

The most common is the introduction of PCM by using printing technologies. Direct introduction of PCM in the fiber is suitable only for synthetic materials and require special temperature conditions. To perform the operation of impregnation a much larger amount of active substance is required than in previous methods which affects the cost of the finished product. To determine the optimal method of administration is also necessary to study thermoregulatory abilities of the modified textile material.

References

1. Application of Phase Change Materials in textiles: a review // Elias Khalil.
2. International journal of research and Review, Vol.2, May 2015. P.281-294
3. Solodovnik, V. D. Microencapsulation / V. D. Solodovnik. – Moscow: Chemical, 1986. – 216 p.
4. Onofrei E., Rocha, A. Textile integrating PCM – a review // Buletinul institutului politehnic, 2010, № 2, P. 99-107

UDC 677.025

INVESTIGATION FOR INFLUENCE OF KNITTING FABRICS' STRUCTURE TO PROPERTIES

*Musayeva M., assistant, Khankhadjaeva N., docent, DSc
Tashkent institute of textile and light industry, Tashkent, Uzbekistan*

Key words: *knitting, rib stitch, cardigan stitch, double jersey circular knitting machine, Terrot, structure, knitted fabrics' properties*

Abstract. Rib has a vertical cord appearance because the face loop wales tend to move over and in front of the reverse loop wales. As the face loops show a reverse loop intermeshing on the other side, 1x1 rib has the appearance of the technical face of plain fabric on both sides until stretched to reveal the reverse loop wales in between. 1x1 rib is production of by two sets of needles being alternately set or gated between each other. Relaxed 1x1 rib is theoretically twice the thickness and half the width of an equivalent plain fabric, but it has twice as much width-wise recoverable stretch. In practice, 1x1 rib normally relaxes by approximately 30 per cent compared with its knitting width. In modern conditions the quality of knitted fabrics plays a special role because of their influence on efficiency and human health. In the research according to the results, knitted fabric, containing 4.5% nylon textured yarns, has good elasticity and meets technical and economic requirements. A small content of polyamide textured yarns in a knitted cloth of cotton yarn is beneficial to the elasticity and formability of the products does not worsen their hygienic properties, facilitates care of them. In this research work ten variants of interlooping with supplementary patterning items of knitwear were developed to determine technological parameters and physical-mechanical properties in knitwear, which

differ from each other by laying the yarn on the needle in the rapport of the interlooping to form patterns.

The simplest rib fabric is 1x1 rib that is knitted on flat machines. The first rib frame was invented by *Jedediah Strutt* of Derby in 1755, who used a second set of needles to pick up and knit the sinker loops of the first set. It is now normally knitted with two sets of latch needles. 1x1 rib is balanced by alternate wales of face loops on each side; it therefore lies flat without curl when cut. It is a more expensive fabric to produce than plain and is a heavier structure; the rib machine also requires finer yarn than a similar gauge plain machine. Like all weft-knitted fabrics, it can be unraveled from the end knitted last by drawing the free loop heads through to the back of each stitch. It can be distinguished from plain by the fact that the loops of certain wales are withdrawn in one direction and the others in the opposite direction, whereas the loops of plain are always withdrawn in the same direction, from the technical face to the technical back [1].

Cardigan stitches are two-course repeat tuck rib knitwear structures, widely used in the body sections of heavy-weight stitch-shaped sweaters. The tuck stitches cause the rib wales to gape apart so that the body width spreads outwards to a greater extent than the rib border. The tuck loops increase the fabric thickness and make it heavier in weight and bulkier in handle, although the rate of production in rows of loops will be less than for normal 1x1 or 2x2 rib. The greater the proportion of tuck to cleared loops, the heavier and wider the finished relaxed structure.

In the production of a knitted stitch, the leading raising and cardigan cams for that bed and direction of traverse must be in action, whilst for a tuck stitch, the raising cams remain in action but the cardigan cam is taken out of action. It is important to arrange the camming for the needle beds so that, at the start of the traverse when tucking, the first needle is tucking and the last needle in action is in the opposite bed and is thus knitting. If the last needle is tucking, the selvedge tuck loop will withdraw from the needle hook as the reverse traverse commences.

Among the technological parameters, the thickness of the knitwear plays an important role in the consumption of raw materials and the improvement of quality indicators. The increase of the layer allows to increase the thickness of the knitwear. The presence of additional elements of patterning knitted fabrics in knitting lead to improved strength characteristics and thickness.

Also the studies considered multi-layered interlooping knitwear for the production of garments, having high heat-shielding properties, and to enhance patterning effects on traditional knitwear due to the volumetric relief images.

These types of interloopings are often used in patterning the knitted fabrics, which is one of the important and interesting directions for today. A number of works devoted to the development of structures and manufacturing techniques of knitted fabrics with different elements to create the pattern and extend the scope of their application in technology and everyday life.

Using the classification of knitted interlacings and on the basis of the device key-systems interlacing machines, the interlooping, the development of which is possible

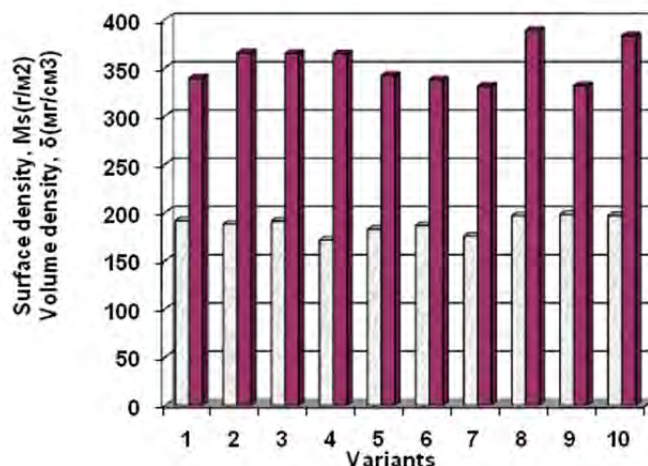
on machines of this type. For this purpose, based on the structure of knitwear, all necessary external signs characterizing different types of interloopings and, given the looping process on the machine, identified the opportunity for their generation.

Doublerib knitwear, with a number of valuable properties of the eraser and its derivatives, is used for manufacturing high-quality range of products. Initially, interlock machines were mainly used in the production of linen products, high performance which are duly appreciated by the consumer. Such a unilateral use of delisting paintings led to the fact that the question about the possibility of obtaining patterns on machines, interlock has not been, until recently, current and not subjected to a comprehensive study. The issue in the production of cloth for the upwear products plays an extremely important role and is of considerable interest. Unlike other double cloths due to its structure preserves the appearance of the pattern when stretched in the transverse and longitudinal directions because the wrong hinges are not visible on the invoice. This is one of its strengths, because in the modern jerseys ornamentation occupies an important place.

In this research work developed and produced in manufacturing environments 10 variants interloopings in interlacing double Jersey circular knitting machine of "Terrot", class machine - 20", diameter of needle cylinder is 30", the number of systems – 72, number of needles – 3744. On this machine there are two positions of the needles in the dial that differ in the arrangement of heels and one needle position in the cylinder. To obtain patterning of looping of knitted fabric on the basis of interlacing interlooping is installed on your machine 36 patterning of pushers in each knitting system, which can occupy 3 positions: left / off position at which the needle does not rise to the knitting process, the average position for full lift on the process of concluding that this creates a loop of conventional size, the right position intended for incomplete recovery on the process of concluding that this creates a press fit in the outline and press the knitwear.

To determine technological parameters and physical-mechanical properties in knitwear, were developed ten variants of this type of interlooping with supplementary patterning items of knitwear, which differ from each other by laying the yarn on the needle in the rapport of the interlooping to form patterns. Analysis of the results of studies conducted by many researchers showed that the decrease of the surface density of the knitted fabric within a certain range reduces the consumption of raw materials and less dangerous for its strength properties, because the absolute value of the strength of knitted fabrics is high, and in operation are subjected to loads not exceeding 20% of the explosive.

According to the results of the analysis determined that technological parameters such as loop pitch, the height of the looped series, the density horizontally and vertically, the thread length in the loop in all variants change with small changes (within 10-12%) Jersey. The surface density (Fig.1) varies to 171.3-197,8 g/m² (15%). The volume density of the generated samples varies 330,8-to 388.6 mg/cm³ (15%).



surface density of
 volume density

Figure 1 – Histogram changes the surface and volume densities according to the variants of interloopings based on delisting knitwear

It should be noted that the lowest volume density is in cases 7, 9, 6, 1. In these embodiments, the maximum thickness and surface density. Since knitwear is a three-dimensional structure characterized by a length, a width and a thickness, and lightweight of this structure must define not a two-dimensional criteria (surface density), and three-dimensional (volumetric density). The volume density of knitted fabric shows the content of textile fibers in a unit volume. In the category of paintings with a reduced consumption of materials include fabrics with a loose structure having a substantial thickness compared to the baseline. Paintings by reduced consumption of materials called canvas, volume density lower than the baseline, optimal module identical loop of yarn.

So options 7, 9, 6, 1 should be recommended as models of interloopings with the lowest consumption of raw materials according to the analysis of the volume density of the developed options. It provides an opportunity to develop lightweight Jersey low material consumption without loss of properties. To achieve such a result allows the structure of the interlooping, as it introduced additional elements of patterned knitwear. The location of additional drafts and broaches affect the thickness of the knitwear.

References

1. D. Spenser. Comprehensive handbook of knitting technology. Textbook – USA Woodhead Publishing LTD 2001.-386 p.