ISSN NO: 2770-0003
Date of Publication: 17-06-2022

Increase The Effectiveness of the Use of Secondary Material Resources of the Textile and Light Industry

Sayfullayev Sayyor Solikh ugli
Khakimov Sherkul Shergozievich

Abstract: This article presents materials for the effective use of secondary material resources and industrial waste of the textile, clothing and knitwear industries, the production of nonwoven glued materials, thermal insulation materials using effective equipment and technology, polymer materials and binders, as well as use in various industries.

Keywords: secondary material resources, non-woven glued materials, natural fibers, man-made fibers, flap, latexes, thermal insulation materials.

Introduction

In recent years, the solution to the problem of industrial waste processing has been of primary importance. In addition, in connection with the gradual depletion of Natural Resources, the full use of all types of industrial waste for all sectors of the national economy plays an important role. These tasks are fully and successfully solved in many developed countries. This applies in particular to Japan, the United States, Germany, the Baltic States and others [1]. In the conditions of the market economy, the need to ensure maximum harmlessness of technological processes before researchers and industrialists, local self-government bodies and make full use of all the wastes of production, that is, the creation of technologies without waste, is being promoted. Workers-employees of light industrial enterprises should strive to make the most optimal use of them, along with the maximum reduction in the yield of their production waste. It is necessary to achieve a cost-effective expenditure of material resources, a reduction in the material capacity of the product, as well as the use of relatively inexpensive and scarce materials, that is, secondary material resources [2].

Methods

In recent years, many measures have been taken in the light industry to collect and improve the use of secondary material resources, but at present the level of use of significant types of waste cannot be considered satisfactory.

Currently, many types of valuable industrial waste are not processed (incinerated, thrown into the trash) or are used from them quite effectively. One of the reasons for the unsatisfactory use of secondary material resources is the fact that the description of waste, the sources and volumes of their formation, the technical and economic indicators of devices for the preparation and use of secondary material resources, the directions and efficiency of their use the description of products prepared from them, regulatory and regulatory requirements.

The creation of new production lines for waste processing, as well as the design and improvement of equipment for processing secondary material resources is of great importance for the development and widespread introduction of resource-intensive technologies, the development of existing power transmission lines, mechanisms and machines used in the textile industry of our country.

Currently, the most promising and cost-effective is the use of secondary material resources obtained in the form of fibrous waste for the production of non-glued materials with high heat-and sound-forming and waterproofing properties. The possibility of using various types of binders in the process of their production, treatment with solutions of biological products, flame retardants and other special ingredients further expands the scope of their application in construction and other sectors of the national economy.

But many issues of the production of non-woven materials that are obtained from waste, such as leather, fur, sewing and knitting products, glue from recycled fibers, remain unexplored until now.

ISSN NO: 2770-0003
Date of Publication: 17-06-2022

The quality of glued nonwovens will largely depend on the effective operation of waste separation lines into mechanical fibers, on the optimization of the technological parameters of their working bodies.

In order to establish the technological procedures necessary for the production of identical bunkers made of porous fiber, bunkers for heat, sound, waterproofing, filters a device for processing secondary material resources, it is also very important to study the process of impregnation of fiber layers made from recycled fibers with environmentally friendly and economical polymer bunkers. In this regard, the development of a single resource-saving technology for the production of non-woven materials of various types from porous fibers from recycled fibers of secondary material resources using the method of impregnation with binders in the Textile, clothing and knitting industry is one of the urgent tasks.

Secondary material resources are those from which the corresponding production waste, raw materials and materials that have not completely lost their consumer value, and the remnants of raw materials are formed during the preparation of the product. Secondary material resources can be used as raw materials or as a supplement to it in the household.

Secondary material resources are repeatedly used as raw materials to obtain the main product, the main product in production is the resulting reversible waste, losses associated with the characteristics of the existing production technology at the current state of technology (dispersion, evaporation, shrinkage, etc.), that is, irreversible losses, as well as production and consumption waste (for example, dust, separated impurities that are not used in the national economy at the current level of development of science and technology or the use of which is undesirable, ditches, etc. o) abandoned entrances.

Secondary material resources can be from natural, chemical and mixed gomashios (a mixture of natural and chemical in different inclusions and proportions) by types of gomashios. Secondary material resources from natural homashia are cotton fibers, flax and other fibrous fibers, wool, natural silk, leather and fur. Secondary material resources from chemical fibers are divided into three groups: from chemical fibers, from chemical threads and from chemical materials (artificial leather). Chemical fibers are divided into artificial and synthetic fibers, and then by types of fibers and threads.

Let's consider the problems of secondary material resources in the sewing and knitting industry, as well as secondary material resources from natural cotton raw materials, that is, the use of secondary material resources formed in the yarn finishing industry.

The purpose of secondary textile raw materials obtained during primary processing is to turn unused raw materials into usable, that is, for industrial use. The technological process of initial processing consists of cleaning from harmful microbes, desalination, separation of old ones, separation into grades, bale pressing, packaging, measurement and labeling of the bale. For many types of secondary textile raw materials, such pre-treatment will not be enough and it will be supplemented by washing and saturation processes. Cleaning from harmful microbes for the new forties, which are brought from sewing and knitting enterprises from sewing workshops, the separation of old, and sometimes from varieties is not carried out.

When processing with a slope, multiple stretching and deformation of the fibers occurs, which leads to an overstrain of the molecular chains in the fibers, which leads to a loss of fiber strength, stretching and tearing [4]. In order to reduce stresses and improve subsequent processing, oil impregnation is used on the bevels, which gives the fibers greater viscosity and elasticity, increases their mobility relative to each other, which ensures the splitting of the bevel into fibers and protects them from destruction, reduces the formation and cooling of short fibers, increases the yield of restored fibers from the bevel. The oil impregnation of the slopes contributes to the production of long-length fibers. Technical butyric acids (oleic acid) and mineral oils are used to impregnate the slopes.

Recycling of secondary material resources is certainly appropriate, but it is necessary to expand the range of waste used and conduct research on the development of a technology for processing secondary material resources that will turn them into consumer goods and the introduction of which will benefit the enterprise.

Industrial waste of consumption includes waste from sewing, knitting, felt, felt and other industries formed during knitting of sewing, knitting, felt, felt products, and used technical rolls and gaskets, technical felt, burlap fabrics, knitted and knitted products.

The purpose of the primary processing of secondary textile raw materials is to convert unused raw materials into usable, that is, suitable for industrial use. The technological process of primary processing

ISSN NO: 2770-0003
Date of Publication: 17-06-2022

consists in cleaning from harmful microbes, dusting, separating old ones, sorting, pressing into toys, packaging measuring and labeling toys. For many types of secondary textile raw materials, such pretreatment will be insufficient and will be supplemented by washing and saturation processes. For new scraps coming from the weaving workshops of sewing and knitting enterprises, cleaning from harmful microbes, separation of old ones and sometimes sorting is not carried out.

The bulk of the recovered fibers are sent to the processing of nonwovens, which are produced using various technologies, depending on their function. In the balance of raw materials for the production of nonwovens, the share of secondary resources accounts for about 40%. Almost 60% of them are waste products of the cotton and cotton gin industry [5].

In accordance with GOST 16430-83, fabrics made from one or more types of textile materials or their combination with non-woven materials by connecting structural elements are called non-woven. All methods of production of nonwovens with rounding are usually divided into three technologies used for fastening layers formed from various textile materials: mechanical, physic-chemical and complex [5].

According to mechanical technology, textile and embroidery non-woven fabrics, needle-punched fabrics are obtained.

These include fabrics glued together by physic-chemical technology, heat-shrinkable, fillet and paper.

According to the improved technology, non-woven materials are made, which are pierced with a needle, electro located, impregnated with non-woven material.

The technological procedure for the production of glued non-woven materials by impregnating fibrous coarse fabrics with binders is determined by the purpose of these fabrics, their structure and the equipment used.

Glued non-woven materials are divided into two large groups according to their structure: flat and voluminous. In the first case, impregnation devices are used for impregnating fibrous coarse fabrics, in which the impregnation of coarse fabrics is carried out by immersing the binder in solutions, followed by squeezing out excess binder, and in the second – spraying the binder on coarse fabrics with the help of sprinklers. For the production of flat and volumetric glued fabrics for various purposes, glue aggregates of the ANK-100, ANK-100-1m brands of Russian production with continuous exposure and the Artois and Brinker brands (Germany), Wako-Kiekie (Japan) of foreign production are used [6].

The technological procedure for the production of flat glued fabrics is determined by the following operations: preparation of fibrous raw materials; formation of coarse fabric; uniform impregnation of fibrous coarse fabric with binders; drying in a drum dryer; laying and trimming edges.

The technological procedure for the production of bulk-glued fabrics is determined by the following operations: preparation of fibrous raw materials; formation of coarse fabric; impregnation of coarse fabric with astringents by spraying from a nozzle, drying; cooling of the fabric and wrapping the finished product.

Glued non-woven fabrics can be divided by function into cushioning fabrics for the garment industry; fabrics for the basis for polymer coatings; fabrics with a filtration function containing fabrics for filtering liquid media and aerosols; fabrics with the function of shoes; fabrics with the function of medicine; decorative fabrics with the function of coating; fabrics for the textile and haberdashery and knitting industries and other groups of fabrics.

Currently, research is being conducted to develop a wider range of glued nonwovens, in connection with which it is possible not only to increase the number of types of fabrics in the main groups of the assortment, but also the emergence of new groups of the assortment of glued nonwovens [7].

The prerequisites for the success of the rapid growth of the production of nonwovens are: the progress of technology, which provides the possibility of complex mechanization and automation of production processes, reduction of labor and capital costs, widespread use of low-grade raw materials.

Non-woven glued materials are widely used in construction and mechanical engineering, not inferior in acoustic, thermal and physical properties to traditional felt materials, and surpassing them in chemical and biological properties. The high efficiency of technical solutions providing for the use of layers of non-woven glued fabrics of various structures in road construction as protective, extreme pressure,

ISSN NO: 2770-0003
Date of Publication: 17-06-2022

filtering, creating conditions for improving quality and thoroughness, and sometimes reducing direct costs has been proved [8].

The range of non-woven glued materials and their production volumes are constantly expanding, which is due to the cost-effectiveness of production and the development of the chemical industry. In construction, mainly solid and elastic thermal insulation materials are used formed from waste of natural and chemical fibers or their mixtures with natural or organic binders due to increased requirements for them. Consequently, in elastic mattresses, binders are necessary for partial attachment of fibers, while in rigid mattresses, fillers and heat treatment are additionally used. Thermosetting waxes are used as model binders: epoxy, organ silicon, phenol, plasticized latexes, which increases the elasticity of bends, reusable without wrinkles. To increase the heat resistance and slow down the wear of the film, thermobarganic emulsions are added to the composition, for example, urea and organosilicon [9]. The heat and sound insulation material "Vorsonit" is widely distributed, which includes latex, metalize a dispersant, polymethylsiloxane and soaked in water.

Non-woven glued materials belong to textile materials, since textile fibers are their basis, and they are used for the same purposes as conventional textile materials. The production of non-woven glued materials is based on physic-chemical processes, the use of which in some cases allows us to abandon the technological processes characteristic of the traditional textile industry. This is reflected in the structure and properties of non-woven materials.

The relationship between the structure and many properties of non-woven glued materials is determined by the distribution of the binder and its amount in the material. A fairly complete idea of the structure of non-woven glued materials can be obtained if the relations between the fibers and binders, the direction of the fibers, the distribution of binders, the nature of the bonded zones and the dimensions of the elementary cells formed by the glued fibers are known. In non-woven glued materials, binders usually fill the space between the fibers only partially, and the degree of its filling may be different for different types of non-woven glued materials.

The structure of non-woven glued materials is very different from the structure of fibers; the difference is mainly determined by the different nature of the bond between the fibers in these materials. In adhesives, the connection between the fibers is carried out directly due to the friction force and the viscosity of the fibers, in non – woven glued materials after the intermediate element-the binder. Taking into account the properties of non-woven glued materials helps to improve their properties and expand the scope of application.

The mechanical properties of the glued nonwovens should depend on the properties of the binders, since binders contribute to the formation of a non-woven material in the form of a single system of glued fibers, provide a redistribution of loads between the fibers and take on part of the load in cases where the fibers are in the direction of stretching of the non-woven glued material. Therefore, when solving problems related to determining the properties of nonwovens, it is necessary to take into account the amount of binder and the influence of its properties on the properties of nonwovens. An increase in the amount of binder leads to a decrease in the size of the holes and a decrease in the air permeability of the material.

Results and Discussion

The astringents used in the manufacture of nonwovens by the method of impregnation of fibrous coarse fabrics include aqueous dispersions of synthetic and natural rubbers(latexes), aqueous dispersions of some cosmopolites, aqueous solutions of polymers. As auxiliary substances, the patch ("tailor") uses chemical reagents, surfactants of various actions (humidifiers, emulsifiers, anticoagulants, etc.), acid salts are used, which are used as catalysts for the formation of acids and binders.

The physic-chemical structure and properties of the binders used determine the most important technological, physic-mechanical and operational properties of nonwovens.

The following main types of latexes are used for the production of glued nonwovens: Latex BNK-40/4, Latex BSNK, synthetic Latex SKN-40-1GP, synthetic Latex DMMA-65GP, synthetic Latex SKS-65GP, copolymer aqueous dispersion of vinyl chloride with vinyl acetate, acrylic emulsion of grades I and A, acrylic emulsion MBM-3, metalize, malefic anhydride, OS-20, polyvinyl acetate emulsion with the addition of auxiliary substances, such as Altamonte DS-m, etc. [5-6-7].

ISSN NO: 2770-0003
Date of Publication: 17-06-2022

The advantage of polymer dispersion over solutions is determined by their incombustibility, low toxicity, low viscosity and a number of positive properties of the side that exclude fire hazard.

Taking into account the features of the technological equipment used to ensure the production of high-quality non-woven adhesive materials, it is necessary to take into account the complex impact of changing and unchangeable process factors. At present, continuous adhesive aggregates ANK-100, ANK-100-1m and glue aggregates of foreign production "Artois", "Bruckner" (Germany), "Wako-Kiekie" (Japan) are used for the production of flat glued fabrics for various purposes [6-8-9].

Heat transfer provides not only energy efficiency, but also allows carrying out technological processes at the specified parameters, providing safe and comfortable working conditions for the service person, transporting heat from the source to the consumer with minimal losses [10-11-12-13]. In addition, heat transfer prevents freezing of cold water in pipelines in the winter season, allows storing liquefied and natural gas in isothermal storage facilities, and reduces energy consumption when heating buildings and structures.

The market of thermal insulation materials in our country has now expanded sufficiently due to the products of foreign companies offering a wide range of thermal insulation materials with various technical characteristics, but the price is quite high.

Unfortunately, the industry of thermal insulation materials in our country practically does not produce special molded products made of mineral wool for sealing pipes. In this regard, instead of form-resistant thermal insulation structures that have high manufacturability for pipes, non-industrial structures are used with the use of glass fiber of the PSX-T brand (TU 6-48-97-93) or needle-punched coarse fabric of the IPS-T-1000 brand, which are very labor-intensive during assembly[13-14-15-16-17].

When choosing thermal insulation materials, it is necessary to take into account that in structures the values of their thermal and physical characteristics differ from those specified in the technical conditions due to the influence of assembly and operation factors.

An analysis of the technical characteristics of thermal insulation materials supplied to the markets of our country, imported from abroad, shows that only materials that have passed certification tests and meet the standards can be included in the regulatory and technical documentation that strictly establishes design standards[18].

Due to the ability to take into account the features of structures in our country, it contributes to a more efficient use of thermal insulation materials[19]. The competent use of these materials of thermal insulation structures increases the energy efficiency, reliability and durability of industrial thermal insulation structures, which ultimately allows you to significantly save energy resources and energy resources of consumers of thermal energy[20-21].

Conclusion

In conclusion, from the whole variety of secondary material resources, we can single out the secondary material resources of the spinning industry as the most common and promising for the production of economical and environmentally friendly household and technical materials.

An urgent task is to analyze and create scientifically based methods for developing technologies for the production of recycled fibers in order to improve the environmental situation and create waste-free production methods that ensure the production of new materials from unprofitable secondary material resources of the spinning industry, as well as the receipt of additional income by enterprises. The task of creating new thermal insulation and non-woven adhesive materials using environmentally friendly and cost-effective organizers allowed for operation in various industries is considered urgent.

References

1. Modin S. A. Ecology of natural science and environmental protection. St. Petersburg, L.: Chemistry. 1998, 115 p.
2. Pushkov E. A. Methods and means of environmental protection of light industry enterprises. M. Legprombyt. 1980, 240 p.
3. Secondary material resources in light industry (Education and use) Reference book-Moscow: Ekonomika, 1983-664 p.

ISSN NO: 2770-0003
Date of Publication: 17-06-2022

4. Gusev V. E. Technology of secondary textile raw materials. Publishing house "Light industry" Moscow 1970. 346 p.
5. Bershev E. H., Kurylenko A. I., Kuritsyna V. V., Smirnov V. V., Nonwoven G. P. fabrics Reference book., M., 1982
6. Bershev E. H., Smirnov G. P., Zametta Yu. P. et al. - Reference book. Non-woven materials"., M.: Legprombytizdat, 1987. 400 p.
7. Ali-Shama-Ogly et al., Non-woven textile materials, obz. inf. M.: 1983 45 p.
8. Vasilevsky A. D. "Production of glued non-woven material. - Textile Industry, 1980, No. 8, p 46
9. Rakhmonov Kh., Fayziev S., Rakhimov Kh., Kazakova D. Relative speed and temperature effect investigation of the of the drying agent on the moisture content of cotton // E3S Web of Conferences 264, 04008 (2021) CONMECHYDRO-2021.P.1-7
10. Semelkin A. B. Development of technology for manufacturing edges of woven synthetic nets. Dis.. Candidate of Technical Sciences. - St. Petersburg. SPGUTiD, 1995, 182 p.
11. Rakhmonov Kh., Fayziev S.Kh., Rakhimov Kh., Ibodullaev O., Mirzoyeva S. Theoretical, practical and experimental research on the creation of an energy-saving universal screw in a new design of the transfer line of the drying drum of raw cotton // SCIENTIFIC JOURNAL "ARCHIVARIUS" 2021. Volume 7 No. 1 (55). pp. 42-49
12. Fayziev S. Kh., Rakhmonov Kh.K., Rakhimov Kh.K., Mukhtarova Z.N. Improving the Transfer Network of Raw Cotton to the Drying Drum // International Journal of Advanced Research in Science, Engineering and Technology, -2020. - Vol. 7, Issue 11.-P. 15578-15583. ISSN: 2350-0328.
13. Rakhmonov Kh., Fayziev S.Kh. Improvement of Equipment and Technology Of Drying of the Cotton Mass and its Technological Assessment on the Basis of Its Thermal Properties // International Journal of Advanced Research in Science, Engineering and Technology. Vol.6, Issue 5, May 2019. P.9496-9500
14. Fayziev S., Rakhimov K., Ibodullaev O., Qurbonova S. A NEW DESIGN OF THE TRANSMISSION NETWORK OF COTTON RAW MATERIALS TO THE DRYING DRUM // SCIENTIFIC ELECTRONIC JOURNAL "MATRIX OF SCIENTIFIC KNOWLEDGE" № 6-2/2021. P. 66-77.
15. Rakhmonov Kh., Fayziev S. Study of Effect of Speed and Temperature of the Drying Agent in the Feeder-Loosened of New Design on the Quality of Fiber // International Journal of Emerging Trends in Engineering Research. 8(10). 2020. P. 7008-7013.
16. Fayziev S. Kh. Theoretical studies of the drying process of raw cotton in drying drums / / Academy. Scientific and Methodological Journal No. 4(43). April 2019. pp. 15-18.
17. Ismoyilov F., Khakimov Sh., Khodjayeva M. Loosening wool machines // International Journal of Recent Technology and Engineering, – 2019. – Vol. 8, Issue. 4. – P. 3650-3655. ISSN: 2277-3878.
18. Khakimov Sh.Sh., Ismoyilov F.B. Analysis of The Properties of Wool Raw Materials Obtained in Uzbekistan // International Journal of Advanced Research in Science, Engineering and Technology, – 2019. – Vol. 6, Issue. 6. – P. 9723-9728. ISSN: 2350-0328.
19. Ismoyilov F. B., Sattarova N. N. New loosening wool machines // International Journal on Integrated Education, – 2020. – Vol. 3, № 11 (2020). – P. 75-77. ISSN: 2620-3502.
20. Khakimov Sh. Sh., Ismailov F. B., Sattarova N. N. Improved trepalnaya machine for wool. Moscow 2021. Universum journal: technical Sciences. No. 2 (83) February, St 57-60.
21. Shokhner B. M. Materials and products for thermal insulation of industrial pipelines. "Technical textiles", 2002, No. 3.46 p.