List of Symbols

Symbols	Explanations
δ	Phase angle
tanδ	Loss tangent value
E’	Storage modulus
E”	Loss Modulus
G*	Complex Shear Modulus
G’	Storage Shear Modulus
G”	Loss Shear Modulus
E*	Complex Elastic Modulus
E’	Storage Modulus
E”	Loss Modulus
G_h	Shear modulus due to hydrodynamic effect
G_r	Shear modulus due to rubber structure
G_p	Shear modulus due to polymer network
G_f	Shear modulus due to filler –filler interaction
H	Viscosities of filled rubber system
η_o	Viscosities of unfilled rubber system
Φ	Volume fraction of the filler
G_o	Shear modulus of unfilled rubber compound
γ (t).	Time dependence shear stress value
σ (t)	Sheer stress response
Ω	Angular frequency of deformation
T	Time
μ	Tractional force in term frictional co-efficient
M	An exponent which is equal to approximately 0.2,
N	an exponent and is greater than 1 or equal to 1
P	Pressure
N	Normal curing
d_n	The limit of the aggregate size, which occupy ‘n%’ of total aggregate volume in the carbon black
ω	Angular disc rotation speed of
D_p	Particles with diameter
η_f	Spin fluid having viscosity
S	Dispersion injection distance
R_d	Detection distance
ML	Minimum torque
MH	Maximum torque
T_s1	Induction time
T_s2	Scorch time
T_c50	50% curing time
T_c90	Optimum curing time

M	Mooney viscosity
L	Large rotor
W’	Initial sample weight
W_{fg}	Final weight of the gel
F_p	Weight fraction of polymer
F_f	Weight fraction of filler
δo’	Original distance between the spheres
δo	New distance between two new spheres
$G_{0.1}$’	Shear Modulus at 0.1% shear strain
G_{100}’	Shear Modulus at 100% shear strain
$\bar{X}$	Mean of aggregate size
d_p	Particle diameter
δ_{agg}	Inter-aggregate distance
d_{agg}	Aggregate diameter
A	Aggregate size distribution co-efficient
$\hat{S}$	Structure co-efficient parameter
θ	Diffraction angles
ϕ	Volume percentage of carbon black