FASH 15 textiles

yarn processing
yarn processing

most apparel & interior fabrics produced from yarns

yarn:
continuous strand of textile fibers, filaments or materials in a form suitable for knitting or weaving or otherwise intertwining to form a textile fabric
filament yarns

made from manufactured fibers—except tiny percentage of filament silk

grouping of filaments with the addition of twist creates filament yarn
filament yarn

#1

yarn name: outdoor UV resistant thread

yarn type: multi-filament

twist direction: Z

amount of twist: high

yarn appearance: standard filament

fiber content: 100% polyester

end uses:
filament yarn

#2

yarn name: elastic sewing thread

yarn type: corespun filament

twist direction: none

amount of twist: none

yarn appearance: braided

fiber content:
42% polyester
58% rubber

end uses:
filament yarns—smooth-filament yarns
uniform as they come from the spinneret
more luster than spun yarn—depending upon delusterant & amount of twist
  • no protruding ends
  • do not lint
  • resist pilling
  • shed soil
strength depends upon:
  • strength of individual fibers
  • number of filaments in yarn
smooth-filament yarn

yarn name: thread

yarn type: filament

twist direction: Z

amount of twist: high

yarn appearance: Standard filament

fiber content: 100% polyester

end uses:
filament yarns—monofilament yarns
primarily for technical uses—low cost, high durability
consist of single coarse-filament fiber
end uses:
•  sewing thread
•  fishing line
•  fruit & vegetable bags
•  nets
metallic fibers used as monofilament yarns—sparkle, minimize static electricity, clean-room apparel & technical applications
yarn name: quilter’s invisible nylon thread

yarn type: filament

twist direction: none

amount of twist: none

yarn appearance: standard filament

fiber content: 100% nylon

end uses: monofilament yarn #4
yarn name: metallic

yarn type: corespun filament

twist direction: none

amount of twist: none

yarn appearance: standard filament

fiber content: 60% nylon 40% polyester

end uses: monofilament yarn #5
filament yarns—tape and network yarns

tape—
inexpensive yarns produced by extruded polymer films
coarse and usually used in carpet backing, rope, cord, fishnets, bagging and interiors support fabrics

network—
made of fibers connected in a network arrangement—bulkier & less dense than tape yarns
used in technical products in which bulk & low density more important than high strength
yarn name: tape yarn

yarn type: extruded polymer film

twist direction: none

amount of twist: none

yarn appearance: flat, lustrous

fiber content: 100% polyester

end uses:
filament yarns—bulk yarns

processed to have greater covering power or apparent volume than that of conventional yarn

sometimes referred to as bulk-continuous-filament (BCF) yarns

bulking gives filaments aesthetic properties of spun yarns
filament yarns—bulk yarns

methods of adding texture/bulk:
• false-twist process
• draw-texturing
• stuffer box
• air-jet
• knit-deknit
yarn name: cording
yarn type: spun
twist direction: none
amount of twist: none
yarn appearance: braided
fiber content: 100% polyolefin
end uses: bulk yarn #7
yarn name: boucle

yarn type: spun

twist direction: S

amount of twist: low

yarn appearance: texturized

fiber content: 100% acrylic

end uses: bulk yarn #8
filament yarns—spun yarns

continuous strands of staple fibers held together in some way—twist generally used

characteristics:
• fuzzy surface
• greater amount of twist than filament yarns
• short fibers that pull apart
• more comfortable on skin than smooth-filament
• low-twist—trap air/insulate
• high-twist—air permeability reduced/wind resistant
participation activity: spun yarns

...pick up a “spinner” tool & some fiber
...watch the instructor as she demonstrates the spinning method that we will be using
...try your hand at “spinning” your fiber
...at the conclusion of the lecture, answer the following questions:

• how easy was this method of spinning?
• what would have made it easier? (fiber type & length, fiber processing, tools, practice, etc...)
• is your yarn uniform?
• how could you have made it more uniform?
• what did this process teach you?
filament yarns—processing staple fibers

opening—
loosens: fibers from compacted bales
cleans: removes short fibers, soil, plant debris, & other foreign matter
blends: from several bales, achieves more uniform quality

carding—
• partially aligns fibers & forms them into a soft, very weak rope of fibers called a carded sliver
• carding machine—revolving cylinder with short wire teeth that remove trash & naps

http://www.youtube.com/watch?v=HfXXAMu35Fl
filament yarns—processing staple fibers

drawing—
increases parallelism of fibers & combines several carded or combed slivers into a drawn sliver

combing—
• aligns long-staple fibers in a parallel arrangement
• removes short fibers—combed sliver more uniform in length

roving—
reduces the drawn sliver, increases parallel alignment & inserts a small amount of twist

http://www.youtube.com/watch?v=97qEHNS6UEU
filament yarns—processing staple fibers

spinning—
one of oldest manufacturing arts
advances in engineering & technology have increased speed & quantity

http://www.youtube.com/watch?v=7gXTWgMeMgI
spun yarn

#9

yarn name: thread

yarn type: spun

twist direction: Z

amount of twist: high

yarn appearance: silk finish—mercerized

fiber content: 100% cotton

end uses:
yarn name: spun single

eyarn type: spun

twist direction: S

amount of twist: medium

yarn appearance: carded wool

fiber content: 100% Peruvian wool

end uses:
fiber blends

**Blend**—
an intimate mixture of fibers of different generic type, composition, length, diameter, or color spun together—fibers cannot be separated

**Mixture**—
refers to yarns of different types within a fabric; one type possibly used as warp while one used as weft—can be separated

**Combination**—
ply yarns are used—at least one strand of a ply yarn is of different generic fiber type from the other strands
why fiber blends?

1. to produce fabrics with better combination of performance characteristics
2. to improve spinning, weaving & finishing efficiency
3. to obtain better texture, hand or fabric appearance
4. to minimize fabric cost
5. to obtain cross-dyed or unique color effects
yarn name: 4-ply

yarn type: spun

twist direction: S

amount of twist: medium

yarn appearance: carded woolen

fiber content: 86% acrylic
10% wool
4% rayon

end uses:

blended yarn

#11
yarn name: textured

yarn type: combination

twist direction: Z

amount of twist: medium

yarn appearance: texturized

fiber content: 52% acrylic, 48% nylon

end uses:
**Combination Yarn #13**

**Yarn Name:**
Hand quilting thread

**Yarn Type:**
Spun & filament

**Twist Direction:**
Z

**Amount of Twist:**
High

**Yarn Appearance:**
Combed

**Fiber Content:**
- 68% polyester (core)
- 32% cotton

**End Uses:**
yarn name: 4 ply with metallic

yarn type: spun & monofilament

twist direction: Z

amount of twist: medium

yarn appearance: combed

fiber content: 97% mercerized cotton 3% metallic filament

end uses:
environmental concerns and sustainability

- hearing protection needed for workers of rotors used in false-twist texturing process
- opening generates large quantities of dust—breathing issues for workers
- opening, carding & combing produce significant waste—
  - now sold to specialists who produce yarns & other fibers products
  - plant debris & soil sold to gardeners for compost
participation activity: spun yarns

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• how could you have made it more uniform?
• what did this process teach you?