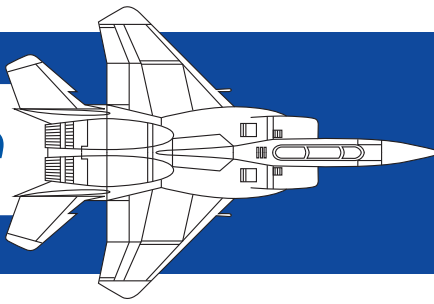


# ***Indestructible***

***specialist coatings manufacture***



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## High Performance Paints and Coatings for Turbine and Aero Engine Production and Overhaul



Indestructible Paint have long been involved with the aerospace and high technology end of the coatings market, including Formula 1 and military requirements. As a result, many specialist products have been developed for use at high temperature, or with particular chemical or erosion resistance. Our customer base includes Rolls Royce Aero engines, Pratt & Whitney, Augusta-Westland, British Aerospace, Goodrich, Turbomeca, Eurocopter.

In this information sheet, we have highlighted a few of these specialist products, which are of interest across a range of industries, but

specifically the turbine/engine manufacture and overhaul. Where products have been released to a specification, (e.g. MSRR), a specific test process is followed and results are available. Each product has its own, detailed technical data sheet; please contact our sales team for more details.

We are committed to developing and enhancing our range of high temperature and sacrificial coatings and are happy to engineer coatings for specific applications at our customers' request. Not restricted in our vision, we always attempt to find the best solution using both organic and inorganic alternatives.

# Engineered Paints and Surface Coatings

## IP 9029R1 and R2 High Heat Resisting Lead Free Aluminium Stoving Enamel.

**MSRR 9029; PWA 578 F; OMat 7/5 D Comat (Alt to PL 101 - E 3746)**

A high temperature, lead free, spraying aluminium enamel resistant to corrosion and aeroengine lubricants and temperatures to 650°C. For use on steel, aluminium, titanium etc. IP9029R2 is used as a high temperature organic coating. Superior in performance to PL101, this material has been recently re-formulated to improve thicker film capabilities, and runs at 100°C higher in temperature.



## Ipcote IP9183-R1

**MSRR 9140 OMat 746 B**

Used typically as a coating on turbine blades and other parts, this product becomes sacrificial when baked at 560°C, and at 350°C with glass bead peening. Minimal Chromium VI content(37ppm). Tested to 1000hrs high temperature and salt water resistance. As an alternative to such products as Aseal, Sermetal W, Ceracote 484, Ipcote is the base of a range of other high temperature sacrificial coatings including thin film coatings for bolts, flanges, etc, and very smooth coatings to enhance performance.

## IP9442 Smoothcote

**CPW 88; MSRR 9140**

New smooth surface version of Ipcote IP9183-R1, which is easy to apply and gives very smooth surface finishes, typically less than 20 micro-inches. Presents little

resistance to airflow or roughness for carbon deposits to adhere to. Used typically with Smoothseal as an alternative to Sermetal 5380DP. Reduced Chromium VI content compared to IP9183-R1 (14ppm).

## Ipseal IP9184 Green and Khaki

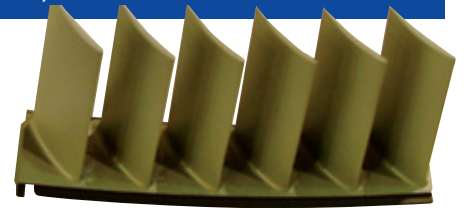
**MSRR 9140; OMat 7/168B; NSN8030 99 434 1295**

For use with Ipcote and Smoothcote, this product withstands a temperature range up to in excess of 600°C and can also be applied to the organic coating IP 9253-R3. Used as a system with Ipcote as an alternative to Sermaseal 570 and VPW 360, this product is single part and easy to apply.

## IP9444 Smoothseal (system similar to the 5380 system)

**MSRR 3010**

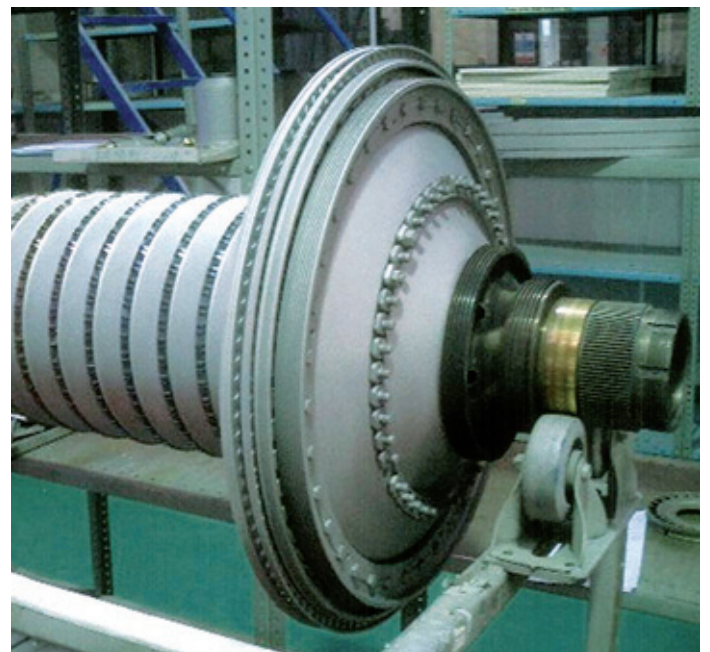
Typically used as a sealcoat for burnished and polished IP9442 Smoothcote, to give extremely smooth surface finishes and excellent air flows. Temperature resistant up to 600°C.

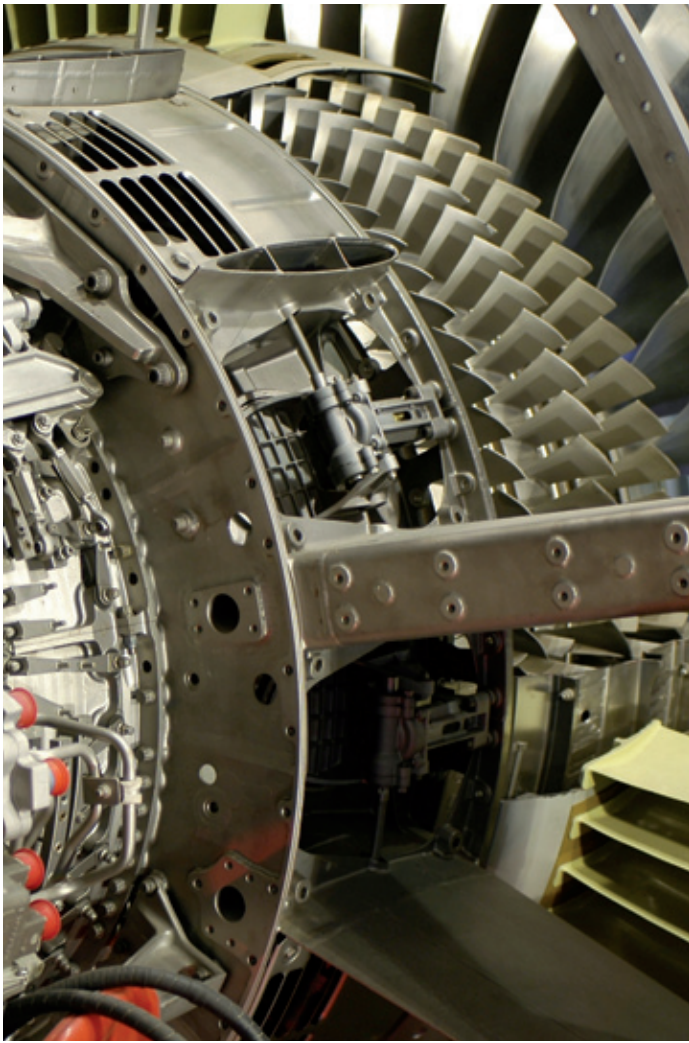


## IP1041 Aluminium Silicon Diffusion Coating for High Temperature Protection against Sulphidation.

**MSRR 1041**

Another addition to the high temperature range, this material is far superior for protection than pack aluminising. Approved by Rolls Royce, it is used as an alternative to Sermalloy J. Tested for more than 2000 hours alternately in a hot gas flame at 800°C+, followed by salt spray.





## IP9188R1 Erosion and Heat Resisting Coating

**MSRR 9188. OMat 7/5D (Alt to PL 205)**

White stoving coating providing good resistance to erosion, corrosion, aircraft fluids and temperatures continually up to 250°C and up to a peak of 280°C. Applied to engine parts of steel and aluminium, it is best recognised on the air intake of many Rolls engines. Reformulated recently for US environmental purposes as Xylene-Toluene free. (Also available in grey and blue – to order)

## PL177 Touch-up Coating

**MSRR 9141; OMat 7/47**

Corrosion resistant coating designed for use as a touch up for 560°C processed Ipcote, on ferritic stainless steel aeroengine and turbine components operating to 600°C, and corrodible steel components to 500°C. Also resistant to 100hrs dry heat 600°C, 100hrs intermittent salt spray, 100hrs skydrol, and 100hrs soak in methanol and water solution.

## PL270 Touch-up Coating for Ipseal Khaki

**MSRR 9394; OMat 7/169A**

Inorganic airdrying brushing touch-up coating for Ipseal Khaki. Resistant to heat and a wide range of fuels including Skydrol.

## PL150A Touch-up Coating for Ipseal Green

**MSRR 9394; OMat 7/169B**

Inorganic airdrying brushing touch-up coating for Ipseal Green. Resistant to heat and a wide range of fuels including Skydrol.

## PL45 Aluminium Flashcoat

**MSRR 9135**

Ideal for both cosmetic touch-up and as high temperature coating. Available as both paint and in an aerosol. Flashcoat has useful anti-corrosive properties and has been used in such areas as exhaust systems, boilers, and turbine engines.

## PL163 Clear High Heat Polyimide Aero Engine Coating

**MSRR 9142, OMat 7/134; AFS 1566; NSN 8010 99 05 16491; (IP 9144)**

Clear stoving coating for use on aero engines. Resistant to dry heat 300°C - 100hrs minimum, skydrol - 100hr, and salt spray - 100hrs, it also confers erosion and corrosion resistance. Used on engines such as the RB211.

## IP9253-R3 High Heat Chrome Free Organic Sacrificial Aluminium Coating.

**MSRR 9253 (Alt to PL 219 - 3863 - A 6000)**

Used on aeroengine and other components as an organic sacrificial coating up to 600°C on 12% Cr steel, and 500°C on low alloy steel, this aluminium filled coating resists aggressive media such as skydrol and salt spray, it becomes a sacrificial corrosion protective coating if baked at 490°C and bead peened, or at 560°C. Latest R3 version is totally chrome free and formulated on environmentally friendly solvents.

## IP9138R1 High Heat Resistant Air Drying Aluminium Coating

**MSRR 9040 (Alt to PL 82 - E 3592) OMat 7/22B Comat 07-038 MTU – MTS 1254**

Air drying, organic coating with resistance to heat, corrosion, and aircraft fluids. For use on steel, aluminium, and other metal parts, this product is routinely tested for 100hrs at 500°C, 100hrs in lubricant at 150°C and skydrol for 3hrs at 70°C. Although often used as an air drying touch up for sacrificial products such as our IP 9029, Ipcote and Sermetal W, it is also used as an air drying high temperature product in its own right. Being skydrol resistant, it is used for example for undercarriage and wheel protection.



### IP9134R1 Aluminium Polyimide Engine Coating

**MSRR 9134. NSN 99 1925127** (Alt to PL 165)

Aluminium filled stoving coating for spray application to aeroengine components. For operating temperatures to 300°C, it is resistant to skydrol, and confers both erosion and corrosion resistance. Tested to the same as PL 163, it has good ester lubricant resistance at high temperature. Used for example at the back end of the Viper, it gives increased corrosion protection to magnesium parts.

### Metal Protective Varnishes (Stoving Versions) (Aerolac Alternatives)

**MSRR 9051 - MTU - MTS 1026A**

**IP9140 Clear Spraying Metal Protective Varnish, to MSRR 9051.**

OMat 712A (Alternative to 1603-C-8070, VX1290)

**IP9149 Aluminium Spraying Metal Protective Varnish, to MSRR 9051.**

OMat 729B (Alternative to 1603-A-8210, E3521, MP404)

**IP9155 Green Dipping Metal Protective Varnish, to MSRR 9051.**

OMat 701A (Alternative to 1603-C-2250-VX1290A/25)

Stoving, anti-corrosive protective coatings especially suitable for a wide range of metals including light alloys of Magnesium and Aluminium. They have a high level of resistance to heat, corrosion, lubricants, hydraulic fluid and aviation fuel, excellent adhesion and outstanding water resistance. The thin green version, for example, is used for protecting the inside of gear boxes.

### Metal Protective Varnishes (Air Drying versions)

Comply with requirements of withdrawn specification MSSR 9037

**IP9169 Air Drying Metal Touch Up Clear**

(Alternative to 1721-C-8187-CO 5187, CV114)

**IP9170 Air Drying Metal Touch Up Grey 693**

(Alternative to 1721-D-6930-CO 5153/693)

**IP9173 Air Drying Metal Touch Up Black**

(Alternative to 1721-X-9520-CO 5152)

These materials are used for overspraying and touching up unprotected parts on engines, and damaged areas on cadmium plated parts. Resistant to Aviation fuels, and lubricants including esters, and temperatures to 200°C. A red oxide primer IP9174 alternative to 1721-P-4011 is available but this is no longer recommended by Rolls Royce.

### IP1043, Compressor Blade Sealing Compound - High Temperature

**MSRR 1043**

Inorganic material for high temperature filling and sealing of compressor blade roots.

Resistant to a wide range of fuels, oils, solvents and heat to 650°C. See also PL224.

## PL134 Ceramic Blade Coating to 850°C

### MSRR 9176

Water based green ceramic coating for aero engines and compressors. Spray applied, it is effective to 850°C. Used on nickel based alloys to prevent against "Green rot" oxidation, it will withstand the thermal shock of being heated to 1000°C and then plunged into cold water.

## PL95-R1 Mica Impregnated Insulating Coating

### MSRR 9054

An excellent insulating coating for spray application to aero engine components, it is extremely resistant to heat, corrosion, lubricants, coolants and fuels. The cured coating can be machined to product accurate dimensions on working surfaces. Tested at 500°C dry heat, lubricants 100 hours at 150°C, skydrol 100 hours at room temperature and 100 hours intermitant salt spray heat.

## IP9189 Air Drying Intumescent

### BSX38; MSRR 1055

Formulated to run at 180°C and be air curable, replacement for PL161. Approved by Eurocopter for use on the EC135 ; and by Bombardier-Shorts. New recent approval as part of system to include IP-FP-8000 Non-Burn topcoat on oil tank and other parts of TP-400 engine for Airbus A-400 military freighter.

## IP1897 Air Drying Intumescent; Low Temperature Capability

### BSX38; Goodrich 1897

Modified grade of IP9189, formulated to remain flexible at -40°C, for use on fuel pumps manufactured by Goodrich.

## IP1265 Thermal Ceramic Barrier

Our experience in thin film intumescent and "thermal barrier" coatings expands continuously.

This is the latest that is in use on the latest Aquada Sports car, and being appraised by aerospace companies including GKN for use on de-icing equipment.

## Two Pack Epoxy Air Drying Coatings

**IP3 range; ultra low VOC; xylene/toluene free (<200gm/litre)**

**IP2 range: low VOC (<420gm/litre)**

**IP9064 series; standard VOC**

**BSX 33, Def-Stan 80-161 (DTD 5555); MSRR 9064 and several manufacturer specs.**

(Alternative to SL 5459, 9110-X-0000, CSH 5538 etc)

## Please ask for separate sheets.

These ranges include 2 pack etch primer, 2 pack strontium chromate primer, 2 pack chromate free anti-corrosive primer, and a range of 2 pack top coats in different colours and sheens including bright and dull aluminium, blacks, whites, greys, blues, reds, etc. Resistant to abrasion, corrosion, and most aircraft fluids, this range can be used inside or out. Used as marking paints, on instruments, on composite and metals etc.

## IP6 Two Pack Low VOC Polyurethane Air Drying Coatings

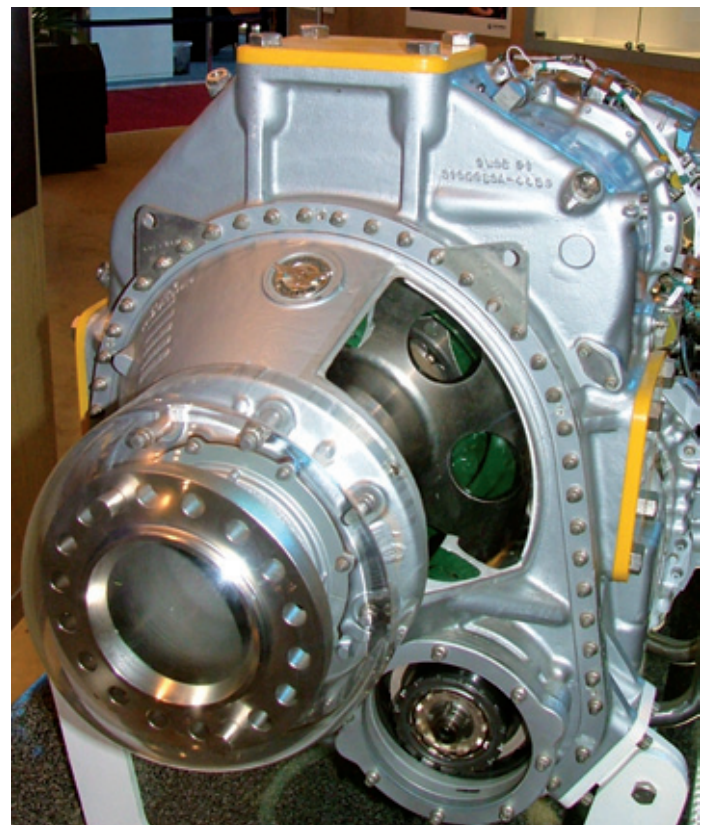
### BSX 34; MSRR 1006, plus several manufacturer specifications

Low VOC(< 420gm/litre) 2 pack polyurethane finishes with good erosion, UV, and chemical resistance. Normal top coat for air frames. Available in a range of colours and gloss levels, including full matt. Can be force cured to speed up production of small parts. Typically used on engine nacelles and airframe ancillaries, the range is now specified by Hindustan Aeronautics as the finish coat on DHRUV-ALH helicopter composite airframe.

## IP714 and IP715 Low VOC Chromate Free Engine Coating System

### PWA 36568; CPW 714 (IP714 primer) and PWA 36569. CPW 715 (IP715 Finish)

Produced to stringent environmental and technically demanding specifications as a low VOC ; chromate free anti-corrosive primer and topcoat system ; xylene and toluene free. For use on steel, aluminium, sealed magnesium and most composites.



## PL149-168A High Heat Resistant Paints

### MSRR 9041

Spraying, (brushable on small areas), inorganic paint resistant to a wide range of fuels, oils and lubricants including skydrol up to 650°C. Used for example on the hot end of the BAe Tornado. This range has undergone a lot of R&D recently, and is now being used as a completely solvent free stoving coating capable of continuous operation at 700°C, and impervious to chemicals and solvents.

PL149.....White PL150.....Green PL151R1 ..Blue  
PL152R1 ..Black PL153.....Grey PL155R1 ..Orange  
PL167R1 ..Red PL168R1 ..Yellow

# Dry Film Lubricants

## PL237-R2 Molybdenum Based Dry Film Lubricant

### MSRR 9274, RAE (F) LV/486/265, RPS 242. OMat 4/43

Molybdenum disulphide pigmented spraying product for operating in adverse conditions to 300°C with resistance to lubricants, skydrol 500b, and corrosive engine by products. Lead & heavy metal free, this product is used in critical parts including rotating engine parts. Both PL 237 and IP 9136 are tested for 100,000 rubs at temperature under load, with no loss of material. Recently re-formulated and approved as R2 grade, eliminating xylene/toluene.

## IP9136-R2 Graphite Based Dry Film Lubricant

### CPW 27, MSRR 9276, RPS 242. OMat 4/44C ; Comat 10-002 (Alt to PL 239, 3862-X-9010)

Spraying graphite lubricant resistant to skydrol, lubricants, and corrosion to 400°C (500°C where oxygen is excluded). With similar properties to PL 237, but at higher temperatures. IP9136-R2 is used to obtain stable torque figures in, for example, bolted assemblies. Recently re-formulated and approved as R2 grade, eliminating xylene/toluene.

Both IP 9136 and PL 237 also resist fretting, and resist corrosion and pitting problems caused by chemical attack at high temperature.

## PL181 High Temperature Inorganic Boron Nitride Dry Film Lubricant

### MSRR 9200, Def 91-19

Speciality dry film lubricant designed to operate at temperatures up to 700°C, it is also resistant to skydrol at high temperatures and engine by products.

## PL470 Rapid DFL Repair Kit

### OMat 4/70

Newly developed rapid repair MoS<sub>2</sub> dry film lubricant touch up kit developed in conjunction with Rolls Royce. For use in on-wing repair and overhaul, typically to re-seat compressor blades.

## IP3016 Tungsten Disulphide High Temperature DFL

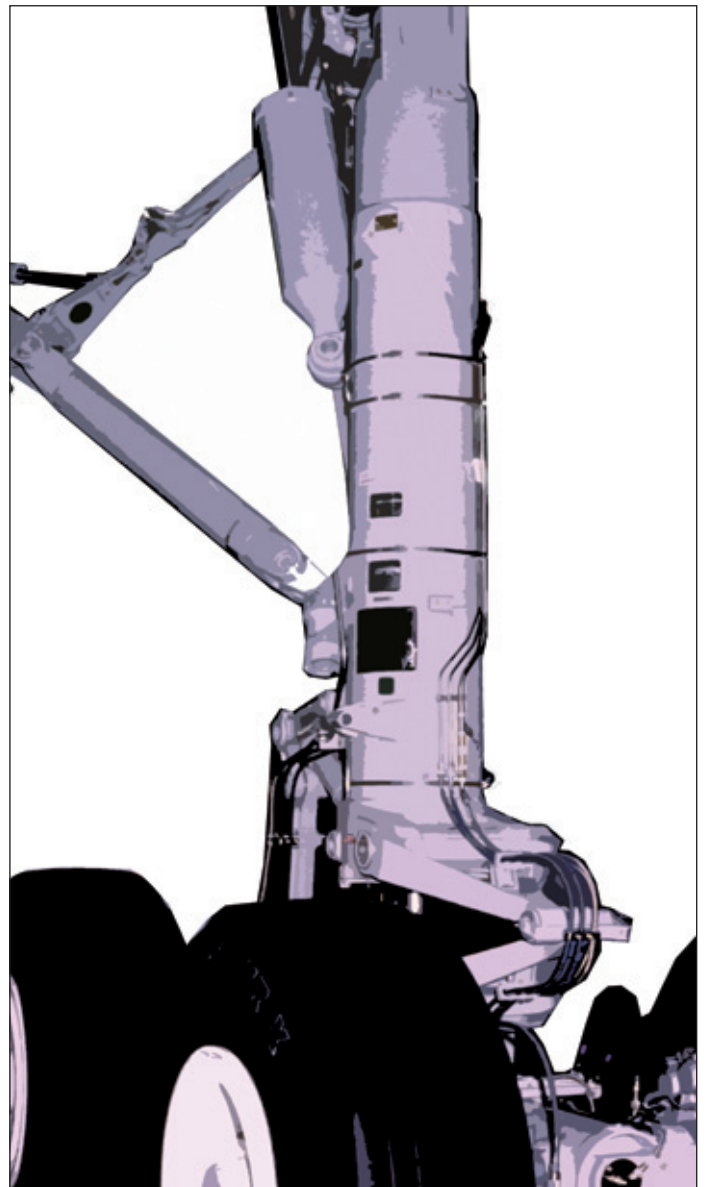
### MSRR 3016

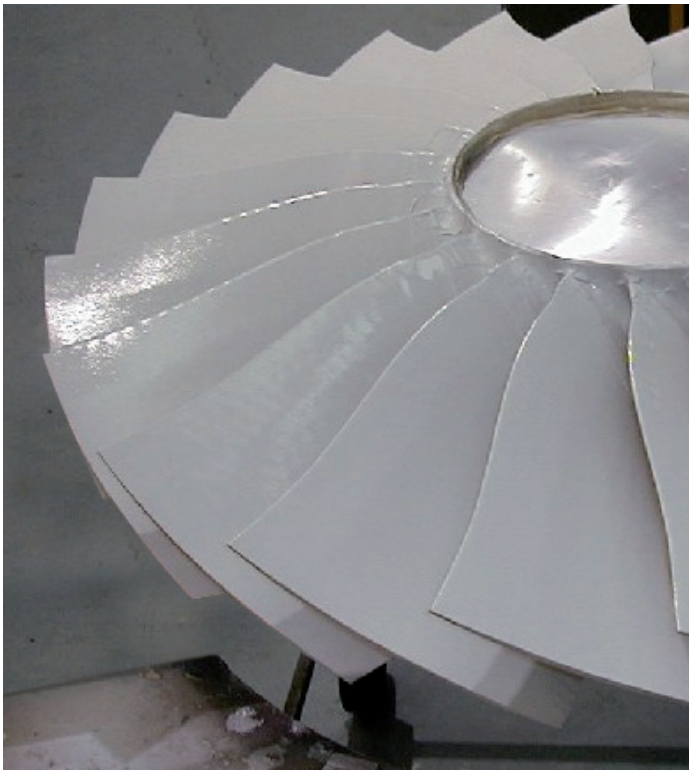
Developed for high heat applications, in excess of 400°C. Excellent resistance to fretting or galling.

## IP9286 Range of PTFE filled Polyimide Coatings

### MSRR 9286

Range of various colours and lubricities according to specification. Used as an erosion resistant material, or for lubricity, for example in hinge pins and under-carriage assembly.





# Attrition Coatings

We describe below a range of attrition coatings designed for use by Rolls Royce and other turbine manufacturers. All can be machined, and if used in engine rings make repair easy, reducing aircraft on ground times.

## NML 46 Thick Film Attrition Coating: Pre-Mixed 2 Component Product, Supplied as a Stable Frozen Stick

**MSRR 9012, RPS340 (IP9100)**

A thick abradable mastic stoved coating which has similar co-efficient of expansion to aluminium and can be machined. Used on the interior of engine compressor components, aluminium, steel, and titanium, it is resistant to oils, fuels, and abrasion. This product is supplied frozen, and should be stored at < -20°C. Allow to return to room temperature before use; use within 8 hours of full de-frosting. Used in conjunction with NML 52, it can also be used to make preformed parts.

## NML 52 Primer Adhesive for Attrition Coatings

**MSRR 9072 (IP9100)**

A clear adhesive for use with the thick film attrition coating NML 46.

## NML 40 Cold Curing Attrition Coating

A two part cold curing attrition compound developed for local repair and field use where stoving facilities are not available. Resistant to oils, fuels, and abrasion, it can be machined. Short shelf life unless refrigerated.

## NML 58 Extended Shelf Life Two Part Attrition Coating

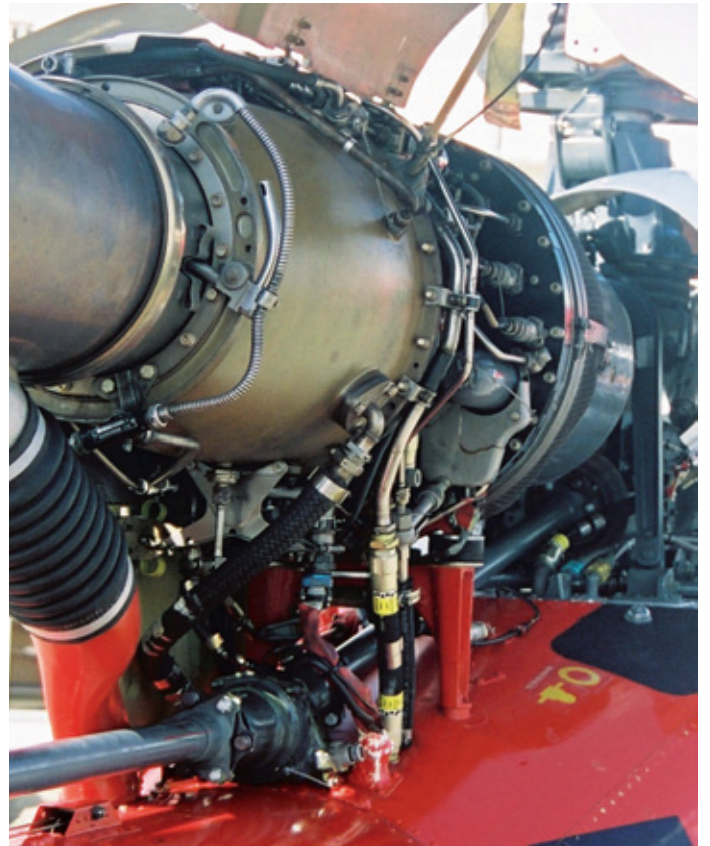
**RPS 340 (IP9103)**

Two pack system developed as a long shelf life field overseas replacement for NML 40. Used on engine compressor components.

## EPWA 27 Graphite Filled Attrition Coating

**MSRR 9316; RPS 340**

A graphite filled two part attrition compound, it is currently used on the AV8B Harrier.



# Composites

## NML 21 Inspection Fluid for Composites

**CSS 251**

Used as a water break test to check readiness of composite surface before bonding. Brush random lines across surface, if lines break up, the surface is imperfect.

## IP50015-R2 Low VOC Epoxy Surfacer

**Def-Stan 80-216**

Low VOC 2 component epoxy primer-surfacer formulated for easy priming and levelling of carbon fibre and other composites. Usually used as a post mould spray application, recent work has been successfully completed on in-mould application, where the primer becomes an integral part of the composite structure.

## IP50019 Low VOC Epoxy Thermal Filler

Low VOC, 2 component epoxy high Build, low weight low heat transfer material. Has been used in conjunction with IP9189 and IP1265 as thermal insulation coating, for example on composite helicopter fire walls and around exhaust ductings. Low weight characteristics allow use of thick films to aid insulative properties without greatly affecting overall weight of component.



# Production Aids

## PL37 Anti Nitriding stop off

### CSS 60

Tin rich lacquer used as a stop off in the nitriding process. Apply using RPS 135.

## PL111 and 110 Heat Resistant Marking Paint

### MSRR 9187

A spraying marking paint resistant to a wide range of chemicals. Temperature resistant to 400°C, but discolours after 200°C. Used on BAe Hawk etc.

PL 111: yellow PL 110: red.

## PL268 Casting Silica Core Anti Canalling Coat

For use on preformed cores before urea or resin treatment as an anti-canalling treatment.

## Air Drying Marking Paints without Heavy Metals

### PL58-70

Weather resistant air drying colour stable marking paints free from lead and heavy metals. Volatilises at temperatures so that it will not pollute if the marked metal is molten. Used for example, for identifying welding rods.

Removable with strong solvents

PL 55/IP 9126: White	PL 58/IP 9127: Brown
PL 60/IP 9128: Green	PL 65/IP 9129: Black
PL 68/IP 9130: Blue	PL 69/IP 9131: Yellow
PL 70/IP 9132: Orange	PL66: Red

## PL81/R3 Blue Tinted Stop Off Lacquer

Very fast drying trike free lacquer for use as a plating insulation varnish, or a protective coating which can be removed with solvent. Applied by brush, spray, dip, or roll.

## PL106 Acid Resistant Stop Off Lacquer

A red lacquer used for masking off products when acid etching is to be processed. Fast drying, this product is resistant to minerals acids including Nitric and Hydrochloric.

## PL200 Weld Anti-Spatter Lacquer (Electron Beam Welding).

### P&W PMC 2056-1

A specially green tinted lacquer designed to aid the removal of weld splatters. Removable with strong solvent or trichloroethane. Non toxic, it is brushed onto areas to be welded. At very high temperatures, it volatilises without affecting weld strength whilst reducing weld spatter to surrounding areas. Most recently adopted by Toyota on line.

## PL258 Endorsing Ink

A general purpose chemical resistant black endorsing ink for use on a variety of metal and other products. Removable with IMS.

## Spray Booth Removable Spray On Coating

### IP40027

White peelable coating specifically formulated for application to spray booth, paint kitchen and drying room walls. Easily peeled off when excessively coated with overspray etc.

**ASK FOR OUR LEAFLET ON THE ROCKHARD RANGE OF PRODUCTS - PARTICULARLY FOR MAGNESIUM AND OTHER METAL PROTECTION**