



Australasian Forensic Science
Assessment Body



AFSAB FIREARM EXAMINATION CANDIDATE GUIDE

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AFSAB FIREARM EXAMINATION CANDIDATE GUIDE

PURPOSE

This document provides guidance for candidates preparing to undergo the AFSAB assessment in Firearm Examination. Details are provided regarding core and discipline competencies to be assessed, assessment structure and recommended resources.

BACKGROUND

AFSAB is committed to enhancing confidence in forensic science service delivery by certifying individuals to an agreed professional standard. The AFSAB assessment process is used to determine competency, focusing on demonstrable ability around eight core competencies. Each component of the assessment will examine the candidate's skills, knowledge, reasoning and abilities in tasks relevant to the operational requirements and practices, standards and contemporary issues relevant to the discipline. Core competencies that will be assessed are:

- ▶ Decision making
- ▶ Communication
- ▶ Critical thinking
- ▶ Problem solving
- ▶ Sequencing of examinations
- ▶ Technical knowledge
- ▶ Uncertainty
- ▶ Understanding limitations

These core competencies will be assessed in light of the discipline specific competencies, which represent the knowledge and skills required for a firearms expert to meet competency requirements to perform their day-to-day role. A focus will be placed on both underpinning knowledge and principles, as well as jurisdictional processes where applicable and appropriate.



ASSESSMENT STRUCTURE

The AFSAB Firearm assessments will consist of the following:

Assessment Component	Maximum Length	Format	Pass Mark	Total Available Marks
Written	3 hours	30x multiple choice	75%	105
		20x short answer		
		2x long answer		
Practical	3 days	Bullet and Cartridge Case Comparisons	Competent/ Not Competent	N/A
Oral	3 hours	Panel discussion based on 3x casefiles submitted by the candidate	75%	200

It is expected that candidates will sit each assessment in the order presented in the table above. Each component will be assessed by a panel of three assessors – where possible, two from the candidate’s own jurisdiction and one external to the jurisdiction.

Candidates must achieve at least 75% to pass each of the written and oral components. The average mark across the three assessors will be rounded to the nearest whole number. For the practical component candidates will be deemed ‘Competent’ or ‘Not Competent’. Specific pass requirements related to the practical assessment are outlined in further detail in the ‘Practical Assessment’ section.

Candidates must pass each component before progressing to the next assessment. In the event a candidate fails a component, they may apply to re-sit that component, and do not have to re-sit previously passed components if all assessments are completed within a two-year period. For further information on unsuccessful certification attempts refer to the *AFSAB Policy and Processes for Certification* (<https://www.anzpaa.org.au/forensic-science/services/afsab>).

DISCIPLINE SPECIFIC COMPETENCIES

Eight discipline specific competencies will be assessed over the written, practical and oral assessments. The weighting of competencies across each assessment component is determined by how the knowledge or skills would be presented or used by the candidate when performing their day-to-day role. A breakdown of each discipline specific competency is provided below:

AMMUNITION

The examination and identification of ammunition, ammunition components and related materials, including (but not limited to) ammunition composition and manufacture.

COMPARISON AND IDENTIFICATION METHODOLOGY

Comparative microscopic examinations of ammunition and ammunition components including:

- ▶ Assessment of class and individual characteristics on fired bullets and fired cartridge cases



- ▶ Interpretation of the quality and quantity of matching and non-matching characteristics to form an opinion of identification, elimination or inconclusive

INCIDENT SCENE AND EXHIBIT PROCESSING

Principles and techniques related to shooting scene investigation and reconstruction. This includes (but is not limited to) the following:

- ▶ Discharge residue production and transference
- ▶ Evidence handling procedures
- ▶ Distance estimation
- ▶ Shooting scene reconstruction to form an opinion on events.

SERIAL NUMBER RESTORATION

Knowledge of the restoration of obliterated alpha numeric markings on firearms, firearm components and related material, including consideration of limitations of techniques.

BALLISTICS

Theoretical principles of physics, as they relate to the discipline of firearms, in the context of interior and exterior ballistics, terminal ballistics and wound ballistics.

FIREARMS

Understanding of firearms, firearm modifications and firearm components and firearm accessories.

LEGAL FRAMEWORK

Knowledge of the legal framework pertaining to a firearms examiner giving evidence in court, including both factual and opinion evidence.

CONTEMPORARY ISSUES

Knowledge and awareness of contemporary issues relating to the discipline of firearms, or which have an impact on forensic science as a whole.

Candidates are encouraged to read the recommended resources listed at the end of this document to aid in preparation for their AFSAB assessments.



WRITTEN ASSESSMENT

Core and discipline specific competencies will be assessed in a **three-hour** written assessment which will be supervised by the candidate’s jurisdictional contact or other AFSAB approved supervisor.

Candidates will require a scientific calculator for the written assessment. The use of a mobile phone will not be permitted.

Questions will be presented in three forms:

Multiple choice

Each multiple-choice question will be worth one mark. They will be presented as a question followed by four possible answers (A, B, C or D). Unless otherwise stated, candidates should select a single response.

Short answer

Short answer questions will consist of a brief prompt that requires a written response varying in length from one sentence (minimum) to several sentences or a paragraph. Short answer questions will be clearly marked as being worth either two or five marks depending on the complexity of the question and answer.

Long answer

Long answer questions will consist of a complex prompt that requires a written response that can vary in length but should be no longer than one page. All long answer questions will be worth ten marks.

Completed written assessments will be securely destroyed upon electronic scan received by ANZPAA NIFS.

Question Style	Marks Available	Discipline Specific Competencies
Multiple Choice	1 mark	Ammunition
		Comparison and Identification Methodology
		Incident Scene and Exhibit Processing
		Serial Number Restoration
		Ballistics
		Firearms
		Legal Framework
		Contemporary Issues
Short Answer	2 marks	Ammunition
		Comparison and Identification Methodology
		Incident Scene and Exhibit Processing
		Serial Number Restoration
		Ballistics
		Firearms
Short Answer	5 marks	Legal Framework
		Contemporary Issues
		Comparison and identification methodology
		Incident scene and exhibit processing
Long Answer	10 marks	Ballistics
		Firearms
		Comparison and identification methodology Incident scene and exhibit processing



PRACTICAL ASSESSMENT

The purpose of the practical component is to assess a candidate's ability to examine, compare and interpret fired cartridge cases and bullets, in a range of tasks that represent those encountered in a candidate's day-to-day role.

The practical assessment will be conducted across **three, eight hour working days**, and be supervised by the candidate's jurisdictional contact or other AFSAB approved supervisor. The candidate will be required to manage their own time across the three days.

The practical assessment comprises three parts:

- ▶ Task 01: One-to-One Comparisons
- ▶ Task 02-Part A: Case Scenario – Scene Comparisons
- ▶ Task 02-Part B: Case Scenario – Scene to Test Comparisons

The candidate will be provided with the assessment material and **Workbook A** for Task 01 and Task 02-Part A at the beginning of Day One. The candidate will be required to manage their own time completing these tasks. Once these tasks have been completed and submitted to the assessment supervisor, the candidate will be provided with **Workbook B** and the assessment material to complete Task 02-Part B.

Candidates must monitor the time available to ensure all tasks are completed within the allowed three-day timeframe.

Candidates will be required to complete all assessment tasks and must provide a conclusion for each comparison. An erroneous identification across any of the tasks will result in the candidate being deemed not competent. If a candidate is deemed not competent in one task, they will be required to re-sit all practical tasks.

The candidate should perform all microscopic comparisons using the same jurisdictional processes that you would use for casework. This includes utilising software/tools that are used in everyday firearms comparison work (i.e., Leica or Vision X microscopes and imaging software).

All automated searching methods and systems must not be utilised (e.g., IBIS, MatchPoint).

Any candidate found to have utilised an automated searching technique will be deemed not competent. In addition, any use of automated searching throughout the assessment will be investigated in relation to breaching of the AFSAB Code of Ethics and Professional Conduct as contained within the *AFSAB Policy and Processes for Certification*.

Please note the physical assessment material has been engraved with letters/numbers. We have endeavoured to make the markings as clear as possible, however slight magnification may be required to best visualize them. Please ensure all components are placed back into each bag as per listed on the outside of the bags.



Task 01 (One-to-One Comparisons)

Task 01 replicates the decision-making skill required in the comparison process. The candidate will be provided with eight sets of comparisons to complete. The candidate is required to determine if the sets of fired cartridge cases or fired bullets were discharged from the same firearm. Note that each comparison set is independent and there are no comparisons required between sets.

One of the following three conclusions must be provided for each one-to-one comparison:

- ▶ Identification - the fired cartridge cases OR fired bullets have been discharged from the same firearm
- ▶ Inconclusive - unable to make an identification or elimination
- ▶ Elimination - the fired cartridge cases OR fired bullets have NOT been discharged from the same firearm

If 'Inconclusive' is chosen as the conclusion, the candidate must select one of the following reasons in support of the determination:

- ▶ Inconclusive A – some agreement of individual characteristic and all discernible class characteristics, but insufficient for an identification
- ▶ Inconclusive B – agreement of all discernible class characteristics without agreement or disagreement of individual characteristics due to an absence, insufficiency, or lack of reproducibility
- ▶ Inconclusive C - agreement of all discernible class characteristics and disagreement of individual characteristics, but insufficient for an elimination.

An incorrect reason for the decision of 'Inconclusive' will result in the comparison being marked as incorrect.

Task 02

Task 02 replicates the comparison and decision-making skills required in casework. Task 02 comprises the following two components:

Task 02-Part A (Case Scenario – Scene Comparisons)

In Task 02-Part A (Workbook A), candidates will be provided with ten unknown fired cartridge cases (marked A-K, excluding I) and seven unknown fired bullets (marked 1-7). The FCCs and FBs represent exhibits collected from a shooting scene.

The candidate is required to complete a comparison of the provided FCCs and FBs and determine how many firearm(s) were discharged at the scene? The candidate will complete this by nominating which FCCs and/or FBs were discharged by each firearm(s).

Task 02-Part B (Case Scenario – Scene to Test Comparisons)

In Task 02-Part B (Workbook B), the candidate will be provided with a number of test-fire cartridge cases and test fire bullets. These FCCs and FBs represent those test-fires conducted using firearms which were located and seized by investigators.

The candidate must complete all relevant comparisons using both the test-fires and scene exhibits (Part A) to determine which, if any, of the submitted firearm(s) were utilised during the shooting incident. Note that this task is open-set, and therefore, any number of the exhibit FCCs and FBs may or may not have been discharged by any of the submitted firearms.



In addition, candidates are required to provide a detailed summary of their examination. This may include clarifying any of the comparisons or providing information resulting from the examination that would be of assistance to investigators.

Comparison Notes

In addition to the workbooks, a candidate's comparison notes may be utilised by ANZPAA NIFS and the assessor panel for the purpose of a review process. A review may occur in the instance there is a difference in the determination made by a candidate to the expected result or there are any other concerns with the assessment process, including professional conduct.

To assist this review process, candidates must save their comparisons notes. The notes should document the examination process as required by the candidate's local jurisdictional procedures. Notes must display the information present that candidates used to form their opinion. Excessive notes are not required. At the end of the assessment a copy of the comparison notes is to be saved electronically (pdf) in the following format *AFSAB Firearms Practical - Comparison Notes- SURNAME DATE*. The assessment supervisor will arrange for the notes to be transferred to ANZPAA NIFS.

PASS REQUIREMENTS

The examination must be completed with 100% accuracy. A review may occur in the instance there is a difference in the determination made by a candidate to the expected result.

An erroneous identification across any of the tasks will result in the candidate being deemed not competent.



ORAL ASSESSMENT

The oral assessment will take the form of a panel discussion assessed, where possible, by two internal and one external assessors. The oral assessment will be in the form of a review where the candidate will submit copies of three finalised cases that are of a complex nature, covering work undertaken by them relating to scene attendance and event reconstruction, comparison microscopy and firearms/ballistics knowledge and ability. The candidate should only submit the forensic examination component of the brief of evidence. The cases must be submitted to the internal jurisdictional contact no less than two weeks prior to the confirmed oral assessment date.

Collectively, the three casefiles shall demonstrate experience in the following areas:

- ▶ Scene examination
- ▶ Distance estimation
- ▶ Serial number restoration
- ▶ Gunshot wound interpretation
- ▶ Firearms
- ▶ Fired component comparison

Each casefile shall include:

- ▶ If appropriate, a selection of photographs that best demonstrate the scene and evidence
- ▶ A copy of the examination notes
- ▶ Exhibit list
- ▶ Examination results
- ▶ Comparison results – written and photographic
- ▶ Clear justification for all conclusions reached
- ▶ Statement or technical report
- ▶ Verification/peer review details

The case does not need to be finalised in court, however all case examinations must be complete.

The candidate should be the lead examiner, or adopt the role of lead examiner, for any statement included in the three casefiles.

The panel may assess the candidate on any aspect of all three cases. In addition, candidates may be asked questions on any or all of the core discipline competencies.

Please be advised that the Oral Assessment may be conducted in person (in your jurisdiction), or it may need to be conducted via video conference (MS Teams). A decision will be made closer to the assessment date. The video conference, if required, will allow for the AFSAB Oral Assessment to be conducted as similarly to a face-to-face panel as possible. Your internal assessors will be present with you in person. Your external assessor will be assessing you via video link from their jurisdiction. All assessors will be provided with the necessary paperwork for this assessment and will strive to conduct the assessment as similarly to a face-to-face panel as possible.

The oral assessment will be run over a maximum of **three hours**, and will be marked by the three assessors according to the rubric on the following page.



Mark	Equivalent Percentage Scale	Criteria
7-8	≥76%	<ul style="list-style-type: none">▶ Demonstrated advanced technical knowledge▶ Succinctly communicated all details▶ Displayed exceptional ability to critically analyse, interpret and evaluate▶ Comprehensive ability to apply established theories to the specifics of their discipline
5-6	51% to 75%	<ul style="list-style-type: none">▶ Demonstrated sound technical knowledge▶ Communicated key details▶ Displayed sound ability to critically analyse, interpret and evaluate▶ Adeptly applies established theories to the specifics of their discipline
3-4	26% to 50%	<ul style="list-style-type: none">▶ Demonstrated basic technical knowledge▶ Communicated some detail▶ Displayed some ability to critically analyse, interpret and evaluate▶ Some ability to apply established theories to the specifics of their discipline
1-2	≤25%	<ul style="list-style-type: none">▶ Demonstrated limited technical knowledge▶ Communicated limited detail▶ Displayed little ability to critically analyse, interpret and evaluate▶ Minimal ability to apply established theories to the specifics of their discipline



NOTIFICATION OF ASSESSMENT OUTCOME

All assessment items will be reviewed by all three assessors. Candidates will be provided with their assessment results and any relevant feedback within ten business days of completing each assessment via the internal jurisdictional contact or an internal assessor.

If a candidate does not agree with an assessment result or certification recommendation, they are permitted to lodge an appeal or grievance in accordance with the AFSAB Certification Appeals and Grievance Process (contained within the *AFSAB Policy and Processes for Certification*).

RESOURCES

Candidates should review the following information prior to undergoing assessment. The material is focused on expanding a candidate's knowledge of legal factors and contemporary issues. Assessment material may be drawn from these documents.

1. Code of conduct/ rules of expert evidence relevant to your jurisdiction
2. Forensic Science Regulator. 2020. Cognitive Bias Effects Relevant to Forensic Science Examinations Issue 2. https://assets.publishing.service.gov.uk/media/5f4fc26ce90e074695f80977/217_FSR-G-217_Cognitive_bias_appendix_Issue_2.pdf. Sections 1, 2, 3 and 9 recommended as a minimum
3. President's Council of Advisors on Science and Technology. 2016. Forensic Science in Criminal Courts: Ensuring Scientific Validity of Feature-Comparison Methods. https://obamawhitehouse.archives.gov/sites/default/files/microsites/ostp/PCAST/pcast_forensic_science_report_final.pdf. Sections 1, 4, and 5.5 recommended as a minimum.
4. Baldwin DP, Bajic SJ, Morris M, Zamzow D. 2016. A study of false-positive and false-negative error rates in cartridge cases comparisons. US Department of Justice NCJ 249874. <https://www.ncjrs.gov/pdffiles1/nij/249874.pdf>
5. Bolton-King R. 2016. Preventing miscarriages of justice: A review of forensic firearm identification. *Science and Justice* 56:129-142.
6. Kerkhoff W, Stoel RD, Mattijssen EJAT, Berger CEH, Didden FW, Kerstholt JH. 2018. A part-declared blind testing program in firearms examination. *Science and Justice* 58:258-263.
7. Mattijssen EJAT, Kerkhoff W, Berger CEH, Dror IE, Stoel RD. 2016. Implementing context information management in forensic casework: Minimizing contextual bias in firearms examination. *Science and Justice* 56:113-122.