



2008
August

Not all Regulations are a Burdon.
The safety Sign Bonanza

Mothers give us a lot of good advice about crossing roads, speaking to strangers, being led astray by wild women, drinking excessively and driving too fast. In my case to remember my pencil case. Sadly what was not mentioned were the pitfalls of computing. The biggest chasm is when a document that is carefully saved simply disappears. Now, William Gates Esq. would contend that it is not possible. But we both know that this can happen and did in the case of this months article. Fear not the neurones are firing again and a similar piece is forthcoming.

As small business people we are being subsumed in a torrent of regulations, guidance and the opportunity to become criminals in the blink of a camera or a missed signature. There are some advantages in this bureaucratic onslaught and one of those is that they all need print. In our particular sector that takes the form of safety signs, warning labels and illuminated displays. If you think of the number of No Smoking signs that were printed for 1st October 2007. Those signs that contained text were translated into eight languages and the explanatory leaflets that explained the complex fact that you cannot smoke in any enclosed public places or building used by the general public were translated into twenty four yes 24 languages. Why you may ask? How our esteemed Government spends our taxes is not for discussion in this article. Thank goodness so much of it is on print particularly of the screen and digital variety.

The Statutory Instruments 2007 No 923 Pubic Health, England The Smoke Free Signs Regulations 2007 takes up less than a page. The BS EN ISO 7010:2003 standard details the specification for the signs. Between them these two documents have created the need for tens possibly hundreds of millions of signs. What a delight for us printers.



Of course it is not just No Smoking but every other hazard that needs explaining to us.



As well as the message there is the substrate onto which it is printed. The most common ones are coated paper and vinyl. Then polycarbonate, acrylic and metals. The most widely used metal is aluminium both non anodised and anodised. So what is the difference? Non anodised is plain or lacquered aluminium where an ink, normally two component, is printed onto the surface.

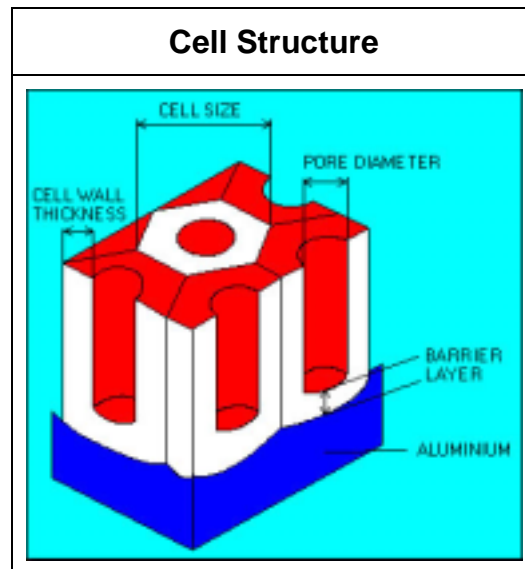
No matter how good the ink is as it is on the surface it can be removed by scratching off or attacked by chemicals. Two component inks are very good, they use a catalyst to affect the cure and the addition of heat can improve the adhesion and chemical resistance. But we still have the problem of it being a surface print.

Printing onto anodised aluminium is quite different. Firstly it uses dye rather than pigment to provide the colour, secondly when the production process is completed the image is formed inside the material. So how does it work?

Aluminium naturally forms an oxide on the surface that is hard and helps protect the metal from mechanical and chemical attack. In the anodising process this protective coating is thickened by aluminium combining with oxygen to form a protective surface film aluminium oxide (Al_2O_3). The oxide film has a hardness similar to that of a ruby or sapphire.

The actual anodising process is normally carried in a specialised facility, it requires a lot of space a series of immersion tanks and large amounts of electricity. The process is called "anodizing" because the part to be treated forms the [anode](#) electrode of an [electrical circuit](#). The process can create up to 200 microns of aluminium oxide coating. It is possible for a company to do their own anodising but the investment and inconvenience does not normally justify it. So a printer will buy in sheets already anodised.

Images are normally screen printed although a photomechanical method can be used or increasingly digital printing. If you looked at the anodised surface through a microscope you would see an open cell structure. The coating is porous and it is this property that lends itself to retaining the printed image.



What you want to do is fill the cells with dye. So you simply print the special dyes onto the surface. These dyes will enter the open cells in the oxide coating.

The anodised sheets must be kept clean before printing with the dye based ink, colours are limited but with careful selection quite a good range is achievable. The printed dye must then be air dried before additional colours are applied. At this stage the image is unstable and can be wiped off. To seal it into the porous surface of the anodising the printed sheets must be immersed in boiling water for about 30 minutes. This seals the once open cells and the dye is trapped inside resulting in an under surface print. It is a laborious process but the finished result is impressive.

This results in a hard chemically resistant surface that has the image within it completely protected by the sapphire hard coat. The technique is ideal for very aggressive environments where permanence of the image is paramount. As far as safety signs are concerned it may not be possible to match the precise colour stated in the standard but the image will be in the material indefinitely.



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Typical Aluminium Nameplates



Probably the most challenging application in the production of safety signs is the printing of illuminated emergency exit signs.

Illuminated Fire Exit Signs



Those are the ones with running figures in white on a green background. To the uninformed it looks easy. A white background with a simple green print on top. Oh how wrong they can be, it is actually one of the most challenging screen printing applications. Many have printers have tried and most have failed.

The difficulties of this application are triggered by the fact that the sign is back lit and can often be viewed from both sides. As soon as you back light a solid colour what looks fine when viewed in reflected light can look streaky and miscoloured when backlit. The ink film has to be consistent across the print without blemish. In some cases it is necessary to compensate for the intensity of light over and area by deliberately altering the density of the printed image.



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Experts in this sector are MTM Labels of Chesterfield. The company has a dust free environment at every part of the process and adopts rigorous production control systems basing its techniques on the practice of lean manufacturing. Ian Greenaway the Managing Director stated "We are not printers we are an engineering company who uses print as one of its main production processes. We also have to understand lighting technology and work closely with lighting technologists at the design stage." The disciplines learnt in producing illuminated signs have been reflected across all the other products particularly in fast turn round of orders with their "Express Order Service."

For companies whose market place is the safety sign catalogue market the emphasis moves from very high quality to fit for purpose. The challenge here is to manage the stockholding of signs and respond instantly to orders placed that day fulfilling where possible from stock and producing the shortfall in the day. As an industry we are used to quick turn round as often the print is responding to market fluctuations but in the safety sign business afternoons on the stencil room and print production floor can be controlled and sometimes uncontrolled chaos, where there is as much adrenaline as there is ink. You may ask why screen print? Why not use digital printing for these very short runs? The answer is the line colours have to match and they must have a light stability foreign to digital printing. This doesn't exclude digital print and vinyl cutting from the safety sign jungle weaponry they all have there place but for some time to come screen printing will be king of this particular jungle.