

Chapter 11

Yarn Classification

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Based on Fiber Length

- **Spun yarns:** Made from short-staple fibers.
- **Regular or smooth filament yarns:** Made from long, smooth filament fibers.
- **Textured-bulk-filament yarns:** Made from crimped filament fibers.

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Twist

- Spiral arrangement of fibers within a yarn.
- **Direction:** S or Z (Z is most common)
- **Amount of twist:** Varies with length of fiber, yarn size, & end use; low, napping, regular, high/voile, or crepe twist.

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Types of Yarn Twist

Amount	Example	Characteristics
Low twist	Filament yarns: 2-3 tpi*	Smooth or bulky; twist may be hard to see
Napping twist	Blanket warp: 12 tpi Filling: 6-8 tpi	Bulky, soft, fuzzy, may be weak.
Average twist	Percale warp: 25 tpi Filling: 20 tpi Nylon hosiery: 25-30 tpi	Most common, smooth, regular, durable, comfortable. Produces smooth, regular fabrics.
Voile twist	Hard-twist singles: 35-40 tpi are plied with 16-18 tpi	Strong, fine yarns. Fabrics have harsher hand due to yarn twist.
Crepe twist	Singles: 40-80 or more tpi are plied with 2-5 tpi	Lively yarns that kink and twist in fabrics with good drape and texture.

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Low Twist Yarns

- Smooth and textured bulk filament yarns: very low twist.



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Spun Yarns

- **Napping Twist:** Low twist, usually filling direction to facilitate brushing fibers to surface (napping); for flannelette, flannel, blankets, etc.



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Spun Yarns

- **Average Twist:** Most common type of twist, neither low nor high, used for most end uses.



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Spun Yarns

- **Voile Twist:** high twist, used for voile



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Spun Yarns

- **Crepe Twist:** very high twist, produces lively, yarn



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Yarn Size

- **Yarn number:** Cotton, woolen, worsted systems are indirect systems; length per unit weight (finer yarns, higher numbers).
- **Denier:** Direct system; weight per unit length (g/9,000 m)—finer yarns, lower numbers; denier used for yarns and fibers.
- **Tex system:** Weight per unit length (g/1,000 m); finer yarns, lower numbers (decitex or dtex).

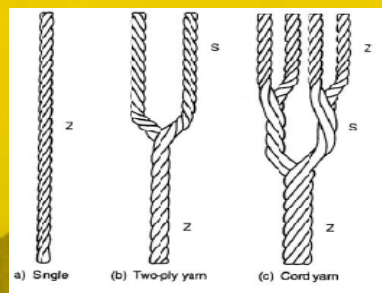
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Yarn Regularity

- **Simple:** All parts are alike.
- **Single:** Spun or filament.
- **Ply:** Two or more singles; increases diameter, strength, and performance (usually spun yarns).
- **Cord:** Ply yarns are twisted together.
- **Uses:** Industrial products.

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Single, Ply, and Cord Yarns



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Cord (Top), Single (Center), and Ply (Bottom) Yarns



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Sewing Thread

- Yarn intended for stitching materials together by machine or hand process.
- Available in several sizes and structures: ply, corded, cable, braided, textured filament, smooth filament, monofilament, and core spun.
- Lubricant or wax finish to facilitate sewing.
- Many fibers used.
- Sized as denier, tex, count, yarn number, or ticket number.

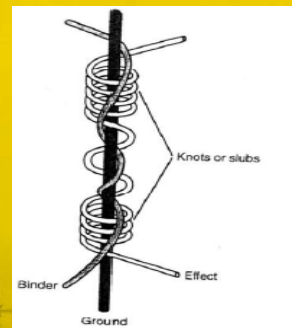
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Fancy, Novelty, or Specialty Yarns

- **Single:** 1 part
- **Complex:** 2 or more parts
 - Ground or foundation or core component
 - Fancy or effect component
 - Binder
- **Uses:** Usually in filling only; adds interest; may add crease resistance to fabric; decreases durability; increases cost; fashion component.

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Parts of a Novelty Yarn



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Examples of Novelty Yarns



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Types

- **Slub or flake:** Single, spun fancy thick-thin yarn.
 - The twist can be varied at regular intervals.
 - The thicker part can be twisted less than the thinner part.
- **Spiral or corkscrew:** Two parts twisted together; differ in color, size, or texture.
- **Ratiné:** Spiral effect with loops at intervals.
- **Knot, spot, nub, or knop:** Effect twisted many times in one spot.

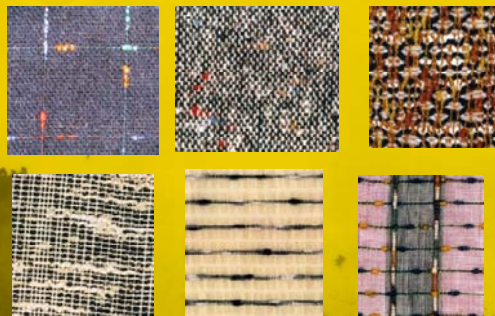
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Types

- **Spike or snarl:** Open loops at intervals.
- **Loop, curl, or bouclé:** Closed loops at intervals.
- **Metallic:** Metal incorporated with yarn.
- **Chenille:** Short pile fibers held in place by two binder yarns twisted together.

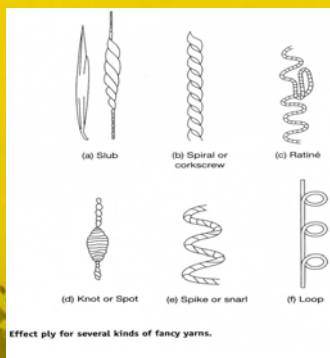
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Fabrics with Novelty Yarns



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Effect Ply for Several Kinds of Fancy Yarns



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Composite Yarns

- Regular in appearance with unlike components.
- Types:
 - **Covered:** Yarn wraps around spandex/rubber.
 - **Core-spun:** Fiber completely covers core of another fiber.
 - **Wrap spun:** Staple fiber core wrapped with filament.
 - **Fasciated:** Filament wrapped with staple fibers or filament yarn wrapped with filament fibers.
 - Polymer with staple fibers; inexpensive.

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Yarn Performance

- Characteristics & performance measured to ensure consistent fabric and product quality and performance.
 - Size, twist, bulk, evenness, & appearance
 - Strength, resistance to abrasion, & other performance aspects

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Yarn Quality

- Thin spots assessed to minimize problems with processing, fabrication, and finishing.
- **Neps:** Small knot of entangled fibers; assessed to minimize problems with dyeing and finishing.
- **Hairiness:** Excessive fiber ends on yarn surface make the yarn more sensitive to abrasion and pilling; assessed to minimize problems with fabrication and performance.

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