

POLYVEST® IN TIRES

FOCUS: MIGRATION

POLYVEST® ST-E / 130 S

Table 1: Composition of Tire Tread compounds with TDAE and POLYVEST® in SSBR/BR systems

	TDAE phr	POLYVEST® phr
1st stage		
Europrene solR72613	70.0	70.0
Buna CB 24	30.0	30.0
ULTRASIL 7000 GR	80.0	80.0
Si 266	5.8	5.8
TDAE	25.0	-
Various POLYVEST*	-	25.0
N 330 carbon black	5.0	5.0
Zinc oxide	2.0	2.0
Stearic acid	2.0	2.0
Anti aging chemicals*	5.5	5.5
2nd stage		
Batch from 1st stage		
Rhenogran DPG-80	2.5	2.5
3rd stage		
Batch from 2nd stage		
Richon TBZTD OP	0.2	0.2
Vulkacit CZ/EG-C/CBS	1.6	1.6
Sulfur	2.0	2.0

* POLYVEST® ST-E
POLYVEST® 130 S

Table 2: Mixing Procedure of Tire Tread compounds with TDAE and POLYVEST® for SSBR/BR systems

Mixing unit: HF mixing group, Type: GK 1.5 E

1st stage

Fill factor 0.66, 65 rpm, chamber temp.: 70 °C,

batch temp.: 140 °C – 155 °C

0.0 - 0.5' Polymer, TDAE/POLYVEST (5.0 phr)

0.5 - 1.0' TDAE/POLYVEST (5.0 phr)

1.0 - 2.0' 1/2 Silica, Silane, ZnO, stearic acid,
TDAE/POLYVEST (5.0 phr)

2.0 - 2.0' clean

2.0 - 3.0' a) CB, 1/2 Silica, TDAE/POLYVEST (5.0 phr)
b) Anti-aging chemicals

3.0 - 6.0' TDAE/POLYVEST (5.0 phr)
mix and keep temp. at 140 °C – 155 °C
Dump, check weight
mill temp. 60 °C, speed front 25 rpm,
rear speed 18 rpm
45 s on open mill (4 mm nip), sheet out
weigh compound for 2nd step,
storage 24 h at 23 °C

2nd stage

Fill factor 0.63, 70 rpm, chamber temp.: 75 °C,

batch temp.: 140 °C – 155 °C

0.0 - 1.0' batch stage 1 plasticise

1.0 - 3.0' add DPG-80, mix and keep temp. at 140 °C – 155 °C

3.0 - 3.0' dump, check weight
mill temp. 60 °C, speed front 25 rpm, rear speed 18 rpm
5 s on open mill (4 mm nip), sheet out
weigh compound for 3rd step, storage 4 – 24 h at 23 °C

3rd stage

Fill factor 0.60, 55 rpm, chamber temp.: 50 °C,

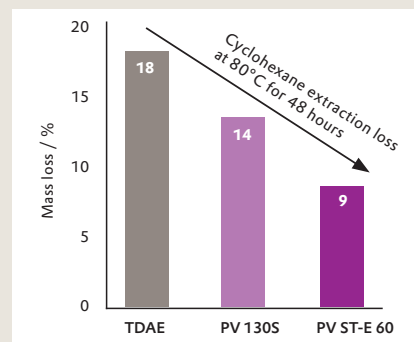
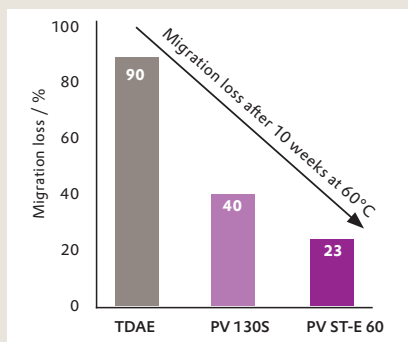
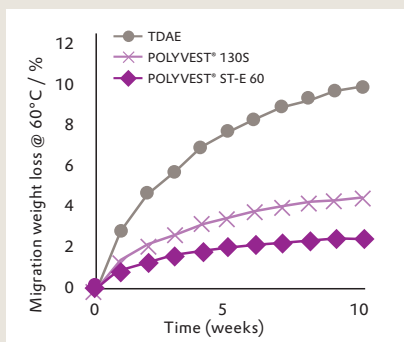
batch temp.: 90 °C – 110 °C

0.0 - 2.0' batch stage 2, add accelerators, sulfur

2.0 - 2.0' dump batch and process on mill
mill temp. 80 °C, speed front 16 rpm, rear speed 11.5 rpm
20 s with 3 – 4 mm nip
cut 3 x left, 3 x right with 3 mm nip
roll up and pass through a 3 mm nip 3 times, sheet off
5 – 6 mm, storage 24 h at 23 °C

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Table 3: Improved migration tendency and efficiency of POLYVEST® compared to TDAE



POLYVEST® ST-E 60 & ST-E 100

Table 4: Performance of POLYVEST® ST products against TDAE examined in a Garvey die extrusion test



TDAE

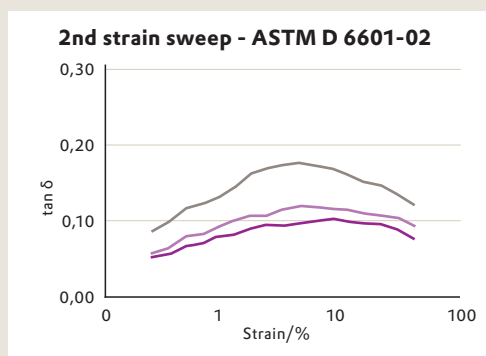
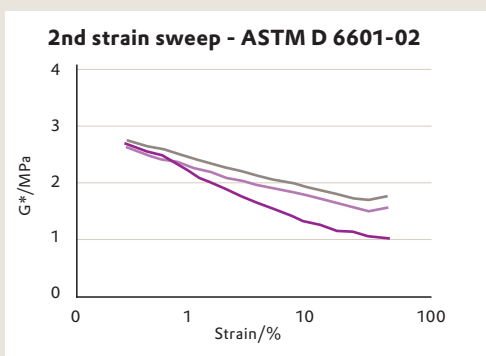


POLYVEST® ST-E 60



POLYVEST® ST-E 100

Table 5: Reduced Payne effects for POLYVEST® ST compared to TDAE as shown by RPA strain sweep at 60°C



— TDAE – 25 phr
— POLYVEST® ST-E 60 – 25 phr
— POLYVEST® ST-E 100 – 25 phr

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