Latent Print Section

Recording Known Impressions

1. Scope

Clear and complete known impressions of fingers, palms, footwear and tires are crucial to have when comparing impressions of unknown impressions. Methods for capturing these will be discussed.

2. Safety

2.1 Personal Protection Equipment will be worn when there is an expectation that potentially infectious material or chemicals are present.

2.2 A protective booty or bag should be worn on the foot being used to record walking test impressions from footwear.

2.3 Be aware of exhaust fumes while working in an enclosed garage.

2.4 It is recommended that two people be present when the vehicle engine is running.

2.5 Care should be taken when the vehicle is moving.

2.6 If using petroleum jelly to record tire impressions, do not leave excess on the tire tread as this retains heat when driven and can cause the tire to blow-out.

3. Quality Assurance

3.1 The scientist/technician will be properly trained in the following techniques. When the known impression taken is not the quality required then another set will be taken.

3.2 Correction tabs may be used on ten print cards.

3.3 Ensure the impressions are properly labeled.

3.4 Any objects wedged or stuck in the sole of the shoe or in the tread of a tire should not be removed prior to recording the impression as they may have been there when the impressions were left at a crime scene.

3.5 Before tire impressions are taken the floor should be swept. If the vehicle tires are wet, they need to be left over night to ensure they are completely dry. The tires can also be wiped down gently with a rag or paper towels to remove loose dirt.

3.6 Depending on case information the spare tire may need to be recorded as well.

3.7 Most accurate representations of questioned impressions are achieved when the tires are mounted on the vehicle; however, this is not always possible.

3.8 Once test impressions are taken of the tires, the tires should be removed from the vehicle and maintained in the laboratory (although this is often not possible). The examiner may need to refer to the actual tire during the examination to form a more concise conclusion.

3.9 Any deviation from these methods will be documented. Circumstances with decomposed or severely damaged skin may require other procedures. Measures taken will be an effort to get a useable impression so an individual can be identified.

3.10 All the lifts or impressions taken will be labeled with case number, date, initials, and appropriate description of the impression being recorded.

3.11 It is the analyst's/technician's discretion on which method is most appropriate to collect the most sufficient information from the knowns given the condition of the knowns being recorded.

4. Recording Fingerprints on Ten-Print Cards

4.1 Fill in all information in the upper portion of the fingerprint card.

4.2 Using ink, an ink pad, or an inkless system, roll the subject's fingers nail to nail in the appropriate boxes.

4.3 Record the right four fingers simultaneously in the bottom right box.

4.4 Record the left four fingers simultaneously in the bottom left box.

4.5 The thumbs of both hands should be recorded in the appropriate boxes

5. Recording Major Case Prints, Post-Mortem Prints or Difficult Prints

5.1 Major case prints include a ten-print card or equal, left and right palm impressions, left and right writer's edge, and the full length of all the fingers and fingertips.

5.2 Method 1 - Adhesive Lifts

5.2.1 Label a sheet of clear acetate or blank sheet of white paper with the ten fingers to be printed, or photocopy a ten-print card onto clear acetate.

5.2.2 Dust or ink the subject's fingers.

5.2.3 Apply a strip of clear, pliable/rubberized fingerprint tape or lifter to the subject's finger, lightly pressing tape/lifter onto the surface of the digit then remove tape/lifter.

5.2.4 Apply the tape/lifter to the underside of the acetate in the appropriately labeled position or to the top side of the piece of paper in the appropriate positions.

5.2.5 Repeat for each finger and thumb.

5.2.6 Dust or ink the subject's palm.

5.2.7 Apply a white or clear adhesive tape/lifter to the subject's palm, gently press around each surface, especially in the center to ensure this area is recorded, then remove and replace cover, if there is one, or place on a clear acetate.

5.2.8 Avoid double pressing any adhesive to an area of friction ridge skin. If the adhesive comes up after it has been in contact with the friction ridge skin, do not press it back down. Continue to touch the adhesive down to the remaining areas of the finger or palm. The adhesive is removing the dust/ink and won't always adhere to the actual skin when taking impressions.

5.3 Method 2 - Gel Lift

5.3.1 Gently apply a black gel lift to the palm and finger ensuring the entire palm and length of fingers make contact with the gel. Ensure the center of the palm made contact, so this area is recorded as well.

5.3.2 No medium such as ink or powder is necessary. Roll the entire fingers on the gel in the same manner as on a ten-print card. Repeat with the fingertips and writer's palm. More than one black gel lifter may be needed to obtain all the areas.

5.3.3 Avoid excessive pressure on the gel lift.

6. Recording Footwear

6.1 The date when the footwear was seized, if known, should be noted with the evidence and record identifying information from inside the shoe.

6.2 Prior to taking test impressions, take sufficient incoming photographs of the condition of the footwear (uppers and outsoles) to capture the overall condition of the footwear. Capture the label of a shoe with the manufacturer's information. If no manufacturers information is available that should be documented in the case notes.

6.3 Prior to taking test impressions, take examination quality photographs and/or scans of the outsole with sufficient lighting angles to capture defects on the tread. The entire outsole

need not be captured in one examination quality photograph/scan if the overall outsole was captured in the initial photographs.

6.4 Some variations in tests occur. Sufficient tests will be taken to capture all the detail available on known outsoles.

6.5 These methods are not exclusive means of recording a footwear impression. If another method is used, it must obtain the desired result without altering the known footwear. The analyst/technician will determine the method needed to obtain the highest quality test impressions.

6.6 Method 1 - Black Gel Lift

6.6.1 Remove the acetate from the gel lift.

6.6.2 Make test impression by gently pressing the outsole against the gel. Ensure all surfaces of the outsole have made contact with the gel surface.

6.6.3 Avoid double pressing any gel to an area of the outsole. If the gel comes up after it has been in contact with the outsole, do not press it back down. Continue to touch the gel down on the remaining areas of the outsole.

6.6.4 Digitize the impression using the GLScan.

6.7 Method 2 - Card Stock

6.7.1 Spread a thin layer of ink onto the sole of the footwear.

6.7.2 Don the inked shoe and step onto the cardstock, stepping heel to toe.

6.8 Method 3 - Roller Transport Film

6.8.1 Dust the entire outsole with a medium to heavy coating of fingerprint powder.

6.8.2 Tap shoe to remove excess powder.

6.8.3 Prepare roller transport film by cutting to appropriate size if necessary.

6.8.4 Place film on a clean, dry, and smooth surface.

6.8.5 Apply a small amount of clean water to the surface of the film (easiest to do this on a lab bench or like height).

6.8.6 Gently and lightly wipe a clean, damp sponge through the water so that it spreads across the surface of the film. Continue wiping the sponge gently across the surface using a back-and-forth motion until tiny bubbles start to appear on the surface of the film.

6.8.8 Use a clean and undamaged squeegee to remove the water/bubble layer from the film.

6.8.9 Don the dusted footwear and step onto the film, heel to toe, in a walking motion. It might be necessary to stop with the outsole in contact with the film and press down gently on the outer peripheral edges of the footwear in order to collect those surfaces in the test impression.

6.8.10 Allow the film to dry, then label appropriately.

6.9 Method 3 - Powder Impressions with Clear Adhesive

6.9.1 Dust the sole lightly with black fingerprint powder.

6.9.2 Tap shoe to remove excess powder.

6.9.3 Lay the adhesive side up.

6.9.4 Don the dusted footwear or press the shoe by hand onto the adhesive. Before removing the adhesive ensure that all areas of the sole have contacted the adhesive.

6.9.5 Remove the adhesive from the shoe and place on a clear sheet of acetate using a fingerprint roller to avoid bubbles.

6.9 Method 4 - Oil Residue Impressions

6.8.1 Lightly coat the sole of the footwear with a thin layer of petroleum jelly or oil.

6.8.2 Wear the shoe and step onto paper or white chart board.

6.8.3 Dust the paper or chart board using magnetic powder and a magnetic brush.

6.10 Method 5 - Three-Dimensional Test Impressions

6.9.1 Impress the footwear outsole into Biofoam or Bubbar at approximately half the depth of the substrate. Carefully remove the outsole from the substrate.

6.9.2 Cast the impression using an appropriate casting technique.

6.9.3 After the casting material has set and cured, any substrate still adhering to the cast can be brushed off.

6.11 Method 6 – Inkless Print Kit

6.10.1 Follow the manufacturer's instructions depending on the inkless kit being used.

6.10.2 Allow the sensitized paper to dry and label appropriately. The impression might not show immediately but should show within a few minutes. If the impression does not show, it is possible the unsensitized side of the paper was used and the impression should be retaken using the correct side of the paper.

6.10.3 Inkless impressions can fade over time. They should be digitized as soon as practical.

7. Recording Tires

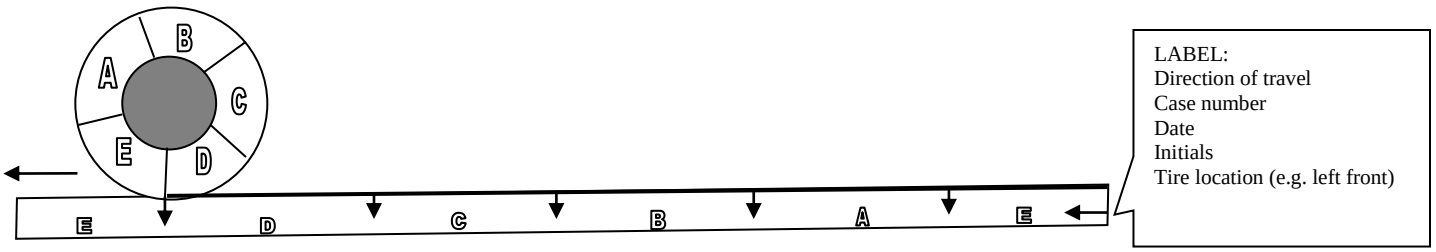
7.1 The date when the tires were seized, if known, should be noted with the evidence.

7.2 It is best to take impressions of the known tires while the tires are on the vehicle. If the original vehicle is unavailable, a suitable replacement (as close to same size/make/model) can be used.

7.3 It takes at least two individuals to properly record known tire impressions. One person will steer the vehicle while others will mark the test impressions and recenter as needed.

7.4 Deviations from these methods are acceptable if it will aid in getting the best tire impressions possible. Deviations will be noted in the case record.

7.5 Segment the sidewall of each tire: Locate the wear bars in the tire tread and draw a line on the sidewall of the tire that corresponds to the location of the wear bar. Do this with all the wear bars. Designate each segment with a letter or number as shown.



7.6 As the vehicle is being driven across the chosen substrate and the tire impression is being captured, the substrate should be marked each time the segmented line on the tire meets

the substrate. Each line that is marked should include the segment letter or number from the tire. In this way, each segment of the tire can be associated with a segment on the test impression. The entire circumference of the tire should be recorded, plus a segment. (circumference = 3.14 x diameter of the tire).

7.7 The forward direction of travel will be marked with an arrow on the test impressions of each tire.

7.8 The following information should also be recorded in the written notes and/or photographs:

- Tire manufacturer
- Tire brand
- Tire size
- Type of tire (summer, all season, mud/snow)
- Construction (radial, belted biased, bias ply)
- DOT number
- Any other numbers
- Observations of wear or damage
- Location of tire on vehicle (left front, left rear, spare etc.)

7.9 Method 1 - Oil and Magnetic Powder

7.9.1 Mark the tire as described.

7.9.2 Apply Vaseline or cooking oil to gloved hands and rub hands together. Rub the greased gloves over the tread of the tire. Use the oil/Vaseline very sparingly on the surface of the tire.

7.9.3 Place enough pieces of poster board in front of the tire to allow for a full circumference of the tire to be rolled. The pieces can be secured together on the underside using tape.

7.9.4 The person driving the vehicle can now move the vehicle onto the board once the second individual has centered the board.

7.9.5 As the first segment of the tire rolls onto the poster board begin marking the tire segments.

7.9.6 Continue this sequence until half of the tire has been rolled on to the poster board. At the halfway point apply the Vaseline or cooking oil, as described above, to the

section of the tire that was on the ground and was not coated during the initial application.

7.9.7 Continue rolling the tire until a full circumference has been taken, marking the segments as the tire rolls.

7.9.8 Using a wide magnetic brush go over the entire impression with black magnetic powder being careful not to touch the surface.

7.9.9 Remove any remaining powder by tipping the poster board on its side.

7.9.10 Cover the test impressions with acetate securing it with clear adhesive tape.

7.10 Method 2 - Inking on Poster Board or Acetate/Roller Transport Film

7.10.1 Mark the tire as described above.

7.10.2 Apply Printer's ink or fingerprint ink to poster board laid out at sufficient length to roll the whole circumference of the tire over. Printer's ink is used when rolling impressions on acetate/Roller Transport Film.

7.10.3 The person driving the vehicle can now move forward slowly over the inked poster boards.

7.10.4 Sufficient clean poster board should be placed in front of the inked boards to capture a full roll of the inked tire.

7.10.4.1 Acetate/Roller Transport Film can be secured to the top of the poster board if transparent impressions are required.

7.10.4.2 Kraft paper can also be used in lieu of the acetate; however, it is not a preferred method because the paper creases from the weight of the vehicle.

7.10.5 When the vehicle is moved forward the segments being recorded are marked by the second individual as described above.

7.10.6 Let the test impressions dry.

7.10.7 Ink can also be applied to the tire by rubbing Printer's Ink over gloved hands and applying a thin layer to the surface of the tire. The impression should be rolled as

described above under Section 7.9, remembering to ink the piece of the tire that was on the ground at the halfway point.

7.11 Method 3 - Recording a Known Tire "Footprint"

7.11.1 Ink a section of the tire(s) sufficient for an adequate recording of the tires full pattern (not full circumference).

7.11.2 Apply clear adhesive to the inked section.

7.11.3 Consideration must be given to the comparison needed. To accurately reproduce the "footprint" of the tire, the tire must be placed on acetate or paper with the weight of the vehicle on it as it normally sits.

7.11.4 The representative sample recording can also be captured by placing the acetate, paper or poster board down on the ground and pushing the vehicle over it.

7.11.5 If capturing the pattern for documentation purposes only, the footprint can simply be taken from an exposed surface of the tread.

7.12 Method 4 – Inkless Print Kit

7.12.1 Follow the manufacturer's instructions depending on the inkless kit being used.

7.12.2 Several impressions will need to be taken if an entire circumference is needed.

7.12.3 Allow the sensitized sheet(s) to dry and label appropriately.

7.12.4 Inkless impressions can fade over time. They should be digitized as soon as practical.

7.13 Vehicle Wheelbase and Tread Stance (Tread Base) Measurements

7.13.1 These measurements may be required to compare to wheelbase measurements taken at a scene to include or exclude a suspect vehicle. These measurements are not required in each case and need only be taken when necessary.

7.13.2 Three measurements need to be taken:

- Wheelbase, distance from front axle to rear axle
- Front tire tread stance (tread base/width)
- Rear tire tread stance (tread base/width)

7.13.3 The tread tire stance should be taken from center to center of each tire.

7.13.4 The three measurements may be utilized to determine if there is correspondence with the unknown tire track measurements taken at the scene.

7.13.5 These measurements should be taken when there are measurements available for comparison from the crime scene.

7.13.6 The measurements may be useful in determining make and model of American or foreign vehicles made with those wheelbase measurements and tread stances. Any searchable database used will be recorded in the case notes and is for investigative purposes only.

8. **Digitizing Test Impressions**

8.1 A variety of methods exist to digitize clean and dry test impressions. The method chosen is left to the discretion of the analyst/technician.

8.2 All images should be captured with a scale, in a lossless file format, at a minimum of 1000 ppi (scans), and saved to the Network drive.

8.3 All images should have the case number and item number in the file name.

8.4 Method 1 – GLScan

8.4.1 Record a gel lift test impression using the GLScan per manufacturer's instructions

8.4.2 The GLScan is programmed to record the scan at 1044 ppi.

8.5 Method 2 - Flatbed scanner

8.5.1 A photo-quality, flatbed scanner can be used to digitize a test impression.

8.5.2 Minimum resolutions:
8.5.2.1: Friction ridge impressions: 1000 ppi
8.5.2.2: Footwear and Tire impressions: 300 ppi

8.5.3 Care should be taken not to scratch the glass platen of the scanner. A piece of acetate film or other suitable, transparent material can be used to cover the glass if needed.

8.6 Method 3 - Betterlight scan

8.6.1 A scan can be taken of the test impression using the Betterlight large format digital scanner per manufacturer's instructions.

8.7 Method 4 - Digital Single-Lens Reflex (dSLR) camera

8.7.1 A dSLR camera can be used to capture images of the test impressions. A full-frame dSLR is preferable.

8.7.2 The focal length of the lens should be set at “normal” depending on the lens and camera used.

8.7.3 The full test impression need not be captured in one frame of the camera.

8.7.4 Photographs should be taken as any examination quality photograph is taken and as described in the method LP-M002 “Capturing Latent Impressions”

8.7.5 Test impressions from tires cannot typically be captured using any of the above techniques and, therefore, photographs of each segment would need to be taken if digitization is necessary.

8.7.5.1 Place or roll out the test impressions on a clean and flat surface.

8.7.5.2 Place a tape measure beside the impression and extend it down the entire length of the impression.

8.7.5.3 Take comparison quality photographs (containing a separate scale and label) capturing the entire length of the test impression, overlapping segments of the tape measure in each photograph so the entire test impression can be stitched together digitally afterwards if needed. The focal length should be set at “normal” for the lens and camera being used.

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