TETEX

QUARTERLY TECHNICAL TEXTILES MAGAZINE
Autumn 2015

TOP 10 PRODUCTS FOR AUTUMN

A YARN STRAIGHT FROM THE SLAUGHTERHOUSE

Check if you wear clothes made from animal-derived materials!

Expo 2015 Milan

"Feeding the Planet, Energy for Life"

Ocean Rescue!

The problem with junk, one of the biggest challenges facing humanity today.

+

Trainers made from ocean rubbish
Synthetic materials that will help clean up the oceans

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Editorial

Welcome!

You are now reading the third issue of the technical textiles magazine, Tetex Magazine.

We are giving you the most interesting pieces of news, advice and reports that we can find, compile and write.

Each day, our editorial team devotes hours to search for what is most valuable in the world of tech-textiles.

In this issue, we present 10 products, which will be a good inspiration for autumn.

We visited the Expo 2015 in Milan – you will find the story about this event later in the magazine.

We, also, got tempted to test the methods of fighting ocean pollution. It turns out that even here, technical textiles can work wonders.

We hope that you will like our third issue of the Tetex Magazine.

Dorota Sakowska-Hunt

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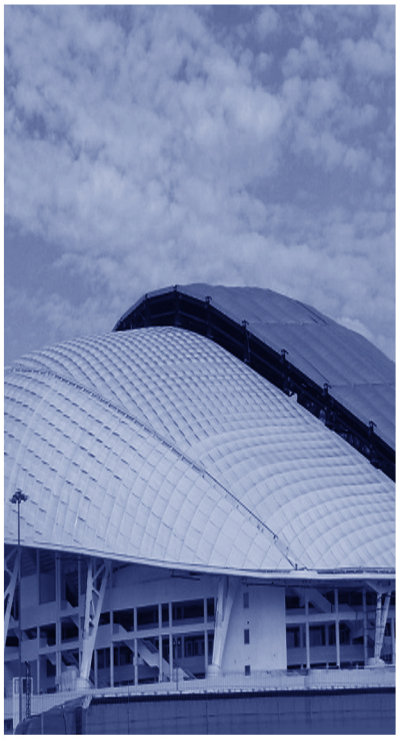

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TOP 10 PRODUCTS FOR AUTUMN

Autumn is a specific time – nature is getting ready for winter, and we are looking for ways to enjoy the last warm days. We have to admit that preparing the TOP 10 list caused us to discover a few unusual and worth testing products. You will find a large variety in our compilation – there is something for everyone. We created a list which presents a wide range of products for the fall season. And everything to make you interested in the world of technical textiles!

1

1. Umbrella

"Umbrellas, umbrellas for adults and for children!" everyone knows the song lyrics, in the meantime, it got colder, darker and rainy outside. Autumn is in full swing. Rainy days happen more and more often. If we don't want to get soaking wet, we should obtain a good quality umbrella. The selection is huge, from small and foldable to the elegant ones with an ornate handle. We all came across low quality products, whose wires bent and edges of fabric shredded even from the slightest wind gusts. A good umbrella, which will withstand strong wind gusts, is fairly lightweight, and made of durable materials that will last for years, isn't easy to come by. Very few people know that pursemaking facilities, with decades-long traditions, providing repair services and manual production, have still survived in Poland. It is their products that are referred to as "Mercedeses" of umbrellas.

Senz's storm umbrellas

2

2. Raincoats

Autumn is that time of year that can surprise us with weather anomalies. In just a few moments, the weather can make an almost 180-degree turn. And we should always be ready for its sudden collapse. It's good, then, to have a raincoat on hand, even the pocket kind. There is a huge disparity in prices. From the cheapest costing a little more than 1 EURO, which can still protect us from unnecessary soaking, and as a consequence, even from illness, to the high quality ones costing even a few hundred EURO, ensuring not only an excellent rain protection, but also thermal comfort and attractive appearance. When packed, the coat is small enough that it can be carried in a woman's purse or a laptop bag, without worrying that we won't have room.

Designer cape coats

Teko's recycled socks

3

3. Warm socks from recycling

Paradoxically, it is warm socks that can prevent us from the common cold and other illness. If our feet get cold, especially on a rainy or chilly day, we are guaranteed to catch a cold. We can, already today, buy warm socks, and become more ECO at the same time. One company in the UK came up with the idea of recycling old and not needed fishing nets, and making them into socks. The production process is still a secret. It is worth mentioning that the company will let us trade in our old and worn socks for a "new-smelling" brand new pair, instead of offering "out of this world" promotions and rebates. Both, the concept and the execution, deserve a word of praise.

Spaio – Relive Line. Italian thermo-active underwear

4

4. Thermo-active underwear

Regardless of whether you are an avid athlete or not, there should be at least one set of thermo-active underwear in your closet. On cooler autumn days, it is very easy to get into situations where we become sweaty – at the same time, we risk coming in contact with wet clothing. That's why the main task of thermal clothes is to wick moisture away from the skin. This is of great importance to the perceived thermal comfort. It is because of moisture that our bodies cool down around 20 times faster than in dry conditions. Thermo-active underwear prevents this process through special fiber construction and material structure. Moisture is drawn out to the outer layer of fabric, and the skin surface stays dry.

Winter jacket with removable lining - DOVER SIOEN

5

5. Clothing for hunters

Autumn is hunting season. Successful hunting is often in the details. A functional knife, a flashlight or reliable binoculars will support you in carrying out your passion. However, it is most important to feel comfortable and warm during fall prey tracking. A well-tailored jacket, thermo-active underwear, insulated pants or perfectly fitting shoes will increase your effectiveness. "Being invisible" isn't without significance here. Hunting clothes are characterized by a specific camouflage, not at all like that of the military, but excellently imitating a forest. The versatility and high quality of this type of clothing makes it popular not just among hunters. It also performs well on bike rides, walks, outdoor events, in paintball, nature photography, etc.

6

6. Survival kit – "GRENADE"

It is better to have it with you in case of a crisis situation, especially on cold autumn evenings. A product of the company, The Friendly Swede, is a handy, 11-piece survival kit. It contains, among others, tinder, kindling, knife blade, aluminum foil, rope, and a fishing kit. All this for less than 10 EURO. And as a bonus – a lifetime warranty.

The Friendly Swede - Survival grenade

7

7. Hypo-allergenic bed linens

The number of indoor mites increases between autumn and spring. It is an especially dangerous time for people with allergies – especially during sleep. It is in bed, where it's warm and moist, that conditions become ideal for the development of mites. Scientists in Lodz found a way to make life easier for sensitive people. They patented a fabric that passes water vapor and air, and stops, dangerous for people with allergies, droppings of household dust mites. Sheets made from the fabric reduce the concentration of allergens in the environment of the affected, and at the same time, improve his health, and reduce the doses of anti-allergy drugs.

Linens that protects against allergy

8

8. Bags for plants

Many plants which we grow in our gardens, terraces or balconies are sensitive to freezing temperatures. Some of our precious specimens, such as roses, rhododendrons, and vines, which we cultivate for many years are, already, of impressive sizes. Therefore, we have to safeguard them properly and protect them from freezing, water loss, and bark cracking. Protective caps is one of the ways to do it. They serve to shield plants wintering in the ground. They are made of agro-textile, which shields plants from adverse weather conditions (frost, humidity, gusty winds). Putting them on is childishly simple, and doesn't take more than 60 seconds. They can also slightly change the gray and dreary appearance of our fall and winter gardens. Instead of white, gray, or black caps looking just like garbage bags from the distance, we can buy those with characters from fairy tales or movies. Children will be delighted when their favorite hero will bravely guard the garden!

Sympathetic bags for plants

Good looking covers

9

9. Covers for garden furniture

They are waterproof, and, most often, made of 100% polyester. They protect unused garden furniture from rain, sun, dirt, and falling leaves. They help us save time (no need for more frequent cleaning and washing of furniture) and space (the furniture stay in the garden all year). In a simple and effective way, we will also make sure that they retain freshness longer, and look like new. Low prices and a wide range of sizes allows to protect even the biggest furniture. The optional Velcro straps ensure that gusty winds, rain, hail or snow will not compromise the covers.

A way of protecting your car

10

10. Car covers

During the fall-winter season, our cars are especially strongly subjected to the effects of harmful factors, such as low temperatures, acid rain, or even road salt.
It is extremely difficult at that time to ensure good condition of the auto body. Car covers and tarps come to our rescue. These are essential accessories for every driver who garages his car "under the open sky". Thanks to them, we can protect our car from frost, the harmful effects of humidity or snow. However, only covers of the highest quality will let us sleep at night. They will ensure protection up to -40° C, and the material from which they are made will not scratch the paint, even when covering a wet vehicle. Let's look for models equipped in strong elastic bands along the bottom edges. Thanks to them, the cover will better cling to the car, and putting it on and off will be quick and pleasant.

A yarn straight from the slaughterhouse

Since the 19th century, people experimented with manufacturing textiles made of natural gelatin sources, a cheaper and less allergenic wool alternative. Although the emergence of synthetic fibers delayed the use of materials of animal origin, the new processing technology will cause them to quickly become popular again.

Every year, 70 million tons of fibers, produced mainly from petroleum and natural gas, is sold worldwide. The most used fibers are wool and cotton. In the recent years, the demand for fibers made from natural materials using ecofriendly methods has increased.

The new yarn has thermal properties similar to Merino wool, and the process of obtaining it can take place in facilities processing animal remnants. It may seem gruesome, but it has its benefits.

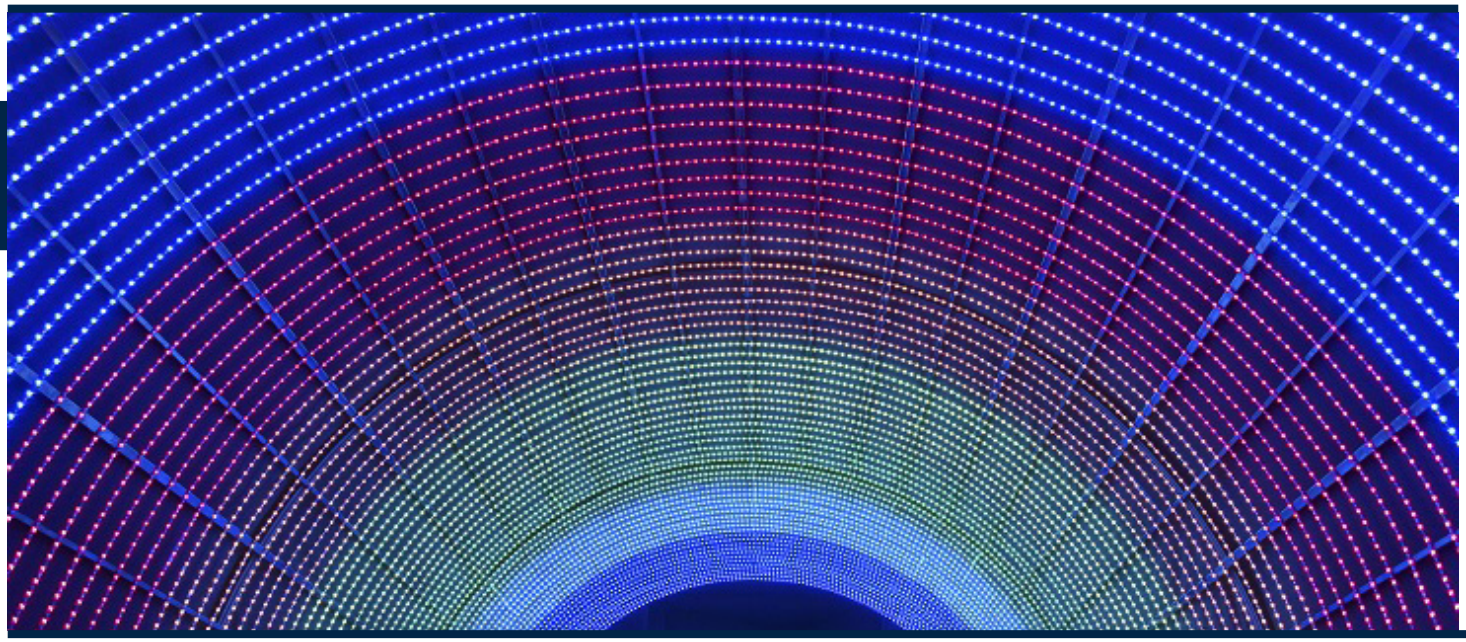
The technology was described by Philipp Stössel, a student of ETW Institute in Zurich, who collaborated with the Advanced Fibers Laboratory in St. Gallen.

The obtained from a slaughterhouse animal remnants, such as skin, bones and tendons, undergo a process of collagen collection. In order for the material to become a yarn, its structure needs to be changed. An isopropanolol solvent is used for this purpose. It causes the proteins in the solution to settle on the bottom of the container. The sediment is then removed, and the result is a semi-product which allows the formation of fibers. The process of fabric manufacturing takes place on a machine with a row of miniature "syringes", which create the yarn. The yarns are soaked in ethanol to achieve better strength and a suitable form. The finished yarn is more pleasant to touch than wool. It is also easier to wash. The author hopes that his material will allow the production of ecological, inexpensive, and strong clothes and items of everyday use.

The biggest flaw of the product is the lack of water resistance, but Stössel and his scientific team are already working on it. Their other objective is to find industrial partners to help commercialize the technology.

We believe that this yarn has the potential to change the industry's attitude toward the technology of fiber sourcing from animal remnants.

Spinning machine in a textile factory



LED FIBERS FOR IMAGE DISPLAYS ON YOUR CLOTHING

Fibers structurally resembling an LED screen were created in the Korean Institute of Science and Technology. They can be used for weaving fabrics intended for clothing manufacturing. The key to creating this technology are diodes located directly in the fibers.

The integration of clothing with displays has always been a dream of technology freaks. Starting from simple T-shirts with an illuminated logo to programmable, flexible screens. The problem with this type of products is that they are stiff, which limits movement and comfort of their wearers. Thus, work on creation of flexible and inexpensive fabrics allowing the display of multimedia content on clothing has been underway for many years.

A breakthrough occurred in the Korean Institute of Science and Technology (KAIST), where fibers resembling with their structure an LED screen have been created. They can be used to weave fabrics intended for clothing manufacturing. The key to creating this technology are diodes located directly in the fibers.

The researchers at KAIST hope that miniaturization and quality achieved in the new fibers will allow the introduction of „wearable screens" on the market. This would make many designers' dreams come true. Imagine work clothes – special vests and jackets, which display warnings and information directly on them. We would minimize costs and increase message visibility, and their content could be displayed in several languages.

The creation of the LED fiber is based on polyethylene. A medium is crafted, and then, repeatedly immersed in a PEDOT solution (a polymer blend yielding characteristics which allow easy fiber formation).
The next part of the process is drying in 130° C for about 30 minutes. The prepared semi-product is filled with an organic polymer, which actually, gives it the LED display functionality.
The final step is preceded by re-baking in the oven. The fibers are coated with a thin layer of lithium fluoride/aluminum.

The scientists claim that this method of production of fibers with displays will revolutionize the clothing market. LED fibers seem to be relatively inexpensive, and their mass production wouldn't be a problem, because they utilize widely available polyethylene (or nylon) fibers.

We have no choice but to keep our fingers crossed for the South Korean scientists' success.

BICYCLE BAGS AND PANNIERS

Business with Tetex is a series of guidelines designed to inspire both, beginners as well as experienced entrepreneurs to reach for new experiences in the field of technical textiles.
We set searching, designing, and preparing of ideas on how to make money in a new business as a primary goal – in this issue, we will discuss bags/saddlebags for bicycles.

New ideas - new possibilities

Our bicycles are not only an excellent mode of transportation around cities – the demand to furnish them with our necessary items such as dried goods, camping accessories, and small electronics emerged with their popularization.

Everyone who has travelled by a bicycle knows that a backpack can be insufficient, and solutions such as trunks or trailers are heavy, require higher concentration, and prove better for longer distances. After a few kilometers, they start to weigh heavy and become uncomfortable. In those cases, it's good to reach for a bike bag or a saddlebag.

Saddlebags and bike bags are storage compartments slung over the sides of a bicycle. A benefit of the bags is not only their capacity, but also low weight and the ability to easily detaching and attaching them (the bike bags can also be easily carried). Thus, from a potential manufacturer's perspective, we should make sure that our products:

► Are compatible with most bicycle models – it would be best to create an easy mounting system which allows for best fit with the bike frame,
► Have extra pockets for accessories,
► Are made of the most flexible and waterproof materials possible,
► Are equipped with additional handles for easy carrying during installation/removal on/from the bike frame.

Modern bike bags and saddlebags are made of materials such as nylon, polyester, TPU or synthetic leather. It should be noted here, that not all models offered are made of waterproof materials. Different manufacturers provide products which can greatly differ in the degree of water resistance. Our goods should be waterproof and be a good value for the money. The lately popular Upcycling, or product manufacturing from waste, is a good alternative to traditionally used materials. Old banners and tarps are excellent ways of ensuring our products not only have an attractive appearance, but are also waterproof and exceptionally durable.

Organization – become a boutique producer

Business development is best started by creating a business plan. Such a plan should clearly identify what kind of bike bags/saddlebags we want to produce, who will deliver materials to make them, whether we will decide to sew them ourselves or if we will have someone else do it. To sum up, we should include in it all aspects of our business operations. Even in a form of a to-do list.

Our experience shows that it is best to be the author as well as the executor of a project. Especially that bike bags are products requiring precision and accuracy during part assembly. Hence, it is worth considering our own sewing facility – a workshop which would serve as a place for developing as well as completing projects. This will require bigger financial investments, however, as the example of small, boutique firms like Trashki and Foliklo shows, it is possible to create high quality items in a small team.

Materials for sewing this type of products can be found directly at companies engaged in advertising (old banners), transportation (tarps and tarp materials destined for upcycling), or attempt to find a supplier on the Tetex.pl closeout marketplace.

Manufacturing saddlebags and bike bags is only the beginning of the road to success. The key is finding customers.

Boutique manufacturers, whose goods are not mass-produced, and there is no need to seek huge markets for them, are in a good situation because an interesting product design and brand can quickly win them fans on social media, and thus, potential customers. Remembering about an appropriate PR image and visual identification often decide whether our product will penetrate consumers' consciousness.

Alternative routes of selling such products are bicycle fairs, outdoor events, stores with camping/bicycling gear, bicycle auctions or sales portals: general, like Allegro, or specialized, like Tetex.pl. Each sale needs to be preceded by a marketing campaign. Internet advertising is not expensive! But its positive results can be seen for months.

The issue of finances

The last and most important issue which needs to be addressed is finances. The cost of renting headquarters for a year, furnishing it and equipping with computers is around 50,000 PLN. Another 50,000 PLN has to be added for equipping the workshop with sewing machines. Of course, we will think about minimizing expenses and costs of the whole investment during business development. It can be tempting to open a home-based business and have sewing done by an external firm. Then, there would be no cost of renting or buying additional facilities, and the number of employees is reduced to a minimum (often, the owner and designer is one person).

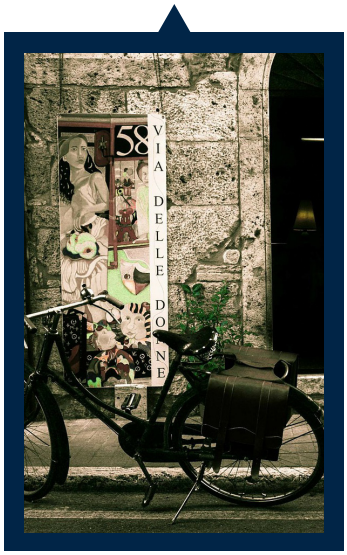
A separate issue of bike bag production is price politics. The cost of manufacturing one bag is from 100 PLN to even 350 PLN, depending on the materials used – thus, we can offer them to customers priced from 200 PLN to 499 PLN.

Summary

Making bike bags is an original business idea. It is important to strive to market good quality products, and with an interesting design.

Most small, boutique manufacturers can't compete with large firms producing thousands of units, with an established reputation, and a large distribution network. But it is the uniqueness and unconventional approach to the subject of product design that can prove to be the key to success.

Bicycles of postmen in Germany are fitted with special bags to transport letters, parcels and packages.



FREEYOURFEET #FYF

The most basic high-tech footwear in the world

The most basic high-tech footwear in the world is intended for protecting feet during the most extreme sports imaginable. They increase efficiency and improve achievements through the use of an innovative technology. As it is easily noticeable, gloves and shoes often hinder our sport practices, but that is all in the past! Thanks to the FYF shoes, we will feel 100% natural, barefoot-like, and our foot will be completely protected.

FYF are made of the latest material, DYNEEMA – 15 times more durable than steel.

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- ▶extraordinary resistance to cuts
- ▶elasticity and pliancy
- ▶ultra-lightweight
- ▶excellent thermal insulation
- ▶hydrophobicity (the tendency of chemical particles to repel water particles)
- ▶high coefficient of fraction
- ▶UV resistance

HOW TO PROTECT YOUR BICYCLE FROM THEFT?

Australian designers, Tosika Maluma and Carson Tully, created a bike lock with built-in LEDs. The project was performed with the intent to increase a cyclist's safety.

Vivid Lock

Vivid Lock, as the first in the world, LED fastener can be worn on an arm in the form of a high-visibility safety band. Besides its basic function of securing a bicycle from fans of other people's property, it will alert drivers to the cyclist's presence on the road at night. The soft and lightweight strap is also decorated with a high quality high-visibility material.

What are their features: Vivid Lock locks are 60 LED lights – white in the front and red in the back – equipped with a 9-operating mode controller and the potential for energy savings. The lighting modes are controlled by a waterproof mini-controller, which attaches to an LED strip. The controller requires two AA batteries, which provide over 70 hours of continuous operation without recharging.

From a safety point, it offers a 4-digit, fully customizable, combination lock, and a steel cable comprised of two main fibers, 6 millimeters in diameter, encased in a stylish, cloth sheath. It will prevent the theft of a bicycle and also prevent cutting the cable.

The Vivid Lock is made of a durable, waterproof 1000D nylon, a transparent PVC, and a waterproof LED strip. And all this in four different color variations.

The designers are relying on a Kickstarter campaign. If everything goes according to plan, the product will be delivered to customers before January 2016. Pledges are starting at $72.

EXPO 2015 - MILAN

"Feeding the planet, energy for life"

Expo is one of the most important exhibition events that are organized in the world. The most interesting achievements of the world are presented in various fields, from management to culture, economics, and science. This year, Italy and the Italian city of Milan are hosting the Expo 2015 event.

The expositions were divided into regional and national sections, which can be visited in specially prepared pavilions. Each such section is assigned to a country, which then fills out the pavilion with its installation. The size of an exposition depends on each country's budget allocated for this purpose. We find the biggest differences not in their sizes but in their contents. Here, you can find two extremes, from traditional, almost historic exhibitions to modern, interactive multimedia installations, utilizing light and sound.

The number of places to visit is gigantic. It is, practically, a city built just for the expo, whose main goal is to show and inspire the fair visiting participants. If you think of visiting most places, you have to buy tickets for several days. There is just a lot of exploring to do. The compensation for taking the time are positive esthetic, scientific, and cultural experiences. We sensed the positive atmosphere that prevailed at the Expo 2015.

This year's edition was held under the slogan: "Feeding the planet, energy for life". The issue of ending hunger was undertaken, and the objective for the participating countries was to demonstrate ways of dealing with scarce quantities of food and other related problems. While at the fair, we observed two main trends, in the direction of which individual expositions were moving.

One focused on methods of increasing quantities of crops – as well as methods of protecting them from the effects of climate change, adverse weather conditions, and risks associated with pests and pollution. Countries presenting this way focused on introducing new methods of plant protection – chemical (new-generation protective substances) as well as mechanical (foils, agro-textiles) could be found among them.

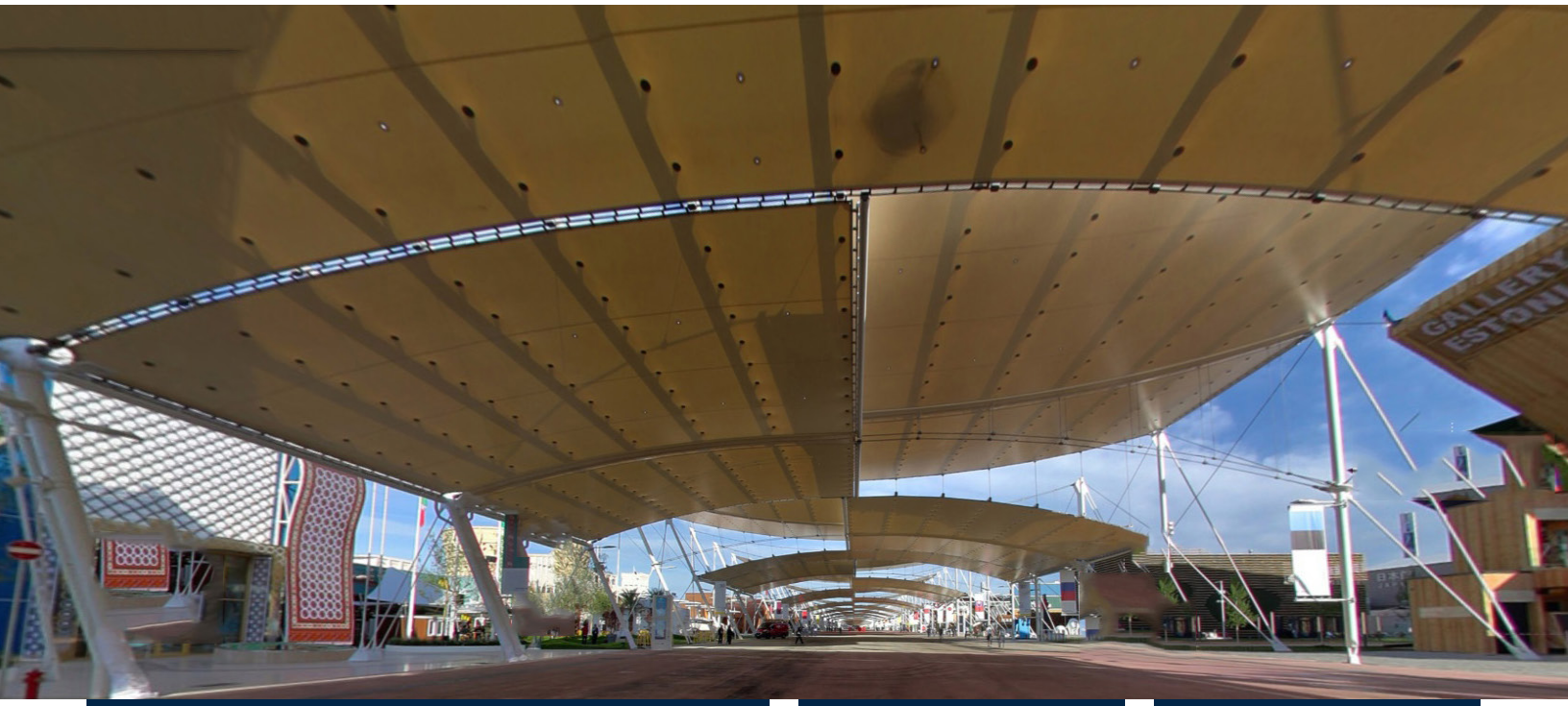
Other topics (or the second trend) weaving through the Expo 2015 stands contained information on how to counteract the obesity epidemic, how to eat smart, and to prevent negative effects of global malnutrition. Most of these expositions was based on multimedia installations, plant and informational-educational material presentations. Flower seedlings, models, charts and info-graphics could be found among the elements of the exhibition. Most of them made a very good impression. Here, once again, we have to commend the professionalism of the people preparing the expositions.

An unquestionable advantage of the whole exhibition is the variety – both, the presented national motifs, as well as the pavilions themselves. Positive feelings can only be ruined by the long lines queueing up to each exhibition. Entering the most interesting pavilions requires a lot of standing. But that is nothing unusual for large, international trade fairs. This is why it's worth to set aside some time for quiet exploration.

A big thumbs-up to the organizers for an interesting project of the whole exposition, and well-placed designations. Thanks to them, one can move between individual parts of the exhibition fairly quickly. Their number is not overwhelming, and their arrangement is logical and helps to navigate the exhibition space.

The Expo 2015 fair was a great experience for the Tetex.com team in terms of new solutions, both scientific as well as cultural. We saw new methods of fighting global hunger, which are often strongly linked to technical textiles. This inspires optimism, and shows that two seemingly unrelated fields can greatly complement each other. Crop yields can be raised, thereby ensuring greater food supply for the poorest regions, through the use of modern foils and agro-textiles. It is also worth mentioning that textile solutions help in cultivation in less favorable climate zones.

TEXTILE STRUCTURES AT THE MARKET EXPO 2015



All the exhibition pavilions located at the 2015 Expo have one thing in common – incredible varierty and diversity when it comes to their structures.

They pride themselves not only on their design but the quality of the textiles and materials used. Only the newest of the new was used – these were durable and attractive components characterized by a perfect fitting. In one word – perfection.

In our opinion, one of the more interesting textiles was hung above the main passage. It resulted in the pathway being not only effective but also useful, since it protected the visitors from the rain. The design of it was so well thought out that only by going through it could you enter the individual pavilions.

The construction of national pavilions is a neat combination of high quality textile materials and other materials that provide the entire pavilion with stability and strenght. We closley observed the finishing touches put on it and we were highly impressed by the accuracy and thoroughness with which it was constructed.

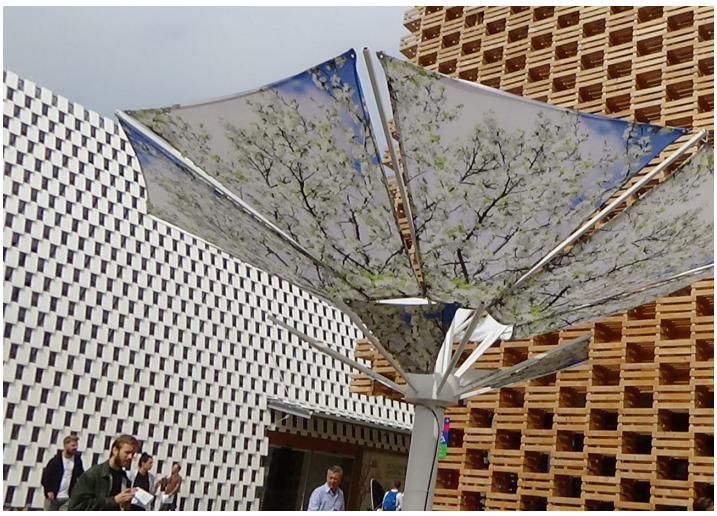
The key to success at these types of fairs is to be able to attract visitors to your stand/exhibition. There are so many stands, that it is impossbile to visit them all. Unless you want to have to wait for several hours in long queues. Hence the organizers and creators of pavilion constructions try to outdo each other in different ways to try to reach the largest amount of visitors. Examples of

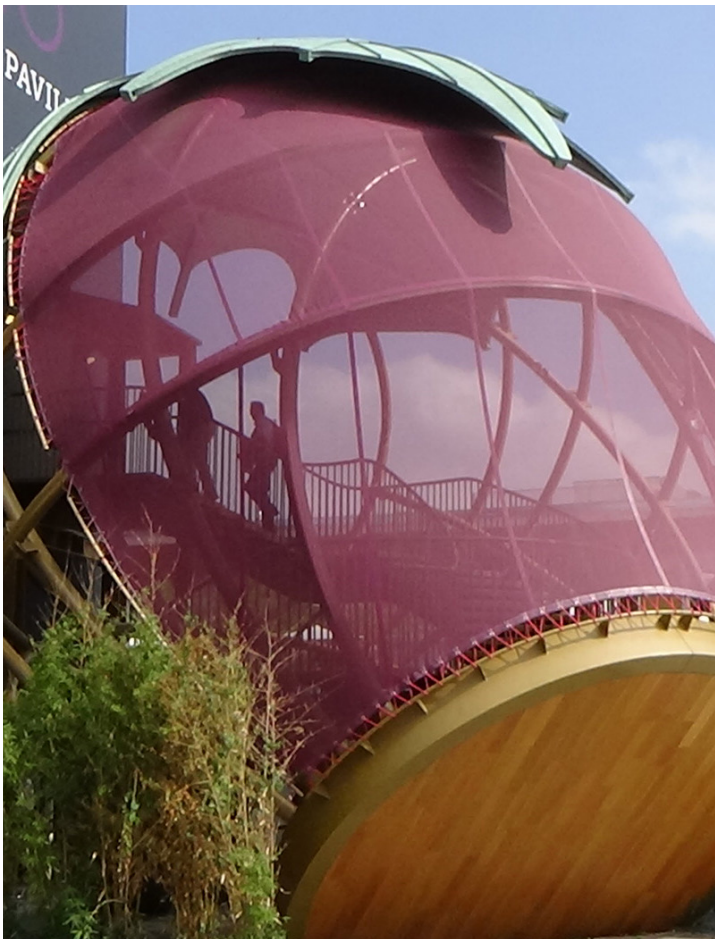
the most impressive textile structures are those presented by countries such as Germany, Malaysia and Kuwait. The projects in question were created all in one go and they managed to utilize a very small space to create a work of art.

An event of this magnitude could of course not happen without our country – the Polish pavilion at the 2015 Expo was characterized by a stylish combination of architecture and nature. The interior of the pavilion was filled to the brim with interesting expositions and inside of it resided a remarkable and intriguing garden for the visitors to admire.

An additional attraction for visitos was organized the 13th of Septemer which is Poland's day. The markets of the 2015 Expo delighted visitors with their quality and large amount of exhibition pavilions. They were all characterized by their originality and perfection in the use of materials. Our attention was caught by and especially attracted to the ones using modern technical textiles as basis for flattering their design. Pavilions are one of the elements of the fair that definitly makes them worth a visit.

Delighting visitors with not only their design but also the quality of the materials and textiles. Since only the newest of the new were used, durable and attractive components, all characterized by a great fitting. In one word – perfection.





An event of this magnitude could of course not happen without Poland– The Polish pavilion at the 2015 Expo was characterized by a stylish combination of architecture and nature.

SUMMARY
OF THE QUARTER

TOP Quarter – is a ranking that shows the most interesting advances in technology and quality that both Polish and foregin firms have to offer. We present services and products of the hightest caliber. The prize for each of the firms you can find in the set is the possibility to publish an articule in the next issue of TeTex magaine – Totally free!

The best company

SAULEDA

Is the leading brand of awnings from sunny Spain. Their specialty is a special technology that allows the fibers of the materials from which the awnying is made from to increase their resistance taking into account the change in weather conditions.

Bestseller

SLIP 'N' SLIDE

A water slide is the biggest sales hit this summer. Its popularity has surrpassed our wildest expectations. A large dose of adernaline and a spectacular decent into water made the Slip 'n' Slide an item everyone wanted this summer.

The best offer

GOCHNIO AWNING

The speed with which the orders are being processed and the quality of the products are the best and biggest advantages to the Gochnio company. The company that origniated in Siedlce can even come and fix or repair an awning right on site where the customer is.

New on the market

SHOES THAT PERFECTLY FIT YOUR FOOT

Vibram is a company that has created a shoe that is a perfect fit for every foot. This is news worthy of recognition because of its high usability and a multitude of potential applications for a shoe of this type.

The most popular article

CARBON FIBER MOTORBOAT

The biggest hit on Tetex.com are most definitly the publications made about motorboats that are made out of carbon fiber. The beast of a boat is equipped with 2700 hp of power and a top speed of over 290km/h per hour. This all comfortably sits in the cockpit that is stylized to look like a Corvette.

CLEAN THE OCEANS IN 5 YEARS!

"Taking care of the world's oceans, problem with trash, is one of the biggest challenges facing humanity today in matters of environmental protection. The cleanup of waters and coastlines is, at the same time, an important step toward our goal of getting rid of the Great Pacific Garbage Patch."

The Earth's oceans are overloaded with plastic bags and other types of synthetic garbage, which can be deadly to marine animals, and are very harmful to the marine environment, in general. According to research from 2014, there are 5.25 trillion pieces of plastic, with a collective weight of 269,000 tons, scattered in the oceans! It is estimated that these pollutants threaten 100,000 sea turtles and mammals, and around 1,000,000 other marine animals each year.

Fortunately, there are people who are not indifferent to this problem, and intend to do something about it. In 2013, Boyan Slat, founder and chairman of a Dutch non-profit organization "The Ocean Cleanup",

According to research from the 2014, there are 5.25 trillion pieces of plastic totaling a weight of 269,000 tons in the oceans!

developed a garbage collector, which is supposed to clean the oceans in only 5 years. He recently announced that this ambitious project will be implemented in 2016.

He plans to start the ocean cleanup off the coast of Tsushima, and island located between Japan and South Korea. It is estimated that each year, an entire cubic meter of pollutants per person winds up in the ocean, so the problem of plastic pollution is massive there. A 2000-meter long system will be the longest floating structure, and it will operate for at least two years.

How does such a system work?

It is an anchored floating network of plastic barriers, which will collect pollutants with the help of ocean currents. So, basically, the ocean will clean itself! After the pollutants settle on the barrier, they will be removed for recycling.

The main purpose of "The Ocean Cleanup" is to develop technological methods enabling the extraction and recycling of plastic trash polluting the ocean. The company plans to launch a 100-kilometer system in the waters between Hawaii and California within five years. According to a computer simulation of ocean cleaning, it would reduce almost half of the, so-called, Great Pacific Garbage Patch (a massive collection of plastics in the Pacific Ocean) within ten years.

SNEAKERS FROM OCEAN GARBAGE

Because the Earth's oceans are overloaded with plastic garbage, engineers around the world are looking for innovative ways of removing this harmful pollutant from the marine environment. Boyan Slat from The Ocean Cleanup plans to launch a massive project in 2016 to clean up the oceans.

Collecting ocean's garbage is one thing, and the other is to find a way to do something with it. According to the recycling ideology, we should give these materials a second life, and use it in further manufacturing. The German shoe giant, Adidas, proposed an unconventional concept of what to do with oceans' waste.

The company created a shoe prototype produced almost entirely out of oceanic waste. The upper part of the shoe is made of fishing nets and other plastics extracted from the deep. The sole of the shoe contains more durable materials which better protect the foot.

Collecting plastic garbage for the production of the shoe prototype wasn't an easy task. Actually, a non-profit organization, Sea Shephard, helped with the project by organizing a 110-day expedition for tracking poachers off the coast of South Africa.

The green stitching on Adidas shoes is nothing other than fishing nets confiscated during that expedition.

Later this year, Adidas plans to launch a production line of shoes made of oceanic waste.

Certainly, there won't be a problem finding plastics like fishing nets and beach litter. The company claims that the initiative aims to not only cleanse the ocean of garbage, but also to help reduce or eliminate creating plastic waste.

A new non-profit organization, Parley for the Oceans, founded with the support of Adidas, seeks and develops innovative technologies. Their main objectives are to change the structure of plastic

A prototype of shoes made from ocean garbage

"Adidas plans to start production line of shoes with oceanic waste this year" *- Eric Liedtke, Adidas Group*

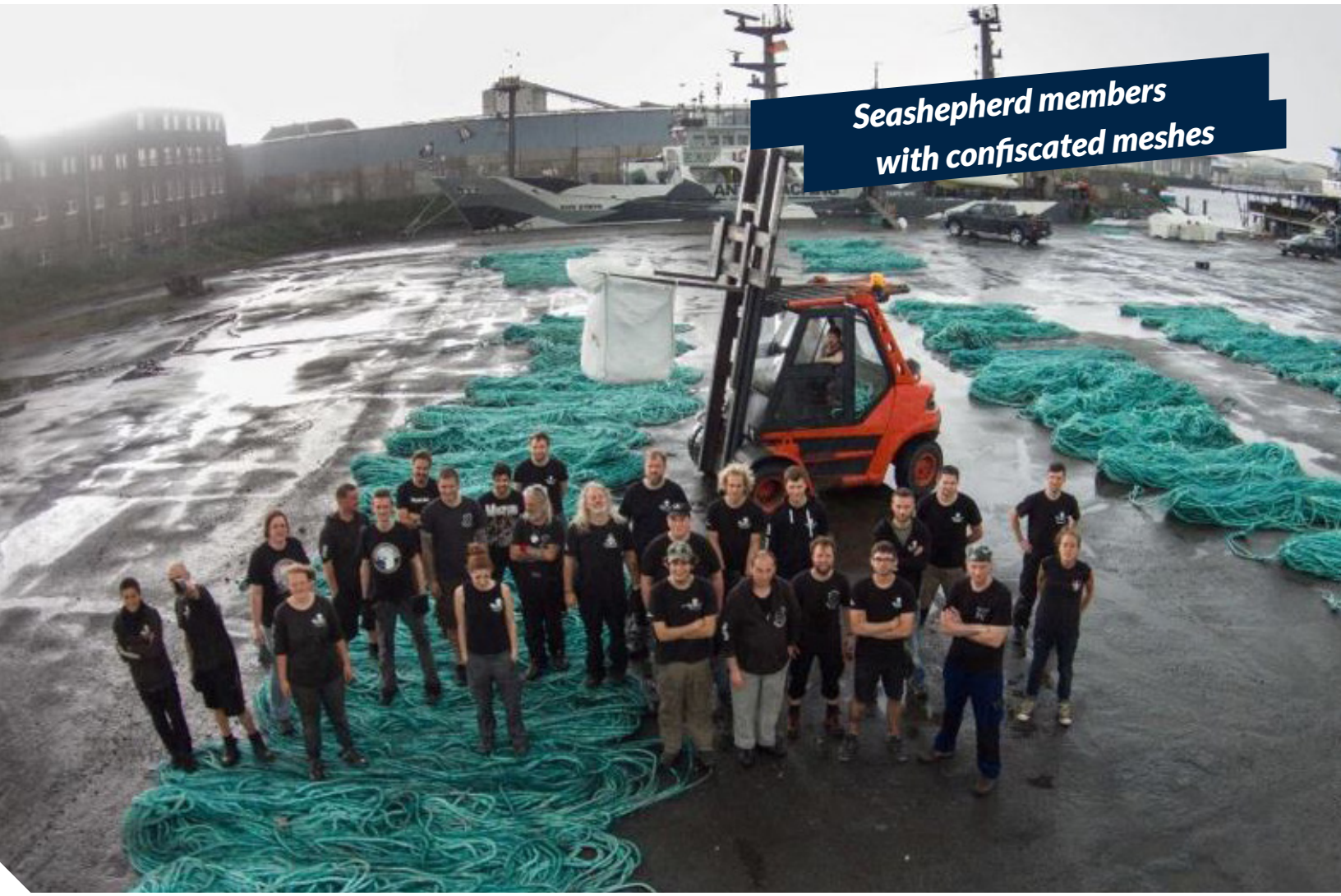
so it would be less harmful to the environment, and minimizing the use of plastics in overall production.

"We will end the pollution of oceans with plastic garbage only when we will start using other materials", said Cyrill Gutsch, founder of Parley for the Oceans. "Plastic doesn't come from nature, and the best way is to limit its inflow into the environment through innovative alternatives to plastics."

The company is trying to develop a material, which will be environmentally friendly, as opposed to conventional plastics, which disintegrate within 500 years.

Adidas hopes that the use of this innovative material will go beyond shoe production.

"We don't have to limit ourselves", said Eric Liedtke from Adidas group. "We can use it for production of T-shirts, shorts and all kinds of other things."



Seashepherd members with confiscated meshes

TEXTILE BASED SEAWEED

"Seaweed is an important source for our future supply of food and feed (additives), biochemical, biomaterials and bioenergy"

said Bert Groenendaal, Coordinator of the AT~SEA project.

Sioen Industrien

Sioen Industries, a leading producer of technical textiles, fine chemicals and high-tech protective clothing, will commercialize its patented seaweed cultivation substrates via the spin-off company called AT~SEA Technologies.

Together with seven of the AT~SEA project partners, Sioen founds AT~SEA Technologies, a spin-off company that will sell turnkey seaweed farms.

AT ~ SEA Technologies

AT~SEA, Advanced Textiles for Open Sea Biomass Cultivation, was an EU 7th framework project. Sioen coordinated this research project since 2012. It targeted the development of advanced, 2D seaweed cultivation substrates in order to demonstrate the technical and economic feasibility of seaweed cultivation in Europe.

AT~SEA Technologies, consisting of six companies from Belgium, Spain, The Netherlands, Ireland and Morrocco, and two research institutes from Belgium and the UK, will start its activities in August 2015.

The first target will be to deploy a 1 ha test farm for seaweed cultivation in Norway by September 2015. The AT~SEA project was funded by the European Union's Seventh Framework Programme.

Polyethylene

Polyethylene's popularity is due to its properties such as, for example, resistance to acids and alkali. Modern industry needs inexpensive and durable materials for production.

Isolation

Bulletproof vest

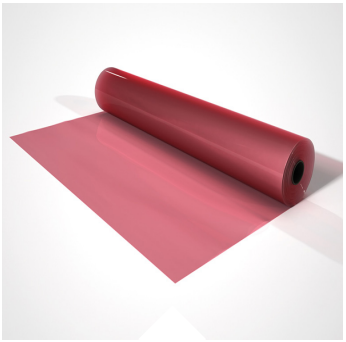
Polyethylene (PE) is a polymer obtained as a result of ethylene polymerization. It occurs as a white, porous substance. It belongs to pliable and flexible thermoplastics – it can be molded above certain temperature. PE's melting temperature is 110 – 137° C.

Polyethylene's popularity is due to its properties such as, for example, resistance to acids and alkali. Modern industry needs inexpensive and durable materials for production. Hence the use of polyethylene in the production of: insulation, gardening fabrics, containers, sails, ropes, bulletproof vests, and packaging.

Polyethylene is an excellent material for the production of technical fibers. They are characterized by a high mechanical resistance. In dealing with non-stabilized polyethylene, the harmful effects of UV radiation need to be considered, as it causes the loss of elasticity.

Important polyethylene properties:

- ▶ resistance to friction
- ▶ dimensional stability
- ▶ is a good electrical insulator
- ▶ doesn't absorb moisture
- ▶ it doesn't dissolve in any organic solvent below 60° C temperature
- ▶ muffles sounds – it can be used as acoustic insulation or in the production of acoustic systems
- ▶ it can be used for food storage
- ▶ an excellent dielectric characterized by a significant elasticity, good mechanical properties, and high resistance to the effects of alkalis, acids and salts.



Garden foil

Containers

MATERIALS FOR SPECIAL TASKS

The "Studies on the functionalization of ballistic materials" project aimed to functionalize textile ballistic materials for potential use in designing personal ballistic shields, mainly in terms of increasing their usefulness and safety.

The standard construction of ballistic cartridges for personal body shields, e.g. bullet- and shrapnel-proof vests, is based on textile sources from fabrics made of aramid fibers and/or oriented fibers of ultra-high molecular weight polyethylene (UHMWPE) submerged in a polymer matrix (from low molecular weight polyethylene), joined into a multi-layer packet.

Qualitative and quantitative composition of ballistic cartridges depends mainly on the properties of the types of materials used, and it changes with the assumed class of ballistic resistance. Typically, the greater ballistic cartridge effectiveness is to be, the more layers needs to be used.

One of the aspects currently being escalated regarding the optimization of personal ballistic shield construction is the maximal cartridge mass reduction in order to achieve the best possible ergonomics.

Of course, reducing the mass of ballistic cartridges cannot occur at the cost of their ballistic resistance. On the contrary, the currently emerging guidelines recommend the highest possible ballistic resistance.

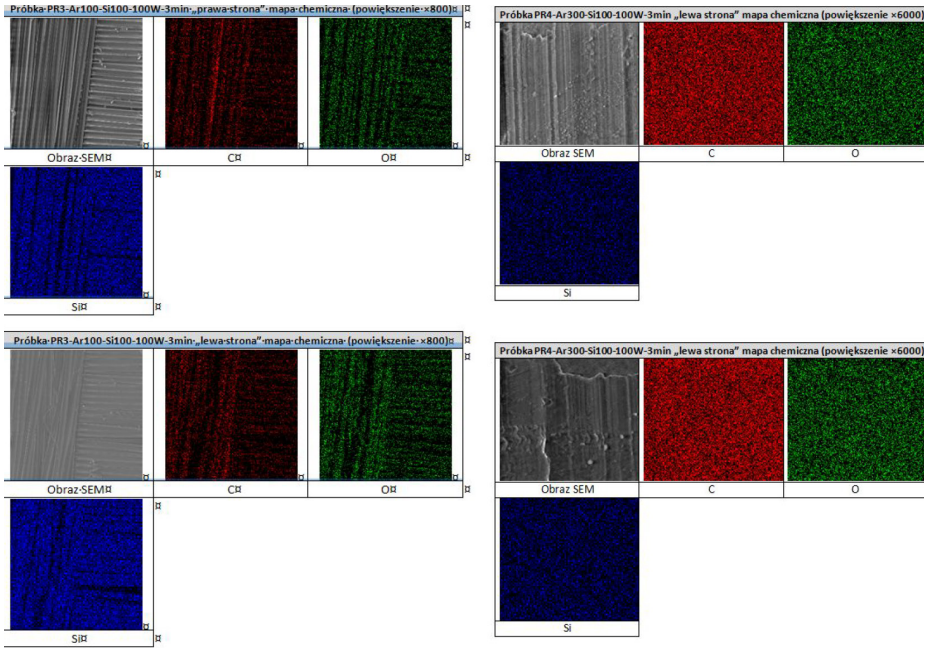


Fig. 1. Chemical map of a surface modified by low-temperature plasma, with a formed organosilicon nanolayer: A. aramid fabric (% Si content – 43%); B. non-woven polyethylene sheet (% Si content – 11.1%)

Due to the properties of currently used ballistic cartridges, both soft and hard (composite), simultaneously obtaining maximum protective surface, high ballistic resistance, and high ergonomics is not possible.

While designing ballistic personal shields, a consensus is reached between safety and the mass of the product.

The second aspect considered in the studies is the evaluation of influence of the personal shields' usage/storage time on maintaining baseline protection parameters, regardless of the conditions in which they are used and stored.

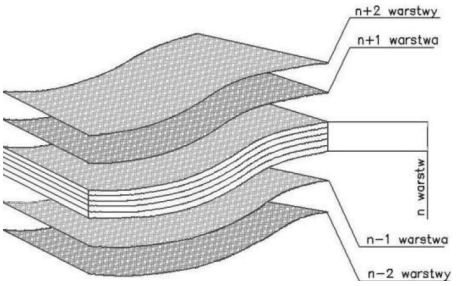
Currently, most manufacturers of ballistic guards guarantee at least a 5-year period of safe use, which in the absence of realistic ability to control conditions in which they are used, increases the risk of uncontrolled loss of ballistic resistance [2]. As a result of, often synergistic, external factors, polymer degradation takes place, which causes rapid and uncontrolled loss of assumed by the manufacturer ballistic resistance of the cartridges.

The object of the invention, created as part of the project implementation, is a method of rendering new functional properties to textile ballistic materials made of olefin, olefin combined with aramid, or aramid polymers, which involves the application of polymer nanolayers, unilaterally or bilaterally, in a low-temperature plasma environment.

The heart of the solution lies in subjecting the textile ballistic materials of various structure and topography, made of olefin, olefin combined with aramid, or aramid polymers, to the deposition of organofluorine and/or organosilicon polymers synthesized in a low-temperature plasma environment. This leads to the attainment of textile materials with a much higher resistance to the effects of environmental factors (humidity, UV rays, temperature).

The functionalization of ballistic materials method, according to the invention, is based on the fact that a textile material made of olefin, olefin combined with aramid, or aramid polymers, undergoes the process of low-temperature plasma environment deposition in argon plasma, first. Surfaces of fibers are activated in the air, and then, in a low-temperature plasma of a low-molecular-weight organofluorine compound,

Fig. 2. The arrangement of layers in a hybrid material system: n-1 – unmodified layer; n-2 – layer modified with low-temperature plasma; n+1 – layer modified with low-temperature plasma; n+2 – unmodified layer; n – additional layers alternately stacked



preferably tetradecafluorohexane, and/or of an organosilicon, preferably hexamethyldisiloxane. The process of organosilicon compound deposition is preferably carried out in argon plasma.

The effectiveness of the modification process has been verified by, among others, the SEM-EDS technique.

Chemical map of a surface modified by low-temperature plasma, with a formed organosilicon nanolayer: A. aramid fabric (% Si content – 43%); B. non-woven polyethylene sheet (% Si content – 11.1%)

A hybrid, ballistic material system (Fig. 2) was designed from alternating fiber material systems made of aramid or olefin polymers, subjected or not subjected to modification in a low-temperature plasma environment, preferably after the application of fluorine or silicon polymer nanolayer. The outer layer in the system consists of fiber material surface-modified in a low-temperature plasma environment, in order to protect from the effects of external factors (humidity, temperature), which negatively affect usage qualities and safety of ballistic guards.

WHAT IS WORTH KNOWING ABOUT GARDEN FOILS

Agriculture is one of the fastest growing economic sectors in Poland. The deciding factor supporting the growth of agriculture are high subsidies funded by the European Union – thanks to them, farmers receive resources for modernizing their farms. And these are becoming competitive in foreign markets.

The shape of the land surface and a temperate climate are favorable for cultivation of various crops. In our climate zone, vegetation period lasts from the last frost to late autumn. There are ways to lengthen it. One of them is greenhouses and horticultural tunnels. They allow to achieve excellent results in cultivation of thermophilic vegetables, such as for example eggplant, tomatoes, peppers, and zucchinis. Choosing an appropriate tunnel isn't easy, because it will cost a few-hundred Zloty, but it will serve us for more than a dozen consecutive years. The foil covering a tunnel is equally important, and that's what we will focus on.

The primary function of a tunnel foil is the assurance of a faster plant growth, and protection from adverse weather conditions. The air space between the soil and the film has humidity and temperature higher than the air above the exposed ground. The soil temperature is also a few degrees higher. The foil protects plants from unwanted effects of various atmospheric factors, such as cold wind or short-lived frosts. It allows for better use of water reserves in soil.

The main parameters of foils available on our market are: grammage (the weight of a product in grams per square meter), thickness, durability (elasticity and resistance to damage), light transmission and diffusion properties, size, and length of manufacturer's warranty.

Without any major problems, every manufacturer should make available a file with technical data of products they sell.

Below, we present offers from the largest stores for the most popular tunnel foils

PRODUCT	PROPERTIES	PRICE PER M^2	MANUFACTURER
Polish tunnel foil 8m x 23m	UV-2 UV stabilizer trilayered	0,35 EURO	FOLIAREX
Polish tunnel foil 12m x 33m	UV-4 UV stabilizer trilayered	0,34 EURO	FOLIAREX
Tunnel foil 12m x 20m	UV-4 durability: 4 seasons	0,56 EURO	MARMA
Garden tunnel foil 12m x 20m	UV-2 durability: 2 seasons	0,50 EURO	MARMA
German tunnel foil, Green House 12m x 33m	grammage: 150 g/m2 UV-5 UV stabilizer durability: 5 seasons	0,35 EURO	SAKO-EXPO
Italian foil for tunnels 12m x 22,0-23,5m	grammage: 150 g/m2 UV-5 UV stabilizer durability: 5 seasons	0,39 EURO	SAKO-EXPO

But the main question is what about them is worth paying attention to? We will briefly explain all parameters occurring in advertisements:

Grammage: The absolute minimum grammage is 100 g/m2. However, for the foil to last at least a few seasons, we recommend a product with grammage of around 150 g/m2.

Thickness: Manufacturer data often contains different units: sometimes, it's mm – millimeters, and other times, µ – microns (1 mm = 1000 microns). The thickness of the foil doesn't have much impact on its durability. The most popular foil thickness on the market is 150 µ. However, we won't have a problem finding those with 130/135 µ thickness, which will have almost identical durability and physical properties.

Size: Most often, we come across foil dimensions of 12x22m, 12x33m, and 16x33m. They are suitable for covering standard-sized tunnel constructions. For smaller backyard tunnels/hotbeds, one should consider purchasing foil "to size" – this way, we only pay for the material we need, and avoid waste.

Durability: The best foils should be characterized by high elasticity and resistance to various mechanical damages.

If we notice holes and mechanical damage to the tunnel cover during the season, it's good to obtain a tape, which will enable ad-hoc patching of any damages to the foil. Prices of such tapes are not exorbitant:

PRODUCT	PROPERTIES	PRICE PER M^2	MANUFACTURER
Remedial tape for garden foils 5cm	width: **50 mm** length: **25 m** color: transparent thickness: 0.15 mm	4,49 EURO	BUTIMEX
Remedial tape for bonding foils 5cm	width: **5 cm** length: **20 m** self-adhesive multi-seasonal tape	4,41 EURO	MARMA
Adhesive gardening tape 5cm	width: **50 mm** length: **20 m** color: transparent thickness: 0.15mm	4,00 EURO	SAKO-EXPO

The degree of stability against UV rays is the most important parameter when choosing a foil. So, a designation of UV-5 means the degree of stability for 5 seasons. A note here, that 5 seasons is not 5 years! In practice, this means guaranteed durability for two and a half years (5 seasons: spring, autumn, spring, etc.). In order to quickly identify them, different shades of foil are often used, for example: UV-2 – blue, UV-3 – yellow, UV-4 – green, and UV-5 – pink. It is worth mentioning that the color of the foil has no impact on the growth of plants in the tunnel. It is conventional in nature, and can differ depending on the manufacturer. In most cases, this parameter is the same as the length of the manufacturer's warranty.

It is also worth mentioning the durability against tearing, splitting, and abrasion. It is expressed most often in N – newtons. After analyzing sales offers, we can ensure that values close to the ones below will provide durability for years:

durability against tearing	warp	400 N/5cm
	weft	250 N/5cm
durability against splitting	warp	100 N
	weft	70 N

Quite frequently after storms and hurricane-force winds, we can see pieces of foil flying about fields. Most often, this is a result of poor quality, not closing the tunnel door or incorrect installation – foil was not stretched taut over the construction, and was carelessly attached to the base.

When we have smaller backyard tunnels, we can roll up the foil before harvest and spread it again in the next growing season, in order to extend its life. But we have to remember to wash and dry the film, carefully roll it up, and store it in a dark and dry place. The sun's rays have a destructive effect on the structure of the folded material.

Light properties:

Light transmittance, expressed in % – the amount of light significantly affecting the condition of plants, and therefore, the size and quality of the harvest. The higher the transmittance, the better it is for the plants. The standard ratio is >90%.

Light diffusion in tunnel foils positively affects growth, especially during spring and autumn seasons. Thanks to light diffusion, the amount of shaded places is reduced to a minimum. By providing uniform sun exposure, we allow light to also reach the lower parts of plants.

A popular treatment from June to August is the shading of foil tunnels by spraying the foil with white paint. The goal is to reduce the internal temperature, and thus, excessive ground drying. Some manufacturers sell specially designed for this purpose shading tarps (Table 2):

PRODUCT	PROPERTIES	PRICE PER M^2	MANUFACTURER
Shading mesh (knit) 4m x 75m	shading: **42%** grammage: **38 g** UV stabilizer	0,26 EURO	LENKO SA
Shading fabric 100m x 2m	grammage: **80 gr/m2**	0,75 EURO	LEROY MERLIN
Dzianina (siatka) cieniująca 2m x 100m	UV - 6 zacienienie: **60%** gramatura: **64 g/m2**	0,50 EURO	MARMA
Shading mesh (knit) 6m x 40m	dark green shading: **40%** grammage: **38 g** UV stabilizer	0,27 EURO	ROLMARKET.PL
Shading tarp 10m x 32m	weave 10 x 10 grammage **100 g/m2** eyeleted rope-reinforced	0,32 EURO	SAKO-EXPO

Besides standard films, there is also a whole range of special foils. They offer above-average quality or additional physical properties, such as anti-condensation or anti-fogging effects.

These are, most often, high density polyethylene (HDPE) foils, reinforced with fiber which increases resistance to tearing (in standard versions, the reinforcement is white, and in premium versions – colorless). Additionally, such foils don't stretch in high temperatures – there's no so-called bags, and the fiber mesh stabilizes the tunnel construction, and protects from tearing the foil. Once the foil is at the end its useful life, we still have a mesh that can be used in many ways.

In Australia, such a mesh is a hit among farmers.

PRODUCT	PROPERTIES	PRICE PER M²	MANUFACTURER
FOL-TEX CLASSIC 8x33m reinforced garden foil	grammage: 160 g/m2 white mesh, eye is about 1x1 cm	0,53 EURO	SAKO-EXPO
FOL-TEX PREMIUM 16x33m reinforced garden foil	grammage: 160 g/m2 Transparent mesh, eye is about 1x1 cm	0,53 EURO	SAKO-EXPO

Another type is a foil with anti-condensation effect – drops of condensated water don't hang on the foil, but form a thin coating flowing to the sides of the object. The anti-condensation effect works with an appropriate roof pitch. The minimum angle is around 15o, and optimal is about 30o.

PRODUCT	PROPERTIES	PRICE PER M²	MANUFACTURER
ANTI-CONDENSATION, tunneling garden foil	UV-5 durability: 5 seasons trilayered high light transmittance – 92-94% anti-fogging effect*	0,56 EURO	GARDENVIT

*Anti-fogging effect – the reduction of fog occurrence in the tunnel, especially in the morning and evening.
**presented gross price

Modern foils fulfill their purpose as a protective measure for plants. One of their advantages is that we can use them practically year-round. We will appreciate the positive effects of using foils when weather conditions will become so adverse, that they will threaten our crops. There are so many types of foil that it will be easy to adapt them to specific needs. It is worth the risk to perform tests, to find out which type will be best suited for us. Manufacturers are racing to come up with new types – but a higher price often hides behind innovation and increased durability. This isn't the place to economize. Our health and safety of our crops is at stake here. And it's never worth skimping on those!

FAIRS IN AUTUMN

30/03
September/October

InterTextile - Kijev
International trade fair for home textiles and hotels

01/04
October

MODEXPO - Bucharest
International trade fair for clothing and footwear

08/11
October

Fashion Industry - St. Petersburg
International trade fair for textiles and clothing

13/15
October

InterTextile - Shanghai
International trade fair for apparel

12/19
November

ITMA - Milan
International trade fair for textile machines

25/27
November

Fast Textile - Rzgow
International trade fair for textile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TeTex.com.pl
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BuildTech
GeoTech
HomeTech
InduTech
Medtech
MobilTech
OekoTech
ProTech
SportTech