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INHALATORY ISOCYANATE EXPOSURE IN DIFFERENT OCCUPATIONAL SETTINGS IN THE NETHERLANDS

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Isocyanates are among the most commonly identified causes of occupational asthma. Despite their widespread use and serious health consequences a lack of knowledge on the relationship between exposure and disease still exists. This is partly due to the wide variety of isocyanate compounds in different occupational settings, of which the relative toxicity is unknown.

For a large-scale epidemiological study on isocyanate exposure and related health effects, inhalatory isocyanate exposure has been monitored in different occupational settings in the Netherlands. Task based personal inhalatory samples have been taken in the breathing zone of car body repair shop workers (480 samples) and foundry workers (80 samples). Samples were taken using impingers with toluene and di-n-butylamine as a reagent. A large number of different isocyanate related tasks has been monitored to identify relevant tasks. Samples have been analysed by LC-MS for detection of products of thermal degradation (monoisocyanates and aminoisocyanates) in addition to isocyanate monomers and oligomers.

A large proportion of the samples did not contain detectable isocyanate levels. The most dominant monomer and oligomer were 1,6-hexamethylene diisocyanate (1,6-HDI) and isocyanurate, respectively. These 1,6-HDI based di and poly isocyanates have been found mainly during the following tasks: spray painting of polyurethane (PU) topcoats > spray painting of PU primers >> cleaning of spray gun, sanding and mounting of cars >> mixing of paint. Geometric mean and standard deviations for spraying of polyurethane (PU) top coat and PU primers were 2.21 (3.81) and 0.47 (3.91) $\mu\text{g}/\text{m}^3$ air for 1,6-HDI and 29.36 (7.78) and 0.90 (6.45) $\mu\text{g}/\text{m}^3$ air (expressed in 1,6-HDI units) for isocyanurate, respectively. Thermal degradation products were predominantly found during welding. For foundry workers, exposure to 4,4-MDI and some thermal degradation products were incidentally detectable.

Large variability within workers and tasks complicates classification of spray painters into exposure sub groups. Therefore, the study will be extended to other spray painting industries with possibly other exposure patterns and higher levels. Currently some 100-120 samples are being collected from various industrial spray painting industries. Exposure data for different categories of isocyanate compounds will be used in epidemiological analyses.

Keywords: isocyanates, occupational exposure, thermal degradation products, spray painters, foundry workers.

IOHA 2005

Pilanesberg National Park, North West Province, South Africa
19 - 23 September 2005

Promoting Occupational Hygiene in Africa and Globally



Conference Programme at a Glance

Sunday 18 September 2005	
Kwa Maritane Bush Lodge	
10.00 - 17.00	Registration
Reception and Welcome to International and Local Delegates	
19.00 - 21.00	Welcome by IOHA Immediate Past President - <i>Ton Spee</i>
	Welcome by SAIOH President - <i>Deon van Vuuren</i>
	Welcome by MVS President - <i>Harry Smit</i>
	Precautions to be taken in the Pilanesberg National Park - Game Ranger
	Buffet meal and drinks at the Kwa Maritane Bush Lodge or "Place of the Rock". You are now in the Pilanesberg National Park; an area rich in wildlife and hosting around 365 species of birds. Virtually all the animal species of Southern Africa can be found in the park, including: lions, elephants, white and black rhinos, buffaloes, leopards, zebras, hyenas, giraffes, hippos and crocodiles - Welcome.

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6th International Scientific Conference

19 – 23 SEPTEMBER 2005
Pilanesberg, South Africa

PROMOTING OCCUPATIONAL HYGIENE IN AFRICA AND
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ABSTRACTS

Published by the International Occupational Hygiene Association (IOHA),
5/6 Melbourne Business Court, Millennium Way, Pride Park, Derby DE24 8LZ, UK

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