

Re.: “Systemic reactions associated with polyisocyanate exposure” by J Nielsen, C Sangö, G Winroth, T Hallberg, S Skerfving. Scand J Work Environ Health 11 (1985) 51—54

The authors of the article “Systemic Reactions Associated with Polyisocyanate Exposure,” published in the *Scandinavian Journal of Work, Environment & Health* in February, quote the Swedish standard for occupational exposure to isocyanates, which is included in Ordinance AFS 1984: 5 published by the National Swedish Board of Occupational Safety and Health. The “level limit value” and “ceiling limit value” according to this document, are set as 0.005 and 0.01 ppm, respectively; the respective values in milligrams per cubic meter, which are specific for each isocyanate, are also included. It is said further in the ordinance: “The same value expressed in ppm is applied also to those isocyanates which do not have set limit values of their own. This also applies to isocyanates (adducts) and blocked isocyanates. The corresponding value expressed in mg/m³ varies, depending on the substance.”

The authors have obviously overlooked the fact that the concentration of a substance in the atmosphere can only be expressed in parts per million if it is a definite chemical species and if it has a substantial vapor pressure. The molecular weight of “prepolymerized isocyanates (adducts)” — such as Desmodur L® — is usually not uniform. Their vapor pressures are extremely low and in most cases not measurable. The term “polyisocyanate vapor” as used in the second paragraph of the discussion on page 53 of the article is therefore irrelevant. A permissible concentration level for a polyisocyanate cannot be related to the standards (0.005 ppm and 0.01 ppm) which have been set in Sweden for toluene diisocyanate.

Due to their low vapor pressure polyisocyanates may present a health hazard only if inhaled as aerosols, eg, in connection with spray painting. These aerosols are mostly mixtures of polyisocyanates with reaction partners like polyols. According to experience described in the literature (1, 3), special care must be employed when samples of an aerosol which contains isocyanate are taken as a preparatory step for analysis. The aerosol has to be left in abeyance, whereas the sampling by liquid absorption in an impinger — as practiced by the authors — was in fact quantitative.

The authors propose to establish an occupational standard for polyisocyanates and to employ a value expressed as the total amount of NCO in micromoles per cubic meter. This standard is not considered necessary or practicable (2). Their NCO content can easily be determined by conventional analytical procedures and expressed as the concentration of the basic diisocyanate. Its “level” or “ceiling limit” value should subsequently be the basis for assessing the occupational hygiene situation at the workplace.

References

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2. Diller WF, Brochhagen FK, Slawyk W. Arbeitsmedizinische Aspekte von Polyisocyanaten. *Zentralbl Arbeitsmed Arbeitssch Prophyl Ergonomie* 35 (1985) 88—91.
3. Rosenberg C, Tuomi T. Airborne isocyanates in polyurethane spray painting: Determination and respirator efficiency. *Am Ind Hyg Assoc J* 45 (1984) 117—121.

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