

2. EUROSHNET CONFERENCE, PARIS, 20-21. OCTOBER 2005

Current problems in the European standardization and its influence on the exposure monitoring

János SOLT

Public Foundation for Research on
Occupational Safety

Budapest, Hungary

Testing Laboratory for Work Environment

Main task is identification and determination of harmful agents in the work environment:

- exposure monitoring of organic and inorganic gases and vapours, as well as solid particles, *excluded* fibrous particles, e.g. asbestos
- measurement of noise level and determination of noise exposure
- measurement of indoor lighting and climate parameters (temperature, humidity and air movement)
- determination of electrostatic charging and electromagnetic fields.

Chemical risk assessment

(according to the 2000. year's Act #XXV. on Chemical Safety)

- Identification of hazards
 - Analysis of dose – response relationship
 - Exposure assessment
 - Evaluation of risk
 - Communication
- (technology, hazardous materials, toxicological data)
 - Exposure monitoring data
 - Environmental parameters
 - Workplace features
 - PPE usage

Exposure monitoring

- Sampling strategy
- Sampling methods
- Evaluation

Sampling strategy

EN 689:1995 (MSZ EN 689:1999)

- duration
- frequency
- sampling period
 - ✓ fulltime
 - ✓ consecutive (fulltime/part-time)
 - ✓ grab

Two ISO standards:

ISO 16000-1:2004 Indoor air -- Part 1: General aspects of sampling strategy

ISO 16000-2:2004 Indoor air -- Part 2: Sampling strategy for formaldehyde

Organics — 11 standards

EN ISO 16017-1:2000 Indoor, ambient and workplace air - Sampling and analysis of volatile organic compounds by sorbent tube/thermal desorption/capillary gas chromatography - Part 1: Pumped sampling (ISO 16017-1:2000)

EN ISO 16017-2:2003 Indoor, ambient and workplace air - Sampling and analysis of volatile organic compounds by sorbent tube/thermal desorption/capillary gas chromatography - Part 2: Diffusive sampling (ISO 16017-2:2003)

ISO 8762:1988 Workplace air -- Determination of vinyl chloride -- Charcoal tube/gas chromatographic method

ISO 9486:1991 Workplace air -- Determination of vaporous chlorinated hydrocarbons -- Charcoal tube/solvent desorption/gas chromatographic method

ISO 9487:1991 Workplace air -- Determination of vaporous aromatic hydrocarbons -- Charcoal tube/solvent desorption/gas chromatographic method

ISO 16200-2:2000 Workplace air quality -- Sampling and analysis of volatile organic compounds by solvent desorption/gas chromatography -- Part 2: Diffusive sampling method

ISO 16702:2001 Workplace air quality -- Determination of total isocyanate groups in air using 2-(1-methoxyphenyl)piperazine and liquid chromatography

ISO 16200-1:2001 Workplace air quality -- Sampling and analysis of volatile organic compounds by solvent desorption/gas chromatography -- Part 1: Pumped sampling method

ISO 16000-3:2001 Indoor air -- Part 3: Determination of formaldehyde and other carbonyl compounds -- Active sampling method

ISO 16000-4:2004 Indoor air -- Part 4: Determination of formaldehyde -- Diffusive sampling method

ISO 16000-6:2004 Indoor air -- Part 6: Determination of volatile organic compounds in indoor and test chamber air by active sampling on Tenax TA sorbent, thermal desorption and gas chromatography using MS/FID

Metals and metalloids — 7 standards

EN 13890:2002 Workplace atmospheres - Procedures for measuring metals and metalloids in airborne particles - Requirements and test methods

ISO 8518:2001 Workplace air -- Determination of particulate lead and lead compounds -- Flame or electrothermal atomic absorption spectrometric method

ISO 11041:1996 Workplace air -- Determination of particulate arsenic and arsenic compounds and arsenic trioxide vapour -- Method by hydride generation and atomic absorption spectrometry

ISO 11174:1996 Workplace air -- Determination of particulate cadmium and cadmium compounds -- Flame and electrothermal atomic absorption spectrometric method

ISO 15202-1:2000 Workplace air -- Determination of metals and metalloids in airborne particulate matter by inductively coupled plasma atomic emission spectrometry -- Part 1: Sampling

ISO 15202-2:2001 Workplace air -- Determination of metals and metalloids in airborne particulate matter by inductively coupled plasma atomic emission spectrometry -- Part 2: Sample preparation

ISO 15202-3:2004 Workplace air -- Determination of metals and metalloids in airborne particulate matter by inductively coupled plasma atomic emission spectrometry -- Part 3: Analysis

Other — 6 standards

EN ISO 10882-2:2000 Health and safety in welding and allied processes - Sampling of airborne particles and gases in the operator's breathing zone - Part 2: Sampling of gases (ISO 10882-2:2000)

EN 14031:2003 Workplace atmospheres - Determination of airborne endotoxins

EN 14530:2004 Workplace atmospheres - Determination of diesel particulate matter - General requirements

ISO 8672:1993 Air quality -- Determination of the number concentration of airborne inorganic fibres by phase contrast optical microscopy -- Membrane filter method

ISO 8760:1990 Work-place air -- Determination of mass concentration of carbon monoxide -- Method using detector tubes for short-term sampling with direct indication

ISO 8761:1989 Work-place air -- Determination of mass concentration of nitrogen dioxide -- Method using detector tubes for short-term sampling with direct indication

Sampling methods

Covered by EN (ISO)

- simple organic compounds (aromatics, chlorinated hydrocarbons)
- welding fumes and gases (metallic compounds, CO, NO_x, O₃)
- some metals

Not covered by EN (ISO)

- inorganic gases
- acid mists and vapours
- alkaline aerosols
- solid particles
- organics, e.g. amines, acids, aldehydes*, phenols, etc.
*excepted formaldehyde

Evaluation

National legislations, in Hungary: Ministry order # 25/2000.(IX.30.) issued by Ministry of Health

Limit values:

ÁK (average concentration)

CK (peak concentration)

MK (ceiling value for carcinogens)

Combined effect: $\sum c / \text{ÁK} < 1$

Number of substances : 337

EU-legislation: 2000/39/EC Directive

Number of substances : 63

Needs for standards

- detailed guide for sampling strategy
- sampling methods for a variety of substances
- investigation method for workplace emission of hazardous materials
- limit values

EXPECTATION

Common work — common research, if necessary — for developing the needed standards, in order to gain comparable results in exposure monitoring and chemical risk assessment