

Best Practices for Flat Fingerprint Capture Using a Livescan Device

EXECUTIVE SUMMARY

Clear legible fingerprints form the foundation of the FBI's Fingerprint Master File, which continues to grow by approximately 13,000 records each day. The proper capture technique coupled with proven livescan devices and workflow software allows agencies of all types, the ability to collect fingerprints easily, quickly and at a reduced cost due to errors or rejections. The following information will assist agencies in obtaining the best quality prints that meet the FBI's standards for acceptance.



FIGURE 1.

I. ERGONOMIC STAGING OF THE SCANNER

The proper staging of any livescan device is required for the collection of top-quality prints. Fingerprint experts recommend the capture surface of the device be located approximately 44 - 46 inches above the floor to allow the forearm of the average adult to be parallel with the floor. Placing the device too high or low places undue stress on the wrist, arm and shoulder of the person being printed, making the entire capture process uncomfortable. This often results in poor image quality due to shifting, cropping or premature lifting of the finger from the platen surface during the capture process. If you are not using a workstation with an adjustable platform set to the appropriate height, then the location of the table or desk for your livescan device should include a platform to be used in addition to the height of the desk and scanner to obtain the height of approximately 44 - 46 inches above the floor. See Figure 1.

II. SILICONE MEMBRANE

Taking fingerprints with the help of modern livescan devices is fast, easy and convenient. However, problems arise when fingers are too wet or too dry. If a person's hands are wet, the solution is simply to dry the person's fingers. The problem of dry fingers occurs much more frequently in real life applications. Frequent airline travelers, individuals living in arid areas such as deserts, high plains and extremely cold environments frequently have dry fingers. Many people who perform manual labor and older individuals tend to have worn ridges or dry hands, making fingerprint capture challenging. These physiological variations in skin characteristics must be addressed when fingerprinting large groups of people — especially in a high throughput environment, such as an airport where the cost of the capture process and the inconvenience to travelers must be minimized. HID has developed patented silicone membrane technology that greatly improves the collection of fingerprints through livescan systems. There are several advantages to using silicone membranes for capturing live fingerprints.

Image enhancement

Silicone membranes enhance fingerprint images regardless of skin condition, requiring less pressure to capture prints. The result is less distortion and more accurate, high-quality images. The silicone membrane eliminates the need for moisturizers or liquids on the fingers for high quality fingerprint capture.

Protection

When used in an abusive environment, damage such as scratches to the platen can occur during operation. Scratching the glass platen is a costly issue, often requiring the replacement of the entire livescan device. The silicone membrane adds an extra layer of protection for the scanner's glass platen. If, however, a silicone membrane is damaged, it can easily be replaced in seconds in the field with virtually no downtime.

Low maintenance

When using a silicone membrane, users often find they are able to collect higher quality images over a wider variation of skin conditions and finger features. The membrane allows for longer operational periods between cleanings as compared to a plain glass platen which may require cleaning after each use. Unlike a glass platen, cleaning the silicone membrane does not require a liquid cleaner or special cloth. Applying a small piece of tape to the silicone membrane will remove dirt, oils and other debris very effectively and quickly — without damaging either the membrane or the platen.

Easy capture

When using livescan devices with or without a silicone membrane, there is no difference in the fingerprint capture approach. The silicone membrane is fitted invisibly atop the glass platen and its use requires no variation of fingerprint presentation technique, making it easy to use.

III. IDENTIFYING A GOOD QUALITY PRINT

Necessary Elements

The FBI states that 43% of the total fingerprints submitted are rejected because the quality of the image characteristics is too low to be used. There are several elements that must be present in fingerprint impressions for acceptance by the FBI for classification or identification purposes.

- The impressions will include the complete pattern area, to include from the tip of the finger to approximately ¼" below the first joint of the finger.
- There should be sufficient contrast to allow the friction ridges and other minutiae in the pattern to be clearly defined and readily identifiable.

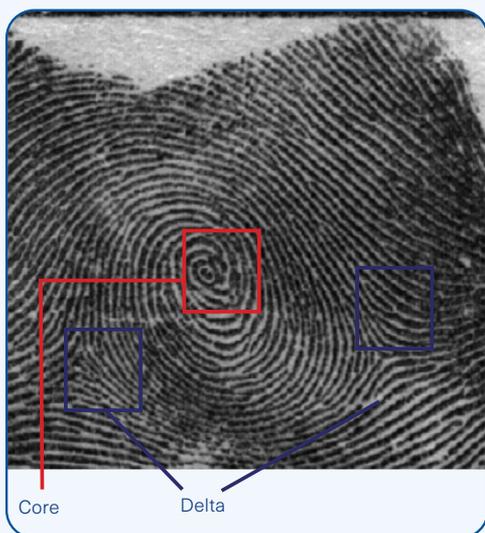
The operator of the livescan equipment is the last word concerning the quality of the flat impression and he or she should determine if there is enough information in the captured print for acceptance and further classification by the receiving agency. If any of the impressions are not of sufficient quality as described, they should be re-taken until enough information is present to allow it to be properly classified by the receiving agency.



LOOP PRINT

Loop Print

Within a Loop print, a core and one delta should be identifiable, and the friction ridges between them should be clear and well defined. The contrast should be sufficient to allow the operator to accurately count the number of ridges between the two points.



WHORL PRINT

Whorl Print

In a Whorl print, one core and two deltas should be identifiable and the friction ridges between them should be clear and well defined. The contrast should be sufficient to allow the operator to accurately count the number of ridges between the two points.

CHALLENGES TO A QUALITY CAPTURE

PRINTS TOO LIGHT

Indications of a print that is too light as shown below are, poor or missing ridge detail, very little contrast and breaks in the definition of a print.



Causes

Rough dry skin, individuals age (very young/old), worn ridges.

Remedy

Ridge detail may be improved by wiping the fingers with Corn Huskers lotion, lotion containing aloe vera or massaging the fingers to force blood to the fingertips. When using a lotion, use it sparingly and wipe the excess off before rolling the print.

PRINTS TOO DARK

Indications of a print that is too dark as shown below are, dark black areas without ridge detail.



Causes

Wet/Sweaty, Oily/Dirty fingers. Overpressure during capture process.

Remedy

Dry fingers with a soft cloth. Wipe with rubbing alcohol.

PRINTS TOO HIGH OR LOW

Prints that are too high or low on the platen will display a sharp straight line across the top or bottom of the print. This missing information should be included to capture a complete pattern area.



Causes

This is caused by placing the fingers too high or low on the scanners platen.

Remedy

In either case, the operator should move the finger up or down on the scanner platen using the markings on the bezel as a guide.



IV. CAPTURE TECHNIQUE

Capturing high-quality flat impressions starts by ensuring that you have ergonomically staged the HID livescan device to the recommended height as stated in Section I of this document. Ensure the platen of the livescan device is free of dust, dirt and any residual fingerprints. Before capturing fingerprints, the individual's hands should be washed, preferably with soap and water. The operator of the livescan device should position the front of the individual's body at 90° (perpendicular) to the front of and at an arm's length from the livescan device, so the forearm is near parallel to the floor.

*See Figure 2 below.



FIGURE 2.

This should be the most comfortable position for the individual and allow for the most natural movement during the capture process.

The subject should place his or her hand lightly on the platen and gently increase pressure if the resulting image is too light. (If a silicone membrane is used, less pressure is generally needed.)

V. CONCLUSION

Digitally capturing high quality fingerprint impressions poses a range of challenges versus the traditional ink on paper methods of yesterday, but the process is essentially the same. Regardless, the importance of ensuring the highest quality image capture has not diminished. Capturing and processing the best available benchmark enrollment image is imperative, as all future matching will be done based on this data asset. And the likelihood that much of this matching will be executed in an automated “lights-out” environment, or said another way, without human intervention, is high. The consequences of capturing a poor benchmark enrollment image as well as verification print capture carries the ultimate risk - a false negative report.

The simple techniques and methods outlined herein, coupled with the technology aids designed into HID’s livescan solutions, can vastly improve fingerprint capture quality. As such, submitting agencies can expedite their fingerprinting process and lower print rejection rate from receiving agencies, all while supporting improved matching speed and scores.

HID has a long history of experience serving the law enforcement, government and fingerprint collection service agencies with industry leading technology innovative and patented processes. Our livescan solution features such as FlexRoll and FlexFlat, as well as our shift detection and roll-stitching algorithms, aid print collection operators to rapidly and ergonomically capture the highest quality images – particularly helpful when handling uncooperative subjects or the operator is a novice. And our patented Auto Capture function eliminates the guesswork for operators on evaluating image quality, reduces recapture attempts and expedites the collection process.

HID products also accommodates variations in subject finger conditions and the influence they have on fingerprint quality. Our engineers also take into consideration subject finger condition as a material influence on print quality. The addition of our patented silicone membrane uniquely addresses subjects with dry skin conditions, by enhancing ridge definition and producing a noticeable improvement in image quality. The addition of our patented silicone membrane uniquely addresses subjects with dry skin conditions, enhancing ridge definition and adding a 5% improvement in image quality. And our moisture discriminating optics found in the latest Guardian tenprint series, ensures quality image capture of subjects with moist or wet fingers without the need to pre-treat the hands.

At HID Global, we are committed to delivering the highest quality certified enrollment and verification solutions for your critical identity applications. It’s why we say – the world identifies with us.

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