

# Pigment differentiation in masterbatches

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Pigments are mainly used in the plastics and rubber industry, in order to color the end product according to the customers wishes.

As pigments in powder form often generate processing difficulties in feeding and handling, masterbatches are used to overcome this problem. A masterbatch is a concentrate of pigments or additives dispersed into a polymer matrix.

In the following case, titanium dioxide supplied by two different manufacturers was compounded to a proportion of 60% with polyethylene to form a masterbatch. During production it was however noticed that for one of the titanium dioxide masterbatches, the power consumption of the drive motor rose steadily until the unit was switched off by its overload protection. This resulted in interruptions in production due to the necessity of emptying out and cleaning the machine.

## Test Aim

Differentiating masterbatches using a laboratory mixer.

## Test Material

Titanium dioxide supplied by two different suppliers mixed with 40% LDPE.

## Test conditions

- Torque rheometer system Thermo Scientific HAAKE PolyLab
- Electrically heated laboratory mixer Thermo Scientific HAAKE Rheomix600
- Banbury rotors
- Thermo Scientific HAAKE PolySoft Mixer software

## Test conditions

- Mixer temperature: 150 °C
- Rotor speed: 70 rpm
- Sample weight: 45g TiO<sub>2</sub> + 30g LDPE

## Test procedure

The samples were thoroughly mixed

at a constant temperature and constant rotor speed and the following variables were recorded:

- Toque (M)
- Energy consumption (E)

## Results and Discussion

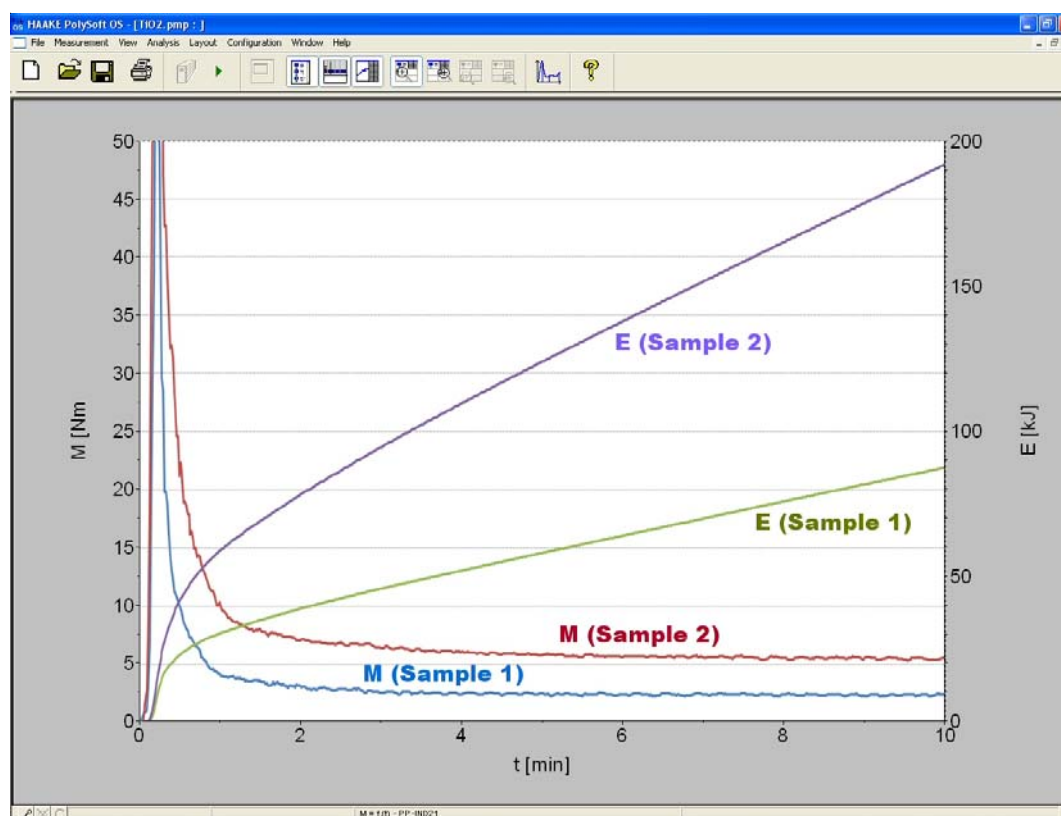
The attached diagram shows the torque curves and energy consumption of the mixer tests done with the two samples.

Although both samples have an identical proportion of polyethylene and titanium dioxide, there is a clear difference between their torque and energy consumption data. The sample which caused the problems in production shows significantly higher values.

## Summary

It is possible to characterize the production behavior of masterbatches supplied by different manufacturers in a short time by using a laboratory mixer Rheomix 600.

Interruptions in production can thus be avoided and costs therefore reduced.



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