

**134. PROFILE ON PRODUCTION OF
ADHESIVE DRESSING FOR MEDICAL
PURPOSE**

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I. SUMMARY

This profile envisages the establishment of a plant for the production of adhesive dressing for medical purpose with a capacity of 72,000 kg per annum.

The present demand for the proposed product is estimated at 69,672 kg per annum. The demand is expected to reach at 113,488 kg by the year 2017.

The plant will create employment opportunities for 45 persons.

The total investment requirement is estimated at about Birr 6.98 million, out of which Birr 4.75 million is required for plant and machinery.

The project is financially viable with an internal rate of return (IRR) of 19 % and a net present value (NPV) of Birr 3.51 million discounted at 8.5%.

II. PRODUCT DESCRIPTION & APPLICATION

Adhesive dressings for medical purposes are surgical adhesive tapes made of various rigid or elastic backing materials wound on plastic rolls. The normal width measurements are 1.25, 2.5, 5, 7 and 10 cms; the normal length is usually 1 metre or 5 metres.

The backing material (carrier) is coated with acrylate adhesive or zinc oxide cautchonic adhesive. Acrylate adhesive is heat resistant, hypoallergenic and transparent for x- rays. Zince –oxide-cautchnic adhesive is the classical adhesive mass.

Traditional adhesive dressings with continuous pad are based on cloth and pvc film in coil-folding length packed in cartons. Their measurements are 4 cm x 100 cm, 6 cm x 100 cm, 4 cm x 50 cm, 6 cm x 50 cm, and 4 cm x 25 cm, and 6cm x 25 cm.

The major end users of surgical adhesive tapes are hospitals, clinics, pharmacies and other health centers.

III. MARKET STUDY AND PLANT CAPACITY

A. MARKET STUDY

1. Past Supply and Present Demand

The major end users of medical adhesive dressings are hospitals, clinics, health centers and pharmacies. The country's requirement of adhesive dressings for medical purposes is entirely met through. Import of the product for the past seven years is provided in Table 3.1.

Table 3.1
IMPORT OF ADHESIVE FOR MEDICAL PURPOSE

Year	Quantity
2000	37,669
2001	59,988
2002	28,747
2003	51,752
2004	98,132
2005	82,468
2006	28,417

Source:- Customs Authority.

Import of adhesive dressings for medical purposes fluctuated from year to year without any trend. Due to absence of a trend in the data set the recent three years average is taken to fairly reflect the current demand. Accordingly current demand is estimated at 69,672 k.g.

2. Demand Projection

The demand for adhesive dressings is mainly influenced by population growth and expansion of the health sector. The health sector has been given due attention by the government. Accordingly the health sector has registered an annual average growth of 9% in the past five years. Due to the favorable environment created for private investment a number of health facilities including hospitals and clinics are being established throughout the country. Considering population growth rate and the expansion of health facilities in the urban and rural areas demand for adhesive dressings for medical purposes is assumed to grow by 5% per annum. The result of the projection based on this assumption is presented in Table 3.2.

Table 3.2
PROJECTED DEMAND OF ADHESIVE DRESSINGS FOR MEDICAL
PURPOSES (KG)

Year	Quantity
2008	73,156
2009	76,814
2010	80,654
2011	84,687
2012	88,921
2013	93,367
2014	98,036
2015	102,938
2016	108,084
2017	113,488

Demand for adhesive dressing for medical purposes is projected to grow from 73,156 kg in the year 2008 to 80,654kg and 102,938kg by the year 2010 and year 2015, respectively.

3. Pricing and Distributions

Based on the import data obtained from Customs Authority a factory gate price of Birr 60 per kg is recommended. The product will find its market outlet through the existing medicine and medical equipment enterprises. Direct sale to bulk purchasers is also another method for distributing the product.

B. PLANT CAPACITY AND PRODUCTION PROGRAMME

1. Plant Capacity

The market study of adhesive dressing for medical purposes indicated that the projected demand for the product in 2008 will be 73156 kgs. This figure will grow to 102938 kgs in 2015 and to 113,488 kgs in 2017. In the technology of adhesive tape production, the speed of the coating machine is the limiting factor in plant capacity determination. Therefore, the standard size recommended for the plant in question is 300,000 m² per annum. This is in the order of 72,000 kgs per annum.

The plant will operate 3 shifts of 8 hours each shift, and 300 days a year.

2. Production Programme

The production programme is scheduled on the basis of time required for a progressive build-up of labor productivity and establishment of potential market outlets. It is therefore suggested that the capacity utilization of the plant will be 65%, 75% 85% and 100% in the 1st, 2nd, 3rd and 4th year of operation, respectively.

Table 3.3
PRODUCTION PROGRAMME

Year	1	2	3	4
Capacity utilization (%)	65	75	85	100
Production (kgs)	46,800	54,000	61,200	72,000

IV. MATERIALS AND INPUTS

A. RAW AND AUXILIARY MATERIALS

The major raw materials for surgical adhesive tape manufacturing are cloth and adhesive mass. The required cloth can be obtained from local textile mills. The required cloth can be obtained from local textile mills. Adhesive mass is not produced locally and has to be imported from foreign market. Table 4.1 below shows annual requirement of these materials at full production capacity along with estimated costs.

Auxiliary materials include labels, packing material and other inputs. Table 4.1 shows annual requirement of auxiliary materials and related costs.

Table 4.1
ANNUAL REQUIREMENT OF RAW & AUXILIARY MATERIALS

No.	Description	Unit of Measure	Qty	Cost ('000 Birr)		
				LC	FC	TC
	<u>A. Raw Material</u>					
1	Cloth	m ²	300,100	1,800.60	-	1,800.60
2	Adhesive Mass	Kg	45,000	105	210	315
	Sub total		-	1,905.60	210	2,115.60
	<u>B. Auxiliary Materials</u>					
1	Labels	-	As reqd	7.5	-	7.5
2	Packing materials	-	“	10.0	-	10.0
3	Other inputs	-	“	5.0	-	5.0
	Su total	-		22.50	-	22.50
	Total	-		1,928.10	210	2,138.10

B. UTILITIES

Utilities required by the envisaged plant are water, electricity and steam. An oil- fired boiler will be used to generate steam required by the plant. Table 4.2 below shows the annual requirements of utilities together with related costs.

Table 4.2
UTILITY REQUIREMENT AND COST

No.	Description	Unit of Measure	Qty	Unit Cost (Birr)	Cost (Birr)
1	Electricity	kWh	95,000	0.474	45030
2	Water	M ³	2,200	10	22,000
3	Fuel oil	Litre	25,000	5.41	135,250
	Total				202,280

V. TECHNOLOGY AND ENGINEERING

A. TECHNOLOGY

1. Production Process

The acrylate adhesive mass used for coating is manufactured in an appropriate unit.

The coating machine is designed for direct and transfer coating. In direct coating, the carrier material is directly coated with the contact adhesive as against to transfer coating, where the contact adhesive is applied to silicon paper. In the latter case, the contact adhesive is transferred on the actual carrier material after the drying process is complete.

The direct coating process is used with cloth and PVC film (which is a plasticized film laminated onto silicon paper). After passing through a drying tower, this material is rewound into large rolls.

The large rolls produced in this fashion, are further processed into spools on separate lines. A slither and rewinding machine is employed to cut the large roll width of spools, and wound onto rolls (stock rolls) with a diameter of 400 mm. The rolls cut by the slither machine are wound with special spooling machine into plastic spools.

The spools are then inserted in snap-on plastic covers and packed in cardboards boxes.

2. Source of Technology

The technology and machinery required for the manufacture of surgical adhesive tape can be obtained from a number of suppliers in Europe and Asia. Address of a company which could be contacted is given below:

Sunrise exports

16 A/1, Prathamesh, MHADA, near Poonam Nagar,

Mahakali Caves

Andheri (E), Mumbai, Maharashtra – 400 093, INDIA

Phone: +(91) –(22)-28214639

Fax: +(91) –(22) – 28213976

Website: <http://www.Indiamart.Com/sunrise-exports>

B. ENGINEERING

1. Plant Machinery and Equipment

Machinery and equipment required by surgical adhesive tape manufacturing plant is indicated in Table 6.1 below.

Table 6.1
LIST OF MACHINERY & EQUIPMENT

No.	Description	Qty	Cost ('000 Birr)		
			LC	FC	TC
1	Kneader, dispersion adhesive preparation	1	350	550	550
2	Coating machine	1		1500	1500
3	Drying oven	1		375	375
4	Storage station	1		-	-
5	Rewinding & measuring machine	1		210	210
6	Slitting machine	1		265	265
7	Spooling machine	1		310	310
8	Gas sterilization chamber	1		475	475
9	Laboratory equipment	Set		220	220
	FOB price	-	350	3905	4255
	Freight, Insurance, Bank, Customs, Material Handling	-	500	-	500
	CIF landed cost	-	850	3905	4755

2. Land, Building and Civil Works

Land area is required for factory building, administration building, space for social facilities, for internal roads and pathways, and space for future expansion. The total land area required is estimated to be 800 m². At land lease rate of Birr 1 per m² for a period of 80 years, the total land lease value will be Birr 64,000. Of the total land area, 400 m² will be built-up area. At the rate of Birr 2000 per m², the total building cost will be Birr 800,000. Thus, the total investment on land, building and civil works will be Birr 864,000.

3. Proposed Location

Location of a plant is determined mainly on the basis of proximity to raw materials, availability of infrastructure, and distance of the plant from potential market outlets. In addition to this fair distribution of projects among SNNPRS woredas is taken into consideration. For this woredas namely Basketo, Bakogazer and West Abaya are identified to determine plant location of these West Abaya woreda is selected. It is therefore proposed that the envisaged plant be located in Birbir town.

VI. MANPOWER & TRAINING REQUIREMENT

A. MANPOWER REQUIREMENT

The mix of manpower required by the surgical adhesive plant include production workers and administration staff. Both skilled and unskilled workers are required in the production process. The mix of manpower of the plant with related monthly salaries and annual wages is shown in Table 7.1.

Table 7.1
MANPOWER REQUIREMENT

No.	Job Title	Nos	Monthly Salary	Annual Wages
	<u>A. Administration</u>			
1	Plant manager	1	2000	24000
2	Secretary	1	800	9000
3	Personnel officer	1	1000	12000
4	Salesman	1	1000	12000
5	Store man	1	800	9600
6	Cashier	1	500	6000
7	Clerk	1	350	4200
8	General Service	4	250	12000
	Sub total	11		88800
	<u>B. Production</u>			
1	Production head	2	1200	28800
2	Quality control expert	2	1000	24,000
3	Skilled workers	15	600	108,000
4	Technicians	6	800	57,600
5	Unskilled workers	9	250	27,000
	Sub total	34		245,400
	Workers' benefit (25% WS)			83,550
	Total	45		317,750

B. TRAINING REQUIREMENT

Training is required for production workers particularly for production head, quality control expert and machinery operators. Training program will be executed at the plant site during erection and commissioning. The machinery supplier will be responsible to conduct the training programme. A total of Birr 10,000 will be allocated for the training programme.

VII. FINANCIAL ANALYSIS

The financial analysis of the adhesive dressing for medical purpose project is based on the data presented in the previous chapters and the following assumptions:-

Construction period	1 year
Source of finance	30 % equity 70 % loan
Tax holidays	3 years
Bank interest	8%
Discount cash flow	8.5%
Accounts receivable	30 days
Raw material local	30 days
Raw material, import	90 days
Work in progress	1 days
Finished products	30 days
Cash in hand	5 days
Accounts payable	30 days

A. TOTAL INITIAL INVESTMENT COST

The total investment cost of the project including working capital is estimated at Birr 6.98 million, of which 37 per cent will be required in foreign currency.

The major breakdown of the total initial investment cost is shown in Table 7.1.

Table 7.1
INITIAL INVESTMENT COST

Sr. No.	Cost Items	Total Cost (‘000 Birr)
1	Land lease value	64.0
2	Building and Civil Work	800.0
3	Plant Machinery and Equipment	4,755.0
4	Office Furniture and Equipment	125.0
5	Vehicle	200.0
6	Pre-production Expenditure*	527.8
7	Working Capital	510.5
	Total Investment cost	6,982.3
	Foreign Share	37

* *N.B Pre-production expenditure includes interest during construction (Birr 377.78 thousand) training (Birr 10 thousand) and Birr 140 thousand costs of registration, licensing and formation of the company including legal fees, commissioning expenses, etc.*

B. PRODUCTION COST

The annual production cost at full operation capacity is estimated at Birr 3.60 million (see Table 7.2). The material and utility cost accounts for 64.84 per cent, while repair and maintenance take 2.08 per cent of the production cost.

Table 7.2**ANNUAL PRODUCTION COST AT FULL CAPACITY ('000 BIRR)**

Items	Cost	%
Raw Material and Inputs	2,138.00	59.24
Utilities	202.28	5.60
Maintenance and repair	75	2.08
Labour direct	147.24	4.08
Factory overheads	49.08	1.36
Administration Costs	98.16	2.72
Total Operating Costs	2,709.76	75.08
Depreciation	598	16.57
Cost of Finance	301.39	8.35
Total Production Cost	3,609.15	100

C. FINANCIAL EVALUATION**1. Profitability**

According to the projected income statement, the project will start generating profit in the first year of operation. Important ratios such as profit to total sales, net profit to equity (Return on equity) and net profit plus interest on total investment (return on total investment) show an increasing trend during the life-time of the project.

The income statement and the other indicators of profitability show that the project is viable.

* Factory overhead cost includes salaries and wages of supervisors, insurance of factory workers social costs on salaries of direct labour etc.

** *Administrative cost includes salaries and wages, insurance, social costs, materials and services used by administrative staff etc.*

2. Break-even Analysis

The break-even point of the project including cost of finance when it starts to operate at full capacity (year 3) is estimated by using income statement projection.

$$\text{BE} = \frac{\text{Fixed Cost}}{\text{Sales} - \text{Variable Cost}} = 22 \%$$

3. Pay Back Period

The investment cost and income statement projection are used to project the pay-back period. The project's initial investment will be fully recovered within 5 years.

4. Internal Rate of Return and Net Present Value

Based on the cash flow statement, the calculated IRR of the project is 19 % and the net present value at 8.5% discount rate is Birr 3.51 million.

D. ECONOMIC BENEFITS

The project can create employment for 45 persons. In addition to supply of the domestic needs, the project will generate Birr 1.91 million in terms of tax revenue. The establishment of such factory will have a foreign exchange saving effect to the country by substituting the current imports.