

1. INTRODUCTION

The storage of flammable solvents in laboratory refrigerators is a common practice. Past experience has highlighted that this practice can result in incidents such as fire or explosions leading to injury and/or property damage. In the majority of these incidents the flammable solvents have been stored in domestic refrigerators.

It is essential that when stored in refrigerators the flammable solvents are managed appropriately.

2. REFERENCES

- *Occupational Health and Safety Act 2004 (Vic)*
- *Occupational health and Safety Regulations 2007 (Vic)*
- AS 2243.2: Safety in laboratories. Part 2. Chemicals aspects

3. REQUIREMENTS OF AS 2243.2

AS 2243.2 Section 4.4.3 (c) requires the following:

A refrigerator may be used to store flammable chemicals provided it has been designed and manufactured to eliminate ignition sources. It may be possible for a domestic refrigerator to be modified by a competent person to eliminate ignition sources.

NOTES:

1. *Refrigerators unsuitable for solvent storage should bear a prominent label inscribed with the words 'Not suitable for flammable solvents'.*
2. *For a normal domestic refrigerator, removal of ignition sources entails removal of the wiring for the internal light, removal of the switching part of the thermostat from inside the compartment and possibly modification of any automatic defrosting procedure and internal fans, depending on the results of a competent person's checks for their potential as ignition sources.*
3. *Solvents stored in suitable refrigerators should be properly labelled and sealed. A complete check of the condition of the refrigerator contents should be carried out at least monthly.*

4. TYPES OF REFRIGERATORS

There are three types of refrigerators that found in laboratories. These include:

- domestic refrigerators;
- internally intrinsically safe refrigerators; and
- fully intrinsically safe refrigerators.

For the purposes of this guidance intrinsically safe means "elimination of an ignition source".

4.1. Domestic refrigerators

Domestic refrigerators are not intrinsically safe and have a number of ignition sources associated with their electrical components. These include:

- temperature control/thermostat
- internal light
- electric fan motors for air circulation

Where domestic refrigerators are used to store flammable solvents they must be modified by a competent person so that they are intrinsically safe. Effectively this will convert the domestic refrigerator into an internally intrinsically safe refrigerator.

4.2. Internally intrinsically safe refrigerators

Internally intrinsically safe refrigerators are manufactured so that the internal storage area of the refrigerator has no ignition sources.

Internally intrinsically safe refrigerators are suitable for most laboratory conditions.

Typically these refrigerators are considerably more expensive than a domestic refrigerator. Therefore it may be more cost effective for existing domestic refrigerators to be modified.

4.3. Fully intrinsically safe

A fully intrinsically safe refrigerator has all ignition sources eliminated – both exterior and interior. These refrigerators are required where the external atmosphere may also be explosive.

5. STORING FLAMMABLE SOLVENTS

When storing flammable solvents in an intrinsically safe refrigerator the following should be followed:

- Wrap caps of volatile materials in parafilm wax.
- Place volatile materials in sealed plastic bags.
- Store containers in bunding (eg a tray with raised edges).
- Immediately clean up any spills.
- Include the refrigerator in the scheduled workplace inspections – inspecting both the inside and outside of the refrigerator.
- When no longer required, dispose of chemicals through the University of Melbourne hazardous waste contractor.

PLEASE NOTE:
Refrigerators not designed or modified to be internally intrinsically safe should be labelled with a prominent warning sign indicating that they are unsuitable for the storage of flammable solvents.

For further information, refer to <http://safety.unimelb.edu.au> or contact your Local Health & Safety contact.