

## **Influence of the size and amount of cork particles on the impact toughness of a structural adhesive**

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### **Abstract-**

The inclusion of particles (nano or micro) is a method to improve the mechanical properties, such as toughness, of structural adhesives. Structural adhesives are known for their high strength and stiffness but also for their low ductility and toughness. There are many processes described in the literature to increase the toughness, one of the most common being the use of rubber particles. In the present study, natural micro particles of cork were used with the objective to increase the impact resistance of a brittle epoxy adhesive. The idea is for the cork particles to act like crack stoppers and absorb impact leading to higher absorption of energy. The influence of the cork particle size and amount were studied. Particles of cork ranging from 38 to 250  $\mu\text{m}$  were mixed in the epoxy adhesive Araldite<sup>®</sup> 2020 from Huntsman. The amount of cork in the adhesive was varied between 1 and 5% by weight. Surface treatment (low pressure plasma) was applied to the cork powder to assess the effect of the interaction adhesive-cork with several degrees of adhesion. This evaluation was made using impact tests and it was evident that impact absorption was related to the size and amount of cork particles in the resin, considering a uniform particle distribution.

**Index Terms-** Adhesive, Cork, mechanical properties, surface treatment.

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