FIRE INVESTIGATOR COMPETENCY REQUIREMENTS

Guidance Document 1: Education, Qualifications, Knowledge and Skills Component

1. Scope and Purpose

Persons seeking registration with South African Council for Natural Scientific Professionals (SACNASP) to conduct fire investigations, will need to meet the competency requirements for:

- Education, professional qualifications and a range of fire investigation specific knowledge and skills.
- Suitable experience and direct involvement in fire investigations, including fire scene examination, reporting and case management.
- Any other requirements that may form part of the registration requirements, such as Continuing Professional Development (CPD), competency testing and referees.

This document provides guidance regarding the Education, Qualifications, Knowledge and Skills Component of the fire investigation registration process and will form the benchmark for the evaluation of competency in this regard.

The contents of this document has taken into consideration international best-practice and has been modelled on the following internationally accepted standards and guides.

- NFPA 1033 Standard for Professional Qualifications for Fire Investigator, 2014 Edition.
- NFPA 921 Guide for Fire and Explosion Investigations, 2017 Edition.

These are living documents that are in a constant review process. The content of this document is thus subject to periodic updates or changes as new versions of the applicable documents become available.

As a result, the requirements are applicable to persons involved in fire investigations in both the public and private sectors and for all fires, including structural, vehicle and wildland fires.

1. Scope and Purpose (*continued)*

The knowledge and skills requirements form part of the minimum competency requirements for registration. As a result, it is imperative that fire investigators evaluate their competency in relation to the requirements of this document to ensure that their capacity is developed and that they remain current regarding key aspects such as:

- Fire investigation relevant fire science and fire dynamics.
- Fire investigation technologies, methodologies and analytical tools including evidence collection/preservation.
- Building construction and the behaviour of various buildings systems, construction materials, and services when exposed to or involved in fire.
- Specific technical topics such as electricity, fire protection systems, vehicles and wildfires.

Education and academic qualifications or recognised equivalent
National Senior Certificate or similar (NQF level 4)
Diploma in a field related to the practice of fire investigation. (NQF level 6)
Diploma in a field NOT related to the practice of fire investigation. (NQF level 6)
Bachelor's Degree in a field related to the practice of fire investigation. (NQF level 7)
Honours Degree in a field related to the practice of fire investigation. (NQF level 8)
Master's Degree in a field related to the practice of fire investigation. (NQF level 9)
Doctoral Degree in a field related to the practice of fire investigation. (NQF level 10)
Bachelor, Honours, Masters or Doctoral Degree in a field NOT related to the practice of fire investigation. (NQF level 7 - 10)

2. Requisite knowledge and Skills

2.1 Fire Science

2.1.1 ***Range Statement***

Fire science applicable to fire investigations, including fire chemistry, thermodynamics, fire growth and development.

2.1.2 ***Knowledge***

- The combustion process and relationship between fuel, heat, oxidising agents and the chemical chain reaction.
- The basics of fire chemistry including the properties of fuels, products of combustion, heat transfer, heat release rates, fire effects, phases of fire, growth and development both confined and unconfined.

2.1.3 ***Skills***

- Interpret interaction of fuels, heat and oxidising agents in relation to the combustion process.
- Assess the development of a fire from ignition of first item to full involvement taking into consideration fire loads, fuel type, configuration, heat release rates, compartment geometry and ventilation.

2.2 Fire Investigation Methodology

2.2.1 ***Range Statement***

The scientific method application throughout the investigation from defining the problem to final hypothesis.

2.2.2 ***Knowledge***

The scientific method including levels of certainty and review procedures.

2.2.3 ***Skills***

- Apply the scientific method to origin and cause determination including expressing levels of certainty.
- Conduct technical and administration reviews of a report.

2.3. Fire Scene Examination

2.3.1 *Range Statement*

Securing the scene, health and safety, exterior assessment, interior assessment, interpretation of burn patterns, examination of debris, reconstruction of the fire area, inspection of building services/fire systems, the difference between fire damage and explosion damage, including the effects that fire suppression activities have on the evidence.

2.3.2 *Knowledge*

- Methods of securing the scene to preserve evidence and prevent unauthorised access.
- Dangers of fire scenes and necessary health and safety precautions to prevent injury.
- Building types, construction methods, construction materials and building services.
- The effects of fire on building elements, construction materials, finishes, contents, installations, and the formation of various fire pattern types and causes of pattern information.
- The effects of full room involvement on the formation of patterns.
- Fire suppression methods commonly employed and the possible effects on fire patterns.
- The need and methods for reconstruction.
- The techniques for debris removal, reconstruction of the area of origin and guidelines to prevent the spoliation of evidence.

2.3 Fire Scene Examination (*continued)*

2.3.3 ***Skills***

- Apply the correct methods of securing a scene.
- Conduct a suitable risk assessment to identify and mitigate hazards to prevent injury to the investigator.
- Interpret the effects of fire on structures, components and contents and associated fire patterns in relation to fire growth and development.
- Interpret the effects of fire suppression activities on fire patterns in relation to the effects of the building structure and contents on the fire.
- Identify the effects of full room involvement or flashover on fire patterns.
- Effective examination/removal of debris and reconstruction of the area of origin.
- Use appropriate techniques regarding the evaluation and handling of debris and evidence to prevent spoliation.
- Differentiate between explosion damage and other fire damage.
- Inspect buildings services and systems including electrical systems and fire protection systems.

2.4 Documenting the fire scene

2.4.1 ***Range Statement***

Taking notes on the scene, photographing the scene and critical activities, scene diagrams and the preparation of updates and final reports.

2.4.2 ***Knowledge***

- The techniques/methods for preparing accurate scene diagrams to record significant information such as contents, fire patterns, reconstruction and evidence collection.
- The competent use of still and video cameras to record the scene and support findings including the control of digital images.
- The methods used to prepare and preserve investigative notes to accurately record scene observations to assist with report preparations and legal proceedings

2.4.3 ***Skills***

- Record a fire scene and associated scene examination activities accurately by way of scene notes, sketches and photographs.

2.5. Collection and Preservation of Physical Evidence

2.5.1 ***Range statement***

Identify, collect, document, label, store and transport evidence so that it is preserved for examination, testing and presentation when required.

2.5.2 ***Knowledge***

- Types of evidence applicable to fire investigation and the legal system in South Africa.
- Correct procedure for the identification, collection, handling and management of evidence and debris samples to prevent damage and contamination including recording the chain of custody.
- Types of evaluation and testing applicable to evidence and samples including forensic, engineering and laboratory analysis along with accepted standards and best practice.
- Appropriate safe and legal disposal of evidence.

2.5.3 ***Skills***

- Identify the relevant evidence applicable to fire investigation.
- Identify, locate, collect, package and manage evidence including debris samples for laboratory analysis.
- Apply the safe and legal disposal of evidence.

2.6. Interviewing persons to obtain information applicable to the investigation.

2.6.1 ***Range Statement***

Obtaining through verbal and non-verbal communication information regarding the overall fire investigation from others.

2.6.2 ***Knowledge***

- The types of information that can be gathered that may assist with the origin and cause process.
- Correct method for planning and conducting verbal interviews, documenting the activity, and processing the information along with other data collected.
- Legal considerations (including constraints and limitations).

2.6.3 ***Skills***

- Apply the correct method for planning, arranging, conducting, recording, processing and analysing the information gathered from verbal interviews.
- Apply the correct method of conducting, recording and processing and analysing non-verbal information.

2.7 Post-Incident Investigation

2.7.1 ***Range Statement***

All circumstances and facts beyond the fire scene that are relevant to the investigation process including records, reports, photographs, CCTV and other relevant sources.

2.7.2 ***Knowledge***

- Types and sources of records, reports, external photographs and similar.
- The accepted method of reviewing, recording and evaluating post-incident data.

2.7.3 ***Skills***

- Identify the types and sources of post-incident data including records, reports, photographs, etc.
- Apply the effective method for collection, reviewing, recording and evaluating post-incident data.

2.8. Presentation of findings and report preparation

2.8.1 ***Range Statement***

The preparation of a written report including the descriptive information that needs to be included, explanation of pertinent facts, final opinions and conclusions and presentation of the findings.

2.8.2 **Knowledge**

- Competent writing skills and detailed understanding of report formats, language style etc.
- Types of report, persons receiving the information, the impact of information release and the correct procedure to be followed regarding ownership, confidentiality, etc.
- Effective presentation of investigation results verbally.

2.8.3 ***Skills***

- Prepare a report including all necessary descriptive information, explanation of pertinent facts and final opinions and conclusions.
- Provide verbal presentation of investigation findings.