

## **FIRE INVESTIGATION TOOLS AND EQUIPMENT**

Every fire investigator charged with performing origin and cause examinations should have (or have ready access to) a basic equipment kit.

- A fire investigator's tools must never be coated with any type of rust preventative.
- Each tool that comes into direct contact with suspected accelerant evidence samples (such as a chisel, utility knife or other cutting tool) must be properly cleaned before it can be used in sampling procedures.
- Cutting surface(s) of tools should be cleansed with isopropyl alcohol and clean paper wipes then immediately flushed with a strong stream of fresh water.
- Certain tools cannot be adequately cleaned and reused once they are contaminated with an accelerant such as gasoline. Brooms, paint brushes, firefighter gloves are several examples.
- Using steel tools enables effective cleaning and hence minimizes the opportunity for cross contamination.
- Always seal steel evidence containers when they are delivered from the supplier.
- Open these containers at the sampling site only.
- Load evidence samples correctly and reseal containers immediately.
- Never place open steel evidence containers in the rear of your car.
- Always use appropriate safety gear (especially safety glasses and helmet).

What follows is a comprehensive list of tools compiled from a variety of published sources. It should not be construed as a "must have" list, but as a starting point for fire investigators to use to determine their own needs. The determination of the toolkit contents is the responsibility of the investigator and is determined by his/her requirements, local standards and needs, and investigative preferences.

### **Safety**

- Hard Hat/Helmet
- Leather Work Gloves
- Nitrile Disposable Gloves
- Steel Toe/Steel Shank Shoes or Boots
- Eye Protection (Safety Glasses/Goggles)
- Turnout Gear
- Nomex Coveralls (or USAR-type coveralls with reinforced knees)
- Disposable Tyvek Outer garment
- Respirator (1/2 face / full-face) and spare cartridges (HEPA / organic vapor / acid gas)
- SCBA (or access to SCBA if warranted based on scene conditions)
- Dawn Detergent (for DECON of contaminated gear and equipment)
- Dust mask(s) – N95
- Flashlight
- Disposable Latex Booties (to wear over boots if necessary)
- Nomex/PBI hood
- 3 or 4 Gas Air Monitor

### **Excavation**

- Broom
- Bucket

- Chisels
  - Cold chisels
  - Wood chisels
- Communications equipment
  - Cellular telephone
  - Facsimile machine (cellular, office)
  - Pager
  - Radio
  - Telephone
  - Portable computer w/ modem
  - Portable radio
  - Public address system
- Crowbar/prybar
- Cutter(s), cutting tools
  - Bolt cutters
  - Carpet cutters
  - Pen knife
  - Pipe cutters
  - Pocket knife
  - Razor blades
  - Tin snips
  - Utility knife (extra blades)
- Drill with wood and metal bits
- Electrician's tools
  - Circuit continuity tester
  - Electrical tape
  - Fuse puller
  - Ground fault/phase tester
  - Volt/Ohm/amp meter
  - Wire cutters
  - Wire gauge
  - Wire stripper
- Flat-head shovel
- Hammers
  - Ballpeen
  - Claw
  - Sledge
- Hand axe/hatchet
- Heavy-duty street broom
- Hoe
- Level (torpedo and bar)
- Long-handle squeegee
- Mason or brick trowel
- Pinch bars (12 inch)
- Rake
- Saws
  - Crosscut
  - Hack (with extra blades)
  - Keyhole
  - Scroll
- Screwdriver (assorted sizes)

- Bit driver with assorted bits
- Phillips head
- Straight blade
- Screws, nails, tacks, staples
- Steel box (to hold tools, at least 18 inches by 9 inches with tray is recommended)
- Steel-tine garden rake
- Vehicle Equipment
  - AC/DC charger
  - First aid kit
  - Flood lights
  - Fuses/light sticks
  - Jumper cables
  - Mobile radio
  - Portable fire extinguisher
  - Public address system
  - Reflective markers
  - Siren
- Wrenches
  - Adjustable
  - Open-end or box
  - Pipe

### **Evidence Collection**

- Sample Collection:
  - Activated charcoal
  - Blotter strips
  - Broom
  - Brushes
  - Chisels
  - Cotton tipped swabs
  - Cotton baby diapers, clean, unused
  - Dental tools
  - Disposable sterile pipets w/ suction bulbs
  - Disposable gloves (latex)
  - Disposable syringes
  - Dust pans
  - Eye dropper
  - Forceps
  - Handsaws (electric circular saw if possible)
  - Hand towel
  - Isopropyl alcohol with a supply of clean paper wipes (to permit on-site cleaning of blade tools)
  - Ladder
  - Modeling knife
  - Paint brushes
  - Paper towels/wiping cloths
  - Pipe wrench
  - Pliers
  - Lineman's
  - Side-cutting

- Slip-lock
- Vise-grip
- Plumb bob
- Putty knives/scrapper
- Pry bars
- Scalpel
- Sifting screens or sieve
- Soap and hand cleaner
- Styrofoam cups
- Tongs
- Tweezers
- Water
- Detection Equipment
  - Combustible gas/vapor detector
  - Hydrocarbon detector with supply of filters and spare hose and battery
  - pH paper
  - Thermometer, dry bulb
  - Thermometer, wet bulb
  - UV (black) light
  - Velometer
  - Voltmeter/ohmmeter
- Measuring Equipment
  - 6-inch ruler
  - 12-inch ruler
  - Folding ruler
  - 6 to 12 foot tape measure
  - Steel tape measure (100 foot)
  - Optical tape measure (for exterior scenes)
  - Sturdy tire depth gauge tool (measuring depth of char)
  - Pencil magnet (to determine the type of metal examined)
- Packing Materials
  - Cellophane tape
  - Clean metal paint cans
  - Clean glass jars with metal or bakelite, screw top lids, assorted sizes
  - Clean glass vials with screw top lids
  - Clean butcher paper (large sheets or roll)
  - Cotton swabs
  - Cotton wool
  - Evidence stickers, labels, and tape
  - Masking tape
  - Paper envelopes--various sizes (coin to 10 by 12-inch clasp-type)
  - Paper grocery bags(various sizes
  - Polyester or nylon bags(various sizes
  - Rope
  - Scene banner tape
  - Surgical gauze (pads best)
  - String
  - Twine
- Impression casting (optional)
  - Plastic mixing bowls (large)
  - Kitchen strainer

- Plastic kitchen spatulas
- Metal or plastic strips (for edging mold area)
- Supply of plaster (in sealed metal can)
- Canning paraffin and small pan for melting
- Silicon rubber casting medium (for tool impressions)

## **Documentation**

- Cardboard boxes, assorted sizes
- Clipboard
- Containers, packaging materials
- Document protectors
- Drawing equipment
  - Compass
  - Drafting templates
  - Pens, pencils, markers
  - Protractor
  - Scale
- Evidence tape (tamper indicating)
- Fingerprint kit
- Glass jars w/ screw top lids, assorted sizes
- Glass vials w/ screw top lids
- Graph paper (drawing diagrams)
- Lined paper - notebooks, writing tablets
- Magnet
- Magnetic compass
- Magnifying glass
- Pencil "scribe" for evidence marking on metal, plastic, or glass
- Portable tape recorder
- Portable illumination
  - Portable flood light and generators
  - Flashlights
  - Battery-powered fluorescent lights
  - High intensity movie lights for lighting large areas (short battery life)
- Transparent tape
- Vermiculite
- Photographic and Video Equipment
  - Batteries
  - Camera - 35 mm automatic, 35 mm SLR
  - Film, extra
  - Flash
  - Flash attachment
  - Instant camera macro attachment
  - Lenses
    - 70 - 200 mm zoom
    - 28 - 70 mm zoom
    - 50 mm
  - Meter
  - Light motor winder
  - Photographic background
  - Photographic logs

- Photographic ruler
- Protective carrying cases
- Tripod
- Videotape boom microphone
- Videotape lighting attachment
- Videocassettes, blank, spare