Verification of rubber material in automotive applications

Publik rapport

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FFI Fordonsstrategisk Forskning och Innovation
VINNOVA Energimyndigheten TRAFIKVERKET
FKG VOLVO SCANIA VOLVO

Innehållsförteckning

1 Sammanfattning

Reselo har utvecklat en elastomer från björkbark (Reselo Rubber) som lämpar sig väl att ersätta fossilbaserade gummipolymerer. I ett gemensamt projekt har Reselo tillsammans med Volvo Cars, Volvo Group, Zeekr Tech och Polestar undersökt möjligheterna med Reselo Rubber i gummiblandningar ämnad för bilindustrin samt att utforska potentialen i ett sådant genomförande.

Syftet med detta projekt har varit att utreda olika aspekter inom teknologi, kommersialisering, hållbarhet samt leveranskedja för en vald applikation.

Två gummiblandningar; en EPDM-baserad och en blandning med EPDM och Reselo Rubber valdes för materialkarakterisering. Resultaten visade inte på några större skillnader mellan de två gummiblandningarna, vissa resultat visade till och med bättre resultat med Reselo Rubber i blandningen. Förbättringar av gummiformuleringen skulle leda till framtida möjligheter för Reselo Rubber inom bilindustrin.

Genom att ersätta EPDM med Reselo Rubber skulle koldioxidutsläppen kunna minska med 52 % samt att transportsträckan från råvaruleverantör till gummitillverkare skulle minska i framtida leveranskedja.

2 Executive summary in English

The feasibility of Reselo Rubber, an elastomer made out of birch bark, has been explored in a joint collaboration between Volvo Group, Volvo Cars, Polestar, Zeekr Technology and Polestar. The aspects of technology, commercialization, sustainability and supply chain have been investigated.

Two rubber compounds; one pure EPDM and one blend of 50 PHR EPDM and 50 PHR Reselo Rubber, were chosen for material characterisation. The following properties were investigated:

- Emissions
- Flammability
- Ageing
- Mechanical
- Chemicals

The results did not show a significant difference between the two compounds. At this stage the rubber compounds do not fulfil the requirements for automotive interior applications. However, the compounds passed the flammability test which means that there could be opportunities in exterior applications for Reselo Rubber.

Durability is important for automotive applications and for future work it is recommended to focus more on improving specific properties; such as ageing, emissions and swelling rather than general mechanical properties.

By replacing EPDM directly with Reselo Rubber, the carbon emissions could decrease by 52 % and the transport distance of raw material to compounder in future supply chain will be reduced.

3 Bakgrund

Reselo has developed a novel elastomer made out of birch bark (Reselo Rubber). There is an opportunity to decrease the carbon footprint when replacing fossil-based rubber polymers with Reselo Rubber in Rubber Formulations.

Reselo was selected by 4 of the 7 Partner Companies to join MobilityXLab Batch 10, and the Project falls under the same initiative. Volvo Cars, Volvo Group, Zeekr Technology and Polestar have been participated in the project.

4 Syfte, forskningsfrågor och metod

The Project aimed to validate Reselo Rubber in Rubber Formulations for automotive applications and explore the potential of such an implementation and how to realize the potential.

5 Mål

The aim of the project has been to investigate the potential of Reselo Rubber in a rubber formulation in regards of technical, commercial, sustainable and supply chain aspects for one selected application.

6 Resultat och måluppfyllelse

The floor mat was selected as an application. Two rubber compounds were analysed in this project – one pure EPDM and one mixed with 50 PHR of Reselo Rubber. The following properties were investigated:

- Emissions
- Flammability
- Ageing
- Mechanical
- Chemicals

The results did not show a significant difference between the two compounds. At this early stage the rubber compounds do not fulfil the requirements for automotive interior applications. However, the compounds passed the flammability test which means that there could be opportunities in exterior applications for Reselo Rubber.

By replacing EPDM with Reselo Rubber 52 % of the carbon footprint could be reduced based on the cradle-to-grave approach. These results are based on initial data from 2022 and the assessment will be revised during 2024.

The transport distance of raw materials could become shorter when including Reselo in the future supply chain. Reselo Rubber can become FSC-certified in the future since the majority of the birch trees already are FSC-certified.

7 Spridning och publicering

7.1 Kunskaps- och resultatspridning

Hur har/planeras projektresultatet att användas och spridas?	Markera med X	Kommentar
Öka kunskapen inom området	X	
Föras vidare till andra avancerade tekniska utvecklingsprojekt		
Föras vidare till produktutvecklingsprojekt	X	
Introduceras på marknaden		
Användas i utredningar/regelverk/ tillståndsärenden/ politiska beslut		

7.2 Publikationer

N/A

8 Slutsatser och fortsatt forskning

The overall difference between the rubber compounds is not significant; some analyses show even better results with Reselo rubber in the compound. An improvement of the rubber formula would benefit the 50:50 blend and pave the way for further opportunities.

Durability is important for automotive applications and it is recommended to focus more on improving specific properties; such as UV, ageing, compatibility, and swelling than general mechanical properties.

9 Deltagande parter och kontaktpersoner

Company	**Name**
Reselo AB	Caroline Grimler
Polestar	Rachel Holland
Volvo Cars	Kai Kallio
Volvo Group	Renato Liardo
Zeekr Technology	Patrik Svensson