

Screen Exposure

Choosing the right exposure system



How to Guide

Exposure is one of the most important steps in screen making and will directly affect the quality of the print and press life of the stencil. Choosing the right exposure system is equally important, so this How to Guide will provide you with essential advice helping you select the best system that meets your requirements.

Factors to consider when selecting an exposure system:

Quality of the UV light - Diazo, Dual Cure and Photopolymer photostencils are only sensitive to Ultra Violet light with a wavelength from 320 to 430 nanometres. It is very important to select a light source that has a spectral output in this range. Avoid light sources that also produce large amounts of Infrared (IR) as this heat energy will quickly cause the stencils to fuse. If in doubt, check the spectral output with the equipment manufacturer to ensure that it is compatible.

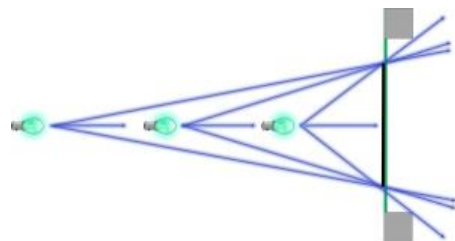
Power of the light - For conventional contact exposure, choose the most powerful lamp you can. The more powerful the lamp, the further it can be positioned away from the stencil.

Top tip: The UV output from all bulbs reduces with use, therefore always replace the bulb regularly in accordance with the manufacturer's recommendations.

Distance from the stencil - The distance from the lamp to the stencil has a big impact on exposure time, as the intensity of the light reduces very quickly the further it has to travel. For example a stencil requiring a 30 second exposure at 1.0 metre distance would increase to 900 seconds if positioned at a 2.0 metre distance. Importantly, the further away you can position the light source from the screen, the less undercutting you get at the image edges.



Angle of the light - Ideally the light should enter the stencil at an angle of 90° to the positive as this will give no undercutting of the image. Be aware though that the closer the lamp is to the image, the more acute the angle will become at the edges of the image. Ultimately, the size of the screen and the quality of the print you require will determine the optimum distance you should use.



The best compromise:

A good combination for conventional contact exposure of Diazo and Dual Cure stencils, such as Capillex 25 and PLUS 8000, of up to 1 square metre in size, is a 5 Kw metal halide with a Gallium Iodide doped 'Diazo' bulb (365, 405 & 418 nanometres output) positioned at a

distance of 1.5 metres. For screens bigger than 1 square metre, a more powerful lamp at a greater distance may be required.

If you only use photopolymer stencils, such as PLUS 9000, a specific 'Photopolymer' Iron Iodide doped bulb can be used, as this emits a shorter wavelength than a Gallium Iodide 'Diazo' bulb. A 'Photopolymer' bulb typically has an enhanced output at 360 to 380 nanometres. If you use a variety of Diazo, Dual Cure and Photopolymer stencils, then a 'universal' bulb is the best compromise.

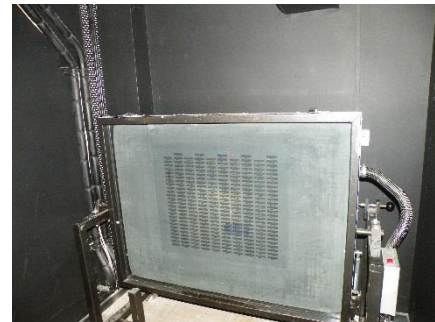
Other factors to consider

Mesh - Dyed (anti-halation) mesh will stop a lot of the light reflection/refraction during exposure providing a better resolution and definition at optimum exposure. However, you may need to increase your exposure time by as much as 100% compared to white mesh.

Vacuum frames - It is essential that the exposure frame gives you perfect contact between the film positive and the stencil, so a good vacuum and seal is very important.

Top tip: If you use a free standing exposure system, paint the walls black to reduce unwanted reflections that could cause undercutting.

Film positives - The quality of the positive you use will have a significant effect on the quality of the final print as any pixilation or imperfections on the image will be reproduced by the stencil. We recommend using quality Lith film positives for very high resolution applications and to make sure the emulsion is in perfect contact with the stencil, otherwise you will lose resolution.



Take care when using low cost ink jet or laser printer positives as these often have quite a low UV/Blue density and the stencils will need to be under exposed to prevent burn through.

Top Tip: Make sure that you do not overload ink jet film positives to increase their UV density as this may result in them sticking to the stencil during vacuuming.

Computer to Screen

There are two main Computer to Screen (CTS) processes that are used today in screen printing; (i) direct digital exposure of the screen using UV light and (ii) digital imaging of a UV resist directly onto the screen followed by a blanket UV exposure.

Within these groups there are several different types of CTS systems including laser exposure, Digital Mirror Device/LED, ink jet and even laser ablation, each one has its own advantages and disadvantages. The choice of which system you select will depend on the size of the screens, the number of screens required per hour, the print detail and the durability required from those screens.

It is also important to match your choice of photostencil with your CTS system to get the optimum result. In general, most Diazo or Dual Cure photostencils (such as PLUS 6000 or 7000) can be used for small to medium sized CTS applications, however for large screens an ultra-fast projection speed photopolymer emulsion (such as PLUS MIDI or AQUA) will probably be required.

Summary

There is no universal exposure system that will suit all screen printing applications, as the requirements for producing stencils for a touch screen application are quite different from those for printing giant flags or banners. Carefully consider all of the above factors before making your choice, as exposure is the most important step in determining the quality and durability of the screens being produced.

Contact us today and see for yourself how our range of products can help you.

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