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COMPARATIVE STUDY OF SPECIFIC GRAVITY OF HPCA AND LPCA OILS FOR sSBR BASED GREEN COMPOUNDS

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ABSTRACT: In the present work four types of low PCA oils and one regular high PCA oils were analyzed for specific gravity and effect on rebound resilience has been investigated. These LPCA oils can act as the best alternative aids for rubber industry. The development of new LPCA-based materials have been a great motivating factor for materials scientists as seen from the increasing trend of present.

KEYWORDS: low PCA oils, Polycyclic Aromatics, Carcinogenesis, PAH, Risk Assessment

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1. INTRODUCTION

The word 'Eco- processing' affix with materials refers to those materials which are 'eco-friendly' and 'renewable' and thus address the twin issues of 'sustainability' and 'ecological impact'. Such materials would be attractive in view of their attributes of environmentally friendly. In this research work, Specific gravity has been carried out for four low poly cyclic aromatic oils and one HPCA oil, which have shown encourage specific gravity based compound property like rebound resilience . The present, most important trends in the study is development of SBR rubbers especially Solution SBR, because of their high synthetic flexibility, in comparison to Emulsion SBR for tyre applications. [1-5] The ASTM definition of process oil is "Hydrocarbon oil derived from petroleum or other sources, used as an extender or process aid". Oils are organic substances added to Rubbers to improve their flexibility and processability. They increase the softness, elongation and low temperature plasticity, and affect the rebound resilience, the concentration of inter molecular forces and the glass transition temperature, Tg, of Rubbers [6-7] The rebound

Kumar & Meena RJLBPCS 2019 www.rjlbpcs.com Life Science Informatics Publications resilience of the rubbers is the ratio of the energy which returned back to its original position to that of the energy which is applied to deformation of the rubbers by indentation due to a single impact. The correlation between the rebound resilience and the loss ratio of the rubber and hence will be derived with this phenomenon [8-12]

2. MATERIALS AND METHODS

Rubber process Oil, RPO (Regular oil Sample No.1) and four low polycyclic aromatic oils (Sample No-2,3,4 and 5) were collected from oils Wanders. Specific gravity is determined by hydrometer according to ASTM D 1298. Oils are used in compounding rubber to maintain a given hardness when increased levels of carbon black or other fillers are added. oils also function as processing aids and improve the mixing and flow properties. Oil is the most popular filler added into the rubber compound due to its ability to enhance the strength properties of rubber vulcanized as compared to gum vulcanized. Generally, there are five types oils used in the rubber compound such as one HPCA and four LPCA However, the choice of oil grades for any given rubber formulation must take into account the desired physical properties of the end products, processing methods and costs [12-18]. Mixing of rubber compound with different oils were carried out using a two-wing rotor laboratory Banbury mixer (Stewart Bolling, USA) in three stages (master batch remill and final batch) and the material used as SBR having regular aromatic oil, SBR having low PCA oil, Oil No.1,2,3,4,5, Filler N339 black, ZnO, Stearic Acid, 6PPD, MC Wax, and MS 40. [19-30]

3. RESULTS AND DISCUSSION

The value of specific gravity, is shown in Table 1 All the HPCA oil and LPCA oils shows comparable values for specific gravity. All the oils except aromatic oil sample No.1 show higher value of specific gravity. The specific gravity value of aromatic oil is high. High specific gravity indicates higher aromaticity. High rubber and polymer solvency, highly suitable for NR, SBR, Polybutadiene Rubber and Neoprene Rubbers. Offers good compatibly and is suitable for use. Specific gravity is the heaviness of a substance compared to that of water, and it is expressed without units. Higher aromatic content is basically the presence of polycyclic group in the oils.

Name of oils	Specific gravity
Sample No.1	1.002
Sample No.2	0.918
Sample No.3	0.939
Sample No.4	0.925
Sample No.5	0.911

Table	1:	Specific	gravity
Labic	1.	Specific	gravity



Figure 1: Specific Gravity

Rebaund Resiliance for compound was slightly compare with increase in dosage of LPCA oils.

S.No.	Compound 1	Rebaund Resiliance
1	Sample No.1	50
2	Sample No.2	45
3	Sample No.3	46
4	Sample No.4	43
5	Sample No.5	44

 Table 2: Rebaund Resilience



Figure 2: Rebound Resilience

4. CONCLUSION

All the LPCA oils shows comparative values for specific gravity. LPCA oils can be alternative of HPCA oil, any exertion of using the LPCA will give rise to profit of outlay as well as atmosphere fortification. By the addition of oils in the rubber compounds as its ability to enhance the mechanical properties. This study gives an insight on how specific gravity of oils influenced the rheological and physical properties like rebound resilience of the rubber vulcanizates in both NR and NR/SBR blends compound.

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CONFLICT OF INTEREST

LPCA oils base materials have been improving and develop new LPCA oils base polymers, which possess environmentally complimentary properties such as renewability, degradability and release of low-toxicity degradation products.

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