

[Application of phosphorus-containing composition in the development of fire-resistant nonwovens from bast fibers].” Nauka. Obrazovanie. Molodej, ATU Conference, 2019: 129–131 - (In Russian)

10. Takei E., Tausarova B.R., Burkitbai A. “İssledovanie teplovydeleniya obrabotannyh tsellyuloznyh tekstilnyh materialov zol-gel kompozitsiei [Investigation of heat release of processed cellulose textile materials by sol-gel composition].” Tehnologiya tekstilnoi promyshlennosti, No. 6 (384), 2019: 236 – 240 - (In Russian)

11. Takey Ye., Taussarova B.R. “Sol-gel composition on the basis of sodium silicate and ammonium polyphosphate for obtaining fire retardant cellulose textile materials.” Himicheskii jurnal Kazahstana, №4, 2018: 43-49 - (In Russian).

12. Khan, L., Kim, J.S., Huh, S.H., Koo B.H. “N-Containing Hybrid Composites Coatings for En-

hanced Fire-Retardant Properties of Cotton Fabric Using One - Pot Sol-Gel Process.” Polymers, №15 (2), 2023: 258 – 269 - (In Russian).

13. Madyaratri, E.W., Ridho, M.R., Aristri, M.A., Lubis, M.A.R., Iswanto, A.H., Nawawi, D.S., Antov, P., Kristak, L., Majlingová, A., Fatriasari W. “Recent Advances in the Development of Fire-Resistant Biocomposites.” Polymers, №14 (3), 2022: 362 – 376 - (In Russian)

14. Kovačević, Z.; Flinčec G., S.; Bischof, S. “Progress in Biodegradable Flame Retardant Nano-Biocomposites”. Polymers, 13 (5), 2021: 741 – 754- (In Russian)

15. Nabiev N.D., Rafikov A.S. “Razrabotka tehnologii ognestoikoiki otdelki smesovoi tkani [Development of technology of fire-resistant finishing of mixed fabric].” Vestnik nauki i obrazovaniya, № 13(49), 2018: 554 – 567- (In Russian)

MRNTI 64.33.81

<https://doi.org/10.48184/2304-568X-2024-1-181-187>

## STUDY OF QUALITATIVE INDICATORS OF COMBINED TEXTURED MATERIALS FOR SPECIAL CLOTHING OF EXPRESS DELIVERY COURIER

K.ZH. KUCHARBAEVA , SH.N. ORYNBAEVA , L.T. SARTTAROVA 

(Almaty Technological University, Kazakhstan, 050012, Almaty, 100 Tolebi st.)

Corresponding authors e-mails: kaldigul.kuzarbaewa@mail.ru, orynbaeva0101@gmail.com\*

*The article considered the effective issues of preparing a set of quality of special clothes for express delivery courier service, strengthening corporate culture and promoting the brand. The special uniform of the employees ensures the reputation and reliability of the service companies, which increases the professional image of the service. A special uniform, made of textured materials mixed with corporate colors, allows customers to immediately identify the field of service, increases its recognition in this field and the loyalty of its work. In the preparation of express delivery courier clothing sets, mixed textured materials were selected and the wear resistance, non-cracking and friction resistance properties of the various materials package met the specified index requirements, the state technical regulatory committee analyzed the standard indicators in the test samples. The multi-functional express delivery courier clothing set prepared according to the requirements of modern fashion has the importance of creating a new composition of the suit in new constructive and artistic solutions for each season, making the transformation of the courier clothing according to the function impossible. On the basis of the above-mentioned factors, courier clothing is transformed according to the service. A set of clothes prepared with reflective elements ensures the safety of the courier (front waist, back waist, sleeves, trouser seams). Courier's special work clothes made from a package of mixed textured materials, express delivery set is easy to service and meets operational requirements, its shape allows comfortable operation in any weather without hindering movement and extends the service life.*

**Keywords:** express delivery, special clothing, courier clothing, mixed textured material, physical and mechanical indicators, multifunctional, reflective element.

## ЖЕДЕЛ ЖЕТКІЗУ КУРЬЕРІНІҢ АРНАЙЫ КИІМІ ДАЙЫНДАЛҒАН АРАЛАС ФАКТУРАЛЫ МАТЕРИАЛДАРДЫҢ САПАЛЫҚ КӨРСЕТКІШНІ ЗЕРТТЕУ

*К.Ж. КУЧАРБАЕВА, Ш.Н. ОРЫНБАЕВА, Л.Т. САРТТАРОВА*

(Алматы Технологиялық университеті, Қазақстан, 050012, Алматы қ., Төле би көш., 100)

Автор-корреспонденттің электрондық поштасы: kaldigul.kuzarbaewa@mail.ru,  
orynbaeva0101@gmail.com\*

Мақалада жедел жеткізу курьер қызметінің сапалы арнайы киім жиынтығын дайындау, корпоративтік мәдениетті нығайтудың және брендті ілгерілетудің тиімді сұрақтары қарастырылды. Қызметкерлердің арнайы формасы қызмет көрсететін компаниялардың беделді, сенімді болуын қамтамасыз етеді, бұл қызмет көрсетудегі кәсіби имиджін арттырады. Фирмалық түстерден аралас фактуралы материалдардан дайындалған арнайы киім формасы, тұтынушыларға қызмет саласын бірден анықтауға мүмкіндік береді, бұл салада оның танылуын және жұмысының адалдығын арттырады. Жедел жеткізу курьер киім жиынтығын дайындауда аралас фактуралы материалдар таңдалды және әртүрлі материалдар пакетінің тозуға төзімділігі, қыртыстанбауы және бояуларының үйкеліске тұрақтылық қасиеттерінің бекітілген көрсеткіш талаптарына сай келуін, сынақтық үлгілерде мемлекеттік техникалық реттеу комитеті стандарттық көрсеткіштермен талданды. Қазіргі сән талабына сай дайындалған көпфункционалды жедел жеткізу курьер киім жиынтығы, әр мезгілге сай жаңа конструктивтік және көркемдік шешімдердегі костюмнің жаңа композициясын құрастыру маңыздылығына ие, қызметіне қарай курьер киімінің түрленуін қамтамасыз етеді. Жоғарыда аталған факторлар негізінде курьерлік киім қызметіне қарай трансформацияланады. Шағылыстыратын элементтермен дайындалған киім жиынтығы курьердің қызметтегі қауіпсіздігін қамтамасыз етеді (алдыңғы бой, артқы бой, жең, шалбардың жан тігісі). Аралас фактуралы материалдар пакетінен дайындалған, жедел жеткізу курьердің арнайы жұмыс киім жиынтығы қызмет көрсетуге ыңғайлы және эксплуатациялық талаптарды қанағаттандырады, оның пішімі қимыл қозғалысқа кедергі келтірмей, кез-келген ауа-райында ыңғайлы жұмыс істеуге мүмкіндік береді және қызмет көрсету мерзімін ұзартады.

Негізгі сөздер: жедел жеткізу, арнайы киім, курьер киімі, аралас фактуралы материал, физико-механикалық көрсеткіштер, көпфункционалды, шағылыстырмалы элемент.

## ИССЛЕДОВАНИЕ КАЧЕСТВЕННЫХ ПОКАЗАТЕЛЕЙ КОМБИНИРОВАННЫХ ФАКТУРНЫХ МАТЕРИАЛОВ ДЛЯ СПЕЦОДЕЖДЫ КУРЬЕРА ЭКСПРЕСС-ДОСТАВКИ

*К. Ж. КУЧАРБАЕВА, Ш.Н. ОРЫНБАЕВА, Л.Т. САРТТАРОВА*

(Алматинский Технологический Университет, Республика Казахстан,  
050012, г. Алматы, ул. Төле би, 100)

Электронная почта автора корреспондента: kaldigul.kuzarbaewa@mail.ru, orynbaeva0101@gmail.com\*

В статье раскрыты вопросы разработки высококачественного специального комплекта одежды для курьера экспресс-доставки и эффективный способ продвижения корпоративной культуры и укрепления бренда. Уникальность форменного стиля сотрудников данной службы способствует созданию положительного и доверительного восприятия со стороны компаний, предоставляющих услуги курьерской доставки, и соответственно улучшает их профессиональный имидж. Специальная одежда, изготовленная из разнообразных фактурных материалов «корпоративных» цветов, позволяет единообразно идентифицировать курьеров, повышая их узнаваемость и организованность их работы. При разработке специального комплекта одежды для курьера экспресс-доставки выбраны комбинированные разнообразные фактурные материалы, проведен анализ стандартных показателей Государственного Комитета технического регулирования на испытательных образцах на соответствие износостойкости, несминаемости и устойчивости красок различных пакетов материалов. Многофункциональный комплект для курьера экспресс-доставки, разработан в соответствии с учетом направления моды, что является одним из основных критериев при составлении новой композиции костюма с различными конструктивными и художественными решениями. Вышеперечисленные факторы обеспечивают трансформацию курьерской одежды в зависимости от деятельности. Для обеспечения безопасности курьера на службе, в комплекте применены светоотражающие элементы на различных участках (на полочке, спинке, рукавах, в боковых швах брюк). Разработанный специальный комплект одежды для курьера экспресс-доставки из пакета комбинированных фактурных материалов удобен в носке при работе курьера, удовлетворяет эксплуатационным

*требованиям, его формат позволяет комфортно работать в любую погоду, не мешая движению и продлевая срок службы.*

**Ключевые слова:** экспресс-доставка, спецодежда, одежда для курьера, комбинированный материал, физико-механические показатели, многофункциональный, светоотражающий элемент.

### **Introduction**

The clothing design should prioritize comfort, ensuring ease of use and considering the simplicity and correctness of putting on the garments. It should accommodate the various movements and postures required during work. [1]. Analyzing the shapes and movements of workers during the construction of clothing helps in developing garments that enable workers to experience unrestricted movement, minimize body fatigue, and effortlessly perform tasks during service [2]. In the course of this investigation, a thorough analysis was conducted on the defined purpose, quality requisites, and performance indicators for specialized attire. Subsequently, all stipulated criteria on the specific clothing requirements for express delivery couriers were meticulously scrutinized and effectively met [3].

### **Research materials and methods**

Express delivery courier working postures can be divided into four groups according to service requirements: standing, sitting, semi-sitting, and kneeling [4]. Couriers experience rapid fatigue in these positions during the performance of their duties, leading to a decrease in productivity [5, 6]. Based on the results of observation of workers' movements, the scheme of movement trajectories of couriers during work shift was analyzed. In the analysis of the forms and movement trajectories of couriers, the additional materials given the freedom necessary for the preparation and assembly of ergonomically rational designs that meet the dynamic compliance were selected, and the features of the format were submitted [7,8].

### **Results and discussion**

In the study, the main forms and movements of couriers during their work were analyzed, and the results of forms and movement trajectories are presented in Table 1 [9,10].

To ensure ergonomic requirements in the work of an express delivery courier, various dynamic figures representing the main anthropometric fea-

tures were analyzed in Table 1 during the design of the special clothing, and corresponding adjustments were made to enhance functionality [11].

Quality indicators of textile materials describe the level of requirements for products made from them. In the course of the work, the characteristics of crusting, paint resistance to friction, wear resistance of the selected samples were studied. To conduct the research, the following materials were tested: twill (00072155), taslan (189T), stitch (CTT-41-2), oxford (600D PU 1000), duspo (240T PU), gretta (4C5KB+BO 01 1001). A set of test samples made from mixed textured materials was prepared and subjected to testing. The test was conducted in the textile materials testing laboratory of the Almaty Technological University [12, 13].

The test samples, comprising a package of mixed textured materials, demonstrated compliance with specified requirements in terms of wear resistance, non-cracking, and friction resistance. The analysis of the test sample was conducted based on the standard indicators outlined by the State Technical Regulatory Committee (State standard) [14]. The preparation of special clothing for express delivery service involved analyzing the non-creasing properties according to State standard 19204-73, wear resistance according to State standard 18976-73, and paint friction stability according to State standard 9733.27-83.











The non-creasing index of mixed textured materials is assessed and its values are presented in Table 2. The recovery angle ( $\alpha$ ) of the non-creasing index is measured with an accuracy of  $1^\circ$ . The creases of the sample are measured by  $\alpha$ , depending on the horizontal and vertical directions of the fabric separately.

$$\alpha = \sum \alpha_i / n(1)$$

where:  $\alpha_i$  is the result of measuring the recovery angle, degrees;

n is the number of studies.

Table 1 – Common forms and characteristics of an express delivery courier during work

Ergonomic of the human body diagram	Ergonomic type of movement	Pressure drop zones of the material	Optimization of pressure drop zones	Constructive solution
	Position №1- Standing	It is necessary to have high visibility in service provision	For high visibility, reflective material is used in the elbow part of the special clothing, at the shoulder level of the front, and on the label pocket of the pants.	
	Position №2- Riding a bicycle	The courier sits directly on the chair, the leg and knee joints move 360° C, the knee is exposed to a lot of friction.	For a comfortable fit, two pleats were made in the front part of the pants at knee level	
	Position №3- Leg movement	The trouser leg is subject to friction from walking and jogging in service	Modern pants are made from material that is resistant to friction during walking	
	Position №4- Elbow movement	While driving the scooter, the arm is positioned at 90°C, and gravity falls on the elbow	The sleeve shape is extended at the elbow	
	Position №5- Fingers	Fingers freeze in cold weather while driving and driving	To prevent freezing of the fingers, a separately treated glove is attached	

The rate of creasing is determined by the following formula:

$$\alpha = X \gamma / 100 \tag{2}$$

where: X is non-creasing of textile fabric, %;  
 $\gamma$  is the full opening angle of the elementary model, equal to 180° [15].

Table 2 – Non-creasing indicators of mixed textured materials

Test sample	$\alpha$	A	%
Sample 1	149.5	151.1	92.7
Sample 2	131.5	144.8	85.2
Sample 3	135.9	146.9	87.2
Sample 4	124.4	141	81.8
Sample 5	150.1	145.3	91.1

All the indicators obtained from the analysis of the presented test samples demonstrated a high resistance to creasing for the package of mixed textured materials.

The wear resistance index of mixed textured materials, according to State standard 18976-73, was determined, and the experimental values obtained are presented in Table 3.

Table 3 – Test result of wear resistance of materials package

Test sample	Kg/mm	
Sample 1	Average weight = 40.35 kg L average = 53.39mm	Average weight = 38.42 kg L average = 50.42mm
Sample 2	Average weight = 39.31 kg L average = 49.47mm	Average weight = 35.44 kg L average = 47.53mm
Sample 3	Average weight = 43.31 kg L average = 56.42mm	Average weight = 40.42 kg L average = 53.42mm
Sample 4	Average weight = 35.41 kg L average = 47.42 mm	Average weight = 33.56 kg L average = 46.54mm
Sample 5	Average weight = 37.51 kg L average = 48.42 mm	Average weight = 36.33 kg L average = 47.59mm

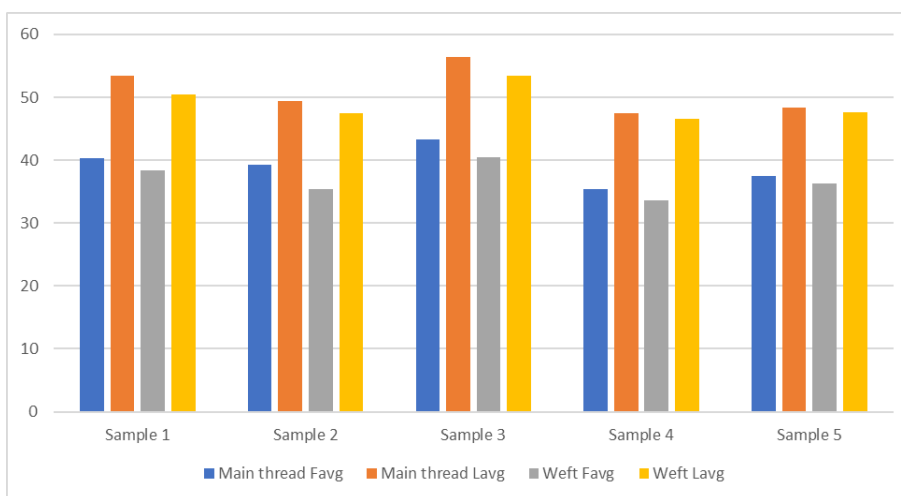


Figure 1 – Analysis of wear resistance of mixed texture materials

After analyzing the obtained data, it was evident that the sample from test material package 3 exhibited the highest wear resistance indicators.

Determination of friction stability of paints of mixed textured package materials was carried out in accordance with State standard 9733.4-83 and State standard 9733.27-83. The results demonstrated that the paint stability of all tested materials complied with the requirements of the technical regulation TR CU 017/2011 'On the safety of light industrial products,' including the

friction stability of test sample 3, which reached up to 90%. As a result of the tests carried out on the test samples, all studied experimental test samples showed good performance. Consequently, test sample 3, composed of duspo and gretta materials, met all the requirements for designing express delivery courier clothing, proving to be optimal. It was subsequently utilized in the development of the multifunctional courier clothing set as illustrated in Figure 2.

Taking into account the ergonomic requirements of special clothing, multifunctional clothing was prepared from mixed textured materials. Multifunctional special uniforms of express delivery workers were designed by the method of separation and addition. Express Delivery Courier Jacket can be transformed into a separately processed convertible hood, sleeve detail, and glove compartment. The separation and connection of each part are facilitated by a detachable zipper button. In this method, the overall shape of the product remains unchanged;

only the parts are separated and transformed. The clothing set undergoes transformation based on a single model, fully meeting the aesthetic and operational requirements of the courier in accordance with market standards. The clothing set, equipped with reflective elements, guarantees the safety of the courier during service. The shape of the courier jacket remains unchanged, and only the parts are transformed through the process of separation and addition, thereby expanding its functionality.



Figure 2 - A special set of courier clothes made from a multi-functional mixed textured material package

### Conclusion

As a result of the research, a set of special clothes for express delivery couriers was developed from a package of mixed textured materials (duspo, gretta) of the highest standard with indicators of non-creasing, wear resistance and friction resistance of paint materials. In the ways of transformation of transformable parts, according to the request and service of the courier, several multi-functional clothing sets have been prepared on the basis of one model. Several types of clothing were obtained using transformable elements, and their functional capabilities have been expanded. A multifunctional special express delivery courier's clothing set made of mixed texture materials allows to provide optimal services in express delivery, reflective elements ensure the safety of the courier at work, and increases the competitiveness of the modern clothing set.

### REFERENCES

1. Kucharbaeva K.Zh., Orynbaeva Sh.N., Gibaratova A. Zhedel zhetkizu kurerge arnalgan arnajt kiimderdin erekshelikterin taldau [Analysis of the features of special clothes for express delivery couriers Material of RNPC "Nauka]. Education. Youth" - Almaty: ATU, April 20, 2023.

2. Suteeva M. A., M.A. Osnovy' tekhnologii shveinogo proizvodstva [Fundamentals of Sewing Production Technology] / M.A. Suteeva M. A., M.S. Kurgambekov. Almaty: TechSmith, 2019. — 208 p. [in Russian]

3. L.T. Sarttarova Tigin buiymdaryn konstruktivni ulgileu . [Constructive modeling of sewing products.] – Almaty, 2014 – 25p.

4. Moskvina M.A. Obespechenie antropometricheskogo sootvetstviya v avtomatizirovannom proektirovanii odezhdy zadannyh siluetnyh form: dissertaciya ... kandidata tekhnicheskikh nauk: 05.19.04 // Sankt-Peterburgskij gosudarstvennyj universitet promyshlennyh tekhnologij i dizajna [Ensuring anthropometric correspondence in the automated design of clothes of given silhouette forms: dissertation ... candidate of technical sciences : 05.19.04 // St. Petersburg State University of Industrial Technologies and Design], -2016.- 211 p.

5. Lo YUn', Kuzmichov B.E Konstruktivnoe obosnovanie polucheniya ob'emno- prostranstvennoj formy odezhdy [Constructive basis of obtaining voluminous - spatial form of clothing]// Sewing industry. - 2014

6. GOST 12.4.280-2014. Sistema standartov bezopasnosti truda. Odezhda special'naya dlya zashchity ot obshchih proizvodstvennyh zagryaznenij i mekhanicheskikh vozdeystvij. Obshchie tekhnicheskie trebovaniya (s Popravkoj). [State standard 12.4.280-2014. System of occupational safety standards. Special clothing for protection against general industrial pollution and mechanical effects. General technical requirements



(with Popravkoy).] Electronic resource. Access mode. URL: <http://docs.cntd.ru/document/1200116594> (Review date 05.11.2023).

7. Sil'cheva L.V. Sovremennye podhody k proektirovaniyu transformiruemoj odezhd /L.V. Sil'cheva// Servis v Rossii i za rubezhom. [Contemporary approaches to the design of transformable clothing/ L.V. Silcheva // Service in Russia and abroad.] - 2014.1. – p. 28-39.(In Russian).

8. G.I. Petushkova Transformativnoe formo-obrazovanie v dizaine kostüma. [Transformative shaping in costume design.] –LENAND, 2015. -78p.

9. GOST 31399-2009. Klassifikaciya tipovyh figur muzhchin po rostam, razmeram i polnotnym gruppam dlya proektirovaniya odezhdy. [State standard 31399-2009. Classification of typical men's figures by height, size and fullness groups for clothing design.] - Electronic resource. Access mode. URL: <http://docs.cntd.ru/document/gost-31399-2009> (Review date 05.11.2023).

10. GOST 31396-2009. Klassifikaciya tipovyh figur zhenshchin po rostam, razmeram i polnotnym gruppam dlya proektirovaniya odezhdy. [State standard 31396-2009. Classification of typical female figures by height, size and fullness groups for clothing design.] - Electronic resource. Access mode. URL: <http://docs.cntd.ru/document/gost-31396-2009> (Review date 05.11.2023)

11. GOST - Seriya standartov shvejnoj promyshlennosti. [State standard - Series of standards of the sewing industry.] -Electronic. resource – 2021. –

URL: [[https://standartgost.ru/0/129-shveytnaya\\_promyshlennost](https://standartgost.ru/0/129-shveytnaya_promyshlennost)] (Review date 11.09.2023)

12. Tashpulatov S.Sh., Kadirov T.D., Rasulova M.K., Abenova İ.R., Talgatbekova A.J. Issledovanie pokazatelei kachestva hlochatobumajnoi tkani, obrabotannoi tehnologicheskim rastvorom dlya izgotovleniya spesodejdy // No 5 (383) Tehnologiya tekstilnoi promyshlennosti. [Investigation of quality indicators of cotton fabric treated with a technological solution for the manufacture of workwear // No. 5 (383) Technology of the textile industry.] Moskva - 2019.-201s. [In Rus]

13. Medvedev, T.V. Materialovedenie shvejnogo proizvodstva [Materials science of sewing production]/ T.V. Medvedeva - HTML5. - M: FORUM, 2014. - 204 p. - ISBN 978-5-91134-437-5.







14. Kucharbaeva K.ZH., Razbekova A.S. Zhastar zhiyntygynda transformaciyalanatyn bolshekterdi aralas fakturaly material erekshelikterinde turlendiru. [Transformation of transformable parts in the set of youth in the features of mixed textured material.] MNPC Young Researcher: Challenges and Prospects No. 17 (259) May 2022. pp. 277-281 - Moscow, pp. 171-172

15. Medvedev, T. V. Konstruirovaniye odezhdy: tekhnologii proyektirovaniya novykh modeley odezhdy. [Clothing design: technologies of designing new clothing models] educational toolkit / t. V. Medvedeva. - HTML5. - M: FORUM, 2014. - 37p. - ISBN 978-5-91134-437-5.

МРНТИ 64.29.23

<https://doi.org/10.48184/2304-568X-2024-1-187-193>

## ИСПОЛЬЗОВАНИЕ ВОДНЫХ ДИСПЕРСИЙ СИНТЕТИЧЕСКИХ СОПОЛИМЕРОВ В ПИГМЕНТНОЙ ПЕЧАТИ

К.И. БАДАНОВ\* , И.К. БАДАНОВ , Р.Р. БАДАНОВА , Г.А. КАСЫМОВА ,  
Г.О. ТУЛЕНДИЕВА , Ж.С. РАХМАНОВА 

(Таразский региональный университет им. М.Х. Дулати, Казахстан,  
080000, Тараз, ул. Сулейманова, 7)

Электронная почта автора корреспондента: kenzebad@mail.ru\*

*В пигментной печати актуальным вопросом является поиск новых связующих веществ для печатных красок. В работе рассматривается поиск доступных и дешевых полимерных препаратов, обладающих шивающими свойствами и способными образовывать прочные, эластичные и прозрачные пленки для создания эффективной малокомпонентной и экологически безопасной технологии пигментной печати. В данной работе исследовано использование полиуретановых дисперсий в различных соотношениях с дополнительными шивающими агентами. В качестве их использовали метазин, карбамол ГЛ, ПВА. Для смеси Аквапол-метазин необходимо применять соотношение с наименьшим содержанием предконденсатов терморезистивных смол. При использовании ПВА оптимальное соотношение 1:1. При добавлении Аквапола 12 устойчивость окрасок к сухому трению и к стирке составляет 5 баллов. ПВА увеличивает адгезию отпечатка к ткани. В случае с ПВА гриф более мягкий. С ростом концентрации ПВА в композиции жесткость либо не изменяется, либо снижается. После модификации полиуретановых дисперсий за счет ПВА его использование является экономически выгодным.*

**Ключевые слова:** пигмент, полиуретан, дисперсия, пленка, загуститель, композиция.