

# Electrical Conductivity and Electromagnetic Shielding Effectiveness of Bio-Composites

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## ABSTRACT

Introduction of bio-composites into aircraft interior and airframe secondary structures is subjected to major technical challenges such as the enhancement of mechanical, thermal, electrical and electromagnetic shielding properties of bio-sourced materials [1,2]. In this paper, electrical conductivity and electromagnetic shielding effectiveness of two bio-composites have been studied by tests and numerical models. Two monolithic composites with partly bio-based content were manufactured. The first bio-composite is made of a carbon fibre fabric prepreg and a partly bio-based (rosin) epoxy resin (CF/Rosin). The second bio-composite is a combination of prepregs of carbon fibre fabric / epoxy resin and flax fibre fabric / epoxy resin (CF-Flax/Epoxy). A single line infusion process has been used prior to the curing step in the autoclave. Both variants are exemplary for the possibility of introducing bio-based materials in high performance CFRP. In-plane and out-of-plane electrical conductivity tests have been conducted according to Airbus standards AITM2 0064 and AITM2 0065, respectively. Electromagnetic shielding effectiveness tests have been conducted based on the standard ASTM D 4935-10. Materials were prepared at the German Aerospace Center (DLR) while characterization tests were conducted at the University of Patras. In addition to the tests, numerical models of representative volume elements have been developed using the DIGIMAT software to predict the electrical conductivity of the two bio-composites. The preliminary numerical results show a good agreement with the experimental results.

## REFERENCES

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