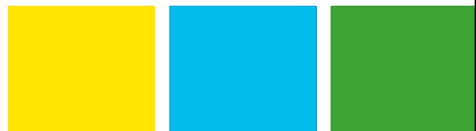




# How to deal with the EMF Directive

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## Basis

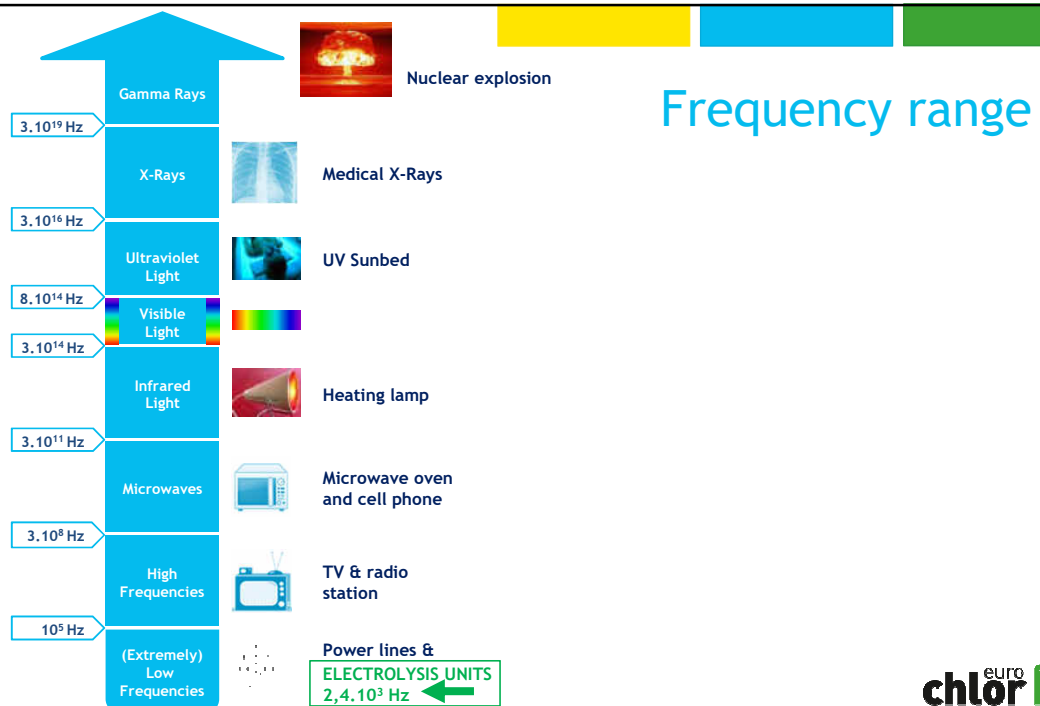
- Directive 2013/35/EU
  - 21 pages
- Non-binding guide
  - 209 pages + 169 pages
- Transposition in each Member State
  - by 1 July 2016

In total: more than 400 pages on a complex subject

## How Euro Chlor helps you

- A Word document
  - “Health 10, What an occupational physician should know”
  - useful also for HSE
  - pages : 21 in all, 14 of explanations
  - available in English and in French
- An MS PowerPoint® presentation
  - ready to use
  - available in English and in French

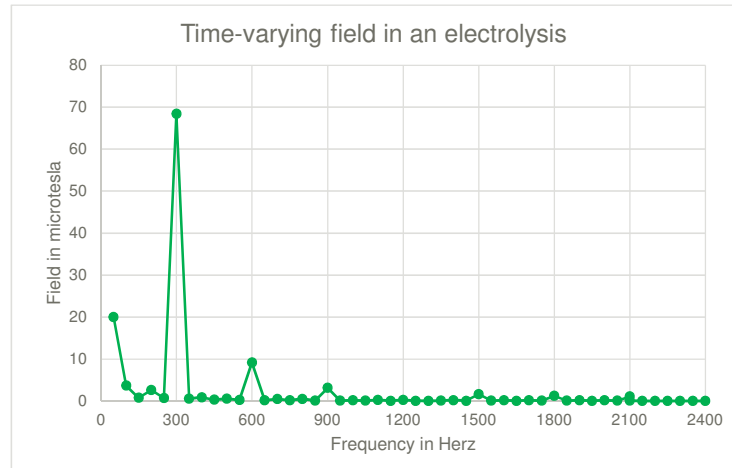
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## EMF in electrolyses

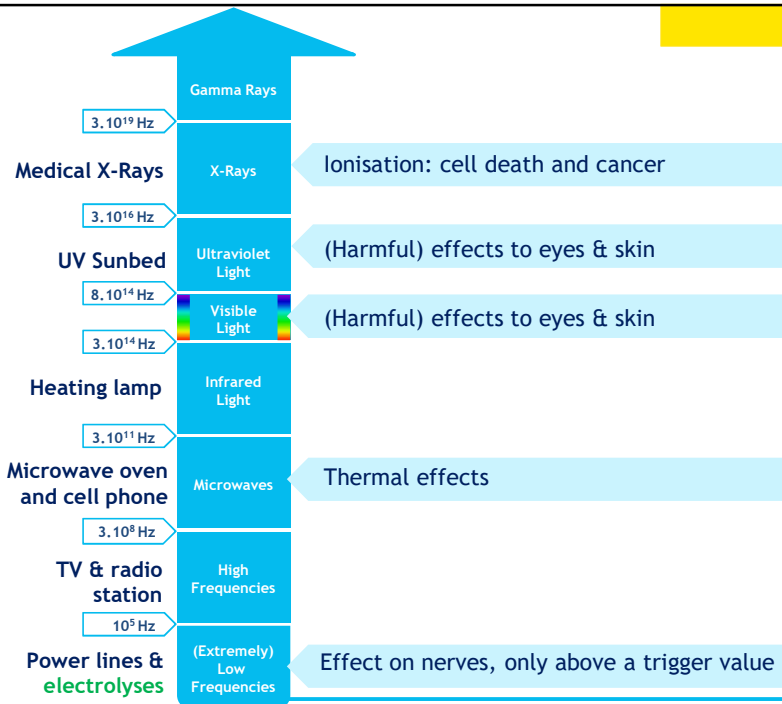
- a weak electric field
- a strong magnetic field
- a static magnetic field
- a multi-frequency magnetic field up to 2400 Hz



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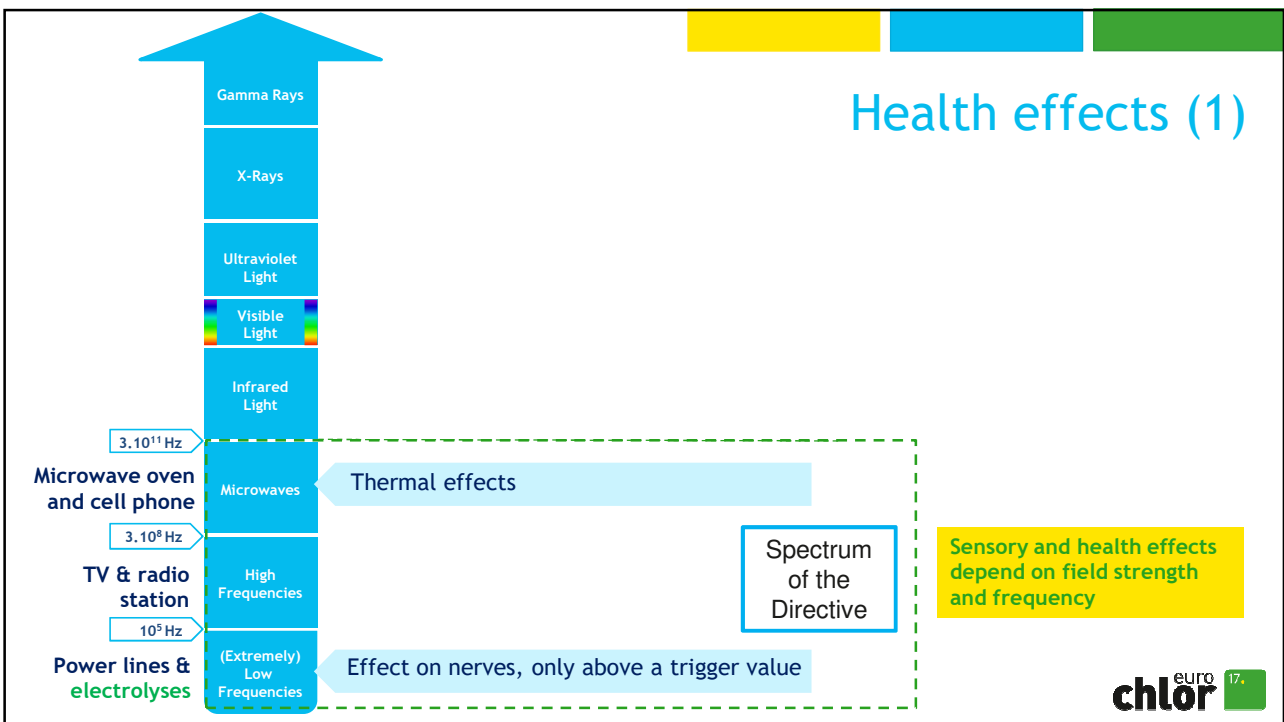
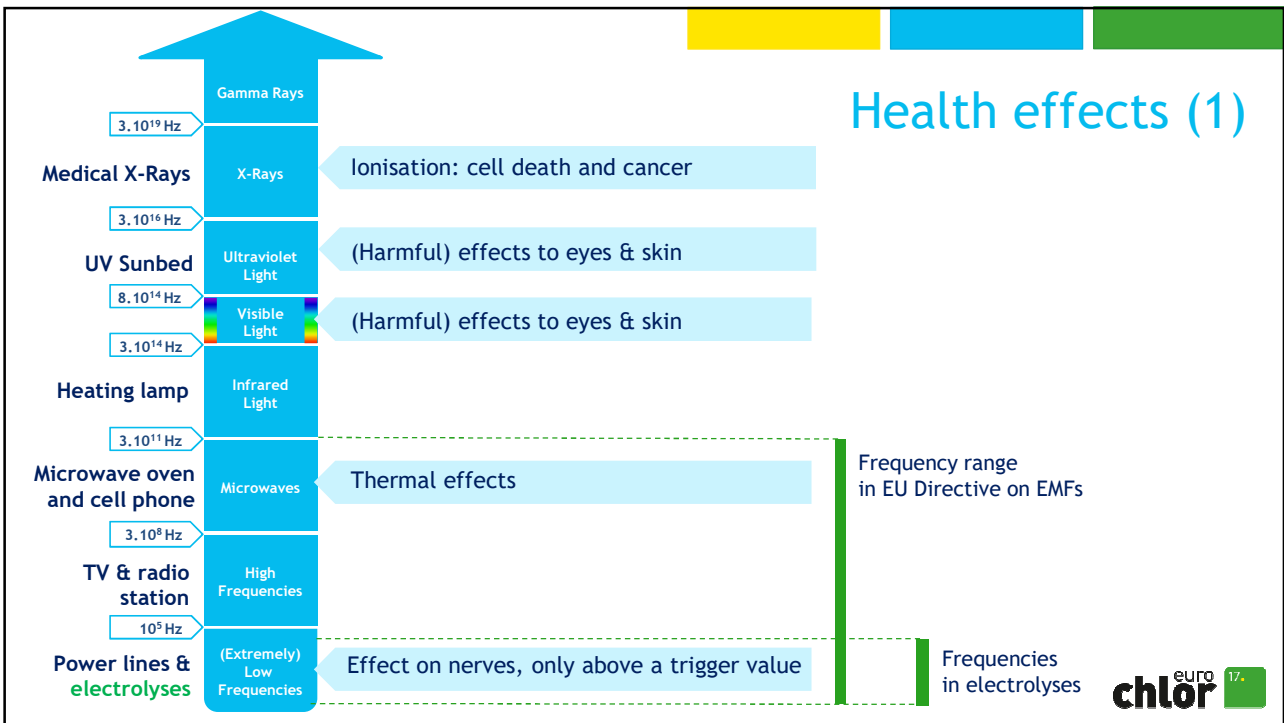


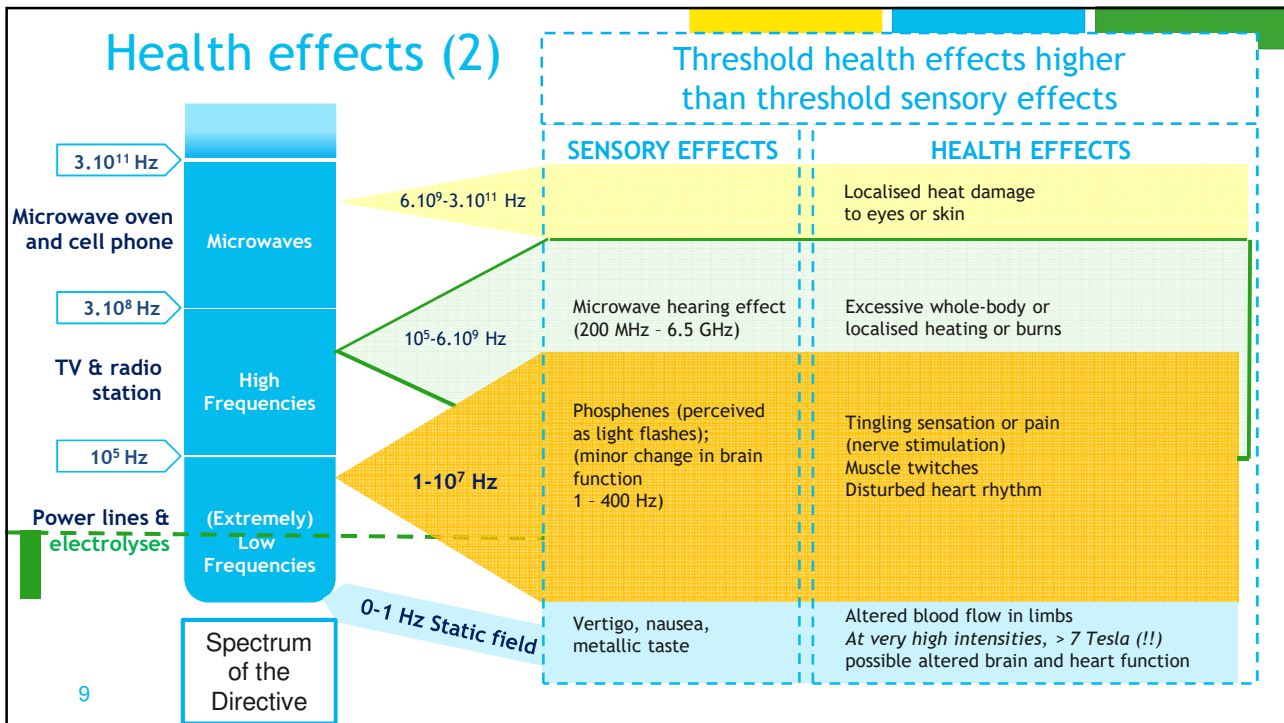
## Health effects (1)



Static electric fields can create sparks and 'jumping' hair; static magnetic fields produce a force on moving ions (with no biological effect found below 2 T)







## Materials

- Metal rods, plates, screws, pins or nails
- Artificial limb or joint
- Surgical clips or staples
- Leads associated with devices such as pacemakers
- Aneurysm clip or coil
- Intra-vascular coil, filter or stent
- Heart valve prosthesis (artificial valve)
- Any foreign metallic body, shrapnel, bullet or other metal fragments
- Patches for drug delivery with an aluminium foil layer (e.g., hormone replacement therapy, angina, nicotine)
- Diaphragm/IUD (coil)
- Metallic body piercings

No effect in electrolyses

## Medical devices in electrolyses

- Cardiac pacemakers and defibrillators (ICD)
- Insulin or other drug infusion pump
- Continual glucose monitors (CGM)
- Spinal cord stimulators for back pain
- Cochlear implants
- Neuro-stimulators, e.g. for epilepsy, Parkinson's, or incontinence

### No effects of EMF below the thresholds

- 0.5 mT : static magnetic fields (< 1 Hz)
- 0.1 mT : multi-frequency magnetic field of extremely low frequency

### Above these thresholds

→ to assess case by case

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## Long term effects of EMFs

- The Directive
  - “did not address the long-term effects, including the possible carcinogenic effects”
  - “no conclusive scientific evidence”
- Scientific data
  - static magnetic field: no convincing data
    - genotoxic effects
    - blood flow
    - vessel growth
    - foetal development
    - carcinogenic effects
  - multi-frequency magnetic field
    - might contribute to the development of childhood (i.e. non-adult) leukaemia

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## Exposure limit values and action levels

- Exposure limit values
  - health effects ELVs
    - stimulation of nerve and muscle tissue
  - sensory effects ELVs
    - transient disturbed sensory perceptions
    - minor changes in brain functions without health effects (level below the health ELVs)
    - [sensory effects ELVs ] < [health effects ELVs]

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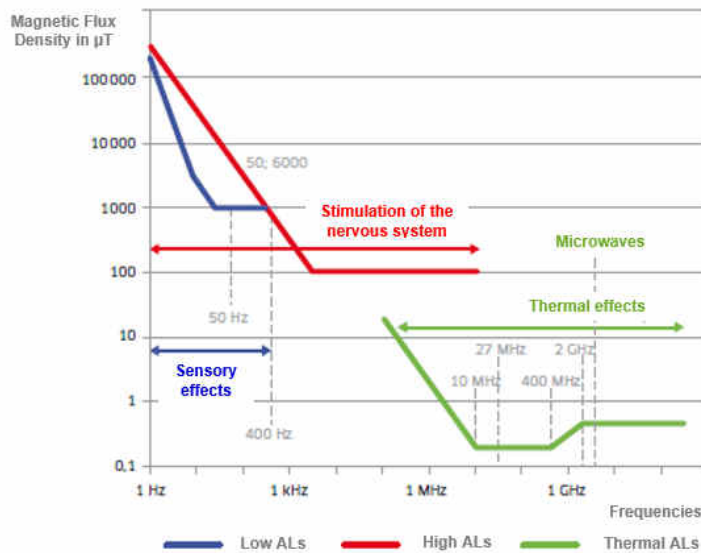
## Exposure limit values and action levels

- In practice, action levels
  - ELVs cannot be measured
  - so need of ‘action levels (ALs)’
    - in order to simplify the process of demonstrating the compliance with relevant ELVs
    - or, where appropriate, to take relevant protection or prevention measures specified in this Directive
  - 2 types of ALs
    - ‘low ALs’ related to the sensory effects ELVs
    - ‘high ALs’ related to the health effects ELVs

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## Magnetic ALs according to the frequency



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## Periodic medical surveillance

- Content
  - absence of known risks or symptoms, so no basis for regular medical examination
- Pregnant women
  - another European Directive regarding pregnant women
  - requires an employer to assess in detail any specific risk of exposure of pregnant workers
  - and in particular the exposure to non-ionizing radiation (which includes electromagnetic fields)
  - no evidence of adverse effects in the medical literature

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## Workers information

- General information
  - as for any other hazard or risk
- Identification by appropriate signs
  - where ALs are exceeded
    - except certain circumstances
  - where exposures could be harmful for
    - wearers of medical devices
    - pregnant women - Council Recommendation / general public / 1999/519/EC

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## In summary

- To measure EMF
  - once and for ever
  - when the electrolysis is running at 100%
- To inform
  - everybody - in case of medical device - implanted now or later
  - every woman - in case of pregnancy - now or later
- To identify by appropriate signs
  - where ALs are exceeded
  - where it could be harmful  
for wearers of medical devices or pregnant women

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Thank you very much

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