

# Nonwoven: A Versatile Fabric

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## Introduction

Nonwoven is a textile product which is engineered in a very sophisticated way with the aid of modern technologies. Probably, these modern technologies [1] are one of most important force which brought nonwovens up to the age of technical textiles. The term 'Nonwoven' came in existence more than half a century ago and at that time it was regarded as the low grade cheap substitute for traditional textiles. In its early stage it was manufactured from dry laid carded webs with the help of modified textile processing machines. Europe is the place where nonwoven originated, grown and matured. Now, the whole world together is making it more and more famous and useful.

EDANA (The European Disposables and Nonwovens Association) and INDA (North America's Association of the Nonwoven Fabrics Industry) has defined nonwoven [2] very well. It can be better understood as 'a manufactured sheet, web or batt of directionally or randomly oriented fibres, bonded by friction, and/or cohesion and/or adhesion, 50% by weight of which contains fibre having length to diameter ratio more than 300'. So, it is a textile product in sheet form, having equivalent (or better properties for some specific applications) properties as traditional fabric, manufactured directly from fibres.

## Manufacturing process

Manufacturing process of nonwoven can be divided in three steps- web formation, web bonding and finishing. Figure 1 gives a brief idea of various system and techniques of nonwoven production.

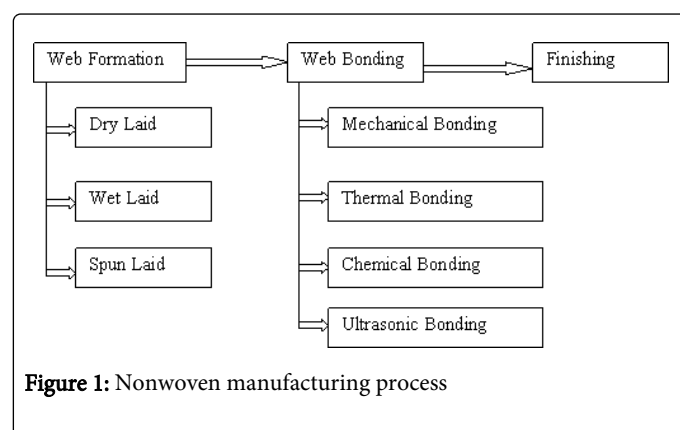


Figure 1: Nonwoven manufacturing process

## Current situation

Now a day, it is very difficult to identify an area where nonwoven is not in use. The field of garment is the only field where nonwoven is not the primary material due to low strength but used extensively as a support and auxiliary material such as glove linings, shoulder pads, fusible interlinings, linings etc. for the completion of any garment. Nonwoven has excellent compression and transmission behavior

which makes it suitable for numerous technical and nontechnical applications.

Most sophisticated application of nonwoven is in the field of medical. Nonwoven medical textiles enhanced the healing rate by controlled drug delivery and adequate compression behavior. Nonwoven medical products are many such as surgical swabs, wound dressings, surgical gowns, mask, cap, transdermal drug delivery system etc. Looking at the health and hygiene sector, one can find that nonwoven has taken around 90 % share. Most of the products of health and hygiene sector such as sanitary napkins, baby diapers, cosmetic removal pads etc. are made up of nonwoven.

Civil engineering and geosynthetics [3] are another field in which nonwoven is a major player. Nonwovens structure, compression and transmission behavior make is most suitable material for this field. Nonwovens have pores of non-uniform sizes which are uniformly distributed all over of it. This type of pore characteristics and its distribution are only possible with the nonwovens not with the other type of structures such as woven fabric, knitted fabrics etc. These characterizes of the nonwoven helps in filtration and reinforcement of civil engineering sites and constructions.

Household applications of nonwovens have increased sharply during last few years due to its low cost and better qualities. Nonwovens are being used as blanket, sheet, curtains, mattress pads, waddings and fillings, window blinds etc. Boom of nonwovens can really be seen in the wipe sector. About 98% of wipes are made up of nonwovens. The reason behind this is probable due the better cleaning and absorbing properties of nonwovens. It absorbs mixture of water and dust particle inside its body and present fresh surface for more wiping and cleaning action.

As the uses of the nonwoven are increasing, the demand of the market is also increasing. This demand has caused great increase in the production of nonwoven. The total global production of nonwoven has reached to around 5.1 million tonnes. Western Europe and Northern America is the major producer contributing up to 60%. Asia Pacific Region produces around 25 % of total production.

## Future prospective

Several developments are in the process all over the world for the structural modifications of the nonwovens. The need for improved performance has induced these research and developments. The future is for composite nonwovens and nonwoven composites. Three dimensional characteristics of nonwoven make it suitable for high performance composite applications where de-lamination properties are required. Nonwoven having many layers of different fibre, constructional and functional behavior are known as composite nonwoven. Nonwoven impregnated [4] with resin is known as nonwoven composite. Composite nonwovens are required for better filtration behavior. High quality masks are made up of composite

nonwovens. Modified fibres such as electrically charged fibres are used in the inner layer of the composite nonwovens to be used in these high quality masks. Fibres of different cross sections have also been used to enhance the performance of the nonwovens.

Europe has recently overtaken the America and become the largest nonwoven producer with help of new developments in air laid and spun laid technology. In American market, the expansion of the absorbent hygiene industry is expected to be modest. Strong growth is expected in wipes sector. With the new industries and intensive research, Indian subcontinent is expected to come up with the highest growth rate in the nonwoven production and quality.

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