

IPAS 21

Rockhard Baking Products

Typical but not exclusive application specification for heat cured epoxy paint systems

Product Ranges Covered:

Rockhard stoving products; IP985 Range; 700-155-003; 985-111-800; 985-000-693; IP9156; 690-152-004; IP985-Bleu TM; IP985-A275 and many others.

Our paints and coatings are used by many customers; many of these customers are in aerospace and have their own application specification which will obviously override this IPC spec.

We cannot cover every method or process; this is simply a good process which we know works. It is very usual to call us and ask if processes not included can be considered for use

This range of baking products are excellent for use on magnesium, aluminium; steel; titanium and other metals.

The Range includes:

Clear sealant (including dyed variants-green) IP985-111-800; IP985-547; IP985-A275 generally only used on magnesium.

Primers (chromate 700-155-003 non chromate IP985-6500) note that we only recommend the chromate primer for direct application to magnesium

Top coats in a range of colours and gloss levels.

Reasons for variations of these paints include; different solvents; removal of EGA; removal of toluene; variance in VOC levels; variance in viscosity / specific gravity (SG); different colours; chromate and non-chromate primers.

Please note that this data sheet covers heat curing materials that must be cured at a minimum of 165°C full metal temperature. Cross linking will not take place at any lower temperature.

However, we have also developed a low curing clear variant (IP985-125) for use in overhauling magnesium helicopter gear boxes and very large new castings such as that on the Sikorsky S53. Typical curing schedule: 4 hours at 125°C although it can also be cured at 140 / 150°C; refer to separate process sheet.

Specifications that these products are approved to, that will override these instructions:

Rolls Royce MSRR 9226; Turbomeca LB 569; Sikorsky SS8688; Pratt and Whitney Canada CPW 489; DTD 911c; DTD 935; DTD 5562; MTU MTS 1012; BMW Rolls Royce; McDonnell Douglas HP 4-133; Williams International CP4240; Hamilton Sundstrand HS 4675; Allied Signal (Textron Lycoming) FP5109; P6426; P6404;

Parker Hannifin (Nicholas Aero engine division) MCS 145; British Aerospace S26.3506; Eurocopter ECS-2178 (primer + coloured topcoats); Eurocopter ECS-2264 (IP985-547 Varnish)

Previous Reference 444 / 480 (or 408 according to BAEP 3506) GE Engine spec A 8B 89A 1 GE – A8B84-S

1. Scope

This specification covers the Application of heat cured epoxy clear, primer and top coat whose primary use is for the corrosion protection of aluminium and magnesium alloy components, but the system can also be applied to steels and other metallic components. The clear is general only used as a sealer for anodised or pre-treated magnesium.

2. Process Work Instructions

This process required Sequential Work Instructions. The work instructions shall include the general information and parameters defined in general painting instructions and the additional requirements of this specification.

3. Paint Preparation

Prepare the material by thorough mixing (if pigmented) and thin as necessary with the appropriate thinners as recommended. The recommended Thinner / Reducer addition is up to 20% by volume. Where an application requires a higher level of addition please refer to Indestructible Technical department for advice. Component geometry and / or local environmental conditions can lead to a requirement for Thinner / Reducer additions greater than 20%.

4. Application

4.1. Epoxy Primer

- 4.1.1. Spray the paint on the component at the spreading rate sufficient to produce a single dry coat with a film thickness of $(20 \pm 5) \mu\text{m}$ unless otherwise specified and allow to dry, with free air access, for a minimum of 10 minutes.
- 4.1.2. If a second coat is required then repeat clause 4.1.1
- 4.1.3. The coated component shall be loaded into a suitable air circulating oven at room temperature (or not greater than $150 \pm 5^\circ\text{C}$) and heat cured for 30 minutes at $150 \pm 5^\circ\text{C}$
- 4.1.4. Components that are to be coated in primer only shall be loaded into a suitable air circulating oven at room temperature (or not greater than $150 \pm 5^\circ\text{C}$) and cured to one of the following schedules:
 - 45 minutes at $190 \pm 5^\circ\text{C}$
 - 60 minutes at $180 \pm 5^\circ\text{C}$
 - At least 90 minutes at $170 \pm 5^\circ\text{C}$

All these schedules require the metal piece to achieve this temperature before the clock started (known in the UK as full or peak metal temperature)

4.2. Epoxy Top Coat

- 4.2.1. Spray the paint on the component, that has been coated in accordance with Clause 4.1 at a spreading rate sufficient to produce a single dry coat with a film thickness of $(25\pm 5)\mu\text{m}$, unless otherwise specified and allow to dry, with free air access, for a minimum of 10 minutes
- 4.2.2. Apply a second coat, unless otherwise specified, in accordance with Clause 4.2.2
- 4.2.3. The coated component shall be loaded into a suitable air circulating oven at room temperature (or not greater than $150\pm 5^\circ\text{C}$) and heat cured for 30 minutes at $150\pm 5^\circ\text{C}$
- 4.2.4. Where further coats are required then repeat clauses 4.2.1-4.2.3 until the desired thickness is achieved
- 4.2.5. The final coat shall be cured to one of the following schedules:
- 45 minutes at $190\pm 5^\circ\text{C}$
 - 60 minutes at $180\pm 5^\circ\text{C}$
 - At least 90 minutes at $170\pm 5^\circ\text{C}$

All these schedules require the metal piece to achieve this temperature before the clock is started (known in the UK as full or peak metal temperature)

Maximum chemical resistance will be achieved when the final coat is cured for 60 minutes 180°C

4.3. Epoxy Clear

- 4.3.1. Spray the clear on the component at a spreading rate sufficient to produce a single dry coat with a film thickness of $(15\pm)\mu\text{m}$ unless otherwise specified and allow to dry, with free air access, for a minimum of 10 minutes
- 4.3.2. If a second coat is required then repeat clause 4.3.1
- 4.3.3. The coated component shall be loaded into a suitable air circulating oven at room temperature (or not greater than $150\pm 5^\circ\text{C}$) and heat cured for 15 minutes @ $180\pm 5^\circ\text{C}$ (30 minutes at $150\pm 5^\circ\text{C}$)
- 4.3.4. Where further coats are required then repeat clauses 4.3.1-4.3.3 until the desired thickness is achieved
- 4.3.5. The final coat shall be cured to one of the following schedules:
- 45 minutes at $190\pm 5^\circ\text{C}$
 - 60 minutes at $180\pm 5^\circ\text{C}$
 - At least 90 minutes at $170\pm 5^\circ\text{C}$

All these schedules require the metal piece to achieve this temperature before the clock is started (known in the UK as full or peak metal temperature)

Maximum chemical resistance will be achieved when the final coat is cured for 60 minutes 180°C

Further information

1. All materials shall be from the same manufacturer
2. If for whatever reason, the curing temperature are unacceptable, consult Indestructible Paint's Laboratories
3. Where thinner coatings, especially primer and clear, are required (e.g. close tolerance surfaces) then the material shall be further thinned until the desired dry coat thickness is achieved
4. The drying time immediately prior to curing is essential where static ovens are used. If conveyor ovens are used, the temperature increase is gradual and air drying is not necessary
5. The primer may darken when heated above 150°C and particularly when under load from bolted joints. This is acceptable providing the primer remains physically undamaged
6. On components where attrition coatings are specified, it is essential that all materials are cured to 150°C only if application of the attrition coating is carried out after painting. The final cure at 190°C will be achieved during subsequent curing of the attrition coating
7. For magnesium components, it is recommended not to exceed 100 microns total scheme thickness as loss of adhesion could occur. **N.B:** coatings down to 10 microns are currently used

5. Touch-Up

- 5.1. The coating immediately adjacent to the damaged area shall be degreased in accordance with specs, rubbed down and the edge of the paint feathered using either 240 or 320 grade abrasive paper depending on the roughness of the surface
- 5.2. Damaged areas of chromated magnesium parts shall then be treated
- 5.3. Damaged areas of anodised aluminium parts shall then be treated
- 5.4. Damaged areas of chromated aluminium parts shall then be treated
- 5.5. The prepared surface shall finally be degreased in accordance with specs. Evaporation of the solvent shall be complete before the touch up is applied
- 5.6. Where possible, the damaged area shall be repaired using the appropriate material according to Clause 4. If spraying is not possible then brushing is allowed
- 5.7. If, for whatever reason, curing is not possible, the room temperature curing two part epoxy (IP9064 or IP3 range) or epoxy / polyurethane (IP6) paint systems shall be used in accordance with their correspondence process

6. Storage and Shelf Life

- 6.1. Materials should not be used if the expiry date stated on the can and/ or that recorded in the materials release note is exceeded. Material outside the stated expiry date may be given an extended life in accordance with the requirements of the manufacturer of customer and the relevant material specification.
- 6.2. Storage of materials shall be in an approved stored with a temperature between 10°C and 30°C

The information printed in this publication is based upon the research and experience of Indestructible Paint Ltd. No representation of warranty is made, however, concerning the accuracy or completeness of the information presented in this publication. Indestructible Paint Ltd make no warranty or representation of any kind, express or implied. Including without information limitation any warranty or merchantability or fitness for any particular purpose, and no warranty or representation shall be implied by law or otherwise. Any products sold by Indestructible Paint Ltd are not warranted as suitable for any particular purpose to the buyer. The suitability of any products for any purpose in particular to the buyer is for the buyer to determine. Indestructible Paint Ltd assumes no responsibility for the selection of products suitable to the particular purpose of any particular buyer. Indestructible Paint Ltd shall in no event be liable for any special, incidental or consequential damages.