LEAKAGE RATE MEASUREMENT THROUGH COMPOSITE LAYUP

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Abstract. Composite tanks are usually made with a liner which has a gas barrier function [1]. The use of linerless composite tank will minimize the weight and the cost of tank production. An experimental study is developed to characterize the graphite/epoxy permeability under thermomechanical loading.

A tank is submitted to thermomechanical loading (Fig.1.a). In order to identify the material mechanical damage behaviour, traction tests and observations are realised. Several layup are used to understand composite damage mechanisms like transverse cracks, fiber debonding [2]. The damage network induced leak path (Fig.1.b).

Figure 1: Layup damage / Leakage rate network.

This leakage rate traduces an apparent permeability of the composite material. The permeability coefficient is established with a Darcy/Knudsen fluid flow model. A device (Fig.2) able to perform leakage rate measurement under thermomechanical loading has been designed.
REFERENCES

