



Plastics:

Driving positive
change through
science.





Our Goals

Sustainability without compromising performance.

As a leading global food packaging manufacturer, our core purpose is to preserve the quality of fresh foods whilst maximising their shelf life and appeal. We use world-class polymer science and engineering expertise to tailor our packaging structures to match customer requirements for sealability, formability and strength of materials, extended shelf life, attractive product presentation and all-time-high food safety and hygiene controls.

Simplifying multilayer structures without sparing vital functionalities is therefore not an easy task, but one that will increase the chance of our materials to be further processed by the supply chain and successfully carried through onto their next product cycle.

As such, our ultimate goal is to provide a product featuring exceptional environmental efficiency with little or no compromise on performance. A product range which, in its creation, has left no indelible mark on the Planet and sits comfortably within a focused, closed-loop system.



We strive to do more with less, through hard work and joined-up thinking.

Kureha's culture of continuous innovation and differentiation has helped us succeed in developing new material structures that are "thinner but stronger", reducing the consumption of plastics while meeting all the functionality needed by our customers and more!

We strongly believe that great packaging solutions can be developed with less resource, at minimum cost to our Planet. But in order to demand less of the environment, we commit to asking more of ourselves - to challenge thinking, pursue smarter utilisation of resource and continue to invest in research and development to accelerate the creation of a more circular economy for plastics.

Along the way, we hope for close industry cooperation that doesn't tolerate 'we've done our bit' attitude. Supply chain collaboration that helps co-ordinate the introduction and development of new sustainable packaging materials with the deployment of corresponding after-use systems and infrastructure. Thus, ensuring positive impact at scale.



Non-chlorine barrier structures

Krehalon's patented ML40 shrink barrier technology uses EVOH (Ethylene Vinyl Alcohol) barrier which is chlorine-free. EVOH is considered a more environmentally friendly alternative to the commonly used PVDC (Polyvinylidene Chloride), which contains chlorine.

EVOH is recyclable as part of a multilayer structure

EVOH can be tolerated in mechanical recycling streams within certain percentages and can be handled by chemical recycling.

Krehalon is the leading producer of EVOH-barrier shrink bags and has extensive application knowledge and proven track record in the development of high barrier, non-chlorine grades for fresh meat applications.



Scan the QR code and find out more about PVDC vs EVOH.



Why is PVDC bad for the environment?

- ◀ PVDC is a closely related compound of PVC and is a chlorine-containing material.
- ◀ PVDC packaging is not currently recyclable.
- ◀ PVDC is a contaminant to mechanical recycling streams and negatively affects the quality of the recycle.
- ◀ PVDC is a contaminant to chemical recycling streams due to the production of hydrogen chloride.
- ◀ PVDC generates considerable quantity of dioxins (highly carcinogenic chemical) during both its manufacture and disposal.

High-barrier properties for shelf life extension

Every year, the world throws out about 1.3 billion tons of food that produce around 4.4 GtCO₂ emissions¹. Expiry of product life is considered one of the biggest contributors to household and supply chain food waste and it is believed that even a one-day extension to product life could save 0.25mt of food waste².

Krehalon has successfully developed high barrier Secondary Seal (SSL™) materials that have proven to deliver shelf life extension of up to 150 days for some fresh meat applications. These materials offer the benefit of minimising purge and delaying microbial spoilage to prolong shelf life and allow broader geographical distribution of the packed product with minimal food wastage.



¹ Food and Agriculture Organisation of the United Nations, 2011
² Waste & Resources Action Programme, 2011

Barrier packaging helps prevent food waste and has a much smaller carbon footprint than the food it preserves.

Did you know?

Carbon footprint of fresh beef joint (unpacked)

Shelf life:
5 days
Dependent on storage conditions

CO₂ emissions:
24.4kg*

Product weight:
1kg



*Assuming meat spoilage. This includes breeding, slaughter, production and distribution to consumer.

Carbon footprint of barrier packaging

Shelf life:
70 days
Dependent on storage conditions

CO₂ emissions:
0.057kg*

Product weight:
1kg



*On average, 6.7g of ML40 material would be needed to wrap 1kg beef cut. CO₂ calculation takes into consideration packaging production, distribution to consumer and disposal.

Our Progress

Formshrink®

Offering 80% packaging weight reduction.



Conventional Pack



Thinner but stronger materials, because less is more

'Reduce' is the very first step of any successful packaging sustainability strategy. For more than 15 years, Krehalon has been supplying our range of ML40 barrier shrink bags that are, on average, 23% thinner compared to corresponding competitor offerings.

The innovative construction of Krehalon's core ML40 technology gives the exceptional advantage of reducing material thickness without compromising material's barrier properties and strength.

This allows us to develop 'thinner but stronger' food packaging materials that constantly challenge competitors and offer significant packaging weight reductions over conventional pack formats.

Our Progress



Reduced packaging waste through automation

Over the last decade Krehalon have focused on developing automated Shrink Bag Replacement (SBR™) solutions that challenge traditional thinking and offer superior operational efficiency through cost reduction and pack differentiation.

Krehalon's patented Formshrink® and Flovac™ film solutions can achieve significant material usage savings by replacing manual bagging and reducing inventory (multiple sizes of pre-made bags in boxes). These automated solutions offer more precise material-to-product ratio, allowing pack sizes to be adjusted to the length and size of each product, eliminating unnecessary packaging waste. For some high-abuse applications, Krehalon automated films can enable the use of thinner materials where this wouldn't normally be possible if the product was handled manually, due to additional pressures applied from manual loading.



Case Study

Application: **Fresh primal beef**
Country: **Australia**



20% Packaging material savings

◀ Before
Packing method Shrink Bags

◀ After
Packing method Flovac™

High-sealing materials to Mono-APET structures

Krehalon offers a range of speciality films that use advanced sealing technology to enable the removal of the PE sealant layer and achieve a lock, peel or reclose seal to a fully recyclable Mono-APET tray or base web.

Such pack formats offer superior environmental benefits without compromising seal strength, food safety, pack integrity and product shelf life.

The KreLid™ Mono films are suitable for thermoforming or tray lidding applications (including minced meat, cheese, bacon), whilst the KreSkin™ Mono grades offer all the benefits of conventional skin films - second skin effect, attractive product presentation and possibilities for vertical product display.



A step change in improving packaging recyclability & sustainability



“ A great mono-material sustainability story with clearly defined future application potential

”

Judges' comments



“The Mono-APET project has been a great step forward in our ambition to make all of our packaging easy to recycle. By simplifying the plastic trays used for protein to just one polymer type, we have been able to make Co-op branded packaging more attractive to recyclers and, therefore, more likely to be recycled.”

Rob Thompson, Packaging Technologist, The Co-op

The Full Range



KreLid™ Mono Lock

Advanced sealing technology matching seal strength of PE-to-PE bonds.



KreLid™ Mono Peel

Advanced sealing technology with 'burst peel' properties.



KreLid™ Mono Reclose

Advanced sealing technology enabling multiple clean and consistent pack openings.



KreSkin™ Mono Peel

Advanced sealing technology with skin-peel properties.

Features & Benefits

- 100% recyclability of the base web or pre-made tray in the PET recycling stream
- Great film machinability with no compromise on speed and output
- Potential reduced pack weight and cost from removal of PE sealant layer
- Sandwich print option (up to 8 colours) for maximum visual appeal
- Available in a range of barriers, with / without anti-fog



Full peel with no sharding or tears

KreCycle™

A range of recyclable barrier packaging without compromising shelf life and sealing performance.

- ◀ Recycle-ready for mechanical recycling
- ◀ Tailored barrier properties to suit application needs
- ◀ Superior sealability & machinability
- ◀ Printable for maximum visual appeal
- ◀ Easy peel options for consumer convenience

KreCycle™ PET

Mechanically recyclable mono-PET structures



Bacon (Thermoform pack)



Mince (Thermoform pack)

KreCycle™ PE

Mechanically recyclable PE-based structures



Sausage (Flowwrap pack)



Cheese (Flowwrap pack)

KreCycle™ PP

Mechanically recyclable PP-based structures



Chicken (MAP pack)



Marinated Ribs (Sous-vide pouch)

Part of the
KUREHA

Group

- ◀ We treasure people and the natural environment.
- ◀ We constantly evolve through innovation.
- ◀ We contribute to society by developing beneficial products.

Krehalon is a wholly owned subsidiary of Kureha Corporation – a Japanese specialty chemicals and plastics manufacturer listed on the Tokyo stock exchange with annual revenues exceeding \$1.2 billion.



Sustainable innovations by Kureha



Polyglycolic acid (PGA)

A new age material to lessen environmental loads

Kureha is the first and, currently, the only company in the world to successfully develop an industrial manufacturing process for Polyglycolic acid (PGA) - a biodegradable polyester resin with high mechanical strength and high gas barrier. This material, branded Kuredux®, has become a key growth driver for Kureha due to its invaluable use in the production of biodegradable frac plugs for oil and gas exploration.



Polyphenylene sulphide (PPS)

Plastic that combines strength with light weight.

Kureha's PPS resin has exceptional toughness and can offer significant weight reductions while resisting extreme temperatures. Due to its properties, PPS is being used as an important alternative to metal for automotive lightweighting. Kureha has recently invested ¥10bn into a 5,000 tpa capacity enhancement for PPS at its Iwaki Plant (currently 10,700 tpa). This is scheduled to be completed by February 2021.



Polyvinylidene fluoride (PVDF)

Reliable and proven performance in challenging environments.

Kureha was the first to produce Polyvinylidene fluoride on an industrial scale in 1970. This engineering thermoplastic serves as a binder material for electrodes in lithium-ion batteries used in a range of applications such as electric vehicles and solar panels. To meet the growing global demands for sustainable energy sources, Kureha has recently invested ¥4.7bn into a new 2000 tpa PVDF line at its Iwaki plant increasing PVDF production capacity to 11,000 tpa in 2019.

Stakeholder of CEFLEX

CEFLEX is the collaborative initiative of a European consortium of companies and associations representing the entire value chain of flexible packaging.

The CEFLEX Mission is to further enhance the performance of flexible packaging in the circular economy by designing and advancing better system solutions identified through the collaboration of companies representing the entire value chain.

CEFLEX is aligned with and fully supporting The Ellen MacArthur Foundation's Global Commitment for a New Plastics Economy.



The vision

- ◀ **By 2020 flexible packaging will have a comprehensive sustainability and circular economy roadmap for flexible packaging, including widely recognised design guidelines and a robust approach to measure, demonstrate and communicate the significant value that flexible packaging adds to the circular economy.**
- ◀ **By 2025 there will be an established collection, sorting and reprocessing infrastructure/ economy developed for post-consumer flexible packaging across Europe, based on end-of-life technologies and processes that deliver the best economic, technical and environmental outcome for a circular economy.**

Signatory of the UK Plastics Pact

The UK is demonstrating global leadership in transforming the plastics economy and tackling plastic pollution with the launch of The UK Plastics Pact.

The UK Plastics Pact, led by WRAP, is the first of a global network of such pacts, enabled by the Ellen MacArthur Foundation's New Plastics Economy initiative.

The initiative is unique because it unites governments, local authorities, NGOs and businesses involved in producing, selling, collecting and reprocessing plastic, to deliver ambitious targets for change by 2025.

As a signatory of the UK Plastics Pact, Krehalon commits to work collaboratively with all members of the Pact towards the delivery of its relevant targets.

By 2025, the UK Plastics Pact will transform the UK plastic packaging sector and help stop plastics polluting the environment by:

- ◀ Eliminating problematic or unnecessary single-use packaging through redesign, innovation or alternative (re-use) delivery models.
- ◀ 100% of plastic packaging to be reusable, recyclable or compostable.
- ◀ 70% of plastic packaging effectively recycled or composted.
- ◀ 30% average recycled content across all plastic packaging.

**THE UK
PLASTICS
PACT**





Plastics:

Driving positive change through science.

 Krehalon

 @Krehalon



We are raising awareness of the plastic facts. Scan the QR code to find out more.



The Seal of Quality

Let's talk facts. Not perceptions.



In time of rapid change within the plastics industry, we understand the importance of sharing knowledge and keeping an attentive and observant mind to broaden our understanding of issues and challenges faced by the supply chain - from resin producers through to brand owners, consumers and recyclers.



We aspire to be Positive Plastic Advocates that educate about the value and benefits of responsible plastic use and promote a culture of trust, accountability and transparency.



We aim to inspire meaningful and knowledgeable discussions of problematic areas; reward curiosity and forward-thinking and encourage decision-making based on substantiated evidence and not misguided perceptions.



KREHALON

Preserving Quality Together

www.krehalon.com

We are part of

