

IPAS 666

The Ipcote Range of Inorganic Sacrificial Coatings

General Information

The lpcote range of aluminium basecoats and clear and coloured sealcoats are based on inorganic chemistry and therefore require a slightly different approach to their application procedure, compared to conventional organic coatings.

A lot of mystique has been built up as to the complexity and difficulty of the application, but if a few simple rules are followed then the application of this range is no more difficult than with conventional organic systems.

Surface Preparation

The cleanliness of the surface of the substrate is important to the success of the application of sacrificial coatings. As a minimum, the parts to be coated should be thoroughly degreased with either solvent based or aqueous degreasers.

It is positively recommended that all surfaces should be thoroughly grit-blasted using 120 / 200 aluminium oxide grit (or as client specified), to a smooth even surface. After grit blasting the components should be thoroughly cleaned to remove any surface debris that may become trapped in the applied coating.

Product Preparation

Ipcote basecoats and Ipseal sealcoats both need significant agitation before spraying. Whilst the range is more stable and less prone to settling than competitive products, basecoats should be spatullad up and then rolled on paint rollers for a minimum 24 hours before application. Paint shakers can be considered, but these tend to be aggressive and lead to foaming of the coating, which needs to be allowed to disperse before application. Suitable rollers specifically designed for this purpose are available from Indestructible; please ask our sales office for a copy of the technical information sheet. On 5 litre bottles, it is recommended that a maximum rotation speed of 60rpm be set to ensure full mixing.

Seal coats need less mixing and whilst most clients use the paint rollers, shakers can be used. To ensure continuity of mixing, it is recommended that bottles in use be kept turning on the rollers.

Spray Gun Selection

The lpcote range has been successfully applied through most types of spray gun, including conventional (Binks-Bullows 230 / 630; DeVilbiss JGA); HVLP and the latest range of 'compliant'.

Our laboratory and technical services team, in conjunction with clients, have run trials with several types of spray guns, and whilst we do not favour any spray gun manufacturer, can suggest the following guns, dependent upon component shape / size to be coated:

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General Application

DeVilibiss Advance HD Compliant; Gravity or Suction Feed

Fine / Complex Shapes

DeVilbiss Sri-Pro 'SMART' Gravity Feed

From our trials, we have found the following gun set ups and air pressures give the best application:

Manufacturer	Gun Design	Nozzle/Aircap Set Up	Working Pressure
General Use / Large Components			
DeVilbiss	Advance HD Compliant; Transtech Gravity Feed	1.3mm 510+ Transtech	2 bar (29psi)
DeVilbiss	Advance HD Compliant; Transtech Suction Feed	1.6mm 510+ Transtech	2 bar (29psi)
Fine Application / Complex-Intricate Shape			
DeVilbiss	Sri-Pro SMART Fine Finish Spray Gun	1.0mm Transtech SRI- PRO-TS1	2 bar (29psi)

These recommendations apply not only to the range of basecoats, but also clear and pigmented sealcoats.

There are more and more requirements to apply both lpcote basecoat and lpseal sealcoats to the internal diameters of shafts. In conjunction with application equipment manufacturers and clients we have evaluated several 'lance' systems, and can suggest the following set up as being ideal for both lpcote and lpseal:

- DeVilbiss Advance HD Conventional Gun: pressure pot feed
- Extension / Lance type 'C' (360° circular spray) part number EXTADV-C-XX with 52-363 TIP

Ipcote has been successfully applied by electrostatic gun, although care must be taken to use an isolated system, as the range, being water based, can cause tracking back.

Spray Room Conditions

The lpcote range of products contain no solvents and are carried in de-ionised water as the diluent. It should be remembered that water has a different rate of evaporation compared to organic solvents, and therefore attention must be paid to the climatic conditions of the spray area.

It is normal to apply the products in the positive pressure spray booth, although this is not an essential. It is preferable to use a 'dry back' extraction system.

Where possible temperature and humidity should be controlled, to be within the following ranges:

Temperature – 12-30°C (55-85°F) Humidity – 35-70% RH

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Application Techniques: Basecoats and Sealcoats

It is important to use a slightly different technique to apply the Ipcote range compared to conventional organic coatings.

When wet the basecoats will be green in colour; they must be allowed to flash off to a matt grey appearance before further application.

It is recommended that a fine even mist coat is first applied to the surface of the component. Once this has flashed off, one or two further fine but wet coats can be applied, dependent upon final film thickness specification, allowing to flash off between coats. The basecoats are usually applied at supply viscosity, but can be thinned if required with up to 10% de-ionised water.

Using this process it is relatively simple to achieve the required film thickness, usually 35-100 microns. Where thinner films are specified, usually on mating surfaces or similar, these are readily achieved with one fine coat, or by the use of IP9356 lpthin, specially formulated to give film thicknesses of 12-15 microns.

Before application of sealcoats, basecoats that have been low temperature cured and bead peened may be oxidised/thermally cleaned by heating in a furnace for a minimum of 30 minutes at 200-350°C (392-662°F). After this oxidation process, allow the components to cool to a maximum of 40°C (104°F) before application of the sealcoat.

Sealcoats are usually applied to a film thickness range of 3-7 microns. Whilst the sealcoats in the lpcote range are regarded as easier to apply than competitor products, it is recommended they are applied in several thin soft coats, rather than one full coat.

Basecoat Processing

As an applied, but uncured coating, Ipcote range basecoats are susceptible to uptake of moisture. Known as 'greening back', the applied coating reverts from the matt grey appearance to a wet green colour. If this occurs, the process cannot be reversed and the suspect coating must be removed.

To prevent this, it is recommended that the components with applied but uncured basecoats are kept in a warm, medium humidity atmosphere. The use of infrared heating lamps can be considered. At this stage, any masking with standard, non-high temperature, masking tape can be carefully removed, but it must be remembered that the applied coating can be easily damaged.

Final Cure

Depending upon the specifier, the alloy of the component, and the performance required, several curing processes can be used. The minimum temperature at which Ipcote basecoats can be cured is 265°C (510°F). Below are listed several curing schedules specified by end users, but these should be read as a guide and attention paid to the end user's specifications.

The curing process can affect the surface smoothness of the applied coating. It has been found that higher curing temperatures, which do not need further processing for sacrificiality, give smoother surface finishes, as low as 8-12µin Ra (0.010" cut off).

Indestructible ® specialist coatings manufacture

- Process 'A' High Temperature: No Peening Required

Flash Off: minimum of 15 minutes to a grey matt finish

Pre-Cure: 1 hour @ 190°C (375°F). At this stage film thickness can be checked, and further coats applied if/as required. This stage may be omitted if thickness checking and/or removal of masking is not required before full cure.

Cure: Following 190°C pre-cure, the component shall then be loaded into a furnace not exceeding 350°C (660°F) and the temperature raised to 560°C (1040°F); and maintained at this temperature for minimum 1 hour. Alternatively, the coating is loaded into an oven not exceeding 80°C and the temperature raised to the Cure temperature before holding for the specified time.

Alternative Schedules: 2 hours @ 540°C (1004°F); 4 hours @ 515°C (960°F)

Final cure will produce conductive coating.

Process 'B' Normal Temperature – Peening Required for Conductivity

Flash off: minimum of15 minutes to a grey matt finish

Pre-Cure: 1 hour @ 190°C (375°F). At this stage film thicknesses can be checked, and further coats applied if / as required. This stage may be omitted if thickness checking and/or removal of masking is not required before full cure.

Cure: Following 190°C pre-cure, the temperature of the furnace is then raised to 350°C (660°F); and maintained at this temperature for 1 hour.

Alternatively, the coating is loaded into an oven not exceeding 80°C and the temperature raised to the Cure temperature before holding for the specified time.

Alternative Schedules: 2 hours @ 300°C (572°F)

Cured coating will require further processing (bead peening) to produce a conductive coating

- Process for Undercarriages: Low Temperature: Peening Required for Conductivity

Flash off: minimum of 15 minutes to a grey matt finish

Pre-Cure: 1 hour @ 190°C (375°F). At this stage film thicknesses can be checked, and further coats applied if / as required



Cure: The temperature of the furnace is then raised to 265°C (509°F); and maintained at this temperature for 1 hour.

Cured coating will require further processing (bead peening) to produce conductive coating

Peening Process

Normally Bead Peening is done with 120 / 220 alumina grit, or 0-40 grade Soda Lime (Glass) Beads, depending upon the specification and required finish. Alumina grit will achieve a surface finish of typically 25-40µin Ra (0.030" cut off) or 15-20µin Ra (at 0.010" cut off).

For smoother surface finishes, typically 10-23µin Ra (0.030") or 8-13µin Ra (0.010"), burnish using 0-40 grade soda lime beads to CSS8.

Other media may be used subject to client specific specifications. It is recommended that any processing specifications from the end user are thoroughly checked before production is started.

Sealcoat Processing

Ipseal IP9184 Green and Khaki

Flash off: Minimum of 15 minutes; the sealcoat should be allowed to dry to a matt appearance before curing *Pre-Cure:* 30 minutes @ 80°C (175°F)

Cure: Raise the temperature to 350°C (662°F) and stove for a minimum of 30 minutes {NB: for undercarriage processing, cure at 265°C (509°F)}

Smoothseal IP9444

To achieve golden colour normally required:

Flash off: minimum of 15 minutes; the sealcoat should be allowed to dry to a matt appearance before curing *Pre-Cure:* 30 minutes @ 80°C (175°F)

Cure: Raise the temperature to 250°C (482°F) and stove for a minimum of 30 minutes

Note: If higher curing temperature, up to 350°C (662°F) is used, the cured coating will be semi opaque white rather than translucent gold.

Organic Sealcoats

Several developments are ongoing with organic, chrome free sealcoats. Please consult out technical team for further information and updates.

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