

## Fire and Explosion Investigations



### WHAT IS AN AAFS STANDARD FACTSHEET?

The AAFS produces clear, concise, and easy-to-understand factsheets to summarize the contents of technical and professional forensic science standards on the OSAC Registry. They are **not** intended to provide an interpretation for any portion of a published standard.

### WHAT IS THE PURPOSE OF THIS STANDARD?

NFPA 921 provides the methodology used for investigating fires and explosions. It is used by both public and private sector investigators. It is widely accepted as the standard of care document for fire and explosion investigation and is the basis for the certification of fire and explosion investigators.

The proper determination of fire origin, cause, and responsibility is fundamental to the protection of lives and property from fires.

The document is over 400 pages long and includes 20 chapters that apply to most investigations and an additional 9 chapters that apply to specific types of fires.

### WHY IS THIS STANDARD IMPORTANT? WHAT ARE ITS BENEFITS?

This guide is important because it provides a science-based methodology for fire and explosion investigation. The basic methodology employed is the scientific method and it integrates state-of-the-art fire science into the practice of fire and explosion investigation.

It provides a rigorous means for fire investigation that provides a highly credible understanding of fire origin, cause, spread, and responsibility, when properly employed.

It also provides guidance for safely conducting investigations in inherently hazardous environments.

**FIRE LINE  
DO NOT CROSS**

A graphic of a yellow fire line tape with black text, set against a dark background with a blurred fire scene. The tape is oriented diagonally.

### HOW IS THE STANDARD USED, AND WHAT ARE THE KEY ELEMENTS?

The investigation methodology is based on the scientific method, including data collection, data analysis, hypothesis formulation, and hypothesis testing. The scientific method is explicitly described for the analysis of fire patterns, fire origin determination, and fire cause determination.

Key elements of fire investigation include scene data collection, including photography and sample collection. In addition, interviews and electronic data sources provide important data for the investigation. Data are individually and collectively analyzed to assess data credibility and meaning. The first determination made in a fire investigation is the origin of the fire, that is where did the fire start. Fire origin hypotheses are developed from the analyzed data. Each hypothesis is tested against the case data and the principles of science. Areas of origin that survive the testing process are included in the determination of the area of origin. The primary importance of the area of origin is limiting the area over which potential ignition sources need to be evaluated.

Fire cause hypotheses involving each potential ignition source are formulated. The fire cause hypothesis includes the ignition source, the first material ignited, the oxidant, and the ignition sequence. Having formulated cause hypotheses for each potential ignition source, the cause of the fire is determined if one and only one cause hypothesis survives hypothesis testing against all the case data and the principles of fire science. The investigation may continue to develop an understanding of the spread of the fire, and how and why people and property were affected by the fire.

