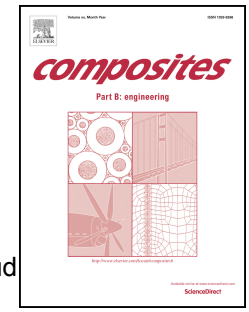
Accepted Manuscript



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PII: S1359-8368(15)00172-9

DOI: 10.1016/j.compositesb.2015.03.053

Reference: JCOMB 3487

To appear in: *Composites Part B*

Received Date: 7 January 2015

Revised Date: 16 February 2015

Accepted Date: 16 March 2015

Please cite this article as: Michels J, Widmann R, Czaderski C, Allahvirdizadeh R, Motavalli M, Glass transition evaluation of commercially available epoxy resins used for civil engineering applications, *Composites Part B* (2015), doi: 10.1016/j.compositesb.2015.03.053.

Glass transition evaluation of commercially available epoxy resins used for civil engineering applications

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Abstract

The paper presents a study about the glass transition of commercially available epoxy resins used for structural strengthening of concrete members for instance by means of Carbon Fiber Reinforced Polymer (CFRP) strips. Prior to an experimental investigation with a dynamic mechanical analysis (DMA), an overview on differences between definitions for the glass transition temperature T_g is given. Several testing recommendations are listed in this respect. Subsequently, DMA tests on three commercially available products are presented. A first focus is put on the different evaluation methods for one specific test result. It is visible that considerable differences in the finally adapted glass transition temperature might arise if one or the other procedure is followed. Additional parameters, such as curing procedure, specimen age, temperature history, and ultimate temperature during heating are considered, too. In all the above mentioned cases, differences in the glass transition can be found. Higher specimen age, higher ultimate temperature during testing, accelerated curing, as well as a lower heating rate implicate higher glass transition temperatures, showing that the glass transition temperature is not a fixed material characteristic. In a final step, the relevance for T_g for civil engineering applications is