

Dryflex® Circular

TPEs with recycled content



INTRODUCTION

There's a shift happening in the polymer industry, we're all becoming more conscious of the impact our products and operations are having on the environment. We're more aware than ever of what happens to plastic products once we've finished using them, whether that's recycling, incineration, landfill or even marine littering.

Increasing the use of recycled and renewable materials will help [support the move to a circular economy model](#), by lowering demand on finite fossil-based virgin materials. Our customers have more demanding 'green' goals to meet and an increased sense of responsibility to use compounds with lower environmental impact. [We share this feeling of responsibility](#), we're working hard to turn waste into resource, taking recycled polymers and incorporating them into our Thermoplastic Elastomers (TPEs).

Please use this guide as an introduction to our [Dryflex Circular](#) range and [contact us](#) to discuss your specific requirements.

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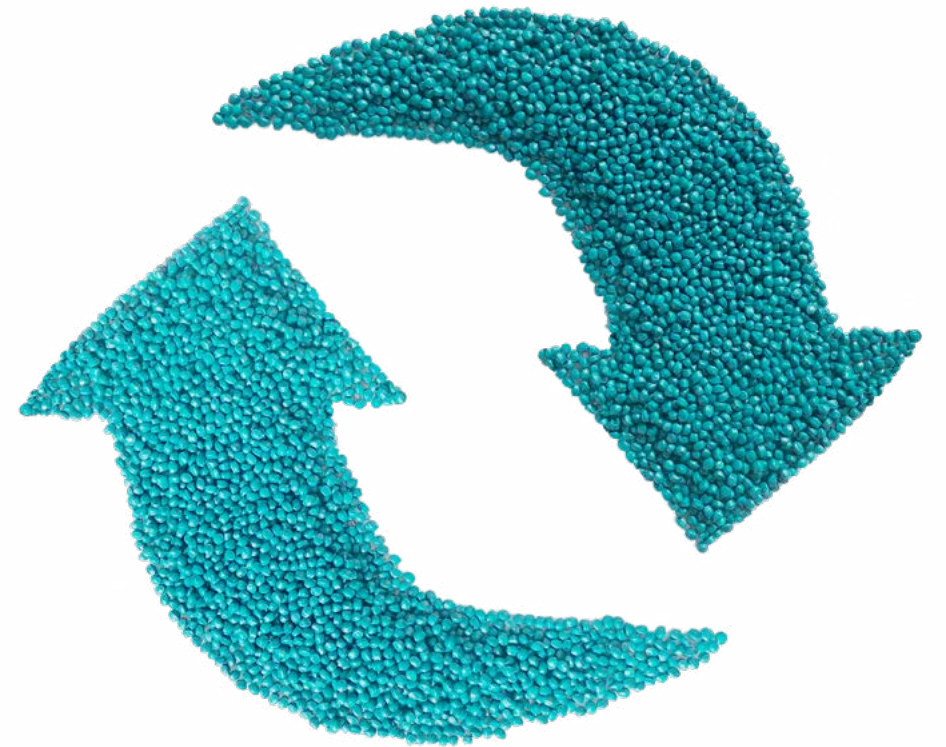
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We used to think in
straight lines

Now we think in
circles



HISTORY

This idea isn't new, but it is becoming increasingly important.

Our first compounds based on recycled content were sold in 2005. These were originally developed to address demands in the automotive industry, which was obliged to use increasing quantities of recyclate and operate under the EU End of Life Vehicle (ELV) Directive.

The plastics and recycling industries have changed greatly during this time, to meet new demands we've created the **Dryflex Circular TPE portfolio**.

The new formulations include grades based on a range of recyclate sources, and we're continually investigating new sources and emerging technologies. This is widening design and application possibilities.

RECYCLED CONTENT DEFINITIONS

We've structured the **Dryflex Circular** range into **different series** based on the **source** of the recycle. This helps give clarity about the material source and answer questions about what is included in calculations for declarations of recycled content. Currently there are series based on the following sources, as defined by **ISO 14021:2016**:

POST INDUSTRIAL RECYCLATE (PIR) (sometimes referred to as pre-consumer)

Material diverted from the waste stream during a manufacturing process. Excluded is reutilisation of materials such as rework, regrind or scrap generated in a process and capable of being reclaimed within the same process that generated it.

POST CONSUMER RECYCLATE (PCR)

Material generated by households or by commercial, industrial and institutional facilities in their role as end-users of the product which can no longer be used for its intended purpose.

CALCULATION OF CONTENT

As no technologies currently exist for an analytical determination of recycled content, we calculate content as defined by [ISO 15343 section 4](#) (*Plastics recycling traceability and assessment of conformity and recycled content*)

The recycled content of DRYFLEX CIRCULAR TPEs is calculated using the formula:

*Percentage recycled content of the product =
mass of recycled materials in the product / total mass of the product x 100*

POST CONSUMER RECYCLATE (PCR)

CURRENT SOURCE:

The recyclate source for the **Dryflex PCR** grades shown in this eGUIDE includes recycled PP from end of life vehicles, including automotive interior and exterior applications. Other grades are available which utilise different recyclate content and we're continually investigating new sources, please contact us to learn more.

TARGET APPLICATIONS INCLUDE:

- Automotive exteriors such as mudflaps, side-steps, wheel-arch liners.
- Outdoor equipment such as lawnmower wheels or safety barriers.

Examples of DRYFLEX PCR grades

The recyclate source for the **Dryflex PCR** grades shown below includes recycled PP from end of life vehicles, including automotive interior and exterior applications. **These grades are only available in black.**

CUSTOMISED GRADES: Below we show several grades to help demonstrate possibilities, these tables do not list all available materials. Please **contact us** → to discuss your specific requirements.

Grade	Hardness ¹ ISO 868 Shore A	Density ISO 2781 g/cm ³	Tensile Strength ² ISO 37 Type 1 MPa	Stress at 100% Strain ² ISO 37 Type 1 MPa	Elongation at Break ² ISO 37 Type 1 %	Tear Strength ² ISO 34-1 Method C N/mm	CS 23°C / 22h ISO 815-1 Type B %	Recycled Content ³ %
Dryflex PCR 50A141B U	50	0.91	5.2	1.4	> 550	17	15	14
Dryflex PCR 90A491B U	90	0.93	6.0	5.5	> 200	45	49	49
Dryflex PCR 50A101B U	50	1.1	5.6	1.3	> 600	21	13	10
Dryflex PCR 90A371B U	90	1.1	6.5	5.7	> 250	48	48	37

¹ after 15 seconds

² across the flow direction

³ calculation as defined in ISO 15343 section 4

POST INDUSTRIAL RECYCLATE (PIR)

Sometimes referred to as 'Pre-Consumer Recyclate'

CURRENT SOURCE:

The recyclate source for the **Dryflex PIR** grades includes material **diverted from the waste stream** during the manufacturing of consumer, construction and household applications including baby products.

TARGET APPLICATIONS INCLUDE:

- Consumer goods
- Sports equipment
- Household goods
- Footwear
- Automotive
- & more

Examples of DRYFLEX PIR grades

The recycle source for the **Dryflex PIR** grades includes material diverted from the waste stream during the manufacturing of consumer, construction and household applications including baby products.

These grades are available in a natural colour, giving additional design possibilities

CUSTOMISED GRADES: Below we show several grades to help demonstrate possibilities, these tables do not list all available materials. Please [contact us](#) → to discuss your specific requirements.

Grade	Hardness ¹ ISO 868 Shore A	Density ISO 2781 g/cm ³	Tensile Strength ² ISO 37 Type 1 MPa	Stress at 100% Strain ² ISO 37 Type 1 MPa	Elongation at Break ² ISO 37 Type 1 %	Tear Strength ² ISO 34-1 Method C N/mm	CS 23°C / 22h ISO 815-1 Type B %	Recycled Content ³ %
Dryflex PIR 50A231N U	50	0.89	3.0	1.4	> 250	15	24	23
Dryflex PIR 70A321N U	70	1.00	3.2	2.5	> 250	23	32	32
Dryflex PIR 93A621N U	93	0.98	9.1	8.0	> 400	61	-	62

¹ after 15 seconds

² across the flow direction

³ calculation as defined in ISO 15343 section 4

QUALITY CONTROLS & PRODUCT TESTING

Like all of our materials, Dryflex Circular TPEs are rigorously tested from development to production, always keeping product quality at the heart of what we do.

- We don't spot buy, we treat recycle the same as virgin raw materials, **everything is bought to a specification**. We don't buy one-off deliveries of mixed scrap, all of our feedstocks are from consistent sources
- All Dryflex Circular compounds are produced under the **ISO 9001** and **ISO 14001** standards
- All Dryflex Circular compounds are **RoHS, REACH** and **SVHC** compliant
- All Dryflex Circular compounds are supplied to a finished product **specification** and tolerance
- We're working with customers for **application specific testing** and approvals
- *Dryflex Circular TPEs are not approved for use in food, medical or toy applications*

Dryflex[®] Circular

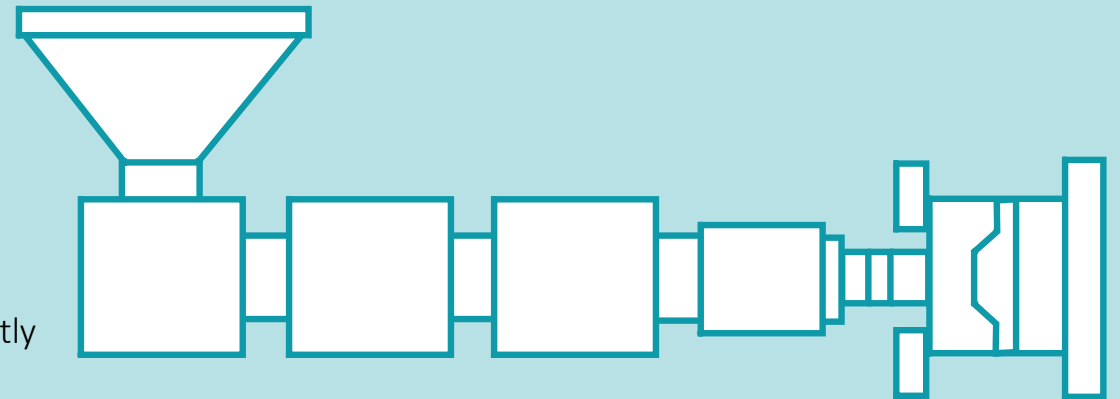
COLLAB

We believe that **collaboration**, from all parts of the supply chain, will be key to making plastics more circular. We've started several 'collab' projects, working with customers to find ways to utilise their '**waste**' streams and **turn-it into new life materials**.

PROCESSING

Dryflex Circular TPEs can be processed using conventional thermoplastic fabricating methods such as [injection moulding](#). This processing information is intended only as a guide. The actual parameters will depend on the machine used and the moulding being produced.

Injection Speed:	Medium - Fast
Injection Pressure:	Medium - Fast
Back Pressure:	Low - Medium
Holding Pressure:	Sufficient to pack the mould
Cooling:	Can be demoulded when parts have cooled sufficiently



Recommended start-up temperatures °C

170 - 190

180 - 200

190 - 210

200 - 220

15 - 50

PROCESSING & STORAGE

Dryflex Circular TPEs can be processed without predrying when stored under normal conditions. The product should be stored in a dry and cool place in the manufacturer's original packaging. If poor surface finish, bubbles, voids or streaks are seen on the finished article then material should be dried for 2 to 3 hours at 80°C.

Cycle times will be governed by temperature and section thickness.

Temperatures should not exceed 260°C and the compound should only be at elevated temperatures for a short period of time. Care must be taken to allow sufficient cooling of the section prior to demoulding in order to prevent permanent distortion of the article.



Further TPE processing & problem solving information is available to download from our website

WANT TO LEARN MORE?

Contact us at

circular@hexpolTPE.com

or visit

www.hexpoltpc.com/en/dryflex-circular →

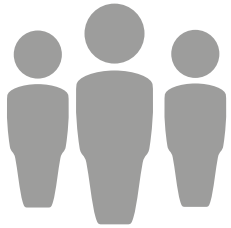
OTHER PRODUCT RANGES...

[DRYFLEX GREEN : Soft Plastics from Plants](#) →

[LIFOCORK : Biocomposite Cork Compounds](#) →

ABOUT HEXPOL TPE

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www.hexpolTPE.com



300+ EMPLOYEES
WORLDWIDE



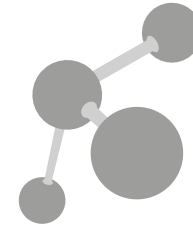
PRODUCTION PLANTS
Sweden, UK, Germany,
China, USA



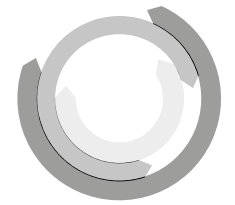
GLOBAL CAPACITY
> 80,000 tonnes p.a.



HEXPOL GROUP
HEADQUARTERS
Malmö, Sweden



34,796+
PROPRIETARY
FORMULATIONS



KEY MARKETS
Consumer,
automotive, medical,
construction,
industrial

All the information about chemical and physical properties consists of values measured in tests on injection moulded test specimens. We provide written and illustrated advice in good faith. This should only be regarded as being advisory and does not absolve the customers from doing their own full-scale tests to determine the suitability of the material for the intended applications. You assume all risk and liability arising from your use of the information and/or use or handling of any product. Figures are indicative and can vary depending on the specific grade selected and the production site. HEXPOL TPE makes no representations, guarantees, or warranties of any kind with respect to the information contained in this document about its accuracy, suitability for particular applications, or the results obtained or obtainable using the information. We retain the right to make changes without prior notice. HEXPOL TPE makes no warranties or guarantees, express or implied, respecting suitability of HEXPOL TPE's products for your process or end-use application. Dryflex® is a registered trademark, property of the HEXPOL TPE group of companies.