

Easy care



No stress. Just put it in the washing machine.

Durable water repellent



Lasts even after 100 washes. Uses non-organic fluorine water repellent.

Protection



It can also be used in medical settings. AAMI LEVEL 2

Breathability



provides a comfortable and lightweight experience.

Antifouling



It is hard to get dirty, and even if it gets dirty, it can be wiped off.

UPF50+/UPF40



The world's highest level of UV protection

Antistatic



Almost no clinging.

Cool touch



Popular all year round! Cool to the touch.

Moisture permeability



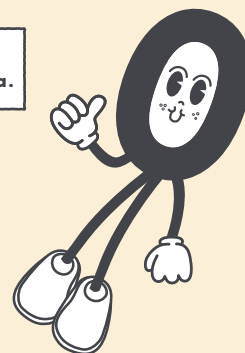
Not stuffy, not sticky, easy to move.

Pollen release



Hard to get pollen. Easy to put on and fall off.

I am Mr. Nishikawa.



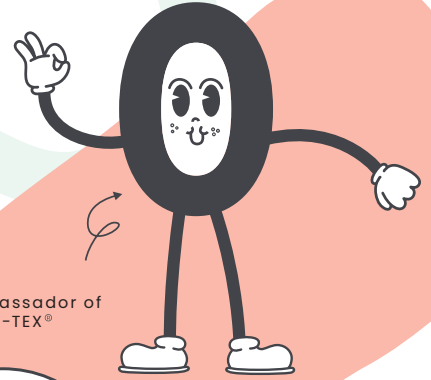
Ambassador of ZERO-TEX®

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I am Mr. Nishikawa.



Ambassador of
ZERO-TEX®

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ZERO-TEX®

Clean World, Bright Future

The real wonder of ZERO-TEX®
01

Easy care

Tumble dryable.



No shrinkage¹
No color fading²
Even after 100 cycles of washing and drying at home.
No discoloration or fading.
Can be washed with other items.

Tumble dryable!

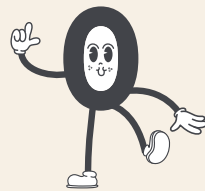
The handling of ZERO-TEX® has only one restriction, which is to avoid chlorine bleaching. There are no other specific constraints. No additional labeling terms³ are necessary. The recommended care instructions are as follows.

This labeling is sufficient.



¹ Shrinkage is expressed as a "shrinkage ratio"; The average shrinkage is about 10%, but ZERO-TEX® shrinks only 3%.

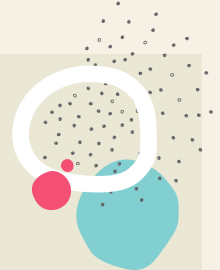
² With ZERO-TEX®, color fading begins after 100 repeated washes, and it drops by one grade from its initial level. For example, if it starts at grade 5, the fabric's color fastness then gradually transitions to grade 4. In comparison, a typical fabric would drop by one grade after just 10 washes, showing a faster decline in color fastness. Therefore, ZERO-TEX® outperforms an average fabric and maintains its color integrity for a much longer period.



Washable with other items!

³ Refers to labels displaying cautionary information for users. You may have seen tags on clothing or other items with statements like "Do not tumble dry" or "Avoid washing with white or light-colored garments." That is what it refers to. Most fabric products typically have some form of precautions mentioned, but ZERO-TEX® does not require such labels.

To demonstrate the outstanding durability and water resistance of ZERO-TEX® fabric, we conducted 130 wash cycles. While regular fabrics typically experience a substantial decline from Grade 5 to Grade 3 after just 10 wash cycles, ZERO-TEX® fabric demonstrates a gradual and minimal degradation. It is worth noting that after 130 wash cycles, the regular fabric becomes significantly damaged, rendering the test unable to continue.



Protection

AAMI LEVEL 2



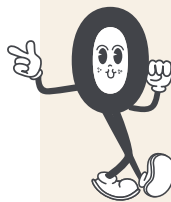
ZERO-TEX® has passed the **AAMI Level 2***1 certification, ensuring its protective capabilities. As a medical-grade fabric*2, it meets internationally recognized standards for barrier performance.



I am Mr. Nishikawa.

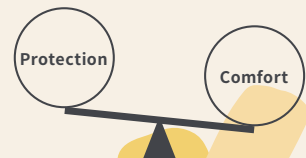
*1 AAMI (Association for the Advancement of Medical Instrumentation) is an organization that establishes numerical standards for the barrier performance (waterproofing) of gowns, drapes, and other medical protective materials. It sets global standards to reduce the risk of occupational infections and patient surgical site infections. The levels range from 1 to 4, with higher numbers indicating superior protection. However, higher levels may also imply reduced comfort (such as increased heat and moisture, stiffness, or heaviness). Factors during surgery such as duration and blood volume need to be considered to ensure both safety and comfort (breathability, softness, lightness). AAMI Level 2 demonstrates that the fabric meets a certain standard of protection (suitable for procedures like endoscopic surgery or cataract surgery). The appropriate level is selected based on specific requirements, and corresponding products are used accordingly.

*2 The actual products encompass gowns, masks, gloves, hats, aprons, and shoe covers. There is even more potential for ZERO-TEX® in fields such as caregiving and childcare. These items undergo stringent quality checks, ensuring ZERO-TEX®'s traceability. ZERO-TEX® is manufactured in a factory*3 that boasts world-class safety and reliability in the fiber business. From raw materials to finished products, as well as quality checks and on-site working conditions, everything adheres to the highest standards.



There are more possibilities in other fields such as nursing care and childcare

Ambassador of ZERO-TEX®



*3 PENFABRIC (a factory based in Malaysia and part of the ASEAN Toray Group) holds the prestigious EcoTex® certification, which represents the highest level of environmental commitment in the textile industry. This certification highlights their efforts in addressing environmental challenges. With ZERO-TEX®, you can trust that it is produced in a factory that meets these standards and delivers high-performance sustainable materials.



The real wonder of ZERO-TEX®
03

Durable water repellency



even after 100 washes

It maintains water repellency even after 100 washes. A non-fluorine-based water repellent used. The secret behind its long-lasting water repellency, **even after 100 washes**, lies in the unique manufacturing process during the initial stages of yarn and fabric production. It is achieved without relying on conventional "water repellent agents." Additionally, this approach is part of our commitment to addressing the significant environmental concerns prevalent in the textile industry.

**1 At the stage of yarn and fabric production, a special technique is employed to process and maintain the fabric's strength, durability in water repellency, and breathability. Unlike conventional water repellent treatments, which involve coating the fabric with a layer of water repellent agent after dyeing, this process significantly differs from regular fabric manufacturing methods.*

**2 According to the Environmental Pollution Industry Ranking released by the United Nations Conference on Trade and Development (UNCTAD) in 2019, the textile and apparel industry ranked second after the petroleum industry in terms of environmental pollution. The annual water consumption amounts to 93 billion cubic meters, which is sufficient to meet the needs of 5 million people. Additionally, the carbon emissions from this industry exceed the combined emissions of the international aviation and maritime sectors. In 2022, Mr. Nishikawa of Yamagin, took the initiative to reassess the manufacturing process of ZERO-TEX®, resulting in a significant reduction of 52% in CO2 emissions and a 70% reduction in water usage compared to conventional methods.*

CO2 emissions: 52% reduction
Water consumption: 70% reduction
(As of 2022, compared to our conventional ZERO-TEX®)

**3 If you specifically require the use of C0 water repellent agents that are completely free of fluorine compounds, it is also possible. However, please note that there may be a slight difference in durability. We encourage you to consult with us for further discussion in such cases.*



PFOA FREE!

We will trigger a transformation in the apparel and textile industry. ZERO-TEX® is poised to bring about a revolution.

The water repellent agent used in ZERO-TEX® does not contain organic fluorine compounds. It is produced using non-organic materials, **specifically C6 PFOA-free or C0 variants***3.



The real wonder of ZERO-TEX®
04

Breathability



Wearing ZERO-TEX® provides a comfortable and lightweight experience.

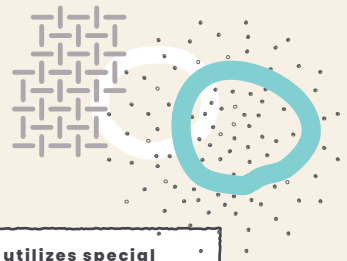
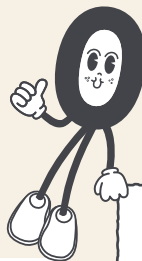
It is essential, when thinking about the working environment, to improve the items used so they are easy to move in, provide a sense of security, and are comfortable.



Efficiency improvement
Employee retention
Organizational cohesion
ESG (Environmental, Social, and Governance)

Experience liberation from the inconvenience of moisture and perspiration.

According to the test (JIS L 1096 A) that measures breathability, ZERO-TEX® has achieved a level comparable to the typical fabric used in everyday shirts and pants.



ZERO-TEX® utilizes special techniques to maintain breathability without compromising the fabric's water repellency through a unique process that avoids clogging the fabric's pores during water-resistant treatment.

What sets ZERO-TEX® apart from typical waterproof materials is its breathability. When it comes to traditional waterproof materials, such as those with PU (polyurethane) coating, they tend to restrict airflow. In contrast, ZERO-TEX® exhibits breathability, allowing air to circulate between the fabric's outer and inner layers.

**1 Waterproof materials do not have breathability, but they possess moisture permeability. When the temperature inside the fabric rises, a mechanism allows the release of water vapor to the fabric's exterior. However, this functionality requires the temperature to reach a level where a "sweaty" state is attained in order to be effective.*



Antifouling



Easy to clean and can be easily restored to its original state even if stains occur.

For hydrophilic stains, they can be easily wiped away. In a test measuring stain resistance, it achieved a rating of Initial Class 4 for (artificial) blood and Initial Class 5 for (artificial) seawater. Water droplets roll off along with the stains.

**1 It refers to stains that are easily soluble in water, such as salt, sugar, juice, and other substances. It also includes secretions like blood, sweat, and urine.*

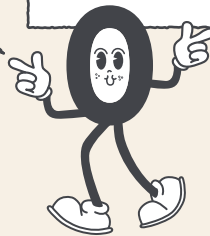
**2 The test measures both the "resistance to staining" (class) and the "ease of stain removal" (class) using the JIS L 1919 B spray method. A higher number indicates a higher level of stain resistance.*

**3 It means "without any treatment such as washing." Even if it gets dirty, you can simply brush it off and the stain will come off! ZERO-TEX® is versatile and can be used in various applications such as outdoor gear, sportswear, and uniforms for the food and beverage industry. It's easy to handle and helps maintain cleanliness.*



Perfect for everyday use, such as outdoor clothing, sports apparel, and uniforms for the restaurant industry! Applications for ZERO-TEX® are expanding!

Easy to clean and can be easily restored to its original state even if stains occur.



How easy it is to handle. It's good to keep it clean!



Some stains may not come off easily, for example, high-temperature oil. Cooking oils can reach temperatures of around 180 degrees Celsius, so ZERO-TEX® may not have sufficient stain resistance against such high temperatures. When dyeing ZERO-TEX®, it is heated to around 130 degrees Celsius, which it can withstand. However, it is relatively weaker against oils at higher temperatures. Additionally, the presence of impurities in the oil plays a significant role. These impurities can cause flow stagnation, resulting in oil stains penetrating the fabric more easily. Even if the test results are satisfactory, actual conditions may differ.



The real wonder of ZERO-TEX®
06

UPF 50+



ZERO-TEX® provides the highest level of UV protection.

UPF*1 is a measure of how long you can stay protected from the effects of ultraviolet (UV) radiation when comparing the "bare skin condition" to the "condition with fabric covering." ZERO-TEX® is rated at the highest level among the 10 levels of evaluation. It means that it provides a very high level of UV protection for an extended period of time*2.

*1 Ultraviolet Protection Factor (UPF) refers to the measurement of UV protection provided by a fabric. It is a globally recognized standard for UV protection established in countries like Australia and New Zealand, where UV radiation awareness is high.

*2 This means that the fabric provides UV protection for a duration that is 50 times longer compared to bare skin. For example, if it is determined that sunburn occurs within 10 minutes of exposure to sunlight without any protection, wearing this fabric would delay the onset of sunburn for up to 500 minutes. It can be said that the fabric has a 50-fold shielding capacity. In other words, it provides over 95% UV blockage.



I am Mr. Nishikawa.

The UPF testing is conducted using white fabric.

The thinnest fabric of ZERO-TEX® achieved a sun protection factor (UPF) rating of 97%, indicating a blocking rate of 97%.

"There's also the 'Transparency Prevention Series!'"



Ultraviolet rays are necessary for the production of nutrients, but excessive exposure can cause sunburn, wrinkles, age spots, and other issues. Prolonged exposure over many years can even lead to benign or malignant tumors, cataracts, and other conditions. While the optimal amount of UV radiation varies from person to person, it's important to be cautious of excessive UV exposure. Furthermore, global measures are being taken to address the increase in UV radiation due to environmental pollution.

Workplace Environmental Risks

Workplaces that are vulnerable to ultraviolet radiation can be broadly categorized as follows

1. Workplaces susceptible to the effects of sunlight

Agriculture, fishing, civil engineering and construction, work on snow and ice.

2. Workplaces susceptible to the effects of artificial radiation sources
Arc welding and cutting operations, work under ultraviolet germicidal lamps, genetic testing operations, medical applications, tanning salons.

(From the Ministry of the Environment's Ultraviolet Radiation Environmental Health Manual 2020)



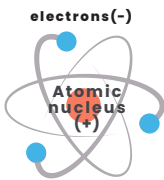
Anti-static



No clinging or sticking.

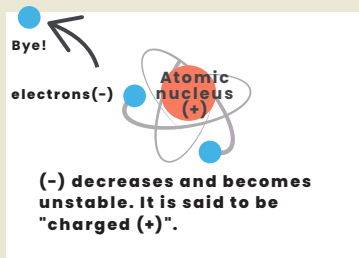
Electrification, also known as static electricity, refers to the state in which a substance's electron balance is disrupted.

Matter is composed of positively charged atomic nuclei (+) and negatively charged electrons (-).



It is in a stable state when the forces of positive (+) and negative (-) are balanced.

When electrons (-) "separate" due to external factors, the negative charge decreases, leading to instability.

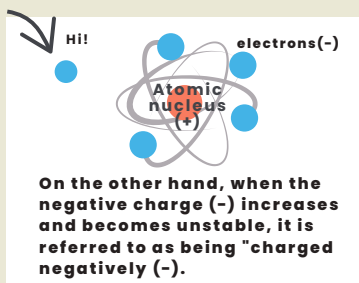


Substances that are prone to being positively charged (+) include:

Humans
Nylon
Wool
Silk

*These are general tendencies.

When electrons (-) are "added" due to external factors...



It tends to give off electrons (-) .

Substances that are prone to being negatively charged (-) include:

Polyethylene
Acrylic
Polyurethane
Polyester

*These are general tendencies.

In the test¹ to evaluate the anti-static effect, ZERO-TEX® has shown excellent results. When compared to other fabrics, it has demonstrated a significant difference in its anti-static performance². Preventing static electricity in environments such as factories helps mitigate the risks of functional disruptions, such as poor contact caused by dust adhesion or uneven coating, as well as production issues like component blockage or misplacement of molded parts due to adhesion between components.

¹The test is conducted according to JIS L 1094 (Half-Life Measurement Method). It measures the time it takes for the charged voltage on the test sample to decrease by half (half-life discharge). The result is given in the form of a half-life value (in seconds). For example, polyester typically takes around 80 seconds to reach half-life discharge. In contrast, ZERO-TEX® achieves an amazing 0.88 seconds. Therefore, it can be confidently stated that there is virtually no static electricity risk.



The real wonder of ZERO-TEX® 08

Cool to the touch



Popular all year round! Cool to the touch.

"Contact coolness" refers to the degree of coolness. The Q-max value is used to evaluate contact coolness. The Q-max value is a number that represents the amount of heat transfer. It refers to the value at the moment of contact and does not indicate long-lasting coolness.

**1 The Q-max value is used in the Contact Coolness test (JIS L 1927). Here, if the Q-max value is 0.100 or higher, it is considered to have contact coolness. However, coolness is influenced by various factors such as breathability, moisture-wicking, and comfort, so it does not necessarily mean that a higher Q-max value translates to a cooler sensation. It is useful to remember that the Q-max value is just one indicator for measuring coolness. In recent years, contact coolness is widely used in garments such as workwear and sportswear, as well as in items like masks, bedding, and innerwear during the summer season. You can experience the sensation of contact coolness in these products.*

Cool to the touch with a mask, bedding, innerwear, etc. in the summer.

These days, it's used all year round. For work clothes and sportswear shoes.



On extremely hot days, contact coolness does not function effectively. When the temperature of the fabric exceeds body temperature, a reverse heat transfer phenomenon occurs, where heat is transferred to the skin instead. An extreme example of this is when touching heated asphalt or concrete feels hot. This is due to the reverse heat transfer phenomenon. During the summer season, diving into a cool mattress pad in an air-conditioned room provides a refreshing and pleasant sensation. However, feeling discomfort when using a cooling pad that has trapped heat can feel hot due to the reverse heat transfer phenomenon. On extremely hot days outdoors, even if mask fabric has a high Q-max value, the function of contact coolness becomes ineffective.

A side effect of water repellent treatment is its impact on the anti-static function. Water repellent agents happen to promote a higher Q-max value.



Breathability



Not stuffy, not sweaty, easy to move in.

Breathability

Not stuffy, not sweaty, easy to move in.

The approximate amount of perspiration released per hour by one adult is.

At rest: 50g

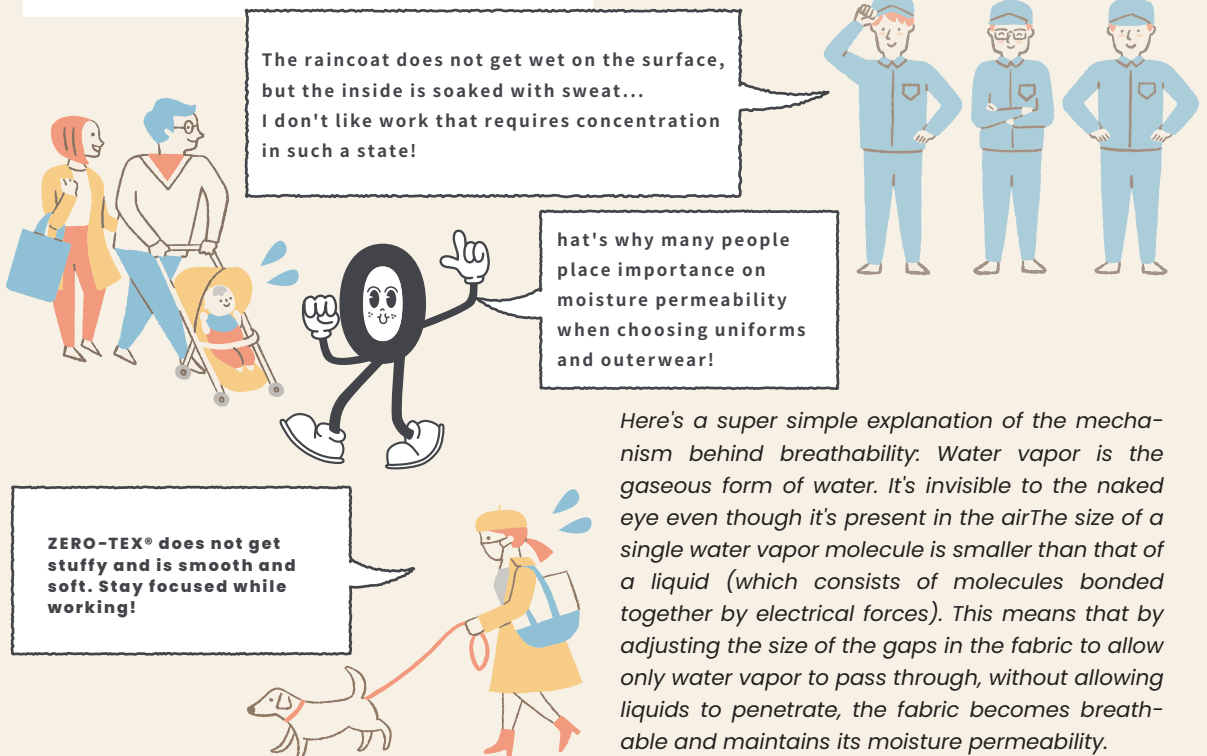
During light exercise: 500g

During strenuous exercise: 1,000g

Even when you're at rest, sweat is being released without you realizing it. It's common to sweat even during winter commutes or light activities.

The moisture permeability test (JIS L 1099 B-1 method) evaluates the fabric's ability to allow water vapor to pass through. It quantifies "how much water vapor passed through the fabric in one hour" using a value called moisture permeability ($\text{g}/\text{m}^2\cdot\text{h}$). A higher value indicates better breathability and less stuffiness. Compared to materials known for their high breathability, ZERO-TEX® surpasses them in terms of numerical values (Material X: $1122 \text{ g}/\text{m}^2\cdot\text{h}$, ZERO-TEX®: $1757 \text{ g}/\text{m}^2\cdot\text{h}$).

Raincoats may keep the outside dry, but the inside gets wet from sweat... It's not ideal for tasks that require concentration. That's why breathability is important when choosing uniforms and outerwear. ZERO-TEX® keeps you feeling dry, comfortable, and focused during work.



The real wonder of ZERO-TEX®
10

Pollen Release.



Pollen is less likely to adhere.
If it does adhere, it is easily removed.

Pollen Reduction Rate *1 of 80% or higher indicates pollen release properties. The size of cedar pollen particles is around 30-40µm, making it very difficult to prevent or remove pollen adhesion. In a high pollen season, it is estimated that 4,000 to 10,000 particles/cm² are dispersed.

According to the Ministry of the Environment's "2022 Survey on Male Cedar Flower Buds," the growth of male cedar flowers is greatly influenced by weather conditions in the previous year, particularly during the summer months (June to August) when flower buds differentiate, with longer sunlight hours and higher temperatures leading to increased pollen production and subsequent pollen dispersal the following spring. Additionally, there is a tendency for reduced male cedar flower growth in years following high pollen dispersal.

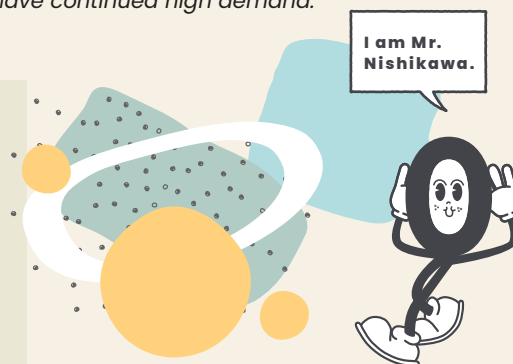
When pollen adheres to clothing without pollen-release properties, it is generally advised not to brush it off with your hands. This is because immediately rubbing it may cause the pollen to get trapped within the fabric fibers, making it difficult to remove. Therefore, using ZERO-TEX® is recommended as a solution

*1 The reduction rate (%) is calculated as follows:
(Pollen count before release - Pollen count after release) / Pollen count before release = ×100
After uniformly applying pollen to the fabric, a specified vibration is applied to release the pollen. The states before and after release are captured using a microscope, and the number of pollen particles is counted to calculate the reduction rate using the formula mentioned above.

Preventing allergies with textiles.

In Japan, there is a thriving market for pollen allergy countermeasures, as allergies affect a significant number of people. This article will discuss the current status, challenges, and future prospects of businesses that offer solutions for pollen allergy management.

Allergy countermeasure businesses refer to those that offer products and services to prevent and alleviate the symptoms of pollen allergies. In Japan, approximately 40 million people suffer from pollen allergies, with about 80% of them being affected by cedar pollen allergies. Pollen allergies not only cause uncomfortable symptoms such as sneezing, runny nose, and itchy eyes but also impact performance and productivity in work and study environments. As a result, the market for pollen allergy countermeasures is expected to have continued high demand.



<https://news.mynavi.jp/article/20221228-2548775/>

