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COLOUR MASTERBATCH PROCESS

MASTERBATCHES

The primary advantage of colour and additive masterbatches is that it allows processors to colour natural polymers economically.

What are masterbatches?

A masterbatch, also referred to as a concentrate, is a package for coloring plastics. Pigments, dyes, or other additives are dispersed into a polymer carrier which is extruded and pelletized. Those pellets are metered, or let down, into natural polymer, using a predefined ratio, during the molding process where additional mixing colors the resin homogeneously. Normal addition rates vary from 1 to 4%.

Masterbatches comprise colour, UV and/or Heat stabilisers that are added to a polymer carrier in a concentrated form. When added to a natural polymer at low addition rates, a masterbatch will alter the colour, UV and/or heat stability properties of that polymer. Masterbatches can be supplied at loadings up to 70% by weight and would typically be let down into natural polymers at between 1% and 5% addition rate. Masterbatches can be tailor made to suit colour, heat or UV requirements.

Inform Plastics formulate masterbatch that are based on polymer specific to the end application.

“Universal” masterbatches are designed to satisfy the need for a multi-purpose product capable of coloring a wide range of resin systems. However, the use of a single product does have limitations and color differences are expected due to differences in resin opacity and inherent natural hues. In addition universal masterbatches run the risk of polymer incompatibility which can result in physical properties of the final plastic article being compromised and in the worst cases lead to catastrophic failure.

What is the difference between a masterbatch and precolored resin?

A masterbatch is a pre-dispersed concentrated color that is let down with natural polymer during molding. With a precolored compound, all the polymer is entirely compounded with the proper amount of color and delivered ready-to-use, eliminating metering and dispersion difficulties. A masterbatch offers economic advantages associated with resin purchasing and color obsolescence. Additionally, since masterbatches are not fully compounded most of the polymer used does not exhibit an additional heat history, potentially deteriorating the properties of some polymers.

Matching Colour

To start the process a colour will need to be agreed upon and often this involves a colour match. The colour standard can be supplied as a painted card, industry standards such as Pantone, Munsell, RAL, etc.

The match is processed using the polymer supplied and is initially conducted using colour computer analysis. The final match is examined both visually and instrumentally. Instrumental analysis of the spectral data for each match is available with exhibits and lab samples.

Once the colour is finalized colour chips and pricing are submitted for colour approval by the customer.

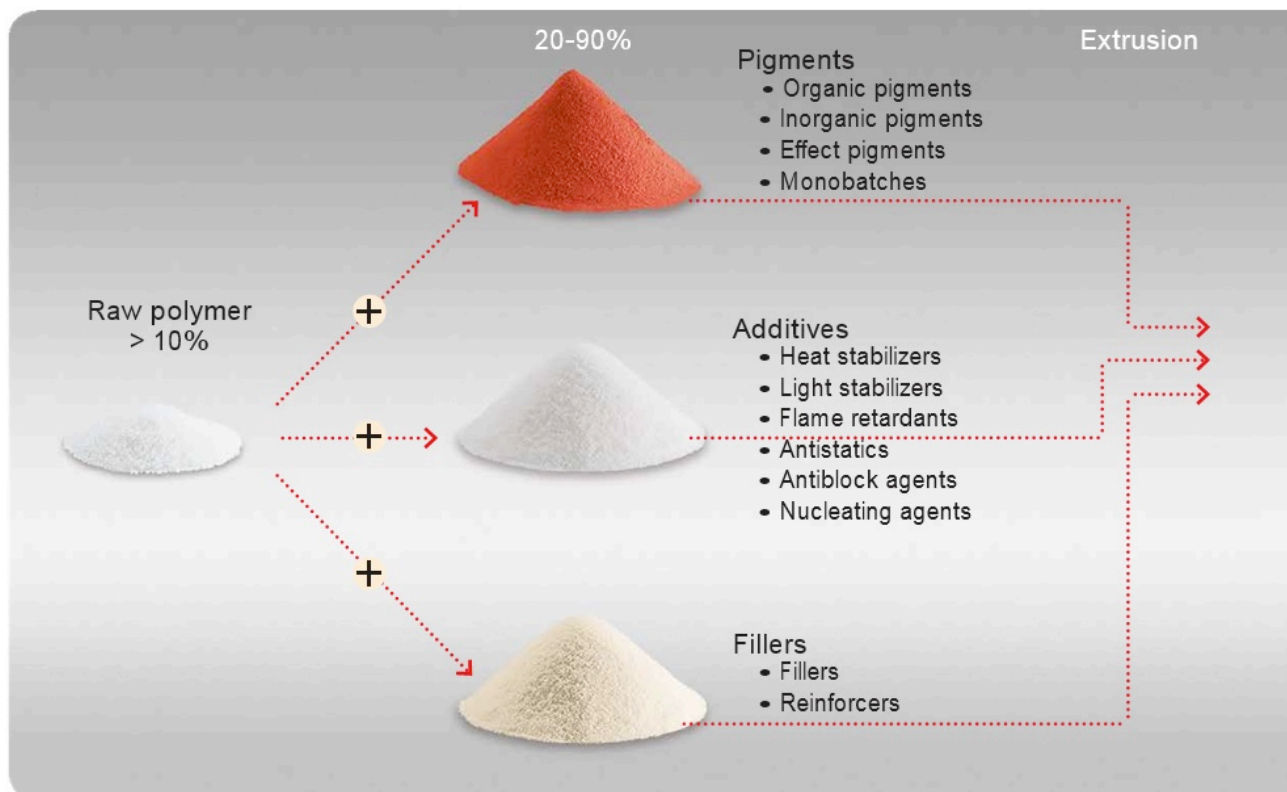
The colour matching process takes around one week from receipt of the colour standard.

Place your order

Once the colour is approved, place your order and the colour masterbatch will be manufactured according to the approved colour formulation.

It is important to take into consideration that it takes time to make every batch – generally one – two weeks. And there is a minimum order quantity of 25kgs for each colour.

Masterbatch Production

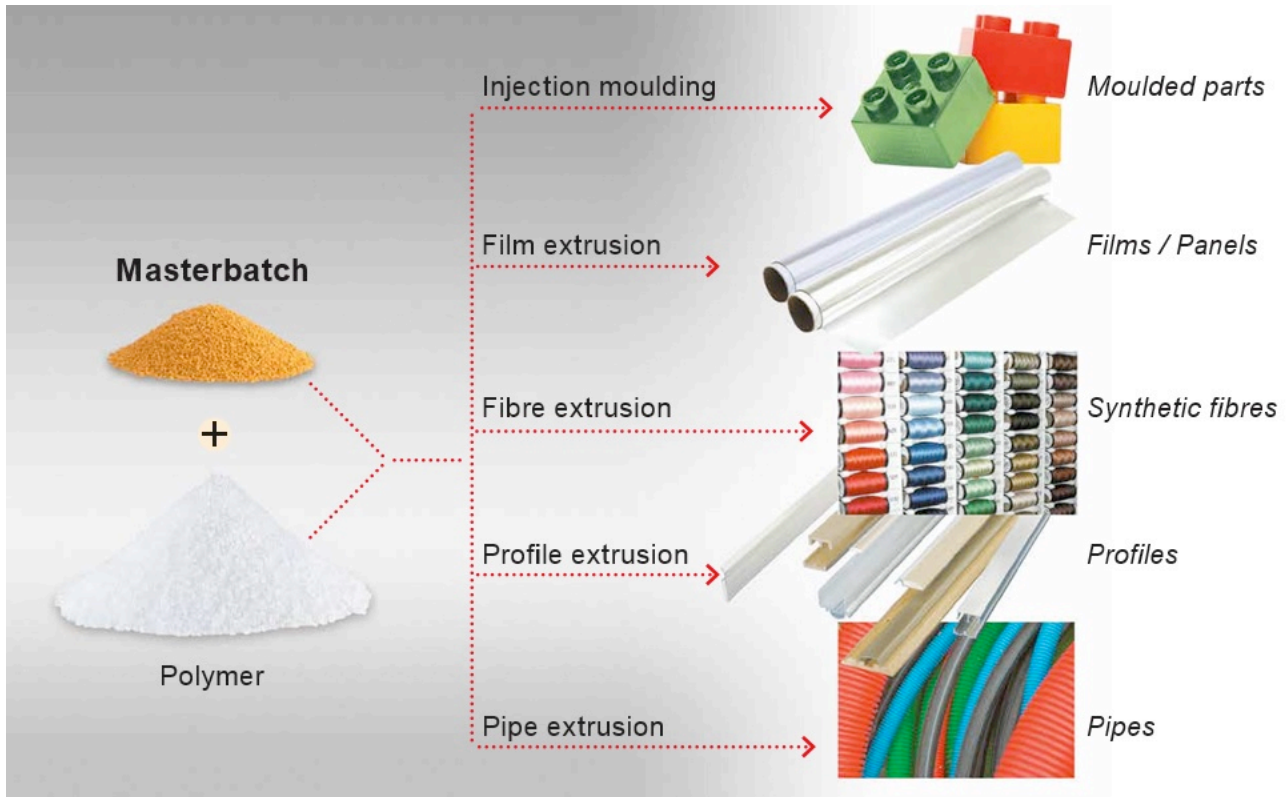


Masterbatch - the Grain of Difference

Polymer granulates with a high percentage of additives, higher than in the end use, are called masterbatch. In later production steps, such as injection moulding, film or fibre production, those granulates are mixed with the raw polymer for colouring or the targeted modification of certain properties.

Advantages: In comparison to pastes, powders or fluid additives, using masterbatch increases the process stability. The reason lies in the exactly defined pigment quantity in each granulate. Additionally: Since there is no handling of large powder masses and therefore the environment and the work station are not being polluted, masterbatch is regarded to be a very good processing material.

Masterbatch Applications

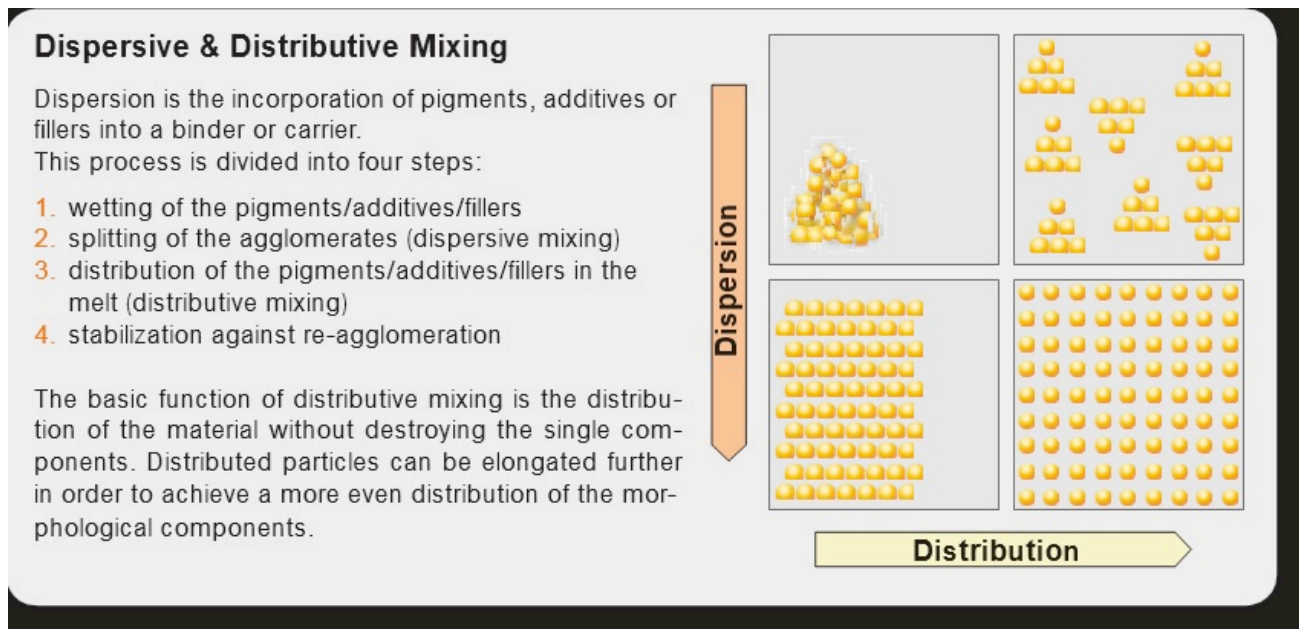


Generally, there are three masterbatch groups:

1. Colour masterbatch, which is used for colouring plastics products
2. Additive masterbatch, which provides for certain chemical and physical properties of the end product (for example UV stabilizers, flame retardants, antistatics or antiblock agents)
3. Filler masterbatch, that is filled with a high share of fillers like chalk

Production Goal

The goal of masterbatch production is the ideal dispersion of additives in the polymer matrix. The fine, powdery feed material often tends to agglomerate and therefore is difficult to work with. Masterbatches with an additive share of 20 - 90% are available, depending on the feed material.



Custom Colouring

Custom Colouring uses an exact mixture of standard colours (monobatches) to produce the required colour match. Via a multi-component gravimetric feed system (generally 5 to 8 components) and predefined standard colours, the colour required by the customer is produced. The setup of the extrusion line is similar to the premix system.

This process is also suitable to meet highest quality standards, e.g. for the production of colour masterbatches for colouring PET fibres. The pigments that are already predispersed in the monobatch rather need distributive than dispersive mixing. That way, they can be colorized more gently into various colour gradings. This is another example where using a twin screw extruder over a single screw has proved of value.

Production Process

A premix consisting of polymer, pigment and dispersion additives is fed to the extruder. Normally, these premixes are produced in batches in a previous mixing step. Great importance must be given to this premix process. If a mistake happens here, unfortunately, oftentimes it is very difficult to make corrections during the extrusion step. Due to the usage of volumetric feeders, there is a high operational reliability, handling is quite uncomplicated, and the process is very popular as well as low priced.

The finished premix is fed into the extruder via a volumetric feeder. The extruder takes on the part of homogenizing and dispersion, wetting as well as distributing the pigments in the polymer matrix. In most cases a common strand granulation system is used.

Quality Control

Assessing the quality of masterbatches can roughly be divided into three fields, depending on the final application:

- ✚ injection moulding quality: production of injection moulded sample chips for colour intensity tests and pigment distribution

Our production facilities follow an internal Quality Management system and every batch produced is closely monitored. Samples are taken at key points in the manufacturing process and further processing cannot continue without Quality Control approval.

No product leaves our facilities without first undergoing a battery of tests to determine that the material meets or exceeds the specifications established for that product. After meeting approval with specifications, each batch is further processed to ensure uniformity throughout.

Every batch produced is given a unique lot number for both backward and forward traceability. Each shipment is double-checked for conformance to the customer's standing and special requirements.