

VULCAN® 1391



Description

VULCAN® 1391 carbon black is a member of a special family of very high surface area products specifically developed by CABOT for very high performance tire treads.

The tread part of tires for that tire market segment requires a performance balance which cannot be met with the traditional high surface area ASTM carbon black grades. VULCAN 1391 carbon black is a very fine particle size carbon black with a surface area much higher than the standard ASTM N200 and N100 types.

Insufficient dispersion can limit the full performance benefit exploration of very high surface area carbon black grades in rubber. The structure of VULCAN 1391 carbon black is higher than that of ASTM N220, N234, N134 or N115, which can reduce these potential carbon black dispersion problems.

All of this result in very high rubber reinforcement, and VULCAN 1391 carbon black offers a unique combination of a very high hysteresis, a low static and a high dynamic

modulus. Those rubber compound properties are critical for the tread part of very high performance passenger tires to grant excellent grip and a good handling performance.

VULCAN 1391 carbon black is mainly used in the tread compounds of motorbike, racing and very high performance (> V rating) passenger tires.

Applications

The specific VULCAN 1391 performance features are the combination of a very high hysteresis, a low static and a high dynamic modulus. This can be seen in the following comparison against ASTM N134, N234 and N339 at equal hardness in a SBR 1721/1500 High Performance passenger tread formulation (69 phr SBR1721, 50 phr SBR1500, 21 phr free Oil):



VULCAN® 1391

CARBON BLACK



CABOT

creating what matters

Basic rubber properties in a SBR1500/1721 HP passenger tread formulation

Carbon black type	VULCAN 1391	VULCAN M	VULCAN 7H	VULCAN 10H
ASTM grade code	—	N339	N234	N134
carbon black loading, (phr)	73	84	76	74
Hardness @ 23°C				
IRHD	75	74	73	73
Shore A, 30 sec.	62	64	62	61
Zwick Rebound				
Rebound @ 23°C, (%)	19	22	21	21
Rebound @ 70°C, (%)	33	39	38	38
Tensile properties				
Tensile Strength, (MPa)	22.2	18.9	19.8	20.5
Elongation @ Break, (%)	644	495	520	565
100% Modulus, (MPa)	1.6	2.9	2.2	2.0
300% Modulus, (MPa)	7.0	12.7	10.5	9.4
Dynamic properties				
Tan delta @75°C	0.33	0.28	0.22	0.29
Tan delta @10°C	0.57	0.50	0.44	0.52
Complex Modulus @75°C	10.6	11.9	10.5	10.2
Complex Modulus @10°C	32.6	32.4	27.1	28.6
CABOT Abrader				
Relative wear Index (higher = better)				
7.8 % slip	127	100	122	119
14.0 % slip	132	100	114	122

The result table below shows a comparison between VULCAN 1391, ASTM N121, N220, N234 and N330 in a basic truck tread, demonstrating the high tear and tensile strength of VULCAN 1391 also in NR based compounds:

Basic rubber properties in a NR truck tread formulation

Carbon black type	VULCAN 1391	VULCAN 3	VULCAN 6	VULCAN 7H	VULCAN 9
ASTM grade code	—	N330	N220	N234	N115/121
carbon black loading, (phr)	45	50	50	50	50
Hardness					
Shore A, @ 23°C	67	65	69	69	68
Zwick Rebound					
Rebound @ 23°C, (%)	47	53	50	48	46
Rebound @ 100°C, (%)	66	71	68	67	65
Tensile properties					
Tensile Strength, (MPa)	30.9	25.6	28.1	27.8	27.8
Elongation @ Break, (%)	525	440	465	455	505
100% Modulus, (MPa)	3.0	3.3	3.5	3.8	3.3
300% Modulus, (MPa)	15.5	17.6	19	18.1	16.0
Tear properties					
Crescent Tear, (N/mm)	182	128	143	153	155

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