

POLYVEST® ST-E IN TRUCK TIRES

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Performance tests of **POLYVEST® ST-E** in typical silica-reinforced tire tread compounds

Performance test of POLYVEST® ST in truck tire tread compounds

Composition	Reference	with POLYVEST® ST-E 60	with POLYVEST® ST-E 100
Natural rubber	100.0	100.0	100.0
Silica (ULTRASIL® 7000 GR)	55	55	55
Sulfur-silane (Si 266°)	5.0	4.0	4.0
POLYVEST® EP ST-E 60	-	7.5	-
POLYVEST® EP ST-E 100	-	-	7.5
Sulfur	2.0	2.0	2.0

Further additives and process aids are included

Mixing procedure

Mixing Unit: HF Mixing Group GmbH, Type GK 1,5E

Stage 1 (65 rpm, batchtemp 145-160 °C)

0.0 - 0.5' polymers
 0.5 - 1.0' TMQ, 6PPD
 1.0 - 2.0' 1/2 silica, silane(s), ZnO
 2.0 - 2.0' lift, clean
 2.0 - 3.0' a) add CB to POLYVEST® ST-E
 → add mixture to the mixer
 b) add 1/2 silica
 c) add remaining chemicals
 3.0 - 3.0' clean
 3.0 - 5.0' mix and keep temp. at 145-160 °C by adjusting RPM

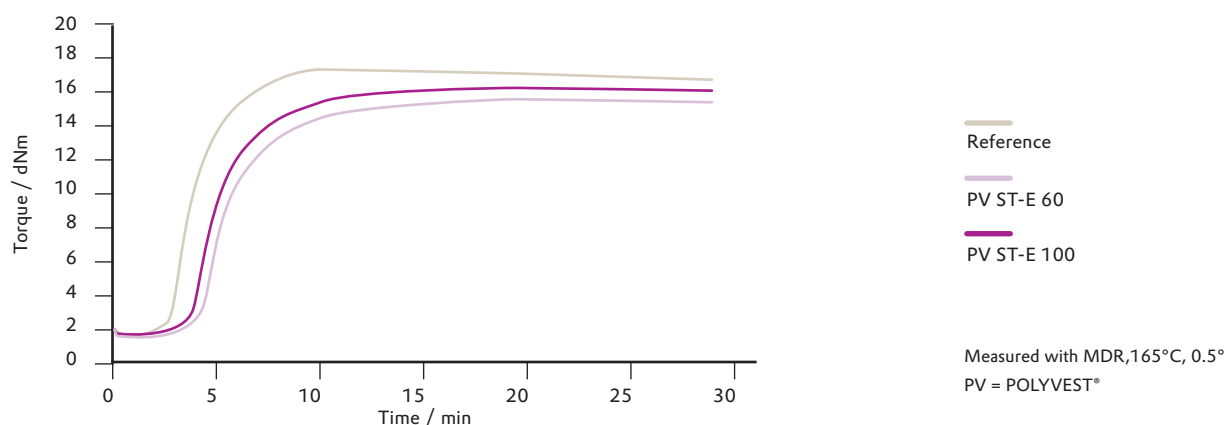
Stage 2: (batchtemp: 145-160 °C)

0.0 - 1.0' 1st batch stage
 1.0 - 3.0' mix and keep temp. at 145-160 °C by adjusting RPM
 3.0 - 3.0' dump, 45 sec. on open mill (4 mm nip), sheet out

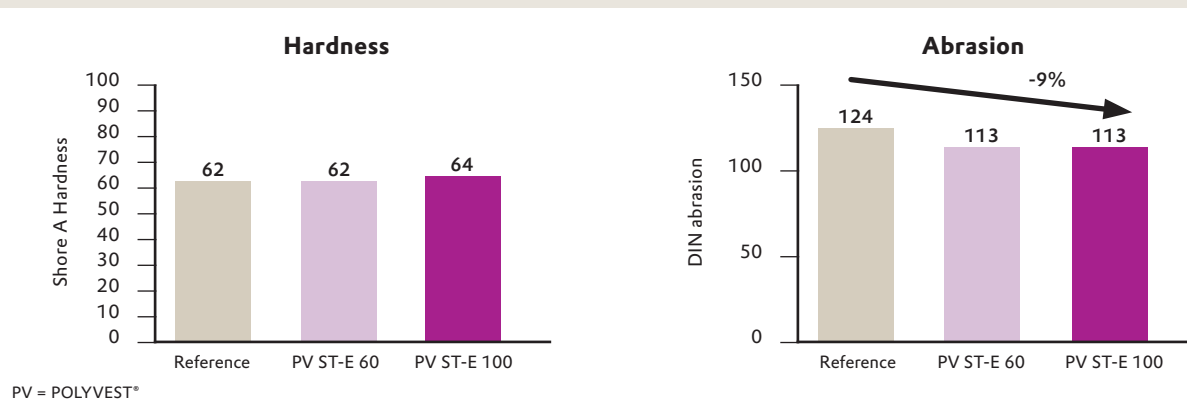
Stage 3: (batchtemp. 90-110 °C)

0.0 - 2.0' 2nd batch stage, accelerators, sulfur
 2.0 - 2.0' dump batch and process on mill during 20 sec.
 with 3 - 4 mm nip.
 cut 3 x left, 3 x right, roll up and pass through a
 3 mm nip 3 x sheet off

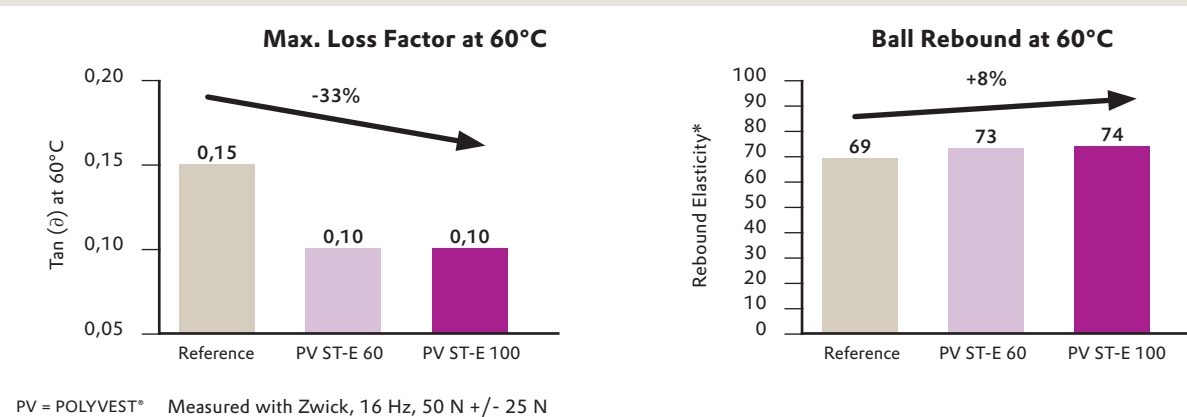
Improved processing by longer scorch times



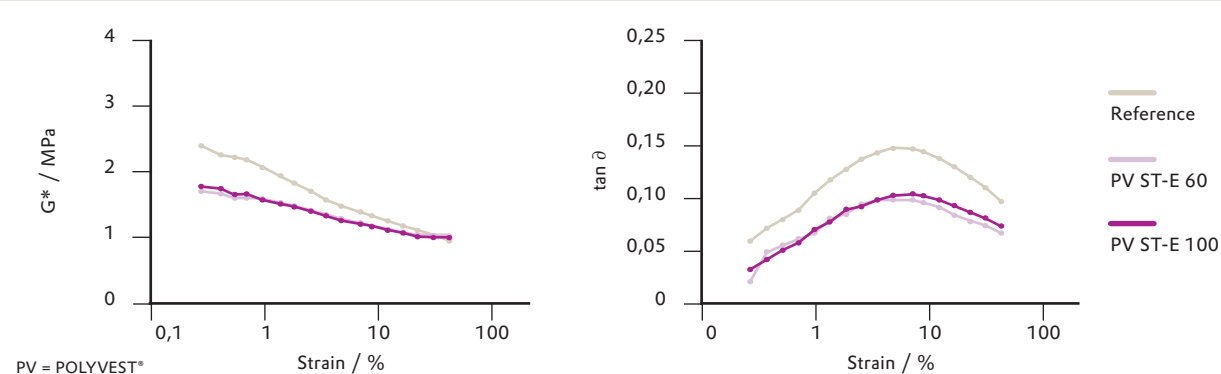
Higher wear resistance as shown by reduced DIN abrasion at constant Shore A hardness



Improved fuel efficiency as indicated by reduced loss factor and higher ball rebound



Reduced Payne effect as shown by RPA strain sweep at 60°C



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