

GMS Composites Develops a New Flame Retardant Epoxy Prepreg Certified to UL94 V0

The specialist composite prepreg producer, GMS Composites, has developed a new, high performance flame retardant (FR) epoxy prepreg with increased toughness and a significantly shorter gel time, which passes the UL94 V0 flammability rating. The new FR grade, GMS EP-540 is a non-halogenated epoxy resin matrix prepreg, replacing EP-530, a previously developed FR grade which had an average 16 minute gel time at a 120 °C mould temperature; the new EP-540 grade has a significantly faster gel time down to only 6 minutes at 120 °C for thinner laminates, with parts fully cured within 2 hours.

Having a faster cycle time was a critical objective to appeal to Motorsport OEMs, which is a key automotive target market, as well other sectors needing high FR rated prepregged composite parts, such as powerboat racing, aerospace, defence, rail and hazardous goods vehicles. Having a fast cure epoxy prepreg which meets UL94 V0 has opened the door for GMS Composites to trial its new FR epoxy prepreg for carbon fibre (CF) composites parts in GT3, GTE, rally cross and similar racing car classes, as UL94 V0 is one of the critical fire standards required by FIA (Federation International de L'automobile). The UL94 standard rates the ignition characteristics of plastic materials. To achieve the highest V0 flammability resistance rating for UL94, test samples are placed vertically with a specified test flame applied from below directly on the bottom of the sample; all flaming combustion must extinguish within 10 seconds, and without burning to the top clamp or dripping molten material.

According to GMS Composites test data** in its published datasheet, the new EP-540 epoxy prepreg has a tensile strength of 460 MPa, flexural strength 578 MPa, with an Izod Impact strength of 230 J/m. Fire performance data provided shows that the UL94 V0 rating is comfortably achieved in the most demanding vertical flame test, recording an average burning time of only 3 seconds, 7 seconds less than the maximum allowable combustion time to meet the V0 rating, and 2 seconds less than the old EP-530 grade it replaces, reflecting the superior performance of the new FR formulation that GMS Composites has successfully developed.

The resin formulation of GMS EP-540 provides a high degree of processing versatility, with a range of cure cycles, pressures and ramp up rate options possible depending on the part being produced; the tack can also be varied. The curing cycle for GMS EP-540 can be as low as 80 °C up to a maximum of 150 °C, offering moulders processing flexibility, in or out of autoclave, to precisely suit the specific production parameters needed for making either large and small parts with any required laminate specification; the grade is compatible with all standard sandwich core materials, as well as carbon, glass and aramid fibre reinforcements. GMS EP-540 prepreg has a shelf life in excess of 6 weeks at a 23 °C ambient temperature and 12 months in -18 °C cold storage conditions.

A key strength of the company is its ability to develop and supply custom design prepregs, with highly flexible production facilities for supplying prototype and smaller volume batches for niche application requirements, right up to higher volume production orders. For its customers, the time and cost savings in using this custom design prepreg service have been tangible; by providing prepreg prototype materials within a relatively short time frame, GMS Composites has helped a number of OEM companies in Aerospace, Defence and Motorsports to accelerate research projects, and to develop and commercialise new end use products faster.

This latest FR grade development for an automotive project is a good example of the expertise, in-house technical skills and dogged approach taken by the GMS Composites team. Managing Director, Sam Weller commented: *“We developed this improved performance FR prepreg in direct response to feedback about our old FR grade from design and process engineers working for two leading OEM automotive companies producing Motorsport super cars. With this automotive application, certification to UL94 V0 was the critical factor, so meeting this demanding fire specification whilst balancing and improving both the mechanical and processing properties of the prepreg system was a real challenge, but we persevered.”* After recent trials of the new EP-540 grade carried out by these two major automotive OEMs on new CF composite parts for Motorsport racing versions of super car models, the feedback on the new EP-540 grade is very positive, now meeting both design engineering and processing needs.

All GMS Composites prepreg resins, including specialist epoxy based formulations and BMI resin based tooling grades are manufactured to ISO 9001:2008 accredited quality assurance systems and procedures at its main factory in Melbourne, Australia. The production facilities are set up as a flexible, lean manufacturing operation able to offer very responsive ‘made to order’ lead times, coupled with a global airfreight delivery service.

For more information about full range of moulding and tooling resin systems and custom prepreg design services provided by GMS Composites Pty Ltd., go to www.gmscomposites.com.

[++: Properties based on testing at 23 °C samples of cured, 3mm thick laminate, T300 carbon fibre, 200gsm 2 x 2 twill fabric, cure cycle 1hr at 120 °C, vacuum bag]

End.

[Word Count: 862]

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Websites featured in this article www.gmscomposites.com

Photos & Captions:



Photo 1: Automotive UL94 V0 FR rated CF reinforced part autoclave cured from GMS EP-540

Photo 1 caption: For thinner laminates, GMS EP-540 FR prepreg has a rapid gel time down to as short as 6 minutes at 120 °C, with parts fully cured within 2 hours.

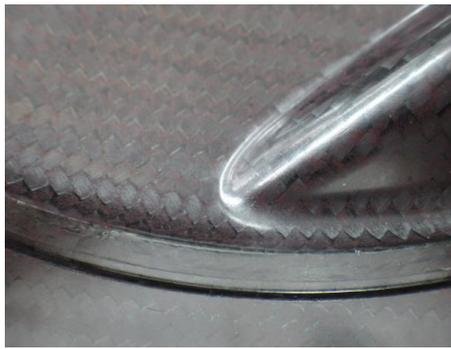


Photo 2 (a) and (b) : Close up of Automotive UL94 V0 FR rated CF reinforced part autoclave cured from GMS EP-540 FR prepreg

Photo 2 caption: GMS EP-540 FR epoxy prepreg is fully compatible with all standard sandwich core materials, as well as carbon, glass and aramid fibre reinforcements.

About GMS Composites

GMS Composites is located in the Melbourne suburb of Dandenong South, Victoria, Australia, where they have their R & D, production and warehousing operations. GMS Composites has been manufacturing epoxy prepregs for over 15 years and now have an established range of over 10 different prepregs resins systems, which cover a wide range of industries including: aerospace, defence, ballistics, rail, motorsport, automotive and tooling. GMS Composites also provide CNC machining services and distributes nationally across Australia a wide range of vacuum consumables, reinforcement fabrics, cores and mould release agents from leading global ancillary and reinforcement suppliers.

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