Gurit's SE 70 reaches new heights:

The first prepreg to be cured in the stratosphere

5th June 2013, Gurit (SWX Swiss Exchange: GUR), a leading global manufacturer and supplier of composite materials, engineering, tooling, parts and systems contributed to a NASA research project, which looked at the development of polymeric material that is curable in the free space environment and useable in space construction projects. The full project report was released by NASA last month.

Future space exploration will require large, lightweight structures for habitats, greenhouses, space bases, space factories and so on. These projects are likely to require the preparation in terrestrial conditions of a prepreg, which can then be shipped uncured in a container into orbit and used for structural applications in space construction projects.

Dr Alexey Kondyurin, a Senior Research Fellow at the University of Sydney, Australia, led a team to investigate the effect of the stratospheric conditions on the polymerization process in the polymer matrix of a composite material, with Gurit providing its SE 70 carbon epoxy prepreg to the project.

Uncured samples of SE 70, along with one cured control sample, were stapled to a sleeve attached to an aluminium base, together making up the flight cassette. Once weather conditions were suitable, the cassette, weighing just 1kg, was fixed to the outside of the balloon's cabin, a telemetry unit.

The balloon was launched from Alice Springs Seven Mile Airport in Australia on April 16th 2010. Over the next three days the balloon and its payload, including the uncured SE 70 prepreg, was exposed in the stratosphere, and reached a maximum altitude of 40km. Temperature variations of -76 to 32.5 °C and pressure up to 2.1 torr were recorded during the flight.

After three days, the payload was separated from the balloon, and over 3 hours it descended by parachute to land nearly 1000km from the launch site.

The samples of SE 70 prepreg from the flight cassette, as well as those from the ground control cassette and the refrigerator control cassette, were analysed, with particular attention paid to the curing reaction and the degree of cross-linking. The final test of the curing ability of the materials after exposure in the stratosphere was carried out using Dynamical Mechanical Analysis of the samples, which had been cured over 3 days at

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80°C. The results show there was no significant difference between the glass transition temperatures (Tg) of the flight, ground control and refrigerated samples. This demonstrates that uncured samples of SE 70 prepreg can be delivered and stored in the stratosphere with no negative impact on its curing capability.

A subsequent project, which took place in November 2012, saw these same samples of Gurit's SE 70 prepreg cured at an altitude of 26 km during a stratospheric flight, resulting in it being the first prepreg in the world to be fully cured in the stratosphere. Analysis of the samples is ongoing and the full NASA report is yet to be published.

Both projects demonstrate that uncured prepreg can be prepared in terrestrial conditions and transported into space, for on-site curing. These results pave the way for further research into the exciting future of space construction.

About SE 70 epoxy prepreg

Gurit's SE 70 is a hot melt, low temperature cure, epoxy prepreg system. It has been developed for use in the construction of large components using low energy cure cycles. Excellent mechanical and toughness properties and can be achieved with a processing temperature of just 70°C / 160°F for 16 hours, enabling the use of lower cost tooling and ovens. SE 70 is widely used in sandwich structures with honeycomb, foam and balsa cores, primarily with the toughened SA 70 Adhesive Film.

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About Gurit: The companies of Gurit Holding AG, Wattwil/Switzerland, (SIX Swiss Exchange: GUR) are specialised in the development and manufacture of advanced composite materials, tooling systems, structural engineering solutions, and select finished parts. The comprehensive product range comprises epoxy and phenolic prepregs, SPRINT™, structural cores (CoreCell™, PVCell™, G-PET™ and Balsaflex™), epoxy Ampreg and PRIME™ laminating systems, Spabond adhesives, and other related products. Gurit is uniquely positioned to serve global growth markets, and has production sites and offices in Switzerland, Germany, the UK, Canada, Spain, Australia, New Zealand, the USA, Ecuador, Brazil, India and China.