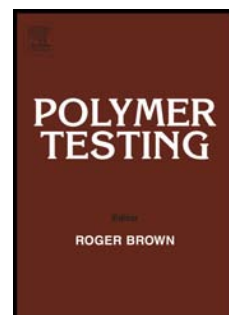


# Accepted Manuscript

Detecting extensional viscosity of polypropylene melt using the Rheotens test: A comparison between standard and steady state test modes

Quan-Jie Wang, Han-Xiong Huang



PII: S0142-9418(13)00184-0

DOI: [10.1016/j.polymertesting.2013.09.001](https://doi.org/10.1016/j.polymertesting.2013.09.001)

Reference: POTE 4114

To appear in: *Polymer Testing*

Received Date: 26 July 2013

Accepted Date: 4 September 2013

Please cite this article as: Q.-J. Wang, H.-X. Huang, Detecting extensional viscosity of polypropylene melt using the Rheotens test: A comparison between standard and steady state test modes, *Polymer Testing* (2013), doi: 10.1016/j.polymertesting.2013.09.001.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

## Test Method

Detecting extensional viscosity of polypropylene melt using the Rheotens test: A comparison between standard and steady state test modes

Quan-Jie Wang, Han-Xiong Huang\*

*Center for Polymer Processing Equipment and Intellectualization, The Key Laboratory of Polymer Processing Engineering of the Ministry of Education, South China University of Technology, Guangzhou 510640, PR China*

## ABSTRACT

---

The Rheotens test was used to determine the extensional viscosity of a polypropylene (PP) melt at three different extrusion velocities and using two capillaries with different length-to-diameter ratios. Results showed that, in the standard Rheotens test, the extensional viscosity curves determined under different testing conditions exhibit an obvious difference, especially under low extensional strain rates. This is attributed to the pre-orientation of macromolecular chains taking place in the capillary. Hence, a steady state Rheotens test was tentatively proposed. It was demonstrated that the extensional viscosity curves determined under most of the testing conditions by this test mode almost overlap, which is attributed to the fact that the pre-orientation of chains relaxes sufficiently near the capillary exit. This implies that equivalent extensional viscosities can be obtained under a wider range of extrusion velocities and capillary length-to-diameter ratios. Moreover, the equivalent extensional viscosities determined in the steady state Rheotens test exhibit good agreement with the extrapolated extensional viscosity curve determined using the Cogswell convergent flow method.

---

**Keywords:** Extensional viscosity; Polypropylene melt; Rheotens; Steady state test

---

\* Corresponding author. Tel./fax: + 86 20 2223 6799.  
E-mail address: mmhuang@scut.edu.cn (H.-X. Huang)

Download English Version:

<https://daneshyari.com/en/article/5206344>

Download Persian Version:

<https://daneshyari.com/article/5206344>

[Daneshyari.com](https://daneshyari.com)