

HAZARD ALERT: INADVERTENT HEATING OF MAGNETIC STIRRER/HOTPLATES

September 2006

In July 2006, a fire occurred at approximately 6:30pm on a Friday afternoon in a fume cupboard in the School of Chemistry. An experienced postdoctoral research fellow was carrying out a reaction as performed on many occasions, involving a reflux reaction with a condenser in an oil bath, heated on a magnetic stirrer/hotplate (Model: Corning PC351).

As part of the standard process, the researcher turned off the heater at 5 pm, leaving the stirrer/hotplate and condenser on to allow the reaction to cool. At 6:30 pm, the student was alerted to a small fire, which was quickly extinguished. The oil bath had overheated causing the organic solvent (15ml) to boil, which forced off the condenser, spilling the solvent into the oil bath, where it ignited.

Investigation

Initially, safety personnel determined that the most probable cause of the fire was a faulty dial that had caused the stirrer/hotplate to heat to its maximum temperature instead of switching off. However, further investigations attributed the cause of the fire to an inadvertent switching of the stirrer/hotplate past the 'off' position to 'high'.

The mechanism of the stirrer/hotplate allows the user to turn the dial until an audible 'click' is heard signalling the 'off' position. It is possible, however, to turn the dial past the 'off' position to 'high', where another audible 'click' is heard. Thus, unless the user is diligently listening for the click or is watching the dial, the hotplate can be turned to a 'high' setting instead of to 'off'. It should be noted this fault is not confined to one particular brand of stirrer/hotplate, but is a common trait amongst many.

Recommendations

OHSE recommends that all departments/schools/centres take the following actions to prevent a recurrence of the accidental heating of these magnetic stirrer/hotplates:

- All existing stirrer/hotplates with the mechanism described above should be retrospectively modified to prevent the dial being turned past the 'off' position. This modification will cost approximately \$65 per unit and can be arranged with university workshops. The price for the modification of multiple units may be negotiable.
- In the interim, a label should be affixed to the front of all stirrer/hotplates stating 'Dial has no stop point - be sure it is turned off'.
- All stirrer/hotplates are to be switched off at the power point as well as with the dial when possible.
- All stirrer/hotplates with the mechanism described above should be progressively phased out of use and replaced with safer alternatives that do not allow the accidental turning of the dial onto 'high', eg IKA® RCT basic IKAMAG safety control.
- It is also a requirement that all appliances be electrically tagged and tested according to the [Procedures for in-service inspection, testing and tagging of electrical equipment](#).

For further information please contact your OHSE consultant or OHSE on 51016.