Easy Pour / Release Masterbatches

Helping Brands make a positive impact

2021

Agenda

- LyondellBasell Sustainability Program areas
- Sustainability is Key
- Masterbatch Solutions - Design for recycling
- We help brands make a positive impact – Easy Pour

Our approach to Sustainability

We have developed five program areas to address the key overarching challenges:

PLASTIC WASTE	CLIMATE CHANGE	THRIVING SOCIETY

End Plastic Waste in the Environment

Advance the Circular Economy

Address Climate Change

Grow Sustainable Solutions

Enhance our Workplace, Operations & Communities

Our ambition

- Produce and market 2 million metric tons of recycled and renewable-based polymers annually by 2030
- Achieve a 15% reduction in CO_2 emissions per ton of product produced by 2030, compared to 2015 levels
- Help divert millions of tons of plastic waste in multiple cities across the globe*
- Support 100% reuse, recycling or recovery of plastic packaging by 2040**
- 0 pellet loss to the environment

Using our scale and reach to make a positive impact across our value chains

** AEPW ambition by 2025 and beyond*
*** ACC and PlasticsEurope goal*

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Advancing Possible

Sustainability is Key

ADVANCING CIRCULARITY

Sustainability is key for brand owners and consumers.

We are facing **design, sorting and recycling challenges** across the packaging industry.

- Major companies with well-known brands have expressed the need to inspire responsible consumption.
- They are putting a strategic social or environmental commitment at the heart of the consumer experience.
- Consumers are increasingly making more conscious sustainable choices.

Design Challenges. Today's packaging solutions need to be designed thoughtfully in order to be recyclable

- Product Design includes the selection of materials **which support reuse or recyclability.**
- Recycling-ready packaging designs aims at the complete sustainable solution, a **responsibility shared by all in the packaging value chain**

Design for Circularity

Masterbatches supporting plastic sorting

Recycled Solutions

Masterbatches enabling performance improvement

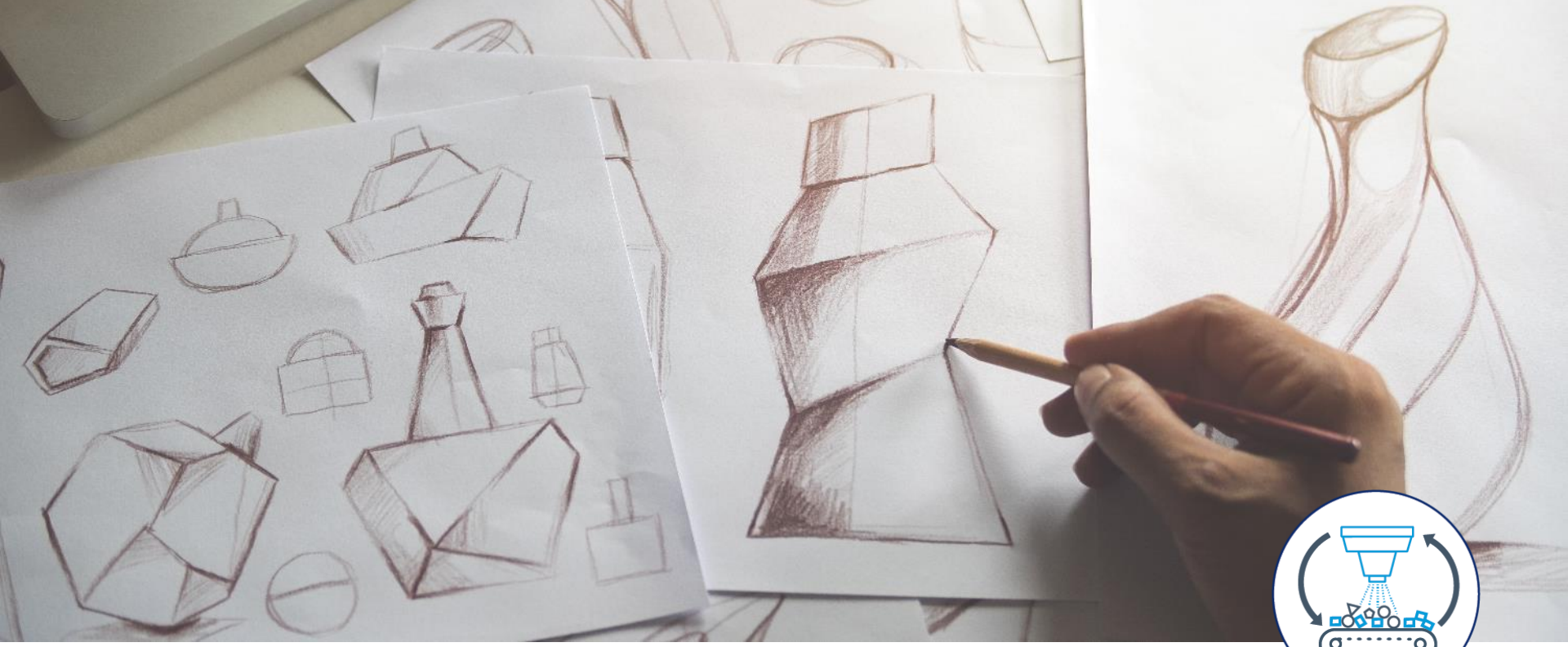
Renewable Solutions

Masterbatch based on renewable resources

ADVANCING CIRCULARITY

LyondellBasell's *Advanced Solutions* Masterbatch Portfolio

- With our varied material technologies know-how and sustainability focus, **we are your partner of choice for innovative solutions**



ADVANCING CIRCULARITY

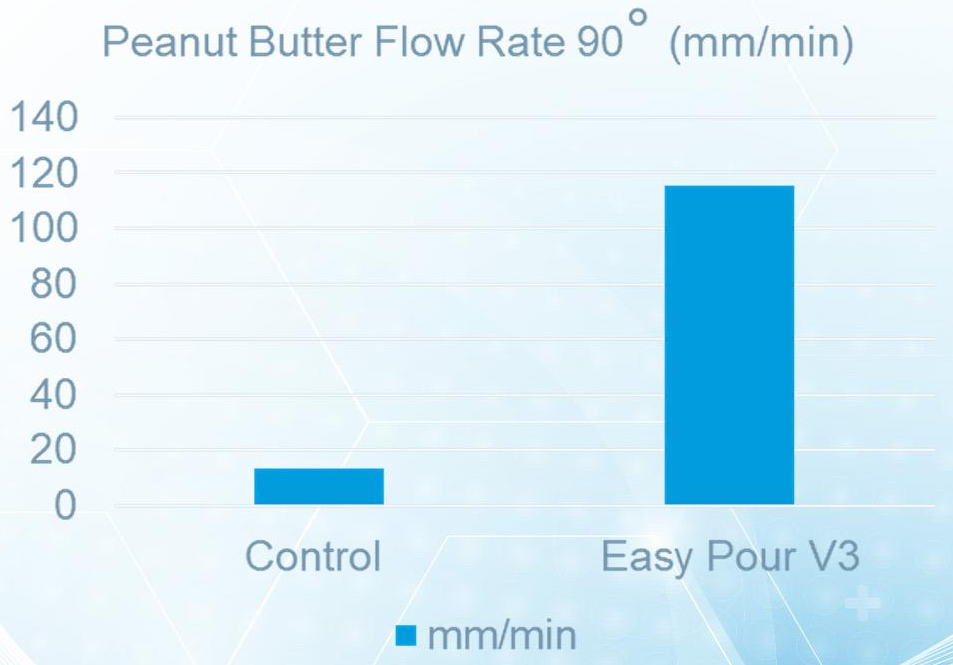
LyondellBasell Masterbatches support intelligent design of articles to improve recyclability of a given product

- Design for circularity is optimizing packaging design which supports sorting and recycling processes
- Mono-material packaging, easy separation and the use of additives play an important role in determining the recyclability of a given product and eventual quality of the recyclate

We help Brands make a positive impact - Easy Pour

- Easy Pour Masterbatch helps to optimize the inner surface of flexible or rigid packaging - minimizing product waste and preparing the packaging for recycling.

- The content will flow down more smoothly, making it easier to empty the package. This leads to benefits for consumers and has advantages for recycling.
- If residues are not washed off correctly before recycling, the residual odor will be transferred to the recycled plastic and end products. Therefore, the emptier the container is, the better.



How does it work?

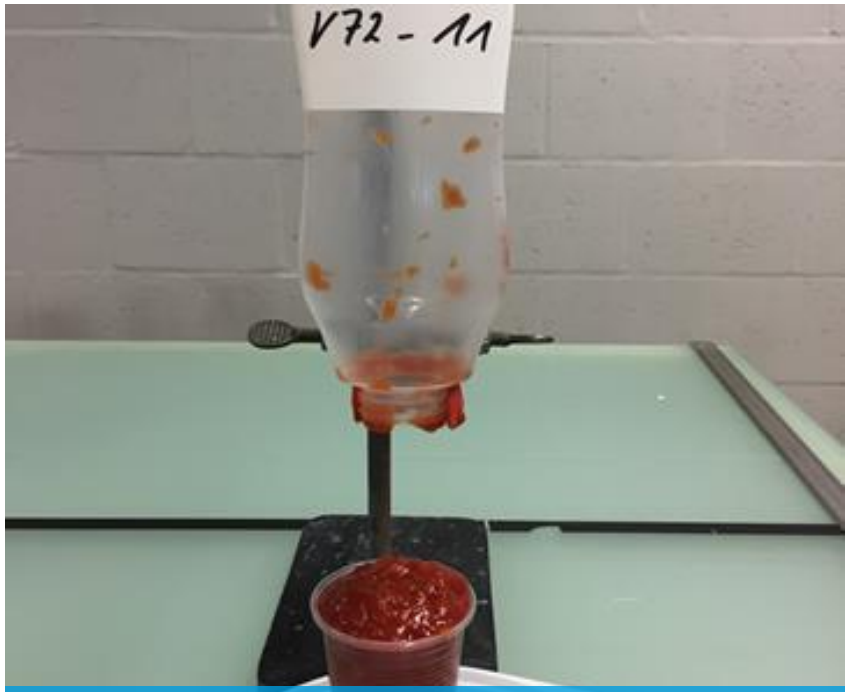
Experimental procedure - Flow Rate Measurement

The flow rate of a substrate is measured between two marked intervals on an inclined, graduated board using PE film.

Example: Food release for PE film

1. Film clipped to a clipboard and pulled taut
2. Food substance was measured out to a specific weight/amount
3. Placed above the “Initial” line
4. Clipboard inverted to 90°
5. Stop watch is used to capture the time (min/seconds) for the bottom of the food substance to cross a specified “Final” line

How does it work?



Measurement with
Test Bottles

Measurement with
Customer Bottle and Product

In Situ Testing

- The quantity of a substrate, which discharges from a container, is measured
- Flow and residue are visualized

Easy Pour Grades & Applications

Commercial grades available and have been tested with a wide range of different substrates.
Experimental grades can be designed for different substrates.

Grade	Addition Rate	Examples of Application
Polybatch **Easy Pour 1395**	2.0 – 5.0%	Tomato sauces, ketchup, toothpaste
Polybatch **Easy Pour 1701**	3.0 – 4.0%	Haircare, pet food, mayonnaise
Polybatch **Easy Pour 1219**	2.0 – 5.0%	Yoghurt, dairy

Q&A

Can you say more about the functionality of Easy Pour?
Easy Pour is a migrating additive. Functionality depends on storage conditions and article thickness etc.

Does Easy Pour impact the visual aspect of the packaging?
There is no significant influence in optical properties when using Easy Pour.

Does Easy Pour bring improvement of mechanical properties?
At this point in time, no changes of mechanical properties of articles have been notices, but can be measured case by case.

How does Easy Pour bring more consumer convenience?
Easy Pour makes the end product more consumer friendly in the sense that the packaging can be emptied easier and faster.
There will be less residue left in the packaging, the consumer can therefore use a maximum of the product.

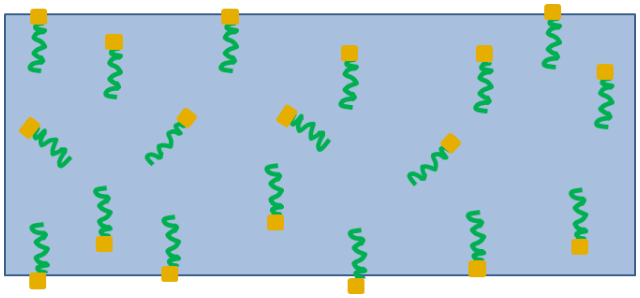
Does Easy Pour influence the ease of production?
When using Easy Pour the production parameters do not need to be changed. Dosing can be done via separate dosing units or by blending with other components that have to be dosed.

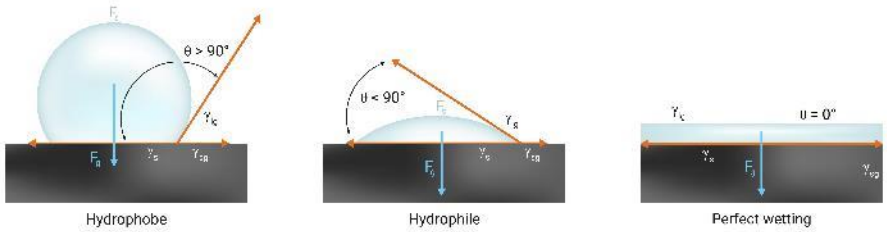
What is the heat stability of Easy Pour?
Easy Pour is heat stable for the most common plastic conversion process technologies.

Appendix – Technical information

How Does Easy Pour Work?

- **Active additive migrates to the polymer surfaces and modifies the surface energy between the substrate (contents) and the polymer.**
  - Lower surface energy increases the contact angle of the liquid and reduces wetting.
  - Creates a more hydrophobic or oleophobic surface to reduce sticking.





- **Different additives and concentration can be used depending on the nature of the contents of the packaging:**
  - Aqueous or oil-based contents
  - Hydrophilic or hydrophobic
  - Viscosity

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