A
PROJECT PROFILE
ON

MANUFATURE OF N-95 MASK

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Prepared By:

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Manufacturing of N-95 mask

1. Introduction. Face mask is a type of protective mask that serves to protect against airborne diseases like COVID19, influenza, chickenpox, mumps, and measles. Surgical masks are made of natural fiber, such as cotton or disposable linen or synthetic materials, such as polypropylene. They are made of different layers including a hydrophobic outer layer, a middle filtering layer, and an inner hydrophilic layer to absorb the fluid and moisture. They are used as a barrier to avoid cross contamination by microorganisms and are used during surgical procedures. The surgical mask is used by surgeons during procedures and other medical professionals while interacting with the patients to avoid cross contamination of microorganism.

2. **Product Profile:** N95 respirators and surgical masks (face masks) are examples of personal protective equipment that are used to protect the wearer from airborne particles and from liquid contaminating the face. The N95 masks are specially designed to filter out at least 95% particles from breathing in including dust and molds. A medical N95 respirator consists of multiple layers of nonwoven fabric, often made from polypropylene. The two outward protective layers of fabric, covering the inside and outside of the mask, are created using spun bonding. Between the spun bond layers there's a pre-filtration layer, which can be as dense as 250 g/m2, and the filtration layer. The pre-filtration layer is usually a needled nonwoven fabric material. The last layer is a high efficiency melt-blown electret (or polarized) nonwoven material, which determines the filtration efficiency.

3. **Demand/ Scope** : The demand for N95 masks has increased rapidly, with the sudden outbreak of global pandemic Covid-19 across the globe. With the rapid surge in the patient pool around the world, due to infectious disease such as Covid-19, is boosting the growth of the market. Increasing demand for N95 masks across every country due to shortage of masks, further fuelling the growth of the market. In addition to this, with the outbreak of the coronavirus, the demand is up to 100 times higher than regular demand in the world. In the countries like India there is a good need of such product both at the Health care units as well as other Industrial units and originations to provide protection from the air transmitted nano-particles.

4. **Production capacity**; 20,000 Pcs per single shift of 8 working hours. i.e. 60 lakh pcs per annum. It can go upto 100 Lakhs pcs using double shift.

5. **Raw Materials :** The N95 masks shall be made up of 5 different layers

i. First layer as he Surface Layer Water repellent non-woven fabric (Blue, White) of 50 GSM
ii. 2nd and 3rd layer melt blown non-woven fabric- 30 GSM
iii. 4th Layer- Filter layer spun bond- 30 GSM
iv. 5th Layer - White non- woven fabric (Inner Layer-30 GSM.

6. **Process**: It is proposed to setup a plant for producing the N-95 masks through an automatic plant having different arrangements. It would be a servo motion with PLC control to execute automatic production from raw materials of 3 to 6 layers to finished

product output. A series of operations will be taking place Unwinding the roll, Ultrasonic compounding, Nasal strip inserting, Prepress Compounding, folding, Pre-press compounding, Ultra sonic compounding, rolling and cutting. The Ear belt of the mask is automatically transported onto the attachment area of the manufactured mask body to the inclined connecting station on the conveyor system. The ear belt with fixed size is attached by ultrasonic welding.

7. **Standardization and Quality Control.** Being the product is a part of protective equipment and mostly used in Health care units, the quality must have to as per the prescribed standards. The corresponding BIS specification is IS9473:2002. The Testing shall be conducted and confirmed in any NABL accredited Laboratory. As such SITRA and DRDE are the main agencies for testing the N95 masks. One of our Ministries body, the PPDC, Meerut is in process of equipping their testing laboratory with the facilities of testing of different PPEs. Moreover, the raw materials and accessories to be used have to confirm the required specifications.

8. Capital Investment:

A. Built up Area : 3000 Sq ft –Rent Rs 30,000/- per month

B. Machinery & Equipment. Machinery and Equipment

Sl. No	Title of the equipment	Specification	Cost per unit (Rs. Lakhs)	Total (Rs. Lakhs)
1	Fully Automatic N-95 Face mask making Machine Imported - preferably Taiwan/Korean /Japan made		175.00	175.00
	Machine Speed	50-60 pcs/min		
	Voltage	220V 50 HZ or required		
	Power	8 -10 KW		
	Air Supply	0.6-0.7 Mpa		
	Control Method	PLC		
	Inspection Method	Photoelectric		
	Welding System	Ultrasonic		
2.	Compressor	5 HP	1.00	1.00
3	Online UPS	10HP	4.00	4.00
4	Respirator valve Attatcher 3 Machines	-	1.00	3.00
5	Auto laser Printing M/c	-	8.00	8.00
6	Sterilization Tunnel	UV Light	1.00	1.00
7	Furniture & Fixer		-	3.00
			Total	**195.00**

C. Total Fixed Capital Requirement : Rs 195.00 lakhs

D. Materials and Accessories per piece (without respirator valve attachment) :

Sl. No	Items	Specification	Quantity	Price per Kg/ Piece (Rs)	Total (Rs)
1	Surface Layer Water repellent non-woven fabric (Blue, White) -1st Layer	50 GSM	2.0 gms	250/-	0.50
2	Middle Layer melt blown (outer)- 2nd Layer	30 GSM	1.2 gms	2500/-	3.00
3	3rd Layer- Middle Layer melt blown (Inner) – 3rd Layer	30 GSM	1.2 gms	2500/-	3.00
4	Filter layer spun bond - 4th Layer	30 GSM	1.2 gms	500/-	0.60
4	White non- woven fabric (Inner Layer)- 5th Layer	30 GSM	1.2 gms	300/-	0.36
	Total				7.46
	Add wastages 30%				2.24
					9.70
5	Ear Loop (Elastic) 2pcs	Sling 5 mm	-	1.00	1.00
6	Nasal Line	3 mm Plastic	-	2.00	2.00
7	Packing Material			2.00	2.00
8	Misc. materials				0.30
				Total	**15.00**

Material requirement per month: Rs. 15/- x 20,000x 25: **Rs. 75.00 Lakhs**

E . Additional Manpower and Pay bills (Per month).

Sl. No	Responsibilities	Qualification and experience	Numbers	Salary/ month	Total
1	Production Manager/ Supervisor	Mechanical Engineer with 5-7 years experience	1	50,000	50,000
2	Marketing Manager	Graduate with 5-7 years experience, MBA in Marketing Management would be preferred	1	50,000	50,000
3	Skilled operator	3 years' experience	4	25,000	1,00,000
4	Administrative staff	3 years	3	20,000	60,000
5	Security and housekeeping, attendant		4	15,000	60,000

	Total	**3,20,000**
	Perquisites	**80,000**
	Total Pay bill per month	**4,00,000**

F. **Utilities and Other Expenses** : LS . **Rs 7.00 Lakhs**
(Including testing, electricity, fuel, transport, travelling, rent, Insurance and maintenance)

G. **Total Recurring Expenses per month**: **Rs. 86.00 Lakhs**

H. **Working Capital Requirement**:)

1. Raw material stick: I month stock:	Rs 75.00	Lakhs
2. Finished good stock (1 week)	Rs 21.50	Lakhs
3. Receivables 1 month:	Rs 86.00	Lakhs
4. Cash in Hand	Rs. 11.50	lakhs
Total :	Rs.194.00	Lakhs

I. **Total Capital Requirement** (C+ H) : **Rs. 389.00 Lakhs**

9. Economy and Profitability.

a. Cost of Production: (Rs in Lakhs):

i. Recurring Expenses:	1032.00	Lakhs
ii. Interest @15%	58.00	Lakhs
ii. Depreciation @ 10 %	19.50	Lakhs
	1109.50	Lakhs
Total (say)	1110.00	Lakhs

b. Cost per unit mask: Rs 18.50

c. Sales price can be fixed with 25 % margin: Rs. 23.15

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Machinery Suppliers:- Sources available on Internet.

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