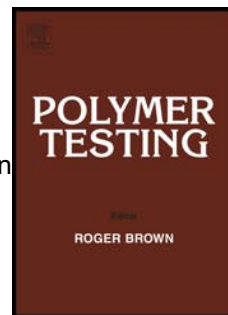


Accepted Manuscript

A correlation between the variable melt flow index and the molecular mass distribution of virgin and recycled polypropylene used in the manufacturing of battery cases

E.E. Ferg, L.L. Bolo



PII: S0142-9418(13)00192-X

DOI: [10.1016/j.polymertesting.2013.09.009](https://doi.org/10.1016/j.polymertesting.2013.09.009)

Reference: POTE 4122

To appear in: *Polymer Testing*

Received Date: 6 August 2013

Accepted Date: 13 September 2013

Please cite this article as: E.E. Ferg, L.L. Bolo, A correlation between the variable melt flow index and the molecular mass distribution of virgin and recycled polypropylene used in the manufacturing of battery cases, *Polymer Testing* (2013), doi: 10.1016/j.polymertesting.2013.09.009.

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

A correlation between the variable melt flow index and the molecular mass distribution of virgin and recycled polypropylene used in the manufacturing of battery cases

E.E. Ferg*, L.L. Bolo

*Department of Chemistry, Nelson Mandela Metropolitan University, PO Box 77000,
Port Elizabeth 6031, South Africa*

**Corresponding author: ernst.ferg@nmmu.ac.za*

Abstract

This study looked at establishing a correlation between the variable melt flow index (VMFI) values of molten polypropylene (PP) with different piston-load masses using a standard MFI analyser. The study was done using virgin PP and recycled PP obtained from recycling Pb-acid batteries. The study showed that the results would fit a suitable power function equation where the size of the exponent reflects the increase in flow characteristics of the polymer with increased piston-load mass. The established correlation was then compared to the average molecular weight distribution of virgin PP determined by gel permeation chromatography (GPC). Good agreement was obtained for the range of grades of virgin PP samples that correlated well with the Mark-Houwink power law where the inverse of the MFI ($1/\text{MFI}$) would be proportional to the average molecular weight to the power of 3.4 ($M_w^{3.4}$). GPC analysis cannot be effectively used to study recycled PP, where a number of factors can influence the melt flow properties such as fillers, impurities and the presence of polyethylene in the polymer matrix. Instead, a comparative understanding of the flow behaviour of recycled PP to that of virgin PP was done by using the VMFI method to

Download English Version:

<https://daneshyari.com/en/article/5206350>

Download Persian Version:

<https://daneshyari.com/article/5206350>

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