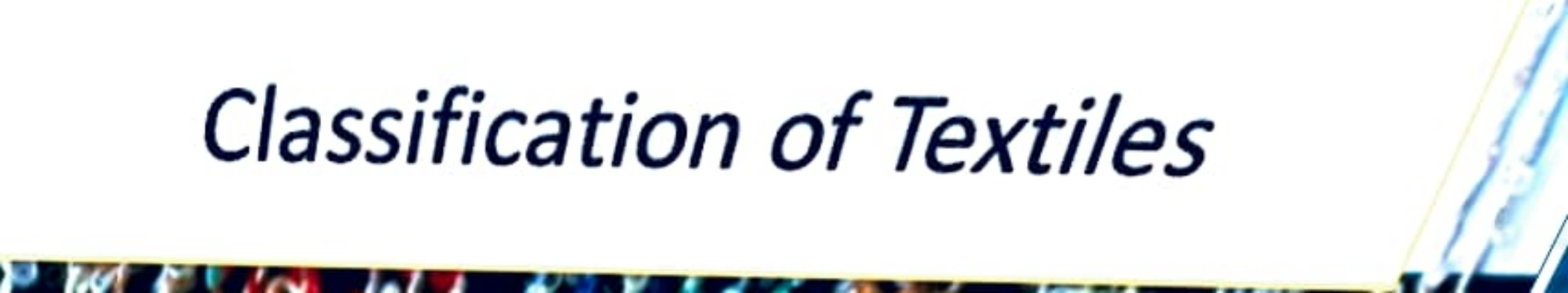
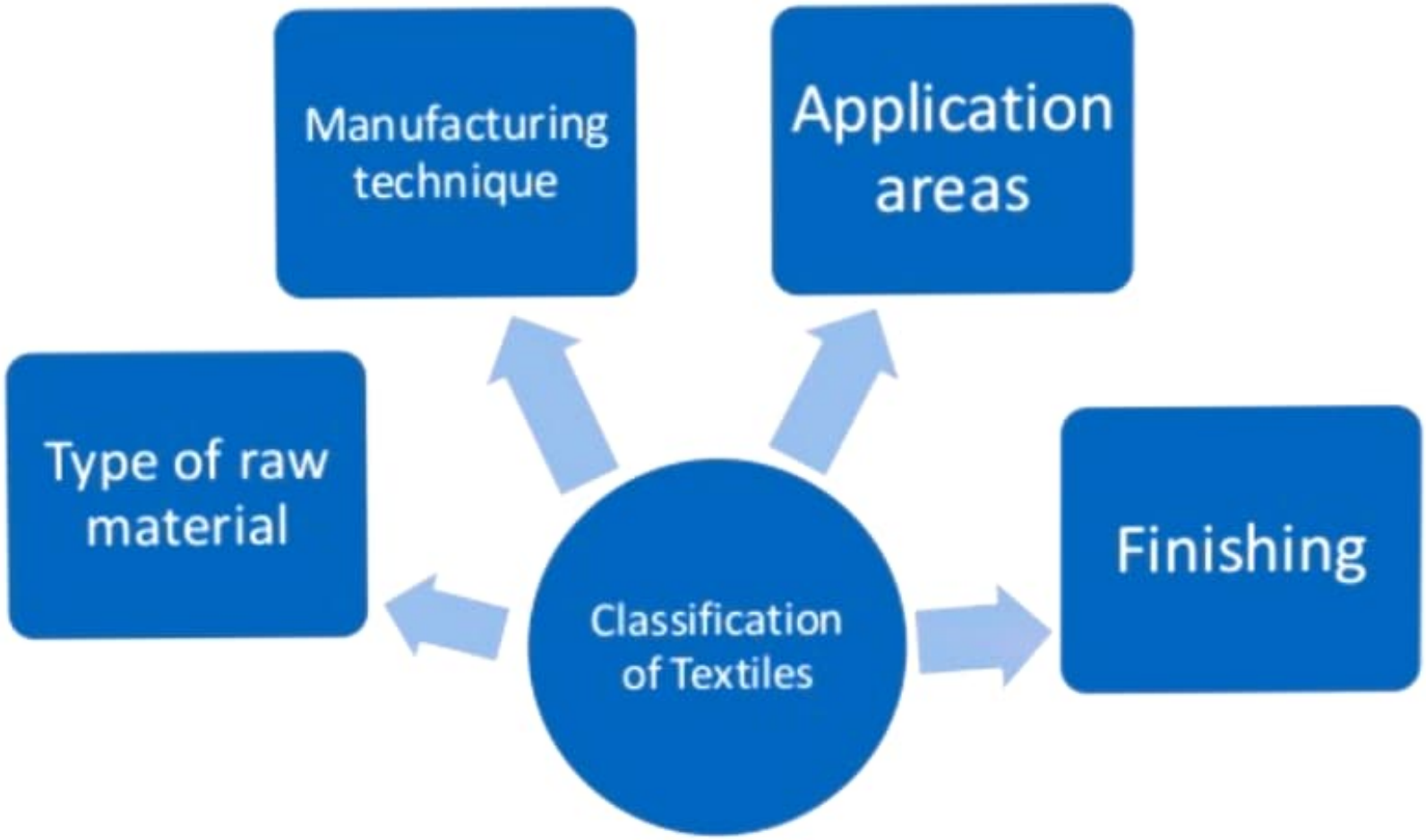
Classification of Textiles



Textile

- Textile is a process of converting fiber or polymer into sheet.
- Earlier it was just full fill the basic needs of human being
- To protect from weather
- Then converted into 3d structures
- Now it goes beyond in clothing science (comfort, vanity, functional)


Manufacturing technique
Application areas
Type of raw material
Classification of Textiles
Finishing

Origin of Fibre

Two origins

Natural resources(non Thermo

Man Made fibers(thermo plastic, thermo set)

Natural fibers there are limitation in properties and having more variations

Manmade fibers produced according to our wish

Natural fibers

According to the source

- Plants (seeds, stem, leaf & seed)
- Animal (Hair, saliva)
- Mineral (basalt)

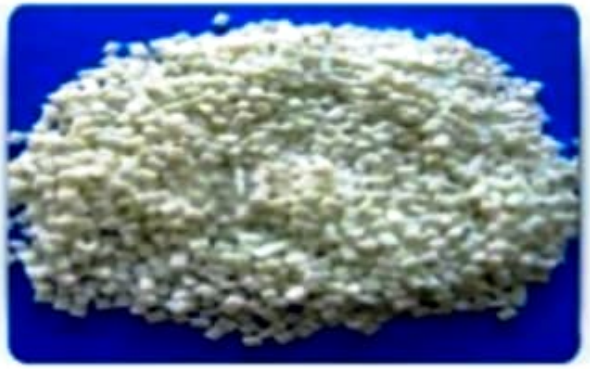
Natural Fibers and Textiles

The Bast fiber

Animal Fibers

Different stages in the silk mill: brushing (drawing out the end of the thread), extracting,

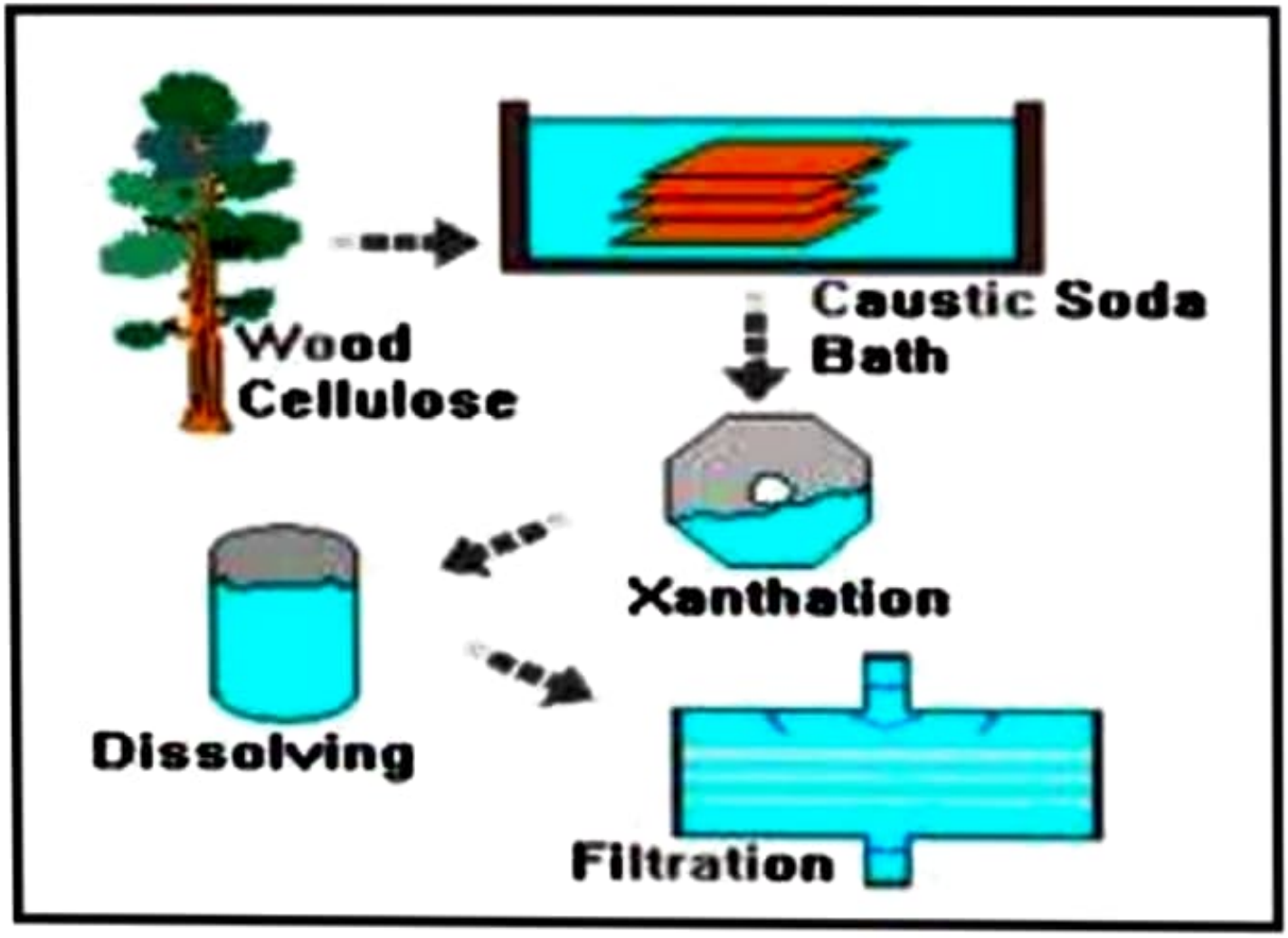
Man Made Fiber



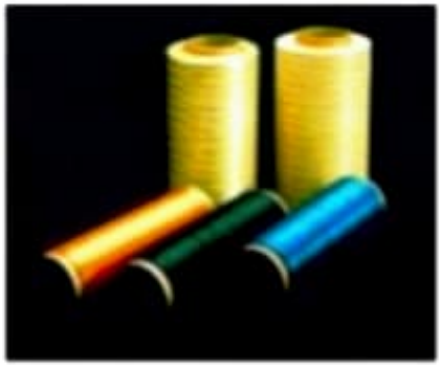
Manmade Fibers

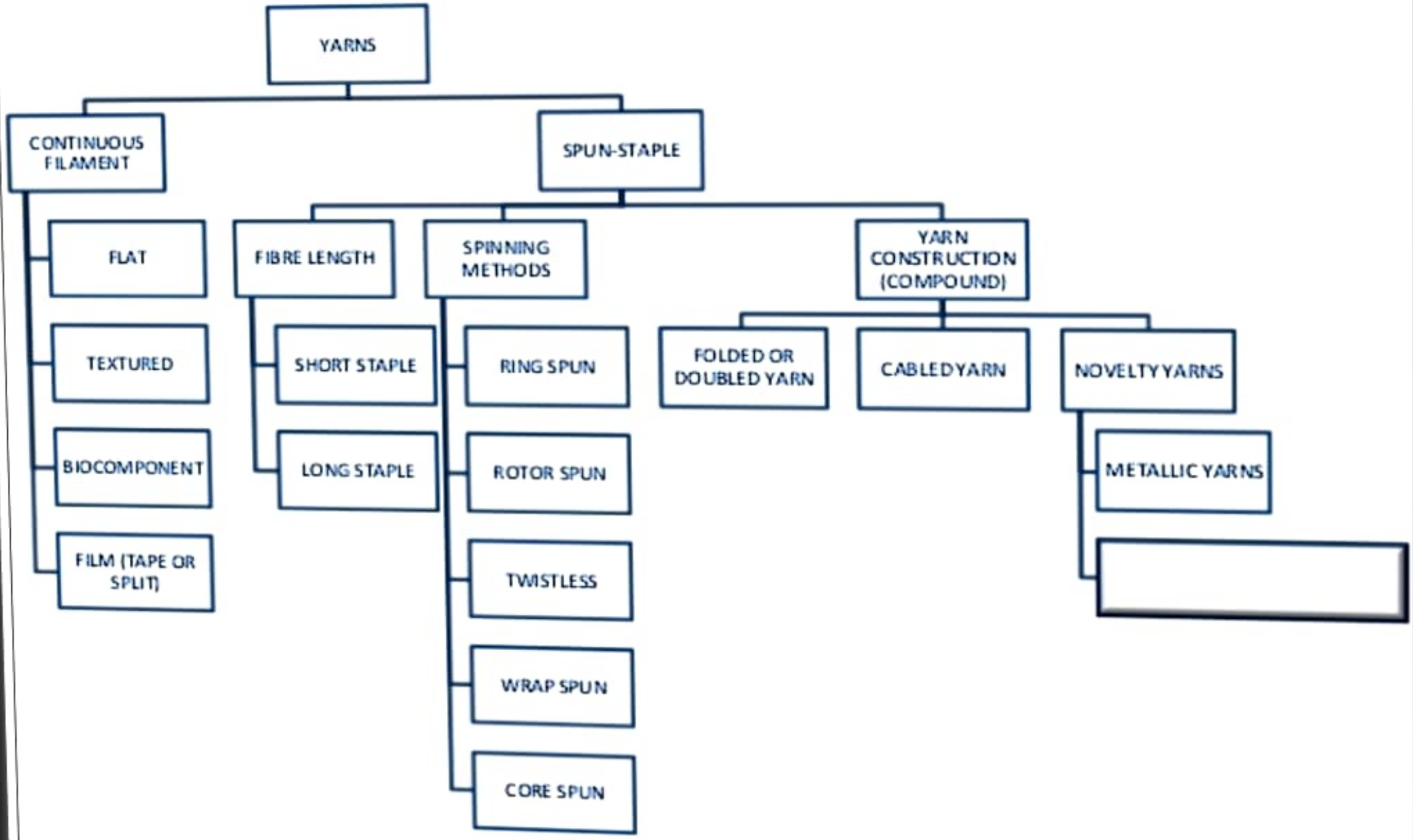
- 1. Regenerated Fibers
- 2. Synthetic fibers
- 3. High performance fibers

Regenerated Fibers

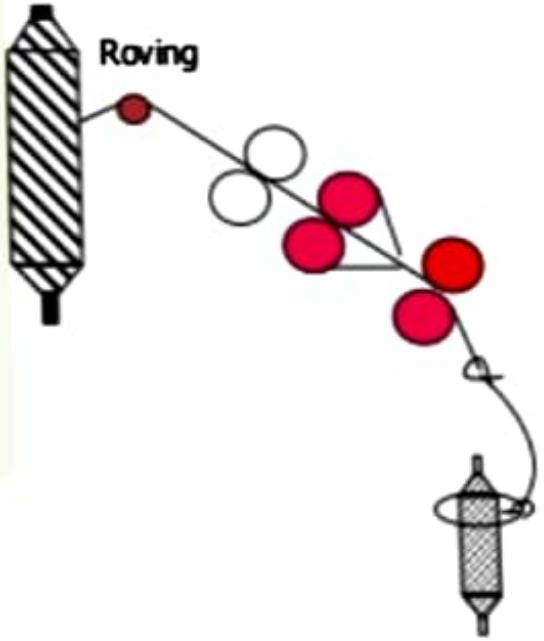


High Performance Fibers

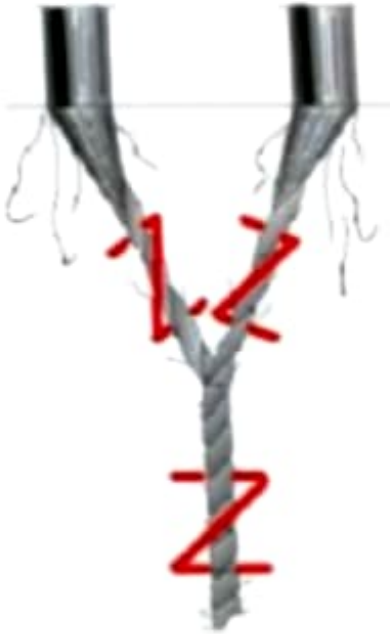



YARNS
CONTINUOUS FILAMENT
SPUN-STAPLE
FLAT
TEXTURED
BIOCOMPONENT
FILM (TAPE OR SPLIT)
FIBRE LENGTH
SPINNING METHODS
YARN CONSTRUCTION (COMPOUND)
SHORT STAPLE
LONG STAPLE
RING SPUN
ROTOR SPUN
TWISTLESS
WRAP SPUN
CORE SPUN
FOLDED OR DOUBLED YARN
CABLED YARN
NOVELTY YARNS
METALLIC YARNS

Different Spinning Systems



SIRO



Ring Yarns

- Ring Yarns further classified as

1.Warp yarn

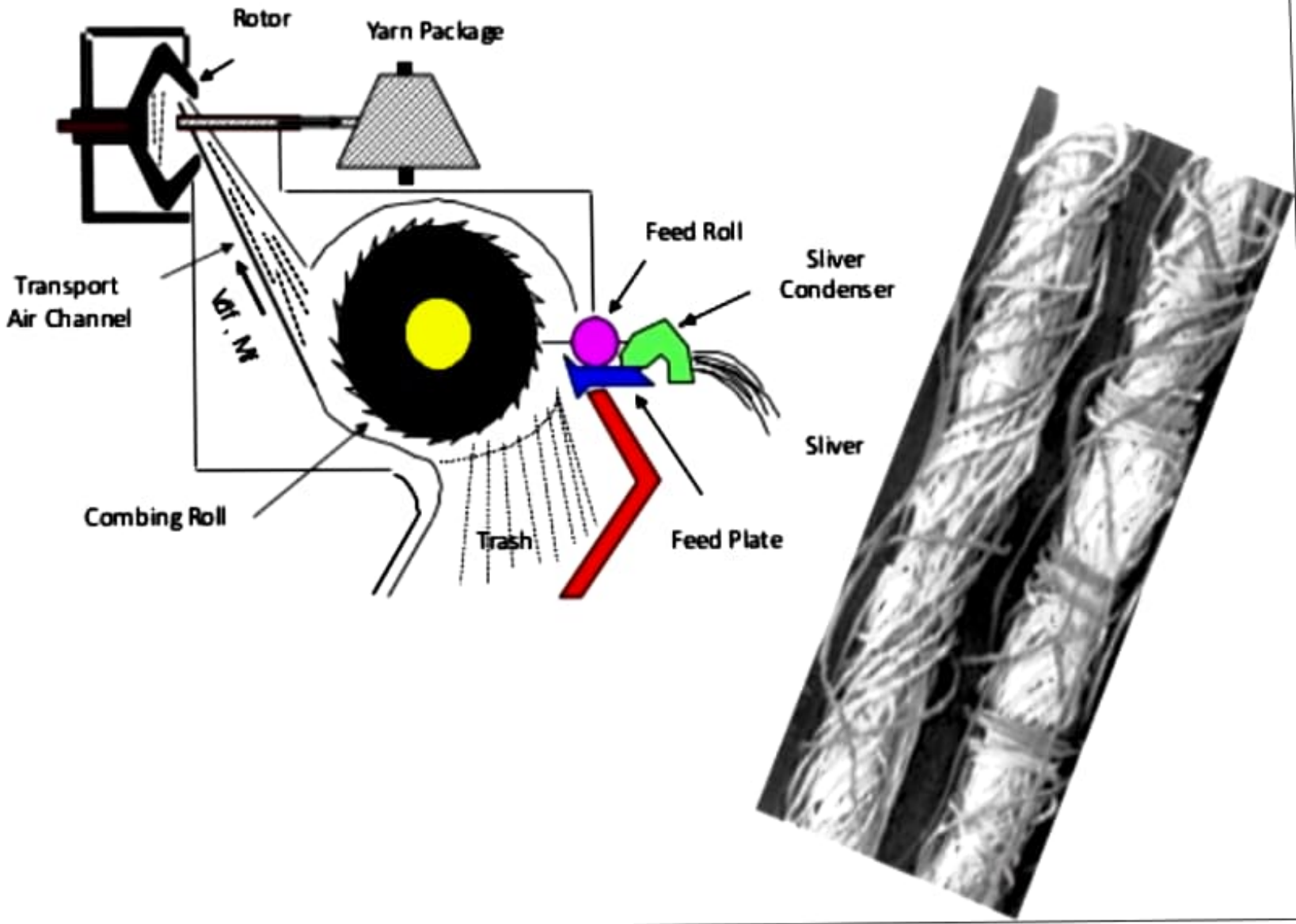
More even and Highly twisted for high strength

2.Hosiearnry

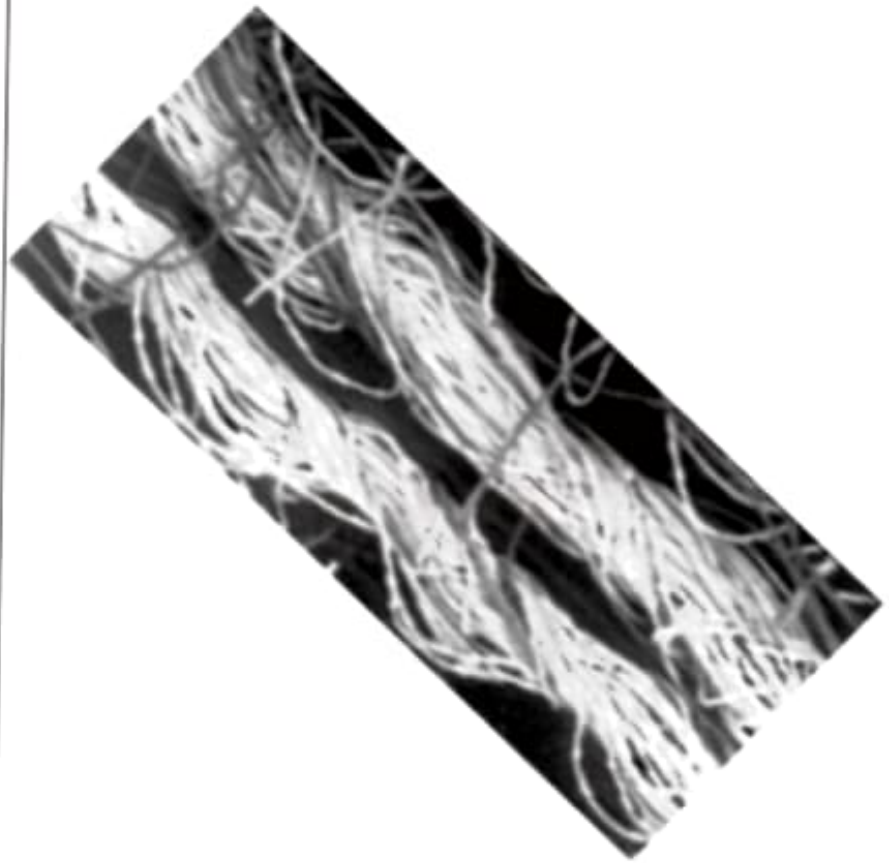
Soft bulkier yarn , Less twist

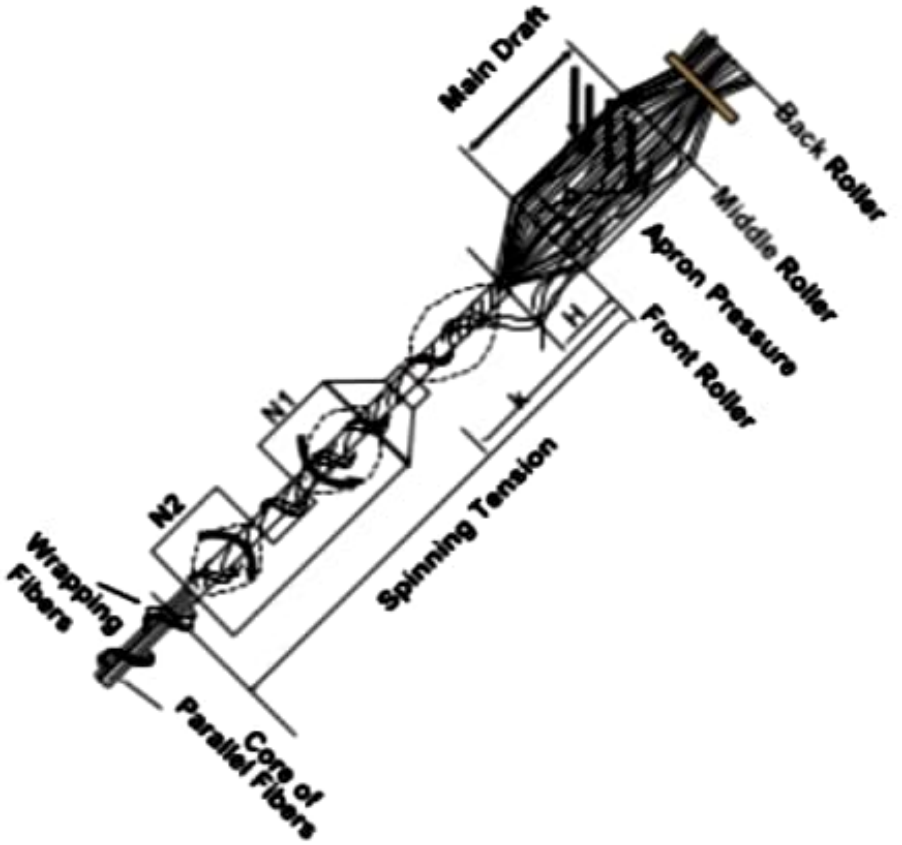
Non Conventional Spinning

Open End Rotor Spinning



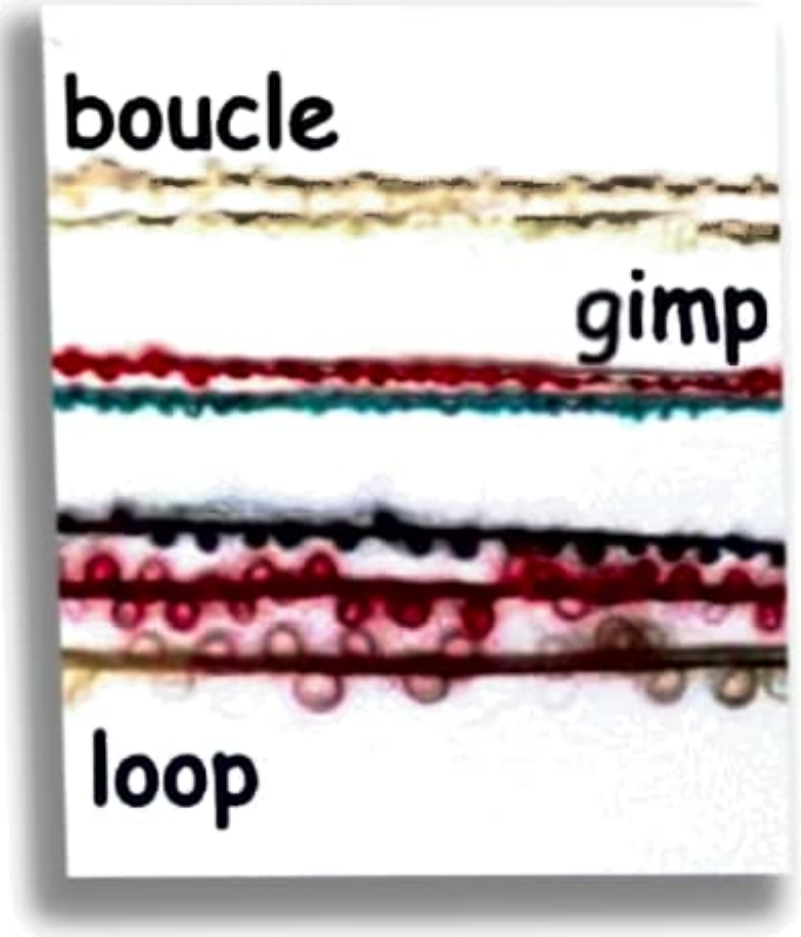
Murata Air Jet Spinning

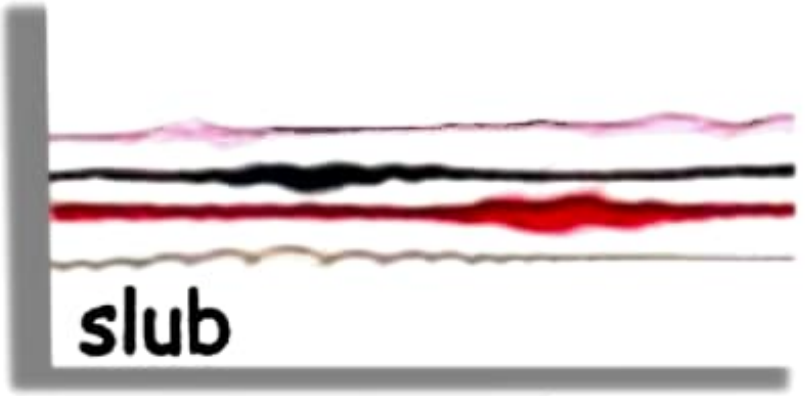




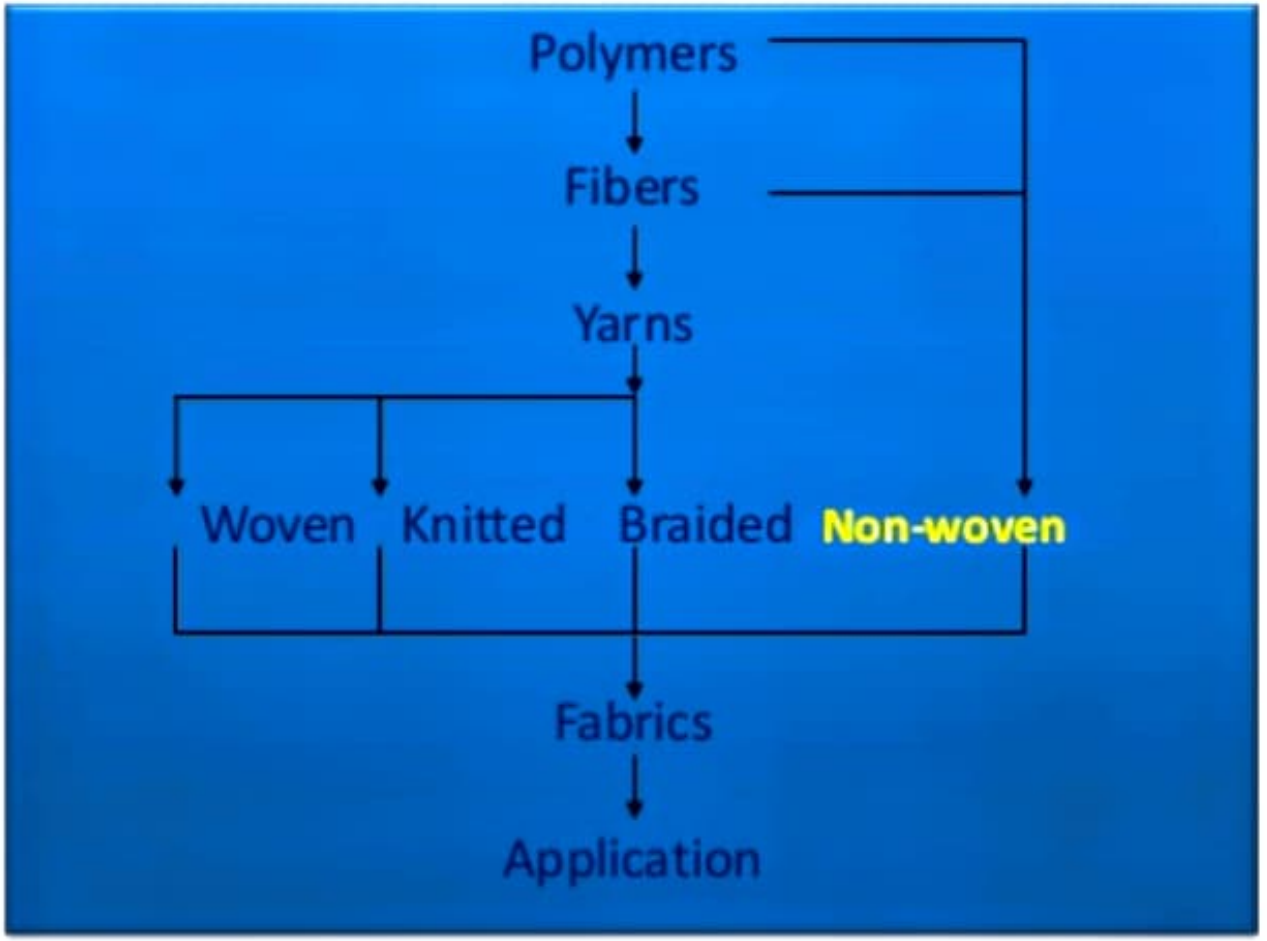
Murata Vortex

Fancy yarns





Fabric Manufacturing



It eliminates the yarn production process and makes the fabric directly from fibers.

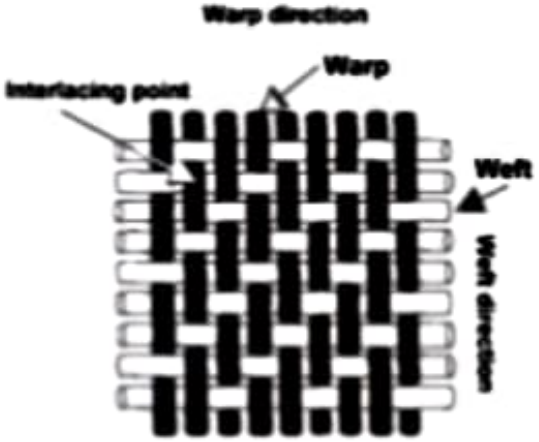
Manufacturing Technic

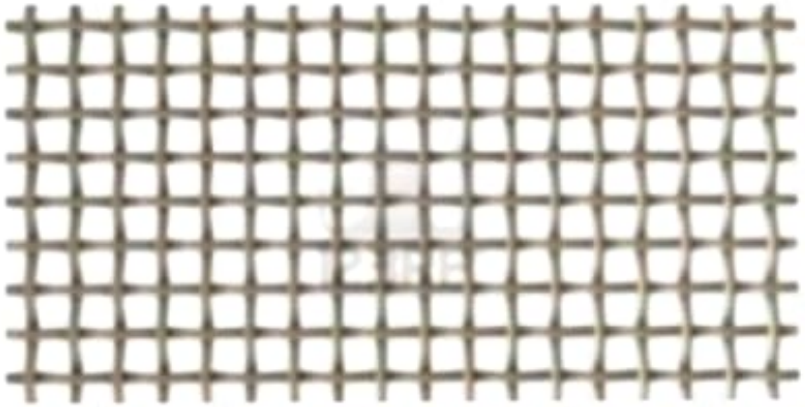
- Woven fabrics
- Knitted fabrics
- Non woven fabrics
- Braided structures

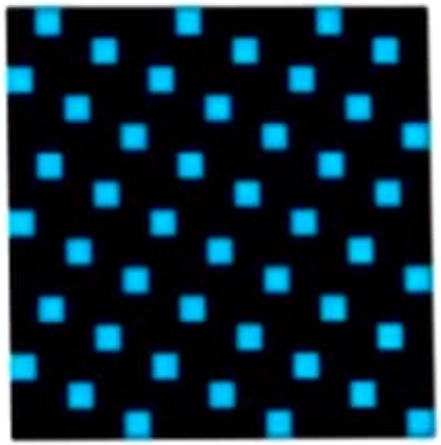
Production Rate

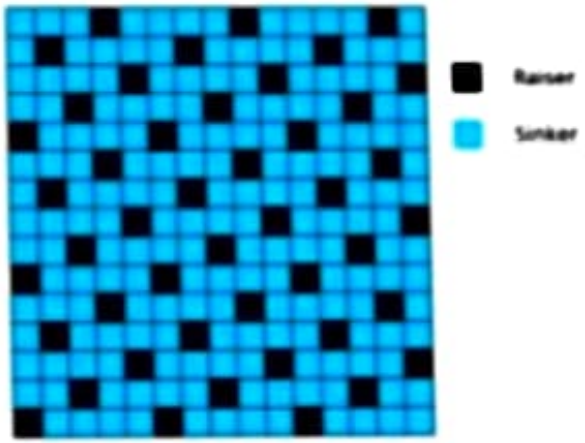
Fabric production method	Rate of fabric production
Weaving	1 m/min
Knitting	2 m/min
Nonwoven	100 m/min

Woven Fabric



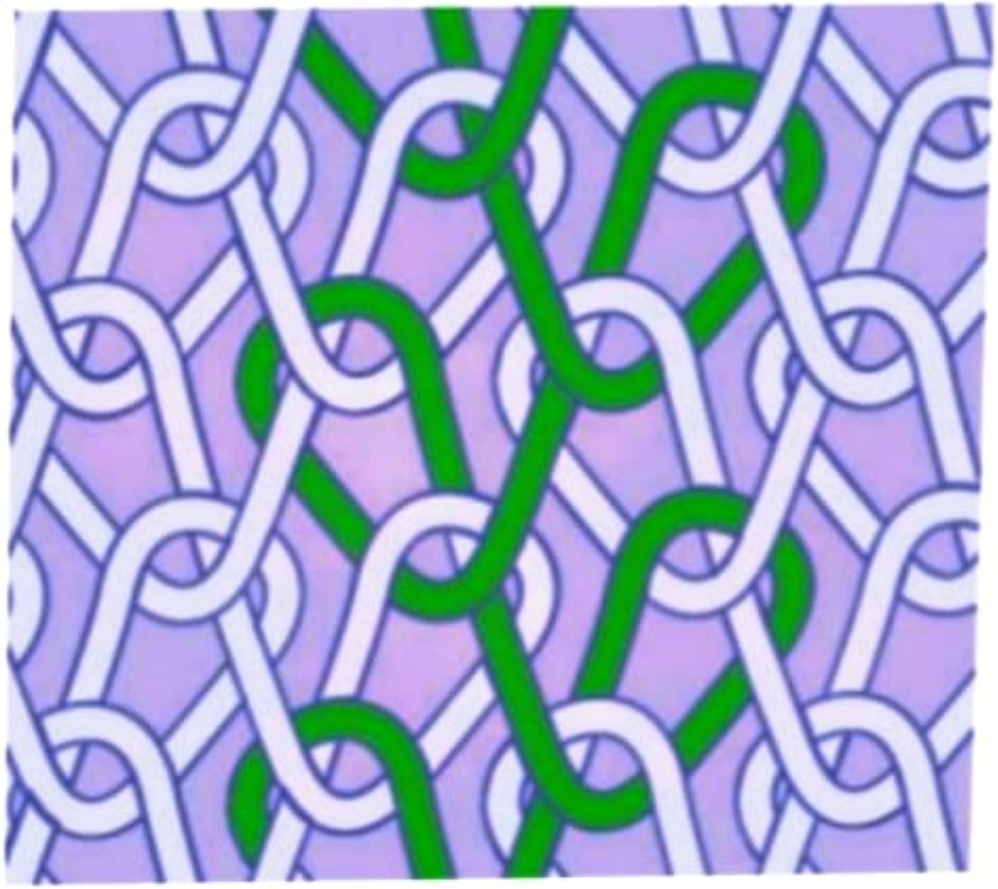






Knitted Fabric (weft Knitting)

Warp Knitting



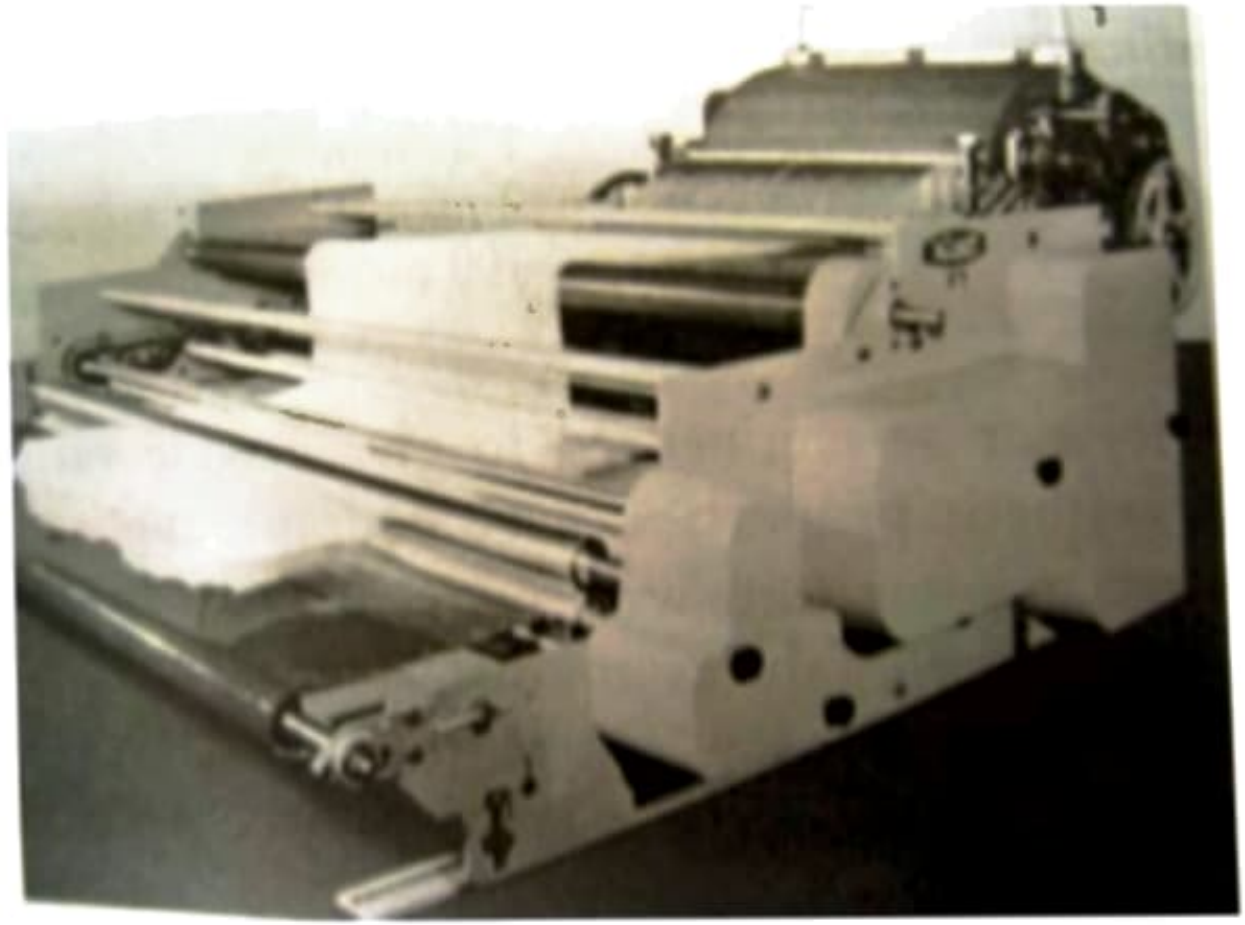
Braided Structures

Nonwoven Fabric

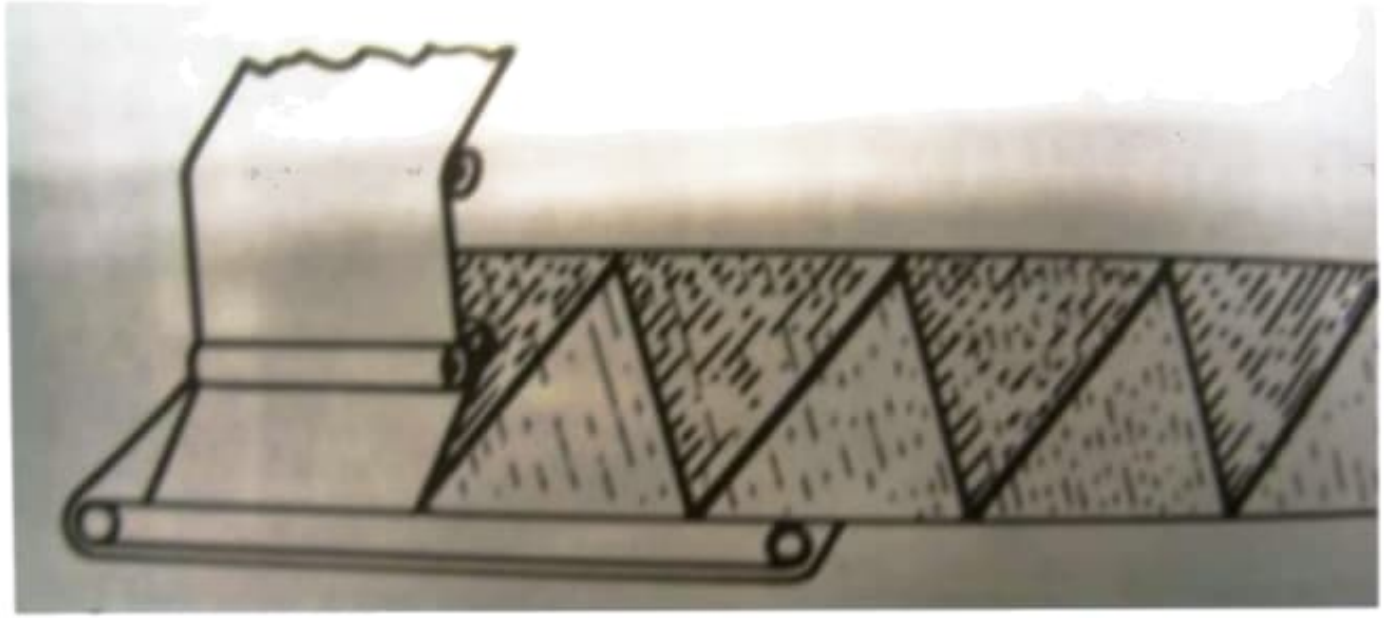
There are normally two steps for making non-woven products.

1. Web formation
2. Bonding systems

Parallel-laid web from carded fibers



Cross Laid Web

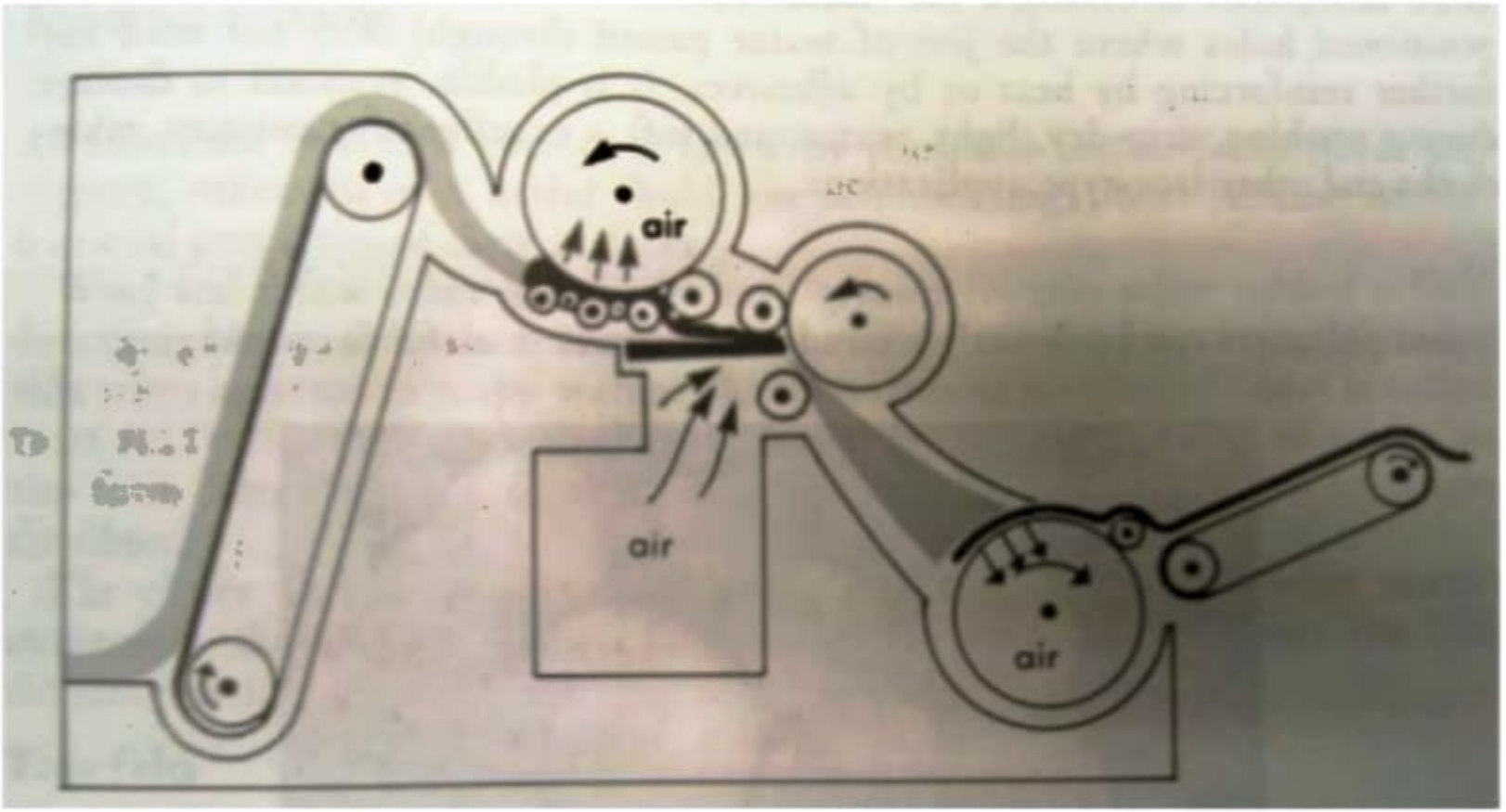


Parellel laid /cross laid web

- Card webs are arranged one over another in a parellel manner
- Strength is high in length wise direction than cross direction

- By means of cross laper, delivery of web turned to right angle

Air laid Web



Airlaid web\ wet laid

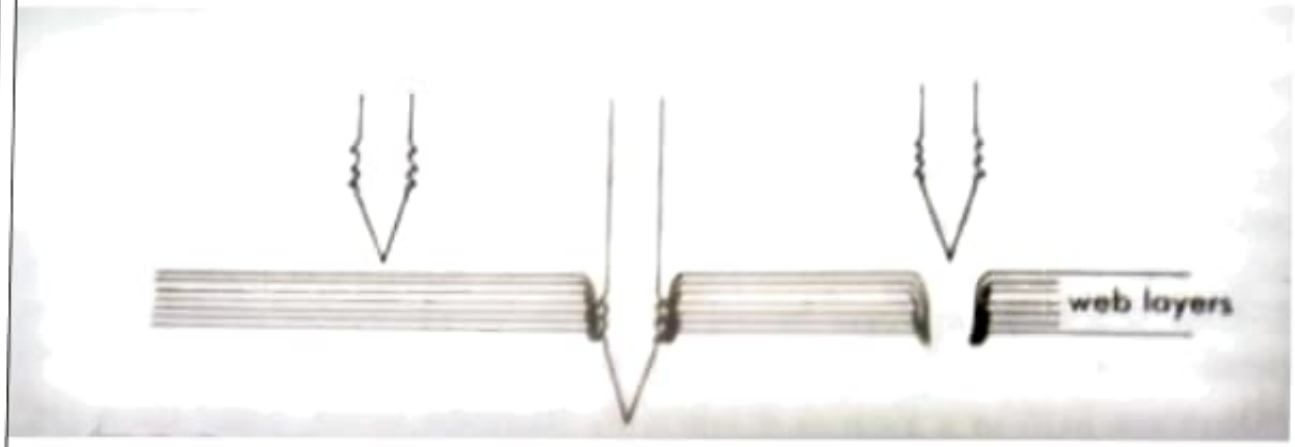
- Opened fibers are suspended in air and deposited on a perforated sheet or drum

- Fibers dispersed in water and deposited on a perforated felt and drain (Paper, Tea bag technic)

Types of Bonding

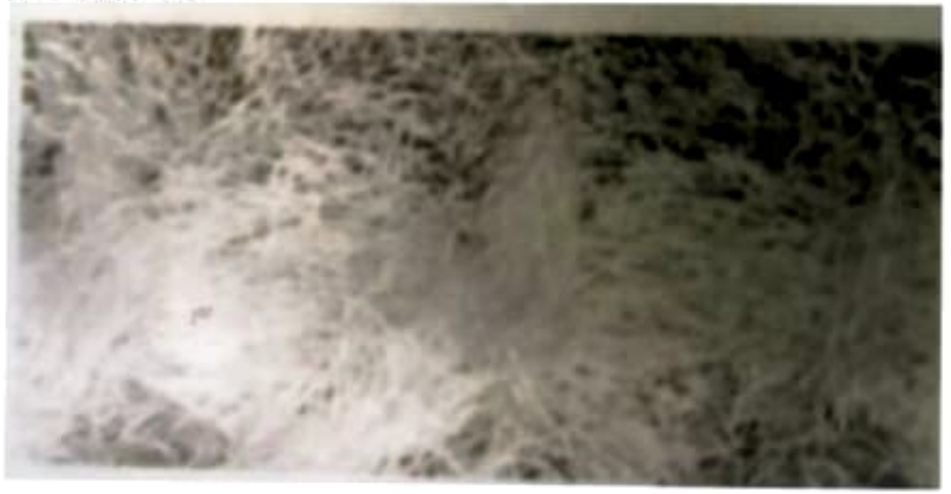
- Needled felts
- Adhesives
- Heat bonding
- Stitch bonding

Needle Punching



Needle punching

Cross section of a needle-punched bonded fabric.



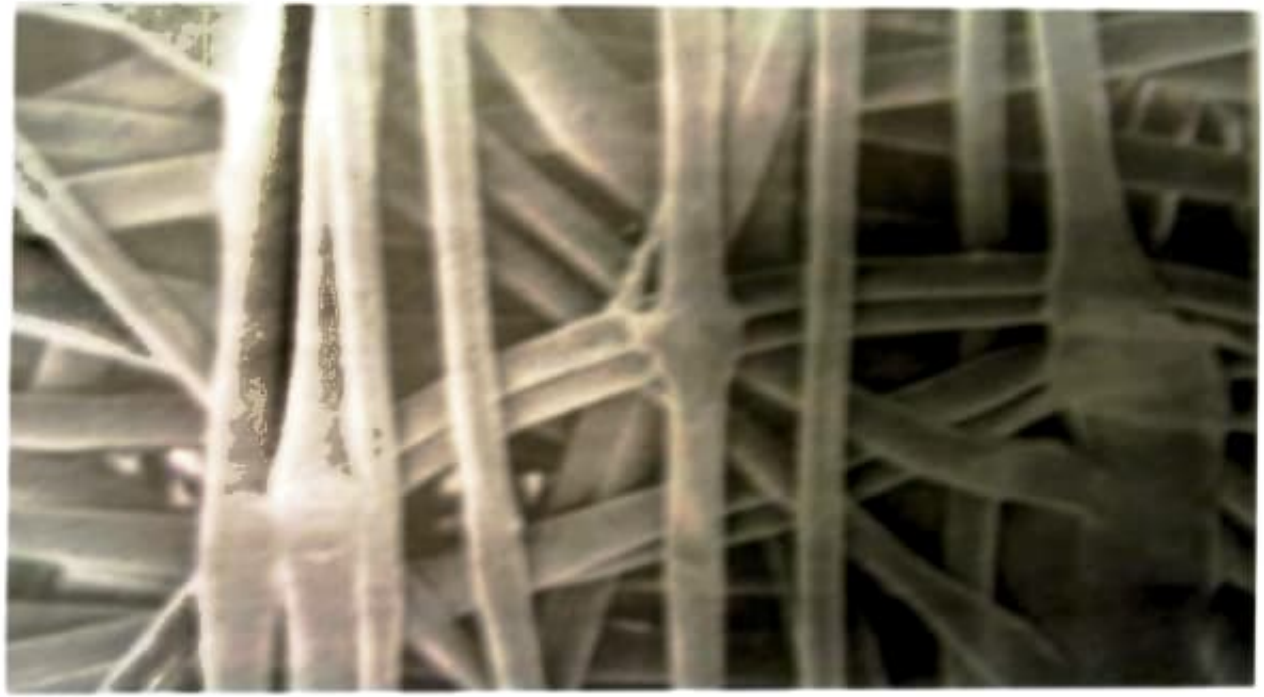
Fibers held together by frictional Contact between fibers

Adhesive Bonding

- The strength of fabric increased by adding adhesive. Where strength is not enough

Thermal Adhesive

- Melt-bonding at selected points to give extra stability to a spun bonded geotextile
- Spun bond and Melt blown systems



Stitch Bonding

Webs may also be given extra strength by stitching them through with yarns.

Such structures are usually more flexible

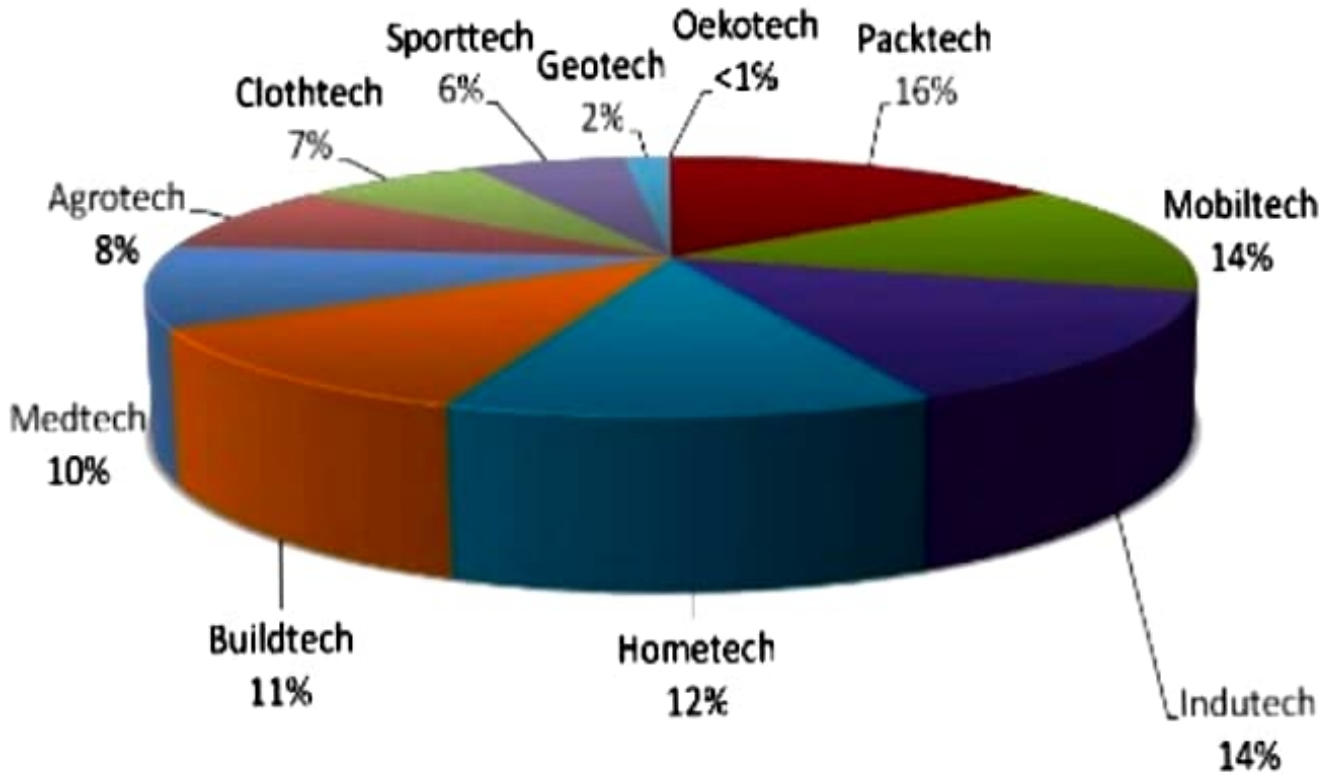
Webs from filament

- It is possible to tangle filaments together to form a web. Such webs are much stronger than web made from staple fibres.
- The thermoplastic filaments are welded to each other to form a strong fabric suitable for curtains & tablecloths.
- Sometimes, the filaments are textured before web formation. This allows greater extensibility of the fabric in use.

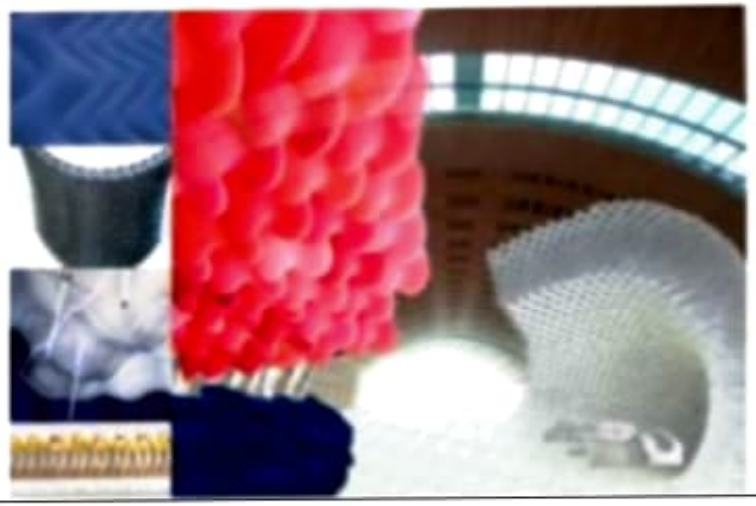
Application of Textiles

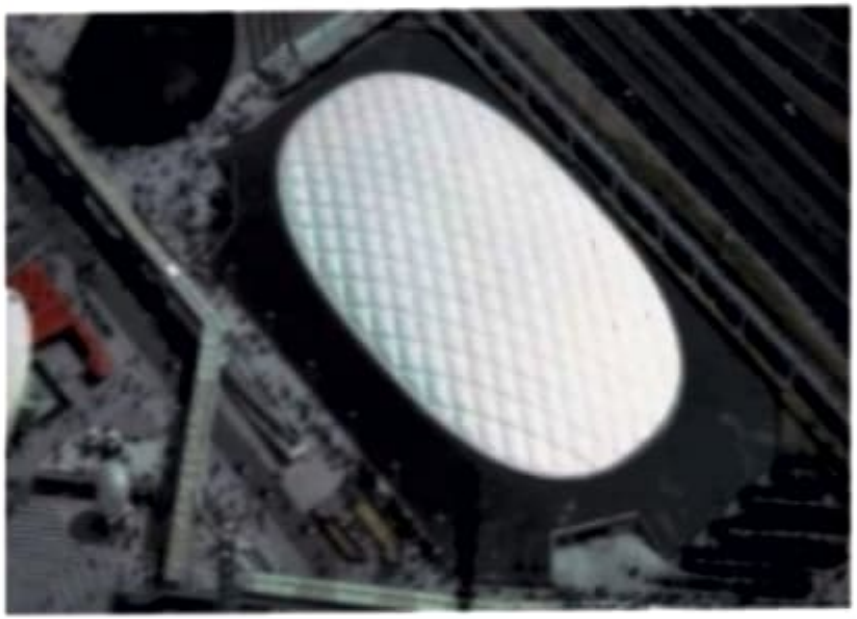
- Domestic applications
- Shirting
- Intimate fabrics
- Vanity fabrics
- Technical Textiles

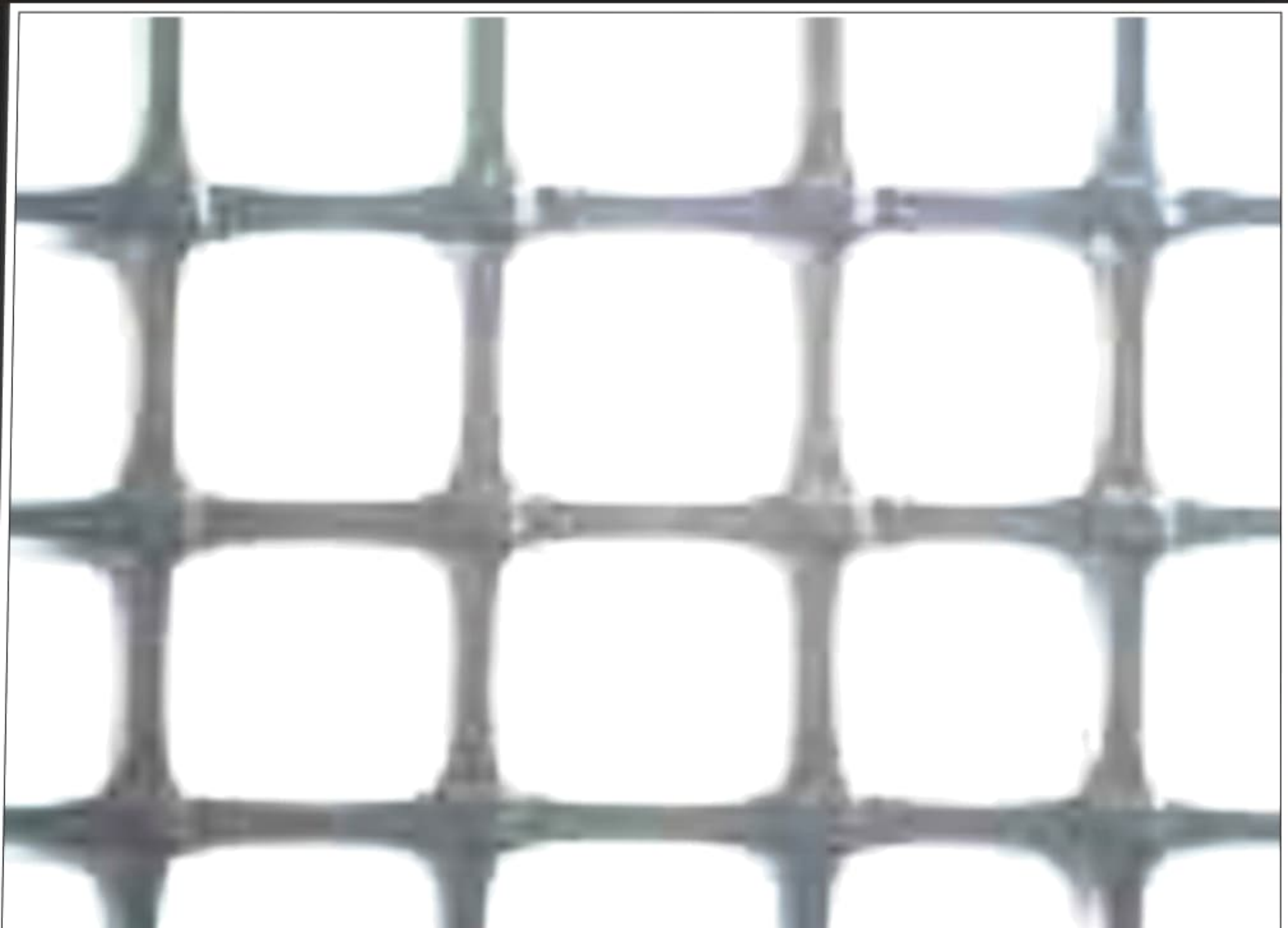
14 groups and 128 applications


Sporttech
6%
Geotech
2%
Oekotech
<1%
Packtech
16%
Clothtech
7%
Agrotech
8%
Mobiltech
14%
Medtech
10%
Buildtech
11%
Hometech
12%
Indutech
14%

Build tech







GEO synthetics

- Geogrids - reinforce slopes beneath the waste, walls, cover soils above geomembranes;
- Geonets - in-plane drainage;
- Geomembranes – a barrier to liquids, gases and/or vapors and landfill caps;
- Geocomposites –for separation, filtration or drainage;
- Geosynthetic clay liners (GCLs) - an infiltration/hydraulic barrier; used also for mine rehabilitation, tunnels, secondary containment
- Geopipes - landfill applications to facilitate collection and rapid drainage of the leachate to a sump and removal system;
- Geotextiles - filtration purpose or as cushion to protect the geomembrane from puncture.

Marine application

Environmental Care

Finishing of Fabrics

- General surface finishes (mechanical finishes, chemical finishes)

- Functional Finishes

Mechanical finishes

- Resistance to sunlight and UV degradation
- Abrasion resistance
- Reduced flammability
- Soil resistance and easy cleanability
- Resistant to microbes and other bacteria
- Crease resistance
- Softer handle and touch
- Water proof (water proof & breathable)

Controlled fragrance release

Anti Bacterial finish

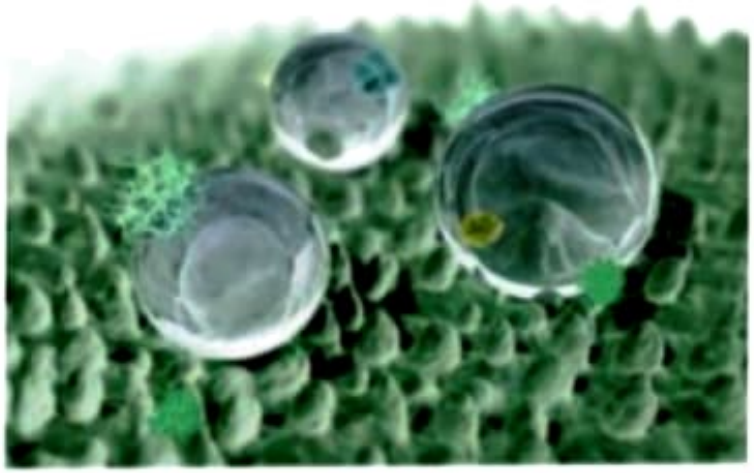
camouflage

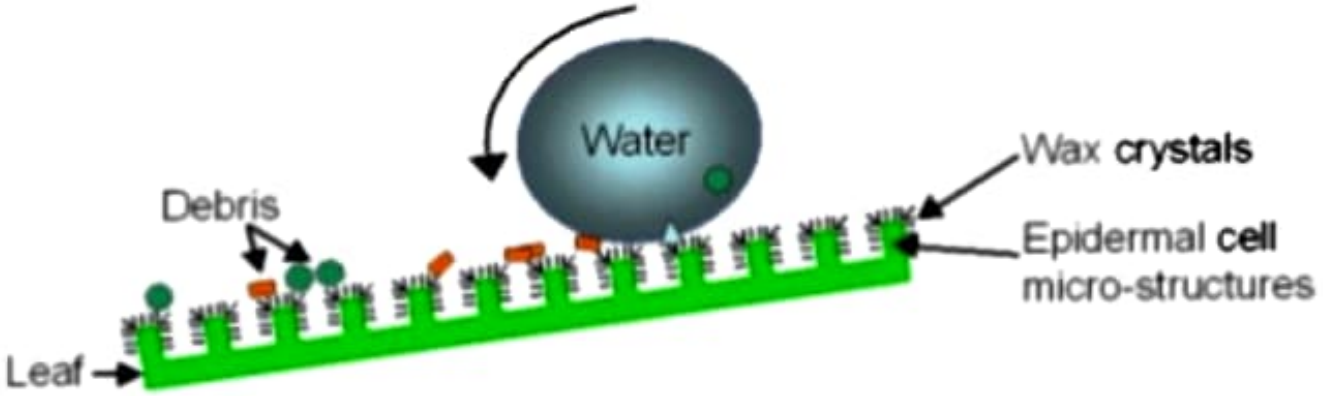
Non sensetivity by radors

Radiation Sheilding

Glow fabrics

Lotus leaf Effect





Smart Textiles

Incorporation of:

- Sensors and actuators
- MP3, GPS, GSM, Ipod, Iphone Ipad
- Energy harvesting systems
- Plastic electronics

Markets:

- Personal protective garments
- Medical systems
- Sports and Leisure
- Niches