GRAFTALEN™ EB – PER 15003, GRAFTALEN™ EB – PER 15010 (REPORT)

This report is a guideline for effectiveness and dosage of GRAFTALEN™ EB – PER 15003, GRAFTALEN™ EB – PER 15010 for decreasing viscosity (Increasing MFI) of polypropylene (PP)

MATERIALS USED

Base 2 initial PP: BRASKEM Inspire 137, Borealis BD310MO
Flow Enhancer: GRAFTALEN™ EB-PER 15003

GRAFTALEN™ EB-PER 15010

TESTS PERFORMED

To determine the effectiveness of our flow enhancer, we measured the melt flow index (MFI) of base PP with different amounts of flow enhancer added.

We added 1%, 2%, 3%, 4% and 5% of GRAFTALEN™ EB-PER 15003

& 1%, 2% 3%, 4%, 5% of GRAFTALEN™ EB-PER 15010

Mixtures were extruded on a laboratory scale extruder.

MFI of mixtures was measured at 230°C, 2,16 kg, in accordance with ISO 1133.
RESULTS

Initial PP: Braskem Inspire 137

<table>
<thead>
<tr>
<th>GRAFTALEN™ EB-PR 15003 [wt.%]</th>
<th>MFI [g/10 min]</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0,73</td>
</tr>
<tr>
<td>1</td>
<td>6,2</td>
</tr>
<tr>
<td>2</td>
<td>13,3</td>
</tr>
<tr>
<td>3</td>
<td>27,6</td>
</tr>
<tr>
<td>4</td>
<td>38,7</td>
</tr>
<tr>
<td>5</td>
<td>57</td>
</tr>
</tbody>
</table>

![Graph showing the relationship between Flow Enhancer Added and MFI](image-url)
Material Report

Initial PP: Borealis BD310MO

<table>
<thead>
<tr>
<th>GRAFTALEN™ EB-PER 15010 [wt.%]</th>
<th>MFI [g/10 min]</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>7.5</td>
</tr>
<tr>
<td>1</td>
<td>73.8</td>
</tr>
<tr>
<td>2</td>
<td>165</td>
</tr>
<tr>
<td>3</td>
<td>368</td>
</tr>
<tr>
<td>4</td>
<td>802</td>
</tr>
<tr>
<td>5</td>
<td>1764</td>
</tr>
</tbody>
</table>

The MFI increases significantly with added GRAFTALEN™ EB-PR 15003 and GRAFTALEN™ EB-PER 15010 even at low amounts.

MFI increases in a polynomial fashion, according to:

\[ MFI = A \cdot x^2 + B \cdot x + MFI_{\text{start}} \]

MFI = Melt flow index of mixture
A, B = Constants, depending on the extrusion parameters
x = Percentage of GRAFTALEN™ EB-PR 15003 and GRAFTALEN™ EB-PER 15010 added
MFI_{\text{start}} = MFI of base PP
CONCLUSIONS

- GRAFTALEN™ EB-PR 15003 and GRAFTALEN™ EB-PER 15010 greatly increases the MFI of polypropylene, even at low additive amounts
- MFI increase follows a polynomial trend with GRAFTALEN™ EB-PR 15003 and GRAFTALEN™ EB-PER 15010 added, meaning:
- More additive means even greater MFI increase than at low additive levels (exponential increase)
CONTACTS

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