

MICROCELLULAR SHEETS

1. INTRODUCTION:

The use of microcellular soles is becoming very popular because of its wear and tear resistance properties. The units manufacturing these can be ancillary to some large scale footwear manufacturing unit. Though the large scale units do manufacture microcellular sheet, their production usually falls short of their requirements thereby necessitating purchases from outside sources. Micro Cellular Rubber Sheet is made up by combining Hard rubber sheet with micro porous cells. Available in black and brown colors with hardness of 60 to 65 shores. These rubber sheets are widely used in making sole portion of shoes and slippers, designed for comfort, light weight, flexibility and durability. One side of the sheet is plain and the other side has projected designs to provide grip on the ground while walking. Micro Cellular Rubber Sheet is selling at the price of Rs. 65 per Kilogram.

2. PRODUCT & ITS APPLICATION:

Micro Cellular Rubber Sheet is available in various sizes and shapes, and are used in various industries namely, auto-mobile, electrical and packaging. The sheets are available in thickness of 20mm-25mm with Size 4x7 feet, 5x8 feet in Color or multicolor. The sheets are available in the market for providing Cow Mat, Gym Mat, Eva Sheets, Animal Mat, Cattle Mat, Buffalo Mat, etc.

The micro Cellular sheets having specifications: Thickness: 12mm to 20mm Design: Ripple, Cord line, Wave Used in Chappal. Rubber hawai chapples which are made in various colors and different sizes and thickness. The micro Cellular sheets are used in foot wears, packing industry, printing industry, house hold goods, Engineering & Mechanical industry inputs etc.

3. DESIRED QUALIFICATIONS FOR PROMOTER:

Graduate in any graduate.

4. INDUSTRY LOOK OUT AND TRENDS

Rubber is a collective term for macromolecular substances of natural or synthetic origin (natural rubber or synthetic rubber). Natural rubber (abbreviated to NR) primarily comprises polyisoprene and is harvested from the milky white latex of a number of species of plants which flourish in the tropics, above all from the Spurge family (Euphorbiaceae). The most of the rubber products that are used today is made from synthetic rubber as natural rubber has certain mechanical, chemical and environmental resistance limitations. So synthetic rubbers are formulated in a proper and are used to manufacture a wide range of rubber products. Rubber is a material which is used to produce different objects used for various applications. A popular and a widely demanded use of rubber form are sheets which are used for different purposes. Rubber sheets are available in various lengths and widths. These sheets are cut according to customer requirements. Various types of rubber are used to make sheets. These sheets are very popular and used in an extensive range application. There are a comprehensive range of rubber sheets for general, industrial and mining applications. These sheets are also available in vulcanized black as well as colored sheets for technical uses and industrial applications. There can also be smooth surfaced rubber sheets or with a canvas-type print on one or both sides of the rubber sheets. These sheets insertions are usually designed for use in applications where stresses are generally static and pressures are low. There can be cloth insertion, metal mesh insertion, gauze, nylon cloth, and copper insertion. Moulding is an operation of shaping and vulcanizing the rubber compound by mass of heat and pressure, in mould of appropriate form. The goods thus produced are known as moulded goods. These moulded goods are used in day to day life in household electrical, surgical and automotive and other applications several thousands of types of moulded goods are being produced. There are many types of rubber sheets produced and are available in markets.

5. MARKET POTENTIAL AND MARKETING ISSUES, IF ANY:

The demand for micro cellular sheets has been steadily increasing and some of the units producing the sheets are working additional shifts to meet the demand. It has also got good export possibilities, especially to the Middle East and West African Countries. According to the International Rubber Study Group report, global rubber production - consumption balance in 2015 and 2016 showed deficits of 400,000 tons and 324,000 tons, respectively. The product have good markets of Indian Subcontinent and South Africa and its main cities like Johannesburg, Durban, Cape town, Soweto, Pietersburg, and Sudan, Ghana, Ethiopia, Egypt, Congo and Uganda. The Micro Cellular Rubber (MCR) is also used to caters to the need of poor Leprosy affected patients with neuropathic feet within India and to countries nearby India. The MCR sheets manufactured with a shore hardness of 15' Shore 'A' has helped prevent high pressure points and thus avoid plantar ulcers in aesthetic feet. Natural Rubber along with several other chemicals is used in optimum quantities to manufacture MCR. The unique manufacturing process gives MCR the ability to spring back to original shape when pressure is released while walking. The larger size (24" X 20") colored MCR sheets with 10mm thickness has become an ideal rubber to prevent stigma for deformed an aesthetic feet. The cost effectiveness in the production of the MCR rubber has helped the poor leprosy patients afford and use the MCR insoles for their footwear. Association and constant interaction with various shoe and footwear companies have led to experimentation and development of newer designs in MCR sandals.

6. RAW MATERIAL REQUIREMENTS:

The main raw materials are Natural Rubber and Synthetic Rubber, Fillers such as china clay, silica, crumb powder, etc.

7. MANUFACTURING PROCESS:

Step 1: Raw material weighing and mixing Input Rubber : Natural Rubber and Synthetic Rubber Fillers such as china clay, silica, crumb powder, etc. Process oils Accelerators, activators and antioxidant, blowing agents, Vulcanizing agent like sulphur. Equipments used

is Kneader Process. The raw materials are fed into the kneader in a predefined sequence where mastication and mixing of rubber take place.

Step 2: Milling and Calendaring: Input Dough from the kneader. Curing agents such as Sulphur. Equipments used Mixing mill.

Process description : The dough and the curing agent (sulphur) are mixed in the mixing mill to complete the mixing process and to convert them in to a sheet form The temperature in the mixing mill needs to be monitored and to be controlled as per specification. The quality of rubber compound may suffer if any of these parameters are not as per the required specification. •Thickness of the rubber sheet should be as per the requirement. Then these sheets are put in the calendaring machine to get the sheets in the desired thickness and without air bubbles and defects. In case of double colored soles (top and bottom), this process is important. In the upper layer of the calendaring machine, the top sole's compound is fed and in the lower layer of the machine, bottom sole's compound is fed. These two compounds are made into thin sheets and are then fixed into a single sheet (sole of chappal) through this calendaring process

Step 3: Blank Preparation and Curing (Moulding)

Equipments used Hydraulic press.

The long rubber sheets (from calendaring) are cut into specific size Moulding Appropriate moulds are taken and prepared for moulding process The mould is then fixed in the hydraulic press Dilute silicone solution is sprayed in the moulds before curing to ensure that compound do not stick to the moulds These sheets are then placed into the moulds of hydraulic press for pressing, The curing process takes place here with the specified curing time, temperature and pressure. The rubber compound sheet is then removed from the moulds after the curing time and are allowed to cool at room temperature

Step 4: Conditioning (Post -curing) and testing : •Testing will done after the curing process to ensure the following: The sheet is cured as per the specifications. There are no bubbles on the rubber sheet. There are no spots in the rubber sheet.

Step 5: Assembling (Sole and strap): The straps are fitted into the sole of the slipper using a machine. The stickers and tags are fixed in the chappals. The chappals are then stacked in racks according to size, style, model number, etc.

Step 6: Packing: The chappals are first packed in a small carton box. Appropriate labels (with color, size, price, etc.) are stuck into the box. Then these small boxes are then assorted and put into a large corrugated box as per assortment (The assortment will have mix of size and different models and the operator needs to pack accordingly).

8. MANPOWER REQUIREMENT:

The enterprise requires 12 employees as detailed below:

Sr. No.	Designation of Employees	Salary Per Person	Monthly Salary ₹	Number of employees required				
				Year-1	Year-2	Year-3	Year-4	Year-5
1	Machine Operators	12,000	24000.00	2	2	2	2	2
2	Helpers	8,000	32000.00	4	5	5	6	6
3	Production supervisor	15,000	15000.00	1	1	1	1	1
4	Accounts/Stores Asst	12,500	25000.00	2	2	2	2	2
5	Office Boy	9,000	9000.00	1	1	1	1	1
	Total		105000.00	10	11	11	12	12

9. IMPLEMENTATION SCHEDULE:

The project can be implemented in 3 months' time as detailed below:

Sr. No.	Activity	Time Required (in months)
1	Acquisition of premises	1.00
2	Construction (if applicable)	1.00

3	Procurement & installation of Plant & Machinery	1.00
4	Arrangement of Finance	2.00
5	Recruitment of required manpower	1.00
	Total time required <i>(some activities shall run concurrently)</i>	3.00

10. COST OF PROJECT:

The project shall cost ₹ 109.00 lacs as detailed below:

Sr. No.	Particulars	₹ in Lacs
1	Land	12.00
2	Building	25.00
3	Plant & Machinery	45.00
4	Furniture, Electrical Installations	3.00
5	Other Assets including Preliminary / Pre-operative expenses	4.50
6	Working Capital	19.50
	Total	109.00

11. MEANS OF FINANCE:

Bank term loans are assumed @ 75 % of fixed assets.

Sr. No.	Particulars	₹ in Lacs
1	Promoter's contribution	27.25
2	Bank Finance	81.75
	Total	109.00

12. WORKING CAPITAL CALCULATION:

The project requires working capital of ₹ 19.50 lacs as detailed below:

Sr. No.	Particulars	Gross Amt	Margin %	Margin Amt	Bank Finance
1	Inventories	9.75	0.25	2.44	7.31
2	Receivables	4.88	0.25	1.22	3.66
3	Overheads	4.88	100%	4.88	0.00
4	Creditors	-		0.00	0.00
	Total	19.50		8.53	10.97

13. LIST OF MACHINERY REQUIRED:

A detail of important machinery is given below: Power Requirement: 5 HP

Sr. No.	Particulars	UOM	Qty	Rate (₹)	Value (₹ in Lacs)
	Plant & Machinery / equipments				
a)	Main Machinery				
i.	complete set for Microcellular sheets making machines	NOS.	1	24	24.00
Sr. No.	Particulars	UOM	Qty	Rate (₹)	Value
ii.	Mixing Machine	Nos	2	400000	8.00
iii.	packing machine	Nos	1	100000	3.00
IV	installation , erection electr.			100,000	5.00
V	taxes and transportation			21000	5.00
	<i>sub-total Plant & Machinery</i>				45.00
	Furniture / Electrical installations				
a)	Office furniture	LS	1	100000	1.00
b)	Stores Almirah	LS	1	350,000	1.00
c)	Computer & Printer	L. S.	1	10000	1.00
	<i>sub total</i>				3.00
	Other Assets				

a)	preliminary and preoperative				4.50
	<i>sub-total Other Assets</i>				4.50
	Total				52.50

All the machines and equipment are available from local manufacturers. The entrepreneur needs to ensure proper selection of product mix and proper type of machines and tooling to have modern and flexible designs. It may be worthwhile to look at reconditioned imported machines, dies and tooling. Some of the machinery and dies and tooling suppliers are listed here below:

- Kamdhenu Agro Machinery
Plot No. 6, Near Power House,
Wathoda Road, Wathoda
Nagpur - 440035
Maharashtra, India

- Future Industries Private Limited
Shed No. 15, Ambica Estate,
Corporation Municipal Plot,
Opposite Sadvichar Hospital,
Naroda, Ahmedabad - 382330,
Gujarat, India

- The Global Pharma Equipments
Star Industrial Estate,
D-32, Naik Pada,
Near Hanuman Mandir,
Opposite Dwarka Industrial Estate,
Vasai East, Vasai - 401208,
Maharashtra, India

14. PROFITABILITY CALCULATIONS:

Sr. No.	Particulars	UOM	Year-1	Year-2	Year-3	Year-4	Year-5
1	Capacity Utilization	%	60%	70%	80%	90%	100%
2	Sales	₹. In Lacs	58.50	68.25	78.00	87.75	97.50
3	Raw Materials & Other direct inputs	₹. In Lacs	41.53	48.45	55.38	62.30	69.22
4	Gross Margin	₹. In Lacs	16.97	19.80	22.62	25.45	28.28
5	Overheads except interest	₹. In Lacs	7.10	7.55	8.44	8.70	8.88
6	Interest	₹. In Lacs	8.18	8.18	5.45	4.09	3.27
7	Depreciation	₹. In Lacs	31.50	22.50	15.75	11.25	10.13
8	Net Profit before tax	₹. In Lacs	-29.81	-18.43	-7.01	1.41	6.00

The basis of profitability calculation:

The growth of selling capacity will be increased 10% per year. (This is assumed by various analysis and study; it can be increased according to the selling strategy.)

Energy Costs are considered at Rs 7 per Kwh and fuel cost is considered at Rs. 65 per litre. The depreciation of plant is taken at 10-12 % and Interest costs are taken at 14 -15 % depending on type of industry.

15. BREAK-EVEN ANALYSIS:

The project shall reach cash break-even at % of projected capacity as detailed below:

Sr. No.	Particulars	UOM	Value
1	Sales at full capacity	₹. In Lacs	97.50
2	Variable costs	₹. In Lacs	69.22
3	Fixed costs incl. interest	₹. In Lacs	12.15
4	$BEP = FC/(SR-VC) \times 100 =$	% of capacity	42.96%

16. STATUTORY / GOVERNMENT APPROVALS

As per the allocation of business rules under the Constitution, labour is in the concurrent list of subjects. It is dealt with by the MOLE at the Central and Departments of Labour under State Governments in respective States / UTs. The MOLE has enacted workplace safety and health statutes concerning workers in the manufacturing sector, mines, ports and docks and in construction sectors.

Further, other Ministries of the Government of India have also enacted certain statutes relating to safety aspects of substances, equipment, operations etc. Some of the statutes applicable in the manufacturing sector are discussed below:

The Static and Mobile Pressure Vessels (Unfired) Rules, 1981

These (SMPV) Rules are notified under the Explosives Act, 1884. These rules regulate storage, handling and transport of compressed gases. These rules stipulate requirements regarding construction and fitments, periodic testing, location, fire protection, loading and unloading facilities, transfer operations etc. in respect of pressure vessels whose water capacity exceeds one thousand litres. These rules are enforced by the Chief Controller of Explosives under the Ministry of Industry and Commerce, Govt. of India (PESO).

The Manufacture, Storage and Import of Hazardous Chemicals Rules (MSIHC), 1989

These MSIHC Rules are notified under the Environment (Protection) Act, 1986. These rules are aimed at regulating and handling of certain specified hazardous chemicals. The rules stipulate requirements regarding notification of site, identification of major hazards, taking necessary steps to control major accident, notification of major accident, preparation of safety report and on-site emergency plan; prevention and control of major accident, dissemination of information etc. These rules are notified by the Ministry of Environment and

Forests (MOEF) but enforced by the Inspectorates of Factories of respective States / UTs in the manufacturing sector.

The Factories Act, 1948 and State Factories Rules

The Factories Act, 1948 is very comprehensive legislation dealing with the matters of safety, health and welfare of workers in factories. The Act places duties on the occupier to ensure safety, health and welfare of workers at work. Some of the salient provisions of the Act include:

- Guarding of machinery
- Hoists and Lifts; Lifting Machines and Appliances
- Revolving Machinery
- Pressure Plant
- Excessive Weight
- Protection of Eyes
- Precautions against dangerous fumes, gases etc.
- Explosive or inflammable dust, gas etc.
- Precautions in case of fire
- Safety of buildings and machinery
- Permissible limits of exposure of chemical and toxic substances
- Entrepreneur may contact State Pollution Control Board where ever it is applicable.

17. BACKWARD AND FORWARD INTEGRATIONS

Chemical companies often become integrated and undergo other activities outside the chemical industry. Increased competition prompts many companies to reduce supply chain costs by looking outside the chemical sector at suppliers and customers. While most companies within the chemicals sector primarily produce chemicals, some companies also conduct other manufacturing activities. The exact proportion of chemicals sector companies that are integrated with other sector activities is unknown, but many companies actively seek

vertical integration. Many manufacturers pursue vertical integration to secure suppliers and customers for their products.

Mergers and acquisitions are a common way for companies to undertake new chemical ventures. By purchasing their chemical suppliers, some manufacturers secure future chemical feedstock for their products or other chemicals that they use in manufacturing. The company making the purchase obtains valuable expertise and equipment. Some mining and petrochemical production is more cost-effective when integrated within a chemical company. Energy and feedstock costs are often a significant expense for chemical companies. Integrating chemical production with activities that secure supplies of chemical feedstock and energy is relatively common as chemical companies grow. Chemical companies are located near mines, oil fields, ammonia factories and water supplies. This reduces transportation costs and increases the reliability of supplies by reducing the distance between feedstock and the factory.

Some companies, such as Sino-Coking Coal and Coke Chemical Industries Incorporated, own their mines. BHP Billiton operates a broad range of mines and is primarily a mining company. It does, however, also produce petrochemical feedstock for the chemical industry and therefore operates within the chemical industry as well. These companies technically operate within both the chemical and mining industries in their normal business operations.

Integrating a chemical company with other activities provides several direct benefits for the company and is becoming increasingly common. High energy costs necessitate greater control of energy resources and minimal reliance on expensive transportation. Chemical companies experience volatile profitability due to fluctuations in feedstock and energy expenses. Some companies control this volatility through careful supply chain management and by charging supply surcharges. Actively researching and developing alternative feedstock and energy supplies helps the company reduce costs.

Vertical integration supports these activities by eliminating redundant activities at multiple companies and increasing efficiency. By consolidating activity among multiple, similar operations, chemical companies achieve cost savings that contribute to higher profitability.

End products are often very profitable, and some chemical companies purchase their former customers to take advantage of the marked-up prices of products further along in the supply chain.

Integration may become more common for many chemical companies as competition strengthens and traditional feedstock becomes more expensive. Market demand for chemical feedstock increases as emerging market economies grow and result in increased consumer spending around the world.

18. TRAINING CENTERS AND COURSES

There is no such training required to start this business but, basic chemical bachelor's degree is plus point for enterpriser. Promoter may train their employees in such specialized institutions to grow up the business. There are few specialised Institutes provide degree certification in chemical Technology, few most famous and authenticate Institutions are as follows:

1. Department of chemical LD college of engineering
No.120, Circular Road, University Area, Navrangpura,
Opposite Gujarat University, Ahmedabad, Gujarat 380015
2. MIT College of chemicalEngineering, Pune
Gate.No.140, Raj Baugh Educational Complex,
Pune Solapur Highway,
Loni Kalbhor, Pune – 412201
Maharashtra, India

Udyamimitra portal (link : www.udyamimitra.in) can also be accessed for handholding services viz. application filling / project report preparation, EDP, financial Training, Skill Development, mentoring etc.

Entrepreneurship program helps to run business successfully is also available from Institutes like Entrepreneurship Development Institute of India (EDII) and its affiliates.

Disclaimer:

Only few machine manufacturers are mentioned in the profile, although many machine manufacturers are available in the market. The addresses given for machinery manufacturers have been taken from reliable sources, to the best of knowledge and contacts. However, no responsibility is admitted, in case any inadvertent error or incorrectness is noticed therein. Further the same have been given by way of information only and do not carry any recommendation.