

Australian Standard[®]

Forensic analysis

Part 1: Recognition, recording, recovery, transport and storage of material



This Australian Standard® was prepared by Committee CH-041, Forensic Analysis. It was approved on behalf of the Council of Standards Australia on 2 May 2012. This Standard was published on 31 May 2012.

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- Australian Association of Forensic Physicians
- Australian Federal Police
- Australia New Zealand Policing Advisory Agency
- Consumer Action
- Expertise, Evidence and Law Program, School of Law, University of New South Wales
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Forensic analysis

Part 1: Recognition, recording, recovery, transport and storage of material

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PREFACE

This Standard was prepared by the Standards Australia Committee CH-041, Forensic Analysis. This Standard is the result of a consensus among the representatives of the Committee to produce it as an Australian Standard.

This Standard is part of a series which, when complete, will include—

AS

5388 Forensic analysis

5388.1 Part 1: Recognition, recording, recovery, transport and storage of material
(this Standard)

5388.2 Part 2: Analysis and examination of material

5388.3 Part 3: Interpretation

5388.4 Part 4: Reporting

The purpose of this Standard is to set out standard practices for the recognition, recording, recovery, transport and storage of physical material from crime scenes in order to preserve its integrity for forensic purposes. The provisions of this document are aimed at qualified personnel with demonstrated competence in the use of appropriate scientific procedures and techniques in a forensic context.

The terms ‘normative’ and ‘informative’ have been used in this Standard to define the application of the appendix to which they apply. A ‘normative’ appendix is an integral part of a Standard, whereas an ‘informative’ appendix is only for information and guidance.

The committee wishes to acknowledge the support provided by the Attorney General’s Department in the development of the Forensic Analysis series (AS 5388) as an Australian Government initiative.

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FOREWORD

The principal focus of the document is the crime scene. That crime scene may be the actual location where the crime took place or a secondary location such as a car or dwelling or any other object which may yield physical material of value to the investigation or any subsequent judicial process.

Persons involved in crime, whether perpetrator, witness or victim, may also be possible sources of relevant physical material. Examples of such material would be samples from the sexual assault victim, post-mortem examination samples, blood spattered on a witness or broken glass on the clothing of the suspect.

Impressions such as tool marks are physical material in the same way as bloodstains, hairs and fibres, drug samples, broken glass and other tangible objects.

Although this Standard does not address procedures for the recovery of digital media from storage media, it is important to remember that the storage medium itself may yield physical material such as fingerprints or DNA. The forensic examiner should bear this in mind during the recording and handling of such material to maximize potential evidence recovery.

The response to a crime will depend on the circumstances of the case. Accordingly, the resources and facilities required by and/or available to an investigator will vary. Some aspects of crime scene examination described in this document may apply in practice only to more serious crime. Nevertheless, this Standard attempts to provide general principles that apply to greater or lesser extent at all scenes.

This Standard calls for the use of procedures that may be hazardous or injurious to health, if adequate provisions are not taken.

STANDARDS AUSTRALIA

Australian Standard Forensic analysis

Part 1: Recognition, recording, recovery, transport and storage of material

1 SCOPE

This Standard specifies requirements for the recognition, recording, recovery, transport and storage of physical material from crime scenes in order to preserve its integrity for forensic purposes, and covers the following processes:

- (a) Recognizing material of forensic interest.
- (b) Recording material at a scene.
- (c) Collection of material from a scene.
- (d) Containers and labelling.
- (e) Documentation.
- (f) Transport of material.
- (g) Storage of material.
- (h) Security of material.
- (i) Retrieving material from storage.
- (j) Documenting and tracking the location of material.

2 REFERENCED AND RELATED DOCUMENTS

2.1 Referenced documents

The following documents are referred to in this Standard:

AS

- 3864 Medical refrigeration equipment—For the storage of blood and blood products
- 5239 Examination of ignitable liquids in fire debris
- 5388 Forensic Analysis
- 5388.2 Part 2: Analysis and examination of material
- 5483 Minimizing the risk of contamination in products used to collect and analyse biological material for forensic DNA purposes

AS/NZS

- 2243 Safety in laboratories (series)
- 4757 Handling and destruction of drugs

ISO/IEC

- 17025 General requirements for the competence of testing and calibration laboratories
- 31000 Risk management—Principles and guidelines

Codes

Australian Code for the Transport of Dangerous Goods by Road and Rail (ADG Code),
Seventh edition 2007, Commonwealth of Australia, ISBN 1 921168 57 9

Codes

Australian Code for the Transport of Explosives by Road and Rail, Third edition 2009, Commonwealth of Australia, ISBN 978 0 642 32747 5

Manuals and Codes

Australian Government Civil Aviation Authority Advisory Circular AC92-04(0), March 2010, Application for permission to carry or consign dangerous goods under Section 23 of the Civil Aviation Act 1988

Australasian Guidelines for Digital Imaging Processes, SMANZL Electronic Evidence Advisory Group, v2, March 2004

Intervention in Emergency Situations Involving Radiation Exposure, Radiation, 2004, Protection Series Publication No. 7, ARPANSA

National Directory for Radiation Protection, April 2010, Radiation Protection Series Publication No. 6, ARPANSA

National Pathology Accreditation Advisory Council, Requirements for the Facilities and Operation of Mortuaries, Second edition, 2009

NOHSC: 1008 (2004): Approved Criteria for Classifying Hazardous Substances

NOHSC: 1015 (2001): Storage and Handling of Workplace Dangerous Goods, National Standard (National Occupational Health and Safety Commission)

NOHSC: 2002 (2005): Code of Practice for the Safe Removal of Asbestos. Second edition

NOHSC: 2010 (1994): National Code of Practice for the Labelling of Workplace Substances

NOHSC: 2017 (2001): Labelling of Workplace Substances, National Code of Practice (National Occupational Health and Safety Commission)

Requirements for the Facilities and Operation of Mortuaries (Second edition 2009), National Pathology Accreditation Advisory Council

2.2 Related documents

Further information may be found in the following Standards:

AS

- 1337 Eye protectors for industrial applications
- 1470 Health and safety at work—Principles and practices
- 1715 Selection, use and maintenance of respiratory protective devices
- 1716 Respiratory protective devices
- 1940 The storage and handling of flammable and combustible liquids.
- 2030 The verification, filling, inspection, testing and maintenance of cylinders for storage and transport of compressed gases (series)
- 2161 Occupational protective gloves (series)
- 2375 Guide to the selection, care and use of clothing for protection against heat and fire
- 2675 Portable first aid kits for use by consumers
- 2865 Confined spaces
- 2931 Selection and use of emergency procedure guides for the transport of dangerous goods
- 3765 Clothing for protection against hazardous chemicals (series)

AS

- 5388 Forensic Analysis
- 5388.3 Part 3: Interpretation of results
- 5388.4 Part 4: Reporting results and conclusions

AS/NZS

- 1336 Recommended practices for occupational eye protection
- 4501 Occupational protective clothing (series)

ISO

- 15189 Medical laboratories—Particular requirements for quality and competence
- 20473 Optics and photonics—Spectral bands

Acts

Commonwealth of Australia Civil Aviation Act 1988

Manuals

ARPANSA Regulatory Guide: Transport of radioactive materials

Crime Scene Investigation: A Guide for Law Enforcement, NIJ Research Report, January 2000

Field Application Document, Supplementary Requirements for Accreditation in the Field of Forensic Science (including Parentage Testing), NATA

UNODC Crime Scene and Physical Evidence Awareness for Non-forensic Personnel, 2009, United Nations Publication ISBN 978-92-1-130273-8

World Health Organization, Laboratory Biosafety Manual, Third edition, Geneva 2004.

UNODC Staff Skill Requirements and Equipment Recommendations for Forensic Science Laboratories, 2011, United Nations Publication

Websites

<http://www.swgdrug.org/approved.htm>

3 DEFINITIONS AND ABBREVIATIONS

For the purpose of this Standard, definitions and abbreviations are included in Appendix A.

4 UNDERPINNING PRINCIPLES

4.1 General

Physical material is available at most, and perhaps all, scenes.

NOTE: Secondary scenes include the physical examination of things involved in an incident as well as the examination of any secondary locations. The examination of persons is dealt with below.

It is neither practical nor desirable to collect everything at a crime scene and it is the responsibility of the examiner to recover physical material of potential forensic relevance taking into consideration case circumstances. Recognition, collection and subsequent management of physical material shall be undertaken to ensure the following:

- (a) Recovery is relevant and optimal.
- (b) The integrity of the physical material is not compromised.
- (c) The potential for contamination is minimized.
- (d) Evidence continuity and security is maintained.
- (e) The potential for analysis is optimized.

Where there are legal requirements covering crime scene examination and the collection of physical material, these shall be met. Appendix B gives some guidance on management and access at scenes but this will vary between jurisdictions.

Similar considerations apply to the examinations of persons but such examinations should also be carried out with appropriate consideration for the dignity and wellbeing of the person involved.

4.2 Recognition of material of possible forensic relevance

Forensic evidence depends upon investigators, forensic practitioners and health professionals recognizing physical material at a scene as having potential investigative or evidentiary value. This in turn relies on the training and experience of the personnel involved. Information from the investigator, complainant and/or witnesses may assist in forming an initial hypothesis of what material may be relevant but should not inhibit the formation of alternative hypotheses.

The recognition, recording and recovery of appropriate and adequate physical material plays a vital role in subsequent analytical and comparative processes.

4.3 Preservation of forensic material

From the point at which physical material is considered to be of potential evidentiary value, the preservation of that material becomes of paramount importance. Material, or samples from that material, shall be recovered and stored in such a way as to minimize the risk of loss, deterioration, contamination or alteration, to ensure that the conclusions based on any scientific examination of the material are reliable and verifiable.

Forensic material shall be collected and stored in accordance with this Standard, prior to examination, with consideration of the following variables:

- (a) OHS considerations for the examiner at the scene.
- (b) The dignity and wellbeing of persons involved.
- (c) The type of material.
- (d) The size or quantity of material required for analysis.
- (e) The environment or matrix in which the material is situated.
- (f) The persistence of the material.
- (g) The stability and volatility of the material.
- (h) If possible, the preservation of material or samples from that material for re-examination.

5 SYSTEMATIC APPROACH TO SCENE EXAMINATION

5.1 First response (Police)

Preservation of life and safety, including that of the first responder, is paramount. Then, as far as possible, physical material should be preserved and the original state of the scene recorded. Records, including any photographs or video footage, should also be preserved.

The first attending police officer should, as far as practicable, proceed as follows:

- (a) Keep track of any injured person(s).
- (b) Start a scene log.
- (c) Make initial observations of the scene location and condition.
- (d) Ensure the scene is clear of unauthorized persons and secured.
- (e) Assess any possible hazards.

- (f) Minimize any contact with potential evidence.
- (g) Assess possible entry and exit points.
- (h) Take appropriate notes of anything of possible interest to the investigators.
- (i) Brief investigators on their arrival.

The person in charge of the scene, at that stage, may then call forensic specialists and/or suitably qualified professionals for assistance.

5.2 Scene examination (Forensic specialists)

5.2.1 General

Scene examination is the first step of the forensic science process and the treatment of an incident scene predetermines the quality and quantity of information available for the investigation and ultimately the information available as evidence in court.

The different types of material encountered require different practitioner skill sets to ensure that recovery of material is appropriate to the circumstances. The overall approach to recovery shall be systematic, objective, and thorough. It should be appropriately planned and documented.

Contemporaneous notes shall be taken when attending a scene. The level of information recorded in the notes will depend on the complexity of the scene. Access to any scene location should minimize scene disturbance. Relevant details of the incident should be obtained, as appropriate, from first responders and investigating officers. This information may include the following:

- (a) The nature of the incident.
- (b) The location, time and date of the incident.
- (c) The location of any secondary scenes.
- (d) Information regarding who has had contact or association with the scene and for what purpose (and whether anything has been moved or touched in any way).
- (e) Records relevant to persons at the scene.

The information obtained from first responders and investigating officers shall be recorded. Similar considerations apply to the examination of persons.

5.2.2 Examination plan

A plan should be developed for conducting the scene examination. Such a plan should be fit for purpose and will depend on the case circumstances. At more complex scenes, it should consider the following:

- (a) Whether any existing cordons are adequate.
- (b) Any specific OHS hazards associated with the scene or material and the level of PPE to be used during the examinations. The protective equipment should prevent contamination of the scene as well as protect the examiner. See Clause 6 for further information on OHS issues.
- (c) Conducting a risk assessment of the situation and generating a safe entry and escape plan from the scene if the location and circumstances so warrant.
- (d) The areas within the scene that require examination.
- (e) The most appropriate search method.
- (f) Whether extra coordination, specialist advice or specialist assistance will be required.
- (g) What examinations are to be conducted in situ.

- (h) Whether any special equipment is required.
- (i) What types of material may need to be collected.
- (j) The specific requirements for collection of material.

Consideration should be given to prioritization as follows:

- (i) Collection or protection of any material at risk of deterioration or loss.
- (ii) The collection of any material that will enable safe access to any deceased persons or remains or any other critical area of a crime scene along entry and exit paths.
- (iii) Any critical areas that may render the most relevant material or, once processed, enable removal of any deceased persons or remains.
- (iv) Assessment of any area or material that may provide an early indication as to the identity of the offender(s).

Examinations shall be carried out in a way that seeks to minimize damage to property. Discarded or used equipment and material shall be collected, bagged and removed before leaving the scene and a location for such collection planned in advance.

When examining a living person, the health, wellbeing and dignity of the person shall be considered in addition to fulfilling any legislative requirements. Similarly, the dignity of a deceased person shall also be considered.

5.2.3 *Scene walk-through and initial examination*

The crime scene examiner should conduct a preliminary walk-through of a scene location, using appropriate precautions, and prepare preliminary documentation of the scene as observed unless doing so may compromise safety or the potential evidence. The examination approach should then be reassessed and should take into consideration such things as new information, changes in the weather and new material located at the scene.

Further consideration may then be required of the resources needed to fully process the scene, the order of examinations and the order in which material is collected.

5.2.4 *Scene management*

At complex scenes, whether a location or a person, coordination of a number of specialists and/or a number of functions may be required. Appendix C lists possible functions and specialists that may be of assistance at crime scenes; the list is not exhaustive. The order in which specialists are utilized and functions carried out should be thoroughly planned to allow optimum recovery of forensic material.

A forensic examiner with appropriate expertise and experience will normally be responsible for the examination of a scene.

For examination of persons, coordination of specialists and functions may be the responsibility of the physician or pathologist.

Crime scene recording and collection of physical material may then begin as outlined in Clauses 7 and 8.

The person in control of the crime scene shall be satisfied that all aspects of scene recording, material collection and sample packaging have been satisfactorily completed, by all persons involved, before finishing the examination. Where the scene is a location, this may involve a final walk-through before handover to the investigators.

6 OCCUPATIONAL HEALTH AND SAFETY—HAZARDOUS MATERIAL

6.1 General

Collecting material at a scene for forensic examination often involves dealing with hazardous material. Risks shall be appropriately assessed and precautions shall be proportionate to the risks involved. The guiding principle is the protection of oneself and others. In all cases, local jurisdictional OHS requirements shall apply.

Unidentified material shall be handled in such a manner as to avoid ingestion, inhalation and dermal exposure.

Should the forensic practitioner suspect the presence of large quantities of flammable material or the presence of highly toxic, highly contagious, highly irritant, nuclear, radioactive or explosive material, examination shall be suspended until appropriately trained specialist staff (such as specialist clandestine laboratory, Hazmat, CBRN, nuclear or bomb/explosive examiners) are notified and attend. Consideration should be given to the possible presence of asbestos.

There are situations where suitably qualified personnel may be required in order for the examiner to safely enter a scene, including the following:

- (a) Where firearms are encountered, they shall be rendered safe by a person with appropriate expertise and labelled as rendered safe.
- (b) Where buildings have structural damage, the building shall be declared safe by an approved building engineer or other authorized person.
- (c) Where electrical hazards are suspected, the power supply shall be disconnected by suitably authorized persons.
- (d) When examining the scene of a train death, the examiner should be escorted by railway personnel and the line closed.
- (e) When attending the scene of an industrial death, any equipment or machinery involved shall be turned off and disconnected from the power supply and all hazards rendered safe by suitably authorized persons.
- (f) When conducting examinations in a prison, security staff may be required.
- (g) Suspected or actual bomb scenes may require appropriate equipment and trained operatives.

When working in hazardous circumstances, specific standards may apply. Examples include working in a confined space and some aspects of working at heights. Safe work practices shall be followed and relevant standards followed.

Facilities shall ensure access to suitable employee assistance services.

6.2 Transport of dangerous goods

Clause 2.1 of the ADG Code sets out detailed technical and procedural requirements, provisions and guidelines for the labelling, packaging and transportation of dangerous goods by either road or rail. Further information is contained in the National Standard NOHSC: 1015 and NOHSC: 2017 covering the handling and storage of dangerous goods. Safe work practices shall be followed and provisions of relevant standards and codes applied.

Nuclear and/or radioactive materials are subject to their own code of practice.

Some dangerous goods including substances that may explode or are flammable or corrosive shall not be carried on commercial aircraft without a formal exemption.

6.3 Protective clothing

AS/NZS 2243.2 and AS/NZS 2243.3 provide guidelines and requirements in the appropriate use of protective clothing when handling hazardous material in a laboratory setting. These Standards shall also apply to handling hazardous material at an incident scene.

The level of PPE used at an incident scene shall be selected to provide protection from exposure to hazardous material and environmental conditions, and to minimize the risk of contamination. The PPE shall be selected to minimize the following risks:

- (a) Exposure of the examiner to hazardous material and environments.
- (b) Exposure of other persons to hazardous material the examiner may have been exposed to.
- (c) Contamination of forensic material.

See Clause 2 for a list of applicable standards and codes that shall be applied in the provision and maintenance of clothing and equipment and as reference material for the preparation of operating procedures.

At scenes on or near roadways or railway lines, reflective or high visibility vests may give extra protection. The risk of contamination posed by such clothing shall, however, be considered.

6.4 Biological hazards

6.4.1 General

Any material that emanates from a person or animal (living or deceased), such as body fluids or tissue, or material that has been in close contact with humans or animals, shall be considered as a potential biological hazard. Bacteria, fungi and moulds may also be encountered during botanical and other investigations. The universal precautions approach* utilized with biological material may, however, not be broadly practicable or warranted based upon risk assessment. The circumstances of the case will often provide information regarding potential hazards that may be present.

6.4.2 Handling biological material

AS/NZS 2243.3 provides guidelines and requirements for the use of PPE when handling biological material. PPE should include protective gloves, overshoes, goggles and suitable overalls, aprons or gowns, and masks. Appropriate use of PPE involves the following:

- (a) Careful removal of contaminated or damaged gloves.
- (b) Avoidance of contact with exposed areas of the body.
- (c) No eating, drinking or smoking when wearing PPE.
- (d) No handling of equipment whilst wearing potentially contaminated gloves.

When handling biological material the following shall apply:

- (i) The creation of droplets and aerosols shall be minimized.
- (ii) Contaminated material or equipment shall be decontaminated prior to re-use.
- (iii) Disposable equipment shall not be re-used.
- (iv) Hands shall be washed after removing protective clothing and gloves.
- (v) Persons with exposed cuts or abrasions shall not handle biological material without a protective dressing in addition to their PPE.

* CDC Update Morbidity and Mortality Weekly Report, 1988, 37/24, 377–88, 87–8. Universal precautions for the prevention of transmission of human immunodeficiency virus, hepatitis B and other blood borne pathogens in health care settings.

An emergency or contingency plan shall be developed at incident scenes or other unfamiliar environments.

Spills or accidental stains involving hazardous biological material shall be cleaned promptly with a suitable disinfectant. The disinfectant should also remove/denature DNA to a point where it is undetectable.

In the event of exposure to body fluids or a breach of PPE, the affected areas shall be suitably disinfected. First aid and safety personnel should be notified. If appropriate, medical attention should be sought and where possible, contaminated material should be tested for infectious agents, e.g. HIV, Hep B or Hep C.

Procedures for the management of biological spills and exposures shall be documented.

6.4.3 *Mortuary safety*

All persons attending a post-mortem shall adhere to the procedures of the mortuary for handling hazardous biological material.

All persons shall assume that all tissue, blood and bodily fluids are potential sources of infection, independent of diagnosis or perceived risk.

NOTE: If the person(s) is deceased as a result of exposure to suspected hazardous materials, including chemical, biological, radiological and/or nuclear agents, appropriate further procedures to protect all persons involved in the examination of the deceased shall be taken. Forensic examiners should seek specialist advice in formulating an examination plan.

6.4.4 *Biological decontamination*

Contamination may take many forms. Contaminated equipment shall be decontaminated as soon as possible. If necessary, the equipment manufacturer's advice should be sought regarding compatibility of disinfectants with surfaces or functions.

6.5 Chemical hazards

6.5.1 *General*

Where unknown or unidentified material is suspected of being hazardous, consideration should be given to the use of appropriate field test equipment. Appropriate protective clothing shall be worn to limit possible hazards.

When bulk chemicals are recovered, consideration should be given to whether the bulk chemicals will be transported for analysis or sampled on site.

Where the identity of a chemical being used, collected or analysed is known, the relevant MSDS should be consulted prior to using or coming into contact with that chemical. If hazardous, appropriate PPE shall be used and procedures followed.

6.5.2 *Handling of chemicals*

AS/NZS 2243.2 provides guidelines and requirements for the appropriate handling of chemicals, along with precautions that shall be followed.

When handling hazardous chemicals, staff shall be appropriately trained and/or supervised and appropriate equipment employed.

All forensic facilities shall have documented procedures for the management of chemical spills at a scene. In the event of a spill, the documented procedures shall be followed.

If chemical exposure occurs, the appropriate procedures, as outlined in the MSDS, shall be followed. Notify a first aid qualified person and if appropriate, seek medical attention at an emergency department as soon as possible and provide a copy of the relevant MSDS(s) to emergency staff.

6.5.3 *Labelling of chemicals*

Chemical solutions used in the field shall be stored in their original containers or in appropriate bottles with adequate labelling in accordance with ISO/IEC 17025 and NOHSC: 2010.

6.5.4 *Storage of chemicals*

Chemicals, including poisons and drugs, shall be stored in a manner that complies with any relevant statutory or legislative requirements and manufacturer recommendations. Relevant hazard warning and safety signs shall be used.

Different classes of chemicals shall be stored separately, in suitable cabinets, as required.

Explosive material (Dangerous Goods Class 1) shall be stored as required by legislation.

The installation of a hazardous atmosphere alarm should be considered for chemical storerooms in a facility containing large volumes of volatile or gaseous chemicals. This also applies to any forensic store used for the storage of large volumes of seized chemicals.

6.6 Physical hazards (sharps)

When handling sharp objects, the examiner should take necessary precautions as outlined in Appendix D. Such precautions are particularly relevant to the collection of syringes.

6.7 Radioactive hazards

Radioactive hazards may be encountered inadvertently during routine casework involving, for example, aircraft or medical couriers.

If radioactive material is encountered or suspected at an incident scene, specialist police should be contacted who in turn may contact other relevant state agencies ARPANSA or ANSTO.

There is a regulatory requirement to be licensed to possess some radiation sources. Relevant commonwealth or state legislation shall be followed.

Consideration should be given to the use of on-site radiation detectors.

Relevant commonwealth or state legislation and regulatory requirements shall be complied with.

Radioactive and/or nuclear material may be encountered in combination with other hazards (see Clause 6.11).

6.8 Electromagnetic radiation hazards

Appropriate eye protection is required when any high-intensity light source is employed, regardless of the wavelength of operation. When using ultraviolet light, protective UV-rated eyewear shall be worn by the operator and any other person in the vicinity. Where possible, exposed skin should be covered.

6.9 Asbestos

Removal of friable asbestos-containing material, or bonded asbestos that is damaged or more than 200 square metres in area, shall be carried out by licensed operators in accordance with the National Occupational Health and Safety Commission's Code of Practice for the Safe Removal of Asbestos.

In other circumstances, if the asbestos is liable to become damaged in the course of the examination, the examiner shall employ methods to minimize the production of dust and prevent any inhalation of that dust.