

Impression Evidence

# Equipment Planning Meets Laboratory Design

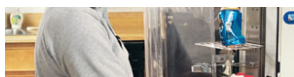
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This article will discuss how equipment can influence the design and infrastructural needs of two laboratory space types where the identification of evidence takes place. We will discuss an ALS examination room and its key components and then move into the needs of specific latent print identification equipment.

The uses of alternate light sources (ALS) for the identification of such evidence as biologicals and latent prints are supported by properly designed rooms dedicated to their use. These light sources function by providing specific wavelengths of light that identify certain types of evidence better than standard spectrum visible light. Some of the features of a well designed ALS room include an overhead service carrier, forensic exam tables, room darkening measures, and considerations for the specific alternate light source or sources being used. Information regarding the advantages of each of these follows.

An overhead service carrier (OSC) is a device that can provide access to power, data, snorkel exhaust, exam lights, and other

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services. An OSC is particularly useful to the design of an ALS room since, mounted to the ceiling, they provide access to services without restricting the work area below. Forensic exam tables (FXTs) are often provided with lockable casters, height adjustment, a paper roll dispenser, attached storage, and accessories to facilitate examination of evidence. Since evidence can range from tall items that need to sit on the floor to items too long to fit on one table, the ability to combine multiple FXTs provides the flexibility to lay out examination space as needed. Additionally, since FXTs provide storage and paper roll dispensing within the unit itself they supplant the need for these other amenities in what can otherwise often be a small room. ALS rooms are equipped with standard laboratory lighting for making a visual inspection and inventory of evidence but require darkening capabilities for proper use of the ALS. Blackout shades are commonly used for windows to achieve room darkening requirements while also giving an examiner the ability to use natural light when desired. As the room's purpose is to provide a space to use an ALS, consideration should be given as to how alternative light sources are going to be used and mounted in the room. One option is to mount the ALS on the OSC. This keeps the ALS out of the way, but may introduce complications such as having to mount the ALS controls on an adjacent wall. An ALS could also be placed on a small cart for mobility. Most are either battery powered or require a standard electrical outlet and are relatively light. For example, the Melles Griot Omniprint 1000A weighs 18 pounds<sup>1</sup> while the Mini-CrimeScope 400 from SPEX Forensics is 15 pounds.<sup>2</sup> Thus manually moving an ALS from FXT to FXT is not prohibitive.

One particular type of alternate light source, a forensic laser, may have greater infrastructure requirements than other types of ALS. While some forensic lasers, such as Spectra Physics's REVEAL lasers, only require a standard 120 volt outlet,<sup>3</sup> other lasers, especially older lasers, may have special electrical needs and require a water chiller. Water chillers generally require a cold water supply as well as a floor drain in the room to capture any water that may spill from the chiller during routine maintenance or system failures. Lasers, based on OSHA requirements, also have safety requirements. OSHA requires that laser warning signs be posted at the entrance of the room where a laser is being used. Additional, more stringent requirements are necessary if the laser being used for examination is a Class I VLaser. One example would be door

interlocks where, in the event the door were opened while the laser was in operation, the laser would automatically shut off.<sup>4</sup>

Just as the equipment used in ALS spaces has special requirements that affect the design of the spaces it is used in, other equipment used in the discovery and development of latent prints also affects laboratory design and infrastructure.

There are multiple methods for developing latent prints with many different types of equipment that aids in that process. For powder processing of prints, a dusting station may be used to prevent residual powder from distributing throughout the laboratory. Generally, these stations draw air in and away from the user handwork as a containment device for the powder. As air enters the cabinet it is passed through a filter pack, cleaned, and re-circulated back into the lab. Such units require only a standard electrical power outlet but may require forethought regarding bench placement and design. For exposing latent prints using cyanoacrylate, a superglue chamber (or forensic cabinet) is often used. These units require electrical power and may require a connection to the building exhaust. Additionally these units come in multiple configuration types from benchtop to floor standing models impacting laboratory design and layout.

An additional technique for detecting difficult fingerprints especially on plastics such as grocery or trash bags is vacuum metal deposition (VMD). VMD uses a vacuum chamber and small amounts of metals—4–5mg of gold “and several grams of zinc” to detect fingerprints. The Royal Canadian Mounted Police found that VMD detected more prints than many other methods including 15% more prints on polyethylene over cyanoacrylate fuming.<sup>5</sup> VMD chambers have special requirements that need to be accounted for when designing a lab area. Utilizing the VMD 900 Vacuum Metal Deposition System from West Technology Systems Limited as an example, there are several items that will impact laboratory design. First, enough physical space is needed for a VMD. The main component of the VMD900, the vacuum chamber, is about 3 feet wide, 4 feet deep and 6 feet tall. The unit may be recessed into a wall. While recessing the unit saves space in the lab it also requires prior planning to be properly installed. The main chamber weighs about 3,300 pounds and must be accommodated by the building’s structural system. The entire system is composed of the chamber, pumps, and compressors, a chilled water connection or a local chiller as well as other

components. Each of these components has different electrical needs that must be accommodated. Additionally, the system also requires an exhaust connection. Ideally the accessory components of the VMD would be located in a support space to help mitigate the noise levels in the lab area.<sup>6</sup>

Forensic laboratory buildings are unique science facilities with unique equipment needs. Equipment and how it is used affects laboratory design and infrastructure. Alternative light sources and latent print equipment, like vacuum metal deposition chambers, have needs that should be planned for when designing a laboratory to house them.

## References

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