SUNNY-TOUGH® POE-g-MAH are Polyolefin Elastomers grafted Maleic Anhydride produced by reactive extrusion process.

The different groups influence the final characteristics of POE-g-MAH as follows:

✓ the POE induces flexibility,…
✓ the MAH involves a high reactivity with various chemical groups such as NH$_2$, OH,…
# Typical Characteristics of POE-g-MAH

<table>
<thead>
<tr>
<th>Property</th>
<th>CMG5805</th>
<th>CMG5805-L</th>
<th>CMG5805-S</th>
<th>CMG5805-H</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Appearance</strong></td>
<td>Nature &amp; semi-transparency pellet</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Basic polymer</strong></td>
<td>POE</td>
<td>POE</td>
<td>POE</td>
<td>POE</td>
</tr>
<tr>
<td><strong>Tg (°C)</strong></td>
<td>&lt;-50</td>
<td>&lt;-50</td>
<td>&lt;-55</td>
<td>&lt;-30</td>
</tr>
<tr>
<td><strong>Density (g/cm³)</strong></td>
<td>~0.88</td>
<td>~0.88</td>
<td>~0.87</td>
<td>~0.88</td>
</tr>
<tr>
<td><strong>MAH level (%)</strong></td>
<td>High</td>
<td>Medium</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td><strong>MFR (g/10min)</strong></td>
<td>1~2 (190°C/5kg)</td>
<td>1~2 (190°C/5kg)</td>
<td>2~3 (190°C/5kg)</td>
<td>~30 (190°C/2.16kg)</td>
</tr>
</tbody>
</table>
SUNNY-TOUGH® POE-g-MAH with a high MAH content, can giving a strong chemical adhesion between resin and polar substrates such as glass, metal, minerals. Furthermore, high reactivity with some chemical groups such as NH$_2$, OH, induces a fine and homogeneous dispersion of interface. So, they are perfectly suitable to be used as compatibilizers of polyamide compositions:

- PA6 or PA66 base resins
- Glass fiber reinforced, mineral filled and/or flame retardant formulations
- Polyamide / Polyolefin alloys
- ……
SUNNY-TOUGH® leads to good adhesion by chemical bonding

◆ The easy processability of CMG5805 in glass fiber reinforced PA6 or PA66 compounds gives:
  ✓ a fine dispersion in the PA matrix, essential for good impact strength;
  ✓ a good wettability of the glass fibers, essential to obtain high mechanical performance.
SUNNY-TOUGH® improves impact strength of PA/GF alloy

PA6+30%GF+CMG5805

PA66+30%GF+CMG5805

SUNNY-TOUGH® have good effect on impact strength in PA/GF compounds.
SUNNY-TOUGH® improves mechanical properties of PA/Talc alloy

SUNNY-TOUGH® have good coupling in the case of Talc (D=2μm). Better effect on impact strength and Elongation at break than PP-g-MAH and blank sample in PA/Talc compounds.
SUNNY-TOUGH® POE-g-MAH with a high comonomer content have an elastomeric behavior. Furthermore, their high reactivity with thermoplastic polyamides induces a fine and homogeneous dispersion of POE-g-MAH in PA compounds. So, they are perfectly suitable to be used as impact modifier of polyamide compositions:

- PA6 or PA66 base resins
- Polyamide / Polyolefin alloys
- Polyamide /GF compounds
- ……
CMG5805 is a general used impact modifier, it shows high efficiency in PA6 or PA66 resins at room temperature.

Supertough PA6 or PA66 compositions can be obtained with a content of CMG5805 higher than 12% by weight.
SUNNY-TOUGH® CMG5805-L is a special impact modifier at -30°C

CMG5805-L has low glass transition temperature, so it shows high efficiency in PA6 or PA66 resins, especially at -30°C temperature.
CMG5805-S has lower glass transition temperature to CMG5805-L, so it shows high impact strength in PA6 or PA66 resins, especially in PA66 at -40°C temperature.

Compared with benchmark (X) in PA66, CMG5805-S approaches to the benchmark.
CMG5805-H has very high fluidity inducing a good wettability of mineral in PA compounds.

The use of CMG5805-H as a coupling agent and impact modifier in mineral filled PA compounds allows us:

- to improve matrix - filler adhesion.
- to improve processing stability.
- to improve surface property of product.
- to optimize mechanical properties such as tensile properties and impact resistance.
What is the special of SUNNY-TOUGH ® CMG5805-H?

- CMG5805-H used in PA6+20%Talc compared with other compatibilizer or toughener, it shows good impact strength and better fluid in PA/Talc compounds.
CMG5805-H can improve the processing stability of PA/Talc compounds.

- The Flow Length of adding different compatibilizers or tougheners in PA6+20%Talc.

<table>
<thead>
<tr>
<th>Test Item</th>
<th>No compatibilizer</th>
<th>General PP-g-MAH</th>
<th>CMG 5805-H</th>
<th>Genera POE-g-MAH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow Length/cm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td>27.9</td>
<td>25.6</td>
<td>27.4</td>
<td>23.7</td>
</tr>
<tr>
<td>Max</td>
<td>28.3</td>
<td>23.9</td>
<td>28.1</td>
<td>26.7</td>
</tr>
<tr>
<td>Min</td>
<td>26.3</td>
<td>26</td>
<td>26.7</td>
<td>21.8</td>
</tr>
<tr>
<td>Range</td>
<td>2</td>
<td>2.1</td>
<td>1.4</td>
<td>4.9</td>
</tr>
<tr>
<td>MFR/g/10min</td>
<td>235°C, 2.16kg</td>
<td>22.2</td>
<td>13.6</td>
<td>13.2</td>
</tr>
<tr>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
Better fluidity means better Processing

PA/Talc

- Tensile Strength (Mpa)
- Flexural Strength (Mpa)
- Notched Izod Impact (J·m⁻¹)
- MFR (235°C, 2.16kg)

For example…

General toughener

CMG5805-H