

Best practices for footwear, textile and furniture sectors technological watch

Learning from Industry Insights: Leveraging
Technological Watch for Enhanced Competitiveness
in Footwear, Textile, and Furniture



Best practices for footwear, textile and furniture sectors technological watch

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Objective

In the dynamic realm of technology, maintaining a competitive edge requires a proactive approach, and this begins with technology watch. This process involves systematically gathering, analysing, and interpreting information on technological developments.

This training module focuses on examining best practices within the footwear, textile, and furniture manufacturing sectors, with a specific emphasis on their alignment with critical technological watch factors.

Learners will explore industry-specific strategies and approaches that leverage technological watch to enhance competitiveness and innovation. Through case studies, they will gain valuable insights into the implementation of best practices tailored to each sector's unique requirements.

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1. Footwear best practices

1.1 Diashoe: diabetic foot prevention

Monitoring the Factor "Customer Demands and Trends"

Through the continuous monitorization of the factor "customer demands and trends", in the framework of the technology watch process of a footwear technology center it has been detected that diabetes is a chronic condition that occurs when the body cannot properly regulate blood sugar (glucose) levels. If untreated, diabetes can lead to severe complications, including cardiovascular disease, kidney problems, nerve damage, vision problems, and even amputations. A common complication, often affects the feet, leading to loss of sensation and making injuries hard to detect. Poor circulation in diabetic patients also slows wound healing, increasing the risk of infections and, in severe cases, amputation.

Technology watch report

To depth in this issue and understand better the problem and be able to offer a solution it was developed a technology watch report or state of the art on the specific affection of footwear in diabetes.

Thus, it has been set that **footwear is particularly important for people with diabetes** because they are at a higher risk for foot problems. Diabetes can lead to two major complications affecting the feet, such as:

- **Peripheral Neuropathy:** nerve damage that often results from high blood sugar levels over time. It can cause reduced sensation in the feet, making it difficult to feel pain, temperature, or injuries. Because of the reduced sensation, individuals with diabetes might not notice cuts, blisters, or pressure sores. These can become infected and lead to more serious complications if not treated for those with structural foot issues or pressure points.
- **Poor Circulation (Peripheral Artery Disease):** Diabetes can impair blood flow, especially to the extremities like the feet. Reduced blood flow can slow down the healing process, which makes it harder for even minor foot injuries to heal properly. This increases the risk of ulcers, infections, and, in severe cases, amputation.

For people with diabetes, choosing appropriate footwear is essential to prevent injuries and protect foot health. What should shoes look like then?

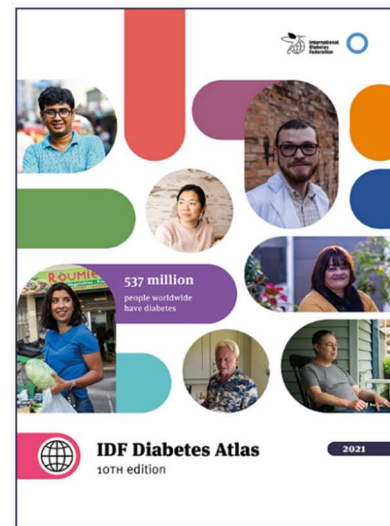
- **Fit and Comfort:** Shoes should fit well, with enough room in the toe box and no tight areas that could cause blisters or pressure points. Avoid high heels or narrow-toed shoes.
- **Support and Cushioning:** Look for shoes that provide good arch support and cushioning to absorb shock and reduce pressure on the feet.
- **Breathability:** Shoes made of breathable materials like leather or mesh help to prevent moisture buildup, which can lead to infections.
- **Inspect Shoes Regularly:** Look for wear and tear that could lead to uneven pressure or potential injury.
- **Specialized Diabetic Footwear:** In some cases, people with diabetes may benefit from specially designed shoes, which are often available by prescription. These shoes typically have extra depth, seamless interiors, and are tailored to accommodate orthotic inserts.
- **Custom Orthotics:** Orthotic inserts can help to distribute pressure more evenly across the foot, which can be particularly beneficial



The increasing prevalence of diabetes worldwide has influenced consumer demands and trends in the footwear industry, especially as people become more health-conscious and aware of the need for specialised footwear to support foot health.

The state of the art involves several reports. The IDF Diabetes Atlas¹ is one the most important and useful for the research objective.

Some key aspects set in this report is that specialists indicate that the main cause of foot complications in diabetics is inadequate footwear. In diabetics, **inadequate footwear is up to 80% cause of leg complications**, often leading to amputations



In fact, it has been declared **Diabetic Foot Syndrome (DFS)** as an ulceration of the foot, including the ankle, linked to neuropathy and varying degrees of

¹ www.diabetesatlas.org

ischemia and infection (WHO). It ranks among the most common complications of diabetes.

Nevertheless, the relationship between SHOES and DIABETIC FOOT CONTROL is not explored as it should be, it lacks a strategy involving research, knowledge and education.

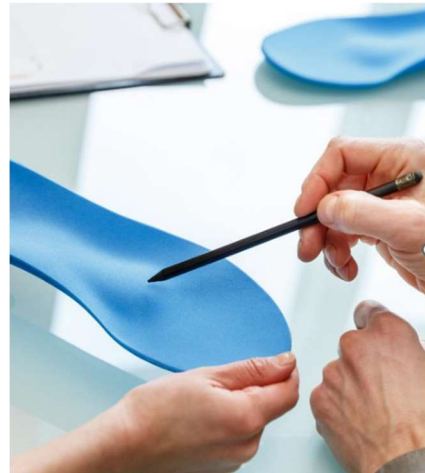
For that, the **intersection of diabetes-related needs with broader consumer trends is pushing the footwear industry to prioritise comfort, customization, sustainability, and style.** This evolving market reflects the desire for footwear that supports both specific health needs and general lifestyle preferences, paving the way for continue

The DIASHOE project: diabetic foot prevention

With the result of the technology watch and state of art on **Diabetic Foot Syndrome** it was launch the DiaSHOE project² focuses on diabetic foot prevention using appropriate footwear.

Project objectives:

- To increase the level of knowledge and skills of designers and footwear producers, making them aware of the need to integrate special features at all stages of the footwear manufacturing in order to respond to necessary needs of diabetics' patients.
- To provide a comprehensive diabetic foot management training programme focused on prevention through proper footwear, using digital tools for 3 target groups: footwear producers, the prescribers and consultants, and the patients and families.
- To combat the effects of diabetes, with a focus on the quality of life of patients.
- To increase the level of knowledge of patients, their families, educators, informal caregivers, health technicians, shoe shops, and businesses about the complications and risks that may be associated with diabetes in the lower extremities, the selection of appropriate footwear, and the acquisition of proper movement habits.



The project partners:

² <https://diashoeproject.ctcp.pt/>

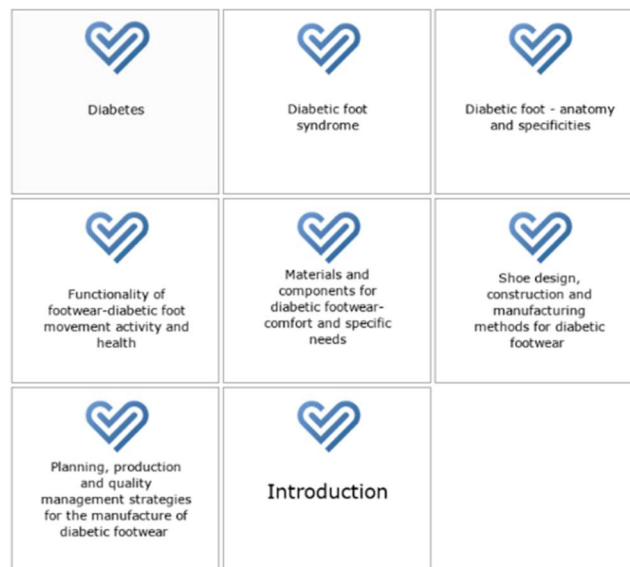


Project Results

Along the project it was designed and developed 3 digital training packages for 3 different targets in 7 languages (Czech, English, German, Polish, Portuguese, Romanian and Spanish), structured according to Learning Outcomes Units, aimed to be inserted in training paths and to be certified in the future.

Package 1 - Online Course for Footwear Companies for Diabetic Foot Management – 8 Modules

▾ Digital education package for designers, footwear technicians, and product managers on footwear manufacturing for diabetic foot control



Package 2 - Online Course for Health Technicians, and trade on Appropriate Footwear for Diabetic Foot Management – 6 Modules

▾ Digital education package for health technicians and shoe shop clerks



Package 3 - Online Course on Diabetic Foot Management – 5 Modules plus 1 infographic

▾ Selfcare digital educational package for diabetic foot control



Physical training: 1 week VET training toward the companies technicians

This training consists in a one-week (35 hours) hands-on intense training dedicated to footwear for diabetics and comfort footwear, from the design to the manufacturing. During this week, a shoe design and production workshop is held at the CTCP Shoe FabLab, as well as intensive technical training, with technical specialists in footwear.

The training was oriented to footwear designers, Footwear Technicians, other technicians and entrepreneurs willing to know more about diabetic context in footwear for the prevention of the Diabetic Foot Syndrome (DFS).



The prototypes:



1.2 FAIST: Agile, Intelligent, Sustainable and Technological Footwear Factory

Monitoring the Factor "Digital Transformation".

At CTCP there is a strong focus on the Digital Transformation and what relates to that, not only regarding the technologies themselves but also the strategies to

implement them and on how to increase the digital maturity leading to a more competitive and innovative companies.

In order to support the footwear companies on the digital transformation, we continuously seek relevant information. This includes searching scientific publications, patents, market reports, technology trends, study cases and others, on topics related to the digital transformation.

Technology watch report to learn about the state of the art

The state of the art is one of the first stages when doing research and innovation. This is what allows us to analyse what has been done and by who; this information helps the demonstration of the novelty of a new project. Before every project consolidation, a technology watch report jointly with a state-of-the-art document are conducted to define research orientations and guidelines to then structure the project in terms of objectives, activities and objects of research. This information may also include what other industrial sectors are doing on the topic.

As one of the key necessities of the sector it was identified the problem of many manual operations, with their associated risks for workers, especially when there is high volume of demand. Moreover, it was identified several advances where the implementation of new technologies could face and avoid these risks.

The FAIST project

FAIST³ - Agile, Intelligent, Sustainable and Technological Factory, coordinated by CTCP is a mobilising project that seeks to increase the agility and flexibility on the quick response to small, medium or large orders, automation of the highly demanding and/or dangerous manual operations, through the implementation and development of digital tools for an efficient production management with artificial intelligence incorporated, and also digital tools for quick prototyping and simulation.

The project joins 44 partners from different backgrounds: footwear, leather goods, components such as outsoles, insoles etc, software houses, technologies developers, materials developers, universities and technological centres.

Results: innovative products implementing technologies for a safer and sustainable industry

This project is still in course, however, some of the results are already available. This includes integrated production lines with automation and robotisation incorporated, digital tools for production management and product development, footwear products with lower environmental impact or with

³ www.faist.pt

TECHGROW

residues valorisation, automated machinery from traditional production operations or even automated machinery for innovative production operations.

In total, there are more than 80 innovative products resulting from collaborative work of this consortium. In parallel with all the technological development, not less important is the capacity building plan including training to provide to workers new skills related with the new reality of the industry - more digital.



1.3 MetalShoe Fablab Network: promoting circular economy within the footwear industry

Monitoring the Factor Circular Economy.

The technology watch process of CTCP includes monitoring academic publications, industry reports, and patent databases to identify new technologies and processes, such as material recycling, bio-based alternatives, and product take-back schemes. Additionally, collaborations and pilot projects within the industry are tracked, providing insights into practical applications of circular economy principles. This approach helped to uncover emerging technologies, evaluate their potential, and inform strategic decisions to implement sustainable practices across the footwear value chain.

As consumer demand for sustainable products rises and regulatory pressures on environmental impact intensify, companies are exploring ways to minimise waste, increase resource efficiency, and create closed-loop production systems. The circular economy offers a transformative approach to product lifecycle management, from design to end-of-life, reducing reliance on virgin materials while extending product durability. For the footwear sector, adopting these principles is crucial to meet sustainability goals and remain competitive in an increasingly eco-conscious market, and therefore, CTCP has been focussing on this factor, monitoring several sources of information that provides valuable information on the latest trends of sustainability related to the footwear sector.

The Metalshoe Fablab Network project

As result of this technology watch process through a comprehensive analysis of recent innovations, trends, and developments it was identify the opportunity and necessity of researching and developing new innovative and sustainable materials combining 3D-printing technologies and the use of recycled plastic in the development of new shoes.

CTCP launched the MetalShoe Fablab Network project aimed to develop and promote technological innovation, foster sustainability and circular economy, facilitate collaboration and knowledge sharing, empowering the industry to accelerate their green and digital transitions.

Results: shoes from recycled 3D filaments

As part of the Metalshoe Fablab Network project, the CTCP partnered with a footwear company to study the application of circular economy principles to the recycling of 3D-printed shoe lasts. The main goal of this study was to explore ways to repurpose waste from 3D printing by converting it into new filament for reuse in the production process. By creating a closed-loop system, the company

aimed to reduce material waste and increase resource efficiency, contributing to the sustainability of its value chain.

CTCP provided support throughout the project, from analysing the materials used in 3D-printed lasts to developing technical solutions for efficiently recycling the plastic. Tests were conducted to convert discarded material into high-quality filament suitable for new 3D prints. This project showcases the industry's commitment to sustainable innovation and reducing environmental impact.

2. Textile best practices

2.1. Skintex – special textiles for patients with skin disease so-called butterfly wing disease:

The starting point for implementing a technology watch system in any organisation is to have a clear understanding of the organisation's information needs, through factors like development, stakeholder concerns, legal changes, ongoing initiatives.

In this step establish Critical Watch Factors (CWF) in areas like technology, market, legislation, economics, sociodemographic, and competition.

Monitoring of the key watch factors, information audit

The chosen project plan is based on the knowledge and information obtained in solving the problem of clothing for medical purposes, which the company has been dealing with for a long time. It was multidisciplinary research, using knowledge from the fields of healthcare, microbiology, chemistry and textile technology. The intent of the project is based on the experience and knowledge of the research team, gathered from textile application and experimental research and development of the application of specialty chemical fibres.

Central to the focus of the research project was the long-term close cooperation with the University Hospital in Hradec Kralove, clinic of skin and venereal diseases and the established relationship with the Debra organization, which is a patient organization that facilitates the life of individuals suffering from the so-called butterfly wing disease (Epidermolysis Bullosa, EB).

The idea for the new project was also based on a long-term cooperation with Czech company Jitex Comfort (producer of special knitted textiles and clothing) and Slovak company Chemosvit Fibrochem (producer of special polypropylene fibers with new functional properties).

Technology watch report, state of art

The design of the new project was preceded by research into current trends in the segment of special textiles and clothing for patients suffering from skin problems. Knowledge and information on how to use special fibres and treatments to improve the physiological and functional properties of textiles and garments to benefit the skin was analysed. The aim was to find a solution for the target group of patients with skin problems that would significantly contribute to alleviating the symptoms of skin disease.

The following conclusions were drawn from the findings. Developed textiles must have the following properties:

- A soft and smooth feel
- Low coefficient of friction
- Physiological comfort - dissipation of excess moisture, heat
- Antibacterial effectiveness which prevents infections. For example, in patients with butterfly wing disease, it helps prevent wound infection
- Easy maintenance especially because of the removal of stains after application of ointments and creams.

A survey of the legislation revealed a clear requirement. Newly developed textiles must comply with the requirements for health safety. A market survey was carried out of laboratories and other institutions that provide the necessary laboratory testing and certification for the development of new textiles and their subsequent marketing.

These findings challenge the conservative view that cotton-based products are the most suitable garments for patients with skin problems.

The result of this phase was the project proposal No. CZ.01.1.02/0.0/0.0/20-336/0023639, PP2 in the Czech national call of collective research in clusters which was approved and solved in years 2021-2023.

Project realization and results

The aim of the project was to research and develop special textiles and garments based on new types of chemical fibres and modified fibres for patients suffering from certain rare skin diseases.

The most important result of the project was "Special flat fabric for patients with skin diseases in the form of a functional sample, protected by utility model number 37050, utility model registration date 16.5.2023. Another important result of the project was "Special clothing accessories for patients with skin diseases" in the form of a functional sample.



The project promoters, i.e. VUB a.s. and Jitex Comfort s.r.o., in cooperation with DEBRA, designed and successfully tested a range of underwear, clothing and clothing accessories (gloves and socks) for patients. In cooperation with Jitex Comfort was prepared a collection of special garments and underwear. Patients

appreciated their exceptional functional and utility properties. Special attention was paid to the garment and underwear design, where the emphasis was on physiological comfort and seamless design.

In cooperation with company Elexus, the development of seamless socks with digital SW technology in low, semi-high and knee-high socks was realised. Based on the knowledge gained from testing, a collection has been prepared and activities are underway towards their market application.

2.2 ECOlogical finishing agent for Durable Water & Oil Repellent textiles with advanced functionalities - ECO-DWOR

The project main goal was to develop and upscale of eco-friendly, cost-effective and durable water repellent and oleophobic high-performance fluorine-free DW(O)R textile finishing system based on a combination of inorganic (nano)particles functionalized with surface fluorine-free groups and bio-based organic polymers from renewable resources with controlled microstructure applied on textiles from synthetic and natural fibres by conventional finishing technologies: impregnation, exhaustion or coating. Incl. multifunctional effects achievement.

Monitoring of the key watch factors, information audit

Fluorocarbon-based resins provide textiles with unique properties based on extremely low surface tension: a high water-repellency and oleophobicity. These properties are very important for functionalization of protective clothing and many types of technical textiles (tents, automotive, home textiles, filters, health-care materials). The best liquid repellent effects are achieved by means fluorocarbons (mainly C8-based). It has been however proven that perfluorinated hydrocarbons are dangerous because they release substances, mainly the perfluoro octanoic acid (PFOA) and its sulphonate (PFOS) and other fluorinated derivatives which are persistent and toxic for human health and environment and are highly resistant against biodegradation ("forever chemicals" - half-life of fluorinated acrylic polymers: 1200-1700 years). Therefor the utilization of fluorinated chemicals for textile finishing in EU was gradually limited by European Commission from 04 Jul 2020 with the contemporary exception for protective clothing till 04 Jul 2023. Nowadays fluorocarbons C8 are prohibited from use completely, a ban of utilization of fluorocarbons C6 and other fluorinated chemicals is suggested by ECHA and expected soon.

These facts were a challenge for the development of innovative durable water and oil repellent systems for textile finishing

Technology watch report, state of art

State-of-the monitoring phase was aimed to map a current situation and trends in following areas:

- Market research – DWOR chemicals and finished textiles/clothing production and sale by chemical types, fibres, end-use and regions
- Legislation and REACH issues
- Survey of available PFOA/PFOS-free commercialized DW(O)R systems
- Survey of innovative developed PFOA/PFOS-free solutions both ready for upscaling
- Research of new ideas under development (actual and prepared research projects, innovative technologies not realized yet) – identification of challenges and possibilities

Several promising solutions contributed to preparation and submitting the ECO-DWOR project aimed for utilization of paraffin and sol-gel/nanoparticles based DW(O)R systems development and preparation (COLOR CENTER, ES) and suggestion, verification and optimization of their application technologies by impregnation, exhaustion and coating). Textile with (multi)functional barrier effects were obtained (water-repellent, water-tight/FR, antistatic, antimicrobial, self-cleaning).



COLOR CENTER – pilot capacity: 65 kg TEXAFOB ARK (paraffin-based DWR product)

R2R Werner-Mathis continuous line (INOTEX),
width 45 cm (INOTEX), strips 3 - 3,2 m



INOTEX – lab trials of DWR finishing TEXAFOB ARK by impregnation-drying-curing process: water repellent effect



3294_IPDI_2 SWCNT 0.1%



INOTEX – lab trials of DWOR finishing 3294_IPDI_2 / SWCNT 0.1% by coating: combination of watertight coating with carbon nanotubes: watertight/antistatic effect

Project realization and results

The selected paraffin-based DWR system TEXAFOB ARK has been upscaled from laboratory and pilot-plant application up to the industrial textile finishing. In cooperation with the Czech textile finishing company JITEX-comfort s.r.o the F-free paraffin-based DWR finishing chemical is currently industrially realized for textile finishing by exhaustion process in amount

2022: 840 kg,

2023: 1575 kg,

2024: 3360 kg.



Industrial application of praffin-based DWR product (JITEX-comfort s.r.o)

Parameters

Square weight: 194 g/m²
 Spray test EN ISO 4920: 4,5 5; spray test washed 5x40°C: 4,5 4,5
 Air permeability EN ISO 9237: 309 mm/s
 Water vapour resistance ISO 11092: face: 2,66/ back: 2,64 m².Pa.W⁻¹
 Water drop test: pass, stable in 5 washing 40°C:

PAD66/Ly ARKICL-1	Finished unwashed	finished + washed 5x40°C	Finished	Finished+ washed 5x40°C
0 min				
5 min				
10min				
30 min				
60 min				

Note

No sediments/precipitation observed of the machinery equipment

Industrially finished textile with F-free TEXAFOB ARK DWR – a stable water repellent effect



E11894! ECO – DWOR

ECOLOGICAL finishing agent for Durable Water & Oil Repellent textiles with advanced functionalities

01.06.2018 - 31.5.2021

The Challenge

- Production of eco-designed (fluorine free) water and oil repellents
- In compliance with the environmental demands from international organisations

The Aim



- Manufacturing a novel Fluorine – free Textile Finishing Agent
(based inorganic nanomaterials and bio-based organic polymers)
- Optimizing the application method to produce textiles with durable water and oil repellency
- Combination of different finishing systems for the production of DWOR textiles with advanced properties

Expected Results And Benefits

- The expertise and know-how generated throughout the project will make possible the implementation of novel polymer synthesis strategies and dispersion technologies
- Set a Novel range of Fluorine-free Textile Finishing agents



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2.3 Project FAG 2023 – Bacteriophages in testing laboratory

This practical case come from [Textile Testing Institute](#) in Brno (CZE). The background of the project was the requirement of textile developers to introduce quality testing of the effectiveness of the antiviral activity of functional treatments. The risk of dissemination of highly contagious viral diseases (as COVID-19, Ebola) led in the increasing need to develop functional textiles and surfaces with antiviral effect.

Monitoring of the key watch factors and sources

The project was based on the systematic monitorisation of different watch factors and sources of information that allow TZU to have updated information of main advances in the textile sector.

As part of this work, it was identified the new standards ISO 18184 and ISO 21702. Due to the previous experience with the cultivation and preservation of bacteriophages given by the long-term experience of the laboratory workers it was decided to investigate and launch a new initiative aimed at testing of a set of samples with antiviral treatment, mainly textile, and dissemination of results via presentations and publication.

Technology watch report, state of art

The selection of test viruses was based on an initial literature review. The search for published data is carried out regularly at approximately monthly intervals. The choice of keywords and scientific and industrial resources is given by years of experience in the field of microbiology and textile testing. The use of AI in this area leads to controversial results.

Technology watch report to learn about the state of the art was carried out during the solution of the project and continued even after its completion, in connection with the publication of outputs.

The keywords used for the search of the appropriate professional and scientific outputs were, for example: antivir*, effectivity, activity, anti-viral, bacteriophage*, virus, surrogate, textile*, antiviral textile, plastic*, non-porous surface, antiviral surface.

The basic platforms used as sources of information: PubMed Central (PMC), ResearchGate, Science Direct, Springer Link.

List of sources

As follows it is showed the identified list of sources:

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Project realization and results

All previous articles and scientific papers were useful to define the project methodology to follow in the laboratory and the last techniques to be applied.

The samples of textiles with antiviral finishing were tested by the bacteriophage-based method and excellent antiviral activity was detected for all tested materials. Together with standard reference material, other woven cotton structures with similar square weight were compared and no statistically significant difference was found between the results (antiviral efficacy values). Moreover, a simple and quickly feasible screening method for determining the antiviral properties of textiles, especially with leaching-type of treatment, was also designed and tested.

Similar to the VFE viral filtration efficiency method using the bacteriophage Phi-X-174 test mechanism, the bacteriophage-based method of antiviral efficiency determination is a suitable safe alternative for textiles and surfaces testing. VFE

method allows the testing of products against the passage of viruses through various types of woven and non-woven textiles. These textiles are used mostly for the production of face masks and other textile materials. It does not use dangerous animal viruses, but still allows to verify the ability of the material to capture infectious agents of viral origin.

Thanks to the systematic use of technical watch resources in the form of technical articles, scientific papers and international standards, the project resulted in an established, validated, accredited test method. This project could be seamlessly followed up by the ANTIVIR project submitted this year, which will look in more depth at the comparison of methods for testing the viral potency results of animal viruses and bacteriophages and the correct interpretation of the test results.

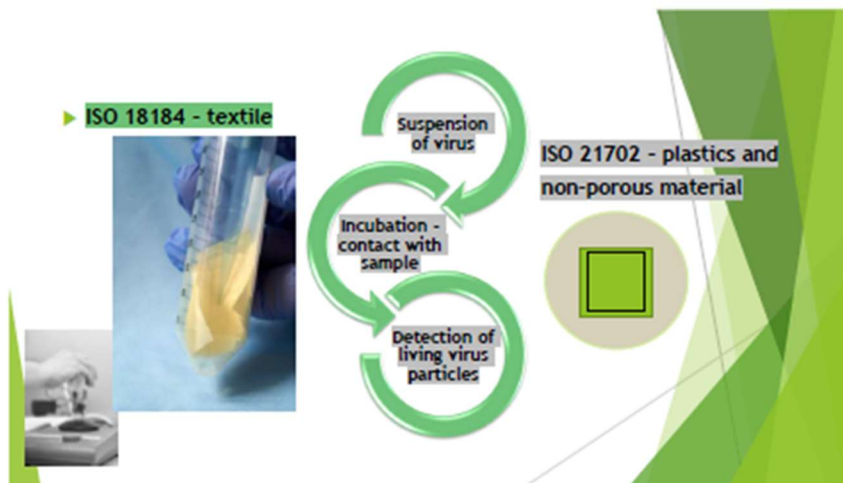


ANTIVIRAL ACTIVITY TESTING

Antiviral activity of textiles and surfaces

Antiviral treatments can reduce the viability of viruses and their ability to infect host cells. Textile Testing Institute offers the testing of textile materials according to the standards ISO 18184 Textiles - Determination of antiviral activity of textile products and the testing of plastics and other types of surfaces according to ISO 21702 Measurement of antiviral activity on plastics and other non-porous surfaces.

The testing methods with the use of bacterial viruses are suitable for the testing of textile products, surfaces of furniture, foils and upholstery fabrics.



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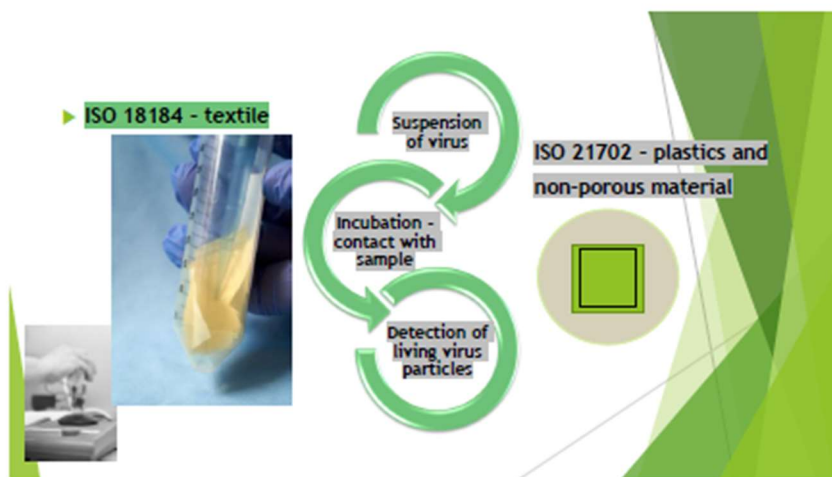


FURNITURE TESTING

Antiviral activity of furniture surfaces

Antiviral treatments of furniture surfaces can reduce the viability of viruses and their ability to infect host cells. Textile Testing Institute offers the testing of textile materials according to the standards **ISO 18184 Textiles - Determination of antiviral activity of textile products** and the testing of plastics and other types of surfaces according to **ISO 21702 Measurement of antiviral activity on plastics and other non-porous surfaces**.

The testing methods with the use of bacterial viruses are suitable for the testing of surface treatments of furniture, foils intended for furniture and upholstery fabrics.



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Publication

The results connected with the project were presented on international meetings in the field of textile treatments (TEXCHEM) and in the field of microbiology (Congress of Virology) and published in textile scientific journal (Fibres and Textiles).



Publications:

TVRZOVÁ, Ludmila; PRODĚLALOVÁ, Jana; BLAHOVÁ, Anna; DOUBKOVÁ, Hana; PROCHÁZKA, Jiří. Testing of antiviral activity of textiles TEXCHEM 2023, Hradec Králové, CZ.

TVRZOVÁ, Ludmila; HRUBANOVÁ, Markéta; BENEŠOVSKÝ, Petr; DOUBKOVÁ, Hana; BLAHOVÁ, Anna et al. Bacterial filtration efficiency and viral filtration efficiency of face masks – the role of bacteriophages in textile testing International Congress on Virology and Advances in Clinical and Cellular Immunology 2023 London UK

TVRZOVÁ, Ludmila; BLAHOVÁ, Anna; FOJT Jakub; DOUBKOVÁ, Hana; PROCHÁZKA, Jiří. Antiviral textiles and antiviral activity testing – The use of bacteriophage surrogate for antiviral activity testing. Fibres and Textiles, 2024.

3. Furniture best practices

3.1. Circular Economy: new and sustainable composite materials

Monitoring the Factor "Circular Economy and Valorization".

At CETEM, we focus on research in the circular economy and valorization, aiming to reuse waste and create sustainable products. This approach not only reduces waste but also adds value to materials that would otherwise be discarded.

To lead in implementing circular economy practices, we continuously and systematically search for relevant information. This involves reviewing scientific publications, patents, market reports, and technology trends in waste recovery and the circular economy.

Technology watch report to learn about the state of the art

Analyzing the state of the art in technology is a crucial step in any research and development process, as it demonstrates the novelty of a project. Therefore, CETEM conducted a technology watch report to identify and evaluate the latest research and developments in using agri-food waste for manufacturing boards. The report includes information on commercial solutions, patent applications, R&D projects, and scientific literature. An example of a technology watch report prepared by CETEM related to the topic is: [Technological Uses and Applications of Biomaterials](#)

Development of the MATCOMP project

To make significant progress in this field, CETEM launched the MATCOMP project. The objective of this initiative was to research and develop composite materials created from the agglomeration of lignocellulosic fibers. These fibers can originate from wood or from the valorization of natural and/or synthetic waste from other industrial sectors, with the aim of applying these composites in products intended for the habitat sector, such as furniture and paneling products intended for the habitat sector, such as furniture and paneling.

Project Results

As a result of the MATCOMP project, we developed a prototype board using waste from the wine industry. This board not only meets the quality and durability standards required for use in furniture and paneling but also represents a sustainable solution by reusing waste that would otherwise be discarded.



3.2. Electronics and ambient intelligence: smart furniture for elderly people

Monitoring of the Factor "Electronics and ambient intelligence"

CETEM has a dedicated research line focused on electronics and Ambient Intelligence applied to the habitat sector. We continuously stay updated with technological advancements, particularly in the incorporation of Internet of Things (IoT) devices in furniture designed for the elderly.

Technology watch report to learn about the state of the art

Our research team has concentrated on identifying the latest innovations in IoT devices that can be integrated into furniture for the elderly. We conducted a state-of-the-art analysis, including commercial solutions, patent applications, R&D projects, and scientific literature. This analysis covers various IoT devices, such as motion sensors, health monitors (heart rate, blood pressure), fall detectors, and emergency communication systems, as well as the usability and benefits for users. Some of the technology watch reports prepared by CETEM related to the topic are: [New Technologies and Applications in Active Ageing](#) and [State of Internet of Things \(IoT\) Technology](#)

Development of the ASISTAE project

To develop innovative technological solutions that enhance the quality of life for the elderly, we launched the Asistae project in collaboration with the upholstered furniture company Fama Sofás. This project focused on creating smart furniture that aids and monitors the elderly through IoT devices.

Project Results

As a result of the Asistae project, a smart chair was developed with a built-in device to monitor elderly individuals via a mobile application. This chair combines

comfort, functionality, and advanced technology. Asistae is currently a protected trademark, and the product is available on the market.



3.3. Immersive reality experience in the furniture sector

Monitoring of the Factor "Industry 4.0".

CETEM actively monitors the critical factor related to Industry 4.0, focusing on the adoption of these technologies to transform and enhance production processes in the furniture sector and improve the customer experience. Industry 4.0 encompasses technologies such as the Internet of Things (IoT), immersive reality technologies, robotics, and artificial intelligence.

Technology watch report to learn about the state of the art

CETEM conducted a technology watch report to track advancements in immersive reality technologies and their application in the furniture industry. This report focused on identifying commercial solutions, patent applications, R&D projects, and scientific literature related to the use of these technologies. The aim was to facilitate tasks like furniture assembly and the visualization of customized configurations in customers' homes by overlaying digital information onto the physical environment, effectively merging the real and virtual worlds. An example of a technology watch report prepared by CETEM related to the topic is: [Applications and Competitive Advantages of Robotics](#)

Development of the REMIXTAT project

To achieve significant progress in applying immersive reality technologies in the furniture sector, CETEM launched the REMIXTAT project. The objective was to develop a mixed reality experience that enables users to visualize and interact with products at their installation site in an intuitive and autonomous manner.

Project Results

As a result of the REMIXTAT project, an innovative and practical mixed reality experience was developed. This solution has optimized how customers can visualize and interact with our furniture products in their own environments.



TECH GROW

VET training on technological watch



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