

**TITLE** INFLUENCES OF STYRENE BUTADIENE RUBBER AND SILICA TYPES ON PERFORMANCE OF PASSENGER CAR RADIAL TIRE TREAD

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**ABSTRACT** A performance comparison among three types of styrene butadiene rubber (SBR), that is, emulsion polymerized SBR (ESBR), solution polymerized SBR (SSBR), and functionalized solution polymerized SBR (F-SSBR), was of interest. Effect of silica type, that is, highly dispersible silica and conventional precipitated silica, was also investigated. It is found that SSBR demonstrates significantly better heat build-up, dynamic set, abrasion resistance, including wet grip (WG) with comparable fuel efficiency, as compared to ESBR. As expected, the best tire performance, that is, abrasion resistance, WG, and fuel efficiency, is found in F-SSBR vulcanizates, attributed mainly to the greatest improvement in magnitude of rubber–filler interaction and degree of filler dispersion. Results reveal that the reactive functional group, that is, propylaminedimethoxysilane, which is chemically anchored at chain ends of F-SSBR, plays a crucial role in tire performance. Unexpectedly, silica type does not significantly influence the degree of filler dispersion, including WG and fuel saving efficiency. Probably, the predominance of sufficiently long mixing time during the compound preparation step may be responsible, as compared to the effect of silica characteristics.