
Abstract

Polyester core cotton sheath core-spun yarns were produced on a conventional ring spinning frame. Two kinds of filaments were used as a core yarns; one is the medium tenacity and the other is the prestabilized high tenacity filament. The completeness of covering the core filament yarn with cotton fibers was assessed by covering ratio method, Also the properties of core-spun sewing threads made of either medium or high tenacity filament core were compared with each other and also with the normal polyester/cotton spun sewing thread.

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(core spun yarn)

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(migration)

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Millier

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. IWS

0.5g den^{-1}

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, Lee

(covering ratio)

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TM()

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P/C

P/C

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50den

70den

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< 1>

< 2>

< 1>

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< 1> Properties of cotton in roving

Property	Test method	
Grade	Egyptian, FARES	—
Fiber length		
Classer's, mm	38($1\frac{1}{2}$ in)	
Suter-Webb meanlength, mm	26.7	ASTM D 1440—72
Linear density, mtex (μ g/in.)	142(3.61)	ASTM D 1769—73
Pressley strength, 1,000psi	97.3	ASTM D 1445—75

< 2> Properties of polyester filament

	Medium Tenacity	High tenacity	Test method
denier/plies	50 den./18	70 den./36	—
Tenacity, g/den	4.7	7.5	KS K 0412
Extension at break, %	31.7	15.3	KS K 0412
Shrinkage, %			ASTM D 204
in boiling water	6.4	1.7	
in air at 150°C	6.5	2.5	
in air at 180°C	6.8	3.4	
in air at 200°C	7.7	4.3	

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Sussen UT620 Spintester

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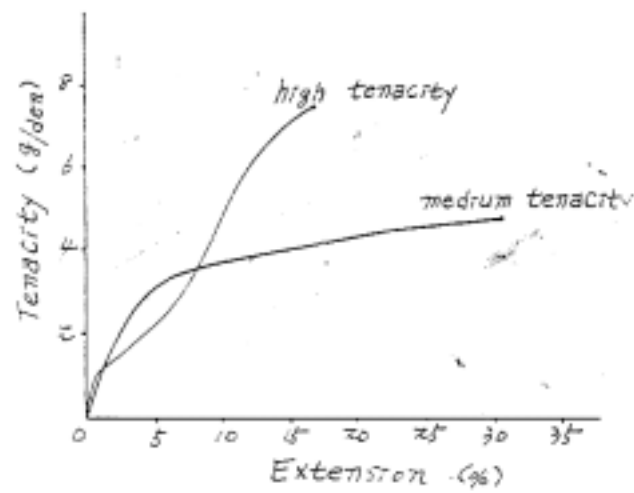
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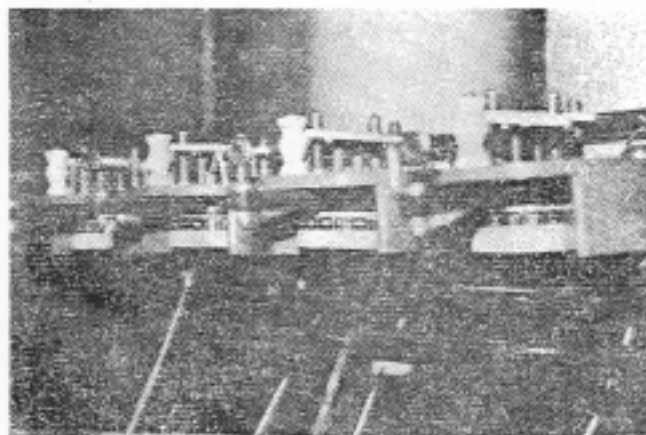
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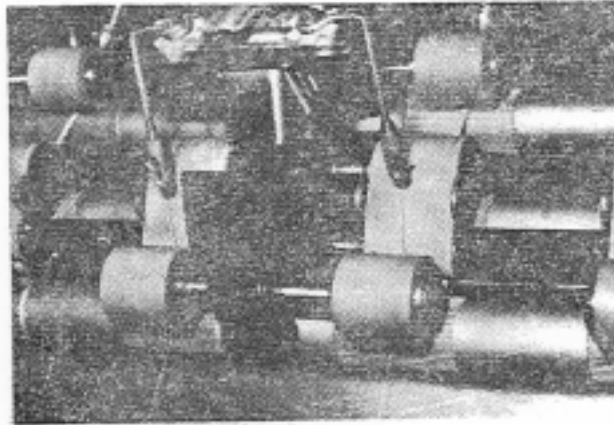
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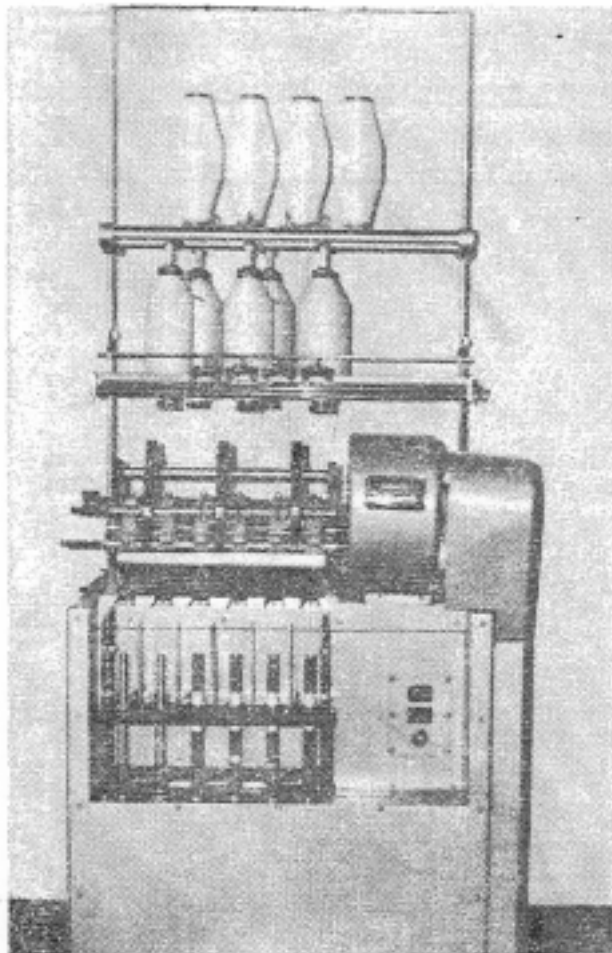
< 1> Tenacity-Extension curves of polyester filament.



< 2> Tension device for core spinning



< 3> Filament guide for core spinning



< 4> Core spinning arrangement

Spintester

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their levels

Factors	Levels
Spindle speed (rpm)	8,000, 9,000, 10,000, 11,000, 12,000
Front top roll weight (kg)	12, 13, 14, 15
Filament tension(g)	
medium tenacity (50 den.)	10, 20, 30, 40, 50
high tenacity (70 den.)	10, 20,30, 40, 50, 60, 70, 80,
Twist multiplier (TM)	3.0, 3.5

< 4>

(日本給紙)

< 4> Optimum spinning condition

Factors	Optimum condition
Spindle speed (rpm)	11,000
Front top roll weight (kg)	14
Filament tension (g)	
medium tenacity (50den)	30
high tenacity (70den)	50
Twist multiplier (TM)	3.5

1.

P/C 60^s/3 (65/35)

50den/18 60^s 3

70den/36 40^s 2 가 P/C

20^s가

P/C

winding → doubling & twisting → heat setting → soft winding → cheese dyeing
→ softener treatment → rewinding → sewing thread winding (waxing)

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73% Z

< 5> Doubling number and condition of twisting & heat setting

Process	Filament	Medium tenacity (50den)	High tenacity (70den)
	Single yarn	60 ^s (TM3.5 S)	40 ^s (TM3.5 S)
Doubling		3	2
Twisting		TM 4.4 Z	TM 3.6 Z
Heat Setting		115°C, 20min	100°C, 20min

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60^s/3 40^s/2

60^s/3 P/C

< 6>

< 6> Comparision of core-spun sewing threads with P/C spun sewing thread

	Core-spun sewing thread		P/C spun sewing thread
	Medium tenacity	High tenacity	
Yarn count, Nec	60 ^s /3	40 ^s /2	60 ^s /3
Fiber contents, P/C%	59.1/40.9	53.8/46.2	66.0/34.0
Tenacity, g/den	2.8	4.1	2.9
Breaking load, g	788	1,110	795
CV of breaking load, %	1.9	3.1	5.9
Extension at break, %	25.6	17.2	16.5
Loop strength, g	1429	1714	1469
Seam strength, kg	20.1	21.3	21.8
Shrinkage, %			
in boiling water	0.1	0.1	0.9
in air at 150°C	0.4	0.6	1.3
in air at 180°C	1.2	1.8	4.1
in air at 200°C	1.9	2.0	4.5
Evenness, U%	7.3	7.2	7.9
Imperfection, per 1000m			
thin places	0	0	0
thick places	21	2	3
neps	31	3	15
2% Modulus, g/den	23	31	19

60^s/3

P/C

59% P/C

66%

가

. 40^s/2

CV P/C

가

2%(173) P/C

4.5% 2 . 40^s/2

60^s/3

< 5> 2 P/C

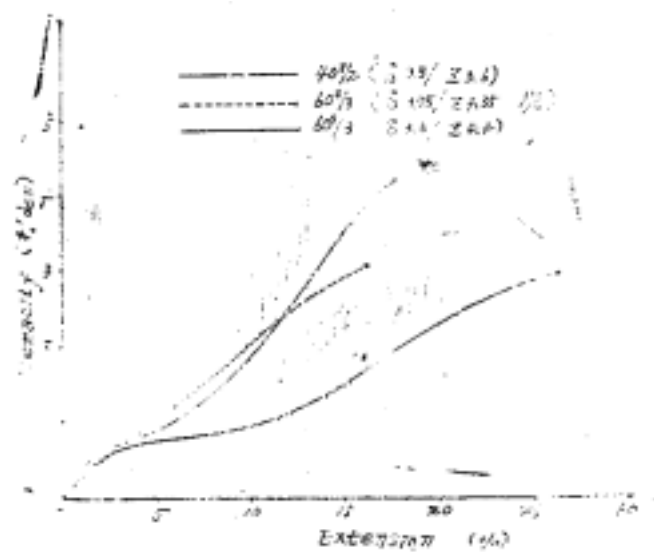
3% 3 가

60^s/3 (modulus)가 40^s/2

P/C 가

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가 .



< 5> Tenacity-Extension curves for various sewing threads

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1. 2% P/C
4.5% 2 .
2. 3% modulus가 P/C
가 .
가 .
3. 가
가

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