European Commission

Non-binding guide
to good practice
for implementing
Directive 2013/35/EU

# Electromagnetic Fields

## Guide for SMEs

Social Europe

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# Electromagnetic Fields

## Guide for SMEs

**European Commission**
Directorate-General
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# 1. INTRODUCTION AND PURPOSE OF THIS GUIDE

The presence of electromagnetic fields (EMF) covered by the EMF Directive (Directive 2013/35/EU) is a fact of life in the developed world as they are generated whenever electricity is used. For most workers field strengths are at a level that will not cause any adverse effects. However, in some workplaces field strengths may present a risk and the EMF Directive exists to ensure the safety and health of workers in these situations. One of the main difficulties facing employers is how to recognise whether they need to take further specific action, or not.

## 1.1 How to Use This Guide

This guide is aimed primarily at small and medium-sized enterprises. However, it may also be useful for workers, worker representatives and regulatory authorities in Member States.

It will assist you to carry out an initial assessment of the risks from EMF in your workplace. Based on the outcome of this assessment, it will help you decide whether you need to take any further action as a result of the EMF Directive.

This guide is designed to help you understand how the work you carry out may be affected by the EMF Directive. It is not legally binding and does not provide an interpretation of specific legal requirements that you may have to comply with. It should therefore be read in conjunction with the EMF Directive, the Framework Directive (89/391/EEC) and relevant national legislation.

The EMF Directive lays down the minimum safety requirements regarding the exposure of workers to risks arising from electromagnetic fields. However, few employers will need to calculate or measure the levels of EMF in their workplace. In most cases the nature of the work carried out is such that risks will be low and this can be established fairly simply.

This guide is designed so that employers who are already compliant will be able to establish that quickly.

More detailed information, including on exposure assessment and preventive measures, can be found in the **comprehensive non-binding guide to good practice for implementing Directive 2013/35/EU Volumes I and II.**

**Table 1.1 — Path for the assessment of risks from electromagnetic fields**

| |
|---|
| If all risks from electromagnetic fields in the workplace are low then no further action is required.<br><br>Employers will wish to record that they have reviewed their workplace and reached this conclusion. |
| If risks from electromagnetic fields are not low, or the risk is unknown, employers should follow a process to assess the risk and implement appropriate precautions, if necessary. |
| It is possible that the conclusion is that there is no significant risk. In this case the assessment should be recorded and the process stops here. |
| To assist with the risk assessment generally and specifically to assess compliance with action levels or exposure limit values, employers may need information on the level of EMF. This may be available from databases or manufacturers or it may be necessary to perform calculations or measurements. |
| Preventative and protective measures may need to be taken where it is necessary to reduce the risk. |

## 1.2 Introduction to the EMF Directive

All employers have a duty to assess the risks arising from the work they undertake and to put in place protective or preventive measures to reduce the risks they identify. These duties are a requirement of the Framework Directive. The EMF Directive was introduced to help employers to comply with their general duties under the Framework Directive for the specific case of EMF in the workplace. As employers will already be complying with the requirements of the Framework Directive, most will find that they already fully comply with the EMF Directive and have nothing more to do.

Electromagnetic fields are produced by a wide range of sources that workers may encounter in the workplace. They are generated and used in many work activities, including manufacturing processes, research, communication, medical applications, power generation, transmission and distribution, broadcasting, aeronautical and marine navigation, and security. Electromagnetic fields may also be incidental, such as the fields that are generated near to cables distributing electrical power within buildings, or resulting from the use of electrically powered equipment and appliances. As most fields are electrically generated, they will disappear when the power is switched off.

The EMF Directive addresses established direct and indirect effects caused by electromagnetic fields; it does not cover suggested long-term health effects. The direct effects are separated into non-thermal effects, such as the stimulation of nerves, muscles and sensory organs and thermal effects, such as tissue heating. Indirect effects occur where the presence of an object within an electromagnetic field may become the cause of a safety or health hazard.

## 1.3 Scope of This Guide

This guide is intended to provide practical advice to help SMEs comply with the EMF Directive. Although the EMF Directive does not specifically exclude any particular type of work or technologies, the fields in many workplaces will be so weak that there is no risk. This guide provides a list of generic work activities, equipment and workplaces where fields are expected to be so weak that employers will not need to take any further action.

The EMF Directive requires employers to consider workers who are likely to be at particular risk, including workers who wear active or passive implanted medical devices, such as cardiac pacemakers, workers with medical devices worn on the body, such as insulin pumps, and pregnant workers. This guide provides advice in these situations.

There will be some potential exposure scenarios that are highly specific or very complex and therefore beyond the scope of this guide. Some industries with particular exposure scenarios may develop their own guidance in relation to the EMF Directive and this should be consulted where appropriate. Employers with complex exposure scenarios should seek further advice on assessment (for details see Chapter 8 and Appendix I of the comprehensive non-binding guide to good practice for implementing Directive 2013/35/EU).

## 1.4 National Regulations and Sources of Further Information

Use of this guide does not necessarily ensure compliance with statutory electromagnetic fields protection requirements in the various EU Member States. The rules of law by which the Member States have transposed Directive 2013/35/EU always take precedence. These may go beyond the minimum requirements of the EMF Directive, on which this guide is based. Further information may be available from the national regulatory authorities.

As a further aid to implementing the requirements of the EMF Directive, manufacturers may design their products to minimise accessible EMF. They may also provide information on the fields and risks associated with equipment in normal use.

# 2. HEALTH EFFECTS AND SAFETY RISKS FROM ELECTROMAGNETIC FIELDS

The type of effect that electromagnetic fields have in people depends primarily on the frequency and intensity: other factors such as the shape of the waveform may also be important in some situations. Some fields cause stimulation of sensory organs, nerves and muscle, while others cause heating. The effects caused by heating are termed *thermal effects* by the EMF Directive, while all other effects are termed *non-thermal effects*.

Importantly, all these effects show a threshold below which there is no risk, and exposures below the threshold are not cumulative in any way. The effects caused by exposure are transient being limited to the duration of exposure, and they will stop or decrease once exposure ceases. This means that there can be no further risk to health once exposure has ended.

## 2.1 Direct Effects

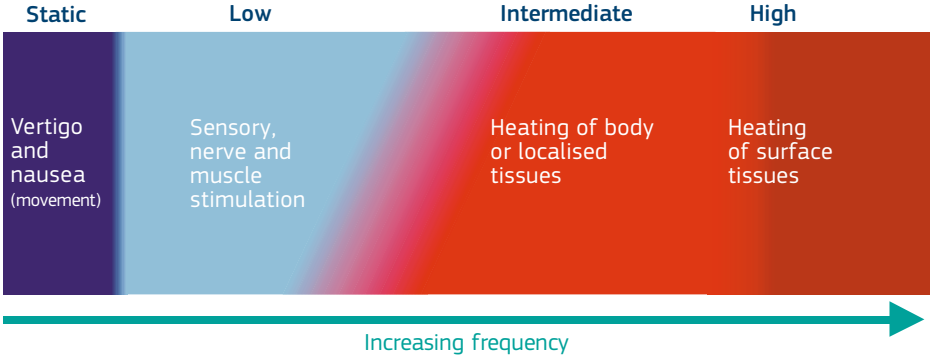
Direct effects are changes that occur in a person as a result of being exposed to an electromagnetic field. The EMF Directive only considers well-understood effects that are based on known mechanisms. It distinguishes between sensory effects and health effects, which are considered to be more serious.

The direct effects are:

- vertigo and nausea from static magnetic fields (typically associated with movement, but may also occur when stationary)
- effects on sense organs, nerves and muscles from low frequency fields (up to 100 kHz)
- heating of the whole body or parts of it from high frequency fields (10 MHz and above); above a few GHz heating is increasingly limited to the surface of the body
- effects on nerves, muscles and heating from intermediate frequencies (100 kHz — 10 MHz)

These concepts are illustrated in Figure 2.1.

**Figure 2.1 — The effect of EMF in different frequency ranges (frequency intervals are not to scale)**



## 2.2 Long-term Effects

The EMF Directive does not address suggested long-term effects of exposure to electromagnetic fields, since there is currently no well-established scientific evidence of a causal relationship. However, if such well-established scientific evidence emerges, the European Commission will consider the most appropriate means for addressing such effects.

## 2.3 Indirect Effects

Undesirable effects may occur due to the presence of objects in the field resulting in a safety or health hazard. Contact with a live conductor is not within the scope of the EMF Directive.

The indirect effects are:

- interference with medical electronic equipment and other devices
- interference with active implanted medical devices or equipment, such as cardiac pacemakers or defibrillators
- interference with medical devices worn on the body, such as insulin pumps
- interference with passive implants (artificial joints, pins, wires or plates made of metal)
- effects on shrapnel, body piercings, tattoos and body art
- projectile risk from loose ferromagnetic objects in a static magnetic field
- unintentional initiation of detonators
- fires or explosions from ignition of flammable or explosive material
- electric shocks or burns from contact currents when a person touches a conductive object in an electromagnetic field and one of them is grounded whilst the other is not

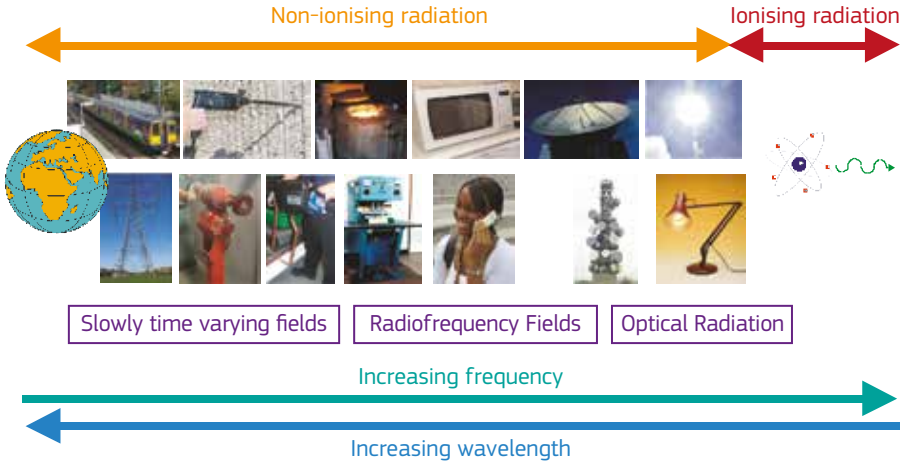
**Key message: effects of EMF**

EMF in the workplace may cause direct or indirect effects. Direct effects are those arising from an interaction of the fields with the body and may be either non-thermal or thermal in nature. Indirect effects result from the presence of an object in the field resulting in a safety or health hazard.

# 3. SOURCES OF ELECTROMAGNETIC FIELDS

Everyone in our modern society is exposed to electric and magnetic fields from many sources including electrical equipment, broadcast transmissions and communications devices (Figure 3.1). The majority of sources of electromagnetic fields found both at home and in the workplace produce extremely low levels of exposure and such most common work activities are unlikely to give rise to exposures in excess of the action levels (ALs) or the exposure limit values (ELVs) established by the EMF Directive.

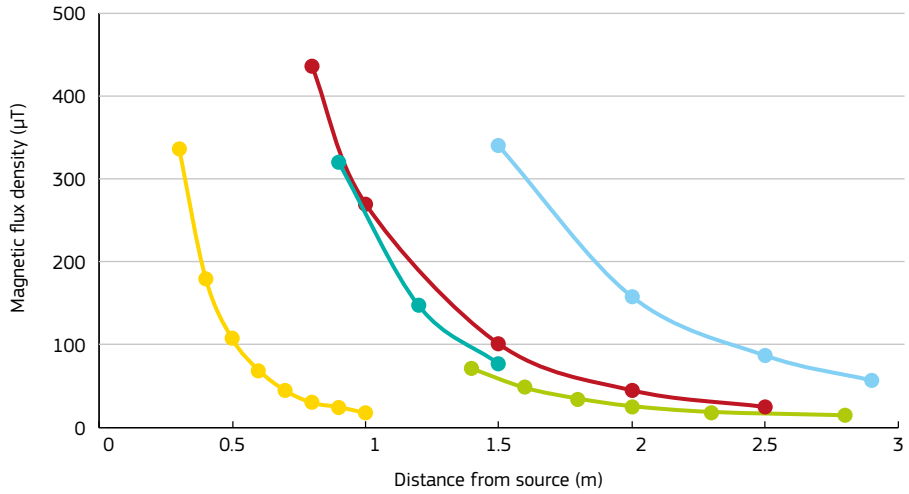
**Figure 3.1 — Schematic representation of electromagnetic spectrum showing some typical sources**




The aim of this guide is to provide employers with information on the sources of EMF found within the work environment to help them decide whether further assessment of the risks from EMF is required. The extent and magnitude of electromagnetic fields produced will depend on the voltages, currents and frequencies that the equipment operates at or generates, along with the design of the equipment. Some equipment may be designed to intentionally generate external electromagnetic fields. In this case, small low-powered equipment may give rise to significant external electromagnetic fields. Generally equipment that uses high currents, high voltages or that is designed to emit electromagnetic radiation will require further assessment.

The magnitude of an electromagnetic field will decrease rapidly with distance from its source (Figure 3.2). Worker exposure can be reduced if it is possible to restrict access to areas close to the equipment when the equipment is in operation. It is also worth remembering that electromagnetic fields, unless generated by a permanent magnet or superconducting magnet, will normally disappear when the power is removed from the equipment.

Figure 3.2 — **Decrease in magnetic flux density with distance for a variety of power frequency sources: spot welder (●—●); 0.5 m demagnetising coil (●—●); 180 kW induction furnace (●—●); 100kVA seam welder (●—●); 1 m demagnetising coil (●—●)**




The following sections of this guide aim to help employers distinguish between, equipment, activities and situations that are unlikely to present a hazard and those where protective or preventative measures may be needed to protect employees.

## 3.1 Workers at Particular Risk

Some groups of workers (see Table 3.1) are considered to be at particular risk from electromagnetic fields. These workers may not be adequately protected by the ALs specified in the EMF Directive and so it is necessary for employers to consider their exposure separately to that of other workers.

Workers at particular risk will normally be adequately protected by compliance with the reference levels specified in Council Recommendation 1999/519/EC. However, for a very small minority even these reference levels may not provide adequate protection. These individuals will have received appropriate advice from the medical practitioner responsible for their care, and this should assist the employer to establish whether the individual is at risk in the workplace.

**Table 3.1 Workers at particular risk as identified in the EMF Directive**

| Workers at particular risk | Examples |
|---|---|
| Workers wearing active implanted medical devices (AIMD) | Cardiac pacemakers, cardiac defibrillators, cochlear implants, brainstem implants, inner ear prostheses, neurostimulators, retinal encoders, implanted drug infusion pumps |
| Workers wearing passive implanted medical devices containing metal | Artificial joints, pins, plates, screws, surgical clips, aneurism clips, stents, heart valve prostheses, annuloplasty rings, metallic contraceptive implants, and cases of AIMD |
| Workers wearing body-worn medical devices | External hormone infusion pumps |
| Pregnant workers | |

*NB*: in considering whether workers may be at particular risk, employers should give consideration to the frequency, level and duration of exposure

### 3.1.1 Workers wearing active implanted medical devices (AIMD)

One group of workers at particular risk are those wearing active implanted medical devices (AIMD). This is because strong electromagnetic fields may interfere with the normal operation of these active implants. There is a legal requirement for device manufacturers to ensure that their products have reasonable immunity to interference and they are routinely tested for field strengths that might be encountered in the public environment. As a result field strengths up to the reference levels specified in Council Recommendation 1999/519/EC should not adversely affect the operation of these devices. However, field strengths above these reference levels *at the position of the device or its sensing leads* (when present) may result in a malfunction, which would present a risk to those wearing them.

Although some of the work situations discussed in this guide may give rise to strong fields, in many cases these will be highly localised. The risk can therefore be managed by ensuring that the strong field is not generated in the immediate vicinity of the implant. For example, the field produced by a mobile phone could interfere with a cardiac pacemaker if the phone was held close to the device. Nevertheless, people wearing cardiac pacemakers can still use mobile phones without being at risk. They simply have to be careful to keep the phone away from the chest.

Column 3 of Table 3.2 identifies those situations where a specific assessment is required for workers wearing active implants due to the possibility that strong fields could be generated in the immediate vicinity of the device or its sensing leads (when present). Often the outcome of this assessment will be that the worker should simply follow the instructions given to them by their medical team when the implant was fitted.

Where workers or others fitted with active implants have access to workplace, the employer will need to consider whether a more detailed assessment is required. In this context it should be noted that for a number of work situations listed in Table 3.2, a distinction is made between someone personally carrying out an activity and the activity occurring in the workplace. The latter situation is unlikely to result in a strong field in the immediate vicinity of the implant and so an assessment is not normally required.

A few situations (such as induction melting) generate very strong fields. In these cases, the region over which the reference levels in Council Recommendation 1999/519/EC may be exceeded will generally be much larger. Consequently the assessment is likely to be more complex and there may be a requirement to implement access restrictions.

### 3.1.2 Other workers at particular risk

For the other groups of workers at particular risk (see Table 3.1) highly localised strong fields will not normally present a risk. Instead, these workers will be at risk where work activities are likely to generate fields that exceed the reference levels in Council Recommendation 1999/519/EC over regions that are more generally accessible. Common situations where this is likely are identified in Column 2 of Table 3.2 and will require specific assessments.

**Key message: workers at particular risk**

Workers with active implants may be at risk from strong fields in the workplace. These fields are often highly localised and risks can usually be adequately managed by following a few simple precautions based on advice from the worker's care team.

Although strong fields may present particular risks to other groups of workers (those with passive implants, body-worn medical devices and pregnant workers) this is only likely in a limited number of situations (see Table 3.2).

## 3.2 Assessment Requirements for Common Work Activities, Equipment and Workplaces

Table 3.2 lists many common work activities, equipment and workplaces, and provides an indication of whether assessments are likely to be required for:

- workers with active implants
- other workers at particular risk
- workers not at particular risk.

The entries in this table are based on whether a situation is likely to give rise to field strengths in excess of the reference levels in Council Recommendation 1999/519/EC, and if so, whether those fields are likely to be highly localised or not.

Table 3.2 is based on the use of equipment conforming to recent standards that has been correctly maintained and is being used as intended by the manufacturer. Where work involves the use of very old non-standard or poorly maintained equipment, the guidance in Table 3.2 may not be applicable.

Where every activity in a workplace has a 'No' in all three columns, it should not be necessary to carry out a specific assessment in relation to the EMF Directive as there is expected to be no risk from EMF. In these situations further actions will not normally by required. It will, however, be necessary to make a general risk assessment meeting the requirements of the Framework Directive. Employers should remain alert to changing circumstances as required by the Framework Directive and should review the need for a specific EMF assessment in the light of any changes identified.

Similarly, for workplaces where there is no access for workers with active implants or other workers at particular risk, provided every activity has a 'No' in all relevant columns, it should not be necessary to carry out a specific assessment in relation to the EMF Directive. It will still be necessary to make a general risk assessment as required by the Framework Directive. Employers should also remain alert to changing circumstances and in particular the possibility of access to premises by workers at particular risk.

**Key message: EMF assessments**

Where the workplace contains only situations listed in Table 3.2 that have a 'No' in all relevant columns it will not normally be necessary to make a specific EMF assessment. A general risk assessment meeting the requirements of the Framework Directive will still be required and employers should remain alert to changing circumstances.

**Table 3.2 — Requirements for specific EMF assessments in respect of common work activities equipment and workplaces**

| Type of equipment or workplace | Assessment required for | | |
|---|---|---|---|
| | Workers not at particular risk* (1) | Workers at particular risk (excluding those with active implants)** (2) | Workers with active implants*** (3) |
| **Wireless communications** | | | |
| Phones, cordless (including base stations for DECT cordless phones) — use of | No | No | Yes |
| Phones, cordless (including base stations for DECT cordless phones) — workplaces containing | No | No | No |
| Phones, mobile — use of | No | No | Yes |
| Phones, mobile — workplaces containing | No | No | No |
| Wireless Communication Devices (e.g. Wi-Fi or Bluetooth) including access points for WLAN — use of | No | No | Yes |
| Wireless Communication Devices (e.g. Wi-Fi or Bluetooth) including access points for WLAN — workplaces containing | No | No | No |
| **Office** | | | |
| Audio-visual equipment (e.g. televisions, DVD players) | No | No | No |
| Audio-visual equipment containing radiofrequency transmitters | No | No | Yes |
| Communication equipment and networks, wired | No | No | No |
| Computer and IT equipment | No | No | No |
| Fan heaters, electric | No | No | No |
| Fans, electric | No | No | No |
| Office equipment (e.g. photocopiers, paper shredders, electrically operated staplers) | No | No | No |
| Phones (landline) and fax machines | No | No | No |
| **Infrastructure (buildings and grounds)** | | | |
| Alarm systems | No | No | No |
| Base station antennas, inside operator's designated exclusion zone | Yes | Yes | Yes |
| Base station antennas, outside operator's designated exclusion zone | No | No | No |
| Garden appliances (electric operated) — use of | No | No | Yes |

| | | | |
|---|---|---|---|
| Garden appliances (electric) — workplaces containing | No | No | No |
| Heating equipment (electrical) for room heating | No | No | No |
| Household and professional appliances, e.g. refrigerator, washing machine, dryer, dishwasher, oven, toaster, microwave oven, iron, provided it does not contain transmission equipment such as WLAN, Bluetooth or mobile phones | No | No | No |
| Lighting equipment, e.g. area lighting and desk lamps | No | No | No |
| Lighting equipment, RF or microwave energised | Yes | Yes | Yes |
| Work places accessible to the general public which meet the reference levels specified in Council Recommendation 1999/519/EC | No | No | No |
| **Security** | | | |
| Article surveillance systems and RFID (radio frequency identification) | No | No | Yes |
| Erasers, Tape or Hard Drive | No | No | Yes |
| Metal detectors | No | No | Yes |
| **Electrical supply** | | | |
| Electrical circuit where the conductors are close together and having a net current of 100 A or less — includes wiring, switchgear, transformers, etc. — exposure to magnetic fields | No | No | No |
| Electrical circuit where the conductors are close together and having a net current of greater than 100 A — includes wiring, switchgear, transformers, etc. — exposure to magnetic fields | Yes | Yes | Yes |
| Electrical circuits within an installation, with a phase current rating of 100 A or less for the individual circuit — includes wiring, switchgear, transformers, etc. — exposure to magnetic fields | No | No | No |
| Electrical circuits within an installation, with a phase current rating of greater than 100 A for the individual circuit — includes wiring, switchgear, transformers, etc. — exposure to magnetic fields | Yes | Yes | Yes |
| Electrical installations with a phase current rating of greater than 100A — includes wiring, switchgear, transformers, etc. — exposure to magnetic fields | Yes | Yes | Yes |
| Electrical installations with a phase current rating of 100A or less — includes wiring, switchgear, transformers, etc. — exposure to magnetic fields | No | No | No |
| Generators and emergency generators — work on | No | No | Yes |
| Inverters, including those on photovoltaic systems | No | No | Yes |
| Overhead bare conductor rated at a voltage up to 100 kV, or overhead line up to 150 kV, above the workplace — exposure to electric fields | No | No | No |
| Overhead bare conductor rated at a voltage greater than 100 kV, or overhead line greater than 150 kV [1], above the workplace — exposure to electric fields | Yes | Yes | Yes |
| Overhead bare conductors of any voltage — exposure to magnetic fields | No | No | No |
| Underground or insulated cable circuit, rated at any voltage — exposure to electric fields | No | No | No |
| Wind turbines, work on | No | Yes | Yes |

[1] For overhead lines above 150kV the electric field strength will usually, but not always, be lower than the reference level specified in Council Recommendation 1999/519/EC.

| Light industry | | | |
|---|---|---|---|
| Arc welding processes, manual (including MIG, MAG, TIG) when following good practice and not supporting cable on body | No | No | Yes |
| Battery chargers, industrial | No | No | Yes |
| Battery chargers, large professional | No | No | Yes |
| Coating and painting equipment | No | No | No |
| Control equipment not containing radio transmitters | No | No | No |
| Corona surface treatment equipment | No | No | Yes |
| Dielectric heating | Yes | Yes | Yes |
| Dielectric welding | Yes | Yes | Yes |
| Electrostatic painting equipment | No | Yes | Yes |
| Furnaces, resistively heated | No | No | Yes |
| Glue guns (portable) — workplaces containing | No | No | No |
| Glue guns — use of | No | No | Yes |
| Heat guns (portable) — workplaces containing | No | No | No |
| Heat guns — use of | No | No | Yes |
| Hydraulic ramps | No | No | No |
| Induction heating | Yes | Yes | Yes |
| Induction heating systems, automated, fault-finding and repair involving close proximity to the EMF source | No | Yes | Yes |
| Induction sealing equipment | No | No | Yes |
| Induction soldering | Yes | Yes | Yes |
| Machine tools (for example pedestal drills, grinders, lathes, milling machines, saws) | No | No | Yes |
| Magnetic particle inspection (crack detection) | Yes | Yes | Yes |
| Magnetizer/demagnetizers, industrial (including tape erasers) | Yes | Yes | Yes |
| Measuring equipment and instrumentation not containing radio transmitters | No | No | No |
| Microwave heating and drying, in woodworking industries (wood drying, wood forming, wood gluing) | Yes | Yes | Yes |
| RF plasma devices including vacuum deposition and sputtering | Yes | Yes | Yes |
| Tools (electric handheld and transportable e.g. drills, sanders, circular saws, and angle grinders) — use of | No | No | Yes |
| Tools (electric handheld and transportable) — workplaces containing | No | No | No |
| Welding systems, automated, fault-finding, repair and teaching involving close proximity to the EMF source | No | Yes | Yes |
| Welding, manual resistance (spot welding, seam welding) | Yes | Yes | Yes |
| **Heavy industry** | | | |
| Electrolysis, industrial | Yes | Yes | Yes |
| Furnaces, arc melting | Yes | Yes | Yes |
| Furnaces, induction melting (smaller furnaces normally have higher accessible fields than larger furnaces) | Yes | Yes | Yes |

| | | | |
|---|---|---|---|
| **Construction** | | | |
| Construction equipment (e.g. concrete mixers, vibrators, cranes, etc) — work in close proximity | No | No | Yes |
| Microwave drying, in construction industry | Yes | Yes | Yes |
| **Medical** | | | |
| Medical equipment not employing EMF for diagnosis or treatment | No | No | No |
| Medical equipment using EMF for diagnosis and treatment (for example, short wave diathermy, transcranial magnetic stimulation) | Yes | Yes | Yes |
| **Transport** | | | |
| Motor vehicles and plant — work in close proximity to starter, alternator, ignition systems | No | No | Yes |
| Radar, air traffic control, military, weather and long range | Yes | Yes | Yes |
| Trains and trams, electrically driven | Yes | Yes | Yes |
| **Miscellaneous** | | | |
| Battery chargers, inductive or proximity coupling | No | No | Yes |
| Battery chargers, non-inductive coupling designed for household use | No | No | No |
| Broadcasting systems and devices (radio and TV: LF, MF, HF, VHF, UHF) | Yes | Yes | Yes |
| Equipment generating static magnetic fields > 0.5 millitesla, whether generated electrically or from permanent magnets (for example, magnetic chucks, tables and conveyors, lifting magnets, magnetic brackets, nameplates, badges) | No | No | Yes |
| Equipment placed on the European market as compliant with Council Recommendation 1999/519/EC or harmonised EMF standards | No | No | No |
| Headphones producing strong magnetic fields | No | No | Yes |
| Inductive cooking equipment, professional | No | No | Yes |
| Non-electrical equipment of all types except those containing permanent magnets | No | No | No |
| Portable equipment (battery powered) not containing radiofrequency transmitters | No | No | No |
| Radios, two-way (for example walkie-talkies, vehicle radios) | No | No | Yes |
| Transmitters, battery driven | No | No | Yes |

*NB:* * Assessment required against applicable ALs or ELVs (see Chapter 6).
** Assess against Council Recommendation reference levels (see Section 5.4.1.3 and Appendix E).
*** Localised personal exposure may exceed reference levels in Council Recommendation — this will need to be considered in the risk assessment, which should be informed by information supplied by the healthcare team responsible for implanting device and/or subsequent care

### 3.2.1 Work Activities, Equipment and Workplaces Likely to Require Specific Assessment

Workplaces containing or close to equipment operating at high currents or high voltages may have regions of strong electromagnetic fields. This is also likely to be the case for equipment designed to deliberately transmit electromagnetic radiation at high power. These strong fields may exceed the ALs or ELVs contained within the EMF Directive or may present unacceptable risks through indirect effects.

Column 1 of Table 3.2 identifies situations that may give rise to strong fields that will normally require a specific EMF assessment. This table was compiled on the basis that existing measurement data for examples of these situations indicates that fields may be strong enough to approach and in some cases exceed relevant ALs. Hence a 'Yes' in Column 1 does not mean that the accessible field will definitely exceed an ELV. Rather, it means that it is not possible to be confident that the ELV will always be complied with, bearing in mind the range of variation likely to be encountered in the workplace. It is therefore advisable to make an assessment that is specific for each workplace.

It must be stressed that Table 3.2 gives examples of situations commonly encountered in the workplace. It cannot be regarded as an exhaustive list and other specialist equipment or unusual processes may exist that have not been included. However, the list should help employers to identify types of situations that are likely to require further detailed assessment.

## 3.3 Work Activities, Equipment and Workplaces Not Listed in this Chapter

Where employers identify situations in their workplaces that do not appear to be covered by entries in Table 3.2, the first step will be to gather as much information as they can from manuals and other documents in their possession. The next step will be to investigate if information is available from external sources such as equipment manufact urers and trade associations.

If it is not possible to obtain information on EMF from anywhere else, then it may be necessary to carry out an assessment by means of measurement or calculation.

**Further information on calculation or measurement of exposure can be found in the comprehensive non-binding guide to good practice for implementing Directive 2013/35/EU.** This guide also contains detailed information on risk assessment, ALs and ELVs, protective and preventative measures, health surveillance, worker information, and training.

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The Directive 2013/35/EU lays down the minimum safety requirements regarding the exposure of workers to risks arising from electromagnetic fields (EMF). However, few employers will need to calculate or measure the levels of EMF in their workplace. In most cases the nature of the work carried out is such that risks will be low and this can be established fairly simply.

This guide is designed to help you understand how the work you carry out may be affected by the EMF Directive. It is not legally binding and does not provide an interpretation of specific legal requirements that you may have to comply with. It should therefore be read in conjunction with the EMF Directive, the Framework Directive (89/391/EEC) and relevant national legislation. This guide is designed so that employers who are already compliant will be able to establish the risks quickly.

More detailed information, including on exposure assessment and preventive measures, can be found in the comprehensive non-binding guide to good practice for implementing Directive 2013/35/EU.

This publication is available in electronic and printed format in all EU official languages.

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