**Buying An Exposure Unit**

**Screen size, image size, and resolution are just some of the factors you need to know before choosing the best screen exposure unit for your needs.**

**By Deborah Sexton**

Often overlooked, an exposure unit is one of the important pieces of equipment in a screen printing shop. It determines the quality of your finished print, impacts efficiency and costs. Wisely chosen, the right exposure unit can do the job for the life of your business.

Simply defined, an exposure unit is the machine used to transfer an image from the film positive to the screen in order to create a stencil. After mesh has been stretched on a frame and coated with a photosensitive emulsion or film, it is placed in contact with a film positive on the exposure unit. Ultraviolet light from the unit then exposes the parts of the screen not covered by the film positive image, causing the photosensitive material in those areas to become insoluble to water.

However, where the opaque image on the positive blocks the UV light the coating remains water-soluble. The unexposed coating is then rinsed out of the mesh in the areas where the ink is to pass through, creating a stencil.

As with any piece of screen printing equipment, the best exposure unit is the one that most closely meets your needs. Before shopping, determine your shop's requirements in terms of:

- Screen size
- Resolution
- Screen throughput
- Stencil material

**Know Your Options**

Exposure units differ in a number of respects, including screen size, type, and power of the light source. Understanding these alternatives and how they impact a unit's ability to meet your needs is critical.

**Screen Size.** Screen exposure units come in a range of sizes. The size of the unit determines the maximum size screen (and image) you can expose. Plan ahead, you may want to choose an exposure unit large enough to accommodate automatic press size screens or a pre-registration system.

**Light Source.** The most important way in which exposure units differ is in the type of light source they employ. To better understand the importance of the type of light source and its impact on screen resolution, think in terms of a silhouette's shadow, like a shadow puppet! In both cases, you want a crisp, clean image. When a single point of light passes the film positive (puppet silhouette) it produces a crisp clean stencil edge (shadow) and

ultimately a crisp clean print. When multiple points of light pass the film positive, it produces a softer stencil edge.

Light sources for exposure units basically fall into three categories: fluorescent (multi-point), metal halide (single point), and halogen-fluorescent (combination of multi-point and single point). There are other types, but these are the most common. The type of light source impacts exposure with respect to resolution, speed, flexibility, and price.

An understanding of the capabilities of exposure units with each type of light source can go a long way in helping you choose the best one for your operation. In broad strokes, the following are the key things to keep in mind about units employing the most common light sources.

**Fluorescent.** Fluorescent exposure units employ multiple fluorescent tubes as opposed to a single bulb or "point light source." Because this type of light source contains multiple tubes (multiple points of light) it is best for lower resolution images like line artwork and coarse halftones. While most can properly expose diazo-sensitized emulsions, photopolymer-sensitized emulsions are the better choice for this type of exposure unit. They generally have low maintenance costs and are priced under $2,000 making them the least expensive type of exposure unit available.

Exposure units with a fluorescent light source are typically best suited for shops with lower screen throughput, specializing in simple designs or athletic printing.

**Halogen-Fluorescent.** Halogen-fluorescent combination units are the next step up. They offer a combination of a multi-point fluorescent and single-point halogen light sources that makes it possible to capture slightly finer detail than fluorescent lights alone. This type of light source is best used with photopolymer or dual-cure emulsions.

Combination units tend to work well for small- to medium-size shops that need a little better resolution, a little more speed, and/or the ability to handle larger screens. They typically cost $2,500-$3,500.

***A metal-halide screen exposure system, such as the Photosharp, offers the highest resolution, fastest exposure times and the longest lamp life.***

**Metal-Halide.** Metal-halide units, employ a single-point light source and offer the finest resolution and the fastest exposure. With prices ranging from roughly $4,000 to $12,000, they also are the most expensive type of unit.

Metal-halide units are available in various in wattages. Units range from about 1,000 to 6,000 watts. They are available with spectral output that is diazo-compatible at about 360 nanometers or photopolymer-compatible at about 320 nanometers. Dual-spectrum units also are available, which provide optimal exposure for both diazo and photopolymer stencil materials.

The higher-wattage halide units allow for faster exposures and make it possible to expose thicker stencils, such as those for high-density printing. Metal-halide systems are usually the best choice for shops that want to capture the finest detail, need fast exposure, and/or desire the ability to create thicker stencils.

It takes about 20-30 seconds for all of the gases in a metal halide lamp to reach full temperature and for the lamp to reach full spectral output and therefore maximum exposure speed. Like an incandescent light in your home, the more times you turn a metal halide lamp on and off, the faster it wears out. You can choose between models with an idle-shuttered light or an instant (cold) start light. Instant start lights strike (also known as cold start, which means turns it on) the lamp with each screen exposure.

Alternatively, an idled-shuttered lamp is left on while you are doing a batch of screens, and a shutter is simply opened and closed for each screen exposed. This extends the life of the lamp.

Replacement lamps for various light sources also vary in cost, ranging from $20-$50 for fluorescent tubes to $50-$100 for halogen, and $300-$700 for metal-halide lamps. They also vary in longevity. Depending on the amount of use, a fluorescent bulb might last many years as opposed to a halogen or metal-halide lamps, which should be replaced every one to three years. It's smart to ask about bulb replacement costs and the anticipated life of the light upfront.

**Screen Contact.** Film-to-screen contact is another key factor in exposure quality, and how that contact is achieved is another point to consider in selecting an exposure unit. Uniform, tight contact between the screen and film has a major impact on the unit's resolution capability. The two types available are compression units and vacuum blankets.

Here's what you need to know:
In units using vacuum blankets, a soft rubber cover is drawn over the "sandwiched" screen and positive and a vacuum draws out the air between the film and screen. Both high-volume/low pressure and lower-volume/high pressure vacuum systems are available.

The lower-volume/high-pressure alternative isn't as fast, but it creates greater pressure and, therefore, provides the best contact. There also are a number of options in terms of blankets. The main things to look for are pliability and durability. The more pliable the blanket, the better it can adapt to frame contours. Also, some blankets have longer lives. Since the blanket is a wearable part, it makes sense to ask about the life expectancy of the blanket and also its replacement cost.

In units using compression contact, a weight or some sort of mechanical force is applied to a soft foam rubber material to "press" the film against the screen. While quick, this type of film to screen contact may not be as good as with a vacuum blanket system.

***The Point 1000 is a halogen/UV screen exposure system. It provides high resolution at an affordable price by bringing together two different light sources. It enables you to capture halftones and fine lines while the UV fluorescent light speed up exposure.***

**Other Considerations**
When selecting an exposure unit, there are a number of other features and variables worth taking into account.

They include:
**Exposure Control.** Exposure controls range from simple dials to digital models. While the dial type is less expensive, it also is less accurate.

**Power Requirements.** Most exposure units are 110 volts, although some of the more powerful units (2,000 watts or higher) are 220 volts.

**Safety Off Switch.** Like the sun, UV light in an exposure unit can be dangerous to your eyes. Therefore, a safety off switch that prevents the lights from being turned on while the lid is open is a good feature to look for.

**What You Pay For**
As a rule of thumb with screen exposure units, you get what you pay for. By and large, the more expensive the unit is, the higher its performance level—and also its maintenance requirements—will be. No matter what its price, however, with proper maintenance, a good exposure unit will last a long time. Therefore, consider your business plan when buying. If you plan on doing only simple athletic work, a basic fluorescent unit may be

all you'll need—ever. On the other hand, if you're focusing on more complex work or plan to grow into it, buying the best unit you can afford at the outset may make better sense long-term than having to upgrade.