

Responsible Design Guide Apparel

Strategies and impulses from ecodesign
for responsible decisions in terms of circular
economy under fair conditions.

Welcome to Sympatex.

This is our Manifesto. This is for everyone.

For you and me. For the coming generations.

In ways large and small, as individuals and groups, we have the power to use our circle of influence. So, can we please change things together?

We wanna make sure doing business right. Using our brand-power to turn new ideas into reality. This often takes creativity and courage. Creativity to imagine our world differently. Courage to connect seemingly unrelated phenomena. Can you imagine products having multiple lifecycles? We can. And we will get there.

What we need is you. `Cause you have tremendous power.

Let's become a dedicated team and spread the word.

We will be Re>Closing the loop. **Together.**





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We are the first generation, to re>close the loop. Together.

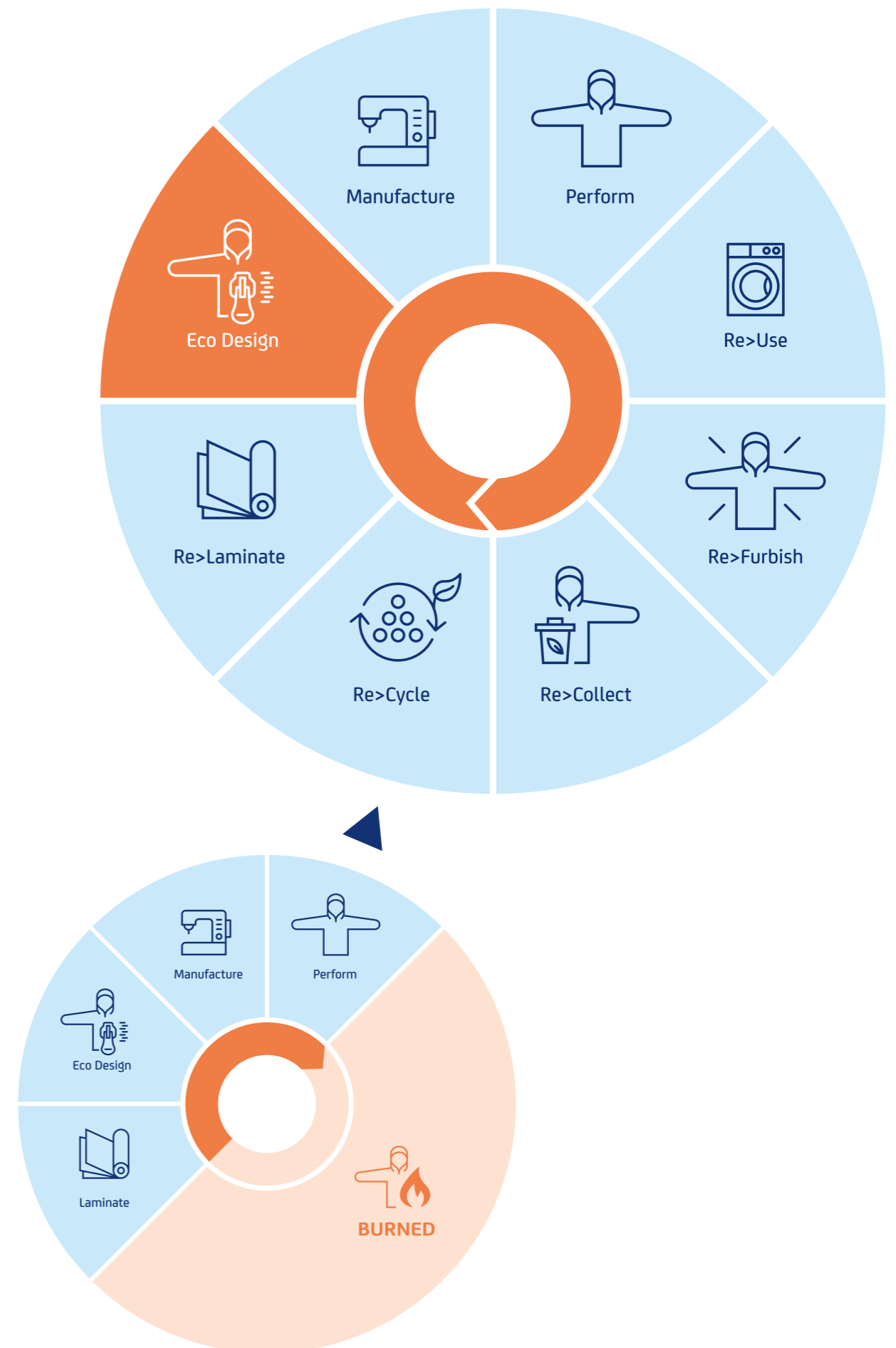
In the face of the pressing climate crisis, a significant part of the fashion industry is now committed and innovative in the solutions to reduce its environmental impact through production methods that take into account circularity and sustainability. The aim is to minimise environmental impact through production methods and to consider the circular economy in addition to other ecological and fair measures. In recent years, the awareness and commitment of the main players in the industry, together with a change in consumer habits, have led to the adoption of concrete solutions to promote more ethical and responsible fashion. The traditional fashion model of recent decades has been an integral part of a wasteful and environmentally damaging linear economic system that urgently needs to change.

With the 100% recycled PTFE- and PFC-free Sympatex membrane, which has been climate-neutral since 2017, Sympatex lays the ideal foundation for closing the textile loop. However, in order to make a garment fully recyclable, other essential decisions need to be made in the design process. The design phase is a central pillar in a more sustainable future for the fashion industry. It is the only way to lay the optimal foundation for a circular garment. Through good, contemporary design, we can avoid waste and pollution, and bring sustainable and recyclable materials into circulation to conserve resources. Motivated by the richness of nature, the outdoor industry in particular should be a pioneer in sustainable innovation and textile problem solving.

As an ingredient brand, Sympatex supplies more than just material: we work closely with our partners and share our expertise to develop the best possible product together. We offer you Designers continuous support and recommend individual strategies on how to make your product recyclable, ecological and socially valuable. We support our customers right from the collection framework planning stage and later throughout the entire production process, from the first prototype to bulk production.

By constantly optimizing the entire supply chain, together we can prepare for a circular future in which recycling is standard. For us, this means considering all decisions at every stage of the value chain - from raw materials to design, production, the end consumer and recycling. The sum of the decisions shows whether a garment can become circular.

In order to connect and collaborate even more closely, we have developed this „Responsible Design Guide“ - a guide for Designers and Product Developers that we are regularly updating. This guide contains a selection of concrete recommendations, solutions and tangible strategies which ensure that your drafts comply with the new laws and also form the best basis for all further steps. Get inspired and learn how „Responsible Design“ can bring about sustainable change.



1

Circular Economy - The new standard for Europe

Under the umbrella of the European Green Deal, the EU Commission published the EU Textile Strategy on 30 March 2022 as part of the new legislative packages - The textile sector as part of the action plan will be the first industry to fully transition from a linear to a circular economy. This publication states:

„By 2030, textile products placed on the EU market are durable and recyclable, consist to a large extent of recycled fibers, are free of hazardous substances and are produced with respect for social rights and the environment.“

„Extending the lifespan of textile products is the most effective way to significantly reduce their impact on the climate and the environment.“

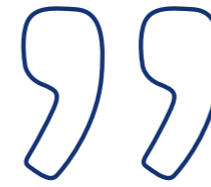
Conserves **raw materials**, **avoids waste**, is **low in pollutants** and **recyclable**.

These are the new principles for the European textile market. The significance and implications of this for the textile industry are immense: the switch to a circular economy, and therefore the design of recyclable clothing, is no longer an option. It is essential if a company is to be successful in the future.

In future, manufacturers will have to take responsibility for their products along the entire value chain in accordance with the Circular Economy Act and the Supply Chain Due Diligence Act. Sustainable design strategies play a decisive role in pursuing this, which must already be implemented in the design process. While collection, sorting and recycling technologies are constantly being further developed, changing the design process is the basis for overcoming these future technical challenges.

The circular economy model consists of several elements across the industry that all work together to form a complete and effective system. Reducing the amount of textile waste and recycling it well are fundamental and important elements that are particularly emphasized in the EU strategy for sustainable and circular textiles.

So what will responsible design look like in the future? You will find impulses, methods and relevant framework conditions for product design and recommendations for Designers in this guide.



„The most fascinating thing about this legislative process is that the European Commission is regulating both parts in one: You can call one sustainability, which includes everything you do when making the product, and the other circularity, which means that when the product leaves the store, it has to go back to where the raw material came from.“

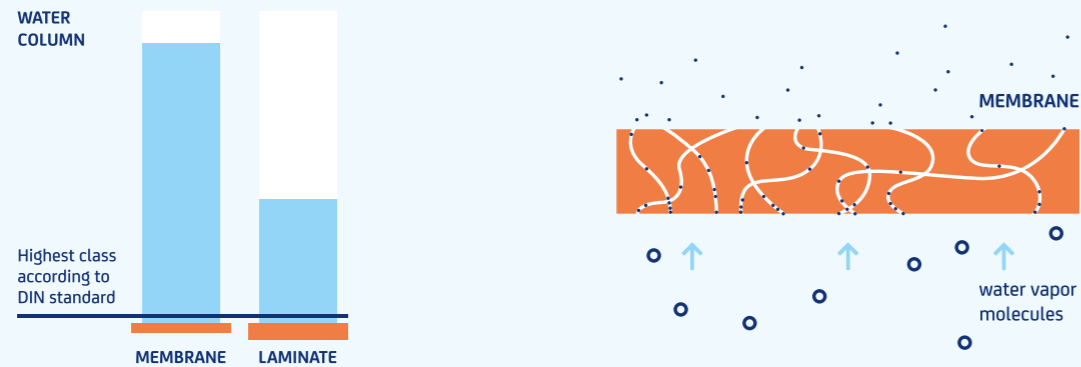
RÜDIGER FOX, CEO SYMPATEX



2 Sympatex laminates

The intelligent Sympatex membrane has been used in clothing, footwear, accessories and technical applications since 1986 and guarantees the performance standard: 100% waterproof, windproof and breathable. Intelligent? The membrane develops proportionally, increasing breathability with increased activity.

Sympatex functional textiles made from recycled and recyclable mono-materials are new and far above the standard. These products have significantly lower CO₂ emissions, use less water and are already recyclable today. The basic prerequisite for this is the use of polyester. Highly functional, versatile and resource-saving, Sympatex laminates can be recycled using proven technologies.

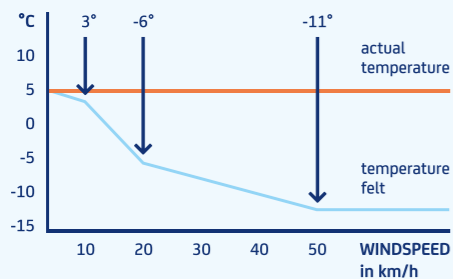


Waterproof

Our membrane has a water column of over 45,000 mm. For comparison: The highest standard class of DIN EN 343 is reached from 2000 mm.

Breathable

The hydrophilic molecular chains conduct the water vapor to the outside. The effect increases dynamically with increasing temperature or humidity differences.

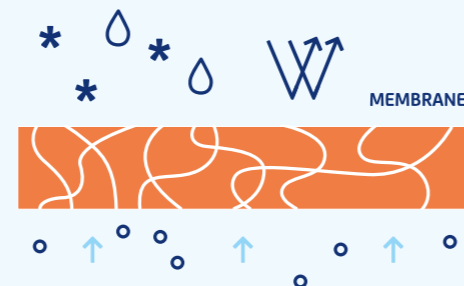


Windproof

Our membrane is absolutely windproof in accordance with DIN EN ISO 9237 and thus ensures that the warming layer of air is not carried away from the body.

Durable

We deliberately avoid using pores in our membrane that could become blocked over time. This ensures that our membrane retains its function for a long time.



Sympatex will not use any new materials from the oil industry in the future. Our developers are already producing textiles with a clear focus on recycled raw materials. Recycled granulate is the base for new polyester fibers. An increasing proportion of this polyester granulate is based on used clothing. We use this recycling process (Fiber2Fiber) to use more and more fibers from the textile cycle for our laminates.

When we relaminate our recycled textiles onto our recyclable membrane, we follow a mono-material strategy to ensure that all new Sympatex laminates can be recycled back into fibers at the end of their life cycle.

By choosing unmixed Fiber2Fiber Sympatex materials such as the „Tokyo“ or the „Wanaka“, you are already helping to make economically and ecologically sensible recycling possible in around 5-10 years after the garment's use phase. Business models will develop around existing collection and sorting systems through cooperation along the value chain, which will then allow recycling on an industrial scale.

100 billion items of clothing and 23 billion pairs of shoes that are produced each year are a source of new raw materials when they reach the end of their life.

We will assume our responsibility to do not only what is legally required, but also what is technically possible in order to make our contribution. Our aim is for 100% of all raw materials required for our functional laminates to come from a circular, textile supply chain and be fully recyclable by 2030.

TOP PERFORMANCE

- Compact hydrophilic, non-porous membrane
- 100% waterproof
- 100% windproof
- Optimally breathable
- Dynamic climate control
- Durable and extremely hard-wearing
- The thinnest membrane in the world (5 µm thick)
- Up to 300% stretch (wearing comfort)

MAXIMUM ECOLOGY

- Polyester and polyether copolymer (oxygen-carbon-hydrogen) that poses no risk to health or the environment
- 100% climate-neutral membranes
- 100% recyclable membrane
- PTFE- and PFAS-free
- OEKO-TEX® STANDARD 100 certified
- bluesign®-certified
- Reduced carbon footprint in polymer production
- Water-repellent treatments free from toxic fluorocarbons

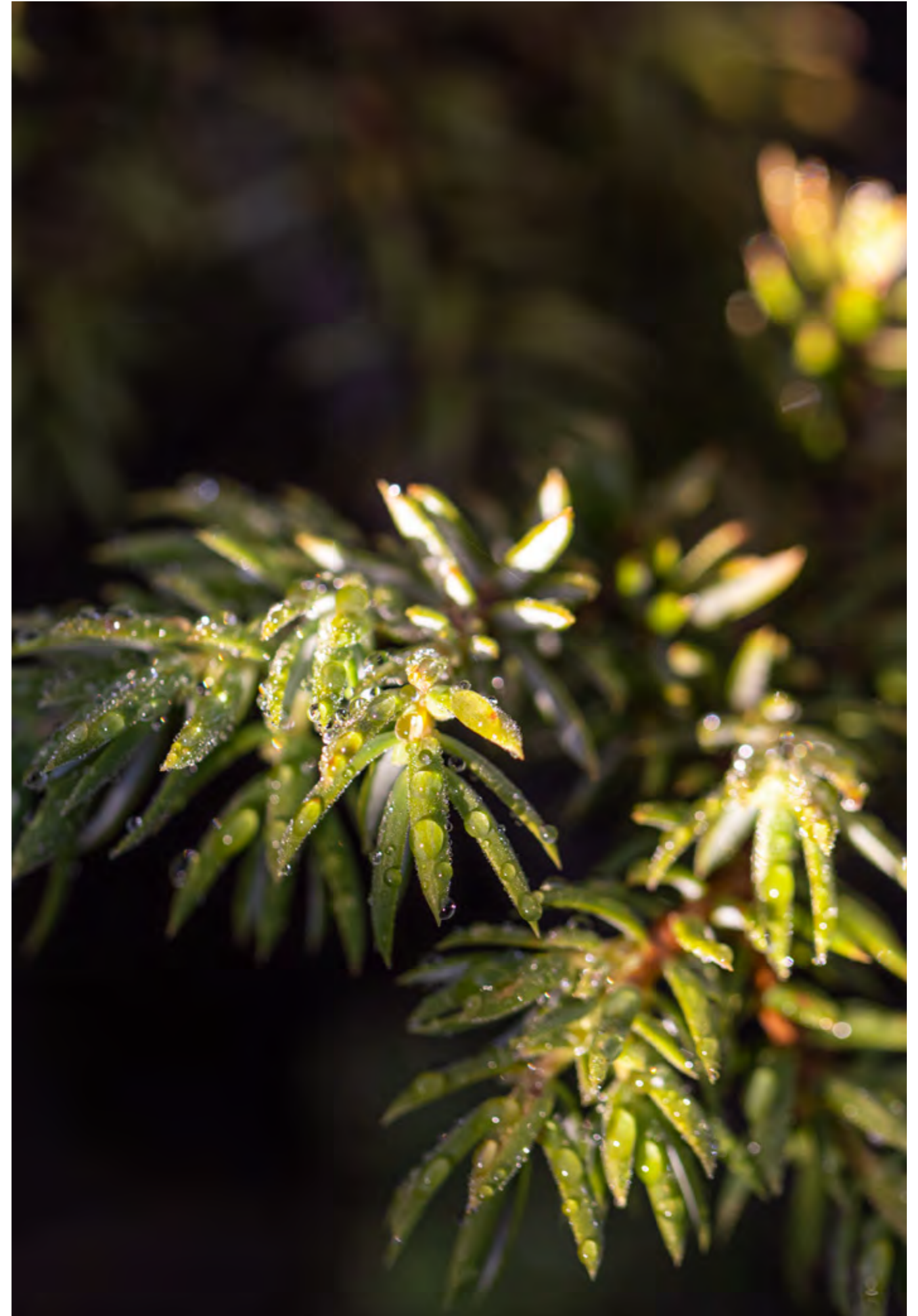
Sympatex laminates are PFAS-free

Sympatex uses the possibility of CO finishing to guarantee long-lasting and permanent water repellency, while breathability is not impaired and washing and weather resistance remain the same. Our finish is not based on substances containing perfluorinated groups.

The Greenpeace Detox Commitment is a Greenpeace initiative that aims to gradually rid the textile industry of hazardous chemicals. An important part of this commitment is the MRSL list, which contains a comprehensive selection of chemicals that should either be avoided or severely restricted in textile production.

The MRSL list includes chemicals that are classified as particularly harmful to the environment and human health. These include heavy metals such as lead, mercury and cadmium, as well as various types of solvents, plasticizers and dyes. By implementing the MRSL list, companies in the textile industry ensure that their production processes are free of these hazardous chemicals.

As an outdoor brand, you can join the Greenpeace Detox Commitment. This independent initiative also offers support to promote environmentally friendly textile production.





**„The greatest superpower is
the ability to change yourself.“**

NAVAL RAVIKANT, ENTREPRENEUR & INVESTOR

3

Design Thinking

Before you take a look at our specific strategies for implementation, use the following food for thought to promote creativity and problem sensitivity: „Design thinking“ is a methodology that aims to solve problems and develop new, innovative ideas. The aim is to find solutions that are both convincing from the user’s point of view and at the same time are market- and product-orientated. This approach is ideal for designing recyclable products and can produce extraordinary solutions. Through targeted exercises, you can achieve flexibility in your thinking and develop original and unconventional ideas. In the following section, we show you some ideas from the methodology. If required, we will be happy to offer your team comprehensive workshops.



Phase 1: Understanding

- What is the intended use?
- When, how and by whom is the garment worn?
- What will happen to the product when it is no longer used?
- What is the product's raison d'être? Why am I designing the product?

Phase 2: Define

- What problems will I face during the circular design process?
- Which product use categories and structures could I imagine?
- Penetrate and reflect on the problem precisely and specifically.

Phase 3: Brainstorming

- Is trend-oriented design really necessary or are there timeless alternatives?
- What will a fashion loop look like in the future? Concretize your vision.
- Do your research and generate lots of visual material.
- Consciously change your perspective.
- Also give chance and naivety room to allow for the unexpected.

Phase 4: Prototyping / Concretization

- Move from cognition to action! How can you experiment as freely as possible? Use as many haptic elements as possible to try out a variety of things.
- Unlearn consciously acquired knowledge for a short time and start again from the beginning.
- What new combinations could you try? Give room for improvisation.
- Exaggerate, reduce, enlarge elements. Play with weight, format and volume.
- Put together innovation teams according to your strengths. (Ideas, brainstorming, courage, humour, organization, elaboration, ...). Something new can emerge from a lively exchange.
- Proceed with passion & at the same time logically and purposefully.
- Stay flexible: Discard your ideas and start again from the beginning. Setbacks and failures lead to new solutions and represent potential for innovation.

Phase 5: Test, fail, learn

- Test your prototypes and learn from your mistakes (e.g. field tests) and implement optimizations quickly and in a targeted manner.
- Develop your first prototypes/mock-ups yourself and make mistakes along the way (use your sewing and 3D printing skills).
- Do good preparatory work for your manufacturer and create a clear, sensible specification sheet to keep the final sampling process short.
- Maintain good and transparent communication within your company in order to pass on new findings quickly.



Ecodesign

By definition, „sustainability“ comprises three aspects: Economic, environmental and social sustainability. There are many creative ways to find solutions for the fashion industry in relation to various requirements. With the help of the „Responsible Design Guide“, we would like to show you some suggestions, strategies and solutions to explore together what responsible design in functional clothing can look like from various aspects of sustainability and how this „limitation“ can also serve as a driver for creativity and innovation.

The principle „form follows function“ from product design, which was first used in the 19th century, is still relevant today. The external, visual form of products should be derived from their function or purpose. In turn, once the shape of the designed product has been finalized, it is possible to draw conclusions about its function or purpose. This principle is based on the fact that good design does not serve a purely decorative purpose, but is always based on a meaningful concept, which must not impair the purely practical function and in the best case supports it. With regard to high-performance functional clothing, we are faced with the major challenge of making adequate decisions between aesthetics, purpose and function, all of which are aimed at sustainability. The „Responsible Design Guide“ is intended to help you develop a product with our materials that is as environmentally friendly as possible, combining proven principles with new solutions. We do not provide definitive answers, but rather approaches, inspiration and impulses. Changing the fashion industry towards sustainability is also about changing behaviors, ideas and general perceptions about what fashion is and can become.





„ESPR“ Ecodesign for Sustainable Products Regulation

The „ESPR“ proposal for new ecodesign guidelines is the centerpiece of the EU’s „Green Deal“ and is described as groundbreaking for the textile sector. The proposal creates a framework for setting ecodesign requirements for specific product groups, including textiles, to improve their circularity. Similarly, the Digital Product Passport will play a key role by increasing transparency and unlocking the potential of the circular economy. In our „Responsible Design Guide“, we would like to give you an overview of the scope and the requirements for you as a brand, because in the future, these legislative initiatives will trigger major changes in the apparel sector. We would like to support you in developing your designs in line with legislation and international obligations and in preparing yourself in the best possible way. Learn how you can design your products to be circular, energy efficient and fair. In order to gain a better understanding of the specific requirements that will change the textile and clothing sector in the coming years, the most important points of the proposed legislation were summarised as follows:

- product durability, reusability, upgradability and reparability
- presence of substances that inhibit circularity
- energy and resource efficiency
- recycled content
- remanufacturing and recycling
- carbon and environmental footprints
- information requirements, including a Digital Product Passport

The various proposals are at different stages of political negotiation. However, many of them are expected to come into force between 2025 and 2026. With the introduction of far-reaching new design requirements, regulation of greenwashing, rules to prevent overproduction and overconsumption and regulations for more responsible handling of textile waste, these initiatives will completely reform the rules for the production, consumption, sale and disposal of textiles.

4.1

Durability

As creatives, you have the power to design garments that are durable in both function and style. Durable products last longer, reducing the amount of textile waste. But how can you design a garment that might even increase in value over its lifetime and continue to appeal to the user in different ways? Here it is important to take an in-depth look at the structures of our consumer society and our target group. The radius of action of a peripherally thinking Designer therefore touches on social movements as well as technical and visual aspects. This requires a profound encounter with them in order to create a corresponding story. Design does not only have to follow conventional conditions, but can also be read as a form of expression with a critical mediating character.

There are three key elements that determine the longevity and lasting success of a product:

1. The physical durability

A physically durable product withstands wear and tear over time, fulfils its intended purpose and serves its user reliably. This is about technical excellence, high-quality materials and ensuring that the product remains fit for purpose.

2. The emotional durability

Beyond pure functionality, a product must establish an emotional connection with its users. This is all about the experience: A product with emotional durability not only performs, but also has a lasting visual appeal and tells a compelling story, creating a connection with its users through affiliation and aligning with their values.

3. The esthetic durability

Aesthetic durability is about adaptability, fit, ease of use and the potential for extended utility beyond its primary purpose. A product with aesthetic durability continuously meets the evolving needs of its users and is therefore perfectly suited to the task and needs at hand.

The aim is to harmonize these elements and maximize durability. The more durable, emotionally appealing and functional a product is, the longer it will be appreciated, cared for and used again and again. This makes it a reliable companion and an essential part of the user's life. As a Designer, you should strive to develop products that become indispensable to the wearer. In the following, we describe specific strategies for this.



4.1.1

Quality

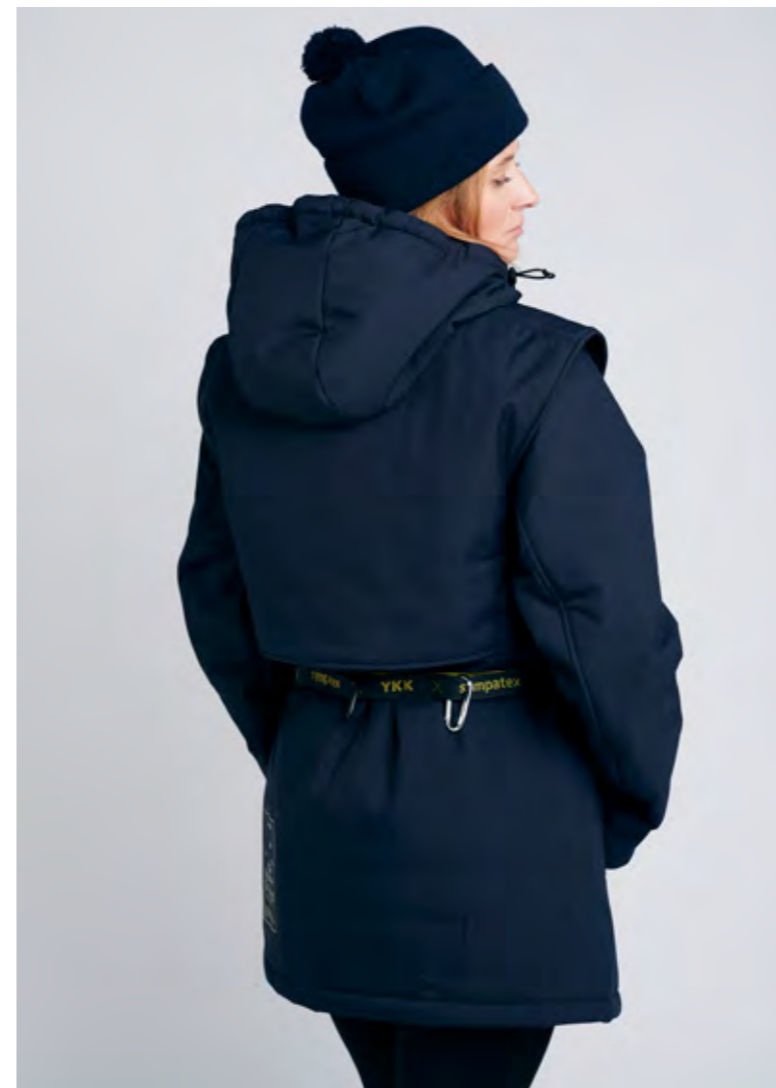
- **Select all components carefully and according to value retention** to make your product more resistant to damage or wear. Properties to consider when selecting textiles include fabric basis weight, knit/woven construction and density, tear resistance, dimensional stability and abrasion resistance. Use materials that will age and develop gracefully over time, revealing a pattern or design. For precision products such as press studs and eyelets, make sure you use high-quality materials and not cheap mass-produced goods to ensure reliable tightness, closing force and durability. For other ingredients, also consider unusual materials such as mineral composites from other industries. See the potential in high-quality, valuable materials that are downcycled or landfilled elsewhere and natural, bio-based raw materials. Think about how you could integrate these into your design.
- **Go against trends and opt for timeless design**, to minimize waste and pollution. In a culture of fast-growing trends and short-term desires, Designers are expected to have an excellent sense of tomorrow's aesthetics and demand. Think about how society as a whole could change and, if in doubt, opt for a steadfast aesthetic so that your product does not become obsolete in one or two seasons. Try to establish classic designs with room for contemporary design influences. It can either be a strategy to focus on colors such as black, white or monochrome color harmonies, as the garment will fit different occasions and seasons. Another approach would be to achieve aesthetic longevity by creating a unique piece that is so interesting due to its uniqueness, special colors or shapes that it can be used for a long time. Other factors that influence how durable a garment is are comfort and fit. Therefore, choose an appropriate cut construction.
- **Reinforce the areas that are subject to greater wear and use**, such as the elbows of jackets or the crotch, knees and inner thighs of pants. Reinforcement can be achieved by double stitching, double layers of fabric or extra stitches. Consider how these areas can become part of the aesthetic. Examine and define the usage pattern of your product in advance to understand where you can increase physical durability.
- **Design your garment so that it can be easily repaired**. Even if the functional durability of a product is well thought out, a repair may occur in the future. Design your garment so that it can be dismantled and do not use strong adhesives. Easily accessible, removable or replaceable parts make repairs easier, as only the broken or worn elements (e.g. the cuffs of a jacket or the fastener of a pair of trousers) can be repaired or replaced. Also provide simple care and washing instructions for your garment, give tips on how to repair it or make suggestions that encourage the reuse of the garment. You can also include spare parts such as buttons, patches and additional tools to encourage the customer to repair the product instead of throwing it away. Retail models such as in-store repair options can have a positive influence on user behavior and also strengthen brand loyalty. We are happy to help with advice on how best to care for our materials and connect you with our authorized repair partners who already have experience in dealing with damaged functional clothing and work with appropriate machines:
www.sympatex.com/ueber-uns/pflege-und-reperatur/

4.1.2

Versatility

The ability to redesign offers the potential for a garment to not only be durable in terms of function/quality, but also to adapt to the changing needs and desires of the wearer. If a garment is able to transform itself over the course of its life and evolve with the personality of the user, its useful life can be extended. Changes such as recoloring or redesigning can give the garment a new aesthetic or functional value. This strategy can help reduce the risk of a user losing interest in the product. Designing for versatility is about adapting a product to different styles, fits and occasions. You can change the drape and create innovative pattern constructions using techniques such as elasticized laces or snaps.

- **Size adjustability** reduces the risk of overproduction. A common reason why a garment is no longer worn is that it no longer fits. It is therefore advisable to develop convertible garments that can be resized over time to extend their useful life. A simple technique for integrating a variable size into the design can be a generous seam allowance, for example. This allows the width to be adjusted afterwards. The use of certain closures or drawstrings can also be useful. In the pattern construction itself, for example, folding techniques can be used that are designed to expand in both directions in order to cover several sizes. Products that particularly benefit from adjustable sizing include maternity or children's clothing.
- **Create a complex, multifunctional product through modularity.** Modular design is a strategy where a product can be broken down into smaller parts that can be used independently or combined in new ways: Either by adding or removing, but without changing the entire product, new functions or styles can be created. A multi-layered, modular collection structure allows products to be individually designed, adapted, updated, extended or easily repaired in parts. The various components must be designed in such a way that they are removable and interchangeable through the use of different elements such as zippers, (press) buttons, loops, magnets or other sophisticated details. If the appearance is constantly changing, a new garment is created from different components time and again. In addition to flexibility in terms of design, comfort and needs, the modular product also facilitates the recycling or reuse of materials and components, as the garment is designed from the outset so that it can be disassembled. By combining several of the user's needs in one garment, the need for new garments can also be reduced.



4.1.3

Participatory Design

With participative design strategies, the user is actively involved in the design and/or manufacturing process of a product. This ensures emotional durability from consumer to product. While functional durability refers to whether a garment is designed to last due to its physical properties, emotional durability refers to whether the user wants to keep and wear it in the long term. Today's use of clothing is unfortunately still largely characterized by short-term wear and a throw-away mentality, whereby a garment is usually replaced because the user has lost interest in it, not because it is broken. Participatory design is about creating garments that consumers want to keep and use for longer because they have contributed time and ideas to the product upfront during the manufacturing and design process or later. The active role of the user can strengthen the emotional connection to the product and increase longevity, which leads to the pieces being appreciated and kept longer. Consumers' desire to play a more active role in the design of a product is becoming increasingly widespread today thanks to the maker culture.

- **Give the customer the opportunity to help shape the product interactively.** In this way, garments can be created that meet the specific needs and wishes of the user. Furthermore, the product also mobilizes personal artistic skills and thus creates a feeling of creative participation. This intensifies the feeling of belonging to the product, which in turn increases brand loyalty. There are various options for co-design: using do-it-yourself kits, users can put together their own garments either personally or automatically via digital platforms and choose from various options. Instructions and open-source designs can also promote interaction and bring the wearer into contact with textile craftsmanship. For example, instead of buying a finished product, a user can purchase only parts of it, such as a hood or extra pockets, and then attach them themselves. Pay attention to a balanced kit to generate an end product with each combination that does not break with its brand identity despite its diversity. This is the actual design behind the modular principle. It is not about total design freedom for the customer - for example, a small selection of colors is enough to create a favorite piece. Participation in the design process can also have an impact on other aspects of sustainable behavior, such as building skills for the repair, care or redesign of a garment. For you as a designer, the collaborative attitude of co-creating has the potential to develop a greater understanding of the customer and a valuable, two-way relationship.
- **Provide elements of personalization** to offer an individual product far removed from mass-produced goods. Customizable designs such as embroidery, letter rivets, monograms and other individual finishes increase the emotional durability of the garment. Removable and interchangeable elements also open up the opportunity to individualize and change the style. Offer different colors, materials and accessories in the form of DIY and upcycling kits to give the garment a personal touch. Often these distinctive products are also used as gifts and then acquire a particularly strong value.
- **Generate as much identification potential as possible through storytelling.** With this content marketing method, you can create a trusting customer relationship on an emotional level and ensure that your product is widely perceived. Tell a story through your design that permanently emphasizes the personality of the user. Follow a dynamic, not a static narrative, leave room for interpretation in order to inspire people in their constant development. Make the story your own to pass on knowledge. And also make yourself accessible and approachable. Use the power of images and visualize the attitude to life that you want to convey as a brand. What does this specific item of clothing stand for, apart from its physical properties? Design functional, exciting but also meaningful and characteristic garments. Don't start this story at the marketing stage, but begin at the design stage in order to preserve its credibility and authenticity and tell your own honest story.





4.2

Synergy Effect

Let's focus on making sustainability issues and the associated challenges easier to understand in order to combine the power of our fellow human beings, colleagues and partners to promote sustainable business environments.

- **Expand your exchange channels through collaboration and networking.** With jointly defined goals, you can advocate more proactively for sustainable, ecological behavior in society. Think about which like-minded partners you share your expertise with and with whom it might make sense to join forces. Where are your interfaces to the outside world that you could use and with which you could give your ideas a strong voice? Through which activities, approaches and collaborations can you jointly advance the goal of the circular economy and „make the world a better place“ in this context? Foundations also often pursue a global, cross-sector approach to overcome systemic blockages. These can bring together key partners along the value chain to tackle problems together. Join think tanks, develop case studies and realize a collective capacity to act. Engage in a close exchange of experiences with your end customers and athletes to find out which functions and special features are required in the product. In marketing, a collaboration with a suitable influencer as a testimonial can help to attract attention and convey all information in an easily understandable and tangible way. If you are a core outdoor brand, you can work with athletes as brand ambassadors. Make sure that your brand ambassador is not only good at their sport, but is also committed to a sustainable cause and makes strong statements to reflect your company's strategy and vision.
- **Continue to learn through workshops, consultations and training courses.** Where can you as a Designer improve your behavior and expand your mindset and know-how? Consciously adopt a curious, open attitude. Get external support so that you don't just operate in your own „bubble“. Think the life cycle of your products through to the end and take advantage of training opportunities to integrate sustainability even more strongly into your process and internalize your corporate values. Work on different topics such as ecodesign, circular business models, design thinking, process and innovation management, textile technology or recycling and find your focus. Various service providers offer training and further education courses to encourage and enable companies to integrate the circular economy into the core of their business model and thus also into product design. In this way, you acquire new industry knowledge and learn methods to facilitate the transition to circular collections. To support you on your way to making responsible decisions in the design process, Sympatex also offers you the opportunity to work with you on specific product challenges through expert, multidisciplinary consulting services. These are individually tailored to your specific needs. Depending on the focus, a workshop can be practiced in person or virtually.
- **Get involved in the areas of training, placement and promotion.** By working together on study projects, you can offer budding designers support and insights into the economy in the spirit of „open source“. Students can incorporate industry-specific experience into innovative feasibility studies and scientific work and gain a good overview of the challenges facing the textile industry in terms of circularity and sustainability in general. On the other hand, students often develop exciting solutions and are therefore valuable sources of inspiration and may also become cooperation partners or employees in the future.

4.3

Improving the eco-balance

We produce 1 million items of clothing every 5 minutes. It takes 8 thousand liters of water and many other resources to produce a single pair of jeans. In 9 out of 10 cases, these resources are lost. They end up in waste incineration or landfill. Only 10 % can be recycled. However, current recycling is largely a downcycling process into materials that can no longer be used for clothing. This means that large quantities of raw materials still have to be produced for new fashion.

- **Act climate neutrally and determine your company's footprint.** Via www.climatehero.me or www.fußabdruck.de you have the option of determining your company's footprint in order to offset your CO₂ emissions. The HIGG Intex is also a tool that is relevant for sustainable companies in the clothing industry in order to provide transparency about emissions, water and waste management and to make climate neutrality measurable. More than 70% of the ecological footprint of products is already determined in the design phase and around 95% of emissions are generated during production. Every item of clothing leaves a significant footprint, so reduce the number of collections and question the raison d'être of each individual product. Use the sun as an energy source with photovoltaic modules. Can seasonal styles also be replaced by 3-in-1 styles to make them wearable all year round? Take a stand against the „fast fashion“ industry. Act responsibly as creatives and brand managers; this includes strategic, sometimes risky maneuvers to radically reduce emissions.
- **Reduce water consumption through targeted dyeing methods.** When designing your collection, consider dyeing alternatives such as the „dope dye“ process, in which the dyeing process begins at the spinning mill. In this process, dye is added to the yarn drop by drop during the manufacturing process, dyeing it through and through. In contrast to inert dyeing, a deep, rich color tone can be achieved in this way. Accept the restriction in the color palette to drastically reduce water consumption during the dyeing process. Also keep an eye on the „undyed“ option, which has become a fashion statement among climate-conscious consumers.
- **Digitize design processes to reduce the need for physical samples.** Use the appropriate software such as „CLO 3D“ or „Assyst“ to achieve maximum efficiency in the sampling process. Skip time-consuming and costly shipping and measuring and save resources. Maintain control over the cutting process, which is often left in the hands of the garment makers in conventional procedures. Work intensively with your garment technicians on the pattern construction and optimize the fit digitally on the avatar. In this way, you can also precisely coordinate the drape of the materials and the look before you have your prototype graded and sewn. Your specification sheet can be optimally prepared from the very first sample. A win-win situation for designers and producers! You also have the option of designing purely digital collections or marketing collections „on demand“. The strategy of „co-creating“ could also be combined here.
- **Donate part of your turnover to environmental protection.** Support environmental protection groups and motivate other companies. Make your contribution to the preservation of nature. Membership of a socially and ecologically committed organisation may be an option. This can certainly bring about significant changes and also strengthen customer loyalty.



Bio-based.

25% bio-content in our membrane leads to 12% less CO₂ emissions per kg of polymer compared to the previous purely fossil based polymers.

With the implementation of the bio-based content in our membrane, the CO₂ footprint of the textile will further improve. More than 25% of the raw materials used in the membrane will be converted to renewable, bio-based raw materials in the course of this year, based on a mass balance with raw materials from various organic waste streams. At the same time, we are ensuring that the membrane not only retains its high performance values in terms of breathability and water and windproofness, but also remains fully recyclable at the end of its life cycle.

DSM, our long-standing raw material partner, has completed the conversion of its production facilities to renewable energy sources to reduce the carbon footprint of its products and operations. In this way, DSM supports us at Sympatex as the first signatory to the UNFCCC Climate Charter for Action for the Textile Industry (now signed by over 100 brands and associations). Another milestone on the way to achieving climate neutrality - several years earlier than planned.

Sympatex's brand partners will benefit from these developments. In particular the inclusion of Sympatex membranes in their collections will help them to fulfill an important commitment of the Climate Charter - the reduction of CO₂ emissions by 30% compared to 2015 - much faster. This reduction is achieved without any change to the polymer composition and membrane performance: No re-qualification or re-testing is required.

5

Design2Recycle

The way fashion is consumed and produced today is to a large extent a one-way street. Significant changes are needed in the fashion industry to avoid waste and regenerate nature. Our goal is to minimize the environmental impact as much as possible. An important part of the solution is the circular economy. Circular fashion requires thoughtful, conceptual and responsible design from the outset and is based on better choices that are essential to build a sustainable brand in the future. Combining the sustainable solutions of Ecodesign with the recycling concepts of Circular Design together with fair conditions, this will have the intense impact of Responsible Design and bring about powerful change. If you as a designer positively change the way you develop products and consider the circular economy when designing, you can play your part in creating a more sustainable fashion industry with great impact. Design2Recycle is an opportunity to take action as a designer and develop more circular products with a lower environmental impact.

A garment can only become recyclable if it is considered in the sum of its individual parts. Both the main material and all additional components such as accessories, trims, prints and details must be consciously chosen so that they can be added to the cycle again later. Fashion must therefore be designed for recyclability in order to generate new resources.

Sympatex developed the patent for the Design2Recycle strategy back in 1996, which was intended to help with the product development of a single-origin garment in order to provide the highest quality, single-origin raw material possible for the subsequent recycling process. A short time later, the first attempt was made together with industrial partners to collect recyclable jackets from end consumers. Due to the low number of returns, the project was discontinued. However, the basic message of the patent has lost none of its validity even after 25 years and is more relevant today than ever.



We urge you to consider the issue of recycling right from the design stage and, in addition to the choice of laminate, to select ingredients (sewing threads, zippers, buttons, cords, support material, etc.) that are as pure as possible and to strive for a minimalist design with as few seams as possible. Design2Recycle is an ongoing process and is regularly updated and adapted to current conditions.

The circularity of materials aims to minimize waste and the need for new resources by allowing products to be either recycled in the technical cycle or decomposed and degraded in the biological cycle. The scarcity of 100% recycled and recyclable materials presents designers with the immense challenge of putting together the right ingredients. Sympatex laminates made from 100% polyester have the potential to be mechanically recycled and regenerated into technical nutrients for new fibers. To ensure recyclability and to be able to recycle a garment as a whole, all components must belong to the same cycle. This is where new concepts for circular design play a key role! This first building block contributes significantly to the recycling process and influences the entire life cycle of a product. It is your responsibility as a designer to create contemporary designs.

Sympatex has set itself the goal of making the greatest possible contribution at all external interfaces of our company so that the textile industry can close the ecological loop as quickly as possible. This also includes the development and publication of our methods for designing circular products. We want to provide impetus to design for the circular economy and drive the transition from a linear to a circular business model. This transition not only reduces pressure on virgin resources and avoids waste, but also contributes to broader sustainability goals related to climate and biodiversity. Below we will present design rules and guidelines for circular products that you can use during your design process.

5.1

Monomaterial

To ensure recyclability, consistently use materials with recyclable properties that are suitable for the same recycling cycle. This approach has the highest priority in today's recycling technologies. In the best case, these carefully selected and mono-based materials have already been produced from recycled raw materials and can be returned to the cycle at the end of their life. On request, we offer our customers access to our exclusive trim library (incl. product information sheets & samples), which includes recycled and/or recyclable accessories from partners. Our selection focuses on particularly sustainable and innovative components, allowing you as a designer to source conveniently and efficiently. Discover in this comprehensive and constantly growing library all listed components of a garment that harmonize optimally with Sympatex laminates and can therefore be fed into the same polyester recycling cycle and reprocessed. As new, innovative accessories and materials are constantly coming onto the market, we work closely with selected trim suppliers to keep the information up to date. Sympatex is currently developing a polyester-based tape for seam sealing to ensure the integrity of mono-materials in common joining technologies. One challenge with a mono-based approach is the risk of having to compromise on the aesthetics of the product and the quality of its components, which currently still seems contrary to the longevity of eco-design. However, despite the current loss of quality of a polyester zip fastener, for example, it also has advantages such as the possibility of reuse if individual „teeth“ are lost, which would no longer be possible with a metal zip fastener. Trade fair visits and constant exchange within the industry can help to identify new developments in the area of trims & details.

- **High-quality, synthetic polyester fibers** are particularly suitable as a versatile raw material for future new products in outdoor clothing. Match all trims & details such as (printed) buttons, threads, size and care labels, etc. to the main material and its recycling cycle. For each accessory, consider what alternatives you have. If there are no PES-based ingredients, switch to a metal alternative, as this can be separated during the recycling process by using magnets without high costs and time.
- **Design products that are as seamless as possible and simplify the cut.** Go for a seam-reduced design overall, especially for sleeves, collars and hoods. Create innovative, seamless constructions using new joining technologies such as laser, highfrequency or ultrasonic welding - avoiding tape and glue at the seams so that your product can be easily dismantled and recycled one day.
- **Choose laser/ultrasonic engraving, weaving techniques or embroidery as alternative fabric textures and surface manipulation.** Try out different thread thicknesses or stitch types. Folding techniques or the application of external elements to a textile are further possibilities that lead to different patterns, colors and textures of surfaces. Avoid plastisol-based prints, as this poses a major challenge for recycling and can also cause health problems during production. Synthetic adhesives and printing pastes disrupt the recycling process, so choose water or algae-based inks.
- **Only use a fluorocarbon-free, water-repellent finish,** such as Sympatex laminates, so as not to make upcycling more difficult. Chemical outer fabric finishes often contain harmful chemicals.
- **Use the bias cut,** if you need the fabric to be stretchy for your design. Try to avoid using elastane and instead change the cut construction by twisting the fabric diagonally when cutting.



„The new EU directives have given us an update on design innovation. Until now, designers have largely developed their products by ignoring the effects of upstream and downstream. The product manufacturing process must now take into account certain restrictions resulting from this responsibility right from the initial idea. But the great thing is that restrictions do not limit innovation, they accelerate it. The moment you realize that only certain materials are recyclable, you can focus on developing new solutions with these materials“

RÜDIGER FOX, CEO SYMPATEX

5.2

Dismantling

Most products today consist of several materials in the individual pattern pieces that have either a functional or an aesthetic meaning. This mix of materials cannot always be avoided. Even in cases where garments are made from one main recyclable material, one component is often made from another material that needs to be broken down before recycling. To make the recycling process viable, garments containing different materials should be designed in such a way, that they can be disassembled as easily as possible. Accessories and trims such as zippers and buttons have to be removed and textile components made of different materials have to be separated. Manual assistance is usually required to cut or tear the relevant parts, which is both time-consuming and costly. New innovations can optimize this process.

- **Use detachable closure mechanisms** such as cords, buttons, buckles, loops and straps so that the components of a product can be sent to separate recycling streams at the end of its life. Offer both aesthetic and functional added value through new assembly methods. In addition, this strategy ties in with reparability, as components can be removed and replaced and the garment can be visibly deconstructed into its segments.
- **Dissolvable yarns and separable seams** such as the chain stitch can be a means of facilitating the fragmentation of materials from different circuits. Dissolvable yarns can be dissolved by water, heat and pressure or by hot air and microwaves. The yarn could dissolve during recycling so that additives such as zippers and buttons fall off the main fabric. Such technologies can have a major positive impact both economically and ecologically when materials have to or should be combined with each other in the conventional way.
- **Use removable metal parts** for easier disassembly during the recycling process. In conventional garments, metal parts such as buttons, fasteners and rivets are permanently attached to garments. As these parts need to be removed before recycling, they complicate the process and make it less effective and economically unviable. Rethink your design with regard to these elements to make recycling easier.
- **Position non-recyclable accessories as far as possible in the same place** on the garment to save fabric when dismantling or recycling.

5.3

Reduction

- **If in doubt, opt for a simple design** and minimize the components of your garment to the bare essentials. Reduce „decorative aspects“ such as logo designs according to the concept of „less is more“. Shift your aesthetic demands to materials, cut, shapes and colors.
- **Reduce the use of reflective material** such as piping, logos or ribbons. If reflective material is absolutely necessary, concentrate on individual pieces of fabric to prevent that the entire material will later becomes unusable later.
- **Adapt the design to the requirements of the brand and the customer.** Be clear about the use of the garment. Design garments for high individual demands, but with uncompromising responsibility for future generations. How much high performance is significantly required for your end user and where is it better to opt for sustainable design constructions? Every garment must be carefully considered and also meet the requirements of current recycling methods.



6

Innovative Services & Tools

So far, there are still few tools for designers that support you in sustainable measures and show you how your design decisions and components used affect, for example, recyclability or the environment. There are some approaches to using a product assessment that shows where a product can be optimized to become even more sustainable. These software innovations, which are based on calculating and classifying the circularity of a product (before it is produced), could significantly change the development and design process in the future. If you could learn in the creation and ideation process what changes and where exactly you could imply them, this would be a helpful tool in the future, for example to demonstrably and transparently present circular design for reuse or calculate CO₂ emissions and thus make better design decisions a habit.



7

Value Chain

The Supply Chain Due Diligence Act regulates corporate responsibility for compliance with human rights in supply chains for the first time, thereby creating legal certainty. The substances and chemicals to be used for textiles are also affected by the law. This is because substances that are harmful to humans and can cause allergies and illnesses not only affect the consumers who wear the products, but also all those who manufacture the textiles and process them into clothing. As a company, you have therefore been obliged since January 2023 to be aware of your social and environmental responsibility at every stage of the complex supply chains and to initiate changes where necessary.

7.1

Production

For the manufacturing processes, we recommend the optimal and economical use of resources, such as minimizing waste or recycling offcuts during production. Become aware of your high-consumption products and focus on material efficiency. Make sure you use up your leftover and deadstock materials and recycle them in other collections. Nothing is more resource-efficient than material that has already been produced! The possibility of collecting waste produced by the industry and transforming it into new products is also within the competence of today's designers. Think carefully about your production sites and try to produce as locally and fairly as possible. The dark side of the fashion and textile industry includes catastrophic working conditions for women, especially in Asian countries and Eastern Europe, with wages far below the minimum subsistence level, numerous - often unpaid - overtime hours, discrimination against women and the prevention of unionization. 80% of employees in sewing factories in Bangladesh are women. They are particularly frequently and severely affected by labor rights violations. So it is not only the environment that suffers from the exploitative excesses of global fashion production, but also people. Responsible design should combine ecological AND fair manufacturing processes. Produce your collections with a clear conscience and demand a 100% transparent value chain from your garment manufacturers, including the subcontractor, to ensure that your garments are produced under humane conditions. Visit your producers regularly and make sure that all requirements are being met.

7.2

Logistics

Use low-emission transportation such as rail transport as far as possible. Make sure that your containers are completely full and combine shipments if necessary. Also make sure to optimize your packaging design accordingly and avoid individual plastic packaging. If you cannot do without it, use recycled or biodegradable packaging. Make use of new developments such as „bioplastics“, in which the biomass consists of renewable raw materials such as corn, sugar cane or cellulose. Reduce packaging waste in general and reuse packaging material.

7.3

Transparency

Trace your production chain completely and obtain all information on environmental, social and chemical compatibility. Can your suppliers and garment manufacturers provide evidence of appropriate social audits (e.g. from organizations such as Fairtrade, BSCI or code of conduct audits)? Rely on a traceable, transparent and certified supply chain and set yourself a target for when your supply chain will become circular. Use the Digital Product Passport (DPP) nominated in the EU's „ESPR“ draft legislation to pave the way for subsequent recycling. As a brand, provide your end customers with information on production: Where and under what circumstances was the product manufactured? How long has the business relationship between the brand and the factory existed? When, where and by whom was the garment made? What is the environmental impact of this particular garment? Rethink your labeling and do your best to live transparency in close dialogue with your end customer.

8

Consumer

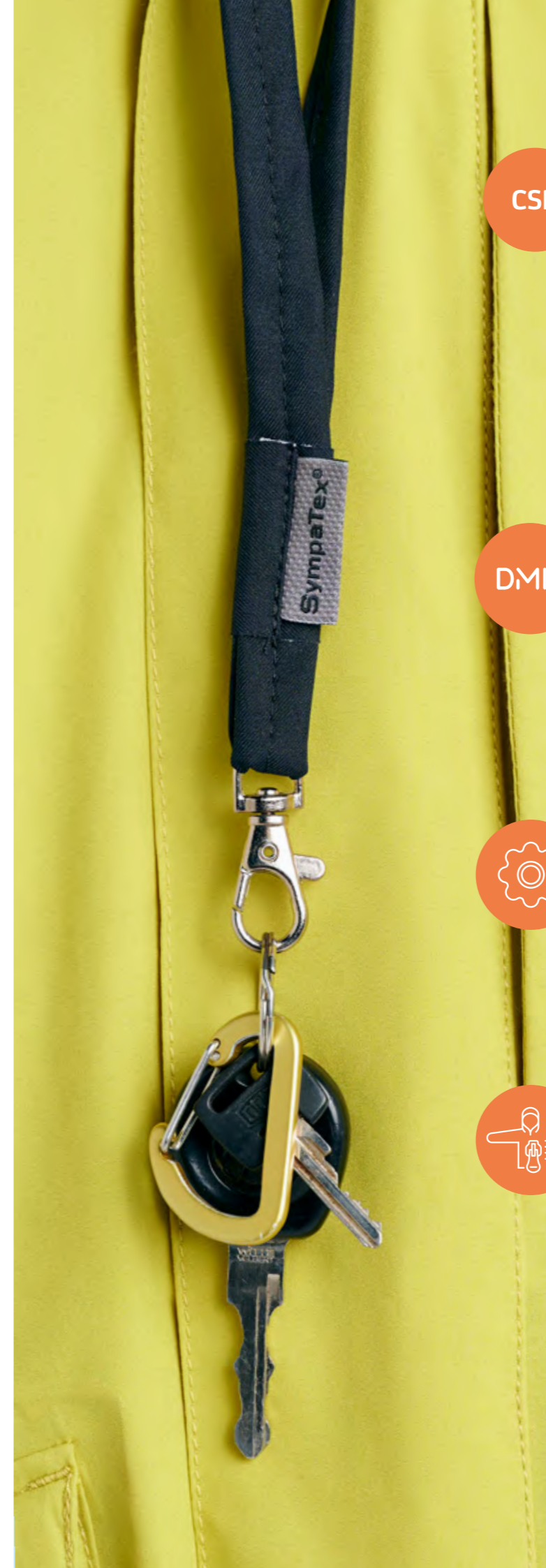
Greenwashing has become a problem in the fashion industry. Consumer concern about the environmental impact of clothing has increased significantly in recent years. Unfortunately, this also applies to the practice of greenwashing. Currently, fashion marketing is flooded with environmentally conscious messages as brands label their products as „sustainable“ without providing the basics. Sensitize your customers by not just using buzzwords, but by sharing background information on the production of the garment and questioning important issues in the outdoor and sports industry on different communication platforms: overconsumption, overproduction, environmental impact, etc. As product labeling in the fashion industry is difficult to measure and not (yet) regulated (like nutritional labeling of food), we recommend that you provide a detailed breakdown of the product with evidence of its claims. Never label a product as more sustainable than it is. Communicate clearly and consistently to consumers to avoid any greenwashing. Back up and validate your claims with data so consumers know if this product is truly sustainable. Focus on your products and align them with your brand's DNA and external communication. Provide your customers with user information and guidelines on specific aspects of the product via hangtags and labels to help raise environmental awareness. Encourage your customers to consume sustainably, wear and recycle the garment frequently and respond to their needs.

9

End-of-Life

What happens after an item of clothing has been used? Unfortunately, there is currently no general, satisfactory answer to this question. In future, consumers will need to be guided and informed. The aim is to show consumers how and where they can return their used clothing to the appropriate material cycle. A practical take-back system for the consumer would enable sorting and recycling companies to access resources and produce high-quality fibers from used goods again.

The outdoor and textile industry is one of the biggest contributors to microplastic pollution in the environment and waterways. We at Sympatex are concerned with this problem and are working together with research institutes, NGOs and companies to find solutions. In test series, we test our laminates with regard to the emission of microplastics.



We support you ...

Corporate Social Responsibility

- ... being on the safe side for all upcoming regulations.
- ... becoming compliant with the LkSG/CSRD.
- ... with access to sustainability data, standards and certificates.
- ... with our 35 years of experience with PFAS-free products.

Cloud Digitization

- ... with a digital solution: check out the digital twins of our laminates online.
- ... in designing your samples with our laminates directly on the screen.
- ... in speeding up the lab dip process to save time and shipments.

Technical Support

- ... with intensive evaluation of your products for the best possible function.
- ... with closely supervised teamwork from sampling stage to bulk production.
- ... reaching the best performance values with our expertise.

Circular Design

- ... with offering our Responsible Design Guide and Trim List.
- ... with sharing ideas for prototyping stage.
- ... with checking your Tech-Packs.



These are insoluble, non-biodegradable synthetic plastics ranging in size from less than 5 millimetres to 1,000 nanometres. More than 700,000 microfibers are washed out with every wash, most of which cannot be filtered out and end up in wastewater and thus in our rivers and oceans, making them available to marine organisms. At the same time, microplastic particles are now found in filter systems for drinking water treatment and therefore in the human body.

9.1

Distribution Channels

Establish new sales channels and second-hand concepts for previously worn clothing. Develop your own recommerce offers and enter into a cooperative dialog with your end consumers. Offer your customers ideas and impulses on what purpose an item of clothing can serve to avoid the residual waste garbage can. Develop strategies to make it easier to reuse clothing that is still wearable or to recycle it. Are distribution channels such as clothing rental or subscription possible? Make your collections digitally accessible and expand your sales channels.

9.2

Collecting, sorting & recycling

Sympatex is not a recycling company, but a building block in the textile value chain. Through partnerships and cooperations, we try to find ways to enable the future recycling of polyester-based clothing and thus close the textile loop. Sympatex aims to return the unmixed garments to the recycling process in such a way that high-quality granulate is produced and the product is „upcycled“. The fact that this is fundamentally possible has already been demonstrated in pilot projects within the wear2wear industry consortium initiated by Sympatex (www.wear2wear.com). Sympatex can therefore ensure that the Sympatex materials used in your garments meet the requirements of recycling companies so that they can be processed into fibers at the end of their life cycle. Waste is therefore not only the problem, but also part of the solution in the recycling process. In order to generate recyclable output, collection/sorting and recycling companies will become an important part of the value chain, working closely with spinning mills, weaving mills, raw material suppliers, textile manufacturers and garment makers to turn your innovative recyclable garments back into yarns and textiles.

Textile consumption in Germany amounts to approx. 1.5 million tons per year. 64% (around 1.0 million tons) of used textiles are collected on average. This is done by commercial collectors, charitable organizations and local authorities. For the collection of used textiles in Germany, a largely nationwide depot container system has been set up. Around 62% of used textiles can be prepared for reuse and sold worldwide as second-hand items. Used textiles that are no longer wearable and marketable are processed into cleaning cloths (approx. 14%) or recycled as tear-off goods (approx. 12%). The remaining 12% is either recycled for energy or disposed of in other facilities. In future, intelligent sorting systems should be able to identify products for the circular economy to generate high-quality, new resources and ensure „fiber2fiber“ recycling. Recycling technology is therefore crucial for the future of the circular textile industry. The use of technology and data plays a key role in enabling change and accelerating transformation.

There are pilot projects that aim to assign a digital label (ID) to each item of clothing during the production process in order to store essential product data that is relevant for reuse and recycling companies. This data identifies product groups and materials and thus identifies the corresponding cycle. This type of sorting software is very advantageous, as it is difficult to meet the requirements for recyclable source material with manual sorting. Ensuring the exclusion of certain chemicals and dyes and determining the exact fiber composition are almost impossible manually. Intelligent sorting stations could upgrade their current manual sorting workstations with software and scanners to read in data, which would then be displayed on a screen for the sorting staff. The sorting quality would be significantly improved with the same effort. Depending on the condition of the garment, the employees decide which of the recommendations given is most likely to apply. This product ID also offers further advantages, and not just for sorters: it contains the complete history of a garment, from information on material components, their origin and production to countries of manufacture, care instructions, strategies for extending the useful life and instructions for returning the garment for reuse, resale or recycling. Other research projects, for example on AI-based sorting, show approaches for machine learning and spectroscopy to optimize sorting for reuse and recycling. In the future, this could make it possible to sort garment types and materials without the need to implement a ID and sort it. While there are various ways in which AI can be used in waste management, it is AI-powered waste sorting that can truly revolutionize the industry and change our environment. There is great potential to make the recycling process far more efficient and improve its economic viability. New legislation will be a catalyst for circular innovations to be implemented on a large scale. At European level, Sympatex is trying to help shape a circular textile value chain (www.acceleratingcircularity.org). Since spring 2019, Sympatex has been working with the British start-up „Worn Again Technologies“ in order to have a recycling technology available on the market in the future that will enable the recycling of polyester and cotton in one plant. Our idea is to join a large European recycling partner network in order to be able to use reliable take-back channels such as recycling for glass or other recyclable materials for textiles across the board.

As a designer, you need to do good preparatory work for later recycling and design your products according to the principles of circularity so that you can later assign product and material types to the correct channel. At best, clothing and return point are labeled for users, similar to waste separation.

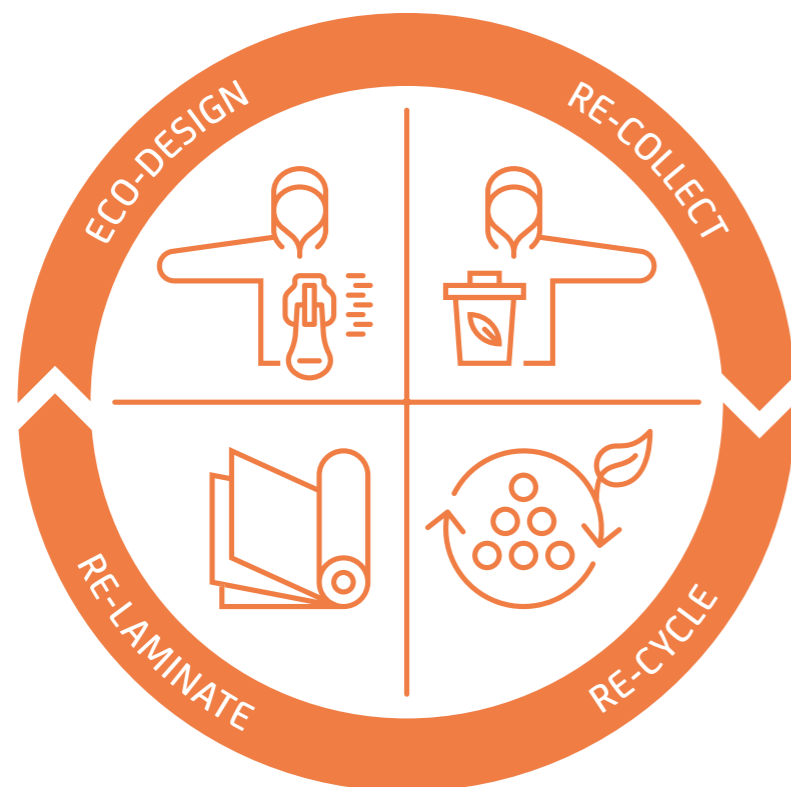
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Support by Sympatex

Together, we have major problems to overcome in terms of the circular economy and sustainability in the textile industry and therefore strive for a close and concrete exchange with our customers about solutions in product development. At Sympatex we see ourselves as team players and we, like you, want to create a garment with the best possible function under sustainable conditions to not only maximize end customer satisfaction.

We offer support to all our brand partners' designers so that they can design their collections with Sympatex materials in the most resource-conserving and environmentally friendly way possible. We start even before prototyping and provide support during creative product development with regard to Ecodesign and Design2Recycle. We introduce you to trims that you can use and show you the true recycling potential of your products.

During the sampling process, your products also undergo sample testing in our in-house Sympatex laboratory. Depending on the performance class of the selected laminate, sprinkling, seam tightness tests and a processing test according to the area of application are carried out there. You will then receive a comprehensive evaluation report with laboratory results and recommendations/assistance from our experts.



11

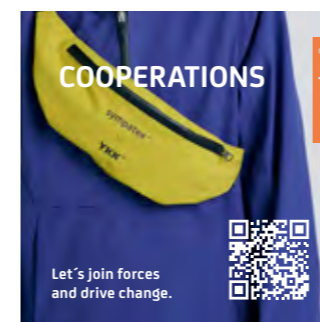
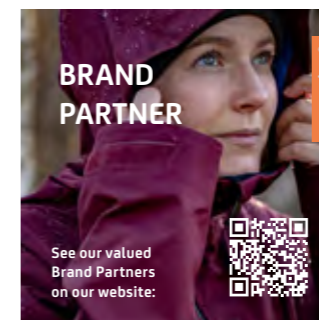
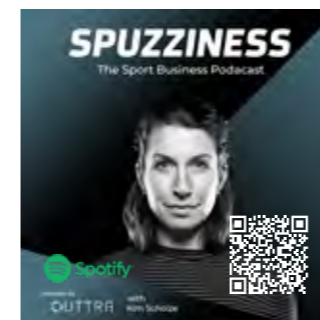
Contact

We are proud and grateful to work with innovative partners beyond the outdoor industry along the entire value chain to advance the vision of the circular economy and sustainability. We can only do this effectively if we work together towards a circular future for fashion.

Are you interested in using our climate-neutral and recyclable Sympatex membrane? We would be happy to show you our material samples to lay the foundation for your circular garment:

Apparel: Jessica.Dedora@sympatex.com
 Workwear: Petra.Klattenhoff@sympatex.com
 Footwear: Yasemin.Malcolm@sympatex.com

Information on recycling strategies: Martin.Mayershofer@sympatex.com



Let's connect!

Use our credible platforms to collaborate and spread the words for change:

Meet us at the **Ingredient Roundtable** and **Young Designers – Sustainability Impact Program**.

Let's work together on **social media**:



Develop **press releases, print media and collaborations at fairs and panel discussions** with us.

Contact Marketing: marketing@sympatex.com

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„Erarbeitung möglicher Modelle der erweiterten Herstellerverantwortung für Textilien“





As an ingredient brand, Sympatex delivers more than just a membrane:

We work closely with our customers and share our expertise, to develop the best possible product together. As a designer, we offer you and recommend customised strategies on how to make your product recyclable and sustainable.

The **Responsible Design Guide** is intended to help you plan your collection sensibly from the outset and ask yourself the right questions in terms of the circular economy.

