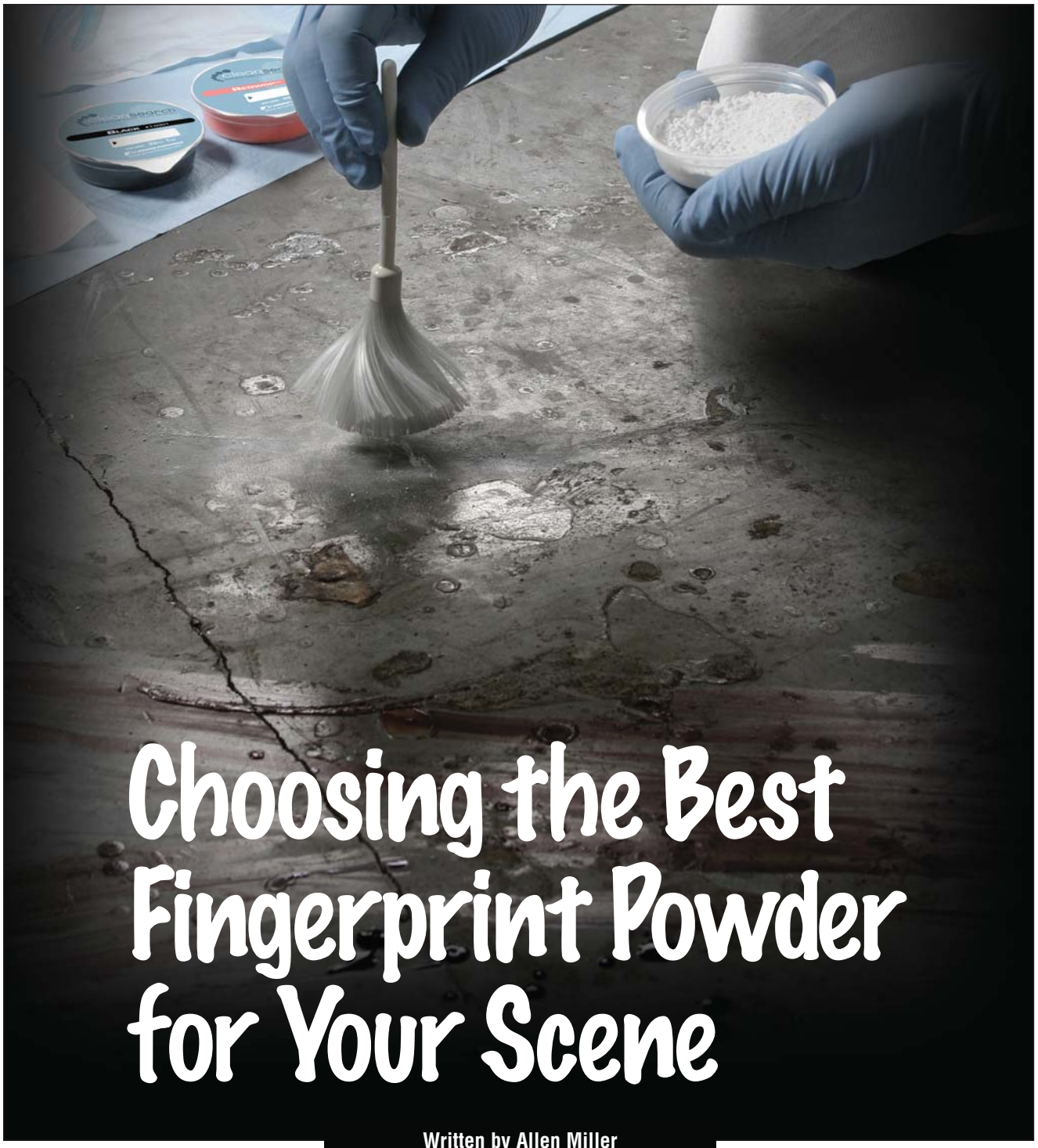


Choosing the Best Fingerprint Powder for Your Scene

Written by Allen Miller

THE "GO-TO" TOOL of all crime scene investigators, besides their keen sense of awareness, is fingerprint powder. Historically, fingerprint powder has been used to assist latent print examiners, crime scene technicians, and analysts in the detection and collection of latent prints left behind at crime scenes. In the beginning, powders were often handmade by latent print examiners or police crime scene technicians. Commercially available powders began to hit the market in the 1900s and are now available in a variety of colors and material configurations specifically manufactured for various investigative needs.

Commonly known as "dusting," the act of applying fingerprint powder to a surface with a natural hair or fiber brush allows the powder to be lightly spread over a surface to make the print visible. With so many different color and material configurations, it is important to understand the features and benefits of each type of fingerprint powder.

FINGERPRINT POWDER

Color Selection

Black is by far the most commonly used latent print powder color. Black powder is manufactured from a variety of carbon-based powders with a binder added for stability. This carbon-based powder readily adheres to the oily residues generated by contact from fingers and other body parts. Black powders are easy to apply to many surface types, porous and non-porous alike.

Because of its versatility, black powder is the workhorse of latent print processing. Before these powders advanced through further scientific development, there were few other colors available. Black and aluminum were both powders of choice, but black was by far the most popular. Regardless of the surface type or color, black powder was spread and prints were developed. Examiners would then use a very bright light source to visualize the prints, especially on darker colors that lacked contrast. The developed prints were of exceptional quality; the only problem was that they simply could not be readily seen.

The convention today is to use a powder color that provides a visual contrast to the surface being processed; dark surface = light powder, and light surface = dark powder. Rather than using black powder for everything, other colors (white, silver/grey/aluminum, or bi-chromatic) can be used to process almost any surface that may be encountered.

White powder works especially well on glass, chromed metals, plastic bags, and dark-colored surfaces. Aluminum powder performs best on glass, plastic, and rubber. Bi-chromatic powder, on the other hand, is typically a combination of black and aluminum powder, although some manufacturers combine the black with a variety of other colors. The idea behind the creation of the bi-chromatic powder was to assist the examiner with multi-colored surfaces. When processing with bi-chromatic powder, developed latent prints will be seen as black ridges on the light parts of the surface and light ridges on the dark parts of the surface. Once these prints are lifted, they will always visualize as dark ridges on a white backing card.

Material Selection

In addition to the color of the powder, the physical composition of the powder also varies depending on the examiner's needs. Powders can be characterized as conventional (colorant and base), magnetic (colorant and iron shavings), and fluorescent (light-stimulated colorant and base).

Conventional powders are the most common type of powders used in crime scenes and are typically applied with a fiber or hair brush. They are generally inexpensive, cover a large area when applied with a brush, and readily develop prints on most non-porous surfaces. The main concern with conventional powders is that they can create a mess. Black powders are generally very light and airy, so the particulate can become airborne at the slightest flick of the brush.

Conventional powders are not designed to work on porous surfaces like paper, but are used in the field none-the-less. Fingerprint residues left behind on paper are best treated with a specialized chemical process. The time it takes to process a print on a porous surface from the time of the print deposition allows some of the

moisture to evaporate, so dry powder processing may not produce optimal results.

Magnetic powders are designed to work on both porous surfaces and non-porous surfaces including plastics, Styrofoam, and rubber. Technicians using magnetic powders develop latent prints without the need of a brush. A magnet embedded inside a plastic or non-ferrous metal wand attracts the magnetic filings and creates a clump or ball of powder. Wrapped around each of the iron filings is the colorant. The iron filings then "rub" over the surface, depositing the colorant where it comes into contact with the oily residues. This process develops the image with little or no abrasive contact with the residues, unlike using fiber or hair brushes.

Magnetic wands can be used in many situations. However, upside-down processing does pose a unique problem. The magnet does a fine job of managing the powder when the wand is held in a normal magnet-down position, but loses its effectiveness when used upside down.

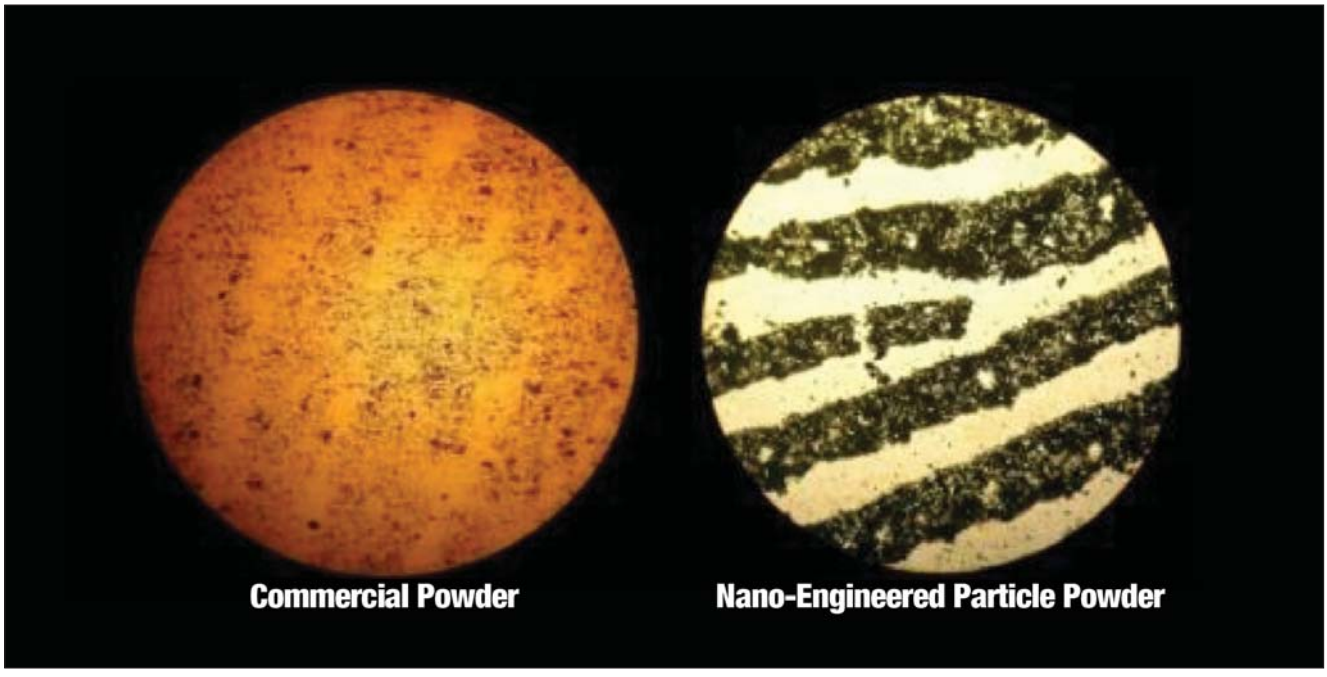
Magnetic powder is easy to clean. As a surface is processed, small bits of the iron filings will dislodge from the wand and remain on a horizontal surface. To clean up these bits, simply pass the wand over the filings to collect for reuse or deposit them back into the jar. It is important to remember that as the filings are returned to the jar and reused over time, the associated colorant will eventually diminish leaving only iron filings in the jar.

Fluorescent powders were developed to use with a variety of alternate light sources ranging from small 1-watt ultraviolet lights to multi-watt lasers. These powders work especially well on raw surfaces where normal conventional powders may paint or clog the surfaces and render prints that are not distinguishable from the surface. Household woodwork, convenience store counter surfaces, and multi-colored non-porous items respond particularly well to processing with fluorescent powders.

The colorants found in fluorescent powders are treated dyes that react to ultraviolet (UV) and purple/blue bands in the visible light spectrum, typical for crime scene work. The hues of the powders can be matched to the color of the surfaces being processed and the wavelength of the light source being used. This coupling helps flatten or eliminate any background interference that may occur from surface coloration or contaminants.

Fluorescent powders are best applied with a feather duster. The minute barbules (soft parts) of the feather are perfect for holding just the right amount of fluorescent powder to develop the print without over-processing the background. When using fluorescent powders, less is better, as over-processing cannot be easily corrected. It is not recommended that fiberglass or hair brushes be used as they will deliver too much powder to the surface and the visual overload may result in the loss of any detail or detection. Fluorescent powders are also not recommended for large-area processing, if only for the over-processing reasons stated earlier.

A few years ago, spray powder hit the market. Spray powders deliver a very localized and controlled application of powder. The idea behind this product evolution was to give the technician a specialized tool to allow for spot processing on certain surfaces. It was not intended to replace conventional powders and brushes already available. The measured portion of powder, delivered by a short blast from the can, provides enough powder to allow the prints to develop without over-processing the background or the prints themselves. The spray powder is contained utilizing a containment tent to keep the powder in a constricted space so it will not broadcast over the area being processed.



This allows for relatively clean processing of crime scenes that minimize both property damage and possible respiratory irritation from exposure to powder.

Introducing Nano-Engineered Particles

The latest addition to the latent fingerprint powder market is the introduction of nano-engineered particles to the powder blend. Nanotechnology-derived particles are extremely fine silica balls designed to hold the colorant and to provide a better processing medium. Technicians can expect to experience up to 30 percent improved latent print definition with the use of the nano-particle infused powders.

The manufacturer of these nano-engineered particles calls them Supranano particles to distinguish them from true nano-particle mixtures that can permeate the skin and create health risks. Supranano particles are larger in size and do not have the ability to permeate the skin. These infused powders come in conventional, magnetic, and fluorescent powder configurations. They are also available as suspensions. Supranano-processed prints can be quickly analyzed with laser instrumentation (MALDI-TOF) to obtain demographic information from the person depositing the print. Demographic characteristics identified through this revolutionary process include drug use (both over-the-counter and illicit types), contact residuals (including explosives), race, and ethnicity. These characteristics can be used as investigative information to help eliminate or implicate suspects in criminal cases. Over time, manufacturers expect to extract even more detailed information from latent prints to assist investigators in solving ever more complex crimes.

Even with advances in fingerprint technology and analytical tools, fingerprint powders remain a critical tool in every crime scene and latent print examiner's kit. Black powder is the original and popular powder of choice, but many other colors and types of powders are available for technicians to use in lifting prints from a wide variety of surfaces.

About the Author

Allen Miller is the Product Manager for the forensics category for The Safariland Group. For more than ten years, Miller has been responsible for the development and management of new products and educating customers on the application of forensic products. Prior to joining The Safariland Group, Miller was a Senior Crime Scene Analyst for more than 20 years for the Florida Department of Law Enforcement, Jacksonville Regional Crime Laboratory. Throughout his tenure, Miller provided crime scene processing services to more than 50 agencies in a 14 county area of Northeast Florida, including federal, state and local agencies.

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