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STATUTORY INSTRUMENTS

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**2016 No. 588**

**HEALTH AND SAFETY**

**The Control of Electromagnetic  
Fields at Work Regulations 2016**

<i>Made</i>	- - - -	<i>17th May 2016</i>
<i>Laid before Parliament</i>		<i>23rd May 2016</i>
<i>Coming into force</i>	- -	<i>1st July 2016</i>

The Secretary of State makes these Regulations in exercise of the powers conferred by sections 15(1), (2), (5), (8) and 82(3)(a) of, and paragraphs 8, 9, 11, 13(2) and (3), 14, 16, 18 and 20 of Schedule 3 to, the Health and Safety at Work etc. Act 1974 (“the 1974 Act”)(1).

The Regulations give effect without modifications to proposals submitted to the Secretary of State by the Health and Safety Executive (“the Executive”) under section 11(3)(2) of the 1974 Act.

Before submitting those proposals to the Secretary of State, the Executive consulted the bodies that appeared to it to be appropriate as required by section 50(3)(3) of the 1974 Act.

**PART 1**

**INTRODUCTION**

**Citation and commencement**

1. These Regulations may be cited as the Control of Electromagnetic Fields at Work Regulations 2016 and come into force on 1st July 2016.

**Interpretation**

2.—(1) In these Regulations—

“the 1974 Act” means the Health and Safety at Work etc. Act 1974;

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(1) 1974 c.37. Section 15(1) was substituted by paragraph 6 of Schedule 15 to the Employment Protection Act 1975 (c.71) and amended by S.I. 2002/794. Section 15(2) was amended by paragraphs 1 and 5 of Schedule 12 to the Energy Act 2013 (c.32).  
(2) Section 11 was substituted by article 5 of S.I. 2008/960.  
(3) Section 50(3) was amended by paragraph 16 of Schedule 15 to the Employment Protection Act 1975 (c.71), articles 3 and 16 of S.I. 2008/960, paragraphs 4 and 6 of Schedule 7 to the Health and Social Care Act 2012 (c.7), and paragraphs 1 and 11 of Schedule 12 to the Energy Act 2013.

“AL” means an action level set out in Parts 2 and 3 of the Schedule;

“direct biophysical effect” means an effect on human body tissue caused by its presence in an electromagnetic field;

“electromagnetic field” means a static electric, static magnetic and time-varying electric, magnetic and electromagnetic field with a frequency of up to 300 GHz;

“ELV” means an exposure limit value set out in Part 2 of the Schedule;

“employee at particular risk” means—

- (a) an employee who has declared to his or her employer a condition which may lead to a higher susceptibility to the potential effects of exposure to electromagnetic fields; or
- (b) an employee who works in close proximity to electro-explosive devices, explosive materials or flammable atmospheres;

“health effect” means a direct biophysical effect which is potentially harmful to human health;

“indirect effect” means an effect, caused by the presence of an object or a substance in an electromagnetic field, which may present a safety or health hazard;

“sensory effect” means a direct biophysical effect involving a transient disturbance in sensory perception or a minor and temporary change in brain function.

(2) In these Regulations a reference to employees is, in relation to an employer, to be treated as a reference to the employees of that employer while they are at work.

### **Application**

3. These Regulations do not apply to the master or crew of a ship or to the employer of such persons in respect of the normal shipboard activities of a ship’s crew which are carried out solely by the crew under the direction of the master, and for the purposes of this regulation “ship” includes every description of vessel used in navigation, other than a ship forming part of Her Majesty’s Navy.

## **PART 2**

### **EXPOSURE AND RISK**

#### **Limitation on exposure to electromagnetic fields**

4.—(1) Subject to paragraphs (2) and (3), an employer must ensure that employees are not exposed to electromagnetic field levels in excess of the ELVs.

(2) Exposure may exceed the sensory effect ELVs during work activities in respect of which the employer has taken the applicable safety measures set out in the Schedule(4).

(3) Paragraph (1) does not apply in relation to—

- (a) any activity in respect of which a suitable and sufficient exposure limitation system is in place, where that activity is carried out—
  - (i) by a person acting in the capacity of a member of either Her Majesty’s armed forces or a visiting force;
  - (ii) by any civilian working with such a person; or
  - (iii) on any premises or part of premises under the control of the Secretary of State for the purposes of the Ministry of Defence or the service authorities of a visiting force; or

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(4) See paragraph 6 of Part 1 of the Schedule.

- (b) the development, testing, installation, use and maintenance of, or research related to, magnetic resonance imaging equipment for patients in the health sector, where—
  - (i) the exposure of employees to electromagnetic fields is as low as is reasonably practicable; and
  - (ii) employees are protected against any health effects and safety risks related to that exposure.
- (4) In paragraph (2), “sensory effect ELVs” means the sensory effect ELVs set out in Part 2 of the Schedule.
- (5) In paragraph (3)(a)—
  - “Her Majesty’s armed forces” means the regular forces and the reserve forces as defined in section 374 of the Armed Forces Act 2006(5);
  - “service authorities” and “visiting force” have the meaning given in section 12 of the Visiting Forces Act 1952(6).

### **Exposure assessment**

**5.—(1)** The employer must make a suitable and sufficient assessment of the levels of electromagnetic fields to which employees may be exposed.

- (2) Where regulation 4(1) applies—
  - (a) the assessment must demonstrate whether that regulation is complied with, if necessary through the use of calculations and measurements; and
  - (b) the employer may, in accordance with the Schedule(7), assess exposure against the ALs in order to determine that specific ELVs are not exceeded.
- (3) The assessment may take into account—
  - (a) emission information and other safety related data provided by the manufacturer or distributor of equipment;
  - (b) industry standards and guidelines;
  - (c) guidance produced by the European Commission; and
  - (d) guidance produced by the Executive.
- (4) The employer must review the assessment when—
  - (a) there is reason to suspect it is no longer valid; or
  - (b) there has been a significant change in the matters to which it relates,and make such changes to it as are necessary to ensure it remains suitable and sufficient.

### **Application of regulations 7 to 9**

- 6.—(1)** Regulation 7 does not apply—
  - (a) where the most recent exposure assessment under regulation 5 demonstrates compliance with regulation 4(1); or
  - (b) in relation to activities set out in regulation 4(3).
- (2) Regulations 8 and 9 do not apply where—

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(5) 2006 c.52. The definition of “the reserve forces” was amended by section 44 of the Defence Reform Act 2014 (c.20).

(6) 1952 c.67. The definition of “visiting force” was amended by paragraph 14 of Schedule 15 to the Criminal Justice Act 1988 (c.33).

(7) See paragraphs 3 and 4 of Part 1 of the Schedule.

- (a) the most recent exposure assessment under regulation 5 demonstrates that employees are not exposed to electromagnetic field levels in excess of the ELVs;
- (b) the indirect effect ALs are not exceeded; and
- (c) there are no employees at particular risk.

(3) In paragraph (2)(b), “indirect effect ALs” means the Low ALs in Table AL1, and the ALs in Tables AL5 to AL7, in the Schedule.

### **Action plan**

7.—(1) The employer must make and implement a suitable and sufficient action plan to ensure compliance with regulation 4(1).

(2) The action plan must include consideration of, where relevant—

- (a) other working methods that entail lower exposure to electromagnetic fields;
- (b) replacement equipment designed to reduce the level of exposure;
- (c) technical measures to reduce the emission of electromagnetic fields, including, where necessary, the use of interlocks, screening or similar health protection mechanisms;
- (d) demarcation and access control measures;
- (e) maintenance programmes for work equipment, workplaces and workstation systems;
- (f) the design and layout of workplaces and workstations;
- (g) limitations on the duration and intensity of exposure; and
- (h) the availability of suitable personal protective equipment.

(3) Where, despite the measures taken under paragraph (1), the exposure of employees exceeds any ELV the employer must, as soon as is reasonably practicable, identify and implement any changes to the action plan which are necessary to ensure compliance with regulation 4(1).

### **Risk assessment**

8.—(1) The employer must make a suitable and sufficient assessment of the risks to employees arising from their exposure to electromagnetic fields.

(2) The risk assessment must include consideration of, where relevant—

- (a) the ALs and ELVs;
- (b) the frequency range, level, duration and type of exposure, including its distribution over the employee’s body and the workplace;
- (c) direct biophysical effects;
- (d) replacement equipment designed to reduce the level of exposure;
- (e) information obtained from any health surveillance or medical examinations provided under regulation 11;
- (f) information provided by the manufacturer or distributor of equipment;
- (g) multiple sources of exposure;
- (h) simultaneous exposure to multiple frequency fields;
- (i) indirect effects;
- (j) any effects on employees at particular risk; and
- (k) other health and safety related information.

(3) The risks referred to in paragraph (1) do not include the risk of effects—

- (a) caused by contact with live conductors;
  - (b) caused by multiple and separate instances of exposure; or
  - (c) which continue to develop when exposure has ceased.
- (4) The employer must review the assessment when—
- (a) there is reason to suspect it is no longer valid; or
  - (b) there has been a significant change in the matters to which it relates,
- and make such changes to it as are necessary to ensure it remains suitable and sufficient.

### **Obligation to eliminate or reduce risks**

**9.**—(1) The employer must ensure that, so far as is reasonably practicable, the risks identified in the most recent risk assessment under regulation 8 are eliminated or reduced to a minimum.

- (2) Measures taken under paragraph (1) must—
- (a) be based on the general principles of prevention set out in Schedule 1 to the Management of Health and Safety at Work Regulations 1999<sup>(8)</sup>; and
  - (b) take into account technical progress, the potential to restrict access to parts of the workplace, and the availability of measures to control the production of electromagnetic fields at source.

## **PART 3**

### **MISCELLANEOUS**

#### **Information and training**

**10.** The employer must provide relevant information and training to any employees who are likely to be subjected to the risks identified in the most recent risk assessment under regulation 8, including in relation to—

- (a) the measures taken under regulation 9;
- (b) the concepts and values of the ALs and ELVs and the possible risks associated with them;
- (c) the possible indirect effects of exposure;
- (d) the results of the most recent exposure assessment under regulation 5;
- (e) how to detect and report sensory and health effects;
- (f) the circumstances in which employees are entitled to health surveillance and medical examinations under regulation 11;
- (g) safe working practices; and
- (h) any additional measures taken in respect of employees at particular risk.

#### **Health surveillance and medical examinations**

**11.**—(1) The employer must ensure that health surveillance and medical examinations are provided as appropriate to any employee who—

- (a) is exposed to electromagnetic field levels in excess of the health effect ELVs; and
- (b) reports experiencing a health effect to that employer.

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<sup>(8)</sup> S.I. 1999/3242, to which there are amendments not relevant to these Regulations.

(2) Any health surveillance or medical examinations must be provided during any reasonable hours chosen by the employee.

(3) The employer must keep a suitable record of any health surveillance and medical examinations provided.

(4) In paragraph (1)(a), “health effect ELVs” means the health effect ELVs set out in Part 2 of the Schedule.

## Records

**12.** An employer who employs five or more employees must—

- (a) record the significant findings of the most recent exposure assessment under regulation 5; and
- (b) where required to make them, record—
  - (i) the most recent action plan under regulation 7; and
  - (ii) the significant findings of the most recent risk assessment under regulation 8.

## Exemptions

**13.—**(1) The Executive may by a certificate in writing exempt employers from the requirements of regulations 4(1) and 7 in relation to one or more work activities.

(2) An exemption under paragraph (1) must be limited in time and subject to the conditions that—

- (a) the exposure of employees to electromagnetic fields is as low as is reasonably practicable; and
- (b) employees are protected against any health effects and safety risks related to that exposure.

(3) The Executive may amend or revoke an exemption at any time by a further certificate in writing.

## Application outside Great Britain

**14.** These Regulations apply outside Great Britain as sections 1 to 59 and 80 to 82 of the 1974 Act apply by virtue of the Health and Safety at Work etc. Act 1974 (Application outside Great Britain) Order 2013(9).

## Review

**15.—**(1) The Secretary of State must from time to time—

- (a) carry out a review of these Regulations;
- (b) set out the conclusions of the review in a report; and
- (c) publish the report.

(2) In carrying out the review the Secretary of State must, so far as is reasonable, have regard to how the Directive is implemented in other Member States.

(3) The report must in particular—

- (a) set out the objectives intended to be achieved by the Directive and by these Regulations;
- (b) assess the extent to which those objectives are achieved; and
- (c) assess whether those objectives remain appropriate and, if so, the extent to which they could be achieved with a system that imposes less regulation.

(4) The first report under this regulation must be published before the end of the period of five years beginning with the day on which these Regulations come into force.

(5) Reports under this regulation must afterwards be published at intervals not exceeding five years.

(6) In paragraphs (2) and (3), “the Directive” means [Directive 2013/35/EU](#)(**10**) of the European Parliament and of the Council of 26 June 2013 on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (electromagnetic fields) (20th individual Directive within the meaning of Article 16(1) of [Directive 89/391/EEC](#)) and repealing [Directive 2004/40/EC](#).

Signed by authority of the Secretary of State for Work and Pensions

17th May 2016

*Justin Tomlinson*  
Parliamentary Under Secretary of State,  
Department of Work and Pensions

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(10) OJ No L 179, 29.6.2013, p1-21.

## SCHEDULE

Regulations 2, 4, 5, 6 and 11

## PART 1

## Introduction to Parts 2 and 3

## 1. In this Schedule—

“contact current ( $I_C$ )” is the current created when a person comes into contact with an object in an electromagnetic field, expressed in ampères (A);

“external electric field strength (E)” is a vector quantity corresponding to the force exerted on a charged particle in the environment, irrespective of its motion in space, expressed in volts per metre ( $Vm^{-1}$ );

“internal electric field strength (E)” is a vector quantity corresponding to the force exerted on a charged particle inside the human body, irrespective of its motion in space, expressed in volts per metre ( $Vm^{-1}$ );

“limb current ( $I_L$ )” is the current induced in the limbs of a person exposed to electromagnetic fields in the frequency range from 10 MHz to 110 MHz, expressed in ampères (A);

“magnetic flux density (B)” is a vector quantity resulting in a force that acts on moving charges, expressed in tesla (T);

“power density (S)” is the radiant power incident perpendicular to a surface, divided by the area of the surface, expressed in watts per square metre ( $Wm^{-2}$ );

“specific energy absorption (SA)” is the energy absorbed per unit mass of biological tissue, expressed in joules per kilogram ( $Jkg^{-1}$ );

“specific energy absorption rate (SAR)” is the rate at which energy is absorbed per unit mass of body tissue, expressed in watts per kilogram ( $Wkg^{-1}$ ).

## 2. The ALs and ELVs are set out in tables and grouped according to their potential effects, being—

- (a) thermal effects, related to the heating of tissue due to its absorption of electromagnetic fields; and
- (b) non-thermal effects, related to the stimulation of nerves or sensory organs due to the presence of electromagnetic fields.

## 3. The Low ALs in Table AL1 in Part 2, and the ALs in Part 3, specify the electromagnetic field levels above which specific indirect effects may occur.

4. The remaining ALs in Part 2 are defined physical quantities related to the direct biophysical effects of exposure to electromagnetic fields. Employers may, as part of their exposure assessment, assess electromagnetic field levels against these ALs. Each AL table states which ELV or ELVs will be complied with if electromagnetic field levels at a particular frequency do not exceed that AL. Exposure to electromagnetic field levels in excess of the AL may still be below the relevant ELV but the employer will have to undertake further assessment to determine this under regulation 5.

## 5. Except where otherwise indicated—

- (a) “f” is the frequency expressed in hertz;
- (b) the ALs and ELVs relate to exposure in any part of the body; and
- (c) notes to the tables apply only to the table under which they appear.



6. The applicable safety measures referred to in regulation 4(2) are those required by the notes to the table or tables containing the sensory effect ELV which is to be exceeded, being—

- (a) the note to Table ELV1; and
- (b) note 2 to Tables ELV3 and ELV5.

## PART 2

### Direct biophysical effects of exposure

#### Action levels – non-thermal effects

**Table AL1 – ALs for exposure to electromagnetic fields from 1 Hz to 10 MHz**

<i>Frequency range</i>	<i>External electric field strength Low ALs (E) [Vm<sup>-1</sup>]</i>	<i>External electric field strength High ALs (E) [Vm<sup>-1</sup>]</i>
$1 \leq f < 25 \text{ Hz}$	$2.0 \times 10^4$	$2.0 \times 10^4$
$25 \leq f < 50 \text{ Hz}$	$5.0 \times 10^5/f$	$2.0 \times 10^4$
$50 \text{ Hz} \leq f < 1.64 \text{ kHz}$	$5.0 \times 10^5/f$	$1.0 \times 10^6/f$
$1.64 \leq f < 3 \text{ kHz}$	$5.0 \times 10^5/f$	$6.1 \times 10^2$
$3 \text{ kHz} \leq f \leq 10 \text{ MHz}$	$1.7 \times 10^2$	$6.1 \times 10^2$
Exposure levels not exceeding the ALs will be compliant with:	Tables ELV2 and ELV3	

#### Notes

1. Between the Low and High ALs, exposure will be below the ELVs but spark discharges may occur. These can be prevented through the provision of information and training under regulation 10 and the use of suitable technical and personal protection measures.

2. The ALs in Tables AL1 and AL2 are root mean square (RMS) values of the field strength. These RMS values are equal to the peak values divided by  $\sqrt{2}$  for sinusoidal fields. The corresponding ELVs in Tables ELV2 and ELV3 are peak values in time, which are equal to the RMS values multiplied by  $\sqrt{2}$  for sinusoidal fields. In the case of non-sinusoidal fields the exposure assessment under regulation 5 must be based on the weighted peak method (filtering in time domain) or on a scientifically proven and validated exposure evaluation procedure which produces comparable results to the weighted peak method.

3. The ALs represent the maximum field values at any place where an employee may be working, before the entry of any person into the field. In the case of an electromagnetic field source in the immediate vicinity of the body, compliance with the ELVs must be determined dosimetrically, case by case.

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**Table AL2 – ALs for exposure to electromagnetic fields from 1 Hz to 10 MHz**

<i>Frequency range</i>	<i>Magnetic flux density Low ALs (B)[<math>\mu T</math>]</i>	<i>Magnetic flux density High ALs (B)[<math>\mu T</math>]</i>	<i>Magnetic flux density ALs for exposure of limbs to a localised magnetic field (B) [<math>\mu T</math>]</i>
$1 \leq f < 8 \text{ Hz}$	$2.0 \times 10^5/f^2$	$3.0 \times 10^5/f$	$9.0 \times 10^5/f$
$8 \leq f < 25 \text{ Hz}$	$2.5 \times 10^4/f$	$3.0 \times 10^5/f$	$9.0 \times 10^5/f$
$25 \leq f < 300 \text{ Hz}$	$1.0 \times 10^3$	$3.0 \times 10^5/f$	$9.0 \times 10^5/f$
$300 \text{ Hz} \leq f < 3 \text{ kHz}$	$3.0 \times 10^5/f$	$3.0 \times 10^5/f$	$9.0 \times 10^5/f$
$3 \text{ kHz} \leq f \leq 10 \text{ MHz}$	$1.0 \times 10^2$	$1.0 \times 10^2$	$3.0 \times 10^2$
Exposure levels not exceeding the ALs will be compliant with:	At and below 400 Hz: the sensory effect ELVs in Table ELV3	The health effect ELVs in Table ELV2	
	Above 400 Hz: the health effect ELVs in Table ELV2		

#### Notes

1. Between the Low and High ALs for exposure up to 400 Hz, exposure in the head of the employee will be below the health effect ELVs but may exceed the sensory effect ELVs in Table ELV3.

2. Notes 2 and 3 to Table AL1 apply.

Action levels – thermal effects

**Table AL3 – ALs for exposure to electromagnetic fields from 100 kHz to 300 GHz**

<i>Frequency range</i>	<i>External electric field strength ALs (E) [<math>Vm^{-1}</math>]</i>	<i>Magnetic flux density ALs (B) [<math>\mu T</math>]</i>	<i>Power density AL (S)[<math>Wm^{-2}</math>]</i>
$100 \text{ kHz} \leq f < 1 \text{ MHz}$	$6.1 \times 10^2$	$2.0 \times 10^6/f$	
$1 \leq f < 10 \text{ MHz}$	$6.1 \times 10^8/f$	$2.0 \times 10^6/f$	
$10 \leq f < 400 \text{ MHz}$	61	0.2	
$400 \text{ MHz} \leq f < 2 \text{ GHz}$	$3 \times 10^{-3} f^{1/2}$	$1.0 \times 10^{-5} f^{1/2}$	
$2 \leq f < 6 \text{ GHz}$	$1.4 \times 10^2$	$4.5 \times 10^{-1}$	
$6 \leq f \leq 300 \text{ GHz}$	$1.4 \times 10^2$	$4.5 \times 10^{-1}$	50
Exposure levels not exceeding the ALs will be compliant with:	Up to 6 GHz: the health effect ELVs in Table ELV4	The health effect ELV in Table ELV6	

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<i>Frequency range</i>	<i>External electric field strength ALs (E) [Vm<sup>-1</sup>]</i>	<i>Magnetic flux density ALs (B) [μT]</i>	<i>Power density AL (S)[Wm<sup>-2</sup>]</i>
	6 - 300 GHz: the health effect ELV in Table ELV6		

**Notes**

1. The electric field strength and magnetic flux density ALs are root mean square values.
2. For radiofrequency pulses, the peak power density averaged over the pulse width must not exceed 1000 times the respective AL (S) value. For multi-frequency fields, the analysis must be based on summation.
3. Note 3 to Table AL1 applies in relation to the ALs for external electric field strength and magnetic flux density.
4. The power density is the maximum level averaged over any 20cm<sup>2</sup> of exposed area. Spatial maximum power densities averaged over 1cm<sup>2</sup> must not exceed 20 times the value of 50 Wm<sup>-2</sup>.
5. From 6 to 10 GHz, power density must be averaged over a six minute period. Above 10 GHz, it must be averaged over a 68/f<sup>1.05</sup>-minute period (where “f” is the frequency in GHz).

**Table AL4 – AL for exposure to electromagnetic fields from 10 to 110MHz**

<i>Frequency range</i>	<i>Limb current AL (I<sub>L</sub>) [mA]</i>
10 ≤ f ≤ 110 MHz	100
Exposure levels not exceeding the ALs will be compliant with:	The health effect ELV in Table ELV4 - localised SAR in the limbs

**Note**

The AL is a root mean square value.

Exposure limit values – non-thermal effects

**Table ELV1 – ELVs for exposure to electromagnetic fields from 0 to 1 Hz**

	<i>Sensory effect ELVs – magnetic flux density (B<sub>0</sub>) [T]</i>
Head and trunk	2
Limbs	8
	Health effect ELV – magnetic flux density (B <sub>0</sub> ) [T]
Any part of the body	8

**Note**

The sensory effect ELVs may be exceeded during an employee’s shift where the employer ensures that—

- (a) they are only exceeded temporarily;

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- (b) protection measures have been adopted which minimise, so far as is reasonably practicable, the sensory effects related to movement in static magnetic fields, including nausea and vertigo;
- (c) adequate information is provided to the employee on the possibility of those sensory effects; and
- (d) where any of those sensory effects are reported to the employer, the exposure assessment under regulation 5, and the protection measures, are updated where necessary.

**Table ELV2 – Health effect ELVs for exposure to electromagnetic fields from 1 Hz to 10 MHz**

<i>Frequency range</i>	<i>Health effect ELVs – internal electric field strength (E) [Vm<sup>-1</sup>]</i>
1 Hz ≤ f < 3 kHz	1.1
3 kHz ≤ f ≤ 10 MHz	3.8 × 10 <sup>-4</sup> f

#### Notes

1. The ELVs are limits for electric fields induced in the body from exposure to time-varying electric and magnetic fields.
2. The ELVs are spatial peak values in the entire body of the employee.
3. Note 2 to Table AL1 applies in relation to methods of determining exposure.

**Table ELV3 – Sensory effect ELVs for exposure to electromagnetic fields from 1 to 400 Hz**

<i>Frequency range</i>	<i>Sensory effect ELVs – internal electric field strength in the head (E) [Vm<sup>-1</sup>]</i>
1 ≤ f < 10 Hz	0.7/f
10 ≤ f < 25 Hz	0.07
25 ≤ f ≤ 400 Hz	0.0028 f

#### Notes

1. The ELVs are spatial peak values induced in the head of the exposed employee, and can arise from exposure to either external electric or external magnetic fields.
2. The ELVs may be exceeded during an employee's shift where the employer ensures that—
  - (a) they are only exceeded temporarily;
  - (b) hazardous spark discharges, and contact currents in excess of those in Table AL5, are prevented through the provision of information and training under regulation 10 and the use of suitable technical and personal protection measures;
  - (c) adequate information is provided to the employee on the possibility of sensory effects related to time-varying magnetic fields, including retinal phosphenes; and
  - (d) where any of those sensory effects are reported to the employer, the risk assessment is updated where necessary.
3. Note 2 to Table AL1 applies in relation to methods of determining exposure.

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### Exposure limit values – thermal effects

**Table ELV4 – Health effect ELVs for exposure to electromagnetic fields from 100 kHz to 6 GHz**

<i>Area of exposure</i>	<i>Health effect ELVs – specific energy absorption rate (SAR) [Wkg<sup>-1</sup>]</i>
Whole body	0.4 (averaged SAR in the body)
Head and trunk	10 (localised SAR in the head and trunk)
Limbs	20 (localised SAR in the limbs)

#### Notes

1. The ELVs correspond to the SAR values averaged over a six minute period.
2. Localised SAR in the body and limbs can be assessed by either computational dosimetry or physical measurement of 10 grams of tissue. For computational dosimetry, 10 grams of contiguous tissue with approximately homogeneous electrical properties must be used for the SAR average. For direct physical measurements a simple geometry, such as cubic or spherical tissue mass, may be used. The maximum value obtained must be assessed against the ELVs.

**Table ELV5 – Sensory effect ELV for exposure to electromagnetic fields from 300 MHz to 6 GHz**

<i>Frequency range</i>	<i>Sensory effect ELV – specific energy absorption in the head (SA) [mJkg<sup>-1</sup>]</i>
300 MHz ≤ f ≤ 6GHz	10

#### Notes

1. When determining SA, energy absorption must be averaged over 10 grams of tissue.
2. The ELV may be exceeded during an employee’s shift where the employer ensures that—
  - (a) it is only exceeded temporarily;
  - (b) adequate information is provided to the employee on the possibility of sensory effects related to pulsed microwave radiation, including auditory sensations; and
  - (c) where any of those sensory effects are reported to the employer, the risk assessment is updated where necessary.

**Table ELV6 – Health effect ELV for exposure to electromagnetic fields from 6 to 300 GHz**

<i>Frequency range</i>	<i>Health effect ELV – power density (S) [Wm<sup>-2</sup>]</i>
6 GHz ≤ f ≤ 300GHz	50

#### Notes

1. The power density is the maximum level averaged over any 20cm<sup>2</sup> of exposed area. Spatial maximum power densities averaged over 1cm<sup>2</sup> must not exceed 20 times the value of 50 Wm<sup>-2</sup>.

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2. From 6 to 10 GHz, power density must be averaged over a six minute period. Above 10 GHz, it must be averaged over a  $68/f^{1.05}$ -minute period (where “f” is the frequency in GHz).

### PART 3

#### Indirect effects of exposure

#### Action levels – non-thermal effects

**Table AL5 – ALs for contact currents**

<i>Frequency of electromagnetic field in which an object is present</i>	<i>Contact current ALs (I<sub>C</sub>) [mA]</i>
up to 2.5 kHz	1.0
$2.5 \leq f < 100$ kHz	0.4 f
$100 \leq f \leq 10,000$ kHz	40

#### Notes

1. “f” is the frequency expressed in kHz.
2. The ALs are root mean square values.
3. The ALs represent the maximum steady state current created during a continuous contact with an object in an electromagnetic field.

**Table AL6 – ALs for static magnetic fields**

<i>Potential indirect effect</i>	<i>Magnetic flux density ALs (B<sub>0</sub>) [mT]</i>
Interference with active implanted medical devices	0.5
Attraction and projectile risk in the fringe field of high field strength sources (> 100 mT)	3

#### Note

The AL for interference with active implanted medical devices represents the maximum field value at any place where an employee may be working.

#### Action levels – thermal effects

**Table AL7 – AL for contact currents**

<i>Frequency of electromagnetic field in which an object is present</i>	<i>Contact current AL (I<sub>C</sub>) [mA]</i>
$100 \text{ kHz} \leq f < 110 \text{ MHz}$	40

#### Notes

1. The AL is a root mean square value.

2. The AL represents the maximum steady state current created during a continuous contact with an object in an electromagnetic field.

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## EXPLANATORY NOTE

*(This note is not part of the Regulations)*

These Regulations implement, as respects Great Britain, [Directive 2013/35/EU](#) of the European Parliament and of the Council (OJ No L 179, 29.6.2013, p1–21) on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (electromagnetic fields) (20th individual Directive within the meaning of Article 16(1) of [Directive 89/391/EEC](#)) and repealing [Directive 2004/40/EC](#).

These Regulations apply in Great Britain, and outside Great Britain to the extent provided by regulation 14.

Part 2 sets out the main duties placed on employers under the Regulations. Part 3 sets out supplementary duties and gives the Health and Safety Executive (“the Executive”) limited powers to exempt employers from specific duties. The Schedule provides more specific details on how employers are to comply with their duties.

The main duties and provisions in Parts 2 and 3 of these Regulations are as follows—

- (a) all employers must ensure that, except in circumstances prescribed by the Regulations or where permitted under an exemption issued by the Executive, employees are not exposed to electromagnetic field levels in excess of prescribed exposure limits (regulation 4(1)). These limits are contained in Part 2 of the Schedule;
- (b) all employers must assess the levels of electromagnetic fields to which their employees may be exposed (regulation 5(1));
- (c) all employers must, except in the circumstances prescribed by regulation 6—
  - (i) make and implement an action plan to reduce exposure levels (regulation 7(1)); and
  - (ii) assess the risks posed to employees by their exposure to electromagnetic fields (regulation 8(1));
- (d) where employers are required to assess the risks of exposure to electromagnetic fields, they must—
  - (i) ensure that any risks identified in that assessment are eliminated or reduced to a minimum (regulation 9(1)); and
  - (ii) provide information and training to employees likely to be subjected to the risks identified in that assessment (regulation 10);
- (e) all employers must, in the circumstances prescribed by regulation 11(1), ensure that health surveillance and medical examinations are provided as appropriate;
- (f) the Executive may exempt employers from having to comply with the exposure limits in respect of one or more work activities (regulation 13(1)). An exemption must be limited in time and subject to prescribed safety conditions.

A full impact assessment of the effect that these Regulations will have on the costs of business has been prepared and can be obtained from the Health and Safety Executive, Economic Advisers Unit,

**Status:** *This is the original version (as it was originally made). This item of legislation is currently only available in its original format.*

Redgrave Court, Merton Road, Bootle, Merseyside L20 7HS. The transposition note in relation to the implementation of the Directive can be obtained at the same address. Copies of both these documents have been placed in the libraries of both Houses of Parliament and are annexed to the Explanatory Memorandum, which is available alongside these Regulations at [www.legislation.gov.uk](http://www.legislation.gov.uk).