

Diploma work

[NTF](#) › [TOI](#) › [Study](#) › [Bachelor's Degree](#) › [Diploma work](#)

Matejka Bizjak+

Ravnikar Maša: Quality requirements for healthcare staff clothing

The thesis in its theoretical and practical parts describes clothing for healthcare staff. The first portion of the theoretical part contains mainly the purpose and the history of the clothing from the year 1900, when Angela Boškin implemented the first standards of the clothing for nurses. Before that, nuns were nursing patients. The second portion of the theoretical part is focused on the standards requested for those clothes.

The experimental part also contains two portions. The first portion contains results for dimensional changes during washing, thermal conductivity, water vapour permeability and determination of colour fastness to artificial light, which are all indicated by the standard SIST EN 340.

The second portion contains a survey that was carried out at three different health care facilities. 60 completed questionnaires enabled gaining diverse opinions from the staff.

Jovanov Velika: Impact of interlinings properties on useful properties of fused panels, 2014

Interlinings are used in the clothing industry for fusing some parts of the garment; this has an important role in the aesthetic appearance as well as the usefulness of the garment. The right choice of interlining affects the final quality of the product.

Ten woollen fabrics with different woven structures (twill, rib, hopsack and plain weave) that differ in thread density, thickness and mass were analysed, along with ten chosen corresponding interlinings. The basic mechanical – physical properties (such as thickness, mass per unit area, breaking force and elongation) of the fabrics, interlinings and fused panels were analysed.

Kanc Tjaša: The purchase of children`s clothing

(co-mentor: Andrej Demšar)

The thesis in its theoretical and practical parts describes children`s clothing and the influences on what we choose and buy. The theoretical part describes raw material adequate for children`s clothing, popular styles of basic clothing, the influence of fashion trends on the choice of children`s clothing, what types of consumers children are and what the shopping habits and the reasons for purchase are where children`s clothing is concerned. It describes the market and the factors that have any influence whatsoever on the decision making when buying an item of children`s clothing, which is usually done by parents or by children together with their parents.

The experimental part describes children`s perceptions of good clothing, how they would choose their own clothing, what influences their wishes and the parents` decision on what to buy and how quality and price influence the potential purchase of an item. Surveys were conducted among primary school pupils in two age groups and their parents, from which we can assess various factors that influence the choice and purchase of children`s clothing. Through a comparative analysis, information was obtained on how much children are able to decide on a purchase by themselves and what matters to them when making the decision. In various stores with children`s clothing, a review was made of the labelling of the fibre content of the clothing.

Časl Martina: From idea to embroidery

Embroidery is known worldwide and in different versions serves as a decoration or fashion accessory or in

numerous other applications. It is also used for designing logos for advertising purposes. Parallel with the development of sewing machines, embroidery machines have also been developing. More recently, with the development of computer technology, the software for designing embroideries has also developed. When designing embroideries with the use of a computer, it proves important that a high quality product may be made with low production costs.

The purpose of the research was to demonstrate how simple the design and manufacturing of an embroidery is with the help of software and a computerised embroidery machine. Technical preparation of the product is also very important. The objective of such technical preparation is to examine material possibilities and characteristics prior to the manufacturing of a new pattern as well as to anticipate all factors that will influence the execution of embroidery.

Petra Eva Forte Tavčer+

Dražnik Nina: Temperature regulating microcapsules for textiles

Phase-change materials (PCM) in the form of microcapsules were printed and impregnated onto cotton fabric. PCM microcapsules manufactured by Aero were used. 100% cotton fabric manufactured by MTT Maribor was used. Flat screen printing on a magnetic printing table with a magnetic roller squeegee was performed. The impregnation was implemented on a 2-roll calendaring machine. All samples were then dried and cured. On fabrics treated with microcapsules, the following analyses were made: weight of fabric, rate of coating on the fabric, breaking strength, air permeability, rigidity, wrinkle recovery of dry fabric, thermal conductivity, weight gain, TGA and SEM images .

Grm Nataša: Recognition of ecological textile labels

Ecological product, eco textile and eco-labelling were defined in the thesis. Two textile eco labels, EU ecolabel and Oeko-Tex Standard 100, were thoroughly described. A list of Slovenian companies that gained certificates Oeko-Tex Standard 100 and EU ecolabel was given. Other ecolabels involved in the textile industry were also described and collected in the table. Positive and negative sides of eco-labelling were introduced. The experimental part contains an online survey in which consumers' care about different textile ecolabels or ecolabels in general was determined. Five hypotheses were set and later confirmed by the survey. It was found that consumers don't know much about ecolabels despite better environmental awareness than five years ago. This is probably the result of poor representation by public authorities, manufacturers and retailers.

Kušar Andreja: The influence of the pigment printing paste age on the print quality

The purpose of the research was to find out how long after preparation pigment print paste is still useful. Two printing pastes were prepared and printed onto a cotton fabric at predetermined time intervals: the 1st, 2nd, 3rd, 4th, 7th, 14th, 30th and 60th day after preparation. The printing pastes were stored air sealed in the refrigerator. The quality of the prints was monitored by comparing the colour depth (K/S) and CIELAB colour values. The fastness of the prints to washing at different temperatures, resistance to rubbing and resistance to light were measured as well as the printing paste viscosity. Research has shown that the quality of the prints shows minimum deviation and that the paste is still suitable for printing after 60 days.

Dunja Šajn Gorjanc+

Neža Sukič: Determination of optimal twist equation for ring-spun yarn

(co-mentor: Msc. Veronika Vrhunc)

The purpose of the diploma thesis was to determine the optimal formula for calculating the twist in yarn. The optimum number of twists can be calculated by different formulas for calculating the twist in yarn. The oldest and therefore the most well-known is Koechlin's equation, from which all other equations developed by various scientists are derived. When calculating the number of twists in yarn, the starting point is the assumption that yarn is a linear formation in the shape of a circular cylinder. In the experimental part, the influence of the number of twists in yarn made from long combed cotton roving on its properties was examined. Yarns of different Tex Counts or Metric Counts (Nm 10, 20, 34, 50, 85 and 100) with different numbers of twists calculated by Koechlin's and Laetsch's equations were tested. The yarns were produced at Predilnica Litija on the laboratory ring spinning machine Spinntester and the technological ring spinning machine made by the company Zinser. The results showed that in order to determine the twist for rougher yarns with Metric Count of 10 to 34 m/g, Koechlin's equation is the more suitable one, as also confirmed by the results of tensile strength and elongation at break, which are higher in this case. For finer yarns with Metric Count of 34 to 100 m/g, Laetsch's equation is the more suitable one, since in this case the calculated number of twists in yarn is higher, and the tensile strength and elongation at break thus have higher values too.

Kristina Poljanšek: Preparation for making skirts with the Lectra software module

In the diploma work, we analysed the construction preparation of women skirts with the program Lectra. On the basis of construction preparation, we made the frame plan, and by arrangement, we chose four skirts to study. The preparation began in program module Modaris, where we prepared the basic cut of skirt, from which we later modelled other four skirts. From the cutting pattern in Modaris, we also prepared decomposition parts that can be carried out for the graduation for 38, 40 and 42 sizes. We used the cutting pattern parts of skirts from Modaris in Diamino, which we placed on the surface of the cutting pattern, from which we tried to ensure maximum use of the material. By convention, we displayed the patterns of all four skirts in two size block patterns and triple size block patterns for single colour material and material with patterns. The last program that we used throughout this process is Kaledo style, in which we drew technical drawings of skirts with handy tools, with descriptions of patterns and stitches.

Brigita Tomšič+

Tanja Jašari: INFLUENCE OF SOL-GEL MATRIX ON PHOTOCATALYTIC ACTIVITY OF TITANIUM DIOXIDE

In the diploma thesis, the influence of sol-gel matrix on photocatalytic self-cleaning activity of TiO₂ nanoparticles was studied. Antimicrobial agent Sanitised T 99-19 (Si-QAC), which is chemically dimethyl-tetradecyl-[3-(trimetoksisilil)-propil] ammonium chloride, was used for the formation of the sol-gel matrix and agent CCA 100 B S for the application of TiO₂ nanoparticles. Using one-step and two-step impregnation processes, both agents were applied to cotton fabric from the mixture at two different concentrations of TiO₂ nanoparticles (1–2.5% and 2–5.0%). While the presence of the agent Si-QAC did not impair UV-protective properties, the latter was effected by the application process. In this case, the two-step process reflected in higher UPF than did the one-step process. The presence of the agent Si-QAC slightly inhibits self-cleaning activity of the TiO₂ nanoparticles on the studied samples, but the latter increased after one washing of the samples.

Barbara Rajar: APPLICATION OF TITANIUM DIOXIDE NANOPARTICLES WITH SCREEN PRINTING

In the diploma thesis, the possibility of application of TiO₂ nanoparticles by screen printing for achieving UV-protective and photocatalytic activity of cotton fabric was studied. CCA 200 B S market product (Cinkarna,

Metalurško-kemična industrija Celje, d.d.) was used and added to the pigment printing paste in three different concentrations, i.e. 5, 10 and 15%. For comparison, TiO₂ nanoparticles were also applied by impregnation process. The results showed the beneficial effect of the printing paste on the increase of the washing durability of the TiO₂ nanoparticles on the surface of the cotton fibres and as such on the prolonged UV-protection and photocatalytic activity.

Rebeka Šerbel: THE COMPARISON OF PRINTS WITH DIGITAL TRANSFER PRINTING AND SCREEN PRINTING

(mentor: senior lecturer Gorazd Golob PhD, co-mentor: assist. prof. Brigita Tomšič)

In the diploma thesis, comparison of prints on woven cotton/spandex fabric made by screen printing and digital transfer printing as well as the influence of 3D additive in concentrations of 10 and 25% on colour fastness of plastisol printing paste were studied. The results showed that compared to screen printing, the digital transfer technique enables better colour fastness for sweat and hot ironing, but only for light colours tones (magenta); better colour fastness of darker colour tones (blue) were obtained for washing and dry and wet rubbing. Inflatable 3D additive mixed in primary magenta plastisol printing paste does not influence the colour fastness for sweat, hot ironing and dry and wet rubbing but has a negative effect on rubbing durability of the prints.

Marija Gorjanc+

Tadeja Okorn: The influence of plasma treatment of cotton on adsorption of green tea dye

(co-mentor: prof. dr. Miran Mozetič from Jožef Stefan Institute)

Green tea dye is well adsorbed by protein textile materials but poorly by cellulose fibres, unless fibres are treated with metallic salts – mordant. The purpose of the research thesis is to increase the adsorption of the green tea dye on cellulose fibres with the use of ammonia low pressure plasma. The results show that, with the help of ammonia plasma, we successfully introduced nitrogen functional groups onto the surface of the cotton, which contributed to the higher adsorption of the green tea dyestuff. Plasma treatment time significantly increased the nitrogen content on the cotton surface and consequently the colour difference between the untreated and plasma treated samples.

Milenko Čubrilović: The influence of dyeing procedure on adsorption of curcumin dyestuff onto cotton

(co-mentor: assist. prof. dr. Mateja Kert)

In the diploma thesis, the influence of dyeing procedure on dyeability of cotton with natural dye curcumin was studied. The dyeing procedures used were impregnation dyeing with multiple dips, dyeing in presence of a reducing agent and exhaustion dyeing in alkaline and neutral medium. The colour values of unwashed and washed samples were determined on a reflectance spectrophotometer. The maximum dyeability of cotton with curcumin dyestuff was achieved for dyeing cotton using exhaustion dyeing in neutral medium.

Deni Pregelj: Presentation of sustainably created collection through material analysis

(co-mentor: assoc. prof. Elena Fajt)

The diploma thesis presented the concept of sustainability in fashion design, namely through the aesthetic forms of clothing and analysis of materials used in the collection Remains Nameless. It was found that the majority of the materials in the collection that were discarded by the industry were made of synthetic materials. Among the materials, polyester, polyamide and viscose were predominant. Other materials were acetate fibres, polyethylene, ethylene vinyl acetate, polyurethane, polypropylene and thermoplastic elastomer.

Nadja Debevec: The use of alternative detergents for household laundering

The effectiveness of different detergents in removing dirt from standard stained cotton fabric and from fabrics made from 100% cotton and blends of polyester / cotton (50/50) stained with household stains was studied. For the research, 22 detergents were used. Based on the results of a household washing, it was found that the washing efficiency strongly depends on the composition of the detergent, type of stain and the composition of textiles.

Alenka Pavko Čuden+

Černugelj Martina: Knitted fashion accessories

The aim of the thesis was to produce knitted fashion accessories and to test the aesthetic and performance properties of the yarns they were made of. Selected fashion accessories were: handbags, detachable collars and gaiters. Fashion accessories were knitted on the electric knitting machine Elektroknit Brother KH-910 in a single jersey structure. The final shape of the fashion accessories was based on cutting and sewing-on three-dimensional applications. Selected knitting yarns were produced from acetate, cotton and copper fibres. The results of the measurement of the mechanical properties indicate that the tested knits conduct heat extremely well and are well-resistant to pilling and abrasion. It was found that the thickness of the fabric is not appropriate for gaiters and handbags due to the linear density of the yarns and the designed density of the knitted structure. Therefore, the knitted fabrics were lined with woven adhesive interlining and then additionally lined with quilted lining. This helped to achieve strength, rigidity and stable form of the designed and examined fashion accessories.

Anže Kupljenik: Eco knitted fabrics

Over the last decade, organic fashion in fashion trends evolved into a movement associated with sustainability and ethical issues. Responsible consumerism, pre-recycling, fair trade, recycling of already recycled products and design of fashionable recycled products with added value expand the boundaries of conventional fashion. The purpose of the present work was to test and compare the comfort and aesthetic properties of circular weft knitted fabrics from organic materials in different knitted structures and assess their suitability for making fashionable clothes. The aim of the thesis was also to design a fashionable knitwear collection in collaboration with a fashion designer, based on the results of knitted fabrics testing, and present it at a fashion show. Manufacturing of knitwear made from the tested fabrics showed that the selected fabrics were suitable for everyday and evening wear. A single jersey structure made of 100% organic cotton was the most dimensionally stable and adequately air permeable, but its appearance after washing deteriorated due to piling. Interlock structure made from a mixture of organic cotton and bamboo viscose with added elastane was less dimensionally stable than the single jersey made from organic cotton. Its air permeability was low. The fabric was well-resistant to piling. Velour structure made from a mixture of organic cotton and bamboo viscose was the least dimensionally stable; it exhibited good air permeability and excellent resistance to piling.

Mateja Kert+

Kristina Zdovc: The influence of surfactant addition on the adsorption of C.I. Acid red 14 on polyamide 6 knitwear

In the thesis, the influence of the addition of surface active agent (surfactant) into the dye bath on the adsorption of anionic acid dye C.I. Acid Red 14 (AR14) on polyamide 6 knitwear (PA 6) was studied. Dyeing was

performed in the Launder-ometer apparatus at four different dyeing temperatures, i.e., 40, 50, 60 and 70 °C, and at pH 4 until the equilibrium was reached (360 minutes). In the research, cationic surfactant dodecyltrimethylammonium bromide (DTA), anionic surfactant sodium dodecylsulphate (SDS), nonionic surfactant Triton X-100 (TX100) and mixtures DTAB/TX100 and SDS/TX100 were used. Dyeing was performed in the absence as well as in the presence of surfactants. According to the obtained results of the degree of exhaustion and K/S values, it can be concluded that dye-fibre interactions are influenced by dye-surfactant, surfactant-surfactant and surfactant-fibre interactions. Among the solely studied surfactants, the TX100 surfactants act as a levelling agent, whilst surfactants SDS and DTAB are less appropriate. The optimum levelling action was obtained by the use of surfactant mixtures.

Ines Besedič: The influence of acid dye structure on adsorption onto nylon 6 knitwear

In the diploma thesis, the influence of acid dye structure on the adsorption onto polyamide 6 knitwear was studied. In the research, three acid dyes with different numbers of sulfonic groups, namely C. I. Acid Red 88 (1 sulphonic group), C. I. Acid Red 14 (2 sulphonic groups) and C. I. Acid Red 18 (3 sulphonic groups), were used. Dyeing was performed at pH 4 in a Launder-ometer apparatus at 40°C and 60°C. The samples were taken out of the dyebath at different time intervals. According to the results, it can be concluded that the highest exhaustion is obtained with dye AR18, followed by dye AR14, whilst the lowest degree of exhaustion is obtained with dye AR88. The results of the degree of exhaustion and K/S values showed that both dye structure and dyeing temperature affect adsorption of the studied dyes onto PA 6 knitwear. The adsorption increases with the increase of dyeing temperature and decreases with the increase of the number of sulphonic groups of dye molecule at given pH 4 of the dyebath.

Andreja Čepič: The influence of conventional pigment addition on light response of photochromic dye on cotton fabric

(co-mentor: doc. dr. Lidija Černe)

In the thesis, the influence of classic pigment addition on photochromic effect of Itofinish UV BLUE commercial photochromic (FC) dye in the form of microcapsules, printed on cotton fabric, was researched. Ten printing pastes of different composition were prepared and printed on the cotton fabric using a screen printing technique. The printing pastes included three classic pigments: Minerprint Giallo 3GL, Minerprint Rosso GRL and Minerprint Blu Royal. The results of the research showed that the values of mass per unit area, rigidity, thickness, tensile force and elongation increased at all printing samples, whilst the value of air permeability decreased irrespective of printing paste composition. The addition of FC dye in printing paste with classic pigment changes colour properties of the textile and causes deterioration of colour fastness of prints with light and rubbing. On the contrary, the washing fastness of visually rated prints stayed unchanged. Due to low colour fastness with artificial light and rubbing, the application of the examined commercial FC dye is restricted only to textile products that are exposed to direct sun light and rubbing for shorter periods.

Tatjana Rijavec+

Anela Kljajić: Impact of monomer aspiration in the spinning shaft on the hollow polyamide 6 fibers properties

(co-mentor: Sabina Jakomin)

In the diploma thesis, impact of monomer aspiration in a spinning line on the properties of polyamide 6 FDY yarns was studied. The yarn's linear density was 37.3 dtex and of the filaments 3.73 dtex. The filaments with a

round cross-section had a hole cross-section of triangular shape. Different aspiration pressure (Pa 0/50/100) influenced the individual filaments in the yarns that had an unequal cross sections of hollow fibre parts. Increasing the aspiration pressure from 0 to 50/100 Pa in the spinning shaft resulted in a decreasing of spinneret's temperature by 3–4°C and increasing of yarn's tension in the whole spinning line. These changes resulted in the following yarn properties: the impact of pressure aspiration on the linear density and breaking force is significant, proven with ANOVA test at 95% statistical probability. Aspiration of the monomer under the spinnerets resulted in an increase in monomer content in the fibres and also an increase in the level of crystallinity of the fibres.

Tina Petrič: The effect of different factors in the spinning line on bulked continuous filament (BCF) polyamide 6 yarn properties

(co-mentor: Smiljan Geiger)

In the diploma thesis, the effect of technological parameters like temperatures of extruder zones (268°C and 258°C), content of TiO₂ in the polymer (0.1% and 0.4%), pore diameter of the filter in the spinning package (25 µm and 15 µm), air velocity in the quench cabinet (0.60 m/s and 0.75 m/s) and drawing ratio (3 and 3.3) on the properties of polyamide 6 BCF yarns with trilobal filaments cross section was studied. The impact of individual technological parameters was statistically verified for the linear density and tensile properties. It was found that the change in the concentration of TiO₂ from 0.1% to 0.4% did not affect the BCF yarn's linear density, breaking force and elongation at break, but the changes of drawing ratio from 3 to 3.3 had an impact on all three properties: the most on linear density and slightly less on breaking force and elongation at break. Also, the choice of the filter of the spinneret pack has a significant influence on the linear density and the breaking force of the BCF yarns. Changes in temperature in extruder zones from 268 to 258°C resulted in increase of breaking strength but a little less so on the elongation at break. Changes of the air speed in the cooling chamber from the 0.60 to 0.75 m/s affected only the breaking force.

Nejc Stupan: The morphology of animal covered structures and their biomimetics on textiles

(co-mentor: doc. dr. Mateja Kert)

In the thesis, research was conducted on morphological structures, i.e. hairs and scales of animal furs and skins, in order to imitate those forms with 3D print technology. Over a long period, animal surfaces changed with time to help them protect themselves from predators and in order to survive. The biomimic approach with animal surfaces was already used on textiles as an imitate surface that increases water-repellency, sweat permeability and mechanical toughness. Researchers are already studying and trying to imitate solid surface structure morphology of the fish *Polypterus senegalus*, which could be used as a shock protection. In the experimental part of the diploma work, research of surface structures with a scanning electron microscope was made to measure dimensions of individual scales. Measurement results were used for precise imitating of the scales in a process of modelling to imitate structures with the computer programmes Google sketch Up 8, Rhinoceros 4.0 and Slicer, which enable creating 3D surface structures models and preparing data for 3D printing. The butterfly scale model was realised using a 3D printer Ortotip (Ortotip, d. o. o.) that works on a principle of adding layers of PLA melt.

Sandra Krebelj: Digitalisation process of journal Tekstilec

(co-mentor: Jure Ahtik, mag. graf. inž.)

The thesis shows the process of digitisation of archived volumes of the journal Tekstilec (ISSN 0351-3386), which represents the initial part of the project of preparing an electronic archive for use on the World Wide Web.

Tekstilec, which is currently the only Slovenian professional journal in the field of textile and clothing technology, has been electronically published since 2014 (e-Tekstilec ISSN 2350-3696). From 2012, a website journal www.tekstilec.si has been operating where scientific articles published in the period after 2000 are already digitised. The journal Tekstilni razgled, which preceded Tekstilec, was first published in 1952 and ceased in 1957. In the year 1958, Tekstilni obveščevalec, under that name until 1972, was launched, and then in 1973 it was renamed Tekstilec. In the context of the thesis, scanning of all the printed journals available in the library of the Department of Textiles, Graphic Arts and Design was done. Scans were compared with the printed copies, if necessary corrected and then combined into copies as derived. The volumes and the content of the journals were analysed. The further preparation of electronic materials to a level that is appropriate for public use is proposed.

Katarina Drevenšek: Properties of polypropylene/ polyamide bicomponent fibres

(co-mentor: Assoc. Prof. D.Sc. Urška Stankovič Elesini)

The properties of bicomponent polypropylene/polyamide 6 yarn, partly oriented (POY) and draw textured (DTY), were researched in this thesis. Bicomponent polypropylene/polyamide 6 yarns were produced at Julon d.d. (Ljubljana) under the trade name MTX. The percentage of polyamide 6 in the yarn is 16.50% and 17.10% respectively. In cross section, polyamide 6 is uniformly distributed in the form of short fibrils. Results obtained for the MTX fibres were compared with the results obtained for two polypropylene yarns (including Dryarn) and two polyamide yarns (including Econyl yarn made from recycled polymer). According to the results obtained in this research, polyamide 6 component has a significant influence on the properties of MTX yarn, i.e. MTX yarns have poorer mechanical properties and also elastic recovery and improved thermal properties (increased melting point) as compared to the yarns made of 100% polypropylene. Added polyamide 6 component has an impact on improved thermal conductivity of knitted fabrics as compared to the knitted fabrics made of 100% polypropylene fibres. Knitted fabric made of textured MTX yarn has excellent abrasion resistance, hydrophobic properties, poorer tensile strength and better wetting properties compared to knitted fabric made of 100% polypropylene yarn.

Tamara Bartol: Nonwovens from coarse domestic wool

(co-mentor: Prof. D.Sc. Mihailo Ristić)

Field of mentoring: textile fibres, nonwovens)

In the diploma work, some properties of bicomponent polyester (BiCoPES) and polypropylene fibres (PP) used in nonwovens from coarse domestic wool were investigated. In comparison with wool synthetic fibres, they had much lower length, significantly lower linear density, higher tensile strength and higher breaking elongation. The fibres had better interconnection on the nonwoven's surface than in their interior. The nonwoven had higher fibre orientation in one direction, which resulted in higher specific breaking force. The content of wool in the WO/PP nonwoven was 84.64%, but in the WO/BiCoPES nonwoven it was 92.49%. The content of moisture was 6.97% in the WO/PP nonwoven and 8.18% in the WO/BiCoPES nonwoven. Thermal conductivity of the nonwovens was comparable to rock and glass wool nonwovens.

Rahela Kurent: Protective clothing

Protective clothing is intended for professional use in different working environments. It provides protection against harmful effects of the environment and protection against risks to which the user may be exposed during work. Optimum protection, comfort, durability and functionality are the essential characteristics of certified protective clothing, which must be made from high quality materials and must be in accordance with

valid standards. These standards specify general safety and comfort requirements, marking and information supplied by the manufacturer. In addition, these standards also give test methods in order to determine whether the garments are appropriate for use and to determine the level of protection provided by the garments. The theoretical part comprises a general overview of Slovenian standards that refer to protective clothing together with a presentation of the main characteristics of protective clothing for use in specific working environments. In the experimental part, examples of modern protective clothing from various manufacturers selected on the basis of compliance with related standards are given.

Dostopnost



[Skip to content](#)