
MASTERFOAM FROM BROADWAY

2024





We develop high-quality materials to improve the appearance, performance, value and sustainability of plastic mouldings.

Broadway is an independent, family owned, UK manufacturer of colour and additive masterbatches, plastic compounds and rotational moulding powders.

We've been operating for almost 27 years. Today we have around 60 employees, based at our 90,000 ft² factory in Suffolk. We supply to many market sectors including automotive, construction, cosmetics, electronics, food and drink, household, leisure, medical and personal care. We form lasting business partnerships with customers and suppliers. Our success is built on innovation, operational excellence, high quality products and attentive customer service.

In recent years we've made great strides to reduce the environmental impact of our operations. We're also developing a portfolio of solutions to improve sustainability in plastic manufacturing – including our *MasterFoam* additive. We're ISO9001 and ISO14001 certified, and we hold an EcoVadis Gold Sustainability Rating, Living Wage accreditation and BPF membership.



[View our videos](#)

MasterFoam is our new blowing agent masterbatch.

This new additive masterbatch – developed by Broadway's in-house R&D team, was successfully trialled throughout 2023. It provided a variety of significant benefits in different applications.

How about a FREE trial?

SAFETY
FIRST

A safe, endothermic reaction



Exothermic blowing agents:

These release energy during reaction (can cause temperature 'run-away').

They typically generate N_2 and CO_2 when decomposing, but can generate Ammonia and CO when decomposed (health and safety considerations). Usually, high gas yield and pressure of gas released.



Endothermic blowing agents:

MasterFoam is an endothermic blowing agent. These absorb energy during the process, so the reaction is easy to control.

Endothermic blowing agents typically only release carbon dioxide and water upon decomposition.



SUMMARY OF THE BENEFITS

One additive, many benefits

Broadway's *MasterFoam* additive is a chemical foaming (or blowing) agent. Supplied in masterbatch form, our blowing agents have proven to offer a multitude of benefits in both injection and extrusion moulding processes, at low addition rates.

Benefits of use may include:

- ✓ Reduction in weight of the moulded component
- ✓ Reduction in material usage
- ✓ Reduction in costs, without any tooling changes
- ✓ Reduced cycle times
- ✓ Reduced energy demand
- ✓ Increased shot/running speed
- ✓ Increase in productivity (up to 100%)
- ✓ Prevention of sink marks in the moulded component
- ✓ Improved strength-to-weight ratio of the moulded component
- ✓ Improved thermal efficiency of the moulded component
- ✓ Improved acoustic insulation of the moulded component
- ✓ Improved carbon footprint of the moulded component

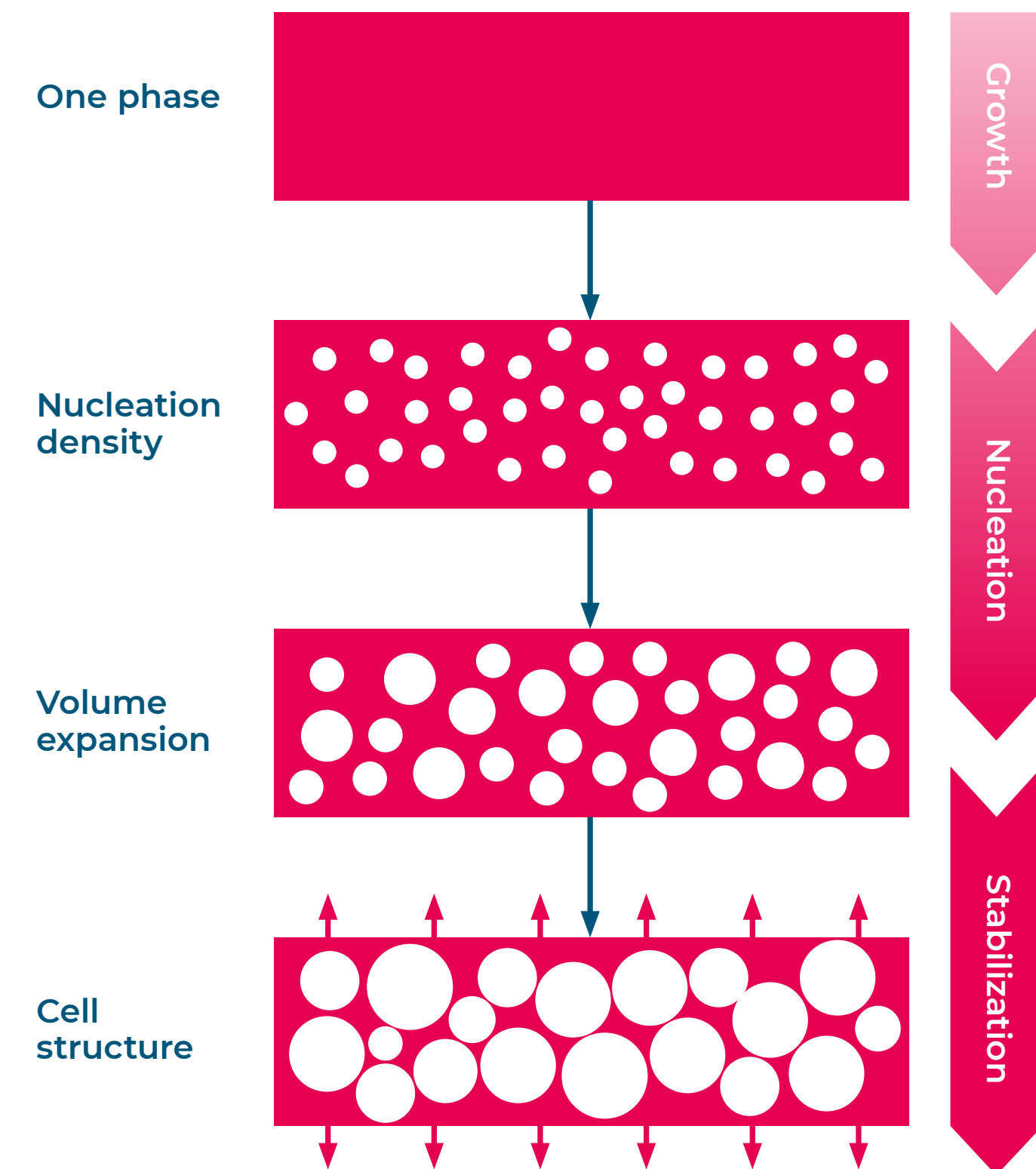
The application, polymer type and moulding conditions will determine which of the above are achievable, and to what extent.

MASTERFOAM – THE BENEFITS

Prevention of sink marks, reduced volume of material

MasterFoam instigates a reaction which creates a foaming effect whilst the material is in a liquefied state. The foam expands as the thermoplastic cools in the mould. This process offsets the tendency for the moulded part to shrink whilst cooling, thus reducing sink marks.

As tiny bubbles of gas are captured in the moulding, this reduces the density of the material and as such the amount of polymer needed to fill the mould cavity. Therefore less material is required in production and components are lighter. This is desirable for applications across many sectors including construction, automotive, aviation and packaging.



MASTERFOAM – THE BENEFITS

Improved thermal efficiency of the final part

The gas trapped within the cell structure has a lower thermal conductivity than the solid polymer. This decreases the rate at which heat is transferred through the material, keeping the contents of the foamed material hotter (or cooler) for longer. Potentially highly beneficial for components used in construction.



Material Conductivity

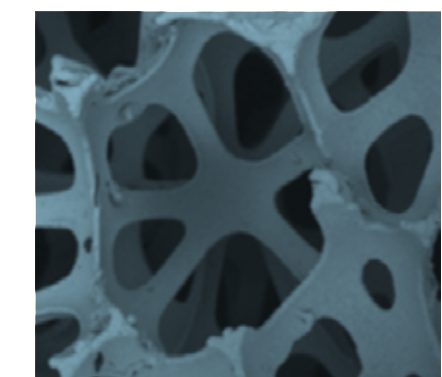
Air	0.024 W/mk
LDPE	0.30 W/mk
HDPE	0.44 W/mk
PP	0.11 W/mk
PET	0.15 W/mk

Improved acoustic insulation of the final part

Sound waves travel as longitudinal waves, causing compressions of air particles. The foamed structure, disrupts (attenuates) the movement of the sound wave.



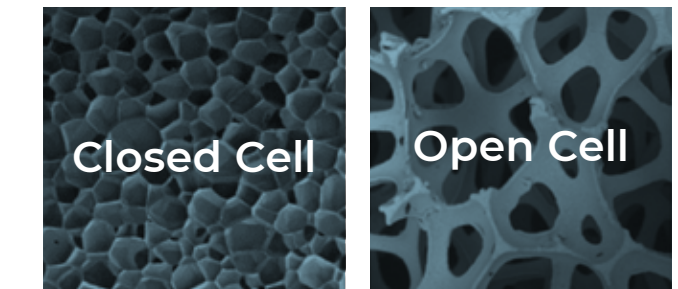
Open-cell foam is less rigid than closed-cell. Because of the open structure, it's better at trapping sound.



MASTERFOAM – THE BENEFITS

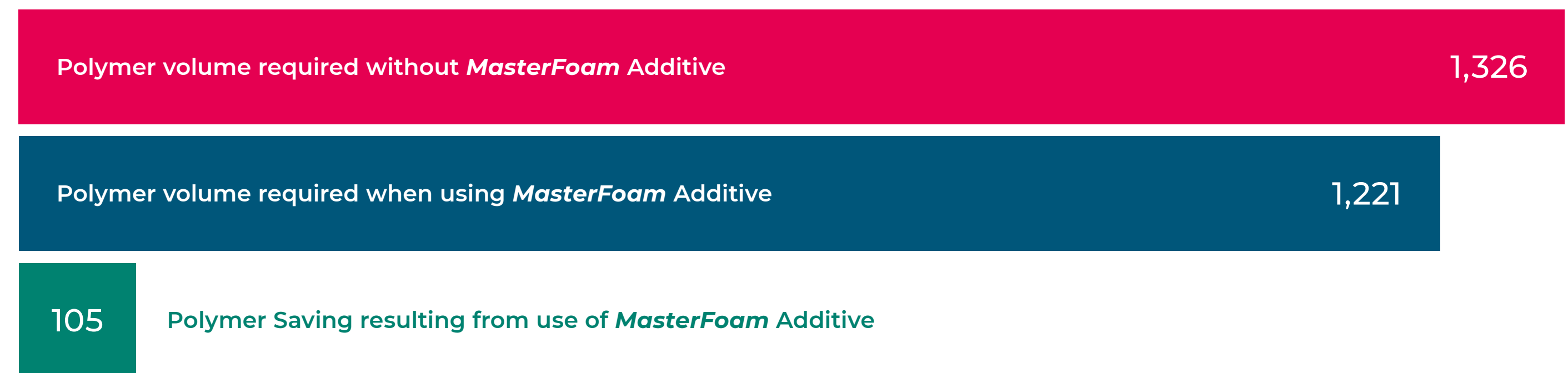
Industry partner's material reduction illustration

The creation of a cellular structure in the polymer, reduces its density. This in turn reduces the overall volume of polymer processed in the production run, as well as lightweighting the component.



Following successful trials, our industry partner provided the following projected figures for the manufacture of two specific packaging applications, over a five-year period.

Material weight (tonnes)



Polymer Reduction:
105t



Cost Reduction:
£110,000



Carbon Reduction:
Illustration also indicated a reduced carbon footprint would be achieved

MASTERFOAM – THE BENEFITS

Material and tax cost reduction illustration

This illustration is based on *MasterFoam* achieving a 10% polymer reduction in a moulded component which is subject to the 2024 UK Plastic Packaging Tax rate.



Without *MasterFoam*:

Material weight: 100 t
Material cost: £100,000
UK PPT cost: £21,875
Total cost: £121,875



With *MasterFoam*:

Material weight: 90 t (includes 1% MasterFoam, 99% polymer)
Material cost: £94,500 (includes MasterFoam & polymer cost combined)
UK PPT cost: £19,606.50
Total cost: £114,106.50

▲ **Saving: £7,768.5*** (10 tonne reduction in material)

* Material cost saving only. This excludes additional savings potential from production and transport efficiencies. Total savings likely to be higher.

MASTERFOAM – THE BENEFITS

Increased shot or running speed, reduced cycle time



Viscosity (resistance to deformation) of the **MasterFoam** melt is lower than just polymer on its own. This is due to bubbles beginning to form in the melt allowing for deformation. This lower viscosity results in a smoother, quicker injection stage. Shot speed is increased as the polymer must be 'short shot' into the mould (i.e. less polymer added), to allow a uniform expansion of the foam in the mould. Cooling times typically are reduced, all of which contributes towards a reduced cycle time.

In an extrusion moulding trial, the use of **MasterFoam-Ex** (our extrusion grade additive) doubled the running speed of our customer's extrusion. This offers them the huge benefit of doubling their capacity, without expanding their infrastructure.



Close up showing bubbles evident in a plastic cap moulding. These are masked when colour is added.



2023 TRIAL RESULTS

Summary of 2023 customer trial results

Since *MasterFoam* launched last year, we've carried out a series of trials with different moulders. As shown below, *MasterFoam* achieved polymer savings, weight reductions and improved cycle times – all helping to reduce each component's carbon footprint. One additive, many benefits. The cost of the additive is less than the value of the polymer saving it provides, so it has a real commercial appeal. **In effect, the more a customer uses, the more they're saving!**

Trial Date	February 2023	August 2023	October 2023	November 2023	November 2023
End Component	Overcap for detergent bottle	Faceted jar outer	Thick-walled jar lid, used in cosmetics	Plastic pallet	20M decking board, for use on superyachts
Moulding Process	Injection	Injection	Injection	Injection	Extrusion
Additive	<i>MasterFoam</i>	<i>MasterFoam</i>	<i>MasterFoam</i>	<i>MasterFoam</i>	<i>MasterFoam-Ex</i>
Polymer	PPHO	PPHO	PPHO	Recycled PPHO	Flexible PVC
Addition Rate	0.5%	1%	0.5 - 1%	0.5 - 1%	1%
Weight Change	7.60g > 7.00g	39.90kg > 36.36kg	16.64g > 15.00g	14.50kg > 13.41kg	6.40kg > 3.20kg
Weight Saving	7.9% (0.60g)	8.9% (3.54kg)	10.0% (1.64g)	6.6% (1.09kg)	50% (3.20kg)
Time reduction	Reduced cycle time by 6% (From 16.6s to 15.6s)	Reduced cycle time by 6.4% (From 15.7s to 14.7s)	Reduced cycle time by 9.4% (From 6s to 5s)	Reduced cycle time by 9.9% (From 116.7s to 105.15s)	Doubled running speed!
Notes	Passed QC check and no detrimental effect when colour masterbatch was added (a gold pearl).	No negative effect observed during QC or when colour was introduced.	No negative effects on dimensional properties were observed during QC checks.	An additional 27 pallets could be manufactured during each 8 hour shift. Improved productivity will increase revenue.	This trial utilised our extrusion grade blowing agent. The potential benefits for this customer are huge – reducing costs and doubling their production capacity.

THIN WALLING VS FOAMING

Thin walling vs chemical foaming

Thin Walling

- ✗ Tooling modification costs
- ✗ Strength reduction
- ✗ Changes dimensions
- ✗ Changes are permanent
- ✗ Potential production issues
- ✓ No ongoing costs

Chemical Foaming (*MasterFoam*)

- ✓ Zero tooling costs
- ✓ Improved strength to weight ratio
- ✓ No (or very minor) dimensional changes
- ✓ Can be turned on and off
- ✓ **FREE** material trial (plus technical support)
- ✗ Ongoing additive costs

THE BROADWAY BENEFITS

Why use Broadway's product?

- ✓ Our injection grade chemical foaming agent – **MasterFoam** is not an imported or traded masterbatch. It was developed in-house by Broadway's technical team.
- ✓ **MasterFoam** is a made to order additive masterbatch. It's manufactured in Holton, Suffolk, offering security of supply.
- ✓ Our blowing agents utilise an endothermic reaction, which is preferable to widely available exothermic blowing agents.
- ✓ In 2023, **MasterFoam** produced the best results in independent trials, against a number of competitor blowing agents.



“Broadway’s MasterFoam allows our customers to achieve ‘more for less.’ This product provides a significant weight saving in the final moulded component, meaning less polymer is required. Savings increase for any components subject to the UK Plastic Packaging Tax.

We’re making a sustained effort to expand our product portfolio with new offerings which support customers with their commercial and sustainability goals.”

Dr Stephen Rayner
Technical Manager



We're offering **FREE** trials, with on-site technical support

Don't just take our word for it. We strongly recommend running a material trial to see for yourself. We're happy to offer a free material sample for trial purposes. We can also provide recommendations to optimise your processing conditions prior to the day of your trial.

We're happy to provide on-site technical support on the day of your trial. If we're present on the day, we're also able to follow this up with a detailed technical report, potentially with recommendations for further optimisation.



Dr. Stephen Rayner
attending recent
customer trials



BROADWAY'S GREENER SOLUTIONS

MasterFoam is just one of many Greener Solutions from your colouring experts

- 🌱 **MasterFoam** – reduce your material usage, costs and cycle times
 - 🌱 **NIR detectable piano black** – improve the recycling compatibility of black plastics
 - 🌱 **UV protection additives** – prolong the life of mouldings designed for outdoor use
 - 🌱 **Bio-sourced additive** – reduce your use of fossil fuel based resins by up to 50%
 - 🌱 **PCR based masterbatches** – legitimately claim “Made from 100% recycled plastic”
 - 🌱 **Odour neutraliser additive** – reduce smells when moulding recycled plastics
 - 🌱 **Free on-site colour matching** – great for brands formulating new colours for use in PCR
-
- 🌱 We’ve installed over **1,700 solar panels** on the roof of our factory
 - 🌱 All our products are manufactured using **100% green energy**
 - 🌱 We’re exploring the use of **carbon negative pigments** in our plastic colourants
 - 🌱 Our environmental management systems are **ISO14001 certified**
 - 🌱 We’re very proud to hold an **EcoVadis** Gold Rating



10943
ISO 9001 / ISO 14001





BROADWAY

YOUR ROAD TO PERFECT POLYMER

Request a **free** *MasterFoam* trial today!

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MASTERBATCH / COMPOUNDS / ROTO POWDER

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