

of a loop and calculation of their actual runner length are established. It is defined that the wave arrangement of threads in a loopy weave corresponds to about IX order of a phase of a structure at which threads a weft settle down practically at one level.

Length of a loopy thread in a loop of  $L_n$  (mm) depends on the gauss size of H formed at a soft battening, diameters of a thread a weft of  $d_y$  and loopy warp of  $d_{o,n}$ :

$$L_n = H + \pi (d_y + d_{o,n}) + d_y.$$

Length of the element of fabric created by one loop of  $l_{mk}$  (mm) is defined according to geometrical model of loopy effect.

$$l_{mk} = R_y \cdot d_y + d_{o,n} + 2 d_{o,z},$$

where  $R_y$  – repeat on a weft of a loopy weave.

As at a rigid battening of a thread a weft move on strongly tense threads of a ground warp, there is an insignificant shift and threads of a loopy warp that influences height of the formed loop.

Loop height of  $B$  (mm) is determined by a formula:

$$B = (L_n - \pi (d_y + d_{o,n})) / 2.$$

Runner length of the loopy warp (%) forming loopy effect

$$a_{o,n} = \frac{(H + \pi (d_y + d_{o,n}) + d_y - R_y \cdot d_y - d_{o,n} - 2d_{o,z}) \cdot 100}{H + \pi (d_y + d_{o,n}) + d_y}.$$

On the basis of the received theoretical dependences optimum structural characteristics of the Assol terry towels developed from a cotton yarn 25 tex  $\times$  2 in a warp and 29 tex in a weft are defined. The size of towels is 50  $\times$  90 cm. Density of threads on a warp – 257 threads / 10 cm, on a weft – 190 threads / 10 cm, fabric weight – 365 g, the size of an runner length of a loopy warp – 300%, loop height – 4 mm.

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## **PILOT STUDIES OF PARAMETERS OF THE STRUCTURE OF SEMI-LINEN COSTUME FABRICS**

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For the last years keen interest of consumers in natural fabrics in clothes, including linen has been noted. The Republic of Belarus holds worthy position in terms of output and the amount of export of linen materials in the world market.

Linen is a peculiar brand according to which this fiber can justly be associated with our country. The linen household range needs to be updated due to formation of new structures of fabrics.

Proceeding from it, relevance of creation of competitive textile materials on the basis of flax is obvious. It will lead finally to increase in import substitution and

growth of interest among the sewing enterprises in the fabrics made in the Republic of Belarus.

The group of costume fabrics is one of the most perspective and high-growth linen fabrics from the range. Therefore, the need for continuous improvement of structure, appearance and the invoice of these materials is obvious. Natural effects of fiber, such as non-spin and roughness, create feeling of originality, hand-made effect and special expressiveness of materials.

Consumer properties of flax are rather high.

However indicators of properties of household fabrics of which products are made have to meet a number of the requirements providing, first of all, comfort, reliability and stability of a form.

In costume products the considerable area contacts directly with a body of the person therefore it is necessary to keep a certain level of hygienic properties which is defined by a type of a product, its seasonality, climatic conditions and age of the person.

The purpose is to update the range of the household fabrics developed at Republican unitary production enterprise "The Orsha linen factory" on non-shuttle weaving loom with the Jacquard machine Z-344. The technology of semi-linen costume fabrics of new structures which allows to create effective surfaces in material is developed: relief, granularity, longitudinal strip.

Along with development of fabrics of big area density the sufficient attention to development of the range of lighter fabrics is paid, it is offered to use for decrease in a material capacity of the projected semi-linen costume fabrics in a warp a pure-linen colored yarn of a wet way of spinning of linear density 56 tex, in a weft – a cotton yarn of linear density 34 tex.

Thanks to a special input of warp threads in the beat-up, the effect of a longitudinal strip in fabric was strengthened: 7 tooth of the beat-up with a 2-thread input in a tooth, 7 tooth of the beat-up with a 4-thread input in a tooth.

At installation on beat-up N 60 density on a warp in the front page makes 120 nit./10 cm, in the second strip – 240 nit./10 see. Two drawings of single-layer big-pattern interlacings are developed at one looming-up.

Researches of properties of the developed samples of costume fabrics were conducted according to standard techniques. The measuring equipment installed in technological laboratories of the factory and working in the modes specified in passports was used.

Values of indicators of tests of physical and mechanical properties of ready semi-linen fabric of the rarefied structure are presented in Table 1.

Table 1 – Physical and mechanical tests of ready semi-linen costume fabric of the rarefied structure

Name of an indicator	Values	
	standard of Belarus 1139-99	The projected sample
Width, cm	-	143,9
Number of threads on 10 cm:		
- warp	-	213
- weft		227
Breaking loading, N:	not less	
- warp	196	558
- weft	196	230
rea density, g/m <sup>2</sup>	-	187
Resistance to attrition, one thousand cycle.	not less 3,0	4,6
Air permeability, dm <sup>3</sup> /m <sup>2</sup> s	not less 60	583
Change of the sizes after wet processing, %:	no more	
- warp	- 6,0	+0,2
- weft	- 4,0	-2,6
Presence of free chlorine at the bleached fabrics	no	no
Amount of free formaldehyde, mkg/g	no more 1000	23,7
Stability of coloring:		
1) to washing at 40 ° C	1) 4/4/4	1) 4/4/4
2) to sweat	2) 4/4/4	2) 4/4/4
3) to dry friction	3) 4	3) 4
4) to wet friction	4) 3	4) 3
5) to an ironing	5) 4/5	5) 4/5
6) to organic solvents	6) 4	6) 4
Reaction of water extract	neutral	neutral

The analysis of data in Table 1 showed that semi-linen costume fabric of the rarefied structure on all indicators of physical and mechanical properties conforms to requirements of the Standard of Belarus 1139-99, and on some, in particular breaking loading, air permeability, resistance to attrition, exceeds several times.

The density made 187 g/m<sup>2</sup>, a contraction on a warp of +0,2%, shrinkage on a weft of -2,6%. In these fabrics density and shrinkage of fabric are lowered.

Positive results of approbation of these materials at production of men's and women's clothing in the conditions of industrial production are received. Samples of semi-linen fabrics of the rarefied structure in a longitudinal strip and parameters of their structure and development are introduced in educational process of EI "VSTU".