

WESTERN RESERVE JOINT FIRE DISTRICT SOP FOR DETERMINING ORIGINS OF “ODORS OF SMOKE”

A. Smoke Color

Smoke is often regarded as one of the firefighter’s worst enemies, and, in many cases, it is. Knowledgeable firefighters, however, can use smoke to their advantage if they read its message: Smoke can help firefighters determine the location and intensity of the fire and suggest possible firefighting strategies.

Black smoke suggests a presence of burning petroleum-based products. However, large volumes of dense, black smoke at the roof level of the building could signal the involvement of burning roofing materials. Lighter volumes of smoke at the same level could be the result of a defective oil burner. Light to moderate quantities of black smoke found in basements often indicate an oil burner malfunction and should prompt firefighters to bring a Class B extinguisher with them. Historically, black smoke from the interior of residential buildings often meant the presence of an accelerant, but this premise is no longer reliable because of the extensive use of plastic furnishings, appliances and piping.

Common Class A materials produce grey to light brown smoke when oxygen is present. When reduced amounts of oxygen are present, large amounts of dark grey or yellow smoke are produced. This is an indication of a potential backdraft, especially if the smoke is issuing under pressure and being drawn back into the building. Many materials produce smoke of other colors, such as compounds containing oxides of nitrogen, which give off red/blue hue, but these are likely to be found at residential or routine commercial fires.

B. Smoke Movement

Smoke movement can tell a firefighter about the intensity of the blaze. Heavy, rolling clouds violently twisting skyward indicate extremely hot smoke from an intense fire deep in the building. This is frequently followed by the fire igniting through openings the smoke is pouring through. Firefighters should use extreme caution when entering, to prevent being caught in the flashover.

Wispy smoke, usually light in color, indicates a fire in the incipient stage; quick use of an extinguisher should solve the problem before it poses a danger. However, be prepared to stretch a line to back up the extinguisher. Smoke settling or hanging in the low spots is known as cold smoke. It is found that fires in sprinklered areas, or where a fire is fully or partially extinguished. Fires that are partially extinguished give off great amounts of carbon monoxide, often an unrecognized danger to firefighters. The necessity of wearing SCBA is not always obvious at these kinds of fires, but is essential to protect against the odorless carbon monoxide.

Smoke often masks the seat of the blaze, making it difficult to determine the fire area. Since smoke normally rises, the lowest floor of visible smoke will usually have some fire on it. However, firefighters should make a point of checking at least one floor below this level. A small fire often originates on the lower floor, and smoke and fire spread upward before breaking out. A heavy smoke condition present throughout the building with no fire visible frequently indicates a cellar fire.

C. Light Ballasts

A fairly common smoke odor comes from overheated fluorescent light ballasts, which often do not give off visible smoke until late in the emergency. Light ballasts contain cooling oil that gives off an oily smell when overheated. (In older types this was often PCB oil; where SCBA when handling these seemingly “minor” incidents.) While locating the defective unit can be complicated by the height of the fixture, District heat scanner devices can be used to allow firefighters to rapidly search along rows of light fixtures. Without a heat scanner, firefighters must inspect each fixture.

The search can be narrowed by using a few visual hints by the floor level. Begin by looking for fixtures with intact bulbs that are glowing faintly. Fixtures without bulbs will not have a current flow and are not usually the problem. Correctly operating fixtures can be the source of the problem, but this is not as common as dim fixtures. Look at the fixtures for defects. Dark colored oil on the outside of the fixtures, or on the light diffuser of the recessed type fixtures, indicates a problem. On surface-mounted fixtures, a dark smudge around the sides, particularly near vent holes, indicates soot deposits. As a last resort, feel each fixture: A normal ballast is warm to the touch, a defective unit is hot.

Once a defective unit is identified, take steps to isolate it. Ensure that there has not been any ignition of nearby combustibles and prevent any further current flow. Generally, this entails getting access to the ballast, feeling around it for abnormal heating, and opening the electric circuit. Shut off power to the fixture, remove all bulbs, open the cover, and disconnect all wires leading to the ballast. Cover the exposed ends of the black and white wires separately and examine nearby combustibles for hidden fire.

D. Electric Fires

Electric fires are common occurrences that can usually be handled easily. To locate the source of the problem, consider where the smell is first detected, then examine all devices in the area that are on or had been on recently.

Confusion occurs in larger buildings when odors or smoke are reported in several areas. This can happen if elevator motors overheat, or where the heating, ventilating, or air conditioning (HVAC) system, dumps smoke out through the duct work. In both cases, a firefighter should be sent, with a radio, to locate the machinery spaces as quickly as

possible. Fires usually occur where equipment is found. They do not usually begin in the middle of shafts or ducts. If the electrical equipment is on fire, as opposed to overheated, use nonconductive extinguishing agents, preferably a “clean agent” that will not damage the equipment or compound clean up problems. CO-2 extinguishers are well suited for this. The power should be disconnected as soon as possible.

E. Incinerator and Compactor Fires

Other fires that result in reports of smoke on several floors include two other kinds of shafts - incinerator shafts, which become blocked by rubbish, and fires in trash compactor chutes. While these two incidents may appear as minimal life hazards, they have the potential to become life threatening conditions.

Incinerator shafts are common in many older, multi-story buildings. They allow rubbish to be dropped through a fire-resistant door into a “chimney” to be burned at the base of the shaft. The doors to the shaft are located on each floor, most often in or just off the common hallway.

A fire in an incinerator is not necessarily an emergency. Incinerator problems develop when an oversized piece of rubbish is forced into the shaft, blocking escape of smoke and gases up the chimney. The gases start to bank down and push their way out of the chutes through the paths of least resistance, usually the hopper doors on each floor. The solution is to locate the blockage and remove it.

Examine each floor where smoke is reported. The halls in the area must be checked to make sure that smoke is not coming from an apartment fire, and to search for life hazard and fire extension. The amount and toxicity of rubbish generated in even a small-to-medium-size apartment building is often staggering. Large quantities of plastics are often present, as well as aerosol cans and flammable liquid containers. For this reason, the use of SCBA in incinerator fires is mandatory.

While searching floor areas, a quick examination of the chute door will reveal if firefighters are above or below the blockage. If smoke comes out when the door is opened, you are below the blockage. Proceed up until the floor is reached where no smoke comes out when the door is opened; you are either above the blockage or the blockage has freed itself. To free the rubbish, use a hook or several sash weights tied on a retrieval line to try to push it down.

Firefighters should prevent any part of their body getting into the shaft because residents above may unknowingly drop more debris. SCBA also protects the face and eyes should uncommon occurrences like shattering glass or explosion contents shoot out when the door is opened. If all attempts to push a blockage down fail, it might be possible to burn it off, loosening it so it falls. To do so, go to the floor just above the blockage, ignite a newspaper and drop it onto the pile. Should all else fail, put out the fire and have maintenance personnel clear the blockage. It is important to remember that most

incinerators have an auxiliary burner (often gas fired) that must be shut down before extinguishing the fire. Otherwise, gas will fill the chute and could explode.

Compactors resemble incinerators, and consist of shafts with hopper doors on each floor that convey rubbish to the basement for removal. Compactors differ from incinerators, however, because they are not designed to hold fire at any time. Smoke coming from a compactor indicates that immediate action is needed, because fire can spread throughout the building. A charged line should be stretched to the first floor above the fire and operated into the shaft, if needed, to prevent extension up the shaft. At the same time, members should go to the basement and work on extinguishment.

Compactor rooms pose several hazards to firefighters: High voltage electrical equipment, high pressure hydraulic hoses, moving rams that can shear an arm if caught in the compactor, as well as failing debris and exploding bottles or cans. Extreme caution should be used when operating in these rooms. Quick identification of a compactor fire can be the difference between a routine fire and a rapidly spreading multiple alarm.

While some buildings may utilize automatic sprinklers in compactor chutes, they are often turned off due to the frequency of such fires and difficulty of replacing a fused head in the shaft.

F. Wood Burners and Chimney Fires

Wood burning stoves and fireplaces involved in creosote fires are also possible sources of fire extension. A severe creosote fire rapidly reaches blow torch proportions, and can damage the chimney at the point of allowing fire to the outside of the chimney. Shut off the air intake to the stove, and check for extension along the length of the chimney. Never use water to extinguish a creosote fire in a chimney. Water can damage the superheated brick and mortar, thereby requiring replacement of the entire chimney. Instead, use dry chemical extinguishers.