DUPONT™

Tyvek®

The HSE Manager's Guide to Lower Environmental Impact PPE

KEY STEPS TO HELP MINIMISE PPE WASTE

DuPont Personal Protection

THIS E-GUIDE IS CLICKABLE

Introduction

Personal Protective Equipment (PPE), such as disposable coveralls, offers vital protection for front-line workers. However, this essential protective equipment can also be a source of plastic waste and carbon emissions.

This Guide explains how Health, Safety and Environmental (HSE) managers can support the uptake of circular practices by selecting and using PPE in ways that reduce the environmental impact from design through to the end of use.

While the law requires HSE managers to dispose appropriately of contaminated PPE* used to protect workers from hazardous biological or chemical substances, there are now viable options to recycle uncontaminated PPE.

This Guide examines how PPE manufacturers can help sustain circular practices by working with HSE managers to successfully recycle uncontaminated disposable protective clothing and reduce packaging.

Finally, the Guide explores some of the sustainable packaging initiatives DuPont supports and how they help HSE managers who want to reduce their company's environmental footprint and associated costs.

*Whereas the law requires HSE managers to dispose appropriately of contaminated PPE used to protect workers from hazardous biological or chemical substances, there are now viable options to recycle uncontaminated PPE (which have not been exposed to a substance that may put the end-user at risk).

Content overview

1/ What is the circular economy?

The world is becoming increasingly resource-constrained, and historic reliance on linear models is no longer sustainable and damaging to the environment.

In this context, companies like DuPont have committed to supporting business models that apply the principles of the 'circular economy'. This approach centres on minimising waste, keeping materials in use, and supporting more regenerative and restorative systems. To achieve this circular model, collaboration throughout the value chains is essential to creating impact at scale[1].

The circular economy is at the heart of the European Green Deal, which sets the framework for how the European Union (EU) aims to make Europe the first climate-neutral continent by 2050[2].

This plan includes practical steps to improve the design, recyclability, reuse, durability and end-of-life of products, including textiles: a sector that includes fabrics for manufacturing PPE.

One of the blueprint's building blocks is the European Commission's circular economy action plan, which outlines steps that can be taken at every stage of a product's lifecycle, such as its design and waste prevention, to reduce its environmental footprint[3].

All industries have a role to play in this transition, including the PPE industry, and they are diligently working on these shared challenges.

Click on the number to check the source

2/ Why does PPE matter in a circular economy?

Studies have shown that improving product longevity and durability at the design and development stage would significantly reduce the sector's environmental footprint. Modelling from the Waste and Resources Action Programme (WRAP), which operates in over 50 countries worldwide, indicates that designing for circularity could enable more than half the impact reductions needed to reduce the sector's carbon and water footprints by 50% by 2030[4].

Given the significant potential for impact reduction highlighted by such studies, it is crucial for PPE manufacturers to adopt sustainable practices throughout the entire lifecycle of their products. By focusing on sustainable manufacturing, packaging, and recycling processes, the PPE industry can play a pivotal role in achieving the ambitious environmental goals set for 2030.

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3/ Key steps to reducing the environmental footprint along the value chain

When selecting PPE, HSE managers could encourage more sustainable practices at every stage in the lifecycle – from manufacturing and packaging through to recycling. This can be done in the following ways:

Manufacturing

Consider working with PPE manufacturers prioritising sustainable practices into their manufacturing processes. For instance, Tyvek® is produced using renewable electricity. DuPont achieved this milestone by purchasing renewable energy credits (RECs) and guarantees of origin (GOs) to match the energy consumed in its 2022 operations and is committed to additional purchases annually. Furthermore, DuPont's notable efforts have earned it an "A-" rating from CDP, the renowned sustainability reporting platform, for its Climate Change performance, we have also been awarded Ecovadis Bronze. Also, DuPont has already achieved in 2023 a 58% reduction of Scopes 1 and 2 greenhouse gas (GHG) relative to its 2019 baseline – surpassing its 2030 goal ahead of schedule[5].

Packaging

Work with PPE providers that offer alternatives eliminating individually packed protective coveralls to reduce packaging waste. DuPont has demonstrated this since 2015 with its Tyvek® 500 Xpert Eco Pack, which removes 820kg of solid waste per 35,000 garments as well as reduce the consumption of water & primary energy and the emittance of CO_2. Also, support the switch from paper-based instructions for use (IFUs) to electronic QR codes, which would save thousands of tonnes of paper annually. DuPont is one of the first PPE manufacturers who has already added QR codes to their product labels for online IFUs and is ready to eliminate the paper IFUs.

Use PPE providers that actively minimise the use of virgin materials in their PPE's packaging and promote the recovery of materials from Post-consumer waste using recycling. The DuPont™ Tyvek® industrial range incorporates minimum 50% post-consumer recycled content in the plastic bags and reduces use of first-grade polymers.

3/ Key steps to reducing the environmental footprint along the value chain

Transportation: When PPE is shipped to end users, this transportation contributes to global carbon emissions. Suppliers like DuPont are exploring ways to increase their manufacturing footprint in areas like Europe and minimise their reliance on long transport routes.

More Durable PPE: One way to keep PPE in use longer is to **select more durable materials** that minimise the risk of abrasion and tears. This simple action can extend the shelf-life of PPE and significantly reduce the number of items that HSE managers have to discard on the front line, thus reducing the consumption and waste generation.

To minimise the waste generated at the end of the PPE's life, HSE managers could select PPE made with lighter fabrics without compromising on safety. The heavier the material, the more waste is generated when the user no longer requires it. For example, Tyvek® material is significantly lighter than the microporous film and spunbond-meltblown-spunbond (SMS) alternatives.

When workers are exposed to biological and chemical hazards, their PPE must be incinerated after use. Subject to local regulations, contaminated Tyvek® can be safely incinerated. In terms of BTU rating, it can be used as a fuel yielding more than twice the energy value of coal and as much energy as oil.

Recyclable Materials: This process means recyclers can recover this high-quality material so it can be reused in other applications.

Most disposable garments are produced using blends of plastics, making it difficult to separate the different material for reuse. Furthermore, when it is possible to extract the individual plastics, the material is often poor in quality and the extracted plastic has limited use.

However, Tyvek® fabric is a **mono-material** made of high-density polyethylene (HDPE), which is manufactured using a patented flash-spinning technology. This process means recyclers can extract this high-quality material so it can be reused for multiple applications.

Ultimately, the manufacturing of PPE is resource intensive, so increasing recycling rates reduces reliance on virgin materials.

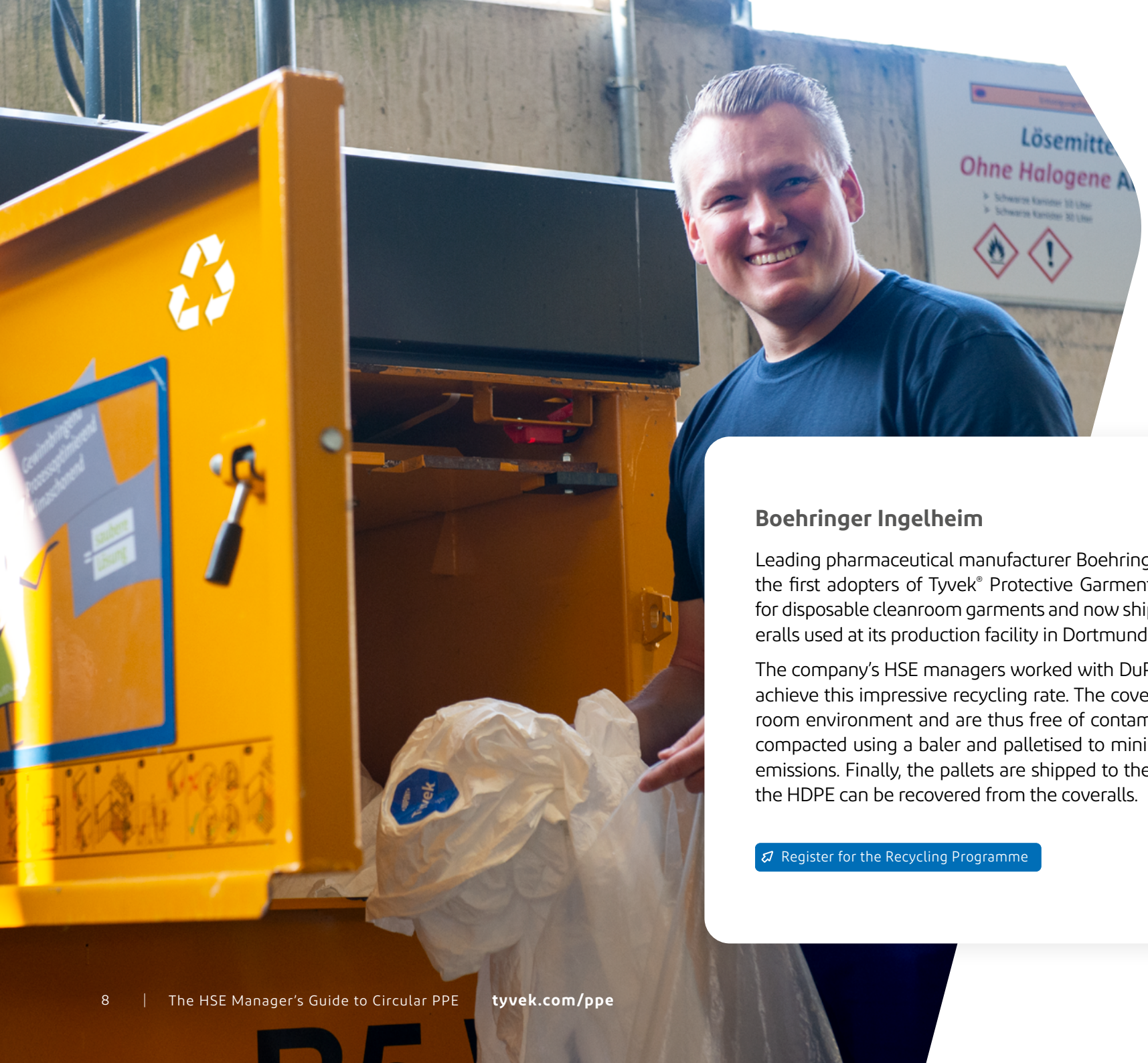
Recycling Programme: DuPont is also focusing on a **recycling programme** that applies circular principles to its DuPont™ Tyvek® disposable garments.

Reducing single-use PPE waste is critical, but more can be done. Let's examine in greater detail how DuPont is delivering benefits throughout the value chain.

This German-based pilot builds on an existing recycling scheme in North America and Brazil, and demonstrates the steps required to drive up recycling rates.

The pilot's success means customers can ship their non contaminated DuPont™ Tyvek® garment in large batches directly to a local recycler. It is evidence of DuPont's ongoing commitment to advancing PPE sustainability along the value chain.

Collectively, this significantly reduces the plastic waste produced as well as transport-related carbon emissions compared to shipping in smaller quantities.



Boehringer Ingelheim

Leading pharmaceutical manufacturer Boehringer Ingelheim was one of the first adopters of Tyvek® Protective Garments' recycling programme for disposable cleanroom garments and now ships 99% of the Tyvek® coveralls used at its production facility in Dortmund to the recycler.

The company's HSE managers worked with DuPont to develop a plan to achieve this impressive recycling rate. The coveralls are used in a cleanroom environment and are thus free of contamination. The PPE is then compacted using a baler and palletised to minimise transport costs and emissions. Finally, the pallets are shipped to the recycling facility, where the HDPE can be recovered from the coveralls.

Register for the Recycling Programme

4/ Conclusion

Globally, many companies are driving the transition to a circular economy and developing new methods to reduce their carbon footprint across their products' lifecycle. PPE manufacturers can also take concrete steps to support a move to circular PPE practices.

HSE managers who work across different industries also want to be part of the solution but need help selecting circular PPE for front-line staff that continues to provide the safety levels required for challenging roles.

This Guide provides the information HSE managers need to minimise the environmental impact of the PPE they select, from designing out waste to recycling used uncontaminated protective garments.

To learn more about DuPont Personal Protection's commitment to advancing PPE sustainability, visit: https://www.dupont.co.uk/personal-protection/dpp-sustainability.html.

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