

**LEAFLET 36****MICROWAVE OVENS****CONTENTS**

## Para

- 1 Scope
- 2 Statutory requirements  
Duties
- 3 Commanding Officer
- 4 Employees
- 5 The microwave hazard and its control
- 8 Other hazards  
Legal and MOD mandatory requirements

## Table

## Page

- 1 Legal and MOD Mandatory Requirements .....3

## Annex

- A HSE guidance reproduced from their website – [www.hse.gov.uk](http://www.hse.gov.uk)

**SCOPE**

- 1 Microwave ovens used to heat materials in domestic, catering and industrial applications.

**STATUTORY REQUIREMENTS**

- 2 The following legislation is relevant:
  - The Health and Safety at Work etc Act 1974
  - The Management of Health and Safety at Work Regulations 1999
  - The Health and Safety (Safety Signs and Signals) Regulations 1996
  - The Electricity at Work Regulations 1989 (as amended)
  - The Provision and Use of Work Equipment Regulations 1998

**DUTIES****Commanding Officer and Head of Establishment**

3 The Commanding Officer (CO) has a duty to the Secretary of State, and a personal responsibility, to protect the environment and secure the health, safety and welfare of their staff at work. The CO is also required to protect persons not in MOD employment (e.g. members of the public) against risks to their health and safety arising from the MOD work activities. This includes radiation safety. The CO's authority (but not responsibility) for radiation safety management arrangements may be delegated to appropriate personnel.

**Employees**

4 It is the responsibility of all employees to ensure that equipment is handled in accordance with written procedures, where these are appropriate, and not deliberately misused or interfered with. Any incidents are to be reported appropriately.

## THE MICROWAVE HAZARD AND ITS CONTROL

5 The microwave hazard and the measures necessary for its control are described in HSE's Local Authority Circular 60/3 that is available on the HSE website ([www.hse.gov.uk](http://www.hse.gov.uk)) and is reproduced at Annex A.

6 In lieu of HSE's suggestion to seek advice from the HSE Field Consultant Group via the 'local enforcement liaison officer', MOD users should seek advice from their TLB Safety Authority (e.g. CESO for the TLB),, in the first place, as they will be aware of local environmental health teams etc holding measuring equipment, or else from Dstl Environmental Sciences Department.

7 If measuring equipment is used (e.g. for assessing microwave oven leakage) it should be checked for correct function and, if used for quantitative measurements, calibrated to recognised standards at an appropriate interval.

## OTHER HAZARDS

8 The main other hazards associated with microwave ovens are electrical and thermal.

9 The electrical hazards are highlighted in HSE's Engineering Information Sheet No 35 'Safety in electrical testing: Servicing and repair of domestic appliances', which is also available from their website ([www.hse.gov.uk](http://www.hse.gov.uk)). The HSE specifically mention two points in relation to microwave ovens:

- When working on microwave ovens there may be a risk of severe electric shock from the internally generated high voltage (approximately 4kV).
- When working on microwave ovens, ensure that the high-voltage internal source is not energised while the oven cover is removed. Functional testing to show whether or not the magnetron is operating should be done with covers fitted.

10 Normal precautions for handling hot materials should be used to mitigate the thermal hazard from anything that has been heated in a microwave oven.

**LEGAL AND MOD MANDATORY REQUIREMENTS**

Table 1 Legal and MOD Mandatory Requirements

| <b>Requirement</b>                            | <b>Applicable</b> | <b>Comments</b>  | <b>Related leaflet*</b> |
|---|-------------------|--|-------------------------|
| HSE Authorisation                             | x                 |  |                         |
| HSE Notification                              | x                 |  |                         |
| EA Notification                               | x                 |  |                         |
| Risk Assessment                               | ✓                 | Should address how much usage the oven gets and also the type of usage to ascertain the frequency of inspection (electrical and mechanical) required |                         |
| Restriction of exposure                       | x                 | Should be engineered into oven   |                         |
| PPE   | ✓                 | For handling hot material  |                         |
| Maintenance of radiation engineering controls | ✓                 |  |                         |
| Contingency plans                             | x                 |  |                         |
| Designated areas                              | x                 |  |                         |
| Monitoring                                    | x                 |  |                         |
| Training for users                            | ✓                 | May be appropriate, especially in industrial situations  |                         |
| Local orders                                  | ✓                 | May be appropriate   |                         |
| Appointed person                              | x                 |  |                         |
| Storage                                       | x                 |  |                         |
| Accounting                                    | x                 |  |                         |
| Leak testing                                  | x                 |  |                         |
| Personal dosimetry                            | x                 |  |                         |
| Reporting procedures                          | x                 |  |                         |
| Transport                                     | x                 |  |                         |
| Disposal                                      | x                 |  |                         |

\*JSP 392, unless otherwise stated

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## LEAFLET 36 ANNEX A

HSE GUIDANCE REPRODUCED FROM THEIR WEBSITE – [WWW.HSE.GOV.UK](http://WWW.HSE.GOV.UK)

## Health and Safety Executive / Local Authorities Enforcement Liaison Committee (HELA)

### Local Authority Circular

- **Subject:** Non Ionising Radiation
- **Open Government Status:** Open
- **LAC Number:** 60/3
- **Keywords:** Microwaves
- **Revised:** September 2000
- **Review date:** September 2001

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**To:** Directors of Environmental Health/ Chief Environmental Health Officers of London, Metropolitan, District and Unitary Authorities and Chief Executives of County Councils.

**For the attention of:** Environmental Services / Trading Standards / Fire Authorities / Other>

**This circular gives advice to local authority enforcement officers**

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### MICROWAVE OVENS - EXPOSURE CONTROL

#### INTRODUCTION

1 The term "microwave" is commonly applied to the upper end of the high frequency range of the electromagnetic spectrum 300 MHz - 300 GHz. These frequencies lie between ordinary radio and infra-red frequencies.

2 Microwaves are put to a variety of uses including radar systems, communication links and clinical medicine (diathermy), but they are probably most often encountered in industrial/commercial and domestic ovens.

#### BACKGROUND

3 Microwaves act by depositing energy within the material and so far as the human body is concerned, the difference between exposure to infra-red frequencies (radiant heat) and microwaves is that the former produces surface heating while the latter is absorbed within the body tissue thus raising its bulk temperature. Thermal damage has been shown to occur at radiation intensities of 100 mW/cm<sup>2</sup> and above.

#### RECOMMENDED AND LEGISLATIVE STANDARDS

4 In 1960 the Post Office published a guide called "Safety Precautions relating to Intense Radio-Frequency Radiation". This recommended a maximum safe working level of 10 mW/cm<sup>2</sup>, thereby setting a safety factor of 10.

5 A committee of the Medical Research Council carried out a review in the late 1960s and their report in 1970 confirmed the 10 mW/cm<sup>2</sup> limit for continuous exposure of personnel. It also laid down parameters for short periods of exposure at higher levels.

6 An EEC draft proposal for a Directive on microwave and RF occupational exposure standards is at an early stage of negotiation. The proposal aims to safeguard workers by setting a limit on the specific absorption rate (SAR) but this has not as yet been translated into exposure limits. In addition, limits are proposed for exposure based on the strength of associated electric and magnetic fields.

7 Current draft proposals<sup>1</sup> by the National Radiological Protection Board for "The Health Protection of Workers and Members of the Public against the Dangers of Extra Low Frequency, RF and Microwave Radiations" recommend the retention of the 10 mW/cm<sup>2</sup> level for the microwave frequency band for the continuous exposure of adults. A lower figure of 5 mW/cm<sup>2</sup> is proposed for the general public. Again limits are placed on the strengths of the associated electric and magnetic fields.

8 British Standard BS 5175: 1976 and International Electrotechnical Commission Standard IEC 335:25 requirements specify maximum leakage rates from a microwave oven in service, of not more than 5 mW/cm<sup>2</sup> at 5 cm from any surface of the oven.

### **ACCIDENT HISTORY**

9 The incidence rate to date for injuries arising at microwave ovens from exposure to microwave radiation appears minimal and derives almost entirely from reports published in the USA. However, inspection has shown that lack of cleanliness and poor maintenance of door seals on ovens can lead to leakage in excess of the recommended limit.

### **ADVICE TO OCCUPIERS**

10 It is considered reasonably practicable to control stray radiation leakage to below 5 mW/cm<sup>2</sup>. Leakage rates in excess of this figure should be viewed as an early warning that some deterioration is taking place and that the equipment may require checking and adjustment.

11 Users' attention should be drawn to the need for cleanliness and the maintenance of door assemblies and seals of the ovens and also the necessity for routine checking of the safety interlocks. The latter are associated with all access doors and are also incorporated into product entry and exit apertures in the case of tunnel or conveyor ovens.

12 Many manufacturers offer maintenance contracts and this service generally ensures that radiation leakage measurement is regularly recorded and that proper maintenance of the electrical and high voltage electronic equipment is carried out by skilled personnel. Such service contracts are to be recommended to occupiers.

13 In cases of difficulty, advice should be sought from the HSE Field Consultant Group (FCG) via the local enforcement liaison officer (ELO).

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<sup>1</sup> JSP392 footnote – NRPB published this advice as 'Statement and advice by the National Radiological Protection Board on Limiting Exposure to Electromagnetic Fields (0 – 300 GHz). Documents of the NRPB, Volume 15, No 2: HMSO London; 2004, ISBN 0-85951-532-X'