

Medical Education Systems, Inc.



Course 906

Fire Safety



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Fire Safety

Learning Objectives

- Identify flammable liquids that require “safe storage” precautions, and discuss the types of acceptable storage
- List potential ignition sources for those flammable liquids
- Identify the classifications of fire extinguishers and the criteria for selection, location and marking of those extinguishers within the building
- Identify and discuss the issues and regulations associated with “emergency egress” protocols

Introduction

The following is a sample of fire safety “rules” for an institution:

The Chemical and Physical Hazards Branch, OHS, administers the CDC/ATSDR fire prevention and life safety inspection programs. This includes reviewing all new building construction and renovations to ensure compliance with applicable state, local, and national fire and life safety standards.

Fire prevention measures propose to reduce the incidence of fires by eliminating opportunities for ignition of flammable materials.

Flammable and Combustible Materials

A. Substitution

Flammable liquids sometimes may be substituted by relatively safe materials in order to reduce the risk of fires. Any substituted material should be stable and nontoxic and should either be nonflammable or have a high flashpoint.

B. Storage

Flammable and combustible liquids require careful handling at all times. The proper storage of flammable liquids within a work area is very important in order to protect personnel from fire and other safety and health hazards.

1) Cabinets

Not more than 120 gallons of Class I, Class II, and Class IIIA liquids may be stored in a storage cabinet. Of this total, not more than 60 gallons may be Class I and II liquids. Not more than three such cabinets (120 gallons each) may be located in a single fire area except in an industrial area.

Table 1. Maximum allowable capacity of containers and portable tanks

Container	Flammable Liquids		Combustible Liquids		
	1A	1B	1C	II	III
Glass or approved plastic ¹	1 pt ²	1 qt ²	1 gal	1 gal	1 gal
Metal (Other than DOT drums)	1 gal	5 gal	5 gal	5 gal	5 gal
Safety Cans	2 gal	5 gal	5 gal	5 gal	5 gal
Metal drums (DOT specifications)	60 gal	60 gal	60 gal	60 gal	60 gal
Approved portable tanks	660 gal	660 gal	660 gal	660 gal	660 gal
(1) Nearest metric size is also acceptable for the glass and plastic (2) One gallon or nearest metric equivalent size may be used if metal and labeled with their contents.					

1) Containers

The capacity of flammable and combustible liquid containers will be in accordance with Table 1.

2) Storage Inside Buildings

Where approved storage cabinets or rooms are not provided, inside storage will comply with the following basic conditions:

- a. The storage of any flammable or combustible liquid shall not physically obstruct a means of egress from the building or area.
- b. Containers of flammable or combustible liquids will remain tightly sealed except when transferred, poured or applied. Remove only that portion of liquid in the storage container required to accomplish a particular job.
- c. If a flammable and combustible liquid storage building is used, it will be a one-story building devoted principally to the handling and storing of flammable or combustible liquids. The building will have 2-hour fire-rated exterior walls having no opening within 10 feet of such storage.
- d. Flammable paints, oils, and varnishes in 1 or 5 gallon containers, used for building maintenance purposes, may be stored temporarily in closed containers outside approved storage cabinets or room if kept at the job site for less than 10 calendar days.

C. Ventilation

Every inside storage room will be provided with a continuous mechanical exhaust ventilation system. To prevent the accumulation of vapors, the location of both the makeup and exhaust air openings will be arranged to provide, as far as practical, air movement directly to the exterior of the building and if ducts are used, they will not be used for any other purpose.

D. Elimination of Ignition Sources

All nonessential ignition sources must be eliminated where flammable liquids are used or stored. The following is a list of some of the more common potential ignition sources:

- Open flames, such as cutting and welding torches, furnaces, matches, and heaters-these sources should be kept away from flammable liquids operations. Cutting or welding on flammable liquids equipment should not be performed unless the equipment has been properly emptied and purged with a neutral gas such as nitrogen.
- Chemical sources of ignition such as d.c. motors, switched, and circuit breakers-these sources should be eliminated where flammable liquids are handled or stored. Only approved explosion-proof devices should be used in these areas.
- Mechanical sparks-these sparks can be produced as a result of friction. Only nonsparking tools should be used in areas where flammable liquids are stored or handled.
- Static sparks-these sparks can be generated as a result of electron transfer between two contacting surfaces. The electrons can discharge in a small volume, raising the temperature to above the ignition temperature. Every effort should be made to eliminate the possibility of static sparks. Also proper bonding and grounding procedures must be followed when flammable liquids are transferred or transported.

E. Removal of Incompatibles

Materials that can contribute to a flammable liquid fire should not be stored with flammable liquids. Examples are oxidizers and organic peroxides, which, on decomposition, can generate large amounts of oxygen.

F. Flammable Gases

Generally, flammable gases pose the same type of fire hazards as flammable liquids and their vapors. Many of the safeguards for flammable liquids also apply to flammable gases, other properties such as toxicity, reactivity, and corrosivity also must be taken into account. Also, a gas that is flammable could produce toxic combustion products.

Fire Extinguishers

A portable fire extinguisher is a "first aid" device and is very effective when used while the fire is small. The use of fire extinguisher that

matches the class of fire, by a person who is well trained, can save both lives and property. Portable fire extinguishers must be installed in workplaces regardless of other firefighting measures. The successful performance of a fire extinguisher in a fire situation largely depends on its proper selection, inspection, maintenance, and distribution.

Classification of Fires and Selection of Extinguishers

Fires are classified into four general categories depending on the type of material or fuel involved. The type of fire determines the type of extinguisher that should be used to extinguish it.

- 1) Class A fires involve materials such as wood, paper, and cloth which produce glowing embers or char.
- 2) Class B fires involve flammable gases, liquids, and greases, including gasoline and most hydrocarbon liquids which must be vaporized for combustion to occur.
- 3) Class C fires involve fires in live electrical equipment or in materials near electrically powered equipment.
- 4) Class D fires involve combustible metals, such as magnesium, zirconium, potassium, and sodium.

Extinguishers will be selected according to the potential fire hazard, the construction and occupancy of facilities, hazard to be protected, and other factors pertinent to the situation.

Location and Marking of Extinguishers

Extinguishers will be conspicuously located and readily accessible for immediate use in the event of fire. They will be located along normal paths of travel and egress. Wall recesses and/or flush-mounted cabinets will be used as extinguisher locations whenever possible.

Extinguishers will be clearly visible. In locations where visual obstruction cannot be completely avoided, directional arrows will be provided to indicate the location of extinguishers and the arrows will be marked with the extinguisher classification.

If extinguishers intended for different classes of fire are located together, they will be conspicuously marked to ensure that the proper class extinguisher selection is made at the time of a fire. Extinguisher classification markings will be located on the front of the shell above or below the extinguisher nameplate. Markings will be of a size and form to be legible from a distance of 3 feet.

Condition

Portable extinguishers will be maintained in a fully charged and operable condition. They will be kept in their designated locations at all times

when not being used. When extinguishers are removed for maintenance or testing, a fully charged and operable replacement unit will be provided.

Mounting and Distribution of Extinguishers

Extinguishers will be installed on hangers, brackets, in cabinets, or on shelves. Extinguishers having a gross weight not exceeding 40 pounds will be so installed that the top of the extinguisher is not more than 3-1/2 feet above the floor.

Extinguishers mounted in cabinets or wall recesses or set on shelves will be placed so that the extinguisher operating instructions face outward. The location of such extinguishers will be made conspicuous by marking the cabinet or wall recess in a contrasting color which will distinguish it from the normal decor.

Extinguishers must be distributed in such a way that the amount of time needed to travel to their location and back to the fire does not allow the fire to get out of control. OSHA requires that the travel distance for Class A and Class D extinguishers not exceed 75 feet. The maximum travel distance for Class B extinguishers is 50 feet because flammable liquid fires can get out of control faster than Class A fires. There is no maximum travel distance specified for Class C extinguishers, but they must be distributed on the basis of appropriate patterns for Class A and B hazards.

Inspection and Maintenance

Once an extinguisher is selected, purchased, and installed, it is the responsibility of the CDC Office of Health and Safety to oversee the inspection, maintenance, and testing of fire extinguishers to ensure that they are in proper working condition and have not been tampered with or physically damaged.

Fire Safety Inspections/Housekeeping

First line supervisors and Safety Committees are responsible for conducting work site surveys at least annually. These surveys should include observations of worksite safety and housekeeping issues and should specifically address proper storage of chemicals and supplies, unobstructed access to fire extinguishers, and emergency evacuation routes. Also, they should determine if an emergency evacuation plan is present in work areas and that personnel are familiar with the plan.

Emergency Egress

Every exit will be clearly visible, or the route to it conspicuously identified in such a manner that every occupant of the building will readily know the direction of escape from any point. At no time will exits be blocked.

Any doorway or passageway which is not an exit or access to an exit but which may be mistaken for an exit, will be identified by a sign reading "Not An Exit" or a sign indicating its actual use (i.e., "Storeroom"). Exits and accesses to exits will be marked by a readily visible sign. Each exit sign (other than internally illuminated signs) will be illuminated by a reliable light source providing not less than 5 foot-candles on the illuminated surface.

Facilities Design Review

Facilities will be designed in a manner consistent with health and safety regulations and standards of good design. The Engineering Services Office, together with OHS, will ensure that there is appropriate health and safety review of facility concepts, designs, and plans. A formal design review process is currently in place for all new construction efforts.

Occupant Emergency Plan for Persons with Disabilities

The first line supervisor is assigned the responsibility to assist Persons with Disabilities under their supervision. An alternate assistant will be chosen by the supervisor. The role of the two assistants is to report to their assigned person, and to either assist in evacuation or assure that the PWD is removed from danger.

- Supervisors, alternates, and the person with a disability will be trained by OHS on available escape routes and methods.
- A list of persons with disabilities is kept in the Office of Health and Safety. This list is updated by the Emergency coordinators, emergency monitors, OHS, the Office of Personnel Management, and the PWD Committee.
- Visitors who have disabilities will be assisted in a manner similar to that of CDC employees. The Host of the person with disabilities will assist in their evacuation.

Emergencies involving Fire

A. Fire Alarms

In the event of a fire emergency, a fire alarm will sound for the building.

B. Evacuation Routes and Plans

Each facility shall have an emergency evacuation plan. All emergency exits shall conform to NFPA standards.

Should evacuation be necessary, go to the nearest exit or stairway and proceed to an area of refuge outside the building. Most stairways are fire resistant and present barriers to smoke if the doors are kept closed.

Do not use elevators. Should the fire involve the control panel of the elevator or the electrical system of the building, power in the building may be cut and you could be trapped between floors. Also, the elevator shaft can become a flue, lending itself to the passage and accumulation of hot gases and smoke generated by the fire.

C. Emergency Coordinators

Emergency Coordinators will be responsible for verifying personnel have evacuated from their assigned areas.

Fire Emergency Procedures

If you discover a fire:

1. Activate the nearest fire alarm.
2. Notify the fire department by dialing 911. Give your location, the nature of the fire, and your name.
3. Notify your Emergency Coordinator and other occupants.
4. Notify the Office of Health and Safety

Fight the fire ONLY if:

1. The fire department has been notified of the fire, AND
2. The fire is small and confined to its area of origin, AND
3. You have a way out and can fight the fire with your back to the exit, AND
4. You have the proper extinguisher, in good working order, AND know how to use it.
5. If you are not sure of your ability or the fire extinguisher's capacity to contain the fire, leave the area.

If you hear a fire alarm:

1. Evacuate the area. Close windows, turn off gas jets, and close doors as you leave.
2. Leave the building and move away from exits and out of the way of emergency operations.
3. Assemble in a designated area.
4. Report to the monitor so he/she can determine that all personnel have evacuated your area.

5. Remain outside until competent authority (Physical Security, Office of Health and Safety, or your supervisor) states that it is safe to re-enter.

Evacuation Routes

1. Learn at least two escape routes, and emergency exits from your area.
2. Never use an elevator as part of your escape route.
3. Learn to activate a fire alarm.
4. Learn to recognize alarm sounds.
5. Take an active part in fire evacuation drills.

Regarding “evacuation routes,” OSHA recently (December 2002) revised its standards:

OSHA REVISES EXIT ROUTES STANDARD

WASHINGTON -- Requirements for exiting buildings quickly during an emergency have been rewritten in a user-friendly format that is easier to understand, the Occupational Safety and Health Administration announced today. The revised Exit Routes, Emergency Action Plans, and Fire Prevention Plans Standard became effective on December 7, 2002.

"Having a clear plan and procedure for exiting a building as safely as possible, if necessary, is one of the most basic and important safety precautions," said OSHA Administrator John Henshaw. "OSHA's standard was over 30 years old and in need of updating. The changes to the language in this rule will make it more clear and consistent, and aid workers and employers alike in understanding the requirements of the standard."

The requirements for exit routes have been rewritten in simple, straight-forward, easy to understand terms. For example, *Means of Egress* will now be referred to as *Exit Routes*. The text has been reorganized and inconsistencies and duplicative requirements have been removed. The revised rule has fewer subparagraphs and a smaller number of cross-references to other OSHA standards than the previous version.

Employers now have the option of adopting the National Fire Protection Associations' Life Safety Code, instead of the OSHA standard for exit routes. OSHA evaluated the NFPA standard and concluded that it provides comparable safety.

The revised standard, which offers more compliance options for employers, does not change the regulatory obligations of the employer or the safety and health protections provided to the employees of the original standard.

So that you can see what a healthcare-related fire safety policy looks like, we are providing you with excerpts from recommendations for operating room fire safety procedures from the state of Massachusetts Department of Public Health (issued in March of 2002):

Health Care Quality Safety Alert: Preventing Operating Room Fires During Surgery

The Massachusetts Department of Public Health (MDPH) Division of Health Care Quality is sending this alert to disseminate best practice recommendations that can assist hospitals in the prevention of operating room fires during surgery. Over the past three years, the Division of Health Care Quality has received incident reports involving fires that occurred in operating rooms during surgery.

These fires were caused by the use of heat-producing surgical instruments in an oxidizer-enriched atmosphere. Fire hazards can be especially acute during surgery of the head and neck area because oxygen or oxygen and nitrous oxide tend to build beneath the surgical drapes or in the oropharyngeal cavity, creating an oxidizer-enriched atmosphere.

Materials that are not considered flammable in normal circumstances can easily ignite in an oxidizer-enriched atmosphere and the resultant fire will burn more violently and at higher temperatures. Our review of the incidents reported to MDPH and the medical literature published by ECRI and others reveals that the three elements necessary for combustion (an oxidizer, a combustible substance and source of ignition) are often present during any surgical procedure and that management of these three elements can prevent fires.

The Department urges hospitals to evaluate the information provided in this document and to use it in the development and implementation of their policies and procedures to minimize the opportunities for fire to occur in the operating room during surgery.

Information is presented in three parts:

1. Recommendations
2. Bibliography of ECRI and ECRI-related Citations on Surgical Fires
 1. Recommendations
 - Summary of ECRI Safety Recommendations for Preventing Fires in the Operating Room (OR)
 1. Make every effort to minimize the buildup of oxygen and nitrous oxide beneath drapes and in the oropharynx. For ophthalmic procedures, tent the operative and full-length body drapes from the end of the nose to facilitate the dissipation of gases. The use of an auxiliary support (such as a Mayo stand) may be necessary to achieve adequate tenting. Be aware of methods available to minimize oxygen buildup beneath drapes and in the oropharyngeal cavity. Allow high concentrations of oxygen to dissipate before activating heat-producing surgical units. With an outlet, gravity will assist in pulling oxygen to the floor away from the patient.
 2. Inflate endotracheal tube cuffs properly, and check for leaks with a stethoscope before and during the procedure. Stop leakage from around a cuff by inflating or repositioning it, and wait at least one minute before using an electrosurgical or cautery unit or a surgical laser in the oropharyngeal area.
 3. Activate electrosurgical and cautery units and lasers *only* when the tip is within view. Do not allow the distal end of an operating fiberoptic light source to contact drapes or other flammable material. When electrosurgical units (ESUs), electrocautery units (i.e., hot wire cautery), and lasers are used, the user must take into account the heating power of the

device and the susceptibility of ignition in or near the operative site, especially in oxygen or nitrous oxide enriched atmospheres. Other ignition sources (such as incandescent sparks caused during cauterization) are unpredictable so emphasis should be placed on reducing the level of the oxidizer in the operative site.

4. If high oxygen or nitrous oxide concentrations in the operative site are unavoidable, use the lowest acceptable power settings on the ESU. For ophthalmic work use the lower temperature cautery probes (consistent with therapeutic needs).
5. Remove from service and replace all electrosurgical units that lack audible activation tones. Replace units that have adjustable activation tones, or contact the ESU manufacturer, and request that the minimum volume setting be modified to ensure that it remains constantly audible when turned on.
6. Always place ESU active electrodes in a safety holster when not in active use. If using a holster is inconvenient or awkward (e.g., when using endoscopic electrosurgical electrodes), place the electrode away from the patient and surgical drapes on an instrument tray or Mayo stand; if this is not possible, disconnect the active electrode cable.
7. If the procedure and patient condition permit (as head and neck surgery frequently does) anticipate the use of electrosurgery or cautery by at least one minute and discontinue oxygen administration to the patient. Oxygen may be re-administered following the use of the electrosurgical or cautery unit.
8. Develop protocols to ensure communication between the surgeon and the anesthesiologist during patient preparation and surgery.
9. Become familiar with the hazards of enriched atmospheres including the various ignition sources present in the operating room and combustible substances that are likely to be encountered. Be aware that an increased level of oxygen or nitrous oxide can dramatically lower the ignition temperature of combustible substances.
10. If oxygen or nitrous oxide is being administered during head and neck surgery, make hair near the operative site (e.g., eyebrows, mustaches, and beards) nonflammable by coating it thoroughly with a water-soluble surgical lubricating jelly. This practice should minimize the chance that the hair will either be the primary point of ignition or add fuel to a fire originating elsewhere.
 - a) The extent to which hair around the mouth should be coated with jelly may be dictated by the procedure and the draping technique. ECRI recommends that the jelly cover the patient's mustache and beard for at least 5 cm from the edge of the mouth.
 - b) The need for coating the eyebrows also depends on the procedure and draping techniques. In many cases of ophthalmic surgery, the eyebrows are covered by a drape, and the application of jelly would have minimal benefit. However, it may be prudent to apply the jelly to the eyebrows if they are within the operative area and oxygen or nitrous oxide is being administered.
11. Minimize liquid alcohol solutions in pools around the patient or in open containers, allowing time for thorough drying of applied solutions before draping, and ensure dissipation of alcohol vapors before using any heat source near the patient.
12. Take the time to check that volatile fuels have fully evaporated on and under the point of application to prevent them from being ignited.
13. Develop and implement pre-operative patient instructions identifying products such as facial creams, hair care products, or other preparations that should not be used by the patient before surgery. Hair care products and facial creams can add to the fuel load, especially alcohol-based products. The varnishes and oils left by hair and skin care products

and many medications have high ignition temperatures and are not ordinarily flammable. In oxidizer-enriched atmospheres, they are very flammable but no more so than the hair, drapes and plastic present during surgery.

14. Do not use alcohol-based surgical preps. They have been involved in fires when volatile alcohol has been trapped by the drapes and directed toward the heat sources in the surgical field.
15. Provide periodic education of operating room staff and physicians regarding the prevention of fire in an oxidizer-enriched atmosphere, management of fire that directly involves the patient and/or staff members, and standard fire policies and procedures including notification of the fire department, MDPH and the JCAHO or other regulatory agencies.
16. Conduct routine fire drills.
17. Post prevention reminders, recommendations, guidelines and information where it is visible and easily accessible to OR staff.
18. Be aware that inattention (which accompanies familiarity with equipment and procedures) can be a factor that contributes to a fire hazard.
19. Develop procedures and educate staff on the Quality Improvement process to be used following any fire. Include guidelines for the examination of instruments and materials, and the process for conducting an internal review.

ECRI's Table of Typical Coexisting Ingredients that Could Cause an OR Fire

- Oxidizers Ignition Sources
 - Combustible Substances
 - Oxygen Electrosurgical units
 - Patient (hair, GI tract gases)
 - Nitrous oxide
 - Electrocautery units (both battery and line operated)
 - Prepping agents (Degreasers [ether, acetone; freon is nonflammable])
 - Surgical lasers Aerosol adhesives
 - Fiberoptic light sources
 - Alcohol (also present when spilled from gut suture packets during opening)
 - Incandescent spark
 - Tinctures (Hibitane [chlorhexidine digluconate]; Merthiolate [thimerosal])
 - Static discharge spark
 - Linens (drapes [nonwoven, woven, and adherent]; gowns; masks; hoods; caps)
 - Dressings (gauze, sponges, adhesive tape [cloth, plastic])
 - Ointments (Collodion; Petrolatum [petroleum jelly]; Tincture of benzoin; aerosols (e.g., Aeroplast®); paraffin; white wax)
 - Plastic/rubber products (blood pressure and tourniquet cuffs, gloves, stethoscope tubing)
 - Anesthesia components (breathing circuits, masks, airways, endotracheal tubes)
- (This list Excludes flammable anesthetics)

- Richemond AL, Bruley ME. Insidious iatrogenic oxygen-enriched atmospheres as a cause of surgical fires. In: Janoff DD, Stolfus JM, Eds. Flammability and sensitivity of materials in oxygen-enriched atmospheres, Vol. 6. 1993 Sep: 66-73. ASTM STP 1197.
- Richemond AL, Bruley ME. Chapter 37: Head and neck surgical fires. In: Eisele DW, ed. *Complications in head and neck surgery*. Mosby Year Book, 1993:492-508.

Final Examination

Select the *best* answer to each of the following items. Mark your responses on the Answer Form.

1. Flammable liquids sometimes may be substituted by relatively safe materials in order to reduce the risk of fires. Any substituted material should be _____.

- a. stable
- b. nontoxic
- c. be nonflammable or have a high flashpoint.
- d. All of the above

2. Any doorway or passageway which is not an exit or access to an exit but which may be mistaken for an exit, should be _____.

- a. locked
- b. identified by a sign reading "Not An Exit" or a sign indicating its actual use (i.e., "Storeroom").
- c. well-lit
- d. All of the above

3. Every inside storage room will be provided with a _____ to prevent the accumulation of vapors.

- a. fan
- b. continuous mechanical exhaust ventilation system
- c. door vent
- d. All of the above

4. Cutting or welding on flammable liquids equipment should not be performed unless the equipment has been properly emptied and purged with _____.

- a. an exhaust system
- b. oxygen
- c. a neutral gas such as nitrogen
- d. None of the above

5. _____ can be generated as a result of electron transfer between two contacting surfaces. The electrons can discharge in a small volume, raising the temperature to above the ignition temperature.

- a. Incandescent sparks
- b. Static sparks
- c. Incendiary non-contact sparks
- d. All of the above

6. Generally, flammable gases pose the same type of fire hazards as flammable liquids and their vapors. Many of the safeguards for flammable liquids also apply to flammable gases, other properties such as _____.

- a. toxicity
- b. reactivity
- c. corrosivity
- d. All of the above

7. Class _____ fires involve materials such as wood, paper, and cloth which produce glowing embers or char.

- a. A
- b. B
- c. C
- d. D

8. If extinguishers intended for different classes of fire are located together, they will be conspicuously marked to ensure that the proper class extinguisher selection is made at the time of a fire. Extinguisher classification markings will be located on the front of the shell above or below the extinguisher nameplate. Markings will be of a size and form to be legible from a distance of _____.

- a. 3 feet
- b. 6 feet
- c. 10 feet
- d. 20 feet

9. Class _____ fires involve combustible metals, such as magnesium, zirconium, potassium, and sodium.

- a. A
- b. B
- c. C
- d. D

10. Employees should attempt to fight a fire ONLY if:

- a. The fire department has been notified of the fire
- b. The fire is small and confined to its area of origin
- c. They have a way out and can fight the fire with their back to the exit
- d. All the above

11. Fire prevention measures propose to reduce the incidence of fires by eliminating opportunities for ignition of flammable materials.

- a. True
- b. False

12. Flammable paints, oils, and varnishes in 1 or 5 gallon containers, used for building maintenance purposes, may be stored temporarily in closed containers outside approved storage cabinets or room if kept at the job site for less than 10 calendar days.

- a. True
- b. False

13. Fire hazards can be especially acute during surgery of the head and neck area because oxygen or oxygen and nitrous oxide tend to build beneath the surgical drapes or in the oropharyngeal cavity, creating an oxidizer-enriched atmosphere.

- a. True
- b. False

14. Do not use alcohol-based surgical preps. They have been involved in fires when volatile alcohol has been trapped by the drapes and directed toward the heat sources in the surgical field.

- a. True
- b. False

15. The varnishes and oils left by hair and skin care products and many medications have high ignition temperatures and are not ordinarily flammable. In oxidizer-enriched atmospheres, they are very flammable but no more so than the hair, drapes and plastic present during surgery.

- a. True
- b. False

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