Forensic Science Regulator

Guidance: Contamination controls – Scene of crime

FSR-GUI-0016

Issue 1

Publication date October 2023

This document is issued by the Forensic Science Regulator in line with Section 9(1) of the Forensic Science Regulator Act 2021.

Contents

1. Introduction

1.1.1 For the purposes of this guidance, contamination is defined as ‘the undesirable introduction of DNA, or biological material containing DNA, to an item/exhibit recovered from an incident scene which is to be examined/analysed’. This is distinct from the adventitious transfer of biological material to a scene that can also occur, usually prior to the exhibit or sample being recovered and before investigative agencies have intervened, this is often referred to as ‘background DNA’.

1.1.2 These guidelines for good practice are necessary because DNA techniques in routine use can readily generate profiles from DNA found in minute saliva aerosols or in skin cells deposited on handled items. Whilst this guidance relates to control of DNA contamination, many of the practices outlined could assist with reducing contamination in general, including from trace material contamination.

1.1.3 Potential routes for DNA contamination to occur at an incident scene include:

a. From a practitioner to surfaces/items within the scene;
b. Contamination from testing or recovery of item/surfaces using contaminated equipment or consumables (for example; swabs, tubes, personal protective equipment and packaging materials); and
c. From location to location within a scene.

1.1.4 DNA contamination may occur as follows:

a. Directly, also described as ‘primary transfer’, for example, saliva or dandruff from an examiner onto a surface or item within the scene.
b. Indirectly, also described as ‘secondary transfer’ or ‘tertiary transfer’ for multiple step transfers of a single source, for example, from one scene to another via contaminated equipment (such as photographic scales) not properly cleaned from previous scenes.

1.1.5 It is recognised that DNA contamination incidents cannot be eliminated completely, given the prevalence of human DNA within the living and working environment, and the issue is exacerbated by the increasing sensitivity of DNA analytical techniques. Therefore, an effective DNA anti-contamination process

requires a combination of approaches both to minimise the risk of occurrence and to maximise the ability to detect contamination when it does occur.

1.1.6 Contamination control measures fall into two core areas of activity.

a. Preventative measures including:

i. Minimising the chance of contamination occurring by, for example, practitioners using appropriate personal protective equipment (PPE);
ii. Ensuring effective separation of equipment and consumables from recovered items/exhibits in scene practitioner vehicles;
iii. Restricting access to areas containing exhibits and consumables;
iv. Cleaning scene examination equipment during use, if necessary, e.g. in a heavily bloodstained scene;
v. Ensuring that critical consumables are free from detectable levels of DNA based on risk assessment and checked for damage before use;
vi. Avoiding taking large numbers of consumables into scenes and considering small packs of consumables,
vii. Ensuring that equipment used at scenes is adequately cleaned between scenes based on risk assessment.
viii. Preventing equipment from contacting sources of DNA evidence unless absolutely necessary.
ix. Ensuring practitioners are aware of contamination risks and trained in the use of contamination control measures.

b. Detection of contamination at incident scenes primarily by:

i. Comparison of DNA profiles generated from scenes/exhibits against a database of reference DNA profiles from personnel from whom there is a significant risk of contamination; and
ii. Investigation of unexpected results.

1.1.7 Nothing can be done to reduce background DNA at scenes, but it is essential that everyone in the investigative process:

a. Is aware of the importance of maintaining the integrity of evidence;

b. Takes appropriate steps to minimise the risks posed by the inadvertent addition or the transfer of DNA during scene examination or other stages of the forensic analysis process; and

c. Is aware of the option to take background “control” samples and elimination DNA samples where appropriate.

2. Scope

2.1.1 This document provides guidance and recommendations on DNA contamination control measures for the incident examination phase of investigations, namely the control avoidance and detection of DNA contamination at incident scenes where DNA evidence is being recovered.

2.1.2 The requirements set out in section 103 of the Forensic Science Regulator’s statutory Code of Practice [1] should be referred to when considering contamination controls for DNA analysis.

2.1.3 The International Laboratory Accreditation Cooperation (ILAC) document, ILAC G19:08/2022 ‘Modules in a Forensic Science Process’ [2], provides high level requirements with regard to DNA anti-contamination measures including:

a. Demonstrating that reagents and kits used at scenes are fit for purpose;

b. A risk assessment of issues surrounding the potential for cross-contamination between samples; and

c. An assessment of each individual scene to ensure that suitable anti-contamination measures are in place.

3. Terms and Definitions

3.1.1 The terms and definitions set out in the statutory Code also apply to this guidance.

3.1.2 The word ‘shall’ has been used in this document where there is a corresponding requirement in ISO/IEC 17020 [3], ILAC G19 [2], or the Forensic Science Regulator’s Code; the word ‘should’ has been used to indicate generally accepted practice and the word ‘may’ has been used for recommendations. Recommendations have been used to indicate what ideal practice is when it is practicable.

3.1.3 The interaction of the Forensic Science Regulator's guidance together with the DNA consumable standards PAS 377:2023 [4] and BS ISO 18385:2016 [5] is shown in Figure 1.

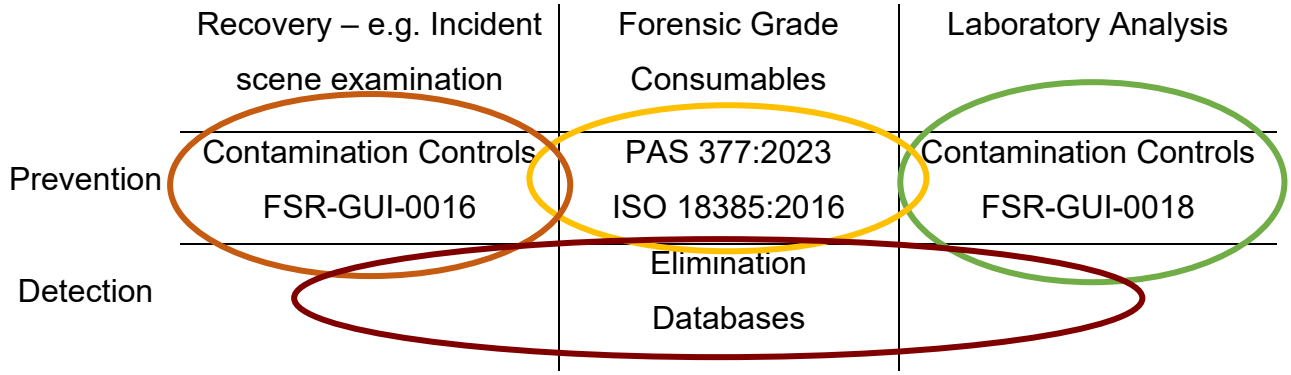

Figure 1: Interaction of prevention and detection principles across the DNA workflow from recovery of material to analysis.

4. Contamination Controls

ISO/IEC 17020 sec. 7.1.2, 7.1.6

4.1 Scene contamination controls

4.1.1 The aim of contamination controls at scenes is to reduce the risk of contamination as far as is practically possible. A key element of this, especially for incidents that require forensic scene management, is to manage activities both within and outside the scene and at other relevant locations in a strategic and coherent fashion to ensure that contamination risks are understood and mitigated as far as practically possible.

4.1.2 This applies not just to a particular scene or secondary scene, but across a case or linked cases, addresses and vehicles.

4.1.3 The DNA contamination controls should not cover health and safety risk assessments in a scene; these are separate issues.

4.1.4 Factors to be taken into account when formulating contamination controls be considered include the following:

a. Activities prior to scene attendance.
b. Environmental factors.

c. Practitioner deployment.
d. Cordons and scene protection, if in place.
e. Scene assessment.
f. Contamination risks between different parts of the same scene.
g. Specialist search dogs, if relevant.
h. Handovers, if applicable.
i. Release of a scene.

Prior to scene attendance

4.1.5 Where relevant, a record of persons with legitimate access to the scene, including emergency service personnel, and their activities before and during control was established and a record of any PPE worn, should be kept.

Environmental factors

4.1.6 Environmental factors include the following.

a. Hot conditions that introduce a higher risk of contamination (for example, scenes where extreme heat introduces the risk of contamination due to perspiration whilst undertaking searching, recording and recovery activities). In this example the contamination controls could include wearing lighter clothing underneath the scene suits, regular changing of PPE and regular breaks arranged at the beginning of the scene attendance.
b. The linking of environments, for example, through communal corridors, waterways or streets. In this example the controls could include identifying a designated route to be taken into and out of the scene (common approach path) to minimise contaminating the primary scene or appropriate protective clothing changes required.

Practitioner deployment

4.1.7 Deployment of practitioners should include an assessment of the risks related to the previous activity of practitioners and use of vehicles or equipment that have:

a. Attended, or been used at, a scene related or linked to the one to be examined;

b. Examined items in the laboratory examination from the same case.

4.1.8 Where operational imperatives dictate that utilising the same practitioners cannot be avoided, the following should be considered and actions taken recorded:

a. The risks and possible transfer mechanisms for material to pass from one scene to another and how these can be mitigated (such as the use of different vehicles and equipment); and
b. Showering and a change of clothes for practitioners; and
c. Ensuring adherence to strict cleaning and contamination control measures for equipment between scenes and during scene examination if required.

Cordons and scene protection

4.1.9 Where cordons are in place, they should include all known or possible routes to and from the scene as a key anti-contamination measure.

4.1.10 The first attending and/or managing forensic practitioner should review the cordon and amend it if evidence or forensic opportunities are in imminent risk of loss or contamination.

4.1.11 Access to the scene should be controlled as a single point of entry and a common approach path should be established. Exceptionally, two entry points may be more appropriate if this enables staff to avoid passing from one delineated zone to another.

4.1.12 Personnel required to attend the scene subsequently to assist in the examination should be directed to park their vehicles in a suitable designated area (rendezvous point) outside the cordon but as near to the head of the common approach path as possible. This will minimise potential contamination risks during the transport of items to and from the scene.

4.1.13 Utilising scene entry tents is an example of good scene management. These can be separated into different areas for putting PPE on and taking it off.

4.1.14 Good practice at scenes is to ensure that the minimum number of people required to undertake the effective examination of the scene are admitted.

Scene assessment

4.1.15 The scene assessment should identify appropriate precautions to be taken to preserve evidence, the parts of the scene that require protection, and the contamination control measures required within these including:

a. Common approach paths;
b. Sequence of examination;
c. Areas to avoid;
d. Areas of the scene where PPE is required;
e. Areas of the scene where PPE should be removed (for example, where overshoes must be removed);
f. Protection of ground surfaces including where stepping plates are to be deployed;
g. Designated “clean” areas for kits, packaging and consumables; and
h. Designated “dirty” areas for disposal of waste such as used PPE.

4.1.16 Where there is significant biological material and movement of items and/or recovery of exhibits could create a contamination risk (such as airborne blood flakes) the scene assessment should include when and how such areas will be examined. This could include; avoiding moving through the area, taking samples at the scene rather than recovering items, and examining after other evidence has been recovered.

Contamination risks between different parts of the same scene

4.1.17 Inadvertent movement of material from one part of a scene to another constitutes a contamination risk. For example, communal living areas or shared/public areas within scenes, or where rooms within a scene have been ascribed particular significance by witnesses. Under these circumstances, additional measures to avoid cross-contamination need to be considered:

a. Control of entry to and exit from specific areas within the scene.
b. Early examination, documentation and recovery of DNA (visible and non-visible) from frequently handled items for example, door handles.
c. Examination of different rooms on different days or by different personnel.

d. Cleaning or changing gloves and changing other PPE and/or other equipment between examination of different parts of the same scene.

Specialist search dogs

4.1.18 Where the use of specialist search dogs is being considered the scene assessment should include any additional contamination risks that may be introduced. Where possible, the strategy of the dog handler should be reviewed by the practitioner and recorded in their examination strategy.

a. Contamination risks from the use of dogs may include:
b. From individuals who have handled the dogs;
c. Transferring material from one part of a scene to another;
d. Transferring material in and out of the scene; and

4.1.19 It is recognised, however, that for certain scenarios, such as searching large areas, there may be no viable alternative to the use of specialist search dogs. Where this is the case notes taken regarding where and when the dogs were used together with a note of the contamination risks and mitigations in place should be kept.

Handovers

4.1.20 If the examination and/or management of a scene is handed over to another practitioner(s) then the handover briefing should include the contamination controls and a record should be made of the handover briefing.

4.2 Scene Activities and Procedures

4.2.1 Once a scene is in the control of a forensic practitioner, all contamination control activities within the scene, including any designated cleaning and/or storage areas, should be managed by a suitably trained and competent practitioner.

4.2.2 Any additional advice sought when formulating the contamination controls should be recorded.

4.2.3 Contamination control procedures for incident scene examination should ensure that:

a. Access to the scene is restricted as far as is practicable to those who need access for a valid reason.
b. Movement within the scene is kept to the minimum possible for the work that has to be undertaken.
c. Verbal communication around areas of interest within the scene is kept to a minimum even if face masks are being worn.
d. The touching of spectacles, face, telephones, door handles, light switches, pens, paper, rulers, etc., without subsequently changing or cleaning the outer pair of gloves is avoided.
e. The use of mobile phones and radios is minimised within the scene and, if used, appropriate contamination controls are carried out.
f. Items from which samples are to be taken are handled carefully and as little as possible, and packaged at the earliest opportunity.
g. Searching of items within the scene should be carried out where the item is located or on sterile paper.
h. All items seized are sealed into their packaging straight away and wherever possible the packaging should be taken to the item and not the item to the packaging.
i. Measures are in place to prevent/minimise contamination of equipment and consumables brought into the scene, for example, taking the minimum amount of equipment/consumables into the scene, setting up a clean area within the scene using plastic or paper sheeting for equipment to be placed if required.
j. Packaging and other containers are of an appropriate size and type for the items being packaged so that the item does not become damaged, and the packaging does not become compromised during transportation and storage.
k. Due care and consideration is made when deciding whether to package items separately or whether to combine them (for example, cigarettes).

4.2.4 All individuals entering a scene should be recorded in the examination notes, or scene log if in use. Where necessary DNA elimination samples should be sought from individuals who have been in a scene and would not be on an elimination database (e.g. first responders, homeowner).

5. Personnel

5.1 First responders

5.1.1 Emergency service personnel who attend scenes may have some forensic awareness with regard to DNA contamination control measures that could be taken without impacting on their primary roles for scene attendance. This includes paramedics and firefighters.

5.1.2 Consideration should be given to requesting relevant control samples, clothing and footwear from first responders, and members of the public and persons of interest, if relevant.

5.2 Training and competency

5.2.1 Forensic practitioners attending a scene should be trained in and demonstrate knowledge of:

a. Contamination issues including contamination theory and understanding the mechanics of contamination, the rationale behind contamination control measures and practical knowledge of any relevant standard operating procedures (SOPs) employed at scenes to avoid contamination;
b. Issues relating to contamination risks and their avoidance in specific processes and methods. These should be an integral part of practitioner training, and the relevant issues should be included within training plans and manuals.
c. This guidance.

5.3 Scene awareness

5.3.1 All practitioners attending a scene once it is controlled should be made fully aware of the contamination risks specific to the scene and how they are to be mitigated. It is the responsibility of the forensic practitioner managing the scene to ensure that all individuals attending the scene are aware of, and conform to, the scene anti-contamination controls. This may include, for example, forensic scientists, exhibits officers, Police officers, forensic pathologists, police search advisers, licensed search officers and practitioners from other forensic units.

5.3.2 All practitioners called to a scene specifically for examination purposes (searching, recording and recovery) should ensure that they have sufficient equipment needed for taking effective contamination control measures. This equipment includes:

a. Sufficient PPE;
b. Sufficient consumables including barrier consumables such as brown paper, recovery and packaging equipment; and
c. Sufficient cleaning materials;

5.3.3 All practitioners working at incident scenes should have had a DNA sample taken from them for submission to the relevant staff elimination database. With some forensic units this will be a mandatory requirement, for others the absence of such a sample should be recorded.

6. Equipment, PPE and Consumables

ISO/IEC 17020:2012, sec.6.2 and the Code sec. 103.3

6.1 Consumables

6.1.1 Consumables are single-use commodities used in the collection, preservation and processing of material for forensic analysis, and are bought and used routinely. These include PPE, tamper evident containers, swabs, and packaging that comes into direct contact with the material for forensic analysis. A consumable can also be equipment used in the collection, processing and safe handling of the material, for example, disposable tweezers or scissors.

6.1.2 Appropriate precautions to minimise the contamination of consumables prior to use include secure storage, restricted access, steps to minimise the chance that the handler causes inadvertent DNA contamination and the risk of DNA being transferred from adjacent items or the storage environment [6].

6.1.3 As stated in the Code (section 103.3.1) consumables used for the recovery of samples for DNA analysis shall be demonstrated to be forensic DNA grade through batch testing and/or using validated post-production treatment, such as ethylene oxide treatment. Use of DNA consumables compliant with PAS 377 [3]

or ISO 18385 [4] negates the need for end-user acceptance batch testing (Code section 103.3.3).

6.1.4 Where batch testing is not required the forensic unit should conduct their own risk assessment to demonstrate confidence, within their Quality Management System that sufficient QA/QC measures are in place. This should include reviewing evidence from the supplier of their compliance with PAS 377 and/or ISO 18385 and the provision of QC data for every batch of consumables, the results for which should be held with the consumables records.

6.1.5 Consumables (including PPE) and reagents used shall not be past their expiry date, unless it is verified that they remain fit for purpose beyond that date (Code section 34.2.1).

Risk assessment

6.1.6 A risk-based approach should be considered by Forensic Units when assessing the use of consumables for scene applications. This should consider the risk associated with using the consumable as an integral part of the overall process and within the specific context of each step of this process.

6.1.7 Annex A provides some examples of how this assessment can be undertaken by breaking the process down into individual steps and considering risks of contamination within each of these. For each identified risk the potential impact is considered if the risk becomes a reality and each is given an overall risk rating by multiplying the potential impact by the likelihood of it occurring by the ability of detection. Each is estimated on a scale of 1-10 in increasing severity.

6.1.8 Annex B provides an example of a rating system developed by the NPCC Transforming Forensics CSI Expert Network. Actions are then identified to reduce or mitigate the risk and the residual risk rating post-action is then calculated. The rating system provides a means to prioritise addressing the identified risks. This type of exercise identifies that use of contaminated consumables poses a significant risk of misleading investigations and missed identification of the offender but various actions can be taken to reduce or mitigate this risk, as discussed in the following examples:

6.1.9 The risk of using a collection device that has been contaminated during manufacture (Risk 8, annex A) has a high calculated risk rating. This is mitigated by, amongst other measures, using forensic DNA grade consumables manufactured in compliance with ISO 18385:2016 or PAS 377:2023 this both minimises the risk of contamination through post-manufacture DNA dosage reduction and maximises the likelihood of detection through checks against an elimination database of manufacturing staff.

6.1.10 The risk of contamination of the collection devices by scene practitioners (Risk 9, annex A) also has a high calculated risk rating. This is mitigated by ensuring that standard operating procedures (SOPs) and associated training and competency assessment are in place for contamination controls including glove cleaning. This minimises the risk of contamination occurring, reinforced by ensuring that the DNA profiles of all scene examiners are held in an elimination database to ensure that detection is maximised in the event of contamination occurring.

6.2 Personal protective equipment (PPE)

6.2.1 The following is a list of recommended protective clothing for practitioners examining an incident scenes where DNA evidence is a consideration. The extent of PPE worn will depend on the type of incident scene being examined, however a face mask and two pairs of gloves should be worn at a minimum where DNA is being recovered.

a. Face mask: Ideally a pinch-nose face mask however, other face masks may need to be used for other purposes (for example, when applying chemical treatments). The wearer should keep talking to a minimum whilst recovering DNA samples, or when recovering/handling items/exhibits, and when close to possible sources of DNA evidence. Face masks used should be comfortable and not require frequent re-adjustment to avoid contaminating gloves by touching the face or mask.
b. Mob cap/hairnet/hood: A mob cap, hairnet, or the hood of the scene suit to prevent shedding of hair or skin flakes by the examiner into the scene.
c. Gloves: Two pairs of disposable nitrile gloves should be worn when handling items/exhibits or touching surfaces that will require analysis.

Where a scene suit is worn the wrist of the gloves should cover the wrist of the scene suit, this can be achieved by:

i. taping the inner pair of gloves to the scene suit; or
ii. inserting the thumb through a hole in the cuff to prevent the suit sleeve from rucking up and always wearing gloves over the top; or
iii. Wearing 'long cuff' gloves as the 'inner' pair so that the cuff can be stretched over the sleeves of the scene suit.

d. Scene suit: This should cover all clothing or skin.
e. Overshoes: These should avoid exposure of skin or clothing between the scene suit and overshoes, if necessary by taping them together.

6.2.2 The outer gloves should be changed or cleaned regularly according to a documented process, ideally at a designated place away from the area being examined. Outer gloves should be changed or wiped both before and after handling items/exhibits that may be submitted for DNA analysis or surfaces that may be sampled for DNA and before and after handling re-usable equipment such as cameras.

6.2.3 PPE should be changed if it becomes visibly stained or compromised in a way that is a contamination risk.

6.2.4 If any item(s) of PPE is believed to have become a potential source of contamination this possibility should be recorded in the examination notes and the specific item(s) of PPE seized as exhibits.

6.2.5 The sequence of putting on PPE should be documented and the following order is recommended:

a. Face mask (and beard snood, where required) should be put on before any other protective clothing to avoid the latter from being contaminated with saliva aerosols, followed by;
b. Mob cap/hairnet if scene suit hood not being used (and hard hat, if required);
c. Safety glasses (if required)
d. First pair of gloves;
e. Scene suit;

f. Overshoes; and

g. Second pair of gloves.

6.2.6 When exiting the scene, PPE should be removed at the designated exit point and sealed in an appropriate bag for disposal or retention.

6.3 Packaging

6.3.1 As stipulated in the Code (section 103.4.1) the packaging of collected items/exhibits shall preserve the integrity of the material for forensic examination and minimise the risk of loss, degradation or contamination. As a minimum this should include:

a. appropriate packaging for the size, condition and forensic analysis requirements of the item/exhibit recovered;

b. Secure sealing;

c. Appropriate labelling and;

d. Separate packaging of items where the packaging of items together is likely to compromise them;

e. Ensuring that packaging kits, such as condom kits, are in date.

6.4 Non-disposable equipment

6.4.1 Equipment that is to be re-used at different scenes and that may come into direct contact with items/exhibits recovered for DNA analysis should be effectively cleaned prior to re-use. Based on a risk assessment, this might include, for example:

a. Stepping plates; and

b. Rulers and scales

6.4.2 Equipment that may come into contact with surfaces or item/exhibits for DNA analysis should be cleaned using a method demonstrated to be effective at removing DNA. A cleaning log of such equipment should also be kept, which provides traceability to the equipment cleaned.

6.4.3 Sequential examinations should be used to minimise the risk of contamination from non-disposable equipment, for example ideally DNA evidence should be recovered prior to fingerprint powdering. Where this is not possible mitigations

include the use of a new fingerprint brush and powder or seizing the brush used as an exhibit.

6.4.4 No individual should be permitted to enter the controlled scene of a serious incident unless they provide a DNA elimination sample, where this is deemed necessary.

7. Wet items/exhibits and drying facilities

7.1 Recovery of wet items/exhibits

7.1.1 To prevent loss of DNA through degradation, wet items/exhibits recovered from an incident scene should be frozen or dried with a minimum delay.

7.1.2 Alternatively, for damp items packaging in breathable tamper evident bags or paper evidence bags may allow the item to dry within the packaging.

7.2 Drying rooms and cabinets

7.2.1 Drying rooms and rooms containing drying cabinets should be considered DNA clean areas as items/exhibits for DNA analysis may be opened in these areas.

7.2.2 Practitioners using drying cabinets or drying rooms should demonstrate competency in their use, cleaning, and contamination controls including environmental monitoring.

Design

7.2.3 The ideal set up for a DNA clean room can be found in section 5.1.2 of the guidance document FSR-GUI-0018 – DNA Contamination controls - laboratory [4]. This set up includes a designated area for gowning up, ideally a separate lobby area (see FSR-GUI-0018, section 5.6).

7.2.4 The drying cabinet or drying room should have the following characteristics:

a. Temperature controlled to between 15.5°C and 24°C.
b. Humidity controlled to less than 60 percent.
c. Be under negative air pressure with 12 to 15 air changes per hour.
d. Air re-circulated through an activated high efficiency particulate air (HEPA) filter.

e. Not be in direct sunlight.
f. Surfaces that can withstand frequent cleaning without staining or deteriorating.
g. Controlled access.
h. Fans should not be used to accelerate drying.

Personal protective equipment

7.2.5 Outdoor clothing, for example, coats, gloves, scarves, and other personal belongings should not be taken into the drying facility.

7.2.6 When entering the drying room or room containing drying cabinets PPE worn should be as stated in section 6.2, except that disposable laboratory coats may be used in place of scene suits. Overshoes may not be needed for DNA clean rooms containing drying cabinets.

Cleaning

7.2.7 The drying room and/or drying cabinets should be cleaned on a regular basis, as well as being cleaned between each use. Cleaning should be undertaken using cleaning equipment dedicated solely for use in each drying room/cabinet and using a cleaning regime validated to provide effective DNA decontamination.

7.2.8 Small, non-disposable items, such as hangers and clips, that are suitable for immersion in cleaning agent without damaging them should be submerged in a validated cleaning agent, wiped and then rinsed in sterile distilled water.

7.2.9 Items that are not suitable for immersion in fluid should be thoroughly cleaned using disposable cleaning roll or wipes liberally wetted with a validated cleaning agent, followed by wiping with sterile distilled water. Where equipment or items are susceptible to corrosion, then an appropriate cleaning agent that does not corrode should be used.

7.2.10 The following are the recommended minimum cleaning requirements:

7.2.11 After each use, clean:

a. Bench work surfaces – all surfaces that may either directly or indirectly come into contact with consumables or items/exhibits; and

b. Surfaces inside drying cabinets, including rails and clips, or surfaces within the drying room that may directly or indirectly come into contact with items/exhibits, such as drying rails and shelves, clips and hangers, adjacent walls and flooring below drying area.
c. Door handles, control switches and surfaces touched during use of drying cabinets.
d. Any pieces of equipment or stationery that have been used such as pens, scissors and IT equipment.

7.2.12 Weekly clean:

a. Floors;
b. All contact surfaces such as door and cupboard handles.

7.2.13 Routine or regularly scheduled whole area deep clean to include the areas listed above and areas not covered by other cleaning routines:

a. lights and vents;
b. walls and ceiling; and
c. insides of drawers/cupboards.

7.2.14 Cleaning or replacement of air filters should be undertaken at a frequency recommended by the manufacturers.

7.2.15 For drying rooms/cabinets that are used on an infrequent basis, i.e. less than once a month, a deep clean should be undertaken prior to re-commencing use.

7.2.16 Cleaning logs should be kept for each drying cabinet or room to show the type of clean carried out and the practitioner who carried out the cleaning. These should be accessible so that it can easily be checked whether the cabinet or room has been cleaned since the last use.

Drying procedure

7.2.17 Before using the drying room or cabinet a check should be made to ensure it has been cleaned since the last use.

7.2.18 Only one item for drying should be handled at a time.

7.2.19 Paper should be placed under the item to capture any trace evidence that might fall off while it dries. This paper should be packaged separately and exhibited.

7.2.20 The item/exhibit packaging should also be opened over the paper used to collect fallen material, i.e. opened within the cabinet if space allows or in the area where it will be hung to dry in a drying room.

7.2.21 Items/exhibits relating to the same case between which a link may be of evidential significance (e.g. suspect and scene) should be appropriately separated for drying. Ideally separation will be drying in different facilities, however if will is not possible then items/exhibits should be dried sequentially in an appropriate sequence with cleaning in between items/exhibits.

7.2.22 Items/exhibits that are wet with body fluids, such as blood, should be dried separately from other items to avoid cross contamination from blood flakes.

7.2.23 Items/exhibits that may be examined for trace DNA should be dried on their own, unless recovered co-mingled from the same owner and separation would compromise other material of interest.

7.2.24 While the item/exhibit is drying the original packaging should be allowed to dry on a workbench in the DNA clean room containing the drying cabinets or in the drying room.

7.2.25 While items are drying the drying cabinet or room should be secured and clearly shown to be in use.

7.2.26 Once the items have dried they can be re-packaged in the original packaging if this is appropriate. However, where the original packaging is not suitable, e.g. polymer bag for fabric items or contaminated paper sack, new exhibit packaging should be used and the original packaging should be retained and exhibited.

7.2.27 The drying cabinet or room used and the time and date of the drying (as well as any other items/exhibits dried at the same time) should be recorded.

7.2.28 Logs should be maintained for each cabinet or room to record the following:

a. The exhibit number and unique reference number (e.g. case or incident number) of each item dried.
b. The practitioner who placed the item in the cabinet/room including time and date, plus confirmation that the cabinet was clean before use.
c. The practitioner who removed the item from the cabinet including time and date, plus confirmation that the cabinet was cleaned afterwards.

7.2.29 The drying cabinet or drying room should be cleaned after each use.

Environmental monitoring

7.2.30 The forensic unit shall have policies and procedures to monitor the ongoing effectiveness of cleaning the drying cabinets or room through environmental monitoring (see Code, section 103.5.9).

7.2.31 Details on environmental monitoring, including sampling, analysis, interpretation of results, corrective actions and record keeping can be found in FSR-GUI-0018 section 6.8.

8. Acknowledgements

8.1.1 This guidance was adapted from the previous, non-statutory version of this document (FSR-G-206) and reviewed by the CSI Technical Forum and Regulator's Incident Examination Specialist Group.

9. Review

9.1.1 The published guidance will form part of the review cycle as determined by the Forensic Science Regulator.

9.1.2 The Forensic Science Regulator welcomes views on this guidance, please send any comments to: FSREnquiries@forensicscienceregulator.gov.uk.

10. References

[1] Forensic Science Regulator, "Code of Practice," 2023. [Online]. Available: https://www.gov.uk/government/publications/statutory-code-of-practice-for-forensic-science-activities. [Accessed 3 8 2023].

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11. Abbreviations and Acronyms

Abbreviation	Meaning
BS	British Standard
CED	Contamination Elimination Database
DNA	Deoxyribonucleic Acid
EN	European Standards
EtO	Ethylene Oxide
FINDS	Forensic Information Databases Service
FSR	Forensic Science Regulator

Abbreviation	Meaning
IEC	International Electrotechnical Commission
ILAC	International Laboratory Accreditation Cooperation
ISO	International Organisation for Standardization
PAS	Publicly Available Specification
NIST	National Institute of Standards and Technology
PCR	Polymerase Chain Reaction
PPE	Personal Protective Equipment
SAI	Senior Accountable Individual
SOP	Standard Operating Procedure
UKAS	United Kingdom Accreditation Service

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13. Annex A

Examples of risk assessment for the use of DNA consumables by scene examiners.

Process Step	Risk description (what ways the process can go wrong - potential failure mode)	Potential impact (on the output, customer, or internal requirements)	Impact	Likeli-hood	Detection un-certainty	Risk Rating	Actions required to reduce/mitigate risk	Impact	Likeli-hood	Detection un-certainty	Risk Rating
Purchase of critical DNA consumables	Critical consumable items not delivered to forensic DNA grade.	Contamination of recovered crime scene sample, resulting in misled investigation, protracted costs, missed identification of offender.	9	4	8	288	1) Establish list of approved suppliers 2) Audit forensic consumables supplier against ISO 18385 or PAS 377:2023. 3) Supplier to provide a quality assurance certificate verifying DNA grade for each batch.	9	2	2	36
Purchase of critical DNA consumables	Consumables received are not of the intended specification	Contamination of recovered crime scene sample, resulting in misled investigation, protracted costs, missed identification of offender.	9	3	8	216	1) Ensure all involved in purchasing consumables use the approved suppliers list. 2) Purchase forensic DNA grade consumables for high-risk applications.	9	2	2	36

Consumable received from supplier at CSI hub.	Consumables delivered are unfit for purpose: damaged or differing to those ordered, thereby raising the risk of contamination.	Contamination of recovered crime scene sample, resulting in misled investigation, protracted costs, missed identification of offender.	9	2	8	144	Introduce QA procedure to check that: 1) Correct items have been delivered; 2) Packaging has not been damaged or compromised during delivery; 3) Shelf life of items is sufficient.	9	2	2	36
Storage of consumables	Consumables become contaminated in storage.	Contamination of recovered crime scene sample, resulting in misled investigation, protracted costs, missed identification of offender	9	3	8	216	1) Restricted access to appropriate practitioners, with DNA profiles held on SED. 2) Cleaning process put in place. 3) Generate SOP stipulating PPE and glove cleaning/ changing requirements. 4) Consumables to be stored in plastic boxes on shelving. Large consumables to be kept covered.	9	2	2	36

Transport of consumables within vehicles.	Contamination of the consumables within CSI van during movement to and from the scene.	Contamination of recovered crime scene sample, resulting in misled investigation, protracted costs, missed identification of offender.	9	4	5	180	1) Recorded vehicle cleaning protocol providing full audit trail. 2) High risk items provided in smaller quantity packs. 3) High risk items to be stored in a separate area therefore reducing unnecessary contact. 4) Only sealed exhibits to enter the vehicles and stored away from consumables.	9	1	5	45
Movement of consumables from vehicle to scene.	Contamination of the consumables during movement to and from the scene.	Contamination of recovered crime scene sample, resulting in misled investigation, protracted costs, missed identification of offender.	9	4	5	180	1) Plastic bag to be utilised to take items from the van into the scene. 2) DNA case to be utilised to transport the high-risk items into the scene.	9	1	5	45

Movement of consumables from vehicle to scene.	High-risk scene case becomes contaminated.	Contamination of recovered crime scene sample, resulting in misled investigation, protracted costs, missed identification of offender.	9	3	5	135	1) High-risk scene case subjected to cleaning with an auditable process. 2) Any high-risk item removed from the case is not to be replaced but disposed of due to potential contamination of external packaging when removed. 3) Appropriate PPE to be worn.	9	1	5	45
Recovery of crime scene stains.	Using a swab or mini tape contaminated during manufacture.	Contamination of recovered crime scene sample, resulting in misled investigation, protracted costs, missed identification of offender.	9	4	8	288	1) Use of only agreed suppliers. 2) DNA collection devices to be EtO-treated/ ISO 18385 or PAS 377:2023 compliant. 3) Fully auditable trail of batch numbers including QA certificate provided by the supplier.	9	2	2	36

Recovery of crime scene stains.	CSI contaminates the swab or minitape.	Contamination of recovered crime scene sample, resulting in misled investigation, protracted costs, missed identification of offender.	9	4	8	288	1) Contamination control SOPs to detail contamination control measures including use of PPE/ cleaning of gloves. 2) Correct training and structured competency monitoring of practitioners. 3) All relevant practitioner DNA profiles placed on SED.	9	2	2	36
Testing of crime scene stains.	Using contaminated filter paper when carrying out KM testing.	Contamination of recovered crime scene sample, resulting in misled investigation, protracted costs, missed identification of offender.	9	3	5	135	1) Testing of the blood with the filter paper to be confined to the outer edge of the stain. Recovery using the swab to be confined to an area adjacent to the one tested. 2) Where the stain is very small, recover without testing.	9	1	5	45

14. Annex B

Risk Rating Factors

Severity	Escalate to:	Rating	Degree of severity	Probability of occurrence	Frequency (1 in …)	Ability of detection	Detection Certainty
Low	Quality Unit / First Line Manager.	1	Internal customer will notice a slight adverse effect, however there will be no detrimental effect on the case outcome. The end customer will not experience any effect (such as system amendments).	Likelihood of occurrence is remote.	1,000,000	Sure that the potential failure will be found or prevented before reaching the next customer.	100%
Low	Quality Unit / First Line Manager.	2	Internal customer will probably experience slight inconvenience which is not detrimental to the case outcome. The end customer will not experience any effect (such as system amendments, or minor incomplete paperwork).	Low failure rate with supporting documentation.	20,000	Almost certain that the potential failure will be found or prevented before reaching the next customer.	99%

Low	Quality Unit / First Line Manager.	3	Internal customer will experience inconvenience due to the slight degradation of performance, such as computer or equipment malfunction or user error.	Low failure rate without supporting documentation.	8	Low likelihood that the potential failure will reach the next customer undetected.	95
Moderate	Second Line Manager and Quality Manager.	4	External customer dissatisfaction occurs due to reduced performance.	Occasional failures.	5	Controls may detect or prevent the potential failure from reaching the next customer.	90
Moderate	Second Line Manager and Quality Manager.	5	Internal customers productivity is reduced by the continued degradation of the effect.	Relatively moderate failure rate with supporting documentation.	4	Moderate likelihood that the potential failure will reach the next customer.	85
Moderate	Second Line Manager and Quality Manager.	6	Unit equipment repair or significant occurrence which affects unit such as major long term (days) network outage or unit area shutdown - not affecting case work.	Moderate failure rate without supporting documentation.	4	Controls are unlikely to detect or prevent the potential failure from reaching the next customer.	80

Substantial	Head of Unit and Quality Manager, Director of Forensic Services (or equiv.), SAI.	7	High degree of external customer dissatisfaction due to component/equipment failure without complete loss of departmental function. Casework affected or destroyed (such as wrong treatment; chemical treatment before DNA recovery) where results are still possible with rework - case value reduced.	Relatively high failure rate with supporting documentation.	2	Poor likelihood that the potential failure will be detected or prevented before reaching the next customer.	70
Substantial	Head of Unit, Quality Manager, Director of Forensic Services (or equiv.), SAI and UKAS.	8	Very high degree of dissatisfaction due to the loss of value of casework, without a negative impact on safety or regulations.	High failure rate without supporting documentation.	2	Very poor likelihood that the potential failure will be detected or prevented before reaching the next customer.	60
Severe	Head of Unit, Quality Manager , Director of Forensic Services (or equiv.), SAI and UKAS.	9	Multiple cases with adverse effect on safe system performance with warning before failure or violation of regulations.	Failure is almost certain based on investigation, testing and analysis.	1	Current controls probably will not even detect the potential failure.	50

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Severe	Head of Unit, Quality Manager , Director of Forensic Services (or equiv.), SAI and UKAS.	10	Customer endangered due to the adverse effect on safe system performance without warning before failure or violation of regulations.	Assured of failure based on investigation, testing and analysis.	1	Absolute certainty that the current controls will not detect the potential failure.	< 50

Published by:

The Forensic Science Regulator

c/o Home Office Science

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B2 4BJ.

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