Microwave Ovens: should they be routinely tested for microwave leakage?

Introduction

The main purpose of this document is to establish whether microwave ovens, excluding industrial/commercial type appliances, should be routinely tested for microwave leakage.

In general, this document focuses on domestic type appliances, but much of what is written may also be applicable to appliances falling into industrial/commercial (including modified domestic ovens) category. This category of appliance, as used in Chemical Engineering & Applied Chemistry within the School of Engineering & Applied Science and probably those used within catering areas, are potentially the most hazardous. Therefore, it is widely accepted that these appliances should be tested for microwave leakage on a regular basis.

Background

Domestic microwave ovens provide a quick convenient method for heating and cooking a variety of foods and liquids. These appliances are more commonly used in areas such as staff rest rooms and kitchens within student accommodation, but are occasionally used for a limited number of operations (eg melting, defrosting and heating of certain solids or liquids) within a laboratory environment. Their continued safe use is dependant on following both the manufacturers operating instructions and any available guidance.

Modern ovens are designed to ensure that most of the microwave radiation they produce is contained within the oven enclosure. Furthermore, the radiation can only be generated when the door is shut (interlocks have activated) and the oven is switched on and operating. The likelihood of microwave leakage occurring from the use of damaged, dirty or modified ovens is significantly increased. It is therefore essential that all microwave ovens are maintained in good condition and are regularly inspected.

Sources of Information

The current British Standards, BS EN 60335-2-25:2002 (Domestic Microwave Ovens), and BS EN 60335-2-90:2006 (Commercial Microwave Ovens) specify, amongst other things, “The microwave leakage at any point 50 mm or more from the external surface of the appliance shall not exceed 50 W/m²”.

In addition to the above standards, The Institution of Engineering and Technology (formally, The Institution of Electrical Engineers) publication, Code of Practice for In-Service Inspection and Testing of Electrical Equipment (3rd edition), now recommends microwave leakage checks should be made at appropriate intervals.

However, in appendix 1 of the HSE Operations Circular on Electromagnetic fields (EMFs) and Radiation, a sample risk assessment of a Microwave oven EMF implies that, providing the
oven housing is undamaged, door seals are in good condition, interlocks are working, no emission (i.e., microwave radiation) measurement is necessary, and the overall risk is low.

Despite the availability of the above documents, considerable time has also been spent on gathering additional information from a variety of resources. These include Health and Safety discussion groups/forums, the web and a number of similar institutions to Aston. The recommendation, therefore, is based on both current best practice and a commonsense approach.

**Recommendation**

As mentioned earlier, information has been drawn from a number of similar institutions. The overwhelming evidence from these institutions is that they currently do not test domestic microwave ovens for microwave leakage. Instead, they support the theory that regular visual inspections are more appropriate and sufficient.

A similar view is shared by many experts, who consider in all probability, the greater hazard is actually from the appliance use or misuse (e.g., scalds, superheating of fluids, fire) rather than from any microwave leakage.

Therefore, based on these facts, our recommendation to Schools/Departments is that they implement a system of regular visual inspection for all domestic microwave ovens.

**Guidance**

The accompanying document, “Guidance for the Inspection and Safe Use of Domestic Microwave Ovens” has been produced to assist Schools/Departments in developing and implementing a plan of local inspection and a system of safe use.

The guidance consists of two suggested ‘checklist’ systems:

- One for the ‘tester’ - enabling them to quickly and effectively evaluate the condition of a domestic microwave oven, and
- The other for the ‘user’ - to guide them in its safe operation

Although both these lists draw attention to the major items that should be included, they may not be exhaustive and consideration should be given to include other items as local requirements dictate.

**Note:** This information and guidance can also be found within the Radiation section (Non-Ionising) of the Health and Safety web pages (http://www1.aston.ac.uk/staff/safety/). It is recommended that these pages are visited regularly as additional and up-to-date information will be made available.