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# Effects of the media and ageing condition on the tensile properties and fracture toughness of epoxy resin

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## Abstract

This paper presents the water diffusion behaviour, tensile properties and fracture toughness of epoxy after it is aged in distilled and salt water in both steady and fluctuating conditions at a temperature of 50°C. In steady and fluctuating conditions, the equilibrium water uptake of epoxy aged in salt water is lower than that in distilled water, but the diffusion rate is unaffected. The effects of the media and ageing condition on the tensile properties and fracture toughness are insignificant. The absorbed water (0.6 - 1.8%) improves the epoxy fracture toughness up to three times, which is indicated by the complex fracture surfaces of aged epoxy.

**Keywords:** Epoxy; Ageing; Distilled water; Salt water; Tensile strength; Fracture toughness

## 1. Introduction

Epoxy resin has been widely used as a matrix for polymeric composite materials, adhesives, coatings and paint due to its good mechanical properties, low shrinkage, and good adhesion. However, in applications, epoxy resin absorbs water from the surrounding environment. It is well known that the absorbed water can degrade the physical and mechanical properties and

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