

30. Formalization and the Strength of Vinyon Filament Yarn

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It has been said, that formalization of heat treated polyvinyl alcohol fiber has practically no effect upon the strength of the fiber. The present work has been carried out to examine this effect more closely.

The heat-treated polyvinyl alcohol yarns that have been stretched to various degrees of elongation are subjected to formalization, and the tensile strengths of yarns before and after formalization are compared. It is observed that through formalization the tensile strength decreases. As shown in Table 1, the percentage drop of tensile strength increases with increasing stretching until 60% elongation and then it decreases again. The tension which is applied to yarns in the course of formalization has practically no effect upon the tensile strength.

Table 1. Strength of Vinyon Filament Yarn before and after Formalization

Stretching(%)	0			20			40		
	Heat treatment only	Formalization under tension	Formalization under no tension	Heat treatment only	Formalization under tension	Formalization under no tension	Heat treatment only	Formalization under tension	Formalization under no tension
Denier	165	177	180	134	145	147	117	130	132
Strength(g/d)	2.36	2.29	2.26	3.13	2.97	2.84	4.18	3.46	3.56
Elongation(%)	43.1	30.8	34.2	27.0	26.7	27.0	21.9	23.5	24.7
Degree of dropping of strength(%)		2.96	4.24		3.71	9.26		17.2	14.8
Stretching(%)	60			80			100		
	Heat treatment only	Formalization under tension	Formalization under no tension	Heat treatment only	Formalization under tension	Formalization under no tension	Heat treatment only	Formalization under tension	Formalization under no tension
Denier	105	111	115	95	105	106	88	93	95
Strength(g/d)	4.50	3.63	3.64	4.63	3.81	3.73	4.73	4.08	3.96
Elongation(%)	20.3	19.8	21.3	16.9	18.4	20.5	15.6	16.7	16.2
Degree of dropping of strength(%)		19.3	20.4		17.7	19.5		13.7	16.3

Effect of formalization upon the knot strength is larger than that upon ordinary the tensile strength.