NEW PRODUCT DEVELOPMENTS

CALPRENES 420X & 480 FOR POLYMER MODIFYING ASPHALT

Calprene 420X

Dynasol Group is offering a new innovative polymer that improves the softening point property in PMA for roofing membranes. ***Calprene 420Xs'*** softening point performance is compared to a typical radial SBS and shows significant improvement in this sector.

Figure 1 shows comparative data of Calprene 420X versus Calprene 411 (our current radial SBS).

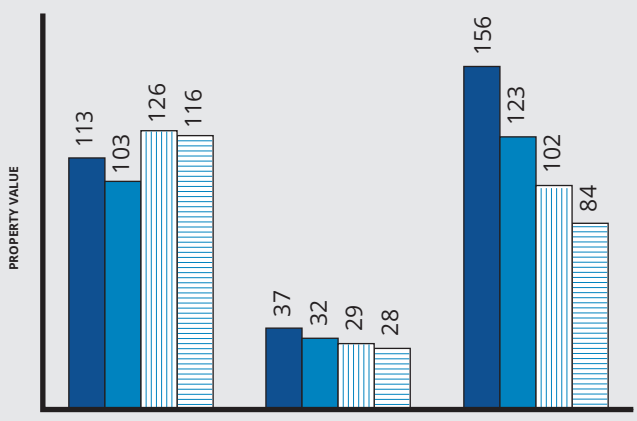
Figure 1. Polymer properties

Property	CALPRENE 411	CALPRENE 420X
Toluene solution viscocity at 5.23% and 25°C, cSt	26	26
Total styrene content, %	30	37
Total butadiene content, %	70	63
Di-block content, %	Less than 10%	30

COMPARATIVE PERFORMANCE OF C420X VS C411

Figure 2 shows a clear reaction in the softening point when blending C420X in PMA. Also shown in the figure is the formulation with asphalt 70/100 and modifying the blend with 10% polymer dosage by weight.

Figure 2. PMA formulations without filler



See figure 3 on next column

Figure 3 shows the increase of the softening point remaining high when using Calprene 420X in PMA. Also displayed is the formulation in asphalt 70/100, modifying it with 10% of polymer dosage, and adding 15% by weight of calcium carbonate as filler. This results in high penetration and less rigidity in the final PMA.

Figure 3. PMA formulations with filler

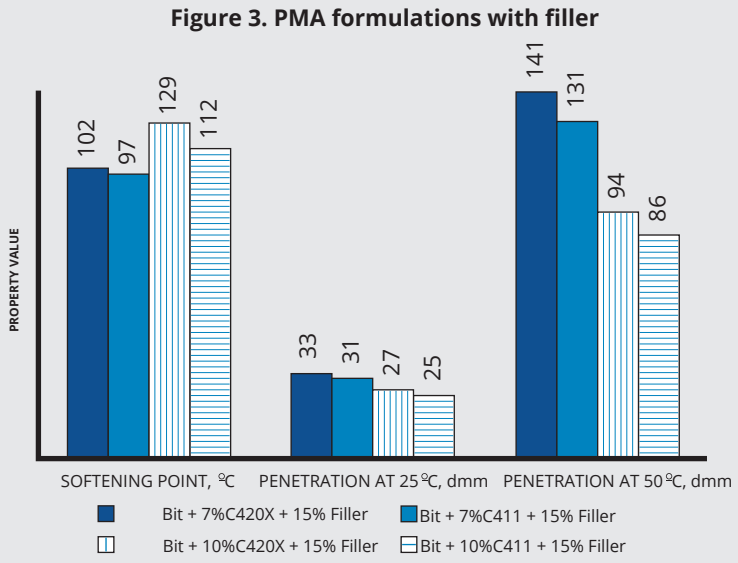
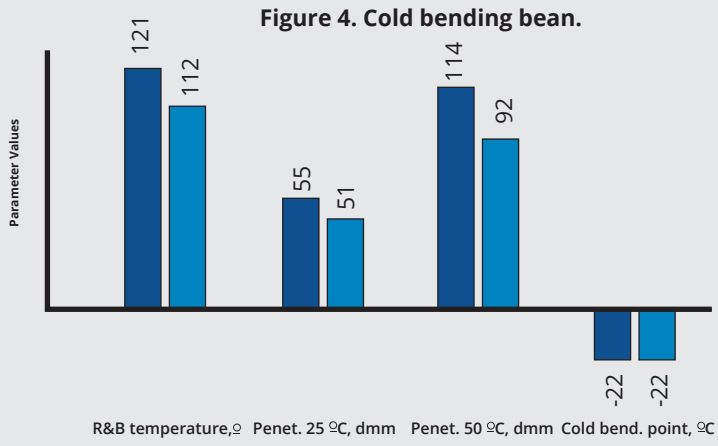


Figure 4 shows that the cold bending point temperature is not being affected by the change in polymer structure using Calprene 420X and Calprene 411.

Figure 4. Cold bending bean.



Calprene 480

Dynasol Group has also designed products with high vinyl content technology. Calprene 480 is a radial SBS that complements our radial product portfolio. This segment focuses on improving processability by decreasing viscosity in PMA.

Figure 5 shows the comparative data of a market reference, C480, and C411. All have similiar composition and structural characteristics.

Figure 5. Polymer properties of radial SBS.

Property	Market Reference	Calprene 480	Radial SBS
TSV, cSt	21.8	21.1	26
Microstructure, % by weight			
Styrene	34.0	35.3	30
Vinyl	40	41	10

Figure 6 shows the thermal-mechanical properties of PMA formulated with C480, radial SBS C411, and the market reference together for comparison.

Figure 7 shows improvement of Calprene 480 in low viscosity from the same PMA lots. For this data a European Asphalt 160/220 was modified with 10 percent polymer dosage by weight.

Figure 6. Thermal-mechanical properties

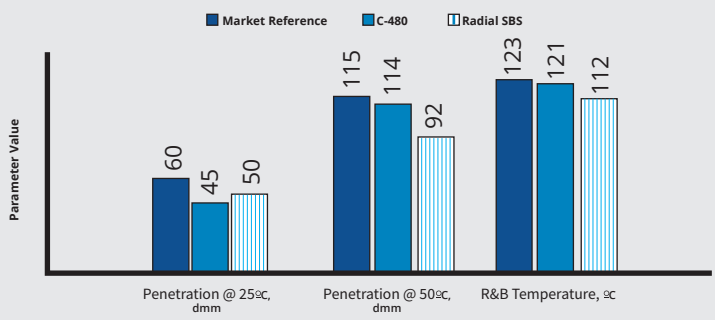
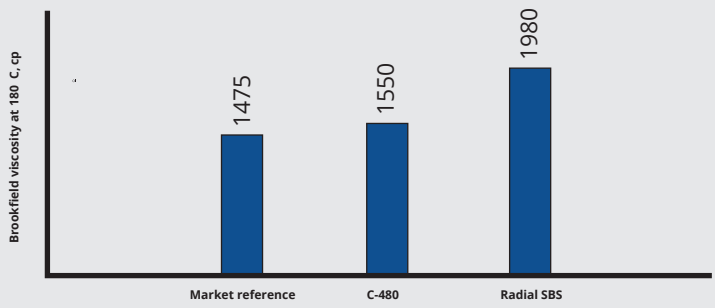


Figure 7. Brookfield viscosity at 180°C



GENERAL CONCLUSION

Dynasol Group has launched two new products for Polymer Modified Asphalt applications.

Calprene 420X is a polymer modifier which increases the softening point in PMA without increasing the viscosity of asphalt including filler in all roofing formulations.

Calprene 480 is a high vinyl radial SBS used as polymer modifier to reduce the viscosity of PMA. C480 increases the compatibility of different asphalt sources and can be used mainly in roofing applications as well as paving applications.

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