

# **1. ACID SLURRY**

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## **SECTION – I**

### **PRODUCT CHARACTERISTICS**

#### **1.1. General details**

Alternate name : Acid slurry

Linear Alkyl benzene sulphonate(LABS)

Category Surfactant

## **1.2. Specifications**

The Acid slurry grade accepted in the market conforms to IS-8401-1977, which has specified two grades of Acid Slurry.

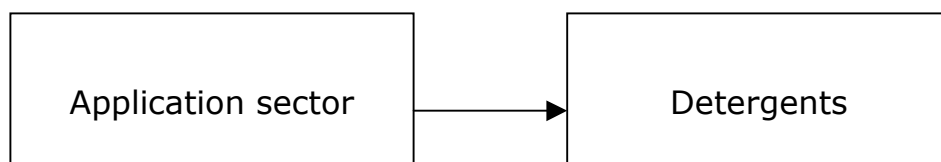
Class A - 85% Active detergent with 9% maximum free acid.

Class B - 90% Active detergent with 3% maximum free acid: Free oil-  
2%

## SECTION - II

### PRODUCT APPLICATIONS

#### 2.1. Application sector



#### 2.2. Typical detergent formulations based on Acid Slurry

##### 2.2.1. Detergent powder (household formulation)

	Premium grade (Weight, %)	Popular grade Weight, %
85% active LAB acid slurry	18	15
Sodium carbonate (soda ash)	35	32
Sodium meta-silicate	2	--
Alkaline sodium silicate (47% liquid Na <sub>2</sub> O:SiO <sub>2</sub> :1:2:2)	6	7
Sodium bicarbonate	10	10
Sodium sulphate (anhydrous)	20	25
Sodium tri-polyphosphate (STPP)	10	7
Sodium carboxy methyl cellulose	1.5	1.0
Phthalocyanine blue colour or oil soluble yellow colour	0.1	0.1
Optical whitener	0.3	0.2
Perfume	0.1	0.1

Water	3	2.6
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### 2.2.2. Liquid detergent formulations

	Light duty (weight %)	Heavy duty (weight t%)
85% active LAB acid slurry	20	25
Caustic soda (15% solution of Sodium hydroxide)	Qty required to bring pH to 7	Qty required to bring pH to 7
Sodium sulphate	2	2
Urea	10	15
Perfume	0.1	0.1
Water	q.s.	q.s.

### 2.2.3. Detergent cakes/bars/tablets formulations

	Extruded bars/cakes (wt%)	Mechanically pressed tablets (wt%)
85% active LAB acid slurry	18	16
Soda ash	15	20
Sodium silicate (alkaline Na <sub>2</sub> O:SiO <sub>2</sub> :1:2:2) 47% soln.	10	10
S.T.P.P.	15	10
Starch (tapioca/maize)	20	5
Talc	10	12
Kaolin	3	-
Paraffin wax	4	-
Opt. Whitener	0.3	0.3
Colour	0.05	0.1
Perfume	0.1	0.1
Sodium sulphate	-	10.0
Water	q.s.	q.s.

## **SECTION III**

### **INDIAN MANUFACTURERS**

#### **General details**

Acid slurry is made by a large number of units in the country predominantly in small scale sector. There are reported to be more than 100 producers of Acid slurry in the country.

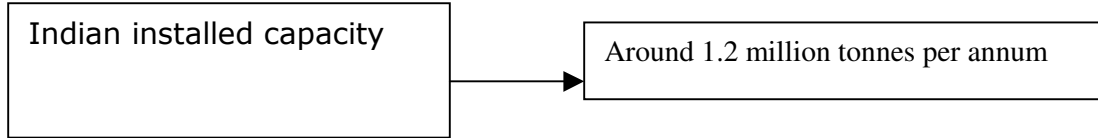
*Important manufacturer of Acid Slurry include the following*

- \* Atul Limited  
Corporate Office : Agrochemicals Division  
P.O. Atul 396 020, Dist. Valsad
  
- \* Amruteswari Enterprises  
No.92, Amruteswari Building,  
6th Main, 4th Cross  
Ist Stage, 6th Phase  
W.C. Road, Industrial Town  
Bangalore-560 044
  
- \* Panda Chemicals Pvt. Ltd.  
24, Zone-II, M.P. Nagar,  
Bhopal-462 011
  
- \* ABC Corporation  
27, Western India House,  
Sir P.M. Road, Fort,  
Mumbai-400 001
  
- \* Cee Sulphones Ltd. MCC050  
B-7, Rajratan Apartments  
Ground Floor, Near Garden  
Service Road, Jogeshwari (E),  
Bombay-400 060  
  
Factory : Plot No.146-149, Achhad Industrial Estate  
Taluka Talasari, Dist-Thane, Maharashtra
  
- \* Meeta Trading Corporation,  
Unit No.7, Ground Floor,  
Bldg. No.5, Jogani Industrial Complex,  
Sion Chunabhati Road, Mumbai-400 022.
  
- \* Memba Chem Industries Pvt. Ltd.  
19, M.J. Building, Ground Floor,  
187 Princess Street, Mumbai-400 002  
Fax : 022-2016261
  
- \* Navrang Chemical Industries,  
Opp. Mittal Estate, Andheri Kurla Road, Mumbai-400 059.

- \* Anand Chemicals  
7th Cross, PIPDIC Industrial Estate  
Sedarapet-605 111
  
- \* Bharani Chemical Industries,  
41, Chairman Muthuramier Road, Madurai-625 009.
  
- \* Gee Gee Khay Chemical Industry,  
96, Nelson Manickam Road, Chennai-600 029  
  
Factory : Maraimalai Nagar-603 209.  
Plot No. 16, A Type, PIPDIC Industrial Estate,  
Mettupalayam, Pondicherry-605 009
  
- \* Ghuru Chemicals  
16, A Type, 9th Cross, PIPDIC Indl. Estate,  
Mettupalayam-605 009
  
- \* New India Surfactants  
A-86 & 87. PIPDIC Industrial Estate  
Sedarapet-605 111
  
- \* Sunrise Chemical Industries,  
No.32, Periyathambi Mudali Street,  
Choolai, Chennai-600 112.
  
- \* Southern Aromatic Chemical Industry  
R.S. No.35/5, Thuthipet Village,  
Sedarapet-605 111
  
- \* Ultramarine & Pigments Ltd.,  
Detergents Division : Plot No.25-B,  
SIPCOT Indl. Complex,  
Ranipet-632 403, Vellore District,
  
- \* Varuni Chemicals (P) Ltd  
Admn. Office : 6/1, Manjanakara Street, Madurai-625 001.  
  
Factory :  
63/5, Viraganoor Village,  
Madurai 625 009.
  
- \* Royel Emulsifiers



#3, Pilkington Road,  
Ayanavaram  
Chennai 600 023



## SECTION - IV

### IMPORT/EXPORT TRENDS

**4.1 Present import level: Negligible quantity**

**4.2 Present export level** 7000 tonnes

#### 2. 4.3 SAMPLE OF INDIVIDUAL EXPORTS

Name of the exporters	Country	Quantity in tonnes	Value in Rs.	Date	Port
Hindustan Lever Ltd.	Colombo	37.6	1297397	09.06.2002 to 31.06.2002	Chennai
Hindustan Lever Ltd.	Colombo	56.4	1946095	09.06.2002 to 31.06.2002	Chennai
Hindustan Lever Ltd.	Colombo	56.4q	1946095	09.06.2002 to 31.06.2002	Chennai
Hindustan Lever Ltd.	Colombo	37.6	1297397	09.06.2002 to 31.06.2002	Chennai

Hindustan Lever Ltd.	Colombo	18.8	1331411	11.07.200 2 to 31.07.200 2	Chennai
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**SECTION - V**

## PRICE TRENDS

**Period: November 2002**

Ex-factory price                      Rs.39.65/- per kg

Taxes and duties                      As applicable

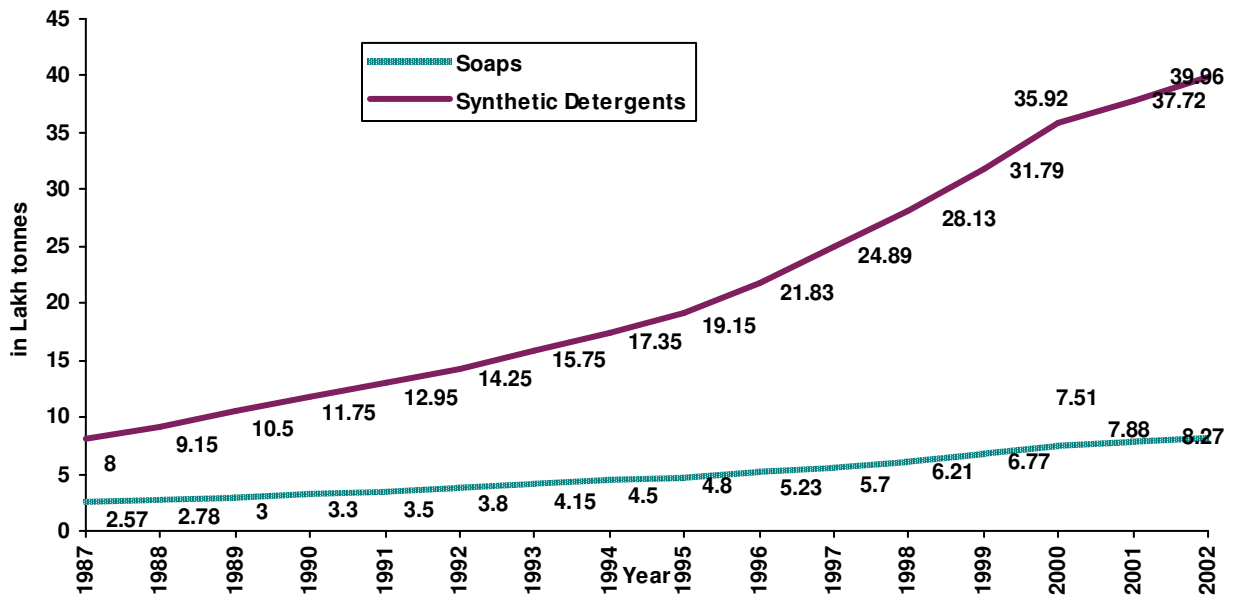
## **SECTION - VI**

### **INDIAN DEMAND**

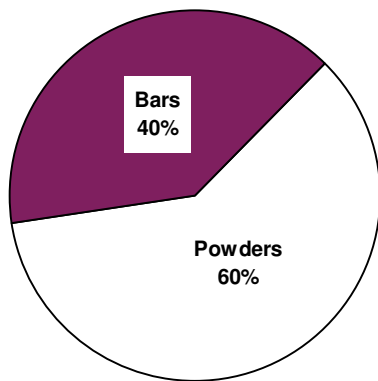
- *Acid slurry is used in the detergent sector*

#### **6.1. Status of Detergent sector**

##### **6.1.1. Production trends for soaps and detergents**



**The ratio of powder to bar is 60:40**



### **6.1.2. Growth rate in demand**

## 2.1. SOAP

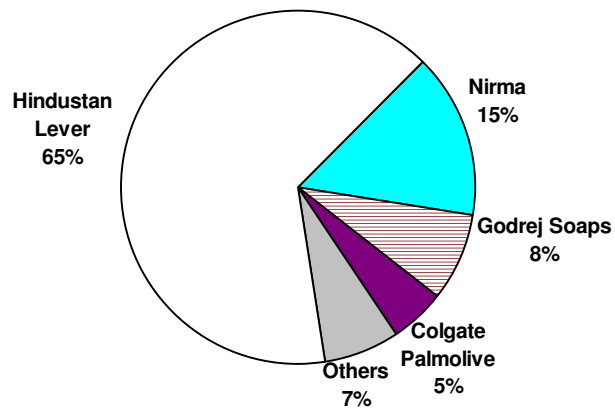
Weighted Average annual growth rate in demand : 7 to 9%  
per annum

## 2.2. DETERGENTS

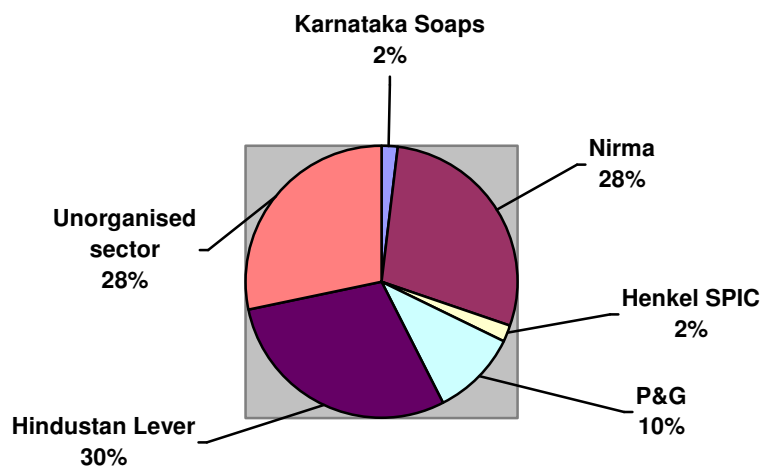
Weighted Average annual growth rate in demand : 11 to 14%  
per annum

### 6.1.3. Market share of major players

#### Toilet Soaps



## Detergents



### 6.1.4. Fabric wash market structure

The detergent powder segment caters to three categories, lower, middle and higher end markets.

### 6.1.5. India Percapita Consumption of detergent

Year	Demand in '000 tonnes	Percapita consumption (kg per annum)
1988-89	1031	1.24
1989-90	1176	1.40
1990-91	1335	1.55
1991-92	1426	1.63
1992-93	1522	1.71
1993-94	1623	1.80
1994-95	1732	1.88
1995-96	1848	1.97
2000-01	2550	2.48

World average percapita consumption of synthetic detergents is 9 kg.



## **6.2. Estimate of All India demand for Acid slurry**

### **6.2.1. Demand for detergent**

ISTMA (Indian Soaps and Toilet Manufacturer Association) has estimated the Indian detergent bars and powders demand to be in the region of 3.5 million tonnes per annum

### **6.2.2. Demand for Acid Slurry**

The use level of Acid slurry in detergent formulations

Acid slurry is usually key active ingredient used in Indian detergents, while soda ash,

zeolites and sodium tri-polyphosphates (STPP) are used as builders to remove hardness from water. The proportion of both LAB and soda ash vary with the degree of concentration of the detergent.

Acid slurry content in detergent

The Acid slurry content could be 15 to 25 percent between popular and premium detergents as indicated below.

Detergent powders (household)

in Weight. %)

	Premium grade	Popular grade
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85% active LAB acid slurry	18	15
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Liquid detergents

in Weight %

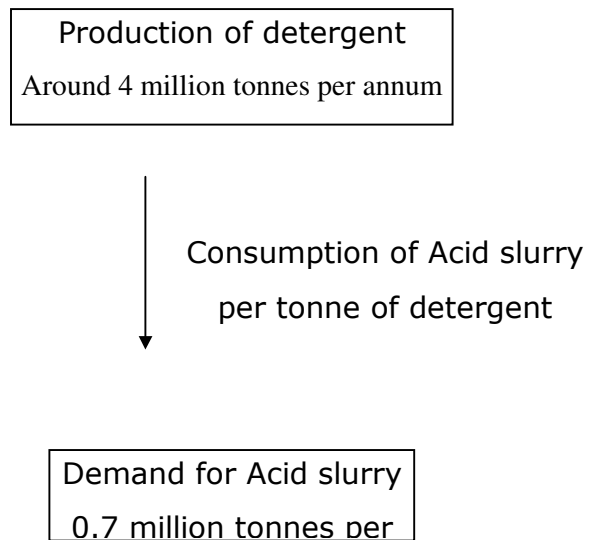
	Light duty	Heavy duty
85% active LAB acid slurry	20	25

Detergent cakes/bars/tablets

in Weight %

	Extruded bars/ cakes	Mechanically pressed tablets
85% active LAB acid slurry	18	16

### 6.2.2. All India Acid slurry demand tree



### 6.3. Demand projections for Acid slurry

Growth in demand for Acid slurry would be in tune with the growth and performance level of the detergent industry.

Based on the past performance records and industry potentials, the growth rate of the detergent industry in the coming years is likely to be in the region of 10 to 12% per annum

## **SECTION VII**

### **BROAD OUTLINE OF MANUFACTURING PROCESS**

#### **7.1. General details**

To produce Acid slurry, Linear alkyl benzene (LAB) can be readily sulphonated using any of the conventional sulphonating agents such as sulphur trioxide or fuming sulphuric acid (oleum of varying free SO<sub>3</sub> content upto 20%).

#### **7.2. Sulphonation using 20% oleum in batch process**

A typical reactor has a capacity of 1 tonne and is made of SS 316 and is fitted with an anchor type stirrer operating at 150 to 200 rpm. The reactor is provided with a mild steel jacket for circulation of water between 25 to 29 deg.C. The reaction vessel is charged with 300 kgs of LAB.

The stirrer is turned on and cooling water is circulated through the jacket. 20% oleum is added slowly into the reactor at such a rate as to maintain the temperature of the reaction mass between 40 to 45 deg.C. Normally, the total weight of the oleum to be charged for completion of the reaction would be 1.2 times the weight of LAB charged.

The entire addition of oleum is completed within 2 to 2½ hours. (in the case of hand operated stirrers, time taken for addition may be around 4 hours). The control of temperature of 45 deg.C during the addition of oleum is very essential, since at elevated temperatures, charring of LAB and formation of undesirable products like sulphones, disulphonic acids and sulphonic anhydride are quite likely. After the addition of oleum is complete, the cooling is regulated in such a way as to allow the reaction mass to get

digested at a temperature of 45 deg.C for at least one hour.

The completion of the reaction to the extent of 98% conversion of LAB to sulphonic acid can be checked by an empirical test at this stage. The test consists of shaking 2 drops of the digested mass with 10 cc of 35% alcohol in water. If the conversion is 98%, the resulting solution would be clear. However, this method needs optimisation and a standard for comparison needs to be developed with a standard sulphonated mixture.

When the digestion is completed, the entire mass is transferred to a lead lined vessel made of mild steel of around one tonne capacity with a conical bottom, fitted with a drain valve and used as a separator vessel. The mass is again stirred with gradual addition of crushed ice (12% of total weight of LAB and oleum charge). During this stage of dilution, the temperature rises gradually and the addition of ice is carefully controlled, keeping the temperature at about 60 deg.C. When the addition of ice is completed, the mass is again stirred for another 15 minutes, after which it is allowed to settle for about 10 to 12 hours.

The separation of the upper sulphonic acid phase and the lower sulphuric acid phase (approximately of 78% strength) can be effective only if the temperature during dilution is kept at 60 deg.C. After 12 hours of settling, the lower acid layer is withdrawn and the sulphonic acid is stored either in stainless steel barrels or high density polythene carboys.

### **7.3. Sulphonation using a mixture of 98% sulphuric acid and 20% oleum**

For manually operated units, a mixture of 98% sulphuric acid and

20% oleum in the ratio of 55:45 is an ideal sulphonating agent. Temperature rise in this case is attained gradually and is well within control. The procedure for sulphonation is essentially the same as described under oleum sulphonation.

The sulphonating mixture is prepared by gradual addition of 45 parts by weight of 20% oleum to 55 parts by weight of 98% sulphuric acid. The temperature during addition of the sulphonating agent is maintained at 45 deg.C and thereafter the mass is digested for at least 90 minutes at 45 deg.C. If the unit has no provision for cooling jacket, the temperature should be controlled by regulating the addition of sulphonating mixture.

The ratio of LAB to sulphonating mixture is normally kept at 1:1.5. However, after the digestion, if it is found that sulphonation has not gone to completion, the ratio could be raised to 1:1.6 by extra addition of sulphonating agent. For dilution, crushed ice, 12% by weight of the total charge, is added while maintaining the mass at a temperature of 60 deg.C to 65 deg.C.

#### **7.4. Disposal of spent acid**

Since considerable quantity of waste sulphuric acid of 78% strength is produced as a byproduct of LAB sulphonation, safe disposal of this is very important.

Normally, spent acid finds a ready market for the manufacture of double salts (alums) and ready sulphate fertilisers.

Alternatively, spent acid could also be returned to the manufacturers of oleum for re-use.

As 78% sulphuric acid is a<sub>22</sub> hazardous effluent, it should not

be allowed to enter drainage systems without being completely neutralised. For neutralising the waste acid, an acid pit filled adequately with quick lime is generally constructed, particularly by the small scale units..

The waste acid is slowly added to quick lime and the mass is mixed carefully. The resulting calcium sulphate can be disposed of safely.

■ *Source of Technology*

\* T.S. Enterprises,

Works : E-416 Road No.14

■ *Vishwakarma Ind.Area, Jaipur-302 013*

Office : A-151, Nehru Nagar, Jaipur - 302 016.

Tel:330613(Works),302635(Office)

(Resi.)337268,336489,302635

Fax:91-0141-302635

**Suppliers of plant and machinery**

Name of the equipment	Name of the company

Jacketed Reactors	<p>Chemitherm Plants &amp; Systems P. Ltd., 30, Anandha Street Alwarpet, Chennai-600 018</p> <p>Texel Fabricators Pvt. Ltd., 335, Sidco Industrial Estate, Ambattur, Chennai-600 098, Tamil Nadu</p>
Steam boiler	<p>Sri Ranga Industries SF, 739, Ramraj Nagar, Goldwins, Coimbatore-641 014</p> <p>Firetech Boilers Pvt. Ltd. No.211, 2nd Cross, 38th Main, B.T.M. Layout 2nd Stage, Bangalore-68</p>

## SECTION VIII



## RAW MATERIAL REQUIREMENTS AND AVAILABILITY

### 8.1 Raw material requirements:

Basic One tonne of Acid Slurry

LAB 300 kgs

Oleum (20%) 360 kg

### 8.2 Raw Material availability

Linear Alkyl Benzene (LAB) is the important raw material for the production of Acid Slurry.

Typical characteristics of LAB:

Sulphonability, %	98 min.
Bromine Number	0.05 max.
Colour, Saybolt	25 min.
Doctor Test	Negative
Biodegradability of Sulphonate, %	92.0 min.
Molecular weight	236 to 243 or 251 to 258
Distillation, 95% recovery	320 Deg C max.

### 1.1.1.1 8.3 Source of supply of raw materials

2.2.1 Name of the raw materials	2.2.2 Name of the company
Linear Alkyl benzene	<ul style="list-style-type: none"><li data-bbox="613 506 1385 611">* Indian Petrochemicals Corporation Ltd., P.O. Petrochemicals, Township, Vadodara Gujarat</li><li data-bbox="613 642 1385 747">* Reliance Industries Ltd., Gujarat Tulsiani Chambers, Nariman Point, Mumbai-400 021</li><li data-bbox="613 779 1385 947">* Tamilnadu Petroproducts, Ltd., Tamil Nadu Manali Express Highway, Manali Chennai – 600 068</li><li data-bbox="613 1020 1385 1230">* Nirma Limited, Nirma House, Ashram Road, Ahmedabad-380 009.</li></ul>

Oleum	<p>There are more than one hundred units producing Sulphuric acid in the country, at various capacity levels.</p> <p>The total installed capacity for Sulphuric acid in the country is around 6.5 million tonnes per annum.</p> <p>* Tanfac Industries Ltd., 14, SIPCOT Indl Complex Kudikadu, Cuddalore</p> <p>* Kamar Chemicals &amp; Industries Ltd., :Plot No.56-A, Sipcot Indl. Complex, Ranipet-632 403.</p>
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## **SECTION - IX**

### **GLOBAL SCENARIO**

Acid slurry has lost some market share to alcohol sulphates this decade, but it remains one of the stock anionic surfactants.

Acid slurry represents one-third of the active ingredients in detergents worldwide. World capacity stands at around 2.7 million tonne per

annum, with world demand is at 2.25million tonne per annum.

In the US, demand has been driven by a market worth over \$4bn per annum for heavy-duty powder and liquid laundry detergents.

Global growth in demand is forecast at around 2 to 4% per annum.

SRI says that growth is strongest in Southeast Asia and moderate in Latin America, Africa and the Middle East.

### **Global manufacturers**

Company	Location
■ North America  Huntsman Condea Vista  Petresa Canada	Chocolate Bayou, TX Baltimore, Md Lake Charles, La Becancour, Quebec

<p><b><i>Western Europe</i></b></p> <p>Ausidet (100% Montedison)</p> <p>CCSA</p> <p>DHW</p> <p>Condea Augusta (100% RWE-DEA)</p> <p>Petresa (100% Cepsa)</p> <p>Wilbarco</p>	<p>Mantova, Italy</p> <p>Gonfreville, France</p> <p>Rodleben, Germany</p> <p>Augusta, Italy</p> <p>Porto Torres</p> <p>San Roque, Spain</p> <p>Ibbenbueren, Germany</p>
<p><b><i>Eastern Europe</i></b></p> <p>Neftochim</p> <p>OHIS</p> <p>Petro Brazi</p> <p>Prva Iskra</p>	<p>Burgas, Bulgaria</p> <p>Skopje, Macedonia</p> <p>Brazi, Romania</p> <p>Baric, Serbia</p>

<p><b>Asia</b></p> <p>Jin Tung Chemical Sinopec Iran Chemical Industries Investment Tamilnadu Petroproducts (TPL) Nirma Formosa Union Chemical Corp.</p>	<p>Nanjing, China Dushanzi, China Esfahan, Iran Chennai, India Baroda, India Taiwan</p>
<p><b>Latin America</b></p> <p>Deten Quimica Quimica Venoco YPF</p>	<p>Camarcari, Brazil Guacara, Venezuela Ensenada, Argentina</p>

## SECTION X

### DISCUSSIONS ON ECONOMIC CAPACITY, 2.3. PROJECT COST AND PROFITABILITY PROJECTIONS

Economic capacity : 900 tonnes per annum

Project cost : Rs.130 lakhs

#### Assessment of project cost

##### 1. Land

S.No.	Description	Cost Rs.in lakhs
1.1	Cost of land of 0.5 acre at Rs.5 .5 per acre	2.75
1.2	Cost of levelling, laying internal roads/fencing and compound wall	0.28
	Subtotal	3.03

##### 2. Building

S.No.	Description	Cost Rs.in lakhs
2.1	Factory building of area 420 sq.m. at Rs.3200/sq.m.	13.44
2.2	Non-factory building of area 50 sq.m.at Rs.4500/sq.m.	2.25
	Subtotal	15.69

### 3. Cost of Plant & Machinery

S.No.	Description	Cost Rs.in lakhs
3.1	Cost of basic plant and machinery	30
3.2	Instrumentation and control	2.25
3.3	Pipelines and valves	3
3.4	Structurals for erection	1.5
	Subtotal	36.75
3.5	Octroi, excise duty, sales tax, etc.at 12%	4.41
3.6	Packaging and insurance charges (2%)	0.74
3.7	Transportation charges (2%)	0.74
3.8	Machinery stores and spares (2%)	0.74
3.9	Foundation charges (2%)	0.74
3.10	Installation charges (2%)	0.74
	Total cost of plant and Machinery	44.86

### 4. Technical know-how fees

Rs.2.5 lakhs

### 5. Miscellaneous fixed assets

S.No.	Description	Cost Rs.in lakhs
5.1.	Electrification	3
5.2.	Steam boiler and auxillaries	4
5.3.	Water storage tank, borewell etc.	1.2
5.4.	Fuel storage tank	1.2
5.5.	Laboratory equipment	1.4
5.6.	Office machinery & equipment	1.8
5.7.	Material handling equipment, packaging machinery, weigh balance, etc.	1.5
5.8.	Diesel generator	6
5.9.	Effluent treatment	1.5
	Total	21.6

### 6. Preliminary & Pre-operative expenses:



S.No.	Description	Cost Rs.in lakhs
6.1.	Preliminary expenses	0.5
6.2.	<b><i>Pre-operative expenses:-</i></b>	0
6.2.1	Establishment	0.8
6.2.2	Rent rates and taxes	0.8
6.2.3	Travelling expenses	1.5
6.2.4	Interest and commitment charges on borrowings	3.8
6.2.5	Insurance during construction period	1.5
6.2.6	Other preoperative expenses and deposits	0
6.2.7	Interest on deferred payment	0
	Total	8.9

<b>7.</b>	<b>Provision for contingency</b>	<b>Rs.6.4 lakhs</b>
<b>8.</b>	<b>Working capital margin</b>	<b>Rs.27 lakhs</b>
<b>9.</b>	<b>Total project cost</b>	<b>Rs. 129.98 lakhs</b>
	<b>Say</b>	<b>Rs.130 lakhs</b>

## 10. Means of Finance

Total project cost	Rs.130 lakhs
Promoter's contribution	Rs.52 lakhs
Term loan from financing institutions	Rs.78 lakhs

## 11. Financial statements

<b>3. A VARIABLE COST</b>	<b>Rs. In lakhs</b>
Raw material and utilities	188.47
Spares and maintenance	2.7
Selling expenses	18
<b>Total variable cost (A)</b>	<b>209.17</b>
<b>4. B FIXED COST</b>	
Salaries and wages	12
Interest on term loan and working capital loan	28.6
Depreciation	6.7
Administrative expenses	10.8
<b>Total fixed cost (B)</b>	<b>58.1</b>
<b>C. Total cost of production (A+B)</b>	<b>267.27</b>
<b>D. Selling price per kg. (in Rupees)</b>	<b>40</b>
<b>5. E. ANNUAL SALES TURNOVER</b>	<b>360</b>
<b>F. Net profit before tax (E -C)</b>	<b>92.73</b>

<b>6. G. BREAKEVEN POINT IN % AT CAPACITY UTILISATION LEVEL</b>	39%
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**SECTION XI**

**SWOT ANALYSIS**

<b>1.1.1.2 Strength</b>	Growing demand for the product. <b>1.1.1.3</b>
<b>1.1.1.4 Weakness</b>	No particular entry barrier and therefore, the market bound to be competitive.
<b>1.1.1.5 Opportunity</b>	1.1.1.6 <ul style="list-style-type: none"> <li>▪ <i>Ideal for investment in small scale sector</i></li> </ul>
<b>1.1.1.7 Threat</b>	1.1.1.8 Credit period required for sale of the product in the competitive market

**1.1.1.9**

## **SECTION - XII**

### **FACTORS INFLUENCING THE POSITION FOR A NEW INDUSTRY AND RECOMMENDATIONS**

#### **Raw material scenario**

The basic raw materials namely LAB and Sulphuric acid are now readily available and there is no particular raw material constraint.

#### **Characteristics of the Industry**

Acid slurry is a low technology oriented industry particularly suitable for small scale entrepreneurs, aspiring to set up projects at low level of investment.

#### **Trade pattern**

The product appears to be mostly sold on credit basis, ranging from 60 to 90 days.

Since the units are set up at small scale level, at proximate distance to the consumers, generally the product is sold directly by the manufacturer to the ultimate user, without presence of trading house in a significant way.

