STUDY ON THE CURE CHARACTERISTICS OF SOLID TYRE MIDDLE COMPOUND PREPARED WITH DIFFERENT TECHNICALLY SPECIFIED RUBBER GRADES

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DECLARATION

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ABSTRACT

Cure characteristics of solid tyre middle compounds are critical as it combines the heel and the tread compounds. Also middle compound is subjected to have high heat build-up due to continuous deflection. In this study cure characteristics of solid tyre middle compound were investigated by preparing the middle compounds with different TSR grades. Three different grades of technically specified rubbers TSR-5L, TSR-10 and TSR-20 were used for the study. All the grades were tested for raw properties such as dirt content, ash content, nitrogen content, plasticity, plasticity retention index and viscosity. Molecular weight and molecular weight distribution of TSR grades were also compared by the frequency sweep test using rubber processing analyzer. Solid tyre middle compounds were mixed using laboratory Banbury mixer and laboratory mill machine in controlled laboratory conditions. The effect of raw rubber properties, molecular weight and molecular weight distribution of three different TSR grades on cure characteristics of solid tyre middle compound were evaluated. It can be concluded that the significant effect can be observed on cure characteristics of middle compound against TSR grades. Also molecular weight of TSR can be positively correlated with middle compound M_L value.

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LIST OF ABBREVIATIONS

NR	Natural Rubber
TSR	Technically Specified Rubber
USS	Unsmoked Sheet
MW	Molecular Weight
MWD	Molecular Weight Distribution
TBBS	N-tert-butyl-2-benzothiazole sulphenamide
PVI	Pre vulcanization inhibitor
CTP	4-Chloro-3-[[(3-nitrophenyl)amino]sulfonyl]-benzoic acid
ASTM	American Society for Testing and Materials
Phr	parts per hundred rubber
MDR	Moving Die Rheometer
ODR	Oscillating Disc Rheometer
M_L	Momentum Low (Minimum Torque)
M_H	Momentum High (Maximum Torque)
t_{s2}	Induction Time (Scorch Time)
t_{90}	Optimum Cure Time
RPA	Rubber Processing Analyzer