

# Safety Meeting Topic

## Flammables and Refrigerators

April 2009

Faculty and staff often ask us if they can use commercial or “home-type” refrigerators and freezers or cold rooms to store flammable materials. Additionally we are asked if they can “field-modify” these types of units in an effort to eliminate the hazards. The answer to both questions is no, here’s why:

### Why do you need a special refrigerator to store flammables?

Vapor from stored chemicals can come into contact with electrical sparks that occur in the normal operation of the defrost timer, the thermostat, switches, or the interior lighting unit. Once the vapors ignite, a powerful explosion occurs that can cause serious injuries or death to someone in the vicinity.

			
Thermostat inside caused spark.	Refrigerator and freezer compartment doors blown off	Freezer compartment interior melted	Mess and potential of much larger explosion and fire

### How can I tell if the refrigerator I have is appropriate for the storage of flammables?

There are 4 types of refrigerators that can be used for laboratory purposes:

#### 1. Ordinary Household Refrigerator



Household refrigerators like the one seen in **Figure 1**. have internal components such as thermostats, relays and switches that can create a spark that is capable of igniting vapors generated from flammable liquids stored inside of them. This type of refrigerator is the lowest cost and because of the lower cost many labs have only this type of refrigerator. Flammable materials must never be stored in this type of refrigerator.

Figure 1.

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### 2. Flammable Storage Refrigerator



Flammable storage refrigerators like the one seen in **Figure 2**, are UL approved for storage of flammable chemicals. Flammable storage refrigerators have no electrical sparking devices, relays, switches, or thermostats that could ignite flammable vapors inside the cabinet. Flammable storage refrigerators also may incorporate design features such as thresholds, self-closing doors, magnetic door gaskets, and special inner shell materials that control or limit the damage should a reaction occur within the storage compartment. A label stating “Flammable Materials Refrigerator: Keep fire away” which has been placed by the manufacturer can identify such refrigerators. The refrigerators must be U.L. listed as Flammable Material Storage Refrigerators. Flammable storage units cannot be placed in a room containing explosive vapors but chemicals that exude explosive vapors can be safely stored inside them. These refrigerators are also called lab-safe or fire-safe refrigerators. These refrigerators are more costly than the household refrigerator types but they must be purchased if you are planning on storing flammables in the refrigerator.

Figure 2.

### 3. Explosion Proof Refrigerator



Explosion proof refrigerators like the one seen in **Figure 3**, are rated UL explosion-proof and are similar in design to the flammable storage units, but also have all operating components sealed against entrance of explosive vapors. Electrical junction boxes are also sealed after connections are made. These units are approved for storage of volatile materials in areas with explosive atmospheres and are the most costly of all types. This type of refrigerator is only required when storing flammable materials in an area with an explosive atmosphere such as a solvent dispensing room. Explosion-proof refrigerators have very limited use on campus and require special hazardous-location wiring rather than simple cord-and-plug connections. Please contact EH&S at 965-1823 if you think you have a need for an explosion proof refrigerator

Figure 3.

\* Please look in your refrigerator now and remove any flammable materials if it is not approved for the storage of flammables.

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### 4. Cold Rooms



Cold rooms have closed air-circulation systems and re-circulate any leaks and escaped vapors within the chamber. The refrigeration coils in cold rooms are aluminum and subject to damage from corrosive atmospheres. The electrical systems are designed with vapor-proof lights and duplex outlets, but frequently are compromised by extension cords and plug strips. Cold rooms are not acceptable for storage of flammables, dry ice, or liquid chemicals. If chemicals need to be refrigerated, they must be stored in an approved refrigerator or freezer, rather than a cold room.

### Information and Guidance

ASU EH&S Department 480-965-1823 or email us at [askehs@asu.edu](mailto:askehs@asu.edu).