



Fraser's Aerospace

# How To Rejuvenate Aircraft Fuselage Paint

**Reduce Fuel Consumption And Enhance Aircraft Appearance.**

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*Introduction.*

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Aircraft suffer various paint problems over time. There are a number of causes which are described briefly below. There are two main reasons why aircraft paint should not be allowed to fade and degrade:

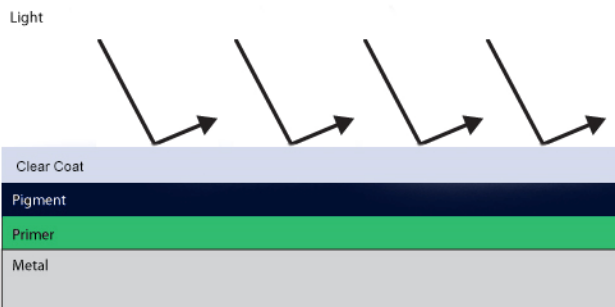
- **Aircraft Appearance.** When an aircraft looks dull and dirty, the impression passengers will have is that the airline poorly maintains the aircraft and that the aircraft is old.
- **Fuel Savings.** It has been shown by theoretical and actual studies over the years that a smooth aircraft surface can reduce drag resulting in fuel savings. The actual saving is difficult to predict accurately, needless to say that a saving will occur. It is estimated that by cleaning alone, a 0.3% fuel saving can be achieved.

*Poorly cured paint.*

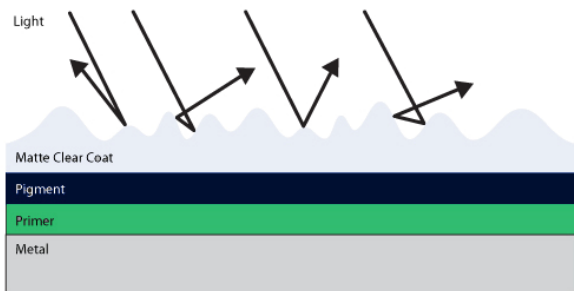
Aircraft coatings are air drying type paints, mostly using a two component product which must be thoroughly mixed together in the correct proportion. There are known cases where this mixing has not been correctly performed. The result is that the paint coating after application does not reach its full curing hardness and remains slightly soft or 'cheesy'. The result of this is that the paint coating has not achieved its full physical properties and is prone to attack by Skydrol, oils, soot, acid rain etc. Contaminants penetrate the coating itself and almost impossible to remove by conventional washing or cleaning. Fortunately, this defect is rare.

*Sun or UV Fading.*

This is the most common defect observed on aircraft. Usually aircraft older than 10 years, or aircraft which have been poorly maintained and left outside in the sun. Usually this can be seen as dull faded paint which has a lower gloss or shine compared to other areas of the aircraft not directly in the sun. The surface appears 'gritty' or rough by touch. Undamaged paint has a smooth feel.



*In the image on the left, new or good condition paint will reflect light which give the glossy or shine effect.*



*In this image UV damaged paint or dirt will scatter light resulting in a dull or low gloss appearance.*

### *Orange Peel*

This occurs during the paint application due to various reasons. Normal paint will appear flat and smooth, paint with orange peel appears bumpy. Visually, paint with orange peel has a poor image clarity as the uneven surface reflects back in an uneven way.



*In the image on the left, orange peel is clearly visible.*

## Orange peel

*Fade out / Overspray*

A common problem when spray painting large aircraft is fadeout or overspray. This occurs when areas being sprayed are partially dry when the adjacent area is coated. The coats do not flow into each other or the overspray has partly dried leaving a mottled effect.



*The mottled effect of fadeout or overspray.*

**Fade out**

*Dust Inclusions*

It is almost impossible to maintain a dust free environment when spray-painting aircraft. During the drying process, the paint film will be susceptible to inclusions of dust from the atmosphere.



*Dust nibs or inclusions.*

**Dust nibs**

### *Swirl Marks*

Swirl marks are usually visible on new aircraft which have been poorly maintained. Generally cleaning procedures have not included soft microfiber type cleaning cloth or equivalent products. Old low cost cloths will scratch the paint film resulting in swirl marks.



*Swirl Marks.*

## Swirl marks

### *Staining / Shadowing*

This is probably the most common form of paint defect which can be mistaken for a poorly cleaned aircraft. The primary cause is a combination of irregular fuselage cleaning and excessive oil (Skydrol) leaking. The aggressive nature of the oil over time permits ingress of the oil into the coating of paint. The longer the period between cleaning cycles, the greater the ingress. Aircraft cleaning products will not remove the oil which has penetrated into the paint coating. The only way to remove these stains is to physically remove a fine layer ( $\pm 1\mu$ ).



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*Procedure*

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Depending on the condition of the paint, the process follows the procedure below:

1. Begin by sanding with Grit 500 (Poor condition) with a random orbital sander. Keep the surface slightly wet to lubricate the sanding discs. Sand until swirl marks appear. This implies that a very thin layer of the old paint has been removed. As soon as the swirl marks have appeared, stop sanding. Excessive sanding could remove excessive paint from the coating.
2. Begin sanding with Grit 2000 (Start here if the paint condition is reasonably good). As per step 1, keep the surface slightly wet. The swirl marks will disappear and the surface will now appear dull. Stop sanding at this point.



3. The next stage requires the removal of sanding marks and begin to smooth the surface to a full gloss. Using Nuvite NuPol (P/N as the cutting paste, apply thinly over the surface. Begin polishing with the Buff Pro machine (P/N BFP026) on a slow speed initially to spread the NuPol, slowly increase speed to achieve the desired result. Fit a coarse cut, Power Pad (P/N BFP029).

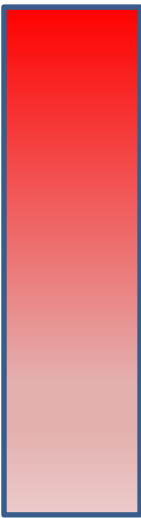


*Sealing*

Once the full process is complete, it is advisable to seal the paint with a good quality polish like Nuvite NuGlaze.



*Quick Reference Guide*

Quick Reference Guide	
	<p><b>Very faded, oxidised paint or stained paint.</b></p> <p><b>Sandpaper with 800 grit.</b></p>
	<p><b>Sandpaper with 2000 grit.</b></p>
	<p><b>Dull faded paint.</b></p> <p><b>Compound Nuvite NuPol.</b></p>

*Part Numbers for the products required for this procedure.*

Part Number	Description
D015 D017	SiaAir Discs 500 Grit 2000 Grit
BFP026	Buff Pro 220v Heavy duty electric drum polisher. Model JF180E (Plug type C European)
BFP029	Power Pad for BuffPro (For Paint Polishing)
N009	NuPol, 1 US Gallon
N205	NuGlaze, 1 US Gallon

*References.*

*Getting to grips with fuel economy, Issue 3 July 2004 – Airbus.*

*Fuel conservation, Airframe maintenance for environmental performance, September 2006 – Boeing.*

*Surface coatings and drag reduction, - Boeing Aeromagazine.*