

TREVES USES NEW BIO DIOL IN CAR CARPETS

Sustainability on the agenda at Treves unit in Spain

The Treves Group, a leading European supplier of automotive components, has recently incorporated a renewably sourced diol into its Solpur polyurethane products. Its subsidiary, Trety SA, based in Macanet de la Selva near Girona in Spain, has successfully completed the development work to utilise Susterra renewably sourced propanediol from DuPont Tate & Lyle Bio Products in its Solpur line of products.

Treves is a manufacturer of components for automotive interiors, producing seats, covers, soundproofing elements, headrests, trays and car mats.

Solpur, a polyurethane elastomer, has been designed to replace rubber in automotive carpet applications. The polyurethane injection process allows parts to be moulded in different shapes and makes it adaptable to any geometric shape in the automotive body. The dimensional stability of the elastomer guarantees consistent shape of the final product.

"Solpur is a polyurethane elastomer washable carpet for industrial cars/vans and was designed to replace traditional 'rubber' carpet manufacturing," said Joan Riera, chemical and process manager of Trety in Spain, adding that the material contains a mineral filler.

The elastomer mats are made in a one-step standard reaction-injection-moulding process, said Riera. Some pieces are re-injected with flexible-foam sound insulation PU in a second stage, as indicated in the diagram (right).

Treves switching to Susterra

Due to some material-handling issues with its current diol, Treves has evaluated Susterra 1,3-propanediol as the crosslinker in its current Solpur formulation. Table 1 below provides the results of this evaluation.

Susterra 1,3-propanediol provided similar crosslinking performance to that of 1,4-

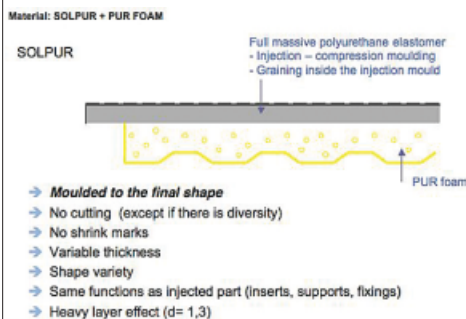


A typical Solpur use in a front floor mat

butanediol (BDO). In addition to being renewably sourced, Susterra offers improved handling at lower temperatures and does not need heating as their current diol does, saving on energy costs.

According to Josep Morcillo, a chemist with Treves technical service, "We've seen significant benefits using Susterra in our operations. For example, we see cost and time efficiency improvements in the internal preparation of our chemical process including elimination of pre-treatment.

"No heating is required prior to using the product. We can now re-use containers and have better material handling. In addition, we have seen production improvements, including



Renewable propanediol

Susterra is manufactured by DuPont Tate & Lyle Bio Products, a 50/50 joint venture between DuPont (US) and Tate & Lyle (UK), in Loudon, Tennessee. Current capacity is 100 million lb (45.36 kilotonnes) and expansion is being considered. The process uses proprietary fermentation and purification developed jointly by DuPont and Tate & Lyle to produce 1,3-propanediol from corn sugar.

Susterra is also the key building block for the DuPont Renewably Sourced Materials portfolio.

Susterra was introduced into Spain by Quimidroga, a leading chemical distributor in Spain and Portugal. Quimidroga has identified the market niches for replacing traditional polyurethane crosslinkers in line with the automotive industry's desire for increased natural-origin products in their components.

Susterra offers PU part makers a renewably sourced alternative for polymer and fluids uses that require quality and performance. It is an excellent glycol alternative to 1,4-butanediol in polyurethane formulations, offering improvements to processing and production as well as being 100-percent from a renewable source. (Susterra is a registered trademark of DuPont Tate & Lyle Bio Products LLC).

Table 2 Physical properties of Susterra and 1,4 butanediol

Property	Susterra	BDO
Chemical name	1,3 Propanediol	1,4-Butanediol
Chemical formula	C ₃ H ₈ O ₂	C ₄ H ₁₀ O ₂
CAS No	50-4-63-2	110-63-4
Molecular weight	76.1	90.1
Freezing point °C (°F)	-24 (-11.2)	19 (16)
Boiling point °C (°F)	214 (417)	230 (446)
Flash point °C (°F)	131 (268)	155 (311)
Specific gravity	1.055	1.015
Viscosity cP (20°C)	52	70

an increase in the flowability of the polyol and a reduction of weight of PU injection (0.5 percent reduction in waste). The economic benefits realised include a reduction in power costs and easier management of the metal drums waste."

Furthermore, the benefits of formulating with Susterra are listed in Table 2 which compares properties for Susterra and 1,4-BDO.

Riera commented that the introduction of the bio-PDO (1,3 propanediol) in Treves' Solpur formulation has given "a mix of process, energy saving and cost benefits."

In terms of flowability, Susterra has benefits compared to 1,4 BDO, because of its lower molecular weight, he said.

"Furthermore, when we compare Solpur with rubber, the cost reduction is around 10 percent in the final piece," he said.

At the moment, Trety produces Solpur in Spain, for Renault, Nissan, Opel and Dacia, currently making mats for 400 cars a day.

Treves hopes to increase use of this technology and introduce it to other customers and countries in the coming years, said Riera.

Table 1 Test formulations with various crosslinkers

Formulation	Initial	A	B	C	D
	1,4-BDO	Susterra 1,3-PDO	DEG	50% 1,4-BDO + 50% DPG	50% 1,4-BDO + 50% Polyol
Polyol + filler	88.6	91.6	88.6	88.6	82.05
Catalyst	0.254	0.254	0.254	0.254	0.254
Colourant	3.4	3.4	3.4	3.4	3.4
Crosslinker	6.55	5.35	6.55	3.275+3.275	6.55+6.55
Isocyanate (Ix100)	24.5	24.5	21.7	21.2	24.5
	Production	Production	Laboratory	Production	Production
Physical properties					
Tear strength >1 daN	1.20	1.21	0.72	1.03	-
Shooting strength >20daN/20.05		19,00	8.77	8.14	-
Stiffness 60-100mm	75	96	94.5	123	-