Coating Systems for Composites

Indestructible
specialist coatings manufacture

Primers, Fillers and Finishes, Intumescents, Thermal Barrier and Fire Resistant and Erosion Resistant

The use of composites in the manufacture of components for the aerospace, automotive and allied industries has been and is still increasing. Composites are now being used and investigated for use in most areas of aircraft production and across other innovative areas of industry.

The requirements of coatings for use on these composite components can be very different from those used on metals, and can present challenges to coatings formulators and manufacturers.

In this brochure we detail specially formulated sealers, primers and finishes for composites, as well as coatings for more specialised applications to include intumescent and flame retardant; thermal barrier and erosion resistance.

Our development team are constantly working on new, innovative coatings for the evolving new uses of composites in all industries.

Low VOC 2 Component Epoxy Sealants

Used as a sealer coat in composites in areas of varying surface finish, to seal resin weak areas, and provide a smooth, sealed surface for further priming and finishing. Available as a clear, or more typically green or black tint to aid application. Can be used with fast set up catalyst to provide fast curing and overcoating.

Engine nose cone coated with 2 component sealer plus EROS Elastomeric top coat.

Low VOC 2 Component Epoxy Primers

A range of primers specifically formulated for use on composites, based on the latest ultra low VOC systems and utilising environmentally friendly solvent systems.

Primer-Surfacer IP3-00015 is designed for use as a post mould application, and is available in white, grey and black. Typically used as the first coat primer for many applications, including helicopter air frames; propellers. Formulated to give easy sanding properties to provide a sound base for finishing with epoxy or polyurethane finishes. Can be applied directly to typical epoxy composites, or over epoxy sealant described above. Complies with Def Stan 80-216.

Lightweight Primer-Filler IP3-00019 can be used where high build is an advantage; the primer is readily applied to high film thicknesses in minimal coats. The low specific gravity reduces overall weight of the component, making this material ideal for use in weight sensitive aerospace applications. As an example, when used as the primer for aircraft interior parts (seat backs; luggage locker doors etc), against a conventional primer it has been found that weight savings in excess of 80kg per aircraft are possible.

Good sanding properties allied to the higher build provides a perfect base for future decoration with minimal topcoat application and resultant faster production rates.

The filler component used to provide the exceptional filling properties and the lightness in weight provides an additional advantage acting as a thermal barrier to reduce the speed of heat transmission through the coating.

In-Mould Priming

In-mould priming has been found to alleviate many of the issues associated with resin weak surfaces, and to reduce to almost nil the need for hand filling and stopping of composite components.

Low VOC Epoxy In-Mould Primer is almost always used with fast set up catalyst, and is applied to the inside of the

moulding tool. After curing the mould is laid up either with a pre-preg system, or fibre matting and resin injected. On removal of the part after curing, the primer surface has become an integral part of the component, and the surface will mirror the smooth internal finish of the mould.

Finishing Systems

In the majority of cases, finishes for composite parts are based on polyurethane systems, although for internal use or for high chemical resistance epoxies would be the choice.

IP6 range of Low VOC Polyurethanes would be the typical finish. These are formulated to meet the requirements of BS2X34A&B, and in addition meet several aerospace primes specifications. The range is available in gloss to matt finishes, including infra-red reflectant. They are used extensively for example on the HAL DHRUV and LCH helicopters over the IP3-00015 primer.

Variants of the IP6 Range include:

IP-STAT6-BLACK Conductive Matt Black, which is formulated as an anti-static coating that will transmit an electrical current for use on propeller blades etc. The product meets the requirements of PS5006/5632.

This product exhibits the chemical and mechanical performance of the standard IP6 products.

Where an epoxy coating would be more relevant, the best choice would be the **IP3 Range** of low VOC systems.

These are available in matt to gloss finishes and meet the requirements of defence standard 80-161 and several manufacturer specifications.

In certain applications, greater erosion resistance is required, both particle and rain. In these instances, the **EROS Range of Elastomeric Polyurethanes** would be specified. The coating is usually supplied as a three component kit, and can be both clear or pigmented. Typical example uses include: aero engine noise spinners and propeller blades; in both cases as a clear coating over pigmented two component epoxy basecoats, and on radomes as a specially pigmented but 'electrically transparent' finish.The systems have been tested for both particle (grit) and rain erosion, and the pigmented version on radomes meet the requirements of SAE-AMS-C-83231.

Intumescent and Thermal Barrier Coatings

Although being formulated originally for use on metal components in fuel systems, intumescent coating systems are now being widely adopted as coatings for composites to protect components and structural sections from both heat and fire.

2 Component Epoxy Intumescent IP9189A/B was specified about 10 years ago as the protective coating on composite doors for helicopters. Using the experience gained from this, many other projects where composite components need protection from heat and fire have been examined, including electronic control boxes, airframe structural components amongst many. In most cases the intumescent coating has been applied over the green tinted sealer coat and overcoated with either polyurethane or epoxy fire resistant finish coat.

Depending upon total film thickness, up to 15 minutes protection from fire and thoroughput of heat can be achieved.

Where the major requirement is the prevention of thoroughput heat, **Thermal Intumescent Coating IP1265** can be considered. This does not intumesce in a fire to the extent of the IP9189, but provides a higher thermal barrier property.

Development Systems

The increasing use of composite components in the design and build of both aerospace and automotive vehicles, and its use in all areas of industry is producing new challenges for coatings and coatings performance.

We see the use of nano particles in composite coatings as an emerging technology advancement that provides properties from the coatings not previously considered.

Increased surface hardness; electrically conductive coatings and even 'bruisable' coatings will, without doubt, become more readily available as a result of our increased development of coatings for composites.

Developments of water based systems, both epoxy and polyurethane, as alternatives to the low VOC IP3 and IP6 ranges is ongoing.

Of particular interest are the new water based 2 component epoxy primers, which show exceptional chemical resistance, including up to 1000 hours resistance to Skydrol. These are typically latest generation chrome free materials, which exhibit excellent corrosion resistance.

Indestructible
specialist coatings manufacture

16-25 Pentos Drive, Sparkhill, Birmingham, B11 3TA, UK
Tel: +44 (0)121 702 2485 Fax: +44 (0)121 778 4338
sales@indestructible.co.uk www.indestructible.co.uk