

## Laboratory Refrigerator Explosions – Electrical Classification

November 2008

The pictures show damage to two laboratories resulting from explosions caused by improperly stored flammable materials in household refrigerators. Flammable materials can accumulate in a closed space such as a refrigerator, because of leaking containers or spills. It is possible for the concentration of flammable vapors to reach the lower explosive limit, creating an explosive atmosphere. A household refrigerator is not designed to prevent ignition of flammable vapors, and has many potential ignition sources – for example, the interior light switch and light, the thermostat for the temperature control, and other internal wiring and electrical components. A spark from any of these can ignite flammable vapors causing an explosion.



Process samples sometimes are stored in a plant control room, possibly only for a few minutes, but perhaps for several months. The storage area electrical classification must meet the correct standards and samples must be properly stored to prevent personnel exposure as well as fires and explosions. Even a laboratory hood can contain ignition hazards.

While this incident occurred in a laboratory, there is a lesson for any facility which handles flammable and combustible materials – ***make sure that all electrical equipment used in hazardous areas is properly designed for use in these areas.*** And, you must also ensure that all equipment designed for use in areas handling flammable and combustible materials is properly maintained. In particular, make sure that any portable electrical equipment brought into a classified area is appropriate for use in that area. Your facility's electrical classification design is based on the potential risk of a flammable atmosphere, and determines the design of electrical equipment which can be used safely in the various parts of the plant.

### Do you know?

- What is the electrical classification for various areas in your plant?
- How to recognize electrical equipment, particularly portable equipment, which is not appropriate for use in hazardous areas?
- How to recognize potential problems with electrical equipment in hazardous areas – for example, damage to wiring, damage to enclosures and gaskets?

### What can you do?

- Make sure that all equipment used to store hazardous materials in your laboratories is properly designed and maintained for that service.
- Learn about the electrical classification of hazardous areas in your workplace.
- Learn to recognize the proper electrical equipment for use in hazardous areas.
- Do not bring portable electrical equipment into a classified area without ensuring that it is properly designed for that area classification.
- When doing routine safety inspections, inspect wiring of instruments, motors, lights, switches, electrical boxes, and other electrical equipment to make sure it is properly installed and maintained.
- When bringing samples into a general use area, make sure that the storage location is designed for the hazards of the samples.

***Understand how to safely use electrical equipment in hazardous areas!***