

# Designing for a Circular Economy

## Clear and effective guidance to transform flexible packaging design and accelerate progress

Designing and innovating to adopt the ‘Designing for a Circular Economy’ guidelines (D4ACE) delivers significant improvements to what materials and packaging enter the market in terms of recyclability - and expands the range and quality of applications able to use the materials when they are recycled.

Phase 1 guidelines for polyolefin-based flexible packaging were published in June 2020 and represent an essential step to delivering CEFLEX’s #MissionCircular vision.

They give a complete picture: providing a comprehensive overview of flexible packaging structures, building understanding of end-of-life processes, giving practical advice on circular economy design principles and making sustainable design choices for recyclability clear.

In 2022, an extensive testing programme with a network of leading laboratories, universities and industry experts was launched to generate robust and independent data to update the guidelines and give further insights for aluminium-based flexible packaging and beyond.



*The ‘Designing for a Circular Economy’ guidelines (D4ACE) are the result of a unique value chain collaboration, with hundreds of stakeholders contributing technical, environmental and market expertise.*

*Adoption and implementation of the guidelines by over 180 CEFLEX stakeholders, and their use by 1,000’s of organisations worldwide, is helping transform flexible packaging design.*

Since their launch, the guidelines have been used by 1,000's of organisations across the value chain worldwide and recognised as a reference point in circular design and innovation for flexible packaging.



**Giving clarity** to brand owners, retailers, converters, film producers and others in the value chain on what design decisions they should be making to support a circular economy for flexible packaging



Helping to **increase levels of collection, sorting and recycling**



**Producing higher quality recycled materials** to be kept in the economy and used in new and existing sustainable end markets

CEFLEX stakeholders are driving this change. Over 180 of them commit to reviewing their packaging portfolios and re-designing where necessary to adhere to these guidelines - applying the principles and information provided to help deliver significant environmental improvements.



A dedicated design guidelines website provides full information, resources, testing results and media exploring the issue of flexible packaging design:

[guidelines.ceflex.eu](https://guidelines.ceflex.eu)



## DESIGNING FOR A CIRCULAR ECONOMY IN ACTION

### A living resource that continues to boost innovation and circularity

#### Phase 2: additional clarity for multi-material structures and robust, independent data to update and improve our design guidance

During development of the initial Designing for a Circular Economy (D4ACE) guidelines, a number of knowledge gaps were identified that need to be filled and supported by robust testing and data.

An extensive programme of independently conducted testing focuses on flexible packaging structures that are not currently considered widely sorted or recycled, and could not yet be classified in the D4ACE guidelines. The programme also provides additional data to support refined design guidance for structures already covered in the D4ACE guidelines.

**A major collaboration with UK Research and Innovation** is enabling more comprehensive testing to urgently address essential gaps in knowledge.



UK Research  
and Innovation



Results are deepening our understanding of specific design elements and their impact on sorting and mechanical recyclability. Together with increasing levels of collection, sorting and recycling of flexible packaging, this will further improve the quantity and quality of recycled materials by:

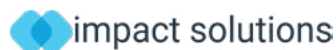
- ▼ Testing to **understand the impact of different materials and elements** in a flexible packaging structure on its **sortability** and **mechanical recyclability**
- ▼ Demonstrating if and how flexible packaging structures that are not currently widely sorted and mechanically recycled in existing polyethylene, polypropylene and mixed-polyolefin waste streams, **can be technically sorted and recycled**
- ▼ Giving further **analysis and guidance to improve design choices** and how flexible packaging moves throughout end-of-life processes to generate value in a circular economy

## Robust, independent data - strengthening flexible packaging design guidance

A panel of key advisors and a dedicated workstream of over 60 CEFLEX stakeholders ensure value added analysis and real-world progress; and testing is conducted with a network of leading laboratories, universities and industry experts to generate robust and independent data in two key areas:

- ▼ **Sortability testing** on a range of flexible packaging structures / designs, comprising
  - ▼ Near Infra-red (NIR) classification testing at **Institute Cyclos-HTP** and the **Dutch National Test Centre for Circular Plastics (NTCP)**. And Eddy Current sorting and metal detector testing for packaging structures containing aluminium
  - ▼ Size and shape-based sorting testing, including wind sifting and ballistic separation processes
- ▼ **Mechanical recyclability** testing on a range of materials and elements such as inks, adhesives and barrier materials used in flexible packaging structures. Recyclability testing is conducted by a group of established laboratories across Europe, including **Aimplas**, **Cyclos-HTP**, **Impact Solutions** and **Proplast** - with a focus on polyethylene (PE) and polypropylene (PP) waste streams.

**Leading universities and laboratories to help advise, develop, peer review and deliver the testing programme.**



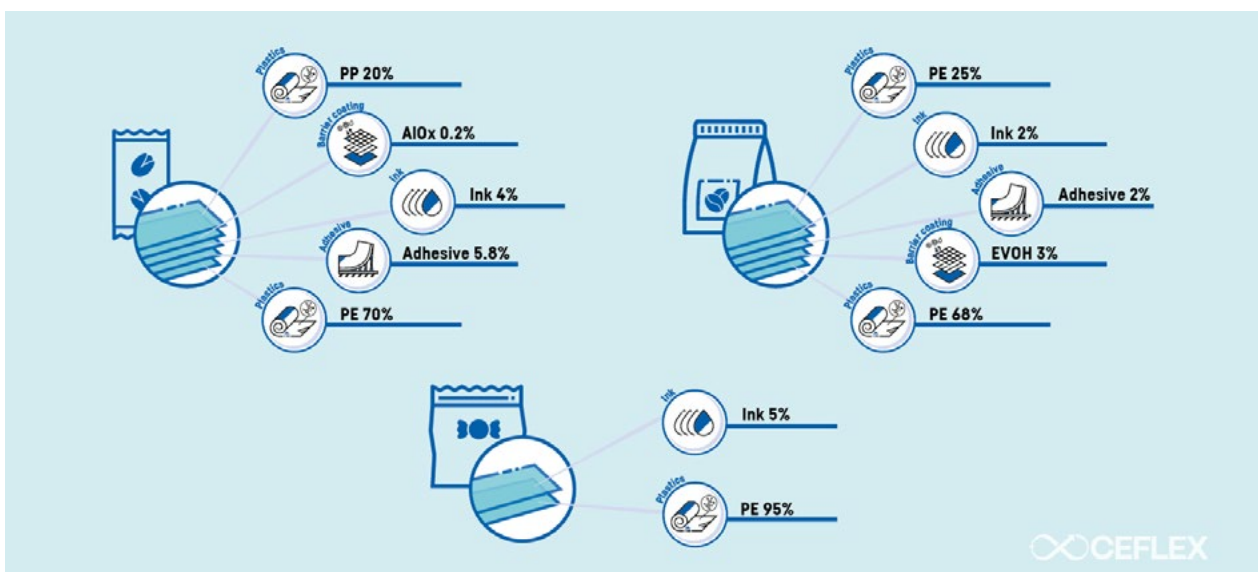


A taskforce of over 60 stakeholders CEFLEX in dedicated sub-groups for each flexible packaging element and a panel of key advisors ensure value added analysis and real-world progress.

## Aiding implementation and impact

CEFLEX adopts an open-data and collaborative approach to accelerate impact. Testing results will be shared transparently and publicly by CEFLEX alongside design guideline updates to enable the widest possible use of the results.

D4ACE guidelines will be reviewed to reflect good practice, take developments in the flexible packaging value chain into account, and integrate the testing programme results key to addressing knowledge gaps and further targeting progress.



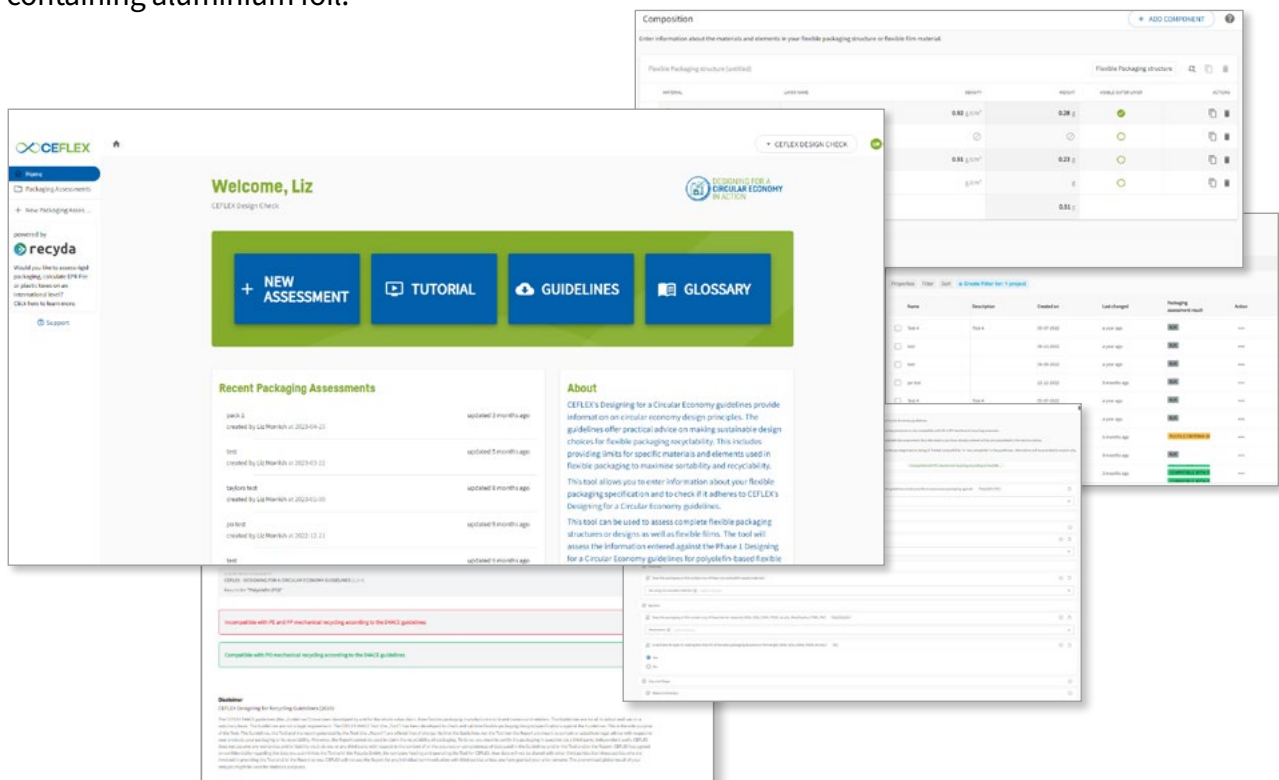
## An assessment tool to help designers, customers and suppliers optimise and accelerate sustainable design

With more urgency than ever before to ensure flexible packaging is optimised for collection, sorting and recycling – and producing higher quality recycled materials – a ‘Design Check’ tool gives valuable guidance on design and specification.

CEFLEX teamed up with recyclability experts **Recyda** to provide an easy-to-use online service which allows users to check if a packaging design or specification adheres to ‘Designing for a Circular Economy’ guidelines. Either to check an existing package, facilitate the R&D and design process, engage with other parts of the value chain or prepare for recyclability testing.

Assessment covers all parts of the guidelines, including their sortability and recyclability principles. It indicates if a specification or design is compatible, limited compatibility or not compatible - and users are also able to undertake assessments for multiple specifications or designs.

The tool will be revised to reflect updates based on the extensive sorting and recycling testing programme and new Designing for a Circular Economy areas, such as flexible packaging containing aluminium foil.



The screenshots illustrate the user interface of the CEFLEX Design Check tool. The main dashboard includes a navigation menu, a welcome message, and buttons for 'NEW ASSESSMENT', 'TUTORIAL', 'GUIDELINES', and 'GLOSSARY'. A 'Recent Packaging Assessments' table lists previous checks with their dates and statuses. Overlaid screenshots show the 'Composition' input form, a table of material components with status indicators (green for compatible, yellow for limited, red for not compatible), a table of project history, and a detailed assessment report with green and red status bars.

Consult and use the tool: [guidelines.ceflex.eu](https://guidelines.ceflex.eu)

## A broad range of materials and collaborations to make flexible packaging circular

While plastic is predominant, **the CEFLEX initiative is material-neutral**, also encompassing paper and aluminium-based flexible packaging and works to improve the sortability and recyclability of all flexible packaging structures.

CEFLEX design guidelines for **flexible packaging structures containing aluminium foil** are currently in development with [Flexible Packaging Europe](#), the [European Aluminium Foil Association](#) and other key actors providing additional technical and operational experience. CEFLEX is also considering design guidance to optimise flexible packaging **design for chemical recycling**.



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CEFLEX also collaborates with the [4evergreen alliance](#) on its **design guidelines for fiber-based packaging** and additionally, CEFLEX and several of its stakeholders collaborate and align with organisations like the [Consumer Goods Forum](#). Their multiple format **‘Golden Design Rules’** use CEFLEX design guidelines as a basis for flexibles – giving sound actions to innovate, eliminate and increase recycling rates.

The project and shared stakeholders also continue to collaborate with the [Ellen MacArthur Foundation \(EMF\)](#) to drive innovative design, reduce waste and accelerate a circular economy for flexibles. The CEFLEX design guidelines built on EMF’s Project Barrier incorporating additional testing, information and activating them to a wider audience at scale. The two organisations also exchange data and insights on the required infrastructure and essential end markets for materials to be used again and again.





# CEFLEX

A CIRCULAR ECONOMY FOR FLEXIBLE PACKAGING

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