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Materials Research Compilation

Article 1: Why are some fabrics blended? The advantages and disadvantages of various cotton blends.

Citation:

IvyandPearlBoutique. "Why Are Fabrics Sometimes Blended? The Advantages And Disadvantages Of Various Common Fabric Blends." *Ivy and Pearl Online Boutique*, 10

July 2019,

www.ivyandpearlboutique.com/fashion-and-news/fashion-school/advantages-disadvantages-common-fabric-blends/.

Information:

- Cotton
 - Advantages: soft, hypoallergenic and dust mite resistant, breathes well
 - Disadvantages: easily wrinkles and creases, weakened by light exposure
- Polyester
 - Advantages: easily dyed, light, resists shrinkage, resists stretching, resists mildew, not damaged by light, resists wrinkling
 - Disadvantages: does not breathe, shine can be unattractive, difficult to remove stains
- Nylon
 - Advantages: resilient, easy to care for, resists insects, fungi, and mildew, can melt when heat is applied
 - Disadvantages: not absorbent, can have unattractive sheen, prone to static electricity
- Wool
 - Advantages: keeps its shape, retains heat, breathable, resistant to tearing
 - Disadvantages: pills easily, weakens when wet, can itch, can mildew/ mold, weakened by light exposure
- Acetate
 - Advantages: silky appearance and field
 - Disadvantages: dyes can fade or bleed, heat sensitive, relatively weak fiber
- Ramie
 - Advantages: resists bacteria, mildew, and insects, absorbency properties are extremely high, easily dyed, strengthens when wet, luster improves with washing, holds shape well, resists shrinkage

- Disadvantages: low elasticity, not resilient, low abrasion resistance, easily wrinkles, stiff and brittle
- Linen
 - Advantages: keeps you cool, easy to clean, strong, comfortable, absorbent, resists stains
 - Disadvantages: expensive, wrinkles easily, shrinks easily, can be affected by mildew and perspiration, shines if ironed
- Silk
 - Advantages: very hypoallergenic, soft and shiny, highly absorbent- allows your skin to breathe, durable, light
 - Disadvantages: expensive, yellows with age, requires special care, leaves water spots
- Rayon
 - Advantages: beautiful silky appearance and feel, drapes well, breathable, inexpensive, dyes easily
 - Disadvantages: easily creases, usually needs to be dry cleaned, prone to stretching and bagging, weak when wet, absorbs moisture
- Spandex/ Lycra
 - Advantages: lightweight and comfortable, resists perspiration, is elastic, durable and strong
 - Disadvantages: does not allow skin to breath, may stick to the body, is sensitive to heat
- Fiber Blends
 - When blended- weaknesses of fabric negated
 - On blended fabrics- highest content listed first
 - Cotton/ Polyester Blend
 - Common in apparel
 - Durable, maintains color well, soft, light
 - Not as breathable
 - Nylon/ Wool Blend
 - Emphasizes moisture wicking properties
 - Acts as natural insulator
 - Anti microbial
 - Blend emphasizes good quality of wool without itching
 - Nylon/ Acetate
 - Attractiveness of acetate
 - Durability, stretch, wrinkle/ shrinkage resistance (from nylon)
 - Ramie/ Polyester
 - Strong
 - Resists heat, insect, mildew, light, acids

- Wrinkle resistant
- Wool/ Cotton
 - Retain shape
 - Softer fabric
 - Breathable
 - Insulated
- Linen/ Cotton Blend
 - Strong fabric
 - Absorbent
 - Cool to the touch
 - Breathability
- Linen/ Silk
 - Luxurious = expensive
 - Durable
 - Very pretty to look at
- Linen/ Rayon
 - Combines cool comfort of linen and wearability of rayon
 - Drapes well
- Silk/ Wool
 - Shine of silk
 - Weight of wool
 - Breathable, drapes well
- Rayon/ Cotton
 - Common
 - Silky feel and appearance
 - Prone to wrinkles
- Cotton/ Polyester/ Rayon/ Spandex
 - Comfort and breathability
 - Controlled shape
 - Stretchable

Article 2: What is Military Fabric Called? What are Uniforms Made of?

Citation:

V, James. "What Is Military Fabric Called? (What Are Uniforms Made of)." *SewingIsCool.com*,

31 July 2020, sewingiscool.com/what-is-military-fabric-called/.

Information:

- Heavy cotton twill
 - Used for decades

- Heavy, hot to wear, took a long time to dry
- Mid 20th century- switch to all synthetic fibers
 - Lighter
 - Drawbacks: hot, did not absorb sweat, reflected infrared light
- Blended cotton and nylon
 - More mobility and range of motion
 - Lighter
 - More difficult to apply dyes

Article 3: A Beginner's Guide: What is Antimicrobial Fabric?

Citation:

Haddad, Leslie. "A Beginner's Guide: What Is Antimicrobial Fabric?" *Herculite*, 16 Feb. 2017,

www.herculite.com/blog/a-beginners-guide-what-is-antimicrobial-fabric.

Information:

- Antimicrobial: "destroying or inhibiting the growth of microorganisms, and especially pathogenic microorganisms"
- Common in medical facilities
- Found in medical bedding, medical curtains, uniforms
- Includes pathogen fighting layer
 - Prolongs life of textiles
 - Protects the fabric surface
- Ensures longevity and allows for reuse
- Antimicrobial fabric composition
 - Polyester, polyester vinyl composites, and even acrylics
 - Effectiveness = ability to fight off microorganisms
 - Prevents bacteria and other microorganisms from attaching to fabric surface
 - Also prevents growth and spread

Article 4: Surface modification of biotextiles for medical applications

Citation:

Tessier, D. "Surface Modifications of Biotextiles for Medical Applications." *Biotextiles as*

Medical Implants, Woodhead Publishing, 2013, pp. 137–156.

Information:

- Antimicrobials can be leached from the fabrics when washed
 - Unable to control bad odors and fight germs
 - Most soluble in water
- Non leaching antimicrobials

- Metal based nanoparticles
- Ex: quaternary ammonium complex beads with antimicrobial activity
 - Formed mainly through covalent bonds
 - Exhibited swelling but were not hydrolyzed
 - Materials retained after ten cycles of washing
- Durable antibacterial hybrid nanofibers
 - Continuous and smooth nanofibers with Ag nanoparticles
 - Exhibited slow and long lasting silver ion release with good antibacterial activity