

Tyvek[®] — Advancing sustainability in healthcare packaging

June 2021



Tyvek[®]

Taking actions to meaningfully advance sustainability

We are proud of our role in helping people live longer and healthier, and we believe that advancing sustainability in healthcare packaging is an important extension of that role. That's why Tyvek® is actively working to advance sustainability across the healthcare packaging value chain.



We understand that making healthcare packaging sustainable is about managing risks for patients, products and the environment, while considering the entire lifecycle of packaging. We also recognize that this is a challenging journey that requires sustainable innovation, continuous improvement and proactive collaboration.

Consistent with the [United Nations' \(UN\) Sustainable Development Goals \(SDGs\)](#), and in support of the [DuPont 2030 Sustainability Goals](#), we are committed to delivering trusted solutions for healthcare providers that will also help address climate change, drive towards a circular economy and help

communities thrive. Specifically, we are focusing our efforts on:

- Relentlessly reducing greenhouse gas (GHG) emissions
- Continuously improving our overall energy efficiency by investing in Bold Energy Plan Projects
- Implementing 4R (Reduce, Reuse, Repurpose, Recycle) waste reduction programs at our manufacturing sites
- Partnerships and active collaboration with other stakeholders in forums promoting the advancement of a circular economy in the healthcare value chain



Tyvek® for sustainable healthcare packaging

- Certified 100% recyclable
- Enables mono-material packaging
- Lifecycle savings



Continuous improvements in our operations

- Over -40% CO₂e emissions*
- -18% energy intensity*
- 96% of waste for recycling and energy recovery



Collaboration towards a circular economy

- Advancing post-consumer waste circularity
- Advocating for safe and circular healthcare packaging

*From baseline year of 2016 by production volume.



Designing sustainable healthcare packaging with Tyvek®



Advantages of Tyvek® for sustainable innovation

Tyvek® is the standard of excellence against which other sterile packaging materials are compared. Due to its tough, durable sheet structure, Tyvek® provides a unique combination of physical properties that no other sterile packaging material can match. Incorporating Tyvek® into the package helps promote health and well-being, thereby helping to enable people and societies to thrive.



Compatibility with recycling techniques
Tyvek® styles 1073B, 1059B, 2FS™ and 40L are made of HDPE and are readily recyclable through established and emerging advanced recycling techniques, helping enable truly sustainable and circular packaging solutions.



Light weight
The superior strength-to-weight ratio of Tyvek® helps enable: lightweight packaging configurations; possible reduction in secondary packaging; and potential decrease in energy use in transportation compared to heavier cellulose-based products.



Less waste
Low material weights, superior tear- and puncture-resistance of Tyvek® can result in less energy and resource consumption over the product lifecycle, as well as helping to reduce the risk of package failures throughout the life of the product.



Low additives
Tyvek® is made without plasticizers or restricted chemicals listed in European Directives, such as RoHS (Directive 2015/863/EU) or REACH Substances of Very High Concern (SVHC).

Tyvek® is manufactured in Richmond, VA, USA, and in Contern, Luxembourg, Europe, under verified environmental management policy according to International Organization for Standardization (ISO) 14001.



Designing for recyclability

Recyclability requires not only the compositional quality of packaging materials to enable recycling, it requires an infrastructure for collecting and sorting materials into existing waste streams and then converting them into new products.

Tyvek® is made of HDPE, making it compatible with existing (mechanical) and emerging (advanced) recycling techniques. In addition, due to its unique combination of properties, Tyvek® facilitates adoption of packaging designs—such as mono-material structures—that meet the

sustainable design guidelines established by a variety of industry organizations, including the Healthcare Plastics Recycling Council ([HPRC](#)), [CEFLEX](#) and [RecyClass](#). Some of these guidelines include:

- Designing with mono-material whenever possible
- Minimizing paper labels and components
- Not combining plastic film with paper in packaging

Tyvek® is certified 100% recyclable

An independent analysis and assessment of the recyclability of Tyvek® styles for healthcare packaging was conducted by [Institute cyclos-HTP](#). As a result, Tyvek® 1073B, Tyvek® 1059B, Tyvek® 2FS™ and Tyvek® 40L have been certified as 100% recyclable. This means, after their initial use, Tyvek® products meet the material and physical prerequisites to be recycled to become a secondary product made of similar material. Although the recyclability of the entire package must be assessed separately, the 100% recyclable rating of Tyvek® provides an optimal starting point, especially for mono-material package designs.



[Download a copy of this certificate](#)

Sustainability across the lifecycle

By using Tyvek®, there are opportunities at every stage of a product's lifecycle to improve sustainability.



Materials & package design

Tyvek® can enable reduction in package size and streamline secondary packaging to generate downstream efficiencies. It can also eliminate the need for labels because it can be printed on using standard commercial printing equipment.



Production, pack-out, handling & sterilization

Tyvek® can optimize pack-out configurations and distribution efficiencies (e.g., smaller case sizes = more units per pallet = downstream sustainability improvements) and can provide increased sterilization efficiencies by streamlining secondary packaging.



Distribution

Tyvek® can reduce product loss incurred from transportation damage because it is tear- and puncture-resistant; and it helps lessen carbon footprint over the product's lifecycle because it is lighter weight than cellulose-based products.



Product use

Tyvek® supports a safe and aseptic presentation of products while minimizing package damage in healthcare facilities due to its clean peel and superior tear- and puncture-resistance.



Post-consumer waste

Tyvek® enables mono-material structures for improved mechanical recyclability and it can help optimize secondary packaging configurations. In addition, Tyvek® is compatible with emerging advanced recycling techniques.



Continuously improving our operational footprint on the environment



Progress towards continuously improving our operational footprint

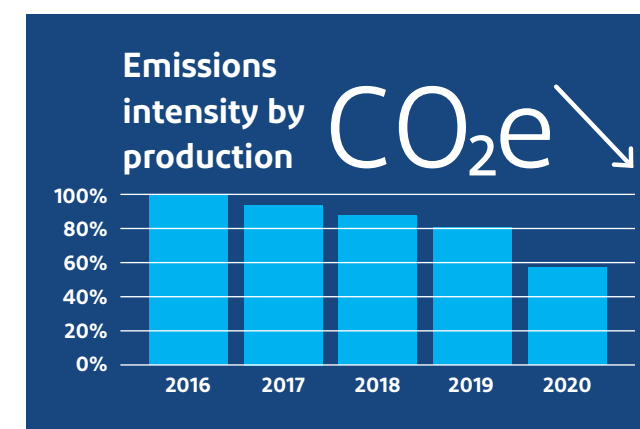
We continue to strive for operational excellence and improved productivity while simultaneously reducing environmental impact. Our Bold Energy Plan has enabled us to achieve more than 40% GHG emission reductions over the past five years.*



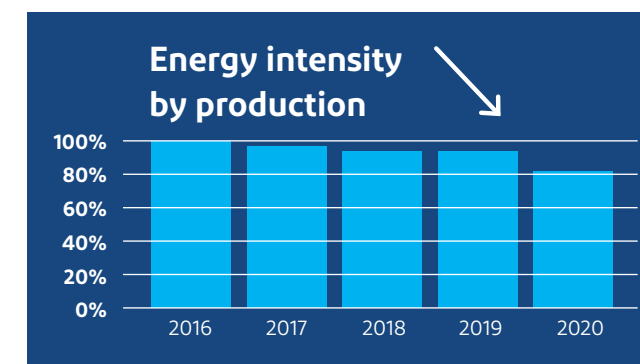
Energy and emissions

As part of the [Bold Energy Plan](#), we overhauled utility production equipment to switch to more sustainable energy resources, which facilitated significant GHG emission reductions. In fact, we reduced CO₂ emissions by more than 40% between 2016 and 2020.

Examples of other energy savings projects we have undertaken since 2016 at our Tyvek® manufacturing sites include optimizing heat recovery systems; improvements to heating, ventilation and air conditioning (HVAC) systems; and upgrading to light-emitting diodes (LED) lighting. These projects have resulted in an 18% energy intensity reduction since 2016.



Normalized per metric ton of produced Tyvek® at both manufacturing sites.



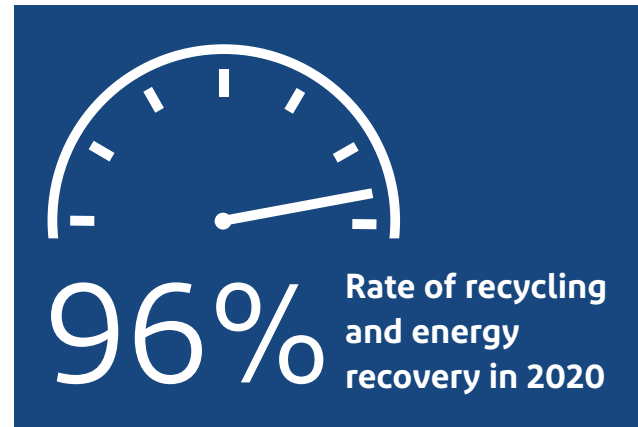
Normalized per metric ton of produced Tyvek® at both manufacturing sites.

*The operational footprint information shown here is for all styles of Tyvek®, including those for healthcare packaging applications.

Waste

Our waste reduction efforts build on years of continuous improvement driven by the ISO 14001 certification process and by other compliance audits, as well as by our own internal standards and our vision of achieving zero waste—a goal we are very close to accomplishing.

As part of our commitment to implement a 4R (Reduce, Reuse, Repurpose, Recycle) waste reduction program at our manufacturing sites, we have established an onsite recycling facility alongside our Tyvek® manufacturing lines in Luxembourg.



This mechanical recycling system makes it easy and efficient to reprocess post-industrial waste back into HDPE granulates for reuse. As an example, the recycled HDPE granulates are used to produce [plastic cores](#) around which Tyvek® can be wound for storage and shipping. DuPont also has an ongoing partnership to give Tyvek® production waste in Richmond, VA, a second life in [highly engineered water management products](#).

Water

Another aspect of our global footprint is to understand where and how DuPont operations interact with local watersheds. We withdraw and purchase water from various local sources and entities to conduct business. Some of that water is treated and returned to a local waterbody; some is rendered in our manufacturing processes or used for other purposes, such as employee health and hygiene. As part of our ISO 14001 certification, we continuously monitor and strive to optimize our water consumption.





Proactive collaboration towards a circular economy

Leveraging partnerships and collaborating along the value chain

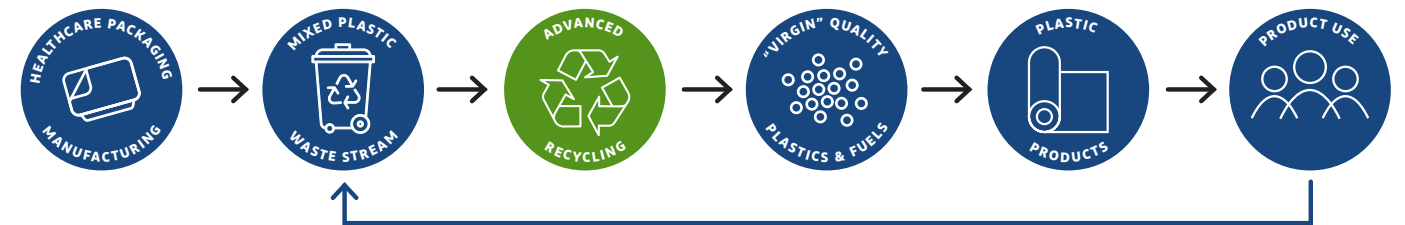
As a leader in healthcare packaging, we actively seek ways to enable companies along the value chain to adopt recycling methods that divert healthcare packaging waste—not only Tyvek® but also other plastic waste—from incineration and landfilling, with the goal of achieving complete circularity in the longer term. We know that this requires a better understanding of the barriers across the value chain, as well as collaboration to overcome them.



Due to the complexity of recycling multi-material packaging used at healthcare facilities and the current waste management infrastructure, most sterile packaging waste is either incinerated or landfilled.

In 2021, we forged a [Tyvek®-converter-advanced recycler partnership](#) to better enable closed-loop utilization of plastic waste generated during packaging production. This collaboration underscores our commitment to achieving circularity in healthcare. We expect this is the first of such partnerships.

Collaborating to advance post-industrial waste circularity



[Advanced recycling](#), also known as chemical recycling, converts mixed plastic waste streams into their original building blocks, feedstocks for new chemicals and plastics, specialty polymers and other valuable products. It will play an increasingly important role as the healthcare industry moves away from a linear “take-make-dispose” model and adopts a lifecycle approach to plastics waste management.

Collaborating to advance post-consumer waste circularity

Our commitment to promote the advancement of a circular economy in our value chains is both strong and long-standing. Our corporate roots include a founding membership in the [World Business Council for Sustainable Development](#); early adoption of the [UN Global Compact](#); and decades of engaging industries, national governments, international bodies and others to advocate for action on climate change.



[Healthcare Plastics Recycling Council](#)

In 2010, DuPont joined with other leading companies in the healthcare, recycling and waste management industries to form the Healthcare Plastics Recycling Council (HPRC). We are proud to be a founding member of this technical coalition that is working to inspire and enable viable, safe and cost-effective recycling solutions for plastic products and packaging used in the delivery of healthcare.

We are pleased to be actively collaborating with value chain partners on numerous initiatives, such as:

- Creation of the [Hospicycle toolbox](#) to enable healthcare facilities to adopt recycling practices that best suit their needs
- Development of the [healthcare recycling vendor directory](#) for Tyvek® and other healthcare plastic waste
- Co-authoring [white papers](#) on advanced recycling technologies
- [Piloting recycling programs](#) at healthcare facilities

We are also active members of:



[International Sustainability & Carbon Certification \(ISCC\)](#)

supporting the development and the adoption of sustainable and circular solutions



[MedTech Europe Environmental & Sustainability Committee](#)

addressing sustainable development challenges within the medical technology sector, including healthcare packaging



[PlasticsEurope Mass Balance Taskforce](#)

engaging industry partners to develop key criteria when applying mass-balance approaches and to ensure a verifiable and certified approach is applied by companies willing to accelerate the use of renewable feedstocks and waste feedstocks along the value chain



[Sterile Barrier Association](#)

promoting the use of and providing education on the most suitable single use sterile barrier systems to ensure patient safety

Developing standards for sustainable healthcare packaging

Standards for healthcare packaging are essential to ensure patient safety while minimizing the environmental impact. Through the standards-setting process, the value chain can align on a set of common goals and adopt a systematic approach to better ensure success through consensus, collaboration and innovation.

Standards are a key tool for achieving the sustainability objectives of packaging set by national and regional regulations that are being introduced to support sustainable development. Europe, with its new circular economy and its new green deal is currently leading the way, but other countries will follow.

ISO and European Committee for Standardization (CEN) are committed to help governments, industry and consumers achieve the UN SDGs. For example, an annex on environmental aspects of packaging was added to the 2019 version of ISO 11607 for the first time. While ISO 11607 continues to position patient safety and maintaining sterility as top priorities, it now encourages users to include environmental considerations when designing sterile barrier solutions. Other standards are being developed to address design for recyclability, quality of recycled materials and recycling processes, to name just a few.

Recognizing the vital importance of such standards, members of our Tyvek® team continue to be actively involved in various ISO, CEN, ASTM International and Association for Advancement of Medical Instrumentation (AAMI) technical committees that develop state-of-the-art standards to advance the UN SDGs in collaboration with impacted stakeholders.

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◀ DUPONT™
Tyvek®

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Tyvek® is made of HDPE and products made of 100% Tyvek® material can be recycled at facilities that recycle flexible HDPE materials. Please check recycling facilities in your area to ensure they can recycle Tyvek®.

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