

# ***WARP KNIT FABRICS TECHNOLOGIES***



Crepe Americana Stitch Rope Model with photomicrograph of the fabric



### 1.3 Comparing sales of warp knits with woven and weft knits

The amount of total fabric produced worldwide per year is highest for woven fabrics, second highest for weft knit fabrics, and least for warp knit fabrics. The major reason is that spun yarn cannot be incorporated in warp knit at a high speed. When the DuPont Co. developed *Qiana*®, a silk-like yarn, for example, they wanted to knit a fabric using a knit structure similar to those used to knit expensive silk yarns. To establish this, the author was sent to New York, Philadelphia, Wilmington, Milan and Rome to buy knitted fabrics made of silk yarn. Twenty-two silk fabrics (warp and weft) were bought randomly (see Figure 1.7).

Twenty-two samples were purchased from New York, Philadelphia, Wilmington, Milan and Rome.

Breakdown of the Samples	Weight classification – (oz/yd <sup>2</sup> )			
	Light (1.5-1.6)	Medium (2.2-2.9)	Heavy (3.4-4.2)	Very heavy (5-10)
75% Interlock	9%	36%	32%	
10% Milanese	9%			
5% Jersey				4%
10% Double Knit				10%

Total Market believed to be as follows:

- 70% Interlock (weft knit)
- 17% Milanese (weft knit)
- 5% Tricot Jersey (warp knit)
- 5% Weft Knit Jersey (weft knit)
- 3% Double Knit (weft knit)

**Figure 1.7**  
Study of silk knit market to obtain tricot goals

The Milanese machine was used to knit silk yarn with uniformity since the Milanese knit structure diffuses the non-uniformity of a yarn. However, milanese machines are very slow and, as a result, the cost of such fabrics is very high. Milanese silk fabrics are therefore best used for expensive dress wear. Tricot silk fabrics are used as a glove fabric and, if printed, are used for dresses. However, piece-dyed silk tricot fabrics have poor uniformity and are full of warp streaks. The weft knit interlock fabric proved to be the most attractive as it was prepared with a high twist silk yarn. To expand and diversify the tricot market, fabrics needed to be developed that are like silk weft interlock, and these soft silk-like fabrics should have surface interest. Key points to remember:

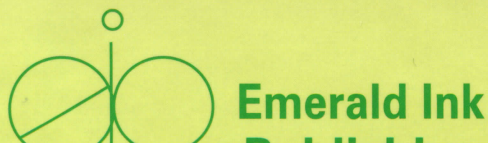


Professor Bharat J. Gajjar, World Authority on Warp Knitting Technology, clearly explains the fabric portion of Warp Knit Technology. He shows how to develop and manufacture quality Warp Knit fabrics, both quality commercial structures as well as advanced fabric structures. This book has many new ideas for designers, research laboratories and manufacturers.

1. Introduction to warp knit fabric technology
2. Stitch notation for warp knits
3. Warping, Knit Machines and Dyeing
4. Basic warp knit stitch constructions
5. Jersey and Modified Jersey Stitch tricots
6. Delaware and Modified Delaware Tricots
7. Queenscord and Modified Queenscord Tricots
8. Single Bar Fabric Concepts
9. Surface Interest Fabrics
10. Tissue Fabric
11. Women's Innerwear Fabrics
12. Pile & Corduroy Fabrics
13. Spun warp knits
14. Tricot fabrics containing Spandex
15. Key Raschel fabrics containing Spandex
16. Other Spandex containing Fabrics
17. Americana and Modified Americana Tricots
18. High Stretch and One Way Stretch Fabrics
19. Other techniques for developing specialist warp knit fabric
20. Carpet manufacture
21. Quality control

Also included: common commercial stitches, limited use stitches, structure and properties of different stitches, advantages of Delaware Stitch, Laid-in Delaware Stitch Fabrics, Queenscord knit structure, single bar warp knit fabrics, atlas stitches, crepe tricot fabrics, surface interest fabrics, cross bar technique, split warp technique, Schreiner calendaring finishing technique, warm weather comfort fabrics, automotive upholstery, pile fabrics, spun fabrics, spandex containing warp knits, raschel fabrics, Brandywine stitches, spaced warp knit technology, Kuper stitch, Americana and Modified Americana Stitches, collapsible fabrics, one-way stretch fabrics, Milanese fabrics, Knit-de-knit elastic tapes, and much more.

The author, Bharat J. Gajjar, was a Professor at Philadelphia University, Philadelphia, PA, USA, and worked as a warp knit consultant (1992 - 2003). Awarded 20 patents in his name, mostly related to warp knitting, he retired from E. I. DuPont de Nemours & Co. after 35 years (1956 - 1992) as a senior research Engineer (25 years in warp knit research, 5 years in weft knit research, and 5 years in International marketing). Professor Gajjar invented the famous Delaware Stitch, the warp knit fabric which made Qiana<sup>®</sup> world famous.



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