

Rockhard

The Indestructible newsletter

December 2007

NEW APPROVALS - THE KEY TO MORE BUSINESS

Indestructible Paint Ltd has recently expanded its share of the aerospace market with several new approvals representing a significant increase in business.

Much of this business is a result of the company's expertise where 'green' issues are of particular importance and in the protection of magnesium parts for aerospace applications.

Aerospace companies in Canada, France, India and the USA as well as the UK have benefited from its diverse range of coatings.

This newsletter provides information about some of the company's products now available to the industry.

Brian Norton

RESTORATION



The Vulcan at Bruntingthorpe during restoration

In addition to its business as a main supplier to the aerospace industry, Indestructible Paint Ltd also supports various historic aircraft restoration projects and museums.

The company has been involved with the 'Vulcan to Fly' project and has supplied a number of coatings used on the engine blades of this historic aircraft.



Over a period of at least 10 years Indestructible Paint Ltd has been involved in the development of 'green' paints and coatings and, as a result, now has a product range that meets most current environmental requirements.

However, a problem affecting the production of 'green' materials is the variation in international standards.

The recent introduction of REACH in Europe will help to address this, and the new regulations are enshrined in law. However,

much effort will need to be applied across a wide spectrum of coatings design, production and user markets to achieve universal standards.

In addition, each of the aerospace manufacturing countries supplied by Indestructible, including the USA and Canada has different standards.

A prime manufacturer of coatings for this market, Indestructible is working to produce paints and allied products that satisfy its environmental diversity. These include: -

- special industrial paint strippers,
- chrome-free pre-treatment products for magnesium and aluminium.
- Contract development of coatings to meet individual client requirements.

These three issues are illustrated in following items in this newsletter.

BLUE CHIP COMPANY GOES GREEN

A Midlands based OEM, a large blue chip company supplying components to the aerospace industry, recently found it necessary to replace a wide range of coating materials for environmental reasons.

As its existing supplier proved less than helpful, the company approached Indestructible Paint.

The main focus was to replace high VOC, chromate containing epoxy primers and PU finishes with a system able to provide exceptional resistance to Skydrol aircraft brake fluid - a well known 'stripper' of coatings.

The project was successfully completed using IP3-6000, an ultra low VOC, environmentally friendly solvent and chrome free epoxy primer plus the IP6 range of low VOC finishes.

Also urgently required was an environmentally acceptable paint stripper capable of removing these paint systems. In addition to being environmentally friendly and its ability to remove paint that resists Skydrol, it was essential that the new stripper did not react with the aluminium used in brake components.

After some fine-tuning of an existing product, Indestructible provided a suitable material for the purpose. As a result its customer placed an initial order for 3,000 litres to be used in a purpose-designed ultra-sonic tank.

The paint stripper and all coatings supplied by Indestructible to its customer had to be low VOC, and free of dichloromethane, chromates, toluene and other environmentally unacceptable materials.

Indestructible
specialist coatings manufacture



Engineered coatings & coatings for engineering

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'IN-HOUSE' ALUMINIUM & MAGNESIUM PRE-TREATMENT PRODUCTS

For many years Indestructible sealants and primers for aluminium & magnesium have been used over proprietary pre-treatment systems from chemical manufacturers.

In nearly all cases these pre-treatments have contained chrome and, linked with the company's products, have provided excellent corrosion protection. With the move to chrome free systems however, Indestructible believes it is sensible to match all stages of the pre-treatment process to the sealer/primer coat, and now offers completely chrome free products for this purpose.

IpClean Alkali Cleaner A water reducible cleaner concentrate, designed for use in either simple immersion or ultrasonic cleaning baths.

Used at temperatures in the order of 60°C, the cleaner easily removes all types of oil based and similar contaminants from metal surfaces.

IpEtch Surface Etchant Used to chemically produce a fine etch to the surface of metal to be coated, to aid adhesion, of the pre-treatment/finishing process and enhance corrosion protection. The mild chemicals used do not affect the molecular structure of the metal surfaces being processed.

The water dilutable concentrate, once mixed with tap water, is simply applied by immersion or spray to the cleaned metal surface.

IpEtch can also be brush applied on small areas. Rinse and dry before application of the pre-treatment coat

IpTreat Chrome free Pre-Treatment Coat A water based immersion or spray pre-treatment coat for aluminium or magnesium. IpTreat needs no rinsing after application, but requires heat fixing at 80-120°C.

This product will provide temporary short term protection but should be overcoated with selected primer or sealant as soon as possible.

Protection Aluminium cleaned and pre-treated with the IpClean/IpEtch/IpTreat system, and overcoated with Rockhard IP985 clear sealant, provided more than 2000 hours corrosion resistance when tested to ASTM B117 salt spray. This equals the results of a typical chrome containing system. Development work continues with magnesium and evaluations of this metal will include various grades of sheet and casting.

CONTRACT DEVELOPMENT SERVICE

The Contract Development Service provides "purpose engineered" coatings to meet, precisely, the performance and application requirements of individual users.

This type of programme can often be driven by environmental legislation changes and often includes greater technical performance. It will usually involve complete reformulation and often requires research into new raw materials.

Final formulation of the newly developed product is backed by:-

- a full report of the work undertaken,
- samples of the new material
- examples and results of the relevant performance tests developed in Indestructible's laboratories.

This provides the customer with a package comprising the new coating, or other product type, with a relevant performance specification and test methods.

Indestructible has already successfully completed several of these programmes on behalf of a number of its aerospace customers.

These have ranged from developing totally new formulations or complete systems on one hand to replacement of pigment types (e.g., chromates) or certain solvents (e.g., toluene) on the other.



Heat exchanger coated with Rockhard Low Environmental Impact sealer

GOLDEN SUPPLIER

TUSAS Aerospace Industries (TAI), based in Turkey, recently presented Indestructible Paint Limited, Birmingham, with its top 'Golden' Supplier' award for the company's products, performance and service.

The TAI award system was introduced in 2003. It rates TAI's suppliers performance in terms of delivery, product acceptability and technical support in equal measure.

The system has varying levels of approval from Gold, through

Silver, Bronze, Yellow or Red depending upon performance measures for all supply areas.

By achieving the "Gold" standard, Indestructible are rated as a key supplier to TAI.

The company provides TAI with a range of aerospace materials including its widely used IP9189 intumescent kit, originally developed for use on the Eurocopter EC135.

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IP APPROVALS - FOR JOINT STRIKE FIGHTER

Two new dry film lubricants from specialised coating manufacturer, Indestructible Paint Ltd., have now been approved for use on fan blade roots for Joint Strike Fighter (JSF) engines and lift fans.

Rolls-Royce, who makes the fan assemblies for engines supplied by Pratt & Whitney (United Technology Group), has a mandate to remove hazardous chemicals from existing engine components on the JSF.

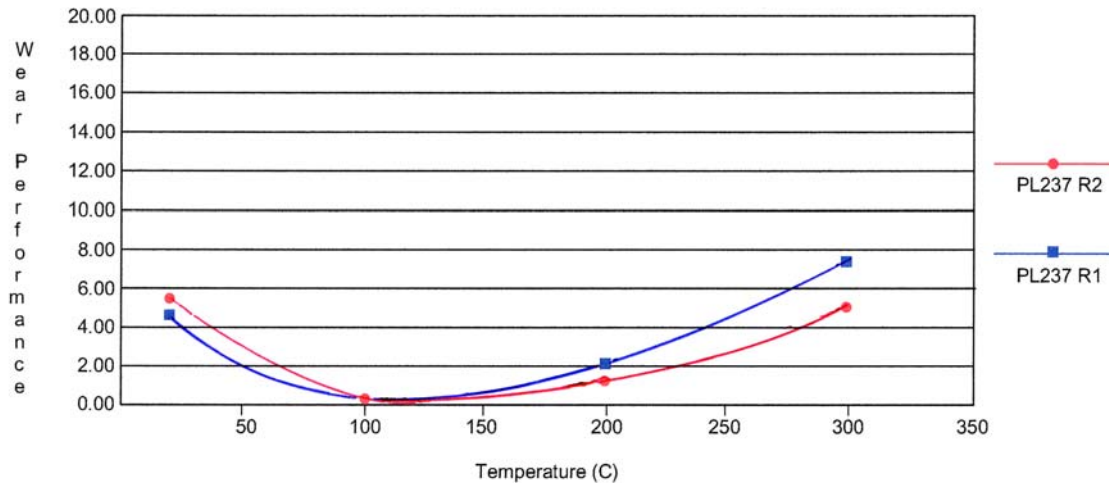
Indestructible's PL237 R1 and IP9136 R1, both heavy metal free dry film lubricants were both designed to operate at temperatures of 300°C and 400°C respectively, in air. IP9136 R1 will also

operate at temperatures as high as 500°C in an oxygen free atmosphere.

Further development of these products carried out at Indestructible Paint's Birmingham laboratories at its customer's request, enabled the company to successfully eliminate hazardous solvents such as ethyl glycol acetate (EGA) and toluene.

In addition, the new more environmentally friendly materials, PL237 R2 based on molybdenum disulphide, and IP9136-R2 based on graphite, comfortably exceeded the wear resistance properties of their predecessors.

Comparison of wear resistance of PL237 R1 with new version PL237 R2 (TKD substrate)



The graph illustrates the improvement in wear resistance at 300°C achieved by PL237 R2 compared with that of PL237 R1.

MAGNESIUM PROTECTION - FOR AEROSPACE COMPONENTS

Magnesium, the lightest metal available for structural purposes, is lighter than aluminium and its alloys, and for this reason is used in aerospace applications.

The original Rockhard protective coatings were formulated many years ago specifically to protect steel, aluminium and especially magnesium from corrosion in harsh environments.

The range has, of course, been updated, improved and extended considerably since its first major applications.

It is important that this protection does not significantly add to the weight of the magnesium component on which it is used.

For this reason Rockhard is sometimes applied as a thin unpigmented coat to keep weight to a minimum.

Widely used on helicopters, particularly for gearboxes, notably by Sikorsky and Eurocopter, Rockhard is also widely used on external engine covers on a number of other aircraft types.

Available in a variety of forms, modern Rockhard coatings also serve in a cosmetic capacity on certain components. The latest range now includes clear-coat protective sealers, chromate free primers, single coat finish colours for certain applications and one coat aluminium ('silver') coating systems for engine covers.

Supplied as either single component stoving materials or two-pack cold cure systems, Rockhard is usually formulated for spray application, but stoving formulations can also be modified for dipping application.

Now the most widely used source of magnesium protection in the aerospace



Magnesium helicopter gearbox casings coated in Rockhard

industry, it may also be used in conjunction with a number of pre-treatment types.

Major aerospace companies, currently using a variety of coatings from the Rockhard range, number more than a dozen.

Amongst others, these include, Boeing, the French Safran group of companies, Eurocopter, Pratt & Whitney, Rolls-Royce and Sikorsky.



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Some Indestructible Paint Ltd product approvals current at 1st September 2007

Latest Releases_ see Eurocopter ; ITP ; MTU ; and Messier Bugatti

Airbus ABP 4 – 2131

Allison Aero Engines ES 26710, PM1, 1400, 1401, 1402, 1403, 1404, 1405, 1406. Several others under test manufactured by IP,

others procured.

British Aerospace -_S26-3506, BAEP 3507 (615-155-001, BAE Missiles RD 117 (See Roxel – UK Rocket Motors)

Bae Systems ABU Register - ACO/I/LT/AG/1705

Defence Standards (UK MOD new and historical)

BSX 32, BSX33 Non VOC Compliant, BS2X, 33 1998 VOC Compliant, BS2X34 1998 VOC Compliant, BS 2X 27, AFS 1814, DEF 900-4045.

AFS 53 (MSRR 9012) AFS 609 (690-155-010)
AFS 641C AFS 712 (MSRR 9026)
AFS 750 (MSRR 9072) AFS 1566 (PL163)
AFS 689D
AFS 525 (MSRR 9026)
Currently reviewing Def-Stans 0-41, 50, 54, 55, 56, 152, 206, 207, 209, 216.

Def Stan 80-15/2 Def Stan 80-24/2 (QX) Def Stan 80-25
Def Stan 80-27 Def Stan 80-35 Def Stan 80/38/2

Def Stan 80-55	Def Stan 80-56	Def Stan 80-92 (CS2465)
Def Stan 80-88/1	Def Stan 80-89/1	Def Stan 80-99/1
Def Stan 80-109	Def Stan 80-114	Def Stan 80-123
Def Stan 80-126	Def Stan 80-161	Def Stan 80-171
Def Stan 80-175 (TS10162)		
DTD 56D	DTD 96A	DTD 840
DTD 5555	DTD 5562	DTD 5580 (Replaced by BSX34)
DTD 900/497 (9072)	DTD 900/4492 (750-450-004)	
DTD 900/8747 (PL82 our IP9138-R1)		
DTD 900/47 (Z2659)	DTD 900/473 (690-155-010)	

We also make alternatives / replacements for:

AFS 1311A (IP9188 & PL205) AFS 977B (IP9139 & PL101)
AFS 873 (PL95) AFS 473 (IP9136-R1 & PL239)
AFS 1567 (IP9138 & PL82)

AFS 1594 & DTD 875A (IP9140, IP9149, IP9155 & AFS 897 (MSRR 9037 VX1290)

Dowty Aerospace Propellers (Undercarriages see Messier Dowty)_PS 5632, PS 5006

Eurocopter Marignane - ECS2178

General Electric -_A8B84A1, A8B85A, A8B84X1, A8B89A1

Goodrich Engine Controls - A-P-164, WP 1046

Hamilton Sundstrand - HS 4675 (961-450-002 & 665-550-025)

Honeywell, Phoenix Arizona - PCS 5022 / EMS 52438.

ITP (Spain) - SMM 919, SMM 915, SMM 903, SMM 914.
Kawasaki Heavy Industries (Jet Engines) - JMSRR 9276, JMSRR 9274

McDonnell Douglas Helicopters - HP-4-133

Messier Bugatti - DB/CE 2006-059

Messier Dowty Undercarriages- PS 637, PS 639. MDLPS 639, MDLPS 637

MTU Aero Engines - MTS 1010, 1011, 1012, 1013 (PL237), 1026 ; 1040, 1173, 1254, 1255.1304 ; 1305 ; 1521 ; 1534

MTS 1010 - IP9140 & IP9149 MTS 1011 – IP9165-R1
MTS 1012 – IP9166 MTS 1013 – IP9105
1026A – IP9169, IP9170, IP9173

MTS 1040 – IP9169 MTS 1173 – IP9136-R1
MTS 1254 – IP9138-R1 MTS 1255 – IP9029-R2
MTS 1521 – PL163 MTS 1534 - IP9189
MTS 1305 - NML 1305
MTS 1304 – NML 46

Parker Hannifin (Nicholls Aircraft Division) - MCS-145 (For G4461 Model)

Pratt and Whitney (Canada) Cage Number K3504

CPMC 79964 CPMC 79965 CPW 489-2 CPW 27 CPW 563 (J900)
CPW 88 LCPMC 71489

Alternative to CPW 268, 269, 619 = New Spec CPW 714 & 715

PWC 07-017 PWC 07-016 CPW 563 (J900)

Pratt and Whitney (USA)

PWA 578F (IP9029-R2 – PWA 36568 and 36569 for production)
PWA 36568, PWA 36569 for production approved for use in Pratt & Whitney Overhaul and Repair: Reference SPM SPOP 148 & SPOP 155.

Rolls Royce

MSRR 1005	MSRR 3017	MSRR 1009	MSRR 1043	MSRR 1055
MSRR 9310	MSRR 1028	MSRR 1061	MSRR 3010	MSRR 9394
MSRR 3016	MSRR 9042	MSRR 9444	MSRR 1041	MSRR 9012
MSRR 9072	MSRR 9181	MSRR 9029	MSRR 9140	MSRR 9188
MSRR 9274	MSRR 9015	MSRR 9134	MSRR 9356	MSRR 9051
MSRR 9026	MSRR 9040	MSRR 9169	MSRR 9226	MSRR 9298
MSRR 9032	MSRR 9141	MSRR 1006	MSRR 9880/13	MSRR 9186
MSRR 9276	MSRR 9018	MSRR 9054	MSRR 9176	MSRR 9253
MSRR 9064	MSRR 9180	MSRR 9259	MSRR 9200	MSRR 9306
MSRR 9037	MSRR 9316	MSRR 9041	MSRR 9228	MSRR 9135
MSRR 9187	MSRR 9285	MSRR 9142	MSRR 9217	MSRR 9307

OMAT - Listed as Omat Supplier UK 261; and US NA2. Large range of approved products available (too large to list)

Sikorsky S 8688 (576-450-002)

Snecma -_P 1064 (IP9136-R1)

Roxel (BAE Rocket Motors) -_RD 1177 BLUE 203 119 PS/1/E000 Issue 2 (Was Def Stan 80-109)

Textron Lycoming - P6445-P1 P6445-P2 P6445-P3 P6426-P1 P6426-P3 P6426-P4 P6426-P5 P6404 P6432-P4 P6431-P6 P6429-P4M-4735 SP519 P6430

Turbomeca – LB 547, 568, 569, 598, 714

Turbomeca – LB 547, 568, 569, 598, 714.

Pratt & Whitney (USA) – Rolls Royce – MTU – FIAT – Japanese Aero Engine Corporation V 2500 International Aero Engines (IAE) COMAT Supplier Code K3504 (UK) and IAE 200 (USA)

IAE COMAT Number

01-031	01-060	01-076	01-085	01-115	06-021	07-014	07-026	07-037	07-038
01-126	01-128	01-210	02-125	04-002	07-043	07-044	07-049	07-086	07-087
04-004	04-005	04-006	04-011	04-014	07-088	07-090	07-091	07-107	07-108

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