BROADWAY

YOUR ROAD TO PERFECT POLYMER

Masterbatch solutions for PET

a technical guide

High-quality masterbatch for PET

Broadway has developed innovative Polyethylene Terephthalate (PET) masterbatches to satisfy a wide range of market sectors. These include personal care, toiletries, food and drink, and pharmaceuticals.

PET continues to be one of the most popular material choices amongst brands, manufacturers and consumers. Broadway has developed PET masterbatches for customers that demand only the best for their products.

Light, strong and inert, PET's numerous benefits provide the perfect alternative to glass. Being lightweight makes the material easy and efficient to transport. It boasts good barrier characteristics and is shatterproof. Key to its popularity are it's clarity – which is similar to glass, plus the fact it's fully recyclable.

Unfortunately, coloured PET products can often be undermined by inferior quality masterbatch, resulting in unsightly flow lines, poor dispersion and inconsistent clarity.

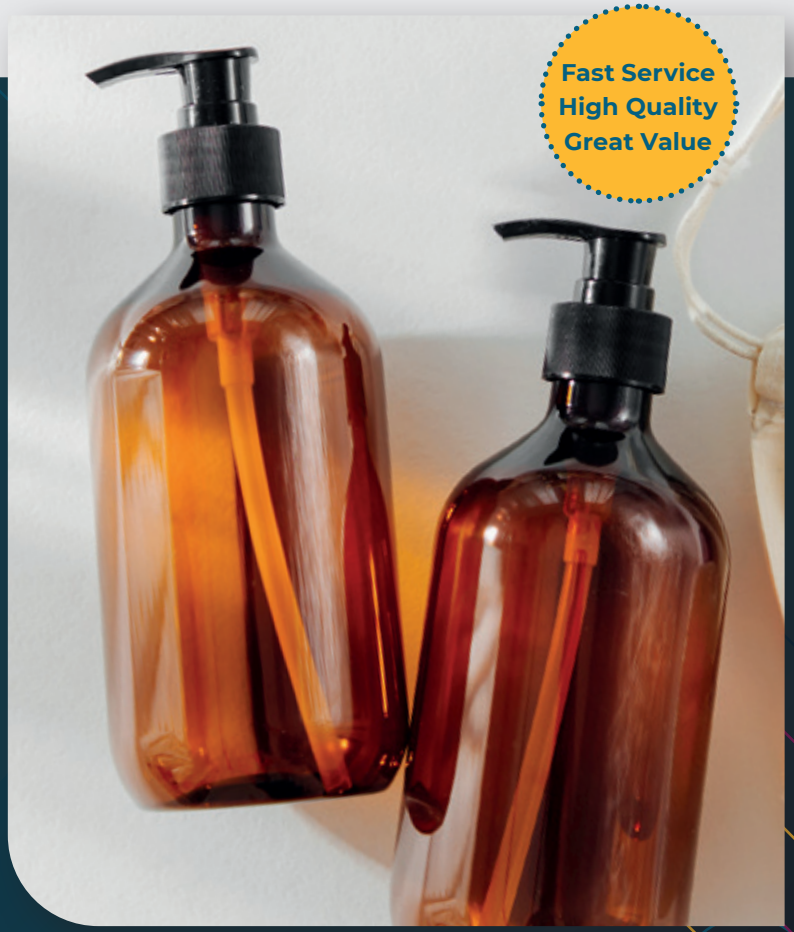
Broadway understands that the highest quality masterbatch is needed to bring out the real beauty of coloured PET. Our products are designed to achieve consistent results across different let down rates and varying transparency requirements. Our materials are rigorously tested and refined to ensure our customers' end applications are consistently enhanced, to meet the needs of demanding market sectors.

Our masterbatch products adhere to REACH, FDA* and European Food and Toy compliance for added reassurance.

FDA and REACH compliance available on request.

BROADWAY'S PET MASTERBATCHES – WHAT ARE THE BENEFITS?

- ✓ Suitable for a wide range of applications, including bottles and containers, thin films and coatings, rigid films, sheets, and filaments
- ✓ Fast turnarounds – UK deliveries achievable within five working days
- ✓ Accurate and efficient FREE custom colour matching service
- ✓ Performance additives, processing aids and special effects all available
- ✓ No customer drying time required – our materials are supplied ready for use
- ✓ REACH, FDA and European Food and Toy compliant
- ✓ Trusted, ISO accredited supplier, well-versed in UK and international trade



About PET

HISTORY OF PET

PET was first synthesised in the US by DuPont chemists in the mid-1940s. Initially it was used to make new textile fibres. DuPont branded it as Dacron. By the late 1950s, researchers found a way to stretch a thin extruded sheet of PET to create PET film for use in video, photographic film, X-ray film and packaging film. In the 1970s technology allowed the development of stretch-blow moulding into lightweight, shatterproof bottles. The first patented PET bottle was manufactured in 1973. In 1977 a PET bottle was recycled for the first time. Today PET is one of the world's most commonly used, versatile and trusted materials. More than half of the world's synthetic fibre is made from PET, and almost all individual-sized and 2-litre bottles of carbonated soft drinks and water sold globally are made from PET resin.

HOW IS PET RESIN PRODUCED?

Polyethylene Terephthalate (PET) is produced by polymerization of ethylene glycol and terephthalic acid. Ethylene glycol and terephthalic acid are regarded as building blocks for PET resin. These resins are heated to a molten liquid which can be easily moulded into items of any shape. The presence of large benzene rings in the process adds stiffness and strength to PET polymer, especially when polymer chains align with each other.

When ethylene glycol and terephthalic acid are combined – with low vacuum pressure and high temperatures, long chains of the polymer are formed. As the mixture thickens, longer chains are formed and the process is stopped when the appropriate chain is achieved. When PET polymer is held in the starched form at different temperatures, it starts to crystallize and becomes opaque and more rigid. This crystallized form of PET is used to prepare products such as containers and trays which can also be reheated.

THE DIFFERENCES BETWEEN AMORPHOUS PET AND CRYSTALLINE PET

The properties of plastics are influenced by their degree of crystallisation. The higher the degree of crystallisation, the stiffer and stronger, but also more brittle a moulded part is. All grades of PET will be a mixture of APET and CPET. The end application will determine whether a grade that is mostly APET or CPET is appropriate.

Amorphous PET (APET)

- Has no or very little crystalline regions of uniformly packed polymer
- Is normally clear in colour
- Tends to soften and agglomerate, forming clumps at drying temperatures. It's important to recrystallise APET to prevent agglomeration from occurring
- Is most suitable for use between – 40 °C and 70 °C
- Is tough with good impact resistance, providing an excellent barrier against O_2, water, CO_2 and N_2. Therefore it's ideal for modified atmosphere packaging
- Glass Transition (Tg) of APET: 67 °C

Applications: Thermoformed food containers · Structural applications; aggregates in concrete, reinforced cement composites · Films and sheets · Drinks bottles

Crystalline PET (CPET)

- Is partially crystalline and is commonly known a semi-crystalline. It possesses polymer chains that are regularly and closely packed
- Is normally white in colour
- Is incredibly thermally stable, making it ideal for packaged ready meals. It can tolerate being taken from sub-zero to oven temperatures.
- Is most suitable for use between – 40 °C and 220 °C
- Glass Transition (Tg) of CPET: 81 °C

Applications: Microwave and oven proof food trays · Freezer shelving · Automotive parts; switches, wiper arms, interior trim, engine covers and headlamp retainers

For applications where CPET is required, APET can be utilised. However it is recommended that APET is recrystallised to CPET prior to pre-drying. Pre-drying the APET will avoid the agglomeration of APET and make it unusable. Semi-crystalline PET is achieved by heating the APET to above its glass transition point whilst agitating. The degree of crystallinity will depend on the grade, relative degree of amorphous nature to the PET and the rate of controlled cooling to achieve CPET.

SUITABLE APPLICATIONS

Since it was first engineered in 1941, PET has become an increasingly versatile polymer. It has a wide range of applications and is used in several different industries because of it's numerous beneficial properties. Broadway's PET masterbatches are ideal for a variety of needs, including injection moulded preform production, injection stretch blow moulding, film and sheet extrusion. We can incorporate a wide selection of special effects and processing aids.

Bottles for water and carbonated drinks

Containers for creams and cosmetics

Food trays for microwave meals

Refrigeration trays and shelving

Pharmaceutical and medicine bottles

Preforms – for blow moulded bottles

Shampoo and personal care bottles

Clothing fibres – polyester fleece

Large bottles for protein supplements

KEY ADVANTAGES OF USING PET

- High gloss and transparency
- Fully recyclable
- Excellent impact tolerance and stiffness
- High resistance to stress cracking
- Very good resistance to chemicals, solvents, cleaning agents, oils and fats
- Very fast mould cycle times with even wall thickness
- Good colour dispersion – achieved with appropriate colourant choices
- Surface can be easily printed on or decorated (without pre-treatment)
- Cheaper and far more energy efficient to mould than glass

RECYCLING PET

PET is a highly recyclable polymer, this makes it a popular choice for packaging. Recycled PET is known as RPET and is the most widely recycled plastic in the world. The recycling process of PET will tend to reduce its IV, however it can still be used in many packaging applications. RPET can also be utilised for other applications where the IV requirement is less important. These include carpet fibres, fibres for winter and thermal applications, clothing polyesters, upholstery, straps, sheets and film.

THE RIGHT CHOICE FOR SAVING ENERGY

When it comes to making a choice between glass and plastic, the latter will generally be the most environmentally friendly option, often by some way.

PET can be moulded at a much lower temperature than glass. Production therefore requires far less energy and so creates fewer greenhouse gasses. This makes the overall carbon footprint of recycling PET plastic a lot smaller than that of recycling glass. PET plastic can be recycled into more products than glass, thus making it a more versatile and useful material. It's also a lot cheaper to recycle than glass.

Transportation of PET plastic also has a much lower carbon footprint than the transportation of equivalent glass products. It weighs less, therefore more can be carried at a time. Transportation costs and energy usage are dramatically reduced due to the weight savings PET offers.

For the consumer, PET plastic creates an effective oxygen barrier which means that the product inside is likely to last a lot longer. This helps to cut down on food waste and reduces the amount of rubbish sent to landfill.

Preparing PET for use

THE IMPORTANCE OF DRYING PET

PET is extremely water sensitive. Processing 'wet' PET is the single most common factor in PET moulding failure in rigid container applications. If the drying process is overlooked, failed mouldings will cause unnecessary waste with increased costs and processing times. A PET dryer is an essential piece of equipment for PET moulders.

It is advisable that PET pellets contain less than 50ppm (0.005%) of water prior to moulding. This ensures molecular weight retention to maintain the physical properties of the product. Un-dried PET will have lowered intrinsic viscosity (IV), due to hydrolysis of the PET chains. This will affect the moulding. IV forms part of the specification to select the right grade of PET for a particular application:

- 0.6 dl/g: appropriate for fibres
- 0.65 dl/g: appropriate for film
- 0.76-0.84 dl/g: appropriate for bottles
- 0.85 dl/g: appropriate for tyre cord

Effects of lowered IV caused by 'wet' PET:

To Preform	To Container
White spots	Uneven wall thickness
Haze, cloudiness, swirls	Vertical bars
Silver streaks	Craters
Stress patterns	Gate off centre
Crystalline lumps, specks	Stress cracking
Flash on top of the neck	Reduced impact resistance

Recommended conditions to dry PET

Drying Temps	Drying Time	Dewpoint	Air Flow
145 – 174°C	*4hrs – 12hrs*	*up to -40°C*	*0.065m³/kg/hr*

Temperature

Temperature is an important consideration in drying any hygroscopic polymer. As the temperature is increased, the PET molecules will possess enough energy to overcome the attractive forces at work that bond the water to the polymer.

The water molecules are then able to travel more freely and diffuse through the bulk material, being carried by the air flow. The heat energy required to overcome the attractive forces is known. Therefore, the optimum temperature requirement can be calculated to be between 145°C and 174°C.

If the temperature is too high, there's a greater risk of thermal and oxidative degradation to the PET resin. If the temperature is too low, then the drying process time is extended. Regular maintenance and calibration of equipment is required for accurate and consistent performance.

Dew point

This is a fundamental drying parameter. The dew point describes the moisture content of the drying air. The dew point temperature is the 'saturated air temperature' at which condensation would occur. Therefore, a low dew point setting (-40°C) will mean the drying air will have a very low moisture content, as most of the moisture will be removed by the desiccant.

This dry air is then heated to the desired temperature, reducing the 'relative humidity' enabling it to hold more moisture when passing through the 'wet' PET. Effectively increasing its moisture absorption capacity.
The low moisture content of the drying air, coupled with the drying temperatures will accelerate the drying process, due to the differential between the 'wet' PET and very dry air.

Drying time

The drying process is not instantaneous. When the PET pellets are surrounded with a steady stream of hot, dry air, time is needed to allow the drying process to migrate through the bulk material.

Polymers are very poor conductors of heat. It takes time for the heat from the surrounding air to be absorbed by the pellets and for the water they hold to be released. The time spent in the dryer is not the same as the 'effective drying time'. The effective drying time will be the time the PET pellets are exposed to the correct drying conditions.

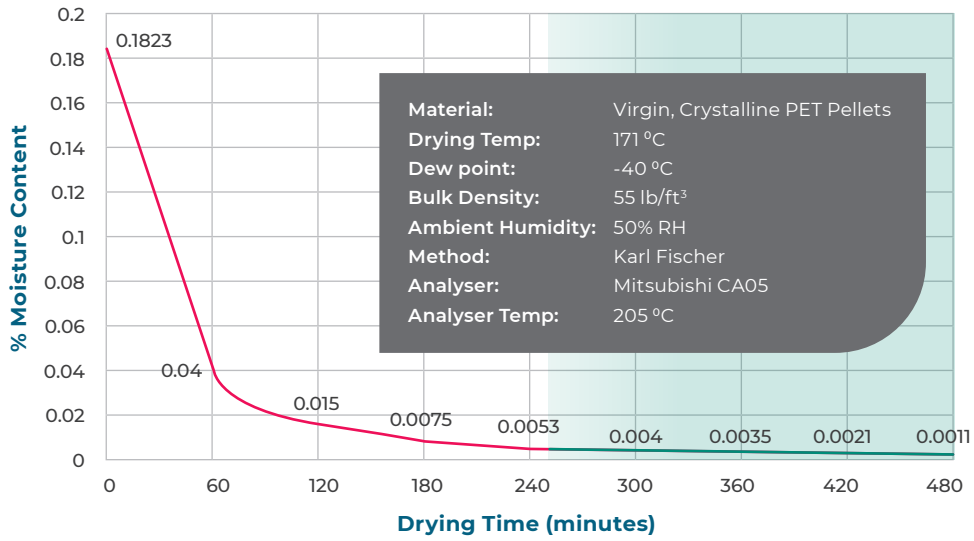
Air Flow

Air flow is a crucial element in the process. It's the medium that transfers the drying air from the dryer to the PET pellets. Poor air flow through the dryer hopper will result in a poor vertical temperature profile within the hopper. This will prolong the drying time.

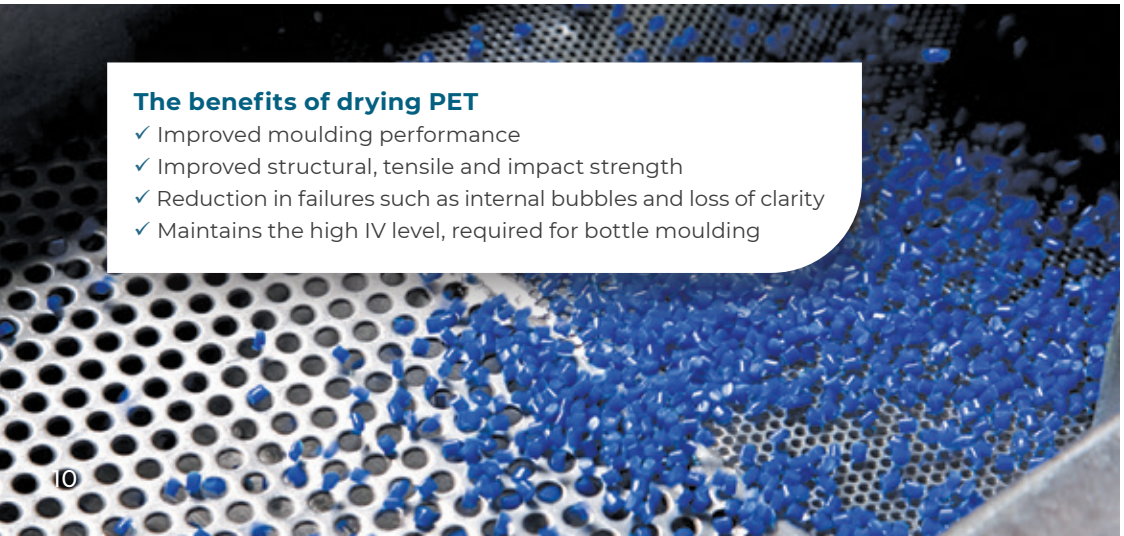
Conversely, excessive air flow will transfer an excess amount of heat to the pellets. Any heat not absorbed will result in higher return-air temperatures, poor desiccant performance, wasted heat energy, higher operating costs and possible damage due to overheating.

Moisture loss characteristics

The graph below is a moisture-loss analysis of a PET drying system. It demonstrates the importance of drying time. It shows how PET pellets give up their moisture quite rapidly in the first hour of drying – note the dramatic drop in residual moisture during the first hour, from 0.1823% to 0.04%. After this, the rate of decline slows significantly. A further 3-4 hours of drying is required to reach an appropriate level of dryness for melt processing.



- **Recommended moisture content is ideally less then 50ppm (0.005%)**
- **Drying time of at least four hours is required to achieve this**



The benefits of drying PET

- ✓ Improved moulding performance
- ✓ Improved structural, tensile and impact strength
- ✓ Reduction in failures such as internal bubbles and loss of clarity
- ✓ Maintains the high IV level, required for bottle moulding

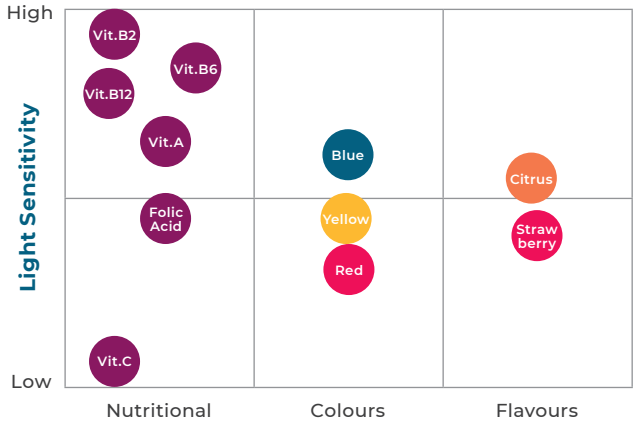
Additives for PET

PET AND UV LIGHT PROTECTION

Transparent PET offers little protection against UV wavelengths present in natural sunlight and certain artificial light. Many beverages contain ingredients and nutritional supplements that are UV light sensitive. The degradation of these beverage additives can lead to reactions that adversely affect shelf life, taste, odour, or colour. More importantly it can damage the brand reputation. Broadway offers a range of PET Masterbatches with a wide variety of UV protection additives. These are carefully chosen to meet individual and geographical regulatory food contact requirements.

Bottle sleeves and opaque PET packaging will only offer a limited protection and may limit the design options that are available. This can pose challenges where vibrant colours are required – such as in FMCG like juice and energy drinks, where the contents can be seen. Bottle sleeves and opaque packaging also introduce production complexity and additional costs. Both are also problematic when it comes PET recycling.

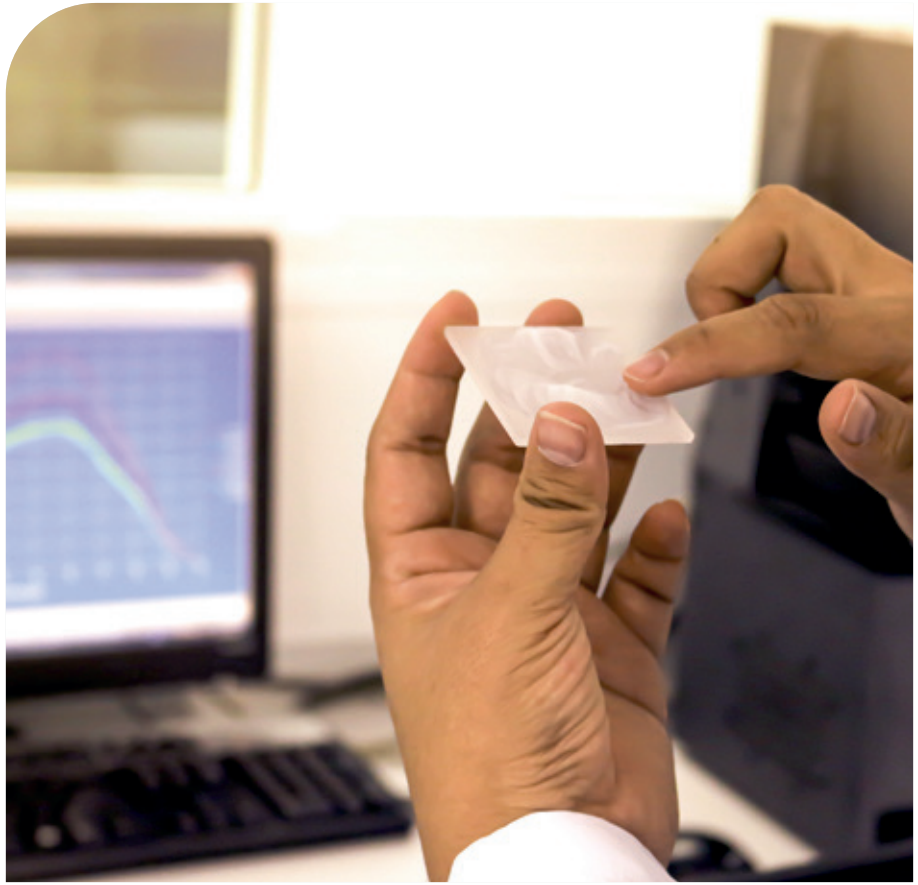
Transparent, non-UV protected packaging would require the use of preservatives to the beverage to help maintain shelf life, appearance, and taste. Growing consumer demand for healthier and preservative free foods has led to the increasing need and use of UV protected PET. Therefore maintaining the integrity of the contents, without the need for preservatives within the product itself.



This graph shows the light sensitivity of common vitamins. Nutritional beverages or food in PET packaging will degrade without UV protection.

Use of UV absorbers in PET packaging will offer

- ✓ Improved suitability when it comes to making recycled PET a sustainable option for brand owners, as it doesn't impact recycling compatibility
- ✓ A reduction in product degradation – extending the product shelf life
- ✓ A reduction in risk of degraded products reaching consumers. This helps to maintain quality and reinforce a positive brand and product image
- ✓ Greater design flexibility. Not being restricted to bottle sleeves or opaque packaging will allow product designers greater freedom in packaging design
- ✓ Formulation flexibility. Beverage formulators have greater flexibility by not having to use food-safe preservatives and stabilisers. Brand owners can market these as preservative-free, healthier options



OTHER ADDITIVES FOR PET, AND THEIR BENEFITS

Broadway is a leader in providing performance masterbatches and additive formulations in polymers. We have vast experience in developing tailor-made additive solutions to meet specific requirements. We're able to offer a large range of UV and antioxidant loaded PET masterbatches that offer superior performance, with reduced discolouration that may normally result from prolonged UV and thermal exposure.

Our commitment to research and development means we'll continue to bring innovative and sustainable technologies to the marketplace, to help you in growing your business. Below is a summary of how we can add value by enhancing the performance of our PET Masterbatches for certain applications.

Anti-slip

These additives are normally added to polymers at the extrusion stage. In PET film production, the slip additives will improve polymer processing by forming a sold lubricating layer that will control friction.

Anti-fog

Fogging (water droplet formation) on the inside of plastic packaging will reduce transparency and clarity. Broadway offers a range of anti-fog additives for food packaging applications that are 100% food safe and bio-based.

Anti-block

These additives reduce the blocking at the surface of polymer films and other plastic articles. This allows easier and trouble-free process and handling by reducing surface attraction and friction.

Anti-statics

Most polymers are poor conductors of electricity and have the ability to hold high static build-up. This can lead to handling, storage and transportation issues, dust attraction, risk of electrostatic discharge to electronic components and employees as well as risks of fire and explosion. Broadway offers a range of anti-static additives that provide permanent and amine free protection.

Laser marking

Broadway are able to introduce laser marking additives which are free from heavy metals. These allow absorption of laser energy, thereby causing very localised, short-lived heating. This creates accurate light or dark marking on the polymer surface.

Colour matching

INDUSTRY-LEADING COLOUR ACCURACY

We know the importance of colour, it's what we do and we do it well. We strive for accuracy and work within a tolerance of just one Delta E – much tighter than the industry standard. We offer an expert **FREE** colour matching service, accessible with a call, email or online form submission – visit **broadwaycolours.com** for details.

Our team of colourists are highly skilled and benefit from many years of experience in the industry. They select from an array of the latest colourants and additives to ensure our materials are not only accurate, but also cost effective, consistent throughout production and suitable for your product's final application – whilst meeting your regulatory requirements. Our laboratory is manned by our team of knowledgeable technicians who have access to an extensive range of testing equipment and vast knowledge of polymers and pigments. This allows us to identify your colour matching challenges and offer practical solutions.

The colour spectrum is practically limitless, as are the combinations of colourants – we can therefore achieve matches to a huge range of colours. 50,000 unique custom matches approved to date is testament to this. We work to various targets including RAL, Pantone and physical samples. We only need a small area to work from to achieve a match. It just needs to be clean and free from variances. Our custom formulations are polymer specific. This means they're designed for high performance when dosed into the base resin each customer will be moulding with.

Colour is critical for brand consistency, or simply for achieving the look you desire. It's worth consulting an expert to help you get it right. We take time to understand the needs of our customers and work closely with you, offering valuable guidance and technical advice. All our formulations are recorded in a comprehensive library so repeat orders can be produced quickly and accurately whenever required.

OUR COLOUR SUITE

Broadway's colour suite allows moulders, designers or brand owners to join us on-site to approve their matches. Access to our friendly team and expert colourists offers customers the opportunity to approve a range of new colours within a single day.

The Body Shop utilised our colour suite when colouring their high PCR content PET shampoo bottles. The colour of the recyclate varies from batch to batch. The colour suite allows customers to understand the challenges colourists face when using PCR resins. We can demonstrate first hand how the end product will look by moulding samples using our customers' supplied materials.

It was surprising to see how much PCR content affected the final colour. Working with Broadway was great, as not only were they able to explain in great detail how the colour can be affected, but they were also able to show us, first-hand, how it looked. By carrying out the colour matching at the Broadway site and being able to feedback on the same day, it saved us precious time on development.

Lauriane Buffe
Product Development Manager, The Body Shop

Special effects for PET

SPECIAL EFFECT PIGMENTS

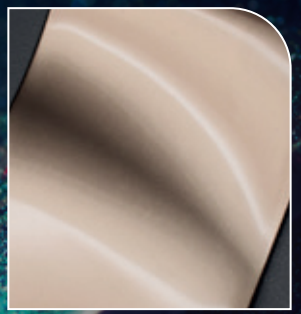
Broadway is known for creating high-quality pigmented resins for plastic injection moulding and roto-moulding applications. In operation for almost a quarter of a century, the business has vast knowledge and experience in the application of pigments and dyes in PET and a wide variety of other polymers.

We offer an impressive range of special effects. Effect pigments differ from traditional pigments. The light is reflected back from multi-layer surfaces within the structure of the material, giving visually interesting and aesthetically pleasing results. Pigment effects will reflect light in subtle and unique ways so as to produce large variations in colour, sparkle, transparency, gloss, lustre and shimmer.

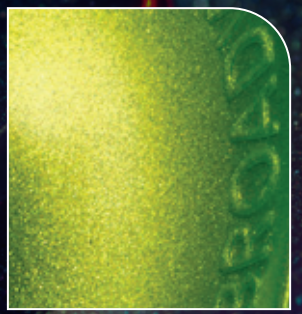
There are 3 types of effect pigments;

Absorption
One-dimensional.
Unabsorbed wavelengths of light are reflected back producing the observable colour. The effect is a flatter, solid colour. As such opaque pigments can be bold and vibrant. Binders and fillers can affect the colour.

Metallic
Two-dimensional.
Fine pieces of metal reflect the light to produce a lustre effect. These flaked pigments can provide attractive aesthetics and functional qualities such as corrosion resistance, and thermal durability.



Interference
Three-dimensional.
Light is reflected back through various layers of substrate coated pigment, creating a range of colours and effects. These include; metallic, pearlescent, fluorescent, frosted, thermochromic and luminescent.



BROADWAY'S FROSTED EFFECT FOR PET

Broadway is a leading force in bringing innovative effects to market. Our frosted effect additive for PET is utilised in the ISB process. The additive can be dosed at varying levels to achieve the desired effect without the need to modify 'spark' the tool. Saving time and cost.

"Best we have seen on the market"
Company Buyer – UK bottle moulder

Typical Uses for effect pigments

- Automotive applications such as interior trim
- Architectural uses such as metallic effects on fascias
- Consumer electronics such as casings on electrical devices
- Advertising, signage and point of sale displays
- Anti-forgery and security printing to avoid counterfeiting

Pigment effects can be altered by changing the following parameters;

Substrate material: The choice of the substrate material will have an affect on the overall appearance. Substrates can be chosen to influence the desired level of transparency, smoothness of surface or gloss finish.

Platelet size: The substrate will normally have a platelet structure. Opaque, silky, transparent or sparkle effects can be achieved depending on the size of the platelets.

Titanium dioxide layer thickness: Varying the thickness of this layer will change the wavelength of the light reflected back. This leads to interference colour changes.

Surface colours: The substrates can be treated with inorganic and organic pigments to achieve the target effect.

Regulatory compliance

Upon request, we can ensure our pigments comply with the following regulations;

- Packaging material directives in Europe (94/62/EC) and the US (CONEG/TPCH)
- Food Packaging Materials in Europe (AP(89) 1) and in the US FDA
- Plastics Directive. EC 1935/2004 and EC 10/2011
- Toy safety; compliance with heavy metal limits under the Directive EC 2009/48

How to store your PET

STORAGE CONDITIONS AND GOOD HOUSEKEEPING OF VIRGIN PET AND PET MASTERBATCH

PET is extremely sensitive, therefore it's vital to implement good storage practice (GSP). Good warehouse management should facilitate a first in, first out system to avoid certain batches of material being in storage much longer than others. It's important to avoid moisture ingress so PET remains in an appropriate condition for processing. It's also important to identify and quarantine any batches of material that may be contaminated.

To maintain the quality of your raw materials

- Do not store or transport PET in an environment with a temperature exceeding 40°C
- Do not expose PET to direct sunlight or a source of heat
- Avoid your PET being subjected to large fluctuations in temperature
- Rotation is recommended to avoid prolonged storage times

Good housekeeping and warehouse management will reduce

- The risk of contamination
- Moisture ingress
- Rejected batches
- Variations in IV

Moulding with PET

CAUSES OF COMMON PET MOULDING PROBLEMS

There are several common moulding problems which can occur when using PET. Below are a few typical examples with suggestions for possible causes.

1. Flow marks and weld lines

Weld lines represent an optical and mechanical defect in a moulded part. Weld lines typically appear in the area where the polymer flows come together during the injection process. Flow marks appear due to flow turbulence during injection. These are normally more visible in coloured or metallic pigmented parts.

Possible causes:

- Stock temperature too low
- Mould temperature non-uniform or too low
- Mould fill too fast or too slow
- Excess mould lubricant
- Scratched or dirty mould surface
- Fill speed and/or packing time too low
- Inadequate venting
- Improper gate location or design

2. Grooves

Grooves are a surface defect where 'rings' appear at the surface of the moulded part mainly around pin point gates and concentrically spread over the mould.

Possible causes:

- Insufficient stock temperature
- Insufficient injection speed
- Mould temperature too low
- Improper gate location or design

3. Moisture streaks

Moisture streaks can appear on the surface of moulded parts as a U-shaped profile open against the direction of the flow. They usually appear as silvery streaks and their surface is rough or porous. Moisture streaks caused by the moisture on the mould surface appear as large and dull lamellar structures.

Possible causes:

- Moisture in resin
- Moisture condensation on surface of mould

4. Colour streaks

Colour streaks can appear on coloured parts as a result of uneven distribution of the colour pigments in the item or different orientation of isotropic pigments in the moulded item. Thermal effects (degradation of pigments) can also cause different colour shading visible on the item.

Possible causes:

- Inadequate colour dispersion or distribution
- Improper masterbatch
- Improper design
- Lack of lubricant for dispersion
- Stock temperature too high
- Excessive injection pressure

5. Excessive shrinkage

Excessive shrinkage is characterized by moulded parts which appear smaller than the intended dimensions or show warpage.

Possible causes:

- Cure time too short
- Pack pressure too low
- Mould or stock temperature too high
- Insufficient injection pressure
- Runners or gates too small
- Poor part design, varying wall thickness

6. Stress whitening and haze (also known as pearlescence)

Stress whitening occurs when PET is overstretched, its microstructure can break up, and the resulting wall shows a number of small, white circles, hence the connection to pearls. Overstretching is a function of both wall thickness and temperature – a thin wall at a temperature well over the glass-transition point may perform perfectly well, whereas a thicker but colder wall may demonstrate pearlescence.

We're here to help

Broadway adopts the ethos that a masterbatch manufacturer must be a valued partner to moulders and brand owners. Our experience, knowledge and facilities allow us to offer reliable information and expert advice. Our problem-solving mentality means Broadway can make a positive contribution to improving the quality, consistency, processability and cost of end components.

We support customers in developing new products, improving sustainability and realising new ways of working. Contact technical@broadwaycolours.com if you're seeking support on a technical challenge.

Regulatory Compliance

BROADWAY AND REGULATORY COMPLIANCE

Regulations are in place to protect businesses, employees, and customers. The regulatory environment is constantly evolving and therefore the compliance target is always moving. Failure to adhere can open you up to risks beyond fines, these may include; health and safety issues, product recall and damage to brand reputation.

Broadway has a dedicated team to ensure regulatory compliance in accordance with customer requirements. The development and manufacture of colourant and additive systems for our compounds, masterbatches and rotational moulding powders have been certified with ISO 9001:2015 and ISO 14001:2015.

We can offer traceability of product batches, guaranteed by our documentation system. Food contact conformity of all our raw materials is regularly checked and recorded. This ensures compliance with current standards. We follow rigorous QC procedures to ensure standards are maintained throughout the production process.

All our raw materials used in our products are EU REACH compliant. We liaise closely with our suppliers to ensure that all raw materials are also compliant to UK REACH, allowing us to commit to continuity of supply. We continuously monitor ECHA's SVHC list and inform our customers regarding the presence of any substances on the list. Safety Data Sheets are available for all our products.

Our products are used in a wide range of applications, including the food packaging industry and cosmetic packaging. We regularly request compliance statements from our suppliers for all raw materials to ensure continuous compliance to specific regulations. We provide detailed food contact compliance statements with EU Regulations (i.e. Commission Regulation No 10/2011 and its amendments, Resolution AP(89)1 on Colourants), and we can also provide FDA statements or country specific food contact statements upon request.

Our products meet the Packaging Directive requirements 94/62/EC. RoHS (Restriction of Hazardous Substances) compliance declarations are also available upon request. Customers are advised to discuss their regulatory requirements with our team who can offer swift assistance to regulatory enquiries.

BROADWAY

YOUR ROAD TO PERFECT POLYMER

Established almost 25 years ago, Broadway is a trusted manufacturer of colour and effect masterbatch, additive masterbatch, compounds and rotational moulding powders.

Our materials are used across many market sectors and are supplied to plastic moulders across the UK, Europe and beyond. Many household brands have chosen to specify our accurate and consistent products for use in the manufacture of their plastic packaging. Our well-equipped site and specialist knowledge allows us to offer high-quality products, fast lead times, expert advice and great service.

We stock a universal masterbatch range of 122 colours, often available on next day deliveries. Custom colours can be matched within three to five working days and production orders are typically dispatched within just five working days. We can also support our customers with call off and consignment stock services.

Vast experience and access to the latest pigments means our expert colourists are able to provide the highest possible accuracy and consistency with custom colour matches. Our fantastic colour suite allows customers to approve samples on site, should they choose. With 50,000 unique colour matches approved to date, you can rest assured your request is in safe hands.

Colour masterbatches can be combined with our range of performance additives to ensure products meet the needs of their end applications. We have extensive testing facilities including an accelerated weather testing station, allowing tests for weather fastness.

Our impressive special effects portfolio can be utilised to help ensure your products stand out from the crowd. Our product range includes masterbatches, compounds and rotational moulding powders.

Contact Broadway today for technical enquiries or a **FREE** colour match

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