Application Note
LR-05

The influence of two different types of carbon black on the flow behavior of a SAN Masterbatch

Matthias Jährling, Thermo Fisher Scientific, Process Instruments, Karlsruhe, Germany

Key words:

- Torque Rheometer
- Mixer Test
- Carbon Black

Abstract

Variations of the filler structure can have a drastic effect on the flow behaviour and so the processability of Polymer Compounds.

Introduction

In the described case a Masterbatch producer had changed the supplier of the Carbon Black. The new Carbon Black caused major problems in production.
The report describes a fast and reliable test method to characterize the influence of fillers properties on the flow behaviour of a Polymer Masterbatch.

Materials and Methods

Basic Polymer: SAN
Filler: 30% Carbon Black (Type 1 & Type 2)

Test arrangements

Torque rheometer Thermo Scientific HAAKE PolyLab
Mixer sensor Thermo Scientific HAAKE Rheomix600
Roller Rotors

Test conditions

Mixer temperature: 230°C
Rotor speed: 40 rpm
Sample weight: 40g SAN, 18g Carbon Black

Test procedure

In the beginning only the base Polymer (SAN) was introduced into the running mixer.
After 3 minutes the mixer was opened again and the Carbon Black sample was added into the mixing process.
During the whole mixing time the torque and the melt temperature were recorded.

Results and Discussion

The diagram below shows the result of the two mixer tests in one graph.

Displayed is the Torque / Time curve of the test with SAN & Carbon Black Type 1 (red curve) and SAN & Carbon Black Type 2 (blue curve).
Clearly can be seen, that the Carbon Black Type 1 generates a much lower torque after mixing, than the Carbon Black Type 2.
The test shows that identical amounts of different types of carbon black can result in a pronounced change in the flow characteristics.

Figure 1

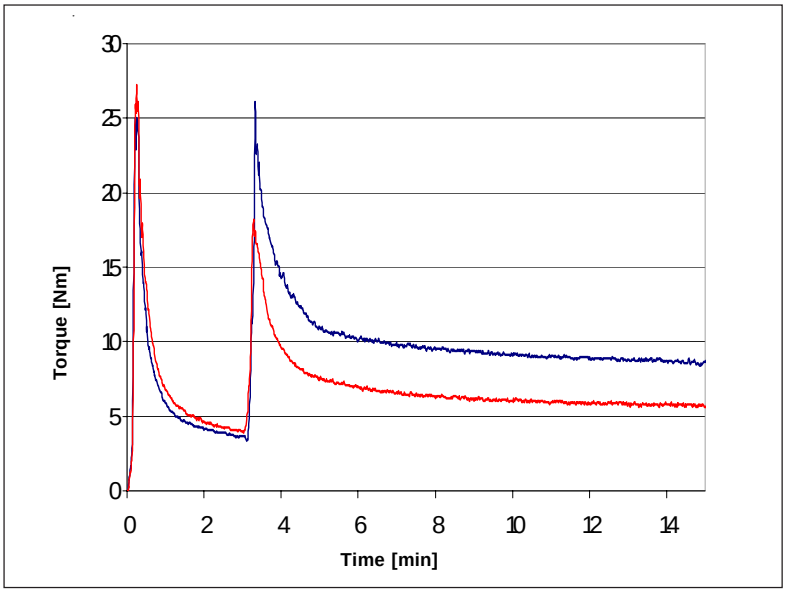

Figure 2

Summary

The described test shows, that the mixer test is an easy and fast method to describe the effect of fillers on the flow behaviour of polymer compounds.
Thus the mixer test can help to prevent problems in production.

Process Instruments

International/Germany
Dieselstr. 4,
76227 Karlsruhe
Tel. +49(0)721 40 94-444
info.mc.de@thermofisher.com

Benelux
Tel. +31 (0) 76 5 87 98 88
info.mc.nl@thermofisher.com

China
Tel. +86 (21) 68 65 45 88
info.mc.china@thermofisher.com

France
Tel. +33 (0) 1 60 92 48 00
info.mc.fr@thermofisher.com

India
Tel. +91 (22) 27 78 11 06
info.mc.in@thermofisher.com

United Kingdom
Tel. +44 (0) 1785 81 36 48
info.mc.uk@thermofisher.com

USA
Tel. 603 436 9444
info.mc.us@thermofisher.com

www.thermo.com/mc

LR-05_03.12.08