S3-7 IMPLEMENTATION OF THE EU WORKERS DIRECTIVE: THE DUTCH APPROACH

Johannes F.B. Bolte¹, Mathieu J.M. Pruppers¹ (1) National Institute for Public Health and the Environment (RIVM), Bilthoven, The Netherlands.

Introduction. During their work employees may be exposed to electric, magnetic or electromagnetic fields (EMF) generated by the equipment they use themselves or by other equipment in their workplace. The European Union (EU) has issued Directive 40/2004/EC which states minimum requirements for the protection of workers against exposure to EMF [1, 4]. The Directive can result in obligations for employers to take a various protective measures from workers education, signposting and fencing of workplaces to even prohibition of the use of certain equipment. Latest by April 30, 2008, the Directive has to be implemented in national law by all member states.

The Directive states the limits as established by ICNIRP [2, 5], the so called Exposure Limit Values (ELV) and the derived Action Values (AV). The ELV are expressed in quantities directly connected to adverse health effects, such as current density in the central nerve system, the Specific Absorption Rate (SAR) or the power density. Since generally these quantities cannot be measured directly, AV are developed. The AV are conservatively derived from the ELV and are better assessable quantities such as the electric field strength or the magnetic field strength at the position of the worker. If the AV are exceeded, it has to be checked whether the ELV are exceeded too. Once the ELV are exceeded, the Directive explicitly gives measures an employer must take to decrease the exposure.

Objective. The objective of this paper is to give an overview of the working environments in the Netherlands where workers may be exposed above the ELV and AV. This paper presents the assessment procedure and an overview of the results of the analysis.

In the final report the National Institute for Public Health and the Environment of the Netherlands (RIVM) will also state the possible protective measures, the costs of these measures for the industry, and an in depth analysis for each working environment. The report will consist of three parts: a manual in plain words for employers on assessment of EMF and possible measures; a part with the background analysis for each working environment; and a part estimating the cost of the implementation of the Directive.

Methods. The European Directive [1, Article 3.3] states that the exposure to EMF should be assessed using CENELEC standards. However, this poses two problems. Firstly, CENELEC standards dont exist for all types of equipment requiring assessment. Secondly, CENELEC standards are not easy to understand nor to use for small entrepreneurs lacking specialist knowledge, such as shopkeepers. Therefore, we propose a procedure in two steps. In step 1, the employer has to classify the working environments in his company into one of the three predefined categories. In step 2, the employer has to take different measures for each category as is illustrated in a simple flow scheme (Figure 1). The measures and simple calculations are derived from international scientific literature, measurement reports, information from industry representatives, and field trips to facilities. The proposed measures are as much as possible in accordance with the current practice.
The working environment is defined as the equipment at the workplace in combination with the activity. If for instance a Magnetic Resonance Imaging apparatus is used to scan a patient, the working environment of the operator is at a distance of the coils. If on the other hand a scan is made with intervention activities of medical personnel, the working environment is close to the coils. In order to analyze the exposure of EMF due to all possible electrical equipment, RIVM defined several groups of working environments likely to require further assessment and grouped them in three categories. Category I means the AV are probably not exceeded and the ELV are certainly not exceeded. No further measures by the employer are required. Category II means the AV are possibly exceeded, but the ELV are probably not exceeded. Category II is split in two sub-categories. Category IIa requires an extra user manual or instruction for instance Keep a distance of 1 metre from EAS gates. Category IIb requires a physical measure, for instance signposting, drawing paint marks around an appliance, fencing or shielding of the source of EMF, or making small changes to the layout of the workplace. Category III means the AV are probably exceeded and possibly the ELV are exceeded too. Major changes (and investments) are necessary, ranging from making a room inaccessible and moving the operating panels away from the equipment to changing the layout of a factory.

**Results.** Working environments that are predefined as category IIb are a.o.: dielectric heaters, bus bars and the electrolysis hall in electrochemical industry, short wave and microwave diathermia, and electrosurgery. Working environments currently suspected of generating exposure possibly above the ELV (category III) are: large rectifiers, small induction ovens, half automated spot and induction welding, MRI with intervention activities, large broadcast transmitters, and activity of, for instance, electricians in trouble shoot situations.

**Conclusions.** The proposed assessment procedure consisting of a predefined list of working environments grouped in three categories and a flow scheme is an easy tool for assessing the working environments in a company, especially designed for employers lacking specialist knowledge.

**References**


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Figure 1. Flow scheme for the EMF assessment of working environments under European Directive 40/2004/EC.

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