

POLYPROPYLENE MUTLIFILAMENT YARNS ANTIVIRAL AND ANTIMICROBIAL YARNS BIODEGRADABLE AND BIOSOURCED YARNS

KNITWEAR, SOCKS AND TACTICAL

MEDICAL TEXTILES AND FACEMASKS



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HQ, R&D CENTER & MANUFACTURING PLANT: Svit, Slovakia

Founded in 1934 240+ employees in Slovakia 50+ employees in Ukraine

LEADING MANUFACTURER OF SPECIALLY MODIFIED POLYPROPYLENEYARNS



MANUFACTURING PLANT: Lutsk, Ukraine







CHEMOSVIT FIBROCHEM S.R.O. is part of CHEMOSVIT Group











Machining

Prolen Yarns

BOPP films

Flexible films

Capacitor Films













Accounting, payroll and facility services



Packaging converting and film production



Support



activities



Machine from component to finalization



BOPP film production for industries



High-quality polypropylene yarn production

Tervakonki, a.n. II.

Capacitor film solutions

Company Timeline

Establishment of the Factory, first Viscose production



Launch of
polypropylene
multifilament yarn
Prolen®
production



Beginning of production of polypropylene microfibers and profiled yarns

Prolen®



1934

1965

1973

1997

2003



Launch of polypropylene staple fiber production



Development of
Antimicrobial
polypropylene yarns
Prolen® Siltex and
Prolen® Bodyfresh



Launch of 100% polypropylene reusable medical textiles Prolen® Medical





PRODUCTION LINE







ANTIMICROBIAL REUSABLE MEDICAL TEXTILES AND FACEMASKS



KNITWEAR, SOCKS AND TACTICAL MADE OF ANTIMICROBIAL POLYPROPYLENEYARNS

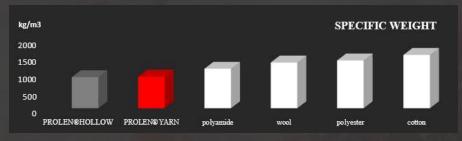
- Compounding
- Spinning
- Texturizing
- Finalizing

- Clothes
- Gowns
- Covers
- Bedlinen
- Sheets

- Thermal Hydrophobic Underwear
- Thermal & Summer Socks
- Fleece
- Tactical 2nd Layer
- Ticks Repelling Clothes

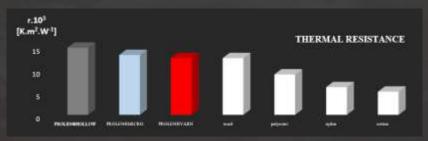






PROLEN®

THERMOREGULATING



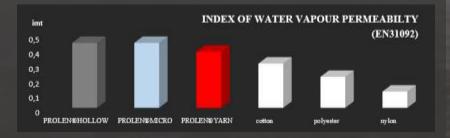
DRY



DURABLE



WICKING EFFECT



SUSTAINABLE & ECOLOGICAL & CLEAN

No water usage, No air pollution
Oekotex Standard 100, Annex 6, Class I
Higg Index 37 (Sustainable Apparel Coalition)
100% recyclable
Dope-dyed

OUR SPECIAL PROLEN® YARNS

- Yarns with a special remission curve in the IR spectrum **Prolen® Invisible**
- Yarns with fluorescent pigments emitting light in dark **Prolen® Glow**
- Microfibers Prolen® Micro and hollow yarns Prolen® Freee
- Yarns with antimicrobial and antiviral modifications Prolen® Siltex and Prolen® Bodyfresh
- Yarns from recycled raw materials Prolen® Recycle
- Yarns with treatment repelling ticks Prolen® IXO
- UV stabilized yarns Prolen® Sunprotect, Prolen® UPF
- Modified yarns for composites Prolen® Composite, Prolen® LowMelt
- Flame retardant yarns **Prolen® Xsting**
- Modified cross section triangle or circular profile **Prolen® Profile**
- Yarns decreasing/increasing temperature Prolen® Cool, Prolen® Thermo
- Yarns enhancing moisture transport Prolen® DryFast
- Automotive industry yarns **Prolen® Carwear**
- Yarns enhancing antibacterial properties, improving processability and touch Prolen® Soft
- Photocatalytic yarns with self-cleaning properties Prolen® Self-clean
- Yarns with hi-visibility pigments for protective wear Prolen[®] Hi-Vis







SEGMENTS

TEXTILE INDUSTRY

HOSIERY, SOCKS, SEAMLESS, CIRCULAR KNITTING, WARP KNITTING, WEAVING FOR SPORTSWEAR, LEISURE WEAR, UNDERWEAR, BASELAYERS, SWEATERS, CAPS, , SHOES, GLOVES, MEDICAL TEXTILES

MEDICAL INDUSTRY

BANDAGES, SPECIAL KNITWEAR, SANITARY, PADS FOR DIRECT CONTACT WITH SKIN, HOSPITAL GARMENTS, DENTAL THREADS, FACSEMASKS, MEDICAL TEXTILES FOR CLEANROOMS

COMPOSITES

AUTOMOTIVE, AERONAUTICS, SPORTS, MARITIME, FURTNITURE

FURNITURE INDUSTRY

UPHOLSTERY FABRICS

AUTOMOTIVE INDUSTRY

INTERIOR, DASHBOARD & AND BACK BOARD UPHOLSTERY, SEAT DRAPERIES COMPOSITES

SPECIAL PRODUCTS

NARROW WEAVING, THREADS, STRIPS, WEBBINGS, RIBBONS, PROTECTIVE WEAR

FOOD INDUSTRY

FILTRATION FABRICS, NETS AND SHEETS FOR SUGAR REFINERIES AND MILLS

AGRICULTURE

COVERING FABRICS, WATER FILTRATION, NETS





FUNCTIONAL SOCKS AND THERMOWEAR

PROLEN® SOCKS and KARPATHIA®



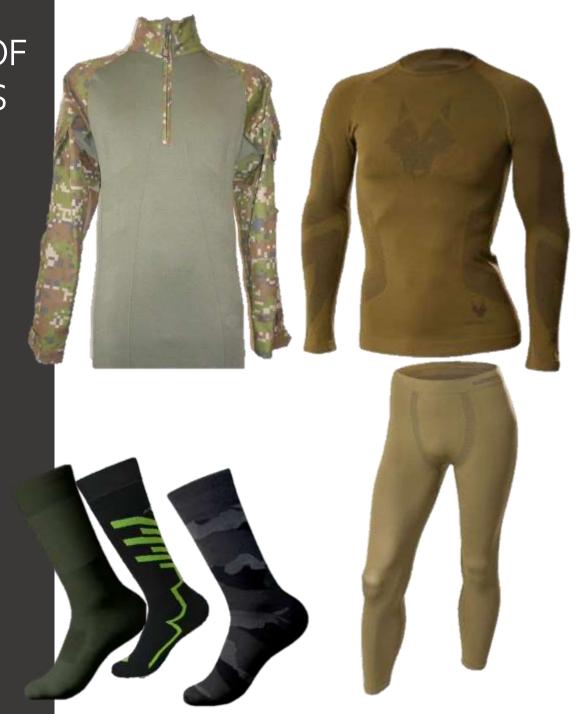
B₂B₂C and B₂G Concept

- CYCLING SOCKS
- SPORT SOCKS (FOOTBALL, OUTDOOR, TENNIS, BASKETBALL, SKIING)
- EVERYDAY SOCKS
- WORKWEAR SOCKS
- TASKFORCE SOCKS & TACTICAL
- SOCKS WITH FOLKLORE DESIGNS
- THERMAL UNDERWEAR KARPATHIA®



KNITWEAR, SOCKS AND TACTICAL MADE OF ANTIMICROBIAL POLYPROPYLENEYARNS

- Combination of hollow and tetrachannel polypropylene yarns
- Combination of polypropylene and with celulose modified polypropylene yarns
- Combination of polypropylene and with tick repelling additive modified polypropylene yarns
- Functional Hydrophobic Thermal Underwear
- Functional Thermal/Sport and Summer Socks



PROL- N® MEDICAL













REUSABLE TEXTILES WITH ANTIVIRAL AND ANTIMICROBIAL PROPERTIES

Prolen® Medical medical clothing and textiles are made of 100% polypropylene certified Prolen® Siltex and Prolen® Bodyfresh yarns, which are permanently treated with an antimicrobial and antiviral additive based on silver and zinc ions registered for use as an antimicrobial agent under the EU Biocidal Products Directive.





REUSABLE TEXTILES WITH ANTIVIRAL AND ANTIMICROBIAL PROPERTIES

EN13975-1 standard, which is intended for the work and management of the infectious environment in a hospital environment with the main impact on infections associated with health and nursing care. Surgical gowns and clean air clothing used as medical aids for patients, healthcare professionals, military medical personnel and standard performance equipment.

Prolen® Medical woven reusable protective face standard EN 14683 + AC: 2019, Type II BFE(%):

98.52%, registered as MEDICAL DEVICE, CLASS 1.









REUSABLE TEXTILES WITH ANTIVIRAL AND ANTIMICROBIAL PROPERTIES



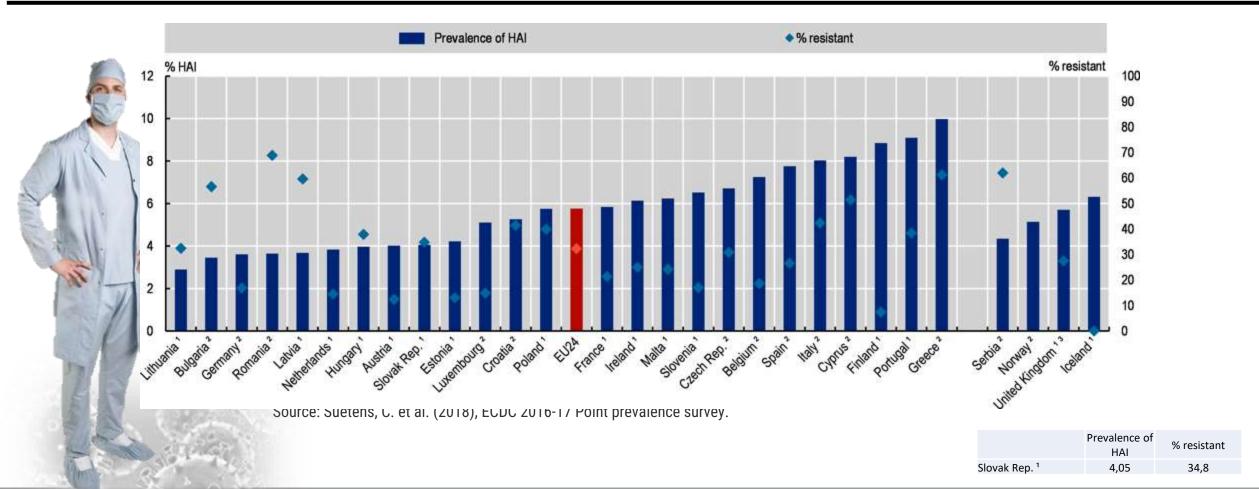
The goal of changing the use of textiles in health service:

- ✓ Ensure the safety of the patients and doctors during the stay in medical facilities and surgical procedures.
- ✓ Reduce the risk of contamination and avoid postoperative complications and spread of nosocomial infections.
- ✓ Save costs related to washing, ironing and frequent bed clothes replacement.



NOSOCOMIAL INFECTIONS IN EUROPE

Percentage of hospitalized patients with at least one healthcare associated infection and proportion of these antibiotic-resistant infections, 2016-17





HEALTHCARE-ASSOCIATED INFECTIONS IN EUROPE

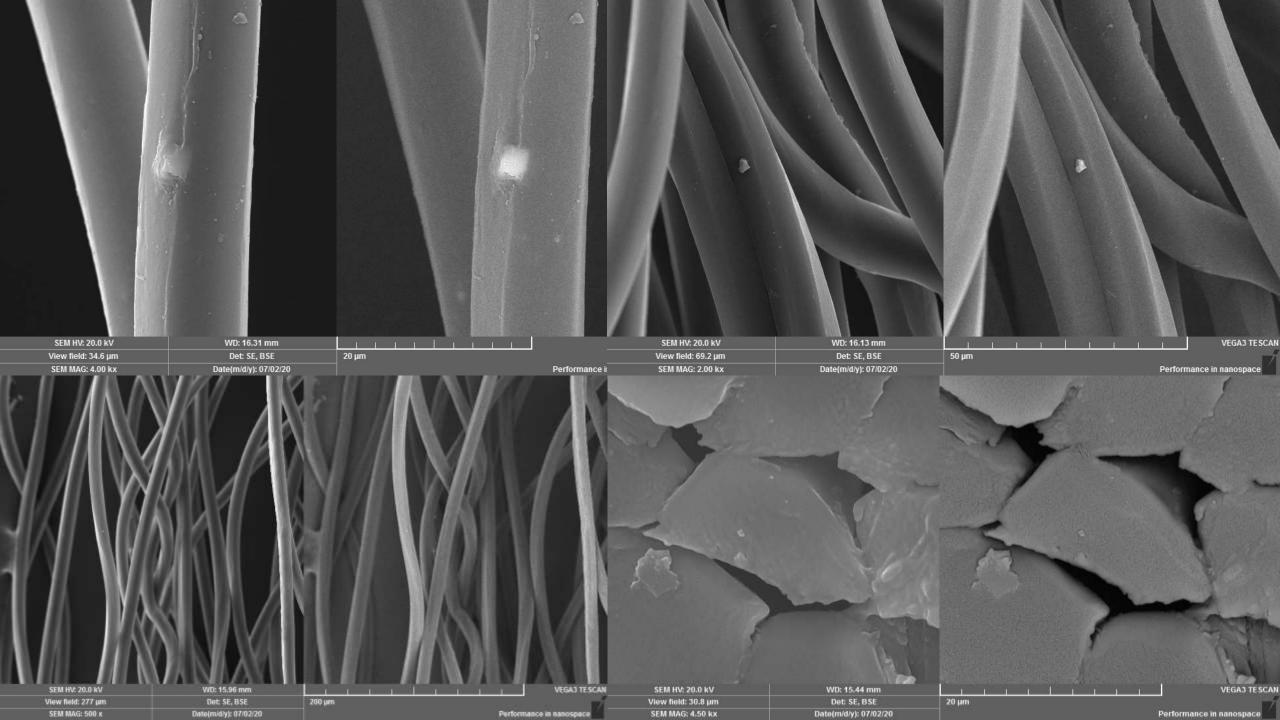
Approximately **4 100 000 patients** are estimated to acquire a healthcare-associated **infection** in the **EU each year**.

An estimated **90 000 people in the EU die each year** due to the six most common infections in health care settings.

At least 20% of healthcare-associated infections are considered to be avoidable through better infection prevention and control.

HAI lead to increased direct and indirect costs, with a wide variation in costs between hospitals and countries. In the USA, the costs of HAI can reach ~\$10–33 billion per year, and in the EU HAI generate costs exceeding 7 billion € annually.





Antibacterial properties AATCC TM 100: 2012 standard.

E. Coli: > 99.9% reduction

Staphyloccocus aureus: > 99.9% reduction

Kliebsiella: > 99.9% reduction

Antiviral properties ISO 18184: 2019

Coronavirus SARS-CoV-2: > 99% reduction

Influenza A virus subtype H1N1: > 99% reduction

Antifungal properties AATCC 30 Part III, EN 14119, method B

Aspergillus Niger: growth reduction

Epidermophyton floccossum: growth reduction

Trichophyton mentagrophytes: growth reduction







PROLEN® MEDICAL

- ✓ Antiviral, antibacterial, antifungal
- ✓ Reusable
- ✓ Sterilisable
- ✓ Longer durability
- ✓ Excellent chemical resistance
- ✓ They are not prone to pilling, no short fibers
- ✓ Stain resistance
- ✓ Lightness
- ✓ No discoloration after washing
- ✓ Help prevent the formation of bedsores
- ✓ Microbial cleanliness: help prevent infections
- ✓ No moisture build-up, hydrophobic
- √ Saves energy when washing
- ✓ Quick drying, no ironing
- ✓ Reduced the spread of microorganisms
- ✓ Breathability provides comfort
- ✓ Recyclable















Additional Prolen® Siltex and Prolen® Bodyfresh certifications:

- ✓ Health certificate according to STN 80 o55:2004 "Textiles. Textile and clothing products. Technical requirements and test methods," and according to the Regulation (EC) No. 1907/2006 of the EP and of the Council from 18th December, 2006 concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) as amended by later regulations and demostration of antibacterial efficiency according to the standard AATCC Test Method 100.
- ✓ Standard 100 by Oekotex, Appendix 6, product class I, for products in contact with children's skin
- ✓ EN ISO 9001:2015
- ✓ EN ISO 14001:2015





PROL- N® MEDICAL

VERIFICATION OF THE EFFICIENCY OF TEXTILES WITH ANTIMICROBIAL TREATMENT PROLEN® MEDICAL IN REAL OPERATING CONDITIONS

Description of measurements

• Measurement of airborne dust concentration and Analysis of microbiological factors – Aeroscope.

Measurement conditions

• The measurement was realized in real operating conditions, in a dynamic room - a space with permanent movement of people and in a static room - a space with limited movement of people, not in laboratory conditions.

Purpose of measurement

• Verification of the effectiveness of passive disinfection of Prolen® Medical textiles.







Analysis of microbiological contamination by ATP – swabs

Sampling was performed using certified ATP swabs from Hygiena LLC, which are used to monitor hygiene and detect the effectiveness of sanitation processes and disinfection on contact surfaces and to determine the CPM.



RESULTS OF VERIFICATION OF THE EFFICIENCY OF TEXTILES WITH ANTIMICROBIAL TREATMENT PROLEN® MEDICAL IN REAL OPERATING CONDITIONS



oth Sampling—ATP SWABS from original standardly used textile (cotton) (Swab No.1 - bed linen bed 1)

Odber sterom č.1 - ATP - ster (pôvodné povlečenie Lôžka č. 1 v Ambulantnej miestnosti č.1) Výsledky sú zobrazené v jednotkách RLU (Relative Light Unit). Hodnota v RLU je priamo úmerná počiatočnému inokulu a zodpovedá počtu baktérií vyjadrenej v jednotka KTJ pomerovou hodnotou: 400 RLU = povrch nie je dostatočne sterilný Kontaminácia povrchu je nad limitnú hodnotu 30 RLU

(Swab No.3 - doctor's clothes)



3rd Sampling—ATP SWABS from Prolen® Medical textiles (Swab No.1 - bed linen bed 1)



(Swab No.3 - doctor's clothes)





Evaluation of microbiological contamination analysis by ATP - swabs

Based on sampling by certified Envirocheck® Contact DC swabs used for the analysis of bacteria, yeasts and fungi, we can state that: Surface contamination is below the limit value of 30 RLU with evaluation:

SURFACE IS STERILE





Analysis of microbiological contamination by ATP swabs after 24 hours

Sampling was performed using certified ATP swabs, which are used to monitor hygiene and detect the effectiveness of sanitation processes and disinfection on contact surfaces and to determine the CPM.

Repeated sampling was performed after 24 hours on identical Prolen ®Medical clothing stored in bags before the cleaning process.



RESULTS OF VERIFICATION OF THE EFFICIENCY OF TEXTILES WITH ANTIMICROBIAL TREATMENT PROLEN® MEDICAL IN REAL OPERATING CONDITIONS



4th sampling - ATP SWABS (Prolen® Medical) - after 24 hours stored in plastic bag before the cleaning process

(Swab No.1 - bed linen bed 1)

(Swab No.3 - doctor's clothes)

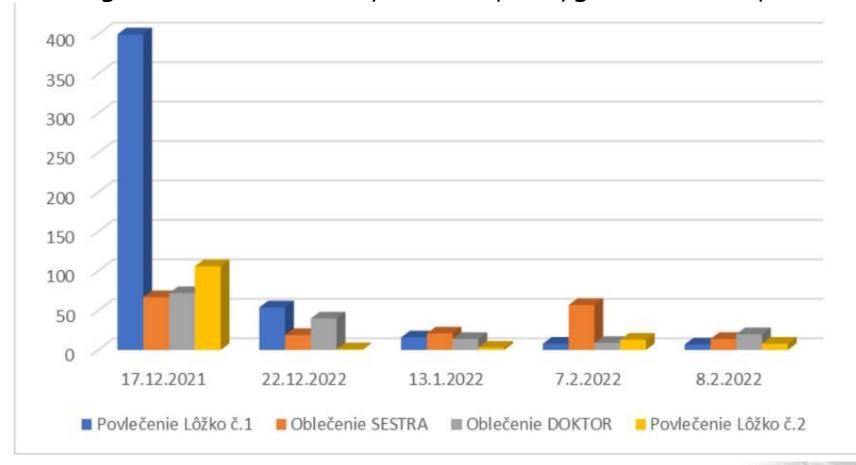
Hodnotenie: Tabuľka s hodnotením Opätovný odber sterom č.1 - ATP - ster (ProlenMedical povlečenie Lôžka č. 1 Výsledky sú zobrazené v jednotkách RLU (Relative Light Unit). Hodnota v RLU je v Ambulantnej miestnosti č.1) priamo úmerná počiatočnému inokulu a zodpovedá počtu baktérií vyjadrenej v jednotka KTJ pomerovou hodnotou: 7 RLU = povrch je sterilný Kontaminácia povrchu je pod limitnú hodnotu 30 RLU Poznámka – hodnota RLU je stabilná oproti predošlému meraniu z 13.1.2022 aj napriek tomu, že vzorka textílie ProlenMedical nebola Prog:0 10月 30分 vystavená procesu čistenia Test:154 Nameraná hodnota zo 7.2.2022 = 8 RLU.





Bedlinen 2

Analysis of microbiological contamination by ATP swaps (Hygiena LLC) - expressed in RLU







Analysis of microbiological contamination by MicroSnap TOTAL – swabs

Sampling was performed using certified MicroSnap TOTAL swabs from Hygiena LLC, which are used to monitor hygiene and detect the effectiveness of sanitation processes and disinfection on contact surfaces and to determine the CPM.

RESULTS OF VERIFICATION OF THE EFFICIENCY OF TEXTILES WITH ANTIMICROBIAL TREATMENT PROLEN® MEDICAL IN REAL OPERATING CONDITIONS



oth Sampling-MicroSnap TOTAL SWABS

(Swab No.1 - bed linen bed 1)





Výsledky sú zobrazené v jednotkách RLU (Relative Light Unit). Hodnota v RLU je priamo úmerná počiatočnému inokulu a zodpovedá počtu baktérií vyjadrenej v jednotka KTJ pomerovou hodnotou:

2825 RLU = povrch nie le sterilný

Kontaminácia povrchu je výrazne nad limitnú hodnotu 30 RLU

(Swab No.3 - doctor's clothes)



Výsledky sú zobrazené v jednotkách RLU (Relative Light Unit). Hodnota v RLU je priamo úmerná počiatočnému inokulu a zodpovedá počtu baktérií vyjadrenej v jednotka KTJ pomerovou hodnotou:

1486 RLU = poyrch nie je sterilný

Kontaminácia povrchu je výrazne nad limitnů hodnotu 30 RLU

3rd Sampling (Prolen® Medical) – MicroSnap TOTAL SWABS

(Swab No.1 - bed linen bed 1)



(Swab No.3 - doctor's clothes)



ster (ProlenMedical oblečenie personálu -

Výsledky sú zobrazené v jednotkách RLU (Relative Light Unit). Hodnota v RLU je priamo úmerná počiatočnému inokulu a zodpovedá počtu baktérií vyjadrenej v jednotka KTJ pomerovou hodnotou:

302 RLU = povrch nie je dostatočne sterilný

Kontaminăcia povrchu je nad limitnů hodnotu 30 RLU

Poznámka – hodnota RLU je výrazne nižšia oproti predošlému meraniu z 13.1.2022

Nameraná hodnota oblečenia z 13.1,2022 = 775 RLU



Analysis of microbiological contamination by MicroSnap TOTAL swabs after 24 hours

Sampling was performed using certified MicroSnap TOTAL swabs, which are used to monitor hygiene and detect the effectiveness of sanitation processes and disinfection on contact surfaces and to determine the CPM.

Repeated sampling was performed after 24 hours on identical Prolen ®Medical clothing stored in bags before the cleaning process.



RESULTS OF VERIFICATION OF THE EFFICIENCY OF TEXTILES WITH ANTIMICROBIAL TREATMENT PROLEN® MEDICAL IN REAL OPERATING CONDITIONS.



4th sampling – MicroSnap TOTAL SWABS (Prolen® Medical) - after 24 hours stored in plastic bag before the cleaning process

(Swab No.1 - bed linen bed 1)

(Swab No.3 - doctor's clothes)

Opätovný odber sterom č.1 - MicroSnap TOTAL - ster (ProlenMedical povlečenie Lôžka č. 1 v Ambulantnej miestnosti č.1)



Výsledky sú zobrazené v jednotkách RLU (Relative Light Unit). Hodnota v RLU je priamo úmerná počiatočnému Inokulu a zodpovedá počtu baktérií vyjadrenej v jednotka KTJ pomerovou hodnotou:

46 RLU = povrch nie je dostatočne sterilný

Kontaminăcia povrchu je nad limitrů hodnotu 30 RLU

Poznámka – hodnota RLU je nižšia oproti predošlému meraniu zo 7.2.2022 aj napriek tomu, že vzorka textílie ProlenMedical nebola vystavená procesu čistenia

Nameraná hodnota povlečenia zo 7.2.2022 = 305 RLU

Opätovný odber sterom č.3 - MicroSnap TOTAL - ster (ProlenMedical oblečenie personálu - doktor)



Výsledky sú zobrazené v jednotkách RLU (Relative Light Unit). Hodnota v RLU je priamo úmerná počiatočnému inokulu a zodpovedá počtu baktérií vyjadrenej v jednotka KTJ pomerovou hodnotou:

142 RLU = povrch nie je dostatočne sterilný

Kontaminácia povrchu je nad limitnů hodnotu 30 RLU

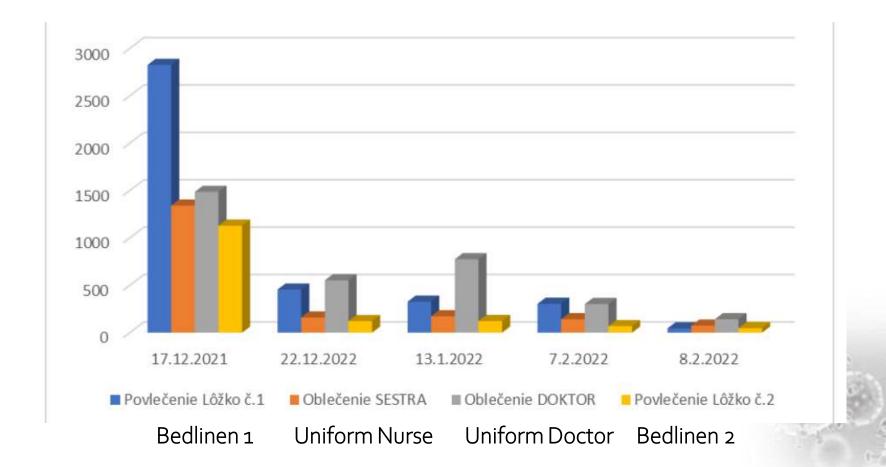
Poznámka – hodnota RLU je nižšia oproti predošlému meraniu zo 7.2.2022 aj napriek tomu, že vzorka textílie ProlenMedical nebola vystavená procesu čistenia

Nameraná hodnota oblečenia zo 7.2.2022 ⊂ 302 RLU





Analysis of microbiological contamination by MicroSnap TOTAL (Hygiena LLC) - expressed in RLU







EVALUATION OF RESULTS

Based on the flow chart of the number of colonies detected from 3 different types of tests, it can be stated that textiles with antimicrobial treatment PROLEN MEDICAL in real health conditions show a sustainable spectrum of microbiological factors with a tendency to reduce the number of colonies and it is possible to recommend this fabric in order to reduce the risk of microbiological factors.

When using PASSIVE DISINFECTION by means of textiles with antimicrobial treatment PROLEN MEDICAL, it is necessary to take into account the process of contamination, the environment and the frequency of changes of the textile in question.





FINAL EVALUATION

Based on the measured results, we can state that the checked samples of PROLEN® MEDICAL textile show effective components of

PASSIVE DISINFECTION



PROL- N® MEDICAL

In 2020, the Ministry of Economy of the Slovak Republic awarded Chemosvit Fibrochem s.r.o. the FIRST PRICE for innovative antimicrobial textiles.

in the category of COVID-19 INNOVATION THAT HELPED TO RESOLVE THE PANDEMIC SITUATION

in the INNOVATIVE ACT OF THE YEAR 2020 competition

for the competition proposal CLOTHING FOR MEDICAL PERSONNEL AND TEXTILE PRODUCTS PROLEN ® MEDICAL

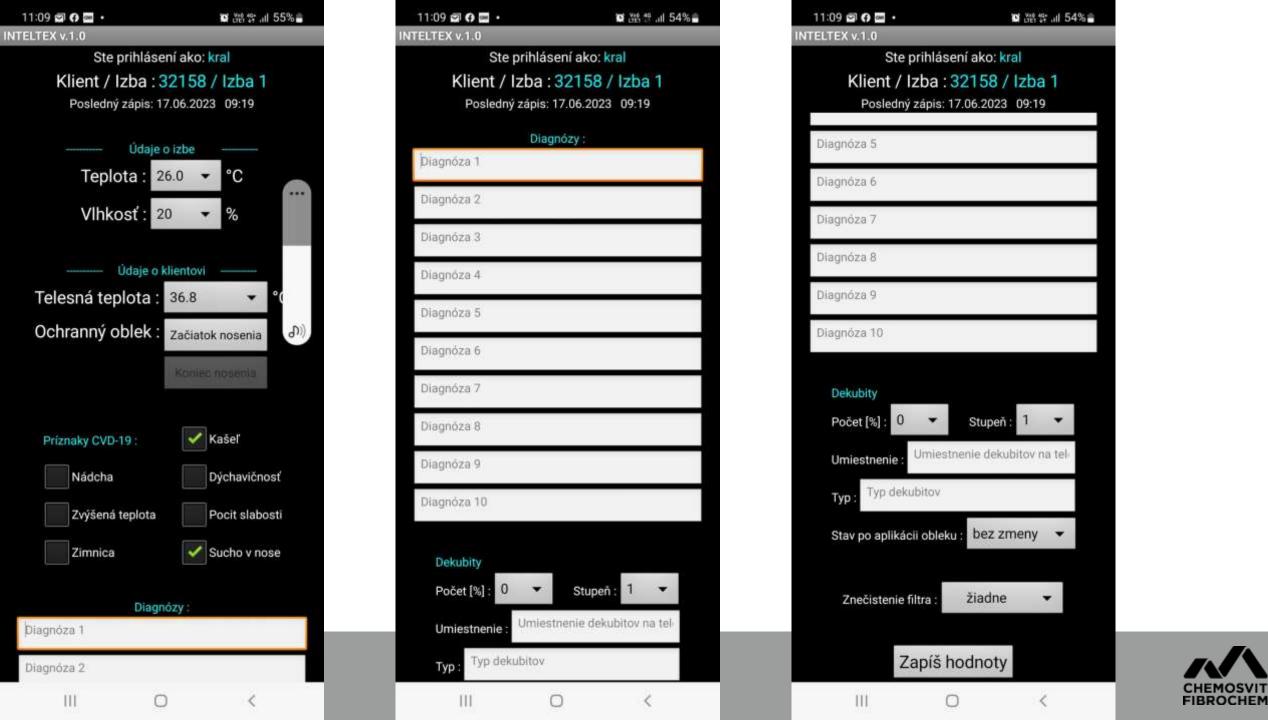




OTHER ACTIVITIES – PROJECT INTELTEX

- The deployment of PROLEN® MEDICAL antimicrobial textiles and filtration technologies in the real environment of the social services home in Bardejov with the aim of measuring the spread of respiratory and gastrointestinal infections and experimental research on the action of antimicrobial textiles as a prevention against bedsores and other dermatological manifestations in cooperation with the TUKE Faculty of Mechanical Engineering as part of the INTELTEX project CENTER FOR TEXTILE INTELLIGENCE.
- A specially developed mobile **application** for monitoring the condition and comfort of patients in the real environment of a social home.





OTHER DEVELOPMENT ACTIVITIES IN THE FIELD OF HEALTHCARE

- Development of photoactive polypropylene fibers Prolen® with the aim of realizing functional work clothes for workplaces with increased risk of transmission of microorganisms
- Development of Prolen® Medical antimicrobial textiles for the healthcare sector based on a combination of silver and copper.
- Development of antistatic polypropylene fibers primarily usable in work clothes and socks.
- Development of recycled polypropylene fibers Prolen® Recycle and controlled control of their circulation in the healthcare industry.
- Development of polypropylene fibers increasing and decreasing the surface temperature of textiles Prolen® Thermo and Prolen® Cool.



OTHER INNOVATION ACTIVITIES



• Development of specially modified PROLEN® GLOW fluorescent fibers that glow in the dark with primary use as a protective work element.



THANK YOU FOR YOUR ATTENTION

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