

Strength

- Power to resist something or resistance
- Strength of fiber affects yarn strength, fabric strength, hand feel, drape and similar properties
- Fiber strength \propto Yarn Strength
- Yarn strength \propto Stiffness



Strength

- Single Yarn Strength
- Lea Strength (One Lea = 120 Yards)
- CLSP (Count, Lea Strength Product)
- Breaking Length



Fabric Testing

- Fabric testing is an important segment of the textile industry. We can easily detect the faults of machinery and materials during test of textiles.
- Textile standards: Standard is a prescribed required level of performance of material. These standards are:
- NFPA: National Fire Protection Association
- ANSI: American National Standard Institute
- ISO: International organization for Standardization



Breaking/Tensile strength

- Breaking strength is the force required to break a fabric when it is under tension (being pulled).
- Breaking Elongation is the increase in length that has occurred when the fabrics breaks.



Breaking/Tensile strength

- Mainly used for woven fabric because the tests are unidirectional and woven fabrics have unidirectional yarns.
- Factors that produce a strong fabric include fiber content, yarn size and type, weave, and yarns per inch.
- Breaking strength is expressed in pounds and the elongation is expressed as a percent and in both cases a number of warp tests and weft test are performed.



Breaking/Tensile strength

- Breaking strength is important in various end uses such as automotive safety belts, parachute harness and pants.
- Breaking strength can also be used to test the effects of destructive forces upon a woven fabric including sunlight, abrasion, laundering etc.



Tear strength

- Tearing strength is the force required to continue a tear or rip already stated in a fabric.

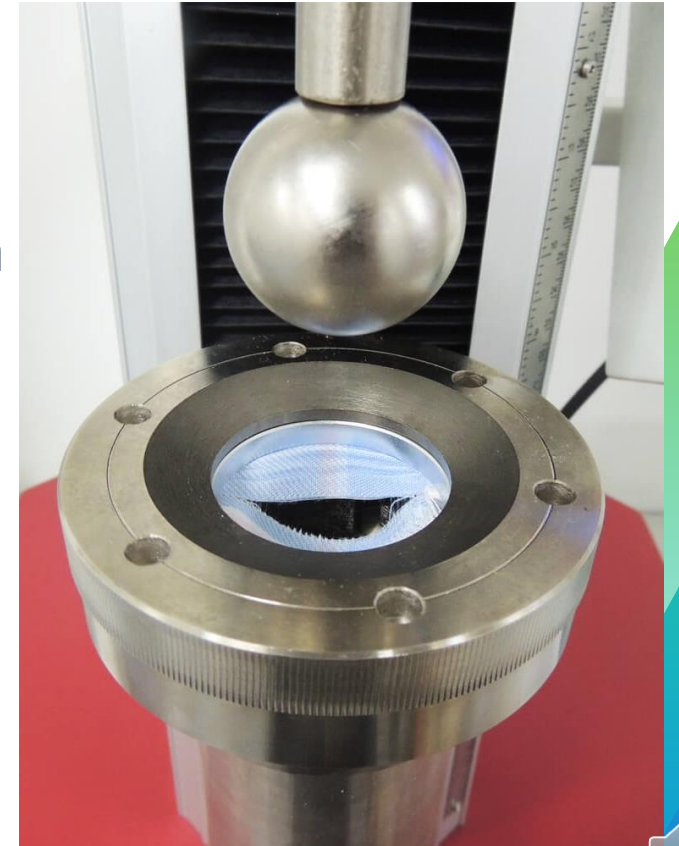


- *Used mainly in woven fabrics.*
- number of tests performed and the average is taken
- strength is ***expressed in grams or N***



Bursting strength

- Bursting strength is the amount of pressure required to rupture a fabric.
- Force is applied radially and not in one direction as in breaking or tearing strength tests.
- Fabrics like knits, felt, non woven, lace and netting are usually tested in this manner because these fabrics either do not have yarns or yarns are not in any given direction.



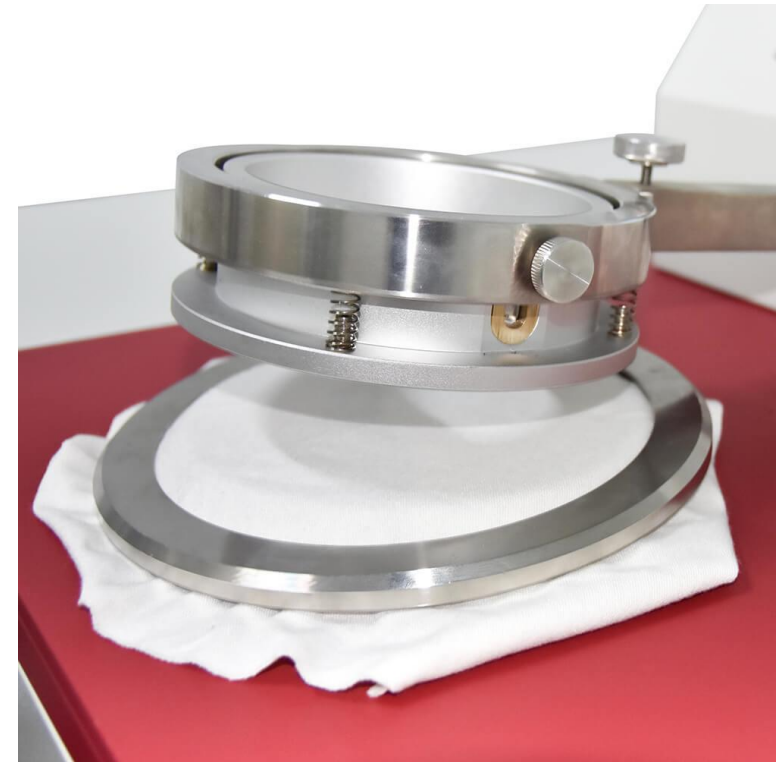
Fabric pilling

- Pilling is the formation of small balls of fibres called pills on the surface of fabric.
- It occurs only when there is rubbing or an abrasive action on the surface of the fabric, during normal wear or in washing/dryer
- Evaluation should be made taking into account the size, number, and visibility of the pills as well as the type and degree of other surface change.



Air permeability

- Air permeability is the rate of air flow through a material under a differential pressure between two fabric surfaces.
- This property is important for a wide range of textile applications.
- Some products like curtains require high air permeability while products like parachutes and gas filters require low air permeability.
- Expressed as cubic feet per square foot of fabric



VARIABLES AFFECTING AIR PERMEABILITY

Fiber content: more crimp, lower air permeability.

Yarn size: heavier yarns, lower air permeability.

Yarn Twist: less twist, less air permeability.

Fabric Thickness: thicker fabric, lower air permeability.

Multiple layers: more layers, lower air permeability.

Threads per inch: greater density, lower air permeability.



Abrasion resistance

- Abrasion resistance is the wearing away of any part of a material when rubbed against any other material.
- Garments that are made from fibres that possess both high breaking strength and abrasion resistance can be worn often and for a long period of time before signs of physical wear appear..
- Nylon is extremely high in abrasion resistance so it is used widely in action outer whereas Acetate has poor abrasion resistance so it does not last long when used for lining in jackets and coats.



Fabric Moisture Management

■ <https://www.youtube.com/watch?v=foLGgKd2yoA>



Chemical testing

- **COLORFASTNESS PROPERTIES**
- **CHEMICAL SOLUBILITY TEST**



Color Fastness testing

- Used to determine the resistance of dyed or printed fabrics to color change under various conditions.
- There are various reasons as to which a fabric changes colors like sunlight, pollution gases, abrasion, perspiration, dry cleaning etc.
- A fabric that experiences little color alteration when exposed to a fading force is said to have a good colorfastness while if the color does not hold, then the fabric has poor colorfastness.



Color Fastness testing

Problem persists with deeper colors like red rather than pastel colors.

There is a scale from 5 to 1 for evaluating colorfastness.

Class 5 means no shade change and class 1 means very great shade change.

Colorfastness to light is rated on L9 to L1 scale with L9 being the best rating and L1 the worst .



Color Fastness tests

1. COLORFASTNESS TO SUNLIGHT .
2. COLORFASTNESS TO WASHING.
3. COLORFASTNESS TO CROCKING.
4. COLORFASTNESS TO FROSTING.
5. COLORFASTNESS TO PERSPIRATION.
6. COLORFASTNESS TO DRY CLEANING.



Thanks!

