REPORT

OF THE

EXPERT COMMITTEE

ON

TECHNICAL TEXTILES

Volume - II

Government of India
Ministry of Textiles
Udyog Bhavan
New Delhi – 110 011

July, 2004

REPORT

OF THE

EXPERT COMMITTEE

ON

TECHNICAL TEXTILES

Volume - II

Government of India
Ministry of Textiles
Udyog Bhavan
New Delhi – 110 011

July, 2004

Appendices

(5A to 5C)

CONTENTS

Appendix No.		Page No.
5A	**Project profiles made by TECS**	
1.	Needlepunch project	1
2.	Geogrid project	39
3.	Automotive seat belt and other rigid webbings project	65
4.	Multipurpose coating project	87
5.	Circular warp knitting project	109
6(a).	Sanitary napkins project (converting line)	129
6(b).	Incontinence (adult) diapers project (converting line)	157
6(c).	Baby diapers project (converting line)	177
7.	Healthcare disposables project	195
8.	Spunbond project	227
9.	Spunlace project	249
10.	Surgical dressings complex project	275
5B	**Project profile made by M/s. Kusumgar Corporates**	305
11.	Taffeta fabrics	
5C	**Project profiles made by SASMIRA**	
12.	Agro shade net project	329
13.	Fibrefill project	339
14.	Industrial filter fabrics project	359
15.	Woven geotextiles project	371
16.	Safety and protective textiles project	381
17.	Shoe uppers project	395
18.	Double needle bar spacer project	407

NEEDLE-PUNCH PROJECT

SECTION I : PRODUCT BRIEF, APPLICATION AREAS AND MARKET POTENTIAL

1.1 **Needlepunching** is the oldest method of producing nonwoven products. The first needle loom produced in the United States was made by the James Hunter Machine Co. in **1948**. Then, in 1957, James Hunter produced the first high - speed needle loom, the "Hunter Model 8" which is still used today. This was the first needle loom completely counter-balanced with eccentrics running opposed to each other and mounted in pairs, it was also the first to operate at 800 strokes per minute.

1.2 The Needle punch **webs** offer a wide range of **product characteristics** such as :

- Unique physical properties i.e., elongation in the X, Y & Z direction for mouldable applications,
- Ability to attach layers of different type fibre webs to produce composites,
- High opacity per unit area,
- **High strength makes them overwhelming choice for geotextile fabric**,

Major Application and End-usages :

- **Geotextiles** : Needle punch geotextiles are **used** in functions like separation, filtration, reinforcement, drainage & erosion control and find applications in roads, railways, air runways, coastal shore protection, etc.
- **Needle punch carpets** : They are used in passenger cars as flooring material.
- **Other Miscellaneous Applications** : Headliners, Filtration, Insulation Felts, etc.

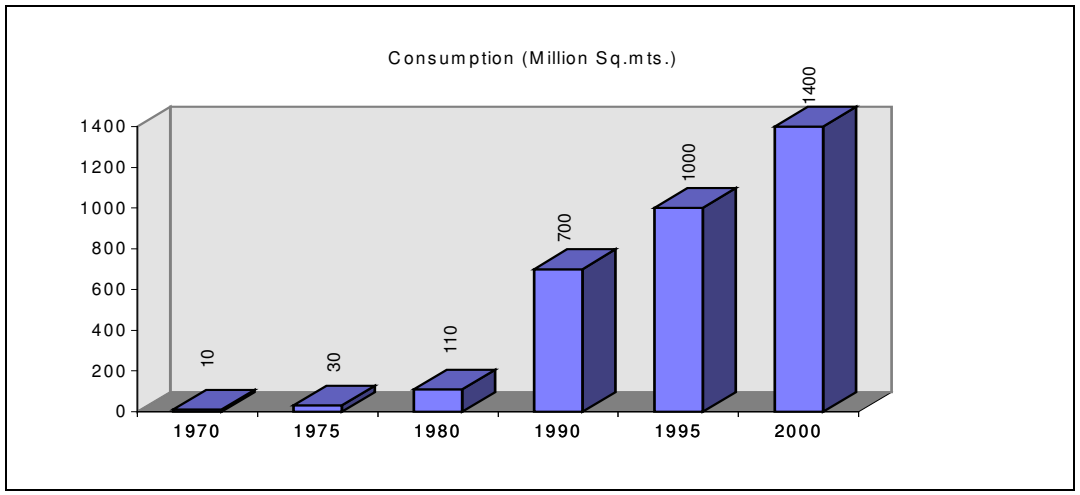
Emerging Market Potential - Global and Indian

Global Market Potential :

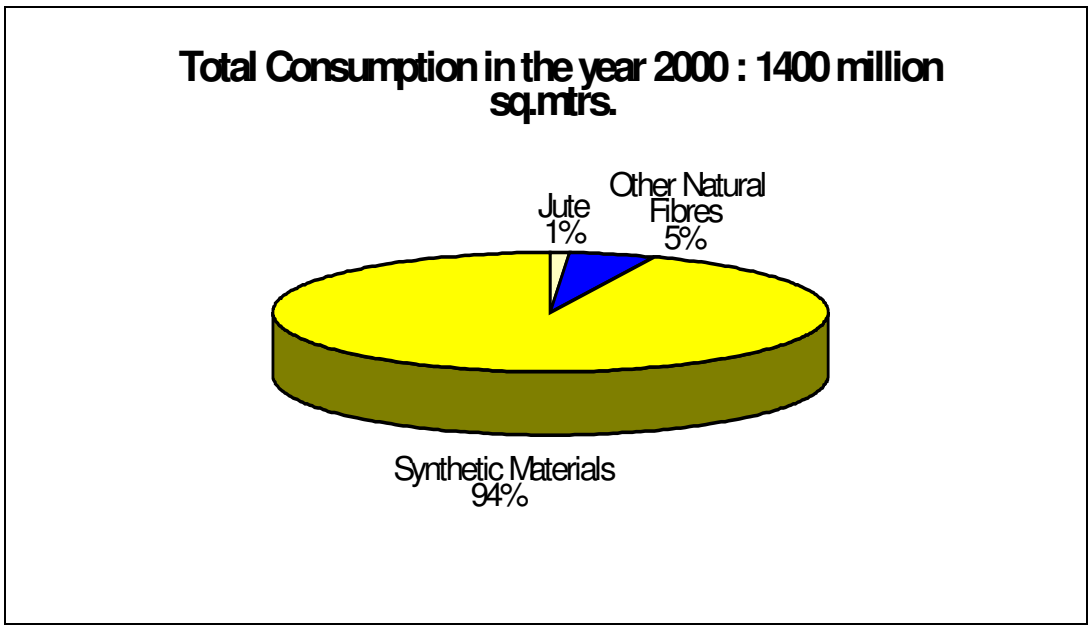
1.3 In 1970, the consumption of geotextiles was 10 million sq. mt. which rose to 110 million sq. mt. in 1980 & 700 million sq. Mts. in 1990 and further to around 1400 million sq. mt. in 2000 as shown overleaf:

TREND IN THE GLOBAL CONSUMPTION OF GEOTEXTILES

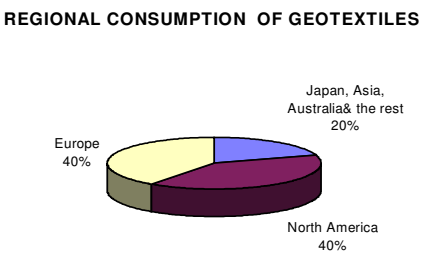
(1970 TO 2000)



1.4 The broad consumption pattern of geotextiles of **different materials,** is shown below :



Regional consumption of geotextiles is shown below :



The future development of the geotextile industry will be in the developing economies of China and India.

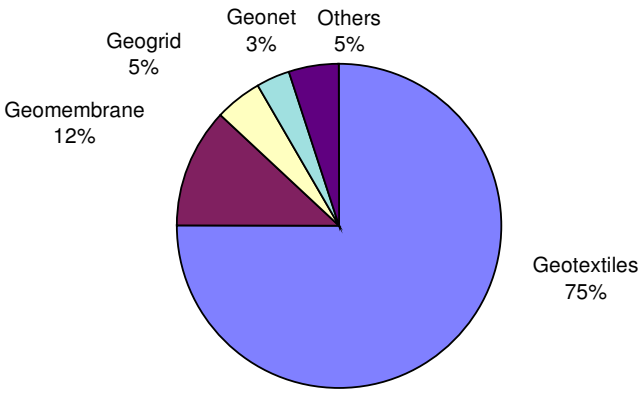
1.5 Global Geotextile industry is expected to maintain an annual growth rate of 8.6%. Accordingly the market **potential** will be as follows :

Year	Global Market Potential			
	By Volume		By Value	
	Mn. sq. mt.	('000 MT)	(Rs. Crores)	($ MN.)
(#)2000-2001	1400	224	2912	633
2001-2002 (Proj.)	1520	243	3162	687
2003-2004 (Proj.)	1793	287	3730	811
2007-2008 (Proj.)	2494	399	5188	1128

(#)**Source:** Internet sourcing. For the subsequent years market potential has been projected.

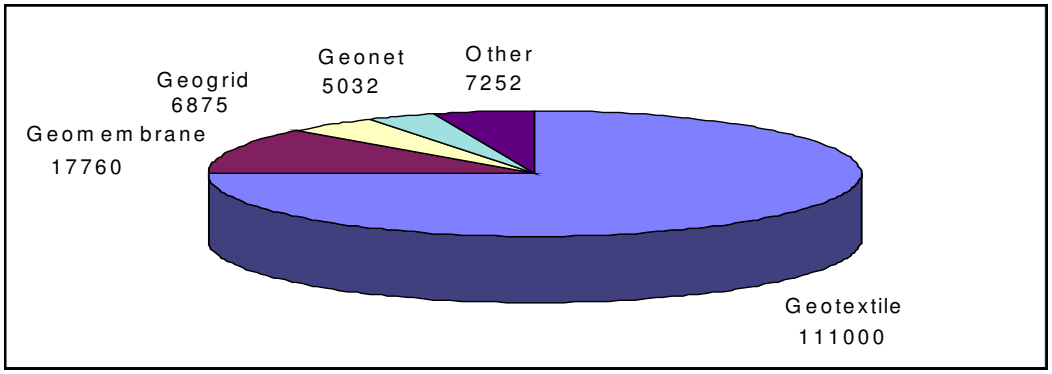
US MARKET POTENTIAL :

US Market Split-up for Geosynthetics : (% wise) 2001-02 (1)



(1)**Source:** Freedonia Group.

US Market Split-up for Geosynthetics : (tonnes) 2001-02 [(1)]



[(1)]**Source:** Freedonia Group.

Notes: Geosynthetics is the family name for the products like: Geotextile, Geogrid, Geomembrane, Geonet etc.

INDIAN MARKET POTENTIAL :

Geotextiles:

(I) ROAD PROJECTS			
Projects	**Infrastructure Investments Planned**	**Market Potential (2001-02 to 2007-08)**	
	Rs. Cr. (upto 2007-08)	**Quantity (tonnes)**	**Value (@ 3%) (Rs. Cr.)**
National Highway Development Program	58000	133846	1740
Pradhan Mantri Gram Sadak Yojana (PMGSY)	60000	138461	1800
Expressways	18884	43615	567
State & District Roads	7520	17384	226
Total Roads (I)	**144404**	**333307 (2563 mn sq. mt.)**	**4333**
(II) RAILWAY PROJECTS			
Projects	**Infrastructure Investments Planned**	**Market Potential (2001-02 to 2007-08)**	
	Rs. Cr. (upto 2007-08)	**Quantity (tonnes)**	**Value (@ 3%) (Rs. Cr.)**
Central Projects (NRVY, Port, connectivity)	15984	36923	480
State Level Projects	10279	23692	308
Metro Projects	13194	30461	396
Total Railways (II)	**39457**	**91076 (700 mn sq. mt.)**	**1184**
Total Roads + Railways (I + II)	**183861**	**246250 (3263 mn sq. mt.)**	**5517**

Notes: NRVY - National Rail Vikas Yojana.

(III) PAVEMENT OVERLAY			
Projects	**Infrastructure Investments Planned**	**Market Potential (2001-02 to 2007-08)**	
	Rs. Cr. (upto 2007-08)	**Quantity (tonnes)**	**Value (@ 3%) (Rs. Cr.)**
Paved Road Network	17500	40384 (310 mn sq. mt.)	525
Grand Total (I + II + III)	**201361**	**464769 (3574 mn sq. mt.)**	**6042**
(IV) OTHER INFRASTRUCTURE PROJECTS			
Projects	**Infrastructure Investments Planned**	**Market Potential (2001-02 to 2007-08)**	
	Rs. Cr. (upto 2007-08)	**Quantity (tonnes)**	**Value (@ 3%) (Rs. Cr.)**
Accelerated Irrigation Benefit Programme (AIBP)	8500	19615 (151 mn sq. mt.)	525
National Coastal Protection Plan (NCPP)	1800	4153 (32 mn sq. mt.)	54
Flood Control	8000	18461 (142 mn sq. mt.)	240
Grand Total (I + II + III + IV)	**2,19,661**	**506996 (3898 mn sq. mt.)**	**6591**

Source : Ministry of Road Transport and Highways - Annual Report and other published documents)

Market potential for geotextiles in Industrial road development as per discussions with organisations like MIDC, GIDC, APIDC is not significant when compared with other road development projects.

1.6 Further split up of market potential for Geo Textiles on annualised basis is shown below :

INDIAN MARKET POTENTIAL FOR GEOTEXTILES

Projects	**Value Rs.Cr. (@ 3%)**	**2001 - 02**	**2002 - 03**	**2003 - 04**	**2004 - 05**	**2005 - 06**	**2006 - 07**	**2007 - 08**
Total Roads (National Highways, Pradhan Mantri Gram Sadak Yojana, Expressways, State & District Roads)	**4333**	**75**	**145**	**175**	**320**	**725**	**1077**	**1816**
Railways	1184	15	35	75	115	250	294	400
Pavement Road Network	525	5	10	25	45	100	140	200
Other Infrastructure Projects	549	5	10	25	40	100	145	224
Total	**6591**	**100**	**200**	**300**	**520**	**1175**	**1656**	**2640**
Cumulative Total		**100**	**300**	**600**	**1120**	**2295**	**3951**	**6591**

* The national highways projects includes golden quadrilateral (completion by 2006-07) and NSEW corridors (scheduled for completion by 2007-08) also The

Pradhan Mantri Gram Sadak yojana and expressways and the state and district roads will be getting over by 2009-10.

* Geotextile demand potential is based on infrastructure projects likely to be implemented between 2001-02 to 2007-08 : Rs.6,591 Cr (@ 3% of investment in infrastructure projects of Rs.219661Cr.)

* However, actual demand realisatiaon will depend on the extent of usage of GT in various projects.

* Also, if the implementation of projects is delayed the actual realisatiton of market will spill over beyond 2007-2008.

OTHER MISCELLANEOUS APPLICATIONS :

(using needle punch technology)

Products	2001-2002		2003-2004 (Est.)		2007-2008 (Proj.)	
	Quantity	Value (Rs. Cr)	Quantity	Value (Rs. Cr)	Quantity	Value (Rs. Cr)
Auto Interior Carpets (100% TTC)	2.5 mn sq. mt.	25.00	5 mn sq. mt.	50.00	8 mn sq. mt.	80.00
Headliners	1.34 mn.sq.mt.	43.00	1.98 mn.sq.mt	63.30	2.90 mn.sq.mt.	92.67
Headliners Fabrics (TTC)	1.34 mn.sq.mt.	8.04	1.98 mn.sq.mt	11.87	2.90 mn.sq.mt.	17.38
Filters	-	260.00	-	297.60	-	386.29
Filtration Media (TTC)	-	81.00	-	95.00	-	132.00
Insulation Felts (100% TTC)	6.31 lakh no of cars / MUV	13.40	9.89 lakh no of cars / MUV	19.76	14.48 lakh no of cars / MUV	28.96
Total (TTC)		341.40 (127.44)		430.66 (176.63)		587.92 (258.34)

Source: Industry Sources, Field Survey feedback and Market estimates.

Notes: 1. Although this project is dedicated for Geotextiles, the technology has broad base applications for other products as mentioned above.

Jute Geo Textiles : Potential Application Areas and Consumption Pattern

Jute Geo-Textiles v/s Synthetic Geo-Textiles

1.7 Jute Geotextile can be customized to meet site-specific technical requirements as in the case of Synthetic Geotextiles. The only differences lies in its biodegradability. Technical properties of Jute Geotextiles are given in Annexure III.

1.8 Production and Consumption of Jute Geotextile in India has been as follows:

Year	Production/ Consumption
2001-2002	3,84,000 sq. mt.
2002-2003	5,33,250 sq. mt.
2003-2004	19,02,268 sq. mt.

1.9 The consumption of Open Weave Jute Geotextile (known as Soil Saver), in the last 3 years was as follows :

Year	Production/ Consumption
2001-2002	4,894 MT
2002-2003	10,023 MT
2003-2004	7,163 MT

1.10 Target customers and potential users of jute geotextiles are State PWDs, CPWD, State Irrigation & Water Resources Departments, Boarder Roads Organisation, Open Cast Coal Mines, Railways, State Forest & Environment Departments and State Rural & Panchayet Departments executing rural roads under PMGSY, etc..

1.11 IJIRA in Kolkatta is well equipped for Common Testing Equipment for Jute Geotextiles.

SECTION II : NEEDLE PUNCH TECHNOLOGY AND EQUIPMENT SUPPLIERS

Process Description :

1.12 Needle-punched nonwovens are manufactured by mechanically orienting and interlocking the fibers of a carded web. This mechanical interlocking is achieved with

thousands of barbed felting needles repeatedly passing into and out of the web. The major components of the needle punch line and brief description of each are as follows :

1. **Blender** - The machine is where the raw materials are stored at a desired proportion of different types fibers (e.g., 40% PP and 60% PET)

2. **Opener** - It is where the raw materials are fed from the blender in order to reduce the size of fiber tufts from the blender to the hopper feed.

3. **Hopper** - The machine where the fibers are stored and are transferred for fiber carding.

4. **Carding** : The process where the entangled fibers are arranged into a parallel fibrous web.

5. **Cross Lapper** - The machine that continuously lays a web so that its fibers are oriented in cross direction. The web is laid on the conveyor moving at right angles.

6. **Needle Punching** - The process in which the web is bonded mechanically to each other by a series of needles. The design of products are being controlled in this line. The operations consists of a pre-needler, drafter and a finish needle loom.

7. **Calendering** - In this process a smoother product by heating up to a certain (melting) temperature depending on the raw materials used.

8. **Winding & Cutting** - The final product is being wound into rolls and being cut into a specified width in this line.

FLOW DIAGRAM OF THE NEEDLE PUNCH PRODUCTION PROCESS

BLENDER
OPENNER
HOPPER
CARDING
CROSS LAPPER
PRE- NEEDLE LOOM
DRAFTING UNIT
FINISHING NEEDLE LOOM

SINGEING PROCESS
CALENDERING
WINDING & CUTTING

Technology and Equipment Suppliers :

1.13 The technology suppliers contacted by TECS are :

1. **Dilo Maschinensystem GmbH (Germany)**
   Local Representative - A.T.E. Marketing Pvt. Ltd.
   A-19 CTS No. 689 Veera Desai Road
   Andheri (W), Mumbai 400 053
   Tel: 5676 6100 Fax: 2673 2446

2. **Fehrer AG (Austria)**
   Local Representative - Engineering & Agencies (Pvt.) Ltd.
   Sterling Centre (4th Floor), Dr. Annie Besant Road
   Worli, Mumbai - 400 018
   Tel: 2498 8510/2 Fax: 2498 6038
3. **Asselin NSC (France)**
4. **American Textile Machinery (USA)**
5. **Shoou Shyng (Taiwan)**

Notes: The list contains the leading global players in the Needle Punch Technology and as per the discussion with Industry experts the above list is exhaustive.

1.14 TECS has received responses from "DILO" and "FEHRER", both these are globally recognised players and discussions were held with their local representatives in India.

Recommended Minimum Economic Size :

1.15 The needle-punch project proposed to be set up in India will have a maximum carding capacity of **600 kgs per hour,** with details like :

Width :	5000 mm max,
Fibres :	PP / PSF (5-12 dtex)
Fibre Length :	60-100 mm

1.16 As per the discussions with the Industry Experts under Indian operating conditions it is safer to assume machine efficiency factor of 80%, and therefore the production would be **480 kgs per hour**.

1.17 The plant would operate in three shifts, 24 hours and 300 working days [(e)] in a year.

[(e)] **Notes:** According to the Industry Experts the cards of the carding unit have to be cleaned on regularly basis and needs annual shutdown for preventive maintenance. Hence 300 working days are assumed.

Investment in Process Plant and Machinery.

1.18 As per the indicative budgetary quotations and **assuming 25% discount from the machinery suppliers**, **the investment in the process plant and machinery (including coating & finishing equipment) will be Rs 26.38 crores** (FOB). The **additional needle boards** needed for carpet making can also be covered in the same cost. The List of core machinery is attached as Annexure I. Finer details on the Equipment specifications and the formal quotations need to be discussed with the technology supplier before the project is taken up. Taking into account the CIF value(2%), the custom duties (Custom duty of 5%), inland transportation (2%), erection and commissioning (5%), **the installed cost of process equipment would be Rs 30.25 crores.**

1.19 Other Technologies Available For Producing The Identified Product :

Products	Other Technologies
Geotextiles	Woven, Knitted, Spunbond & Spunlace For Non Woven

SECTION III : PROJECT COST & PROFITABILITY PROJECTIONS

Land

1.20 The total requirement of land for this project is around 12138 Sq. Mtrs. (3.0 acres). This takes into account the contingency plan for future expansion.

1.21 Based on the available information the cost of land is assumed at Rs 1200 per square meter (including the developmental cost). Depending on the exact location of the project to be determined by the promoter the land cost could be higher or lower. Hence the total cost of developed land will be **Rs 1.46 crores**.

Buildings

1.22 The building area comprising of main factory building, godowns, office, R & D labs / In-house Testing centre etc. would be 4500 sq. mtrs. The cost of construction would again vary depending on the structure and the materials to be used. It has been assumed that the average cost of construction would be Rs 4500 per sq. mtr. Thus the total cost of building and other civil works would be around **Rs 2.03 crores**.

Plant and Machinery

1.23 Details of Plant and machinery as well as technology required for the project have been presented in earlier Section II . The installed cost of plant and machinery would be **Rs 30.25 crores**.

1.24 Apart from the main process equipments the utilities required are:

- Electricals,
- Piping,
- Water supply system,
- Compressors,
- Fire fighting equipments,
- Material Handling equipment such as fork lifts etc.
- Other miscellaneous equipment.

1.25 The provision on this count is assumed at **Rs 2.00 crores**.

Testing Lab (In-house)

1.26 As per the Industry Experts the In-house Testing and R& D facility would call for an investment of around **Rs 0.35 crore.** The list of testing equipment is given in Annexure II.

Miscellaneous Fixed Assets

1.27 Under this head the items included are Furniture and fixtures, Office equipments, Air Conditioners etc. and the provision made is around **Rs 0.15 crores**.

Project Engineering and Consulting

1.28 Under this head the items included are the fees and expenses on account of Architect fees, project engineering and management (both local and overseas), detailed project reports etc.

Preliminary & Preoperative Expenses

1.29 The items included under this head are company formation expenses, public issue expenses (if any), interest during construction, pre-production expenses, during the implementation phase etc.

Contingency Expenses

1.30 Depending on the gestation period and further detailing of the project cost by the promoter, the contingency provision has been made at the rate of 10%.

Margin Money for Working capital

1.31 The margin money for working capital forming part of the total project cost would be **Rs 1.32 crores**. The details of the working are shown in Exhibit 1.3.

Total Project Cost

1.32 The total project cost as given in **Exhibit 1.1** would be **Rs 46.83 crores**.

Project Funding And Financing Pattern

1.33 It has been assumed that the project would be financed through long term funds and Equity participation by the Promoter / Public. The technical textile sector being a high priority area, it is assumed that a Debt- Equity ratio of 1.5 : 1 would be feasible. (However the sensitivity analysis has also been presented for 1 : 1 and 2 : 1 Debt Equity ratios.)

Sales, Profitability And Sensitivity Analysis

Sales Realisation and Turnover

1.34 As per the details available from the Technology and Equipment suppliers and Industry Experts the economic size of a plant with maximum carding capacity is **600 kgs/hour.**

1.35 As per the feedback from the Industry Experts under Indian conditions, it is assumed that the machine would operate at an efficiency level of 80 %. Hence the production from the plant would be **480 kgs/hour** .

1.36 The plant would operate on Three -shift basis and 300 workings days in a year.

1.37 The capacity utilisation for the 1st year is assumed at 50% and thereafter for the 2nd, 3rd and 4th year onwards 60%, 75% and 90% respectively.

1.38 The average selling price of the geotextile would be **Rs 125/kg** (net of excise duties, sales tax and other incidental expenses). The prevailing **international prices** are in the range of **$2.75 to $ 3/kg** depending on the gsm range and other parameters. This line is dedicated for geotextiles. However, the machinery has the capability to manufacture other products such as carpets, headliners, filtration and needle punch felts.

1.39 The details of sales turnover projected are given in **Exhibit 1.2.**

Cost of Production

Major Raw materials

1.40 The main raw materials used and the corresponding prevailing indicative prices are as follows :

Major Raw Material	Landed Cost* (Rs / kg)
Polypropylene Staple Fibre (PPSF)	70

* Inclusive of import duty of 20%
# Polyester Staple Fibre (PSF) is also an alternate raw material.

1.41 PPSF Specifications are as follows :

Property	Values
Fineness	5 - 12 dtex
Tenacity (gm / den)	4.4 - 5.4 (⊕ 5%)
% Elongation	25 - 60
Crimps per cm	4.6 - 5.4
% Oil Pick-up	0.50 ⊕ 0.05

1.42 The major suppliers of these raw materials are :

Indian :

(a) Zenith Fibres, Gujarat

(b) Sanghi Synthetics, Hyderabad

International :

(a) Polyfil, Belgium

(b) Asota, Austria

(c) DOMO, Germany

(d) Synthetic Fibres, USA

Power Cost

1.43 The total connected load is 500kW. The power cost would be 3% of sales amounting to **Rs. 1.30 Cr.** (at 100% capacity utilisation)

Repair & Maintenance

1.44 The repair and maintenance cost would be at 1% of the Plant & Machinery cost at **Rs. 0.30 Cr** increasing 10% yearly upto it reaches 2.5 %.

Manpower, Salaries and Wages

1.45 The manpower requirements and the salary structure is given in Exhibit **1.4.**

1.46 The total manpower requirement comprising of supervisors, machine operators, helpers and the managerial cadre would be **78 nos** incurring a cost of **Rs. 0.89 Cr.**

Factory and Overhead Expenses

1.47 The items covered under this head are establishment expenses, travel expenses, packaging expenses, etc. and amount to **Rs. 0.60 Cr**. in the first year.

Marketing and Promotional Expenses

1.48 The promotion of geotextiles will call for expenditure on this account and a provision of 1.5% of sales accounting to **Rs. 0.65 Cr** which has been made uniformly over the years (at 100% capacity utilisation).

Interest and Depreciation

1.49 The prevailing interest rate for long term under Technological Upgradation Fund (TUF) is 5% and short term borrowed funds is taken at 11% per annum .

1.50 The repayment of loans has been assumed for 10 years with two years moratorium (2+8).

1.51 The depreciation rates as per the Company Law and Income-Tax Ready Reckoner have been worked out for Straight Line and WDV Method basis.

1.52 The current corporate tax rate is assumed at 35% and the surcharge is assumed at 2.5% per annum.

Profitability, Break-even, IRR and Payback .

1.53 The **Sales turnover** increases from Rs 21.17 Cr in the first year to Rs 38.10 Cr. from the 4th year onwards.

1.54 The **PBT** increases from Rs 1.43 Cr. in the first year to Rs. 6.55 Cr. from the 4th year onwards. (See **Exhibit 1.5**)

1.55 The **Break Even** of the project is at 50.63%.

1.56 The **Internal Rate of Return (IRR)** has been worked out at 12.45%.

1.57 The **Payback period** for the project is 6.32 years .

Sensitivity Analysis

1.58 The sensitivity analysis has been presented in the **Exhibit 1.6**

Common Testing Facilities :

1.59 Indian testing centres like IIT (Mumbai, Delhi), Central Road Research Institute (CRRI), BTRA, SASMIRA, etc. currently cater to the testing requirements.

1.60 Some of the leading International Geosynthetic Test Laboratories are :

Testing Centre	Country
Geosynthetic Testing Services	Australia
Ghent University	Belgium
Activation Laboratories Ltd.	Canada
LGA Geosynthetic Institute	Germany
tBU	Germany
Geospec Ltd.	United Kingdom
SGS Testing Services L.L.C.	United States
TRI/Environmental Inc.	United States

1.61 The various properties that need to be tested and researched for Geotextiles and Geogrids are listed below:

Properties	Tests
Physical Properties	• Mass per unit area (thickness) • Determination of apparent opening size of geotextiles
Mechanical Properties	• Tensile properties of geotextiles and geogrid. • Grab breaking load and elongation for geotextiles. • Index puncture testing. • Evaluating the unconfined tension creep behaviour of geotextiles. • Pyramid puncture resistance for geotextiles. • Connectivity testing for geogrids. • Mullen burst test.
Hydraulic Properties	• Inplane flow testing. • Cross plane flow testing. • Measuring the soil geotextile clogging system. • Emersion procedures for evaluating the chemical resistance of geotextiles.
• Ultraviolet testing for polymers	
• Building of road pavement for simulating real life testing.	

1.62 TECS, interaction with tBU, Germany one of the Testing Centre for geotextiles/geogrids has shown interest in collaborating to set-up a testing centre in India. For further follow-up, the address is given below:

tBU
Gutenberg Str. 29
48268 Greven, Germany
Tel: +(49) 2571/9872-0
Email: tbu@tbu-gmbh.de
website: www.tbu-gmbh.de

DEVELOPMENT AND PROMOTIONAL MEASURES :

1.63 **Global** consumption of geotextiles has grown phenomenally during the last three decades from 30 mn mtr. in 1975 to 1400 mn mtr. in 2000-01 and expected to touch 1650 mn mtr. in 2003-04 and further to 2490 mn mtr. by 2007-08.

1.64 The developed regions of **N. America & Europe** accounted for 80% of the total consumption reflecting the importance of geotextiles in the road and other infrastructure projects.

1.65 The new emerging markets are **China and India.**

Global Practices:

1.66 In **Germany** the Regulatory Framework can be understood in the light of the regulations since 1970s titled as "GEOSYNTHETICS IN ROAD CONSTRUCTION - GERMAN REGULATIONS."

1.67 Germany tested geotextiles for road construction work in **1970s** on large-scale tests on-site. In 1977, at the first International Conference on the Use of Fabrics in Geotechnics, held in Paris, the Norwegian Road Research Laboratory developed a system to test the mechanical strength of the textiles by a so called **CBR-tensile-test** and in addition by a cone-drop-test and used the results to define the suitability for the use under 4 different classes of fill over soft soil.

1.68 The Germans adopted the **CBR-tensile-test** as Plunger-Puncture-Test and classified the nonwovens in five Geotextile-Robustness-Classes (GRC). To find out the necessary GRC for a given site, they classified the fill in 5 classes on the basis of the diameter and the coarseness/sharpness of aggregates. The table below shows the GRC **classification.**

GRC classification:

Product Group	Nonwovens	
Geotextile-Robustness-Classes	**Plunger-puncture-force (kN)**	**Mass per unit area (gsm)**
GRC1	>= 0.5	>= 80
GRC2	>= 1.0	>= 100
GRC3	>= 1.5	>= 150
GRC4	>= 2.5	>= 250
GRC5	>= 3.5	>= 300

1.69 The German regulations or for that matter the **regulations anywhere in the developed countries don't mandate** the usage of geotextiles but it is mostly based on the benefits derived like, increase in road life to 4 -5 times than the roads built today, minimising road maintenance (7 to 8 years) and improving riding quality without potholes and reflective cracking.

1.70 **China** is under mass infrastructure construction and hence the largest market of geosynthetics in the current decade (2001-2010). In recent years, China has invested $ 86.7 billion in improving its road- railway network, new airports, water conservancy projects, etc.

1.71 At the same time the **promotional effort** done by the Chinese government to increase the usage of geosynthetics in these infrastructure projects are to be appreciated. China International Geosynthetics Exhibition is held every year.

1.72 The Chinese are using an **integrated approach** within various agencies in the promotion of geosynthetics. There are atleast 15 agencies (as listed below) co-operating with each other to **create awareness and promote usage** of geosynthetics. Numerous discussion meetings are held throughout China each year to discuss the applications of geosynthetic products.

1.73 In **2002 alone, 130 national level** technical communications have been issued, in which research, experimental works, manufacturing, the use of geosynthetics in engineering projects and issues are reported.

1.74 List of Chinese Agencies collaborating with each other are as follows:

1. **China Technology Market Association (CTMA)**
2. **IGS-China Chapter**
3. **Chinese Technical Association on Geosynthetics (CTAG)**
4. **China Nonwovens Technical Association (CNTA)**
5. **Shanghai Geosynthetics Technical Association (SGTA)**
6. **China Association for Science & Technology**
7. **China Hydraulic Engineering Society**
8. **China Communication Association**
9. **China Railway Society**
10. **Chinese Society for Hydroelectric Engineering**
11. **Chinese Society for Environmental Science**
12. **China Civil Engineering Society**
13. **China Textile Engineering Society**
14. **CNTA Science & Technology Co. Ltd.**
15. **CMP Asia Exhibitions & Paperloop Inc.**

1.75 It is interesting to note here that after the **disastrous flooding** of Yangste River in 1998, Prime Minister, Zhu Rong Yi issued a document in which he **encouraged Engineers to use geosynthetic products** in their work. This shows the level of involvement in increasing the usage of geosynthetics in China. In 2001-02 China alone consumed **250 mn sq. mtrs** of geosynthetics.

PROMOTIONAL EFFORTS IN INDIA:

1.76 In India poor road conditions and high maintenance cost requires serious attention and the solution lies in use of **geotextiles** which gives increased road life to 4 - 5 times than the roads built today, minimising road maintenance (7 to 8 years) and improving riding quality without potholes and reflective cracking.

1.77 Indian investment in the infrastructure projects like Roads & Railways alone stands at Rs. 1,84,000 Cr. ($ 40 bn) and the usage of geosynthetics (geotextiles & geogrids) has not been significant compared to the initiatives taken by developed/developing countries like China, Korea, etc.

1.78 Indian Road Congress publication on "SPECIFICATIONS FOR ROAD AND BRIDGE WORKS" (Fourth Revision) under section 700 gives the use Geosynthetics (Geotextile/Geogrid/Geonet/Geomembrane/Geocomposite) under Clause nos. 701, 702, 703 & 704.

1.79 Indian Road Congress Special Publication 59 (IRC: SP: 59 - 2002) has published "GUIDELINES FOR USE OF GEOTEXTILES IN ROAD PAVEMENTS AND ASSOCIATED WORKS" which gives the details of the properties and installation of geotextiles for various soil conditions.

1.80 Under Section 700 of the Indian Road Congress Clause no. 704 "PROTECTION WORKS WITH GEOSYNTHETICS" give the use of Geogrids for various applications and the details about construction and installation.

1.81 Special Publication for Geogrids **does not exist** which should be drafted by the Indian Road Congress (IRC)

1.82 Ministry of Road Transport and Highways (**MORTH**) should encourage the usage of geotextiles. The factors that affect the potential usage of geotextiles in the Indian context are :

- Traditional geotechnical and civil engineering practices.
- Resistance to adapt to geotextiles than conventional methods.

1.83 **As per the industry feedback mandation should exist to incorporate geotextile layer in the road works from design stages itself as it increases the road life by 30% hence reducing maintenance. Such mandation should exist for geogrid also.**

1.84 All geotextiles and geogrids should be enforced with **mandatory testing clause before installation.**

1.85 The **Inter-Ministerial Co-ordination** is one of the **workable solutions for the promotion of geotextiles and geogrids** in the country with Ministry of Textiles taking the lead role.

1.86 All those concerned like, Ministry of Road Transport & Highway (MORTH), Ministry of Environment & Forests (MOEF), Ministry of Water Resources (MOWR), Ministry of Railways (MOR) & Ministry of Urban Affairs are important government bodies need to play active role in the promotion of geotextiles and geogrids.

1.87 The **Indian Geotextile and Geogrid manufacturers** should be given representation for all the inter-ministerial and departmental committees as well as Bureau of Indian Standards for participation in the policy matters.

1.88 In view of the ongoing infrastructural development activities in the country the usage of geotextiles / geogrids should be made mandatory within the next three to six months.

1.89 The technical expertise exists in the country for conceptualising the requirement of the geotextile and geogrid fabric in applications like roads, railways, bridges, embankments, etc.

1.90 Expertise in Design of Civil and Geotechnical structures exists with research institutes like CRRI, RDSO, BTRA etc. and institutions like SASMIRA, IIT - Delhi & Mumbai, NHAI, etc. Thus the country possess human resource talent pool.

1.91 The Ministry of **Human Resource** Development can introduce specialisation courses for Geosynthetics (geotextiles and geogrids) in Civil & Textile Engineering courses at graduation and post-graduation levels for churning professionals in this sector.

1.92 GoI should relax the criteria for domestic players like long term testing clause of 10,000 hrs for **Creep Behaviour Test** to 2,000 hrs giving them an opportunity to prove their product.

1.93 To advocate the usage of geotextiles and geogrids, GoI can give **concessions** like the **absorption** of the additional project cost on account of usage of geotextiles and geogrids.

1.94 Imported geotextile and geogrid should be levied with **additional customs duty** (to be decided by the government) to protect the Indian players who would be in the nascent stages of development. This would also encourage International collaborations with Indian players to increase the competitiveness.

EXHIBIT 1.1

PROJECT COST

(LAND, BUILDINGS, PROCESS PLANT & MACHINERY, UTILITIES & OTHER ASSETS)

		Project Cost (Rs. Cr.)
1	**Land** Area: 3.0 acres (12138 Sq Mtrs) Rate: (Rs.1200 /Sq. Mtr)	**1.46**
2	**Buildings** Plant Area, Office, Godown, Lab, Service Area etc.) Built-up Area : 4500 Sq. Mtrs Avg Rate : Rs. 4500 /Sq. Mtrs	**2.03**
3	**Process Plant & Equipment** (including Finishing & Coating Equipment)	**30.25**
4	**Utility & Other equipments** (Electricals, Piping, Water supply system, Compressors Fire Fighting, Material Handling etc.)	**2.00**
5	**Testing Facilities (In-house)**	**0.35**
6	**Misc. Fixed Assets** (Furniture & Fixtures, Office Equipment,etc.)	**0.15**
7	**Project Engineering & Consultancy charges (2.5%)**	**0.84**
8	**Preliminary & Pre-operative Expenses (12%)** (Company Formation, Interest during construction, pre-production expenses, etc.)	**4.29**
9	**Contingency (10 %)**	**4.14**
10	**Total**	**45.50**
11	**Margin Money for Working Capital**	**1.32**
12	**Total Project Cost**	**46.83**

EXHIBIT 1.2

ESTIMATION OF SALES REVENUE

(Rs. Cr.)

ITEM	YEAR OF OPERATION									
	I	**II**	**III**	**IV**	**V**	**VI**	**VII**	**VIII**	**IX**	**X**
Maximum Carding Capacity (Kg/hr)	600	600	600	600	600	600	600	600	600	600
80% efficiency	480	480	480	480	480	480	480	480	480	480
Capacity Utilisation	50%	60%	75%	90%	90%	90%	90%	90%	90%	90%
Actual Production per hour	240	288	360	432	432	432	432	432	432	432
Production per day (kg)	5760	6912	8640	10368	10368	10368	10368	10368	10368	10368
Production for 300 working days (kg)	1728000	2073600	2592000	3110400	3110400	3110400	3110400	3110400	3110400	3110400
Selling Price (Rs/kg)	125.00	125.00	125.00	125.00	125.00	125.00	125.00	125.00	125.00	125.00
Sales Revenue (Rs. Cr)	**21.60**	**25.92**	**32.40**	**38.88**	**38.88**	**38.88**	**38.88**	**38.88**	**38.88**	**38.88**
Value Loss (2%)	0.43	0.52	0.65	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Net Sales Revenue (Rs. Cr)	**21.17**	**25.40**	**31.75**	**38.10**	**38.10**	**38.10**	**38.10**	**38.10**	**38.10**	**38.10**

EXHIBIT 1.3

REQUIREMENT OF WORKING CAPITAL

(Rs.Cr)

ITEM	NO. OF MONTHS	MARGIN (%)	YEAR I			YEAR II			YEAR III			YEAR IV			YEAR V		
			W.CAP REQMT	MARGIN MONEY	BANK FINANCE	W.CAP REQMT	MARGIN MONEY	BANK FINANCE	W.CAP REQMT	MARGIN MONEY	BANK FINANCE	W.CAP REQMT	MARGIN MONEY	BANK FINANCE	W.CAP REQMT	MARGIN MONEY	BANK FINANCE
Factory Related																	
Raw materials & other commodities	2.00	25.00	2.12	0.53	1.59	2.54	0.64	1.91	3.18	0.79	2.38	3.81	0.95	2.86	3.81	0.95	2.86
Goods in process	0.10	25.00	0.13	0.03	0.09	0.15	0.04	0.11	0.19	0.05	0.14	0.22	0.06	0.17	0.22	0.06	0.17
Finished Goods	1.00	25.00	1.29	0.32	0.97	1.53	0.38	1.15	1.90	0.47	1.42	2.27	0.57	1.70	2.28	0.57	1.71
A/c Receivable	1.00	25.00	1.76	0.44	1.32	2.12	0.53	1.59	2.65	0.66	1.98	3.18	0.79	2.38	3.18	0.79	2.38
Cash in hand																	
Salaries & wages	1.00	0.00	0.07	0.00	0.07	0.08	0.00	0.08	0.08	0.00	0.08	0.09	0.00	0.09	0.09	0.00	0.09
Power	1.00	0.00	0.05	0.00	0.05	0.06	0.00	0.06	0.08	0.00	0.08	0.10	0.00	0.10	0.10	0.00	0.10
Repairs & Maintenance	1.00	0.00	0.03	0.00	0.03	0.03	0.00	0.03	0.04	0.00	0.04	0.05	0.00	0.05	0.06	0.00	0.06
Sales, Marketing & Training Expenses	1.00	0.00	0.03	0.00	0.03	0.03	0.00	0.03	0.04	0.00	0.04	0.05	0.00	0.05	0.05	0.00	0.05
Factory & Office overheads	1.00	0.00	0.05	0.00	0.05	0.06	0.00	0.06	0.07	0.00	0.07	0.08	0.00	0.08	0.08	0.00	0.08
Total Requirement			**5.48**	**1.32**	**4.15**	**6.53**	**1.58**	**4.95**	**8.15**	**1.98**	**6.17**	**9.75**	**2.37**	**7.39**	**9.79**	**2.37**	**7.42**

EXHIBIT 1.3 (Contd..)

REQUIREMENT OF WORKING CAPITAL

(Rs.Cr)

ITEM	NO. OF MONTHS	MARGIN (%)	YEAR VI			YEAR VII			YEAR VIII			YEAR XI			YEAR X		
			W.CAP REQMT	MARGIN MONEY	BANK FINANCE	W.CAP REQMT	MARGIN MONEY	BANK FINANCE	W.CAP REQMT	MARGIN MONEY	BANK FINANCE	W.CAP REQMT	MARGIN MONEY	BANK FINANCE	W.CAP REQMT	MARGIN MONEY	BANK FINANCE
Factory Related																	
Raw materials & other commodities	2.00	25.00	3.81	0.95	2.86	3.81	0.95	2.86	3.81	0.95	2.86	3.81	0.95	2.86	3.81	0.95	2.86
Goods in process	0.10	25.00	0.22	0.06	0.17	0.22	0.06	0.17	0.22	0.06	0.17	0.23	0.06	0.17	0.23	0.06	0.17
Finished Goods	1.00	25.00	2.29	0.57	1.72	2.29	0.57	1.72	2.30	0.57	1.72	2.30	0.58	1.73	2.31	0.58	1.73
A/c Receivable	1.00	25.00	3.18	0.79	2.38	3.18	0.79	2.38	3.18	0.79	2.38	3.18	0.79	2.38	3.18	0.79	2.38
Cash in hand																	
Salaries & wages	1.00	0.00	0.09	0.00	0.09	0.10	0.00	0.10	0.10	0.00	0.10	0.11	0.00	0.11	0.12	0.00	0.12
Power	1.00	0.00	0.10	0.00	0.10	0.10	0.00	0.10	0.10	0.00	0.10	0.10	0.00	0.10	0.10	0.00	0.10
Repairs & Maintenance	1.00	0.00	0.06	0.00	0.06	0.06	0.00	0.06	0.06	0.00	0.06	0.06	0.00	0.06	0.06	0.00	0.06
Sales, Marketing & Training Expenses	1.00	0.00	0.06	0.00	0.06	0.06	0.00	0.06	0.06	0.00	0.06	0.06	0.00	0.06	0.06	0.00	0.06
Factory & Office overheads	1.00	0.00	0.05	0.00	0.05	0.05	0.00	0.05	0.05	0.00	0.05	0.05	0.00	0.05	0.05	0.00	0.05
Total Requirement			**9.86**	**2.37**	**7.49**	**9.87**	**2.38**	**7.50**	**9.88**	**2.38**	**7.51**	**9.89**	**2.38**	**7.52**	**9.91**	**2.38**	**7.53**

EXHIBIT 1.4

MANPOWER REQUIREMENTS

	Nos	Monthly	Total Monthly	Annual
General Manager	1	30000	30000	360000
Production Manager	1	20000	20000	240000
Machine Operators	24	6000	144000	1728000
Machine Helper (Semi Skilled)	15	3000	45000	540000
Material Handling	3	6000	18000	216000
R&D, Testing	6	8000	48000	576000
Marketing & Sales				
Marketing Head	1	25000	25000	300000
Sales Team	3	12000	36000	432000
Clerical Staff (Admin, Accounts etc)	10	6000	60000	720000
Other Staff (Peon, Security)	5	3000	15000	180000
Maintenance Department	9	10000	90000	1080000
TOTAL	**78**		**531000**	**6372000**
Fringe Benefits (40 % of the above)				2548800
Total Wage Bill (Annual) Rs. :			Salary + Other Benefits =	**8920800.00**
Total Wage Bill (Annual) Rs. Cr. :				**0.89208**

EXHIBIT 1.5

PROFITABILITY STATEMENT AND COMPUTATION OF TAX

(Rs.Cr)

ACCOUNT HEAD	FINANCIAL YEAR OF OPERATION									
	I	II	III	IV	V	VI	VII	VIII	IX	X
Revenue										
Net Sales Turnover	21.17	25.40	31.75	38.10	38.10	38.10	38.10	38.10	38.10	38.10
Total Revenue	21.17	25.40	31.75	38.10	38.10	38.10	38.10	38.10	38.10	38.10
Expenses										
Raw Materials	12.70	15.24	19.05	22.86	22.86	22.86	22.86	22.86	22.86	22.86
Power	0.65	0.78	0.97	1.17	1.17	1.17	1.17	1.17	1.17	1.17
Repair & Maintenance	0.30	0.30	0.45	0.61	0.76	0.76	0.76	0.76	0.76	0.76
Salaries & wages	0.89	0.94	0.98	1.03	1.08	1.14	1.20	1.26	1.32	1.38
Marketing & Promotional Expenses	0.32	0.38	0.48	0.57	0.57	0.57	0.57	0.57	0.57	0.57
Factory & Office Overheads	0.60	0.70	0.85	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Interest on S.T. Loans	0.46	0.54	0.68	0.81	0.82	0.82	0.82	0.83	0.83	0.83
Cost of Sales	15.92	18.88	23.47	28.00	28.21	28.27	28.33	28.39	28.45	28.52
Depreciation (St.Line)	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27
Amort. of Expenses	0.14	0.14	0.14	0.14	0.14	0.14	0.00	0.00	0.00	0.00
Interest on L.T Loan	1.40	1.40	1.32	1.14	0.97	0.79	0.61	0.44	0.26	0.09
Profit Before Tax	1.43	2.70	4.56	6.55	6.52	6.63	6.89	7.00	7.12	7.22
Tax	0.15	0.28	0.48	0.69	0.56	2.21	2.51	2.72	2.88	3.01
Profit After Tax	1.28	2.42	4.08	5.86	5.95	4.42	4.37	4.29	4.24	4.22
Dividend	0.00	0.00	0.94	0.94	0.94	1.87	1.87	1.87	1.87	1.87
Profits For Appropriation	1.28	2.42	3.14	4.92	5.02	2.55	2.50	2.42	2.37	2.34

EXHIBIT 1.5 (Contd..)

PROFITABILITY STATEMENT AND COMPUTATION OF TAX

(Rs.Cr)

ACCOUNT HEAD	FINANCIAL YEAR OF OPERATION									
	I	II	III	IV	V	VI	VII	VIII	IX	X
COMPUTATION OF TAX										
Profit after interest before depreciation	3.71	4.97	6.83	8.82	8.79	8.90	9.16	9.28	9.39	9.50
Depr.(WDV) to be claimed	10.16	14.15	15.01	12.62	7.18	2.58	1.98	1.52	1.17	0.90
Depreciation claimed	3.71	4.97	6.83	8.82	7.18	2.58	1.98	1.52	1.17	0.90
Depr. carried forward	6.45	9.17	8.18	3.80	0.00	0.00	0.00	0.00	0.00	0.00
Taxable Profit	0.00	0.00	0.00	0.00	1.61	6.32	7.19	7.76	8.22	8.59
Profit Before Tax (Book)	1.43	2.70	4.56	6.55	6.52	6.63	6.89	7.00	7.12	7.22
Minimum Alternate Tax	0.15	0.28	0.48	0.69	0.00	0.00	0.00	0.00	0.00	0.00
Tax (Actual)	0.00	0.00	0.00	0.00	0.56	2.21	2.51	2.72	2.88	3.01
Tax Provision	0.15	0.28	0.48	0.69	0.56	2.21	2.51	2.72	2.88	3.01

EXHIBIT NO. 1.6

SENSITIVITY ANALYSIS

Items	Profit after Tax (PAT) (assumed at 90 % capacity)	Break Even (%)	Internal Rate of Return (IRR) (%)	Payback Period (Years)
NORMAL VALUES	**5.86**	**50.63**	**12.45**	**6.32**
Debt Equity Ratios				
(a) 2:1	5.75	51.58	12.55	6.28
(b) 1:1	6.03	49.19	12.31	6.39
Increase in Project Cost by 10 %	5.49	53.74	11.09	6.84
Decrease in Selling Price to Rs. 120/kg	4.53	56.95	10.23	7.23
Increase in Selling Price to Rs. 130/kg	7.19	45.60	14.44	5.73
Decrease in Raw Material Prices by 10%	7.73	43.04	15.72	5.38

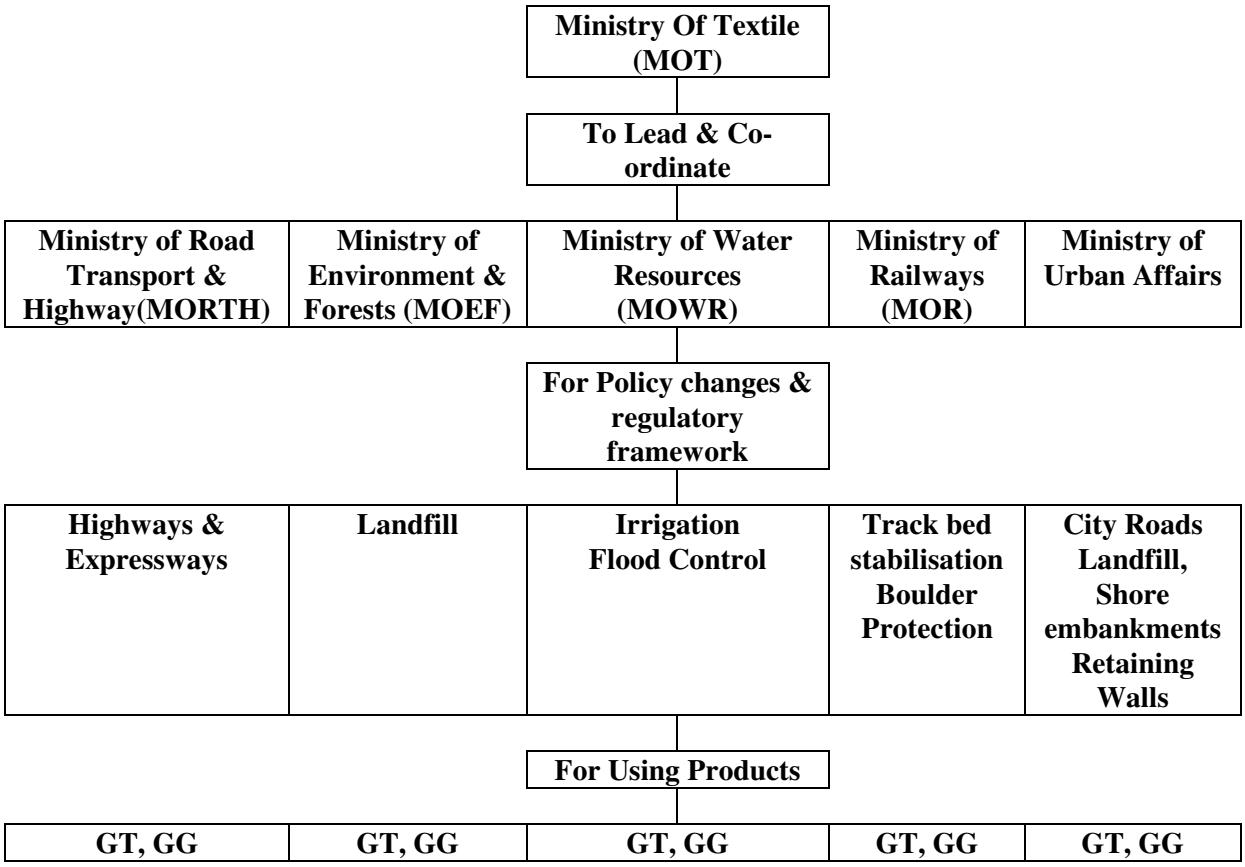
EXHIBIT NO. 1.6

SENSITIVITY ANALYSIS

Items	Profit after Tax (PAT) (assumed at 90 % capacity)	Break Even (%)	Internal Rate of Return (IRR) (%)	Payback Period (Years)
NORMAL VALUES	**5.86**	**50.63**	**12.45**	**6.32**
Debt Equity Ratios				
(a) 2:1	5.75	51.58	12.55	6.28
(b) 1:1	6.03	49.19	12.31	6.39
Increase in Project Cost by 10 %	5.49	53.74	11.09	6.84
Decrease in Selling Price to Rs. 120/kg	4.53	56.95	10.23	7.23
Increase in Selling Price to Rs. 130/kg	7.19	45.60	14.44	5.73
Decrease in Raw Material Prices by 10%	7.73	43.04	15.72	5.38

EXHIBIT NO. 1.7

INTEGRATED APPROACH & INTER-MINISTERIAL CO-ORDINATION FOR USE OF GEOTEXTILES / GEOGRIDS IN VARIOUS PROJECTS



Note : GT - Geotextile, GG - Geogrid.

ANNEXURE I

NEEDLE PUNCH PROJECT - LIST OF EQUIPMENTS

1.0 1 Fibre Opening and Blending Plant
4 Bale Opener Bx
1 Tuft Blender FML 5
1 Station for Separation SCB
1 Blending Hopper BXM
1 Fine Opener FOL

2.0 1 Card Feeding Unit
1 Chute feeder
(for card working width : 3000 mm)
1 Vibration Chute Feed, Type RS
(for card working width : 3000 mm)
1 Belt Weigher ME 2

3.0 1 Carding Machine
1 Super Servo-Card SSC 4-5 PC
(working width : 3000 mm)
Set Card Underframe and Platforms

4.0 1 Crosslapper, Type Topliner CL 4002
working width : 3000 mm
layering width : 6000 mm

5.0 1 Needle Felting Line
1 Compressive Batt Feeder, CBF T 60
1 Needle Loom, Di-Loom OD-II 60
1 Drafting Unit, VE 4-60
1 Feeding System

1 Needle Loom, Di-Loom OUG-II 55

1 Tension Control, TCW 55

1 Cutting and Winding Device

6.0 1 Thermo-Heat-Setting Stenter and Two-Bowl-Calender

1 Santaframe - High Efficiency Single - Layer Drying Stenter

1 Santabond - Two-Bowl Calender

7.0 1 Electrical Drive Equipment

AC and AC-S drives for all process influencing parts include. PLC, control cabinets, control desks and cable material are included in the machine prices.

8.0 Optional Items

1 Process-Control-System

control of the plant by means of PC with 3 monitors

1 Suction and Filter Unit, Type TD 30

1 Thermal-Oil Generator/Chiller

9.0 Finishing & Coating Equipment to be sourced separately from Technology suppliers like - Menzel

Total Investment would be -- Rs. 26.38 Cr.

(Machinery wise break-up could be obtained at the time of finalisation of project)

Note: Includes cost of needle boards required for Carpet making.

ANNEXURE II

TEST LABORATORY EQUIPMENT (IN-HOUSE)	
No.	**Machine Name**
1.	Universal Testing Machine
2.	Template & Weighing Scale
3.	Glass Beads & Others
4.	Permittivity Tester
5.	Thickness Tester
6.	Other miscellaneous items
	Total Investment required - Rs. 35,00,000 **(Rs. 0.35 Cr.) approx.**

Note: Laboratory should be maintained for temperature and humidity control.

ANNEXURE III

PROPERTIES OF JUTE GEOTEXTILES

Specifications/Properties

	Jute Geotextiles for Control of Surface Soil Erosion by Rain and Wind		**Jute Geotextile for Separation and Filtration**		**Jute Geotextile for Filtration and Drainage**		**Prefabricated Drains for Accelerated Consolidation of Soft Soil**		
1.	Weight (g/m2) at 20% M.R.	292 500 730	Weight (g/m2) at 20% M.R.	760 760 1200	Weight (g/m2) at 20% M.R.	500 1000	Material	¾ Coir-wicks within jute sheath	
2.	Threads/dm (MD x CD)	12 x 12 6.5 x 4.5 7 x 7	Threads/dm (MD x CD)	102 x 39 102 x 39 102 x 39	Thickness (mm)	4 8	Width (mm)	¾	100
3.	Thickness (mm)	2 4 6	Thickness (mm)	2 2 2	Width (cm)	150 150	Thickness (mm)	¾	5
4.	Width (cm)	122 122 122	Width (cm)	76 76 76	Strength (kN/m) (MD x CD)	4 x 5 6 x 7	Strength (kN)/100 mm	¾	45
5.	Open area (%)	60 50 40	Strength (kN/m) (MD x CD)	20 x 20 20 x 20 21 x 21	Elongation at break (%) (MD x CD)	20 x 25 20 x 25	Pore size (O90) (micron)	¾	300

	Jute Geotextiles for Control of Surface Soil Erosion by Rain and Wind		**Jute Geotextile for Separation and Filtration**		**Jute Geotextile for Filtration and Drainage**		**Prefabricated Drains for Accelerated Consolidation of Soft Soil**		
6.	Strength (kN/m) (MD x CD)	10 x 10 10 x 7.5 12 x 12	Elongation at break (%) (MD x CD)	10 x 10 10 x 10 10 x 10	Pore size (O90) Micron	500 300	Discharge capacity at 50 kPa (l/s)	¾	13
7.	Water holding capacity (%) on dry weight	400 500 500	Pore size (O90) Micron	300 300 150	Co-eff. of water permitivity (m/s)	3.4×10^{-3} 3.4×10^{-4}			
			Water permeability at 10 cm water head (l/m2/s)	50 50 20					
			Puncture resistance (N/cm2)	380 380 400					

GEOGRID PROJECT

SECTION I : PRODUCT BRIEF, APPLICATION AREAS & MARKET POTENTIAL

2.1 Geogrids are matrix like materials with large open spaces called apertures, which are typically 10 to 100 mm between the ribs called longitudinal and transverse respectively. Geogrids can be manufactured from different materials such as PE, polyester, aramide, glass, etc.

2.2 Geogrid can be manufactured by extrusion, weaving, knitted, welding etc.

2.3 Woven Geogrid are made from high tenacity, high modules polyester yarns and are coated with any one of the materials like PVC, latex, bitumen etc.

2.4 Reinforcement is the main function of geogrids.

2.5 Geogrids can be produced in wide ranges with strength parameters assumed are 20 kN/m to 200 kN/m with aperture size varying from 10x10 mm to 100x100 mm.

Major Application and End-usages :

- **Geogrids** : are used for re-enforcement applications like :
  - Reinforcement of steep slopes,
  - Embankment of soft soils,
  - Stabilisation of shallow clay slopes,
  - Support and capping of landfills,
  - As gabions for wall construction,
  - As asphalt reinforcement in pavements

Why Woven Geogrid?

2.6 There are around 15 renowned geogrid manufacturers in the world, of which 9 are producing woven geogrids. The list is given below* :

No.	Name of the Company	Manufacturing Process
1.	ACE Geosynthetics Enterprises Co. Ltd.	Woven
2.	Amoco Fabric & Fibres Co. Ltd.	Composite, non-woven, cross-bonded grid
3.	Hueskar Inc.	Woven, knitted
4.	Luchenhaus North America Inc.	Woven, knitted
5.	Macaferri	Woven, knitted, extruded
6.	Mirafi Construction Products	Woven
7.	Naue Fasertechnik	Laid and Welded Flat bars
8.	Synteen Technical Fabrics	Woven
9.	Saint Gobain Technical Fabrics America Inc.	Knitted, non- wovens
10.	SI Geosolutions	Woven

No.	Name of the Company	Manufacturing Process
11.	Strata Systems Inc.	Knitted
12.	Tennax Corporation	Extrusion
13.	Tensar Earth Technologies Inc.	Integrally Formed
14.	Webtec Inc.	Woven
15.	Xtec Inc.	Woven

*** Source : GFR 2004**

2.7 From the above list it can be concluded that India should also follow the global trend and encourage woven geogrid usage.

2.8 It should also be noted that the project cost required to set-up a woven geogrid project is less compared to alternate geogrids produced by different technologies like knitted or extrusion. The project cost aspects are covered in section II.

2.9 Presented below is the comparative analysis of geogrids produced by Woven, Knitted and Extruded process* :

Properties	Woven	Knitted	Extruded
Ultimate tensile strength (US) (kN/m) {MD/CD}	152.9 / 34.6	147.60 / 30	144 / NA
Creep Related Strength (kN/m)	100.5	89.2	62.9
Design Strength (DS) (kN/m)	79.2	77.1	59.9
Ratio of DS / US (%)	52	52	42

*** Source : GFR 2004**

Notes : MD - Machine Direction, CD - Cross Direction

Creep related strength : As per ASTM D 5262, for a minimum of 10,000 hrs and extrapolate for 75 years.

2.10 The machinery for woven geogrids has broad based end product coverage of the following :

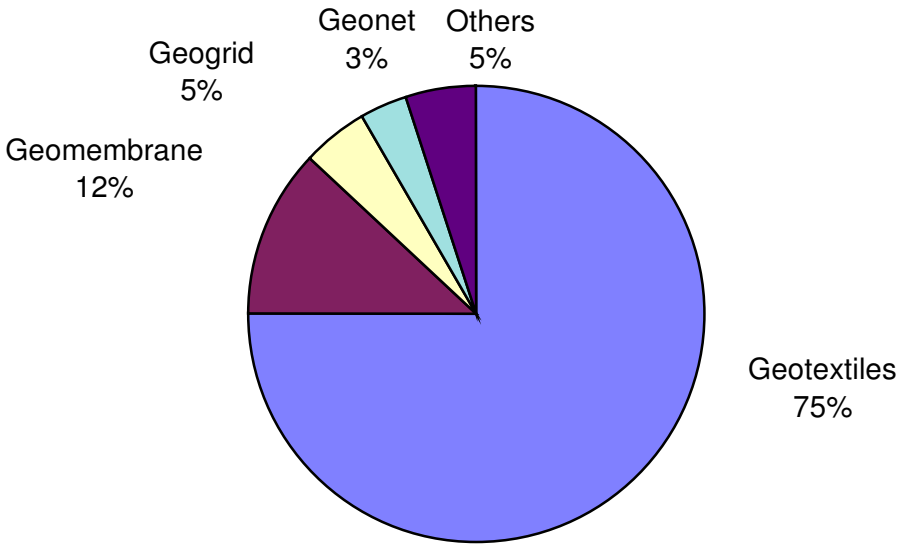
- Insect nets
- Woven Geotextiles (upto strength 600 kN/m)
- Leno Scrim Fabrics
- Grids from different materials like glass, polyester, etc.

2.11 As per the discussions with the Industry Experts the country has used **6 Lakhs sq. mt.** of woven geogrids for the following projects :

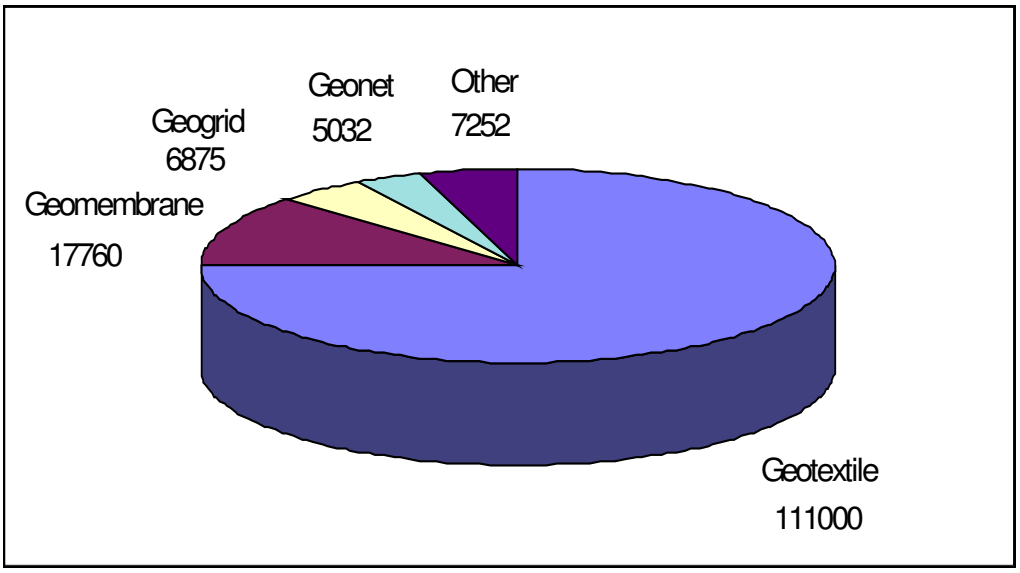
- Kanpur By-Pass
- Nagpur - MSRDC Project
- Indore Project
- Powai Flyover Project, Mumbai
- Hyderabad Flyover
- Kerala State Projects

Emerging Market Potential - Global and Indian

US Market Split-up for Geosynthetics# : (Value-wise) 2001-02



US Market Split-up for Geosynthetics# : (tonnes) 2001-02



#Source : Freedonia Group

USA Market Potential# : Geogrid

Year	1992	1996	2001	2006	2011	% CAGR (92-01)	% CAGR (01-11)
Quantity (mn sq. mt.)	13	19	28	35	46	7.51	5.24
Value (Mn $)	43	60	84	106	137		
Value (Rs. Cr.)	198	276	386	488	630		

#Source: Freedonia Group

Indian Market Potential For Geogrids :

2.12 The market potential for geogrids in India is calculated as under :

Projects	Infrastructure Investments Planned	Market Potential (2003-04 to 2007-08)	
	Rs. Cr. (upto 2007-08)	Quantity (mn sq. mt.)	Value (@ 3%) (Rs. Cr.)
Irrigation - Accelerated Irrigation Benefit Programme (AIBP)	8500	25.50	255
National Coastal Protection Plan (NCPP)	1800	5.40	54
Flood Control	8000 (required)	24.00	240
Retaining Wall of Bridges*	NA	9.00	90
Total	**18300**	**63.90**	**639**

Source : Market Estimates and Industry feedback

*** Assuming around 100 flyovers would be built in the next 5 years and 2000 road embankments on the NHAI project. (Avg. 4000 sq. mt. per flyover)**

2.13 Further split up of market potential for Geogrid on annualised basis is shown below :

MARKET POTENTIAL FOR GEOGRID

Geogrid										
Projects	**Planned Infrastruc-ture Projects**	**Market Potential (2001-02 to 2007-08**		**Projected Market Potential**						
	Rs. Cr. (Upto 2007-08)	**Qty. (Mn. Sq.)**	**Value Rs. Cr. (@3%)**	**2001-20**	**2002-03**	**2003-04**	**2004-05**	**2005-06**	**2006-07**	**2007-08**
Geogrid	18300	63.90	639	10	20	50	70	125	150	214
Cumulative Total				10	30	80	150	275	425	639

* Geogrid Projects include Irrigation projects (Rs. 8500 Cr.), Coastal protection projects (Rs.1800 Cr), flood control projects (Rs. 8000 Cr.) and retaining wall of bridges. The market estimates are done assuming around 100 flyovers would be built in the next 5 years and 2000 road embankments on the NHAI project. (Avg. 4000 sq.mt. per flyover).

SECTION II : GEOGRID TECHNOLOGY AND EQUIPMENT SUPPLIERS

2.13 The woven geogrid process is discussed below as per the budgetary quotations obtained from the local representatives.

Process Description :

2.14 The woven geogrids are manufactured on Projectile Weaving Machine based on Weft Insertion System.

2.15 The raw materials used are Synthetics (filament yarns), Polypropylene.

2.16 The nominal width for weaving can be (in cm) 360, 390, 430, 460, 540.

2.17 Coating material used are PVC, Acrylic depending on the end product application and other process parameters.

2.18 List of machinery recommended by the equipment supplier are as follows :

(I) Sectional Warping Machine (1 no)

(II) Projectile Weaving Machine - P7300 (2 nos)

a. Nominal weaving width - 360 to 540 cm

b. Weft Insertion rate - 1000 to 1100 m/min

c. Speed - 300 to 230 rpm

(III) Winding & Slitting Machine (1 no)

(IV) Offline Coating Line (1 no)

Notes : a. Detailed specifications can be further obtained from overseas technology suppliers.

b. Subsequently once the market picks up 4 to 8 loom can be added.

2.19 Special characteristics of this product is as follows :

- High tear resistance values which can be exactly adapted according to their application,
- Geogrid gives high strength according to the aperture size and are mainly influenced by the selection of the yarn material, yarn arrangement, yarn thickness and density of filler threads and weft.

2.20 Globally, the **well known technology suppliers** with proven track are :

1. Sulzer Textil (Switzerland)

Local Representative : Sultex (India) Pvt. Ltd.

Karmayog Building, Parsi Panchayat Road

Andheri (East), Mumbai - 400 069

Tel : 26827661/62, Fax : 26827665/6

2. Dornier GmbH (Germany)

3. Menzel GmbH (Germany) -- For Coating

Notes : The list contains the leading global players in the Woven Geogrid Technology and based on discussion with Industry experts the above list is exhaustive.

Recommended Economic Size :

2.21 The geogrid project proposed to be set up in India will have a designed capacity of **250 sq. mts**. **per hour.**

2.22 As per the Industry Experts under Indian operating conditions it is safer to assume machine efficiency factor of 75%, and therefore the production would be **188 sq. mts. per hour.**

2.23 The plant would operate in three shifts, 24 hours and 350 working days in a year.

Investment in Process Plant and Machinery.

2.24 As per the indicative budgetary quotations and **assuming 10% discount from the machinery suppliers**, **the investment in the process plant and machinery (including offline coating) will be Rs 4.40 crores** (FOB). Finer details on the Equipment specifications and the formal quotations need to be discussed with the technology supplier before the project is taken up. Taking into account the CIF value (2%), the custom duties (5%), inland transportation (2%), erection and commissioning (5%), **the installed cost of process equipment would be Rs. 5.05 crores.**

2.25 **Other Technologies Available For Producing Geogrid :**

Product	Other Technologies
Geogrid	Knitted, Extrusion

SECTION III : PROJECT COST & PROFITABILITY PROJECTIONS

Land

2.26 The total requirement of land for this project keeping in mind the possible future expansion is around 4046 Sq. Mtrs. (1.0 acres).

2.27 Based on the available information the cost of land is assumed at Rs 1200 per square meter (including the developmental cost).Depending on the exact location of the project to be determined by the promoter the land cost could be higher or lower. Hence the total cost of developed land will be **Rs 0.49 crores**.

Buildings

2.28 The building area comprising of main factory building, godowns, office, R & D labs / In-house Testing centre etc. would be **2000 sq. mtrs**. The cost of construction would again vary depending on the structure and the materials to be used. It has been assumed that the average cost of construction would be Rs 4500 per sq. mtr. Thus the total cost of building and other civil works would be around **Rs 0.90 crores**.

Plant and Machinery

2.29 Details of Plant and machinery as well as technology required for the project have been presented in earlier Section II . The installed cost of plant and machinery would be **Rs 5.05 crores**.

2.30 Apart from the main process equipments the utilities required are:

- Fire fighting equipments,
- Packaging Machine,
- Inspection and Winding Machine
- Material Handling equipment such as fork lifts etc.
- Other miscellaneous equipment.

2.31 The provision on this count is assumed at **Rs 0.50 crores**.

Testing Lab (In-house)

2.32 As per the Industry Experts the In-house Testing and R& D facility would call for an investment of around **Rs 0.35 crore.** The list of testing equipment is given in Annexure.

Miscellaneous Fixed Assets

2.33 Under this head the items included are Furniture and fixtures, Office equipments, Air Conditioners etc. and the provision made is around **Rs 0.15 crores**.

Project Engineering and Consulting

2.34 Under this head the items included are the fees and expenses on account of Architect fees, project engineering and management (both local and overseas), detailed project reports etc.

Preliminary & Preoperative Expenses

2.35 The items included under this head are company formation expenses, public issue expenses (if any), interest during construction, pre production expenses during the implementation phase etc.

Contingency Expenses

2.36 Depending on the gestation period and further detailing of the project cost by the promoter, the contingency provision has been made at the rate of 10%.

Margin Money for Working capital

2.37 The margin money for working capital forming part of the total project cost would be **Rs 0.37 crores.** The details of the working are shown in **Exhibit 2.3.**

Total Project Cost

2.38 The total project cost as given in **Exhibit 2.1** would be **Rs. 9.59 crores** .

Project Funding And Financing Pattern

2.39 It has been assumed that the project would be financed through long term funds and Equity participation by the Promoter / Public. The technical textile sector being a high priority area, it is assumed that a Debt- Equity ratio of 1.5 : 1 would be feasible. (However the sensitivity analysis has also been presented for 1 : 1 and 2 : 1 Debt Equity ratios.)

Sales, Profitability And Sensitivity Analysis

Sales Realisation and Turnover

2.40 As per the discussions with the Industry Experts the economic size of a plant is **250 sq. mts./hour.**

2.41 As per the Industry Experts under Indian operating conditions it is safer to assume machine efficiency factor of 75%, and therefore the production would be **188 sq. mts**. per hour.

2.42 The plant would operate on Three -shift basis and 350 workings days in a year.

2.43 The capacity utilisation for the 1st year is assumed at 50% and thereafter for the 2^{nd}, 3^{rd} and 4^{th} year onwards 60%, 75% and 90% respectively.

2.44 The average selling price of the end product would be **Rs 100 per sq. mt.** (net of excise duties, sales tax and other incidental expenses). The international price is in the range of $2.2 to $2.75/sq. mt. depending on the gsm and other technical parameters.

2.45 The details of sales turnover projected are given in **Exhibit 2.2**.

Cost of Production

Major Raw materials

2.46 The main raw materials used and the corresponding prevailing prices as an indicator are as follows :

Major Raw Materials	Landed Cost* (Rs / kg)
PFY	110

*** Inclusive of import duty**

2.47 Raw material specifications of PFY are given below:

Property	Value	
Denier	1000	2000
Breaking Strength	84N	160N
% elongation	12%	

2.48 The major suppliers of these raw materials (PFY, PVC etc.)are :

Indian (for PVC) :

(a) Reliance Industries

(b) IPCL (Taken over by Reliance)

International (for PFY) :

(a) Enka

(b) Tejin

(c) Corica Fibres, etc.

Power Cost

2.49 The total connected load is 161 kW. The power cost would be **Rs. 0.49 crores.**

Repairs & Maintenance

2.50 The repair and maintenance cost would be at 2.5% of the Plant & Machinery cost i.e. **Rs. 0.13 Cr.**

Manpower, Salaries and Wages

2.51 The manpower requirements and the salary structure is given in **Exhibit 2.4**.

2.52 The total manpower requirement comprising of supervisors, machine operators, helpers and the managerial cadre would be 33 nos incurring a cost of **Rs. 0.48 Cr.**

Factory and Overhead Expenses

2.53 The items covered under this head are repairs and maintenance, Establishment expenses, stationers, travel expenses, packaging expenses etc. and amount to **Rs. 0.24 Cr**.

Sales, Marketing and Commission Expenses

2.54 The promotion of geogrids will call for expenditure on this account and a provision of 20% of sales.

Interest and Depreciation

2.55 The prevailing interest rate for long term under Technological Upgradation Fund (TUF) is 5% and short term borrowed funds is taken at 11% per annum.

2.56 The repayment of loans has been assumed for 10 years with two years moratorium (2+8).

2.57 The depreciation rates as per the Company Law and Income-Tax Ready Reckoner have been worked out for Straight Line and WDV Method basis.

2.58 The current corporate tax rate is assumed at 35 % and the surcharge is assumed at 2.5% per annum.

Profitability, Break-even, IRR and Payback .

2.59 The **Sales turnover** increases from Rs 7.72 Cr in the first year to Rs 13.89 Cr. from the 4th year onwards.

2.60 The **PBT** increases from Rs 1.91 Cr. in the first year to Rs. 4.70 Cr. from the 4th year onwards. (Exhibit 2.5)

2.61 The **Break Even** of the project is at 48.35%.

2.62 The **Internal Rate of Return (IRR)** has been worked out at 31.39%.

2.63 The **Payback period** for the project is 3.33 years.

Sensitivity Analysis:

2.64 The sensitivity analysis has been presented in the **Exhibit 2.6.**

Common Testing Facilities :

2.65 Indian testing centres like IIT (Mumbai, Delhi, Chennai), Central Road Research Institute (CRRI), BTRA, SASMIRA etc. currently cater to the testing requirements.

2.66 Some of the leading International Geosynthetic Test Laboratories are :

Testing Centre	Country
Geosynthetic Testing Services	Australia
Ghent University	Belgium
Activation Laboratories Ltd.	Canada
LGA Geosynthetic Institute	Germany
tBU	Germany
Geospec Ltd.	United Kingdom
SGS Testing Services L.L.C.	United States
TRI/Environmental Inc.	United States

DEVELOPMENTAL AND PROMOTIONAL MEASURES.

2.67 As per the inputs from IIT-Mumbai, a National Level Testing Facility needs to be set-up for R&D and Testing of fabrics.

2.68 The various properties that need to be tested and researched for Geotextiles and Geogrids are listed below :

Properties	Tests
Physical Properties	• Mass per unit area • Thickness Test • Determination of apparent opening size of geotextiles • CBR Puncture test
Mechanical Properties	• Tensile properties of geotextiles and geogrid. • Grab breaking load and elongation for geotextiles. • Index puncture testing. • Evaluating the unconfined tension creep behaviour of geotextiles. • Pyramid puncture resistance for geotextiles.

	• Connectivity testing for geogrids. • Mullen burst test.
Hydraulic Properties	• Inplane flow testing. • Cross plane flow testing. • Measuring the soil geotextile clogging system. • Emersion procedures for evaluating the chemical resistance of geotextiles.
• Ultraviolet testing for polymers	
• Building of road pavement for simulating real life testing.	

2.69 TECS, interaction with tBU, Germany one of the Testing Centre for geotextiles/geogrids has shown interest in collaborating to set-up a testing centre in India. For further follow-up the address is given below :

tBU
Gutenberg Str. 29
48268 Greven, Germany
Tel : +(49) 2571/9872-0
Email : tbu@tbu-gmbh.de
website : www.tbu-gmbh.de

DEVELOPMENT AND PROMOTIONAL MEASURES :

2.70 **Global** consumption of geotextiles/geogrids has grown phenomenally during the last three decades from 30 mn mtr. in 1975 to 1400 mn mtr. in 2000-01 and expected to touch 1650 mn mtr. in 2003-04 and further to 2490 mn mtr. by 2007-08.

2.71 The developed regions of **N. America & Europe** accounted for 80% of the total consumption reflecting the importance of geotextiles in the road and other infrastructure projects.

2.72 The new emerging markets are **China and India.**

Global Practices:

2.73 In **Germany** the Regulatory Framework can be understood in the light of the regulations since 1970s titled as "GEOSYNTHETICS IN ROAD CONSTRUCTION - GERMAN REGULATIONS."

2.74 Germany tested geotextiles for road construction work in **1970s** on large-scale tests on-site. In 1977, at the first International Conference on the Use of Fabrics in Geotechnics, held in Paris, the Norwegian Road Research Laboratory developed a system to test the mechanical strength of the textiles by a so called **CBR-tensile-test** and in

addition by a cone-drop-test and used the results to define the suitability for the use under 4 different classes of fill over soft soil.

2.75 The Germans adopted the **CBR-tensile-test** as Plunger-Puncture-Test and classified the nonwovens in five Geotextile-Robustness-Classes (GRC). To find out the necessary GRC for a given site, they classified the fill in 5 classes on the basis of the diameter and the coarseness/sharpness of aggregates. The table below shows the GRC **classification.**

GRC classification:

Product Group	**Nonwovens**	
Geotextile-Robustness-Classes	**Plunger-puncture-force (kN)**	**Mass per unit area (gsm)**
GRC1	>= 0.5	>= 80
GRC2	>= 1.0	>= 100
GRC3	>= 1.5	>= 150
GRC4	>= 2.5	>= 250
GRC5	>= 3.5	>= 300

2.76 The German regulations or for that matter the **regulations anywhere in the developed countries don't mandate** the usage of geotextiles but it is mostly based on the benefits derived like, increase in road life to 4 -5 times than the roads built today, minimising road maintenance (7 to 8 years) and improving riding quality without potholes and reflective cracking.

2.77 **China** is under mass infrastructure construction and hence the largest market of geosynthetics in the current decade (2001-2010). In recent years, China has invested $ 86.7 billion in improving its road- railway network, new airports, water conservancy projects, etc.

2.78 At the same time the **promotional effort** done by the Chinese government to increase the usage of geosynthetics in these infrastructure projects are to be appreciated. China International Geosynthetics Exhibition is held every year.

2.79 The Chinese are using an **integrated approach** within various agencies in the promotion of geosynthetics. There are atleast 15 agencies (as listed below) co-operating with each other to **create awareness and promote usage** of geosynthetics. Numerous discussion meetings are held throughout China each year to discuss the applications of geosynthetic products.

2.80 In **2002 alone, 130 national level** technical communications have been issued, in which research, experimental works, manufacturing, the use of geosynthetics in engineering projects and issues are reported.

2.81 List of Chinese Agencies collaborating with each other are as follows:

1. **China Technology Market Association (CTMA)**
2. **IGS-China Chapter**
3. **Chinese Technical Association on Geosynthetics (CTAG)**
4. **China Nonwovens Technical Association (CNTA)**
5. **Shanghai Geosynthetics Technical Association (SGTA)**
6. **China Association for Science & Technology**
7. **China Hydraulic Engineering Society**
8. **China Communication Association**
9. **China Railway Society**
10. **Chinese Society for Hydroelectric Engineering**
11. **Chinese Society for Environmental Science**
12. **China Civil Engineering Society**
13. **China Textile Engineering Society**
14. **CNTA Science & Technology Co. Ltd.**
15. **CMP Asia Exhibitions & Paperloop Inc.**

2.82 It is interesting to note here that after the **disastrous flooding** of Yangste River in 1998, Prime Minister, Zhu Rong Yi issued a document in which he **encouraged Engineers to use geosynthetic products** in their work. This shows the level of involvement in increasing the usage of geosynthetics in China. In 2001-02 China alone consumed **250 mn sq. mtrs** of geosynthetics.

PROMOTIONAL EFFORTS IN INDIA:

2.83 In India poor road conditions and high maintenance cost requires serious attention and the solution lies in use of **geotextiles** which gives increased road life to 4 - 5 times than the roads built today, minimising road maintenance (7 to 8 years) and improving riding quality without potholes and reflective cracking.

2.84 Indian investment in the infrastructure projects like Roads & Railways alone stands at Rs. 1,84,000 Cr. ($ 40 bn) and the usage of geosynthetics (geotextiles & geogrids) has not been significant compared to the initiatives taken by developed/developing countries like China, Korea, etc.

2.85 Indian Road Congress publication on "SPECIFICATIONS FOR ROAD AND BRIDGE WORKS" (Fourth Revision) under section 700 gives the use Geosynthetics (Geotextile/Geogrid/Geonet/Geomembrane / Geocomposite) under Clause nos. 701, 702, 703 & 704.

2.86 Indian Road Congress Special Publication 59 (IRC: SP: 59 - 2002) has published "GUIDELINES FOR USE OF GEOTEXTILES IN ROAD PAVEMENTS AND ASSOCIATED WORKS" which gives the details of the properties and installation of geotextiles for various soil conditions.

2.87 Under Section 700 of the Indian Road Congress Clause no. 704 "PROTECTION WORKS WITH GEOSYNTHETICS" give the use of Geogrids for various applications and the details about construction and installation.

2.88 Special Publication for Geogrids **does not exist** which should be drafted by the Indian Road Congress (IRC)

2.89 Ministry of Road Transport and Highways (**MORTH**) should encourage the usage of geotextiles. The factors that affect the potential usage of geotextiles in the Indian context are :

- Traditional geotechnical and civil engineering practices.
- Resistance to adapt to geotextiles than conventional methods.

2.90 **As per the industry feedback mandation should exist to incorporate geotextile layer in the road works from design stages itself as it increases the road life by 30% hence reducing maintenance. Such mandation should exist for geogrid also.**

2.91 All geotextiles and geogrids should be enforced with **mandatory testing clause before installation.**

2.92 The **Inter-Ministerial Co-ordination** is one of the **workable solutions for the promotion of geotextiles and geogrids** in the country with Ministry of Textiles taking the lead role.

2.93 All those concerned like, Ministry of Road Transport & Highway (MORTH), Ministry of Environment & Forests (MOEF), Ministry of Water Resources (MOWR), Ministry of Railways (MOR) & Ministry of Urban Affairs are important government bodies need to play active role in the promotion of geotextiles and geogrids.

2.94 The **Indian Geotextile and Geogrid manufacturers** should be given representation for all the inter-ministerial and departmental committees as well as Bureau of Indian Standards for participation in the policy matters.

2.95 In view of the ongoing infrastructural development activities in the country the usage of geotextiles / geogrids should be made mandatory within the next three to six months.

2.96 The technical expertise exists in the country for conceptualising the requirement of the geotextile and geogrid fabric in applications like roads, railways, bridges, embankments, etc.

2.97 Expertise in Design of Civil and Geotechnical structures exists with research institutes like CRRI, RDSO, BTRA etc. and institutions like SASMIRA, IIT - Delhi & Mumbai, NHAI, etc. Thus the country possess human resource talent pool.

2.98 The Ministry of **Human Resource** Development can introduce specialisation courses for Geosynthetics (geotextiles and geogrids) in Civil & Textile Engineering courses at graduation and post-graduation levels for churning professionals in this sector.

2.99 GoI should relax the criteria for domestic players like long term testing clause of 10,000 hrs for **Creep Behaviour Test** to 2,000 hrs giving them an opportunity to prove their product.

2.100 To advocate the usage of geotextiles and geogrids, GoI can give **concessions** like the **absorption** of the additional project cost on account of usage of geotextiles and geogrids.

2.101 Imported geotextile and geogrid should be levied with **additional customs duty** (to be decided by the government) to protect the Indian players who would be in the nascent stages of development. This would also encourage International collaborations with Indian players to increase the competitiveness.

EXHIBIT 2.1

PROJECT COST
(LAND, BUILDINGS, PROCESS PLANT & MACHINERY, UTILITIES & OTHER ASSETS)

		Project Cost (Rs. Cr.)
1	**Land** Area: 1.0 acres (4046 Sq Mtrs) Rate: (Rs.1200 /Sq. Mtr)	**0.49**
2	**Buildings** Plant Area, Office, Godown, Lab, Service Area etc.) Built-up Area : 2000 Sq. Mtrs Avg Rate : Rs. 4500 /Sq. Mtrs	**0.90**
3	**Process Plant & Equipment**	**5.05**
4	**Utility & Other equipments** Packaging Machine, Inspection & winding m/c Fire Fighting, Material Handling etc.)	**0.50**
5	**Testing Facilities (In-house)**	**0.35**
6	**Misc. Fixed Assets** (Furniture & Fixtures, Office Equipment, etc.)	**0.15**
7	**Project Engineering & Consultancy charges (2.5%)**	**0.16**
8	**Preliminary & Pre-operative Expenses (12%)** (Company Formation, Interest during construction, pre-production expenses, etc.)	**0.83**
9	**Contingency (10 %)**	**0.81**
10	**Total**	**9.23**
11	**Margin Money for Working Capital**	**0.37**
12	**Total Project Cost**	**9.59**

EXHIBIT 2.2

ESTIMATION OF SALES REVENUE

(Rs. Cr.)

ITEM	YEAR OF OPERATION									
	I	**II**	**III**	**IV**	**V**	**VI**	**VII**	**VIII**	**IX**	**X**
Production per hour (sq mt)	250	250	250	250	250	250	250	250	250	250
75% efficiency	188	188	188	188	188	188	188	188	188	188
Capacity Utilisation	50%	60%	75%	90%	90%	90%	90%	90%	90%	90%
Actual Production per hour	94	113	141	169	169	169	169	169	169	169
Production per day (sq mt)	2250	2700	3375	4050	4050	4050	4050	4050	4050	4050
Production for 350 working days (sq mt)	787500	945000	1181250	1417500	1417500	1417500	1417500	1417500	1417500	1417500
Selling Price (Rs/sq mt)	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Sales Revenue (Rs. Cr)	**7.88**	**9.45**	**11.81**	**14.18**	**14.18**	**14.18**	**14.18**	**14.18**	**14.18**	**14.18**
Value Loss (2%)	0.16	0.19	0.24	0.28	0.28	0.28	0.28	0.28	0.28	0.28
Net Sales Revenue (Rs. Cr)	**7.72**	**9.26**	**11.58**	**13.89**	**13.89**	**13.89**	**13.89**	**13.89**	**13.89**	**13.89**

EXHIBIT 2.3

REQUIREMENT OF WORKING CAPITAL

(Rs.Cr)

ITEM	NO. OF MONTHS	MARGIN (%)	YEAR I			YEAR II			YEAR III			YEAR IV			YEAR V		
			W.CAP REQMT	MARGIN MONEY	BANK FINANCE	W.CAP REQMT	MARGIN MONEY	BANK FINANCE	W.CAP REQMT	MARGIN MONEY	BANK FINANCE	W.CAP REQMT	MARGIN MONEY	BANK FINANCE	W.CAP REQMT	MARGIN MONEY	BANK FINANCE
Factory Related																	
Raw materials & other commodities	2.00	25.00	0.38	0.10	0.29	0.46	0.11	0.34	0.57	0.14	0.43	0.69	0.17	0.51	0.69	0.17	0.51
Goods in process	0.10	25.00	0.03	0.01	0.02	0.03	0.01	0.02	0.04	0.01	0.03	0.05	0.01	0.03	0.05	0.01	0.03
Finished Goods	1.00	25.00	0.41	0.10	0.31	0.48	0.12	0.36	0.58	0.15	0.44	0.69	0.17	0.52	0.69	0.17	0.52
A/c Receivable	1.00	25.00	0.64	0.16	0.48	0.77	0.19	0.58	0.96	0.24	0.72	1.16	0.29	0.87	1.16	0.29	0.87
Cash in hand																	
Salaries & wages	1.00	0.00	0.04	0.00	0.04	0.04	0.00	0.04	0.04	0.00	0.04	0.05	0.00	0.05	0.05	0.00	0.05
Utilities	1.00	0.00	0.02	0.00	0.02	0.02	0.00	0.02	0.03	0.00	0.03	0.04	0.00	0.04	0.04	0.00	0.04
Power	1.00	0.00	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01
Repairs & Maintenance	1.00	0.00	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01
Sales, Marketing & Commision expenses	1.00	0.00	0.13	0.00	0.13	0.15	0.00	0.15	0.19	0.00	0.19	0.23	0.00	0.23	0.23	0.00	0.23
Factory & Office overheads	1.00	0.00	0.02	0.00	0.02	0.02	0.00	0.02	0.02	0.00	0.02	0.02	0.00	0.02	0.02	0.00	0.02
Total Requirement			**1.67**	**0.37**	**1.31**	**1.98**	**0.43**	**1.55**	**2.45**	**0.54**	**1.91**	**2.91**	**0.64**	**2.27**	**2.91**	**0.64**	**2.27**

EXHIBIT 2.3 (Contd..)

REQUIREMENT OF WORKING CAPITAL

(Rs.Cr)

ITEM	NO. OF MONTHS	MARGIN (%)	YEAR VI			YEAR VII			YEAR VIII			YEAR XI			YEAR X		
			W.CAP REQMT	MARGIN MONEY	BANK FINANCE	W.CAP REQMT	MARGIN MONEY	BANK FINANCE	W.CAP REQMT	MARGIN MONEY	BANK FINANCE	W.CAP REQMT	MARGIN MONEY	BANK FINANCE	W.CAP REQMT	MARGIN MONEY	BANK FINANCE
Factory Related																	
Raw materials & other commodities	2.00	25.00	0.69	0.17	0.51	0.69	0.17	0.51	0.69	0.17	0.51	0.69	0.17	0.51	0.69	0.17	0.51
Goods in process	0.10	25.00	0.05	0.01	0.03	0.05	0.01	0.03	0.05	0.01	0.04	0.05	0.01	0.04	0.05	0.01	0.04
Finished Goods	1.00	25.00	0.69	0.17	0.52	0.70	0.17	0.52	0.70	0.18	0.53	0.71	0.18	0.53	0.71	0.18	0.53
A/c Receivable	1.00	25.00	1.16	0.29	0.87	1.16	0.29	0.87	1.16	0.29	0.87	1.16	0.29	0.87	1.16	0.29	0.87
Cash in hand																	
Salaries & wages	1.00	0.00	0.05	0.00	0.05	0.06	0.00	0.06	0.06	0.00	0.06	0.07	0.00	0.07	0.07	0.00	0.07
Utilities	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Power	1.00	0.00	0.04	0.00	0.04	0.04	0.00	0.04	0.04	0.00	0.04	0.04	0.00	0.04	0.04	0.00	0.04
Repairs & Maintenance	1.00	0.00	0.04	0.00	0.04	0.04	0.00	0.04	0.04	0.00	0.04	0.04	0.00	0.04	0.04	0.00	0.04
Sales, Marketing & Commision expenses	1.00	0.00	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01
Factory & Office overheads	1.00	0.00	0.23	0.00	0.23	0.23	0.00	0.23	0.23	0.00	0.23	0.23	0.00	0.23	0.23	0.00	0.23
Total Requirement			**2.95**	**0.65**	**2.30**	**2.96**	**0.65**	**2.31**	**2.97**	**0.65**	**2.32**	**2.98**	**0.65**	**2.33**	**2.99**	**0.65**	**2.34**

EXHIBIT 2.4

MANPOWER REQUIREMENTS

	Nos	Monthly	Total Monthly	Annual
General Manager	1	30000	30000	360000
Shift Supervisor	4	15000	60000	720000
Machine Operator	9	6000	54000	648000
Machine Helper (Semi Skilled)	5	4000	20000	240000
Material Handling	2	4000	8000	96000
R&D, Testing	2	12000	24000	288000
Marketing Manager	1	30000	30000	360000
Asst. Sales Manager	1	15000	15000	180000
Finance & Adminstration	3	4000	12000	144000
Maintenance (Jobber+Fitter+Electronics)	5	6000	30000	360000
TOTAL	**33**		**283000**	**3396000**
Fringe Benefits (40 % of the above)				1358400
Total Wage Bill (Annual) Rs. :			Salary + Other Benefits =	**4754400.00**
Total Wage Bill (Annual) Rs. Cr. :				**0.47544**

EXHIBIT 2.5

PROFITABILITY STATEMENT AND COMPUTATION OF TAX

(Rs.Cr)

ACCOUNT HEAD	FINANCIAL YEAR OF OPERATION									
	I	II	III	IV	V	VI	VII	VIII	IX	X
Revenue										
Net Sales Turnover	7.72	9.26	11.58	13.89	13.89	13.89	13.89	13.89	13.89	13.89
Total Revenue	7.72	9.26	11.58	13.89	13.89	13.89	13.89	13.89	13.89	13.89
Expenses										
Raw Materials	2.28	2.74	3.43	4.11	4.11	4.11	4.11	4.11	4.11	4.11
Salaries & wages	0.48	0.50	0.52	0.55	0.58	0.62	0.67	0.73	0.79	0.85
Power	0.24	0.29	0.37	0.44	0.44	0.44	0.44	0.44	0.44	0.44
Repairs & Maintenance	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Sales, Marketing & Commission expenses	1.54	1.85	2.32	2.78	2.78	2.78	2.78	2.78	2.78	2.78
Factory & Office Overheads	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24
Interest on S.T. Loans	0.14	0.17	0.21	0.25	0.25	0.25	0.25	0.26	0.26	0.26
Cost of Sales	5.05	5.92	7.20	8.49	8.52	8.57	8.62	8.67	8.73	8.80
Depreciation (St.Line)	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44
Amort. of Expenses	0.03	0.03	0.03	0.03	0.03	0.03	0.00	0.00	0.00	0.00
Interest on L.T Loan	0.29	0.29	0.27	0.23	0.20	0.16	0.13	0.09	0.05	0.02
Profit Before Tax	1.91	2.59	3.63	4.70	4.70	4.69	4.70	4.68	4.66	4.63
Tax	0.18	0.57	1.05	1.51	1.58	1.62	1.67	1.69	1.70	1.71
Profit After Tax	1.73	2.02	2.58	3.19	3.13	3.07	3.04	3.00	2.96	2.92
Dividend	0.00	0.00	0.19	0.19	0.19	0.38	0.38	0.38	0.38	0.38
Profits For Appropriation	1.73	2.02	2.39	3.00	2.94	2.68	2.65	2.61	2.57	2.54

EXHIBIT 2.5 (Contd..)

PROFITABILITY STATEMENT AND COMPUTATION OF TAX

(Rs.Cr)

ACCOUNT HEAD	FINANCIAL YEAR OF OPERATION									
	I	II	III	IV	V	VI	VII	VIII	IX	X
COMPUTATION OF TAX										
Profit after interest before depreciation	2.35	3.03	4.08	5.14	5.15	5.14	5.15	5.13	5.11	5.08
Depr.(WDV) to be claimed	1.84	1.41	1.08	0.83	0.64	0.50	0.39	0.31	0.24	0.19
Depreciation claimed	1.84	1.41	1.08	0.83	0.64	0.50	0.39	0.31	0.24	0.19
Depr. carried forward	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Export Income exempt from tax	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Taxable Profit	0.51	1.62	3.00	4.31	4.51	4.64	4.76	4.82	4.86	4.89
Profit Before Tax (Book)	1.91	2.59	3.63	4.70	4.70	4.69	4.70	4.68	4.66	4.63
Minimum Alternate Tax	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tax (Actual)	0.18	0.57	1.05	1.51	1.58	1.62	1.67	1.69	1.70	1.71
Tax Provision	0.18	0.57	1.05	1.51	1.58	1.62	1.67	1.69	1.70	1.71

EXHIBIT 2.6

SENSITIVITY ANALYSIS

Items	Profit after Tax (PAT) (assumed at 90 % capacity)	Break Even (%)	Internal Rate of Return (IRR) (%)	Payback Period (Years)
NORMAL VALUES	3.19	48.35	31.39	3.33
Debt Equity Ratios				
(a) 2:1	3.17	48.63	31.51	3.31
(b) 1:1	3.21	47.92	31.28	3.34
Increase in Project Cost 10 %	3.16	49.11	29.07	3.51
Decrease in Selling Price Rs. 80 / sq. mt.	1.76	60.54	18.83	4.78
Increase in Selling Price Rs. 120 sq. mt.	4.62	41.82	42.17	2.64
Decrease in Raw Material Prices by 10%	3.46	46.21	33.66	3.16

EXHIBIT NO. 2.7

INTEGRATED APPROACH & INTER-MINISTERIAL CO-ORDINATION FOR USE OF GEOTEXTILES / GEOGRIDS IN VARIOUS PROJECTS

Ministry Of Textile (MOT)

To Lead & Co-ordinate

Ministry of Road Transport & Highway(MORTH)	Ministry of Environment & Forests (MOEF)	Ministry of Water Resources (MOWR)	Ministry of Railways (MOR)	Ministry of Urban Affairs
		For Policy changes & regulatory framework		
Highways & Expressways	**Landfill**	**Irrigation Flood Control**	**Track bed stabilisation Boulder Protection**	**City Roads Landfill, Shore embankments Retaining Walls**
		For Using Products		
GT, GG	**GT, GG**	**GT, GG**	**GT, GG**	**GT, GG**

Note : GT - Geotextile, GG - Geogrid.

ANNEXURE I

TEST LABORATORY EQUIPMENT (IN-HOUSE)

No.	Machine Name
1.	Universal Testing Machine
2.	Template & Weighing Scale
3.	Glass Beads & Others
4.	Permittivity Tester
5.	Thickness Tester
6.	Other miscellaneous items
	Total Investment required - Rs. 35,00,000 **(approx. Rs. 0.35 Cr.)**

AUTOMOTIVE SEAT-BELT AND OTHER RIGID WEBBINGS

SECTION I: PRODUCT BRIEF, APPLICATION AREAS & MARKET POTENTIAL

3.1 Seat belt manufacture is basically an assembly operation comprising large number of light engineering sub components and the technical textile webbing.

3.2 The technical textile portion in a seat belt is the webbing and prerequisites are:

- Light weight
- High abrasion resistance
- Excellent recovery characteristics
- Heat and light resistance
- Flexibility in use, etc.

3.3 For these properties mainly High Tensile Polyester Filament Yarn (PFY) (500 / 750 / 1000 / 1500 dtex) is used. Globally, PFY is the most preferred synthetic yarn for seat belts.

3.4 Warp direction in the belt is more important since the load is applied mainly in that direction. Normally twill or satin type finish is used. The webbing is normally of standard length 3 meters and width 50 mm woven on needle looms.

3.5 Seat belts producers follow the AIS : 005 - 2000 and 015 - 2000 for safety seat Assemblies / Anchorages - specifications developed by Automotive Research Association of India (ARAI), Pune. ARAI is the pioneer organisation catering to certification and testing needs of 90% of the Indian Automobile industry. ARAI is ISO 9001 : 1994 and accredited R&D Institute.

Usage and Application Areas:

3.6 Seat belts are used by the four wheeler automobile sector, i.e.,

- Passenger cars (Multi Utility Vehicles and taxis)
- Light / Medium / Heavy trucks
- Buses
- Seat belts are also used in air crafts and helicopters

3.7 As per the Government Notification from 1st October 2002 all four wheeler vehicles are to be equiped with front and rear seat belts.

3.8 As per the Supreme Court notification all state governments are expected to ensure that the driver and co-driver use the seat belt.

Producers and indigenous capacity build-up:

3.9 Realising the opportunity of growing Indian market for seat belts from the automobile sector, some of the major global players have set up their shops in India as joint venture projects.

3.10 The **producers** of seat belts are :

- IFB Autoliv India, Bangalore (Collaboration with Autoliv, Sweden)
- Abhishek Auto Industries Limited, Gurgaon (Collaboration with Ashimori Industries Limited, Japan)
- Bond Safety Belt, Mumbai (Pioneer using indigenous technology).
- TRW Rane Occupant Restraints Limited, Chennai

3.11 The vehicle producers are target user customers of seat belts (OEM) are :

Commercial vehicles	**Passenger cars / MUV***	
Tata Motors. Ashok Leyland Eicher Motors Limited Mahindra & Mahindra Bajaj Tempo Swaraj Mazda Volvo, etc.	Tata Motors. Maruti Mercedes Hyundai Toyota Ford	Fiat Mahindra & Mahindra Honda GM

*MUV (Multi - Utility Vehicle)

3.12 India now has the presence of almost all the major global players and the consumer has a wider choice of vehicles. The past trend and the projected market for four wheeler vehicles is shown below :

(lakh nos.)

Years	**Commercial Vehicles (A)**	**Passenger Vehicles (Cars & Utility Vehicles) (B)**	**Total 4 - Wheelers (A + B)**
1998 – 99	1.36	5.04	**6.40**
1999 - 00	1.74	7.02	**8.76**
2000 - 01	1.52	6.31	**7.83**
2001 - 02	1.63	6.70	**8.33**
2002 - 03	2.03	7.21	**9.24**
2003-2004 (Est.)	2.75	9.89	**12.64**
2007-2008 (Projected)	3.47	14.48	**17.95**

Source : For past data Society of Indian Automobile Manufacturers (SIAM) Automobile Component Manufacturers Association of India (ACMA).

- For Commercial Vehicles 2003-2004 to 2007-2008 growth rate assumed 6% / year.
- For Passenger Vehicles 2003-2004 to 2007-2008 growth rate assumed 10% / year.

Emerging Market Potential for Seat Belts & Webbing

3.13 Based on the past performance and the projected market for four wheeler sector as presented in the earlier paragraphs the demand for seat belts and webbings has been worked out.

3.14 It is assumed that each Passenger Car / MUV would be fitted with four seat belts and commercial vehicles with two seat belts. Provision has also been made for retail sale of seat belts for vehicles on the road but not fitted with the seat belts and also the possible replacement demand (if any). Further it is assumed that each seat belt will have a standard length of 3 meters and width of 50 mm.

3.15 Accordingly market potential for seat belts and the webbings has been worked out.

Market	2001-2002		2003-2004 (Est.)		2007-2008 (Projected)	
	Q.	V. (Rs. Crs.)	Q.	V. (Rs. Crs.)	Q.	V. (Rs. Crs.)
Seat Belts (S.B.)	1.92 million nos.	96.00	5.19 million nos.	259.50	7.45 million nos.	372.50
Seat Belt Webbings (Average price Rs. 16 / mtr.)	5.76 million mtrs.	9.22	15.57 million mtrs.	24.91	22.35 million mtrs.	35.76

Market Potential for other rigid webbings

3.16 The **project has the flexibility** to take up the production of other rigid narrow and heavy duty webbings such as **Slings, Parachute belts, Net webbings, Break Parachute Webbings, Supply Dropping Parachute Webbing, Military belts, Cargo Lifting tape, Safety Harness, Luggage Straps,** etc.

3.17 These products are being manufactured by companies like, Todi and Co., Motilal Dalichand Co. Pvt. Ltd. (Kanpur), Viraj Syntex (Kanpur), India Cordage Factory, etc. Also there are units in the decentralised sector.

3.18 Amongst the major producers, Todi & Co is the market leader with an annual turnover of around Rs. 10 crores, largely meeting the requirement of Defence forces and the established producers of rigid webbings for other applications. These webbings are manufactured from NFY, PFY and PP.

3.19 As per the industry sources, the total market for these rigid webbings (excluding seat belt webbing) was around **Rs. 24 crores** in 2001-02 and nearly **40-50%** is consumed by the **Defence sector** . The demand for these webbings is expected to increase at the rate of 8-12% per annum.

3.20 Accordingly, the market potential for these webbings would increase from **Rs. 23.58 crores (2001-02)** to **Rs 27.50 crores (2003-04)** and **Rs. 40.26 crores (2007-08).**

Aggregate Market Potential for Automotive Seat Belt Webbing and other Rigid Webbings

Market	2001-2002		2003-2004 (Est.)		2007-2008 (Proj.)	
	Q.	V. (Rs. Crs.)	Q.	V. (Rs. Crs.)	Q.	V. (Rs. Crs.)
Seat Belts	1.92 million nos.	96.00	5.19 million nos.	259.50	7.45 million nos.	372.50
Seat Belt Webbings	5.76 million mtrs.	9.22	15.57 million mtrs.	24.91	22.35 million mtrs.	35.76
Other Rigid Webbings	29.47 million mtrs.	23.58	34.38 million mtrs.	27.50	50.33 million mtrs.	40.26
Total Webbings	35.23 million mtrs.	32.80	49.95 million mtrs.	52.41	72.68 million mtrs.	76.02

3.21 All the Major seat belt producers are to a great extent dependent on the imported webbings. Thus there is scope for investment opportunities in Seat Belt Webbings project and it will also be an attempt towards indigenisation

SECTION II: SEAT-BELT WEBBING TECHNOLOGY AND EQUIPMENTS SUPPLIERS

3.22 TECS, has contacted indigenous and global technology and equipment suppliers for seat-belt webbing (rigid narrow fabric).

3.23 Our study has revealed that the needle looms and processing machinery required for elastic narrow fabrics and general purpose rigid narrow fabrics is available indigenously **but similar equipment for seat belt webbing needs to be imported.**

3.24 The technology and equipment suppliers contacted by TECS are:

International:

1. **Mageba Textilmaschinen GmbH, (Germany)**
2. **Jacob Muller AG (Germany)**
3. **Kyang Yhe Delicate Machine Co. Ltd. (Taiwan)**

Indian Representative :

S. K. Overseas

Princess Street, Mumbai - 400 002

Tel.: 2200 0823

Fax : 2206 4687

4. **Comez Spa, (Italy)**

Indian: (do not supply machinery for seat belt webbing)

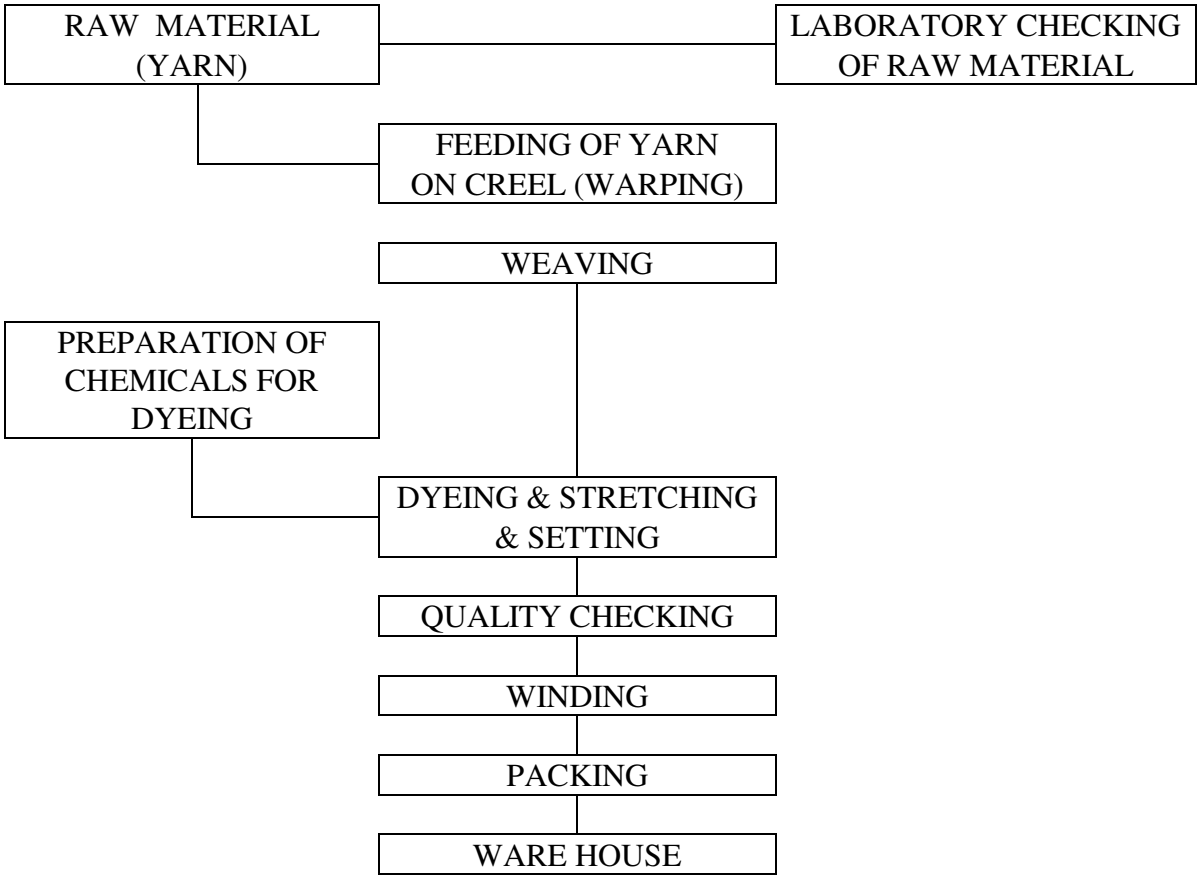
1. **Ravitex Machines, Ghaziabad**
2. **Trikso Industries, Ahmedabad**
3. **Prashant Texmach, Ahmedabad**

Notes: The list contains the leading global players in the seat belt webbing technology and as per the discussion with Industry experts the above list is exhaustive.

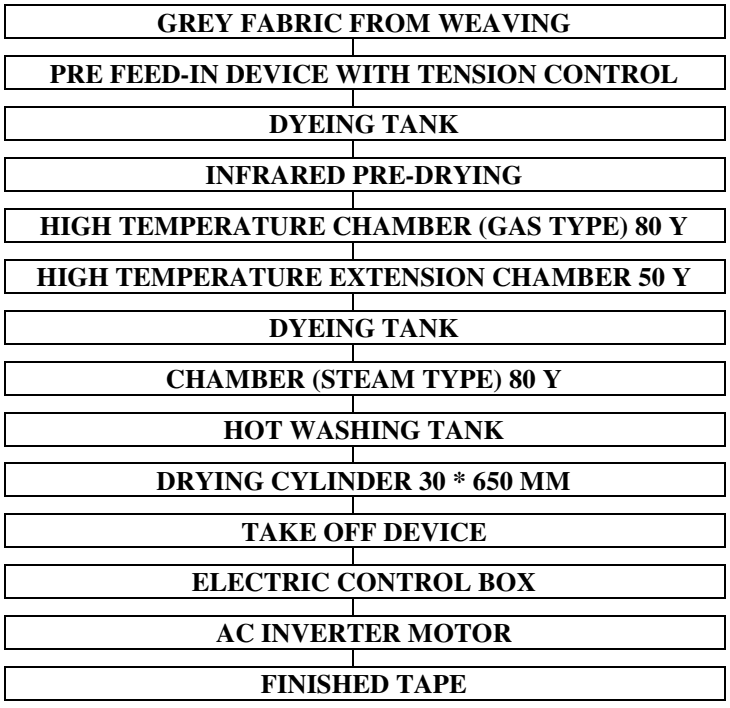
3.25 The known major player who has supplied machinery for seat belt webbing to global players is Kyang Yhe, Taiwan. For comparison Mageba quotation was studied.

3.26 The Process Description for the Webbing is as shown below and the stages involved in the dyeing process also follows:

Manufacturing Process:



Process Flow of Dyeing:



Process Systems and Equipments

3.27 **The machinery items required for the webbing project are:**

1. High Speed Automatic Needle Looms.
2. Warp Yarn Tension Control Device.
3. Tape Collection Device.
4. Cone Creel of 600 ends.
5. Continous Dyeing Machine.
6. Steam Boiler, Compressor & Effluent Treatment Plant.
7. Packing Machine
8. Testing Lab Equipment (Breaking Strength, Colour Fastness, etc.)

Minimum Recommended Economic Size:

3.28 The seat-belt webbing project proposed to be set up in India will have a designed capacity of **1111 mt per hour (18.52 mtr / min)** based on Dyeing and processing equipment meant for seat belt webbing project.

3.29 Under Indian operating conditions it is safer to assume machine efficiency factor of 75%, and therefore the production would be **833.33 mt per hour (833 mt per hour)**.

3.30 The plant would operate in three shifts, 24 hours and 300 working days in a year.

Investment in Process Plant and Machinery

3.31 As per the indicative budgetary quotations, **the investment in the process plant and machinery will be Rs 0.92 crores** (CIF) including 10% discount. Finer details on the Equipment specifications and the formal quotations need to be discussed with the technology supplier before the project is taken up. Taking into account the custom duties (5%), inland transportation, loading and unloading (2%), erection and commissioning (5%), **the installed cost of process equipment would be Rs 1.04 crores.**

3.32 Seat belt webbing can also be manufactured using **Dope Dyed High Tenasity Polyester Filament Yarn (HTPFY)**. thereby reducing the project cost by eliminating certain sections in the processing equipments. The highlights of Option II are presented separately at the end of section III of this chapter. However, the selection of webbing for seat belt by different technologies is finally left to the seat belt manufacturers.

SECTION III : PROJECT COST & PROFITABILITY PROJECTIONS

Land

3.33 The total requirement of land for this project keeping in mind the possible future expansion is around 2000 Sq. Mtrs. (0.5 acres).

3.34 Based on the available information the cost of land is assumed at Rs 1200 per square meter (including the developmental cost).Depending on the exact location of the project to be determined by the promoter the land cost could be higher or lower. Hence the total cost of developed land will be **Rs 0.24 crores**.

Buildings

3.35 The building area comprising of main factory building, godowns, office , R & D labs / In-house Testing centre etc. would be 1000 sq. mtrs. The cost of construction would again vary depending on the structure and the materials to be used. It has been assumed that the average cost of construction would be Rs 4500 per sq. mtr. Thus the total cost of building and other civil works would be around **Rs 0.45 crores**.

Plant and Machinery

3.36 Details of Plant and machinery as well as technology required for the project have been presented in earlier Section II . The installed cost of plant and machinery would be **Rs 1.04 crores**.

3.37 Apart from the main process equipments the utilities required are:

- Electricals,
- Piping,
- Power,
- Water supply,
- Compressors,
- Fire Fighting Equipments etc.

3.38 The provision on this count is taken as 5 % of the cost of machinery which works out to **Rs 0.15 crores**.

Miscellaneous Fixed Assets

3.39 Under this head the items included are Furniture and fixtures, Office equipments, Air Conditioners etc. and the provision made is around **Rs 0.10 crores (Rs 10 lakhs)**.

Testing Equipments

3.40 The following testing equipments are required for the Narrow Fabric plant:

- Tensile Strength,
- Crockometer : To check the colour fastness to rubbing and perspiration,
- Stiffness testing : Softness,
- Thickness Guaze

3.41 The Testing and R&D facilities would call for an investment of around **Rs 0.10 crores (Rs 10 lakhs)**

Project Engineering and Consulting

3.42 Under this head the items included are the fees and expenses on account of Architect fees, project engineering and management (both local and overseas), detailed project reports etc.

Preliminary & Preoperative Expenses

3.43 The items included under this head are company formation expenses, public issue expenses (if any), interest during construction, pre-production expenses, during the implementation phase etc. .

Contingency Expenses

3.44 Depending on the gestation period and further detailing of the project cost by the promoter, the contingency provision has been made at the rate of 10%.

Margin Money for Working capital

3.45 The margin money for working capital forming part of the total project cost would be **Rs 0.23 crores** .[Exhibit 3.3]

Total Project Cost (Total Investment)

3.46 The total project cost as given in **Exhibit 3.1** would be **Rs 2.80 crores**.

Project Funding And Financing Pattern

3.47 It has been assumed that the project would be financed through long term funds and Equity participation by the Promoter / Public. The technical textile sector being a high priority area, it is assumed that a Debt- Equity ratio of 1.5 : 1 would be feasible.

(However the sensitivity analysis has also been presented for 1 : 1 and 2 : 1 Debt Equity ratios.)

Sales , Profitability And Sensitivity Analysis

Sales Realisation and Turnover

3.48 As per the details available from the Technology and Equipment suppliers the economic size of a plant is **1111 mt per hour.**

3.49 Under the Indian conditions, it is assumed that the machine would operate at an efficiency level of 75 %. Hence the production from the plant would be **833.33 mt per hour (833 mt. per hr.)**.

3.50 The plant would operate on Three -shift basis and 300 workings days in a year.

3.51 The capacity utilisation for the 1st year is assumed at 50% and thereafter for the 2nd, 3rd and 4th year onwards 60%, 75% and 90% respectively.

3.52 The average selling price of the end product would be **Rs 15/mt** (net of excise duties, sales tax and other incidental expenses). The current price of imported webbing is Rs 15-20 per mt.

3.53 The details of sales turnover projected are given in **Exhibit 3.2.**

Cost of Production

Major Raw materials and their specifications

3.54 The main raw materials used and the corresponding prevailing indicative prices are as follows:

Major Raw Materials	Basic Price	Remarks (Imp. duty)
Polyester High Tenacity Yarn (for Warp 1500 denier for Weft 750 denier)	**$1.80** per kg (CIF) Landed Cost : Rs 110 per kg	**20%** (BCD : 20 %)
Dyestuff	Rs 1.50 per mtr. (Landed Cost)	

3.55 High Tenacity Poly Filament Yarn (PFY) is not available locally and is currently imported.

International Suppliers:

(a) Enka , USA

(b) Teijin , Japan

(c) Corica Fibres , Korea.

Conversion Cost

3.56 The conversion cost will include the cost of power, water, consumables, etc. which is assumed at **Rs 0.60 per mtr.**

Manpower, Salaries and Wages

3.57 The manpower requirements and the salary structure is given in **Exhibit 3.4.**

3.58 The total manpower requirement comprising of supervisors , machine operators, helpers and the managerial cadre would be 64 nos. and the annual expenses on this count would be **Rs 0.70 crores**

Factory and Overhead Expenses

3.59 The items covered under this head are repairs and maintenance, establishment expenses, travel expenses, packaging expenses, etc.

Marketing and Promotional Expenses

3.60 The promotion of seat-belt webbing will call for expenditure on this account and a provision of 2.5% of sales has been made uniformly over the years.

Interest and Depreciation

3.61 The prevailing interest rate for long term and short term borrowed funds is assumed at 5% and 11% per annum respectively. (Technology Upgradation Fund).

3.62 The repayment of loans has been assumed for 10 years with two years moratorium (2+8).

3.63 The depreciation rates as per the Company Law and Income-Tax Ready Reckoner have been worked out for Straight Line and WDV Method basis.

3.64 The current corporate tax rate is assumed at 35 % and the surcharge is assumed at 2.5% per annum.

Profitability, Break-even, IRR and Payback .

3.65 The **Sales turnover** increases from Rs 4.41 Cr. in the first year to Rs 7.94 Cr. from the 4th year onwards.

3.66 The **PBT** increases from Rs 0.03 Cr. in the first year to Rs. 0.82 Cr. from the fourth year onwards. (See **Exhibit 3.5**)

3.67 The **Break Even** of the project is at **62.39%.**

3.68 The **Internal Rate of Return (IRR)** has been worked out at **16.00%**.

3.69 The **Payback period** for the project is **5.31 years** .

Sensitivity Analysis:

3.70 The sensitivity analysis has been presented in the **Exhibit 3.6**

DEVELOPMENTAL AND PROMOTIONAL MEASURES

3.71 At a Selling price of Rs 15 per meter and the existing custom duty structure of 20% on High Tenacity Poly Filament Yarn (Rs 110 per kg - Landed Cost), the project is not very attractive.

3.72 Hence the sensitivity of the project at lower landed cost of HTPFY at Rs 100 per kg will give an IRR of 24.50%. (Against 16.00% IRR for Landed Cost of PFY at Rs 110 per kg).

3.73 The duty on the HT PFY has to be reduced and made lower than the Finished Goods (Seat Belts) or else it becomes difficult to compete due to similar duty structure (i.e., 20%) on both the items.

3.74 The desired duty on the raw material HTPFY should be reduced to 5% from the prevailing 20%.

3.75 Similarly, at a **selling price** of Rs 18 and Rs 20 per mtr the IRR comes to 43.07% and 58.19% as against an IRR of 16.00% at selling price of Rs 15 per mt.

3.76 The European and US markets require **OEKOTEX Certificate** for the exported products (proof of the absence of any harmful dyes) from the European laboratories only. However in India, nonstandard products (webbing) enter the domestic market killing the webbing market.

3.77 Most of the existing players have their own testing facilities for the raw material and finished goods testing. SASMIRA, BTRA carry out Grip Testing.

3.78 This machinery is not recommended for Tape required for Zip fasteners because such tapes can be manufactured using the local low cost machinery.

3.79 The **regulatory measures** for the mandatory installation of Four Seat Belts for passenger cars are in place under the Motor Vehicles Act. However the use of seat belts has not been enforced in all the states.

3.80 The Automotive Research Association of India **(ARAI)** , Pune has the latest testing facilities for Webbing as well as Seat Belts. All the existing seat belt manufacturers have their in-house testing facilities, both for Seat Belt and Webbing.

3.81 Keeping in mind the **rapid changes in the automobile industry**, the **Ministry of Heavy Industries and Public Enterprise** proposes to set up two new testing centres for the automobile industry.

3.82 The **globally recognised automotive testing agencies** are IDIADA Automotive Technology (Spain), AIB - Vincotte International (Belgium), MIRA (UK), LTC Ltd. (UK) and Millbrook (UK).

OPTION - II (Seat Belt Webing Project Based On Purchased Dope Dyed HTPFY)

3.83 There is a second option of using purchased **HTPFY Dope Dyed Yarn** (Tenacity 7.6-7.8, Filaments 96, Elongation 16) in denier range of 500/700/1000/1500**.** This is not being manufactured in the country and Far Eastern Textiles, Taiwan is the well-known supplier. The indicative price of the yarn is **$2.50 per kg** and the landed cost works out to Rs 140 per kg.

3.84 The modified process chart for Dope Dyed Yarn is as follows:

3.85 This eliminates the dyeing machine, thus reducing the project cost from Rs 2.80 cr to Rs 1.82 crore**.**

3.86 The PBT increases from Rs 0.06 Cr. in the first year to Rs. 0.76 Cr. from the fourth year onwards.

3.87 The Break Even of the project is at 61.24%. The Internal Rate of Return (IRR) has been worked out at 20.20%. The Payback period for the project is 4.67 years .

COMPARISION OF ALTERNATE TECHNOLOGIES FOR SEAT BELT WEBBING PROJECT

Technology / Particulars	**Seat Belt Webbing Project**	
	OPTION - I With dying & processing plant	**OPTION - II Using dope dyed yarn (HTPFY)**
Capacity (18.52 mtrs / min)	1111 mt. / hr	1111 mt. / hr
Project Cost	Rs. 2.80 Cr.	Rs. 1.82 Cr.
Revenue (1st year)	Rs. 4.41 Cr.	Rs. 4.41 Cr.
BEP	62.39%	61.24%
IRR	16.00%	20.20%
Payback	5.31 years	4.67 years

EXHIBIT 3.1

PROJECT COST
(LAND, BUILDINGS, PROCESS PLANT & MACHINERY, UTILITIES & OTHER ASSETS)

		Project Cost (Rs. Cr.)
1	**Land** (Area: 2000 Sq. Mtrs.) Rate: (Rs.1200 /Sq. Mtr)	**0.24**
2	**Buildings** (Plant Area, Office, Godown, Lab, Service Area etc.) Built-up Area : 1000 Sq. Mtrs Avg Rate : Rs.4500 /Sq. Mtrs	**0.45**
3	**Process Plant & Equipment**	**1.04**
4	**Utility & Other equipments** (Compressor, Stem Boiler, Effluent Treatment Plant, etc.)	**0.15**
5	**Testing Equipments**	**0.10**
6	**Misc. Fixed Assets** (Furniture & Fixtures, Office Equipment, etc.)	**0.10**
7	**Project Engineering & Consultancy charges (2.5%)**	**0.04**
8	**Preliminary & Pre-operative Expenses (12%)** (Company Formation, Interest during construction, pre-production expenses, etc.)	**0.22**
9	**Contingency (10 %)**	**0.23**
10	**Total**	**2.58**
11	**Margin Money for Working Capital**	**0.23**
12	**Total Project Cost**	**2.80**

EXHIBIT 3.2

ESTIMATION OF SALES REVENUE

(Rs. Cr.)

ITEM	YEAR OF OPERATION									
	I	**II**	**III**	**IV**	**V**	**VI**	**VII**	**VIII**	**IX**	**X**
Average Production per hr (mt.)	1111	1111	1111	1111	1111	1111	1111	1111	1111	1111
75% efficiency	833	833	833	833	833	833	833	833	833	833
Capacity Utilisation	50%	60%	75%	90%	90%	90%	90%	90%	90%	90%
Actual Production per hr (mt.)	417	500	625	750	750	750	750	750	750	750
Production per day (mt.)	9999	11999	14999	17998	17998	17998	17998	17998	17998	17998
Production for 300 working days (mt.)	2999700	3599640	4499550	5399460	5399460	5399460	5399460	5399460	5399460	5399460
Selling Price (Rs/mt.)	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
Sales Revenue (Rs. Cr)	**4.50**	**5.40**	**6.75**	**8.10**	**8.10**	**8.10**	**8.10**	**8.10**	**8.10**	**8.10**
Value Loss (2%)	0.09	0.11	0.13	0.16	0.16	0.16	0.16	0.16	0.16	0.16
Net Sales Revenue (Rs. Cr)	**4.41**	**5.29**	**6.61**	**7.94**	**7.94**	**7.94**	**7.94**	**7.94**	**7.94**	**7.94**

EXHIBIT 3.3

REQUIREMENT OF WORKING CAPITAL

(Rs.Cr)

ITEM	NO. OF MONTHS	MARGIN (%)	YEAR I			YEAR II			YEAR III			YEAR IV			YEAR V		
			W.CAP REQMT	MARGIN MONEY	BANK FINANCE	W.CAP REQMT	MARGIN MONEY	BANK FINANCE	W.CAP REQMT	MARGIN MONEY	BANK FINANCE	W.CAP REQMT	MARGIN MONEY	BANK FINANCE	W.CAP REQMT	MARGIN MONEY	BANK FINANCE
Factory Related																	
Raw materials & other commodities	1.00	25.00	0.21	0.05	0.16	0.25	0.06	0.19	0.31	0.08	0.23	0.37	0.09	0.28	0.37	0.09	0.28
Finished Goods	1.00	25.00	0.34	0.09	0.26	0.40	0.10	0.30	0.48	0.12	0.36	0.56	0.14	0.42	0.57	0.14	0.43
A/c Receivable	1.00	25.00	0.37	0.09	0.28	0.44	0.11	0.33	0.55	0.14	0.41	0.66	0.17	0.50	0.66	0.17	0.50
Cash in hand																	
Salaries & wages	1.00	0.00	0.06	0.00	0.06	0.06	0.00	0.06	0.06	0.00	0.06	0.07	0.00	0.07	0.07	0.00	0.07
Utilities	1.00	0.00	0.05	0.00	0.05	0.06	0.00	0.06	0.08	0.00	0.08	0.09	0.00	0.09	0.09	0.00	0.09
Advertising & Promotional Expenses	1.00	0.00	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.02	0.00	0.02	0.02	0.00	0.02
Admin. Overheads	1.00	0.00	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01
Total Requirement			**1.04**	**0.23**	**0.81**	**1.22**	**0.27**	**0.95**	**1.50**	**0.34**	**1.17**	**1.78**	**0.40**	**1.38**	**1.79**	**0.40**	**1.39**

EXHIBIT 3.3 (Contd..)

REQUIREMENT OF WORKING CAPITAL

(Rs.Cr)

ITEM	NO. OF MONTHS	MARGIN (%)	YEAR VI			YEAR VII			YEAR VIII			YEAR XI			YEAR X		
			W.CAP REQMT	MARGIN MONEY	BANK FINANCE	W.CAP REQMT	MARGIN MONEY	BANK FINANCE	W.CAP REQMT	MARGIN MONEY	BANK FINANCE	W.CAP REQMT	MARGIN MONEY	BANK FINANCE	W.CAP REQMT	MARGIN MONEY	BANK FINANCE
Factory Related																	
Raw materials & other commodities	1.00	25.00	0.37	0.09	0.28	0.37	0.09	0.28	0.37	0.09	0.28	0.37	0.09	0.28	0.37	0.09	0.28
Finished Goods Stock	1.00	25.00	0.57	0.14	0.43	0.58	0.14	0.43	0.59	0.15	0.44	0.59	0.15	0.45	0.60	0.15	0.45
A/c Receivable	1.00	25.00	0.66	0.17	0.50	0.66	0.17	0.50	0.66	0.17	0.50	0.66	0.17	0.50	0.66	0.17	0.50
Cash in hand																	
Salaries & wages	1.00	0.00	0.08	0.00	0.08	0.08	0.00	0.08	0.09	0.00	0.09	0.10	0.00	0.10	0.10	0.00	0.10
Utilities	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Advertising & Promotional Expenses	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Admin. Overheads	1.00	0.00	0.02	0.00	0.02	0.02	0.00	0.02	0.02	0.00	0.02	0.02	0.00	0.02	0.02	0.00	0.02
Total Requirement			**1.80**	**0.40**	**1.40**	**1.81**	**0.40**	**1.41**	**1.82**	**0.41**	**1.42**	**1.84**	**0.41**	**1.43**	**1.85**	**0.41**	**1.44**

EXHIBIT 3.4

MANPOWER REQUIREMENTS

	Nos	Monthly	Total Monthly	Annual
General Manager	1	30000	30000	360000
Production Manager	1	20000	20000	240000
Supervisor -Dyeing	3	10000	30000	360000
Supervisor -Weaving	3	10000	30000	360000
Labour for Looms	18	5000	90000	1080000
Labour for Dyeing	9	5000	45000	540000
Labour for Packing	9	5000	45000	540000
Machine Operators	3	6000	18000	216000
Machine Helper (Semi Skilled)	8	3000	24000	288000
R&D, Testing	1	10000	10000	120000
Marketing Head	1	25000	25000	300000
Marketing & Sales Staff	2	12000	24000	288000
Clerical Staff	2	6000	12000	144000
Other Staff	2	3000	6000	72000
Maintenance (Elec. & Mech.)	1	10000	10000	120000
TOTAL	**64**		**419000**	**5028000**
Fringe Benefits (40 % of the above)				2011200
Total Wage Bill (Annual) Rs. :			Salary + Other Benefits =	**7039200.00**
Total Wage Bill (Annual) Rs. Cr. :				**0.70392**

EXHIBIT 3.5

PROFITABILITY STATEMENT AND COMPUTATION OF TAX

(Rs.Cr)

ACCOUNT HEAD	FINANCIAL YEAR OF OPERATION									
	I	II	III	IV	V	VI	VII	VIII	IX	X
Revenue										
Net Sales Turnover	4.41	5.29	6.61	7.94	7.94	7.94	7.94	7.94	7.94	7.94
Total Revenue	4.41	5.29	6.61	7.94	7.94	7.94	7.94	7.94	7.94	7.94
Expenses										
Raw Materials	2.49	2.99	3.74	4.48	4.48	4.48	4.48	4.48	4.48	4.48
Salaries & wages	0.70	0.74	0.78	0.81	0.86	0.92	1.00	1.08	1.16	1.26
Conversion Cost	0.62	0.75	0.93	1.12	1.12	1.12	1.12	1.12	1.12	1.12
Repairs & Maintenance	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Marketing & Promotional Expenses	0.11	0.13	0.17	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Factory & Office Overheads	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Interest on S.T. Loans	0.09	0.10	0.13	0.15	0.15	0.15	0.15	0.16	0.16	0.16
Cost of Sales	4.17	4.87	5.90	6.92	6.97	7.04	7.11	7.19	7.28	7.37
Depreciation (St.Line)	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
Amort. of Expenses	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00
Interest on L.T Loan	0.08	0.08	0.08	0.07	0.06	0.05	0.04	0.03	0.02	0.01
Profit Before Tax	0.03	0.22	0.52	0.82	0.79	0.73	0.67	0.60	0.53	0.44
Tax	0.00	0.02	0.05	0.25	0.26	0.25	0.24	0.22	0.20	0.17
Profit After Tax	0.03	0.19	0.46	0.57	0.53	0.48	0.44	0.38	0.33	0.27
Dividend	0.00	0.00	0.06	0.06	0.06	0.11	0.11	0.11	0.11	0.11
Profits For Appropriation	0.03	0.19	0.41	0.51	0.48	0.37	0.32	0.27	0.21	0.15

EXHIBIT 3.5 (Contd..)

PROFITABILITY STATEMENT AND COMPUTATION OF TAX

(Rs.Cr)

ACCOUNT HEAD	FINANCIAL YEAR OF OPERATION									
	I	II	III	IV	V	VI	VII	VIII	IX	X
COMPUTATION OF TAX										
Profit after interest before depreciation	0.15	0.33	0.63	0.94	0.91	0.85	0.79	0.72	0.64	0.56
Depr.(WDV) to be claimed	0.46	0.67	0.61	0.22	0.17	0.14	0.11	0.09	0.07	0.06
Depreciation claimed	0.15	0.33	0.61	0.22	0.17	0.14	0.11	0.09	0.07	0.06
Depr. carried forward	0.31	0.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Taxable Profit	0.00	0.00	0.02	0.72	0.73	0.71	0.68	0.63	0.57	0.50
Profit Before Tax (Book)	0.03	0.22	0.52	0.82	0.79	0.73	0.67	0.60	0.53	0.44
Minimum Alternate Tax	0.00	0.02	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tax (Actual)	0.00	0.00	0.01	0.25	0.26	0.25	0.24	0.22	0.20	0.17
Tax Provision	0.00	0.02	0.05	0.25	0.26	0.25	0.24	0.22	0.20	0.17

EXHIBIT NO. 3.6

SENSITIVITY ANALYSIS

Items	Profit after Tax (PAT) (assumed at 90 % capacity)	Break Even (%)	Internal Rate of Return (IRR) (%)	Payback Period (Years)
NORMAL VALUES	0.57	62.39	16.00	5.31
Debt Equity Ratios				
(a) 2:1	0.57	62.74	16.06	5.29
(b) 1:1	0.58	61.87	16.10	5.28
Increase in Project Cost 10 %	0.80	63.34	14.69	5.61
Increase in Selling Price to				
(a) Rs 18 per mtr	1.57	37.29	43.07	2.61
(b) Rs 20 per mtr	2.23	29.70	58.19	2.08
Decrease in Raw Material Price to Rs 100 per kg	0.84	52.29	24.50	5.02

*** Current International price HTPFY is $1.80/kg (Rs. 82.80/Kg-CIF)+Customs duty structure of BCD - 20%**

All selling prices are net of excise duty, sales tax and other local levies.

MULTIPURPOSE COATING PROJECT

SECTION I: PRODUCT BRIEF, APPLICATION AREAS & MARKET POTENTIAL

4.1 In the field of Technical Textiles , coated fabrics form one of the most important segments. Coating operation (also Lamination and Impregnation) is carried out to impart certain characteristics and desirable properties for the end-use application of the product.

4.2 The different substrates (base fabric) used are Wovens, Non Wovens and Knitted fabrics manufactured from Polyester, Nylon, Polypropylene, Acrylic, Cotton, Rayon, Wool , Jute etc.

Polyester fabric

4.3 Polyester is a cost effective fabric that possesses a wide range of benefits such as good abrasion resistance, good electricity insulation properties, low creep and good weatherability. They are not affected by strong acids , alkalis and common industrial solvents**.**

Nylon fabric

4.4 Nylon has exceptional abrasion resistance, as well as resistance to most strong bases, dilute acids and solvents, insects and most micro-organisms. Nylon can be blended with other fibers to impart strength, high flexibility and abrasion resistance to the fabric.

Rayon fabric

4.5 Rayon is moisture absorbent and does not build up static electricity. Rayon can be manufactured to possess varying levels of properties such as strength, ignition resistance and absorbency.

Silk fabric

4.6 Silk is one the strongest natural fibers and has a relatively high standard moisture regain. Silk is resistant to mild dew and many bacteria and fungi, but is attacked by rot-producing bacteria.

Cotton fabric

4.7 Cotton fabrics are resistant to strong alkali,organic solvents, bleaches and heat. Cotton is suitable for blending with other materials to achieve unique combinations not found in other materials alone.

4.8 The chemicals used for coating are PVC (Vinyl), Polyurethane (PU), Acrylic , Rubber etc.

PVC (Polyvinyl Chloride) coating material

4.9 PVC is the most widely used coating material because of its low cost , versatility and performance properties. It is strong ,durable, abrasion and moisture resistant, and electrically non- conductive. Vinyl can

be produced in almost any colour, with the end products ranging from opaque to crystal clear.

PU (Polyurethane) coating material

4.10 Polyurethane coatings are resistant to ozone, hydrocarbons, moderate chemicals, fats, oils and greases, possess excellent low-temperature crack resistance, outstanding tensile strength, abrasion resistance, tear strength and elongation. Urethane materials can be formulated for a number of special properties including dielectric sealability, high and low coefficients of friction and vibration dampening.

Acrylic coating material

4.11 Acrylics are high-heat and oil resistant specialty materials. The most outstanding feature of acrylic coatings is the ability to resist the effects of hot oils, including those containing sulphur and its colour retention ability.

Rubber Coated Fabrics

4.12 Natural rubber coatings are applied to impart outstanding tensile strength, abrasion resistance, resilience and resistance to flex fatigue and compression set. They are generally resistant to moderate chemicals, organic acids, alcohols, ketones and aldehydes.

Neoprene coatings

4.13 Neoprene compounds can be formulated for good resistance to ozone, oxygen, heat weathering and many chemicals. They can provide good resilience, tensile strength and compression set resistance.

Silicone rubber coatings

4.14 Silicone rubber is a specialty elastomer designed to remain serviceable over a extremely wide range of temperatures ranging from 400 degree F upto 9000 degree F. They are often used in medical applications because of their high degree of biocompatibility.

Major Applications and End Usages

- Hoardings and Signages,
- Soft Luggage material (Nylon / Polyester),
- Awnings and Canopies,
- Fire Retardant textiles (Coated),
- Scaffolding nets,
- Tarpaulins, Tents ,Umbrella fabrics, Airbags, Parachute fabrics etc.

Emerging Market Potential - Global and Indian

Global Market Potential :

4.15 The global market for coated fabrics is around 1.9 billion square yards (year 2000) valued at $ 8.26 billion .

4.16 Projected global demand for coated fabrics by year 2005 projected at $ 9.7 billion growing at a CAGR of 3.02% .

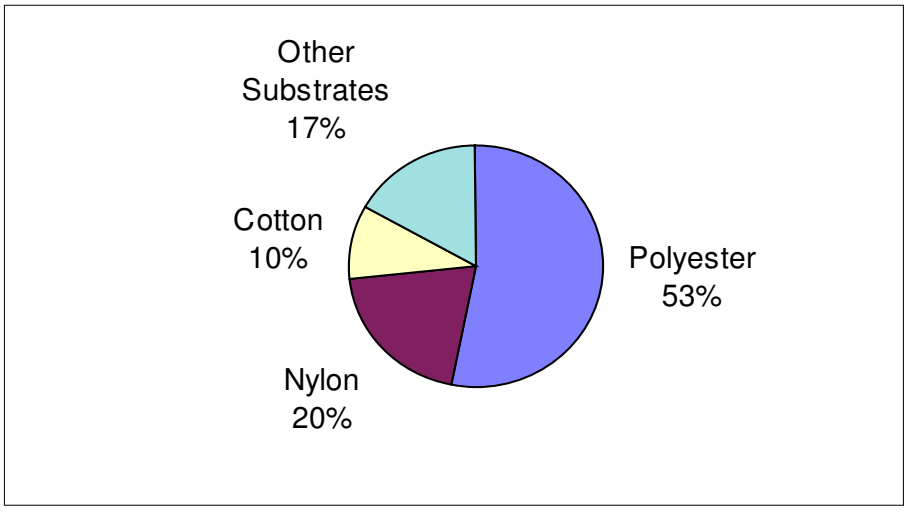
4.17 US market which accounts for 30% of the total global demand is expected to increase marginally from 570 million square yards in 2000 to 630 million square yards by 2005. Likewise, the West European market of around 25 % is also expected to grow at around 2.8% per annum for the corresponding period.

4.18 The demand for coated fabrics in the Asia Pacific region (including Japan) was estimated to be 425 million square yards (22% market share) in 2000 and is expected **to reflect much higher growth rates with China and India emerging as the target markets.**

4.19 Korea has already emerged as a major producer and exporter due to low cost availability of Polyester yarns and fabrics.

4.20 **Non Rubber Coated fabrics (PVC, PU and Acrylic) accounted for more than 80% of the total sales in** 2002. PVC (Vinyl) will continue to be the dominant coating material since Vinyl coated fabrics offer good performance at a modest price in variety of applications**.**

4.21 As an illustration, it may be stated that in the largest US market the composition of substrates (Base fabric) used are:



Source : Freedonia Report

Indian Market Potential :

4.22 The Indian technical textile value added coated fabric market segment which is at a **take off stage** has the potential for the manufacturing base to meet the growing domestic market and also emerge as a exporter to developing countries.

4.23 The **summary** of Indian market potential for coated fabrics for some of the selected categories is presented below:

Major Products*	**Indian Market Potential**						**Type of fabric**
	2001-2002		**2003-2004 (Est.)**		**2007-2008 (Proj.)**		
	Qty	**Value (Rs. Cr.)**	**Qty**	**Value (Rs. Cr.)**	**Qty**	**Value (Rs. Cr.)**	
Hoardings & Signages (100% TTC))	5 mn.mt.	50.00	8 mn.mt.	80.00	20 mn.mt.	200.00	Knitted / Woven
Scaffolding Nets (100% TTC)	40000 sq.mt.	0.10	53000 sq.mt.	0.13	90000 sq.mt.	0.25	Knitted / Woven
Awnings & Canopies (100% TTC)	45454 sq.mt.	1.00	65909 sq.mt.	1.45	136363 sq.mt.	3.00	Woven / Knitted
Soft Luggage Material (100% TTC)	5 mn.mt.	60.00	7 mn.mt.	84.00	11.50 mn.mt.	138.00	Woven / Nonwoven / Knitted
Sub - Total		**111.10**		**165.58**		**341.25**	

Source: Market Survey Feedback

Major Products*	Indian Market Potential						Type of fabric
	2001-2002		2003-2004 (Est.)		2007-2008 (Proj.)		
	Qty	Value (Rs. Cr.)	Qty	Value (Rs. Cr.)	Qty	Value (Rs. Cr.)	
Fire Retardant Textiles							Woven / Knitted / Nonwoven
A. F.R. Apparels (100% TTC)	1 Mn.	27.50	1.10 Mn.	30.25	1.40 Mn.	38.50	Woven / Knitted
B. Speciality F.R. Apparel for Defence (100% TTC)	50000 No.	150.00	75000 Nos	225.00	175000 Nos.	525.00	Woven / Knitted
C. F.R. Upholstry/ Furnishing (General Public (100% TTC)	0.5 Mn.mt.	20.00	1.00 Mn.mt.	40.00	5.00 Mn.mt.	200.00	Woven / Knitted / Non Woven
Sub Total F.R.	**---**	**197.50**	**---**	**295.25**	**---**	**763.50**	
Tarpulins for applications such as truck covers, food storage and industrial machinery covering, temp. Shelters, etc		1000.00		1100.00		1300.00	
Tuffeta (Umbrell, wind cheater,triangular cut panels, etc.)	490 tonnes	9.13	540 tonnes	10.00	940 tonnes	17.50	
Grand Total	**-**	**1317.73**	**-**	**1570.83**	**-**	**2422.25**	

Source: Market Survey Feedback

Major Producers

4.24 The major producers of coated fabrics are SRF Limited, Entremonde Polycoaters Limited, Kusumgar Corporates, Texon Products Limited, Haren Textiles Pvt. Limited, Rajasthan Spinning and Weaving mills (mainly from fire retardant Virgin PSF fibre), Jayshree Textiles, Digjam Industries, Netlon India Limited etc.The market coverage by these companies for the above mentioned product categories is not significant and the country's dependence on imports continue.

4.25 VISHMAT - Vishnu Fabrics (P) Limited (Chennai) is India's first and only **glass fibre advanced textiles coating (GEAT)** plant (**100% EOU**). GEAT has special applications in geotextiles / geogrids, antifire /anti flame for insulation, window screens / insect screens, wall cladding and plaster reinforcement, scrim fabric, etc.

4.26 Vishmat has developed and patented its own indigenous technology and can be made available to European / American corporations. This company has annual sales of Rs 75-100 crores. ASTM/DIN standards are followed and the company has basic testing facilities.

SECTION II : COATING TECHNOLOGY AND EQUIPMENT SUPPLIERS

Technology

4.27 Manufacturing of coated fabrics is a technology intensive process with more that 35 different types of manufacturing (coating heads) available for use. The most popular coating methods are Roller systems, Knife coating, Rotary Screen printing, Dipping coating system etc.

4.28 The state of the art technology and machinery for coating for technical textile products **is not available indigenously.** Hence, TECS initiated correspondence with some of the global suppliers such as :

1. **Stork Prints, Netherlands**
   Local Agency : A T E Marketing Private Limited
   A-19 , CTS No 689 , Veera Desai Marg,
   Andheri (West), Mumbai - 400053
   Phone no : 5676 6100
2. **Brueckner Trockentechnik Gmbh & Co. KG , Germany**
   Local Agency : ICC International Agencies Limited
   51, Udyog Bhavan, Sonawala Lane ,
   Goregaon (West), Mumbai - 400063
   Phone no : 56681173/74
3. **Herbert Meyer Machines Gmbh, Germany**
   Local Agency : R R International
   M - 59, South City -1
   Gurgaon -122001. Haryana.
   Phone no : 124-2380962
4. Coatema Machinery Gmbh , Germany
5. Monti Antonio S p A, Italy
6. Zimmer Maschinenbau Gmbh, Austria.

4.29 TECS has received responses from some of these suppliers and had preliminary discussions with Stork who is a globally recognised market leader and considered as a **Bench Mark** in coating technology.

4.30 Stork has recommended a **wider choice** of substrates, chemicals and technology (Rotary Screen and Knife coating) and the budgetary indicative quotation is competitive . Its modular design makes it easy to adapt for specific applications for future

developments and also simplifies integration into many different types of production lines.

4.31 **Stork CFT** is a multi-functional coating and finishing machine and offers an exceptionally wide choice of substrates and techniques (Rotary Screen and Knife Technology). The Stork CFT machine is very easy to adapt for specific applications or future developments and also simplifies integrating into many different types of production lines and is therefore considered as a **Bench Mark Technology** in the coating machines.

4.32 **With a view to incorporating diversified substrata of fabric material and minimising the investment, it is recommended that the main coating plant may be imported and the other supporting system sourced indigenously as explained below:**

List of Main Process Equipments

Technical Data:

Maximum Web Width : 1850 mm

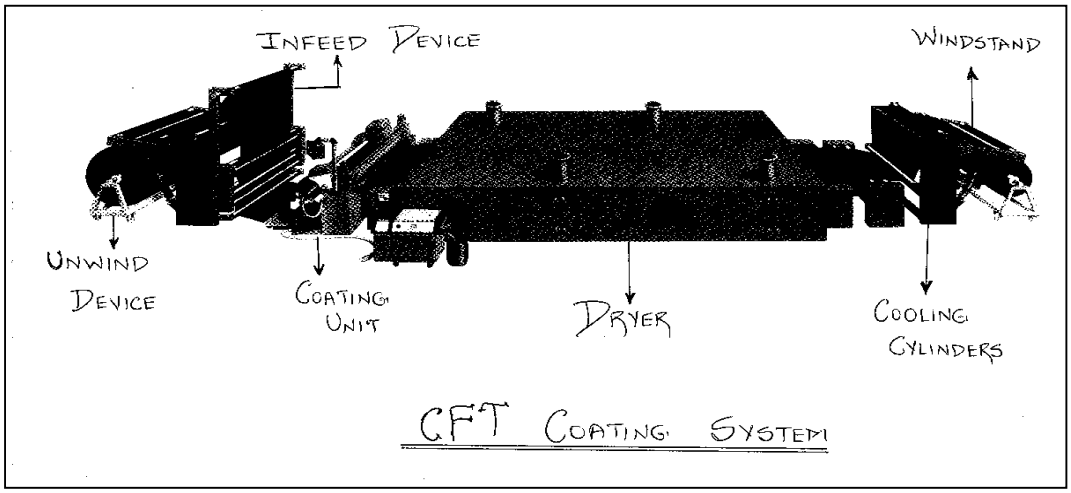
Standard Repeat Size : 640/914 mm

Mechanical speed : 5-100 m/min (Recommended : 10-20 mt / min)

Main Coating Equipment :

1. **One Rotary Screen Coating Unit (**Stable foam coating/Paste coating),
2. **Foam** impregnating with closed squeeze system,
3. Stable foam coating with screen or **knife** (Knife coater, mounted onto the CFT's rear frame part),
4. Foam Processor FP-3/300,
5. Indigenous equipment based on the drawings given by Stork:
    - Infeed Device
    - Cooling Cyclinders
    - Dryers (5 Chambers)
    - Laminating Calender
    - Edge Trimming Device
    - Rotary Engraving plant

4.33 The diagramatic plant description is as follows:



Recommended Economic Size:

Recommended Minimum Economic Size

4.34 It is recommended that the coating plant will have a designed capacity of **900 mtrs per hour** (Range varying from 10 - 20 mts per min : 600 - 1200 mtrs per hour depending upon the coating thickness, substrate used and other production parameters).

4.35 Under Indian operating conditions it is safer to assume machine efficiency factor of **75%,** and therefore the production would be **675 mtrs per hour**.

4.36 The plant would operate in three shifts, 24 hours and 330 working days in a year.

Investment in Process Plant and Machinery.

4.37 As per the discussions with the equipment supplier and the indicative budgetary quotations, **the investment in the process plant and machinery will be Rs 2.23 crores,** including discount of 20%. This cost includes imported coating unit and indigenous sourcing of equipments like infeed device, cooling cylinders, dryers, laminating calender, edge trimming device and rotary engraving plant. Taking into account the CIF value, the custom duty (5%), inland transportation and loading/unloading (2%), erection and commissioning (5%), **the installed cost of process equipment would be Rs 2.55 crores.**

4.38 The entrepreneur if desired can install a **lamination unit** of Meyer at a FOB cost of Euro 186,500 (Rs 1.02 crores) over and above the cost of the coating plant.

SECTION III : PROJECT COST & PROFITABILITY PROJECTIONS

Land

4.39 The total requirement of land for this project keeping in mind the possible future expansion is around 2000 Sq. Mtrs. (0.5 acres).

4.40 Based on the available information the cost of land is assumed at Rs 1200 per square meter (including the developmental cost).Depending on the exact location of the project to be determined by the promoter the land cost could be higher or lower. Hence the total cost of developed land will be **Rs 0.24 crores.**

Buildings

4.41 The building area comprising of main factory building, godowns, office , R & D labs / In-house Testing centre etc. would be 1000 Sq. Mtrs. The cost of construction would again vary depending on the structure and the materials to be used. It has been assumed that the average cost of construction would be Rs 4500 per sq. mtr. Thus the total cost of building and other civil works would be around **Rs 0.45 crores**.

Plant and Machinery

4.42 Details of Plant and machinery as well as technology required for the project have been presented in earlier Section II. The installed cost of plant and machinery would be **Rs 2.55 crores.**

4.43 Apart from the main process equipments the utilities required are

- Electricals,
- Piping Systems,
- Water supply System,
- Compressors,
- Fire Fighting equipments,
- Effluent Treatment Plants,
- Other miscellaneous equipments

4.44 The provision on this count is works out to **Rs 0.13 crores.**

Testing, Research and Development Facilities

4.45 The Testing and R & D facilities would call for an investment of around **Rs 0.27 crores**. The various machines required under this head are listed below along with the indicative prices of the test.

	Testing Equipment
1	Vertical Flammability Tester
2	Flex Abrasion Machine
3	Flex Abrasion Tester
4	Crock Meter
5	Cone Measuring Cylinder
6	Bundesmann Tester & Spray Tester
7	Other equipments such as Ovens, UTM etc.
	TOTAL COST : Rs 26.7 Lakhs

Miscellaneous Fixed Assets

4.46 The items included are Furniture and fixtures, Office equipments, Air Conditioners etc. and the provision made is around **Rs 0.10 crores**.

Project Engineering and Consulting

4.47 Under this head the items included are the fees and expenses on account of Architect fees, project engineering and management (both local and overseas), detailed project reports etc. .

Preliminary & Preoperative Expenses

4.48 The items included under this head are company formation expenses, public issue expenses (if any), interest during construction, pre production expenses during the implementation phase etc. .

Contingency Expenses

4.49 Depending on the gestation period and further detailing of the project cost by the promoter, the contingency provision has been made at the rate of 10%.

Margin Money for Working capital

4.50 The margin money for working capital forming part of the total project cost would be **Rs 0.72 crores**. [**Exhibit 4.3**]

Total Project Cost (Total Investment)

4.51 The total project cost as given in **Exhibit 4.1** would be **Rs 6.58 crores**.

Project Funding And Financing Pattern

4.52 It has been assumed that the project would be financed through long term funds and Equity participation by the Promoter / Public. The technical textile sector being a high priority area , it is assumed that a Debt- Equity ratio of 1.5 : 1 would be feasible. (However the sensitivity analysis has also been presented for 1 : 1 and 2 : 1 Debt Equity ratios.).

Sales , Profitability And Sensitivity Analysis

Sales Realisation and Turnover

4.53 As per the details available from the Technology and Equipment suppliers the economic size of a plant is **900 mtrs/hour**.

4.54 Under the Indian conditions, it is assumed that the machine would operate at an **efficiency level of 75%.** Hence the production from the plant would be **675 mtrs/hour**.

4.55 The plant would operate on **Three-shift basis and 330 workings days** in a year.

4.56 The capacity utilisation for the 1st year is assumed at 50% and thereafter for the 2nd, 3rd and 4th year onwards 60%, 75% and 90% respectively.

4.57 The coating plant has the flexibility to take up wide variety of substrate material such as Cotton, Polyester, Nylon etc. in different GSM ranges.

4.58 In terms of end products the machinery can produce the following items:

Products	Indicative Price Range (Rs / sq. mt.)
Signage	45 - 70
Soft Luggage Material	30 - 160
Awnings	110 - 180 (and above)
Fire Retardant Textiles (Using Virgin Fire Retardant PSF)	200 - 350
Tarpaulins	70 - 230

4.59 The price assumption is for Signage material at **Rs 50 per sq. MT** (Net of excise duties and other taxes). The similar exercise can be carried out for other products as well and there is unlikely to be major difference in the margins for similar product range.

4.60 The details of sales turnover projected are given in **Exhibit 4.2**.

Cost of Production

Major Raw materials

4.61 The main raw materials used and the corresponding prevailing prices as an indicator are as follows:

Major Raw Materials	Prices
Polyester Fabric	Rs 25 per sq. mt (Range of Rs 20-25 per sq. meter or more depending on the fabric)
PVC	Rs 45 per kg (Range of Rs 40 - 50 per kg)

* Prices are net of Excise duties and other taxes

4.62 The major suppliers of raw materials are :

Polyvinyl Chloride (PVC)

(a) Reliance Industries Limited
(b) IPCL
(c) Chemplast Industries Limited
(d) Finolex Industries Limited

Polyester

(a) Reliance Industries Limited.
(b) Indo-Rama Synthetics Limited.

Conversion Cost

4.63 The conversion cost will include the cost of power, water, other utility items, chemicals and additives, consumables etc. which is assumed at **Rs 10 per sq. mtr.**

Manpower, Salaries and Wages

4.64 The manpower requirements and the salary structure is given in **Exhibit 4.4**.

4.65 The total manpower requirement comprising of supervisors, machine operators, helpers and the managerial cadre would be 26 nos. And the wage bill would be Rs 34 lakhs.

Factory and Overhead Expenses

4.66 The items covered under this head are repairs and maintenance, Establishment expenses, stationaries, travel expenses, packaging expenses etc.

Marketing and Promotional Expenses

4.67 The promotion of coated fabrics will call for expenditure on this account and a provision of 10 % of sales has been made uniformly over the years.

Interest and Depreciation

4.68 The prevailing interest rate for long term and short term borrowed funds is assumed at **5% and 11% per annum** (Technology Upgradation Fund).

4.69 The repayment of loans has been assumed for 10 years with two year moratorium (2+8).

4.70 The depreciation rates as per the Company Law and Income-Tax Ready Reckoner have been worked out by Straight Line and WDV Method.

4.71 The current corporate tax rate is assumed at 35 % and the surchage is assumed at 2.5% per annum.

Profitability , Break-even , IRR and Payback :

4.72 The **Sales turnover** increases from **Rs 13.10 Cr** in the first year to **Rs 23.58 Cr**. from the 4 th year onwards.

4.73 The **PBT** increases from **Rs 0.79 Cr**. in the first year to **Rs. 3.20 Cr.** from the 4 th year onwards. (See **Exhibit 4.5**)

4.74 The **Break Even** of the project is at **52.85%.**

4.75 The **Internal Rate of Return (IRR)** has been worked out at **27.25%**

4.76 The **Payback period** for the project is **3.90 years .**

Sensitivity Analysis

4.77 The sensitivity analysis has been presented in the **Exhibit 4.6**.

DEVELOPMENTAL AND PROMOTIONAL MEASURES.

4.78 For the future development of Indian Technical Textiles sector, setting up of a **state-of-the-art** Coated Fabric projects will be one of the pre requisites.

4.79 **India** continues to remain **dependent on the imported coated fabrics** required for Signage and Hoardings, Soft Luggage material, Awnings and Canopies etc. . Hence setting up of these coated fabrics projects will not only indigenise the domestic market but also provide opportunities for exports.

4.80 For India to emerge as a globally competitive player , high tenacity polyester (600 - 1800 D) and nylon filament yarn (420 - 168 D) should be made available at international prices and should cover the coating materials like PVC, PU, Acrylic, Rubber (Neoprene, Silicone etc.) and other base raw materials like Caprolactum , Nylon chips , Spin finish oil etc.

4.81 For the protection of domestic technical textiles sector it would be appropriate to **curb the imports of sub standard coated fabrics** used for certain applications like Signage and Hoardings.

4.82 In one of the discussions with the largest producer of Soft Luggage material it was pointed out that the **advantages of global players** over Indian manufacturers are :

- Good quality yarn availability,
- Sophisticated machinery,
- Easy availability of raw materials at competitive prices,
- Mass Production reduces overhead costs,
- Better Productivity.

4.83 Normally each coated fabric project has its own R&D and Testing facility for regular usage. However organisations like SASMIRA, BTRA, Wool Research Association (WRA) should also be equipped with state of the art common testing facilities to meet the requirements of the industry.

4.84 For the coated fabrics sector there are no set regulatory norms at the International or National Level and it is for the individual companies to follow the guidelines as per the technology suppliers on the standards to be followed.

4.85 The technical manpower required for setting up these projects or for the national level R&D / Testing centres is available locally.

.

EXHIBIT 4.1

PROJECT COST
(LAND, BUILDINGS, PROCESS PLANT & MACHINERY, UTILITIES & OTHER ASSETS)

		Project Cost (Rs. Cr.)
1	**Land**	**0.24**
	Area: 2000 Sq Mtrs	
	Rate: (Rs.1200 /Sq. Mtr)	
2	**Buildings**	**0.45**
	Plant Area, Office, Godown, Lab, Service Area etc.)	
	Built-up Area : 1000 Sq. Mtrs	
	Avg Rate : Rs. 4500 /Sq. Mtrs	
3	**Process Plant & Equipment**	**2.55**
4	**Utility & Other equipments (5%)**	**0.13**
	(Power, Water, Compressor, Humidity Control,	
	Fire Fighting, Material Handling etc.)	
5	**Testing Facilities (In-house)**	**0.27**
6	**Misc. Fixed Assets**	**0.10**
	(Furniture & Fixtures, Office Equipment, etc.)	
7	**Project Engineering & Consultancy charges (2.5%)**	**0.08**
8	**Preliminary & Pre-operative Expenses**	**0.40**
	(Company Formation, Interest during construction,	
	pre-production expenses, etc.)	
9	**Contingency (10 %)**	**1.64**
10	**Total**	**5.86**
11	**Margin Money for Working Capital**	**0.72**
12	**Total Project Cost**	**6.58**

EXHIBIT 4.2

ESTIMATION OF SALES REVENUE

(Rs. Cr.)

ITEM	YEAR OF OPERATION									
	I	II	III	IV	V	VI	VII	VIII	IX	X
Average Production per hour (sq mt)	900	900	900	900	900	900	900	900	900	900
75% efficiency	675	675	675	675	675	675	675	675	675	675
Capacity Utilisation	50%	60%	75%	90%	90%	90%	90%	90%	90%	90%
Actual Production per hour	338	405	506	608	608	608	608	608	608	608
Production per day (sq mt)	8100	9720	12150	14580	14580	14580	14580	14580	14580	14580
Production for 330 working days (sq mt)	2673000	3207600	4009500	4811400	4811400	4811400	4811400	4811400	4811400	4811400
Selling Price (Rs/sq mt)	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00
Sales Revenue (Rs. Cr)	**13.37**	**16.04**	**20.05**	**24.06**	**24.06**	**24.06**	**24.06**	**24.06**	**24.06**	**24.06**
Value Loss (2%)	0.27	0.32	0.40	0.48	0.48	0.48	0.48	0.48	0.48	0.48
Net Sales Revenue (Rs. Cr)	**13.10**	**15.72**	**19.65**	**23.58**	**23.58**	**23.58**	**23.58**	**23.58**	**23.58**	**23.58**

EXHIBIT 4.3

REQUIREMENT OF WORKING CAPITAL

(Rs.Cr)

ITEM	NO. OF	MARGIN	YEAR I			YEAR II			YEAR III			YEAR IV			YEAR V		
	MONTHS	(%)	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK
			REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE
Factory Related																	
Raw materials & other com.	1.00	25.00	0.61	0.15	0.45	0.73	0.18	0.55	0.91	0.23	0.68	1.09	0.27	0.82	1.09	0.27	0.82
Goods in process	0.25	25.00	0.21	0.05	0.16	0.25	0.06	0.19	0.31	0.08	0.23	0.37	0.09	0.27	0.37	0.09	0.27
Finished Goods	1.00	25.00	0.96	0.24	0.72	1.14	0.28	0.85	1.40	0.35	1.05	1.62	0.41	1.22	1.62	0.41	1.22
A/c Receivable	1.00	25.00	1.09	0.27	0.82	1.31	0.33	0.98	1.64	0.41	1.23	1.96	0.49	1.47	1.96	0.49	1.47
Cash in hand																	
Salaries & wages	1.00	0.00	0.03	0.00	0.03	0.03	0.00	0.03	0.03	0.00	0.03	0.03	0.00	0.03	0.03	0.00	0.03
Utilities	1.00	0.00	0.15	0.00	0.15	0.18	0.00	0.18	0.23	0.00	0.23	0.27	0.00	0.27	0.27	0.00	0.27
Advertising & Promotional Expe	1.00	0.00	0.11	0.00	0.11	0.13	0.00	0.13	0.16	0.00	0.16	0.16	0.00	0.16	0.16	0.00	0.16
Admin. Overheads	1.00	0.00	0.07	0.00	0.07	0.07	0.00	0.07	0.07	0.00	0.07	0.07	0.00	0.07	0.07	0.00	0.07
Total Requirement			**3.16**	**0.72**	**2.44**	**3.77**	**0.86**	**2.91**	**4.68**	**1.06**	**3.61**	**5.50**	**1.26**	**4.24**	**5.51**	**1.26**	**4.25**

EXHIBIT 4.3 (CONTD...)

REQUIREMENT OF WORKING CAPITAL

(Rs.Lakhs)

ITEM	NO. OF	MARGIN		YEAR VI			YEAR VII			YEAR VIII			YEAR IX			YEAR X	
	MONTHS	(%)	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK
			REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE
Factory Related																	
Raw materials & other	2.00	25.00	2.18	0.55	1.64	2.18	0.55	1.64	2.18	0.55	1.64	2.18	0.55	1.64	2.18	0.55	1.64
Goods in Process	0.50	25.00	0.73	0.18	0.55	0.74	0.18	0.55	0.74	0.18	0.55	0.74	0.18	0.55	0.74	0.19	0.56
Finished Goods Stock	1.00	25.00	1.62	0.41	1.22	1.63	0.41	1.22	1.57	0.39	1.18	1.58	0.39	1.18	1.58	0.39	1.18
A/c Receivable	1.00	25.00	1.96	0.49	1.47	1.96	0.49	1.47	1.96	0.49	1.47	1.96	0.49	1.47	1.96	0.49	1.47
Cash in hand																	
Salaries & wages	1.00	0.00	0.04	0.00	0.04	0.04	0.00	0.04	0.04	0.00	0.04	0.05	0.00	0.05	0.05	0.00	0.05
Utilities	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Advertising & Promotional	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Admin. Overheads	1.00	0.00	0.16	0.00	0.16	0.16	0.00	0.16	0.10	0.00	0.10	0.10	0.00	0.10	0.10	0.00	0.10
Total Requirement			**6.97**	**1.63**	**5.35**	**6.98**	**1.63**	**5.35**	**6.87**	**1.61**	**5.26**	**6.88**	**1.61**	**5.26**	**6.89**	**1.62**	**5.27**

EXHIBIT 4.4

MANPOWER REQUIREMENTS

	Nos	Monthly	Total Mon.	Annual
General Manager	1	30000	30000	360000
Production Manager	1	20000	20000	240000
Machine Operator	3	6000	18000	216000
Machine Helper (Semi Skilled)	9	3000	27000	324000
R&D, Testing	1	8000	8000	96000
Marketing & Sales				
Marketing Head	1	25000	25000	300000
Sales Team	3	12000	36000	432000
Clerical Staff	4	6000	24000	288000
Other Staff	2	3000	6000	72000
Maintenance (Tech. & Non-Tech.	1	10000	10000	120000
TOTAL	**26**		**204000**	**2448000**
Fringe Benefits (40 % of the above)				979200
	Total Wage Bill (Annual) Rs.:	Salary + Other Benefits =		**3427200.00**
	Total Wage Bill (Annual) Rs. Cr.:			**0.34272**

EXHIBIT 4.5

PROFITABILITY STATEMENT AND COMPUTATION OF TAX

(Rs.Cr)

ACCOUNT HEAD	FINANCIAL YEAR OF OPERATION									
	I	II	III	IV	V	VI	VII	VIII	IX	X
Revenue										
Net Sales Turnover	13.10	15.72	19.65	23.58	23.58	23.58	23.58	23.58	23.58	23.58
Total Revenue	13.10	15.72	19.65	23.58	23.58	23.58	23.58	23.58	23.58	23.58
Expenses										
Raw Materials	7.27	8.72	10.91	13.09	13.09	13.09	13.09	13.09	13.09	13.09
Salaries & wages	0.34	0.36	0.38	0.40	0.42	0.45	0.49	0.52	0.57	0.61
Power, Fuel, Stores & Other Expenses (including packing materials)	1.82	2.18	2.73	3.27	3.27	3.27	3.27	3.27	3.27	3.27
Marketing & Promotional Expenses	1.31	1.57	1.96	1.89	1.89	1.89	1.89	1.18	1.18	1.18
Factory & Office Overheads	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Interest on S.T. Loans	0.27	0.32	0.40	0.47	0.47	0.59	0.59	0.58	0.58	0.58
Cost of Sales	11.81	13.96	17.17	19.91	19.93	20.08	20.12	19.44	19.49	19.53
Depreciation (St.Line)	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29
Amort. of Expenses	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00
Interest on L.T Loan	0.20	0.20	0.19	0.16	0.14	0.11	0.09	0.06	0.04	0.01
Profit Before Tax	0.79	1.26	1.99	3.20	3.21	3.08	3.08	3.78	3.76	3.74
Tax	0.08	0.15	0.54	1.03	1.07	1.06	1.09	1.35	1.36	1.37
Profit After Tax	0.70	1.11	1.44	2.18	2.13	2.02	1.99	2.43	2.40	2.38
Dividend	0.00	0.00	0.13	0.13	0.13	0.26	0.26	0.26	0.26	0.26
Profits For Appropriation	0.70	1.11	1.31	2.04	2.00	1.75	1.73	2.16	2.14	2.11
COMPUTATION OF TAX										
Profit after interest before depreciation	1.08	1.55	2.27	3.49	3.50	3.37	3.37	4.07	4.05	4.03
Depr.(WDV) to be claimed	1.24	1.12	0.73	0.56	0.43	0.33	0.26	0.20	0.16	0.12
Depreciation claimed	1.08	1.12	0.73	0.56	0.43	0.33	0.26	0.20	0.16	0.12
Depr. carried forward	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Taxable Profit	0.00	0.43	1.55	2.94	3.07	3.04	3.11	3.87	3.90	3.91
Profit Before Tax (Book)	0.79	1.26	1.99	3.20	3.21	3.08	3.08	3.78	3.76	3.74
Minimum Alternate Tax	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tax (Actual)	0.00	0.15	0.54	1.03	1.07	1.06	1.09	1.35	1.36	1.37
Tax Provision	0.08	0.15	0.54	1.03	1.07	1.06	1.09	1.35	1.36	1.37

EXHIBIT 4.6

SENSITIVITY ANALYSIS

Items	Profit after Tax (PAT) (assumed at 90 % capacity)	Break Even (%)	Internal Rate of Return (IRR) (%)	Payback Period (Years)
NORMAL VALUES	2.18	52.85	27.25	3.90
Debt Equity Ratios				
(a) 2:1	2.16	53.11	27.33	3.89
(b) 1:1	2.19	52.45	27.12	3.92
Increase in Project Cost by 10 %	2.16	53.34	25.93	4.03
Decrease in Selling Price to Rs 45 per sq. mtr.	1.05	76.56	10.24	7.94
Increase in Selling Price to Rs 55 per sq. mtr	3.57	41.33	41.90	2.84

CIRCULAR WARP KNITTING PROJECT

SECTION I : PRODUCT BRIEF, APPLICATION AREAS AND MARKET POTENTIAL

5.1 The broad product categorization could be termed as Healthcare Enhancing and Rehabilitation Aid Products.

Product Range and Application Areas:

5.2 The product range could be grouped as follows:

- **Knee Calf and Ankle Support:** Knee Brace, Calf Support, Hinged Knee Caps, Elastic Knee Support, Elastic Tubular Knee Caps, Elastic Tubular Anklet, Vericose Veins Stockings, Heal Cushion, etc.
- Neoprene Supports: Ankle Wrap, Wrist Brace, Lumbar Belt, Knee Bracing
- Back Support: Lumbar Belt, Frame Back Support, Magnetic Body Belt, Orthopaedic Back Rest, Buttock Rest, Back Support and Shoulder Harness
- **Cervical Aids:** Collar with support with or without soft turkish fabric, Collar with adjustable chin support, cervical pillow,
- **Traction Kit and spares:** Pelvic Traction Belt, Water and Sand Weight Bags, Ankle Traction Belt, Foot / Skin Traction Kit, etc.
- Wrist and Elbow Support: Elastic Wrist Splint, Wrist Brace, Tennis Elbow Support, Wrist Binder with double lock, etc.
- Fracture Aids: Rib Belt, Adjustable Pouch Arm Sling, Shoulder Immobiliser, etc.
- **Sports Goods for Rehabilitation:** Weight Cuff, Stockings, Stockinet, etc.
- **General Aid:** Headache Band, Blood Pressure Cuff, Arm Board, Multipurpose Restraint Strap, etc.

5.3 Amongst the various Indian players engaged in the production of these products, **Vissco Rehabilitation Aids Pvt. Ltd.** is the market leader with a **share of around 30-40%.** Established around 25 years ago, Vissco is involved in the designing, manufacturing and marketing of Rehabilitation Aids and Hospital Furniture Items. The product range includes Back Supports, Cervical and Walking Aids, Neoprene Body Supports, Traction Kits and Exercisers to Hospital Beds, Gynaec Tables, Examination

Tables, Foldable Wheelchairs, Stretchers, etc. The company has an all India distribution network with the products available at all the leading chemists and hospitals.

5.4 **Omtex Healthwear Pvt. Ltd.** is also a leading manufacturer of Healthwear, Sportswear and Swimwear. They have an All India network of distributors, retailers and agents. Their products are exported to UK and other European countries.

5.5 **Norma D.N.D. Products** is involved in the manufacturing and marketing of soft orthotics products for different medical specialities like Compression Stockings, Compression Garments, Abdominal Binders, Braces, Knee Supports, Post Lipo-Suction Garments, Arm Sleeves, Lumbo-Sacral Belt, etc.

5.6 **Leela and Co. (Surat)** was established in 1960 and was the first company to manufacture elastic knee cap, anklet, elastic jacquard stockings. The company manufactures and exports Stocking, Knee Caps, Wrist Band, Ankle Supporters, Corset, Abdominal Belt, Thumb Supporters, Belt-B-Velcro.

5.7 **Sabar Healthcare and Rehabilitation Aid Products**, part of Sabar Group was established in 1990 with an in-house production unit manufacturing Abdominal Surgical Belt, Lumbar Sacro Belt, Frame Back Support, Shoulder/Ankle Support, Back Guard, Tennis Elbow Support, Vericose Vein Stocking, etc.

5.8 Other players like Tyar Orthopaedic Ltd. (Punjab), Ronak Surgicals Ltd. (Mumbai), Mukta Rehabilitation Aids (Mumbai), Dynamic Orthopaedic Pvt. Ltd. (Kerala), also have a presence in this market.

Market Size and Potential:

5.9 As per the TECS field survey and discussions with the knowledgeable persons from the industry, the all India market for these compression garments used for variety of applications was reported to be around **Rs. 40-50 crores** (Average Rs 45 Cr.) in 2002 - 03 (2001-02 : Rs. 40 crores).

5.10 The industry market leaders anticipate a growth rate of **10-15% per annum** (Average: 12%) and accordingly the market potential is expected to be **Rs 50.40 crores in 2003-04 (Est.) and Rs 70.80 crores by 2007-08 (Proj.)**

5.11 The market share of **knee caps, vericose veins stockings, ankle and elbow support and stockings** for medical and fashion purposes is reported to be **40-45%.** Hence the market for these products is forecasted to increase from the current Rs 18.00 crores (2001 - 02) to Rs 22.68 crores (2003-04) and Rs 31.86 crores (2007-08)

5.12 With the increasing awareness about the products and its applications in various fields like fashion, medical and sports, the industry expects a healthy growth in the coming years.

5.13 The concept of seamless knee caps and stockings as well as usage of better quality raw materials manufactured on state-of-the-art warp knitting machines would change the profile of this industry. Our survey has revealed that there is total lack of awareness about the seamless products popularly used abroad.

5.14 The hospitals, nursing homes and the retailers would welcome the new product range provided price-wise they are competitive with the products currently available in the market.

5.15 The indicative price range of the products available in the Indian market is as given below:

Sr. No.	Item	Indian Market Price (Rs.)
1.	**Back Support**	400.00 - 600.00
2.	**Pelvic Traction Kit and Spares**	
A.	Pelvic Traction Belt	280.00
B.	Ankle Traction Holder	140.00
C.	Foot Traction Strip	70.00
3.	**Cervical Aids**	120.00 - 250.00
4.	**Abdominal Support**	
A.	Belts (5” / 6” / 8”)	300.00 - 400.00
B.	Hernia Belt with Double Pad	360 .00
5.	**Knee Caps and Ankle Supports**	
A.	Knee Brace Small/Long(L/M/S)	330.00 - 410.00
B.	Elastic Knee Support	180.00
C.	Elastic Knee Cap (Tubular)	160.00
D.	Elastic Vericose Veins Stocking (Per Pair)	500.00

5.16 The international price of these products as marketed by Lucas are: Euro $ 40-50, which is Rs. 2750 per knee cap.

5.17 There is a need to promote these products by canvassing through the hospitals/nursing homes and the retail outlets focussing the campaigns on their benefits and the advantages offered.

5.18 The existing players would be keen to modernise their machinery by replacing with the state-of-the-art warp knitting machines subject to the viability of the project.

SECTION II : CIRCULAR WARP KNITTING TECHNOLOGY AND EQUIPMENT SUPPLIERS

Machinery Suppliers and Specifications:

5.19 The major global suppliers for Circular Warp Knitting Machinery are:

1. M/s Harry Lucas (Germany),
2. M/s Rius (Spain).

5.20 TECS has received response form the local representative of Harry Lucas; **Voltas Ltd.** whose technology has been used as a **Benchmark Technology.** These are the leading global players engaged in the manufacturing of circular warp knitted products and based on the industry feedback the above list is exhaustive.

5.21 The machines recommended by the local representative of Harry Lucas (Voltas) are:

- **RR2-FB-106+Jacquard** for manufacturing of cylindrical, conical and curved tubular fabric for knee cap, elbow cap and ankle protectors. This machine is equipped with two knitting systems and one rubber inlay.

  Machine Specification:

  - Programmed electronic control unit,
  - Programming of the fabric width by varying elastic tensions,
  - Programmable tuck control,
  - Fabric takedown unit,
  - Step-free drive with electromagnetic brake,
  - Revolving bobbin stand,
  - Two or three colour jacquard patterns with individual needle selection,
  - Electronically-controlled pre-feed device,
  - Knitting pockets

- RME for production of orthopaedic elastic stockings for medical and sports applications.

Machine Specifications:

- Programmed electronic control unit,
- Elastic yarn feed,

- One programmable selection bloc per inlay system,
- Vacuum pump (reinforced design),
- Stitch-adjustment per system,
- Individual needle selection,
- Bobbin stand, not fitted onto the machine

Recommended Minimum Economic Size:

5.22 The recommended minimum economic size for the circular warp knitting machines would be to manufacture **20 knee caps per hour** and **7.5 stockings per hour.**

5.23 The **detailed cost structure of the two machines** along with their outputs is given below:

Model RR2-FB-106+Jacquard to cover different sizes of knee caps

Sizes	No. of Machines	Machine Capacity/hr.	CIF Value -Euro $ (Machinery)	CIF Value (Rs. Cr.)
Knee Cap of 4”	1	20 knee caps	35000	0.1925
Knee Cap of 5”-6”	1	20 knee caps	37000	0.2035
Knee Cap of 9”	1	20 knee caps	41000	0.2255
Total			**11300**	**0.6215**

Model RME: Stockings for medical and sports applications

Sizes	No. of Machines	Machine capacity / hr.	CIF Value -Euro $ (Machinery)	CIF Value - Rs. Cr.
Stockings of 41/2"	1	7.5 stockings	57000	0.3135
Stockings of 5"	1	7.5 stockings	57600	0.3168
Stockings of 51/2"	1	7.5 stockings	59000	0.3245
Total			**173600**	**0.9548**

5.24 Thus the total cost of the machinery is seen to be **Rs. 1.42 crores (CIF),** inclusive of 10% discount offered by the machinery manufacturers. Taking into account the CIF value, the custom duty (5%), inland transportation and loading, unloading (2%), erection and commissioning (5%), **the installed cost of process equipment would be Rs. 1.60 crores.**

5.25 The seamless stockings are manufactured by circular warp knitting technology only. However in the Indian market currently, they are being made on woven machines

and the ends are stitched. Circular Knitting machines are also being used to manufacture seamless bandages, but they are reportedly of inferior quality.

5.26 The circular warp knitting machines are product specific and can be used for the above products only.

SECTION III : PROJECT COST AND PROFITABILITY PROJECTIONS

Land

5.27 The total requirement of land for this project keeping in mind the possible future expansion is around 750 Sq. Mtrs. (0.19 acres).

5.28 Based on the available information, the cost of land is assumed at Rs 1200 per square meter (including the developmental cost). Depending on the exact location of the project to be determined by the promoter, the land cost could be higher or lower. Hence the total cost of developed land will be **Rs 0.09 crore (Rs 9 lakhs).**

Buildings

5.29 The building area comprising of main factory building, godowns, office, R & D labs/In-house Testing centre etc. would be 350 sq. mtrs. The cost of construction would again vary depending on the structure and the materials to be used. It has been assumed that the average cost of construction would be Rs 4500 per sq. mt. Thus the total cost of building and other civil works would be around **Rs 0.16 crore (Rs 16 lakhs).**

Plant and Machinery

5.30 Details of Plant and machinery as well as technology required for the project have been presented in earlier Section II . The installed cost of plant and machinery would be **Rs 1.60 crores.**

5.31 Apart from the main process equipment, the other utilities and equipment required are:

- Hamming Machine (for smooth finish),
- Compressors,
- Dryer,
- Stabilizer,
- Electricals,

- Piping System,
- Water supply System,
- Fire Fighting Equipment etc.

5.32 The provision on this count works out to be **Rs 0.10 crore (Rs 10 lakhs).**

Miscellaneous Fixed Assets

5.33 Under this head the items included are furniture and fixtures, Office equipment, Air Conditioners etc. and the provision made is around **Rs 0.08 crore (Rs 8 lakhs)**.

Testing Facilities

5.34 These products would require **Yarn and Fabric Testing Facilities**, the cost of which is around **Rs 0.02 crore (Rs 2 lakhs)** and can be sourced locally.

Project Engineering and Consulting

5.35 Under this head the items included are the fees and expenses on account of Architect fees, project engineering and management (both local and overseas), detailed project reports etc.

Preliminary & Preoperative Expenses

5.36 The items included under this head are company formation expenses, public issue expenses (if any), interest during construction, pre production expenses during the implementation phase etc.

Contingency Expenses

5.37 Depending on the gestation period and further detailing of the project cost by the promoter, the contingency provision has been made at the rate of 10%.

Margin Money for Working capital

5.38 The margin money for working capital forming part of the total project cost would be **Rs 0.17 crores (Rs 17 lakhs).** [**Exhibit 5.3**]

Total Project Cost (Total Investment)

5.39 The total project cost as given in **Exhibit 5.1** would be **Rs 2.73 crores.**

Project Funding and Financing Pattern :

5.40 It has been assumed that the project would be financed through long term funds and Equity participation by the Promoter / Public. The technical textile sector being a high priority area , it is assumed that a Debt- Equity ratio of 1.5:1 would be feasible. (However the sensitivity analysis has also been presented for 1:1 and 2:1 Debt Equity ratios.)

Sales, Profitability and Sensitivity Analysis :

Sales Realisation and Turnover

5.41 As per the details available from the Technology and Equipment suppliers the economic size of the plant for:

- **Stockings** manufactured on three **RME machines** : 23 stockings
- **Knee Caps** manufactured on the three **RR2-FB-106+J machines:** 60 Knee Caps

5.42 Thus the plant has a designed capacity to produce 83 pieces per hour. (For details on product and machine configuration, please refer Section II).

5.43 Under the Indian conditions, it is assumed that the machine would operate at an efficiency level of 85%. Hence the production from the plant would be 70 pieces per hour.

5.44 The plant would operate on Three-shift basis and 300 workings days in a year.

5.45 The capacity utilisation for the 1st year is assumed at 50% and thereafter for 2nd, 3rd and 4th year onwards 60%, 75% and 90% respectively.

5.46 As per the market information, the assumptions with regard to the prices of stockings and knee caps is Rs. 200 and Rs. 150 respectively. Thus the weighted average selling price assumed for sales projections works out to Rs 164 per piece. (net of excise duties, sales tax and other incidental expenses).

5.47 It may be noted that these products are available in different sizes, hence there could be price variation from product to product. The indicative International prices as given by the technology supplier at Euro$40-50 per knee cap (Rs 2750) appear unrealistic for the Indian market.

5.48 The details of projected sales turnover as projected are given in **Exhibit 5.2**

Cost of Production:

Major Raw materials and their specifications:

5.49 Polyester and cotton core yarn are the main raw materials used in these products. The core rubber yarn is covered with either Polyester or Cotton depending on the application and the final product. The raw material mix and the specifications thereof are not readily available with the technology supplier.

5.50 The yarn thickness for feeder 1 is 3X90/f 48: 3-ply yarn with 90 dtx and having 48 filaments. While the yarn thickness for feeder 2 (lycra) is 2X90/f 48+; 2-ply yarn with 90 dtx and having 48 filaments.

5.51 These raw materials are used in different proportions depending on the final end product and as indicated by the technology supplier, the raw material cost is around 40% of the selling price. Accordingly the value of raw materials is around Rs 3.47 crores after accounting for a process waste of 5% (at full capacity).

5.52 Reliance Industries Ltd. is the major supplier of Polyester Filament Yarn, while the cotton yarn could be sourced from the local spinning mills. The neoprene rubber required is also locally available.

Conversion Cost

5.53 The conversion cost will include the cost of power, water, chemicals and additives, consumables, repairs and maintenance and other expenses etc. taken at 7.5% of the raw material cost.

Manpower, Salaries and Wages

5.54 The manpower requirements and the salary structure is given in **Exhibit 5.4**.

5.55 The total manpower requirement comprising the managerial cadre of supervisors, machine operators and helpers would be 29 persons. All the technical manpower is locally available and the wage bill would be **Rs 0.41 lakhs.**

Factory and Overhead Expenses

5.56 The items covered under this head are establishment expenses, repairs and maintenance, stationery, travel expenses, packaging expenses etc.

Marketing and Promotional Expenses

5.57 The promotion of technical textiles will call for expenditure on this count and a provision of 20% of the annual sales has been made uniformly over the years.

5.58 This would include the margins to distributors and retailers and promotion required at the hospitals, nursing homes and also for the customers directly.

Interest and Depreciation

5.59 The prevailing interest rate for long term and short term borrowed funds is assumed at 5% and 11% per annum [Project is included in the Technology Upgradation Fund (TUF)]**.**

5.60 The repayment of loans has been assumed for 10 years with a moratorium period of two years (2+8).

5.61 The depreciation rates have been worked out as per Company's act (SLM) and Income-Tax Ready Reckoner (WDV).

5.62 The current corporate tax rate is assumed at 35% and the surcharge is assumed at 2.5% per annum.

Profitability, Break-even, IRR, DSCR and Payback

5.63 As presented in **Exhibit 5.5**, the sales turnover increases from Rs 4.06 crore in the first year to Rs 7.30 in the fourth year.

5.64 The PBT increases from Rs 0.89 crore in the first year to Rs 1.51 crore in the fourth year.

5.65 The **Break Even** of the project is at **60.33%.**

5.66 The **Internal Rate of Return** (IRR) has been worked out at **34.84%.**

5.67 The **Payback period** for the project is **3.09 years.**

Sensitivity Analysis

5.68 The sensitivity analysis has been presented in the **Exhibit 5.6.**

DEVELOPMENTAL AND PROMOTIONAL MEASURES.

5.69 There is a need to create awareness about the state-of-the-art warp knitting machinery available for producing medical, sports and fashion compression garments of international quality.

5.70 The technology supplier needs to interact with the existing players for briefing on the techno-commercial advantages of these machines vis-à-vis conventional knitting machines presently used.

5.71 The Health Ministry and other concerned authorities should encourage the inclusion of these rehabilitation aids in the Medical Insurance which will encourage the patients to use these good quality products.

5.72 These seamless stockings and knee caps having better elasticity and advantages should be promoted by the Indian manufacturers, concerned authorities, medical community etc.

5.73 The hospitals, nursing homes and the orthopaedic doctors can play an important role in informing the patients at large about the merits of these products vis-à-vis the conventional items presently in use.

5.74 All the existing producers have their own in-house testing facilities.

5.75 Organisations like SASMIRA, BTRA, International Wool Research Association can take a lead for testing the products manufactured by international players and passing on the key inputs of the research to the local small players to enable them to manufacture these quality products in India.

5.76 Our study has revealed that there are no regulatory aspects or policy issues governing these products in India and abroad.

EXHIBIT 5.1

(LAND, BUILDINGS, PROCESS PLANT & MACHINERY, UTILITIES & OTHER ASSETS)

		Project Cost (Rs. Cr.)
1	**Land**	**0.09**
	(Area: 750 Sq. Mtrs.)	
	Rate: (Rs.1200 /Sq. Mtr)	
2	**Buildings**	**0.16**
	(Plant Area, Office, Godown, Lab, Service Area etc.)	
	Built-up Area : 350 Sq. Mtrs	
	Rate: (Rs.4500 /Sq. Mtr)	
3	**Process Plant & Equipment**	**1.60**
4	**Utility & Other equipments**	**0.10**
	(Compressor, Dryer, Stabilizer, Hamming Machine, etc.)	
5	**Misc. Fixed Assets**	**0.08**
	(Furniture & Fixtures, Office Equipment, etc.)	
6	**Testing Equipments**	**0.02**
7	**Project Engineering & Consultancy charges (2.5%)**	**0.05**
8	**Preliminary & Pre-operative Expenses (12%)**	**0.23**
	(Company formation, Interest during construction period,	
9	pre-production expenses, etc.)	
10	**Contingency (10 %)**	**0.23**
11	**Total**	**2.56**
12	**Margin Money for Working Capital**	**0.17**
13	**Total Project Cost**	**2.73**

EXHIBIT 5.2

ESTIMATION OF SALES REVENUE

(Rs. Cr.)

ITEM	YEAR OF OPERATION									
	I	II	III	IV	V	VI	VII	VIII	IX	X
Average Production per hr (pcs.)	83	83	83	83	83	83	83	83	83	83
85% efficiency	70	70	70	70	70	70	70	70	70	70
Capacity Utilisation	50%	60%	75%	90%	90%	90%	90%	90%	90%	90%
Actual Production per hr (pcs.)	35	42	53	63	63	63	63	63	63	63
Production per day (pcs.)	842	1010	1262	1515	1515	1515	1515	1515	1515	1515
Production for 300 working days (pcs.)	252450	302940	378675	454410	454410	454410	454410	454410	454410	454410
Selling Price (Rs/pc.)	164.00	164.00	164.00	164.00	164.00	164.00	164.00	164.00	164.00	164.00
Sales Revenue (Rs. Cr)	**4.14**	**4.97**	**6.21**	**7.45**	**7.45**	**7.45**	**7.45**	**7.45**	**7.45**	**7.45**
Value Loss (2%)	0.08	0.10	0.12	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Net Sales Revenue (Rs. Cr)	**4.06**	**4.87**	**6.09**	**7.30**	**7.30**	**7.30**	**7.30**	**7.30**	**7.30**	**7.30**

EXHIBIT 5.3

REQUIREMENT OF WORKING CAPITAL

(Rs.Lakhs)

ITEM	NO. OF	MARGIN	YEAR I			YEAR II			YEAR III			YEAR IV			YEAR V		
	MONTHS	(%)	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK
			REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE
Factory Related																	
Raw materials & other commodities	1.00	25.00	0.12	0.03	0.09	0.17	0.04	0.13	0.22	0.05	0.16	0.26	0.07	0.20	0.26	0.07	0.20
Finished Goods	1.00	25.00	0.24	0.06	0.18	0.32	0.08	0.24	0.39	0.10	0.29	0.45	0.11	0.34	0.46	0.11	0.34
A/c Receivable	1.00	25.00	0.34	0.08	0.25	0.41	0.10	0.30	0.51	0.13	0.38	0.61	0.15	0.46	0.61	0.15	0.46
Cash in hand																	
Salaries & wages	1.00	0.00	0.03	0.00	0.03	0.04	0.00	0.04	0.04	0.00	0.04	0.04	0.00	0.04	0.04	0.00	0.04
Utilities	1.00	0.00	0.01	0.00	0.01	0.01	0.00	0.01	0.02	0.00	0.02	0.02	0.00	0.02	0.02	0.00	0.02
Advertising & Promotional Expenses	1.00	0.00	0.07	0.00	0.07	0.08	0.00	0.08	0.10	0.00	0.10	0.12	0.00	0.12	0.12	0.00	0.12
Admin. Overheads	1.00	0.00	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01
Total Requirement			**0.80**	**0.17**	**0.63**	**1.03**	**0.22**	**0.80**	**1.27**	**0.28**	**0.99**	**1.50**	**0.33**	**1.17**	**1.51**	**0.33**	**1.18**

EXHIBIT 5.3 (Contd...)

REQUIREMENT OF WORKING CAPITAL

(Rs. Cr.)

ITEM	NO. OF	MARGIN		YEAR VI			YEAR VII			YEAR VIII			YEAR IX			YEAR X	
	MONTHS	(%)	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK
			REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE
Factory Related																	
Raw materials & other commodities	1.00	25.00	0.26	0.07	0.20	0.26	0.07	0.20	0.26	0.07	0.20	0.26	0.07	0.20	0.26	0.07	0.20
Finished Goods Stock	1.00	25.00	0.46	0.11	0.34	0.46	0.12	0.35	0.47	0.12	0.35	0.47	0.12	0.35	0.48	0.12	0.36
A/c Receivable	1.00	25.00	0.61	0.15	0.46	0.61	0.15	0.46	0.61	0.15	0.46	0.61	0.15	0.46	0.61	0.15	0.46
Cash in hand																	
Salaries & wages	1.00	0.00	0.04	0.00	0.04	0.05	0.00	0.05	0.05	0.00	0.05	0.06	0.00	0.06	0.06	0.00	0.06
Utilities	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Advertising & Promotional Expenses	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Admin. Overheads	1.00	0.00	0.12	0.00	0.12	0.12	0.00	0.12	0.12	0.00	0.12	0.12	0.00	0.12	0.12	0.00	0.12
Total Requirement			**1.51**	**0.33**	**1.18**	**1.52**	**0.33**	**1.19**	**1.53**	**0.33**	**1.20**	**1.54**	**0.34**	**1.20**	**1.55**	**0.34**	**1.21**

EXHIBIT 5.4

MANPOWER REQUIREMENTS

	Nos	Monthly	Total Monthly Salary	Annual
General Manager	1	30000	30000	360000
Machine Operators	6	6000	36000	432000
Machine Operators	6	6000	36000	432000
Material Handling	2	6000	12000	144000
R&D, Testing	2	8000	16000	192000
Marketing & Sales				
Marketing Head	1	25000	25000	300000
Sales Team	5	12000	60000	720000
Clerical Staff (Admin, Accounts etc)	2	6000	12000	144000
Other Staff (Peon, Security)	2	3000	6000	72000
Maintenance (Elec. & Mech.)	1	10000	10000	120000
TOTAL	**29**		**243000**	**2916000**
Fringe Benefits (40 % of the above)				1166400
Total Wage Bill (Annual) Rs. lakhs:	**Salary + Other Benefits =**			**4082400**
Total Wage Bill (Annual) Rs. Cr.:				**0.40824**

EXHIBIT 5.5

PROFITABILITY STATEMENT AND COMPUTATION OF TAX

(Rs.Cr)

ACCOUNT HEAD	FINANCIAL YEAR OF OPERATION									
	I	II	III	IV	V	VI	VII	VIII	IX	X
Revenue										
Net Sales Turnover	4.06	4.87	6.09	7.30	7.30	7.30	7.30	7.30	7.30	7.30
Total Revenue	4.06	4.87	6.09	7.30	7.30	7.30	7.30	7.30	7.30	7.30
Expenses										
Raw Materials	1.39	2.08	2.60	3.12	3.12	3.12	3.12	3.12	3.12	3.12
Salaries & wages	0.41	0.43	0.45	0.47	0.50	0.54	0.58	0.63	0.68	0.73
Power, Fuel, Stores & Other Expenses (inclu	0.10	0.16	0.20	0.23	0.23	0.23	0.23	0.23	0.23	0.23
Marketing & Promotional Expenses	0.81	0.97	1.22	1.46	1.46	1.46	1.46	1.46	1.46	1.46
Factory & Office Overheads	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Interest on S.T. Loans	0.07	0.09	0.11	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Cost of Sales	2.95	3.89	4.74	5.58	5.61	5.65	5.69	5.74	5.79	5.85
Depreciation (St.Line)	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Amort. of Expenses	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00
Interest on L.T Loan	0.08	0.08	0.08	0.07	0.06	0.05	0.04	0.03	0.02	0.01
Profit Before Tax	0.89	0.76	1.13	1.51	1.50	1.47	1.44	1.41	1.37	1.32
Tax	0.16	0.16	0.33	0.49	0.50	0.51	0.51	0.51	0.50	0.49
Profit After Tax	0.73	0.59	0.80	1.02	1.00	0.96	0.93	0.90	0.87	0.83
Dividend	0.00	0.00	0.05	0.05	0.05	0.11	0.11	0.11	0.11	0.11
Profits For Appropriation	0.73	0.59	0.75	0.97	0.94	0.85	0.82	0.79	0.76	0.72
COMPUTATION OF TAX										
Profit after interest before depreciation	1.02	0.89	1.26	1.64	1.63	1.60	1.57	1.54	1.50	1.45
Depr.(WDV) to be claimed	0.56	0.42	0.32	0.25	0.19	0.15	0.11	0.09	0.07	0.05
Depreciation claimed	0.56	0.42	0.32	0.25	0.19	0.15	0.11	0.09	0.07	0.05
Depr. carried forward	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Taxable Profit	0.47	0.46	0.94	1.40	1.44	1.45	1.46	1.45	1.43	1.40
Profit Before Tax (Book)	0.89	0.76	1.13	1.51	1.50	1.47	1.44	1.41	1.37	1.32
Minimum Alternate Tax	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tax (Actual)	0.16	0.16	0.33	0.49	0.50	0.51	0.51	0.51	0.50	0.49
Tax Provision	0.16	0.16	0.33	0.49	0.50	0.51	0.51	0.51	0.50	0.49

EXHIBIT 5.6

SENSITIVITY ANALYSIS

Items	Profit after Tax (PAT) Rs. Cr. (assumed at 90 % capacity)	Break Even (%)	Internal Rate of Return (IRR) (%)	Payback Period (Years)
NORMAL VALUES	1.02	60.33	34.84	3.09
Debt Equity Ratios				
(a) 2:1	1.02	60.52	34.94	3.08
(b) 1:1	1.03	60.04	34.70	3.10
Increase in Project Cost by 10 %	1.02	60.85	32.29	3.25
Decrease in Selling Price by 10%	0.65	69.69	23.82	4.01
Increase in Selling Price by 10%	1.40	53.94	44.80	2.50
Decrease in Raw Material Prices by 10%	1.25	55.38	40.81	2.71

SANITARY NAPKINS PROJECT (CONVERTING LINE)

SECTION I : PRODUCT BRIEF, USAGE PATTERNS AND MARKET POTENTIAL

6.1 Sanitary Napkins are absorbent disposable single use products designed to receive, absorb, retain menstrual fluid and isolate them from the rest of the body.

6.2 Initially Sanitary Napkins were made out of rags and later from absorbent cotton. But protection provided by such Sanitary Napkins was not adequate and were also not very comfortable to use. Due to these inadequacies, considerable R&D has taken place to evolve better products. These developments have been both in product design and the materials used therein.

6.3 From the basic Sanitary Napkins consisting of cotton wool in guaze cloth, the present day design of Indian napkins is that of flat, rectangular type, consisting of wood pulp and a non woven cover wrap to maintain the shape of the product and keep skin contact dry.

6.4 The current trend is to use **spunbond polypropylene**, the light weight nonwoven fabric which serves as a cover layer next to the skin allowing moisture to penetrate to the absorptive layer below while the cover remains relatively dry and comfortable next to the skin. Nonwovens continue to be the basic material for feminine hygiene products as consumers expect higher quality, comfort and environmental friendliness. However, the **premium brands** of sanitary napkins have started using **extruded plastic films** instead of nonwovens.

6.5 **Superabsorbent polymers** (SAP) play an important role in producing absorbency properties. The combination of nonwoven webs and superabsorbent additives helps to reach 90% of their absorption capacity in 15 seconds. This is the main reason behind increasing use of these materials in the sanitary napkins in today's market. These SAPs are added to the wood pulp to enhance the absorption capacities. They find great use in the Ultrathin range of sanitary napkins which demands good absorption capacity with reduced weight of the wood pulp for thinner napkins.

6.6 Sanitary Napkins are used by females normally in the reproductive age group of 15 - 44 years.

6.7 The important and desired properties in the sanitary napkins are:

- No Leakage,
- No unaesthetic appearance or colour,

- No odour,
- No noise,
- Stay in place,
- Comfortable to wear,
- Hygienic

Emerging Market Potential - Global and Indian

6.8 The global feminine hygiene market comprising of sanitary napkins and tampons account for an estimated $11.6 bn in the year 2000. According to EDANA, the West European market for Sanitary Napkins (2001) is 13.5 bn napkins.

Market Size and Potential:

6.9 The Indian market size for Sanitary Napkins as seen from the published sources has shown a growing trend from Rs. 250 Cr. (1999-2000) to Rs. 300 Cr. (2001-02) reflecting a CAGR of around 9.54 per cent. On the basis of three pronged approach comprising the Retailers, Industry Feedback and Desk Research, it was seen that the Indian sanitary napkins market was around Rs. 300 Cr to Rs. 350 Cr. (2001-02)

6.10 The Indian Sanitary Napkins market can be divided into High end or Premium Products, Mid tier products and Low tier products, depending on their price range. The players having presence in the market are Johnson & Johnson, Proctor & Gamble, Kimberly Clark who import some of their napkins from their parent company situated abroad and then sell it in the Indian markets after repacking them in smaller pack sizes. The Indian players with a foothold in the market are Dima Products, Gufic Biosciences, Golden Surgimed etc.

6.11 Consumption of nonwovens is primarily in the low and mid-tier price segments of the sanitary napkins market (account for 70% of the volumes). It has been observed that bulk of the nonwoven fabrics requirement is met through imports.

6.12 The market potential for sanitary napkins has been presented under alternative scenarios has shown below :

1.	**Scenario I**	**:**	Normative Approach (Based on **Industry Feedback)**
2.	**Scenario II**	:	Urban penetration estimated to inc. from current 20% to 23% (2003 - 04) and 32% (2007 - 08).
3.	**Scenario III**	**:**	Urban penetration estimated to inc. from current 20% to 23% (2003 - 04) and 32% (2007 - 08) along with Rural penetration increase form current zero percent to 1.5% (2003 - 04) and 5% (2007 - 08).

6.13 It may be assumed that the average of the projections of these estimates would provide a more realistic picture which takes into consideration the performance of the past and the scope for greater demand in the rural and urban market.

6.14 The detailed market projections for the sanitary napkins and the demand for the nonwovens arising therefrom is shown below:

DEMAND FOR SANITARY NAPKINS

Year	Scenario I	Scenario II	Scenario III	Average S. N. demand
2001 - 02	Rs.300.00 Cr.	Rs.353.84 Cr.	Rs.353.84 Cr.	**Rs. 335.89 Cr.**
	(857.14)	(1010.96)	(1010.96)	**(959.69)**
2003 - 04	Rs.376.32 Cr.	Rs.419.74 Cr.	Rs.493.45 Cr.	**Rs. 429.84 Cr.**
	(1075.20)	(1199.26)	(1409.86)	**(1228.11)**
2007 - 08	Rs.592.15 Cr.	Rs.621.78 Cr.	Rs.883.38 Cr.	**Rs. 699.10 Cr.**
	(1691.85)	(1776.52)	(2523.94)	**(1997.44)**

(Figures in bracket represent volume in million nos.)

DEMAND FOR NONWOVENS

Year	Nonwoven demand			Average NW consumption
	Scenario I	Scenario II	Scenario III	
2001 - 02	Rs. 7.41 Cr.	Rs. 8.74 Cr.	Rs. 8.74 Cr.	**Rs. 8.32 Cr.**
	(642.00)	(757.21)	(757.21)	**(718.81)**
2003 - 04	Rs. 9.30 Cr.	Rs. 10.37 Cr.	Rs. 12.19 Cr.	**Rs. 10.62 Cr.**
	(805.32)	(898.25)	(1055.98)	**(919.85)**
2007 - 08	Rs. 14.63 Cr.	Rs. 15.36 Cr.	Rs. 21.83 Cr.	**Rs. 17.27 Cr.**
	(1267.19)	(1330.61)	(1890.43)	**(1496.08)**

(Figures in bracket represent the nonwoven requirement in tonnes)

* Demand projections are subject to Market Realisation

SECTION II : SANITARY NAPKINS: MANUFACTURING TECHNOLOGY & EQUIPMENT SUPPLIERS

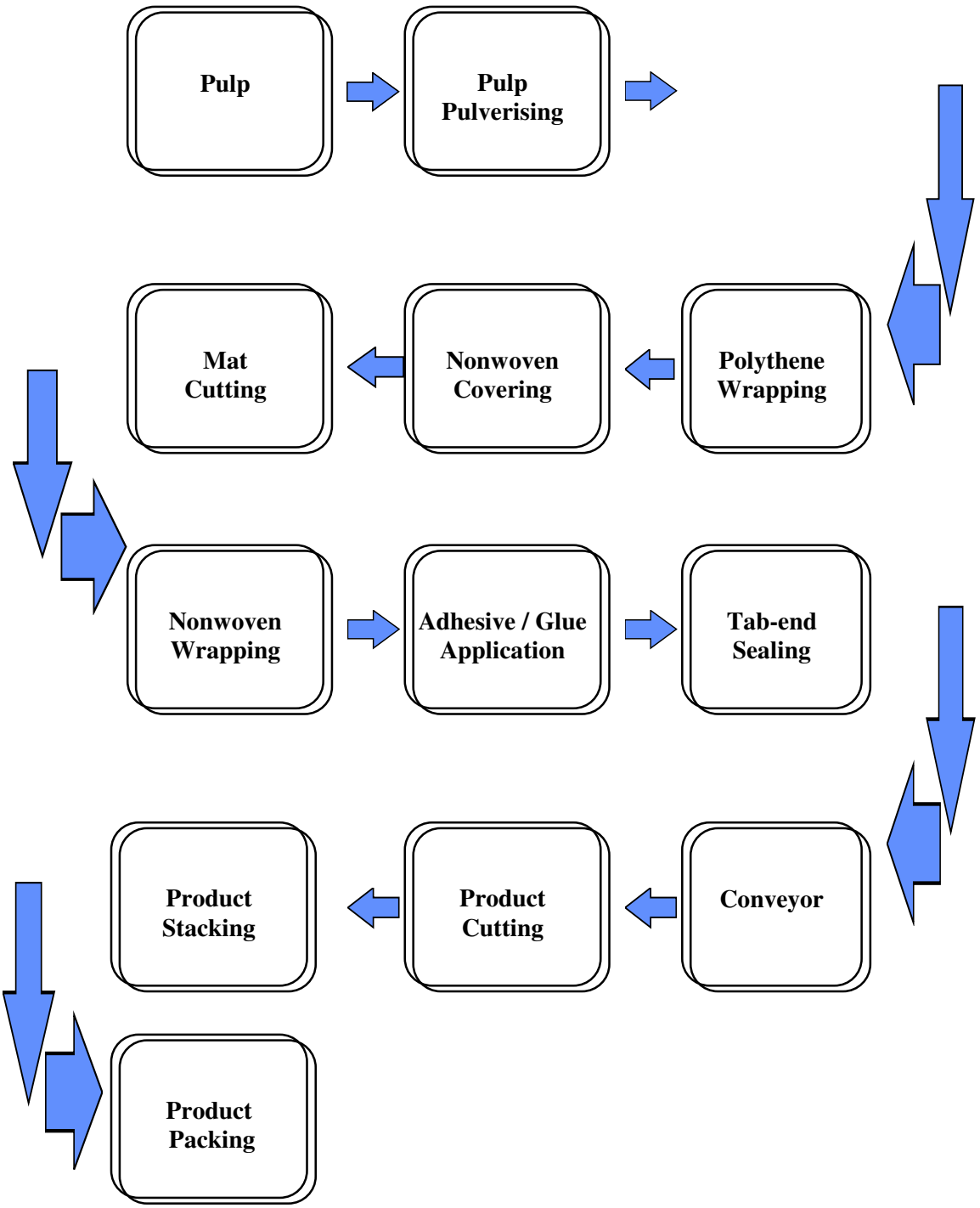
Process Description:

6.15 The main raw material is cellulose pulp in rolls. The pulp goes through a cylinder mill, where it is fluffed. The entry of the pulp roll is regulated by a speed variator so does the weight. A super absorbent powder can be applied at this stage on the fluffed pulp. The fluffed pulp goes on top of a tissue paper layer which is folded in "C" form, in order to obtain the standard width of the napkins. For the production of sophisticated napkin, it is also possible, at this stage, to insert an liquid along their whole length of the napkins. This continuous line of pulp and tissue is then cut by a rotary knife at the required length. A poly film to protect the bottom part of the napkins is also inserted. The resulting pads are then spaced and passed on the non-woven fabric covering which is then embossed and cut by a die cutter roll adequately shaped for the napkins with wings, or for napkins with round ends without wings.

6.16 A permanent multi-lines adhesive, protected by a silicoated paper strip is applied on the nonwoven back sheet, while self-adhesive tabs are applied on the wings. The finished product with the folded wings is delivered to an automatic counter and stacker unit, which counts and discharges, in a pre-selected number, the finished napkins. The operator (preferably women) will insert by hand the pre-counted groups of napkins inside plastic bags. These bags are then sealed by a separate sealing machine.

SANITARY NAPKINS MANUFACTURING PROCESS

FLOW CHART



Product Composition:

6.17 Composition of the Sanitary Napkins is as follows:

- ❉ Wood Pulp Core (Fluff) / Airlaid Core,
- ❉ Super Absorbent Powder,
- ❉ Sublayer / Acquisition layer,
- ❉ Transfer Layer;
- ❉ Coverstock / Topsheet (Nonwoven or perforated Poly),
- ❉ Backsheet (Polyethylene),
- ❉ Release Paper,
- ❉ Paper Tape on the wings

Machinery (Technology & Equipment) Suppliers and Specifications

6.18 Globally, the known technology suppliers contacted by TECS are:

1. M. D. Viola (Italy),
2. Diatec SRL (Italy),
3. Rainbow Fame (Taiwan)
4. Caldiroli (Italy),
5. BHT Bicma (Germany)
6. Fameccanica (Italy),
7. Winkler+Dunnebier (Germany),
8. Cellulose Converting Equipment (Italy),
9. Zuiko (Japan),
10. Joa Curt (USA),
11. General Disposable Machinery (Italy),

Note : The list contains the leading global players in Sanitary Napkins Manufacturing Technology and based on discussion with Industry experts the above list is exhaustive.

6.19 TECS has received favourable responses and indicative quotations from the technology suppliers.

Process Systems and Equipments

- The machinery required for the manufacturing of the sanitary napkins are as follows:
    - Pulp/Airlaid Unwinder,
    - Core Cutting Section,
    - Air Collection System and filter,
    - Back Sheet and coverstock Unwinder,
    - Wings Folding,
    - Sealing Station,
    - Central Silicon Tape Applicator/Wing Tape Applicator,
    - Adhesive Applicator,
    - Cutting Unit,
    - Counting and Stacking Unit.

Recommended Minimum Economic Size:

6.20 The proposed Sanitary Napkins project to be set up in India will have a designed capacity of **600 napkins per min**

6.21 Under Indian operating conditions it is safer to assume machine efficiency factor of 75%, and therefore the production would be 450 napkins per min

6.22 The plant would operate in Three shifts, 24 hours and 300 working days in a year.

Investment in Process Plant and Machinery:

6.23 **The investment in the process plant and machinery will be Rs 3.52 crores (FOB)** after accounting for a **discount of 15% .** Finer details on the Equipment listing, specification and the quotations need to be discussed with the technology supplier before the project is taken up. Taking into account the CIF value , the custom duties (5%), CVD (16%), inland transportation and loading, unloading (2%), erection and commissioning (5%), **the installed cost of process equipment would be Rs 4.69 crores.**

6.24 The converting line mentioned above is dedicated for sanitary napkins only.

SECTION III : PROJECT COST & FINANCIALS

Land

6.25 The total requirement of land for this project keeping in mind the possible future expansion is around **6069 Sq. Mtrs.** (1.5 acres).

6.26 Based on the available information the cost of land is assumed at Rs 1200 per square meter (including the developmental cost). Depending on the exact location of the project to be determined by the promoter, the land cost could be higher or lower. Hence the total cost of developed land will be **Rs 0.73 crore (Rs 73 lakhs).**

Buildings

6.27 The building area comprising of main factory building, godowns, office, R & D labs/ In-house Testing centre etc. would be **3000 sq. Mtrs.** The cost of construction would again vary depending on the structure and the materials to be used. It has been assumed that the average cost of construction would be Rs 4500 per sq. Mt. Thus the total cost of building and other civil works would be around **Rs 1.35 crores.**

Plant and Machinery

6.28 Details of Plant and machinery as well as technology required for the project have been presented in earlier Section II . The installed cost of plant and machinery would be **Rs 4.69 crores.**

6.29 Apart from the main process equipments the other utilities required are:

- Electricals,
- Piping,
- Water supply,
- Compressors,
- Fire fighting equipments etc.

6.30 The provision on this count is taken as 5% of the cost of machinery which works out to Rs 0.23 crores (Rs 23 lakhs).

Miscellaneous Fixed Assets

6.31 Under this head the items included are Furniture and fixtures, Office equipments, Air Conditioners etc. and the provision made is around Rs 0.15 crore (Rs 15 lakhs).

Testing Facilities

6.32 The sanitary napkins unit calls for **Tensile Strength testing, Burst Strength testing for Corrugated Boxes, Dancing Lady** (which has its legs moving to mimic the walking effects of the females). A provision of around Rs 0.15 crore (Rs 15 lakhs) is made on this count.

Project Engineering and Consulting

6.33 Under this head the items included are the fees and expenses on account of Architect fees, project engineering and management (both local and overseas), detailed project reports etc.

Preliminary & Preoperative Expenses

6.34 The items included under this head are company formation expenses, public issue expenses (if any), interest during construction, pre production expenses during the implementation phase etc.

Contingency Expenses

6.35 Depending on the gestation period and further detailing of the project cost by the promoter, the contingency provision has been made at the rate of 10%.

Margin Money for Working capital

6.36 The margin money for working capital forming part of the total project cost would be Rs 0.70 crores (Rs 70 lakhs). [**Exhibit 6.3**]

Total Project Cost (Total Investment))

6.37 The total project cost as given in **Exhibit 6.1** would be **Rs 9.84 crores.**

Project Funding and Financing Pattern:

6.38 It has been assumed that the project would be financed through long term funds and Equity participation by the Promoter / Public. The technical textile sector being a high priority area , it is assumed that a **Debt- Equity ratio of 1.5 : 1** would be feasible. (However the sensitivity analysis has also been presented for 1 : 1 and 2 : 1 Debt Equity ratios.)

Sales, Profitability and Sensitivity Analysis:

Sales Realisation and Turnover

6.39 As per the details available from the Technology and Equipment suppliers the economic size of a plant is **600 napkins per min.**

6.40 Under the Indian conditions, it is assumed that the machine would operate at an **efficiency level of 75%.** Hence the production from the plant would be 450 napkins per min.

6.41 The plant would operate on Three-shift basis and 300 workings days in a year.

6.42 The capacity utilisation for the 1st year is assumed at 50% and thereafter for the 2nd, 3rd and 4th year onwards 60%, 75% and 90% respectively.

6.43 The average **selling price** of the end product would be **Rs 1.50 per napkin**.(sales tax and other incidental expenses). The prevailing market price for sanitary napkins vary from Rs. 2 to 8 per napkin. Being a product for the females, the end product is exempt from excise duty. These are the prices of the product sold by the established players in the country. The international price of the sanitary napkins are Rs 2 - 3.50 per napkin. On this the import duties, margins etc. get added.

6.44 The details of projected sales turnover as projected are given in **Exhibit 6.2.**

Cost of Production:

Major Raw materials and their specifications:

6.45 The main raw materials used and the corresponding prevailing prices as an indicator are as follows:

Raw Material	Prices	Landed cost (inclusive of all duties)
Wood Pulp Core	Rs. 30 per kg	Rs. 35 per kg
Nonwoven	Rs. 90 per kg	Rs. 110 per kg
Super Absorbent Polymer	Rs. 70 per kg	Rs. 110 per kg
Hot Melt Glue	Rs. 150 per kg	Rs. 300 per kg

6.46 Apart from the above, other materials also form a part of the napkins like those mentioned below:

* Tissue,
* Release Paper,
* PE Film,
* Paper Tape on the wings,

6.47 However, Wood Pulp Core (Fluff) and Nonwoven or Perforated Poly account for around 60-65% of the total raw material cost and around 70% of the weight of the sanitary napkins raw materials.

6.48 The spunbond nonwoven (coverstock) of 15-18 gsm is used.

6.49 The **leading raw material suppliers** of the sanitary napkins are:

- **Wood Pulp Core (Fluff):** Georgia Pacific, Weyerhaeuser, Tartas S.A., Buckeye Cellulose Corporation, Cellu Tissue Corporation,
- **Nonwoven or Perforated Poly:** Amoco Fabrics Division, Fabriano Soft S.r.l., Tenotex S.p.a., Pantex Group

6.50 The requirement of the raw materials would be Rs 13.27 crores, accounting for a process waste of 5%. (100% Capacity Utilisation)

Conversion Cost

6.51 The conversion cost will include cost of power, water, chemicals and additives, consumables etc., which is assumed at 10% of the raw material cost.

Manpower, Salaries and Wages

6.52 The manpower requirements and the salary structure is given in **Exhibit 6.4.**

6.53 The total manpower requirement comprising the managerial cadre of supervisors, machine operators and helpers would be 48 persons. The wage bill for the conversion unit would be Rs 0.67 crores.

Repairs and Maintenance

6.54 Provision has been made for repairs and maintenance at 2.5% of the cost of the process plant and equipment, which would be required during its operating life span.

Factory and Overhead Expenses

6.55 The items covered under this head are establishment expenses, repairs and maintenance, stationery, travel expenses, packaging expenses etc.

Marketing and Promotional Expenses

6.56 The promotion of sanitary napkins will call for expenditure on this count and a provision of 25% of the annual sales has been made uniformly over the years.

6.57 This provision includes the margins to the distributors, retailers, advertising and promotional expenses etc. Being a new project, such heavy expenditure on marketing and promotional efforts would be required to penetrate the market with a stronghold of the MNCs.

Interest and Depreciation

6.58 The prevailing interest rate for long term and short term borrowed funds is assumed at 5% p.a. and 11% p.a. respectively. (Project included under Technology Upgradation Fund).

6.59 The repayment of loan has been assumed for 10 years with a moratorium period of two years (2+8).

6.60 The depreciation rates have been worked out as per Company's Act (SLM) and Income-Tax Ready Reckoner (WDV).

6.61 The current corporate tax rate is assumed at 35% and the surcharge is assumed at 2.5% per annum.

Profitability, Break-even, IRR, DSCR and Payback

6.62 As presented in **Exhibit 6.5**, the sales turnover increases from Rs 14.29 crores in the first year to Rs 25.72 crores from the 4th year.

6.63 The PBT increases from Rs 0.43 crores in the first year to Rs 3.51 crores in the fourth year.

6.64 The Break Even of the project is at 75.98%.

6.65 The Internal Rate of Return (IRR) has been worked out at 21.82%.

6.66 The Payback period for the project is 4.42 years.

Sensitivity Analysis

6.67 The sensitivity analysis has been presented in the **Exhibit 6.6.**

OPTION II (Based on Local / Chinese Technology)

6.68 This option presents the choice of the cheaper machine (Chinese make) with an installed cost in the process plant and machinery of **Rs 69 lakhs.** The total **project cost** would be **Rs 4.26 crores.**

6.69 The designed capacity of the machine is for **350 pads per min**

Profitability, Break-even, IRR, DSCR and Payback

6.70 As presented in **Exhibit 6.5**, the sales turnover increases from Rs 8.33 crores in the first year to Rs 15 crores from the 4th year onwards.

6.71 The PBT increases from Rs 0.42 crores in the first year to Rs 1.92 crores in the fourth year.

6.72 The Break Even of the project is at 74.28%.

6.73 The Internal Rate of Return (IRR) has been worked out at 24.57%.

6.74 The Payback period for the project is 4.14 years.

COMPARISION OF ALTERNATE TECHNOLOGIES

Technology Particulars	Sanitary Napkin Project	
	Option - I European Technology	**Option - II Local / Chinese Technology**
Capacity	600 Napkins per min	350 Napkins per min
Project Cost	Rs. 9.84 Cr	Rs. 4.26 Cr.
Revenue (1st year)	Rs. 14.29 Cr.	Rs. 8.33 Cr.
BEP	75.98%	74.28%
IRR	21.82%	24.57%
Payback	4.42 years	4.14 years

DEVELOPMENTAL AND PROMOTIONAL MEASURES

6.75 Sanitary Napkins are manufactured as per the **BIS No. IS : 5405** as given in **Annexure I**. There is a need for periodic updating and revision of these standards.

6.76 The new products use the gel technology and not the traditional filler material. Gel based napkins (ultrathins) absorb the fluid and convert it into a gel which gets sealed inside, hence there is a need for revision of the standards.

6.77 Norm and clear size designation should be made a part of the Standards.

6.78 TECS global search has revealed that there are **no regulatory norms** for disposal of the sanitary napkins in the developed/developing countries.

6.79 Industry should find out hygienic and environment-friendly methods for disposal.

6.80 Although there are **no environmental regulations** for sanitary napkins but within the plant, concept of **positive air pressure** should be maintained to ensure hygienic conditions in the plant.

6.81 It is generally avoidable to use **asbestos** based material for roofing or in any other form as it is considered to be carcinogenic.

6.82 Prevailing **duty structure** on the following products needs **revision** for the promotion of this sector and even be competitive in the export market.

Item	Prevailing Duty Structure	Recommended Duty Structure
Wood Pulp	5% (BCD) + 4% (CVD)	Total Duty : 5%
NonWovens	20% (BCD) + 16% (CVD) + 0.5% (Textile Cess)	Total Duty : 10%
Super Absorbent Polymers	20% (BCD) + 16% (CVD)	Total Duty : 10%
Hot Melt Glue	20% (BCD) + 16% (CVD)	Total Duty : 10%

6.83 There are no norms fixed for rebate on the duty structure even if the manufacturer undertakes export orders. The **Duty Drawback Scheme** should be introduced for the exports of these napkins.

6.84 There is a **great potential** for export of these products to the **developing countries (SAARC, Africa and Middle East).** The MNCs may not be competitive due to their Trade Pockets Agreement, which force them to export either from US or UK which increases the freight cost considerably. **The Indian manufacturers have a great advantage here due to proximity to these regions and hence lower transportation costs making our products competitive in those markets.**

6.85 The Indian sanitary napkin market has attained a maturity level in terms of production and promotion of latest products available in developed countries. The

industry is well equipped in terms of availability of desired level of technical, marketing and R&D based manpower resources.

6.86 This industry is providing opportunities for outsourcing and job work on behalf of MNCs.

6.87 With the expansion of the market base in semi-urban and rural areas, there is scope for addition of new conversion units. The inclusion of these units in the SSI sector is a recent phenomenon. However in view of the investment level required in setting up state-of-the-art unit and the absence of indigenous suppliers of the machinery, the Rs 1 crore limit is not feasible.

6.88 For new and existing projects of MNCs or non-SSI.units, there is an export obligation of 50%.

6.89 To ensure the quality of the sanitary napkins and strict adherence to the prescribed standards, a common testing facility can be set up in reputed organisations like SASMIRA, BTRA, etc. This facility would enable the small time converters for testing their raw material and finished products.

6.90 The penetration levels of the product in the urban and semi-urban regions is low currently. This is due to lack of awareness of the hygienic aspects of the product coupled with the unaffordability of the napkins.

6.91 The **product awareness** development program may be launched right from the school level, for the promotion of these products in the semi-urban and rural areas by the concerned authorities in collaboration with the major players.

6.92 The Government can promote the indigenous manufacturers by giving them **Preferential Treatment** by encouraging the Government hospitals to buy a fixed percent of their total requirement from these players only, without compromising on the quality.

6.93 To ensure the quality of the sanitary napkins and strict adherence to the prescribed standards, a common testing facility can be set up in reputed organisations like SASMIRA, BTRA, etc. This facility would enable the small time converters for testing their raw material and finished products.

6.94 To ensure the quality of the sanitary napkins and strict adherence to the prescribed standards, a common testing facility can be set up in reputed organisations like SASMIRA, BTRA, etc. This facility would enable the small time converters for testing their raw material and finished products.

Exhibit 6.1 PROJECT COST		
(LAND, BUILDINGS, PROCESS PLANT & MACHINERY, UTILITIES & OTHER ASSETS)		
		Project Cost (Rs. Cr.)
1	**Land**	**0.73**
	Area: 1.5 acres (6069 Sq Mtrs)	
	Rate: (Rs.1200 /Sq. Mtr)	
2	**Buildings**	**1.35**
	(Plant Area, Office, Godown, Lab, Service Area etc.)	
	Built-up Area : 3000 Sq. Mtrs	
	Avg Rate : Rs.4500 /Sq. Mtrs	
3	**Process Plant & Equipment**	**4.69**
4	**Utility & Other equipments (5%)**	**0.23**
	(Power, Water, Compressor, Humidity Control,	
	Fire Fighting, Material Handling etc.)	
5	**Misc. Fixed Assets**	**0.15**
	(Furniture & Fixtures, Office Equipment, Testing Lab etc.)	
6	**Testing Equipments**	**0.15**
7	**Project Engineering & Consultancy charges (2.5%)**	**0.17**
8	**Preliminary & Pre-operative Expenses (12%)**	**0.84**
	(Company Formation, Interest during construction,	
	pre-production expenses, etc.)	
9	**Contingency (10 %)**	**0.83**
10	**Total**	**9.14**
11	**Margin Money for Working Capital**	**0.70**
12	**Total Project Cost**	**9.84**

Exhibit 6.2

ESTIMATION OF SALES REVENUE

(Rs. Cr.)

ITEM	YEAR OF OPERATION									
	I	II	III	IV	V	VI	VII	VIII	IX	X
Average Production per min	600	600	600	600	600	600	600	600	600	600
75% efficiency	450	450	450	450	450	450	450	450	450	450
Capacity Utilisation	50%	60%	75%	90%	90%	90%	90%	90%	90%	90%
Actual Production per min (pcs)	225	270	338	405	405	405	405	405	405	405
Actual Production per hr (pcs)	13500	16200	20250	24300	24300	24300	24300	24300	24300	24300
Production per day (pcs)	324000	388800	486000	583200	583200	583200	583200	583200	583200	583200
Production for 300 working days (pcs)	97200000	116640000	145800000	174960000	174960000	174960000	174960000	174960000	174960000	174960000
Selling Price (Rs / napkin)	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
Sales Revenue (Rs. Cr)	**14.58**	**17.50**	**21.87**	**26.24**	**26.24**	**26.24**	**26.24**	**26.24**	**26.24**	**26.24**
Value Loss (2%)	0.29	0.35	0.44	0.52	0.52	0.52	0.52	0.52	0.52	0.52
Net Sales Revenue (Rs. Cr)	**14.29**	**17.15**	**21.43**	**25.72**	**25.72**	**25.72**	**25.72**	**25.72**	**25.72**	**25.72**

EXHIBIT 6.3

REQUIREMENT OF WORKING CAPITAL

(Rs.Lakhs)

ITEM	NO. OF	MARGIN	YEAR I			YEAR II			YEAR III			YEAR IV			YEAR V		
	MONTHS	(%)	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK
			REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE
Factory Related																	
Raw materials & other commodities	1.00	25.00	0.55	0.14	0.41	0.66	0.17	0.50	0.83	0.21	0.62	1.00	0.25	0.75	1.00	0.25	0.75
Finished Goods	1.00	25.00	1.07	0.27	0.80	1.20	0.30	0.90	1.48	0.37	1.11	1.75	0.44	1.32	1.76	0.44	1.32
A/c Receivable	1.00	25.00	1.19	0.30	0.89	1.43	0.36	1.07	1.79	0.45	1.34	2.14	0.54	1.61	2.14	0.54	1.61
Cash in hand																	
Salaries & wages	1.00	0.00	0.06	0.00	0.06	0.06	0.00	0.06	0.06	0.00	0.06	0.06	0.00	0.06	0.07	0.00	0.07
Utilities	1.00	0.00	0.06	0.00	0.06	0.07	0.00	0.07	0.08	0.00	0.08	0.10	0.00	0.10	0.10	0.00	0.10
Advertising & Promotional Expenses	1.00	0.00	0.30	0.00	0.30	0.36	0.00	0.36	0.45	0.00	0.45	0.54	0.00	0.54	0.54	0.00	0.54
Admin. Overheads	1.00	0.00	0.05	0.00	0.05	0.05	0.00	0.05	0.05	0.00	0.05	0.05	0.00	0.05	0.05	0.00	0.05
Total Requirement			**3.23**	**0.70**	**2.53**	**3.79**	**0.82**	**2.96**	**4.70**	**1.02**	**3.67**	**5.60**	**1.22**	**4.38**	**5.61**	**1.22**	**4.38**

EXHIBIT 6.3 (CONTD...)

REQUIREMENT OF WORKING CAPITAL

(Rs.Lakhs)

ITEM	NO. OF	MARGIN		YEAR VI			YEAR VII			YEAR VIII			YEAR IX			YEAR X	
	MONTHS	(%)	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK
			REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE
Factory Related																	
Raw materials & other commodities	1.00	25.00	1.00	0.25	0.75	1.00	0.25	0.75	1.00	0.25	0.75	1.00	0.25	0.75	1.00	0.25	0.75
Finished Goods Stock	1.00	25.00	1.76	0.44	1.32	1.77	0.44	1.33	1.77	0.44	1.33	1.78	0.45	1.34	1.79	0.45	1.34
A/c Receivable	1.00	25.00	2.14	0.54	1.61	2.14	0.54	1.61	2.14	0.54	1.61	2.14	0.54	1.61	2.14	0.54	1.61
Cash in hand																	
Salaries & wages	1.00	0.00	0.07	0.00	0.07	0.08	0.00	0.08	0.09	0.00	0.09	0.09	0.00	0.09	0.10	0.00	0.10
Utilities	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Advertising & Promotional Expenses	1.00	0.00	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01
Admin. Overheads	1.00	0.00	0.54	0.00	0.54	0.54	0.00	0.54	0.54	0.00	0.54	0.54	0.00	0.54	0.54	0.00	0.54
Total Requirement			**5.62**	**1.23**	**4.39**	**5.63**	**1.23**	**4.40**	**5.64**	**1.23**	**4.42**	**5.66**	**1.23**	**4.43**	**5.67**	**1.23**	**4.44**

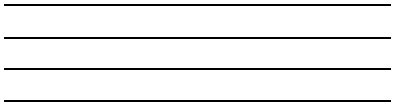


Exhibit 6.3

MANPOWER REQUIREMENTS

	Nos	Monthly	Total Monthly Salary	Annual
General Manager	1	30000	30000	360000
Production Manager	1	20000	20000	240000
Machine Operators	6	6000	36000	432000
Machine Helper (Semi Skilled)	12	3000	36000	432000
R&D, Testing	2	8000	16000	192000
Marketing Manager & Sales Manager	2	25000	50000	600000
Sales Representatives	12	12000	144000	1728000
Clerical Staff	6	6000	36000	432000
Other Staff	4	3000	12000	144000
Maintenance (Elec. & Mech.)	2	10000	20000	240000
TOTAL	**48**		**400000**	**4800000**
Fringe Benefits (40 % of the above)				1920000
Total Wage Bill (Annual) Rs. lakhs:	Salary + Other Benefits =			**6720000.00**
Total Wage Bill (Annual) Rs. Cr.:				**0.672**

Exhibit 6.5

PROFITABILITY STATEMENT AND COMPUTATION OF TAX

(Rs.Cr)

ACCOUNT HEAD	FINANCIAL YEAR OF OPERATION									
	I	II	III	IV	V	VI	VII	VIII	IX	X
Revenue										
Net Sales Turnover	14.29	17.15	21.43	25.72	25.72	25.72	25.72	25.72	25.72	25.72
Total Revenue	14.29	17.15	21.43	25.72	25.72	25.72	25.72	25.72	25.72	25.72
Expenses										
Raw Materials	6.63	7.96	9.95	11.94	11.94	11.94	11.94	11.94	11.94	11.94
Salaries & wages	0.67	0.71	0.74	0.78	0.82	0.88	0.95	1.03	1.11	1.20
Conversion Costs	0.66	0.80	1.00	1.19	1.19	1.19	1.19	1.19	1.19	1.19
Repairs & Maintenance	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
Sales, Marketing & Training Expenses	3.57	4.29	5.36	6.43	6.43	6.43	6.43	6.43	6.43	6.43
Factory & Office Overheads	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58
CVD	0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest on S.T. Loans	0.28	0.33	0.40	0.48	0.48	0.48	0.48	0.49	0.49	0.49
Cost of Sales	13.12	14.78	18.15	21.52	21.56	21.63	21.70	21.78	21.86	21.95
Depreciation (St.Line)	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42
Amort. of Expenses	0.03	0.03	0.03	0.03	0.03	0.03	0.00	0.00	0.00	0.00
Interest on L.T Loan	0.30	0.30	0.28	0.24	0.20	0.17	0.13	0.09	0.06	0.02
Profit Before Tax	0.43	1.63	2.56	3.51	3.51	3.48	3.47	3.43	3.38	3.33
Tax	0.04	0.17	0.60	1.09	1.15	1.19	1.23	1.24	1.25	1.24
Profit After Tax	0.38	1.46	1.96	2.42	2.35	2.29	2.25	2.19	2.14	2.09
Dividend	0.00	0.00	0.20	0.20	0.20	0.39	0.39	0.39	0.39	0.39
Profits For Appropriation	0.38	1.46	1.77	2.22	2.16	1.89	1.85	1.80	1.75	1.69
COMPUTATION OF TAX										
Profit after interest before depreciation	0.84	2.05	2.98	3.93	3.92	3.89	3.89	3.85	3.80	3.75
Depr.(WDV) to be claimed	1.76	2.27	1.26	0.81	0.63	0.49	0.39	0.31	0.24	0.20
Depreciation claimed	0.84	2.05	1.26	0.81	0.63	0.49	0.39	0.31	0.24	0.20
Depr. carried forward	0.92	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Taxable Profit	0.00	0.00	1.71	3.12	3.29	3.40	3.50	3.54	3.56	3.55
Profit Before Tax (Book)	0.43	1.63	2.56	3.51	3.51	3.48	3.47	3.43	3.38	3.33
Minimum Alternate Tax	0.04	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tax (Actual)	0.00	0.00	0.60	1.09	1.15	1.19	1.23	1.24	1.25	1.24
Tax Provision	0.04	0.17	0.60	1.09	1.15	1.19	1.23	1.24	1.25	1.24

EXHIBIT 6.6

SENSITIVITY ANALYSIS

Items	Profit after Tax (PAT) Rs. Cr. (assumed at 90 % capacity)	Break Even (%)	Internal Rate of Return (IRR) (%)	Payback Period (Years)
NORMAL VALUES	2.42	75.98	21.82	4.42
Debt Equity Ratios				
(a) 2:1	2.40	76.20	21.90	4.40
(b) 1:1	2.44	75.65	21.69	4.45
Increase in Project Cost by 10 %	2.38	76.62	20.19	4.65
Selling Price @ Rs. 2.00 / Napkin **(Current Market Price: Rs 2 to 8 / napkin)**	6.53	55.10	51.24	2.29
Decrease in Raw Material Prices by 10%	3.28	68.44	28.94	3.62
Increase in Raw Material Prices by 10%	1.91	85.38	14.28	5.90

ANNEXURE I:
INDIAN STANDARD SPECIFICATION (ISI) FOR SANITARY NAPKINS

This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 15 February 1980, after the draft finalised by the Surgical Dressings Sectional Committee had been approved by the Consumer Products and Medical Instruments Division Council. This standard was first published in 1969.

1. Scope :

1.1 This standard covers the requirements for sanitary napkins for external use.

2. Materials :

2.1 **Absorbent Filler** - The filler material, such as cellulose pulp, cellulose wadding, tissue, cotton, etc., shall be free from lumps, oil spots, dirt or foreign material.

2.2. **Covering** - The covering of the absorbent filler shall be of a good quality cotton or rayon knitted sleeving, gauze or non-woven fabric with sufficient porosity to permit the assembled pad to meet the absorbency requirements. If cotton gauze is used, it shall conform to IS : 758-1975.

3. Sizes :

3.1 Sizes of sanitary napkins shall be as agreed to between the purchaser and the supplier. However recommended sizes are as follows :

Size	Pad Length (mm)	Width (mm)	Thickness (mm)
Regular	200 ± 20	60 to 75	15 ± 2
Large	240 ± 20	60 to 75	15 ± 2
Extra Large	280 ± 20	60 to 75	15 ± 2

3.1.1. The thickness shall be measured by stacking 10 complete pads and measuring the stack height. The average thickness for the 10 pads shall be used as the pad thickness.

4. Manufacture, Workmanship and Finish :

4.1 The absorbent filler shall be arranged and neatly cut to the required size of the pad and form a uniform thickness throughout without any wrinkles or distortion. It shall be placed in the covering in such a way that it does not cause lump formation with the effect of sudden pressure. The covering fabric shall cover the filler completely, and in case of napkins with tabs, extend beyond the length of the filler to form tabs or loops at each end for securing the paid in use. In case of tabless napkins, an adhesive system or other suitable method may be introduced for holding the napkin securely in position. The sanitary napkins shall have a non-absorbent barrier on one side which shall have an identifying thread or marking indicating clearly the side of the barrier. In case of napkins that are heat sterilizable, the barriers shall also be heat resistant.

4.2. When the sanitary napkins are claimed as disposable, that it, disposable in lavatories, they shall be manufactured from disposable material. If cotton hose or gauze is used as covering, the instructions for the use of napkins shall clearly indicate that the non-absorbent barrier should be removed before flushing.

4.3 The sanitary napkins shall have a very soft feel and when worn shall not chafe or give any uncomfortable feeling. They shall be free from all sorts of foreign matter.

5. Requirements :

5.1 **Absorbency and ability to withstand pressure after absorption** - The sanitary napkins shall absorb 30 ml of coloured water or oxalated sheep or goat blood or test fluid when flowed on to the centre of the napkin)at the rate of 15 ml per minute) and it shall not show up at the bottom or sides of the sanitary napkin, when tested according to Appendix A.

5.1.1 The tabless napkins shall absorb 20 ml of coloured water or oxalated sheep or goat blood or test fluid when tested by the method given in 5.1.

5.2 **Disposability** - A disposable sanitary napkin with the covering removed, shall be immersed in 15 litres of water and stirred. The pad shall disintegrate in the water in not more than 5 minutes.

5.3 **pH Value** - The sanitary napkins shall be free from acids and alkali and the pH of the absorbent material shall be 6 to 8.5 when tested by the method given in IS : 1390 - 1961.

5.4 **Instructions** - Following instructions shall be included in every packet of sanitary napkins :

a) Method of use;

b) Indication as to which side is absorbent; and

c) Disposal instructions, such as that the napkins without covering can be disposed off in water closets.

6. Tests :

6.1 Absorbency and ability to withstand pressure after absorption shall be tested as given in Appendix A.

6.1.1 **Type Test** : Use oxalated sheep or goat blood or test fluid.

6.1.2 **Routine Test** - Use coloured water.

7. Packing :

7.1 Sanitary napkins shall be packed in polyethylene lined carton or polyethylene bag. The carton shall contain an instruction leaflet or shall have the instructions printed on the outside of the polyethylene bag or carton.

8. Marking :

8.1 Each carton shall be marked with the manufacturer's name or trade mark, the number of sanitary napkins contained in it, and size designation.

8.1.1 The carton may also be marked with ISI Certification Mark.

APPENDIX A

(Clauses 5.1 and 6.1)

METHOD FOR DETERMINATION OF ABSORBENCY AND ABILITY TO WITHSTAND PRESSURE AFTER ABSORPTION

A-1. **Procedure :-**

A-1.1 **Test Fluid** - To about 6 1 of boiling water in a 10 1 stainless steel or glass vessel add 4 g of methyl paraben and stir until dissolved. Add 740g of the gum arabic or gum acacia and stir until all the gum is dissolved. Add water to make 8.05 1 and allow the solution to stand for at least 24 hours. Filter through a layer of glass wool. Add 9 g of methylene blue, 1 470 ml of glycerine, and 840 ml of water and stir. The total volume will be approximately 9.2 1. Mix thoroughly and allow to stand at least for 24 hours. Shake before use.

A-1.2 Lay the sanitary napkin on a flat level transparent surface, so that the underside of the sanitary napkin can be observed. Drip, at the rate of 15 ml per minute, 30 ml (20 ml for tabless napkins) of the fluid maintained at a temperature of $27^0 \pm 2^0$ C on to the centre of the sanitary napkin from a height of approximately 1 to 2 mm. After the napkin has absorbed the full amount of fluid, keep a standard weight of 1 kg for one minute on the portion where the fluid was absorbed. Observed the back and sides of the sanitary napkin for any fluid showing up.

INCONTINENCE (ADULT) DIAPERS (CONVERTING LINE)

SECTION-I : PRODUCT BRIEF, APPLICATION AREAS AND MARKET POTENTIAL

Incontinence Diapers:

7.1 Incontinence is defined as the **inability to exercise control over the bladder** resulting in urinary leakage, a condition most often associated with the **elderly.**

7.2 Incontinence Diapers are **absorbent disposable single use products** designed to receive, absorb and retain body fluids. The use of the Diapers is hygienic as the diapers can **avoid the fungal infection of the skin** since the aggressive substance present in the urine does not come in contact with the skin. They are required to provide these functions without skin irritation or leakage and in a manner that allows the user to effectively manage their incontinence.

7.3 The diapers are made of **cellulose with super absorbent material** and cotton having **poly backsheet and a nonwoven coverstock**. They are expected to be effective in quickly absorbing and retaining waste, at the same time being discreet and indiscernible to the public.

The primary requirements of these products are:

Absorb and retain urine during miction and distribute the urine throughout the absorption pad,

- Retain urine effectively in the absorbent core,
- Isolate wetness from the skin,
- Reduce potential odour problems caused by urine degradation

The important / desired properties of Incontinence Diapers are:

- Maximum wearer comfort,
- Simplicity - Easy to use and put on / take off,
- Low noise factor,
- Good Product fit,
- Good level of discreteness with the product,
- Hygienic

7.4 The product is consumed in the following institutions, apart from the retail sale directly to the senior citizens:

- Nursing Homes
- Hospitals
- Home Care Providers
- Prisons/Correctional Facilities
- Retirement Centres
- MR Facilities
- (mentally challenged individuals)
- Pediatric Facilities
- Private Homes
- Day Care Centres

7.5 The purchases in these institutions is mainly triggered by cost issues and the end users care more about the comfort and wellness than tricks and frills.

Emerging Market Potential - Global and Indian

Incontinence (Adult) Diapers:

Global Incontinence Market:

7.6 The adult incontinence market in the **US** is over **$1.1 bn** with approximately 19mn North Americans who are incontinent. The nonwoven coverstock consumption by the adult incontinence products is approximately 14%. The **World Bank** has estimated that the US population between ages 50 to 59 will increase from nearly 25 mn (1995) to 41 mn (2010), while 60 to 69 age group is expected to increase from 20 mn (1995) to 29 mn (2010).

7.7 EDANA estimates the total **West European** market to be of **5.2 bn** diapers (2001 data).

7.8 Among the baby boomer generation in US, one adult turns 50 every 8 seconds, a total of 1000 a day, hence the market for these products will continue to grow.

Indian Incontinence (Adult) Diapers:

7.9 **TECS** has adopted a **two-pronged approach** for assessing the Incontinence Diapers market in India, that of **Retailer & Hospital Survey** and **Industry Feedback**, supplemented through **Internet research and data scan from secondary sources.**

7.10 The industry feed back from the established players reveal that the estimated Indian market for Incontinence Diapers is around **Rs. 20 crore (2001-02).**

Year	S – I (Rs. Cr.)	S - II (Rs. Cr.)	Avg I. D. (Rs. Cr.)	Nonwoven demand (tonnes) S - I	Nonwoven demand (tonnes) S - II	Average NW con. (tonnes)
2001 - 02	20.00 (3.50)	20.00 (3.50)	**20.00 (3.50)**	Rs. 0.36 Cr. (32.97)	Rs. 0.36 Cr. (32.97)	**Rs. 0.36 Cr. (32.97)**
2003 - 04	22.05 (3.68)	85.86 (14.31)	**53.96 (8.99)**	Rs. 0.38 Cr. (34.62)	Rs. 1.48 Cr. (134.80)	**Rs. 0.93 Cr. (84.71)**
2007 - 08	26.80 (4.47)	243.35 (40.56)	**135.07 (22.51)**	Rs. 0.46 Cr. (42.08)	Rs. 4.20 Cr. (382.05)	**Rs. 2.33 Cr. (212.07)**

Figs in brackets denote vol in mn pcs

* Demand projections are subject to Market Realisation

S - I : Normative Approach (Based on Industry Feedback

S - II : Increase Penetration of the product from current levels to 0.75% (2003-04) and 2% (2007-08)

SECTION II : DIAPERS MANUFACTURING TECHNOLOGY AND EQUIPMENTS SUPPLIERS

Process Description:

7.11 The main raw material is **cellulose pulp** in rolls. The fluffing system is obtained through a hammer mill inside an asonic cabin which reduces the noise. The entry of the pulp rolls is regulated by a speed variator so does the weight. A super-absorbent powder is applied at this stage on the fluffed pulp.

7.12 The combined fluff mat ribbon overwrapped by the tissue is transported to an embossing unit through a conveyor belt. Then the mat is cut by a rotary die and the resulting pad obtained is spaced and top formed by a non woven fabric covering, while the bottom will be formed by a PVC sheet. A unit composed by a set of rotary cutting knives provide to cut the diapers and the PVC with the non woven, while a continuous suction system provides the removal of the cutting waste. In this part of the machine there is an applicator to fix the elastic in the leg region. Other applicators can operate according to the type and quality of the diapers desired applying the frontal tapes, the faecal barrier and eventually elastic waist-band. Adhesive labels type velcro are applied in order to fix the waist-line of the diaper.

7.13 A sealing system seals the ends of the diapers, after the final cut. The finished diapers are then conveyed to a transversal final folding group which has the capacity to half-fold or three-fold the diapers by means of belts and cams.

7.14 An automatic counter and packer unit is receiving the finished folded product, and discharges stacks of diapers pre-counted in a funnel where the operator has to insert a poly bag or cardboard box for the final packing.

Machinery (Technology & Equipment) Suppliers and Specifications:

7.15 Globally, the well known technology suppliers with proven track record for Diapers contacted by TECS are:

- M. D. Viola (Italy),
- Diatec SRL (Italy),
- Sanimac (Italy),
- Rainbow Fame (Taiwan),
- Caldiroli (Italy),
- BHT Bicma (Germany),
- Fameccanica (Italy).

Note : The list contains the leading global players in manufacturing Incontinence and Baby Diapers and based on discussion with Industry experts the above list is exhaustive.

7.16 TECS has received favourable responses and indicative quotations.

Process Systems and Equipments

- **The machinery required for the manufacturing of the Incontinence Diapers is as follows:**
  - Raw Material Unwinder (Pulp, Nonwovens, Poly, Tissue Paper),
  - Pulp Grinding,
  - Fluff Drum Forming System,
  - Fluff Processing,
  - SAP Applicator,
  - Fluted Elastic Waist Band Applicator,
  - Fluff Leg Cuff Applicator,
  - Hot Melt Glue Applicator,
  - Tape Detector,

- Three Folding System,
- Compression Unit,
- Poly Cutting System,
- Stacker

Recommended Minimum Economic Size:

7.17 The **Incontinence Diapers** project proposed to be set up in India will have a designed capacity of **200 diapers per min.**

7.18 Under Indian operating conditions it is safer to assume machine efficiency factor of 75%, and therefore the production would be 150 diapers per min (Incontinence Diapers)

7.19 The plant would operate in three shifts, 24 hours and 300 working days in a year.

7.20 These converting lines mentioned above are dedicated for incontinence and baby diapers only.

Investment in Process Plant and Machinery.

7.21 **The investment in the process plant and machinery for Incontinence Diapers will be Rs 7.63 crores** (FOB) after a **discount of 15%.** Finer details on the Equipment listing, specification and the quotations need to be discussed with the technology supplier before the project is taken up. Taking into account the CIF value, the custom duties (5%), CVD (16%), inland transportation and loading / unloading (2%), erection and commissioning (5%), **the installed cost of process equipment would be Rs 10.15 crores.**

SECTION III : INCONTINENCE DIAPERS : PROJECT COST AND FINANCIALS

Land

7.22 The total requirement of Land for this project keeping in mind the possible future expansion is around 6069 sq. mtrs. **(1.5 acres).**

7.23 Based on the available information, the cost of land is assumed at Rs 1200 per square meter (including the developmental cost). Depending on the exact location of the project to be determined by the promoter the land cost could be higher or lower. Hence

the total cost of developed land will be **Rs 0.73 crores (Rs 73 lakhs).**

Buildings

7.24 The building area comprising of main factory building, godowns, office , R & D labs / In-house Testing centre etc. would be 3500 sq. mtrs. The cost of construction would again vary depending on the structure and the materials to be used. It has been assumed that the average cost of construction would be Rs 4500 per sq. mtr. Thus the total cost of building and other civil works would be around **Rs 1.58 crores**.

Plant and Machinery

7.25 Details of Plant and machinery as well as technology required for the project have been presented in earlier Section II . The installed cost of plant and machinery would be **Rs 10.15 crores**.

7.26 Apart from the main process equipments the utilities required are

- Electricals,
- Piping,
- Water supply,
- Compressors,
- Fire fighting equipments

7.27 The provision on this count is taken as 5 % of the cost of machinery which works out to **Rs 0.51 crores** (Rs 51 lakhs).

Miscellaneous Fixed Assets

7.28 Under this head the items included are Furniture and fixtures, Office equipments, Air Conditioners etc. and the provision made is around **Rs 0.15** crores (Rs 15 lakhs), inclusive of the testing and R&D facilities.

Testing Facilities

7.29 The Incontinence Diapers unit calls for **Tensile Strength testing, Burst Strength testing for Corrugated Boxes, Dancing Doll** (which has its legs moving to mimic the walking effects of the adult). A provision of around **Rs 0.15 crore** (Rs 15 lakhs) is made on this count.

Project Engineering and Consulting

7.30 Under this head the items included are the fees and expenses on account of Architect fees, project engineering and management (both local and overseas), detailed project reports, etc. The total expenses under this head may be taken as 2.5% of the total machinery and civil assets cost.

Preliminary & Preoperative Expenses

7.31 The items included under this head are company formation expenses, public issue expenses (if any), interest during construction, pre production expenses during the implementation phase etc.

Contingency Expenses

7.32 Depending on the gestation period and further detailing of the project cost by the promoter, the contingency provision has been made at the rate of 10%.

Margin Money for Working capital

7.33 The margin money for working capital forming part of the total project cost would be Rs 2.28 Crores .[**Exhibit 7.3**]

Total Project Cost (Total Investment)

7.34 The total project cost as given in **Exhibit 7.1** would be **Rs 18.93 crores.**

Project Funding and Financing Pattern:

7.35 It has been assumed that the project would be financed through long term funds and Equity participation by the Promoter / Public. The technical textile sector being a high priority area , it is assumed that a **Debt- Equity ratio of 1.5 : 1** would be feasible. (However the sensitivity analysis has also been presented for 1 : 1 and 2 : 1 Debt Equity ratios.)

Sales , Profitability and Sensitivity Analysis:

Sales Realisation and Turnover

7.36 As per the details available from the Technology and Equipment suppliers the economic size of a plant is 200 adult diapers per min.

7.37 Under the Indian conditions, it is assumed that the machine would operate at an efficiency level of 75%. Hence the production from the plant would be 150 adult diapers per min.

7.38 The plant would operate on Three-shift basis and 300 workings days in a year. The capacity utilisation for the 1st year is assumed at 50% and thereafter for the 2nd, 3rd and 4th year onwards 60%, 75% and 90% respectively.

7.39 The average selling price of the end product would be Rs 15 per adult diaper (net of excise duties, sales tax and other incidental expenses). The adult diapers sold in the Indian market at Rs 45 - 80 per piece. The finished products are exempt from excise duty. The players sell the imported and repacked diapers in the Indian market. The international price of the incontinence diapers is Rs 80 per piece. On this the import duty, margins etc. get added.

7.40 The details of projected sales turnover are given in **Exhibit 7.2.**

Cost of Production

Major Raw materials and their specifications:

7.41 The **main raw materials** used and the corresponding prevailing prices as an indicator are as follows:

Raw Material	Prices	Landed cost (inclusive of all duties)
Nonwoven for topsheet and cuffs	Rs. 90 per kg	Rs. 110 per kg
Wood Pulp Core (Fluff)	Rs. 30 per kg	Rs. 35 per kg
Super Absorbent Polymer	Rs. 70 per kg	Rs. 110 per kg
Hot Melt Glue	Rs. 150 per kg	Rs. 300 per kg

7.42 Apart from the above, other materials also form a part of the napkins like those mentioned below:

- Acquisition layer,
- Tissue,
- Poly Backsheet,
- Leg Elastic
- Elastic Cuffs,

7.43 Wood Pulp Core (Fluff) and Nonwoven account for around 85% of the total cost and weight of the incontinence diapers raw materials.

7.44 The nonwoven in the gsm range of 20-22 gsm is used.

7.45 The leading **suppliers** of the incontinence diapers **raw materials** are:

- **Wood Pulp Core (Fluff):** Georgia Pacific, Buckeye, Cellulose Corporation Weyerhaeuser, Tartas S.A., Cellu Tissue Corporation,
- **Nonwoven or Perforated Poly:** Amoco Fabrics Division, Fabriano Soft S.r.l., Tenotex S.p.a., Pantex Group

Conversion Cost

7.46 The conversion cost will include the cost of power, water , other utility items , chemicals and additives, consumables etc. which is assumed at 10% of the cost of raw material.

Manpower, Salaries and Wages

7.47 The manpower requirements and the salary structure is given in **Exhibit 7.4.**

7.48 The total manpower requirement comprising the managerial cadre of supervisors, machine operators and helpers would be **48 persons.** The wage bill for the conversion unit would be Rs 0.67 crores.

Factory and Overhead Expenses

7.49 The items covered under this head are establishment expenses, repairs and maintenance, stationery, travel expenses, packaging expenses etc.

Marketing and Promotional Expenses

7.50 The promotion of technical textiles will call for expenditure on this count and a provision of 25% of the annual sales has been made uniformly over the years.

7.51 This provision includes the margins to the distributors and the retailers, along with heavy advertising and promotional expenses. The entrepreneur will have to undertake massive promotional campaigns to educate the public about the product, its benefits, usage patterns, availability etc. These efforts would be required due to the lack of awareness among the general public about these products.

Interest and Depreciation

7.52 The prevailing interest rate for long term and short term borrowed funds is assumed at 5% and 11% per annum as it is covered under Technology Upgradation Fund (TUF).

7.53 The repayment of loans has been assumed for 10 years with a moratorium period of two years (2+8).

7.54 The depreciation rates have been worked out as per Company's act (SLM) and Income-Tax Ready Reckoner (WDV).

7.55 The current corporate tax rate is assumed at 35% and the surcharge is assumed at 2.5% per annum.

Profitability, Break-even, IRR, DSCR and Payback

7.56 As presented in **Exhibit 7.5,** the **sales turnover** increases from Rs 47.63 crores in the first year to Rs 85.73 crores from the 4th year.

7.57 The **PBT** increases from Rs 5.17 crores in the first year to Rs 15.12 crore from the fourth year onwards.

7.58 The **Break Even** of the project is at **66.18%.**

7.59 The **Internal Rate of Return** (IRR) has been worked out at **42.44%.**

7.60 The **Payback period** for the project is **2.74 years.**

Sensitivity Analysis

7.61 The sensitivity analysis has been presented in the **Exhibit 7.6.**

OPTION II

7.62 This option presents the choice of the cheaper machine (Chinese make) with an installed cost in the process plant and machinery of **Rs 3.33 lakhs.** The total **project cost** would be **Rs 8.77 crores.**

7.63 The designed capacity of the machine is for 100 diapers per min

7.64 The projected sales turnover for the adult diaper unit is shown in Exhibit **7.7.**

Profitability, Break-even, RR, DSCR and Payback

7.65 As presented in **Exhibit 7.8**, the sales turnover increases from Rs 23.81 crores in the first year to Rs 42.87 crores from the 4th year onwards.

7.66 The PBT increases from Rs 2.61 crores in the first year to Rs 7.30 crores in the fourth year.

7.67 The Break Even of the project is at 66.33%.

7.68 The Internal Rate of Return (IRR) has been worked out at 42.76%.

7.69 The Payback period for the project is 2.75 years.

COMPARISION OF ALTERNATE TECHNOLOGIES

Technology Particulars	Incontinence Diapers Project	
	Option - I European Technology	Option - II Local / Chinese Technology
Capacity	200 Diapers per min	100 Diapers per min
Project Cost	Rs. 18.93 Cr	Rs. 8.77 Cr.
Revenue (1st year)	Rs. 47.63 Cr.	Rs. 23.81 Cr.
BEP	66.18%	66.33%
IRR	42.44%	42.76%
Payback	2.74 years	2.75 years

DEVELOPMENTAL AND PROMOTIONAL MEASURES

7.70 Within Europe these incontinence products are classified as **Medical Devices Class 1** and their manufacture and control are required to follow the requirements set out in the **European Council Directive 93/42/EEC 14 June 1993.** Similar arrangements are in place in the US too. **Even in India such measures can be introduced for the diapers.**

7.71 Prevailing **duty structure** on the following products needs **revision** for the promotion of this sector and even be competitive in the export market.

Item	Prevailing Duty Structure	Recommended Duty Structure
Wood Pulp	5% (BCD) + 4% (CVD)	Total Duty : 5%
NonWovens	20% (BCD) + 16% (CVD) + 0.5% (Textile Cess)	Total Duty : 10%
SAP	20% (BCD) + 16% (CVD)	Total Duty : 10%
Hot Melt Glue	20% (BCD) + 16% (CVD)	Total Duty : 10%

7.72 The penetration level of the incontinence diapers even in the urban regions is very low. This is due to lack of awareness of the hygienic aspects of the product coupled with the unaffordability of the diapers.

7.73 To **increase the penetration levels** from the current dismal state, following steps need to be taken:

- Awareness creation campaigns and promotional efforts,
- Duty reduction on raw materials.
- Distribution of the incontinence diapers through the **Public Distribution System** (PDS),

7.74 **Increased education** and marketing efforts would allow incontinent adults to feel more comfortable using this product.

7.75 The Incontinence Diapers should now enter a **"consumer style market"** with TV commercials increasing the awareness of the product.

Exhibit 7.1

	PROJECT COST	
(LAND, BUILDINGS, PROCESS PLANT & MACHINERY, UTILITIES & OTHER ASSETS)		
		Project Cost (Rs. Cr.)
1	**Land**	**0.73**
	Area: 1.5 acres (6069 Sq Mtrs)	
	Rate: (Rs.1200 /Sq. Mtr)	
2	**Buildings**	**1.58**
	(Plant Area, Office, Godown, Lab, Service Area etc.)	
	Built-up Area : 3500 Sq. Mtrs	
	Avg Rate : Rs.4500 /Sq. Mtrs	
3	**Process Plant & Equipment**	**10.15**
4	**Utility & Other equipments (5%)**	**0.51**
	(Power, Water, Compressor, Humidity Control,	
	Fire Fighting, Material Handling etc.)	
5	**Misc. Fixed Assets**	**0.15**
	(Furniture & Fixtures, Office Equipment, Testing Lab etc.)	
6	**Testing Equipments**	**0.15**
7	**Project Engineering & Consultancy charges (2.5%)**	**0.31**
8	**Preliminary & Pre-operative Expenses (12%)**	**1.56**
	(Company Formation, Interest during construction,	
	pre-production expenses, etc.)	
9	**Contingency (10 %)**	**1.51**
10	**Total**	**16.65**
11	**Margin Money for Working Capital**	**2.28**
12	**Total Project Cost**	**18.93**

Exhibit 7.2

ESTIMATION OF SALES REVENUE

(Rs. Cr.)

ITEM	YEAR OF OPERATION									
	I	II	III	IV	V	VI	VII	VIII	IX	X
Designed Capacity per min	200	200	200	200	200	200	200	200	200	200
75% efficiency	150	150	150	150	150	150	150	150	150	150
Capacity Utilisation	50%	60%	75%	90%	90%	90%	90%	90%	90%	90%
Actual Production per min (pcs)	75	90	113	135	135	135	135	135	135	135
Actual Production per hr (pcs)	4500	5400	6750	8100	8100	8100	8100	8100	8100	8100
Production per day (pcs)	108000	129600	162000	194400	194400	194400	194400	194400	194400	194400
Production for 300 working days (pcs)	32400000	38880000	48600000	58320000	58320000	58320000	58320000	58320000	58320000	58320000
Selling Price (Rs / diaper)	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
Sales Revenue (Rs. Cr)	**48.60**	**58.32**	**72.90**	**87.48**	**87.48**	**87.48**	**87.48**	**87.48**	**87.48**	**87.48**
Value Loss (2%)	0.97	1.17	1.46	1.75	1.75	1.75	1.75	1.75	1.75	1.75
Net Sales Revenue (Rs. Cr)	**47.63**	**57.15**	**71.44**	**85.73**	**85.73**	**85.73**	**85.73**	**85.73**	**85.73**	**85.73**

EXHIBIT 7.3

REQUIREMENT OF WORKING CAPITAL

(Rs.Lakhs)

ITEM	NO. OF	MARGIN	YEAR I			YEAR II			YEAR III			YEAR IV			YEAR V		
	MONTHS	(%)	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK
			REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE
Factory Related																	
Raw materials & other commodities	1.00	25.00	1.82	0.46	1.37	2.19	0.55	1.64	2.73	0.68	2.05	3.28	0.82	2.46	3.28	0.82	2.46
Finished Goods	1.00	25.00	3.35	0.84	2.51	3.84	0.96	2.88	4.74	1.19	3.56	5.64	1.41	4.23	5.65	1.41	4.23
A/c Receivable	1.00	25.00	3.97	0.99	2.98	4.76	1.19	3.57	5.95	1.49	4.47	7.14	1.79	5.36	7.14	1.79	5.36
Cash in hand																	
Salaries & wages	1.00	0.00	0.06	0.00	0.06	0.06	0.00	0.06	0.06	0.00	0.06	0.06	0.00	0.06	0.07	0.00	0.07
Utilities	1.00	0.00	0.18	0.00	0.18	0.22	0.00	0.22	0.27	0.00	0.27	0.33	0.00	0.33	0.33	0.00	0.33
Advertising & Promotional Expenses	1.00	0.00	0.99	0.00	0.99	1.19	0.00	1.19	1.49	0.00	1.49	1.79	0.00	1.79	1.79	0.00	1.79
Admin. Overheads	1.00	0.00	0.16	0.00	0.16	0.16	0.00	0.16	0.16	0.00	0.16	0.16	0.00	0.16	0.16	0.00	0.16
Total Requirement			**10.39**	**2.28**	**8.10**	**12.28**	**2.70**	**9.58**	**15.27**	**3.36**	**11.92**	**18.27**	**4.02**	**14.25**	**18.28**	**4.02**	**14.26**

EXHIBIT 7.3 (CONTD...)

REQUIREMENT OF WORKING CAPITAL

(Rs.Lakhs)

ITEM	NO. OF	MARGIN		YEAR VI			YEAR VII			YEAR VIII			YEAR IX			YEAR X	
	MONTHS	(%)	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK
			REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE
Factory Related																	
Raw materials & other commodities	1.00	25.00	3.28	0.82	2.46	3.28	0.82	2.46	3.28	0.82	2.46	3.28	0.82	2.46	3.28	0.82	2.46
Finished Goods Stock	1.00	25.00	5.65	1.41	4.24	5.66	1.41	4.24	5.66	1.42	4.25	5.67	1.42	4.25	5.68	1.42	4.26
A/c Receivable	1.00	25.00	7.14	1.79	5.36	7.14	1.79	5.36	7.14	1.79	5.36	7.14	1.79	5.36	7.14	1.79	5.36
Cash in hand																	
Salaries & wages	1.00	0.00	0.07	0.00	0.07	0.08	0.00	0.08	0.09	0.00	0.09	0.09	0.00	0.09	0.10	0.00	0.10
Utilities	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Advertising & Promotional Expenses	1.00	0.00	0.02	0.00	0.02	0.02	0.00	0.02	0.02	0.00	0.02	0.02	0.00	0.02	0.02	0.00	0.02
Admin. Overheads	1.00	0.00	1.79	0.00	1.79	1.79	0.00	1.79	1.79	0.00	1.79	1.79	0.00	1.79	1.79	0.00	1.79
Total Requirement			**18.29**	**4.02**	**14.27**	**18.30**	**4.02**	**14.28**	**18.31**	**4.02**	**14.29**	**18.32**	**4.02**	**14.30**	**18.34**	**4.03**	**14.31**

Exhibit 7.4

MANPOWER REQUIREMENTS

	Nos	Monthly	Total Monthly Salary	Annual
General Manager	1	30000	30000	360000
Production Manager	1	20000	20000	240000
Machine Operators	6	6000	36000	432000
Machine Helper (Semi Skilled)	12	3000	36000	432000
R&D, Testing	2	8000	16000	192000
Marketing Manager & Sales Manager	2	25000	50000	600000
Sales Representatives	12	12000	144000	1728000
Clerical Staff	6	6000	36000	432000
Other Staff	4	3000	12000	144000
Maintenance (Elec. & Mech.)	2	10000	20000	240000
TOTAL	**48**		**400000**	**4800000**
Fringe Benefits (40 % of the above)				1920000
Total Wage Bill (Annual) Rs. lakhs:	Salary + Other Benefits =			**6720000.00**
Total Wage Bill (Annual) Rs. Cr.:				**0.672**

Exhibit 7.5

PROFITABILITY STATEMENT AND COMPUTATION OF TAX

(Rs.Cr)

ACCOUNT HEAD	FINANCIAL YEAR OF OPERATION									
	I	II	III	IV	V	VI	VII	VIII	IX	X
Revenue										
Net Sales Turnover	47.63	57.15	71.44	85.73	85.73	85.73	85.73	85.73	85.73	85.73
Total Revenue	47.63	57.15	71.44	85.73	85.73	85.73	85.73	85.73	85.73	85.73
Expenses										
Raw Materials	21.87	26.25	32.81	39.37	39.37	39.37	39.37	39.37	39.37	39.37
Salaries & wages	0.67	0.71	0.74	0.78	0.82	0.88	0.95	1.03	1.11	1.20
Conversion Costs	2.19	2.62	3.28	3.94	3.94	3.94	3.94	3.94	3.94	3.94
Repairs & Maintenance	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Sales, Marketing & Training Expenses	11.91	14.29	17.86	21.43	21.43	21.43	21.43	21.43	21.43	21.43
Factory & Office Overheads	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94
CVD	1.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest on S.T. Loans	0.89	1.05	1.31	1.57	1.57	1.57	1.57	1.57	1.57	1.57
Cost of Sales	41.04	47.12	58.20	69.29	69.33	69.39	69.47	69.54	69.63	69.72
Depreciation (St.Line)	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Amort. of Expenses	0.05	0.05	0.05	0.05	0.05	0.05	0.00	0.00	0.00	0.00
Interest on L.T Loan	0.57	0.57	0.53	0.46	0.39	0.32	0.25	0.18	0.11	0.04
Profit Before Tax	5.17	8.61	11.85	15.12	15.16	15.16	15.21	15.21	15.19	15.17
Tax	0.86	2.36	3.71	5.03	5.17	5.27	5.36	5.41	5.45	5.48
Profit After Tax	4.31	6.25	8.14	10.10	9.99	9.89	9.85	9.79	9.74	9.70
Dividend	0.00	0.00	0.38	0.38	0.38	0.76	0.76	0.76	0.76	0.76
Profits For Appropriation	4.31	6.25	7.76	9.72	9.61	9.14	9.10	9.04	8.99	8.94
COMPUTATION OF TAX										
Profit after interest before depreciation	5.97	9.41	12.65	15.93	15.96	15.96	16.02	16.01	16.00	15.98
Depr.(WDV) to be claimed	3.52	2.69	2.05	1.57	1.21	0.93	0.72	0.56	0.44	0.35
Depreciation claimed	3.52	2.69	2.05	1.57	1.21	0.93	0.72	0.56	0.44	0.35
Depr. carried forward	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Taxable Profit	2.45	6.73	10.60	14.36	14.75	15.03	15.29	15.45	15.56	15.63
Profit Before Tax (Book)	5.17	8.61	11.85	15.12	15.16	15.16	15.21	15.21	15.19	15.17
Minimum Alternate Tax	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tax (Actual)	0.86	2.36	3.71	5.03	5.17	5.27	5.36	5.41	5.45	5.48
Tax Provision	0.86	2.36	3.71	5.03	5.17	5.27	5.36	5.41	5.45	5.48

EXHIBIT 7.6

SENSITIVITY ANALYSIS

Items	Profit after Tax (PAT) Rs. Cr. (assumed at 90 % capacity)	Break Even (%)	Internal Rate of Return (IRR) (%)	Payback Period (Years)
NORMAL VALUES	10.10	66.18	42.44	2.74
Debt Equity Ratios				
(a) 2:1	10.06	66.30	42.53	2.74
(b) 1:1	10.15	65.99	42.31	2.75
Increase in Project Cost by 10 %	10.02	66.55	39.71	2.90
Increase in Selling Price to Rs. 16 / Diaper	12.75	61.49	51.29	2.32
Decrease in Selling Price to Rs. 14 / Diaper	7.44	72.37	32.74	3.36
Decrease in Raw Material Prices by 10%	12.95	59.75	52.61	2.26
Increase in Raw Material Prices by 10%	7.24	74.15	31.48	3.47

BABY DIAPERS (CONVERTING LINE)

SECTION-I : PRODUCT BRIEF, APPLICATION AREAS AND MARKET POTENTIAL

Baby Diapers:

8.1 The baby diapers main functions are to keep the baby dry and absorb and retain urine and waste. Baby Diapers must be able to keep the baby dry (be able to take up a large quantity of liquid) and then "hold it under load" as the baby moves around.

Important / Desired properties of baby diapers are:

- High absorbency while creating little or no irritation to the skin (skin friendly) - No Diaper Rash,
- Protect against leaks,
- No rewetting (provide dryness),
- Comfortable and good fit,
- Environmentally friendly when disposed,
- No noise, Easy to handle with features such as refastenable tapes.

Functions of baby diapers are:

- Absorb urine during miction,
- Retain urine inside the absorbent core,
- Isolate wetness from the baby's skin,
- Containing faeces,
- Isolate urine and faeces from the baby's environment (clothes, bed, etc.)

8.2 The baby diaper design is strongly driven by bare marketing issues: make the product attractive not for the user (Baby) but for the purchaser (Mother).

Emerging Market Potential - Global and Indian

Baby Diapers:

Global Baby Diapers Market :

8.3 The global market for disposable diapers is $20 bn annually (2001). The diaper industry accounted for approximately 80% of the North American coverstock consumption according to EDANA (1997).

8.4 According to EDANA, the West European market for disposable baby products is around 16 bn pieces (2001 data). The diaper market is mature in developed areas such as North America, Western Europe and Japan, while the penetration in other areas is limited, making it attractive to the manufacturers. This is because the declining birth rates and extremely high penetration levels in the developed regions have created a maturing market with little room for growth.

Indian Baby Diapers Market :

8.5 The **Indian market** for Baby Diapers is around **Rs 70 Cr. p.a.** The industry estimates the baby diaper market to grow at a rate of around 5-10% (Average: 7%).

8.6 The market estimates for the baby diapers and the nonwoven requirement that would arise form the segment is as follows:

Year	Baby Diapers Demand		Nonwoven demand	
	Qty (mn pcs)	Value (Rs. Cr.)	Qty (tonnes)	Value (Rs. Cr.)
2001 - 02	53.85	70.00	161.55	1.78
2003 - 04 (Estm.)	61.65	80.14	184.95	2.03
2007 - 08 (Proj.)	80.81	105.05	242.43	2.67

* Demand projections are subject to Market Realisation

SECTION II : DIAPERS MANUFACTURING TECHNOLOGY AND EQUIPMENTS SUPPLIERS

Process Description:

8.7 The main raw material is **cellulose pulp** in rolls. The fluffing system is obtained through a hammer mill inside an asonic cabin which reduces the noise. The entry of the pulp rolls is regulated by a speed variator so does the weight. A super-absorbent powder is applied at this stage on the fluffed pulp.

8.8 The combined fluff mat ribbon overwrapped by the tissue is transported to an embossing unit through a conveyor belt. Then the mat is cut by a rotary die and the resulting pad obtained is spaced and top formed by a non woven fabric covering, while the bottom will be formed by a PVC sheet. A unit composed by a set of rotary cutting knives provide to cut the diapers and the PVC with the non woven, while a continuous

suction system provides the removal of the cutting waste. In this part of the machine there is an applicator to fix the elastic in the leg region. Other applicators can operate according to the type and quality of the diapers desired applying the frontal tapes, the faecal barrier and eventually elastic waist-band. Adhesive labels type velcro are applied in order to fix the waist-line of the diaper.

8.9 A sealing system seals the ends of the diapers, after the final cut. The finished diapers are then conveyed to a transversal final folding group which has the capacity to half-fold or three-fold the diapers by means of belts and cams.

8.10 An automatic counter and packer unit is receiving the finished folded product, and discharges stacks of diapers pre-counted in a funnel where the operator has to insert a poly bag or cardboard box for the final packing.

Machinery (Technology & Equipment) Suppliers and Specifications:

8.11 Globally, the well known technology suppliers with proven track record for Diapers contacted by TECS are:

1. M. D. Viola (Italy),
2. Diatec SRL (Italy),
3. Sanimac (Italy),
4. Rainbow Fame (Taiwan),
5. Caldiroli (Italy),
6. BHT Bicma (Germany),
7. Fameccanica (Italy).

Note : The list contains the leading global players in manufacturing Baby Diapers and based on discussion with Industry experts the above list is exhaustive.

8.12 TECS has received favourable responses and indicative quotations.

Process Systems and Equipments

- **The machinery required for the manufacturing of the Baby Diapers is as follows:**
    - Pulp Unwinding Stand,
    - Pulp Grinding,
    - Fluff Drum Forming System,
    - SAP Applicator,
    - Fluff Recycling System,
    - Compression Unit / Debulking Unit,

- Backsheet / Coverstock Unwinding,
- Leg Cuff Applicator,
- Fluted Elastic Waist Band Applicator,
- Acquisition Layer Applicator.
- Hot Melt System,
- Three Folding System,
- Stacker and Counter,

Recommended Minimum Economic Size:

8.13 The **Baby Diapers** project proposed to be set up in India will have a designed capacity of **400 diapers per min.**

8.14 Under Indian operating conditions it is safer to assume machine efficiency factor of 75%, **and** therefore the production would be 300 diapers per min (Baby Diapers)

8.15 The **plant** would operate in three shifts, 24 hours and 300 working days in a year.

8.16 These converting lines mentioned above are dedicated for baby diapers only.

Investment in Process Plant and Machinery.

8.17 For the baby diapers project is **the investment in the process plant and machinery will be Rs 6.46 crores** (FOB) after a **discount of 15%.** Finer details on the Equipment listing, specification and the quotations need to be discussed with the technology supplier before the project is taken up. Taking into account the CIF value, the custom duties (5%), CVD (16%), inland transportation and loading / unloading (2%), erection and commissioning (5%), **the installed cost of process equipment would be Rs 8.60 crores.**

SECTION III-B : PROJECT COST AND FINANCIALS

Land

8.18 The total requirement of land for this project keeping in mind the possible future expansion is around 6069 sq. mtrs. (1.5 acres).

8.19 Based on the available information, the cost of land is assumed at Rs 1200 per square meter (including the developmental cost). Depending on the exact location of the project to be determined by the promoter the land cost could be higher or lower. Hence the total cost of developed land will be **Rs 0.73 crores** (Rs 73 lakhs).

Buildings

8.20 The building area comprising of main factory building, godowns, office , R&D labs / In-house Testing centre etc. would be 3500 sq. mtrs. The cost of construction would again vary depending on the structure and the materials to be used. It has been assumed that the average cost of construction would be Rs 4500 per sq. mtr. Thus the total cost of building and other civil works would be around **Rs 1.58 crores.**

Plant and Machinery

8.21 Details of Plant and machinery as well as technology required for the project have been presented in earlier Section II . The installed cost of plant and machinery would be **Rs 8.60 crores.**

8.22 Apart from the main process equipments the utilities required are:

- Electricals,
- Piping,
- Water supply,
- Compressors,
- Fire fighting equipments

8.23 The provision on this count is taken as 5% of the cost of machinery which works out to Rs 0.43 crores (Rs 43 lakhs).

Testing Facilities

8.24 The Baby Diapers unit calls for **Tensile Strength testing, Burst Strength testing for Corrugated Boxes, Dancing Doll** (which has its legs moving to mimic the walking effects of the baby). A provision of around **Rs 0.15 crore** (Rs 15 lakhs) is made on this count.

Miscellaneous Fixed Assets

8.25 Under this head the items included are Furniture and fixtures, Office equipments, Air Conditioners etc. and the provision made is around **Rs 0.15 crores** (Rs 15 lakhs), inclusive of the testing and R&D facilities.

Project Engineering and Consulting

8.26 Under this head the items included are the fees and expenses on account of Architect fees, project engineering and management (both local and overseas), detailed project reports, etc. The total expenses under this head may be taken as 2.5% of the total machinery and civil assets cost

Preliminary & Preoperative Expenses

8.27 The items included under this head are company formation expenses, public issue expenses (if any), interest during construction, pre production expenses during the implementation phase etc.

Contingency Expenses

8.28 Depending on the gestation period and further detailing of the project cost by the promoter, the contingency provision has been made at the rate of 10%.

Margin Money for Working capital

8.29 The margin money for working capital forming part of the total project cost would be Rs 2.49 Crores .[**Exhibit 8.3**]

Total Project Cost (Total Investment)

8.30 The total project cost as given in **Exhibit 8.1** would be **Rs 17.10 crores.**

Project Funding and Financing Pattern:

8.31 It has been assumed that the project would be financed through long term funds and Equity participaion by the Promoter / Public. The technical textile sector being a high priority area , it is assumed that a Debt- Equity ratio of 1.5 : 1 would be feasible. (However the sensitivity analysis has also been presented for 1 : 1 and 2 : 1 Debt Equity ratios.)

Sales , Profitability and Sensitivity Analysis:

Sales Realisation and Turnover

8.32 As per the details available from the Technology and Equipment suppliers the economic size of a plant is 400 baby diapers per min.

8.33 Under the Indian conditions, it is assumed that the machine would operate at an efficiency level of 75%. Hence the production from the plant would be 300 baby diapers per min..

8.34 The plant would operate on Three-shift basis and 300 workings days in a year.

8.35 The capacity utilisation for the 1st year is assumed at 50% and thereafter for the 2nd, 3rd and 4th year onwards 60%, 75% and 90% respectively.

8.36 The average selling price of the end product would be Rs 8 per baby diaper (net of

sales tax and other incidental expenses). There is no excise duty on these products. The international price of the baby diapers is Rs 12 - 18 per piece. On this the import duty, CVD, margins etc. get added.

8.37 The details of projected sales turnover are given in **Exhibit 8.2.**

Cost of Productions

Major Raw materials and their specifications:

8.38 The **main raw materials** used and the corresponding prevailing prices as an indicator are as follows:

Raw Material	Prices	Landed cost (inclusive of all duties)
Wood Pulp Core (Fluff)	Rs. 30 per kg	Rs. 35 per kg
Nonwoven for topsheet and cuffs	Rs. 90 per kg	Rs. 110 per kg
Super Absorbent Polymer	Rs. 70 per kg	Rs. 110 per kg
Hot Melt Glue	Rs. 150 per kg	Rs. 300 per kg

8.39 Apart from the above, other materials also form a part of the napkins like those mentioned below:

- Acquisition layer,
- Tissue,
- Poly Backsheet,
- Elastic Waist Band,
- Frontal Tape,
- Prelaminated Tape,
- Leg Elastic,
- Elastic Cuffs,

8.40 Wood Pulp Core (Fluff) and Nonwoven or Perforated Poly account for around 70-75% of the total raw material cost and weight..

8.41 The nonwoven in the gsm range of 20-25 gsm is used.

8.42 The leading **suppliers** of the Baby Diapers **raw materials** are:

- **Wood Pulp Core (Fluff):** Georgia Pacific, Weyerhaeuser, Tartas

S.A.,Buckeye Cellulose Corporation, Cellu Tissue Corporation,

- **Nonwoven or Perforated Poly:** Amoco Fabrics Division, Fabriano Soft S.r.l., Tenotex S.p.a., Pantex Group

Conversion Cost

8.43 The conversion cost will include the cost of power, water , other utility items , chemicals and additives, consumables etc. which is assumed at 10% of the cost of raw material.

Manpower, Salaries and Wages

8.44 The manpower requirements and the salary structure is given in **Exhibit 8.4.**

8.45 The total manpower requirement comprising the managerial cadre of supervisors, machine operators and helpers would be **48 persons.** The wage bill for the conversion unit would be Rs 0.67 crores.

Factory and Overhead Expenses

8.46 The items covered under this head are establishment expenses, repairs and maintenance, stationery, travel expenses, packaging expenses etc.

Marketing and Promotional Expenses

8.47 The promotion of technical textiles will call for expenditure on this count and a provision of 25% of the annual sales has been made uniformly over the years.

8.48 This provision includes the distributors and retailers margins, advertising and promotional expenses etc. Being a new project, such heavy expenditure on marketing and promotional efforts would be required. The public does have sufficient knowledge about the baby diapers, however availability at the right place and the right price along with channelled marketing efforts will be the thrust areas.

Interest and Depreciation

8.49 The prevailing interest rate for long term and short term borrowed funds is assumed at 5% and 11% per annum as it is covered under Technology Upgaradation Fund (TUF)

8.50 The repayment of loans has been assumed for 10 years with a moratorium period of two years (2+8).

8.51 The depreciation rates have been worked out as per Company's act (SLM) and Income-Tax Ready Reckoner (WDV).

8.52 The current corporate tax rate is assumed at 35 % and the surcharge is assumed at 2.5% per annum.

Profitability, Break-even, IRR, DSCR and Payback

8.53 As presented in **Exhibit 8.5,** the net sales turnover increases from Rs 50.80 crores in the first year to Rs 91.45 crores from the 4th year.

8.54 The **PBT** increases from Rs 4.55 crores in the first year to Rs 13.59 crore in the fourth year.

8.55 The **Break Even** of the project is at **69.31%.**

8.56 The **Internal Rate of Return** (IRR) has been worked out at **41.47%.**

8.57 The **Payback period** for the project is **2.83 years.**

Sensitivity Analysis

8.58 The sensitivity analysis has been presented in the **Exhibit 8.6.**

OPTION II

8.59 This option presents the choice of the cheaper machine (Chinese make) with an installed cost in the process plant and machinery of **Rs 2.40 crores.** The total **project cost** would be **Rs 7.36 crores.**

8.60 The designed capacity of the machine is for 150 baby diapers per min. The sales revenues are shown in **Exhibit 8.7.**

Profitability, Break-even, IRR, DSCR and Payback

8.61 As presented in **Exhibit 8.8**, the sales turnover increases from Rs 19.05 crores in the first year to Rs 34.29 crores from the 4th year onwards.

8.62 The PBT increases from Rs 1.37 crores in the first year to Rs 4.59 crores in the fourth year onwards.

8.63 The Break Even of the project is at 71.90%.

8.64 The Internal Rate of Return (IRR) has been worked out at 33.36%.

8.65 The Payback period for the project is 3.35 years.

COMPARISION OF ALTERNATE TECHNOLOGIES

Technology Particulars	Baby Diapers Project	
	Option - I European Technology	Option - II Local / Chinese Technology
Capacity	400 Diapers per min	150 Diapers per min
Project Cost	Rs. 17.10 Cr	Rs. 7.36 Cr.
Revenue (1st year)	Rs. 50.80 Cr.	Rs. 19.05 Cr.
BEP	69.31%	71.90%
IRR	41.47%	33.36%
Payback	2.83 years	3.35 years

DEVELOPMENTAL AND PROMOTIONAL MEASURES

8.66 Prevailing **duty structure** on the following products needs **revision** for the promotion of this sector and even be competitive in the export market.

Item	Prevailing Duty Structure	Recommended Duty Structure
Wood Pulp	5% (BCD) + 4% (CVD)	Total Duty : 5%
NonWovens	20% (BCD) + 16% (CVD) + 0.5% (Textile Cess)	Total Duty : 10%
Super Absorbent Polymers	20% (BCD) + 16% (CVD)	Total Duty : 10%
Hot Melt Glue	20% (BCD) + 16% (CVD)	Total Duty : 10%

8.67 The new players have to be creative when exploring newer markets areas, such as premature diapers. They should look for opportunities in growing regions such as Asia and Latin America. With a large populations and number of consumers, Asia has become one of the largest growing market for baby diapers. Latin America is also an area for diaper growth, despite economic turmoil in Argentina and Venezuela. Extra features at a lower price will determine which diaper will be chosen

Exhibit 8.1		
	PROJECT COST	
(LAND, BUILDINGS, PROCESS PLANT & MACHINERY, UTILITIES & OTHER ASSETS)		
		Project Cost (Rs. Cr.)
1	**Land**	**0.73**
	Area: 1.5 acres (6069 Sq Mtrs)	
	Rate: (Rs.1200 /Sq. Mtr)	
2	**Buildings**	**1.58**
	(Plant Area, Office, Godown, Lab, Service Area etc.)	
	Built-up Area : 3500 Sq. Mtrs	
	Avg Rate : Rs.4500 /Sq. Mtrs	
3	**Process Plant & Equipment**	**8.60**
4	**Testing Equipments**	**0.15**
5	**Utility & Other equipments**	**0.43**
	(Power, Water, Compressor, Humidity Control,	
	Fire Fighting, Material Handling etc.)	
6	**Misc. Fixed Assets**	**0.15**
	(Furniture & Fixtures, Office Equipment, Testing Lab etc.)	
7	**Project Engineering & Consultancy charges (2.5%)**	**0.27**
8	**Preliminary & Pre-operative Expenses (12%)**	**1.38**
	(Company Formation, Interest during construction,	
	pre-production expenses, etc.)	
9	**Contingency (10 %)**	**1.33**
10	**Total**	**14.61**
11	**Margin Money for Working Capital**	**2.49**
12	**Total Project Cost**	**17.10**

Exhibit 8.2

ESTIMATION OF SALES REVENUE

(Rs. Cr.)

ITEM	YEAR OF OPERATION									
	I	II	III	IV	V	VI	VII	VIII	IX	X
Designed Capacity per min	400	400	400	400	400	400	400	400	400	400
75% efficiency	300	300	300	300	300	300	300	300	300	300
Capacity Utilisation	50%	60%	75%	90%	90%	90%	90%	90%	90%	90%
Actual Production per min (pcs)	150	180	225	270	270	270	270	270	270	270
Actual Production per hr (pcs)	9000	10800	13500	16200	16200	16200	16200	16200	16200	16200
Production per day (pcs)	216000	259200	324000	388800	388800	388800	388800	388800	388800	388800
Production for 300 working days (pcs)	64800000	77760000	97200000	116640000	116640000	116640000	116640000	116640000	116640000	116640000
Selling Price (Rs/pc)	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
Sales Revenue (Rs. Cr)	**51.84**	**62.21**	**77.76**	**93.31**	**93.31**	**93.31**	**93.31**	**93.31**	**93.31**	**93.31**
Value Loss (2%)	1.04	1.24	1.56	1.87	1.87	1.87	1.87	1.87	1.87	1.87
Net Sales Revenue (Rs. Cr)	**50.80**	**60.96**	**76.20**	**91.45**	**91.45**	**91.45**	**91.45**	**91.45**	**91.45**	**91.45**

EXHIBIT 8.3

REQUIREMENT OF WORKING CAPITAL

(Rs.Lakhs)

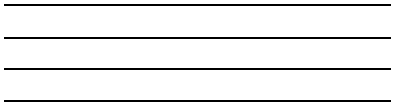
ITEM	NO. OF	MARGIN	YEAR I			YEAR II			YEAR III			YEAR IV			YEAR V		
	MONTHS	(%)	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK
			REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE
Factory Related																	
Raw materials & other commodities	1.00	25.00	2.06	0.52	1.55	2.48	0.62	1.86	3.10	0.77	2.32	3.72	0.93	2.79	3.72	0.93	2.79
Finished Goods	1.00	25.00	3.67	0.92	2.75	4.25	1.06	3.18	5.25	1.31	3.94	6.25	1.56	4.69	6.25	1.56	4.69
A/c Receivable	1.00	25.00	4.23	1.06	3.18	5.08	1.27	3.81	6.35	1.59	4.76	7.62	1.91	5.72	7.62	1.91	5.72
Cash in hand																	
Salaries & wages	1.00	0.00	0.06	0.00	0.06	0.06	0.00	0.06	0.06	0.00	0.06	0.06	0.00	0.06	0.07	0.00	0.07
Utilities	1.00	0.00	0.21	0.00	0.21	0.25	0.00	0.25	0.31	0.00	0.31	0.37	0.00	0.37	0.37	0.00	0.37
Advertising & Promotional Expenses	1.00	0.00	1.06	0.00	1.06	1.27	0.00	1.27	1.59	0.00	1.59	1.91	0.00	1.91	1.91	0.00	1.91
Admin. Overheads	1.00	0.00	0.17	0.00	0.17	0.17	0.00	0.17	0.17	0.00	0.17	0.17	0.00	0.17	0.17	0.00	0.17
Total Requirement			**11.31**	**2.49**	**8.81**	**13.40**	**2.95**	**10.45**	**16.67**	**3.67**	**13.00**	**19.95**	**4.40**	**15.55**	**19.95**	**4.40**	**15.55**

EXHIBIT 8.3 (CONTD...)

REQUIREMENT OF WORKING CAPITAL

(Rs.Lakhs)

ITEM	NO. OF	MARGIN		YEAR VI			YEAR VII			YEAR VIII			YEAR IX			YEAR X	
	MONTHS	(%)	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK
			REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE
Factory Related																	
Raw materials & other commodities	1.00	25.00	3.72	0.93	2.79	3.72	0.93	2.79	3.72	0.93	2.79	3.72	0.93	2.79	3.72	0.93	2.79
Finished Goods Stock	1.00	25.00	6.26	1.56	4.69	6.26	1.57	4.70	6.27	1.57	4.70	6.28	1.57	4.71	6.28	1.57	4.71
A/c Receivable	1.00	25.00	7.62	1.91	5.72	7.62	1.91	5.72	7.62	1.91	5.72	7.62	1.91	5.72	7.62	1.91	5.72
Cash in hand																	
Salaries & wages	1.00	0.00	0.07	0.00	0.07	0.08	0.00	0.08	0.09	0.00	0.09	0.09	0.00	0.09	0.10	0.00	0.10
Utilities	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Advertising & Promotional Expenses	1.00	0.00	0.02	0.00	0.02	0.02	0.00	0.02	0.02	0.00	0.02	0.02	0.00	0.02	0.02	0.00	0.02
Admin. Overheads	1.00	0.00	1.91	0.00	1.91	1.91	0.00	1.91	1.91	0.00	1.91	1.91	0.00	1.91	1.91	0.00	1.91
Total Requirement			**19.96**	**4.40**	**15.56**	**19.97**	**4.40**	**15.57**	**19.99**	**4.40**	**15.59**	**20.00**	**4.40**	**15.60**	**20.02**	**4.41**	**15.61**



Exhbit 8.4

MANPOWER REQUIREMENTS

	Nos	Monthly	Total Monthly Salary	Annual
General Manager	1	30000	30000	360000
Production Manager	1	20000	20000	240000
Machine Operators	6	6000	36000	432000
Machine Helper (Semi Skilled)	12	3000	36000	432000
R&D, Testing	2	8000	16000	192000
Marketing Manager & Sales Manager	2	25000	50000	600000
Sales Representatives	12	12000	144000	1728000
Clerical Staff	6	6000	36000	432000
Other Staff	4	3000	12000	144000
Maintenance (Elec. & Mech.)	2	10000	20000	240000
TOTAL	**48**		**400000**	**4800000**
Fringe Benefits (40 % of the above)				1920000
Total Wage Bill (Annual) Rs. lakhs:	Salary + Other Benefits =			**6720000.00**
Total Wage Bill (Annual) Rs. Cr.:				**0.672**

Exhibit 8.5

PROFITABILITY STATEMENT AND COMPUTATION OF TAX

(Rs.Cr)

ACCOUNT HEAD	FINANCIAL YEAR OF OPERATION									
	I	II	III	IV	V	VI	VII	VIII	IX	X
Revenue										
Net Sales Turnover	50.80	60.96	76.20	91.45	91.45	91.45	91.45	91.45	91.45	91.45
Total Revenue	50.80	60.96	76.20	91.45	91.45	91.45	91.45	91.45	91.45	91.45
Expenses										
Raw Materials	24.78	29.73	37.17	44.60	44.60	44.60	44.60	44.60	44.60	44.60
Salaries & wages	0.67	0.71	0.74	0.78	0.82	0.88	0.95	1.03	1.11	1.20
Conversion Costs	2.48	2.97	3.72	4.46	4.46	4.46	4.46	4.46	4.46	4.46
Marketing & Promotional Expenses	12.70	15.24	19.05	22.86	22.86	22.86	22.86	22.86	22.86	22.86
Factory & Office Overheads	2.07	2.07	2.07	2.07	2.07	2.07	2.07	2.07	2.07	2.07
CVD	1.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest on S.T. Loans	0.97	1.15	1.43	1.71	1.71	1.71	1.71	1.71	1.72	1.72
Cost of Sales	44.99	52.09	64.39	76.70	76.74	76.80	76.87	76.95	77.03	77.13
Depreciation (St.Line)	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
Amort. of Expenses	0.05	0.05	0.05	0.05	0.05	0.05	0.00	0.00	0.00	0.00
Interest on L.T Loan	0.51	0.51	0.48	0.42	0.35	0.29	0.22	0.16	0.10	0.03
Profit Before Tax	4.55	7.62	10.59	13.59	13.61	13.61	13.65	13.64	13.62	13.59
Tax	0.78	2.10	3.33	4.53	4.65	4.73	4.80	4.85	4.88	4.90
Profit After Tax	3.78	5.52	7.26	9.06	8.97	8.88	8.85	8.79	8.74	8.69
Dividend	0.00	0.00	0.34	0.34	0.34	0.68	0.68	0.68	0.68	0.68
Profits For Appropriation	3.78	5.52	6.91	8.72	8.63	8.20	8.16	8.10	8.05	8.01

EXHIBIT 8.6

SENSITIVITY ANALYSIS

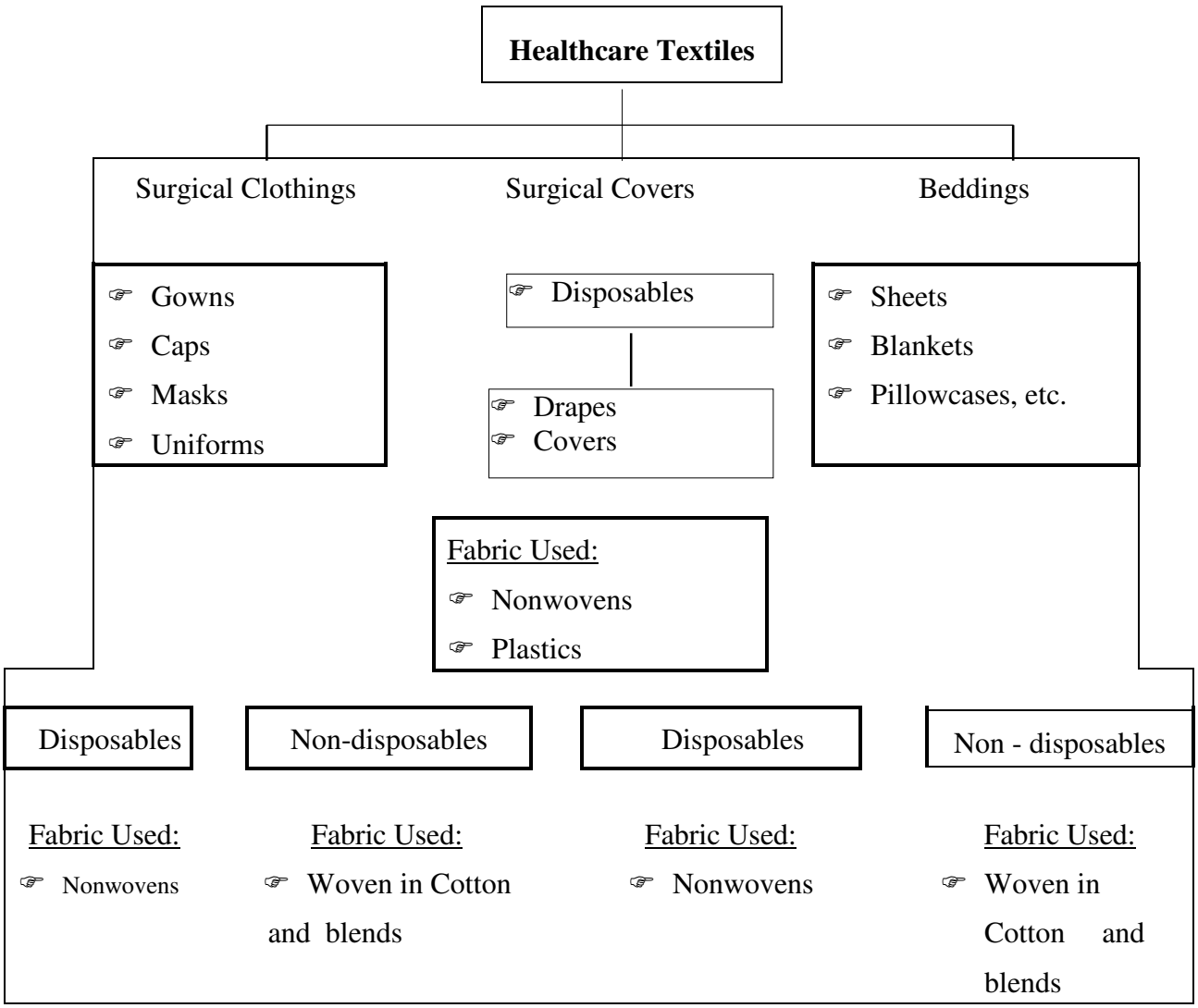
Items	Profit after Tax (PAT) Rs. Cr. (assumed at 90 % capacity)	Break Even (%)	Internal Rate of Return (IRR) (%)	Payback Period (Years)
NORMAL VALUES	9.06	69.31	41.47	2.83
Debt Equity Ratios				
(a) 2:1	9.03	69.43	41.56	2.83
(b) 1:1	9.11	69.14	41.34	2.85
Increase in Project Cost by 10 %	9.00	69.65	38.79	3.00
Increase in Selling Price to Rs. 9.00 / Diaper	14.38	60.24	60.44	2.03
Decrease in Selling Price to Rs. 7.00 / Diaper	3.75	85.36	19.11	4.96
Decrease in Raw Material Prices by 10%	**12.30**	**61.76**	**54.09**	**2.23**
Increase in Raw Material Prices by 10%	5.83	78.98	27.85	3.82

HEALTHCARE DISPOSABLES
(MASKS, CAPS, GOWNS, DRAPES, ETC.) CONVERTING LINE

SECTION - I : PRODUCT BRIEF, USAGE PATTERNS

Product Range and Application Areas:

9.1 Healthcare Textiles required by the hospitals can be classified as follows:



Surgical Clothing

9.2 Surgical Clothings consist of **all the items** required by the doctors, nurses and the hospital staff such as the gowns, caps, uniforms, etc.

9.3 Woven fabrics are traditionally used in Surgical Gowns. Instead of 100% cotton woven gown, polyester / combed cotton woven/knitted fabrics prove to be comfortable, with good abrasion resistance, moisture resistance, faster drying and reusability properties and also low linting. Nonwoven gowns are very rarely used in the Indian hospitals.

9.4 **Surgical Masks** are of the woven type made of cotton. However, masks made from non-woven fabrics with a **three layer structure and ultrasonically sealed** are also being used in the country. These masks should have a high bacterial filtration capacity, high air permeability and light weight. Though these disposable masks are used in the large hospitals, the reusable masks still have a strong presence in the Indian markets. They are covered on both sides by acrylic bonded parallel-laid or random-laid non-woven.

9.5 **Surgical Caps** are of both woven and non-woven types, woven being made of cotton and the non-wovens made from cellulosic fibres using the spun-laying or thermal-bonding process.

9.6 **Uniforms** made of cotton, viscose teflon blends have necessary requirements of comfort and durability.

Surgical Covers

9.7 Surgical drapes made of nonwovens or plastic provide an essential adjunct to skin disinfection in containing the patients skin bacteria and play a vital role in the surgical aseptic regime. They physically contain any skin bacteria which rises to the skin surface during surgery, thus preventing it from migrating into the incision site and thus reducing the incidence of wound contamination. They provide a waterproof, bacteria proof barrier, which prevents wound irrigates, organs and instruments from being contaminated by direct contact with the unsterile skin.

Beddings

9.8 The **Beddings** used in the Indian hospitals are of reusable type rather than the disposable bedsheets, pillowcases, blankets used globally. A combination of cotton, cellulose and a fluffy absorbent material is commonly used. The use of Machintosh sheets is common as an alternative, only if needed. Woolen blankets are used in India while the world over cotton leno blankets have replaced the traditional woolen blankets to prevent the risk of cross-infection.

Indian Market Size and Potential for Healthcare Textiles

9.9 **TECS** has adopted a **two-pronged approach** for assessing the Indian market.

(i) The leading hospitals were contacted to understand their requirement and usage patterns as well as their supply sources.

(ii) Producers / Dealers survey

9.10 To estimate the potential demand for medical disposables, data regarding the number of hospitals and number of beds in the country was obtained. A correlation has been established between the number of beds and the product usage pattern to estimate the potential demand for nonwovens.

9.11 **Nonwoven material** is superior to **cotton in terms of hydrophobic ability** and air **permeability linking.** However, in terms of flammability or electric charging non woven material is inferior to cotton cloth. The **major reasons nonwovens** are used for surgical operations is that they ensure a relatively low post operational rate of infection.. In emergency operations, when there is no time to do routine comprehensive examinations there is a greater risk of contamination. The **pre-requisites** of the nonwovens used in the healthcare segment are **high level of barrier protection while being soft and breathable.**

9.12 The market study reveals that the nonwovens comprise a very small portion of the entire healthcare segment. Mostly the big hospitals use **disposable headgear** and **facemasks** and they are the ones who have shown willingness to use other disposables.

9.13 These products which have found acceptance in the Western countries are yet to make inroads in the Indian market in a significant manner. This can be attributed to various factors such as:

I. Abundance of the raw material and low operational cost:

- India has plenty of cotton, the raw material needed for preparing the reusable material. Due to this the reusable textiles are manufactured cheaper and in mass scale for the use of the healthcare industry. In the global markets, cotton is a scarcely available commodity and hence costly, thus increasing the cost of the end product. Here the disposables made of nonwovens are found to be much cheaper.

- Labour costs are higher than India in the developed countries and the production of woven healthcare textiles being labour intensive, increases the manufacturing cost of the end product.

II. Budgetary constraints

- The hospitals have fixed budgets for the linen department, which often forces them to use Autoclaved washable (reusable) operation theatre garments. In the wake of the rising cases of AIDS and other infectious diseases in India, combination of washable and disposable apparels has made inroads into the hospitals. Disposable clothings are used only in major surgeries like cardiac, neurology and that too only in bigger hospitals.

- **The penetration of the disposable nonwoven apparel is quite slow due to the high cost of importing these finished products or the roll goods to produce them. Imported disposable due to the various duties, local taxes and distribution costs, are expensive in relation to the reusables medical products.**

III. Low hygiene awareness

- The concern about the health and hygiene is very low in India as compared to the other parts of the world were nonwovens form a dominant part of the healthcare textiles.

- Disposables involve heavy one time investment which all the Indian hospitals cannot afford. Hence only the big hospitals use these disposables for their important surgeries, amount which can be easily recovered from the operation bills.

IV. Pricing policies of the nonwovens

- Compared to the reusable products, the hospitals are of the opinion that the nonwovens turn out to be a costlier proposition.

- This misconception has to changed and the cost considerations have been provided in the detailed cost comparison chart shown later in **Annexure 9.1**

V. Disposing problems

- Due to disposal problems in India, not much efforts are taken to promote the nonwovens, single use items. The healthcare officials are quite unsure of the safety and hygiene of the disposable nonwovens, hence they prefer the autoclaved products where atleast the quality and hygiene is assured.

VI. Availability of cheap washing facilities favouring reusable cotton garments

- Textile fabrics used for the medical applications should be lint free. In cellulose types of nonwoven fabrics, fibres from the fabrics come off. Sterilisation of these apparels

are necessary and cellulose type of fabrics can be sterilised only by Gamma radiation which is a costly affair. Hence for apparels mostly woven manmade cloth is used which are reusable and can be sterilized easily.

Based on the market feedback the assumed penetration levels for disposable Healthcare products are shown below:

	2001 - 02	2003 - 04	2007 - 08
Beddings	1%	5%	20%
Clothings	10%	20%	50%
Covers	5%	10%	30%

9.14 Because of these reasons, the current usage practice among all the hospitals is to procure the cloth in bulk from the mills and then cut into the desired sizes for the gowns, apparels, etc. Most of the hospitals cut the caps out of the same cloth leftovers after using the major portion for cutting the gowns and other operating theatre garments. The other protective garments required in the hospitals such as doctor's **caps, staff uniform** etc. are customized as per the requirements of each hospital.

9.15 The current and future market potential for the healthcare disposable products is as shown below:

	Reusable / Washable Textiles			**Demand for Nonwovens**		
	2001-02 Estimated	**2003 - 04 Estimated**	**2007 - 08 Projected**	**2001 - 02 Estimated**	**2003 - 04 Estimated**	**2007 - 08 Projected**
Beddings	Rs. 73.00 cr. (15.66)	Rs. 94.87 cr. (20.35)	Rs. 160.23 cr. (34.37)	Rs. 0.73 cr. (62.02 T)	Rs. 4.74 cr. (403.02 T)	Rs. 32.05 cr. (2722.74T)
Clothings	Rs. 20.00 cr. (4.00)	Rs. 25.99 cr. (5.20)	Rs. 43.90 cr. (8.78)	Rs. 2.00 cr. (177.38 T)	Rs. 5.20 cr. (461.06 T)	Rs. 21.95 cr. (1946.76 T)
Covers	Rs. 9.30 cr. (1.97)	Rs. 12.09 cr. (4.49)	Rs. 20.41 cr. (7.59)	Rs. 0.47 cr. (40.26 T)	Rs. 1.21 cr. (104.64 T)	Rs. 6.12 cr. (530.21 T)
Total	**Rs. 102.3 cr. (21.64)**	**Rs. 132.95 cr. (30.04)**	**Rs. 224.54 cr. (50.74)**	**Rs. 3.20 cr. (279.67 T)**	**Rs. 11.15 cr. (968.72 T)**	**Rs. 120.24 cr.* (10399.42 T)**
	Fig. in brackets denote volume in mn. mt.					

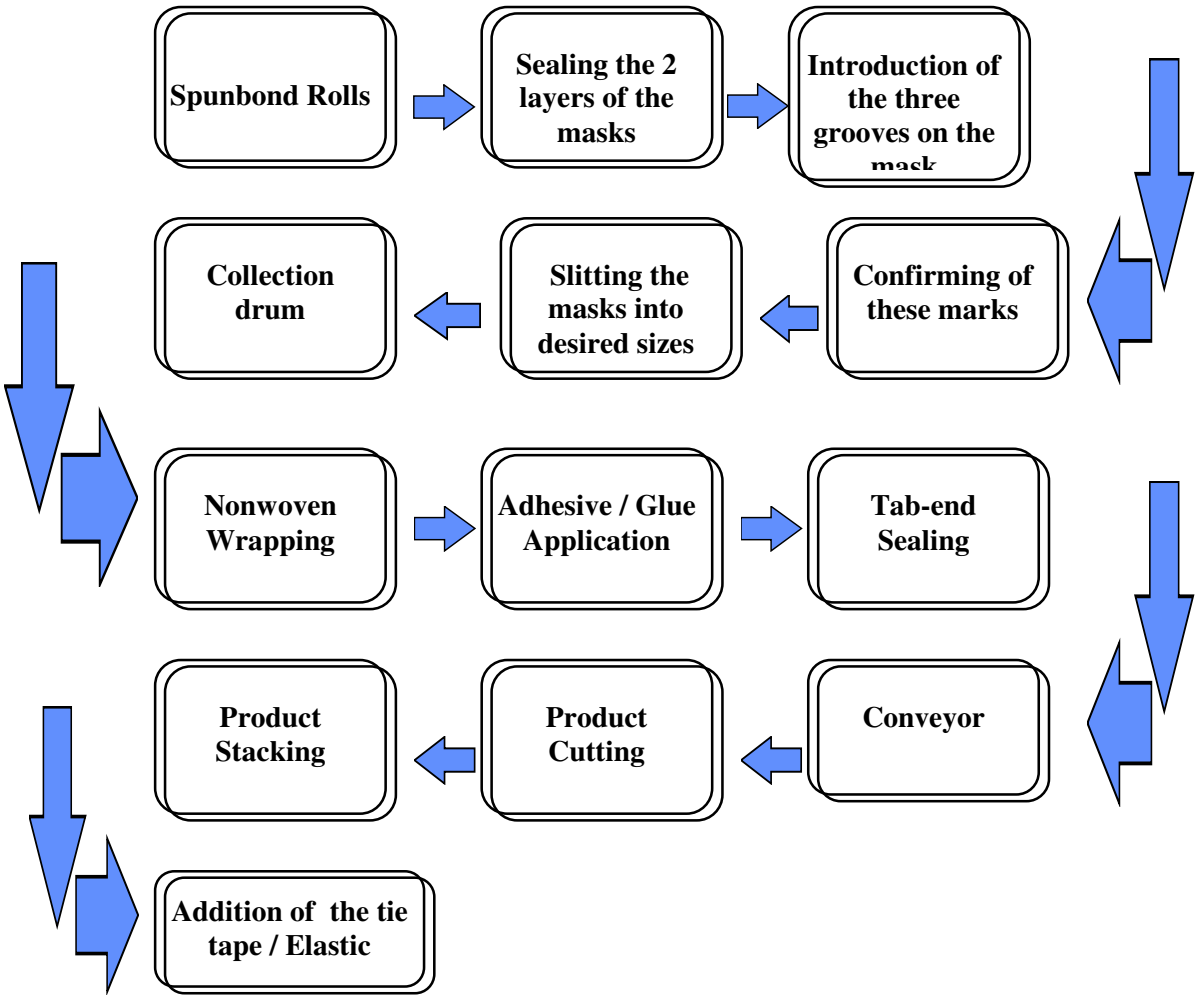
*** Includes 100 % export on total of Rs. 60.12 Cr (5199.71 T)**

SECTION II : MANUFACTURING TECHNOLOGY AND EQUIPMENTS SUPPLIERS

Process Description:

9.16 The main raw material is the **Spunbond Nonwovens.** For Medical Disposable Masks, the number of the spunbond nonwoven rolls depends on the number of layers (2-ply / 3-ply).

Process Flow Chart for Masks Manufacturing



9.17 The manufacturing process for the caps, drapes and gowns involves the stitching of the pre-cut sizes of the respective items on the sewing machines.

Product Composition:

9.18 Currently in India, these healthcare disposable items are manufactured using spunbond nonwoven fabric. But they can also be made using spunlace fabric subject to the relative technical advantages and cost considerations.

9.19 This point was reascertained after discussions with two of the major suppliers of healthcare products, namely, Safetec Disposables, Healthcare Disposables, etc.

Machinery Suppliers and Specifications: (Technology & Equipment Suppliers)

9.20 Globally, the well known technology suppliers with proven track record contacted by TECS are:

1. NCM Nonwoven Converting Machinery Co. Ltd. (Taiwan),

2. Healthy Machinery Co. Ltd. (Taiwan)

Note: The list contains the leading global players in Healthcare Disposables Technology and based on discussion with Industry experts the above list is exhaustive.

9.21 TECS has received responses and machinery quotations. These companies donot have any Indian representative.

Recommended Minimum Economic Size:

9.22 The proposed Healthcare Disposable project to be set up in India will have a designed capacity of:

Items	Designed Capacity
Caps	100 caps per min
Masks	120 masks per min
Gowns	50 gowns per hour
Drapes	75 drapes per hour
Aprons	50 aprons per hour
Beddings	50 beddings per hour

9.23 Under Indian operating conditions it is safer to assume machine efficiency factor of 75% with the plant operating for 300 working days, and therefore the production would be:

Items	Operating Capacity	Shifts in operation
Caps	75 caps per min	Two Shifts
Masks	90 masks per min	Two Shifts
Gowns	38 gowns per hour	One Shift
Drapes	56 drapes per hour	One Shift
Aprons	38 drapes per hour	One Shift
Beddings	38 beddings per hour	One Shift

Other Technologies Available for Producing the Products:

9.24 Currently in India, these healthcare disposable items are manufactured using spunbond nonwoven fabric. But in they can also be manufactured using spunlace fabric subject to cost economics.

Process Systems and Equipments

9.25 The major equipments for the healthcare disposable machinery are:

1. **Machinery for Masks:**
   - Blank Masks Making Machinery,
   - Ear Loop Sealing Machine,
   - Tie-Tape Sealing Machinery,
   - Packing Machinery.
2. **Sewing Machines** are required for Caps, gowns, Drapes, etc. to stitch the pre-cut sizes of the respective items.

9.26 The total investment for the plant and machinery for these disposable projects is given in Exhibit 8.1 and as per the indicative budgetary quotations , **the investment in the process plant and machinery will be Rs 1.11 crores** (FOB), inclusive of a **discount of 10%**. Finer details on the Equipment listing, specification and the quotations need to

be discussed with the technology supplier before the project is taken up. Taking into account the CIF value, the custom duties (5%), inland transportation and loading/unloading (2%), erection and commissioning (5%), **the installed cost of process equipment would be Rs 1.27 crores.**

9.27 The machinery mentioned above is product specific and cannot be used for manufacturing any other products.

SECTION III : PROJECT COST & FINANCIALS

Land

9.28 The total requirement of land for this project keeping in mind the possible future expansion is around 1000 Sq. Mtrs. (0.25 acres).

9.29 Based on the available information the cost of land is assumed at Rs 1200 per square meter (including the developmental cost). Depending on the exact location of the project to be determined by the promoter the land cost could be higher or lower. Hence the total cost of developed land will be Rs 0.12 crores (Rs 12 lakhs).

Buildings

9.30 The building area comprising of main factory building, godowns, office , R & D labs / In-house Testing centre etc. would be 500 sq. mtrs. The cost of construction would again vary depending on the structure and the materials to be used. It has been assumed that the average cost of construction would be Rs 4500 per sq. mtr. Thus the total cost of building and other civil works would be around Rs 0.23 crores (Rs. 23 lakhs).

Plant and Machinery

9.31 Details of Plant and machinery as well as technology required for the project have been presented in earlier Section II . The installed cost of plant and machinery would be Rs 1.27 crores.

9.32 Apart from the main process equipments the utilities required are:

- Electricals,
- Piping,
- Water supply,
- Compressors,
- Fire Fighting equipments etc.

9.33 The provision on this count is taken as 5% of the cost of machinery which works out to Rs 0.06 crores (Rs 6 lakhs)

Testing Equipments

9.34 This project does not require heavy investments in testing facilities. An investment of Rs. 0.05 crores (Rs. 5 lakhs) for Weighing Balance, Rulers, Elongation, bonding strength, breaking strength etc. would be sufficient.

Miscellaneous Fixed Assets

9.35 Under this head the items included are Furniture and fixtures, Office equipments, Air Conditioners etc. and a provision of around Rs 0.10 crore (Rs 10 lakhs) is made.

Project Engineering and Consulting

9.36 Under this head the items included are the fees and expenses on account of Architect fees, project engineering and management (both local and overseas), detailed project reports etc.

Preliminary & Preoperative Expenses

9.37 The items included under this head are company formation expenses, public issue expenses (if any), interest during construction, pre production expenses during the implementation phase etc.

Contingency Expenses

9.38 Depending on the gestation period and further detailing of the project cost by the promoter, the contingency provision has been made at the rate of 10%.

Margin Money for Working capital

9.39 The margin money for working capital forming part of the total project cost would be Rs 0.25 crores (Rs. 25 lakhs). [**Exhibit 9.3**]

Total Project Cost (Total Investment)

9.40 The total project cost as given in **Exhibit 9.1** would be **Rs 2.53 crores.**

Project Funding and Financing Pattern

9.41 It has been assumed that the project would be financed through long term funds and Equity participation by the Promoter / Public. The technical textile sector being a high priority area , it is assumed that a Debt- Equity ratio of 1.5 : 1 would be feasible. (However the sensitivity analysis has also been presented for 1 : 1 and 2 : 1 Debt Equity ratio.

Sales, Profitability and Sensitivity Analysis :

Sales Realisation and Turnover

9.42 As per the details available from the Technology and Equipment suppliers the economic size of a plant for the various disposable products would be as follows:

Items	Economic Size Plant
Caps	100 caps per min
Masks	120 masks per min
Gowns	50 gowns per hour
Drapes	75 drapes per hour
Aprons	50 aprons per hour
Beddings	50 beddings per hour

9.43 Under the Indian conditions, it is assumed that the machine would operate at an efficiency level of 75%. Hence the production from the plant operating 300 working days in a year would be:

Items	Operating Capacity	Shifts in operation
Caps	75 caps per min	Two Shifts
Masks	90 masks per min	Two Shifts
Gowns	38 gowns per hour	One Shift
Drapes	56 drapes per hour	One Shift
Aprons	38 aprons per hour	One Shift
Beddings	38 beddings per hour	One Shift

9.44 The capacity utilisation for the 1st year is assumed at 50% and thereafter for 2nd, 3rd and 4th year onwards 60%, 75% and 90% respectively.

9.45 The average selling price of the end products (net of excise duties, sales tax and other incidental expenses) would be:

Items	Average Selling Price Unit
	Domestic Market
Caps	Rs 1.50
Masks	Rs 1.50
Gowns	Rs 90.00
Drapes	Rs 30.00
Aprons	Rs. 15.00
Beddings	Rs 90.00

9.46 The international prices for caps, masks, gowns, drapes, aprons, beddings are 1.8 cents, 2 cents, $1, 60 cents, 10 cents, $1 respectively. On these prices, the import duty, CVD, margins, etc. are added.

9.47 The details of projected sales turnover as projected are given in **Exhibit 9.2 (A-F).**

Cost of Production

Major Raw materials and their specifications:

9.48 The major raw materials required for manufacturing these disposable products are the spunbond polypropylene fabrics. These fabrics are currently imported by the Indian manufacturers.

Major Raw Materials	International Price	Landed Cost
Nonwoven	US $1.6 - 1.8	Rs. 110 - 120 per kg

9.49 The spunbond fabrics are used in various gsm range depending on their applications, for caps and masks spunbond fabric of 30 gsm is used, for gowns, drapes, etc. gsm range of around 40 is preferred while beddings use higher gsm of around 80.

9.50 These healthcare textiles are manufactured in the country from the imported spunbond fabric available at US$1.6-1.8 per kg.

Conversion Cost

9.51 The conversion cost will include the cost of power, water, chemicals and additives, consumables etc., which is assumed at 5% of the cost of raw material.

Manpower, Salaries and Wages

9.52 The manpower requirements and the salary structure is given in **Exhibit 9.4.**

9.53 The total manpower requirement comprising the managerial cadre of supervisors, machine operators and helpers would be **58 persons.** The total wage bill come to around **Rs 0.75 crores.**

Factory and Overhead Expenses

9.54 The items covered under this head are establishment expenses, repairs and maintenance, stationery, travel expenses, packaging expenses etc.

Marketing and Promotional Expenses

9.55 The promotion of technical textiles will call for expenditure on this count and a provision of 5% of the annual sales has been made uniformly over the years.

Interest and Depreciation

9.56 The prevailing interest rate for long term and short term borrowed funds is assumed at 5% and 11% per annum (Project included under Technology Upgradation Fund).

9.57 The repayment of loans has been assumed for 10 years with a moratorium period of two years (2+8).

9.58 The depreciation rates have been worked out as per Company's act (SLM) and Income-Tax Ready Reckoner (WDV).

9.59 The current corporate tax rate is assumed at 35 % and the surcharge is assumed at 2.5% per annum.

Profitability, Break-even, IRR, and Payback

9.60 As presented in **Exhibit 9.5**, the sales turnover increases from Rs 4.57 crore in the first year to Rs 8.19 crore from the 4th year.

9.61 The PBT increases from Rs 0.25 crore in the third year to Rs 0.52 crore in the fourth year onwards.

9.62 The Break Even of the project is at 76.29 %.

9.63 The Internal Rate of Return (IRR) has been worked out at 9.80%.

9.64 The Payback period for the project is 7.09 years.

Sensitivity Analysis

9.65 The sensitivity analysis has been presented in the **Exhibit 9.6.**

DEVELOPMENTAL AND PROMOTIONAL MEASURES.

9.66 The standards applicable for these items are: **EN 46002, MDD (TUV Rheinland).** However there are no standards for such products in India. Hence a need is felt to develop these standards in the country.

9.67 The Indian government needs to introduce regulations similar to those in the U. S. like, **Occupational Safety and Health Administration (OSHA)** regulations etc., which will convince the users of the good quality and the hygiene of the product.

9.68 There is a good scope for the exports of masks and caps to the European countries. But for such exports **"CE Certification"** is mandatory which costs around **Rs. 5 lakhs.** The Government helps with only a part of the amount and hence the Indian players sell the product to Turkey (which accepts without CE certification) and then in turn it is exported to the other countries of the European Union. Hence we loose out on valuable Foreign Exchange.

9.69 The **total import duty** on the raw materials is very high in the country as compared to the global markets where the **total duties are not more than 5%.** This makes our products uncompetitive in the global markets.

9.70 Detailed Testing is not required for the products like Gowns, Drapes, etc., only test for bacteria filtration are performed for masks. The players manufacturing these products in India get these tests performed from the **US Laboratories** which are recognised globally.

9.71 The absence of any such well recognised and standard laboratory creates economic problems for the manufacturers who have to spend huge amounts to get their products certified.

9.72 Even countries like **China and Japan** have their own **testing laboratories** and on their model, even India can think of setting up a standardised teasing laboratory of help to all the players in the industry.

9.73 **SASMIRA** can take a lead role by establishing small testing laboratories which can also serve as the **Central Testing Laboratory** for the country.

9.74 Currently the requirement of spunbond fabric is met by imports, hence the raw material has to be stocked for 3 months. If good quality product is available, then such a high block up of capital would not be necessary.

9.75 The Government and the manufacturers have to assume a proactive approach to promote the usage of the disposable products in the country. Some of the steps in this direction can be:

- **Single use nonwovens** eliminate the potential for problems associated with the disposal of potentially infected liquids or wastewater.

- With the rising water shortage, the consumption of disposable nonwovens will eventually increase. As the cost of **washing a reusable** cotton gown becomes **higher,** the people will shift to disposable gowns, hence a cost comparison of the two has to be shown.

- The cost of using the textiles is higher as they must be cleaned with detergent, wrapped in separate plastic covers or bags and then labeled. **Nonwovens** are seen to be **less expensive** as the patient or the hospital needs to open it, use it and throw away, thus proving very cost effective. However this concept of cost saving is not that pronounced with the high one time cash out-go taken into consideration.

- With increasing awareness about hygiene and traditional textiles being replaced by nonwovens, **the safety factor of the disposable nonwovens is extremely** appealing.

- With the increasing incomes of the people and the availability of greater disposable incomes, the people **undergoing the operations** would readily spare a few more rupees for the cost of the nonwovens after understanding the immense benefits offered.

- R&D efforts are underway in the developed countries to produce **non wovens** with increased **barrier resistance** while making them softer and more comfortable, thus improving the comfort of the wearer. Hence a proactive approach by the Indian manufacturers can help the cause.

- **Protective clothing for patients and surgeons drapes,** which have proven to be infection free represent the greatest enduse potential for disposable nonwoven fabrics. Spunbond fabrics are preferred because of their low cost, which allows one time use and thus minimises sterilisation procedures

- The rise of the diseases and the resistant strains being developed emphasizes the need for higher fluid protection in medical devices.

9.76 Consequently, the nonwoven fabrics can be produced at **mass-production facilities** which in turn would reduce the cost of the products, thereby further increasing the volume of nonwovens used in the medical field.

9.77 The government should accord the **hospital hygiene and safety a priority basis** as they are often a breeding ground for germs and diseases. Once the importance and advantages of disposables are imprinted upon the minds of the hospitals and the users the demand for these products would start increasing.

Exhibit 9.1		
	PROJECT COST	
(LAND, BUILDINGS, PROCESS PLANT & MACHINERY, UTILITIES & OTHER ASSETS)		
		Project Cost (Rs. Cr.)
1	**Land:**	**0.12**
	Area: 0.25 acres (1000 Sq Mtrs)	
	Rate: (Rs.1200 /Sq. Mtr)	
2	**Buildings**	**0.23**
	(Plant Area, Office, Godown, Lab, Service Area etc.)	
	Built-up Area : 500 Sq. Mtrs	
	Avg Rate : Rs.4500 /Sq. Mtrs	
3	**Process Plant & Equipment**	**1.27**
4	**Utility & Other equipments (5%)**	**0.06**
	(Power, Water, Compressor, Humidity Control,	
	Fire Fighting, Material Handling etc.)	
5	**Misc. Fixed Assets**	**0.10**
	(Furniture & Fixtures, Office Equipment, etc.)	
6	**Testing Equipments**	**0.05**
7	**Project Engineering & Consultancy charges (2.5%)**	**0.04**
8	**Preliminary & Pre-operative Expenses (12%)**	**0.20**
	(Company Formation, Interest during construction,	
	pre-production expenses, etc.)	
9	**Contingency (10 %)**	**0.21**
10	**Total**	**2.28**
11	**Margin Money for Working Capital**	**0.25**
12	**Total Project Cost**	**2.53**

EXHIBIT 9.2

ESTIMATION OF SALES REVENUE

(Rs. Cr.)

ITEM	YEAR OF OPERATION									
	I	II	III	IV	V	VI	VII	VIII	IX	X
Sales Revenue										
Caps	1.59	1.91	2.38	2.86	2.86	2.86	2.86	2.86	2.86	2.86
Masks	1.91	2.29	2.86	3.43	3.43	3.43	3.43	3.43	3.43	3.43
Aprons	0.07	0.08	0.10	0.12	0.12	0.12	0.12	0.12	0.12	0.12
Drapes	0.20	0.24	0.30	0.36	0.36	0.36	0.36	0.36	0.36	0.36
Gowns	0.40	0.48	0.60	0.71	0.71	0.71	0.71	0.71	0.71	0.71
Beddings	0.40	0.48	0.60	0.71	0.71	0.71	0.71	0.71	0.71	0.71
Total	**4.55**	**5.46**	**6.83**	**8.19**	**8.19**	**8.19**	**8.19**	**8.19**	**8.19**	**8.19**

% Contribution

Raw Material

Caps	1.23	1.48	1.85	2.22	2.22	2.22	2.22	2.22	2.22	2.22
Masks	1.39	1.67	2.08	2.50	2.50	2.50	2.50	2.50	2.50	2.50
Aprons	0.03	0.04	0.05	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Drapes	0.06	0.07	0.08	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Gowns	0.07	0.08	0.10	0.12	0.12	0.12	0.12	0.12	0.12	0.12
Beddings	0.32	0.38	0.47	0.57	0.57	0.57	0.57	0.57	0.57	0.57
Total	**3.09**	**3.71**	**4.64**	**5.57**	**5.57**	**5.57**	**5.57**	**5.57**	**5.57**	**5.57**

Exhibit 9.2 (A)

ESTIMATION OF SALES REVENUE: CAPS

(Rs. Cr.)

ITEM	YEAR OF OPERATION									
	I	II	III	IV	V	VI	VII	VIII	IX	X
Average Production per min	100	100	100	100	100	100	100	100	100	100
75% efficiency	75	75	75	75	75	75	75	75	75	75
Capacity Utilisation	50%	60%	75%	90%	90%	90%	90%	90%	90%	90%
Actual Production per min (pcs)	38	45	56	68	68	68	68	68	68	68
Actual Production per hr (pcs)	2250	2700	3375	4050	4050	4050	4050	4050	4050	4050
Production per day (pcs)	36000	43200	54000	64800	64800	64800	64800	64800	64800	64800
(Two Shift Operations)										
Production for 300 working days (pcs)	10800000	12960000	16200000	19440000	19440000	19440000	19440000	19440000	19440000	19440000
Selling Price (Rs / cap)	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
Sales Revenue (Rs. Cr)	**1.62**	**1.94**	**2.43**	**2.92**	**2.92**	**2.92**	**2.92**	**2.92**	**2.92**	**2.92**
Value Loss (2%)	0.03	0.04	0.05	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Net Sales Revenue (Rs. Cr)	**1.59**	**1.91**	**2.38**	**2.86**	**2.86**	**2.86**	**2.86**	**2.86**	**2.86**	**2.86**

Exhibit 9.2 (B)

ESTIMATION OF SALES REVENUE: MASKS

(Rs. Cr.)

ITEM	YEAR OF OPERATION									
	I	II	III	IV	V	VI	VII	VIII	IX	X
Average Production per min	120	120	120	120	120	120	120	120	120	120
75% efficiency	90	90	90	90	90	90	90	90	90	90
Capacity Utilisation	50%	60%	75%	90%	90%	90%	90%	90%	90%	90%
Actual Production per min (pcs)	45	54	68	81	81	81	81	81	81	81
Actual Production per hr (pcs)	2700	3240	4050	4860	4860	4860	4860	4860	4860	4860
Production per day (pcs)	43200	51840	64800	77760	77760	77760	77760	77760	77760	77760
(Two Shift Operations)										
Production for 300 working days (pcs)	12960000	15552000	19440000	23328000	23328000	23328000	23328000	23328000	23328000	23328000
Selling Price (Rs / mask)	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
Sales Revenue (Rs. Cr)	**1.94**	**2.33**	**2.92**	**3.50**	**3.50**	**3.50**	**3.50**	**3.50**	**3.50**	**3.50**
Value Loss (2%)	0.04	0.05	0.06	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Net Sales Revenue (Rs. Cr)	**1.91**	**2.29**	**2.86**	**3.43**	**3.43**	**3.43**	**3.43**	**3.43**	**3.43**	**3.43**

Exhibit 9.2 (C)										
ESTIMATION OF SALES REVENUE: APRONS										
										(Rs. Cr.)
ITEM	YEAR OF OPERATION									
	I	II	III	IV	V	VI	VII	VIII	IX	X
Average Production per hour	50	50	50	50	50	50	50	50	50	50
75% efficiency	38	38	38	38	38	38	38	38	38	38
Capacity Utilisation	50%	60%	75%	90%	90%	90%	90%	90%	90%	90%
Actual Production per hr (pcs)	19	23	28	34	34	34	34	34	34	34
Production per day (pcs)	150	180	225	270	270	270	270	270	270	270
(One Shift Operations)										
Production for 300 working days (pcs)	45000	54000	67500	81000	81000	81000	81000	81000	81000	81000
Selling Price (Rs / aprons)	15	15	15	15	15	15	15	15	15	15
Sales Revenue (Rs. Cr)	**0.07**	**0.08**	**0.10**	**0.12**	**0.12**	**0.12**	**0.12**	**0.12**	**0.12**	**0.12**
Value Loss (2%)	0.00135	0.00162	0.002025	0.00243	0.00243	0.00243	0.00243	0.00243	0.00243	0.00243
Net Sales Revenue (Rs. Cr)	**0.07**	**0.08**	**0.10**	**0.12**	**0.12**	**0.12**	**0.12**	**0.12**	**0.12**	**0.12**

Exhibit 9.2 (D)

ESTIMATION OF SALES REVENUE: DRAPES

(Rs. Cr.)

ITEM	YEAR OF OPERATION									
	I	II	III	IV	V	VI	VII	VIII	IX	X
Average Production per hour	75	75	75	75	75	75	75	75	75	75
75% efficiency	56	56	56	56	56	56	56	56	56	56
Capacity Utilisation	50%	60%	75%	90%	90%	90%	90%	90%	90%	90%
Actual Production per hr (pcs)	28	34	42	51	51	51	51	51	51	51
Production per day (pcs)	225	270	338	405	405	405	405	405	405	405
(One Shift Operations)										
Production for 300 working days (pcs)	67500	81000	101250	121500	121500	121500	121500	121500	121500	121500
Selling Price (Rs / drape)	30	30	30	30	30	30	30	30	30	30
Sales Revenue (Rs. Cr)	**0.20**	**0.24**	**0.30**	**0.36**	**0.36**	**0.36**	**0.36**	**0.36**	**0.36**	**0.36**
Value Loss (2%)	0.00405	0.00486	0.006075	0.00729	0.00729	0.00729	0.00729	0.00729	0.00729	0.00729
Net Sales Revenue (Rs. Cr)	**0.20**	**0.24**	**0.30**	**0.36**	**0.36**	**0.36**	**0.36**	**0.36**	**0.36**	**0.36**

Exhibit 9.2 (E)

ESTIMATION OF SALES REVENUE: GOWNS

(Rs. Cr.)

ITEM	YEAR OF OPERATION									
	I	II	III	IV	V	VI	VII	VIII	IX	X
Average Production per hour	50	50	50	50	50	50	50	50	50	50
75% efficiency	38	38	38	38	38	38	38	38	38	38
Capacity Utilisation	50%	60%	75%	90%	90%	90%	90%	90%	90%	90%
Actual Production per hr (pcs)	19	23	28	34	34	34	34	34	34	34
Production per day (pcs)	150	180	225	270	270	270	270	270	270	270
(One Shift Operations)										
Production for 300 working days (pcs)	45000	54000	67500	81000	81000	81000	81000	81000	81000	81000
Selling Price (Rs / gown)	90	90	90	90	90	90	90	90	90	90
Sales Revenue (Rs. Cr)	**0.41**	**0.49**	**0.61**	**0.73**	**0.73**	**0.73**	**0.73**	**0.73**	**0.73**	**0.73**
Value Loss (2%)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Net Sales Revenue (Rs. Cr)	**0.40**	**0.48**	**0.60**	**0.71**	**0.71**	**0.71**	**0.71**	**0.71**	**0.71**	**0.71**

Exhibit 9.2 (F)

ESTIMATION OF SALES REVENUE: BEDDINGS

(Rs. Cr.)

ITEM	YEAR OF OPERATION									
	I	II	III	IV	V	VI	VII	VIII	IX	X
Average Production per hour	50	50	50	50	50	50	50	50	50	50
75% efficiency	38	38	38	38	38	38	38	38	38	38
Capacity Utilisation	50%	60%	75%	90%	90%	90%	90%	90%	90%	90%
Actual Production per hr (pcs)	19	23	28	34	34	34	34	34	34	34
Production per day (pcs)	150	180	225	270	270	270	270	270	270	270
(One Shift Operations)										
Production for 300 working days (pcs)	45000	54000	67500	81000	81000	81000	81000	81000	81000	81000
Selling Price (Rs / bedding)	90	90	90	90	90	90	90	90	90	90
Sales Revenue (Rs. Cr)	**0.41**	**0.49**	**0.61**	**0.73**	**0.73**	**0.73**	**0.73**	**0.73**	**0.73**	**0.73**
Value Loss (2%)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Net Sales Revenue (Rs. Cr)	**0.40**	**0.48**	**0.60**	**0.71**	**0.71**	**0.71**	**0.71**	**0.71**	**0.71**	**0.71**

Exhibit 9.3

REQUIREMENT OF WORKING CAPITAL

(Rs.Lakhs)

ITEM	NO. OF	MARGIN	YEAR I			YEAR II			YEAR III			YEAR IV			YEAR V		
	MONTHS	(%)	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK
			REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE
Factory Related																	
Raw materials & other commodities	1.00	25.00	0.26	0.06	0.19	0.31	0.08	0.23	0.39	0.10	0.29	0.46	0.12	0.35	0.46	0.12	0.35
Finished Goods	1.00	25.00	0.37	0.09	0.28	0.43	0.11	0.32	0.52	0.13	0.39	0.61	0.15	0.46	0.61	0.15	0.46
A/c Receivable	1.00	25.00	0.38	0.09	0.28	0.46	0.11	0.34	0.57	0.14	0.43	0.68	0.17	0.51	0.68	0.17	0.51
Cash in hand																	
Salaries & wages	1.00	0.00	0.06	0.00	0.06	0.07	0.00	0.07	0.07	0.00	0.07	0.07	0.00	0.07	0.08	0.00	0.08
Utilities	1.00	0.00	0.01	0.00	0.01	0.02	0.00	0.02	0.02	0.00	0.02	0.02	0.00	0.02	0.02	0.00	0.02
Advertising & Promotional Expenses	1.00	0.00	0.02	0.00	0.02	0.02	0.00	0.02	0.03	0.00	0.03	0.03	0.00	0.03	0.03	0.00	0.03
Admin. Overheads	1.00	0.00	0.02	0.00	0.02	0.02	0.00	0.02	0.02	0.00	0.02	0.02	0.00	0.02	0.02	0.00	0.02
Total Requirement			**1.10**	**0.25**	**0.85**	**1.30**	**0.30**	**1.00**	**1.59**	**0.37**	**1.23**	**1.89**	**0.44**	**1.45**	**1.90**	**0.44**	**1.46**

Exhibit 9.3 Contd.

REQUIREMENT OF WORKING CAPITAL

(Rs.Lakhs)

ITEM	NO. OF	MARGIN		YEAR VI			YEAR VII			YEAR VIII			YEAR IX			YEAR X	
	MONTHS	(%)	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK
			REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE
Factory Related																	
Raw materials & other commodities	1.00	25.00	0.46	0.12	0.35	0.46	0.12	0.35	0.46	0.12	0.35	0.46	0.12	0.35	0.46	0.12	0.35
Finished Goods Stock	1.00	25.00	0.62	0.16	0.47	0.63	0.16	0.47	0.63	0.16	0.48	0.64	0.16	0.48	0.65	0.16	0.49
A/c Receivable	1.00	25.00	0.68	0.17	0.51	0.68	0.17	0.51	0.68	0.17	0.51	0.68	0.17	0.51	0.68	0.17	0.51
Cash in hand																	
Salaries & wages	1.00	0.00	0.08	0.00	0.08	0.09	0.00	0.09	0.10	0.00	0.10	0.10	0.00	0.10	0.11	0.00	0.11
Utilities	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Advertising & Promotional Expenses	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Admin. Overheads	1.00	0.00	0.03	0.00	0.03	0.03	0.00	0.03	0.03	0.00	0.03	0.03	0.00	0.03	0.03	0.00	0.03
Total Requirement			**1.91**	**0.44**	**1.47**	**1.92**	**0.44**	**1.48**	**1.94**	**0.45**	**1.49**	**1.95**	**0.45**	**1.50**	**1.97**	**0.45**	**1.52**

Exhibit 9.4

MANPOWER REQUIREMENTS (Inclusive of Gowns, Drapes)

	Nos	Monthly	Total Monthly Salary	Annual
General Manager	1	30000	30000	360000
Production Manager	1	20000	20000	240000
Machine Operator / Helper	12	6000	72000	864000
Sewing Machine Operators	16	3000	48000	576000
R&D, Testing	2	8000	16000	192000
Marketing Manager & Sales Manager	2	25000	50000	600000
Sales Representatives	12	12000	144000	1728000
Clerical Staff	6	6000	36000	432000
Other Staff	4	3000	12000	144000
Maintenance (Elec. & Mech.)	2	10000	20000	240000
TOTAL	**58**		**448000**	**5376000**
Fringe Benefits (40 % of the above)				2150400
Total Wage Bill (Annual) Rs. lakhs:	+ Other Benefits =			**7526400.00**
Total Wage Bill (Annual) Rs. Cr.:				**0.75264**

Exhibit 9.5

PROFITABILITY STATEMENT AND COMPUTATION OF TAX

(Rs.Cr)

ACCOUNT HEAD	FINANCIAL YEAR OF OPERATION									
	I	II	III	IV	V	VI	VII	VIII	IX	X
Revenue										
Net Sales Turnover	4.55	5.46	6.83	8.19	8.19	8.19	8.19	8.19	8.19	8.19
Total Revenue	4.55	5.46	6.83	8.19	8.19	8.19	8.19	8.19	8.19	8.19
Expenses										
Raw Materials	3.09	3.71	4.64	5.57	5.57	5.57	5.57	5.57	5.57	5.57
Salaries & wages	0.75	0.79	0.83	0.87	0.91	0.99	1.07	1.15	1.24	1.34
Conversion Costs	0.15	0.19	0.23	0.28	0.28	0.28	0.28	0.28	0.28	0.28
Sales, Marketing & Training Expenses	0.23	0.27	0.34	0.41	0.41	0.41	0.41	0.41	0.41	0.41
Factory & Office Overheads	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19
Interest on S.T. Loans	0.09	0.11	0.13	0.16	0.16	0.16	0.16	0.16	0.17	0.17
Cost of Sales	4.53	5.28	6.38	7.49	7.54	7.61	7.69	7.78	7.87	7.97
Depreciation (St.Line)	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
Amort. of Expenses	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00
Interest on L.T Loan	0.08	0.08	0.07	0.06	0.05	0.04	0.03	0.02	0.01	0.00
Profit Before Tax	-0.17	-0.01	0.25	0.52	0.48	0.42	0.35	0.28	0.19	0.10
Tax	0.00	0.00	0.03	0.05	0.04	0.14	0.12	0.10	0.08	0.05
Profit After Tax	-0.17	-0.01	0.23	0.46	0.44	0.28	0.23	0.17	0.11	0.05
Dividend	0.00	0.00	0.05	0.05	0.05	0.10	0.10	0.10	0.10	0.10
Profits For Appropriation	-0.17	-0.01	0.18	0.41	0.39	0.18	0.13	0.07	0.01	-0.05
COMPUTATION OF TAX										
Profit after interest before depreciation	-0.06	0.10	0.37	0.63	0.60	0.53	0.47	0.39	0.31	0.21
Depr.(WDV) to be claimed	0.47	0.89	1.07	0.93	0.47	0.14	0.11	0.09	0.08	0.06
Depreciation claimed	-0.06	0.10	0.37	0.63	0.47	0.14	0.11	0.09	0.08	0.06
Depr. carried forward	0.53	0.79	0.71	0.30	0.00	0.00	0.00	0.00	0.00	0.00
Taxable Profit	0.00	0.00	0.00	0.00	0.13	0.39	0.36	0.30	0.23	0.15
Profit Before Tax (Book)	-0.17	-0.01	0.25	0.52	0.48	0.42	0.35	0.28	0.19	0.10
Minimum Alternate Tax	0.00	0.00	0.03	0.05	0.00	0.00	0.00	0.00	0.00	0.00
Tax (Actual)	0.00	0.00	0.00	0.00	0.04	0.14	0.12	0.10	0.08	0.05
Tax Provision	0.00	0.00	0.03	0.05	0.04	0.14	0.12	0.10	0.08	0.05

EXHIBIT 9.6

SENSITIVITY ANALYSIS

HEALTHCARE TEXTILES

Items	Profit after Tax (PAT) (assumed at 90 % capacity)	Break Even (%)	Internal Rate of Return (IRR)	Payback Period
NORMAL VALUES	0.46	72.69	9.80	7.09
Debt Equity Ratios				
(a) 2:1	0.46	76.60	9.87	7.03
(b) 1:1	0.47	75.82	9.68	7.18
Increase in Project Cost				
(a) 10 %	0.45	77.18	8.73	7.75
(b) 20%	0.43	78.07	7.99	8.31

ANNEXURE 9.1

COST COMPARISON BETWEEN DISPOSABLES AND NON DISPOSABLES

COST OF CAPS & MASKS

⇨ **COST OF THE NONDISPOSABLE CAPS:**

Cloth + Stitching = Rs.35.00 (Fixed Cost)

Recurring Cost : Laundry + Sterlisation = Rs.1.50 x 10 cycles = Rs.15.00

Thus total cost = Rs.35.00 + Rs.15.00 = Rs.50.00

Cost per usage = Rs.50.00/10 = Rs.5.00

- **Cost of DISPOSABLE Cap : Rs.2.00 - Rs.3.00**

⇨ **COST OF THE NONDISPOSABLE MASKS:**

Cloth + Stitching = Rs.17.50 (Fixed Cost)

Recurring Cost : Laundry + Sterlisation = Rs.1.50 x 10 cycles = Rs.15.00

Thus total cost = Rs.17.50 + Rs.15.00 = Rs.32.50

Cost per usage = Rs.32.50/10 = Rs.3.25

- **Cost of DISPOSABLE Mask : Rs.2.00 - Rs.3.00**

COST OF UNIFORMS

⇨ Cost of the **NONDISPOSABLE** uniform : Cloth + Stitching = Rs.300.00 (Fixed Cost)

Recurring Cost: Laundry + Sterilisation =

Rs.8.00 x 24 cycles (6 months) = Rs.192.00

Thus total cost = Rs.300.00 + Rs.192.00 = Rs.492.00

Cost per usage = Rs.492.00/24 = Rs.20.50

Cost of **DISPOSABLE** uniform : Rs.115.00

No. of usages = 5

Cost per usage = 115/5 = Rs.23.00

3. Cost of disposable v/s non disposables : (Broad indicative costs)

Cost structure of the disposables

Sr.No.	Items	Cost/piece (Rs.)
1.	Caps	2.00 - 3.00
2.	Masks	3.00
3.	Gowns	200.00 - 250.00

Cost structure of the nondisposables

	Items	**Cost per Usage (Rs.)**
1. & 2.	Caps & Masks	The non disposables caps and masks are cut from the remains of the cloth used for stitching the gowns/uniforms. There is no separate cloth purchased for the caps and masks. Hence the hospitals find it economical to use these; though the trend is changing rapidly with increasing penetration of the nonwovens/disposables in this segment. Caps & Masks are the target product segments in the nonwovens for wider acceptance. The units surveyed engaged in nonwoven disposables reveal that the cost can be further reduced if marketed directly to the hospitals, once the volumes increase
3.	Gowns	⇨ Cost of the **NONDISPOSABLE** gown : Cloth + Stitching = Rs.200.00 (Fixed Cost) Recurring Cost : Laundry + Sterilisation = Rs.8.00 x 24 cycles (6 months) = Rs.192.00 Thus total cost = Rs.200.00 + Rs.192.00 = Rs.392.00 **Cost per usage = Rs.392.00/24 = Rs.16.33 (say Rs.16.00)** ⇨ Cost of **DISPOSABLE** gowns : Rs.200.00 No. of usages = 4 **Cost per usage = Rs.200.00/4 = Rs.50.00** ⇨ With the **aggressive promotion of disposables** and setting up of **large economic size plants,** it should be **feasible to reduce the cost of disposables** significantly, thereby selling the concept to the hospitals on commercial consideration.

SPUNBOND PROJECT

SECTION I : PRODUCT BRIEF, APPLICATION AREAS AND MARKET POTENTIAL

10.1 Spunbond Nonwoven Textiles are not made by conventional weaving or knitting processes, but are composed of ultra fine continuous fibers made from thermoplastics which are randomly laid to a web onto a conveyor belt and subsequently bonded together.

10.2 Special properties such as water repellence or permeability or UV stability can be obtained by mixing additives to the raw materials or applying different agents to the fabric.

10.3 Spunbond fabrics are characterized by tensile, tear, and burst strengths, elongation-to-break, weight, thickness, porosity and stability to heat and chemicals. These properties reflect fabric composition and structure. The Spunbonded webs offer a wide range of product characteristics such as:

- High liquid retention capacity due to high void content,
- High in-plane shear resistance, and low drapeability,
- Random fibrous structure,
- High opacity per unit area,
- Most spunbond webs are layered or singled structure, the number of layers increases with increasing basis weight,
- Basis weights typically range from 12 - 150 gsm,
- Fiber diameters range preferred is between 15 to 35 μm,
- Web thickness typically between 0.2 - 1.5 mm,
- High strength-to-weight ratios compared to other nonwoven, woven, and knitted structures,
- High tear strength (for area bonded webs only),
- Good fray and crease resistance.

Major Application and End-usages:

- **Sanitary and Hygiene:** The use of spunbond web as a coverstock for **Sanitary Napkins, Baby Diapers and Incontinence Diapers** are the most widely used world over because of the unique structure of spunbond web which helps the skin of the user stay dry and comfortable. Additionally, the spunbond webs are cost effective over the conventional non wovens.

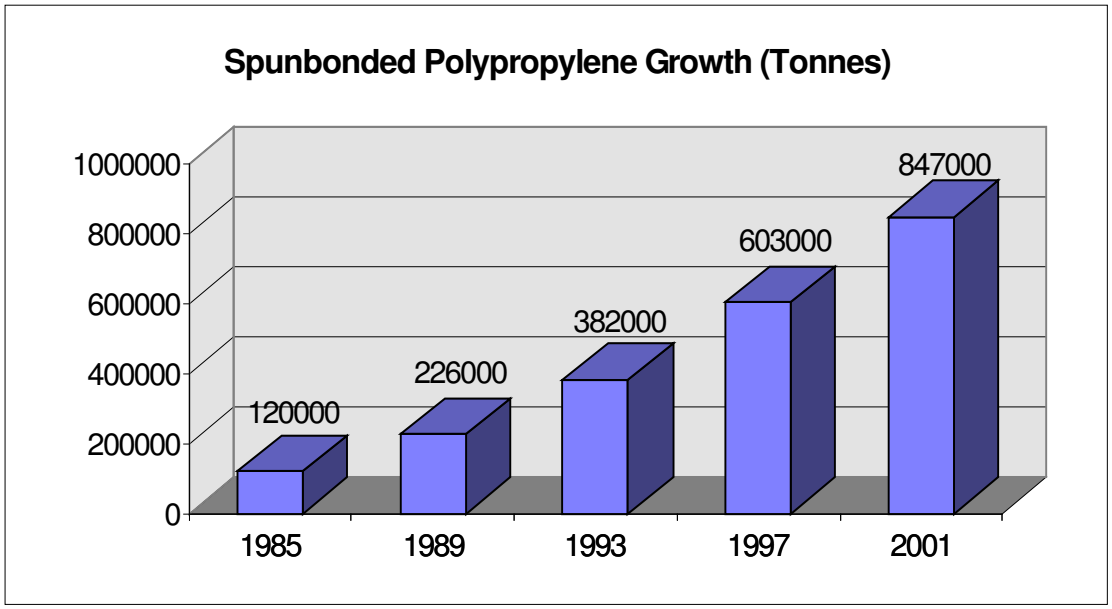
- **Medical and Surgical:** In Medical applications world over, other traditional woven materials have been replaced by high performance spunbonded webs due to typical

properties such as breathability, resistance to fluid penetration, lint free structure, sterilisability and impermeability to bacteria. **The medical applications include gowns, masks, caps, drapes, etc.**

- **Other Miscellaneous Applications** like :- Filtration Material, Agriculture, Headliners, etc.

Global Market Potential :

10.4 Spunbond Polypropylene and spunbond Meltblown polypropylene composites are the fastest growing of the nonwoven technologies worldwide (See Graph below):



10.5 The spunbond polypropylene has reflected an average growth rate over the 12 year period approaching 15% per year.

10.6 It may be noted that the main focus area has been the fine denier spunbond and SMS polypropylene markets which accounted for 88% of the total spunbond and SMS production. The review of the global regional production of fine denier spunbond and SMS polypropylene reveals that North America is the largest market with 34% market share followed by Europe with 31% and the balance by rest of the world (1997) reflecting growth rate of 6% p.a. for the European and American markets between 1997 and 2001.

10.7 **The largest of the spunbond and SMS composite markets is for coverstock used by absorbent products.** In terms of tonnage, coverstock account for about half of the total fine denier spunbond PP material consumed. Spunbond coverstock is growing worldwide at the rate of 10% per annum and it's share will reach about 64% of all fine denier spunbond PP and SMS consumption. The factors identified driving the market for

spunbond and SMS coverstock worldwide are:

- Increase consumption of disposable absorbent products,
- New Diaper designs utilise more coverstock per diaper,
- Spunbond share of the market in cover stock increasing

10.8 Led by Kimberly Clark in North America, disposable medical nonwoven materials are also gaining a significant share of the medical markets in US, Europe and rest of the world. The major factor attributed to slower growth of disposable nonwoven apparel in the developing markets is the high cost of importing these finished products or the roll goods to produce them.

10.9 The market potential for medical disposable products can grow significantly if the import duties, local taxes and distribution costs can be brought down.

Indian Market Potential :

Healthcare and Hygiene Applications:

10.10 The spunbond fabric find varied applications in hygiene and healthcare segments as mentioned below:

- **Sanitary Napkins:** The spunbond nonwoven is used in the napkin coverstock/top layer.
- **Incontinence /Adult Diapers and Baby Diapers:** The nonwovens are used in the topsheet and cuffs.
- **Healthcare Textiles:** This category includes the products used in hospitals like Caps, Masks, Gowns, Aprons, Beddings, etc.

10.11 The All India nonwoven demand arising from these segments is as shown below:

Products	Quantity (Tonnes)			Value (Rs. Cr.)		
	2001-02 Estimated	2003-04 Estimated	2007-08 Projected	2001-02 Estimated	2003-04 Estimated	2007-08 Projected
Sanitary napkins	818.81	919.85	1496.08	8.31	10.62	17.27
Incontinence Diapers	32.97	84.71	212.07	0.36	0.93	2.33
Baby Diapers	161.55	184.95	242.43	1.78	2.04	2.67
Healthcare Textiles	279.66	968.72	4485.07	3.20	11.15	51.19
TOTAL*	**1292.99**	**2158.23**	**9653.475**	**13.65**	**24.74**	**111.28#**

*: Subject to realisation of the market potential for the above healthcare and hygiene products.

 # Includes the export of 50 % on Total of Rs. 74.18 Cr. (i.e. Rs. 37.10 Cr. (3217.825 T).

10.12 **At present the entire requirement of spunbond fabric for the above applications (and others) is met through imports by the parties directly.**

10.13 There are EOUs in the country like PVD and Uni products which are manufacturing the fabric in India. KT International is the trader selling another player producing the spunbond fabric in the country.

10.14 Some of the established and potential customers for the spunbond fabric are:

Company	Products
Johnson and Johnson	Sanitary Napkins
Procter & Gamble Hygiene and Healthcare Ltd.	Sanitary Napkins and Baby Diapers
Kimberly Clark Lever Ltd.	Sanitary Napkins and Baby Diapers
Godrej	Baby Diapers
Gufic Biosciences	Sanitary Napkins
Elder Hartmann	Incontinence Diapers
Noble Hygiene	Incontinence and Baby Diapers
Dima Products	Sanitary Napkins

10.15 Thus in the background of the projected market potential of short term period upto 2007-08 and long term prospects, there is scope for setting up an economic size spunbond project in India, using state-of-the-art technology. Setting up of this unit would provide a big boost to the above mentioned user industries.

10.16 Other Technologies available for producing the above mentioned products are as follows:

Products	Other Technologies
Healthcare Products	Spunlace

SECTION II : SPUNBOND TECHNOLOGY AND EQUIPMENTS SUPPLIERS

Process Description:

10.17 The spunbond process is a nonwoven manufacturing system involving the direct conversion of a

polymer into continuous filaments, integrated with the conversion of the filaments into a random-laid, bonded nonwoven fabric. The spun bond process is one of the newer nonwoven technologies, having first been commercialised in the mid-1960s. Spunbond technology has received considerable attention since its initial introduction, as the resulting product has met some important market needs.

10.18 The typical spunbond nonwoven process consists of several integrated steps in the conversion of polymer / resin pellets into a finished nonwoven fabric. The major elements of the process are :

Polymer Feed :

10.19 Polymer feedstock in pellet or powder form is conveyed from storage bins or silos to the feeder section of an extruder.

Extruder :

10.20 Polymer feedstock is mixed with stabilisers, additives, color master-batch, resin modifiers, or other additives. This blend of raw materials is melted within the extruder barrel.

Fiber Spinning :

10.21 The molten polymer mix is pumped through a heated conduit to a resin filter system and then to a distributor section that leads to the spinnerette units. The spinnerette usually consists of a perforated plate arranged across the width of the line. The resin is forced through the many small holes in the spinnerette plate to form continuous filaments.

Quenching / Attenuation Zone :

10.22 As the filaments emerge through the spinnerette holes, they are directed downward into quench chambers or chimneys. As the filaments travel through these chambers, cool air is directed across the filament bundle to cool the molten filaments sufficiently to cause solidification. The filaments are then led further downward into a tapered conduit by an airstream. A second stream of high velocity air is directed parallel to the direction of the filaments, causing an acceleration and accompanying attenuation or stretching of the individual filaments. This mechanical stretching results in increased orientation of the polymer chains making up the continuous filament. Such orientation leads to increased filament strength, along with modification of other filament properties, including the filament denier or thickness.

Web Forming :

10.23 The filaments are deposited in a random manner on a moving, porous forming belt. A vacuum under the belt assists in forming the filament web on the forming belt and in removing the air used in the extrusion / orientation operation. In some processes, an

electrostatic charge is placed on the filament bundle to ensure spreading and separation of individual filaments. In other processes, deflector plates are used to lay down the filament sheet in a random manner on the forming belt.

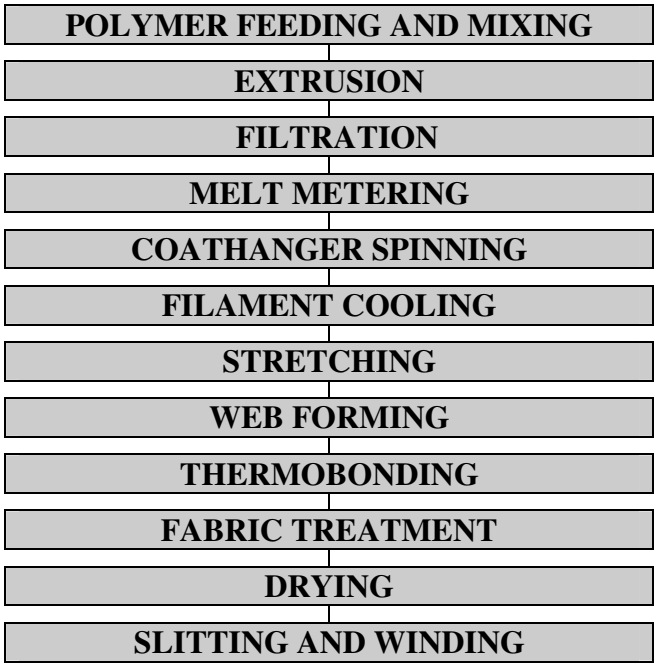
Bonding :

10.24 The continuous filament web is delivered to a bonding section, where one of several bonding methods can be used to bond the loose filaments into a strong, integrated fabric.

Slitting / Winding :

10.25 The bonded fabric encounters a slitting section where the two edges are trimmed to eliminate the nonuniform, rough edge created during the manufacturing step. In some operations, the fabric may also be further slit into precise, smaller widths to provide finished rolls of precise dimension. Following slitting, the fabric is wound onto a larger roll, either a full width roll or a series of narrow slit rolls. From this point, the fabric rolls are ready for wrapping and shipping.

A GENERIC FLOW DIAGRAM OF THE SPUNBOND PROCESSING:



Machinery Suppliers and Specifications:

10.26 Globally, the **two well known technology suppliers** with proven track record contacted by TECS are:

1. **Rieter Perfojet (France),**
   Local Representative:
   Rieter India Pvt. Ltd.,

1005-1008, Hemkunt Tower,
98, Nehru Place,
New Delhi - 110 019.
Tel.: (022) 2628 3896 / 2644 8501 / 02 / 03
Fax: (022) 2644 8505

2. Reifenhauser GmbH & Co. (Germany)
Local Representative:
Reifenhauser (India) Marketing Ltd.,
229, Udyog Bhavan, Sonawala Road,
Goregaon (E), Mumbai - 400 063.
Tel.: (022) 28756361
Fax: (022) 2875 6362
Email: reifen@bom3.vsnl.net.in

Note : The list contains the leading global players in Spunbond Technology and based on discussion with Industry experts the above list is exhaustive..

10.27 TECS has received responses from both these gobal players and preliminary discussions were held with their local representatives in India.

Process Systems and Equipments

10.28 The main process equipment in the Spunbond Unit would comprise of the following:

- **The Spunbond Tower houses all Process Systems and Equipments described below:**
    - Dosing and pellets handling system (Volumetric),
    - Extruder (Barrier Screw L/D = 30),
    - Screen Changer (Continuous Operation Type),
    - Polymer Transfer Line (with electrical heating system, instrumentation and controls),
    - Spinning Beam (Multi-layers Distribution Pack),
    - Quenching System,
    - Smoke Removal System,
    - Filament Drawing system (with one single liner injector feed with compressed and cooled air),
    - Formation System (for fire opening and deposition over the web former),
    - Filament Stabilisation System (controls the air flow and makes more stable the spinning filaments),
    - Web Former (mechanical appropriation upto 400 m/min),

- Vacuum System / Forming,
- Vacuum System / Hold down,
- Process Stabilisation System (PSS),
- Line Automation and Process Control System,

- **The Service Equipment consisting of:**
  - Spin Pack Handling System,
  - Burning Oven,
  - Washing Bath,
  - Spin Pack Working Table,
  - Spinneret Inspection Table,
  - Polymer Local Storage Tanks

- **2-Rolls Hydraulic Calender (Width : 3700 mm; diameter : 560 mm; Production Speed : 30 - 300 m / min)**

- **Winder (web width:3500 m; Production speed : 300 m/in; No. Of spools : 4)**

Minimum Recommended Economic Size:

10.29 The spunbond project proposed to be set up in India will have a designed capacity of 690 kgs per hour* (Average)

(1.6-2.0 dpf: 12-30 gsm: 630 kg/hr.;

> 2.0 dpf: 30-150 gsm: 750 kg/hr.)

*For Hygiene and Medical applications, less than 30 gsm is used.

10.30 Under Indian operating conditions it is safer to assume machine efficiency factor of 90%, and therefore the production would be 621 kgs per hour.

10.31 The plant would operate in three shifts, 24 hours and 300 working days in a year.

Investment in Process Plant and Machinery.

10.32 The list of major equipments for the spunbond project is as given above and as per the indicative budgetary quotations , **the investment in the process plant and machinery will be Rs 33 crores** (FOB) inclusive of 10% discount as given by the machinery manufacturers. Finer details on the Equipment listing, specification and the quotations need to be discussed with the technology supplier before the project is taken up. Taking into account the CIF value, the custom duties (Custom duty of 5%), inland transportation, erection and commissioning , **the installed cost of process equipment would be Rs 37.85 crores.**

SECTION III : PROJECT COST AND PROFITABILITY PROJECTIONS

Land

10.33 The total requirement of land for this project keeping in mind the possible future expansion is around 10115 Sq. Mtrs. (2.5 acres).

10.34 Based on the available information, the cost of land is assumed at Rs 1200 per square meter (including the developmental cost). Depending on the exact location of the project to be determined by the promoter, the land cost could be higher or lower. Hence the total cost of developed land will be **Rs 1.21 crore.**

Buildings

10.35 The building area comprising of main factory building, godowns, office, R & D labs/In-house Testing centre etc. would be 4000 sq. mtrs. The cost of construction would again vary depending on the structure and the materials to be used. It has been assumed that the average cost of construction would be Rs 4500 per sq. Mt. Thus the total cost of building and other civil works would be around **Rs 1.80 crores.**

Plant and Machinery

10.36 Details of Plant and machinery as well as technology required for the project have been presented in earlier Section II . The installed cost of plant and machinery would be **Rs 37.85 crores.**

10.37 Apart from the main process equipments, the utilities required are:

- Water Supply System,
- Humidity Control System,
- Piping,
- Compressors,
- Fire Fighting Equipments etc.

10.38 The provision on this count is taken as 3% of the cost of machinery which works out to **Rs 1.14** crores.

Captive Power Plant

10.39 The cost for this unit is **Rs 5.25 crores**

Testing Equipments

10.40 The testing equipments required for a Spunbond Unit are:

- Laboratory Equipment, Dynamometer, Oven Dryer, Balance etc.,
- In-line monitoring equipment - GSM, humidity etc.,
- Metal Parts detection,
- Air Handling, Humidification system,
- Automatic Packing System.

10.41 A provision of **Rs. 3.12** crores has been made on this account.

Miscellaneous Fixed Assets

10.42 Under this head the items included are Furniture and fixtures, Office equipments, Air Conditioners etc. and the provision made is around **Rs 0.30** crore (Rs 30 lakhs) inclusive of the Testing and R & D facilities.

Project Engineering and Consulting

10.43 Under this head the items included are the fees and expenses on account of Architect fees, project engineering and management (both local and overseas), detailed project reports etc.

Preliminary & Preoperative Expenses

10.44 The items included under this head are company formation expenses, public issue expenses (if any), interest during construction, pre production expenses during the implementation phase etc.

Contingency Expenses

10.45 Depending on the gestation period and further detailing of the project cost by the promoter, the contingency provision has been made at the rate of 10%.

Margin Money for Working capital

10.46 The margin money for working capital forming part of the total project cost would be Rs 1.87 crores. [**Exhibit 10.3**]

Total Project Cost (Total Investment)

10.47 The total project cost as given in **Exhibit 10.1** would be **Rs 64.29 crores.**

Project Funding and Financing Pattern :

10.48 It has been assumed that the project would be financed through long term funds and Equity participation by the Promoter / Public. The technical textile sector being a high priority area , it is assumed that a Debt- Equity ratio of 1.5 : 1 would be feasible. (However the sensitivity analysis has also been presented for 1 : 1 and 2 : 1 Debt Equity ratios.)

Sales, Profitability and Sensitivity Analysis :

Sales Realisation and Turnover

10.49 As per the details available from the Technology and Equipment suppliers the economic size of a plant is 690 kgs per hour.

10.50 Under the Indian conditions, it is assumed that the machine would operate at an efficiency level of 90%. Hence the production from the plant would be 621 kgs per hour.

10.51 The plant would operate on 3-shift basis and 300 working days in year.

10.52 Being a continuous operation, the capacity utilisation for the 1st year is assumed at 75% and thereafter for the 2nd and 3rd year onwards 85% and 90% respectively.

10.53 The average selling price of the end product would be Rs 100 per kg . (net of excise duties, sales tax and other incidental expenses). The **international price** of the spunbond fabric is **$1.6-$1.8 / kg** and accordingly the landed cost is seen to be Rs 110 - Rs 120 per kg

10.54 The details of projected sales turnover as projected are given in **Exhibit 10.2.**

Cost of Production:

Major Raw materials and their specifications::

10.55 The main raw materials used and the corresponding prevailing prices as an indicator are as follows:

Raw Material	Prices	Landed cost (inclusive of import duty of 15% & inland transportation etc.)
Polypropylene Chips (PP chips)	$800/tonne (Rs 37/kg)	Rs 45.00/kg

10.56 The major suppliers of these raw materials are :

(a) Exxon
(b) BP - Amoco
(c) Borealis
(d) Fina

10.57 Along with the PP Chips, other additives like TiO_2 and dyes are also added which account for another 2.5% of the raw material cost (Rs. 50 lakhs).

10.58 The requirement of PP chips would be 4560.62 kg, accounting for a process waste of 2%. Hence the total raw material cost is Rs 21.03 crores. These **PP Chips** are mainly of **25-35 MFI.**

Power Cost

10.59 The total connected load is about 2000KW and the norm of consumption of power per kg is 1.10 Kwh, priced at Rs. 4.50 per unit.

Manpower, Salaries and Wages

10.60 The manpower requirements and the salary structure is given in **Exhibit 10.4**

10.61 The total manpower requirement comprising the managerial cadre of supervisors, machine operators and helpers would be 62 persons.

Repairs and Maintenance

10.62 The provision for Repairs and Maintenance has been made at 2% of the process plant and equipment cost.

Factory and Overhead Expenses

10.63 The items covered under this head are establishment expenses, repairs and maintenance, stationery, travel expenses, packaging expenses etc.

Marketing and Promotional Expenses

10.64 The promotion of technical textiles will call for expenditure on this count and a provision of 5% of the annual sales has been made uniformly over the years. This includes the margins and commission to the agents, distributors, etc.

Interest and Depreciation

10.65 The prevailing interest rate for long term and short term borrowed funds is assumed at 5% and 11% per annum respectively. (Project under Technology Upgradation Fund-TUF).

10.66 The repayment of loans has been assumed for 10 years with a moratorium period of two years (2+8).

10.67 The depreciation rates have been worked out as per Company's act (SLM) and Income-Tax Ready Reckoner (WDV).

10.68 The current corporate tax rate is assumed at 35% and the surcharge is assumed at 2.5% per annum.

Profitability, Break-even, IRR and Payback

10.69 As presented in **Exhibit 10.5**, the sales turnover increases from **Rs 32.86** crore in the first year to **Rs 39.44** crore from the 3rd year onwards.

10.70 The PBT increases from **Rs 6.14** crore in the first year to **Rs 8.42** crore in the fourth year.

10.71 The Break Even of the project is at **52.38%.**

10.72 The Internal Rate of Return (IRR) has been worked out at **14.61%**.

10.73 The Payback period for the project is **5.57 years**.

Sensitivity Analysiss

10.74 The sensitivity analysis has been presented in the **Exhibit 10.6.**

DEVELOPMENTAL AND PROMOTIONAL MEASURES.

1. Nonwoven fabrics manufactured from Spunbond technology have the widest applications for healthcare and medical products.

2. This sector is one of the most important for development of Medical and Healthcare technical textile industry.

3. It will be a **Mother Unit** for supplying the raw materials for healthcare and medical products such as Sanitary Napkins, Incontinence and Baby Diapers, Masks, Caps, etc.

4. There is **scope for setting up this unit in India** to meet the requirement of Spunbond nonwoven fabrics for the current decade subject to the realisation of **India's untapped market potential** for the user sectors of sanitary napkins, incontinence diapers, baby diapers, caps, masks, medical disposables, etc.

5. The assumed customs duty on PP Chips is 20% BCD and it is recommended that for level laying field it should be reduced to 5%.

6. With the implementation of this project, imported spunbond fabric should carry higher customs duty to discourage the customers to use imported fabrics.

7. The Indian product should satisfy the national and international standards. Bureau of Indian Standards should take a lead in this direction. With the quality standards at par with the International market and competitive pricing policies, a level playing field can be assured to the Indian entrepreneurs.

8. The manufacturers of the healthcare products and the spunbond fabric should have representation in the Committees set up by the Ministry of Health.

9. Over the years, attempts may be initiated by companies like Reliance to take up the manufacturing of PP Chips, the main raw material for spunbond industry.

10. There are no regulatory issues connected with this project. As a forward linkage, this project will not only be an import substitution, but provide the critical raw material for the medical and healthcare products.

EXHIBIT 10.1

PROJECT COST
(LAND, BUILDINGS, PROCESS PLANT & MACHINERY, UTILITIES & OTHER ASSETS)

		Project Cost (Rs. Cr.)
1	**Land**	**1.21**
	Area: 2.5 acres (10115 Sq Mtrs)	
	Rate: (Rs.1200 /Sq. Mtr)	
2	**Buildings**	**1.80**
	Plant Area, Office, Godown, Lab, Service Area etc.)	
	Built-up Area : 4000 Sq. Mtrs	
	Avg Rate : Rs. 4500 /Sq. Mtrs	
3	**Process Plant & Equipment**	**37.85**
	(List of Equipments given in the Section II)	
4	**Utility & Other equipments (3%)**	**1.14**
	(List of Equipments given in the Section III)	
5	**Captive Power Plant (1880 kW)**	**5.25**
6	**Misc. Fixed Assets**	**0.30**
	(Furniture & Fixtures, Office Equipment, etc.)	
7	**Testing Lab Equipments**	**3.12**
	(List of Equipments given in the Section III)	
8	**Project Engineering & Consultancy charges (2.5%)**	**1.02**
9	**Preliminary & Pre-operative Expenses (12%)**	**5.04**
	(Company Formation, Interest during construction,	
	pre-production expenses, etc.)	
10	**Contingency (10 %)**	**5.67**
11	**Total**	**62.41**
12	**Margin Money for Working Capital**	**1.87**
13	**Total Project Cost**	**64.29**

EXHIBIT 10.2

ESTIMATION OF SALES REVENUE

(Rs. Cr.)

ITEM	YEAR OF OPERATION									
	I	II	III	IV	V	VI	VII	VIII	IX	X
Average Production per hour (kg)	690	690	690	690	690	690	690	690	690	690
90% efficiency	621	621	621	621	621	621	621	621	621	621
Capacity Utilisation	75%	85%	90%	90%	90%	90%	90%	90%	90%	90%
Actual Production per hour	466	528	559	559	559	559	559	559	559	559
Production per day (kg)	11178	12668	13414	13414	13414	13414	13414	13414	13414	13414
Production for 300 working days	3353400	3800520	4024080	4024080	4024080	4024080	4024080	4024080	4024080	4024080
Selling Price (Rs/Kg)	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Sales Revenue (Rs. Cr)	**33.53**	**38.01**	**40.24**	**40.24**	**40.24**	**40.24**	**40.24**	**40.24**	**40.24**	**40.24**
Value Loss (2%)	0.67	0.76	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Net Sales Revenue (Rs. Cr)	**32.86**	**37.25**	**39.44**	**39.44**	**39.44**	**39.44**	**39.44**	**39.44**	**39.44**	**39.44**

EXHIBIT 10.3

REQUIREMENT OF WORKING CAPITAL

(Rs.Lakhs)

ITEM	NO. OF	MARGIN	YEAR I			YEAR II			YEAR III			YEAR IV			YEAR V		
	MONTHS	(%)	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK
			REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE
Factory Related																	
Raw materials & other com.	2.00	25.00	2.63	0.66	1.97	2.98	0.74	2.23	3.15	0.79	2.37	3.15	0.79	2.37	3.15	0.79	2.37
Goods in process	0.25	25.00	0.40	0.10	0.30	0.45	0.11	0.34	0.48	0.12	0.36	0.49	0.12	0.36	0.49	0.12	0.37
Finished Goods	1.00	25.00	1.73	0.43	1.30	1.95	0.49	1.46	2.08	0.52	1.56	2.11	0.53	1.58	2.11	0.53	1.58
A/c Receivable	1.00	25.00	2.74	0.68	2.05	3.10	0.78	2.33	3.29	0.82	2.46	3.29	0.82	2.46	3.29	0.82	2.46
Cash in hand																	
Salaries & wages	1.00	0.00	0.07	0.00	0.07	0.07	0.00	0.07	0.07	0.00	0.07	0.08	0.00	0.08	0.08	0.00	0.08
Utilities	1.00	0.00	0.09	0.00	0.09	0.11	0.00	0.11	0.14	0.00	0.14	0.17	0.00	0.17	0.17	0.00	0.17
Marketing & Promotional Expens	1.00	0.00	0.14	0.00	0.14	0.16	0.00	0.16	0.16	0.00	0.16	0.16	0.00	0.16	0.16	0.00	0.16
Admin. Overheads	1.00	0.00	0.06	0.00	0.06	0.06	0.00	0.06	0.06	0.00	0.06	0.06	0.00	0.06	0.06	0.00	0.06
Total Requirement			**7.86**	**1.87**	**5.98**	**8.88**	**2.12**	**6.76**	**9.44**	**2.25**	**7.19**	**9.51**	**2.26**	**7.25**	**9.52**	**2.26**	**7.26**

EXHIBIT 10.3 (contd..)

REQUIREMENT OF WORKING CAPITAL

(Rs.Lakhs)

ITEM	NO. OF	MARGIN		YEAR VI			YEAR VII			YEAR VIII			YEAR IX			YEAR X	
	MONTHS	(%)	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK
			REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE
Factory Related																	
Raw materials & other	2.00	25.00	3.15	0.79	2.37	3.15	0.79	2.37	3.15	0.79	2.37	3.15	0.79	2.37	3.15	0.79	2.37
Goods in Process	0.50	25.00	0.98	0.24	0.73	0.98	0.25	0.74	0.98	0.25	0.74	0.99	0.25	0.74	0.99	0.25	0.74
Finished Goods Stock	1.00	25.00	2.12	0.53	1.59	2.12	0.53	1.59	2.13	0.53	1.60	2.14	0.54	1.61	2.15	0.54	1.61
A/c Receivable	1.00	25.00	3.29	0.82	2.46	3.29	0.82	2.46	3.29	0.82	2.46	3.29	0.82	2.46	3.29	0.82	2.46
Cash in hand																	
Salaries & wages	1.00	0.00	0.09	0.00	0.09	0.09	0.00	0.09	0.10	0.00	0.10	0.11	0.00	0.11	0.12	0.00	0.12
Utilities	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Marketing & Promotio	1.00	0.00	0.06	0.00	0.06	0.06	0.00	0.06	0.06	0.00	0.06	0.06	0.00	0.06	0.06	0.00	0.06
Admin. Overheads	1.00	0.00	0.16	0.00	0.16	0.16	0.00	0.16	0.16	0.00	0.16	0.16	0.00	0.16	0.16	0.00	0.16
Total Requirement			**10.02**	**2.38**	**7.64**	**10.04**	**2.39**	**7.65**	**10.06**	**2.39**	**7.67**	**10.08**	**2.39**	**7.68**	**10.10**	**2.40**	**7.70**

EXHIBIT 10.4

MANPOWER REQUIREMENTS

	Nos	Monthly	Total Mon.	Annual
General Manager	1	30000	30000	360000
Production Manager	1	20000	20000	240000
Machine Operators	12	6000	72000	864000
(4 X 3 shifts)				
Machine Helper (Semi Skille	9	3000	27000	324000
(3 X 3 sgifts)				
Material Handling	3	6000	18000	216000
R&D, Testing	6	10000	60000	720000
Marketing & Sales				
Marketing Head	1	25000	25000	300000
Sales Team	5	12000	60000	720000
Clerical Staff	10	6000	60000	720000
Other Staff (Peon, Security)	5	3000	15000	180000
Maintenance Department	9	10000	90000	1080000
TOTAL	**62**		**477000**	**5724000**
Fringe Benefits (40 % of the above)				2289600
	Total Wage Bi	Salary + Other Benefits =		**8013600.00**
	Total Wage Bill (Annual) Rs. Cr.:			**0.80136**

EXHIBIT 10.5

PROFITABILITY STATEMENT AND COMPUTATION OF TAX

(Rs.Cr)

ACCOUNT HEAD	FINANCIAL YEAR OF OPERATION									
	I	II	III	IV	V	VI	VII	VIII	IX	X
Revenue										
Net Sales Turnover	32.86	37.25	39.44	39.44	39.44	39.44	39.44	39.44	39.44	39.44
Total Revenue	32.86	37.25	39.44	39.44	39.44	39.44	39.44	39.44	39.44	39.44
Expenses										
Raw Materials	15.77	17.88	18.93	18.93	18.93	18.93	18.93	18.93	18.93	18.93
Salaries & wages	0.80	0.84	0.88	0.93	0.97	1.05	1.14	1.23	1.33	1.43
Power, Fuel, Stores & Other Expenses	1.13	1.35	1.69	2.03	2.03	2.03	2.03	2.03	2.03	2.03
Repairs & Maintenance	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76
Marketing & Promotional Expenses	1.64	1.86	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97
Factory & Office Overheads	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67
Interest on S.T. Loans	0.66	0.74	0.79	0.80	0.80	0.84	0.84	0.84	0.85	0.85
Cost of Sales	21.43	24.11	25.70	26.09	26.13	26.25	26.34	26.43	26.53	26.64
Depreciation (St.Line)	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
Amort. of Expenses	0.17	0.17	0.17	0.17	0.17	0.17	0.00	0.00	0.00	0.00
Interest on L.T Loan	1.93	1.93	1.81	1.57	1.33	1.08	0.84	0.60	0.36	0.12
Profit Before Tax	6.14	7.84	8.57	8.42	8.61	8.73	9.06	9.21	9.35	9.48
Tax	0.64	0.82	0.90	1.46	2.32	2.72	3.10	3.36	3.56	3.72
Profit After Tax	5.49	7.02	7.67	6.96	6.29	6.01	5.95	5.85	5.79	5.76
Dividend	0.00	0.00	1.29	1.29	1.29	2.57	2.57	2.57	2.57	2.57
Profits For Appropriation	5.49	7.02	6.38	5.67	5.01	3.44	3.38	3.28	3.21	3.18
COMPUTATION OF TAX										
Profit after interest before depreciation	9.33	11.04	11.76	11.61	11.81	11.93	12.25	12.40	12.54	12.68
Depr.(WDV) to be claimed	13.94	15.36	12.66	7.44	5.18	4.16	3.39	2.81	2.37	2.03
Depreciation claimed	9.33	11.04	11.76	7.44	5.18	4.16	3.39	2.81	2.37	2.03
Depr. carried forward	4.61	4.32	0.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Taxable Profit	0.00	0.00	0.00	4.17	6.62	7.77	8.87	9.60	10.18	10.64
Profit Before Tax (Book)	6.14	7.84	8.57	8.42	8.61	8.73	9.06	9.21	9.35	9.48
Minimum Alternate Tax	0.64	0.82	0.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tax (Actual)	0.00	0.00	0.00	1.46	2.32	2.72	3.10	3.36	3.56	3.72
Tax Provision	0.64	0.82	0.90	1.46	2.32	2.72	3.10	3.36	3.56	3.72

EXHIBIT 10.6

SENSITIVITY ANALYSIS

Items	Profit after Tax (PAT) Rs. Cr. (assumed at 90 % capacity)	Break Even (%)	Internal Rate of Return (IRR) (%)	Payback Period (Years)
NORMAL VALUES	6.96	52.38	14.61	5.57
Debt Equity Ratios				
(a) 2:1	7.07	53.37	14.71	5.53
(b) 1:1	6.81	50.91	14.46	5.63
Increase in Project Cost by 10 %	7.10	55.15	13.11	6.03
Decrease in Selling Price to Rs. 95 / kg	5.87	58.27	12.33	6.30
Increase in Selling Price to Rs 110 / kg	9.06	43.81	19.25	4.48
Decrease in Raw Material Prices by 10%	7.90	47.20	17.04	4.9

SPUNLACE PROJECT

SECTION I : PRODUCT BRIEF, APPLICATION AREAS AND MARKET POTENTIAL

11.1 The oldest technique for consolidating a web is mechanical bonding, which entangles the fibers to give strength to the web. Under mechanical bonding, the two most widely used methods are needlepunching and spunlacing (hydroentanglement).

11.2 There are many different specific terms for spunlace nonwoven like jet entangled, water entangled, hydroentangled or hydraulically needled. The term, spunlace, is used more popularly in the nonwoven industry. **The spunlace process can be defined as: the spunlace process is a nonwovens manufacturing system that employs jets of water to entangle fibers and thereby provide fabric integrity.**

11.3 **Hydroentanglement** uses high-speed jets of water to strike a web so that the fibers knot about one another. As a result, nonwoven fabrics made by this method have specific properties, as soft handle and drapability.

11.4 Hydroentanglement is considered to be a highly versatile process because it can be used to produce nonwovens with a broad range of end-use properties. These differences are achieved as a result of a wide range of fibers that are available and also because of the wide range of possible parameter adjustments. Spunlace fabrics can be further finished, usually dyed and/or printed, treated with binders to allow for wash durability, or fire retardants can be applied to resist burning. The fabric can be treated by antimicrobial agents to enhance resistance against microorganisms.

11.5 The Spunlaced fabrics offer a wide range of product characteristics such as:

- High density,
- Absorbency,
- Strength Modulus,
- Softness,
- Drapeability,
- Lint free,
- Excellent cover,
- Uniformity,
- Bulky property,
- Printability,
- Durable fabrics

Major Application and End-usages:

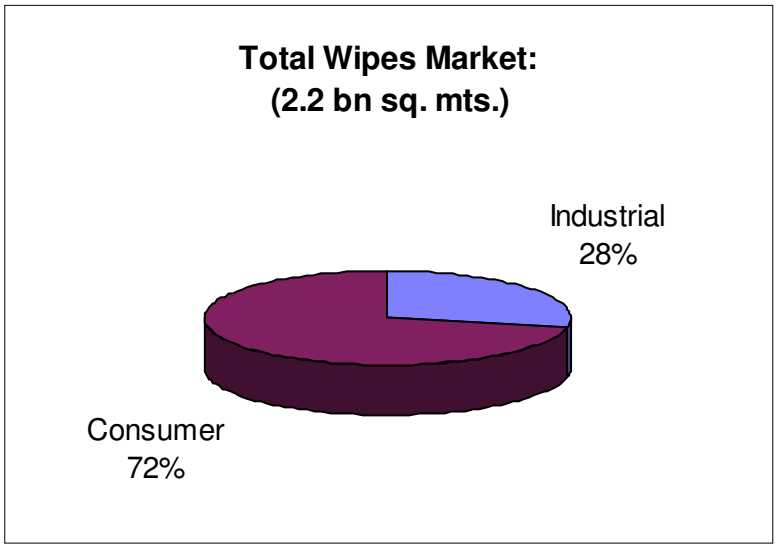
11.6 Spunlaced fabrics have a wide use in various applications due to relatively high absorption abilities and absence of a binder in the fabric allowing sterilization of the fabric at high temperatures. Some of the application areas are:

- Wipes: Baby Wipes, Household Wipes, Industrial Wipes, Consumer premoistened wipes
- Cosmetic Cotton pads,
- Hospital use: surgical gowns, drapes, operation cover sheets

North American Wipes Market Potential :

11.7 Over the five year period from 1997-2002, the North American (US & Canada) wipes industry expanded about 14% per year. This was due to the increasing use of consumer and industrial wipes and introduction of new classifications of products that expanded the market.

11.8 During 2002, the sales of nonwoven wipes to the endusers industry reached $2.8 bn consuming an estimated 2.2 bn sq. mts. of various nonwovens valued at $470 mn.



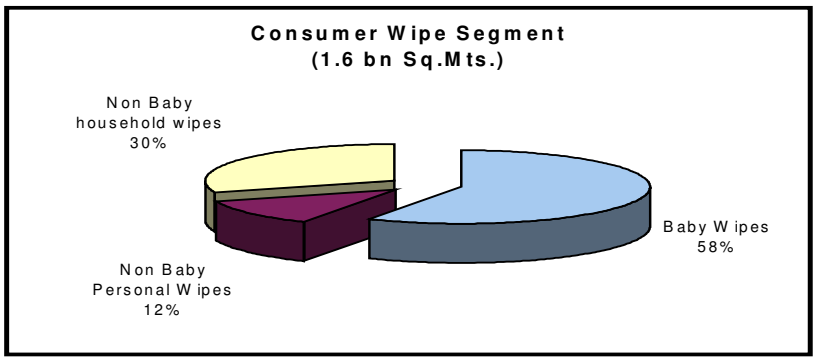
Source: INDA

11.9 The total wipes market as seen above can be classified into:

1. **Consumer Wipes** accounting for 1.6 bn sq. Mts.,
2. **Industrial Wipes** accounting for 0.6 bn sq. mts.,

1. Consumer Wipes

11.10 The consumer wipes market account for 72% or 1.6 bn sq. mts. of the total wipes market in 2002.



Source : INDA

11.11 This segment can be further divided into

I) Baby Wipes

II) Non baby personal wipes

III) Non baby household wipes.

11.12 INDA forecasts that North American consumer wipes sales at retail will rise about 8% p.a. during the 5-year period upto 2007 rising from current $2.2 bn to $ 3.2 bn.

I) BABY WIPES:

11.13 The baby wipes market is estimated at $ 860 mn at retail in North America (2002)

11.14 Baby wipes were meant for cleaning babies face at feeding time and babies' bottoms during diaper change. However the consumers were using it for a multitude of enduses besides these, giving rise to other non baby personal and household products.

II) NON BABY PERSONAL WIPES:

11.15 In North America, retail sales during 2002 for personal wipes were about $ 470 mn.

11.16 The personal wipes are further segmented into:

A) Body Wash/Incontinent Wipes:

11.17 Represents a retail market of $ 180 mn.

11.18 Growth rate :- 30% per annum as new products entered the market.

B) Moist Toilet Tissue:

11.19 Produced from Airlaid Pulp. Participants are Georgia Pacific Quitted Northern Fresh, Kimberly - Clark's Cottonelle Fresh and Proctor & Gamble's Charmin Fresh mates. This segment accounts for less than $ 70 mn.

C) Feminine Care :

11.20 Include intimate care products by Always, Playtex and others. This segment has been growing rapidly and has witnessed rapid proliferation of facial care products.

11.21 Cosmetic/Facial Wipes include Facial cleansing and makeup remove wipes, nail polish removers and hair remover pull strips.

D) Medicinal Wipes:

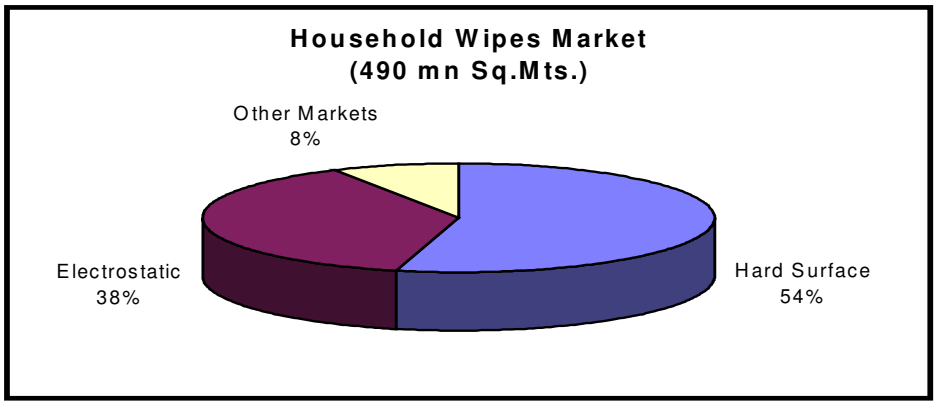
11.22 Retail sales are estimated at less than $ 50 mn per year. Products include Stridex, Oxy, Clearsil and haemorrhoid Wipes.

III) NON BABY HOUSEHOLD WIPES:

11.23 The household wipes segment had retail sales estimated at $ 806 mn in 2002 growing at about 15% per annum.

11.24 This segment includes hard surface wipes, electrostatic wipes, antibacterial and cleansing wipes, floor cleaning products polish cloth and automotive care.

11.25 The household wipes segment can be pictorially represented as under:



Source: INDA

11.26 Hard surface wipes such as Clorox, Mr. Clean and Lysol products account for over half of the total household segment and consumed estimated 270 mn sq.mt. of nonwoven fabric.

11.27 Electrostatic and related wipes (Swiffer, pledge Grab-It) accounted for around 190 mn sq.mt. of the fabric.

11.28 Accounting for the remaining consumption of non woven materials is the kitchen dry wipes, mop heads, silver cleanes, furniture polishing wipes, computer wipes, glass wipes, various auto interior wipes and stain remover wipes.

Wipes Market Trends in the World

11.29 Mature boomers and grandparents have the disposable income to splurge on these value added products.

11.30 Baby wipe material is hydroentangled to give just enough strength for conversion allowing the maximum softness to be obtained. The fibre blend varies from 50/50 to 70/30 viscose/polyester depending on price, and polypropylene can be used to economise on polyester without sacrificing softness. However PP tends to be harder to hydroentangle.

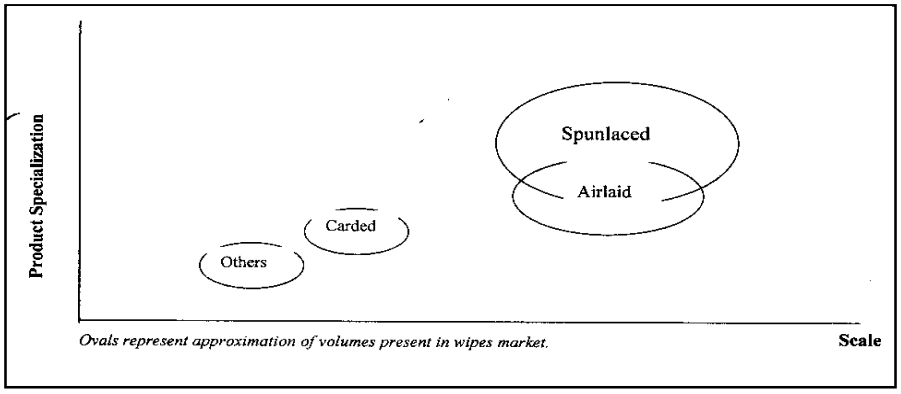
11.31 In case of General Purpose Wipes, the fabric is stronger, heavier and more abrasion resistant than the baby wipe material, and is usually apertured to create dirt-holding voids. These fabrics tend to be more costly to make than baby-wipes, and yet have a lower retail value.

11.32 Wipes prices in Europe have fallen in the last two years and the market is now very competitive with low cost imports being available from Turkey, Israel and China.

11.33 Established consumer companies are employing nonwoven wipes as brand extensions.

11.34 Viscose/Polyester hydroentangled wet-wiping cloths have been a major growth area for viscose in Europe over the last 5 years.

11.35 The Nonwoven Technology Competition in the Global Wipes market is shown below:



Indian Wipes Market Potential:

11.36 Based on the preliminary field investigations, the total market size for wipes is around **Rs 450 crores** comprising domestic, medical, cosmetic and baby wipes.

11.37 Presently wipes are used on very restrictive basis and availability is confined to large retail outlets and department stores in metros and major city centres. With greater awareness and promotion, consumer preference will gradually increase over the years in all application areas.

11.38 Based on the deliberations and discussions with Indian market players, the market size for spunlace based wipes is around **Rs 25 crores** in 2003-04 expected to reach **Rs 110 crore** by 2007-08.

11.39 It should be noted that Industrial Wipes are manufactured by Needle Punch or Chemical Bonding Technology; hence not considered under this project.

11.40 Also, the assumed price of Spunlace Fabric around Rs 165 per kg and through conversion a value addition of around 40 - 50% for the final end products.

11.41 Some of the brands available in the Indian market are as shown :

Brand	Purpose	Pack	Price	Size (cm^2)
Magic cleen	Multi-purpose	One	55	25 x 29
Supreme	Multi-purpose	One	20	33 x 36
Easy wipe	Multi- purpose	One	10	20 x 20
Simoniz	Multi- purpose	One	18	31 x 45
Supreme handy mop	Multi- purpose	One	25	19 x 17
Super wipe	Multi- purpose	Two	20	17 x 20
Magic touch	Kitchen wipe	Two	11	30 x 30
Magic touch	Crockery wipe	One	11	17 x 20
	Facial wipes			
Fresh Ones	Wet Wipes	100	150	1.4 x 2.2
		50	99	1.4 x 2.2
Fresh Ones-Car pack		50	99	1.4 x 2.2
Fresh Ones-Car pack		75	125	1.4 x 2.2
Fresh Ones-Car pack		30	75	1.4 x 2.2
Convenience Pack		15	35	1.4 x 2.2
Pouch Pack		10	25	1.4 x 2.2
Koolers		25	75	1.65 x 2.0
Clarus		8	15	15.0 x 25.0
Clarus		30	50	15.0 x 20.0

Brand	Purpose	Pack	Price	Size (cm^2)
Fresh Ones-	Baby Wipes	15	35	2.20 x 1.40
Baby fun		50	99	2.20 x 1.40
		100	150	2.20 x 1.40
Clarus		12 (small)	25	15.0 x 20.0
Fresh ones Premium		25 (XL)	125	2.0 x 2.0
Sctoch Brite	Kitchen Wipes	1	35	17.5 x 20.0
Oil filter		1	25	23.0 x 23.0
Mop		1	20	30.5 x 30.5
Kitchen Wipe		1	30	30.5 x 38.0
Kitchen Wipe		1	50	46.0 x 53.0

11.42 Our survey has revealed that some of the companies who may consider entering the wipes market are :

- Hindustan Lever Ltd. (marketing and distribution),
- Supreme Nonwovens,
- Safetec Disposables,
- Healthcare Disposables Ltd.
- Rajasthan based private company, etc.

Medical Applications:

11.43 Apart from wipes, spunlace nonwoven fabric has the potential in the **medical field of guazes**, for which the current total market is estimated at around Rs 145.61 crores and assuming the penetration level of 5%, the market size in the year 2003-04 would be around **Rs 7.28 crores.** (Details are presented in the Phase I Market Survey Report on Surgical Dressings).

11.44 There are multinational and large Indian companies like J&J, Elder, Smith and Nephew, Bierersdorf, 3M India, etc. and a large number of small and medium size companies.

11.45 Our discussions with the knowledgeables in the industry reveal that in view of the increasing health awareness, the total market for **medical field of guazes** will increase to Rs. 158 crores out of which market potential for spunlace based guazes will be 25% i.e. Rs. 39.5 crores (approx. **Rs 40 crores**) by 2007-08.

11.46 These market estimates have also accounted the time period required for setting up the spunlace unit, marketing & promotional efforts, etc. in creating the market for spunlace guazes replacing the traditional woven guazes

11.47 The current practice in India for manufacturing **Healthcare Disposables** like Caps, Masks, Gowns, Drapes, Beddings, is through the use of **Spunbond fabric**. With regard to the choice between spunlace and spunbond fabric, the trend in India for caps and masks which are mass production items would be for spunbond whereas for drapes and gowns would be either spunlace or spunbond.

11.48 Another important factor is the **price differential** between the spunbond and spunlace fabric [Spunbond Price: $2/kg; Spunlace Price: $3/kg - International prices]. The landed cost of spunbond is around Rs 100 - 125 per kg and spunlace is around Rs.150 - 175 per kg.

11.49 The current and future market potential for the healthcare disposable products is as shown below:

	Reusable / Washable Textiles			**Demand for Nonwovens (Spunlace Fabric)**		
	2001-02	**2003 - 04**	**2007 - 08**	**2001-02**	**2003-04**	**2007 - 08**
Beddings	Rs. 0.73 cr. (62.02)	Rs. 4.74 cr. (403.02)	Rs. 32.05 cr. (2722.74)	- -	- -	Rs. 4.49 cr. (272.27 T)
Clothings	Rs. 2.00 cr. (177.38)	Rs. 5.20 cr. (461.06)	Rs. 21.95 cr. (1946.76)	- -	- -	Rs. 6.42 cr. (389.35T)
Covers	Rs. 0.47 cr. (40.26)	Rs. 1.21 cr. (104.64)	Rs. 6.12 cr. (530.21)	- -	- -	Rs. 0.87 cr. (53.02T)
Total	**Rs. 3.20 cr. (279.66)**	**Rs. 11.15 cr. (968.72)**	**Rs. 60.12 cr. (5199.71)**	**- -**	**- -**	**Rs. 11.78 cr. (714.64 T)**

Fig. in brackets denote values in tonnes.

11.50 Thus the market potential for spunlace fabric from the healthcare sector is shown in the table and the actual realisation would depend on the combined efforts of the concerned ministry, existing fabric manufacturers and the user sector (hospitals, nursing homes, etc.).

11.51 Thus the total market for Spunlace Fabric from the above sectors would be as follows:

Item	Market Size (Rs. Cr.)	Market Size (Rs. Cr.)	Market Size (Rs. Cr.)
	2001-02 (Estimated)	**2003-04 (Estimated)**	**2007-08 (Projected)**
Wipes	-	25.00	110.00
Guazes	2.52	7.28	40.00
Healthcare Applications	-	-	11.78
Total Spunlace Market	**2.52**	**32.28**	**242.69***

***The total includes the exports of 50% on total Domestic market of Rs. 161.78 Cr. i.e. Rs. 80.91 Cr.**

Other Technologies Available For Producing The Following Products:

Products	Other Technologies
Healthcare Applications	Spunbond

SECTION III : SPUNLACE TECHNOLOGY AND EQUIPMENTS SUPPLIERS

Process Description:

11.52 Spunlacing is a process of entangling a web of loose fibers on a porous belt or moving perforated or patterned screen to form a sheet structure by subjecting the fibers to multiple rows of fine high-pressure jets of water. Various steps are of importance in the hydroentangling process. The steps characteristic for producing hydroentangled nonwoven fabric include:

Precursor web formation

1. The formed web (usually air-laid or wet-laid) is first compacted and prewetted to eliminate air pockets and then water-needled. The water pressure generally increases from the first to the last injectors. Pressures as high as 2200 psi are used to direct the water jets onto the web. This pressure is sufficient for most nonwoven fibers, although higher pressures are used in specialized applications.

2. The impinging of the water jets on the web causes the entanglement of fibers. The jets exhaust most of the kinetic energy primarily in rearranging fibers within the web and, secondly, in rebounding against the substrates, dissipating energy to the fibers. A vacuum within the roll removes used water from the product, preventing flooding of the product and reduction in the effectiveness of the jets to move the fibers and cause entanglement.

3. Usually, hydroentanglement is applied on both sides in a step-wise manner. The first entanglement roll acts on the first side a number of times in order to impart to the web the desired amount of bonding and strength. The web then passes over a second entanglement roll in a reverse direction in order to treat and, thereby, consolidate the other side of the fabric. The hydroentangled product is then passed through a dewatering device where excess water is removed and the fabric is dried.

Process Systems and Equipments

The main process equipment of the spunlace line are listed below:

1. Blow Room :

- Bale Openers : 1.600 mm width,
- Blending Conveyor,
- Fibre Lubricating System,
- Recycling of Fibres from the carding machines,
- Horizontal Opener,
- Blowers,
- Super mix blenders,
- Fine openers,
- Air / Fiber Seperators with static Filters,
- Electronic metal detector, etc.

2. Injection Cards :

- Volumetric Control Chute Feeds: Working Width-3700 mm,
- System for Dust Suction,
- Weighing Bridges,
- Injection Cards : 3700 mm width,
- Card Suction system,
- System for webs suction,
- Lateral Foot Boards, etc.

3. Spunlace (Hydroentanglement) Line,

Three entanglement cylinders with five injectors, dewatering conveyors and complete filtration system for fibres including all aperturing capabilities.

- Water jets working width : 2500 mm,
- Production Rating Max : 800 kgs / hr,
- Web : 30 to 100 gsm,
- Fibres denier : 1 to 3,

- Fibber type : Polyester, Polypropylene, viscose and Blends

4. Dryer

- Design basis weight of product : 30 to 220 gsm,
- Maximum water content at the entrance of the dryer : 1.3 kg H2O per kg dry fibre,
- Maximum working width : 3500 mm,
- Speed (m / min) : 60 gsm designed product at 190 m / min
- Rolls dimensions : 2.8 mt. (dia),
- Hood, Airheater, Main Fans, etc.

5. Automatic Winder and Inline Slitting machine:

- Winder : Web Width - 3500 mm,
- Inline Slitting system : Slitting Width : 100 mm
- Winder Equipment with its accessory, driving system control desk, foundation plates, etc.

Materials used in the spunlace technology

11.53 Hydroentanglement could be carried out using dry-laid (carded or air-laid) or wet-laid webs as a precursor. Most commonly, precursors are mixtures of cellulose and man-made fibers (PET, PP, nylon, acrylics, Kevlar P84, (imide) etc.).

11.54 In general, cellulosic fibers are preferred for their high strength, pliability, plastic deformation resistance and water insolubility. Cellulosic fibers are hydrophilic, chemically stable and relatively colorless. Another advantage is that cellulose has an inherent bonding ability caused by a high content of hydroxyl groups, which attract water molecules. As the water evaporates from the fabric, the hydroxyl groups on fiber surface link together by hydrogen bonds.

11.55 Also, greige cotton has been used in spunlacing technology. It has been shown that the absorbency rate increases with increasing hydroentangling energy. This is the result of oil and wax removal from the fiber surface. These nonwovens can be subsequently bleached, which should raise the strength of the fabric

Machinery Suppliers

11.56 Globally, the three well known technology suppliers with proven track record contacted by TECS are:

1. Rieter Perfojet (France),

Local Representative:

Rieter India Pvt. Ltd.,
1005-1008, Hemkunt Tower,
98, Nehru Place,
New Delhi - 110 019.
Tel.: (022) 2628 3896 / 2644 8501 / 02 / 03
Fax: (022) 2644 8505

2. Fleissner GmbH & Co. (Germany),

Local Representative:

A.T.E. Marketing Pvt. Ltd.,
A-19, CTS No. 689, Veera Desai Road,
Andheri (W), Mumbai - 400 053
Tel: (022)-5676 6139 / 5676 6100
Fax: (022)-2673 2446

3. Taiwan Spunlace

11.57 TECS has received responses from two of the global players and preliminary discussions were held with their local representatives in India.

Recommended Minimum Economic Size:

11.58 The spunlace project proposed to be set up in India will have a designed capacity of 800 kgs per hour

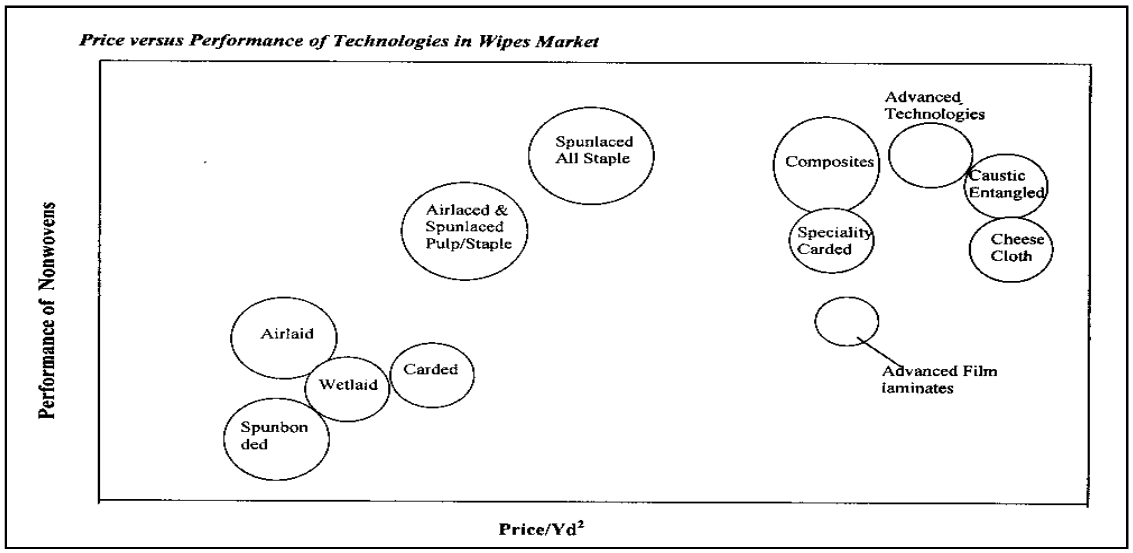
11.59 Under Indian operating conditions it is safer to assume machine efficiency factor of 90%, and therefore the production would be 720 kgs per hour. The plant would operate in three shifts, 24 hours and 300 working days in a year.

Investment in Process Plant and Machinery:

11.60 The comparisons of the various technologies used in manufacturing the wipes in the global market are as shown below:

11.61 The list of major equipments for the spunlace project is given above and as per the indicative budgetary quotations, **the investment in the process plant and machinery will be Rs 24.30 crores** (FOB). Finer details on the Equipment listing, specification and the quotations need to be discussed with the technology supplier before the project is taken up. Taking into account the CIF value, the custom duties (5%), inland

transportation, erection and commissioning, **the installed cost of process equipment would be Rs 28 crores.**



Note: The list contains the leading global players in Spunlace Technology and based on discussion with Industry experts the above list is exhaustive.

SECTION III : PROJECT COST AND PROFITABILITY PROJECTIONS

Land

11.62 The total requirement of land for this project keeping in mind the possible future expansion is around 6069 Sq. Mtrs. (1.5 acres).

11.63 Based on the available information, the cost of land is assumed at Rs 1200 per square meter (including the developmental cost). Depending on the exact location of the project to be determined by the promoter, the land cost could be higher or lower. Hence the total cost of developed land will be **Rs 0.73 crore** (Rs 73 lakhs).

Buildings

11.64 The building area comprising of main factory building, godowns, office, R & D labs/In-house Testing centre etc. would be 4000 sq. mtrs. The cost of construction would again vary depending on the structure and the materials to be used. It has been assumed that the average cost of construction would be Rs 4500 per sq. mt. Thus the total cost of building and other civil works would be around **Rs 1.80 crores.**

Plant and Machinery

11.65 Details of Plant and machinery as well as technology required for the project have been presented in earlier Section II . The installed cost of plant and machinery would be **Rs 28 crores.** Apart from the main process equipments, the other equipments required are:

- Electricals,
- Piping,
- Water supply,
- Compressors,
- Fire fighting equipments etc.

11.66 The provision on this count is taken as 3% of the cost of machinery which works out to **Rs 0.84 crores**.

Captive Power Plant

11.67 The cost for this unit is **Rs 5.25 crores**.

Miscellaneous Fixed Assets

11.68 Under this head the items included are Furniture and fixtures, Office equipments, Air Conditioners etc. and the provision made is around **Rs 0.30 crore** (Rs 30 lakhs) .

Testing Equipments

11.69 The testing equipments required for a Spunlace Unit are:

- Laboratory Equipment, Dynamometer, Oven Dryer, Balance etc.,
- In-line monitoring equipment - GSM, humidity etc.,
- Metal Parts detection,
- Air Handling, Humidification system,
- Automatic Packing System.

11.70 A provision of **Rs 3.12 crores** has been made on this account.

Project Engineering and Consulting

11.71 Under this head the items included are the fees and expenses on account of Architect fees, project engineering and management (both local and overseas), detailed project reports etc.

Preliminary & Preoperative Expenses

11.72 The items included under this head are company formation expenses, public issue expenses (if any), interest during construction, pre production expenses during the implementation phase etc.

Contingency Expenses

11.73 Depending on the gestation period and further detailing of the project cost by the promoter, the contingency provision has been made at the rate of 10%.

Margin Money for Working capital

11.74 The margin money for working capital forming part of the total project cost would be **Rs 3.40 crores. [Exhibit 11.3]**

Total Project Cost (Total Investment)

11.75 The total project cost as shown in **Exhibit 11.1** would be **Rs 52.43 crores.**

Project Funding and Financing Pattern :

11.76 It has been assumed that the project would be financed through long term funds and Equity participation by the Promoter / Public. The technical textile sector being a high priority area , it is assumed that a Debt- Equity ratio of 1.5 : 1 would be feasible. (However the sensitivity analysis has also been presented for 1 : 1 and 2 : 1 Debt Equity ratios.)

Sales, Profitability and Sensitivity Analysis :

Sales Realisation and Turnover

11.77 As per the details available from the Technology and Equipment suppliers the economic size of a plant is 800 kgs per hour.

11.78 Under the Indian conditions, it is assumed that the machine would operate at an efficiency level of 90%. Hence the production from the plant would be 720 kgs per hour.

11.79 The plant would operate on Three-shift basis and 300 workings days in a year.

11.80 The capacity utilisation for the 1st year is assumed at 75% and thereafter for the 2nd and the 3rd year onwards 85% and 90% respectively.

11.81 The average selling price of the end product would be Rs 165 per kg (net of excise duties, sales tax and other incidental expenses) The **international price** of the spunlace fabric is **$3-$3.5 / kg**.

11.82 The details of projected sales turnover as projected are given in **Exhibit 11.2.**

Cost of Production

Major Raw materials and their specifications:

11.83 The main raw materials used and the corresponding prevailing prices as an indicator are as follows:

Raw Material	Landed cost (inclusive of all duties)
Polyester Staple Fiber (PSF)	Rs. 65 / kg
Viscose	Rs. 75 / kg

11.84 The two raw materials are taken in the ratio 1:1 and are used in the denier of 1.4 and 1.6. The major **suppliers of these raw materials are :**

(a) Reliance Industries Ltd.,
(b) Grasim Industries Ltd.

11.85 The requirement of these raw materials would be 5391.36 tonnes costing **Rs 37.74 crores** after accounting for a process waste of 4%.

Power Cost

11.86 The connected load is 1076 kW. The power cost is Rs 2.51 crores

Manpower, Salaries and Wages

11.87 The manpower requirements and the salary structure is given in **Exhibit 11.4**.

11.88 The total manpower requirement comprising the managerial cadre of supervisors, machine operators and helpers would be 62 persons.

Factory and Overhead Expenses

11.89 The items covered under this head are establishment expenses, repairs and maintenance, stationery, travel expenses, packaging expenses etc.

Marketing and Promotional Expenses

11.90 The promotion of technical textiles will call for expenditure on this count and a provision of 5% of the annual sales has been made uniformly over the years.

Interest and Depreciation

11.91 The prevailing interest rate for long term and short term borrowed funds is assumed at 5% and 11% per annum respectively. (Project covered under Technology Upgradation Fund)

11.92 The repayment of loans has been assumed for 10 years with a moratorium period of two years (2+8).

11.93 The depreciation rates have been worked out as per Company's act (SLM) and Income-Tax Ready Reckoner (WDV).

11.94 The current corporate tax rate is assumed at 35% and the surcharge is assumed at 2.5% per annum.

Profitability, Break-even, IRR and Payback

11.95 As presented in **Exhibit 11.5**, the sales turnover increases from Rs 62.87 crore in the first year to Rs 75.44 crore from the 3rd year onwards

11.96 The PBT increases from Rs 21.99 crore in the first year to Rs 27.19 crore in the tenth year.

11.97 The **Break Even** of the project is at **28.06%.**

11.98 The **Internal Rate of Return** (IRR) has been worked out at **41.03%.**

11.99 The **Payback period** for the project is **2.39 years.**

Sensitivity Analysis

11.100 The sensitivity analysis has been presented in the **Exhibit 11.6.**

DEVELOPMENTAL AND PROMOTIONAL MEASURES.

11.101 This project is a state-of-the-art high tech and capital intensive project with a total investment of Rs.50 crores.

11.102 The Indian market is not yet ready for the wipes, as the current consumption is

very negligible due to the availability of cheaper substitutes such as mops manufactured from natural fibre waste.

11.103 However at the initial stages the product promotion has to be through chain of converting line using imported spunlace fabric and once, the market expands, then the mother unit could be set up.

11.104 The **Indian Pharmacopoeia (IP)** needs to be upgraded to take cognisance of the latest developments in the wipes and hygiene market and the guazes and wipes should be incorporated in the IP.

11.105 A legislation for hygiene products should be introduced for preventing the use of raw cotton and the unhygienic manufacturing process adopted for manufacturing guazes and other medical products in the decentralised sector.

11.106 Converting lines for hygienic, baby, adult, household, toilet, bathroom and floor wipes would require an investment of around S$600,00 (Entry level machine) or US$798,000 for the higher level machine. The machine gives an output of 75 packs per minute. These wipes so manufactured would require a value addition of around 40% in selling price of the spunlace fabric.

Exhibit 11.1		
	PROJECT COST	
(LAND, BUILDINGS, PROCESS PLANT & MACHINERY, UTILITIES & OTHER ASSETS		
		Project Cost (Rs. Cr.
1	**Land**	**0.73**
	Area: 1.5 acres (6069 Sq Mtrs)	
	Rate: (Rs.1200 /Sq. Mtr)	
2	**Buildings**	**1.80**
	Plant Area, Office, Godown, Lab, Service Area etc.)	
	Built-up Area : 4000 Sq. Mtrs	
	Avg Rate : Rs. 4500 /Sq. Mtrs	
3	**Process Plant & Equipment**	**28.00**
4	**Utility & Other equipments (3%)**	**0.84**
5	**Captive Power Plant**	**5.25**
5	**Misc. Fixed Assets**	**0.30**
	(Furniture & Fixtures, Office Equipment, Testing Lab etc.)	
6	**Testing Lab Equipments**	**3.12**
	(Furnished in Section III)	
7	**Project Engineering & Consultancy charges (2.5%)**	**0.76**
8	**Preliminary & Pre-operative Expenses (12%)**	**3.76**
	(Company Formation, Interest during construction,	
	pre-production expenses, etc.)	
9	**Contingency (10 %)**	**4.46**
10	**Total**	**49.03**
11	**Margin Money for Working Capital**	**3.40**
12	**Total Project Cost**	**52.43**

Exhibit 11.2										
ESTIMATION OF SALES REVENUE										
										(Rs. Cr.)
ITEM	YEAR OF OPERATION									
	I	II	III	IV	V	VI	VII	VIII	IX	X
Average Production per hour (kg)	800	800	800	800	800	800	800	800	800	800
90% efficiency	720	720	720	720	720	720	720	720	720	720
Capacity Utilisation	75%	85%	90%	90%	90%	90%	90%	90%	90%	90%
Actual Production per hour	540	612	648	648	648	648	648	648	648	648
Production per day (kg)	12960	14688	15552	15552	15552	15552	15552	15552	15552	15552
Production for 300 working days	3888000	4406400	4665600	4665600	4665600	4665600	4665600	4665600	4665600	4665600
(In tonnes)	3888.00	4406.40	4665.60	4665.60	4665.60	4665.60	4665.60	4665.60	4665.60	4665.60
Selling Price (Rs/Kg)	165.00	165.00	165.00	165.00	165.00	165.00	165.00	165.00	165.00	165.00
Sales Revenue (Rs. Cr)	**64.15**	**72.71**	**76.98**	**76.98**	**76.98**	**76.98**	**76.98**	**76.98**	**76.98**	**76.98**
Value Loss (2%)	1.28	1.45	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54
Net Sales Revenue (Rs. Cr)	**62.87**	**71.25**	**75.44**	**75.44**	**75.44**	**75.44**	**75.44**	**75.44**	**75.44**	**75.44**

EXHIBIT 11.3

REQUIREMENT OF WORKING CAPITAL

(Rs.Lakhs)

ITEM	NO. OF	MARGIN	YEAR I			YEAR II			YEAR III			YEAR IV			YEAR V		
	MONTHS	(%)	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK
			REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE
Factory Related																	
Raw materials & other com	2.00	25.00	4.72	1.18	3.54	5.35	1.34	4.01	5.66	1.42	4.25	5.66	1.42	4.25	5.66	1.42	4.25
Goods in process	0.25	25.00	0.67	0.17	0.51	0.77	0.19	0.58	0.81	0.20	0.61	0.82	0.20	0.61	0.82	0.20	0.61
Finished Goods	1.00	25.00	2.96	0.74	2.22	3.38	0.85	2.54	3.57	0.89	2.68	3.58	0.89	2.68	3.58	0.89	2.68
A/c Receivable	1.00	25.00	5.24	1.31	3.93	5.94	1.48	4.45	6.29	1.57	4.72	6.29	1.57	4.72	6.29	1.57	4.72
Cash in hand																	
Salaries & wages	1.00	0.00	0.07	0.00	0.07	0.07	0.00	0.07	0.07	0.00	0.07	0.08	0.00	0.08	0.08	0.00	0.08
Utilities	1.00	0.00	0.10	0.00	0.10	0.18	0.00	0.18	0.19	0.00	0.19	0.19	0.00	0.19	0.19	0.00	0.19
Marketing & Promotional E	1.00	0.00	0.26	0.00	0.26	0.30	0.00	0.30	0.31	0.00	0.31	0.31	0.00	0.31	0.31	0.00	0.31
Admin. Overheads	1.00	0.00	0.11	0.00	0.11	0.11	0.00	0.11	0.11	0.00	0.11	0.11	0.00	0.11	0.11	0.00	0.11
Total Requirement			**14.08**	**3.40**	**10.68**	**16.04**	**3.86**	**12.18**	**16.97**	**4.08**	**12.89**	**16.98**	**4.08**	**12.89**	**16.99**	**4.09**	**12.90**

EXHIBIT 11.3 (CONTD...)

REQUIREMENT OF WORKING CAPITAL

(Rs.Lakhs)

ITEM	NO. OF	MARGIN		YEAR VI			YEAR VII			YEAR VIII			YEAR IX			YEAR X	
	MONTHS	(%)	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK
			REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE
Factory Related																	
Raw materials & other	2.00	25.00	5.66	1.42	4.25	5.66	1.42	4.25	5.66	1.42	4.25	5.66	1.42	4.25	5.66	1.42	4.25
Goods in Process	0.50	25.00	1.64	0.41	1.23	1.64	0.41	1.23	1.64	0.41	1.23	1.65	0.41	1.24	1.65	0.41	1.24
Finished Goods Stock	1.00	25.00	3.59	0.90	2.69	3.59	0.90	2.69	3.60	0.90	2.70	3.61	0.90	2.71	3.62	0.90	2.71
A/c Receivable	1.00	25.00	6.29	1.57	4.72	6.29	1.57	4.72	6.29	1.57	4.72	6.29	1.57	4.72	6.29	1.57	4.72
Cash in hand																	
Salaries & wages	1.00	0.00	0.09	0.00	0.09	0.09	0.00	0.09	0.10	0.00	0.10	0.11	0.00	0.11	0.12	0.00	0.12
Utilities	1.00	0.00	0.11	0.00	0.11	0.11	0.00	0.11	0.11	0.00	0.11	0.11	0.00	0.11	0.11	0.00	0.11
Marketing & Promotion	1.00	0.00	0.06	0.00	0.06	0.06	0.00	0.06	0.06	0.00	0.06	0.06	0.00	0.06	0.06	0.00	0.06
Admin. Overheads	1.00	0.00	0.31	0.00	0.31	0.31	0.00	0.31	0.31	0.00	0.31	0.31	0.00	0.31	0.31	0.00	0.31
Total Requirement			**17.93**	**4.29**	**13.63**	**17.94**	**4.30**	**13.65**	**17.96**	**4.30**	**13.66**	**17.98**	**4.30**	**13.68**	**18.00**	**4.30**	**13.70**

Exhibit 11.4

MANPOWER REQUIREMENTS

	Nos	Monthly	Total Mon.	Annual
General Manager	1	30000	30000	360000
Production Manager	1	20000	20000	240000
Machine Operators	12	6000	72000	864000
Machine Helper (Semi Skilled)	9	3000	27000	324000
Material Handling	3	6000	18000	216000
R&D, Testing	6	10000	60000	720000
Marketing & Sales				
Marketing Head	1	25000	25000	300000
Sales Team	5	12000	60000	720000
Clerical Staff	10	6000	60000	720000
Other Staff (Peon, Security)	5	3000	15000	180000
Maintenance Department	9	10000	90000	1080000
TOTAL	**62**		**477000**	**5724000**
Fringe Benefits (40 % of the above)				2289600
	Total Wage Bill (Annual) Rs. lakhs:		Salary + Other Benefits =	**8013600.00**
	Total Wage Bill (Annual) Rs. Cr.:			**0.80136**

Exhibit 11.5

PROFITABILITY STATEMENT AND COMPUTATION OF TAX

(Rs.Cr)

ACCOUNT HEAD	FINANCIAL YEAR OF OPERATION									
	I	II	III	IV	V	VI	VII	VIII	IX	X
Revenue										
Net Sales Turnover	62.87	71.25	75.44	75.44	75.44	75.44	75.44	75.44	75.44	75.44
Total Revenue	62.87	71.25	75.44	75.44	75.44	75.44	75.44	75.44	75.44	75.44
Expenses										
Raw Materials	28.30	32.08	33.97	33.97	33.97	33.97	33.97	33.97	33.97	33.97
Salaries & wages	0.80	0.84	0.88	0.93	0.97	1.05	1.14	1.23	1.33	1.43
Conversion Costs (Power, Fuel, Stores & (	1.26	2.13	2.26	2.26	2.26	2.26	2.26	2.26	2.26	2.26
Marketing & Promotional Expenses	3.14	3.56	3.77	3.77	3.77	3.77	3.77	3.77	3.77	3.77
Factory & Office Overheads	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28
Interest on S.T. Loans	1.18	1.34	1.42	1.42	1.42	1.50	1.50	1.50	1.50	1.51
Cost of Sales	36.66	41.94	44.28	44.33	44.37	44.53	44.62	44.71	44.81	44.92
Depreciation (St.Line)	2.52	2.52	2.52	2.52	2.52	2.52	2.52	2.52	2.52	2.52
Amort. of Expenses	0.13	0.13	0.13	0.13	0.13	0.13	0.00	0.00	0.00	0.00
Interest on L.T Loan	1.57	1.57	1.47	1.28	1.08	0.88	0.69	0.49	0.29	0.10
Profit Before Tax	21.99	25.09	27.04	27.19	27.34	27.38	27.62	27.72	27.82	27.91
Tax	4.80	6.73	8.05	8.58	8.99	9.27	9.56	9.75	9.90	10.02
Profit After Tax	17.19	18.36	19.00	18.62	18.35	18.11	18.06	17.97	17.92	17.89
Dividend	0.00	0.00	1.05	1.05	1.05	2.10	2.10	2.10	2.10	2.10
Profits For Appropriation	17.19	18.36	17.95	17.57	17.31	16.01	15.96	15.87	15.82	15.79
COMPUTATION OF TAX										
Profit after interest before depreciation	24.51	27.61	29.56	29.71	29.86	29.90	30.14	30.24	30.34	30.43
Depr.(WDV) to be claimed	10.78	8.38	6.57	5.21	4.18	3.41	2.82	2.38	2.04	1.79
Depreciation claimed	10.78	8.38	6.57	5.21	4.18	3.41	2.82	2.38	2.04	1.79
Depr. carried forward	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Taxable Profit	13.72	19.23	22.99	24.50	25.68	26.49	27.32	27.86	28.29	28.64
Profit Before Tax (Book)	21.99	25.09	27.04	27.19	27.34	27.38	27.62	27.72	27.82	27.91
Minimum Alternate Tax	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tax (Actual)	4.80	6.73	8.05	8.58	8.99	9.27	9.56	9.75	9.90	10.02
Tax Provision	4.80	6.73	8.05	8.58	8.99	9.27	9.56	9.75	9.90	10.02

EXHIBIT 11.6

SENSITIVITY ANALYSIS

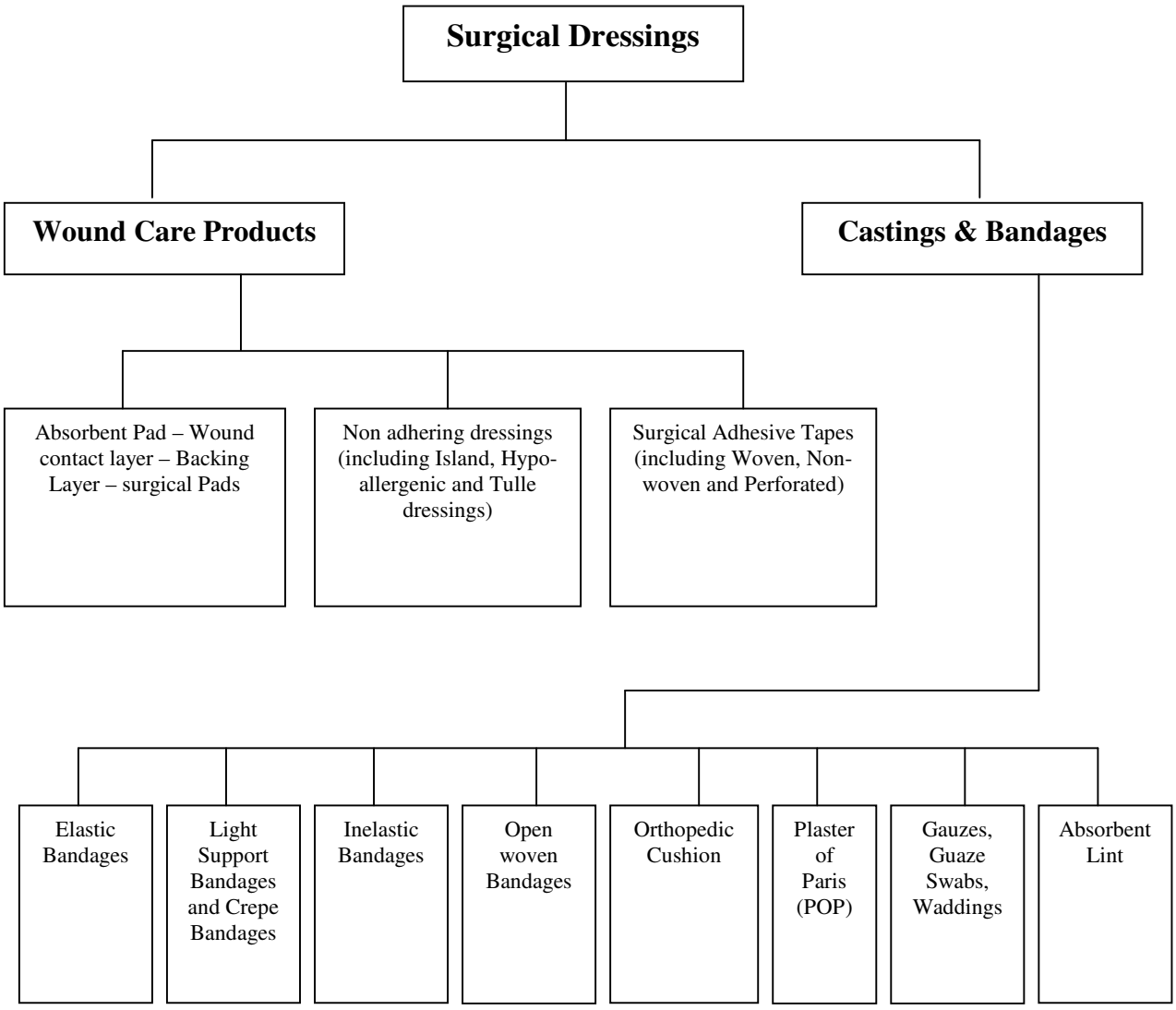
Items	Profit after Tax (PAT) Rs. Cr. (assumed at 90 % capacity)	Break Even (%)	Internal Rate of Return (IRR) (%)	Payback Period (Years)
NORMAL VALUES	18.62	28.06	41.03	2.39
Debt Equity Ratios				
(a) 2:1	18.52	28.43	41.44	2.39
(b) 1:1	18.76	27.50	40.88	2.40
Increase in Project Cost by 10 %	15.71	32.11	33.18	2.87
Decrease in Selling Price to Rs 155	15.87	30.96	35.97	2.68
Increase in Selling Price to Rs 175	18.62	28.06	41.03	2.39
Decrease in Raw Material Prices by 10%	18.13	28.02	40.38	2.43

SURGICAL DRESSINGS COMPLEX

SECTION I : PRODUCT BRIEF, APPLICATION AREAS AND MARKET POTENTIAL

12.1 Wound healing is a dynamic process & the requirements of the dressing change as the wound healing progresses. For effective wound management, extensive knowledge of tissue repair and that of the dressing properties is necessary, **as no single dressing is universally available for all types of wounds.**

12.2 Broadly items included are as follows:



12.3 The surgical dressings are required to have the following characteristics :

- Ease of application, Good padding characteristics,
- Non-sticking nature to the wound and painless on removal,
- Creation of an optimal environment for wound healing,
- Require fewer dressing changes, thereby reduce the nursing time,
- Softness, Pliability,
- Highly absorbent,
- Easily cleanable, etc.

I. Wound Care Products : Product Composition

A. Wound Contact Layer-Absorbent pad-Backing Layer

12.4 **Traditional wound dressings** have been made from **cellulosic fibres** such as cotton and viscose rayon, in the form of a woven or non-woven pad or guaze. Modern wound dressings are composed of absorbent layers held between a wound contact layer and a backing layer. Alternatively, dressings are also available with just the two layers; wound contact layer and the backing layer.

12.5 The **wound contact layer (primary dressing)** is generally placed **directly over the wound.** It is low adherent and can easily be removed without disturbing new tissue growth. The wound contact layer is perforated made of **Silk, Polyamide, Viscose, Polyethylene of Knitted, woven, non-woven material.**

12.6 The **absorbent layer (pad)** is a **nonwoven material** made of bleached **Cotton, Viscose and other synthetic materials**. Viscose helps to absorb the fluids while synthetic helps to maintain the thickness of the pad even after absorbing the fluids. Absorbent pads are also available as individual single use items, which are **cotton pads covered with a guaze cloth.**

12.7 The **backing layer** is a non-woven of cellulosic material or plastic film.

12.8 Thus the **complete dressing** has a wound contact layer placed over the wound and covered with an absorbent pad, and the whole dressing retained with a backing layer. The function of the **wound contact layer is to pass the pus** or the other exudates from the wound to the backing layer, which then absorbs it, and to allow the **medication to reach the wound** from the backing layer.

B. Non-adherent Dressings (including Island, Hypo-allergenic, Tulle dressings):

12.9 **Non-adherent Dressings (Tulle Gras)** are applied to avoid adhesion when dealing with large area wounds such as burns and skin grafts. They are **paraffin gauze dressings** having a soft paraffin base and gels for keeping the wound moist and at the same time absorbing the exudate. These dressings are also **medicated with an antibiotic or any topical antiseptic. For use in tropical countries, suitable mixture of hard paraffin and soft paraffin is used.** Fabrics made from continuous filaments yarns, viscose, rayon are used. Knitted fabrics are very satisfactory. The open structure of fabric is important with a leno weave imparting stability to the dressing.

C. Surgical Adhesive Tapes (including Woven, Non-woven and Perforated):

12.10 Surgical adhesive tapes are manufactured both from woven and non-woven fabrics. The future trend is likely to for the use of non-woven fabric only. Nonwoven Tapes consist of backing material of nonwoven synthetic fibres, laid in a net or randomly and bonded in or on evenly spread non-occlusive acrylic adhesive mass. They are permeable to air and water vapour, and this results in the maintenance of the normal environment at the skin surface beneath the tape. They are light in weight and their cohesive characteristics allow them to be removed from the skin without leaving debris on the surface.

II. Bandages : Product Composition

A. Elastic Bandages

12.11 **Elastic Bandages** are **cotton crepe bandages** consisting of high twist yarns imparting the necessary elasticity used in treating **vericose veins.** They are manufactured by weaving and warping the thread/yarn and the cloth is then processed in water based bath causing it to shrink and then after drying it develops it's properties for stretchbility and regain so as to conform to body contours and provide compression support. The bandages consist of two types of twists: **S twist** (clockwise) and **Z twist** (Anti clockwise).

B. Light Support Bandages

12.12 **Light Support Bandages** provides retention and prevents development of a deformity change in the shape of a mass of tissue owing to swelling or sagging.

C. Inelastic Bandages

12.13 **Inelastic Bandages** are medicated cloth bandages. These three are grouped together as **Adhesive Bandages.** They have a layer of adhesive impregnated on the cloth layer.

D. Open wove bandages

12.14 **Open wove bandages** consists of a cloth of plain weave made of cotton, viscose or combined cotton and viscose yarns. It is used mainly to protect absorbent dressings and to hold them in place. It gives a degree of support and provides partial restriction of movement, which can assist in rapid healing of the wound.

E. Orthopedic Cushion Bandages

12.15 **Orthopedic Cushions** are made of **cotton and synthetics.** These bandages retain their cushioning effect in the moist atmosphere between skin and plaster. In India, cotton rolls are used for this purpose where a fluffy cotton layer is rolled together and applied on the fractured area to serve as a protection layer and does the function of shock absorber, thus protecting the damaged area. However this conventional cotton layer has been replaced by needle punched nonwoven viscose of uniform grammage of around 100 gsm for tropical climate and a similar nonwoven is also available in polyester for cold climate.

F. Plaster of Paris

12.16 The **Plaster of Paris bandages** are made of **cotton guaze material** of Leno weave cloth. The interlocking thread is impregnated in the plaster of paris slurry consisting of binding agents, antiseptic, wetting agents including solvents that are oven dried and then slit into the required size for bandages. The main function is limb protection and to render the limb immobile to allow the dislocated bones to regain it's original shape. Now-a-days, **Synthetic Casting Materials** are also available.

G. Gauzes and Guaze Swabs

12.17 Guaze consist of either cotton cloth or a mixed cotton and viscose cloth, containing upto 45% of viscose. Guaze absorbs water and fluids readily and is used in a number of simple and compound absorbent products.

12.18 Guaze Swabs are the simple absorbent type, produced by folding into rectangles or squares in such a manner that the cut edges of the cloth are not exposed. Guazes and swabs are used pre-operatively (to swab the area of the skin prior to the operations), during operations (to absorb blood and body fluids) and post-operatively.

H. Waddings

12.19 **Waddings** are single use **cotton pieces in great demand abroad.** In India, for clinical practice as well as for domestic purposes **cotton rolls are preferred**, pieces of cotton are removed as and when required. In the foreign countries, the sterile, single-use cotton waddings are highly popular.

I. Absorbent Lint

12.20 **Absorbent Lint** consists of cloth of plain weave made of cotton or viscose or combination of the two. It absorbs water and fluid readily. In its unmedicated form it is used as an external absorbent and protective dressing, and is used widely in first aid treatment in home. It is also used with medications in wound application.

12.21 The Surgical Products world over is classified under the category of **Medical Devices** whereas in India, it falls under the purview of Drugs and Cosmetics Act 1940. Medical Devices are classified into Low Risk, Medium Risk, High Risk and Very High Risk, based on the risk management and product claims made by the manufacturer.

Target Areas

12.22 The major sales of these items are through the **Health Departments, Institutions/Hospitals, Nursing Homes and Clinics** requiring the wound care products in their Operation Theaters, Out Patient Department (OPD), etc.

12.23 The **retail sales** are from the general practitioners requiring the product for their practice and the individuals buying it for their first aid boxes and other household requirements.

Producers of Surgical Dressings in India

12.24 The wound care and wound management industry is distributed between the organized sector representing the **MNCs and the SSI / Cottage Scale sector.**

12.25 Some of the players representing the organized sector are:

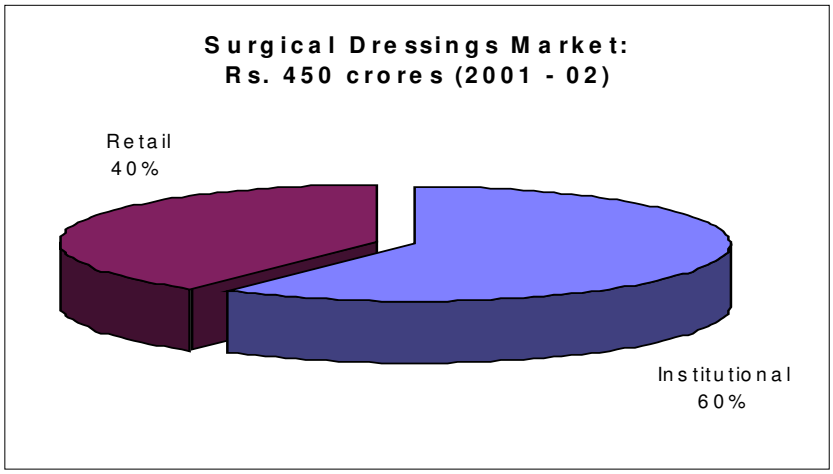
- Johnson & Johnson Ltd.
- Smith & Nephew
- 3M India Ltd.
- Casil Health Products Ltd.
- Carl - Otto
- Ramaraju Surgicals Pvt. Ltd.
- Golden Surgimed Ltd.
- Beiersdorf India Ltd.
- Elder Pharmaceuticals Ltd. (Hartmann Div.)
- Dr. Sabharwal Laboratories
- Dutt Mediproducts
- Dynamic Orthopaedics Pvt. Ltd.

12.26 In India it is an established practice to have the company manufacturing complete range of products partly through **contract manufacturing** and the then selling it through retail and institutional markets. The high operational cost makes it uneconomical for the companies to undertake their own manufacturing.

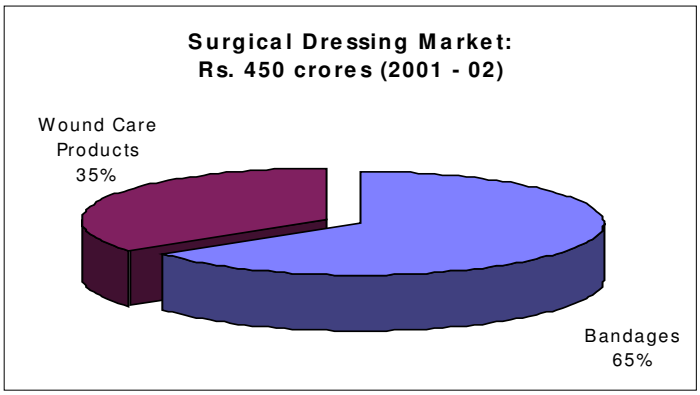
Market Size for Surgical Dressings (2001 - 02)

12.27 Based on the industry feedback the **market size of wound care surgicals in 2001 – 02,** was assessed at around **Rs. 450 crores** with the units concentrated in **Delhi, Ichalkaranji, Jalgaon, Meerut, Modinagar, Mumbai, Palghar, Rajapalayam, etc.** (However, the unconfirmed sources have projected the market size to be around Rs. 1000 - 1200 Crores. in 2001-02, but the market size of around Rs. 450 Crores in 2001-02 appears more realistic)

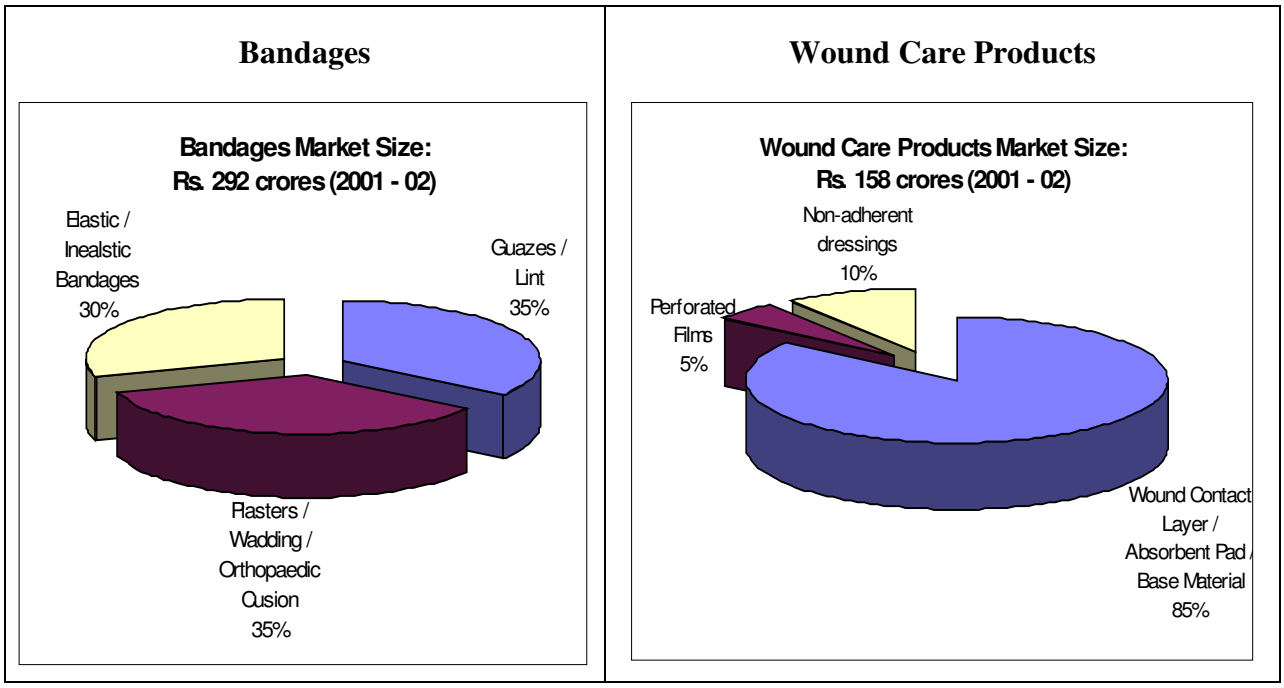
12.28 The major sales of the surgical dressings are through the **State Health Departments**, **Institutions/Hospitals** accounting for **nearly 60%** of the total sales of the surgical dressings. The **Retail Sales** through the individuals and the general practitioners account for **40%** of the sales of the product in the **Rs. 450 cr. Market.**



12.29 Major group wise assessed market has shown that the various **bandages have a larger share (65%)** of the market share pie as compared to the wound care products (35%). This has been depicted graphically as follows



12.30 Each of the group-based segmentation is as follows:



12.31 The high tech sector having the presence of the MNCs, **contract manufacturing** has become the natural practice due to high operational cost making it uneconomical for the companies to undertake their own manufacturing.

12.32 In view of the unstructured status of the industry, our survey has revealed that the **anticipated growth** is unlikely to be more than **5-10% p.a. (Avg. 7.5%).**

12.33 Hence the future market potential of these products is expected can be summarised as follows:

Year	Market Size (Rs. Cr.)
2001 - 02	450.00
2003 - 04 (Estm.)	520.03
2007 -08 (Proj.)	694.48

12.34 This group covers highly heterogeneous range of items available in different medical sizes, shapes and configuration depending upon the end use application in the hospitals and for retail trade.

12.35 The hospitals, the existing establishments of these products, dealers and agents, are of the opinion that this is a **slow growth industry** where any company can set up an unit, resulting in unhealthy competition leading to price cutting. Some of the individual segments are facing the onslaught of new products thus degrowing the market

Surgical Dressings Sector: Impediments and Main Issues of Concern

12.36 In the Indian context, the industry is concentrated in the **cottage** and the **unorganized sector** using:

- Local obsolete technology,
- No testing facilities,
- Absence of Research & Development facility.

12.37 There is **no standard testing facility** available at the **All India level,** while these products need to be checked for bioburden, biocompatibility, and cytotoxicity, nor any clinical trials being undertaken for new products that are being imported.

12.38 This industry is facing problems like **unhealthy competition** and threat from the **decentralised sector** flooding the market with low quality, substandard products.

12.39 The taxes are paid only by the organised sector whereas **tax evasion** being rampant in the unorganized sector. The unorganized sector is known to operate on the power looms, and at the same time claiming to be operating on handlooms to avail of the tax benefits.

12.40 The main competitor for India in the **Meditech segment is China.** The Chinese products are **25 - 40 %** cheaper due to low raw material costs, better infrastructure, large production capacities in conjunction with better technology making it economically

feasible for them to sell their products at a very low price. The Chinese units are **lax in following any standards.** For example, the Chinese Adhesive Tapes don't confirm to any pharmacopoeial standards while the Indian Adhesive Tapes are manufactured according to the USP standards making it mandatory to perform all the tests, thus increasing the costs. The Chinese also score over India in the resources available like the labour and infrastructure.

12.41 There is **no association to represent the medical device industry,** hence they face immense problems and the sector on the whole is neglected.

12.42 Under normal circumstances, the producers of these healthcare products are expected to follow standards and regulations as per British, Indian or United States Pharmacopoeia. The varied usage pattern for these products across the medical fraternity highlights the importance of the standards etc. to be followed:

- Orthopedic surgeons: POP bandages, Elastic bandages, Light support and cushion bandages
- Cardiac Surgeons: Pre and post operative dressings, Surgical pad, Tulle dressings, Elastic bandages
- Plastic Surgeons: Skin Grafts, Burns
- Gynaecologists

12.43 Inspite of all the problems mentioned above, India offers **immense potential as a manufacturing base for outsourcing the products** provided the guidelines set by European Union and other Asian countries are followed.

12.44 The European companies are finding it difficult to compete in their homeland and are **willing to transfer their technology to India** or China. Their willingness to enter into **foreign collaboration** offers immense opportunities for the Indian companies, as coupled with the cheap labour the lower operational cost make India a very attractive destination.

12.45 The foreign parties prefer dealing with the **private parties/ entrepreneurs in India** rather than the Chinese Government. Indian Private Enterprise is preferred over the Government working in China. The major disadvantage hampering the future potential of this sector is the **poor infrastructure facilities** - perennial problems of bad roads, water scarcity etc.

12.46 To take advantage of this, t**he Government should formulate a policy to facilitate the transfer of machinery, technical know-how and take steps to ensure the formulation of a simple Exit Policy.**

12.47 For the market to grow and prosper, **healthy competition** among various players is necessary.

12.48 The current trend witnessed in the industry is to use PE / Viscose instead of cotton, both of which are available in abundance in India. 10% of the dressings in India are non-wovens while this ratio all over the world is 50-60%. Even in the future, there is expected to be a 50:50 share of the market between both the wovens and the nonwovens.

SECTION II : INTEGRATED SURGICAL DRESSING COMPLEX

Surgical Dressings Complex:

12.49 It is proposed to set up a state-of-the-art integrated surgical dressings complex starting **from** manufacture of woven fabric using narrow and broad width loom with processing and finishing facilities comprising washing, dyeing, bleaching, tensionless drying, metering, batching, folding, etc. **to** inclusion of commodity and value added products as shown below:

Sr. No.	Particulars	Installed Capacity	Value (Crores)
1	Elastic Adhesive Bandage	24 Lacs Rolls	Rs. 15.00
2	Adhesive Tapes	30 Lacs Sq. Mt	Rs. 20.00
3	Gauze Products	60 Lacs Sq. Mt	Rs. 15.00
4	Surgical Pads	5 Million Pcs.	Rs. 3.00
5	Casting & Bandaging	10 Million Pcs.	Rs. 8.00
6	Tulle Dressings		Rs. 12.00
7	Island Dressings		Rs. 10.00
8	Hypoallergenic Paper Tapes		Rs. 5.00
9	Crepe Bandages		Rs. 10.00
10	Drapes & Disposables		Rs. 10.00
11	Other Misc. Dressings		Rs. 12.00
	Total		**Rs. 120.00**

* product mix as recommended by one of the recognized producer and exporter of surgical dressings

Recommended Technology and Plant & Machinery:

12.50 The machinery required for the project can be made to order or sourced locally except for certain critical equipments such as **Gauze Swab Folding Machine, Island Dressing Equipment, etc.**

12.51 The section wise break up of **equipment and machinery** is given below

Sr. No.	Equipments	Price (Rs Lakhs)
	A. ADHESIVE SECTION :	
1.	Sigma Mixer (2 Nos.)	15.00
2.	Rubber Mill	12.00
3.	Cooling Tower	1.50
4.	Day Tank for Storage of Solvents	1.00
5.	Underground Tank for Solvent Storage	5.00
6.	Adhesive Coating Machine for Cloth Tape	20.00
7.	Adhesive Coating Machine for Crepe Cloth	12.00
8.	Slitting Machine	9.00
9.	Spooling Machines	2.50
	Total - A	**78.00**
	B. GAUZE SECTION :	
10.	Gauze Rolling Machine	9.00
11.	Gaize Cittomg <acjome	2.00
12.	Gauze Swab Folding Machine (2 Nos.)	20.00
13.	Non-Woven Swab Folding	20.00
14.	Packing Machcine	1.50
	Total - B	**48.50**
	C. SURGICAL PADS SECTION :	
15.	Automatic Padding & Cutting	9.00
16.	Ultrasonic Sealing	5.00
17.	Mixing Tank for Impregnation	2.50
	Total - C	**16.50**
	D. CASTING & BANDAGING SECTION :	
18.	Mixing Mill	2.50
19.	Mixing Tank with Stirrers	4.50
20.	Drier	30.00
21.	De-humidification	6.00
22.	Automatic Pouching	7.50
23.	Cutting & Spooling & Tables	3.00
	Total - D	**53.50**

Sr. No.	Equipments	Price (Rs Lakhs)
	E. TULLE GRAS SECTION :	
24.	Coating Line Under Laminar	12.00
25.	Dosing Line Under Laminar	12.00
26.	Pouching Machine Under Laminar	16.00
27.	Dry Heat Sterilizer	3.50
28.	U. V. Hatches	4.00
29.	Air Handling with Modules	25.00
30.	Preparation Area & Equipment	15.00
	Total - E	**87.50**
	F. ISLAND DRESSING SECTION :	
31.	Assembling Line (Small & Large)	70.00
32.	Medication Impregnation Tanks	3.00
33.	Tooling & Dies	6.00
34.	Air Handling	12.00
	Total - F	**91.00**
	G. HYPO ALLERGENIC DRESSING SECTION :	
35.	Mixers	15.00
36.	Transfer Coating Line	45.00
37.	Slitting Machine	15.00
38.	Packing Line	5.00
	Total - G	**80.00**
	H. DRAPES SECTION :	
39.	Assembly Line (Cutting & Fusing)	40.00
40.	Packing Line	3.00
41.	Testing & Checking	0.50
42.	Tools & Jigs	1.50
	Total - H	**45.00**

Sr. No.	Equipments	Price (Rs Lakhs)
	I. HYPO ALLERGENIC DRESSING SECTION :	
43.	Narrow Width Looms (20)	80.00
44.	Broad Width Looms + Leno Heals	120.00
45.	Steaming Autoclave	2.00
46.	Warping	4.00
47.	Washing & Dyeing	5.00
48.	Tensionless Drying	5.00
49.	Fluorescence Free Bleaching Keir	6.00
50.	Stenter	30.00
51.	Metering, Batching & Folding	3.00
	Total - I	**255.00**
	Grand Total : (A + B + C + D + E + F + G + H + I)	**755.00**

LIST OF PLANT AND MACHINERY (Contd..)

Sr. No.	Equipments	Price (Rs Lakhs)
	J. UTILITIES SECTION :	
1.	Steam Boiler - 2 Nos.	9.00
2.	Thermic Heating	3.00
3.	Air Compressor - 4 Nos.	6.00
4.	Solvent Recovery Plant	35.00
	Total - J	**53.00**
	K. QUALITY CONTROL DEPARTMENT :	
1.	Incubator B.O.D. = 2 Nos.	1.50
2.	Muffle Furnace	1.10
3.	Vaccum Oven = 2 Nos.	1.00
4.	Single Pan Electronic Balance = 2 Nos.	0.80
5.	Other Misc. Laboratory Apparatus	1.50
6.	U. V. Spectrophotometer	1.50
7.	HPLC	8.00
8.	Fluorescence Test Equipment	0.10

Sr. No.	Equipments	Price (Rs Lakhs)
9.	Yarn & Fabric Testing Apparatus	2.00
10.	Tensile Testing	1.50
11.	Laboratory Oven 2	0.90
12.	Adhesion Bonding Test Apparatus	3.00
13.	Brookshield Viscometer	1.50
14.	Cast Strength Testing Machine	1.30
15.	Laminar Flow	1.50
16.	Refrigerator	0.25
17.	P. H. Meter	0.15
18.	Colony Counter	0.15
19.	Modules for Micro-Sterility	4.00
20.	Water Still (Amnesty)	0.25
21.	Flask Shaker	0.10
22.	Vellometer	0.10
23.	Air Sampler	0.30
24.	Other Misc. Equipment	2.50
	Total - K	**35.00**
	L. ELECTRICAL INSTALLATIONS :	
1.	Electrical Installations	15.00
2.	Electrical Panels, etc.	10.00
	Total - L	**25.00**
	M. EFFLUENT TREATMENT SYSTEMS :	
1.	ETP System with Tanks	15.00
	Total - M	**15.00**
	N. OTHER ASSETS :	
1.	Furniture	5.00
2.	Air Conditioners	5.00
3.	Air Handling System	25.00
4.	Misc. Maint. Etc.	5.00
	Total - N	**40.00**

SECTION III : PROJECT COST & PROFITABILITY PROJECTIONS

Land

12.52 The total requirement of land for this project keeping in mind the possible future expansion is around 20000 Sq. Mtrs. (5 acres).

12.53 Based on the available information the cost of land is assumed at Rs 1200 per square meter (including the developmental cost).Depending on the exact location of the project to be determined by the promoter the land cost could be higher or lower. Hence the total cost of developed land will be **Rs 2.4 crores**.

Buildings

12.54 The building area comprising of main factory building, godowns, office , R & D labs / In-house Testing centre etc would be 10000 sq. mtrs. The cost of construction would again vary depending on the structure and the materials to be used. It has been assumed that the average cost of construction would be Rs 4500 per sq mtr. Thus the total cost of building and other civil works would be around **Rs 4.5 crores**.

Plant and Machinery

12.55 Details of Plant and machinery as well as technology required for the project have been presented in earlier Section II . The installed cost of plant and machinery would be **Rs 7.55 crores**. Apart from the main process equipments the utilities required are Electricals, Piping, Power , Water supply, compressors ,fire fighting equipments and effluent treatment plant etc. The provision on this count is taken as **0.68 crores.**

Miscellaneous Fixed Assets

12.56 Under this head the items included are Furniture and fixtures, Office equipments, Air Conditioners etc and the provision made is around **Rs 0.40 crores**.

R & D And Testing Equipment

12.57 The Testing and R& D facilities as elaborated in the section II would call for an investment of around **Rs 0.35 crore**.

Project Engineering and Consulting

12.58 Under this head the items included are the fees and expenses on account of Architect fees, project engineering and management (both local and overseas),etc. and the provision made is of **0.36 Crore.**

Preliminary & Preoperative Expenses

12.59 The items included under this head are company formation expenses, public issue expenses (if any), interest during construction, pre-production expenses, during the implementation phase etc and the provision made is **Rs. 1.82 crores**.

Contingency Expenses

12.60 Depending on the gestation period and further detailing of the project cost by the promoter, the contingency provision has been made **Rs. 1.81 Crores**.

Margin Money for Working capital

12.61 The margin money for working capital forming part of the total project cost would be **Rs 2.16 crores** .

Total Project Cost

12.62 The total project cost as given in **Exhibit 3.1** would be **Rs 22.02 crores** (say Rs. 22 crores)

Project Funding And Financing Pattern

12.63 It has been assumed that the project would be financed through long term funds and Equity participation by the Promoter / Public. The technical textile sector being a high priority area, it is assumed that a Debt- Equity ratio of 1.5 : 1 would be feasible.

Sales and Profitability Analysis

Sales Realisation and Turnover

12.64 Based on the market considerations and other parameters the product mix recommended and the sales realization for the surgical complex is as shown below. (Installed capacity)

Sr. No.	Particulars	Installed Capacity	Value (Crores)	Average Per unit price (net of taxes)(Rs)
1	Elastic Adhesive Bandage	24 Lacs Rolls	Rs. 15.00	62.5 per roll
2	Adhesive Tapes	30 Lacs Sq. Mt	Rs. 20.00	66.66 per sq. mt.
3	Gauze Products	60 Lacs Sq. Mt	Rs. 15.00	25 per sq. mt
4	Surgical Pads	5 Million Pcs.	Rs. 3.00	6 per pc.
5	Casting & Bandaging	10 Million Pcs.	Rs. 8.00	8 per pc.
6	Tulle Dressings		Rs. 12.00	Aggregate in and turnover is shown view of the diversity of products, types usages.
7	Island Dressings		Rs. 10.00	
8	Hypoallergenic Paper Tapes		Rs. 5.00	
9	Crepe Bandages		Rs. 10.00	
10	Drapes & Disposables		Rs. 10.00	
11	Other Misc. Dressings		Rs. 12.00	
	Total		**Rs. 120.00**	

* product mix as recommended by one of the recognized producer and exporter of surgical dressings

12.65 Under the Indian conditions, it is assumed that the surgical dressing plant would operate at an efficiency level of 75 %. Hence the production from the plant would be **Rs. 90 crores.**

12.66 The plant would operate on Two or Three -shift basis depending on the process requirements and 330 working days in a year.

12.67 The capacity utilisation for the 1st year is assumed at 50% and thereafter for the 2nd ,3rd and 4th year onwards 60%, 75% and 90% respectively.

12.68 The details of sales turnover projected are given in **Exhibit 3.2.**

Cost of Production

Major Raw materials

12.69 As an integrated complex it is proposed to have captive weaving and processing facilities of woven, narrow and broad width fabric using cotton viscose as the main raw material for outsourced Yarns.

12.70 Cotton yarns used are normally in the count range 25, 30 ,32 and 40. Besides spunlace Non-woven fabric will be outsourced along with the chemicals dyes adhesives

and packaging materials. At full capacity the requirement of raw materials as shown below:

Raw Materials	Cost in Rs. Crores
Yarn, Fabrics & Cloth	52.00
Chemicals (Dyes, pigments, adhesives, Bleaching agents, etc)	7.00
Primary and secondary Packing Materials	16.00
Total (at installed capacity)	75.00

12.71 Thus the basic cost of conversion from raw material stage of yarn, fabric and cloth to finished products at full capacity will be **Rs. 23 crores**. (Basic raw materials (Rs. 52 crores) + conversion cost (Rs. 23 crores)

Manpower ,Salaries and Wages

12.72 The manpower requirements and the salary structure is given as follows**.**

Type of Manpower	Number	Annual Wage Bill
Technical :		
• G. M.	3	**Rs. 60.00 Lacs**
• Chemists	8	
• Maintenance	6	
Administrative & accounts	10	**Rs. 20.00 Lacs**
Sales / Marketing	100	**Rs. 200.00 Lacs**
Skilled Labour	75	**Rs. 60.00 Lacs**
Unskilled Labour	200	**Rs. 72.00 Lacs**
TOTAL	**405**	**Rs. 412.00 Lacs**

Factory and Overhead Expenses

12.73 The items covered under this head are repairs and maintenance, establishment expenses, travel expenses, packaging expenses, etc. The provision made for this is **Rs. 1.35 crores**

Marketing and Promotional Expenses

12.74 The promotion of surgical dressings will call for expenditure on this account and a provision of 10% of sales has been made uniformly over the first five years as the small industries have to give certain promotional discounts and schemes. Then the marketing and promotional expenses can be lowered to 5 % uniformly over the next years.

Interest and Depreciation

12.75 The prevailing interest rate for **long term** and **short term** borrowed funds is assumed at **5 % per annum** and **11 % per annum** respectively.

12.76 The repayment of loans has been assumed for 8 years with two year moratorium.

12.77 The depreciation rates as per the Company Law and Income-Tax Ready Reckoner have been worked out for Straight Line and WDV Method basis.

12.78 The current corporate tax rate is assumed at 35 % and the surcharge is assumed at 2.5% per annum.

Profitability, Break-even, IRR and Payback .

12.79 The **Sales turnover** increases from **Rs 44.10 Cr** in the first year to **Rs 79.38 Cr**. from the 4 th year onwards.

12.80 The **PBT** increases from **Rs 2.55 Cr.** in the first year to **Rs. 9.85 Cr**. In the 4 th year. and **Rs. 11.81 crores** in the 10 th year (See **Exhibit 3.4**)

12.81 The **Break Even** of the project is at **61.33%.**

12.82 The **Internal Rate of Return (IRR)** has been worked out at **27.54 %**.

12.83 The **Payback period** for the project is **4.05 years** .

DEVELOPMENTAL AND PROMOTIONAL MEASURES.

12.84 In the Indian context, the industry is concentrated in the **cottage** and the **decentralized sector** using:

- Local obsolete technology,
- No testing facilities,
- Absence of Research & Development facility.

12.85 There is **no standard common testing facility** available at the **All India level,** while these products need to be checked for bioburden, biocompatibility, and cytotoxicity, nor any clinical trials being undertaken for new products that are being imported.

12.86 This industry is facing problems like **unhealthy competition** and threat from the **decentralised sector** flooding the market with low quality and substandard products.

12.87 The taxes are paid only by the organised sector whereas **tax evasion** being rampant in the unorganized sector. The decentralized sector is known to operate on the power looms, and at the same time claiming to be operating on handlooms to avail of the tax benefits.

12.88 The main competitor for India in the **Meditech segment is China.** The Chinese products are **25 - 40 %** cheaper due to low raw material costs, better infrastructure, large production capacities in conjunction with better technology making it economically feasible for them to sell their products at a very low price. The Chinese units are **lax in following any standards.** For example, the Chinese Adhesive Tapes don't confirm to any pharmacopoeial standards while the Indian Adhesive Tapes are manufactured according to the USP standards making it mandatory to perform all the tests, thus increasing the costs. The Chinese also score over India in the resources available like the labour and infrastructure.

12.89 There is **no association to represent the medical device industry,** hence they face immense problems and the sector on the whole is neglected.

12.90 Under normal circumstances, the producers of these healthcare products are expected to follow standards and regulations as per British, Indian or United States Pharmacopoeia. The varied usage pattern for these products across the medical fraternity highlights the importance of the standards etc. to be followed:

- Orthopedic surgeons: POP bandages, Elastic bandages, Light support and cushion bandages
- Cardiac Surgeons: Pre and post operative dressings, Surgical pad, Tulle dressings, Elastic bandages
- Plastic Surgeons: Skin Grafts, Burns
- Gynaecologists

12.91 Inspite of all the problems mentioned above, India offers **immense potential as a manufacturing base for outsourcing the products** provided the guidelines set by European Union and other Asian countries are followed.

12.92 The European companies are finding it difficult to compete in their homeland and are **willing to transfer their technology to India** or China. Their willingness to enter into **foreign collaboration** offers immense opportunities for the Indian companies, as

coupled with the cheap labour the lower operational cost make India a very attractive destination.

12.93 The foreign parties prefer dealing with the **private parties / entrepreneurs in India** rather than the Chinese Government. Indian Private Enterprise is preferred over the Government working in China. The major disadvantage hampering the future potential of this sector is the **poor infrastructure facilities** - perennial problems of bad roads, water scarcity etc.

12.94 To take advantage of this, t**he Government should formulate a policy to facilitate the transfer of machinery, technical know-how and take steps to ensure the formulation of a simple Exit Policy.**

12.95 For the market to grow and prosper, **healthy competition** among various players is necessary.

12.96 The current trend witnessed in the industry is to use **PE / Viscose** instead of **cotton**, both of which are available in abundance in India. 10% of the dressings in India are non-wovens while this ratio all over the world is 50-60%. Even in the future, there is expected to be a 50:50 share of the market between both the wovens and the nonwovens.

12.97 In the above back ground, the proposal to set up an integrated surgical complex is the step in the right direction for the future development of this sector which takes into account multiplicity of products - both commodity and value added.

EXHIBIT 12.1

	PROJECT COST	
(LAND, BUILDINGS, PROCESS PLANT & MACHINERY, UTILITIES & OTHER ASSETS)		
		Project Cost (Rs. Cr.)
1	**Land**	**2.40**
	(Area: 20000 Sq. Mtrs.)	
	Rate: (Rs.1200 /Sq. Mtr)	
2	**Buildings**	**4.50**
	(Plant Area, Office, Godown, Lab, Service Area etc.)	
	Built-up Area : 10000 Sq. Mtrs	
	Avg Rate : Rs.4500 /Sq. Mtrs	
3	**Process Plant & Equipment**	**7.55**
4	**Utility & Other equipments**	**0.68**
	(Compressor, Stem Boiler, Effluent Treatment Plant, etc.)	
5	**Testing Equipments**	**0.35**
5	**Misc. Fixed Assets**	**0.40**
	(Furniture & Fixtures, Office Equipment, etc.)	
6	**Project Engineering & Consultancy charges (2.5%)**	**0.36**
7	**Preliminary & Pre-operative Expenses (12%)**	**1.82**
	(Company Formation, Interest during construction,	
	pre-production expenses, etc.)	
8	**Contingency (10 %)**	**1.81**
9	**Total**	**19.86**
10	**Margin Money for Working Capital**	**2.16**
11	**Total Project Cost**	**22.02**

EXHIBIT 12.2

ESTIMATION OF SALES REVENUE

(Rs. Cr.)

ITEM	YEAR OF OPERATION									
	I	II	III	IV	V	VI	VII	VIII	IX	X
Average Production per hr (mt.)	120	120	120	120	120	120	120	120	120	120
75% efficiency	90	90	90	90	90	90	90	90	90	90
Capacity Utilisation	50%	60%	75%	90%	90%	90%	90%	90%	90%	90%
Actual Production per hr (mt.)	45	54	68	81	81	81	81	81	81	81
Sales Revenue (Rs. Cr)	**45.00**	**54.00**	**67.50**	**81.00**	**81.00**	**81.00**	**81.00**	**81.00**	**81.00**	**81.00**
Value Loss (2%)	0.90	1.08	1.35	1.62	1.62	1.62	1.62	1.62	1.62	1.62
Net Sales Revenue (Rs. Cr)	**44.10**	**52.92**	**66.15**	**79.38**	**79.38**	**79.38**	**79.38**	**79.38**	**79.38**	**79.38**

EXHIBIT 12.3

REQUIREMENT OF WORKING CAPITAL

(Rs.Lakhs)

ITEM	NO. OF	MARGIN	YEAR I			YEAR II			YEAR III			YEAR IV			YEAR V		
	MONTHS	(%)	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK
			REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE
Factory Related																	
Raw materials & other comm	1.00	25.00	1.71	0.43	1.28	2.05	0.51	1.54	2.56	0.64	1.92	3.07	0.77	2.30	3.07	0.77	2.30
Finished Goods	1.00	25.00	3.26	0.82	2.45	3.84	0.96	2.88	4.69	1.17	3.52	5.55	1.39	4.16	5.57	1.39	4.18
A/c Receivable	1.00	25.00	3.68	0.92	2.76	4.41	1.10	3.31	5.51	1.38	4.13	6.62	1.65	4.96	6.62	1.65	4.96
Cash in hand																	
Salaries & wages	1.00	0.00	0.34	0.00	0.34	0.36	0.00	0.36	0.38	0.00	0.38	0.40	0.00	0.40	0.42	0.00	0.42
Utilities	1.00	0.00	0.72	0.00	0.72	0.86	0.00	0.86	1.08	0.00	1.08	1.29	0.00	1.29	1.29	0.00	1.29
Advertising & Promotional Ex	1.00	0.00	0.37	0.00	0.37	0.44	0.00	0.44	0.55	0.00	0.55	0.66	0.00	0.66	0.66	0.00	0.66
Admin. Overheads	1.00	0.00	0.11	0.00	0.11	0.11	0.00	0.11	0.11	0.00	0.11	0.11	0.00	0.11	0.11	0.00	0.11
Total Requirement			**10.08**	**2.16**	**7.92**	**11.97**	**2.57**	**9.40**	**14.78**	**3.19**	**11.59**	**17.60**	**3.81**	**13.79**	**17.64**	**3.81**	**13.83**

EXHIBIT 12.3 (CONTD...)

REQUIREMENT OF WORKING CAPITAL

(Rs.Lakhs)

ITEM	NO. OF	MARGIN		YEAR VI			YEAR VII			YEAR VIII			YEAR IX			YEAR X	
	MONTHS	(%)	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK	W.CAP	MARGIN	BANK
			REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE	REQMT	MONEY	FINANCE
Factory Related																	
Raw materials & other commoditie	1.00	25.00	3.07	0.77	2.30	3.07	0.77	2.30	3.07	0.77	2.30	3.07	0.77	2.30	3.07	0.77	2.30
Finished Goods Stock	1.00	25.00	5.27	1.32	3.95	5.31	1.33	3.98	5.35	1.34	4.01	5.39	1.35	4.04	5.43	1.36	4.08
A/c Receivable	1.00	25.00	6.62	1.65	4.96	6.62	1.65	4.96	6.62	1.65	4.96	6.62	1.65	4.96	6.62	1.65	4.96
Cash in hand																	
Salaries & wages	1.00	0.00	0.45	0.00	0.45	0.49	0.00	0.49	0.53	0.00	0.53	0.57	0.00	0.57	0.61	0.00	0.61
Utilities	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Advertising & Promotional Expens	1.00	0.00	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01
Admin. Overheads	1.00	0.00	0.33	0.00	0.33	0.33	0.00	0.33	0.33	0.00	0.33	0.33	0.00	0.33	0.33	0.00	0.33
Total Requirement			**17.05**	**3.74**	**13.31**	**17.12**	**3.75**	**13.37**	**17.20**	**3.76**	**13.44**	**17.28**	**3.77**	**13.51**	**17.37**	**3.78**	**13.59**

EXHIBIT 12.4

MANPOWER REQUIREMENTS

	Nos	Annual	Total Monthly Salary	Annual
General Manager	3	30000	90000	1080000
Chemists	8	15000	120000	1440000
Maintenance	6	10000	60000	720000
Admini	0	10000	0	0
Marketing & Sales Staff	2	12000	24000	288000
Clerical Staff	2	6000	12000	144000
Other Staff	2	3000	6000	72000
Maintenance (Elec. & Mech.)	1	10000	10000	120000
TOTAL	**24**		**322000**	**3864000**
Fringe Benefits (40 % of the above)				1545600
Total Wage Bill (Annual) Rs. lakry + Other Benefits =				**41200000.00**
Total Wage Bill (Annual) Rs. Cr.:				**4.12**

EXHIBIT 12.5

PROFITABILITY STATEMENT AND COMPUTATION OF TAX

(Rs.Cr)

ACCOUNT HEAD	FINANCIAL YEAR OF OPERATION									
	I	II	III	IV	V	VI	VII	VIII	IX	X
Revenue										
Net Sales Turnover	44.10	52.92	66.15	79.38	79.38	79.38	79.38	79.38	79.38	79.38
Total Revenue	44.10	52.92	66.15	79.38	79.38	79.38	79.38	79.38	79.38	79.38
Expenses										
Raw Materials	20.48	24.57	30.71	36.86	36.86	36.86	36.86	36.86	36.86	36.86
Salaries & wages	4.12	4.33	4.54	4.77	5.01	5.41	5.84	6.31	6.81	7.36
Conversion Cost	8.63	10.35	12.94	15.53	15.53	15.53	15.53	15.53	15.53	15.53
Repairs & Maintenance	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Marketing & Promotional Expenses	4.41	5.29	6.62	7.94	7.94	3.97	3.97	3.97	3.97	3.97
Factory & Office Overheads	1.35	1.35	1.35	1.35	1.35	1.35	1.35	1.35	1.35	1.35
Interest on S.T. Loans	0.87	1.03	1.28	1.52	1.52	1.46	1.47	1.48	1.49	1.49
Cost of Sales	40.00	47.07	57.58	68.11	68.35	64.72	65.16	65.64	66.15	66.70
Depreciation (St.Line)	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Amort. of Expenses	0.06	0.06	0.06	0.06	0.06	0.06	0.00	0.00	0.00	0.00
Interest on L.T Loan	0.66	0.66	0.62	0.54	0.45	0.37	0.29	0.21	0.12	0.04
Profit Before Tax	2.55	4.30	7.06	9.85	9.70	13.40	13.11	12.71	12.28	11.81
Tax	0.27	0.90	2.05	3.18	3.24	4.62	4.59	4.51	4.40	4.27
Profit After Tax	2.29	3.41	5.01	6.68	6.46	8.78	8.52	8.21	7.89	7.55
Dividend	0.00	0.00	0.44	0.44	0.44	0.88	0.88	0.88	0.88	0.88
Profits For Appropriation	2.29	3.41	4.57	6.23	6.02	7.90	7.64	7.33	7.01	6.67
COMPUTATION OF TAX										
Profit after interest before depreciation	3.38	5.13	7.89	10.68	10.52	14.23	13.93	13.54	13.11	12.64
Depr.(WDV) to be claimed	3.28	2.57	2.02	1.60	1.27	1.02	0.83	0.67	0.55	0.46
Depreciation claimed	3.28	2.57	2.02	1.60	1.27	1.02	0.83	0.67	0.55	0.46
Depr. carried forward	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Taxable Profit	0.09	2.56	5.87	9.08	9.24	13.20	13.10	12.86	12.55	12.18
Profit Before Tax (Book)	2.55	4.30	7.06	9.85	9.70	13.40	13.11	12.71	12.28	11.81
Minimum Alternate Tax	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tax (Actual)	0.03	0.90	2.05	3.18	3.24	4.62	4.59	4.51	4.40	4.27
Tax Provision	0.27	0.90	2.05	3.18	3.24	4.62	4.59	4.51	4.40	4.27

EXHIBIT 12.6

SENSITIVITY ANALYSIS

Items	Profit after Tax (PAT) Rs. Cr. (assumed at 90 % capacity)	Break Even (%)	Internal Rate of Return (IRR) (%)	Payback Period (Years)
NORMAL VALUES	6.68	61.33	27.54	4.00
Debt Equity Ratios				
(a) 2:1	6.64	61.56	27.60	4.00
(b) 1:1	6.73	60.98	27.44	4.00
Increase in Project Cost by a) 10 %	6.60	61.92	25.69	4.01
b) 20%	6.53	62.52	24.10	4.02

PRODUCTION OF GREY TAFFETA FABRICS

SECTION I: PRODUCT BRIEF, APPLICATION AREAS & MARKET POTENTIAL

12.1 A lustrous medium weight plain weave fabric with a slight ribbed appearance in the weftwise (cross-wise). It provides crisp hand, with lots of body. Earlier silk yarns was extensively used; however, today it is replaced by nylon and polyester filament yarns with rare exception of viscose and acetate.

12.2 Prerequisites of Taffeta fabrics are:

- Medium weight
- High abrasion resistance
- High tear resistance
- Flexibility in use, etc.

12.3 For these properties mainly Nylon Filament Yarn (NFY) and Polyester Filament Yarn (PFY) (70 dtex) normally used. Global constructions are **190 T, 210 T and 230 T** where **T** indicates the thread densities.

Usage and Application Areas:

12.4 Taffeta fabrics are used for

- Lining
- Umbrella cloth
- Wind cheater
- Kites
- Courier bags
- Variety of domestic bags
- Artificial flowers
- Sleeping bags
- Tents
- Substrate for Coating materials
- Range of other applications

Umbrellas and Wind Cheaters

12.5 Umbrellas and wind cheaters are mainly used during the rainy season. Umbrellas are also used as protection from the sun but this usage is mainly in South India as this region being closer to the Equator is also hotter.

12.6 In earlier times the most commonly used material for umbrella cloth was cotton. However, over the last two decades usage has shifted to Nylon and Polyester.

12.7 Manufacture of umbrellas and wind cheaters is basically an activity carried out in the **small scale sector**. Some of the famous **brands** of umbrellas are **"Stag", "Citizen", "Sun", "Avon", "Captain", "Elephant", "Johns"** etc. Umbrellas are available in prices ranging from Rs.60 / pc to Rs.250 / pc.

Market size

12.8 Umbrella and windcheater **cloth (Taffeta)** is **not being produced** in the country but is entirely imported from China, Taiwan, UAE etc. Total quantum imported, as per import statistics was as follows over the two years.

Year	Qty (Tonnes)	Value (Rs./Lakhs)
2000-2001	520.60	996.39
2001-2002	293.13	520.13
Total	813.73	1516.52
Average of two years	**406.86**	**758.26**

12.9 Major Importers of Umbrella and Windcheater Cloth are (1) Sagar Impex, Mumbai & Calcutta, (2) Chandanlal & Co. Mumbai, (3) Mr.Arun Kumar & Co. Mumbai.

12.10 Since about 75 gm of material are required in both umbrellas and windcheater, 407 tonnes of imported cloth translates into about 5.5 mln. numbers of final product. In addition there could be about 15 to 20% coming in through unofficial channels which puts total output of windcheaters and umbrellas at 6.5 mln. nos.

12.11 Some of the major umbrella manufacturers are as follows :

1. Ebrahim Currim & Sons, Mumbai, Calicut, Mangalore.
2. K.C. Pal & Co. Calcutta'

3. Mahendra Datto, Calcutta
4. Metro Umbella Industries, Mumbai
5. John's Umbrellas, Alepey, Kerala
6. Kwality Umbrella Mfg. Co. Mumbai
7. Bhupendra Umbrellas Mfg. Co. Palghar
8. Capital Chathla Udyog, Delhi
9. Lion Brand Umbrella, Madurai
10. Citizen Umbrellas, Mumbai .

Market Potential

12.12 Based on discussions with major manufacturers and other knowledgeable people the estimated market for umbrellas and windcheaters is expected to grow from 6.50 mln. Nos. In 2001-02 to about 12.50 mln. numbers by 2007-08 of which the share of umbrellas would be 9.7 mln numbers and of windcheaters 2.7 mln numbers. This translates into a total textile requirement of about 540 tonnes valued at Rs.10 crores in 2003-04 and 940 tonnes worth Rs.17.5 crores by 2007-08 (a CARG of 5%/yr).

12.13 Since the entire requirement of umbrella and windcheater cloth is being **imported** it would be worth while carrying out a techno-ecomonic feasibility study to ascertain the prospects of manufacture in India.

12.14 It could be **integrated composite unit** starting from chips (raw material) to yarn/fabrics processing and finishing.

Sleeping Bags (Camping)

Product Type and Range

12.15 A sleeping bag may be used in high altitudes with $-50^{O}C$ temperature or in warmer places having temperature in the range of $10^{O}C$. Such widely varying uses make sleeping bag construction a highly technical job. As a result, it requires substantial knowledge regarding raw material selection, sewing method, and design.

12.16 Sleeping bags need to be light-weight and should be capable of providing warmth, comfort and protection from wind and water. According to international standards, the maximum permissible **total weight of a sleeping bag is around 1.5 kg.**

12.17 Keeping in view such functional requirements, the following fabrics are used in sleeping bags:

Sr. No.	Product Type	Textile	Application	Performance Requirements	Consumption Norm per unit
1	Sleeping Bags	nylon taffeta (90-230 GSM) Polyester	Outer and inner fabric	Light weight, wind proof, water resistant, durable, washable	7 sq meters of cloth

12.18 Sleeping bags are constructed with tough yet soft touch **nylon taffeta shells** filled either with holofil fiber, down feathers, cotton, or polyfill sheet in mummy shape. These fabrics range from 90-125 GSM, are extremely light weight, wind-proof and have very high tear resistance.

12.19 Water-resistance is a desirable characteristic in the nylon fabric used for making sleeping bags. But the water-proof fabric must be breathable too. Such **breathable water-proof nylon fabric** is not produced in India. It has been developed and patented by Goretex (USA). These fabrics are expensive and the water-resistance property usually lasts for three years only.

12.20 Nylon taffeta which is used as outer fabric is also used as inner fabric. In certain sleeping bags cotton or fleece inner lining is also used. Since light-weight and durability are desired characteristics, nylon taffeta is used in most of the sleeping bags. Cotton is considered better than nylon for skin but cotton linings in sleeping bags are susceptible to fungus.

12.21 Ultra-holofil or polyfil is the most commonly used filling material in sleeping bags in India because in addition to being light-weight and providing heat insulation, it is washable and does not form lumps. It is estimated that 80% of the sleeping bags produced uses synthetic fiber filling and the remaining uses cotton filling. The quality of polyfil fiber used varies greatly. According to market sources, low-grade polyfill fibers obtained from the recycling of disposed PET bottles is also used in sleeping bags.

12.22 The quantity of filling used depends on the purpose of a sleeping bag. The following table indicates the quantity of ultra-holofil used in different types of sleeping bags:

Sr. No.	Sleeping bag types	Quantity of filling
1	High altitude sleeping bags	Down feather filling of 1300 gms; Ultra-hollofil of 1700 gms
2	Low altitude sleeping bags	Ultra-hollofil filling of 1200 gms
3	Rectangular - summer travel bags	Filling of 500 gms

Usage and Application Areas

12.23 The major users of sleeping bags in India are **military forces and para-military forces.** They are estimated to be accounting for nearly 90% consumption of the total number of sleeping bags produced in India. The other segments comprise of corporate sectors, school children going for camping and excursions, mountaineering departments and adventure loving people.

Producers of Sleeping Bags in India

12.24 **Stikage** is a Delhi based firm specializing in outdoor adventure sports equipment. The firm follows UIAA world standard in making sleeping bags. It uses imported nylon taffeta and depending upon the requirement uses either down feathers or polyfill as filling material. The firm claims to be selling around 500 sleeping bags a year. It carries a range of other equipment required in mountaineering.

12.25 **Canvas Emporium** is also a Delhi based firm that produces tents and sleeping bags. It produces sleeping bags only upon demand. The company buys nylon taffeta from the importers and converts them into sleeping bags. The unit tried to process the polyester fabric produced in India for wind-proofing. But the cost of wind-proof processing amounted to Rs. 60 a meter whereas a processed wind-proof imported fabric is available for merely Rs. 45 a meter. It uses polyfill for stuffing in sleeping bags.

Market Size for Sleeping Bags (2001 - 02)

12.26 The sleeping bag industry is concentrated in **small sized firms** operating in the **unorganized sector.** It is a localized industry with production taking place in smaller quantities in a number of places. The **military forces** are the major consumers and they have also set up their **own production unit. Azad Market in Delhi** is lined with a number of producers engaged in sleeping bags, tents and tarpaulins production.

12.27 Sleeping bag production is a highly technical job and requires specialized machines for shell construction, quilting, down or polyfill filling so that appropriate quantity of down, or feathers, or polyfill is filled such that there is no lumping and the user gets a cozy bag cushioned well to ensure a good sleep even in harsh conditions. However, the producers in India do not use such specialized machines. Almost all of them are using simple sewing machines and a few of them are using quilting machines priced between Rs. 3000 to Rs. 30000.

12.28 The industry is highly localized, fragmented, and consists of firms who are engaged in producing other items such as tents and tarpaulins and make sleeping bags only upon demand. In view of all these factors, the current market for the sleeping bags is estimated to be around **Rs. 6.25 Cr.**

12.29 The demand for sleeping bags is linked to adventure loving lifestyle involving active participation in hiking, trekking, income and spending power, awareness about desired product attributes for specific uses.

12.30 As mentioned earlier, military is the major consumer of sleeping bags in India. The sleeping bags required by military forces deployed in the northern frontiers of Siachen and Kargil is absolutely different from the ones required in the lower foothills. Light-weight and construction to suit varying climatic conditions are critical aspects of the sleeping bags for military. It was learnt that the variety required for use in extreme conditions such as **Siachen and Kargil** is met **exclusively through imports**.

12.31 According to the producers, the sleeping bags used by army deployed in other parts of the country are not suitable to their requirements. They are not light-weight, and neither are they constructed appropriately.

12.32 Nylon taffeta is the major raw material required and is **met entirely through imports** from Korea and China because the quality produced in the mills located at **Surat is extremely poor** with respect to tear resistance. Besides Korea and China, nylon taffeta is also imported from Chinese Taipei, Indonesia, Japan, Sri Lanka, UAE, and U.K.

Impediments and Major Issues of Concern

12.33 The sleeping bags used by the army deployed in other parts of the country apart form Siachen and Kargil use **lower quality and cheaper bags often with cotton filling or inappropriate quantity of polyfill filling** due to:

- ☞ Lack of awareness,
- ☞ Cost consciousness

12.34 The percentage of the population participating in adventurous activities is extremely low and hence the demand for the bags is lower.

12.35 The **level of awareness regarding quality** and **capability of spending higher amounts in better quality of sleeping bags is also very low**.

12.36 Most of the buyers especially parents of the children going for camping as a part of school excursions look at sleeping bag purchases as one-time purchase and base their decision on price than on the quality required.

12.37 The Indian producers have to depend fully on imports of nylon taffeta from China and Korea. Since the quantity of nylon taffeta required by the industry is lower than the minimum quantum supplied by an exporter, the Indian importers meet the demand by importing stock lots from these countries.

12.38 It is never possible to assure supply, quality and price consistency for goods purchased in stock lots. Rather, Chinese producers are in a more advantageous position and are cost efficient producer and exporter of sleeping bags.

Future Market Potential for Sleeping Bags

12.39 Television channels such as BBC, Discovery, and National Geographic have definitely propagated adventurous pastimes and created demand for related products. The market for sleeping bags according to producers has expanded by approximately 30-40% but the **market size is still extremely small.**

12.40 It was learnt that **sleeping bags** are used as **lighter and convenient alternative** to the conventional **bulky beddings** carried during travel especially by train. In metropolitan cities, sleeping bags are often used in houses as **temporary arrangements for guests** in lieu of beds and mattresses. The users in this category look for cheaper products and are not at all concerned with quality.

12.41 The **market for sleeping bags is still at its infancy** and the production is in response to the **demand** and exports also of the same order and same quantity sold in the civil market, the current and anticipated market scenario is as follows :

	Market Potential	
Year	**Quantity (Nos.)**	**Value (Rs. Cr.)**
2001 - 2002	25,000	6.25
2003 - 2004	30,000	7.50
2007 - 2008	50,000	12.50

12.42 The **military and para-military forces** are the major consumers but the demand varies significantly from one year to another. Incidents such as **impending war on the northern frontiers or exhaustion of sleeping bags stock** induce demand.

12.43 Furthermore, the army procures its requirement from its own production facility as well as the market. Consequently, it is extremely difficult to estimate the annual consumption by military alone. Some of the producers contacted have cited that average annual requirement of the Defence Department can be estimated to be approximately **8,000 units of sleeping bags.**

12.44 In order to be able to cater to the **exports market, ready availability of raw material and quality assurance with respect to fabric type, color shades, are the prerequisites**.

SECTION II : TAFFETA TECHNOLOGY AND EQUIPMENTS SUPPLIERS

12.45 Taffeta fabrics are manufactures on conventional shuttle looms as well as unconventional shuttleless looms. Shuttleless looms specially waterjet lloms are preferable because of :

- Higher productivity
- Lower value loss
- Low power cost per unit fabric
- Less noise level

12.46 The raw material used are sized beams of nylon or polyester for warp and unsized yarns in the weft. No warping is required to process the warp.

12.47 The nominal width for weaving is 157.5 cm (62 inches).

International:

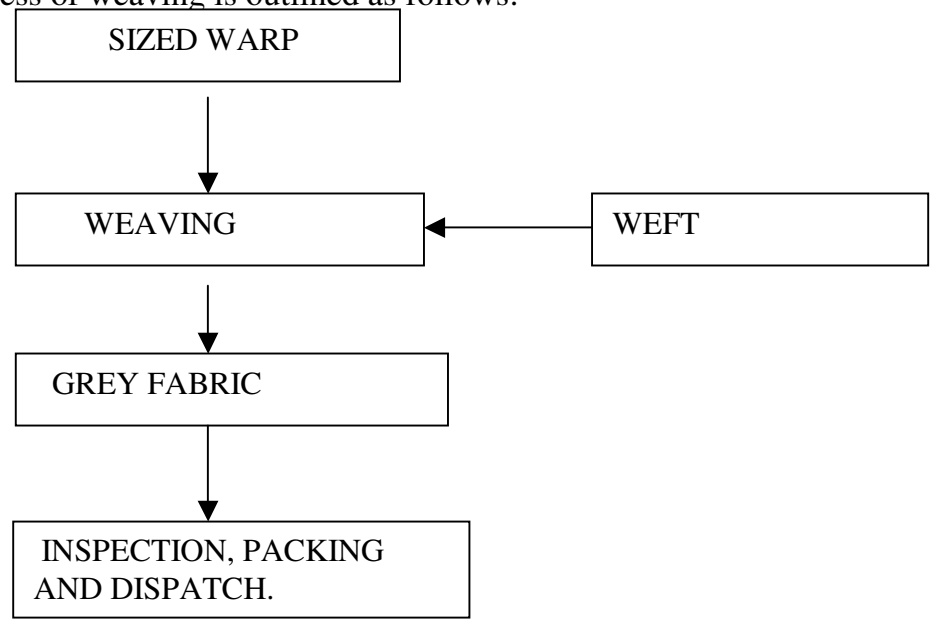
1. **Tsudakoma Corp.**
2. **Nissan**

Indian Representative :

Inditeck
Mumbai - 400 002
Tel.: 2200 0823
Fax : 2206 4687

Indian: (do not supply machinery for water jet looms)

12.48 The basic process of weaving is outlined as follows:



Process Systems and Equipments

12.49 **The machinery items required for the webbing project are:**

1. High Speed Water jet looms Looms.
2. Inspection machine
3. Testing Lab Equipment (Breaking Strength, Tear resistance etc.)

Minimum Recommended Economic Size:

12.50 The Taffeta fabric weaving project proposed to be set up in India will have 20 high speed water jet machines.

12.51 Under Indian operating conditions it is safer to assume machine efficiency factor of 90%, and therefore, the production would be **274 m per day per loom.**

12.52 The plant would operate in three shifts, 24 hours and 300 working days in a year.

Investment in Process Plant and Machinery

12.53 As per the indicative budgetary quotations, **the investment in the plant and machinery will be Rs 2.4 crores** (FOB). Finer details on the Equipment specifications and the formal quotations need to be discussed with the technology supplier before the project is taken up. Taking into account the CIF value , the custom duties (Custom duty of 5%), inland transportation, erection and commissioning (2%), **the installed cost of process equipment would be Rs 2.57 crores.**

SECTION III : PROJECT COST & PROFITABILITY PROJECTIONS

Land

12.54 The total requirement of land for this project keeping in mind the possible future expansion is around 2000 Sq. Mtrs. (0.5 acres).

12.55 Based on the available information the cost of land is assumed at Rs 1200 per square meter (including the developmental cost).Depending on the exact

location of the project to be determined by the promoter the land cost could be higher or lower. Hence the total cost of developed land will be **Rs 0.24 crores**.

Buildings

12.56 The building area comprising of main factory building, godowns, office , labs / In-house Testing centre etc. would be 1200 sq. mtrs. The cost of construction would again vary depending on the structure and the materials to be used. It has been assumed that the average cost of construction would be Rs 4500 per sq. mtr. Thus the total cost of building and other civil works would be around **Rs 0.54 crores**.

Plant and Machinery

12.57 Details of Plant and machinery as well as technology required for the project have been presented in earlier Section II . The installed cost of plant and machinery would be **Rs 2.57 crores**. Apart from the main process equipments the utilities required are:

- Electricals,
- Piping,
- Power,
- Water supply,
- Compressors,
- Softening plant
- Deminaralised plant
- Fire Fighting Equipments etc.

12.58 The provision on this count is taken as 5 % of the cost of machinery which works out to **Rs 0.13 crores**.

Miscellaneous Fixed Assets

12.59 Under this head the items included are Furniture and fixtures, Office equipments,. and the provision made is around **Rs 0.02 crores (Rs 2.0 lakhs)**.

Testing Equipments

12.60 The following testing equipments are required for the Taffeta plant:

- Tensile Strength of yarn and fabric
- Tear Testing
- Mass per unit area

- Thickness Gauze

12.61 The Testing and R&D facilities would call for an investment of around **Rs.0.05 crores (Rs 5.0lakhs)**

Project Engineering and Consulting

12.62 No project consultancy is required for this project.

Preliminary & Preoperative Expenses

12.63 The items included under this head are company formation expenses, interest during construction, pre-production expenses, during the implementation phase etc. 12% on the cost of plant and machinery inclusive of testing equipments has been considered .

Contingency Expenses

12.64 Depending on the gestation period and further detailing of the project cost by the promoter, the contingency provision has been made at the rate of 10%.

Margin Money for Working capital

12.65 The margin money for working capital forming part of the total project cost would be **Rs 0.33 crores** .[**Exhibit 12.4**]

Total Project Cost (Total Investment)

12.66 The total project cost as given in **Exhibit 12.1** would be **Rs 4.60 crores**.

Project Funding And Financing Pattern

12.67 It has been assumed that the project would be financed through long term funds and Equity participation by the Promoter / Public. The technical textile sector being a high priority area, it is assumed that a Debt- Equity ratio of 1.5 : 1 would be feasible. (However the sensitivity analysis has also been presented for 1 : 1 and 2 : 1 Debt Equity ratios.)

Sales , Profitability And Sensitivity Analysis

Sales Realisation and Turnover

12.68 As per the details available from the Technology and Equipment suppliers the economic size of a plant is **20 water jet looms.**

12.69 Under the Indian conditions, it is assumed that the machine would operate at an efficiency level of 90 %. Hence the production from the plant would be **274 m per loom per day**.

12.70 The plant would operate on Three -shift basis and 300 workings days in a year.

12.71 The capacity utilisation for the 1st year is assumed at 80% and thereafter for the 2nd year onwards 90% respectively.

12.72 The average selling price of the end product would be **Rs 34/mt** (net of excise duties, sales tax and other incidental expenses)

12.73 Annual sales is projectd at Rs 5.48 crores.The details of sales turnover projected are given in **Exhibit 12.2.**

Cost of Production

Major Raw materials

12.74 The main raw materials used and the corresponding prevailing indicative prices are as follows:

Major Raw Materials	**Basic Price**	**Remarks (Excise duty)**
Nylon Tenacity Yarn Warp 70 denier Sized	**Rs 160** per kg + Rs 40 per kg sizing charges (without excise)	**16%**
Weft 70 Denier	Rs 160 per kg (without excise)	**16%**

12.75 Nylon Filament Yarn (NFY) and Polyester Filament Yarn)PFY) suppliers:

International Suppliers:

(a) Tejin Indonesia
(b) Tory, Indonesia
(c) Kohap, S Korea
(d) Kolon, South Korea

Indian Supplier

(a) Century Enka
(b) Reliance
(c) Indorama
(d) JCT
(e) GSFC

Conversion Cost

12.76 The conversion cost will include the cost of power, water , consumables, etc. which is estimated at Rs 0.87 crores**.** Break up is as follows:

Sr. No.	Particulars	Basis	Rate	Amount per annum, Rs Cr.
1.	Power (17.18 kWh for 20 loom + 7.47 for lighting, pumps etc.	24.65 kWh	Rs 4.5 per kWh	0.80
2.	Water charges	80000 litres per day for 20 looms	Rs 13/1000 litres	0.03
3.	Stores and spares	Estimated	Rs 30000 per month.	0.04
Total				**0.87**

Repair & Maintenance

12.77 The repair and maintenance cost would be at 2.5% of the Plant & Machinery cost i.e. **Rs. 0.06Cr**

Manpower ,Salaries and Wages

12.78 The manpower requirements and the salary structure is given in **Exhibit 12.3.**

12.79 The total manpower requirement comprising of supervisors , machine operators, helpers and the managerial cadre would be 22 nos. Total wage bill inclusive of fringe benefits is estimated at Rs 0.13 crores.

Factory and Overhead Expenses

12.80 The items covered under this head are repairs and maintenance, establishment expenses, travel expenses, packaging expenses, etc.

Marketing and Promotional Expenses

12.81 For marketing and promotion, a provision of 3% of sales has been made uniformly over the years.

Interest and Depreciation

12.82 The prevailing interest rate for long term and short term borrowed funds is assumed at 8 % per annum (Technology Upgradation Fund).

12.83 The repayment of loans has been assumed for 8 years with two years moratorium.

12.84 The depreciation rates as per the Company Law and Income-Tax Ready Reckoner have been worked out for Straight Line and WDV Method basis.

12.85 The current corporate tax rate is assumed at 35 % and the surcharge is assumed at 2.5% per annum.

Profitability, Break-even, IRR and Payback .

12.86 The **Sales turnover** increases from Rs 4.39 Cr. in the first year to Rs 5.48 Cr. from the 2nd year onwards.

12.87 The **PBT** increases from **Rs 0.13 Cr**. in the first year to **Rs. 0.48 Cr**. in the 10th year. (See **Exhibit 12.5**)

12.88 The **Break Even** of the project is at **56.8%.**

12.89 The **Internal Rate of Return (IRR)** has been worked out at **9%**.

12.90 The **Payback period** for the project is about **4.5 years** .

Sensitivity Analysis.

12.91 The sensitivity analysis has been presented in the **Exhibit 12.6**

12.92 At a selling price of Rs 34 per meter and the existing custom duty structure of 20% or Rs 115 per Kg (Whichever is higher)Taffeta cloth, the project is not very attractive unless one goes for high volume as the margin is very low.

12.96 A a **selling price** of Rs 35 and Rs 33 per mtr the IRR comes to 16% and 5% as against an IRR of 9^ at selling price of Rs 34 per mt. He profitability is price sensitive.

12.97 A reduction in raw material price by 10% increases the IRR value to 16%.

EXHIBIT 12.1

PROJECT COST
(LAND, BUILDINGS, PROCESS PLANT & MACHINERY, UTILITIES & OTHER ASSETS)

		Project Cost (Rs. Cr.)
1	**Land** (Area: 2000 Sq. Mtrs.) Rate: (Rs.1200 /Sq. Mtr)	**0.24**
2	**Buildings** (Plant Area, Office, Godown, Lab, Service Area etc.) Built-up Area : 1200 Sq. Mtrs Avg Rate : Rs.4500 /Sq. Mtrs	**0.54**
3	**Process Plant & Equipment**	**2.57**
4	**Utility & Other equipments** (Compressor, DM Plant, Softening Plant, etc.)	**0.13**
5	**Testing Equipments**	**0.05**
6	**Misc. Fixed Assets** (Furniture & Fixtures, Office Equipment, etc.)	**0.02**
7	**Project Engineering & Consultancy charges**	**0.00**
8	**Preliminary & Pre-operative Expenses (12%)** (Company Formation, Interest during construction, pre-production expenses, etc.)	**0.33**
9	**Contingency (10 %)**	**0.39**
10	**Total**	**4.27**
11	**Margin Money for Working Capital**	**0.33**
12	**Total Project Cost**	**4.60**

EXHIBIT 12.2

ESTIMATION OF SALES REVENUE

(Rs. Cr.)

ITEM	YEAR OF OPERATION									
	I	II	III	IV	V	VI	VII	VIII	IX	X
Average Production per day per loom (mt.)	305	305	305	305	305	305	305	305	305	305
90% efficiency	275	275	275	275	275	275	275	275	275	275
Capacity Utilisation %	80%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Actual Production per hr (mt.)	220	274	274	274	274	274	274	274	274	274
Production per day for 20 looms (mt.)	4392	5480	5480	5480	5480	5480	5480	5480	5480	5480
Production for 300 working days (mt.)	1317600	1644000	1644000	1644000	1644000	1644000	1644000	1644000	1644000	1644000
Selling Price (Rs/mt.)	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00
Sales Revenue (Rs. Cr)	**4.48**	**5.59**	**5.59**	**5.59**	**5.59**	**5.59**	**5.59**	**5.59**	**5.59**	**5.59**
Value Loss (2%)	0.09	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
Net Sales Revenue (Rs. Cr)	**4.39**	**5.48**	**5.48**	**5.48**	**5.48**	**5.48**	**5.48**	**5.48**	**5.48**	**5.48**

EXHIBIT 12.3

MANPOWER REQUIREMENTS

	Nos	**Monthly**	**Total Monthly Salary**	**Annual**
Technical Manager	1	20000	20000	240000
Technical Assistant	2	10000	20000	240000
Weaver	3	4000	12000	144000
Reliever	3	4000	12000	144000
Grey Checking	1	4000	4000	48000
Jobber/Fitter	2	4000	8000	96000
Helper	2	2500	5000	60000
DM PlantOperator	1	2500	2500	30000
Drawer & Reacher	1 pair	6000	6000	72000
Testing	1	4000	4000	48000
Clerical Staff	1	3000	3000	36000
Security	3	2500	7500	90000
TOTAL	**22**			**1248000**
Fringe Benefits (40 % of the above)				499200
Total Wage Bill (Annual) Rs. lakhs:			Salary + Other Benefits =	**17477200.00**
Total Wage Bill (Annual) Rs. Cr.:				**0.17**

EXHIBIT 12.4

REQUIREMENT OF WORKING CAPITAL

(Rs.Cr)

ITEM	NO. OF MONTHS	MARGIN (%)	YEAR I			YEAR II			YEAR III			YEAR IV			YEAR V		
			W.CAP REQMT	MARGIN MONEY	BANK FINANCE	W.CAP REQMT	MARGIN MONEY	BANK FINANCE	W.CAP REQMT	MARGIN MONEY	BANK FINANCE	W.CAP REQMT	MARGIN MONEY	BANK FINANCE	W.CAP REQMT	MARGIN MONEY	BANK FINANCE
Factory Related																	
Raw materials & other commodities	1.00	25.00	0.21	0.05	0.16	0.46	0.12	0.34	0.46	0.12	0.34	0.46	0.12	0.34	0.46	0.12	0.34
Finished Goods	1.00	25.00	0.30	0.08	0.22	0.37	0.09	0.28	0.37	0.09	0.28	0.37	0.09	0.28	0.37	0.09	0.28
A/c Receivable	1.00	25.00	0.37	0.09	0.28	0.46	0.12	0.34	0.46	0.12	0.34	0.46	0.12	0.34	0.46	0.12	0.34
Cash in hand																	
Salaries & wages	1.00	0.00	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01
Utilities	1.00	0.00	0.06	0.00	0.06	0.07	0.00	0.07	0.07	0.00	0.07	0.07	0.00	0.07	0.07	0.00	0.07
Repairs & Maintenance	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Marketing & Promotional Expenses	1.00	0.00	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01
Admin. Overheads	1.00	0.00	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01
Total Requirement			**0.97**	**0.22**	**0.74**	**1.39**	**0.33**	**1.07**	**1.39**	**0.33**	**1.07**	**1.39**	**0.33**	**1.07**	**1.39**	**0.33**	**1.07**

EXHIBIT 12.4 (Contd..)

REQUIREMENT OF WORKING CAPITAL

(Rs.Cr)

ITEM	NO. OF MONTHS	MARGIN (%)	YEAR VI			YEAR VII			YEAR VIII			YEAR XI			YEAR X		
			W.CAP REQMT	MARGIN MONEY	BANK FINANCE	W.CAP REQMT	MARGIN MONEY	BANK FINANCE	W.CAP REQMT	MARGIN MONEY	BANK FINANCE	W.CAP REQMT	MARGIN MONEY	BANK FINANCE	W.CAP REQMT	MARGIN MONEY	BANK FINANCE
Factory Related																	
Raw materials & other commodities	1.00	25.00	0.46	0.12	0.34	0.46	0.12	0.34	0.46	0.12	0.34	0.46	0.12	0.34	0.46	0.12	0.34
Finished Goods	1.00	25.00	0.37	0.09	0.28	0.37	0.09	0.28	0.37	0.09	0.28	0.37	0.09	0.28	0.37	0.09	0.28
A/c Receivable	1.00	25.00	0.46	0.12	0.34	0.46	0.12	0.34	0.46	0.12	0.34	0.46	0.12	0.34	0.46	0.12	0.34
Cash in hand																	
Salaries & wages	1.00	0.00	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01
Utilities	1.00	0.00	0.07	0.00	0.07	0.07	0.00	0.07	0.07	0.00	0.07	0.07	0.00	0.07	0.07	0.00	0.07
Repairs & Maintenance	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Marketing & Promotional Expenses	1.00	0.00	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01
Admin. Overheads	1.00	0.00	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01
Total Requirement			**1.39**	**0.33**	**1.07**	**1.39**	**0.33**	**1.07**	**1.39**	**0.33**	**1.07**	**1.39**	**0.33**	**1.07**	**1.39**	**0.33**	**1.07**

EXHIBIT 12.5

PROFITABILITY STATEMENT AND COMPUTATION OF TAX

(Rs.Cr)

ACCOUNT HEAD	FINANCIAL YEAR OF OPERATION									
	I	II	III	IV	V	VI	VII	VIII	IX	X
Revenue										
Net Sales Turnover	4.39	5.48	5.48	5.48	5.48	5.48	5.48	5.48	5.48	5.48
Total Revenue	4.39	5.48	5.48	5.48	5.48	5.48	5.48	5.48	5.48	5.48
Expenses										
Raw Materials	2.49	3.11	3.11	3.11	3.11	3.11	3.11	3.11	3.11	3.11
Salaries & wages	0.14	0.17	0.18	0.19	0.20	0.21	0.22	0.23	0.24	0.25
Conversion Cost	0.70	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Repairs & Maintenance	0.05	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Marketing & Promotional Expenses	0.08	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Factory & Office Overheads	0.13	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16
Other Expenses	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest on S.T. Loans	0.06	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
Cost of Sales	3.64	4.58	4.59	4.60	4.61	4.62	4.63	4.64	4.65	4.66
Operating profit	0.75	0.90	0.89	0.88	0.87	0.86	0.85	0.84	0.83	0.82
Depreciation (St.Line)	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Interest on L.T Loan	0.29	0.29	0.26	0.22	0.18	0.15	0.11	0.07	0.04	0.01
Profit Before Tax	0.13	0.28	0.30	0.33	0.36	0.38	0.41	0.44	0.46	0.48
Tax	0.01	0.02	0.06	0.11	0.15	0.18	0.21	0.24	0.25	0.26
Profit After Tax	0.12	0.26	0.24	0.22	0.21	0.20	0.21	0.21	0.21	0.22
Dividend	0.00	0.00	0.06	0.06	0.06	0.12	0.12	0.12	0.12	0.12
Profits For Appropriation	0.12	0.26	0.24	0.22	0.21	0.20	0.21	0.21	0.21	0.22

EXHIBIT 12.5 (Contd..)

PROFITABILITY STATEMENT AND COMPUTATION OF TAX

(Rs.Cr)

ACCOUNT HEAD	FINANCIAL YEAR OF OPERATION									
	I	II	III	IV	V	VI	VII	VIII	IX	X
COMPUTATION OF TAX										
Profit after interest before depreciation	0.46	0.61	0.63	0.66	0.69	0.71	0.74	0.77	0.79	0.81
Depr.(WDV) to be claimed	0.82	0.62	0.47	0.35	0.26	0.20	0.15	0.10	0.08	0.06
Depreciation claimed	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Depr. carried forward	0.49	0.29	0.14	0.02	0.00	0.00	0.00	0.00	0.00	0.06
Export Income exempt from tax	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Taxable Profit	-0.36	-0.01	0.16	0.31	0.43	0.51	0.59	0.67	0.71	0.74
Profit Before Tax (Book)	0.13	0.28	0.30	0.33	0.36	0.38	0.41	0.44	0.46	0.48
Minimum Alternate Tax	0.01	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tax (Actual)	0.00	0.00	0.06	0.11	0.15	0.18	0.21	0.24	0.25	0.26
Tax Provision	0.01	0.02	0.06	0.11	0.15	0.18	0.21	0.24	0.25	0.26

EXHIBIT No.12.6

SENSITIVITY ANALYSIS

Items	Profit after Tax (PAT) (assumed at 90 % capacity)	Break Even (%)	Internal Rate of Return (IRR) (%)	Payback Period (Years)
NORMAL VALUES	Rs 0.26 Cr.	56.81	9%	4.4
Change in Selling Price to				
(a) Rs 35 per mtr	0.56	50.51	16%	2.5
(b) Rs 33 per mtr	0.13	62.75	5%	7.5
Decrease in Raw Material Price by10%	0.47	5.23%	16%	3.6

AGRO SHADE NET PROJECT

SECTION I: PRODUCT BRIEF, APPLICATION AREAS & MARKET POTENTIAL

1.1 PRODUCT BRIEF

In the field of Technical Textiles , agriculture is one of the end use sector of national interest. In the agricultural arena various textile base products are used, some are general-purpose industrial application products and some are specialised structures exclusively designed for agricultural applications (Agro textiles). Agro shade net is one of the most popular product in India. Agro shade nets are used in horticulture, floriculture, green house/poly house, forestry and farming arena to protect plantation from the sun in order to ensure healthy plant growth and good harvest.

The main agro shade net is a knitted fabric structure manufactured from polyethylene, Polypropylene polymer that is either tape or monofilament forms etc. Appropriate UV stabilizers are incorporated in base polymer so as to impart Ultra Violet stability property to the shade net structure.

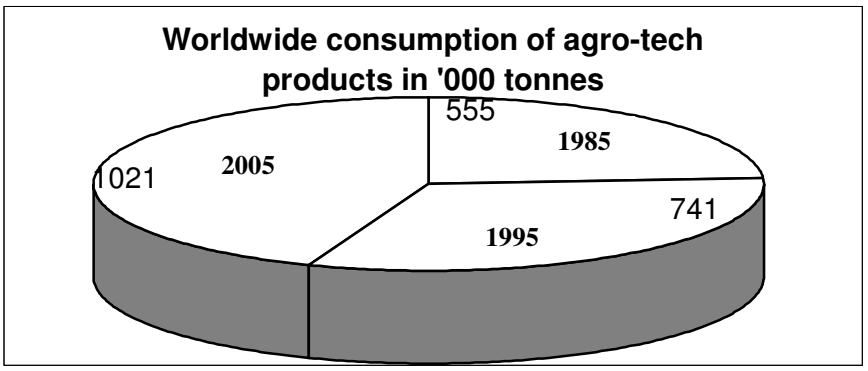
1.2 MAJOR APPLICATIONS AND END USAGE:

- Horticulture.
- Floriculture.
- Green/Poly/Shade house.
- Nurseries
- Forestry

1.3 EMERGING MARKET POTENTIAL - Global And Indian

1.3.1 Global Market Potential* (agro textiles):

Global market potential for agro textile is given below.



** Ref – DRA report (Technical Textiles report)*

Worldwide Consumption of Agro-tech products			
Year	1985	1995	2005
Consumption in 000 tonnes	555	741	1021
Value in US $ million	2517	3636	5088

Projected overall global demand for agro textiles (inclusive of agro shade net) is around 1021000 tonnes (year 2005) valued at $ 5088 million .

1.3.2 Indian Market Potential* :

Indian market potential for agro shade net fabric is presented below in tabular form:

Indian Market Potential for Agro shade net		
	Year	
	2003-2004	2007-2008
Quantity, tonnes	1650	8250
Value, Rs. Cr.	20	99

** Ref – TECS Phase-II report*

The present Indian market size for agro shade net is 1,650 tonnes, worth value of 20 Cr. Rs. It is estimated that consumption for the year 2007 would be 8250 tonnes, costing 99 Cr. Rs.

1.4 MAJOR PRODUCERS

Some of the major producers of agro shade nets in India.

- Netlon India Limited
- Malmo Exim Limited
- Krishi Net Limited

Agro shade nets are produce with 35%, 50%, 75% and 95% shade percentages values with a standard width of 3-8 mts. and roll length of 50/100 mts.

Cost of agro shade net varies from manufacture to manufacture and is dependent on shade percentage and colour. Generally cost per square meter ranges between 15-21. Indicative cost for shade net is given overleaf:

Agro shade nets & its prices		
Shade (%)	**Colour**	**Rates/Mtrs.^{2} (Rs.)**
25-30	Green/White	16
50-55	Green/White	18
65-70	Green/White	19
75-80	Green/White	20
90	Green/White	21
25-30	Black	15
50-55	Black	17
65-70	Black	18
75-80	Black	19
90	Black	20

SECTION II: AGRO SHADE NET MANUFACTURING MACHINERY, TECHNOLOGY AND EQUIPMENTS SUPPLIERS

The technology and the equipment for the Shade net manufacturing is Warp Knitting Machine for structure production and warping machine for preparation of suitable yarn beams. These machines are supplied by globally recognised player, namely Karl Mayer, Germany, Liba, Germany, etc.

The approximate cost for two knitting machine and one warping machine is Rs.2.02 Cr.

SECTION III: PROJECT COST AND PROFITABILITY PROJECTIONS

3.1 LAND

The total requirement of land for this project is around 1000 Sq. Mtrs. Based on the available information the cost of land is assumed at Rs 1200 per square meter (including the developmental cost). Depending on the exact location of the project to be determined by the promoter, the land cost could be higher or lower. Hence the total cost of developed land will be Rs 0.14 crore (Rs 12 lakhs).

3.2 BUILDINGS

The building area comprising of main factory building, godowns, office, R & D labs/In-house Testing centre etc would be 500 sq. mtrs.The cost of construction would again vary depending on the structure and the materials to be used. It has been assumed that the average cost of construction would be Rs 4500 per sq mtr. Thus the total cost of building and other civil works would be around Rs 0.22 crores (Rs 22 lakhs).

3.3 PLANT AND MACHINERY

Details of Plant and machinery as well as technology required for the project have been given in previous section. The installed cost of plant and machinery would be **Rs 2.02 crores.** Apart from the main process equipments, the utilities required are Electricals, Piping, Water supply, compressors, fire fighting equipments etc. The provision on this count is taken as 5% of the cost of machinery which works out to Rs 0.10 crores.

3.4 MISCELLANEOUS FIXED ASSETS

Under this head the items included are Furniture and fixtures, Office equipments, Air Conditioners etc. and the provision made is around Rs 0.15 crore (Rs 15 lakhs) inclusive of the Testing and R & D facilities.

3.5 PROJECT ENGINEERING AND CONSULTING

Under this head the items included are the fees and expenses on account of Architect fees, project engineering and management (both local and overseas), detailed project reports etc.

3.6 PRELIMINARY & PREOPERATIVE EXPENSES

The items included under this head are company formation expenses, public issue expenses (if any), interest during construction, and pre production expenses during the implementation phase etc.

3.7 CONTINGENCY EXPENSES

Depending on the gestation period and further detailing of the project cost by the promoter, the contingency provision has been made at the rate of 10%.

3.8 MARGIN MONEY FOR WORKING CAPITAL

The margin money for working capital forming part of the total project cost would be Rs 0.10 crores.

3.9 TOTAL PROJECT COST

The total project cost as given in Exhibit 1 would be **Rs 3.34 crores.**

3.10 SALES REALISATION AND TURNOVER

As per the targeted capacity the no. of knitting and warping machine required are two and one respectively.

Under the Indian conditions, it is assumed that the machine would operate at an efficiency level of 75%. Hence the production from the plant would be 1350 Square meters per hour.

The plant would operate on Three-shift basis and 300 workings days in a year.

The capacity utilisation for the 1st year is assumed at 50% and thereafter for the 2nd, 3rd and 4th year onwards 60%, 75% and 90% respectively.

The average selling price of the end product would be Rs 18 per Square meters (net of excise duties, sales tax and other incidental expenses).

The details of projected sales turnover as projected are given in Exhibit 2.

3.11 MAJOR RAW MATERIALS

Polyethylene, Polypropylene tape and monofilament yarn are the main raw materials used in these products.

3.12 MANPOWER, SALARIES AND WAGES

The manpower requirements and the salary structure is given in Exhibit 3.

The total manpower requirement comprising the managerial cadre of supervisors, machine operators and helpers would be 21 persons.

EXHIBIT 1

PROJECT COST
(LAND, BUILDINGS, PROCESS PLANT & MACHINERY, UTILITIES & OTHER ASSETS)

		Project Cost (Rs. Cr.)
1	**Land** Area: 1000 Sq Mtrs Rate: (Rs.1200 /Sq. Mtr)	**0.12**
2	**Buildings** Plant Area, Office, Godown, Lab, Service Area etc.) Built-up Area : 500 Sq. Mtrs Avg Rate : Rs. 4500 /Sq. Mtrs	**0.22**
3	**Process Plant & Equipment**	**2.02**
4	**Utility & Other equipments (5%)** (Power, Water, Compressor, Humidity Control, Fire Fighting, Material Handling etc.)	**0.10**
5	**Misc. Fixed Assets** (Furniture & Fixtures, Office Equipment, Testing Lab etc.)	**0.15**
6	**Project Engineering & Consultancy charges (2.5%)**	**0.0505**
7	**Preliminary & Pre-operative Expenses (12%)** (Company Formation, Interest during construction, pre-production expenses, etc.)	**0.24**
8	**Contingency (10 %)**	
9	**Total**	**2.90**
10	**Margin Money for Working Capital**	**0.10**
11	**Total Project Cost**	**3.34**

EXHIBIT 2

ESTIMATION OF SALES REVENUE (RS. CRORE)

ITEM	YEAR OF OPERATION									
	I	**II**	**III**	**IV**	**V**	**VI**	**VII**	**VIII**	**IX**	**X**
Average Production per hour (Sq.Mts.)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
75% efficiency	1350	1350	1350	1350	1350	1350	1350	1350	1350	1350
Capacity Utilisation	50%	60%	75%	90%	90%	90%	90%	90%	90%	90%
Actual Production per hour(Sq. Mts.)	900	1080	1350	1620	1620	1620	1620	1620	1620	1620
Production per day (Sq.Mts.)	21600	25920	32400	38880	38880	38880	38880	38880	38880	38880
Production for 300 working days (Sq. Mts.)	6480000	7776000	9720000	11664000	11664000	11664000	11664000	11664000	11664000	11664000
Selling Price (Rs/Sq.Mts.)	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00
Sales Revenue (Rs. Cr)	**11.66**	**14.00**	**17.50**	**21.00**	**21.00**	**21.00**	**21.00**	**21.00**	**21.00**	**21.00**
Value Loss (2%)	0.23	0.28	0.35	0.42	0.42	0.42	0.42	0.42	0.42	0.42
Net Sales Revenue (Rs. Cr)	**11.43**	**13.72**	**17.15**	**20.58**	**20.58**	**20.58**	**20.58**	**20.58**	**20.58**	**20.58**

EXHIBIT 3

MANPOWER REQUIREMENTS

	Nos	Monthly	Total Mon.	Annual
Production Manager	1	15000	15000	180000
Machine Operator	6	4000	24000	288000
Machine Helper (Semi Skilled)	3	3000	9000	108000
R&D, Testing	1	10000	10000	120000
Marketing & Sales	3	12000	36000	432000
Clerical Staff	3	4000	12000	144000
Other Staff	2	2500	5000	60000
Maintenance (Mech. & Elec.)	2	4000	8000	96000
TOTAL	**21**		**119000**	**1428000**
Fringe Benefits (40 % of the above)				571200
Total Wage Bill (Annual) Rs. lakhs:		Salary + Other Benefits =		**1999200.00**
Total Wage Bill (Annual) Rs. Cr.:				**0.19992**

FIBER FILL PROJECT

1. PRODUCTS AND TECHNOLOGY

1. A synthetic fiber stuffing for pillows, cushions, quilts, mattresses, baby beds, sleeping bags, soft toys, furniture comforters, bedspreads, industrial insulation, life jackets etc. Polyester fibers are most commonly used.
2. A very wide range of fiber types and qualities are used in the manufacture of these items.
3. Natural materials such as coir, sisal, wool, cotton, kapok, glass and horsehair have been traditionally used as filling materials for upholstered furniture and other applications.
4. Synthetics have advantage over natural fibers in terms of launderability and low propensity to harbour dust or fluff and hence became popular. Making synthetic fibre fire retardant (treated or inherent) is added advantage.
5. The new products are based on hollow fibers incorporating a number of channels or bi-component fibers (in some cases).
6. Fiberfill is crimped polyester staple fiber (PSF) hollow in cross-section so that it has higher bulk, loft, air circulation and resilience, making it soft, light and durable material for filling in comfort products. These fibres are manufactured on standard melt spinning system.
7. These fibers also have advantages like improved shape retention, higher insulation (increased warmth per unit weight) and increased breathability.

2. MAJOR APPLICATIONS

The majority of the fibers are consumed in home textile sector. The application areas may be classified as follows:

<table>
<tr>
<td rowspan="3">

- ***Interior Textiles***
  - Bed Textiles
  - Sleeping bags
  - Furniture components
  - Bath room textiles
  - Accessories
  - Baby mattress
  - Box & folding mattress
  - Quilts
  - Quilted winter garments
  - Ski-suits

</td>
<td>

- ***Automotive Textiles***
  - Car Interiors
  - Seat covers

</td>
</tr>
<tr>
<td>

- ***Stuffed toys***

</td>
</tr>
<tr>
<td>

- ***Industrial***
  - Insulation

</td>
</tr>
</table>

3. GLOBAL & INDIAN MARKET POTENTIAL:

- As compared to other textile sectors, global trades for fibre fill is still relatively low.
- Unlike clothing industry which has become global in terms of its supply chain and its served market, the fiber fill industry remains relatively regionalised.
- End product preferences vary considerably according to culture, history, climate etc. In addition many fill products are difficult and expensive to transport as a result of their bulkiness.
- The domestic market is not adequately developed and the buyers are not aware of different qualities available for soft toys.
- Soft toys from Chinese and other sources, which are available in many varieties and at relatively lower cost, the preference for imported toys will continue.
- India until recently had a fairly unsophisticated and limited industry in this area as compared to developed countries.
- The per capita domestic consumption of fiberfill today is only 20 gms as against 1007 gms in USA implying majority of Indians still have to utilize fiber fill products (Table 1 & 2).

Table-1

Consumption of fibre type

	Filament	**Staple**	**Fiberfill**
US & EU (%)	41	49	10
India (%)	54	45	1

Source: Recron Perfection A Reliance publication – January – March 2003

Table 2

Fibre fill consumption level

	USA	**India**
Population (crore)	27	100
Fiberfill consumption (tpa)	2,90,000	20,000
Per capita consumption	1007 gms	20 gms

Source: Recron Perfection A Reliance publication – January – March 2003

- Market size (domestic) for fiberfill was 48,000 tonnes valued at Rs. 288 Cores (2001-02)

4. MAJOR MANUFACTURERS

- Reliance Industries Ltd.
- Arora fiber Ltd.
- Harish Fiber Ltd.
- Nirmal Fiber Ltd.
- Ganesh Polytex Ltd.

5. PLANT DETAILS

Equipment supplier	1. Zimmer GmbH, Germany 2. Enka tecnica, Germany 3. Viba Siat, Italy 4. Comoli Fermo S.r.l., Italy 5. Barmag, Germany 6. Erema, Austria 7. Huitong Polyester Corporation, China	
Capacity	2500 tpa	1.5 – 4 D @ 800 – 1000 mpm spinning speed @ 95% efficiency
Essential machineries	Main spinning system Downstream processing machineries	Dryer – hopper – blender – extruder – spinneret – spinning chute – tow formation Stacking – Drawing – heatsetting – finish applicator – crimping – relaxation and thermosetting – cutting baling
Project cost	2.5 Crores	Turnkey project execution – 12 months

Note: M/s Huitong Corp., China has been considered for estimation purposes since they supply the most economy size plant and machineries

6. REGULATORY FRAMEWORK & POLICY ISSUES

- Institutional buyers like defense, tourism industry, disaster management programme authorities; relief service bodies (especially in colder region) etc. may be insisted to consume these products
- Inter ministerial support is essential to promote these goods
- Impose hefty import duty for finished goods to discourage entry
- Propose more promotional programmes to increase awareness

7. TESTING REQUIREMENT & FACILITIES

Sr. No.	Property	Facility available
1	Thermal insulation	In standard textile testing laboratories across the country are equipped with all relevant testing facilities for the fibre fill products. This includes both fibre and finished goods.
2	Flame retardancy	-- do --
3	Resiliency	-- do --
4	Tensile properties	-- do --

SECTION II: FIBER FILL TECHNOLOGY AND EQUIPMENTS SUPPLIERS

Process Description:

The fiber fill process is a melt spinning system involving the direct conversion of a polymer into staple fibers.

The typical melt spinning process consists of several integrated steps in the conversion of polymer into staple fibers. The major elements of the process are :

Material preparation system

The system includes bottle breaker, mixer, and washing facility; it will process the raw material like wasteful bottles, wasteful yarn, fiber and polyester blocks to be uniform material for drying and spinning.

Drying system

During regenerated polyester fiber spinning process, in order to avoid material degradation in high temperature, which may result of high percentage

breakage, adherence, bad finishing property and low tenacity, moisture of PET material should be decreased prior to spinning

Material is charged into vacuum driers through hopper. The vacuum driers are jacketed and heated by steam; it's tilted to expedite the material rolling in vacuum drier. To expedite drying process, one vacuum system containing vacuum pump and dust separator will be equipped for vacuum setup. One batch drying time will be about 10 hours. After drying, the moisture will be not more than 0.001%.

Spinning system

Polyester material is extruded to be polymer melt in extruder by heating and extrusion, The polymer melt melted by screw extruders is uniformly distributed to spinning beam through manifold for spinning. Polymer melt in extruders shall be heated by electricity through jacket. In addition two polymer filters shall be equipped in conjunction with each extruder for polymer filtration.

One spinning machine shall be equipped which contains two spinning beams, Spinning beams are heated by downtherm vapor; one electric downtherm heaters are equipped for the spinning machine. The downtherm heating system is of close circulation. Downtherm shall be of mixed composition of 75% biphenyl aether and 25% biphenyl. Each spinning beam contains four positions, therefore there will equip total eight spinning positions. 8pcs inverter controlled metering pumps shall be equipped for polymer pumping and metering.

Polymer melt is extruded to be undrawn filament by spinneret, 8pcs spinnerets shall be equipped, undrawn filament bundles are cooled and solidified by quench air, then the bundles are inducted to the draw-off machine through quench duct. Quench ducts shall be cooled by quench air system. In order to assure running stability and filament quality excellence, quench air flow, quench air speed and quench air temperature, moisture shall be strictly controlled during melt cooling and solidifying.

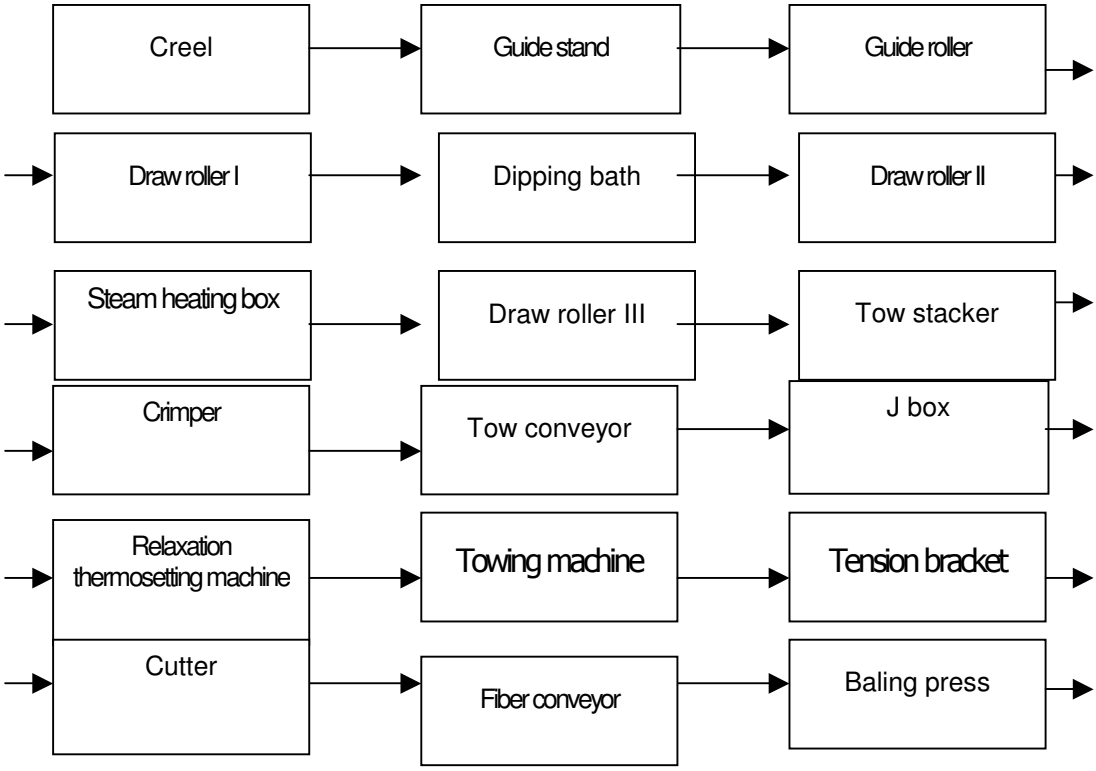
The undrawn filaments from each position are firstly drawn to be one bundle and applied by spin finish for moisture by double face application roller, finally eight bundles are gathered to be one single tow from draw-off machine, tows shall be deposited into cans uniformly via feed roller.

Fiber downstream processing system

Illustration of fiber downstream processing system

The tows produced from spinning system will be not valuable due to their low molecule orientation and tenacity. Tows' drawing shall be required to improve molecule orientation to gain sufficient tenacity and proper elongation property. In addition, tows shall be largely shrunk caused by heating, therefore thermosetting shall be required to improve tows' thermal stability. In consideration of blending spinning with other natural or chemical synthetic fibers, crimping shall be required to increase fibers' yarn forming capability. In order to avoid electrostatic occurring and improve fibers' spinning property, spin finish application shall be proceeded with. Eventually, finishing products shall be produced after cutting and baling. In consequence, fiber downstream processing system will be absolutely needed for fiber production.

Fiber downstream processing system contains gathering, tows' guiding, drawing, stacking, crimping, tows conveying, thermosetting, towing, cutting and baling procedures etc. In case of normal fiber production, relaxation thermosetting machine will only act the purpose of tows conveyor without adding steam for heating. The downstream processing system is illustrated as follows;



Gathering

In order to increase fiber downstream processing system capability, gathering procedure is particularly proceeded with. The quantity of spinning-cans can be adjusted in accordance with the type of product. Un-drawn yarn pulled from cans passed through creel, up guide stand, down guide stand for adjusting its tension.

Drawing

The tensed tow from creel is divided into three plies tow ribbon and drawn into the fiber line area passing the guide roller, dipping bath where three plies tow layer is homogenized. The complete orientation, crystallization of the molecular structure of the filaments is obtained after passing the draw zone. Tows' drawing shall be proceeded with in hot medium.

Inside the first draw zone, between seven roller draw roller I and seven roller draw roller II, the main drawing is achieved at about 72□ which is heated by the dipping draw bath. Tows shall be drawn for 4.0-5.0 times.

Inside the second draw zone, between draw roller II and seven roller draw roller III, the main drawing is achieved at about 90□. The thermal energy for drawing is supplied by steam box which is located in front of the draw roller III, Tows shall be drawn for 1.1-1.2 times.

Rollers of the draw roller III are heated by steam. Normally roller surface speed of the draw roller III is named as drawing speed. It's very important factor of fiber downstream system capability. In the proposed plant, 180m/min will be the maximum drawing speed; 150m/min shall be recommended for normal running.

Polyester fibers' molecule orientation and crystallization shall be largely improved after drawing.

Stacking

The thermosetting tow is sent to the tow stacker in which it is applied by the spin finish. Three bundles of oiled tow are combined to one by passing through the tow stacker. Stacking is achieved by roller, whose bevel angle can be adjusted. The width of tow is important for crimping and combining as well.

Crimping

One crimper is equipped for tows' crimping. Crimping is achieved by the stuffing box in the crimper and in front of it the steam pre-heater supplies the necessary thermal energy, which gives fiber product good properties of yarn forming and nice handing for next manufacture.

Relaxation thermosetting

In case of hollow fiber production, because of hollow fibers' property of relatively lower tenacity and higher elongation, relaxation thermal setting machine shall be applied for hollow fiber production, it's of continuous shade type, in the procedure of relaxation thermosetting, temperature should be controlled at about 140% to control the shrinkage rate to be less than 1%. After relaxation thermosetting, property of relatively lower tenacity and higher elongation of tows shall be obtained.

When producing normal fiber, relaxation thermosetting machine will only act the purpose of tows conveyor without adding steam for heating.

Towing & tension unit

To stabilize the tension of tows before feeding cutter, towing machine and tension unit is equipped for the purpose.

Cutting

One cutter is equipped for fiber cutting. The tow is twined on the blade tray of the cutter, then the roller presses tow to the blade and staple fiber downfalls from inside of the blade tray. The staple fiber length is depended on the distance between two blades on the tray. The wool type is obtained by mixing different length fiber, which is got through different distance among blades.

Baling

One baling press is equipped for fiber baling. The staple fiber is sent to the baling press by the gravity. In the baling press, staple fiber is measured and pressed into bales.

Quenching / Attenuation Zone : As the filaments emerge through the spinnerette holes, they are directed downward into quench chambers or chimneys. As the filaments travel through these chambers, cool air is directed across the

filament bundle to cool the molten filaments sufficiently to cause solidification. The filaments are then led further downward into a tapered conduit by an airstream. A second stream of high velocity air is directed parallel to the direction of the filaments, causing an acceleration and accompanying attenuation or stretching of the individual filaments. This mechanical stretching results in increased orientation of the polymer chains making up the continuous filament. Such orientation leads to increased filament strength, along with modification of other filament properties, including the filament denier or thickness.

Web Forming : The filaments are deposited in a random manner on a moving, porous forming belt. A vacuum under the belt assists in forming the filament web on the forming belt and in removing the air used in the extrusion / orientation operation. In some processes, an electrostatic charge is placed on the filament bundle to ensure spreading and separation of individual filaments. In other processes, deflector plates are used to lay down the filament sheet in a random manner on the forming belt.

Bonding : The continuous filament web is delivered to a bonding section, where one of several bonding methods can be used to bond the loose filaments into a strong, integrated fabric.

Slitting / Winding : The bonded fabric encounters a slitting section where the two edges are trimmed to eliminate the nonuniform, rough edge created during the manufacturing step. In some operations, the fabric may also be further slit into precise, smaller widths to provide finished rolls of precise dimension. Following slitting, the fabric is wound onto a larger roll, either a full width roll or a series of narrow slit rolls. From this point, the fabric rolls are ready for wrapping and shipping.

Recommended Economic Size:

The fiber fill project proposed to be set up in India will have a designed capacity of 2500 TPA (1.5 – 4 D @ 800 – 1000 mpm spinning speed)

Under Indian operating conditions it is safer to assume machine efficiency factor of 75%, and therefore the production would be 1875 TPA.

The plant would operate in three shifts, 24 hours and 300 working days in a year.

Investment in Process Plant and Machinery.

The list of major equipments for the spunbond project is as given above and as per the indicative budgetary quotations , **the investment in the process plant and machinery will be Rs 2.5 crores** (FOB). Finer details on the Equipment listing, specification and the quotations need to be discussed with the technology supplier before the project is taken up. Taking into account the CIF value, the custom duties (Custom duty of 5%), inland transportation, erection and commissioning , **the installed cost of process equipment would be Rs 2.625 crores.**

PROJECT COST AND PROFITABILITY PROJECTIONS (IRR, PAYBACK PERIOD, BREAK-EVEN ETC.)

Land

The total requirement of land for this project keeping in mind the possible future expansion is around 2000 Sq. Mtrs.

Based on the available information the cost of land is assumed at Rs 1200 per square meter (including the developmental cost). Depending on the exact location of the project to be determined by the promoter, the land cost could be higher or lower. Hence the total cost of developed land will be Rs 0.24 crore (Rs 24 lakhs).

Buildings

The building area comprising of main factory building, godowns, office, R & D labs/In-house Testing centre etc would be 1000 sq. mtrs. The cost of construction would again vary depending on the structure and the materials to be used. It has been assumed that the average cost of construction would be Rs 4500 per sq mtr. Thus the total cost of building and other civil works would be around Rs 0.45 crores.

Plant and Machinery

Details of Plant and machinery as well as technology required for the project have been presented in earlier Section 5. The installed cost of plant and machinery would be **Rs 2.65 crores.** Apart from the main process equipments, the utilities required are Electricals, Piping, Water supply, compressors, fire fighting equipments etc. The provision on this count is taken as 5% of the cost of machinery which works out to Rs 0.13 crores.

Miscellaneous Fixed Assets

Under this head the items included are Furniture and fixtures, Office equipments, Air Conditioners etc and the provision made is around Rs 0.35 crore (Rs 35 lakhs) inclusive of the Testing and R & D facilities.

Project Engineering and Consulting

Under this head the items included are the fees and expenses on account of Architect fees, project engineering and management (both local and overseas), detailed project reports etc.

Preliminary & Preoperative Expenses

The items included under this head are company formation expenses, public issue expenses (if any), interest during construction, and pre production expenses during the implementation phase etc.

Contingency Expenses

Depending on the gestation period and further detailing of the project cost by the promoter, the contingency provision has been made at the rate of 10%.

Margin Money for Working capital

The margin money for working capital forming part of the total project cost would be Rs 35 lakhs.

Total Project Cost

The total project cost as given in Exhibit 1 would be **Rs 4.79 crores.**

SALES, PROFITABILITY AND SENSITIVITY ANALYSIS

Sales Realisation and Turnover

As per the details available from the Technology and Equipment suppliers the economic size of a plant is 2500 TPA.

Under the Indian conditions, it is assumed that the machine would operate at an efficiency level of 75%. Hence the production from the plant would be 1875 TPA.

The plant would operate on Three-shift basis and 300 workings days in a year.

The capacity utilisation for the 1st year is assumed at 50% and thereafter for the 2nd, 3rd and 4th year onwards 60%, 75% and 90% respectively.

The average selling price of the end product would be Rs 65 per kg . (net of excise duties, sales tax and other incidental expenses)

The details of projected sales turnover as projected are given in Exhibit 2.

Cost of Production:

Major Raw materials

- The main raw materials used and the corresponding prevailing prices as an indicator are as follows:

Raw Material	Prices (inclusive of all duties)
Polyester Chips (PET chips)	Rs 30.00/kg

- The requirement of PET chips would be 2310 tonnes per annum, accounting for a process waste of 5%.

Conversion Cost

- The conversion cost will include the cost of power, water, chemicals and additives, consumables etc., which is assumed at 15% of the cost of raw material.

Manpower, Salaries and Wages

- The manpower requirements and the salary structure is given in Exhibit 3.
- The total manpower requirement comprising the managerial cadre of supervisors, machine operators and helpers would be 46 persons.

Factory and Overhead Expenses

- The items covered under this head are establishment expenses, repairs and maintenance, stationery, travel expenses, packaging expenses etc.

Marketing and Promotional Expenses

- The promotion of technical textiles will call for expenditure on this count and a provision of 2.5% of the annual sales has been made uniformly over the years.

Interest and Depreciation

- The prevailing interest rate for long term and short term borrowed funds is assumed at 13 % per annum .
- The repayment of loans has been assumed for 5 years with a moratorium period of one year.
- The depreciation rates have been worked out as per Company's act (SLM) and Income-Tax Ready Reckoner (WDV).
- The current corporate tax rate is assumed at 35 % and the surcharge is assumed at 2.5% per annum.
- Profitability statement is given in Exhibit 4.

EXHIBIT 1

PROJECT COST
(LAND, BUILDINGS, PROCESS PLANT & MACHINERY, UTILITIES & OTHER ASSETS)

		Project Cost (Rs. Crore)
1	**Land** Area: 2000 Sq Mtrs Rate: (Rs.1200 /Sq. Mtr)	**0.24**
2	**Buildings** Plant Area, Office, Godown, Lab, Service Area etc.) Built-up Area : 1000 Sq. Mtrs Avg Rate : Rs. 4500 /Sq. Mtrs	**0.45**
3	**Process Plant & Equipment**	**2.65**
4	**Utility & Other equipments (5%)** (Power, Water, Compressor, Humidity Control, Fire Fighting, Material Handling etc.)	**0.13**
5	**Misc. Fixed Assets** (Furniture & Fixtures, Office Equipment, Testing Lab etc.)	**0.35**
6	**Project Engineering & Consultancy charges (2.5%)**	**0.07**
7	**Preliminary & Pre-operative Expenses (12%)** (Company Formation, Interest during construction, pre-production expenses, etc.)	**0.30**
8	**Contingency (10 %)**	**0.25**
9	**Total**	**4.44**
10	**Margin Money for Working Capital**	**0.35**
11	**Total Project Cost**	**4.79**

EXHIBIT 2

ESTIMATION OF SALES REVENUE

ITEM	YEAR OF OPERATION									
	I	**II**	**III**	**IV**	**V**	**VI**	**VII**	**VIII**	**IX**	**X**
Average Production per hour (kg)	350	350	350	350	350	350	350	350	350	350
75% efficiency	263	263	263	263	263	263	263	263	263	263
Capacity Utilisation	50%	60%	75%	90%	90%	90%	90%	90%	90%	90%
Actual Production per hour	175	210	263	315	315	315	315	315	315	315
Production per day (kg)	4200	5040	6300	7560	7560	7560	7560	7560	7560	7560
Production for 300 working days (kg)	1260000	1512000	1890000	2268000	2268000	2268000	2268000	2268000	2268000	2268000
Selling Price (Rs/Kg)	65.00	65.00	65.00	65.00	65.00	65.00	65.00	65.00	65.00	65.00
Sales Revenue (Rs. Cr)	**8.19**	**9.83**	**12.29**	**14.74**	**14.74**	**14.74**	**14.74**	**14.74**	**14.74**	**14.74**
Value Loss (2%)	0.16	0.20	0.25	0.29	0.29	0.29	0.29	0.29	0.29	0.29
Net Sales Revenue (Rs. Cr)	**8.03**	**9.63**	**12.04**	**14.45**	**14.45**	**14.45**	**14.45**	**14.45**	**14.45**	**14.45**

EXHIBIT 3

MANPOWER REQUIREMENTS

	Nos	**Monthly**	**Total Mon.**	**Annual**
General Manager	1	30000	30000	360000
Production Manager	1	15000	15000	180000
Machine Operator	9	4000	36000	432000
Machine Helper (Semi Skilled)	12	3000	36000	432000
R&D, Testing	5	10000	50000	600000
Marketing & Sales	6	12000	72000	864000
Clerical Staff	5	4000	20000	240000
Other Staff	5	2500	12500	150000
Maintenance (Mech. & Elec.)	2	4000	8000	96000
TOTAL	**46**		**279500**	**3354000**
Fringe Benefits (40 % of the above)				1341600
Total Wage Bill (Annual) Rs. lakhs:		Salary + Other Benefits =		**4695600.00**
Total Wage Bill (Annual) Rs. Cr.:				**0.47**

EXHIBIT 4

PROFITABILITY STATEMENT AND COMPUTATION OF TAX

(Rs. Crore)

ACCOUNT HEAD	I	II	III	IV	V	VI	VII	VIII	IX	X
Revenue										
Net Sales Turnover	8.03	9.63	12.04	14.45	14.45	14.45	14.45	14.45	14.45	14.45
Total Revenue	8.03	9.63	12.04	14.45	14.45	14.45	14.45	14.45	14.45	14.45
Expenses										
Raw Materials	3.97	4.76	5.95	7.14	7.14	7.14	7.14	7.14	7.14	7.14
Salaries & wages	0.47	0.49	0.52	0.54	0.57	0.60	0.63	0.66	0.69	0.73
Power, Fuel, Stores & Other Expenses (including packing materials)	0.60	0.71	0.89	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Marketing & Promotional Expenses	0.20	0.24	0.30	0.36	0.36	0.36	0.36	0.36	0.36	0.36
Factory & Office Overheads	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Interest on S.T. Loans	0.16	0.19	0.24	0.29	0.29	0.29	0.29	0.29	0.29	0.29
Cost of Sales	6.20	7.20	8.71	10.21	10.24	10.27	10.30	10.33	10.36	10.39
Depreciation (St.Line)	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
Amort. of Expenses	0.19	0.19	0.19	0.19	0.19	0.19	0.00	0.00	0.00	0.00
Interest on L.T Loan	2.38	2.14	1.66	1.18	0.70	0.23	0.00	0.00	0.00	0.00
Profit Before Tax	-0.96	-0.12	1.26	2.65	3.10	3.54	3.93	3.90	3.87	3.83
Tax	0.08	0.59	1.40	2.22	2.18	8.31	9.39	9.83	10.16	10.40
Profit After Tax	0.68	5.01	11.97	18.92	20.90	16.19	16.44	15.95	15.57	15.27

EXHIBIT 4 (Contd..)

PROFITABILITY STATEMENT AND COMPUTATION OF TAX

(Rs. Crore)

ACCOUNT HEAD	I	II	III	IV	V	VI	VII	VIII	IX	X
Dividend	0.00	0.00	2.52	2.52	2.52	5.04	5.04	5.04	5.04	5.04
Profits For Appropriation	0.68	5.01	9.45	16.40	18.38	11.15	11.41	10.92	10.53	10.24
COMPUTATION OF TAX										
Profit after interest before depreciation	7.19	12.03	19.80	27.57	29.51	30.94	32.26	32.21	32.16	32.10
Depr.(WDV) to be claimed	29.20	44.04	48.62	41.37	23.29	7.18	5.44	4.13	3.14	2.39
Depreciation claimed	7.19	12.03	19.80	27.57	23.29	7.18	5.44	4.13	3.14	2.39
Depr. carried forward	22.02	32.01	28.82	13.80	0.00	0.00	0.00	0.00	0.00	0.00
Taxable Profit	0.00	0.00	0.00	0.00	6.22	23.75	26.82	28.08	29.02	29.71
Profit Before Tax (Book)	0.75	5.60	13.37	21.14	23.08	24.50	25.83	25.78	25.73	25.67
Minimum Alternate Tax	0.08	0.59	1.40	2.22	0.00	0.00	0.00	0.00	0.00	0.00
Tax (Actual)	0.00	0.00	0.00	0.00	2.18	8.31	9.39	9.83	10.16	10.40
Tax Provision	0.08	0.59	1.40	2.22	2.18	8.31	9.39	9.83	10.16	10.40

EXHIBIT 5

SENSITIVITY ANALYSIS

Items	Profit after Tax (PAT) Rs. Cr. (assumed at 90 % capacity)	Break Even (%)	Internal Rate of Return (IRR) (%)	Payback Period (Years)
NORMAL VALUES	18.92	43.29	15.99	5.17
Debt Equity Ratios				
(a) 2:1	18.43	44.75	16.14	5.11
(b) 1:1	19.65	41.09	15.74	5.28
Increase in Project Cost by 10 %	17.88	46.41	14.4	5.61
Decrease in Selling Price By 10%	10.85	56.73	11.13	6.7
Increase in Selling Price by 10%	25.35	35.19	20.45	4.35
Decrease in Raw Material Prices by 10%	25.58	37.69	18.91	4.58

INDUSTRIAL FILTER FABRICS

SECTION I: PRODUCT BRIEF, APPLICATION AREAS & MARKET POTENTIAL

1.1 PRODUCT BRIEF

1. Fabric filters are used for various filtration purposes in both dry & wet applications.

2. Textile materials especially woven & non-woven fabrics are particularly suitable for filtration because of their complicated structures and considerable thickness.

3. Textile fabrics are a 3-D network of fibers enclosing small pockets of void volume. Dust particles have to follow a "tortuous" path around textile fibers.

4. Due to their structures, textile fabrics have high filtration efficiencies. Textile materials do not restrict the flow of the fluid too much, yet they efficiently stop the particles.

5. The filter fabric should possess greatest possible collection efficiency, low pressure drop, small filtering area, low penetration of the dust in the fabric and low cost.

6. Also it must have good abrasion resistance, chemical resistance, tensile strength and permeability.

7. The conventional filter cloth is made up of cotton, wool, viscose and polyamide etc. but these fibers have some deficiencies to match the end use requirement.

8. To overcome the disadvantages polypropylene fibers can be used due to their resistance to chemical breakdown and higher bulk with lightweight.

9. Higher performance requirements for filtration systems are being driven by industry needs for improved productivity and by stricter environmental requirements.

1.2 MAJOR APPLICATIONS

1. Chemical industry is the largest consumer of the filter fabrics, involving main application of solid-liquid separation.

2. The Fabric filters are used for various filtration purposes, which include dust filtration, the purification of gases, the removal of suspended materials from liquids and also for gas and liquid chromatography.

3. Major filtration segments

Aerospace
- HVAC
- Fuel
- Hydraulic

Chemical Process Industry
- Chemicals
- Paints
- Pneumatic Air
- Water & Wastewater

Cigarettes
- Tips

Coal
- Washing

Coalescing
- Aerospace
- Automotive

Dust Collection
- Baghouse Filters
- Pleated Cartridges

Coolant
- Aerospace
- Automotive
- Aluminum Cans

Fluid Power (Hydraulics)
- Mobile
- Stationary
- Vents

Food & Beverage
- Beer, Wine and Liquor
- Cheese Whey
- Coffee & Tea
- Cooking Oils
- Flour & Sugar Sifting
- Make-up Water

1.3 GLOBAL & INDIAN MARKET POTENTIAL:

1. Industrial survey reports a 20% growth rate in the consumption of the filter fabrics worldwide.

2. The market for filters in the US will grow 4.7 percent annually through 2007. Gains will be driven by environmental laws, manufacturers' interest in water

recycling, and the proliferation of newer products such as motor vehicle cabin air filters. Engine filters will remain dominant while fluid filters grow the fastest. The consumer market will post the strongest gains.

3. The world market for filtration media will rise from $17 million in 1998, to over $75 billion in 2020, according to McIlvaine's report, *World Filter Media Market in 2020*.

4. The world market for equipment and bags will exceed $4.5 billion by 2003.

5. China will be the largest purchaser in the cement and metals segment while the U.S. will be the leader in power plant fabric filter purchases.

6. Around 70% of the market volume is accounted by unspun fiber tow, used to form the main filter of a cigarette

7. Radical changes in filtration media shape and performance are changing the approach to traditional applications and expanding the market at the expense of precipitators (cement and power).

8. Health concerns over submicron particle inhalation will add momentum to the market and require the use of higher efficiency media.

9. The modular small collector market (less than 2,000 cfm) is a sizable and profitable market segment.

10. The largest growth will come in the high temperature segment (greater than 350° F).

11. The market for integrated systems which remove both particles and gases (such as S02 and HCl) will grow at a double digit rate.

1.4 MAJOR MANUFACTURERS IN INDIA

1 Arunodaya Textiles, Mumbai
2 Garuda Nonwovens, Mumbai
3 Giri Textiles Pvt Ltd, Bangalore
4 Khosla Profil Pvt. Ltd., Mumbai
5 Krishna Corporates, Mumbai
6 N K Filter Fabrics Pvt Ltd, Mumbai
7 Pure Filter Systems, Pune
8 Siddhi Filter Media, Mumbai
9 Sri Ram Filteration & Engg. Co., Mumbai

10 Sky Industrial Traders, Pune
11 Skytouch Tapes Pvt Ltd, Mumbai
12 Stella Enterprises, Pune
13 Tirupati Polymers, Secunderabad
14 Ucco-Mech Filters Pvt. Ltd., Pune
15 Varun Impex , Mumbai

1.5 PLANT DETAILS

Woven & Nonwoven fabrics are used, depending on the end product.

Economic Capacity: **(Considering woven fabrics only)**	Winding Machine: 2 Warping Machine: 1 Shuttleless looms : 12 Stenter: 1 Calendering Machine: 1 Working width : 2 mts. Rpm: 400 rpm Others: Sectional warping/ yarn preparatory machines, Calendering & Heat setting
Plant and machinery Cost	**Rs. 4.0 Cr.**

1.6 Global Technology and Equipment Suppliers

Major Machinery suppliers	***Weaving Machinery*** 1. Sultex, Switzerland 2. Lindauer Dornier, Germany 3. Promatech, Italy 4. Texo, Sweden 5. Jaeger, Germany 6. Picanol, Belgium 7. Benninger, Switzerland ***Processing Machinery*** 1. Gayatri, India 2. Kusters-Calico, Germany-India 3. Ramisch Guarneri, Italy 4. TEPA, Spain 5. Harish-Textmac, India 6. Krantz, Germany 7. Devrekha, India 8. Dhall, India

1.7 REGULATORY FRAMEWORK & POLICY ISSUES

Because of the growing awareness in ecology all the countries are set setting up laws to minimise the pollution due to chemicals. Thus chemical industry is the largest consumer of the filter fabrics. It involves various levels of filtration and their requirements vary as per the nature of the chemicals and filtrates. The overall market for filters is growing and will be accelerated by the strict Eco-regulations act. The new Environmental Protection Agency (EPA) ambient standards have been released.

Particulate is a much bigger problem than EPA or the polluting utilities realize. The reason is that no one knows for sure how much particulate matter is being emitted because no utility has installed continuous mass monitors. The EPA strategy is to reduce fine particulate matter by reducing NOx and sulfur. Without new standards, SO_2 emissions from utilities would be 9.7 million tons a year and with a new cap for sulfur, that would be reduced to 5.2 million tons. The new ambient standards for ozone and fine particulate would also result in NOx being lowered by an additional 500,000 tons per year.

1.8 TESTING REQUIREMENT & FACILITIES

Sr. No.	Property	Facility available
1.	Effective aperture width	In standard textile testing laboratories across the country are equipped with all relevant testing facilities for the filtration products.
2.	Mass Per Unit Area	-do-
3.	Thickness	-do-
4.	Breaking strength/elongation	-do-
5.	Index Puncture Resistance	-do-
6.	Air Permeability	-do-
7.	Particulate air filtration efficiency	-do-
8.	Thermal resistance	-do-
9.	Test for particle filtration	Specialized test not available in India
10.	Filter media test	-do-
11.	Bubble point and mean flow pore test	-do-
12.	Arrestance test for filters	-do-

SECTION II: FILTER FABRIC MANUFACTURING MACHINERY, TECHNOLOGY AND EQUIPMENTS SUPPLIERS

The technology and the equipment for the filter fabric manufacturing is warping equipment, weaving equipment, calendering & heat setting. These machines are supplied by globally recognised player, namely Sultex, Dornier, Picanol, Harish-Textmac, Krantz etc. The approximate cost for the set up is 4.0 Cr.

SECTION III: PROJECT COST AND PROFITABILITY PROJECTIONS

3.1 LAND

The total requirement of land for this project is around 2000 Sq. Mtrs. Based on the available information the cost of land is assumed at Rs 1200 per square meter (including the developmental cost). Depending on the exact location of the project to be determined by the promoter, the land cost could be higher or lower. Hence the total cost of developed land will be Rs 0.24 crore (Rs 24 lakhs).

3.2 BUILDINGS

The building area comprising of main factory building, godowns, office, R & D labs/In-house Testing centre etc would be 1000 sq. mtrs. The cost of construction would again vary depending on the structure and the materials to be used. It has been assumed that the average cost of construction would be Rs 4500 per sq mtr. Thus the total cost of building and other civil works would be around Rs 0.45 crores (Rs 45 lakhs).

3.3 PLANT AND MACHINERY

Details of Plant and machinery as well as technology required for the project have been given in previous section. The installed cost of plant and machinery would be **Rs 4.0 crores.** Apart from the main process equipment, the utilities required are Electricals, Piping, Water supply, compressors, fire fighting equipments etc. The provision on this count is taken as 5% of the cost of machinery which works out to Rs 0.44 crores.

3.4 MISCELLANEOUS FIXED ASSETS

Under this head the items included are Furniture and fixtures, Office equipments, Air Conditioners etc. and the provision made is around Rs 0.30 crore (Rs 30 lakhs) inclusive of the Testing and R & D facilities.

3.5 PROJECT ENGINEERING AND CONSULTING

Under this head the items included are the fees and expenses on account of Architect fees, project engineering and management (both local and overseas), detailed project reports etc.

3.6 PRELIMINARY & PREOPERATIVE EXPENSES

The items included under this head are company formation expenses, public issue expenses (if any), interest during construction, and pre production expenses during the implementation phase etc.

3.7 CONTINGENCY EXPENSES

Depending on the gestation period and further detailing of the project cost by the promoter, the contingency provision has been made at the rate of 10%.

3.8 MARGIN MONEY FOR WORKING CAPITAL

The margin money for working capital forming part of the total project cost would be Rs 0.35 crores.

3.9 TOTAL PROJECT COST

The total project cost as given in Exhibit 1 would be **Rs 6.21 crores. T**he manpower details including cost of wages are shown in Exhibit 3. Exhibit 2 and 4 shows the estimation of sales revenue and profitability statement respectively.

EXHIBIT 1

PROJECT COST
(LAND, BUILDINGS, PROCESS PLANT & MACHINERY, UTILITIES & OTHER ASSETS)

		Project Cost (Rs. Crore)
1	**Land** Area: 2000 Sq Mtrs Rate: (Rs.1200 /Sq. Mtr)	**0.24**
2	**Buildings** Plant Area, Office, Godown, Lab, Service Area etc.) Built-up Area : 1000 Sq. Mtrs Avg Rate : Rs. 4500 /Sq. Mtrs	**0.45**
3	**Process Plant & Equipment**	**4.00**
4	**Utility & Other equipments (5%)** (Power, Water, Compressor, Humidity Control, Fire Fighting, Material Handling etc.)	**0.20**
5	**Misc. Fixed Assets** (Furniture & Fixtures, Office Equipment, Testing Lab etc.)	**0.35**
6	**Project Engineering & Consultancy charges (2.5%)**	**0.07**
7	**Preliminary & Pre-operative Expenses (12%)** (Company Formation, Interest during construction, pre-production expenses, etc.)	**0.30**
8	**Contingency (10 %)**	**0.25**
9	**Total**	**5.86**
10	**Margin Money for Working Capital**	**0.35**
11	**Total Project Cost**	**6.21**

EXHIBIT 2

ESTIMATION OF SALES REVENUE

(Rs. Crore)

ITEM	YEAR OF OPERATION									
	I	**II**	**III**	**IV**	**V**	**VI**	**VII**	**VIII**	**IX**	**X**
Average Production per hour (sq. mtr)	900	900	900	900	900	900	900	900	900	900
75% efficiency	675	675	675	675	675	675	675	675	675	675
Capacity Utilisation	50%	60%	75%	90%	90%	90%	90%	90%	90%	90%
Actual Production per hour	450	540	675	810	810	810	810	810	810	810
Production per day (sq. mtr)	10800	12960	16200	19440	19440	19440	19440	19440	19440	19440
Production for 300 working days (sq. mtr)	3240000	3888000	4860000	5832000	5832000	5832000	5832000	5832000	5832000	5832000
Selling Price (Rs/sq. mtr)	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00
Sales Revenue (Rs. Cr)	**5.83**	**7.00**	**8.75**	**10.50**	**10.50**	**10.50**	**10.50**	**10.50**	**10.50**	**10.50**
Value Loss (2%)	0.12	0.14	0.17	0.21	0.21	0.21	0.21	0.21	0.21	0.21
Net Sales Revenue (Rs. Cr)	**5.72**	**6.86**	**8.57**	**10.29**	**10.29**	**10.29**	**10.29**	**10.29**	**10.29**	**10.29**

EXHIBIT 3

MANPOWER REQUIREMENTS

	Nos	**Monthly**	**Total Mon.**	**Annual**
General Manager	1	30000	30000	360000
Production Manager	1	15000	15000	180000
Machine Operator	4	4000	16000	192000
Machine Helper (Semi Skilled)	8	3000	24000	288000
R&D, Testing	3	10000	30000	360000
Marketing & Sales	3	12000	36000	432000
Clerical Staff	3	4000	12000	144000
Other Staff	2	2500	5000	60000
Maintenance (Mech. & Elec.)	2	4000	8000	96000
TOTAL	**27**		**176000**	**2112000**
Fringe Benefits (40 % of the above)				844800
Total Wage Bill (Annual) Rs. lakhs:		Salary + Other Benefits =		**2956800.00**
Total Wage Bill (Annual) Rs. Cr.:				**0.30**

EXHIBIT 4

PROFITABILITY STATEMENT AND COMPUTATION OF TAX

(Rs. Crore)

ACCOUNT HEAD	I	II	III	IV	V	VI	VII	VIII	IX	X
Revenue										
Net Sales Turnover	5.72	6.86	8.57	10.29	10.29	10.29	10.29	10.29	10.29	10.29
Total Revenue	5.72	6.86	8.57	10.29	10.29	10.29	10.29	10.29	10.29	10.29
Expenses										
Raw Materials	2.92	3.50	4.37	5.25	5.25	5.25	5.25	5.25	5.25	5.25
Salaries & wages	0.30	0.31	0.33	0.34	0.36	0.38	0.40	0.42	0.44	0.46
Power, Fuel, Stores & Other Expenses (including packing materials)	0.44	0.52	0.66	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Marketing & Promotional Expenses	0.14	0.17	0.21	0.26	0.26	0.26	0.26	0.26	0.26	0.26
Factory & Office Overheads	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Interest on S.T. Loans	0.11	0.14	0.17	0.21	0.21	0.21	0.21	0.21	0.21	0.21
Cost of Sales	4.71	5.44	6.54	7.64	7.66	7.68	7.70	7.72	7.74	7.76
Depreciation (St.Line)	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
Amort. of Expenses	0.19	0.19	0.19	0.19	0.19	0.19	0.00	0.00	0.00	0.00
Interest on L.T Loan	2.38	2.14	1.66	1.18	0.70	0.23	0.00	0.00	0.00	0.00
Profit Before Tax	-1.78	-1.13	-0.04	1.06	1.52	1.97	2.37	2.35	2.33	2.31

WOVEN GEOTEXTILES PROJECT

1. PRODUCTS AND TECHNOLOGY

Woven Geotextiles form the major component of all geotextile products.

- The manufacturing process involves weaving of high tensile strength and low elongation yarns into fabrics
- Yarns of Polyester, Polypropylene, and nylon in multifilaments /monofilament/tape forms are widely used in weaving.
- Filament yarns of linear density 1100 dtex and 2200 dtex are predominantly used in plain weave constructions for geotextiles
- Wide width looms are specifically used for producing geotextiles.
- Triaxial and leno constructions are also used for specific applications

2. MAJOR APPLICATIONS

Woven geotextiles are mainly used for

- Reinforcement of Unpaved Roadways, Paved Roadways, etc
- Separation applications in, Unpaved Roadways, Paved Roadways, Sediment Control, etc.
- As components in geo-composites

3. MARKET POTENTIAL

A. GLOBAL MARKET POTENTIAL FOR GEOSYNTHETICS*:

	Quantity ('000 MT)	**Value ($ MN.)**
2001	264	766
2002	272	789
2003	286	832
2004	302	878

**** Ref – DRA report (Technical textiles and Industrial Nonwovens: world market short term forecasts to 2004)***

Note : According to estimates by DRA, In the year 2004, 131, 000 MT of Goetextiles would be woven products, which is approximately 43.3 % of total geotextile consumption.

B. INDIAN MARKET POTENTIAL FOR GEOTEXTILES* :

ROAD, RAILWAYS AND PAVEMENT OVERLAY PROJECTS			
Projects	**Infrastructure Investments Planned**	**Market Potential (2003-04 to 2007-08)**	
	Rs. Cr. (upto 2007-08)	**Quantity (tonnes)**	**Value (@ 3%) (Rs. Cr.)**
Roads	144404	216650 (1083 mn sq mt)	4333
Railways	39457	29600 (74 mn sq mt)	1184
Paved Road Network	17500	26250 (131 mn sq mt)	525
Grand Total (Road+Railway+Pavement Overlay) (2003-04 to 2007-08)	**201361**	**272500 (2.73 lac tonnes) (1288 mn sq mt)**	**6042**

**** Ref – TECS Phase –II report***

Following international trends it may be estimated that approximately 40 % of market potential would be for woven geotextiles, which would be Rs.2416.8 crores.

4. MAJOR MANUFACTURERS

- Garware wall ropes Ltd.
- Kusumgar corporates Ltd.
- Shakti polyweave ltd.
- H.L.Textiles, Ltd.
- Urja products pvt. Ltd.

5. DETAILS OF PLANT/MACHINARY

Major Machinery suppliers	1. Sultex, Switzerland 2. Lindauer Dornier, Germany 3. Promatech, Italy 4. Texo, Sweden 5. Jaeger, Germany 6. Picanol, Belgium 7. Benninger, Switzerland
Economic Capacity:	Projectile looms : 8 Fabric output : 73,000 mts p.a. Working width : 6 mts., Rpm: 130 rpm, Weft insertion rate : 1200 m /min Others: Sectional warping/ yarn preparatory machines
Plant and machinery Cost	**Rs. 20 Cr.**

6. PROJECT COSTS AND PROFITABILITY PROJECTIONS :

Land

The total requirement of land for this project is around 2000 Sq. Mtrs. Assuming a land cost of Rs 1200 per square meter approximate lad cost would be **Rs. 0.24 crores**.

Buildings

The building area comprising of main factory building, godowns, office, R & D labs / Inhouse Testing centre etc would be 1200 sq. mtrs. Assuming a construction cost of Rs. 4500 per sq.mts. total cost of building and other civil works would be around **Rs 0.54 crores**.

Plant and Machinery

Installed cost of Plant and machinery as specified in earlier Section would be **Rs 20 crores**. Apart from the main process equipments the utilities required are Electricals, Piping, Power, Water supply, compressors, fire fighting equipments, etc. The provision on this count is taken as 5 % of the cost of machinery which works out to **Rs 1.0 crores**.

Miscellaneous Fixed Assets

Investment towards Furnitures, Office equipments, Air Conditioners, minimum Testing facilities would be around **Rs 0.35 crores**.

Project Engineering and Consulting

Under this head the items included are the fees and expenses on account of Architect fees, project engineering and management, detailed project reports etc. As per standard practice provision of 2.5% of plant cost is made.

Preliminary & Preoperative Expenses

The items included under this head are company formation expenses, public issue expenses (if any), interest during construction, pre production expenses during the implementation phase etc. As per standard practice provision of 12% of plant cost is made.

Contingency Expenses

Depending on the gestation period and further detailing of the project cost by the promoter, the contingency provision has been made at the rate of 10%.

Margin Money for Working capital

The margin money for working capital forming part of the total project cost would be **Rs 0.30 crores** .

The Total Project Cost is estimated to be 27.83 crores

7. REGULATORY MEASURES & POLICY ISSUES :

In many of the developed countries Regulatory Framework have been laid out for many of the technical textile products. It has been one of the factors, which has spurred the growth of technical textiles/geotextiles worldwide. For example, in Germany regulations on geosynthetics has been formulated since 1970s (GEOSYNTHETICS IN ROAD CONSTRUCTION - GERMAN REGULATIONS). In the Indian context a similar regulatory frame work needs to be evolved

1. Ministry of Road Transport and Highways (MORTH) has to promote/create awareness about geosynthetics vis a vis traditional civil engineering techniques.

2. Indian Road Congress publication has following publications on geosynthetics

   - "SPECIFICATIONS FOR ROAD AND BRIDGE WORKS" (Fourth Revision) under section 700 under Clause nos. 701, 702, 703 & 704.
   - Publication 59 (IRC: SP: 59 - 2002) "GUIDELINES FOR USE OF GEOTEXTILES IN ROAD PAVEMENTS AND ASSOCIATED WORKS" .

The specifications can be upgraded in consultation with concerned ministries, CRRI, Geotechnical/Civil/Textile engineers, industries and testing experts

3. Funding of new ventures in Geotextiles may be provided by Government on the lines of TUFS
4. Import of geotextiles should be restricted with additional duty to protect the Indian players for a fixed time frame.
5. International collaborations with global players may be encouraged in the sector.
6. Import duties on machinery required for geotextiles may lowered to competitive levels
7. Import duties on raw materials like high strength yarns, not available in the country may be relaxed.
8. Exemptions may be given on locally made raw material in terms of excise duty, octrio, sales tax, etc.
9. The Inter-Ministerial Co-ordination Committee should continue its efforts to promote geosynthetics.
10. Encourage export of the geotextile fabric by domestic players by suitable fiscal concessions.

8. TESTING FACILITIES :

Proper testing and evaluation of products are absolutely essential for geotextiles, for conformation to specifications (***details in annexure 1***). Especially in India at the nascent stage of development of Geotextiles, effective testing should support product development efforts by entrepreneurs. Some of the essential parameters for which the geotextiles has to be tested include:

- Mass and thickness
- Wide width tensile strength
- Grab tensile strength
- Trapezoid tear strength
- Index puncture resistance
- Apparent opening size
- Water permeability
- Resistance to UV exposure

Currently geotextile testing facilities are available at

- Central Road Research Institute (CRRI), New Delhi
- SASMIRA, Mumbai
- IIT, Mumbai,
- IIT, NewDelhi,
- BTRA, Mumbai
- VJTI, Mumbai

However not all the facilities are available with all these bodies. In addition not all the laboratories are recognized by NHAI (National Highways Authority of India) for testing of Geotextiles.

In view of above, It is recommended

- To set up few laboratories with complete state of the art facilities for testing of Geotextiles
- To recognize some of the laboratories as testing/certification centers for geotextiles.
- Some of the laboratories may be encouraged to form collaborations with reputed overseas Geosynthetic testing houses and get accreditation of bodies like GAI (Geosynthetics Accreditation Institute)

ANNEXURE 1
Test parameters/standards for Woven Geotextiles

Serial No.	Test Parameters	Specification Standard	Equipments	Major Suppliers	Approximate Cost RS.(lakhs)
1.	Geotextile Sampling Method	EN963 ASTM:D4354 IS 14706 :1999	-	-	-
2.	Geotextile Identification	EN30320	-	-	-
3.	Standard atmosphere Conditioning cabinet for Geotextiles	ISO 554	Conditioning cabinet	BT technology, USA SDL, UK	8.0
4.	Thickness	ASTM: D5199-91 BSEN: 964 -1 ISO: 9863 IS:13162 (Part 3)	Thickness gauge with variable load	BT technology, USA SDL, UK AIMIL, INDIA	1.5
5.	Mass Per Unit Area	ASIM: D5261-92 BSEN:965 ISO:9864 IS: 14716: 1999	Weighing Balance Weight Box & Scissor	BT technology, USA SDL, UK AIMIL, INDIA	1.5
6.	Wide-Width TENSILE TEST	ASTM:D4595-86 (1994) BSEN: 6906 (part 1) ISO: 10319 IS:13162 (Part 5)	Tensile Tester with Load Cells AND specialised GRIPS,	BT technology, USA SDL, UK AIMIL, INDIA, INSTRON,UK ZWICK,INDIA	20

Serial No.	Test Parameters	Specification Standard	Equipments	Major Suppliers	Approximate Cost RS.(lakhs)
7.	Multi-axial Tension Test	ASTM:D5671-94	Tensile Tester AND specialised attachments,	BT technology, USA SDL, UK AIMIL, INDIA, INSTRON,UK ZWICK,INDIA	15.0
8.	Trapezoid Tear Strength	ASTM: D4533-91 IS: 14293 : 1995	Tensile Testing Machine & Trapezoidal Template	BT technology, USA SDL, UK AIMIL, INDIA, INSTRON,UK ZWICK,INDIA	1.0 (attachment to tensile tester)
9.	Tensile Test for Joints/Seams (by Wide Width Method)	ISO10321:1992 (E) IS 15060 : 2001	Tensile Tester AND specialised GRIPS,	BT technology, USA SDL, UK AIMIL, INDIA, INSTRON,UK ZWICK,INDIA	4.0 (attachment to tensile tester)
10.	Grab Tensile Test	ASTM:D4632-91	Tensile Tester AND specialised GRIPS,	BT technology, USA SDL, UK AIMIL, INDIA, INSTRON,UK ZWICK,INDIA	1.0 (attachment to tensile tester)
11.	Index puncture resistance	ASTM D 4833	TENSILE TESTER AND ATTACHMENTS	BT technology, USA SDL, UK AIMIL, INDIA, SHIMDZU, JAPAN	1.0 (attachment to tensile tester)
12.	CBR puncture resistance	ISO 12236	TENSILE TESTER AND ATTACHMENTS	BT technology, USA SDL, UK AIMIL, INDIA, SHIMDZU, JAPAN	4.0 (attachment to tensile tester)

Serial No.	Test Parameters	Specification Standard	Equipments	Major Suppliers	Approximate Cost RS.(lakhs)
13.	BURSTING STRENGTH	ASTM D 3786	DIAPHRGM/MULLENT TYPE BURSTING TESTERS	BT technology, USA SDL, UK	6.0
14.	Pullout Resistance in Soil	EN 13738	Pull-out Resistance Tester	BT technology, USA	15.0
15.	Coefficient of Soil & Geosynthetic Friction	ASTM: D5321-92	Direct Shear Test Equipment	BT technology, USA AIMIL, INDIA,	22.0
16.	WATER PERMEABILITY	ASTM: D5493-93 IS 14324 : 1995	CROSS PLANE Water permeability tester	BT technology, USA AIMIL, INDIA,	6.0
17.	TRASMITTIVITY OF GEOTEXTILES	ASTM: D4716-93	IN PLANE Water permeability tester	BT technology, USA AIMIL, INDIA,	6.0
18.	LONG TERM FLOW AND GRADIENT RATIO TESTS	ASTM D 5101	long term flow/ gradient ratio APPARATUS	BT technology, USA AIMIL, INDIA,	3.0
19.	Tensile Creep	EN ISO 13431 ASTM: D5262-92 IS 14739:1999	Tensile Strength Tester with extensometer	BT technology, USA AIMIL, INDIA	22.0
20.	Apparent opening size (AOS)	ASTM D 4751 95	Dry sieve apparatus	W.S.Tylor, Germany BT technology, USA AIMIL, INDIA,	1.5
21.	Wet sieve test	ASTM D 4751 95	Wet sieve apparatus	BT technology, USA AIMIL, INDIA,	3.0
22.	Resistance to Weathering /Ultraviolet Degradation	ASTM:D 4355-92 IS:13162 (Part 2)	Xenon-Arc Apparatus/Quick UV Tester	ATLAS SDL, UK ATI CORP. USA	40.0
23.	TEMPERATURE STABILITY	ASTM D 4594	Environmental chamber for thermal resistance***(attachment)***	SDL, UK INSTRON,UK ZWICK,INDIA	17.0 (attachment to tensile tester)

EXHIBIT 1

PROJECT COST
(LAND, BUILDINGS, PROCESS PLANT & MACHINERY, UTILITIES & OTHER ASSETS)

		Project Cost (Rs. Cr.)
1	**Land** Area: 2000 Sq Mtrs Rate: (Rs.1200 /Sq. Mtr)	**0.24**
2	**Buildings** Plant Area, Office, Godown, Lab, Service Area etc.) Built-up Area : 500 Sq. Mtrs Avg Rate : Rs. 4500 /Sq. Mtrs	**0.54**
3	**Process Plant & Equipment**	**20.00**
4	**Utility & Other equipments (5%)** (Power, Water, Compressor, Humidity Control, Fire Fighting, Material Handling etc.)	**1.00**
5	**Misc. Fixed Assets** (Furniture & Fixtures, Office Equipment, Testing Lab etc.)	**0.35**
6	**Project Engineering & Consultancy charges (2.5%)**	**0.5**
7	**Preliminary & Pre-operative Expenses (12%)** (Company Formation, Interest during construction, pre-production expenses, etc.)	**2.40**
8	**Contingency (10 %)**	**2.50**
9	**Total**	**27.53**
10	**Margin Money for Working Capital**	**0.30**
11	**Total Project Cost**	**27.83**

SAFETY AND PROTECTIVE TEXTILES

1. PRODUCTS AND TECHNOLOGY

1. Protective textiles refer to garments and other fabric related items designed to protect the wearer from harsh environmental effects that may result in injury or death.

2. According to end use the classification of the protective textiles can be done as High temperature textiles, Flame Resistant protective clothing, Chemical protective clothing, Mechanical protection, Electrical protective clothing, Clean room textiles, Radiation protection, Thermal insulation, High visibility textiles, Metallised fabrics, Space suits, Covers for Automotives.

3. Wide ranges of fiber type, qualities depending on desired technical and functional parameters are used in designing safety and protective textiles. High tech synthetic fibres like aramid, glass, melamine FR polyester, olefins, polybenzimidazole (PBI), phenolic, PTFE (flurocarbon), carbon, ceramic, silica, polyacrylates etc with their brand product name are mainly used in this segment.

4. Generally for safety and protective textiles base fabric is woven or non-woven which is either specially finished, coated, laminated or metallised.

5. Final garment may consist of single or double layer. Stitching of garment also demands need of specialized sewing yarn and technique of sewing.

PROTECTIVE TEXTILE

Protection from extreme environment has always been a critical requirement of textile industry. Clothing that protect from water, extreme winter, intensive heat, open fire, high voltage, propelled bullets, toxic chemicals, nuclear radiations, and biological toxins etc. are some of the examples. These clothing find applications as sportswear, defence wears, firefighting wears (fire entry suits), bulletproof jackets, and other professional wears.

Apart from clothing, even structures that can protect from above exposures are required to be created using protective textiles. Shelters- temporary or permanent such as army tents, stadium roofs, and exhibition arena are some of the

examples. Textile materials used in composites for various structural uses are also required to have certain protective properties.

Challenges

The protective textile try to combine both the fabric characteristics such as flexibility, softness, drape, handle and breathability with critical protective characteristics mentioned above. This is a challenge because, applying any coating or modifying fibres for obtaining protective function tend to sacrifice that very fabric qualities which are dear to a textile technologist and a customer.

Therefore, a balance where desirable textile attributes are preserved while achieving adequate protection is always a topic of intense research worldwide.

Inherently fire retardant polyester filaments

Such materials are very important in creating protective clothing for use in chemical-nuclear-biological warfare, firefighting, and other heat intensive jobs. Many approaches have been used around the world in producing such fibres through modification during polymerization or melt spinning route. However, melt additive during spinning route is normally not commercially used as it tends to lower the mechanical properties of the resultant fibre. Ther is a unique approach of adding phosphorous-based compounds to PET up to 10% by weight loading in the fibres. These fibres can be easily drawn at high draw ratios to give high strength nearly equivalent to PET fibres without additive. The Limiting Oxygen Index (LOI) values for these fibres were as high as 27.5 in knitted filament form (i.e. open structure).

Breathable Coatings

Textiles that allow water vapours to pass but protect from rain or water find varied applications in many areas. Many commercial products are today available, however, creating breathable coating which can provide very high rates of water vapor transmission (WVTR) to allow comfortable feeling to the wearer is still a challenge. Microporous films or coatings with hydrophobic-hydrophilic segmented polymer are known methods of creating such structures. However, due to hydrophobic nature of the polymers used, WVTR values are normally restricted. Hydrophilic films are a better choice but they suffer from the limitation that they are soluble in water, and therefore, are not durable. Our group is working on integrating certain hydrophillic polymer systems based on substituted

polyacrylamides with known textile surfaces that can provide durable protective coating while giving very high values of WVTR.

Heat Managing Outer-layer Structures

Textile structures for extreme winter clothing is normally composed of several layers. these layers provide insulation and at times manage the flow of winds so that they do not penetrate the textile structures. Use of fur inside and bird feathers in between are often used or providing insulation from low outside temperatures. However, very little attention has been given for optimizing the structure of outermost layer of such garments. Our group has investigated certain structures for outer most layer which allow better capturing of heat from the Sun while minimizing loss of captured heat from the surface under windy conditions. Use of these layers was found to raise the fabric temperature by several degrees compared to standard structures.

2. GLOBAL MARKET POTENTIAL:

The estimated market size of this sector is unclear due to the unclear distinction between protective clothing and everyday workwear, and between protective sportswear and leisurewear.

From the following table it is seen that the total consumption of safety and protective textile for the year 2000 is 238 (000t) worth value of 5193 ($m). It is estimated that the estimated total consumption for the year 2010 would be around 340 (000t) worth value of 6857 ($m). Consumption for Asian region is 56 and 93 (000t) for the year 2000 and 2010 respectively, where India is one of the major consumer.

Worldwide Market by (Region wise)

Worldwide Consumption of protective textiles				
	Consumption (000t)		**Value ($m)**	
Year	2000	2010	2000	2010
W. Europe	71	90	1584	1852
E. Europe	7	13	167	272
N. America	80	107	1717	2165
S. America	11	17	253	355
Asia	56	93	1184	1811
Australia	2	3	38	57
Rest of World	11	17	250	344
Totals	**238**	**340**	**5193**	**6857**

Ref – DRA report (Technical Textiles report)

3. RECOMMENDED PLANT MACHINERY (Depending on the end product:

Machinery Required:

- Shuttle less weaving machine
- Nonwoven lines
- Needle punch/Spun bonding
- Finishing/Coating/Lamination machinery

4. GLOBAL TECHNOLOGY AND EQUIPMENT SUPPLIERS

- Weaving Machine

  Sulzer, Somet, Picanol (Belgium), Donier,

- Nonwoven Plant

  Dilo Maschine system GmbH (Germany), Fehrer AG (Austria)

  Asselin (France), American Textile Machinery (USA)

  Shoou Shyng (Taiwan), Rieter Perfojet (France)

  Reifenhauser GmbH& Co. (Germany)

- Finishing/Coating/Lamination

  Stork Prints, Netherlands, Brueckner Trockentechnik Gmbh, Germany

  Coatema Machinery Gmbh, Germany, Monti Antonio SPA, Italy

  Zimmer Maschinenbau Gmbh, Austria

5. TOTAL PROJECT COST (for Coating / lamination machinery) – Rs.24.62 Crores

Depends on end product, technique of manufacturing and after treatment of product like finishing, coating, etc.

Considered here are two models for developing

1. Class of protective fabrics for chemical, electrical protection, clean room textiles and high visibility textiles – Generally a woven fabric that is coated/ laminated

2. Protective fabrics for thermal insulation, flame resistance, high temperature resistance – Generally a multilayer fabric, comprising of woven and nonwoven layers that would be coated or laminated.

Thus, it may be noted that fabrics may be sourced from appropriate industry and subjected to the necessary making – up , coating/laminating process for these garments.

6. RECOMMENDED ECONOMIC SIZE PLANT :

Make: CFT Coating and Finishing System including – Unwinder, Infeed device, Coating system, Dryer, Cooling cylinders

Manufactures: Stork Prints, Netherlands

Designed Capacity : 1200 mtrs per hour

Plant installed cost: Rs. 17.21 Cr. including installation charges

7. PROJECT COST AND PROFITABILITY PROJECTIONS

I. ***PROJECT COST***:

(SeeTable 1)

Land

The total requirement of land for this project would be approximately 2000 sq.m. the land cost is assumed to be Rs.1200 per sq. m.(including development cost). The total cost of developed land would be **Rs. 0.24 Cr**.

Building

The building area comprising of main factory building, office, godown, testing laboratory would require about 1000 sq.m. at a projected cost of Rs. 4,500 per sq.m, costing **Rs. 0.50 Cr**.

Plant and machinery

The machinery required for the manufacture has been described in the earlier section. The cost of set –up would require about **Rs.17.21 Crores**.

Utility and other equipments

The finishing machinery and accessories for the set-up including environment conditioning, compressor and other such infrastructure would require about 5 % of the Plant cost, **Rs. 0.86 Cr**.

Miscellaneous Fixed Assets

The provision for office furniture and fixtures, laboratory instruments, etc is made under this head to a tune of **Rs. 0.35 crores**.

Project Engineering and Consulting

Under this head the items included are fees and expense on account of architect fees, project engineering and management and detailed project reports.

Preliminary and Pre-operative Expenses

The items included under this head are company formation expense, public issues (if any), interest during construction, pre – production expenses during implementation phase.

Contingency

Depending upon the gestation period and further detailing of the project cost by the promoter, the contingency provision has been made at the rate of 10 %.

Margin Money for Working Capital

The margin money for working capital of the total project cost would be about **Rs. 1.33 Crores**.

The TOTAL PROJECT COST is estimated to be Rs. 24.62 Crores.

II. SALES AND PROFITABILITY ANALYSIS:

(See Table 2)

Sales Revenue and Turnover

The average selling price of a protective fabric depending upon the end – use, ranging from Rs. 75 to Rs. 250 per metre. Assuming an average price of Rs. 150 per m.

The machine is assumed to operate at 75 % efficiency to give a production of 900 m per hour.

The plant would operate on three – shift basis 300 day per year.

The capacity utilization for the first year is assumed at 50 % and thereafter it is assumed to be 60 %, 75%, 90% and so on.

Cost of Production

Raw Material cost

The raw materials for these protective fabrics would include

Major Raw Material	Average Prices
Textile substrate – woven, non-woven	Rs. 50 per sq mt.
Coating materials & auxiliaries	Rs. 200 per Kg

Conversion cost

The conversion cost including the cost of power, water, chemical, consumables, etc is assumed to be 25% of the cost of raw material i.e., **Rs. 16 per sq mt**.

Manpower, salaries and wages

The manpower requirements and the salary structure is exhibited in Table 3. The total manpower requirement is 26 people at various levels with an expense of **Rs. 0.20 crore** annually.

Factory and Overhead Expenses

The items covered under this head are establishment expense, repairs and maintenance, stationery, travel, packaging, etc. at a flat rate of **Rs. 0.10 Crores** annually.

Marketing and Promotional Expenses

The promotion of technical textile products based on spacer fabrics will call for expenditure of about 5% of annual sales.

Interest and depreciation

The prevailing interest rates for short term and long term borrowed funds is assumed to be 13 % per annum.

The repayment of loans has been assumed for 5 years with a moratorium period of 1 year.

The depreciation rates have been worked out as per Company's Act (SLM) in a straight line method.

III. PROFITABILITY, BREAK-EVEN & PAYBACK PERIOD

As shown in the Profitability Statement, vide **Table 2**, the sales turnover increases from **Rs. 45.6 Crore** in the first year to **Rs. 91.1 Crore** in the fifth year. The Profit Before Tax increases from **Rs. 11.6 crore** in first year to **Rs. 29.80 Crore** in the fifth year.

The **BREAKEVEN SALES** is projected to be **Rs. 16.71 crore, i.e., 36.6**%

The **PAY BACK PERIOD** for the project is **23 months**.

8. REGULATORY FRAMEWORK & POLICY ISSUES

- Institutional buyers like defense, industries, disaster management programme authorities; fire fighters, relief service bodies (especially in colder region) etc. may be insisted to consume these products.
- Civil workers, fire bridge people, out door working persons, sports participants like racing driver, paratroopers, mountaineers etc. require sufficient safety and protection. This will be strictly followed by imposing government regulations.
- Personnel working in chemical industry, dye & auxiliary manufacturing industry, steel plant, heavy metal industry ect. should require suitable chemical protective clothings.
- Inter ministerial support is essential to promote these safety regulations to the users to protect their life etc.

- Impose hefty import duty for finished goods to discourage entry.
- Propose more promotional programmes to increase awareness.

9. Essential testing parameters, Test Methods, Equipments, Suppliers and Cost (Approximate) are given in following table:

Test Parameters	Specification Standard	Equipments	Major Suppliers	Approx. Cost Rs. lakhs
Thickness	ASTM: D5199-91 BSEN: 964 -1 ISO: 9863 BIS: IS:13162 (Part 3)	Thickness gauge with variable load	SDL	1.5
Mass Per Unit Area	ASIM: D5261-92 BSEN:965 ISO:9864 BIS: IS: 1964	Weighing Balance	Mettler/Precisa	1.0
Tensile Properties	ASTM:D5035-90	Tensile Tester with Load Cells	Shimadzu-AGS, Instron, Zurick	13.50
Air Permeability	ASTM:D737-75	HP Air Permeability Tester	Textocraft	1.26
Ultraviolet Degradation	ASTM:D4355-92 BIS: IS:13162 (Part 2)	Xenon-Arc Apparatus/Quick UV Tester	Quick UV tester (Atlas UV2000)	40.0
Degree of fusion /Curing of coating	BS 3424, ASTM D 4005-81	Oven	Therelek, Heraeus etc.	0.5
Blocking	BS 3424, IS 7016 Part 9	Oven	Therelek, Heraeus etc.	0.5
Coating Adhesion	BS 3424, IS 7016 Part 5, ASTM D751	UTM	Shimadzu/ Instron	15.0
Accelerated Ageing	BS 3424, IS 7016 Part 8 Based on ISO/R1419-1970	Oven	Therelek, Heraeus etc.	0.5
Flexibility- Flat Loop Method	IS 7016 Part 11 Based on ISO/R5979-1982	-	To be fabricated	
Damage due to Flexing	BS 3424, IS 7016 Part 4, ASTM D2097	Flex abrasion M/c	SDL	5.0
Abrasion Resistance	BS 3424, ASTM D 3389	Flat abrasion tester	SDL	5.0

Test Parameters	Specification Standard	Equipments	Major Suppliers	Approx. Cost Rs. lakhs
Test for Colourfastness to dry and wet rubbing	BS 3424, IS1259	Crockmeter	SASMIRA, AATCC	0.1 to 5.0
Water vapour Permeability	ASTM E 96-80	WVP tester	SDL	5.0
Resistance to Permeation by Hazardous Liquid Chemicals	ASTM F 739-96	UV IR spectrophotometer, chromatograph	Varian, Shimadzu	12.0 to 15.0
Electrical resistively of the fabric	AATCC 76-1995	Resistivity meter/ Honestmeter	Shishido Electrostatic, Ltd.	20.0
Tensile strength/ Tear strength	IS 7016	UTM	Shimadzu, instron, Zurick	15.0
Bursting strength	IS 1966	Bursting strength tester	SDL/ Ubique	6.0
UV resistance	ASTM G 151	Q-UV, Atlas 2000	Atlas/ Q-sun	25.0
Light fastness	AATCC-16-93, IS- 2454	Xenotest/ Light fastness tester	SASMIRA/ Atlas	25.0

Note: SASMIRA, Worli, Mumbai and other TRA'S have most of the above testing facility.

TABLE 1

PROJECT COST
(LAND, BUILDING, PROCESS PLANT & MACHINERY, UTILITIES & OTHER ASSETS)

		(Rs. Crores)
1	**LAND** Area: 2000 sq. m Rate: Rs.1,200/ sq.m	**0.24**
2	**BUILDING** (Plant area,Office, Godown, Lab, Service area) Area: 1000 sq.m Rate: Rs.4,500/sq.m	**0.45**
3	**PROCESS PLANT & EQUIPMENT** Zimmer (Austria), Designed Capacity : 1200 mtrs per hour	**17.21**
4	**UTILITY & OTHER EQUIPMENT** machinery and accessories for the set-up	**0.86**
5	**MISC. FIXED ASSETS** (Furniture &fixtures, testing lab, office equipment)	**0.35**
6	**PROJECT ENGINEERING & CONSULTANCY CHARGES (2.5%)**	**0.42**
7	**PRELIMINARY & PRE-OPERATIVE EXPENSES (12%)** (Company formation, Interest during construction, pre-production expense)	**2.06**
8	**CONTINGENCY(10%)**	**1.70**
9	**TOTAL**	**23.29**
10	**MARGIN MONEY FOR WORKING CAPITAL**	**1.33**
	TOTAL PROJECT COST	**24.62**

TABLE 2

PROFITABILITY STATEMENT (in Crore Rs.)

ACCOUNT HEAD	FINANCIAL YEAR OF OPERATION				
	I	II	III	IV	V
REVENUE					
NET SALES TURNOVER (@ Rs.150 per meter fabric)	45.60	54.70	68.30	82.00	91.10
Total Revenue	45.60	54.70	68.30	82.00	91.10
EXPENSES					
Raw Material	24.30	29.20	36.50	43.70	48.60
Salaries & Wages	0.20	0.21	0.22	0.24	0.25
Power, Fuel & other expenses (25% of raw material cost)	3.80	4.60	5.70	6.80	7.60
Marketing & Promotional exp.	0.25	0.28	0.34	0.41	0.45
Factory & office overheads	1.90	1.90	1.90	1.90	1.90
Interest on short term loans	0.39	0.47	0.58	0.68	0.68
Cost of Sales	**30.84**	**36.66**	**45.24**	**53.73**	**59.48**
Depreciation	1.24	1.24	1.24	1.24	1.24
Interest on Long Term Loans	1.92	1.73	1.35	0.96	0.58
Profit Before Tax	**11.60**	**15.07**	**20.47**	**26.07**	**29.80**

TABLE 3

MANPOWER REQUIREMENT
ANNUAL BUDGET FOR SALARIES & WAGES (Rs.)

MANPOWER	NOS.	MONTHLY SALARY	TOTAL MONTHLY SALARY	TOTAL ANNUAL SALARY
General Manager	1	30000	30000	360000
Production manager	1	15000	15000	180000
Machine Operator (1 per shift)	3	4000	12000	144000
Machine Helper (2 per shift)	9	3000	27000	324000
R & D, Testing	1	10000	10000	120000
Marketing & Sales Staff	4	12000	48000	576000
Clerical staff	4	4000	16000	192000
Other staff	2	2500	5000	60000
Maintenance	1	4000	4000	48000
Total Wage Bill	**26**			**2004000**

SHOE UPPERS

1. PRODUCT AND TECHNOLOGY

1. Leather was so far used for shoe upper manufacturing as it has properties to absorb and transmit perspiration with good resistance to flexing in walking.

2. Today the textile component forms 15 to 20% of the shoe and remaining non-textile components. The shoe uppers and the lining used are inner parts of the shoe.

3. The advantage of textiles over leather in footwear upper is consistency of quality and specification, lightness especially when wet, their easy-care properties i.e. they can be washed and dried. A fashion feature is that they can be produced in bright non-fading colours.

4. Usually nylon, polypropylene, acrylic, cotton or blends of polyester cotton woven, knitted or non-woven with polyurethane coating are good imitation of softer leathers in appearance and feel and are soft, light in weight and comfortable to wear with moisture transfer from inside to outside.

5. coated fabrics form one of the most important segments. Coating operation (also lamination and Impregnation) is carried out to impart certain characteristics and desirable properties for the end-use application of the product. Polyurethane (PU) coated fabrics are the main synthetic upper material. They normally have a thin coating of PU on a raised fabric base, normally woven cotton or polyester/cotton. In the newer coagulated materials the fabric is impregnated prior to the coating being applied.

6. Other upper material include PVC-coated fabrics, which have a degree of permeability to perspiration and used in sports / training shoes and slippers.

7. Footwear is among the product, which can be labeled, as eco-friendly i.e. the product has been manufactured under environmentally friendly conditions and that will not pose any threat to human health or to the environment during its use and after disposal.

2. MAJOR APPLICATIONS

The major components of shoes, which are textile based, are following:

- Shoe upper
- Shoe linings
- Laces
- labels

3. GLOBAL MARKET POTENTIAL:

- About 110 million pairs per year of footwear of all types are manufactured in U.K. retail sales are around 290 pairs or five pairs per head of population.

- The large part of demand is met by imports from sources with lower labour cost.

- Globally this condition appears to be same for other developed countries with the vast potential for exports.

- China, Malaysia, Singapore and Hong Kong are the major exporter due to the advantage of low labour cost, high productivity, large project size and better quality components.

4. INDIAN MARKET POTENTIAL:

- The majority of the production of foot wear is mainly accumulated in decentralised sector with cluster growth of small medium and cottage units. The quality of foot wear produced by this units vary according to the manufacturer.

- Indian footwear industry is expected to maintain a growth rate of 8% per annum under normal circumstances and the projected market potential would be as follows:

Year	2003-04	
	Mn Pairs	Value (Rs.Cr.)
2003-04	595	5950 (1200)
2007-08	804	8040 (1600)

Figures in the brackets reflect approximate vaule of technical textile shoe components

- Apart from domestic market the focus should be given for exports as India has the benefit of low labour cost, and resources provided the quality of the components should be maintained as per international standards.

5. MAJOR MANUFACTURERS:

The major shoe manufacturers in India are as follows:

- Bata
- Action
- Lakhani
- Nike
- Liberty
- Reebok
- Adidas

6. REGULATORY FRAMEWORK & POLICY ISSUES

- The components of the shoes are not standardized, government should implement standards on these components and finished products as per international norms.

- The different duty structure should be streamlined for units in the centralised and decentralised sector.

7. TESTING REQUIREMENT & FACILITIES

S. No	Test Required	Instrument	Approx. Cost in Rs. (Lakhs)
1.	Adhesion (Peel bond) (ASTM D 751-98)	Universal tester	15.00
2	Flexing test (BS-3424)	Flex tester	3.00
3.	Abrasion resistance	Martindale abrasion tester	5.00
4.	Water penetration resistance (BS3424 part26; 1986)	Hydrostatic head apparatus	3.00
5.	Fabric stiffness (ASTM D1338-96)	Bending-length tester cantilever	2.00
6.	Fabric strength (ASTM D5035-90)	Tensile tester	15.00
7.	Colour fastness to rubbing (ISO105-A02)	crockmeter	0.002
8.	Soiling and cleanaility	Fabricated	
9.	Breathability (BS7209)	Shirley water-vapour permeability tester	4.00
10.	Odour test	Electronic nose (Fabricated)	

8. ESSENTIAL MACHINERY

The various manufacturing processes are available for making shoe uppers. They are mainly weaving, knitting as well as non-woven. Mostly the decentralised sector of India is engaged in production of woven and knitted fabrics. This sector has potential to produce the required fabric for the above applications.

The coating are applied on the fabrics by coating machines. Either polyurethane (PU)coating or polyvinyl coating(PVC) are applied. As PVC coating are cost effective they are mostly used for shoe uppers, but for the expensive shoes PU coatings are used as they are more durable and water based causing less harm to the enviroment.

Coating Equipment Suppliers:

1. Stork Prints (Netherlands)
2. Coatema Machinery (Germany)
3. Zimmer (Austria)
4. Monti Antonio Spa (Italy).
5. Brueckner Trockentechnik (Germany)

There are 4 main departments connected with manufacturing within a footwear company and the components follow a progressive route through each of these departments to produce the finished shoes. The departments are, Clicking, Closing, Lasting/ Making, Finishing/ Shoe Room.

PROJECT COST & PROFITABILITY PROJECTIONS

1. Land

The total requirement of land for this project keeping in mind the possible future expansion is around 2000 Sq. Mtrs. (0.5 acres).

Based on the avaliable information the cost of land is assumed at Rs 1200 per square meter (including the developmental cost).Depending on the exact location of the project to be determined by the promoter the land cost could be higher or lower. Hence the total cost of developed land will be **Rs 0.24 crores.**

2. Buildings

The building area comprising of main factory building, godowns, office , R & D labs / Inhouse Testing centre etc would be 1000 Sq. Mtrs. The cost of construction would again vary depending on the structure and the materials to be used. It has been assumed that the average cost of construction would be Rs 4500 per sq mtr.Thus the total cost of building and other civil works would be around **Rs 0.45crores**.

3. Plant and Machinery

Details of Plant and machinery as well as technology required for the project have been presented in earlier Section 7. The installed cost of plant and machinery would be **Rs 17.00crores.** Apart from the main process equipments the utilities required are Ancillary equipments, Electricals, Piping, Power , Water supply, compressors ,fire fighting equipments etc. The provision on this count is taken as 5 % of the cost of machinery which works out to **Rs 0.85**.

4. Miscellaneous Fixed Assets

Under this head the items included are Furniture and fixtures, Office equipments, Air Conditioners etc and the provision made is around **Rs 0.05 crores**. Additionally the Testing and R& D facilities would also call for an investment of around **Rs 0.20crores**.Thus the total investment under this head would be **Rs 0.2 5 crores**.

5. Project Engineering and Consulting

Under this head the items included are the fees and expenses on account of Architect fees, project engineering and management (both local and overseas), detailed project reports etc .

6. Preliminary & Preoperative Expenses

The items included under this head are company formation expenses , public issue expenses (if any), interest during construction, pre production expenses during the implementation phase etc .

7. Contingency Expenses

Depending on the gestation period and further detailing of the project cost by the promoter, the contigency provision has been made at the rate of 10%.

8. Margin Money for Working capital

The margin money for working capital forming part of the total project cost would be **Rs 0.89 crores**.

9. Total Project Cost

The total project cost as given in **Exhibit 1** would be **Rs 23.66 crores**.

10. Sales Realisation and Turnover

As per the details available from the Technology and Equipment suppliers the economic size of a plant is **1200 mtrs/hour**.

Under the Indian conditions, it is assumed that the machine would operate at an efficiency level of 75 %.Hence the production from the plant would be **900 mtrs/hour**.

The plant would operate on Three -shift basis and 300 workings days in a year.

The capacity utilisation for the 1st year is assumed at 50% and thereafter for the 2nd ,3rd and 4th year onwards 60%, 75% and 90% respectively.

The average selling price of the end product would be **Rs 60 /sq mtrs**. (net of excise duties ,sales tax and other incidental expenses). Estimation of sales revenue is given in Exhibit 2.

11. Major Raw materials

The main raw materials used and the corresponding prevailing prices as an indicator are as follows:

Major Raw Materials	Prices
Polyester Fabric	Rs 22/sq mt
PVC	Rs 50/Kg

- The major suppliers of raw materials are :

Polyvinyl Chloride (PVC)

(a) Reliance Industries

Polyester

(a) Reliance Industries.

(b) Indo-Rama Synthetics Limited.

12. Manpower , Salaries and Wages

The manpower requirements and the salary structure is given in Exhibit 3.

The total manpower requirement comprising of supervisors, machine operators, helpers and the managerial cadre would be 29 nos.

13. Factory and Overhead Expenses

The items covered under this head are repairs and maintenance, Establishment expenses, stationeries, travel expenses, packaging expenses etc.

14. Marketing and Promotional Expenses

The promotion of coated fabrics will call for expenditure on this account and a provision of 10 % of sales has been made uniformly over the years.

The profitability statement is given in Exhibit 4.

EXHIBIT 1

PROJECT COST
(LAND, BUILDINGS, PROCESS PLANT & MACHINERY, UTILITIES & OTHER ASSETS)

		Project Cost (Rs. Cr.)
1	**Land** Area: 2000 Sq Mtrs Rate: (Rs.1200 /Sq. Mtr)	**0.24**
2	**Buildings** Plant Area, Office, Godown, Lab, Service Area etc.) Built-up Area : 1000 Sq. Mtrs Avg Rate : Rs. 4500 /Sq. Mtrs	**0.45**
3	**Process Plant & Equipment**	**17.00**
4	**Utility & Other equipments (5%)** (Power, Water, Compressor, Humidity Control, Fire Fighting, Material Handling etc.)	**0.85**
5	**Misc. Fixed Assets** (Furniture & Fixtures, Office Equipment, Testing Lab etc.)	**0.25**
6	**Project Engineering & Consultancy charges (2.5%)**	**0.45**
7	**Preliminary & Pre-operative Expenses (12%)** (Company Formation, Interest during construction, pre-production expenses, etc.)	**2.04**
8	**Contingency (10 %)**	**1.70**
9	**Total**	**22.98**
10	**Margin Money for Working Capital**	**0.89**
11	**Total Project Cost**	**23.66**

EXHIBIT 2

ESTIMATION OF SALES REVENUE

(Rs. Crore)

ITEM	YEAR OF OPERATION									
	I	**II**	**III**	**IV**	**V**	**VI**	**VII**	**VIII**	**IX**	**X**
Average Production per hour (sq. mtr)	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200
75% efficiency	900	900	900	900	900	900	900	900	900	900
Capacity Utilisation	50%	75%	90%	90%	90%	90%	90%	90%	90%	90%
Actual Production per hour	600	900	1080	1080	1080	1080	1080	1080	1080	1080
Production per day (sq. mtr)	14400	21600	25920	25920	25920	25920	25920	25920	25920	25920
Production for 300 working days (sq. mtr)	4320000	6480000	7776000	7776000	7776000	7776000	7776000	7776000	7776000	7776000
Selling Price (Rs/sq. mtr)	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00
Sales Revenue (Rs. Cr)	**25.92**	**38.88**	**46.66**	**46.66**	**46.66**	**46.66**	**46.66**	**46.66**	**46.66**	**46.66**
Value Loss (2%)	0.52	0.78	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Net Sales Revenue (Rs. Cr)	**25.40**	**38.10**	**45.72**	**45.72**	**45.72**	**45.72**	**45.72**	**45.72**	**45.72**	**45.72**

EXHIBIT 3

MANPOWER REQUIREMENTS

	Nos	Monthly	Total Mon.	Annual
General Manager	1	30000	30000	360000
Production Manager	1	15000	15000	180000
Machine Operator	3	4000	12000	144000
Machine Helper (Semi Skilled)	9	3000	27000	324000
R&D, Testing	3	10000	30000	360000
Marketing & Sales	3	12000	36000	432000
Clerical Staff	5	4000	20000	240000
Other Staff	3	2500	7500	90000
Maintenance (Mech. & Elec.)	1	4000	4000	48000
TOTAL	**29**		**181500**	**2178000**
Fringe Benefits (40 % of the above)				871200
Total Wage Bill (Annual) Rs. lakhs:				**3049200.00**
Total Wage Bill (Annual) Rs. Cr.:		Salary + Other Benefits =		**0.30492**

EXHIBIT 4

PROFITABILITY STATEMENT

(Rs. Crore)

ACCOUNT HEAD	FINANCIAL YEAR OPERATION									
	I	II	III	IV	V	VI	VII	VIII	IX	X
Revenue										
Net Sales Turnover	19.05	22.86	28.58	34.29	34.29	34.29	34.29	34.29	34.29	34.29
Total Revenue	19.05	22.86	28.58	34.29	34.29	34.29	34.29	34.29	34.29	34.29
Expenses										
Raw Materials	7.84	10.58	14.11	14.11	14.11	14.11	14.11	14.11	14.11	14.11
Salaries & wages	0.30	0.32	0.34	0.35	0.37	0.39	0.41	0.43	0.45	0.47
Power, Fuel, Stores & Other Expenses (including packing materials)	2.10	2.70	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60
Marketing & Promotional Expenses	1.76	2.29	2.86	2.68	2.68	2.68	1.34	1.34	1.34	1.34
Factory & Office Overheads	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24
Interest on S.T. Loans	0.38	0.46	0.57	0.69	0.69	0.69	0.69	0.69	0.69	0.69
Cost of Sales										
Depreciation (St.Line)	13.63	17.59	22.72	22.67	22.69	22.71	21.39	21.41	21.43	21.45
Amort. of Expenses	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28
Interest on L.T Loan	0.19	0.19	0.19	0.19	0.19	0.19	0.00	0.00	0.00	0.00
Profit Before Tax	1.05	1.66	2.73	8.97	9.43	9.88	11.62	11.60	11.58	11.56

DOUBLE NEEDLE BAR SPACER MACHINES

1. PRODUCT AND TECHNOLOGY SECTOR

- A spacer fabrics is a three –dimensional fabric consisting generally of two warp knitted fabrics produced independently of each other, and connected by monofilaments or other yarns. The two fabric surfaces can be produced from different components and also can have different structures.
- These are produced using double needle bed knitting machines, of warp or weft type.
- The space between the layers can be varied, thereby, resulting spacer fabrics have thickness ranging from 1 – 15 mm.
- These fabrics are characterised by Light weight, Bulk, Softness, High air permeability, Fluid transmission, Thermal control, Tear resistance

Major Application and End-usages:

The potential space between the spacer fabric layers can be utilized for incorporating support strap, foam padding and shape and function components. Consequently these fabrics find varied uses in the following areas of technical textiles.

1.	Mobiltech	Car seat covers Upholstery insert in car seats Linings for automobile doors, columns, backs, dashboard, hood, luggage screen area, etc Mud flaps for busses and lorries
2.	Medtech	Bandages to replace plasters Bed pads for children and incontinence patients Mattress for long term patients
3.	Sportech	Insoles for sports and other shoes Protective zones in sportswear and work wear fabrics High performance sportswear Diving suits and surfing suits
4.	Indutech	Support for ceramic filters Fluid filters Mats to absorb oil Lining for loud speakers Inner lining for tool belts

5. Hometech — Mattress underlays

6. Clothtech — Shoulder pads
Formed breast cups

7. Geotech — Reinforcement and filtration function

2. GLOBAL MARKET POTENTIAL:

Spacer fabrics are said to have varied applications in different technical textile fields. As the market for technical textiles (as per David Rigby Report) is poised for growth, so is the market for spacer fabrics. It may be said to have a volume of 24 metric tonnes by 2005, having value of 194 m$.

3. INDIAN MARKET POTENTIAL :

Taking into consideration the wide and varied applications of spacer fabrics, the market for spacer fabrics in India should be excellent. However, the technology is not popular in the country as yet. Few of the products in the area of Clothtech and Sportech are manufactured in our country using the V-bed kntting machines. For the Warp knitted spacer fabrics to become popular, the high cost of imported machinery is an impediment.

4.	**Global Technology and Equipment Suppliers**	Karl Mayer Raschel Warp Knitting machines, Germany

5.	**Recommended Economic Size Plant (Imported*): -** **RD 2N, 75" wide, 400 rpm, 210 cpm** **RD 6/7N, with Piezo jacquard for patterning, 130" wide, 850 rpm, 450 cpm** * *Karl Mayer, Germany*

These machines are supplied by **A.T.E.Marketing Pvt. Ltd.** in India. There are several models available in Raschel warp Knitting machines, costing in the range of **1,20,000 to 2,00,000 Euro FOB**. The model considered for the project costing purpose is **RD 6N, 130" wide, E22 gauge, Made in China** (cost about 40 % less than that made at Principals, Germany). This model is commonly used for production of Auto Interior trims, Car underlay, mattress underlay and their likes.

RD 6N Specification:

- Working width : 130 inches, 330 cm
- Gauges available : E22, 24, 28 (needles per inch)
- Knitting elements : 2 needle bars with individual latch needles, 6 ground guide bars, 2 knockover comb bars and 2 stitch comb bars
- Warp beam support : Free-standing, 6 warp beam positions, 32" flange diameter
- Yarn let-off device : 6 electronically controlled yarn let – off gears, computer with display of production data on screen and interface for central data acquisition
- Machine speed : 850 rpm
- Pattern devices : 6 pattern discs
- Take – up roller : 3 roller take up driven by change gear

6.	**Investment in Process Plant Equipment including Finishing & Coating Equipment (installed cost) :-**	Rs.1.8 Cr.

7. PROJECT COST AND PROFITABILITY PROJECTIONS

(i) PROJECT COST: vide Table 1

Land

The total requirement of land for this project would be approximately 1000 sq.m. the land cost is assumed to be Rs.1200 per sq. m.(including development cost).

Building

The building area comprising of main factory building, office, godown, testing laboratory would require about 500 sq.m. at a projected cost of Rs. 4,500 per sq.m.

Plant and machinery

The machinery required for the manufacture has been described in the earlier section. The cost of set –up would require about Rs.1.8 Crores.

Utility and other equipments

The preparatory process machines for warping and winding, environment conditioning, compressor and other such infrastructure would require about 5 % of the Plant cost, Rs. 0.09 Cr

Miscellaneous Fixed Assets

The provision for office furniture and fixtures, laboratory instruments, etc is made under this head to a tune of Rs.0.30 crores

Project Engineering and Consulting

Under this head the items included are fees and expense on account of architect fees, project engineering and management and detailed project reports.

Preliminary and Pre-operative Expenses

The items included under this head are company formation expense, public issues (if any), interest during construction, pre – production expenses during implementation phase.

Contingency

Depending upon the gestation period and further detailing of the project cost by the promoter, the contingency provision has been made at the rate of 10 %.

Margin Money for Working Capital

The margin money for working capital of the total project cost would be about Rs.0.20 Crores

The TOTAL PROJECT COST is estimated to be Rs. 3.61 Crores.

(ii) SALES AND PROFITABILITY ANALYSIS vide Table 2

Sales Revenue and Turnover

The average selling price of the spacer fabric of about 350 g/sq.m. being used for Auto Interior trims, Car underlay, mattress underlay and their likes is projected to be Rs. 250 per kg.

The machine is assumed to operate at 75 % efficiency to give a production of 14 kg per hour.

The plant would operate on three – shift basis 300 day per year.

The capacity utilization for the first year is assumed at 50 % and thereafter it is assumed to be 60 %, 75%, 90% and so on.

Cost of Production

Raw Material cost

Polyester, Polypropylene, cotton yarns are popularly used for these applications. The cost of raw material is calculated after accounting for 5% of process waste at average price of Rs.100 per kg.

Conversion cost

The conversion cost including the cost of power, water, chemical, consumables, etc is assumed to be 25% of the cost of raw material.

Manpower, salaries and wages

The manpower requirements and the salary structure is exhibited in Table 3. The total manpower requirement is 24 people at various levels with an expense of Rs.0.16 crore annually.

Factory and Overhead Expenses

The items covered under this head are establishment expense, repairs and maintenance, stationery, travel, packaging, etc. at aflat rate of Rs.0.10 Crores annually.

Marketing and Promotional Expenses

The promotion of technical textile products based on spacer fabrics will call for expenditure of about 5%of annual sales.

Interest and depreciation

The prevailing interest rates for short term and long term borrowed funds is assumed to be 13 % per annum.

The repayment of loans has been assumed for 5 years with a moratorium period of 1 year.

The depreciation rates have been worked out as per Company's Act (SLM) in a straight line method.

(iii) PROFITABILITY, BREAK-EVEN & PAYBACK PERIOD

As shown in the Profitability Statement, vide Table 2, the sales turnover increases from **Rs. 4.86 crore in first year to Rs. 9.72 crores in the fifth year**. The Profit Before Tax increases from **Rs. 1.21 Crore to Rs. 3.42 crore in the fifth year**.

The **BREAKEVEN SALES** is projected to be **Rs. 2.31 crore**, i.e., 47.6%

The **PAY BACK PERIOD** for the project is **2.43 years**.

8. REGULATORY FRAMEWORK & POLICY ISSUES : (INCLUDING CONCESSIONS, EXEMPTIONS AND TESTING FACILITIES)

(i) The authorities should encourage the use of these specialised products with promotional campaigns for use of Spacer fabrics in mattress underlays, car seat underlays, beddings for patients and sports and innerwear fabrics considering the value addition improved functionality provided by them.

(ii) The decentralised sector of northern India caters to the production of some of the multilayer fabrics used in clothtech and sportech, using the flat bed machines. These indigenously manufactured machines pose limitations to designing of the fabrics in terms of fineness of the gauge and thickness of the fabric. The high cost of the imported machinery is a major hindrance to the further development of spacer fabrics in our country.

9. TESTING REQUIREMENT & FACILITIES

TABLE 4: COMMON TEST PARAMETERS FOR SPACER FABRICS

Sr No.	Property	Test Specification	Instrument	Instrument Supplier	Cost of Instrument (Rs.)
1	Weight	D3376	Weighing balance	Mettler, Presica	1,00,000
2	Thickness	ASTM D1777	Thickness meter	SDL, Paramount, CSI	1,00,000
3	Air permeability	ASTM D737	Air Permeability Tester	SDL, Testex, CSI	5,00,000
4	Moisture transfer	ASTM E 96-80	Moisture transfer meter	SDL, ATLAS, CSI	5,00,000
5	Thermal insulation		Thermal conductivity tester	SDL, SASMIRA, CSI	8,00,000
6	Tear Properties	ASTM D 2261-96	Universal Testing Machine	Instron, Shimadzu, Paramount, Zwicki	20,00,000
7	Tensile properties	ASTM D 4964	Universal Testing Machine	Instron, Shimadzu, Paramount, Zwicki	20,00,000

Testing Facility are available in standard textile testing laboratories across the country. Other specific tests like chemical and UV resistance, flame retardancy, water repellency may be required to be performed depending upon the end use.

TABLE 1

PROJECT COST
(LAND, BUILDING, PROCESS PLANT & MACHINERY, UTILITIES & OTHER ASSETS)

		(Rs. crore)
1	**LAND** Area: 1000 sq. m Rate: Rs.1,200/ sq.m	**0.12**
2	**BUILDING** (Plant area,Office, Godown, Lab, Service area) Area: 500 sq.m Rate: Rs.4,500/sq.m	**0.23**
3	**PROCESS PLANT & EQUIPMENT** 4 Raschel knitting machines RD 6N	**1.8**
4	**UTILITY & OTHER EQUIPMENT** (Yarn preparatory machines, Compressor, conditioner, etc)	**0.09**
5	**MISC. FIXED ASSETS** (Furniture &fixtures, testing lab, office equipment)	**0.5**
6	**PROJECT ENGINEERING &CONSULTANCY CHARGES(2.5%)**	**0.07**
7	**PRELIMINARY &PRE-OPERATIVE EXPENSES (12%)** (Company formation, Interest during construction, pre-production expense)	**0.33**
8	**CONTINGENCY(10%)**	**0.27**
9	**TOTAL**	**3.41**
10	**MARGIN MONEY FOR WORKING CAPITAL**	**0.2**
	TOTAL PROJECT COST	**3.61**

TABLE 2

PROFITABILITY STATEMENT

(Rs. crore)

ACCOUNT HEAD	FINANCIAL YEAR OF OPERATION				
	I	II	III	IV	V
REVENUE					
NET SALES TURNOVER (@Rs.250 per kg of fabric)	4.86	5.83	7.29	8.74	9.72
Total Revenue	**4.86**	**5.83**	**7.29**	**8.74**	**9.72**
EXPENSES					
Raw Material	2.04	2.45	3.06	3.67	4.08
Salaries & Wages	0.16	0.17	0.18	0.19	0.2
Power, Fuel & other expenses (25% of raw material cost)	0.51	0.61	0.76	1.00	1.00
Marketing & Promotional exp.	0.29	0.35	0.44	0.47	0.47
Factory & office overheads	0.10	0.10	0.10	0.10	0.10
Interest on short term loans	0.09	0.12	0.16	0.19	0.19
Cost of Sales	**3.19**	**3.8**	**4.7**	**5.62**	**6.04**
Depreciation	0.18	0.18	0.18	0.18	0.18
Interest on Long Term Loans	0.28	0.25	0.2	0.14	0.08
Profit Before Tax	**1.21**	**1.6**	**2.21**	**2.8**	**3.42**

TABLE 3
MANPOWER REQUIREMENT
ANNUAL BUDGET FOR SALARIES &WAGES (Rs.)

MANPOWER	NOS.	MONTHLY SALARY	TOTAL MONTHLY SALARY	TOTAL ANNUAL SALARY
Production manager	1	15000	15000	180000
Supervisor (1 per shift)	3	8000	24000	288000
Machines operators (2 per shift)	6	4000	24000	288000
Machine Helper (2 per shift)	6	3000	18000	216000
R & D, Testing	1	10000	10000	120000
Marketing & Sales Staff	2	12000	24000	288000
Clerical staff	2	4000	8000	96000
Other staff	2	2500	5000	60000
Maintenance	1	4000	4000	48000
Total Wage Bill	**24**			**1584000**