INDUSTRY PAPER

Livescan Fingerprint Collection with Silicone Membranes

CROSSMATCH® TECHNOLOGIES

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Protecting People, Property and Privacy

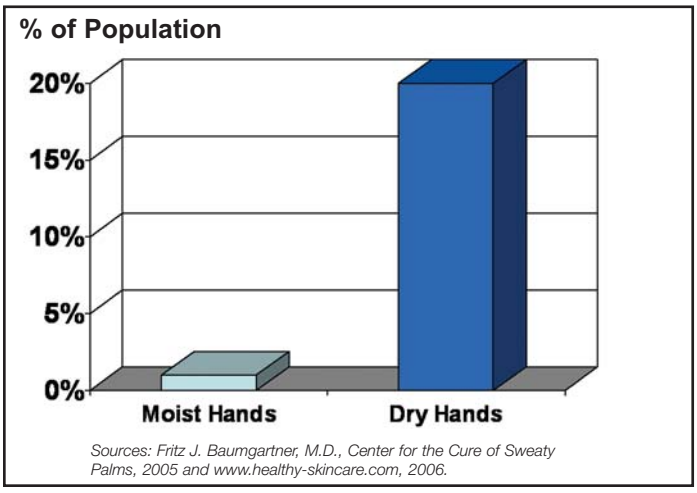
Revolutionizing Fingerprint Capture

Biometric identity management is at the forefront of the security concerns of organizations worldwide. With the introduction of new livescan fingerprint and palm print systems, the use of messy ink and paper cards has been made largely obsolete. Livescan systems are advanced digital photography solutions that create high-quality digital images of fingerprints and palm prints and electronically distribute them to identification services.

Using livescan systems to process individuals at airports and seaports in large-scale programs such as US-VISIT, helps ensure the integrity of the United States immigration system. However, with livescan solutions comes not only the ease of collecting biometric data, but the issue of quickly capturing quality images in high-volume situations.

Livescan instruments must be able to collect fingerprints from a wide cross section of people—including those with very fine, worn, scarred or cracked fingerprint ridges and varying degrees of skin moisture content. Most systems are optimized for individuals with well-defined ridges on their fingers and sufficient moisture content in their hands. In general, younger people fit this description and have little or no trouble with their fingerprints being captured on any certified scanner. However, problems arise when fingers are too wet or too dry.

For the few (estimated at less than one percent of the population) individuals with palmar hyperhidrosis—a disorder characterized by excessive sweating on the hands—capturing a usable fingerprint can be very difficult with livescan systems. As troublesome as this hereditary disorder can be, due to its rarity, it accounts for a small amount of rejected fingerprint scans.



Sources: Fritz J. Baumgartner, M.D., Center for the Cure of Sweaty Palms, 2005 and www.healthy-skincare.com, 2006.

A far more common impediment to capturing quality fingerprints is xeroderma—dry skin. By some estimates, up to 20 percent of the population has dry skin, with more women than men between the ages of 10 and 60 affected. And with one in five people living with xeroderma, it is not solely a problem associated with skin aging and can lead to poor quality fingerprint captures across a wide population group.

There are four main causes for dry fingerprints: genetics, age, disease and environmental context. Genetic conditions such as psoriasis (rapid buildup of dead skin cells), hypothyroidism (resulting in rough, dry skin), atopic dermatitis (chronic dry skin), and ichtyosis (accumulation of thick, dry scales on the skin) account for many of the genetic impediments to capturing quality fingerprints. As people age, the skin tends to become drier due to the oil-producing glands becoming less active—resulting in progressively drier skin. Diseases such as diabetes can draw water away from the body's tissues, thereby causing dry skin. Additionally, environmental factors such as frigid weather, arid local climates, dehydration, cleansers, alcohol, drugs or even internal air conditioning can increase the difficulty of capturing fingerprints.

Cross Match Technologies, Inc. has developed a patent-pending silicone membrane technology that greatly improves the collection of fingerprints through livescan systems. The use of a silicone membrane enhances the fingerprint image regardless of skin condition—requiring less finger pressure to capture a print. The result is less distortion of the fingerprint platen and a more accurate, high-quality image.

Fingerprint Collection Basics

During the fingerprint collection process, if a subject's hands are wet, which does not occur naturally under normal operating circumstances, the simple and obvious remedy is to require the subject to dry his or her fingers. Competing livescan systems use a small angled prism design, which is tolerant of wet hands; however, it has limited effect on enhancing the captured image.

To address the most common of moist finger issues—when warm hands are applied to a cold livescan platen causing condensation "halos"—Cross Match livescan systems automatically heat the surface a few degrees above ambient temperature, thereby raising the dew point and preventing condensation halos. This is achieved utilizing silicone membranes, which not only address moist finger issues but the more significant and frequent dry finger issue.

The research and development team at Cross Match determined that using a silicone membrane on the fingerprint capture surface of livescan systems successfully addresses the most significant challenges facing high-volume fingerprint capture. Although a silicone membrane is not required for proper livescan operation, it does uniquely address the most significant obstacles to rapidly collecting high-quality ten-print images from a large cross section of people. As such, silicone membranes represent a significant competitive advantage for the Cross Match suite of livescan ten-finger and palm print systems.

The following discussion is presented to highlight the significant value of silicone membranes to system integrators, customers and livescan system users.

Silicone Membrane Chalk Talk

Greatly increasing the intimate contact area for friction ridge image capture, the silicone surface enables the easy and rapid capture of fine, worn and dry finger ridge detail. This is most important in situations where throughput must be maximized and customer inconvenience and field maintenance minimized, such as in airports.

Auto capture innovation. Auto capture technology from Cross Match, on which there is a U.S. patent pending, enhances the speed at which quality prints are captured from subjects with worn or dry fingerprints. The silicone membrane quickly extracts the "dark image" required for a quality print. Adopted by several U.S. government agencies, the technology greatly improves digital fingerprint capture in high-volume implementations.

For auto capture to work efficiently, high-contrast and high-quality images must be acquired quickly from the scanner—regardless of the subject's age or skin condition. This is where the use of a silicone membrane is essential. If a glass platen is used without a silicone membrane, the capture time for a dry print to become dark enough for the auto capture algorithm to acquire it is lengthened and the technological impact is lessened.

Silicone membranes are easy to replace on Cross Match livescan systems.

A cleaner capture. Silicone membranes protect the glass platen from surface mars and scratches. The membrane's highly durable surface is very easy to maintain and will result in fewer system cleaning requirements.

The livescan image process algorithms analyze the background noise in each fingerprint image and notify operators when the membrane needs cleaning. Unlike glass platens, cleaning the silicone membrane does not require a liquid cleaner or special cloth. Rather, the application of a small piece of tape to the silicone membrane, while in place atop the platen will lift the dirt, oils and other debris very effectively and quickly.

On average, Cross Match livescan systems require cleaning after capturing 100 sequential sets of prints—demonstrating their very low maintenance. This represents significant value to customers and users when compared to competing systems that require cleaning after capturing each fingerprint.

Additionally, when using silicone membranes, there is no need for lotions, moisturizers or liquid on the fingers to acquire high-quality images; thereby further decreasing maintenance concerns and increasing throughput.

Durable and economical. Tearing, ripping or gouging of silicone membranes is nearly non-existent, as Cross Match customers have proven through millions of fingerprint collections. For example, the Cross Match livescan systems in use at the Port of Palm Beach in southern Florida, have achieved up to 8,000 fingerprint sets collected between silicone membrane changes. And when silicone membrane replacement is necessary, it is quick with virtually no system down time.

Livescan screen shots showing a comparison of fingerprint images taken both with (right) and without (left) the silicone membrane.

Join the Revolution

Just as livescan fingerprint systems forever changed the way biometric data is captured, silicone membranes have helped make fingerprint collection easier, faster, neater and more accurate. Cross Match livescan system software automatically detects if a silicone membrane is present and makes the illumination adjustments to capture a high-quality image under either circumstance. Although it is not necessary to use the silicone membrane to capture a quality image, approximately 10,000 of the Cross Match ten-print livescan devices in use worldwide—including those in Iraq and Afghanistan—do utilize silicone membranes. This feature, both unique and proprietary to Cross Match, is a benefit to many customers.

Additionally, silicone membranes are an ideal solution when using livescan systems in office environments, where personnel work behind glass enclosures. Using Cross Match technology, there is no need for workers to constantly leave their posts to assist patrons to use the livescan device or to clean and change the silicone membrane.

Cross Match has developed patented livescan technologies that maximize the advantage of using patent-pending silicone membranes. A cost-effective, low-maintenance solution to combat the difficulties of capturing fingerprints from dry skin, silicone membranes are the proven advantage to increasing fingerprint image detail and eliminating rejections due to insufficient biometric data.

Cross Match livescan systems are currently in use worldwide. At the beginning of 2007, there were more than 22,000 Cross Match livescan systems in use in addition to more than 60,000 single-finger capture devices. Prominently placed for use in the US-VISIT program as well as other large-scale government and private sector projects, Cross Match livescan technologies are at the center of some of the world's most important security endeavors.

Continuing its time-honored tradition of conducting research, discovering high-quality optical transparency materials, and creating durable products, Cross Match will continue to enhance the appeal of its products to the marketplace.

For more information:
Please contact your Cross Match Technologies sales representative.

Visit our Web site at www.crossmatch.com.

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About Cross Match Technologies

Cross Match Technologies, Inc. is a leading global provider of high-quality interoperable biometric identity management applications and solutions. The company's offerings consist of a wide range of biometric products and solutions which are used to capture and process the unique physiological characteristics of individuals to establish and verify their identity, such as fingerprint, palm scan and facial recognition systems and solutions, enterprise and application software (including enterprise matching software), document readers, access control systems, and related services. Cross Match products are used around the world to conduct criminal bookings; perform background checks for job applicants; verify identities at borders and other checkpoints; register citizens for driver's license and national identification programs; prevent identity fraud in large-scale government and civilian programs; and control access to office buildings, government facilities and other secure areas. Cross Match serves a broad range of vertical markets including national, state and local governments, national and local law enforcement, transportation and other critical infrastructure, financial services, education, healthcare and other commercial enterprises. For more information, visit us at www.crossmatch.com.

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