

USERS' PLATFORM

Buses & Trucks

Tougher fire-rated bus parts thanks to intumescent topcoat

Wright Composites manufactures a range of passenger vehicle FRP parts to demanding quality standards, high mechanical performance levels and stringent fire resistance specifications. To achieve all these key criteria, Wright Composites only uses Scott Bader's Crystic® Class 1 and 2 fire retardant and HDT resin systems in combination with the Crystic® Fireguard 75PA Excel intumescent topcoat and a variety of woven and CSM reinforcements and Airex® foams.

The laminate structure of each part is designed in-house to match the needs of the application as cost effectively as possible. The Wright Composites (part of the Wright Group, located in Galgorm, Ballymena, Northern Ireland) team discovered that using Crystic Fireguard 75PA Excel enables them to produce much tougher BS 476 Class 1 fire-rated bus parts, such as electrical enclosures, interior floor sections, roof panels, engine and driver cab panels. These parts are then supplied to the sister company, Wrightbus, as well as other vehicle manufacturing customers.

Passive fire protective barrier

When applied to a cured FRP laminate surface, an intumescent topcoat such as Crystic Fireguard 75PA Excel provides a passive barrier to block the path of a fire. Fire protection is ensured by its unique chemistry and its reaction when exposed to a direct flame. In simple terms, when fire attacks the intumescent topcoat, it causes a chemical reaction which makes the topcoat expand to form a non-flammable protective layer that insulates the surface over which it has been applied. While it will not protect indefinitely from an unchecked fire, the topcoat can withstand a direct flame at a temperature of 700°C for over 60

minutes without the laminate behind catching fire. This is a significant period of time to contain a fire and prevent it from rapidly spreading, which can help to avoid catastrophic fire damage and save lives.

The new intumescent topcoat is a product upgrade. The long-established Crystic 75PA has been reformulated by Scott Bader's R&D team (Fig. 1). The new "Excel" version offers better fire

retardant (FR) properties and significant handling improvements, yet is still cured with a standard MEKP catalyst (2% addition by weight). The original Crystic 75PA has been specified for over 30 years in critical internal applications which need to meet BS 476 Part 6 Class 0 or BS 476 Part 7 Class 1 FR test standards. It has been used for interior parts in buildings, rail and other public transport vehicles, as well as in the marine sector where it is used to protect the engine compartments of both pleasure craft and working boats. The most recent successful new applications, now with Crystic Fireguard 75PA Excel, have been produced by Wright Composites for a range of different Wrightbus parts which can go up to 10 sq. metres in size.

Raising quality standards

Established since 2005, Wright Composites has developed into a significant stand-alone business with a dedicated workforce of 120 employees operating from their modern, purpose-built 4,800 sq. m production facilities. This ISO 9001-2008 accredited company manufactures components for the Wrightbus vehicle range, currently meeting approximately 70% of the Group's OEM passenger vehicle composites needs, as well as supplying the bus aftermarket customer base and

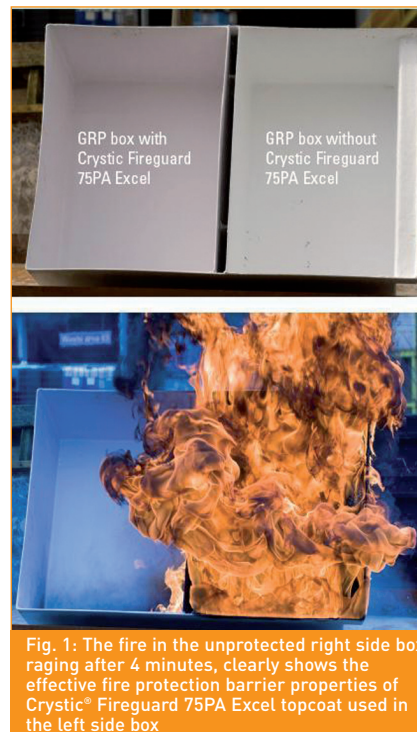


Fig. 1: The fire in the unprotected right side box raging after 4 minutes, clearly shows the effective fire protection barrier properties of Crystic® Fireguard 75PA Excel topcoat used in the left side box

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Fig. 2: The Wrightbus is fitted with the rear wheel arch part shown in picture 3, one on each side (up). All parts of the StreetCar RTV are supplied by Wright Composites and used in the occupant compartments of a motor vehicle must meet stringent fire safety standards (down)

a variety of other industry sectors (Fig. 2). Led by General Manager Mr. Andy Colhoun, the company strongly focuses on looking for innovative ways to raise quality standards and deliver what customers need, while controlling costs and improving productivity. The team spends a lot of time re-evaluating the raw materials and reinforcements available, ways to improve laminate designs, and their production methods. Significant investments have been made over the years to increase production capacity and productivity to keep pace with growing demand. Depending on the part size, type and numbers needed, they now have the flexibility to make components by hand layup, spray layup or light resin transfer moulding (LRTM). They have a

dedicated LRTM facility that uses closed mould systems from MVP and Composite Integration.

Spreading the use

The company has been using Crystic Fireguard 75PA for many years. In 2010, they switched to the new 75PA Excel version. Laminators on the production floor of Wright Composites claim it has improved consistency and cure, with much better handling ability. Overall, they found it easy to apply by brush or with a roller and that it was touch dry "tack free" within 30 minutes, a big boost for shop floor productivity (Fig. 3).

These product improvements have encouraged Wright Composites to think about how they can use the benefits of an FR intumescent topcoat more widely. They have come up with a number of innovative new ideas to either improve the mechanical performance of a part or to reduce cost and scrap.

On the performance improvement side, they have successfully proved and implemented a BS 474 Class 1 FR specification using Crystic Fireguard 75PA Excel in combination with a Class 2 rated Crystic FR resin, offering improved toughness without compromising the required FR rating for the part. As Andy Colhoun commented: "We chose Crystic Fireguard 75PA Excel because it provides us with a Class 1 fire-rated part and a mechanically better laminate system compared with other Class 1 laminate system options. In our experience, Class 1 resin systems tend to be brittle by nature. By using Crystic

Fireguard 75PA Excel, we can achieve the superior structural benefits that come with our Class 2 resin system, while providing a Class 1 fire rating at the same time. Customers benefit from having FR rated parts with tougher performance capabilities in use."



Fig. 3: Laminators at Wright Composites found Crystic® Fireguard 75PA Excel intumescent topcoat easy to apply by brush or with a roller and that it was touch dry "tack free" within 30 minutes

Cost saving

On the cost saving side, they are currently working on a creative idea that involves using Crystic Fireguard 75PA Excel as a "retrofit" FR refurbishment product. This could be a double win for both aftermarket vehicle customers and the environment. Rather than replacing an entire composite part, Wright Composites is looking at the overall costs and feasibility of applying the topcoat to certain critical FRP parts fitted on vehicles currently in service which must have their FR rating upgraded to comply with the latest legislation. The expectation is that this "retrofit" FR upgrade idea will offer significant cost-saving opportunities for some customers, while being environmentally friendly as it can extend the life of a part and help to reduce the amount of FRP scrap from public transport vehicles. ■

More information:

www.scottbader.com

www.wright-composites.com

All photos are courtesy of Wright Composites® and Wrightbus®

+ About Scott Bader

Scott Bader was established in 1921. Today it is a £180 million multinational chemical company, employing 560 people worldwide. It is a common trusteeship company, having no external shareholders, with a strong commitment to support its customers, workforce and the environment.

Scott Bader's headquarters is based in the UK where they have purpose-built, state-of-the-art technical facilities that provide R&D as well as complete evaluation, testing and application support. They have manufacturing facilities in the UK, France, Croatia, the Middle East and South Africa.