Product	**:**	**Non- Woven Fabric**
Quality Standards	**:**	**IS: 15891:2011**
NIC Code	**:**	**1312**
Installed Capacity	**:**	**375 Kg/hr**
Net Profit Ratio	**:**	**21.05%**
Break Even Point	**:**	**52.17 %**
Year of preparation	**:**	**January 2023**
Prepared by	**:**	**Chemical Division**

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1. Introduction:

Nonwoven fabric is a fabric-like material made from staple fibre (short) and long fibres (continuous long), bonded together by chemical, mechanical, heat or solvent treatment. They are flat, porous sheets that are made directly from separate fibers or from molten plastic or plastic film. There are different non-woven fabrics mainly defined by the method that the fibers are bonded together: Mechanical bonding (fiber entanglement), chemical bonding (fibers are chemically bonded together with glue-like compounds), or thermal bonding (where low-melt fibers are used and heat is used to melt the fiber to each other). Most non-woven fabrics are used for a single-use application. But there are also advantages to the use of non-woven fabrics given their versatility and inexpensive production costs.

Non-woven materials are used in numerous applications, including:

Medical

Isolation gowns, surgical gowns, surgical drapes and covers, surgical masks, surgical scrub suits, caps, medical packaging: porosity allows gas sterilization, gloves, shoe covers, bath wipes, wound dressings, drug delivery, plasters

Filters

Gasoline, oil and air – including HEPA filtration, water, coffee, tea bags, pharmaceutical industry, mineral processing, liquid cartridge and bag filters, vacuum bags, allergen membranes or laminates with non woven layers

Geo textiles

Nonwoven geo textile containers (sand bags) are used for soil stabilizers and roadway underlayment, foundation stabilizers, erosion control, canal construction, drainage systems, geo membrane protection, frost protection, pond and canal water barriers, sand infiltration barrier for drainage tile, landfill liners

Other

Diaper stock, feminine hygiene, and other absorbent materials, carpet backing, primary and secondary, composites, marine sail laminates, table cover laminates, chopped strand mat, backing/stabilizer for machine embroidery, Packaging where porosity is needed, Shopping bags, Insulation (fiberglass batting), Acoustic insulation for appliances, automotive components, and wall-paneling, pillows, cushions, mattress cores, and upholstery padding, batting in quilts or comforters consumer and medical face masks, mailing envelopes, tarps, tenting and

transportation (lumber, steel) wrapping, disposable clothing (foot coverings, coveralls), weather resistant house wrap, clean room wipes, potting material for plants

2. Market:

India's nonwoven market is growing at a rate of 8-10%. However, in the coming years, the continuous growing India's GDP, increasing Purchasing Power Parity (PPP) and India's initiative in the economic development will give a boost to this niche field, and it is assumed that it would fetch a growth rate of 12-15%.

The Non-woven Fabric Market is segmented by Technology (Spun-bond, Wet-laid, Dry-laid, and Other Technologies), Material (Polyester, Polypropylene, Polyethylene, Rayon, and Other Materials), End-user Industry (Construction, Textile, Healthcare, Automotive, and Other End-user Industries), and Geography (Asia-Pacific, North America, Europe, South America, and Middle-East and Africa).

Non-woven fabric is used to make various products in the healthcare industry, such as surgical gowns, aprons, drapes, face mask components, and wound dressings. They are also used in hygiene products, such as sanitary towels, sanitary napkins, tampons, baby diapers, and napkin liners. Owing to the COVID-19 outbreak, there has been a huge increase in the demand for non-woven face masks to prevent the spreading of the virus. This has resulted in an increase in demand for non-woven fabrics across the world at an exponential rate. In India, it is currently estimated that over ~60% of Indian women do not use sanitary care products. This is majorly due to the high amount of population residing in rural areas. With the increase in the penetration rate of sanitary care products, owing to the increasing hygiene precautions, the market for non-woven in the country is expected to grow rapidly. In India, the sales of sanitary napkins reached 10.31 billion pieces in 2021, growing by over 100% during the last five years. Other factors like population growth, increasing aging population, and the COVID-19 outbreak across the world are driving the demand for non-woven fabrics in the healthcare industry.

According to association of non wovens, automobiles that use nonwovens in every component have a 30 percent lower environmental effect due to lower CO2 emissions. Environmental concerns continue to grow from governmental groups and leaders to individuals. As a result, the usage of nonwoven materials in car manufacturing has increased dramatically. While there aren't exactly 101 applications for nonwoven vehicles, there are around 40. In today's vehicles, nonwoven textiles account for about 38 yards on average.

Given growing oil prices, climate change, and building requirements mandating energy efficiency and fire protection, nonwovens can also provide cost-effective and efficient solutions to building and construction challenges. A few examples include insulation, house wrap, roofing underlayment and composites, air and vapor barrier systems, drainage, and ground stabilization.

Top Non Woven manufacturers in India- KK Non-Wovens, Aditya Nonwoven Fabric Pvt Ltd., Aawadkrupa Plastomech Private Limited, KT Exports (India) Pvt Ltd

3. Basis & Presumptions:

- The basis for calculation of production capacity has been taken on a single shift basis on 75% efficiency,

- The maximum capacity utilization on single shift basis is for 300 days in a year. During the first year and second year of operations, the capacity utilization is 60% and 80% respectively. The unit is expected to achieve full capacity utilization from the third year onwards.

- The salaries and wages, cost of raw materials, utilities, rent, etc. are based on the prevailing rates in and around, Kerala. These cost factors are likely to vary with time and location,

- Interest on term loan and working capital has been taken @ 13% on an average. This rate may vary depending upon the policy of financial institutions/agencies from time to time.

- The cost of machinery and equipment's refer to a particular make/model and the prices are approximate.

- The break-even point percentage indicated is of full capacity utilization.

- The project preparation cost, etc. Whenever required could be considered under the pre-operative expense.

- The essential machinery and equipment's required for the project have been indicated. The unit may also utilize common facilities available at MSME Technology Centres under the Ministry of MSME, Govt. of India, CFCs set up under the MSE-CDP scheme of Govt. of India in different clusters, common facilities set up by Govt. of India & State Governments to manufacture products conforming to International standards

4. Implementation Schedule

The major activities in the implementation of the project have been listed and the average time for implementation of the project is estimated at 12 months:

Sl.No	Name of activity	Period in months (Estimated)
1.	Preparation of project report	1
2.	Registration & other formalities	1
3.	Sanction of loan by financial institution	2
4.	Placement of orders	1
5.	Procurement	1

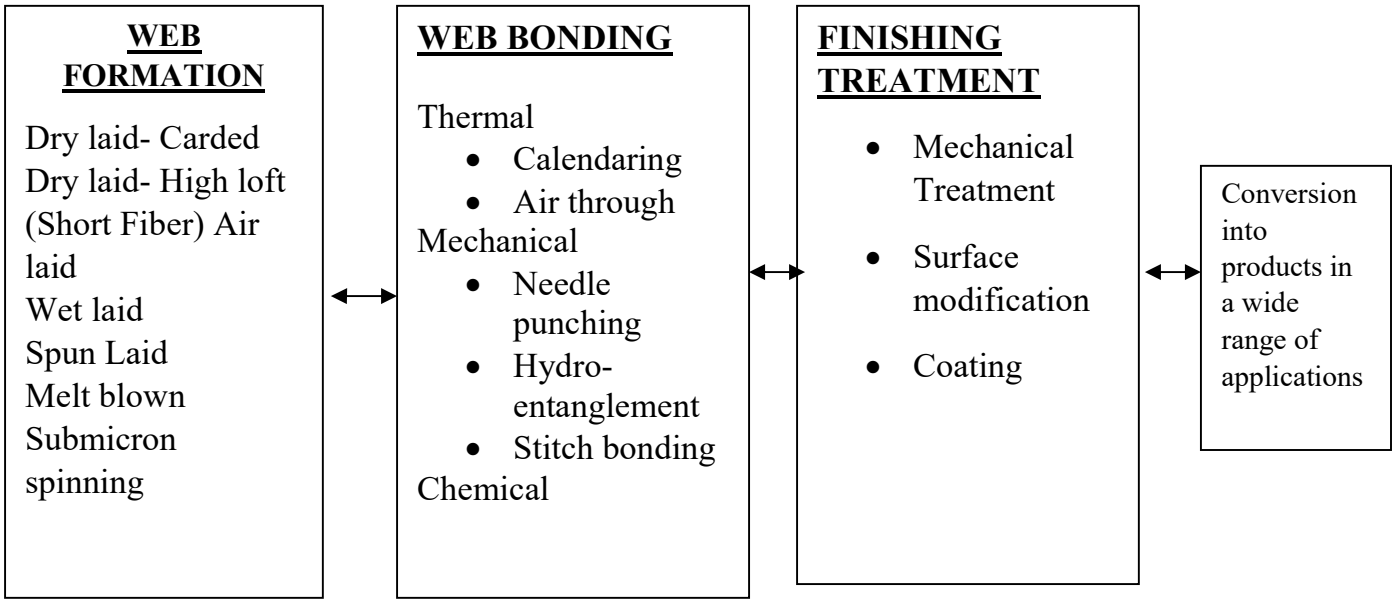
6.	Electrification & installation	1
7.	Procurement of raw materials	1
8.	Recruitment of technical personnel	1
9.	Trial operation	5th Month
10.	Commercial operation	6th

Note: Many of the above activities shall be initiated concurrently. When imported equipments are required, the implementation period of the project may vary Procurement of raw materials commences from the 3rd month onwards.

5. Technical aspects

5.1. Process of Manufacturing

The production of nonwovens takes place in three stages, although modern technology allows an overlapping of some stages, and in some cases all three stages can take place at the same time.

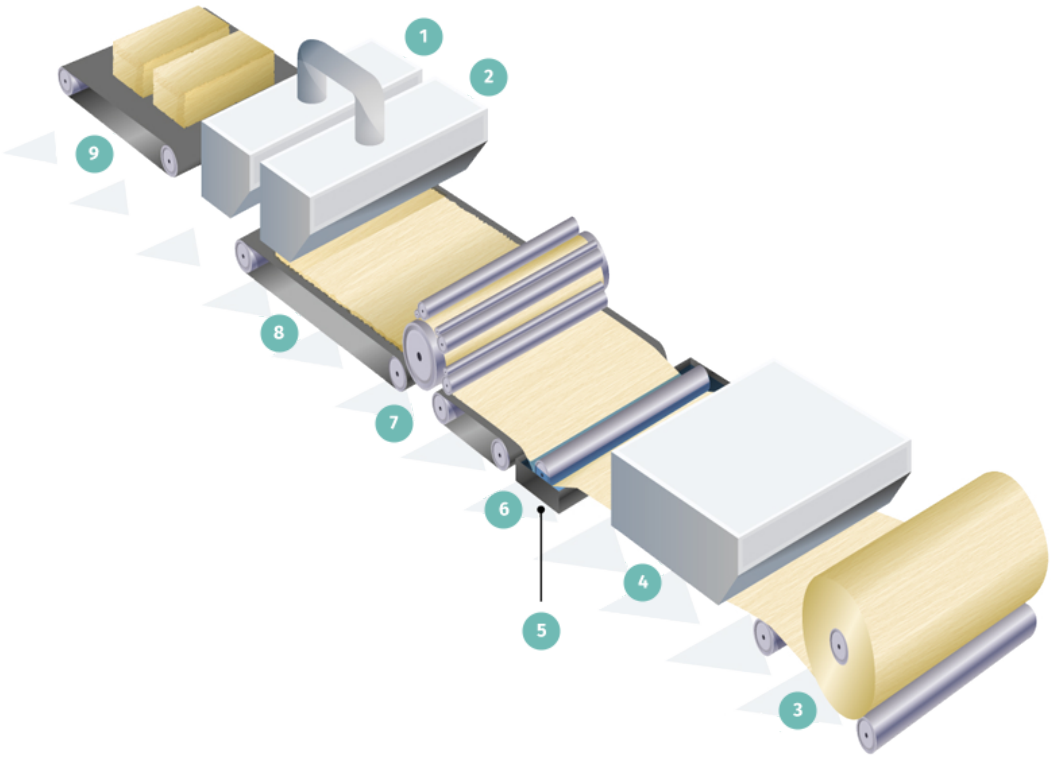


Web formation:

Nonwoven's manufacturing starts by the arrangement of fibers in a sheet or web. The fibers can be staple fibers or filaments extruded from molten polymer granules.

Illustrations of some of the methods used to form a web:

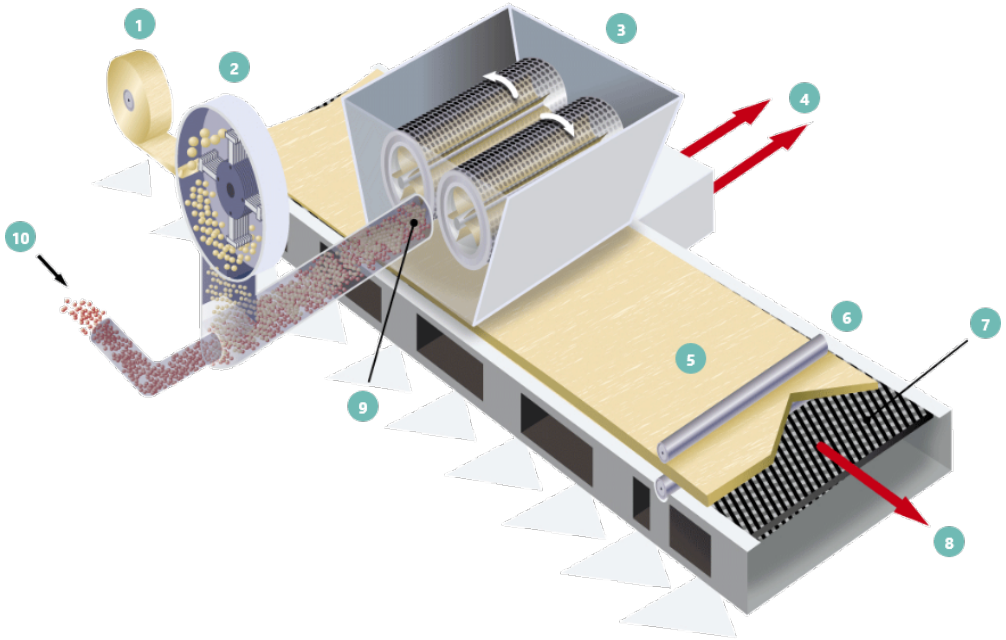
Dry- Lay Carding



1	Bale opener	5	Binder impregnation
2	Chute Feed	6	Card
3	Drying	7	Staple fibre from bale opener or blender
4	Pan with liquid binder	8	Bales of staple fibre

Carding is a mechanical process which starts from bales of fibres. These fibres are ‘opened’ and blended after which they are conveyed to the card by air transport. They are then combed into a web by a carding machine, which is a rotating drum or series of drums covered by card wire (thin strips with teeth). The precise configuration of cards will depend on the type of fibre and the basis weight to be produced. The web can be parallel-laid, where most of the fibres are laid in the machine direction, or they can be randomised. Typical parallel-laid carded webs result in good tensile strength, low elongation and low tear strength in the machine direction and the reverse in the cross direction. Machine parameters and fibre mix can be varied to produce a wide range of fabrics with different properties.

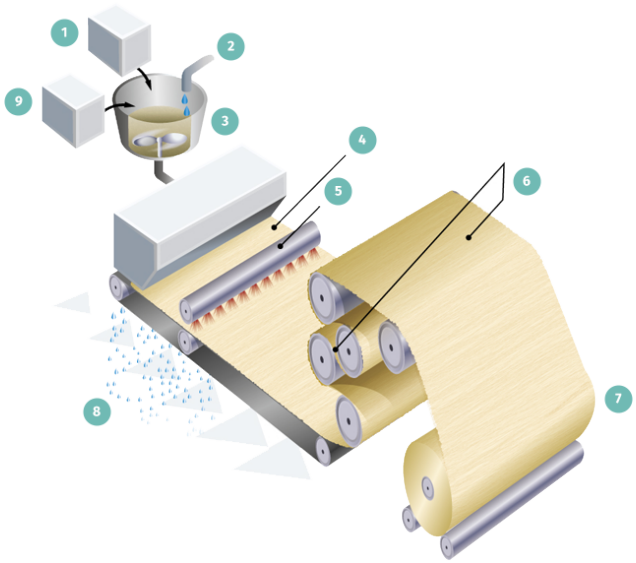
Short Fiber Air laid



1	Short fibre feed	5	Compactor
2	Hammer mill (defibrator)	6	Moving wire mesh
3	Forming head	7	To further bonding
4	Air out	8	Fibres + air in
5	Web	9	Thermofusible fibres

In short fibre airlaid the fibres, which are always relatively short, are fed into a forming head by an airstream. The forming head assures a homogeneous mix of all fibres. By air again, a controlled part of the fibre mix leaves the forming head and is deposited on a moving belt, where a randomly oriented web is formed. Compared with carded webs, airlaid webs have a lower density, a greater softness and an absence of laminar structure. Airlaid webs offer great versatility in terms of the fibres and fibre blends that can be used.

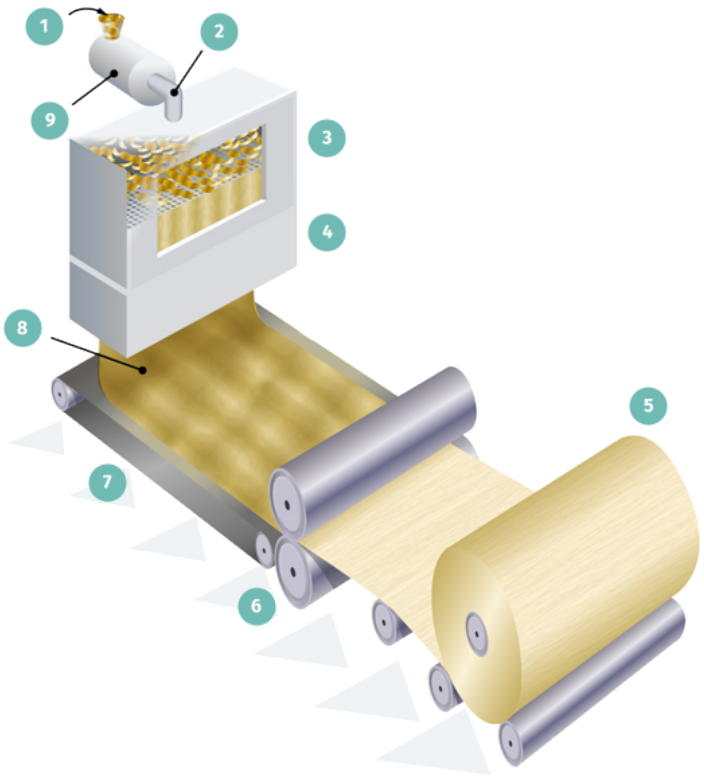
Wet laid



1	Long fibre	5	Drying
2	Water	6	Windup
3	Fibre and water (slurry)	7	Excess water removal
4	Webforming	8	Wood pulp
5	Binder impregnation		

The principle of wet laying is similar to paper manufacturing. The difference lies in the amount of synthetic fibres present in a wet laid nonwoven. Dilute slurry of water and fibres is deposited on a moving wire screen, where the water is drained and the fibres form a web. The web is further dewatered by pressing between rollers and dried. Impregnation with binders is often included in a later stage of the process. The strength of the random oriented web is rather similar in all directions in the plane of the fabric. A wide range of natural, mineral, synthetic and man-made fibres of varying lengths can be used.

Spun Laid



1	Polymer chips feed	6	Calender bonding
2	Liquid polymer	7	Laydown
3	Extrusion die	8	Fiber dispersion
4	Filament attenuator (cooling and stretching)	9	Extruder
5	Wind up		

Spun melt is a generic term describing the manufacturing of nonwoven webs directly from thermoplastic polymers. It encompasses 2 processes, spunlaid and melt blown, often run in combination.

Polymer granules are extruded into filaments through so called spinnerets. The continuous filaments are stretched and quenched before being deposited on conveyor belt to form a uniform web. The spunlaid process results into nonwovens with an increased strength compared to carding, due to the attenuation of the filaments. The downside is that the choice of raw materials is more restricted. Co-extrusion of two components leads to bico fibres, either adding more properties to the web or allowing air-through bonding. Please note that the word spun bonded is reserved for thermo bonded spun laid.

Melt Blown

Melt blown, like spun laid, starts with extruding a low viscosity polymer. But instead of quenching the filaments when they leave the spinneret, the filaments are being attenuated by hot air streams, keeping the filaments in a partly molten state. This leads to much thinner filaments, with a low tensile strength. The filaments hit a belt or a conveyor belt where they form a web.

Sub-Micron Spinning

Melt blown -roughly speaking- results in filaments with a minimum diameter of 1 micron. For more than a decade developments are going on to produce nonwovens with even finer fibers. These can be of use increasing the efficiency of filtration media or improving the barrier properties.

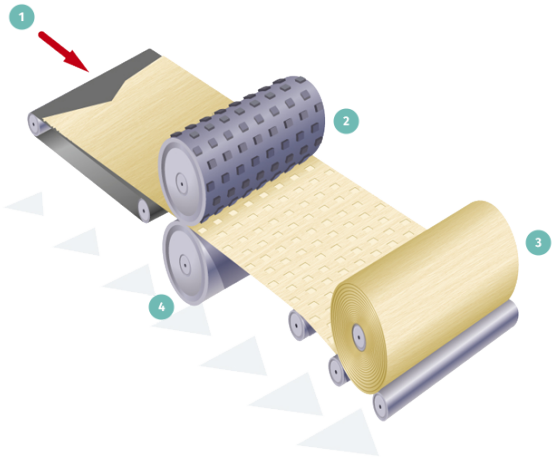
Technologies in the market are sub-micron melt blown, centrifugal spinning, solution spinning and electro spinning. Although the productivity of these methods is low compared to spun melt, they are increasingly important for the unique properties they can add to a nonwoven.

Web bonding

Webs have a limited initial strength right after the web formation (depending on various bonding mechanisms). The web needs therefore to be consolidated in one or the other way. The choice of the web consolidation method strongly depends on functional properties that are needed as well as on the type of fibers used.

There are three basic types of bonding:

Thermal Bonding (Cohesive bonding)



1	From web forming	3	Windup
2	Hot embossed cylinder	4	Hot smooth cylinder

This method uses the thermoplastic properties of certain synthetic fibres to form bonds under controlled heating. In some cases, the web fibre itself can be used, but more often a low melt fibre or bi-component fibre is introduced at the web formation stage to perform the binding function later in the process.

There are several thermal bonding systems in use:

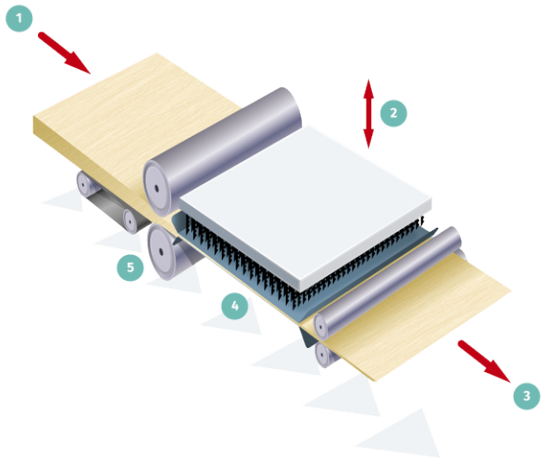
Calendering uses heat and high pressure applied through rollers to weld the fibre webs together at high speed.

Through-air thermal bonding makes bulkier products by the overall bonding of a web containing low melting fibres. This takes place in a carefully controlled hot air stream.

Drum and blanket systems apply pressure and heat to make products of average bulk.

Ultrasonic bonding is a technology in which molecules of the fibres are being ‘excited’ under a patterned roller by high frequency movement of a ‘sonotrode’ which produces internal heating and softening of the fibres.

Mechanical Bonding



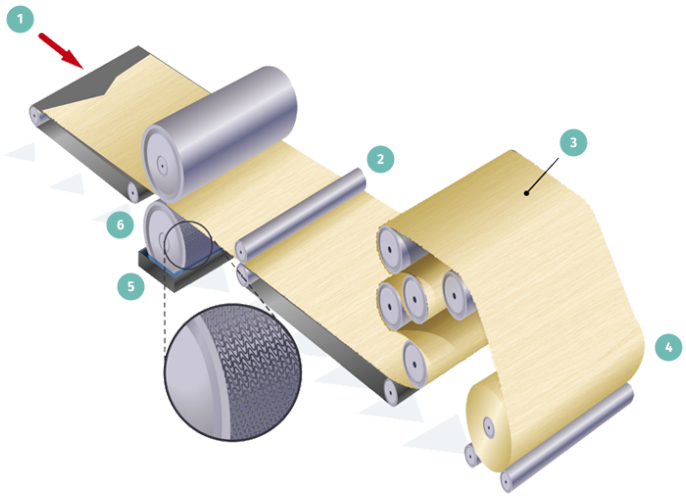
1	From web forming	3	To wind up or further bonding
2	Needle board	4	Needling
		5	Web compression

In mechanical bonding the strengthening of the web is achieved by inter-fibre friction as a result of the physical entanglement of the fibres. There are two main types of mechanical bonding:

Needle punching, specially designed needles are pushed and pulled through the web to entangle the fibres. Webs of different characteristics can be needled together to produce a gradation of properties difficult to achieve by other means. Needle punching can be used with most fibre types but, because of the nature of the process, not with very fine fibers.

Hydro entanglement is commonly applied to carded or wet laid webs and uses fine, high pressure water jets to cause the fibres to interlace. Hydro entangling is sometimes referred to as spun lacing, as the arrangement of jets can also be used to give a wide variety of aesthetically pleasing effects. The water jet pressure used has a direct bearing on the strength of the web.

Chemical Bonding



1	From web forming	4	Wind up
2	Nip Rolls	5	Pan with liquid binder
3	Drying	6	Engraved drum (bottom)

Chemical bonding refers to the application of a liquid-based bonding agent to the web. Three groups of materials are commonly used as binders-acrylate polymers and copolymers, styrene-butadiene copolymers and vinyl acetate ethylene copolymers. Water based binder systems are the most widely used but powdered adhesives, foam and in some cases organic solvent solutions can be found.

The binder can be applied in many ways. It can be applied uniformly by impregnating, coating or spraying or intermittently, as in print bonding.

Finishing treatment

The opportunity to combine different raw materials and different technologies accounts for the diversity of the industry and its products.

This diversity is further enhanced by a range of finishing treatments. By finishing the nonwoven can be tailored or functionalized to meet specific properties. Finishing treatments can be either mechanical (stretching, perforating, crimping etc) or chemical. With the latter one can modify the surface of the fibres and the nonwoven to change the haptics or the repellency of the nonwoven.

Nonwovens can be made conductive, flame retardant, water repellent, porous, antistatic, breathable, absorbent and much more. They can also be coated, printed, flocked, dyed or laminated to other materials.

Converting

Nonwoven manufacturing ends usually with large rolls of product. Converters convert -as the word says- this roll good into a consumer product.

Sometimes converting is done in 2 steps. Before manufacturing the finished product one might want to bring the rolled good one step closer to the final product by slitting, cutting, folding, sewing or heat sealing.

5.2. Quality Control and Standards

IS 15891 : Part 1 : 2011 (Reaffirmed Year : 2019)

Textiles — Test Methods for Non-wovens Part 1 Determination Of Mass Per Unit Area

IS 15891 : Part 2 : 2011 (Reaffirmed Year : 2019)

Textiles — Test Methods For Non-wovens Part 2 Determination Of Thickness

IS 15891 : Part 3 : 2011 (Reaffirmed Year : 2019)

Textiles - Test Method for Nonwovens Part 3 Determination of Tensile Strength and Elongation

IS 15891 : Part 4 : 2011 (Reaffirmed Year : 2019)

Textiles - Test Methods for Nonwovens Part 4 Determination of Tear Resistance

IS 15891 : Part 5 : 2017 (Reaffirmed Year : 2021)

Textiles-Test Methods for Nonwovens Part 5 Determination of Resistance to Mechanical Penetration (Ball Burst Procedure)

IS 15891 : Part 6 : 2012 (Reaffirmed Year : 2020)

Test Methods for Nonwovens Part 6 Absorption

IS 15891 : Part 7 : 2012 (Reaffirmed Year : 2020)

Textiles — Test Methods for Nonwovens Part 7 Determination of Bending Length

IS 15891 : Part 8 : 2012 (Reaffirmed Year : 2020)

Textiles — Test Methods for Nonwovens Part 8 Determination of Liquid Strike — Through Time (Simulated Urine)

IS 15891 : Part 9 : 2012 (Reaffirmed Year : 2020)

Textiles-Test Methods for Non-wovens Part 9 Determination of Drapability including Coefficient

IS 15891 : Part 10 : 2017 (Reaffirmed Year : 2021)

Textiles — Test Methods for Nonwovens Part 10 Lint and Other Particle Generation in the Dry State

IS 15891 : Part 11 : 2017 (Reaffirmed Year : 2021)

Textiles-Test Methods for Nonwovens Part 11 Run-off

IS 15891 : Part 12 : 2017 (Reaffirmed Year : 2021)

Textiles-Test Methods for Nonwovens Part 12 Demand Absorbency

IS 15891 : Part 13 : 2017 (Reaffirmed Year : 2021)

Textiles-Test Methods for Nonwovens Part 13 Repeated Liquid Strike-Through Time

IS 15891 : Part 14 : 2017 (Reaffirmed Year : 2021)

Textiles-Test Methods for Nonwovens Part 14 Cover stock Wetback

IS 15891 : Part 15 : 2017 (Reaffirmed Year : 2021)

Textiles-Test Methods for Nonwovens Part 15 Determination of Air Permeability

IS 15891 : Part 16 : 2017 (Reaffirmed Year : 2021)

Textiles-Test Methods for Nonwovens Part 16 Determination of Resistance to Penetration by Water (Hydrostatic Pressure)

IS 15891: Part 17: 2017 (Reaffirmed Year: 2021)

Textiles — Test Methods for Nonwovens Part 17 Determination of Water Penetration (Spray Impact)

IS 15891: Part 18: 2017 (Reaffirmed Year: 2021)

Textiles-Test Methods for Nonwovens Part 18 Determination of Breaking Strength and Elongation of Nonwoven Materials Using the Grab Tensile Test

5.3. Production Capacity

Width of Finished Fabric	3200 mm
Daily Output Based on 40gsm (24Hrs)	9 Tons
Max. Diameter of Product in Roll	Φ1200 mm
Monofilament Fineness	S: 2.0-2.5 denier
GSM of Product	10-180 g/㎡
Mechanical Design Speed	150m/min
Actual Production Speed	100-120m/min

5.4. Pollution Control- Government accords utmost importance to control environmental pollution. The MSEs should have an environmental friendly attitude and adopt pollution control measures by process modification and technology. The unit has to adhere the pollution control norms of central and state pollution control boards.

5.5. Energy Conservation- With the growing energy needs and shortage coupled with rising energy cost, a greater thrust in energy efficiency in industrial sector has been given by the Govt. of India. The Energy Conservation Act, 2001 has been enacted which provides for efficient use of energy, its conservation and capacity building of Bureau of Energy Efficiency created under the Act.

The following steps may help for conservation of electrical energy:

✓ Adoption of energy conserving technologies, production aids and testing facility,

✓ Efficient management of process/manufacturing machineries and systems, QC and testing equipments for yielding maximum Energy Conservation,

✓ Optimum use of electrical energy for heating during soldering process can be obtained by using efficient temperature controlled soldering and disordering stations,

✓ Periodical maintenance of equipments etc.

✓ Use of power factor correction capacitors. Proper selection and layout of lighting system; timely switching on-off of the lights; use of LED lamps etc.

5.6. Motive Power Requirement

1.	Electricity	Connected load 455 KW
2.	Cooling Tower	80T/hr
3.	Air Compressor	7.5KW motor

5.7. Machinery Utilization

Machine output	375 Kg/hr

6. FINANCIAL ASPECT

6.1. Fixed Capital

1. Land and Building (Rented)			
Built up Area:			30,000 – 40,000 sq.ft
Rent payable per annum			Rs.
2. **Machinery &Equipment's**			
Sl.No.	Description	Unit (Nos.)	Specification
1	Main Extruder	1 set	170/30 with 132 KW AC motor
2	Waste Recycling Extruder	1 set	105/15 with 15kw AC motor
3	Auto. Suction Device for Granules or Powders	1 set	7.5kw AC motor

4	Screw for Color Master batch and Cooling Master batch	1 set	0.75kw*2 AC motor (inverter control)
5	Filter	1 set	
6	Metering Pump & Driving Control	1 set	7.5kw AC motor (inverter control), 300cc
7	Spinneret Plate	2 sets	3590x216 Pore diameter 45S (0.45mm)
8	Spinning Box	1 set	
9	Stretching Unit	1 set	
10	Cooling Box	1 set	
11	Side Blowing, Suction Air Passage	1 set	
12	Web Forming Machine AC Motor	1 set	
13	Web Forming Belt	1 set	
14	Double-roller Hot Rolling Mill	1 set	150m/min
15	Oil Furnace for Die	1 set	48kw
16	Oil Furnace for Hot Rolling Mill	2 sets	48kw
17	Winding Machine With inflatable shaft*3	1 set	
18	Cooling Air Blower	1 set	75kw AC motor (inverter control)
19	Suction Blower	1 set	55kw, AC motor (inverter control)
20	Monomer Blower	1 set	7.5kw AC motor (inverter control)
21	Air Conditioner	1 set	200000 kilocalorie
22	Refrigerating Unit	1 set	200000 kilocalorie
23	Slitting Machine	1 set	
24	Steel Platform	1 set	
25	Distribution Box with Touch Screen	1 set	Siemens inverter
Total cost			**420 lakhs**

Electrification charges @10% cost of machinery and equipment	4200000
Cost of office furniture/equipment	200000
Pre-operative expenses	528000
Total Fixed capital	**46928000**

6.2. WORKING CAPITAL

Recurring expenditure per month

1. Staff & Labor

Sl.No	Designation	No.of Persons	Salary (Rs.)	Total Salary (Rs.)
1	Supervisory Cadre			
	Manager	1	25000	25000
	Supervisor	4	15000	60000
2	Non-Supervisory Cadre			
	Skilled Worker	6	12000	72000
	Semi-Skilled Worker	10	8000	80000
	Perquisites @ 15%			35550
			Total	**272550**

2. Raw material / month(for --- units)

Sl.No	Particulars	Ind/Imp	Qty	Rate	Value (Rs.)
1.	PP granules	Indigenous	140000	Rs.90/kg	12600000
2.	Additives	Indigenous	LS		100000
3.	Color	Indigenous	LS		
				Total	**12700000**

3. Utilities / month

Sl.No	Particulars	Value (Rs.)
1.	Electricity- Connected load 455 KW + Air compressor 7.5 KW = Hence total load is 462.5 KW/H Total load for month is 92500KW	Unit costing is Rs.5.50, Hence cost is Rs. 508750/-
2.	Water: 2000 liter for chiller and other works	1250/-
	Total	**510000/-**

4. Other contingent expenses per month		
Sl.No	Particulars	Value (Rs.)
1.	Rent	25000
2.	Postage and Stationary	5000
3.	Telephone/Internet charges	10000
4.	Repair and maintenance	5000
5.	Transport and Conveyance	10000
6.	Advertisement and Publicity	5000
7.	Insurance	10000
8.	Miscellaneous expenditure	5000
	Total	**75000**

Total Recurring expenses per month	13557550
Working Capital (for 3 months)	40672650

Total Capital Investment		
1.	Total Fixed Capital	46928000
2.	Working Capital for three months	40672650
	Total Capital Investment	87600650

7. Financial analysis

Cost of production/annum		
1.	Total recurring cost	40672650
2.	Depreciation on machinery and equipment's @ 10% per year	4200000
3.	Depreciation on furniture/office equipment's @ 20% per year	40000
4.	Interest on capital investment @ 12%	10512078
	Total	55424728

8. Total Turnover per annum –

It's assumed that the production capacity is 60% of Installed capacity

Items	Average Selling Price	Quantity	Amount
375 kg/ hr	130/kg	540000 Kg	70200000
			70200000

9. **Profit per year = (Turnover – Cost of production) =**

= Rs.70200000- Rs.55424728 = Rs. 14775272/-

10. Percentage of profit on sales = $\frac{\text{Profit per year X 100}}{\text{Total turnover}}$ = 21.05%

11. Percentage of profit on Capital investment =

$$\frac{\text{Profit per year x 100}}{\text{Total capital investment}} = 16.86\%$$

12. **Break Even Analysis**

Annual Fixed Cost		
1.	Rent	25000
2.	Depreciation on machinery and equipment's @ 10% per year	4200000
3.	Depreciation on furniture/office equipment @ 20% per year	40000
4.	40% of salaries	1137600
5.	40% of other contingent expenses (excluding rent & insurance)	192000
6.	Interest on capital investment	10512078
7.	Insurance	10000
	Total fixed cost	**16116678**

Break Even Point = $\frac{\text{Fixed Cost x 100}}{\text{Fixed cost + Profit}}$

= 16116678 / (16116678 + 14775272)
= 52.17 %

13 Additional Information:

1 The project may be modified/ tailored to suit the individual entrepreneurship qualities/capacity, production programme and also to suit the locational characteristics, wherever applicable,

2 The technology in this sector is undergoing rapid strides of charge and there is a need for regular monitoring of the national and international technology scenario. The unit, may therefore, keep abreast with new technologies in order to keep them in pace with the developments for global competition,

3 Quality today is not only confined to the product or service alone. It also extends to the process and environment in which they are generated. The Zero Effect & Zero Defect (ZED) certification system quality management system and environmental management system for acceptability at international level. The unit may therefore adopt ZED certification to meet the challenges of global competition. For more details visit www.zed.msme.gov.in

4 The margin money recommended is 25% of the working capital at an average. However the percentage of margin money varies as per bank's discretion.

5 Govt. of India has introduced an online free registration portal for MSMEs https://udyamregistration.gov.in. Udyam registration enables MSMEs to avail various benefits from Government, financial institutions and supporting agencies.

Contacts for Technology details & transfer contact.

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