Seek Together

ENGAGE™11000 SERIES

For Original Equipment Manufacturer

The specific polymer design of the ENGAGE™ 11000 series can enable further lightweighting of existing plastic parts made from talc filled TPO compounds. It can also enable more metal replacement due to its contribution to new TPO compounds with lower thermal expansion (CLTE).

To create thinner and consequently lighter parts, it is required that TPO compounds can flow through thinner walls. The design of such TPO compounds is possible with the higher rubber efficiency and very low glass transition of the ENGAGE™ 11000 series.

Figure 1 demonstrates the improvement of both flow properties and toughness, shown as falling dart impact resistance at -40°C. Such high performance allows for downgauging in a next generation of interior and exterior car parts that require outstanding impact properties.

Another important component of the TPO design is the choice of filler that contributes to mechanical strength, stiffness and that controls part shrinkage. One way to further improve the stiffness/toughness balance in a TPO compound is the use of talc with high aspect ratio (HAR talc). It can provide the required stiffness level at reduced addition level, contributing to weight reduction due to lower compound density. A lower filler addition level also allows for better flow of the TPO compound.

HAR talc can be combined with impact modifiers from the ENGAGE™ 11000 series and provide the higher stiffness/toughness balance for thinner and downgauged parts at the required higher flow compared to standard TPO compounds in today´s market. More complex geometries are enabled with such high flow TPO compounds.

Metal replacement continues to be a priority for exterior parts in next generation cars. Lightweighting and better manufacturing efficiency are driving that trend. One difficulty is the higher thermal expansion for polypropylene, the main component in TPO compounds. Figure 2 shows how addition of fillers like long glass fibers (LGF-PP) and talc can reduce the CLTE, still there is a gap to metals like aluminum.

Downgauging potential

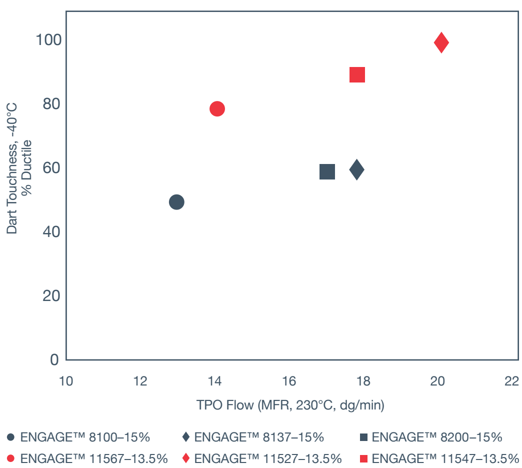

Figure 1: Improved toughness/flow balance for TPO compounds using the ENGAGE™ 11000 series with 20% talc filler, reduced addition level compared to the ENGAGE™ 8000 series.

Metal replacement

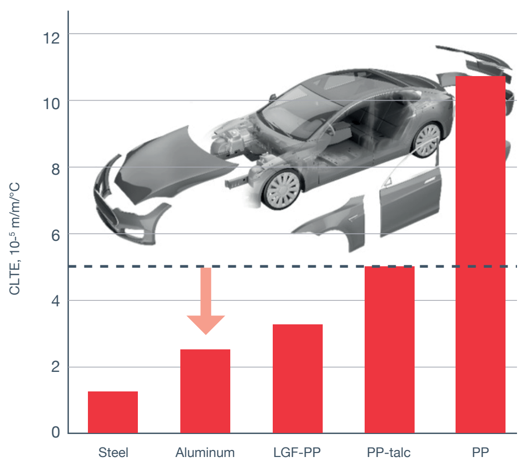

Figure 2: Coefficient of linear thermal expansion compared for metals, polypropylene and filled PP.

Engage
polyolefin elastomers by Dow

In Figure 3 we see a significant decrease in thermal expansion and desired low CLTE values for TPO compounds with 10% talc filler and two addition levels of a polyolefin elastomer from the ENGAGE™ 11000 series, compared to the ENGAGE™ 8000 series. It is known that the addition of higher flow elastomers results in lower CLTE, however a combination of high flow, low CLTE and high impact resistance of the TPO compound is now enabled by the ENGAGE™ 11000 series.

We continue the development of novel polyolefin elastomers in the ENGAGE™ 11000 series, targeting next generation car models and addressing main trends in lightweighting and manufacturing efficiency.

Dimensional stability

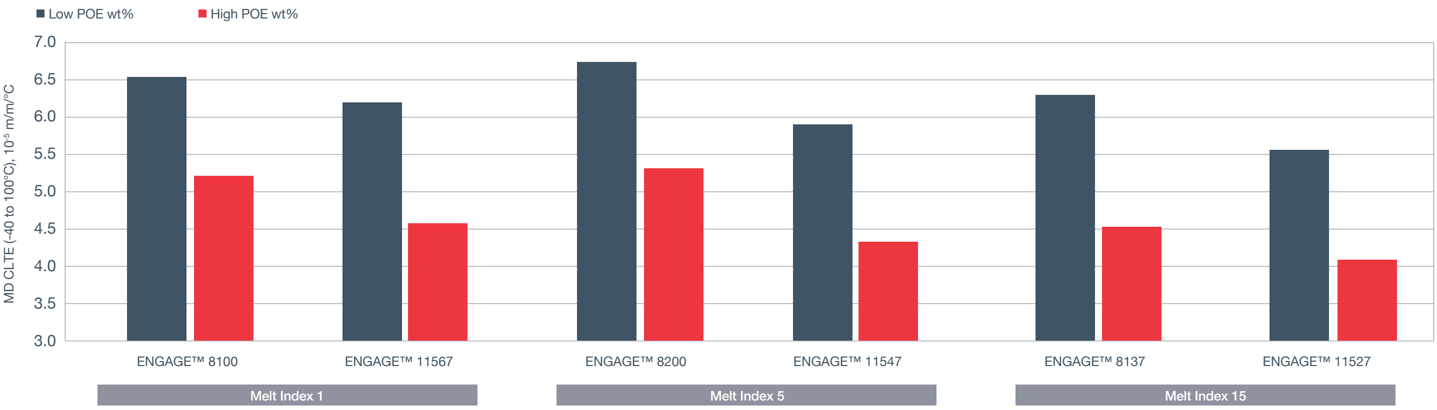

Figure 3: Coefficient of linear thermal expansion compared for TPO compounds with 10% talc and 17% (low) and 27.5% (high) polyolefin elastomers from the ENGAGE™ 11000 and 8000 series.

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