



GEOPOLYMER COMPOSITES: WAY TO REALLY FIRE SAFE & FORMALDEHYDE-FREE AIRCRAFT INTERIORS

Geopolymers are anorganic (= zero carbon content) materials that can withstand temperatures in excess of 1 000°C producing almost no toxic products and keeping good residual strength.

Geopolymers can be utilized as matrix in fiber composites.

Geopolymers can be processed at low temperatures & pressures like common organic resins.

Geopolymer based composites features mechanical properties & density comparable to present used glass/phenolic prepreg laminates.

Geopolymer composites are a way to formaldehyde-free interior components.

Specificities of geopolymer fiber reinforced composites:

Due to high alkalinity of the resin, alkali resistant fibers (carbon, AR glass, ceramic, natural) are to be employed.

Physical (e.g. plasma) surface treatment of fibers is recommended for better fiber-to-matrix adhesion.

At the present there is no commercially available geopolymer resin system, therefore laminating resin GPL 30 was developed in VZLÚ Prague:

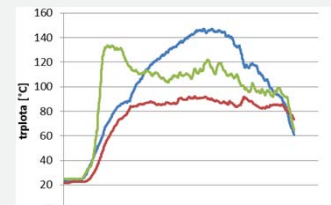
Variable curing parameters (RT to 100°C, p = 0,8 bar+) Flexural strength: 80-100 MPa (Araldite LY 5052: 116-122 MPa).



Carbon/geopolymer panel with „T“ integral stiffeners. Manufactured in single curing operation



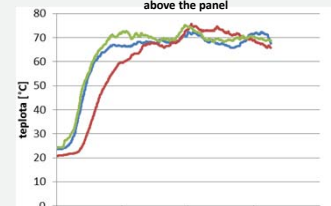
Glass/phenolic panel - Flame penetration test per FAA AC 20-135 (1st minute)



Glass/phenolic panel – Temperature 100 mm above the panel



Carbon/geopolymer panel - Flame penetration test per FAA AC 20-135 (15th minute)



Carbon/geopolymer panel – Temperature 100 mm above the panel

