consumption, the height of capillary rise and the temperature of the polymer composition. To solve this optimization problem generalized desirability function is introduced, which takes into account the values of all of the resulting indicators [1]:

$$D = (d_1 \times d_2 \times ... \times d_k)^{1/k}, \quad (1)$$

where d_i — partial desirability functions ($i \in [1..k]$), k — number of partial desirability functions.

Partial desirability functions are determined by normalizing the resulting functions, so that the value ranged from 0 to 1, since the resulting indicators units may have different dimensions and ranges. In this case the value of 0 corresponds to the least, and 1 to the most desirable values of the functions [2, 3].

Derived partial desirability functions of temperature, height, and energy consumption were used to obtain generalized desirability functions in form of (1) for infrared and microwave intensification methods of impregnation process.

It is found that generalized desirability function for IR and microwave methods of intensification have the same nature and allow to determine the optimal exposure time for the selected radiation power and vice versa. After the study of desirability functions formulas for determining the optimal combination of power and time of exposure to various concentrations were obtained.

The studies have found that the intensification of the process of formation of textile composite materials using microwave radiation allows reaching a given height of polymer composition raising (efficiency of impregnation) with significantly less power and in significantly less time.

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OPTIMIZATION OF THE PROCESS OF WEAVING TECHNICAL FABRIC

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Currently, among the weavers of the Republic of Belarus, the highest position is occupied by the production of glass fiber and products on its basis, which today enjoy wide popularity. Range of application of the fiberglass is various: enterprise aviation

and space industry, military-industrial complex, automotive, shipbuilding, construction industry and other fields.

The aim of this work is the selection of optimal parameters for production of insulating glass to reduce its defects and improve quality. The fabric is produced of a width 127 cm pneumatic Jet-710 (Japan). In the warp we use yarns with a liner density of 71 Tex and weft – 136 Tex. The thickness of the fabric – 0,232 mm, the surface density fabric – 230 g/m^2, the density of the fabric in the warp – 170 threads/10 cm and in the weft – 83 threads/10 cm. Low yield of the variety of fabrics 1 class due to the high level of defects. It was 2,27 defect per 100 liner meters of fabric. The vices of the warp were 0,46, yarn weft – 1,4 and vices of a general nature – 0,41. Studies have shown, that the main cause of defects weaving ishigh humidity of weft yarn. Humidity of the weft yarn was 0,32 % versus 0,1 % in the norm.

To increase the intensity of the drying process of filling glass yarns, to reduce their moisture content, we proposed to reduce the weight of the yarn on the bobbin from 8 kg to 6 kg. Studies conducted in the production laboratory of factory showed, that the level of humidity weft thread to weaving decreased from 0,32 % (bobbin 8 kg) to 0,14 % (bobbin 6 kg). Table 1 shows the results of determining the moisture content of the weft yarn.

Table 1 – Results of determining the moisture content of the weft yarn

The number of tests	The weight of the weft yarn on the bobbin, g		
	8000	7000	6000
1	0,28	0,26	0,11
2	0,23	0,18	0,2
3	0,26	0,23	0,15
4	0,34	0,17	0,07
5	0,33	0,31	0,09
6	0,25	0,28	0,13
7	0,3	0,19	0,17
8	0,33	0,17	0,19
9	0,32	0,2	0,21
10	0,23	0,29	0,18
11	0,55	0,5	0,06
12	0,44	0,33	0,08
Average	0,32	0,24	0,14

Besides humidity of the weft thread, we also studied the effect of the speed of the main shaft of the weaving loom on defect fabric. Studies have been proposed for high-speed modes of 600 rev/min, 650 rev/min and 700 rev/min. For each option to turn out for 2 rolls of fabric length of 2000 m. These rolls were compiled further defective sheets. Analysis of these sheets showed, that the lowest level of the fabrics has defects, worked out at a rotational speed of the main shaft of the loom 650 rev/min and using weft yarn moisture of 0,14 %.

The proposed activities will allow to reduce the defect rate of fiberglass from 2,27 to 1,13 blemish on 100 meters of fabric.

The economic effect of the introduction of the proposed measures will be 800 million Rubles for the annual production of the weaving fabrics.