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# Development of the recommendations on selection of glass-fiber reinforced polyurethanes for vehicle parts

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## Abstract

© Research India Publications. Advanced polymer composites have essential features: high specific strength ratio, resistance to aggressive substances (water, fuel, oil, lubricants, weak alkalies and acids), wide operation temperature range (from -60 to +80 °C), sufficient durability (up to 10 years), high aesthetic qualities. The use of polymer composites for vehicle parts significantly reduces the curb weight of a vehicle, improves its dynamic behavior, increases its payload capacity, reduces its fuel consumption and emissions. The research was focused on the parts made of rigid glass-fiber reinforced polyurethane. The samples were made using the system based on polyol component A and isocyanate component B in a ratio of 1,75:1 (A:B). As a filler the glass fiber roving was used in the amount of 25 weight parts per 100 weight parts of the matrix component. The glass-fiber reinforced polyurethane parts were manufactured by spraying. The paper describes the comprehensive research of the glass-fiber reinforced polyurethane properties including the evaluation of thermal resistance, impact resilience, temperature resistance, Shore D hardness, acoustic absorption coefficient with the state-of-t-e-art test procedures and research equipment. The recommendations were developed to select glass-fiber reinforced polyurethanes for vehicle parts: for parts where the material is under high load during operation (temperature, impact resilience, etc.) it is recommended, whenever possible, to use the materials with larger thickness; for the parts where hardness is subject to special requirements – the materials with smaller thickness; during part production it is necessary to precisely carry out the operations of part manufacturing process to avoid any defects which are stress raisers and reduce the material strength.

## Keywords

Acoustic absorption coefficient, Comprehensive research, Glass-fiber reinforced polyurethane, Impact resilience, Polymer composite, Shore D hardness, Temperature resistance, Thermal resistance