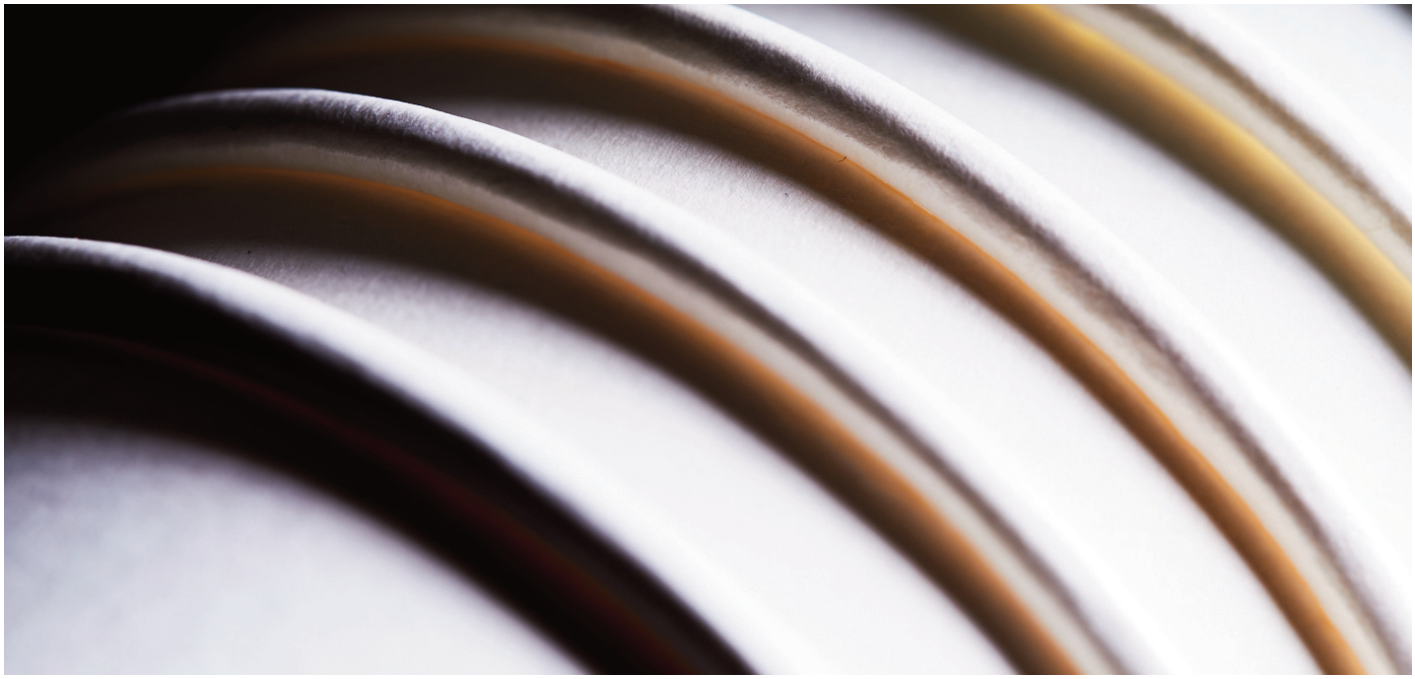
TRADVANCE

# FACT SHEET
# PAPER CUPS IN THE UK MARKET



## INTRODUCTION

**According to the House of Commons Environmental Audit Committee, in the UK alone, roughly 1 in 5 people visit a Coffee Shop daily and between us we use more than 2.5 billion disposable Paper Coffee Cups every year, yet less than 1% of them are currently being recycled.**

In this report we explain the issues around recycling and evaluate the current commercial offerings to address concerns over plastics and recycling of disposable Paper Cups.

## SUMMARY


The UK public has been sensitised to the issue of single-use plastic and its effect on the environment. This in turn is persuading many Brands and coffee shops to investigate alternatives. As yet there has been little significant progress in replacing PE-lined paper cups which dominate the takeaway hot beverage market.

**There are several reasons why progress has been slow**

- The challenge of developing a non-plastic coating that will meet the technical requirements for cup use and can also be formed on existing cup production machinesthat typically can run up to 350 cups per minute.
- Ideally non-plastic cups should be able to be recycled without the need for specialist recycling and the consequent different waste collection schemes.
- Compostable cups are only compatible with certain types of industrial composting systems, not home composting, and in most cases not actually composted. There is considerable confusion and topic is not clear for the public.
- Paper cups are generally made from the highest quality virgin paper fibre. This means composting is in fact a very poor environmental option. Ideally cups should be recycled as the high-quality fibres will significantly improve the overall quality of paper pulp in recycling and support a circular economy.
- The public and indeed many sellers of takeaway cups are not sufficiently aware of the issues involved with recycling. Many cups have sustainability claims that are in fact virtually impossible to achieve, for example PE-lined cups can only be recycled if collected separately and sent to the few recycling Mills which will not reject them as a contaminant, which is why the House of Commons Environmental Audit Committee report from 2017 estimated that only 1 in 400 (0.25%) was being recycled.

The House of Commons Environmental Audit Committee report can be found **here.**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**We will provide the facts associated with the various options currently available as alternative to PE coated paper cups.**

## KEY FACTS

An alternative to the conventional PE lined paper cups is required to reduce the environmental impact.

**Challenge**

- suitable for conventional paper recycling
- convert on existing high speed conversion lines

Aqueous dispersion coatings offer the solution.

## THE CHALLENGE OF RECYCLING PAPER CUPS

Paper Cups are sometimes made from more than one layer of paper and can combine different fibre sources, some of which may have already been recycled and some of which are new (often called "virgin") fibres being used for the first time. The use of recycled fibres is critical to maintaining the sustainability of paper as a packaging material, but it is the new "virgin" fibres which are key to understanding the challenge of recycling paper cups.

There are thousands of tonnes of these high-quality paper fibres used in the UK every year to make Paper Coffee Cups, almost all of which are sourced from sustainability managed forests. These fibres can be used up to 6 times to create a wide variety of recycled Paper products, but they are most valuable to a Paper Recycling Mill the first time they enter the recycling chain. This is because the less times the fibre has been processed, the more it will enhance the quality of the recycled paper which is produced and the more it will help improve the efficiency of the process.

**So, if these fibres are so valuable to the paper recycling chain, why are so few actually being recycled...?**

- Consumer behaviour and 'binfrastructure'; if a Paper Cup is not put in the correct type of recycling bin, it will almost certainly not get recycled.
- Even if the cup does enter the recycling chain initially, not all Paper Recycling Mills will accept it. This is because the high-quality 'virgin' fibres which are of most value have been applied with a thin plastic coating (typically Polyethylene "PE" or Polylactic Acid ("PLA") in order to make the cup suitable to hold liquid. This coating can be difficult to separate from the paper fibres and doing so tends to reduce the efficienc of the recycling process.
- Even though some Paper Recycling Mills in the UK can recycle Paper Cups, the Waste Management company which collects the cups must ensure that they are separated and sent to the appropriate Mill which is a costly process. Additionally, the Paper Recycling Mil will typically only achieve a fibre recovery yield of between 60-80% and the 20-40% contamination which is not recycled can reduce the efficiency of the process.

## KEY FACTS

**Paper fibres from cups are high value**

- Cup fibres can be recycled up to 6 times
- Fibres have high strength

**Currently a very low level of cups are recycled because conventional PE and PLA**

- .Contaminate the recycling process with plastic fragments
- .Conventional PE or PLA cups have a low fibre recovery

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## REDESIGNING THE PAPER CUP FOR STANDARD PAPER RECYCLING

The current standard PE and "compostable" PLA-based linings are commercially unattractive to re-pulp. However, suitable barrier technology does exist which would allow a higher fibre yield (98%), without requiring any changes to the repulping process, or segregated waste collection. This solution must also be compatible with other parts of the supply chain; meaning this material can be used to manufacture Paper Cups on the existing cup forming machines without any modifications, and at full speed. Achieving full compatibility would make these new paper cups commercially viable to all in the value chain and provide consumers with a clear, and simple message.

### KEY FACTS

Options to increase recycling are limited due to commercial implications

**The solution is to redesign the paper cup towork with the current invested recycling streams**

- No plastic film contamination
- High fibre recovery 98%

## MICRO-PLASTICS CONCERN

The ECHA (European Chemicals Agency) Proposal for the Restriction of Intentionally Added Microplastics (March 2019) directly addresses the issue of microplastics as a significant environmental concern. The report which supports the proposal explains that the concern associated with micro-plastics is related to polymer-based materials which are resistant to environmental degradation, or which only degrade progressively via fragmentation into smaller and smaller particles. These particles are practically impossible to remove from the environment once they have been released. Therefore, the proposal includes a clear definition of the term "Micro-plastic" which states that only Polymers which are not degradable should be considered "Micro-plastics". It also goes on to explain that "the intent of the definition is not to regulate the use of polymers generally, but only where they meet the specific conditions that identify them as being 'microplastics'".

A good, simple, explanation of Micro-plastics can be found on the **ChemSafetyPRO** website.

## POTENTIAL SOLUTIONS FOR RECYCLING

Having outlined the core challenges helps us to understand what potential solutions might be available.

- **Improve UK Waste Management Infrastructure:** Segregated collection schemes for Paper Cups (such as the Simply Cups scheme) appear to help, but even the most optimistic industry estimates suggest that rates have only increased to 1 in 25 (4%) cups being recycled. This system also has two major challenges; firstly, it requires significant investment to ensure there are enough dedicated collection points (i.e. bins) for Paper Cups; and secondly economy of scale. These two challenges mean that whilst this solution may have a place, it is (a) only really likely to be effective in high-usage, relatively enclosed environments, and (b) will take time to implement.
- **Upgrade Paper Recycling processes to be able to efficiently recycle Paper Cups:** It would resolve the issue if Paper Cups could be handled in the same way as any other Paper waste by everyone in the chain from Consumers right through to the Paper Recycling Mills. However, it is not currently commercially viable.
- **Redesign the Paper Cup to be compatible with the waste paper value chain:** It is possible to redesign the material used to make Paper Cups to be compatible with the current Paper recycling chain. Obviously, this would resolve the challenge of recycling Paper Cups as soon as it could be widely adopted by major users of Paper Cups.

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| Cup offering | Type of Barrier Technology | Origin | UK Recycling Status | Suitable for Composting | Micro Plastic Concern | Compatibility with cup forming machines | Coating from Renewable sources | Odour & Taste Neutral | Coating Weight | Microwave Safe |
|---|---|---|---|---|---|---|---|---|---|---|
| PE-lined Cup | PE-based Extruded Plastic Film | Europe | Not widely recycled | Not suitable | Yes | Suitable for high-speed and low-speed forming | No | Yes | Typicall <5% | No |
| Vegware | PLA-based Extruded Plastic Film | Europe | Not widely recycled | Suitable for Industrial Composting | Yes | Better suited tolow-speed forming | Approx. 70% | No | Typically >5% | No |
| The Game Changer | Water-based Dispersion | Europe | Suitable for standard recycling | Suitable for Industrial Composting | Unknown | Better suited to low-speed forming | Partially | No | Typically <5% | No |
| trucup® | Water-based Dispersion | UK | Suitable for standard recycling | Suitable for Industrial Composting | No | Suitable for high-speed and low-speed forming | No | Yes | Typically <3% | Yes |
| reCUP | PE-based Extruded Plastic Film | Europe | Not widely recycled | Not suitable | Yes | Suitable for high-speed and low-speed forming | No | Yes | Typically >5% | No |
| BioPBS Cup | PBS-based Extruded Plastic Film | China | Unknown | Suitable for Industrial Composting | Yes | Unknown | Approx. 70% | Yes | Typically >5% | No |
| Frugal Cup | Plastic insert to Paper Cup | UK | Not widely recycled | Not suitable | Yes | Special equipment required for production | No | Yes | Typically <5% | No |

## CONCLUSION

There is no perfect solution currently commercially available, and new innovations have a cost premium compared to PE-lined Paper Cups. However, assuming the suitability of the cup, the three most important considerations are; (1) no micro-plastic concern, (2) compatibility with standard Paper Recycling, and (3) functional performance on existing cup forming machines, both high-speed and low-speed.

Therefore, **tru**cup® stands out as the best available alternative to provide an improved option to PE-lined Paper Cups. The lightweight, water-based coating which is fully compatible with standard UK paper waste recycling, and has been proven to work on both high-speed and low-speed cup forming machines, is the obvious choice as the next-generation solution for Paper Cups.

## KEY FACTS

**tru**cup® **provides the best commercially available fully recyclable alternative to conventional PE or PLA cupstock**

Tullis Russell
HIGH PERFORMANCE COATING

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