

Fingerprint Powders Guidelines

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IN THIS LEAFLET

This leaflet contains important information about maximising the use of powders for fingerprint recovery from a range of surfaces found at scenes of crime. It summarises advice on the most appropriate choice of applicator and powder for commonly found surfaces, given in previous HOSDB publications¹⁻³. The leaflet also gives advice on DNA recovery from powdered fingerprints.



RECOMMENDATIONS

1. Aluminium powder should, where possible, be applied with a glass fibre brush.
2. Zephyr style squirrel brushes or tapered polyester brushes should be used on surfaces where glass fibre brushes may tangle and clog up eg, contaminated surfaces.
3. The health and safety advice given in the Fingerprint Development Handbook (FDH)⁴ and Manual of Fingerprint Development Techniques (MoFDT)⁵ is still appropriate for aluminium powder.
4. Scene examiners must receive appropriate training and maintain good application technique when applying powders. This is likely to be as important as powder selections for some smooth surfaces.
5. Glass should be powdered with aluminium powder unless contamination prohibits its use.
6. Where appropriate, a black or jet black magnetic powder should be used on textured surfaces, NOT aluminium or black granular powder.
7. Black or jet black magnetic powders should be used on u-PVC.
8. For serious crime, scene examiners should consult their force fingerprint development laboratory staff as chemical processing may be more effective on textured surfaces.

ADDITIONAL NOTES

These guidelines are based upon extensive trials on a range of surfaces commonly encountered at crime scenes (glass, painted metal, u-PVC, painted doors, kitchen worktops, wooden and laminate furniture etc). See References 1-3 overleaf for full trial reports and References 4-5 for additional information.

ALUMINIUM FLAKE Powder is the most effective powder on glass, but shows similar performance to alternative powders on other smooth surfaces. It may still be the powder of choice as it is easy to apply and develops good contrast marks on most smooth surfaces.

BRASS FLAKE Powder performs similarly to aluminium flake powder but should only be used on smooth, silver surfaces where aluminium would give low contrast.

BLACK GRANULAR Powder may be used on some smooth surfaces only.

BLACK MAGNETIC Powder is the most effective powder on any textured surface and u-PVC. Similar results were obtained with 'jet black' magnetic powder, but others (grey, silver etc) should be avoided as they are considerably less sensitive. White magnetic powder, although less sensitive, may be used on dark textured surfaces when contrast is an issue.

MAGNETA FLAKE Powder is slightly less sensitive than black magnetic powder on textured surfaces but may offer an alternative on dark textured surfaces. It may be used on most smooth surfaces although application can be difficult and inconsistent.

HEALTH AND SAFETY

ALUMINIUM FLAKE Powder: Advice given in FDH⁴ and MoFD⁵ is still current. It has a Workplace Exposure Limit (WEL) of 10mg m^{-3} (the same as nuisance dust). Appropriate dust masks should be worn if high concentrations are likely to be generated, for example in confined or poorly ventilated spaces.

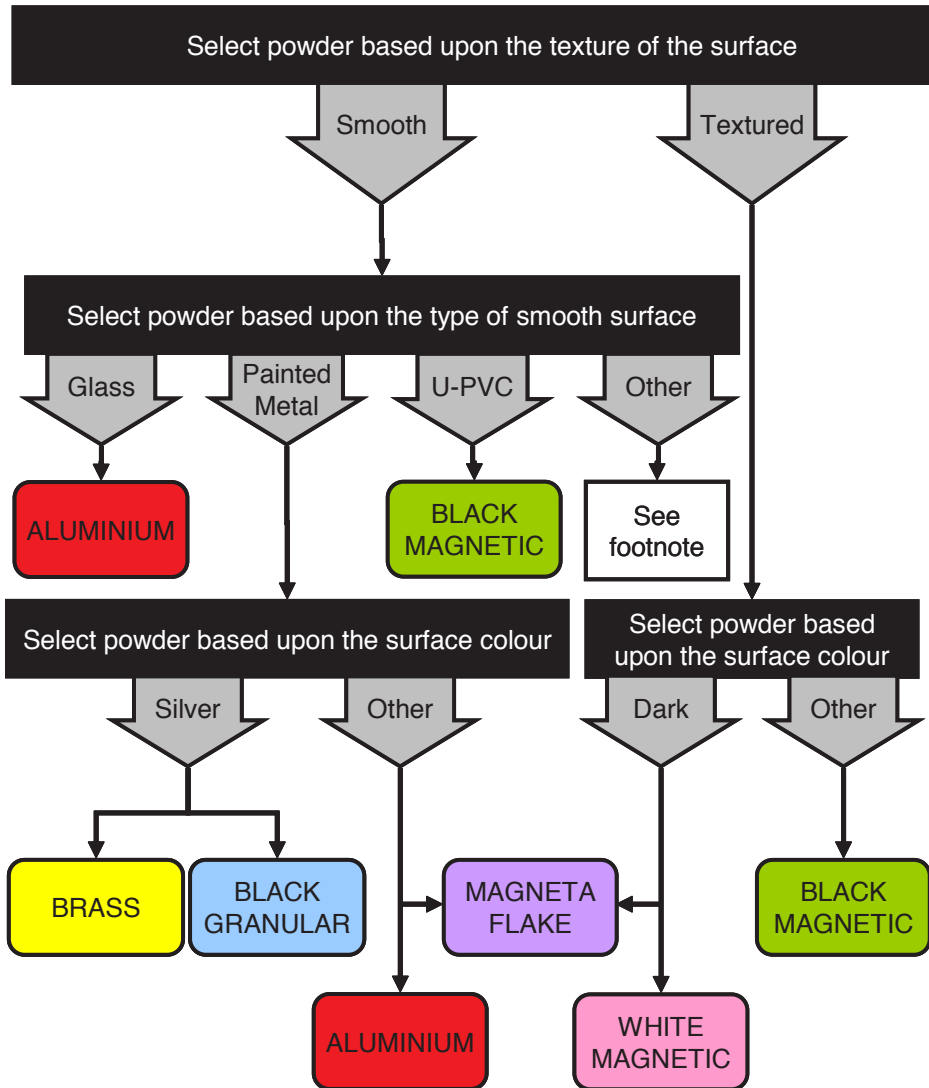
BRASS FLAKE Powder: Sold as 'bronze' or 'gold' powder (named after the colour NOT the constituents). Although brass itself has no exposure limit, its main constituent (copper) has a WEL of 1mg m^{-3} . Exposure monitoring of scene examiners indicate that this limit is likely to be exceeded in some situations. Therefore, those at risk of exposure MUST wear an appropriate dust masks when airborne powder is present.

BLACK GRANULAR Powder: Made primarily of carbon which has a WEL of 3.5mg m^{-3} . There are no reported exposure monitoring trials in the literature but the lower WEL would suggest that appropriate dust masks should be worn whilst in use.

MAGNETIC Powders: Due to the low toxicity of the components within the magnetic powders mentioned in this leaflet and the application method, it is unlikely that exposure limits would be exceeded. Appropriate dust masks should be worn if high concentrations are likely to be generated, for example in confined or poorly ventilated spaces.

GLASS FIBRE Brushes: Fibres shed from this type of brush are too large to cause any measurable health effects to the respiratory system. However, the fibres may irritate the eyes and skin. Skin sensitisation is not a recognised hazard from glass fibres suggesting that it is purely mechanical friction from fibres that may cause irritation. Appropriate protective equipment should be provided if the user complains about eye/skin irritation.

Powders Selection Chart



Footnote: Aluminium flake, black granular, black magnetic and magneta flake powder performed similarly on many smooth surfaces in trials conducted at HOSDB. However, it is widely considered that flake powders are more sensitive than granular ones although little evidence is available in the literature to back this up. Users may prefer to use non-magnetic powders as they are generally easier to apply at scenes.

FINGERPRINTS AND DNA

It has been found that when used individually the standard recommended chemical or physical methods of latent fingerprint development (including powders) have relatively little effect on the subsequent recovery of DNA profiles. Please refer to the FDH⁴ for additional information relating to maximising fingerprint and DNA evidence. A summary is listed below:

- All relevant anti-contamination precautions should be taken and best practice used in the packaging and handling of any exhibits.
- DNA processing is best carried out as soon as possible after powdering. This will optimise DNA recovery and help to limit the potential for cross-contamination.
- When powder is lifted some DNA remains on the surface and some is lifted along with the powder. Informative partial LCN profiles have been obtained both from the surface after lifting and from the lift. Photography of the powdered mark on the surface and subsequent swabbing of the mark for DNA may yield better results.
- Although there is little evidence of cross-contamination via the powder and brush, risk may be reduced by using fresh powder and brushes when required. Use of a magnetic applicator should reduce cross-contamination risks further.
- All fingerprint development processes, including powders, can be used to locate contact areas on a surface. This enables the scene examiner to swab areas where contact is known to have happened thus increasing the chances of maximising DNA recovery.
- At a serious crime scene, it may be possible to locate contact areas with fluorescence examination for targeted DNA swabbing. Although a poor technique relative to powders it may reduce the risk of cross-contamination.

REFERENCES

1. HOSDB Publication No. 54/04, The Powders Process, Study 1: Evaluation of Fingerprint Brushes for Use with Aluminium Powder, H Bandey
2. HOSDB Publication No. 08/06, The Powders Process, Study 2: Evaluation of Fingerprint Powders on Smooth Surfaces, H Bandey et al
3. HOSDB Publication No. 67/06, The Powders Process, Study 3: Evaluation of Fingerprint Powders on Textured and Other Difficult Surfaces, H Bandey et al
4. HOSDB Publication No. 1/05, Fingerprint Development Handbook, 2nd Edition, V. Bowman ISBN 1-84473-492-7
5. Manual of Fingerprint Development Techniques, 2nd Edition, V. Bowman ISBN 1-85893-972-0

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