, cinema, etc.

- (iv) Introduction of sales promotion scheme etc.

BASIS AND PRESUMPTIONS

The profile is drawn on the basis of following presumptions:

Working hours/shift	8 hours
No. of Shift/day	1
Working days	300
Total No. of Working hours	2400
Working efficiency	70%
Time period for achieving Max. cap. Utilisation	3rd year from the date on which production will be started.
Labour charges	As per the Minimum Wages Act of State Govt.
Margin Money investment	25% of capital
Rate of Interest on fixed and working capital	14%
Operative period of the project	10 years

The value of machinery and equipment is estimated on the basis of prevailing cost of the market.

IMPLEMENTATION SCHEDULE

Project implementation will take a period of 8 months from the date of approval of the Scheme. Break-up of activities with relative time for each activity is shown below:

Nature of activity	Period in month (estimated)
1. Scheme preparation and approval	0-1
2. SSI provisional registration	1-2

3. Sanction of Loan	2-5
4. Clearance from Pollution Control Board	3-4
5. Placement of order for delivery of m/c	4-5
6. Installation of m/c	6
7. Power connection	6-7
8. Trial run	7-8
9. Commencement of production	9 onwards

TECHNICAL ASPECTS

Process of Manufacture

Main steps involved in the manufacture of detergent powders are:

- (a) Neutralisation of acid slurry followed by its absorption with dry powders builders and finally drying of the mixture.
- (b) Neutralisation of acid slurry followed by dissolving the Neutralised slurry and builders in water and spray drying (the same).
- (c) Simultaneous Neutralisation of acid slurry by soda ash and absorption by builders followed by drying.
- (d) Manufacture of formulated products by dry mixing of concentrated active detergent powder and the builders.

The process more common among the small scale and even more medium scale industry is as follows:

The required soda ash (usually more than 60%) as per the formulation is heaped on the floor itself. The required dosage of acid slurry is added on top of this heap and mixing is done.

Colour is added in the slurry itself. This is followed by addition of optical brightner and perfume. The above

mixed material is then sieved on sieves made of G.I. wire mesh placed at 3' height over stands made of wooden construction. The material is put on sieves and spread on the entire surface of the mesh.

The sieved material is then packed in polythene bags (usually $\frac{1}{2}$ kg. of 1 kg. Pack) by sealing or stapling. These packed polythene bags are put in gunny bags to make 50kg. Pack.

In the power operated process for making high density detergent powder, the required soda ash and sodium carbonate, as per formulation, is added in the blender and mixing is started by switching on the motor.

Linear Alkyl Benzene Sulphoric Acid, commonly known as Acid Slurry is slowly added through the opening of the lid of the blender. As the neutralisation of the slurry and soda ash progresses, the mass becomes brownish in colour and subsequently yellowish. At this point, slight water is sprinkled so that the mass becomes nearly white.

Alternatively, sodium hypochlorite solution as a bleaching agent may also be added, which will help in making the product whiter and brighter. Required colour is then added, followed by other ingredients such as sodium tripolyphosphate, borax trisodium phosphate, caboxymethyl cellulose, sodium sulphate, optical brightener etc. Finally, the perfume is added, and the mass transferred on to a vibrating screen, where the mass is sieved. As the powder comes out from the vibrating screen, the same is collected on G.I. tray, wherein the mass is spread and kept for ageing (drying). After ageing, the powder is packed in polythene bags.

Formulation of Detergent Bars/Cakes

Formulation of cake is different from that of cake in powder form. To give grit to the cake and firmness of solids, clay and starch-like fillers are added and sodium sulphate content is reduced.

The production of detergent bar is a more expensive proposition compared to handmade detergent powder, from the point of capital cost. However, small scale manufacturers do produce and market detergent bars successfully.

Process Description

Various steps involved in the manufacture of synthetic detergent bars/cakes are as under:

- (i) Proportioning of acid slurry, soda ash and other ingredients.
- (ii) Mixing in a sigma mixer.
- (iii) Passing through a tripple roll mill.
- (iv) Extrusion through plodder.
- (v) Cutting and conditioning
- (vi) Finally, stamping and wrapping.

Quality Control and Standards

Indian Standard Specifications for detergent powder and cake are given below.

Requirement for Synthetic Detergent Powders for Household use as per IS 4955:1982.

Sl. Characteristics No. Grade-1	Requirement for Grade-2	
1. Active ingredient, percent by mass, minimum(Acid Slurry)	16.0	10.0
2. Moisture and volatile matter, per cent by mass maximum	15.0	15.0
3. Total phosphates expressed as Sodium Tripolyphosphate, Calculated from P.O. content, Percent by mass, min. 25	15.0	9.0

4. Sodium Tripolyphosphate STPPP, per cent by mass, min.	7.5	4.5
5. Sum of STPP, Pyrophosphate and trimethosphosphate, all expressed as STPP, per cent by mass, min.	12.5	7.5
6. pH of 1 per cent solution at 27°C	9 to 11.0	9 to 11.0
7. Matter insoluble in water, per cent by mass, max.	1.0	2.0

Table for requirements for laundry detergents bars as per IS 8180:1982.

Sl. Characteristic No.	Requirements			
	Gr. 1	Gr.2	Gr.3	Gr.4
1. Active detergent (as sodium salt of alkyl benzene sulphuric acid) percent by mass min.	18.0	15.0	10.0	12.0
2. Total phosphates as STPP Calculated from P2 p5. Percent by pass, min.	17.0	10.0	6.0	-
3. pH of 1 percent solution at 27C	9.0 to 11.0	9.0 to 11.0	9.0 to 11.0	9.0 to 11.0

Production Capacity

Detergent Powder	20 MT
Detergent Cake	16.7 MT

FINANCIAL ASPECTS

A. Fixed Capital

- i) Land and Building (500 sq. mt.) Rented 5,000
- ii) Machinery

For Detergent Powder		(Rs.)
(a) Ribbon blender MS Botton discharging arrangement cap - 150 kgs/Batch- 2 number		50,000
(b) Tank for slurry feeding Ms Cap 1MT		20,000
(c) Vibrating screen with motor		20,000
(d) Misc. equipment viz. weighing machine, Lab breaker, motor, etc., bag sealing and stitching machine.		30,000
Total		1,25,000

For Detergent Cakes		(Rs.)
(a) Mixer machine-sigma blade mixture M.S. 150 Kg/hour		25,000
(b) Milling Machine 125 Kg/Hour		30,000
(c) Extruder- plodder M.S. with motor		60,000
(d) Misc. equipment viz. lump breaker, weighing		30,000
Machine, motors gun metal embossing stamps, cutting machine, etc.		15,000
Installation/Electrification		28,000
Pre-operative expenses		10,000
Furniture/Fixture		20,000
Laboratory Equipment		20,000
	Total	2,33,000
	Powder and Cake Total	3,58,000

B. Working Capital (per month)

(i) Personnel		(Rs.)
(a) Manager/ Chemist- 1		4,000
(b) Supervisor- 1		2,000
(c) Skilled workers- 5		7,500
(d) Unskilled workers- 4		5,000
(e) Accountant/Clerk- 1		2,000
(f) Sale/Purchase Officer		3,000
(g) Watchman/Peon- 2		24,000
	Total	25,900
<i>Perquisites</i>		3,885
	Total	29,785

(ii) Raw Material (per month)

For Detergent Powder (20 MT)		(Rs.)
(a) Acid Slurry 4 MT @ Rs 50,000 PMT		2,00,000
(b) Soda Ash 8 MT @ Rs11,000 PMT		88,000
(c) Sodium Bicarbonate 1 MT @ Rs 13000 PMT		13,000
(d) Sodium Tripolyphosphate 3 MT @ 4000 PMT		1,20,000
(e) Trisodium phosphate 500 Kg. @ Rs16,000 PMT		8,000
(f) Sodim Sulphate 1 Mt @ Rs 8,000 PMT		8,000
(g) Sodium Metasilicate @ Rs 4000 PMT		4,000

(h) Carboxy methylcellulose 400 Kg. @ Rs. 40000PMT		10,000
(i) Colour 50 Kg.		10,000
(j) Perfume 30 Kg.		5,400
(k) Optical whitener 40 Kg.		6,000
(l) Water 1.9 MT		
	Total	4,78,400

For Detergent Cakes (16.7 MT)		(Rs.)
(a) Acid Slurry 1.5 Mt @Rs 50,000PMT		75,000
(b) Soda ash 750 MT @Rs11000 PMT		8,250
(c) Starch 600 Kg. @Rs 10000 PMT		12,000
(d) Talc 4.5 MT @ Rs10000 PMT		45,000
(e) Sodium Silicate 4.25 MT @Rs 9000PMT		38,250
(f) Sodium tripoly phosphate 1 MT @ Rs 40000 PMT		40,000
(g) Colour		1,000
(h) Optical Whitener		6,000
(i) Perfume		4,000
(j) Water 150 Kg.		
	Total	2,29,500

(iii) Other Contingent Expenses (per month)		(Rs.)
(i) Rent		5,000
(ii) Postage/Stationery		1,000
(iii) Telephone		1,000
(iv) Repair/Maintenance		500
(v) Advertisement and publicity		5,000
(vi) Insurance		500
(vii) Transport/Conveyance		3,000
(viii) Packing Charges		20,000
	Total	36,000

(iv) Utilities Rs. 8,000

Total Working Capital (per month)		(Rs.)
Rs 29,785+ Rs. 4,78,400 + Rs. 2,29,500+ Rs 36,000+ Rs. 8,000 = Rs. 7,81,685		
	Or say	7,82,000

C. Total Capital Investment

(i) Fixed capital		Rs. 3,58,000
(ii) Working capital for 3 months		Rs. 23,44,800
	Total	Rs. 27,02,800

FINANCIAL ANALYSIS

(1) Cost of production (per year)		(Rs.)
(i) Working Capital	93,79,200	
(ii) Depreciation on furniture @ 20%	4,000	
(iii) Depreciation on plant/machinery @ 10%	23,300	
(iv) Interest on total capital investment @ 14%	3,60,892	
Total	97,67,392	
or Say	97,67,000	

(2) Sales Turnover (per year)		(Rs.)
(i) By sale of detergent powder 240MT @ Rs. 30,000 PMT	72,00,000	
(ii) By sale of detergent cake 200 MT @ Rs. 20,000 PMT	40,00,000	
Total	1,12,00,000	

(3) Net Profit

$$= \text{Rs. } 1,12,00,000 - \text{Rs. } 97,67,000$$

$$= \text{Rs. } 14,33,000$$

(4) Profit on Turnover

$$= \frac{\text{Net Profit per year} \times 100}{\text{Total Turnover per year}}$$

$$= \frac{14,33,000 \times 100}{1,12,00,000}$$

$$= 12.80\%$$

(5) Rate of Return on Total Capital Investment

$$= \frac{\text{Net Profit per year} \times 100}{\text{Total Capital Investment}}$$

$$= \frac{14,33,000 \times 100}{27,02,800}$$

$$= 53\%$$

(6) Break-even Point

(i) Fixed Cost		(Rs.)
(a) Depreciation on machinery/equipment	23,300	
(b) Dep. on furniture	4,000	
(c) Interest on total capital investment @ 14% per annum	3,60,892	
(d) Insurance	6,000	
(e) 40% of salary and wages	1,42,968	

(f) 40% of other expenses (excluding rent and insurance)	1,72,800
Total	7,09,960
or Say	7,10,000

$$(ii) \text{B.E.P.} = \frac{\text{Fixed cost} \times 100}{\text{Fixed cost} + \text{Net profit}}$$

$$= \frac{7,10,000 \times 100}{7,10,000 + 14,33,000}$$

$$= \frac{7,10,000 \times 100}{21,43,000}$$

$$= 33.13\%$$

Addresses of Machinery and Equipment Suppliers

1. M/s. K.S. Krishnan Associates Pvt. Ltd.
15 Community Centre,
East of Kailash,
New Delhi-110024.
2. M/s. Atlas Engg. Works
Diwan Hall, Chandni Chowk,
Delhi-110006
3. M/s. Chemical and Metallurgical Design Co. Pvt. Ltd.
A-660 Greater Kailash,
New Delhi-110048
4. M/s. Kay Iron Works Pvt. Ltd.
Yamunanagar
(Haryana)
5. M/s. A.P.V. Engg. Co.
Jessore Road,
Kolkata
6. M/s. Metal Engineers Ltd.
Balanagar,
Hyderabad

Addresses of Raw Material Suppliers/Dealers

1. M/s. Sunbeam Industries
Samual St.
Mumbai-3

2. M/s. Sarla Chemicals
Peonya Industrial Estate,
Bangalore
3. M/s. Chawla Sales Co.
Sadar Bazar, Karnal
(Haryana)
4. M/s. Silvasa Syndnet Pvt. Ltd.
Silvasa (Daman)

Soda Ash

1. M/s. Ramnath and Co.
Tilak Bazar,
Delhi-110006
2. M/s. Ram Chemical Co.
Tilak Bazar,
Delhi-110006.
3. M/s. Aggarwal Chemicals
95/1, GIDC Estate,
Odhav PS, Ahmedabad.
4. M/s. Tata Chemicals
Mithapur, Gujarat.
5. M/s. Saurashtra Chemicals
Gujarat.
6. M/s. Dharangdhra Chemicals
Gujarat.

CMC

1. M/s. Cellulose Products of India Ltd.
Kathwada Maize Products,
Ahemdabad.
2. M/s.. Kalpana Chemicals
Macharam I.F.,
Hyderabad.

Phosphate Builders

1. M/s. Star Chemicals Bombay Pvt.
Ltd.
21, Noble Chambers,
Parsi Bazar, Fort,
Mumbai-1.
2. M/s Ashok Chemicals Company
49, New Banra Lane,
Vadagadi, Mumbai-43.
3. M/s D.C.M. Chemicals Works
P.B.No. 1211,
Najafgarh Road,
New Delhi.
4. M/s Everest Chemicals Industries
265, Samuel St.,
Mumbai