TECHNICAL INFORMATION

Tire and Footprint Plaster Casting Kit

Catalog No. 639C

INTRODUCTION

Footwear identification has advanced in recent years from a mere *aid to investigation* to an accepted laboratory technique on a level with ballistics and fingerprint examinations. Not long ago, footwear evidence was acceptable only as supporting or corroborating—but not, of itself, sufficient as proof. However, in the past two decades, court rulings have increasingly accepted footwear evidence as *positive proof* of presence, even in the most serious of offenses.

Unlike the ridge and furrow formation of a fingerprint, the tread surfaces of footwear are under constant change. After the crime scene impression has been made, very little added wear is required to make positive identification impossible. Therefore, if the suspect footwear is to be properly identified, there must be only a short time lapse between the commission of the offense and the examination of the suspected

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footwear. The exception lies in those cases where the suspect changes shoes after the commission of a crime. Some offenders have been known to keep a pair of sneakers or running shoes to facilitate their quiet entrances and in order to gain from the element of surprise.

Just as some offenders utilize gloves to prevent fingerprints, other offenders utilize footwear that they keep in cupboards, closets and garages. They do not realize that once found and identified with crime scene impressions, the footwear can then be identified with the impressions from the crime scene.

In footwear evidence cases, the investigator who apprehends the suspect should remove the shoes from the feet of the suspect or be present when the jailor accepts the footwear from his prisoner. In this manner, those shoes presented as evidence will, in fact, be those shoes removed from the prisoner charged.

Footwear taken as evidence should be tagged with notations as to time, date, location, offender and investigators involved, and the tag should be securely attached to the eyelet of the footwear—never write on any portion of the footwear, inside or outside. Additional tags should be attached as the footwear changes hands from investigator to jailor, jailor to laboratory, and laboratory to specialist.

PARTIAL IMPRESSIONS

The value of partial impressions left by footwear is little understood. Often, *partial* impressions left by leather soles and heels are thrown aside as unsuitable for identification—when, in fact, the impressions are often more identifiable than *whole* impressions left by rubber and composition footwear.

The majority of impressions that find their way into courtrooms seem to be composition or rubber footwear impressions and are more fitted for questions of elimination rather than questions of identification.

In all cases, once the elimination stage has been exhausted, the identification process begins. Investigation specialists and investigators should realize that 70 percent of the partial impressions left by leather soled and heeled footwear are not only identifiable, but possess, in most cases, *ten or more times the identification points of a set of fingerprints left at the crime scene.*

Possession of a partial impression is only valuable, however, if the suspect is quickly apprehended. The true identification markings found on the tread surface of footwear are so minute that the additional wear of one day's use may preclude positive identification.

Even composition and rubber surfaces are somewhat changed by additional wear, but to a far lesser degree because the resilient surfaces deflect most of the abrasive wear that easily marks leather. However, many sharper objects can cut and deface rubber surfaces in such a manner as to make them identifiable.

Any extraneous material found on footwear that might serve to link a suspect with the scene should be preserved. The specialist should have clean vials and marking labels in his kit so crime scene dust samples and footwear dust samples can be isolated, marked, and transferred to the laboratory without contamination. Footwear to be examined in the laboratory should never be sent in the same package with crime evidence as the defense counsel may have proper grounds for objection to possible and probable contamination.

CAUTIONS

- Before using this kit, consult the appropriate Material Safety Data Sheets (MSDS) found on our website at www.sirchie.com/support.
- Carefully remove any debris lying on top of the impression to be recovered. Any object imbedded in the impression should not be removed.
- Photograph all impressions prior to performing any preparation. The camera should be directly above the impression at a 90° angle. Be certain to include a scale in at least one photo.

MAKING PLASTER CASTS

All impressions, whether they are of footwear, auto tire marks, or tool marks should be photographed before any attempt at casting is made. A scale should always be included in the photograph for relative size indications.

The following measurements should be made and recorded before casting:

1. Distance from the front of the sole to the rear of the heel.
2. Length of heel.
3. Width of the front of the heel.
4. Width at widest part of sole.

The nature of the soil bearing the impression should be carefully examined in conjunction with the weather that has prevailed since the print was made, keeping in mind that soils such as clay may suffer considerable contraction and distortion on exposure to sunlight or rain.

INITIAL PREPARATION

First, the FCF100 metal casting frame is located around the impression area, unless the impression area is too small to warrant it. *The frame telescopes to provide sufficient area for most types of tire and footprint impressions.*

If the surface where the impression is located does not permit the use of the metal frame, an earthen dam may be used.

Foreign matter such as twigs, leaves, etc. are removed with care, so as not to damage any detail before applying the plaster. *If debris is imbedded in the impression, do not attempt to remove it as this will damage the detail that may be present.*

SURFACE PREPARATION

CAUTION! Good practice dictates that you make a cast of an impression in a difficult medium such as sand, snow, or dust by placing your own foot impression in the same medium and making an experimental cast to verify proper procedure requirements.

Earth, mud, clay, and similar substances provide a relatively firm base for making casts. Usually though, the impression bears detail that may be delicately formed and composed of small, discreet masses. The weight of the casting material may deform this discreet detail unless precautions are taken. To aid in reducing this deformation, the rigidity of the detail is aided by first spraying the impression surface with the Dust and Dirt Hardener No. 638CA. The Hardener is *not sprayed directly at the impression,* but rather in a manner that allows the Hardener to fall into the impression as a mist. Apply three or four coats of hardener, allowing 3 to 5 minutes between coats. Sand, dust, and flour-like substances are probably the most difficult materials to make casts in. First, the lack of cohesion among the particles presents the danger of losing detail because of shifting under the weight of the plaster; second, these substances may be dissolved in the plaster mixture; third, these substances will adhere to the plaster and cannot be washed off. To prepare these materials for a plaster cast, the surface is first sprayed with Dust and Dirt Hardener, exercising the same cautions as outlined above, usually 3 to 4 coats, allowing at least 3 minutes between coats. Considerable care must be exercised to avoid disturbance of powdery outlines. After the Dust and Dirt Hardener has thoroughly hardened, a thin layer of Silicone Release Agent (No. SRA10) is sprayed over the area that has been treated.

Preparation of Snow Prints

It is impossible to give a general prescription for making a cast in snow because of the type of snow and weather conditions in which they are found are so many and varied. We recommend the use of Snow Impression Wax (No. SP1000). After preparation, the plaster is spooned into the impression area very lightly.

Before attempting to make a case of a snow impression, be sure to make a test impression and cast before trying to recover the evidence. (See instructions for use supplied with Snow Impression Wax.)

PLASTER CASTING MATERIAL

Although various preparations have been used for plaster casting, it will be found that Casting Material (Cat. No. 639C15) will give satisfactory results. The exothermic retarder added to our Casting Material will permit casting under severe weather conditions. Select a flexible rubber mixing bowl suitable for the approximate volume of casting material required. Partially fill the bowl with water, and then slowly pour the casting material into the water until the water can no longer absorb any more. Approximately 7 parts plaster to 4 parts water will be found to be a satisfactory mixture. The plaster and water are then mixed with the spoon furnished until there are no more lumps and the mixture has the consistency of heavy cream. Water or plaster may be added until this consistency is reached. When the plaster is poured into the print, it should not be held high above the print, but should be poured from a low level, breaking its fall with the spoon furnished. The spatula may be used to spread the casting material evenly without touching the print and to aid in preventing air bubbles from forming.

Cast made using casting plaster included in the No. 639C Kit.

When the layer of plaster is about 1" thick, pieces of the 2" x 4" Reinforcement Mesh should be carefully placed on the liquid plaster to reinforce the cast. After the reinforcing mesh has been placed, a second layer of plaster is poured on until the total thickness is two inches or more, depending upon the depth of the impression. These operations should be performed rapidly to avoid hardening between layers of the cast. The plaster should be permitted to harden for at least 30 minutes before removal. After removal, turn the casting upside down and allow it to dry thoroughly.

DO NOT make any attempt to remove dirt or debris clinging to the cast as the soil sample may be of value to the laboratory technician. Use care when packaging the cast for shipment. Be certain to identify each cast with an evidence tag or label.

FIGURE 1

FIGURE 2

FIGURE 3

FIGURE 4

Plaster Casting Techniques

Follow these procedures for consistently good casts:

1. Remove any debris, twigs or leaves found lying on top of the impression. *Do not* remove any object imbedded in the impression.
2. Place a Casting Frame (No. FCF100) around the impression.
3. When casting in loose soil or sand, prepare the surface by adding several light coatings of Dust and Dirt Hardener (No. 638CA). *No direct spraying!* Allow 3 to 5 minutes of drying time between coatings. Hard soil or clay generally will not require hardening (Fig. 1).
4. Apply a light coating of Silicone Release Agent (No. SRA10) to the impression.
5. Mix the required amount of plaster (Fig. 2). Approximately 1 minute of mixing is sufficient.
6. Pour into the impression (Fig. 3). The entire mixture should be a uniform color.

7. Be certain to break the fall of the mixture using the spoon provided (Fig. 4). Pour around the edges and allow the mixture to flow over the impression.
8. When the layer of plaster is about 1" thick, carefully place pieces of the 2" x 4" Reinforcement Mesh on the liquid plaster. Continue pouring a second layer of plaster until the total thickness of 2" or more is reached.

639C CONTENTS:

- 1- SP1000 Snow Impression Wax, Net Wt. 15 oz. (425g)
- 2- 639C4 Base Builder, 8 oz. vol. (236ml)
- 1- 639C2 Water Container, 32 oz. (946ml)
- 1- 638CA Aerosol Dust & Dirt Hardener, Net Wt. 15 oz. (425g)
- 1- SRA10 Aerosol Silicone Rubber Release Agent, 4.5 oz. (133ml)
- 1- KCP142 Steel Spoon
- 1- KCP155 Spatula, 7" (17.8cm), Steel Blade
- 1- 642C Flexible Mixing Bowl, 4.25" (10.8cm)
- 1- 643C Flexible Mixing Bowl, 4.75" (12.1cm)
- 1- 644C Flexible Mixing Bowl, 5.25" (13.3cm)
- 1- KCP114 Retractable Measuring Tape
- 1- KCP154 Pipette with Suction Bulb
- 1- KCP200 Surface Brush
- 1- 639C15 Tire and Footprint Casting Plaster, 5 lbs. (2.3kg)
- 1- 639C5 Wire Mesh Reinforcement, 2" x 4" (5.1cm x 10.2cm), 10 each
- 1- STM1003 Modeling Clay, 1/4 lb. (113g)
- 1- FCF100 Adjustable Casting Frame, 7.25" x 12"-18" (18.4cm x 30.5cm-45.7cm)
- 24- 608E01 Evidence Tags, Preprinted
- 1- Technical Information
- 1- 639CC Black Molded Copolymer Carrying Case w/Folding Handle and Locking Latches, Includes Molded Inserts; Dimensions: 17" x 13" x 7.375" (43.2cm x 33cm x 18.7cm); Weight: 18 lbs. (8.2kg)