TRINITY COLLEGE FOR WOMEN
NAMAKKAL

DEPARTMENT OF COSTUME DESIGN & FASHION

TEXTILE TESTING AND
QUALITY CONTROL

EVEN

SEMESTER

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YARN EVENNESS, TWIST, AND HAIRINESS

- **Evenness (Mass Variation):** Measured via capacitance testers (e.g., Uster). Records mass variations per centimeter, tracking thick places, thin places, and neps.
- **Yarn Twist:** Measured in turns per inch (TPI) or turns per meter (TPM). Evaluated using "Twist-Untwist" or straight tension methods.
- **Hairiness:** Measurement of protruding fiber ends from the core yarn body. Quantified by the H-index (total length of protruding fibers within a specific measurement window).

IMPORTANCE OF QUALITY & KEY TERMINOLOGIES

- **Why Quality Matters:** Ensures process ability in knitting/weaving, minimizes machine downtime, and determines final garment durability.
- **Key Terminologies: Quality Control (QC):** Operational techniques to sustain required quality.
- **Quality Assurance (QA):** Systematic actions providing confidence that a product satisfies given requirements.
- **Tolerance:** The acceptable deviation from a specified standard.

OBJECTIVES OF TESTING & LAB CONDITIONS

- **Core Objectives: To** check raw material suitability.
- To monitor process efficiency.
- To assess final product quality against buyer specifications.
- **Standard Atmospheric Conditions (ISO 139):Temperature:** 20°C ± 2°C (65°F ± 4°F).
- **Relative Humidity (RH):** 65% ± 4%.
- **Rationale:** Moisture absorption drastically alters fiber strength, elongation, and weight.

IDENTIFICATION OF TEXTILE FIBERS

- **Non-Technical Methods: Burning Test:** Evaluates odor, smoke color, melting behaviour, and ash residue (e.g., cotton burns like paper with gray ash; polyester melts into a hard black bead).
- **Technical Methods: Microscopic View:** Longitudinal and cross-sectional views (e.g., convoluted ribbons for cotton; smooth cylinders for nylon).
- **Chemical Solubility:** Dissolving fibers in specific reagents (e.g., Acetone dissolves Acetate; 70% Sulfuric Acid dissolves Cotton).

YARN NUMBERING SYSTEMS & COUNT DETERMINATION

- **Indirect System (Length per unit weight):** Used for natural fibers like cotton. Higher number = Thinner yarn.*English Count (Ne):* Number of 840-yard hanks per 1 pound.
- **Direct System (Weight per unit length):** Used for synthetic filaments. Higher number = Thicker yarn.*Tex:* Weight in grams of 1,000 meters of yarn.
- *Denier (Den):* Weight in grams of 9,000 meters of yarn.
- **Determination:** Measured using a wrap reel (to make hanks) and a quadrant or analytical balance.

YARN STRENGTH TESTING AND CSP

- **Tensile Testing Concepts: Single Yarn Strength:** Measured via Constant Rate of Elongation (CRE) testers.
- **Lea Strength:** Testing a loop of 120 yards (80 turns on a wrap reel) simultaneously.
- **Count Strength Product (CSP):**Formula: $\text{CSP} = \text{Lea Strength (lbs)} \times \text{English Yarn Count (Ne)}$
- **Significance:** A benchmark metric used globally to grade the spinning quality of ring-spun cotton yarns.

THANK YOU

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