

* Lecture I.

Introduction

Statistical data, international associations

EDANA, INDA

Definition of nonwoven textile (ISO 9092 1988)

A manufactured sheet, web or batt of directionally or randomly orientated fibres, bonded by friction, and/or cohesion and/or adhesion, excluding paper (see note) and products which are woven, knitted, tufted, stitch-bonded incorporating binding yarns or filaments, or felted by wet-milling, whether or not additionally needed.

The fibres may be of natural or man-made origin. They may be staple or continuous filaments or be formed in sieve.

To distinguish wetlaid nonwovens from wetlaid papers, a material shall be regarded as a nonwoven if

1) more than 50% by mass of its fibrous content is made up of fibres (excluding chemically digested vegetable fibres) with a length to diameter ratio greater than 300;

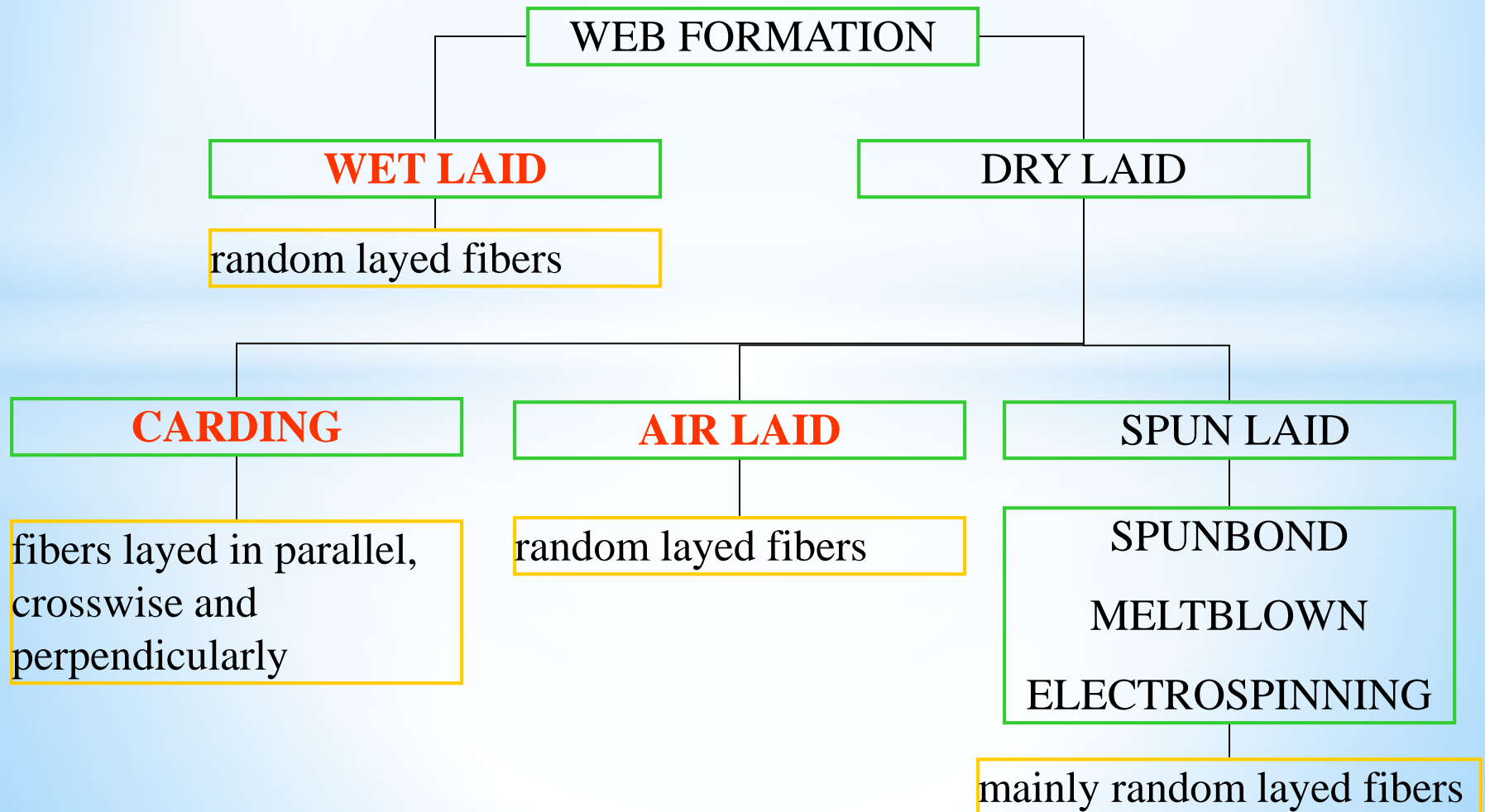
or, if the conditions in 1) do not apply, then

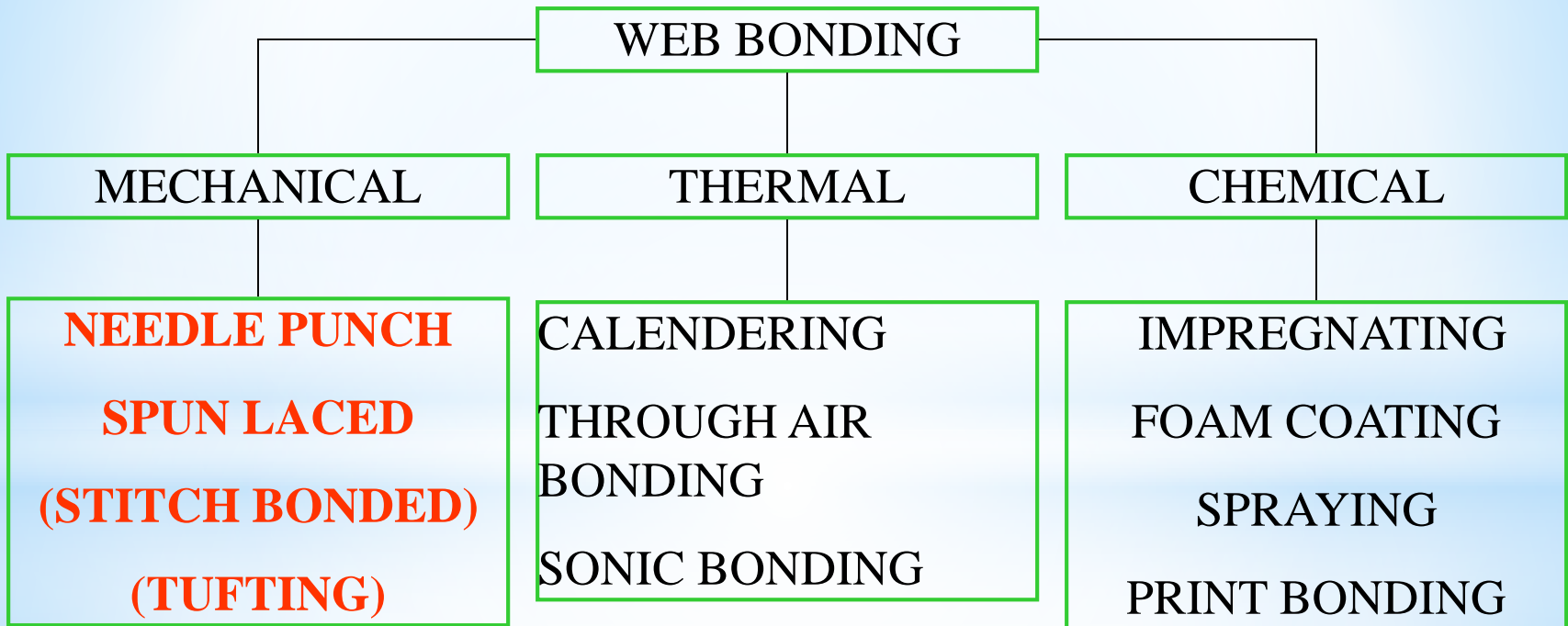
2) if the following conditions are fulfilled: more than 30% by mass of its fibrous content is made up of fibres (excluding chemically digested vegetable fibres) with a length to diameter ratio greater than 300

and its density is less than 0,40 g/cm³

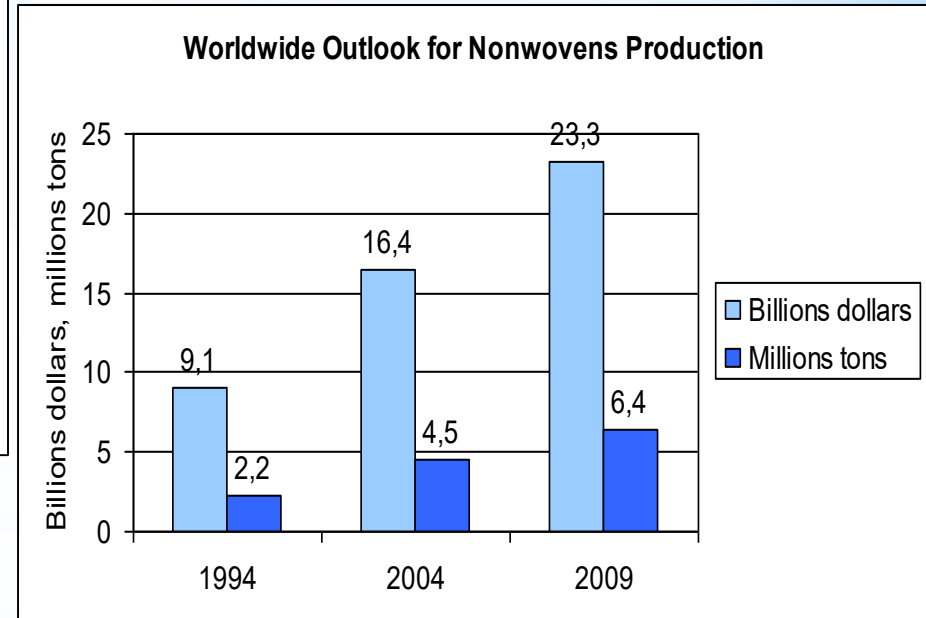
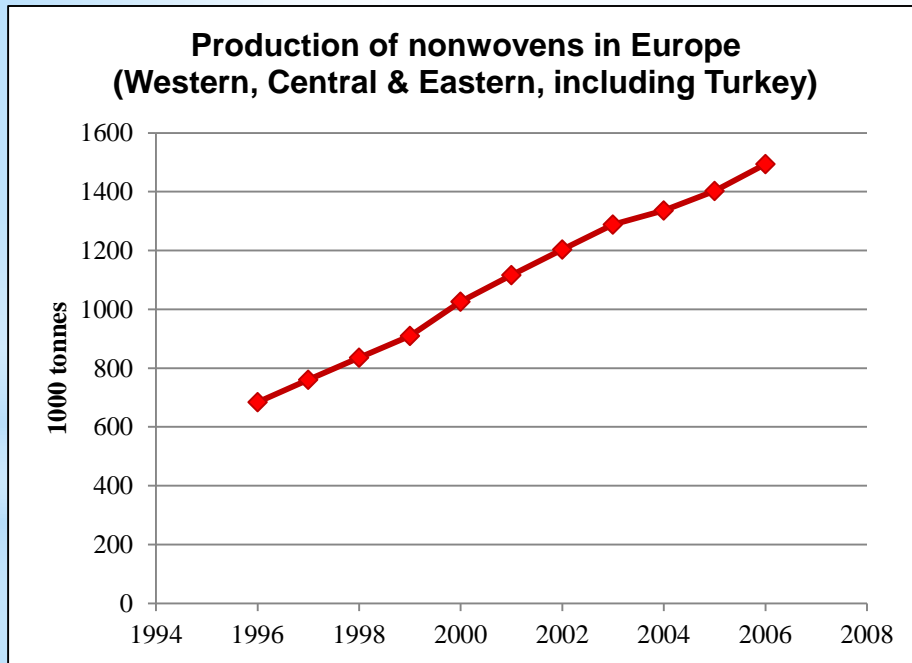
Mechanical technology within scheme of nonwovens

Scheme of nonwovens consists of the web formation and web bonding

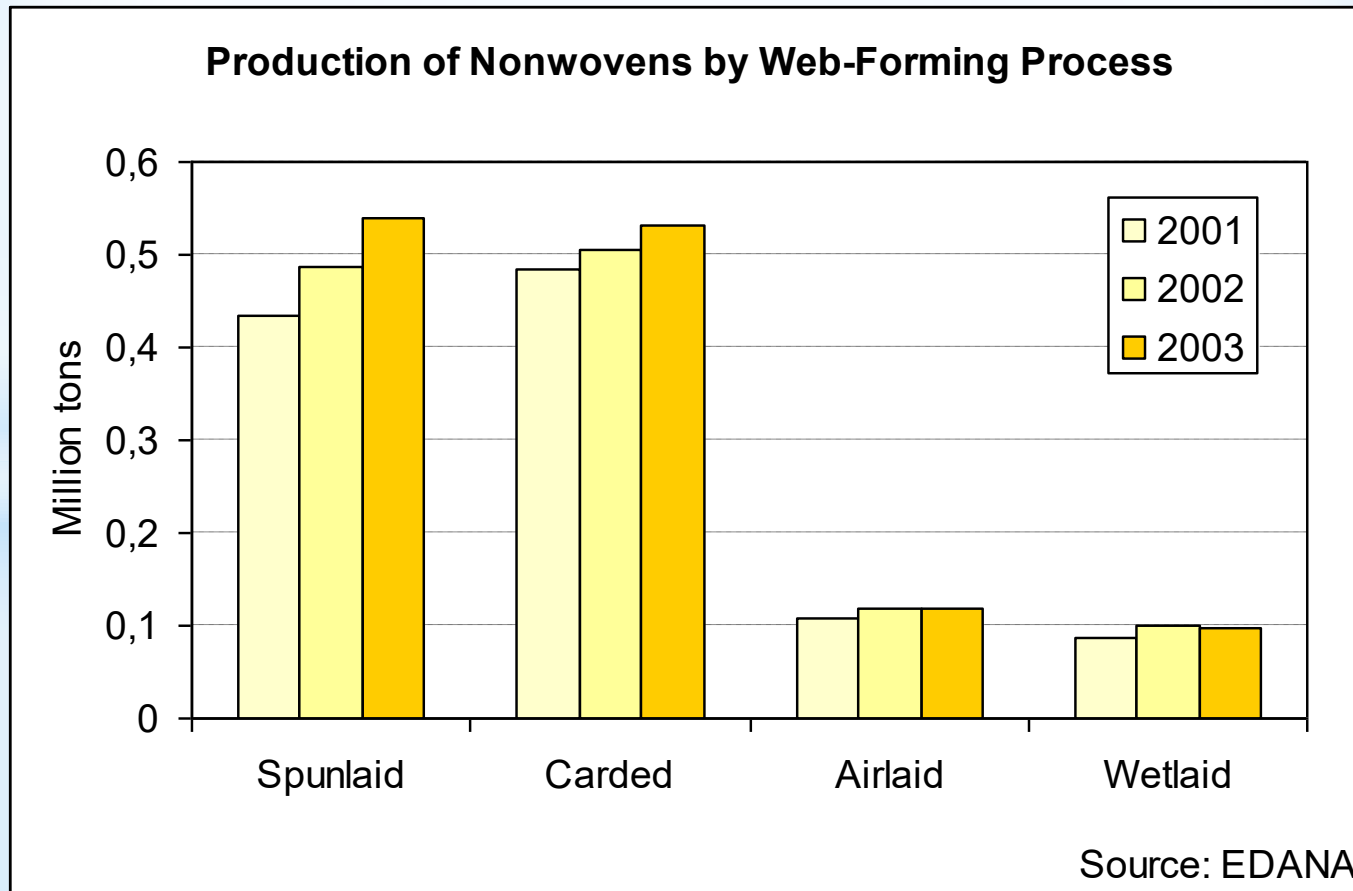




Nonwoven production in Europe and in the world

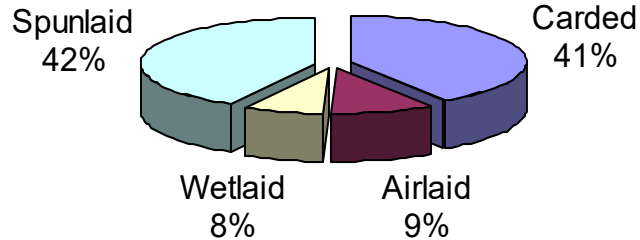


Production of nonwovens technologies in Europe

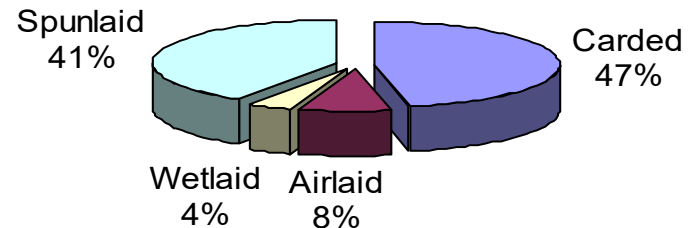


Production of nonwovens technologies in the world

Europe Production of Nonwovens Technology in the year 2003 (1,29 million tons)



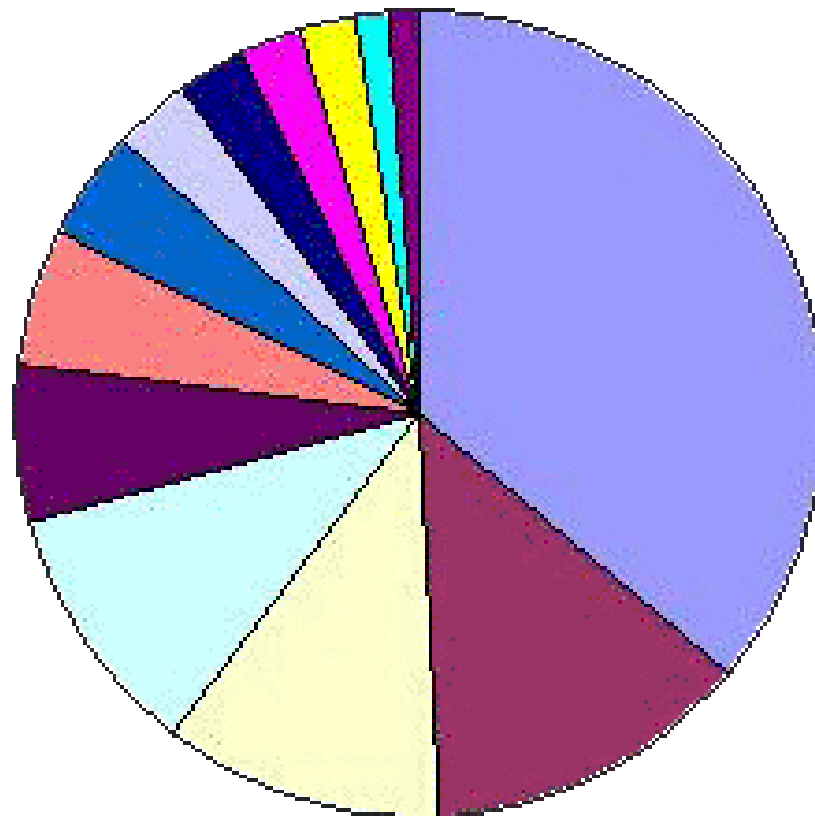
Worldwide Production of Nonwovens Technology in the year 2004 (4,5 million tons)



Source: INDA

* Applications of nonwoven fabrics

Nonwoven end uses



- Hygiene
- Building
- Wipes
- Others
- Civil engineering
- Upholstery/Bed linen
- Filtration
- Floorcoverings
- Medical
- Interlinings
- Footwear/leather goods
- Coating Substrates
- Garments

European association of nonwoven producers EDANA

EDANA is the international association serving the nonwovens and related industries, with around 190 member companies in 26 countries

Activities:

1. Promotion and education
2. Technical services (test standards for nonwovens)
3. Statistics and information
4. Public affairs
5. Meeting and platform activities

EDANA test methods I.

0.0-89 Definition

1.4-02 Vocabulary

10.4-02 Absorption

20.2-89 Tensile strength

30.5-99 Thickness

40.3-90 Mass per unit area

50.6-02 Bending length

60.2-99 Conditioning

70.4-99 Tear resistance

80.4-02 Burst

90.4-99 Drape

100.1-78 Brightness

110.1-78 Opacity

120.2-02 Repellency

130.2-89 Sampling

140.2-99 Air permeability

EDANA test methods II.

150.5-02 Liquid strike-through time

151.3-02 Coverstock - wetback

152.1-02 Run-off

153.0-02 Repeated Strike-Through time

154.0-02 Wetback after repeated strike- through time

170.1-02 Wet barrier - mason jar

180.0-89 Bacterial filtration efficiency

190.1-02 Dry bacterial penetration

200.1-02 Wet bacterial penetration

210.1-99 Free formadehyde - I

211.1-99 Free formaldehyde - II (under stressed conditions)

212.0-96 Free formaldehyde - III (determination by HPLC)

213.0-99 Free formaldehyde - IV (in processing)

220.1-02 Linting - dry state

230.1-02 Demand absorbency

300.0-84 Surface linting (useful method)

INDA and EDANA test method for nonwovens I.

INDA is the trade association representing the nonwoven fabrics industry since 1968. In cooperation with EDANA has been published standard test methods for nonwovens industry.

Table of contents:

GUIDANCE DOCUMENTS

- Glossary of Terms
- How to Write a Test Method
- Sample and Laboratory Conditioning
- Worldwide Associations
- Sampling
- List of Vendors
- Guidance to Nonwoven Test Methods
- Guidance to Highloft Test Methods

USEFUL METHODS

- Surface Linting
- Lamination Strength

INDA and EDANA test method for nonwovens II.

ABSORPTION

- Nonwoven Absorption
- Rate of Sorption of Wiping Materials
- Demand Absorbency

ABRASION RESISTANCE

- Inflated Diaphragm
- Flexing and Abrasion
- Double Rotary Platform (Tabor)
- Modified Martindale

BURSTING STRENGTH

- Diaphragm Burst
- Burst

ELECTROSTATIC PROPERTIES

- Surface Resistivity
- Decay

OPTICAL PROPERTIES

- Opacity (INDA)
- Brightness (INDA)
- Brightness (EDANA)
- Opacity (EDANA)

PERMEABILITY

- Air Permeability
- Liquid Strike-Through
- Water Vapor Transmission Rate
- Mocon/INDA
- Water Vapor Transmission Rate
- Mocon/EDANA Part 1
- Water Vapor Transmission Rate
- Lyssy/EDANA Part 2
- Repeated Liquid Strike-Through Time
- Wetback after Repeated Strike-Through

INDA and EDANA test method for nonwovens III.

REPELLENCY

- Surface Wetting Spray
- Penetration by Water (Rain Test)
- Penetration by Water (Spray Impact)
- Penetration by Saline Solution
- (Automated Mason Jar)
- Water Resistance (Hydrostatic Pressure)
- Penetration by Oil (Hydrocarbon Resistance)
- Alcohol Repellency
- Run-Off
- Coverstock Wetback
- Wet Barrier Mason Jar

STIFFNESS

- Cantilever Bending (INDA)
- Stiffness Using the Gurley
- Handle-O-Meter
- Cusick Drape
- Bending Length (EDANA)

TEAR STRENGTH

- Elmendorf
- Trapezoid Tear
- Tongue Tear

TENSILE

- Grab Tensile
- Strip Tensile
- Ball Burst

THICKNESS

- Thickness (INDA)
- Thickness of Highloft
- Compression and Recovery, Highloft
- Compression and Recovery, Highloft
- Using Weights and Plates
- Compression and Recovery, Highloft
- High Temperature/High Humidity
- Thickness (EDANA)

INDA and EDANA test method for nonwovens IV.

WEIGHT

- Mass per Unit Area

BINDER/APPEARANCE/DRYCLEANING

- Binder Distribution/Penetration
- Appearance and Integrity of Highloft Batting

LINTING

- Particulate Shredding, Dry
- Particulate Shredding, Wet
- Fibrous Debris from Nonwovens
- Fibrous Debris from Hydrophobic Nonwovens

GEOTEXTILES

- Conditioning
- Sampling
- Bursting Strength
- Air Permeability
- Cantilever Stiffness
- Trapezoid Tear
- Force and Elongation Grab
- Breaking Force Strip Test
- Thickness
- Thickness of Highloft
- Mass per Unit Area

INDA and EDANA test method for nonwovens V.

SUPERABSORBENT MATERIALS

- pH of Polyacrylate (PA) Powders
- Residual Monomers
- Particle Size Distribution
- Mass Loss Upon Heating
- Free Swell Capacity in Saline, Gravimetric Determination
- Fluid Retention Capacity in Saline, after Centrifugation
- Absorption Under Pressure, Gravimetric Determination
- Flow-rate, Gravimetric Determination
- Density, Gravimetric Determination
- Extractable
- Respirable Particles
- Dust in Collection, Sodium Atomic Absorption/Emission Spectrometry

BACTERIAL

- Filtration Efficiency
- Dry Bacterial Penetration
- Wet Bacterial Penetration

FORMALDEHYDE

- Water Extraction Method I
- Stressed Extraction Method II
- Free Formaldehyde Determination
- HPLC, Method III
- Free Formaldehyde in Processing
- Method IV

ABSORBENT HYGIENE PRODUCTS

- Syngina Method (Tampons)
- Ethanol - Extractable Organotin 1
- Synthetic Urine - Extractable Organotin 2