

**201. PROFILE ON PRODUCTION OF
ABRASIVE CLOTH/EMERY CLOTH**

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I. SUMMARY

This profile envisages the establishment of a plant for the production of abrasive cloth with a capacity of 95 tonnes of per annum.

The present demand for the proposed product is estimated at 61 tones per annum. The demand is expected to reach at 131.7 tones by the year 2017.

The plant will create employment opportunities for 25 persons.

The total investment requirement is estimated at Birr 4.87 million, out of which Birr 2.87 million is required for plant and machinery.

The project is financially viable with an internal rate of return (IRR) of 24.86 % and a net present value (NPV) of Birr 3.16 million discounted at 8.5%.

II. PRODUCT DESCRIPTION AND APPLICATION

Abrasive cloth (emery cloth) consist of some type of abrasive mineral, which can be organic or synthetic; flexible backing; and adhesives. Due to their extreme hardness, natural minerals such as garnet or emery (corundum with iron impurities) find limited use in products for wood-related applications, while crocus mineral (natural iron oxide) is limited to use as a polishing agent because of its softness.

Abrasive cloth (Emery cloth) is originally restricted to finishing applications such as polishing or preparing surfaces for painting or plating. Through improvements in the strength of backings and the properties of abrasive minerals, coated abrasives now can be used for heavy –duty applications.

Although the most familiar types of coated abrasives are probably the individual sheets of emery cloth with which home wood workers prepare furniture or crafts for painting, the trade term “coated abrasives” actually encompasses a much wider array of products for both individual and industrial use. While these products assume many forms, all are essentially a single layer of abrasive grit attached to a flexible backing.

The biggest users of coated abrasives are manufactures who employ large-scale abrasives in various phases of industrial production. For example, coated abrasives are critical in both the furniture and automotive industries.

III. MARKET STUDY AND PLANT CAPACITY

A. MARKET STUDY

1. Past Supply and Present Demand

Abrasive cloth /emery cloth as a polishing, cleaning, shaping, smoothing and finishing materials is mainly used in the metal, wood, glass and the like. The demand for the product is currently met through import. The major suppliers of abrasive/emery cloth to the Ethiopian market are China, Germany, United Arab Emirates, and Britain among others. Import of abrasive/emery cloth in the past eight years is presented in table 3.1

Table 3.1
IMPORT OF ABRASIVE/EMERY CLOTHE (TON)

Year	Quantity
1999	61.4
2000	60.4
2001	42.9
2002	28.1
2003	47.7
2004	62.4
2005	70.3
2006	49.4

Source: - Compiled From Customs Authority

Table 3.1 reveals that import of abrasive cloth/emery cloth during the years 1991 and 2000 was slightly above 60 tones. But between years 2001 – 2003, the yearly average import has declined to about 40 tones. Compared to the previous years it has decreased by about 33%. This shows that the high import in the previous years has been used as a buffer stock for the following years. On the other hand yearly average level of import during the period 2004 -2006 has sharply increased and reached about 61 tones. Since a trend could not be established from the data set, the recent three years average, which is 61 tones, is considered to be the current effective demand for the product.

2. Demand Projection

Demand for abrasive cloth/emery cloth will increase with the development of the manufacturing sector mainly the wood and metal sub sectors. These sub sectors are also the main suppliers of various goods to the construction sector. Since the construction sector is growing fast due to various development activities the growth of the metal and wood-manufacturing sector is inevitable. Considering this situation demand for abrasive/emery cloth is forecasted to grow by 8% per annum. The projected demand is shown in Table 3.2

Table 3.2

PROJECTED DEMAND FOR ABRASIVE/ EMERY CLOTH (TON)

Year	Quantity
2008	65.9
2009	71.2
2010	76.8
2011	83.0
2012	89.6
2013	96.8
2014	104.5
2015	112.9
2016	121.9
2017	131.7

3. Pricing and Distribution

The prices of emery. abrasive cloths vary according to the quality of the raw material used. The average CIF price of the product in the recent two years is Birr 32,640 per tone. Allowing 30% for import duty and other clearing expenses, the factory gate price of the envisaged plant is estimate at Birr 39, 432 per tone.

Currently the product is distributed mainly by the building material merchandizing enterprise. The envisage plant can also use the existing enterprises.

B. PLANT CAPACITY AND PRODUCTION PROGRAMME

1. Plant Capacity

The envisaged plant would have a capacity of 95 tones of abrasive cloth per year. The plant operates single shift of 8 hours per day and 300 working days per annum..

2. Production Programme

The plant is expected to start at 75% of its capacity during the first year of operation and at 85% during the second years and then to full capacity during the 3rd year and then after.

IV. MATERIALS AND INPTUS

A. MATERIALS

The required raw material and annual requirement for the manufacturing of abrasive cloth are listed in the table 4.1 below.

Table 4.1
ANNUAL REQUIREMENT FOR RAW AND AUXILIARY MATERIALS AND
THEIR COSTS

Sr. No	Description	Qty. Tone	Cost, 000 Birr		
			F.C	L.C	Total
1	Aluminum Oxide	20	245.00	-	245.00
2	Silicon Carbide	15	180.00	-	180.00
3	Treated Cloth	6	250.00	-	250.00
4	Phenol formaldehyde resin	25	486.00	-	486.00
5	Other inputs (Glue, ink, etc)	LS	105.00	-	105.00
	Total	-	1,266.00		1,266.00
	Insurance, Customs Duty, Inland Transport, Bank Charge, Etc.			316.50	316.50
	Grand Total		1,266.00	316.50	1,582.50

B. UTILITIES

Utilities required are electricity and water. Water is mainly needed for human consumption and general purpose. The annual quantities and cost of utilities are estimated as shown in Table 4.2.

Table 4.2
ANNUAL UTILITY REQUIREMENT

No	Description	Qty	Cost, 000 Birr		
			F.C	L.C	Total
1	Electric Power	65,000 Kwh	-	30.78	30.78
2	Water	1000 m ³	-	10.00	10.00
	Total			40.78	40.78

V. TECHNOLOGY AND ENGINEERING

A. TECHNOLOGY

1. Production Process

Production starts when the make coat is applied to one side of the backing material. The abrasive grains are then applied using an electrostatic deposition process, in which the grains are given an electric charge. Finally, another layer of adhesive-the size coat-is applied.

The next step, applying the abrasive mineral, is the most important in the manufacturing process because it determines the orientation and density of the mineral. The backing is passed, adhesive side down, over a pan of abrasives that have been electro-statically charged-given an electric charge opposite to the backing. The opposite charge causes the abrasive to adhere evenly to the backing, resulting in a very sharp, fast cutting coated abrasive tool with the maximum life possible.

Once the grain has been imbedded in the make coat, the roll is dried and moved on for application of the size coat. Following application of the size coat, the roll is dried again and cured under carefully controlled temperature and humidity conditions.

Before the coated abrasive roll is converted into a belt or other products, it is systematically flexed or bent to break the continuous layer of adhesive bond. Converting roll material into abrasive belts with cutting strips of coated abrasives to the desired width. Each strip is then cut to the proper length and the ends are joined together.

2. Source of Technology

The above described technology is available from the following sources:

Borkowski, J. Use of Abrasives and Abrasive Tools. Prentice Hall,1992

Web:www.madehow.com/Volume-1/

B. ENGINEERING

1. Machinery and Equipment

Table 5.1 below provides list and costs of machinery and equipment required for the envisaged plant.

Table 5.1**LIST OF MACHINERY AND EQUIPMENT AND CORRESPONDING COST**

Sr. No.	Description	Qty.	Cost (Birr)		
			LC	FC	Total
1	Main Machinery				
	Electrostatic coating equipment	1		1,230,000.00	1,230,000.00
	Abrasive application	1		150,000.00	150,000.00
	Adhesive mixer	1		65,000.00	65,000.00
	Mark printer	1	-	223,000.00	223,000.00
	Adhesive coating machine	1	-	145,000.00	145,000.00
	Dryer	1		150,000.00	150,000.00
2	Auxiliary Machinery				
	Re-winding Machine	1	-	120,000.00	120,000.00
	Slitting machine	1	-	35,000.00	35,000.00
	Cutting machine	1		45,000.00	45,000.00
	Flat press	1		270,000.00	270,000.00
Total			-	2,298,000.00	2,298,000.00
Insurance, customs duty, inland transport, bank charge, etc.			574,500.00	-	574,500.00
Grand Total			574,500.00	2,298,000.00	2,872,500.00

2. Land, Buildings & Civil Works

The production building will be one-storied steel frame building will be suitable. The floor space required 400 m². The walls will be plastered, reinforced concrete floor and RHS truss and EGGA sheet roof. Taking into consideration space for easy movement and possible future expansion, the total area of the project will be 1,000 square meters the lease value at a rate of Birr 0.625 per square meter and for 80 years will amount to Birr 50,000. The total building and construction cost at a unit cost of Birr 2300 is estimated at about Birr 920,000.

3. Proposed Location

The plant can be located in any of the zonal capital of second grade considering the availability of access to clean water, electricity and other infrastructures for the smooth operation of the plant.

VI MANPOWER AND TRAINING REQUIREMENT

A. MANPOWER REQUIREMENT

Total manpower required is 55 persons. The detail of the manpower requirement and the estimated annual labor cost including employees' benefit is given in Table 6.1.

Table 6.1**MANPOWER REQUIREMENT AND ESTIMATED LABOUR COST**

Sr. No	Job Title	No. of Persons	Salary (Birr)	
			Monthly	Annual
1	General Manager	1	2,000	24,000
2	Secretary	1	800	9,600
3	Production & Technical Head	1	1,700	20,400
4	Commercial Head	1	1,600	19,200
5	Finance & Administration Head	1	1,600	19,200
6	Personnel	1	1,000	12,000
7	Accountant	1	750	9,000
8	Accounts Clerk	1	400	4,800
9	Cashier	1	500	6,000
10	Sales person	1	700	8,400
11	Purchaser	1	500	6,000
12	Store Keeper	1	500	6,000
13	Quality Controller	1	800	9,600
14	Forman	1	750	9,000
15	Machine Operator	15	7,500	112,000
16	Assistant Operator	10	4,000	48,000
17	Laborer	10	1500	18,000
18	Mechanic	1	700	8,400
19	Electrician	1	700	8,400
20	Driver	2	800	9,600
21	Guard	2	400	4,800
	Sub – Total	55		372,400.00
	Employee's Benefit 25% basic salary			93,100.00
	Grand Total			465,500.00

B. TRAINING REQUIREMENT

The supervisor, skilled workers and quality control worker need at least three weeks training on the technology, maintenance and quality control. For the rest, on-the-job training will be sufficient during commissioning and start up period by the machinery suppliers and experts. Total training cost is estimated at about 60,000 Birr.

VII. FINANCIAL ANALYSIS

The financial analysis of the abrasive close 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	30days
Raw material, import	90days
Work in progress	5 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 4.57 million, of which 13 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	50
2	Building and Civil Work	920.00
3	Plant Machinery and Equipment	2,872.50
4	Office Furniture and Equipment	75
5	Vehicle	200
6	Pre-production Expenditure*	382.85
7	Working Capital	307.3
	Total Investment cost	4,807.7
	Foreign Share	13

* *N.B Pre-production expenditure includes interest during construction (Birr 232.85 thousand) training (Birr thousand 106) and Birr 94 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 2.91 million (see Table 7.2). The material and utility cost accounts for 54.42 per cent, while repair and maintenance take 2.58 per cent of the production cost.

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

Items	Cost	%
Raw Material and Inputs	1,582.0	54.42
Utilities	40.78	1.40
Maintenance and repair	75	2.58
Labour direct	279.3	9.61
Factory overheads	116.38	4.0
Administration Costs	186.2	6.40
Total Operating Costs	2,279.66	78.42
Depreciation	410.75	14.13
Cost of Finance	216.73	7.46
Total Production Cost	2,907.14	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.

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.

$$\text{BE} = \frac{\text{Fixed Cost}}{\text{Sales} - \text{Variable Cost}} = 28 \%$$

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 4 years.

4. Internal Rate of Return and Net Present Value

Based on the cash flow statement, the calculated IRR of the project is 24.86% and the net present value at 8.5% discount rate is Birr 3.16 million.

D. ECONOMIC BENEFITS

The project can create employment for 55 persons. In addition to supply of the domestic needs, the project will generate Birr 2.12 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.