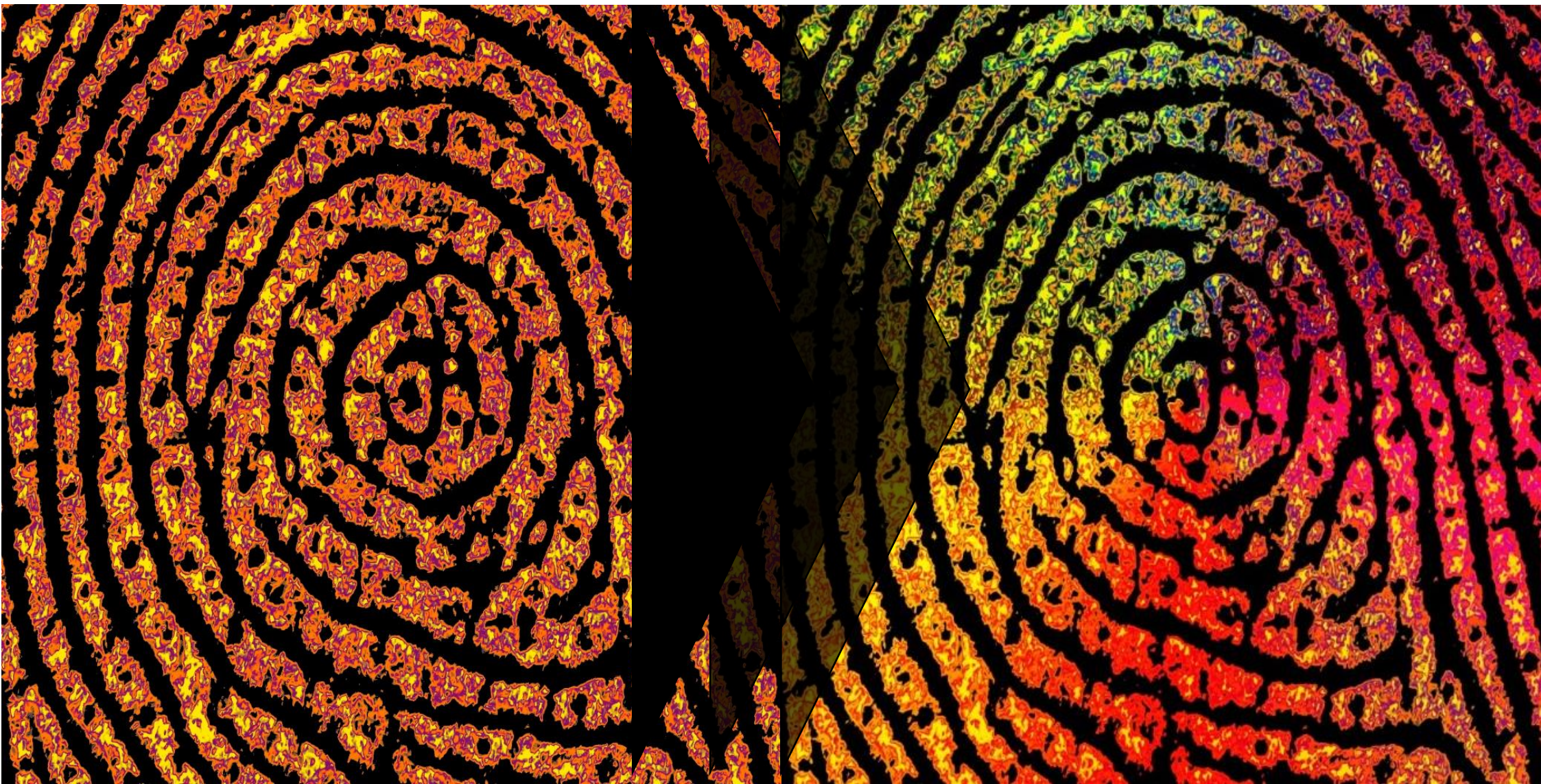


# Fingerprint Visualisation Manual First to Second Edition Technical Changes



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## Fingermark Visualisation Manual First to Second Edition Technical Changes

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## 1 Introduction and changes to whole document

The information below provides a comprehensive summary of the changes between the Fingermark Visualisation Manual (FVM) First and Second Editions. A summary of the main changes has already been provided within the Preface (page ix) of the FVM Second Edition.

In order to clearly show the most important updates, minor changes that do not affect the technical information are not included. This includes error corrections (layout, spelling and grammar) and minor clarifications.

Changes that apply to the FVM in its entirety:

- Where there is reference to ISO 17025, there is now also reference to ISO 17020 where applicable
- Reference to 'CAST' or 'Home Office' is replaced with 'The author'
- Where appropriate, 'DFO' is replaced with 'Indandione'
- 'Basic Violet 3' is replaced with 'Lipid Dyes (Basic Violet 3)'
- Solvent Black 3 and Natural Yellow 3 are now options within Lipid Dyes (Other)
- 'Ultraviolet (UVC) Reflection' is replaced with 'Shortwave Ultraviolet (UVC) Reflection'
- Minor text updates to account for changes in 2.2.11 (water content of fingermarks)
- Contents lists updated to reflect changes

The following section contains details of further changes and includes the page numbers in reference to the Second Edition (unless specifically stated otherwise).

At the time of publication two errata have been identified in the FVM Second Edition. These are listed below:

Page No.	Sub-heading	Erratum
3.1.20	Chemical inventory	Zinc chloride (CAS No. 7646-85-7, Reagent Grade $\geq$ 98%) has been omitted from the list
4.53	Chart 3A Blood contamination	Pink symbol next to acid dyes on the chart shows it visualises latent marks which is incorrect and only a blood drop should be present

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## 2 Changes within each chapter

### 2.1 Chapter 1

Page No.	Sub-heading	Change
1.6 – 1.19	User Guide	Updated to reflect changes in the subsequent chapters

### 2.2 Chapter 2

Page No.	Sub-heading	Change
2.2.8	Generation of fingerprints	Clarification of latent marks
2.2.10	Constituents table	Choline updated
2.2.11	Water content of eccrine sweat and likely water content of latent fingerprints	Section updated with reduced water content
2.2.13	Examples of semi-endogenous compounds and exogenous contaminants table	Foodstuffs and lubricants added, water removed
2.2.17	Persistence of fingerprints	Clarification by adding triangle of interaction wording
2.2.17	Persistence of fingerprints	Prediction difficulty updated
2.2.19	Persistence of fingerprints	Physical profile changed due to water loss
2.2.23	Persistence of fingerprints	Updated for high and low humidity environments to discuss moisture effects on the mark and surface
2.2.34 – 36	Exploiting chemical information in fingerprints	New section
2.3.3 – 4	Dates of introduction tables	Updated and note added about UV and Infrared (IR) advances
2.3.5	Target materials and properties table	Updated for Indandione, Lipid Dyes and Powder Suspension
2.3.6	Targeted development of sweat from different sweat gland types	Clarification by adding limit of detection
2.3.7	Sequential processing	Updated to include exceptions
2.3.8	Sequential processing	Flow diagram processes updated for Indandione, Lipid Dyes and UVA
2.3.10	Process effectiveness: influencing factors	Water content and timeframe updated

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2.3.12/16	Process effectiveness: Effect of water/Examples	Clarification to effectiveness of superglue on wetted marks, and the dependence on the age of the mark prior to wetting
2.4.5	Visualisation processes	Updated to align with Chapter 5
2.5.3	Fingermark comparison	Updated for other features
2.5.6	Fingermark lift image	Replaced
2.5.17	Interpretation: reverse direction (mirrored) marks	Examples added
2.5.20	Interpretation: enhancement of digital images	Updated to include access to original image

### 2.3 Chapter 3

Page No.	Sub-heading	Change
3.1.4/7/8	Tables	Updated to align with Chapter 5
3.1.5	Laboratory requirements	Access control list updated for retractable tape barrier
3.1.10	Images	Clarification of recommendations with use of tick/cross
3.1.10	Indandione and Ninhydrin development ovens	Updated to focus on requirements
3.1.12	Vacuum Metal Deposition (VMD) equipment	Updated to focus on requirements
3.1.18/20	Chemical inventory	Updated to align with Chapter 5 and note added on quality of n-Dodecylamine acetate
3.2.4	Setting up and maintaining a safe laboratory facility	Clarification of pipework recommendations in the example provided
3.2.12	Hazards associated with items	Updated physical and chemical hazards
3.2.16	Hazards from light sources	Updated Note 2 to include UV damage to DNA evidence
3.2.20/25/30	Hazard labelling of chemicals, Controlling risks from chemical hazards, Hazard symbols	Updated for Globally Harmonised System (GHS) and Great Britain Classification, Labelling and packaging of Substances and Mixture (GB CLP) Regulation and removal of Chemicals (Hazard Information and Packaging for Supply) Regulations (CHIP)
3.2.22	Hazards associated with prepared solutions	Updated to include reference to 2021 CJV Consulting Ltd health and safety report
3.2.27	Safe quantities of stored chemicals, solutions and mixtures	Dangerous Substances and Explosive Atmospheres Regulations 2002 (DSEAR)) clarification

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3.2.29	Disposal or return of items	Updated for labelling post chemical treatment
1 <sup>st</sup> Ed. 3.2.33	CHIP chemicals classification	Pages removed
3.2.33	Laser safety classification table	Class 1C added
3.3.3	Examples	Iron oxide-based Powder Suspension updated to align with Chapter 5
3.3.4	Keep the chemical, solution or mixture free from contamination	Updated for Powders
3.3.4	Guideline expiry dates	Updated for standard industry practice and processing solutions
3.3.5/8	Measuring cylinders, Standard method for solution preparation	Information added on when pipettes are appropriate to use
3.3.13	Drying of items	Emphasis that drying temperature is guidance only
3.3.22/23/25	Imaging	References updated for image procedures

### 2.4 Chapter 4

Page No.	Sub-heading	Change
4.2	Important general notes	Updated to raise awareness of, and information within, the pages that support the charts
4.2	The charts and process selection	Updated for end of sequence processes
4.2	Optical processes	Updated for imaging outside of the visible spectrum
4.3	Superglue Fuming Enhancement	New section
4.4	Imaging	Updated to replace 30°C with elevated temperature
4.5	Primary chart definitions	Updated for painted surface porosity
4.66	Optical processes selection guide	IR Reflection, UVA and UVC updated for changes to Chapter 5
4.68/69	Category B-C process options	Updated table for changes to Chapter 5, including a new section on mass spectrometry applied to fingerprint analysis

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### Charts:

Page No.	Chart No.	Sub-heading	Change
4.1 – 4.54	All (where relevant)	N/A	Superglue Fuming Enhancement now follows Superglue Fuming and is used to replace Superglue Fluorescent Dye Staining, Powders and VMD where appropriate (as outlined in 4.3); flow charts and notes updated accordingly
4.6	1	Non-Porous	Powder Suspension footnote added; important general notes more prominent; Superglue Fuming water symbol changed from red to amber; Lipid Dyes footnote added; secondary charts updated
4.10	1.4	Unplasticised polyvinylchloride (uPVC)	Note 3 Powder Suspension added
4.11	1.5	Plastic Packaging (Soft)	Biodegradable bags updated for bioplastics
4.13	1.7	Currency (Polymeric)	Section updated for Bank of England notes (maturity increased) and processing sequence revised
4.15	1.9	Plastic Packaging (Cling Film)	Updated powders practicality note
4.16	1.10	Rubber	Note 3 Powder Suspension added
4.17	1.11	Wax and Waxed Surfaced	Updated text and image for modern items (maturity decreased)
4.18	1.12	Painted Surfaces (Gloss)	Updated for environmental concerns; minor chart modifications required (VMD) and links added to other paint charts
4.19-23	1.13	Untreated Metals	Guidance notes and images added for aluminium and light-weight alloys; lead; copper and its alloys; stainless steel; iron and other (non-stainless) steels; precious metals; plated metals
4.24-25	1.14a	Adhesives with Non-Porous Backing	Note 2 guidance on treating both sides added
4.27/37	Chart 1A/2A	Blood Contamination	Removal of elevated temperature notes
4.29	2	Porous	Important general notes more prominent; secondary charts updated
4.34	2.5	Currency (Paper-Based)	Updated notes on Bank of England currency usage
4.39	3	Semi-Porous	Important general notes more prominent; secondary charts updated, note 2 value of Powder Suspension added
4.42	3.3	Painted Surfaces (Matt)	Moved from porous chart 2.7; section updated with new chart, general information and modifications



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4.43	3.4	Painted Surfaces (Intermediate Sheen/Gloss)	Updated title, general information, considerations and chart
4.48	3.9	Cellophane Packaging	Added physical characteristics
4.51	3.12	Skin	Added text on distinguishing blood marks
4.52	3.13	Bioplastics	New page (notes only)
4.53	3A	Blood Contamination	Removal of reference to elevated temperatures in notes
4.54	3B	Grease Contamination	Added text on lipid dye background staining

### 2.5 Chapter 5

Page No.	Sub-heading	Change
<b>All process instructions</b>		
5.1 – 5.Ref.1	Decision making	Decision making pages are made clearer by the addition of a 'Decision Making' sub-title
5.1 – 5.Ref.1	Health and Safety	No known hazards removed and replaced with guidance that the process can be used safely
5.1 – 5.Ref.1	Health and Safety	Removed all reference to CHIP
5.1 – 5.Ref.1	Health and Safety	Updated to 2021 CJV Consulting Ltd health and safety report
5.1 – 5.Ref.1	Chemicals	Added link from 'purified water' to relevant page in Chapter 3
5.1 – 5.Ref.1	Theory	Link to Source Book added to the end of each optical, chemical and physical process instruction
<b>Adhesive Tape Removal</b>		
5.ATR.1/2/10	Process overview, Sequential use of tape removal, Use of solvents	Updated text related to solvent use
<b>Soot Removal</b>		
5.SR.7	Chemicals table	Changed 5-Sulphosalicylic acid dehydrate to dihydrate

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<b>Colour Filtration</b>		
5.CF.11/12/13	Lighting diagram	Updated diagrams to remove green or red filter
<b>Fluorescence Examination</b>		
5.FE.9	Initial examination	New final paragraph on fluorescent properties of thermal paper
5.FE.10	Wavelength selection	Updated table to include Natural Yellow 3 and IR fluorescence of some acid dyes
5.FE.13	Processing	Updated images to replace DFO with Indandione
5.FE.22	Troubleshooting	Added Shortwave Ultraviolet (UVC) Reflection to correction column in the table
5.FE.23	Theory	Updated text for occasional IR use
5.FE.28	Examples of fluorescent marks	Updated images for Indandione and Natural Yellow 3
5.FE.29	Requirements for fluorescence examination	Updated excitation and emission spectra for Category A processes
5.FE.35 – 37	Requirements for fluorescence examination	Light sources updated to account for newer technology
5.FE.47	Live view imaging systems	Updated links to Shortwave Ultraviolet (UVC) Reflection and Longwave Ultraviolet (UVA) Reflection
<b>Infrared Reflection</b>		
5.IRR.1/5	Images	New images demonstrating benefit following Powder Suspension on banknotes
5.IRR.7	Theory	Updated text
5.IRR.9	Infrared radiation sources	Updated for light emitting diode (LED) technology
<b>Longwave Ultraviolet (UVA) Reflection</b>		
5.UVAR.1 – 8	Longwave Ultraviolet (UVA) Reflection	New Category A process instruction added
<b>Visual Examination</b>		
5.VE.15	Equipment	Corrected text error by moving semi-silvered mirror from 5.VE.16 to this page
5.VE.18	Set-up	Text corrected for angle of light beam

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<b>Acid Dyes</b>		
5.AD.4	Hazard table	Added source reference for 28°C lower explosive limit
5.AD.7	Ready reckoner	Changed 5-Sulphosalicylic acid dehydrate to 5-Sulphosalicylic acid dihydrate
5.AD.8	Processing	Added point 8c to highlight Acid Black 1 and Acid Violet 17 exhibit some IR fluorescence
5.AD.14	Troubleshooting	Added new page titled 'Poor development with Acid Dyes when used after Superglue Fuming'
<b>Basic Violet 3</b>		
1 <sup>st</sup> Ed. 5.LDBV3.1–20	Lipid Dyes (Basic Violet 3)	Section updated: Process instruction relocated to 'Lipid Dyes (Basic Violet 3)'
<b>ESDA</b>		
5.ESDA.3	Hazard table	Corrected error for how ozone is generated
5.ESDA.12	Supplementary information	Removed pre-humification effect on DFO
<b>DFO</b>		
1 <sup>st</sup> Ed. 5.DFO.1 – 13	DFO	Process instruction relegated to Chapter 6 (Category B) and text updated to reflect relegation
<b>Indandione</b>		
5.IND.1 – 18	Indandione	New category A process instruction (promoted from Category B) – new formulation and additional text
<b>Lipid Dyes (Basic Violet 3)</b>		
5.LDBV3.1/2/3 /13	Lipid Dyes (Basic Violet 3)	Updated with reference to Lipid Dyes (Other), including preferred scene use of Natural Yellow 3 due to associated hazards
5.LDBV3.1	Process overview	Replaced 'some' with 'weak' in reference to enhancement with fluorescence
5.LDBV3.5	Labelling solutions table	Removed hazard statement H412 for Basic Violet 3 (DOSS) working solution

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5.LDBV3.6	Chemicals	Updated alternative names for ethanol and added clarification on grade of Basic Violet 3, including footnote regarding CLP hazard classification
5.LDBV3.10	Processing	Corrected error in 3c by replacing DOSS with Phenol
5.LDBV3.20	Theory	Inserted missing text to bottom-middle image legend
<b>Lipid Dyes (Other)</b>		
5.LDO.1 – 18	Lipid Dyes (Other)	New category A process instruction that combines Solvent Black 3 and Natural Yellow 3
<b>Multi-Metal Deposition</b>		
5.MMD.2	Laboratory or Scene?	Added information to aid decision making
5.MMD.4	Labelling solutions table	Entries for citric acid, Multi-Metal Deposition Redox and colloidal silver working solutions updated
5.MMD.8	Solutions	Updated guideline for expiry dates and storage conditions for Silver Nitrate solution
5.MMD.9	Ready reckoner	Changed Sodium citrate tribasic dehydrate to dihydrate; changed quantities for colloidal silver working solution
5.MMD.11	Processing	Added Physical Developer Enhancement text
<b>Ninhydrin</b>		
5.Nin.5	Equipment	Updated Ninhydrin development oven requirements
5.Nin.6	Equipment – Ninhydrin Development Oven Set-up	Updated text to make more generic for other development ovens
5.Nin.7	Chemicals	Added alternative names for acetic acid and specified grade of ethyl acetate
5.Nin.9	Processing	Added immediately prior to processing
5.Nin.10	Processing	Added text regarding treatment of large items
5.Nin.18	Troubleshooting	Chemicals and conditions used added to column titled 'Cause'
5.Nin.19 – 20	Theory	Updated page with sub-titles for clarity and addition of new 'acetic acid' section

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<b>Physical Developer (PD)</b>		
5.PD.1	Process overview, Safety and Effectiveness Summary	Decreased maturity rating from 5 to 4; Updated for evidence base; Impractical for use at scenes
5.PD.2	Laboratory or Scene?	Added Health and Safety, Effectiveness and Practicality information to aid decision making
5.PD.4	Labelling solutions table	Removed H335 for PD Redox solution
5.PD.6	Chemicals	Added link to 'Theory' for water quality information
5.PD.6	Chemicals	Replaced Synperonic N with Decaethylene glycol monododecyl ether (DGME); quality of n-Dodecylamine acetate added
5.PD.7	Solutions	Replaced Synperonic N with DGME and altered quantities of n-Dodecylamine acetate, DGME and stock detergent solution; added text to preparation of formulation and changed guideline expiry dates of the redox solution, working solution and silver nitrate solution.
5.PD.8	Solutions	Replaced Synperonic N with DGME and altered quantities of n-Dodecylamine acetate, DGME and stock detergent solution
5.PD.9	Processing	Removed 17°C temperature requirements; added 5b for guideline development time
5.PD.10	Post-processed	Simplified 3a for re-use of solutions
5.PD.12	Troubleshooting	Replaced 17°C temperature requirements with room temperature
5.PD.16	Troubleshooting	Updated for new treatment time
5.PD.19 –20	Theory	Updated theory on mechanism of PD; added information on water temperature and quality; updated images
<b>Physical Developer Enhancement</b>		
5.PDE.1	Main uses, Process overview, Safety and Effectiveness Summary	Updated for wider usage (silver deposition processes); IR Reflection use and scene use
5.PDE.3	Laboratory or Scene?	Added to Health and Safety, Effectiveness and Practicality information to aid decision making
5.PDE.5	Labelling solutions	New page
5.PDE.7	Chemicals	New footnote added for blue toner

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5.PDE.8	Solutions	Added best practice text to 1a; updated solution temperature requirements; guideline expiry dates reduced for PD redox solution
5.PDE.8/9	Solutions	Added units of measurement in millilitre quantity for sodium hypochlorite
5.PDE.15	Theory	Updated for wider usage (silver deposition processes)
<b>Powders</b>		
5.Pow.2	Options	Added text on use of other powders
5.Pow.5	Laboratory or scene?	Updated health and safety information
5.Pow.6	Hazards associated with Powders	Added text for carbon black; added text for scene use
5.Pow.9	Powders	Added text for expiry dates
5.Pow.10 – 12	Processing	Added scene use considerations; added note 1d on refreshing powder
5.Pow.12	Processing	Added note 1c on decanting powder
5.Pow.13	Post-processing	Updated (3) by removing disposal notes and adding powder re-use
5.Pow.14	Scene use	Updated health and safety information with adequate protection factor
5.Pow.18	Theory	Updated for water content of fingermarks
<b>Powder Suspension</b>		
5.PS.1	Main uses, Process overview	Decreased maturity rating from 5 to 4 bars; changed tick to a cross (with footnote) for grease; updated to surfactant solution
5.PS.2	Options	Language moderated and added note about the modified iron oxide-based formulation
5.PS.4	Hazards associated with Powder Suspensions	Added text for carbon black and nanomaterials; new table
5.PS.5	Labelling solutions and mixtures table	Removed H302 and H318 for both solutions/mixtures
5.PS.6	Chemicals	Updated for new formulation; updated text related to commercial products
5.PS.7 – 8	Solutions and Mixtures	Updated for new formulation
5.PS.9	Processing	Changed secondary examination from Fluorescence Examination to Infrared Reflection
1 <sup>st</sup> Ed. 5.PS.12	Troubleshooting	Page removed

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5.PS.16 – 17	Theory, Formulation Changes	Theory on electrical interaction added; results on older marks added; performance based on particle size and new section on formulation changes added
<b>Small Particle Reagent</b>		
5.SPR.8	Processing	Added text to 5a for treatment of multiple sides
<b>Superglue Fluorescent Dye Staining (SFDS)</b>		
5.SFDS.2	Options	Added water-based as an option for ink dissolution scenarios
5.SFDS.4	Hazards table	Added flash point for ethanol
5.SFDS.5	Labelling solutions table	Added H319 for ethanol-based solutions; renamed powder suspension stock detergent to SFDS stock detergent
5.SFDS.7 – 9	Chemicals, Solutions	Added solubility of alternatives, updated for changes to water-based solutions and BY40 information
5.SFDS.16	Troubleshooting	New page for cloudy solutions
<b>Superglue Fuming</b>		
5.SF.1	The item or surface	Updated for effectiveness on wetted surfaces
5.SF.5	Processing	Added Ultraviolet (UVA) Reflection and notes as a secondary examination process in the Examination section
5.SF.11	Theory	Added paragraph and new image regarding impact of water
<b>Vacuum Metal Deposition</b>		
5.VMD.1	The item or surface	Updated to provide options regarding treatment of curved surfaces
5.VMD.2	Options	Added link to 'normal and reverse development' theory page; added text about silver VMD fading; added new section on alternative options and link to Category C summary page for Vacuum Metal Deposition Silver/Zinc
5.VMD.3	Hazards table	Updated risk of explosion within chamber for clarification
5.VMD.4 – 5	Equipment	Updated to focus on requirements that accommodate the broader range of instruments now available

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5.VMD.7 – 9	Processing	Updated to account for the broader range of instruments now available; 1g updated for silver quantities; points 7b and 8a updated for clarification within Processing (Silver) instructions (Examination); added Infrared Reflection and notes as a secondary examination process; added 7e to flag use of Physical Developer Enhancement
5.VMD.10	Post-processing	Added new bullet (4a) and updated 4c regarding cleaning
5.VMD.17 – 23	Theory, Equipment, Processing	Updated for clarification throughout; use of VMD on biodegradable materials
<b>References</b>		
5.Ref.1 – 2	Source Book	New page with table cross-referencing process name with Source book location

### 2.6 Chapter 6

Page No.	Sub-heading	Change
<b>All process instructions (where applicable)</b>		
6.0.1 – 6.6.3	Category B-F processes	Key information on front page changed to reflect updates to other visualisation processes
6.0.1 – 6.6.3	Decision making	Decision making pages are made clearer by the addition of a 'Decision Making' sub-title
6.0.1 – 6.6.3	Health and Safety	No known hazards removed and replaced with guidance that the process can be used safely
6.0.1 – 6.6.3	Health and Safety	Removed all reference to CHIP
6.0.1 – 6.6.3	Chemicals	Added link from 'purified water' to relevant page in Chapter 3
6.0.1 – 6.6.3	Further reading	Link to Source Book added on the first page of each process instruction
<b>Category B processes</b>		
6.1.6 – 7	Acid Dyes (water-based)	Changed 5-Sulphosalicylic acid dehydrate to dihydrate
6.1.11	Adhesive Tape Removal (solvent-based)	Added examples to reflect its potential use; Why the process is not in Category A – added section on evaluation; The Item or Surface – effectiveness on porous surfaces and potential damage to substrate updated
6.1.12	Body Decomposition Residue Removal	Added that 30°C is guidance only



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6.1.13 – 25	DFO	Relegated from Chapter 5 Category A to Chapter 6 Category B; updated to fit the Category B format including explanation for where this process could be used and why the process is not in Category A; added clarification in 6.1.24 'cause'
1 <sup>st</sup> Ed. 6.1.23	Europium Chelate	Page removed (relegated to Category E)
1 <sup>st</sup> Ed. 6.1.25	Indandione	Page removed (promoted to Category A)
6.1.33	Earth and Mud Removal	Added that 30°C is guidance only
1 <sup>st</sup> Ed. 6.1.43	Natural Yellow 3	Page removed (promoted to Category A)
6.1.44	Leuco Crystal Violet	Name clarification for hazardous product
6.1.45	LumiCyano™	New Category B process summary page
6.1.46 – 53	Matrix Assisted Laser Desorption/ Ionisation – Mass Spectrometry (MALDI-MS)	New Category B process instruction
6.1.56	PolyCyanoUV	New Category B process summary page
6.1.58	RECOVER®	New Category B process summary page promoted from Category C (S <sub>2</sub> N <sub>2</sub> )
6.1.69 – 70	Superglue Fluorescent Dye Staining (propanol-based)	Added flash point of propanol; added solubility of alternatives
<b>Category C processes</b>		
1 <sup>st</sup> Ed. 6.2.4	Cartridge Electrostatic Recovery and Analysis (CERA)	Page removed (relegated to Category E)
6.2.4	Drug Removal	Added that 30°C is guidance only
6.2.5	Electrochromic Development	New image; updated alternative names
6.2.6	Galvanic Metal Deposition	Previously 'Electroless Silver Deposition' – renamed and expanded with more options
1 <sup>st</sup> Ed. 6.2.8	Fluorescent Superglue Fuming	Page removed following addition of separate pages in Category B for LumiCyano™ and PolyCyanoUV
1 <sup>st</sup> Ed. 6.2.10	MALDI-MSI	Page removed and replaced with Category B MALDI MS
6.2.9	Powders (Fluorescent)	Added text on evaluation; process overview – removed specific usage on non-porous and added visualisation using infrared
1 <sup>st</sup> Ed. 6.2.15	Disulphur Dinitride (S <sub>2</sub> N <sub>2</sub> )	Promoted to Category B, updated and renamed RECOVER®

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6.2.13	Thermal Development	'Will' changed to 'may' be reduced in effectiveness of Indandione/Ninhydrin
6.2.14	Thermanin	Process overview – error amendment – 'temperature' changed to 'humidity'
6.2.15	Vacuum Metal Deposition (Silver/Zinc)	New Category C process summary page
<b>Category D processes</b>		
6.3.2/7	Acid Dyes (Methanol-based)	Error amendment – process overview – three changed to four solutions in sequence; Solutions – in Wash solution 2 methanol changed to water
6.3.12	Ninhydrin Enhancement (Zinc Toning)	Equipment – updated oven requirements to align with Category A Ninhydrin
<b>Category E processes</b>		
6.4.4	Electrostatic Enhancement Processes	New page
6.4.5	Fat/Lipid Reagents	Added Europium Chelate (relegated from Category B); removed reference to substrate type in overview
<b>References</b>		
6.6.1 – 3	References	New page with table cross-referencing process name with Source book location

### 2.7 Chapter 7

Page No.	Sub-heading	Change
7.3	Ballistics	Effect of ballistics processes on fingermarks – added rendering safe handling
7.4	Body Fluids	New image
7.6 – 7	CCTV and other Video Evidence	Updated title and text to include video; image updated to reflect current video evidence sources; text added on downloading from network systems; text altered to state a reference time source
7.8 – 9	Digital Forensics	Updated to include social media and alternative storage devices; images to reflect current digital evidence sources added; Effect of fingermarks processes – updated to be unlikely to be detrimental
7.11	DNA	Effect of fingerprint processes on DNA – added information for UVC radiation

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7.14 – 15	Drugs	Updated to reflect current drug evidence and analysis methods; hazards of synthetic opioids added; through barrier analysis recommendations added; advanced mass spectrometry imaging processes added
7.22	Hairs	Added cutting as a transfer method

### 2.8 Appendices

Page No.	Sub-heading	Change
A.0.1, A.2.1, A.2.5	Introduction	Reference to appendix 3, newsletters and supporting documents added
A.1.6	Fingerprint Evidence Recovery Sequence	Error correction in the Superglue Fuming rationale box - non-adhesive side of tape
1 <sup>st</sup> Ed. A.1.13	Example 10	Removed Australian banknotes example
A.1.13	Multiple evidence types	Added option to carry out DNA before fingerprints
A.3.1 – A.3.3	Appendix 3: Expectations for Fingerprint Visualisation	New section added

### 2.9 Glossary

Page No.	Sub-heading	Change
GLO.1 – 7	Glossary	Updated visualisation terms to align with terminology used within Forensic Science Regulator and European Network of Forensic Science Institute's publications

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