**Talk to the Specialist**

*Selecting Fire Extinguishers for the Operating Room*

**QUESTION**
What type of fire extinguisher should we have in our operating rooms (ORs)?

**ANSWER**
ECRI prefers carbon dioxide (CO2) extinguishers for use in the OR, for the reasons outlined below. We recommend that a 5 lb CO2 extinguisher be mounted just inside the entrance of each OR in the hospital.

**Recommended: CO2 extinguishers.** CO2 extinguishers expel a fog of cold CO2 gas and snow that leaves no residue as it smothers and cools a fire. The cold fog is unlikely to injure the burning patient (or staff member) and in fact may help minimize thermal injury. The range of these extinguishers is only a few meters.

CO2 extinguishers are Class BC extinguishers, meaning they are rated for use on flammable liquid and electrical fires (see the inset). However, ECRI’s testing shows that CO2 extinguishers are also very capable of fighting small Class A fires—that is, fires involving common OR combustibles, such as gowns and blankets.

CO2 extinguishers are made in many sizes, with the 5 lb, 10 lb, and 20 lb models being the most widely used. ECRI recommends the 5 lb model for placement in the OR for rapid use in case of a surgical fire.

**Only as a last resort: dry-powder extinguishers.** Dry-powder extinguishers use a charge of CO2 that propels a powder to a distance of up to about 5 m (16.5 ft) to cool and smother the fire. The powder is usually monoammonium phosphate; it is mixed with metallic stearates, tricalcium phosphate, or silicone to improve its storage, flow, and water-repellency characteristics.

Dry-powder extinguishers are Class ABC extinguishers. They are made in many sizes, with the most widely used being the 2 lb, 5 lb, 10 lb, and 20 lb sizes.

Dry-powder extinguishers are considered a last resort in surgical fires for several reasons: The very fine powder cannot mix with water and is therefore difficult to remove from a wound. The powder is also an airway and mucous membrane irritant that could interfere with staff or rescuer breathing and with visibility in the room (because of the dusty cloud it produces). Further, the extinguisher will contaminate the entire OR when discharged because the powder is very fine and widely dispersed.

Nevertheless, ECRI recommends that the OR suite (not each room) be equipped with a 20 lb dry-powder fire extinguisher for use in last-ditch rescue and extinguishing efforts—that is, in cases for which the OR fire extinguisher is insufficient.

**Not recommended.** ECRI recommends against using the following types of fire extinguishers in the OR:

- **Water-based fire extinguishers** use water, sometimes mixed with wetting or antifreeze agents, and a source of pressure to propel the water through a nozzle. A concern with these extinguishers is that the water they use is not sterile and could cause a patient infection or a toxic reaction.

Pressurized water extinguishers are typically Class A, contain 20 L (5 gal) of water, and expel a water stream from a nozzle to a distance of up to 7 m (23 ft). For surgical fires, the stream should be

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made into a spray by placing a thumb over the nozzle’s opening; the spray will cool and smother a larger area of the fire than the stream. Using one of these extinguishers could result in an electric shock to the user because the water may be electrically conductive. ECRI does not recommend the use of water-based extinguishers in the OR.

- **Water-mist fire extinguishers** expel a mist stream, usually to a distance of up to 3 to 4 m (10 to 13 ft), to cool and smother a fire. They are typically rated Class AC and contain 10 L (2.5 gal) of distilled water. Although water-mist extinguishers are intended for use on Class A fires in the vicinity of electrically energized devices and will not conduct electricity back to the user, water that has pooled in, on, or around electrically energized devices could cause an electric shock. In addition, the water used in these extinguishers is not sterile. ECRI does not recommend the use of water-mist fire extinguishers in the OR.

- **Halon-replacement fire extinguishers**—such as FE-36, FM-200, and Halotron—can be effective at putting out fires, but they can be expensive and problematic to place and use. Most of these extinguishers are rated Class ABC.

  Many halon-replacement extinguishers use halogenated hydrocarbons that cool and smother the fire. In very hot fires, these agents break down to form toxic pyrolysis products, mostly acid gases and halogens. Also, many of these agents can cause cardiac arrhythmias if ingested or inhaled. The effects of these agents when discharged onto a patient wound are not defined and may cause health problems (e.g., emboli). ECRI does not recommend the use of halon-replacement fire extinguishers in the OR.

### Talk to the Specialist

**Fire Blankets in the OR?**

**Question.** Are fire blankets appropriate for use in the operating room (OR)?

**Answer.** No. Fire blankets—typically wool blankets that are treated with fire retardants and are placed over a fire to smother it—should never be located in an OR and should never be used for surgical patient fires. There are several reasons:

- The fire could be sustained by oxygen delivered to the patient, preventing the blanket from being effective.
- A fire blanket will trap the fire next to and under the patient, causing further injury.
- Placing a fire blanket on a patient may displace instruments and cause further injury.
- Fire blankets will burn if used in oxygen-enriched atmospheres and are therefore not effective against fires in such atmospheres.

- If a fire blanket is located in an OR, staff may assume it’s suitable for a surgical fire, placing the patient at further risk.
- Given the suddenness and intensity of most surgical fires, there is insufficient time to get a fire blanket, unpack it, and apply it to the patient before serious or fatal injuries are sustained.

  Fire blankets have a valid place in many industrial settings, but not in the unique environment of a hospital OR. For more details on this subject, see the earlier version of this Talk to the Specialist article in the November 1999 *Health Devices*.

**UMDNS term.** Blankets, Fire [16-477]

**Suppliers.** These products are available from a variety of sources; consult ECRI’s *Health Devices Sourcebook* or Health Devices International Sourcebase for suppliers.