

# industry know-how

0845 34 54 560  
www.plastribution.co.uk

## Purging

**purge** (pûrj)

v. **purged, purg-ing, purg-es**

v.tr.

- a. To free from impurities; purify.
- b. To remove (impurities and other elements) by or as if by cleansing.

**Due to the increased demands of customers and the desire for less capital tied up in inventories regular colour and material changes are often required for polymer processors.**

**Running the same material of the same colour 'day in day out' would be ideal but this is the exception rather than the norm for a whole range of plastic processors.**



After a material/colour change and before and after start up and shut down, it is essential to remove all traces of the previous material. It is also good practice to use effective purging techniques in order to avoid contamination from residual colour and/or polymer and also avoid the build up and release of carbonised material. The use of specifically designed purging agents normally results in higher quality components that are produced more efficiently and the economics typically justifies the additional expense of purchasing a specific purging compound.

The most common method of purging, particularly with commodity polymers, is to run through virgin material at the end/start of the run to drag out any unwanted colour and polymer. Whilst this method is commonly used it is not very effective or economically viable. This can result in colour streaks and contamination, black specks and polymer contamination resulting in poor quality parts and milkiness when processing clear materials like PS, PC and PMMA.

To this end specific compounds designed to improve this process have been formulated.

### Contamination sources

The most common cause of contamination results from the shutdown procedure, this is anytime that the machine stops; weekend shut down, tool change, breakdown etc. Essentially if the residence time of the polymer in the processing equipment is increased there will be a chance of degradation therefore the equipment must be purged effectively. The reason why either purging with a more inert polymer such as PE or shutting down the machine with the screw forward is not effect is because the screw is not empty it is just less full.

The issue of contamination does not only depend upon the type of polymer, but also the interaction of that polymer with other additives. For example some colourants will leach out of certain polymers whilst remaining fully encapsulated in others. Strong blue being one good example; in POM colour leach out can be so severe that the surface of

the tool will be coated with a blue stain whereas there will not be a trace when compounded in ABS.

Also not all polymers will drag out contamination all the time, the mfi has an effect as does residence time, injection speed, screw speed and also which additives and colourants are used;

TiO<sub>2</sub> is a good example as it is very abrasive and is found in a lot of colours either as a colourant, a brightener or an opacifier but the quantity varies as does the particle size. So it will not always drag out contaminants.

Another area of contamination source is with materials that are processed at their upper end of their processing window where even very minor variations can cause degradation and subsequent contamination.

### Types of purging compounds

There are many types of purging compounds available ranging from very specific applications based around polymer type, heat range and mode of operation to universal products. These can be roughly divided into three main categories.

#### Mechanical

These act by using abrasion to "scrub" the metal surfaces clear of polymer, colourants and carbonised materials. These are often based on semi-abrasive materials such as cast acrylic and can also incorporate other abrasive ingredients such as calcium carbonate, glass fibres etc. They have proved themselves to be very effective as purging compounds but by their very

nature mechanical type purging compounds are viewed with some reservation as there are concerns over damage and wear to processing equipment. Clearly the purging compound manufacturer understands and where there is risk of abrasive damage to processing equipment provides appropriate warnings. Mechanical purging agents are also not well suited to hot runner systems but development is currently underway to rectify this.

#### Chemical

These employ chemical reactions to break down residual polymers and carbonised material from screws and barrels. They can act to reduce polymer chain length and incorporate surfactants to loosen contaminants which are then flushed away by the purge. Blowing agents are also sometimes incorporated into the formulation to ensure difficult to reach nooks and crannies are not missed where materials can hold up and carbonise. This type of purging agent can be suitable to hot runner systems

#### Mechanical and Chemical

These are a combination of both of the above and should, in theory, offer best of both worlds

### Why use purging compounds?

Not only do purging agents they should save the polymer processor time, money and decrease the occurrence of rejects due to contaminants, but also improve machine availability when the pressure is on to supply contamination free components.

Time is money and long drawn out purging with ineffective materials is a costly business. The aim is to clean through as quickly and efficiently as possible. Not only does this save time but also reduces the amount of expensive virgin polymer used to purge which is ultimately thrown away.

As good practise machines should be purged on start up and on shut down as well as when changing from one material/colour to another. Regular use of a good purging agent will keep the levels of carbonised material to a minimum and should be incorporated into the preventative maintenance programme of each machine.

The use of a quality purging compound when the black specks start appearing this can save pulling screws, to remove carbon, which is a time intensive process that can also require additional skill and requires suitable risk assessment to avoid injury to personnel.

**Plastribution stock the UK's most effective and proven range of mechanical/chemical range of purging compounds to suit all polymer and process types.**

**If you are unsure of what type would be most suitable or are having issues with colour changes, black specks or other purging related issues please contact us and we will be happy to help.**

**Plastribution is the UK's leading distributor of plastics raw materials, delivering reliability, know-how and true business partnership to the world's best polymer suppliers and our UK customers.**

In the event that you require further information about the shrinkage of polymers, please do not hesitate to contact a member of the Plastribution team for further information by emailing sales@plastribution.co.uk or phone 0845 3454560

© Plastribution Limited. All rights reserved. 2012

  
**plastribution**  
let's make it work.