Digital Anoprinting—1. The Product.

Digital Anoprinting is a unique process that creates full-colour digital images inside the hard anodised surface of aluminium. There is no surface print, the surface is pure and smooth anodised aluminium. This makes it ideal for interior wayfinding signage in buildings where signs may be subject to wear or abuse. It is particularly useful in apartment blocks and student accommodation, being very easy to clean, requiring no maintenance, and because the graphics are locked inside the hard anodised surface, they cannot be defaced or interfered with.

Anoprinted aluminium wayfinding signage.

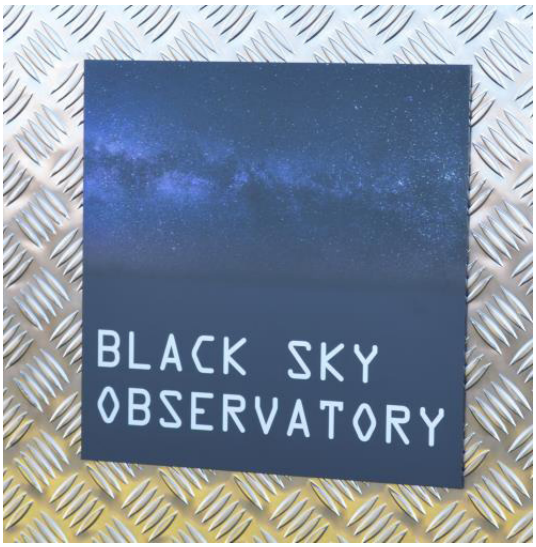
Because there is no surface print or coating, anoprinted aluminium is extremely safe to use where fire safety is concerned. Our internal wayfinding signage has been certified to BS 476: Part 6: 1989 + A1: 2009 – Fire Propagation, and BS 476: Part 7: 1997 – Surface Spread of Flame by an industry-leading independent test company.

An advantage of Anoprinted Aluminium is that it is extremely resistant to wear. Unlike surface prints or coatings, the graphics will not wear off even with very heavy use. This makes it an ideal process for applications such as control panels or interactive displays in museums and exhibitions, where surface printing would soon be rubbed away.

Because the surface is bare and smooth anodised aluminium, it will not trap dirt, and the graphics do not wear away. This makes it an ideal product for tabletop QR codes which suffer a much harder life than you may think. Laser-engraved laminates wear away too easily, and the QR codes fill with dirt and stop working. Anoprinted aluminium will outlast the table, and cleans as easily as the tabletop. This also makes it a good choice for food areas and cleanrooms because the surface will not trap dirt, and there is no print or paint fill that can become damaged and release fragments or particles.

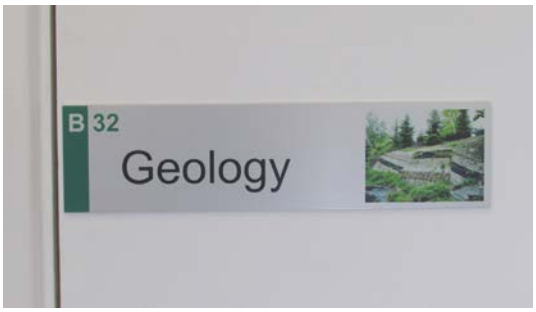
Digital Anoprinting—2. The Process.

When aluminium is anodised, the surface is porous until the anodising is completed. At this stage it can be coloured using dyes that soak into the porous surface. This process has been used to make coloured aluminium sheet, and brightly coloured metal objects by simply soaking in a vat of coloured dye solution. When the right colour is achieved, the surface is sealed so that the dye is locked into the hard anodised surface.



Our process works in exactly the same way. We have a specially designed digital printer that prints into the anodised surface before the anodising is completed. After printing, the anodised surface is sealed using a process that is very similar to setting concrete. This locks the graphics into the surface so that solvents, oils or even paint stripper will not remove the image. It is also extremely resistant to wear, so is useful for more challenging applications such as parking space identification.

The process uses CMYK colours so there is no white, and colours can blend seamlessly into the surface if required. This makes it ideal for colourful and creative wayfinding signage. Because it is CMYK, you can set up the artwork in the same way as for any similar digital printing process.



Digital Anoprinting—3. Key points

Durability in tough environments is the main advantage of digital anoprinting. It is especially useful where signs may suffer vandalism or a lot of wear. Because the graphics are locked inside the hard anodised surface, they will not wear off as surface prints will. The following examples show a simple wear test upon anoprinted aluminium, etched stainless steel, and a surface print. The test samples were subjected to even wear from an abrasive pad. After just 20 seconds, the surface print had been completely removed. After 60 seconds, the painted background of the etched plate had started to wear through. The anoprinted aluminium (top disc) was unaffected, even when the other two discs were completely destroyed.

This makes it useful for signage on doors that will suffer wear and impacts, and smaller floor mounted signage that will be walked on, but do bear in mind that because the surface is smooth, larger floor signs will be a slip hazard.

Like other full-colour signage , digital anoprinting will suffer from daylight fade. For outdoor use we normally apply a tough laminate to reduce fade, but care should still be exercised when considering the positioning of signs. Avoid fixing signs to face south if possible, and due to reflected glare it is sensible not to face signs towards the sun anyway.

Black colours and darker colours are not destroyed by daylight fade. The black we use is carbon, so for essential safety information and graphics that need to be permanent exposed to full sun in challenging environments such as paths, canals, and rail tracks it is an ideal product. For rail applications it also has the advantage of meeting low smoke zero halogen (LSZH) requirements.

Digital Anoprinting—More key points

Durability can mean a lot of things, but it is hard to imagine a more challenging environment than the example shown here. The wall graphic was created using anoprinted tiles, jointed with a specialist flexible sealant. It stands up well to the cleaning chemicals, as well as to graffiti and vandalism. The interiors of lifts can be just as harsh an environment for signage, and anoprinted aluminium works well there too.

Cutting to shapes is easy with anoprinted aluminium but it must remain flat, it cannot be bent, folded or rolled. Reasonably simple shapes can be cut in our workshop, but more complex designs such as control panels with holes and cut-outs are sent out to be machined by a specialist. Anoprinted aluminium works particularly well for control panels as it withstands a lot of wear and is easy to clean.

There is no white used in our digital anoprinting, it is a CMYK process onto matt aluminium. Good white effects can be created however by adding a grey tint to the background. The example on the left uses a 10% black tint fading from the top of the sign which produces an attractive appearance as well as allowing the white to stand out in the logo. We are only able to anoprint into our own specially prepared sheet material, we cannot anoprint into other aluminium sheet.

If you need any further information, advice, or technical help, do please get in touch.

Digital Anoprinting—Analytical test data

Anoprinted Aluminium is made from 5005 aluminium alloy which has a good resistance to atmospheric corrosion, it is also resistant to solvents and acids. It complies with low smoke, zero halogen (LSZH) requirements, so can be used in trains, aircraft, tunnels and others areas where this is specified.

See test results below (For all images in mono and multicolour):

Images
C - Cyan
M - Magenta
Y - Yellow
K - Black
Full colour

Condition	Application	Result
Abrasive Resistance	Taber -Abraser with CS 17 wheel Load: 1000 gr. Cycles pro hr: 7000	SLIGHT DULLING
Abrasive Resistance	Pig hairbrush+ water+ talcum powder. Load: 1000 gr. Cycles pro hr: up to 24000	NO EFFECT
Temperature Resistance	500°C	BLEACHING within 2 minutes.
Temperature Resistance	300°C for 12 hrs	NO EFFECT
Salt spray	5% at 40°C for 700 hrs	NO EFFECT
Mil-S-3136 Hydrocarbon fluid	700 hrs immersion	NO EFFECT
Mil-S-5161 Turbine+ Jet Engine fuel	700 hrs immersion	NO EFFECT
Kerosene	700 hrs immersion	NO EFFECT
Skydroll	700 hrs immersion	NO EFFECT
Methyl Ethylketone	700 hrs immersion	NO EFFECT
Ethyl acetate	700 hrs immersion	NO EFFECT
Xylol	700 hrs immersion	NO EFFECT
Heptane	700 hrs immersion	NO EFFECT
Ethyl alcohol	700 hrs immersion	NO EFFECT
Ferric chloride	10% solution, 24 hrs	NO EFFECT
Mil-P-21563	Soap solution, 16 hrs	NO EFFECT
Mil-C -25179 AIN in Heptane	25% solution, 1 min (cleaning solution)	NO EFFECT
Sulphuric Acid	10% solution, 24 hrs	NO EFFECT
Phosphoric Acid	1 % solution, 12 hrs	NO EFFECT
Nitric Acid	3% solution, 72 hrs	NO EFFECT
TSP	1 % solution, 40 hrs	NO EFFECT