

Assesing potential health risks of nanoparticle emissions released during industrial metal laser cutting process

Lucia Bustin¹, Miroslav Badida², Lýdia Sobotová²,
Miroslava Badidová², Emília Hroncová³, Juraj
Ladomerský³, Torsten Tritscher¹



¹ TSI GmbH, Neukollner Str.4, 520 68, Aachen, Germany, lucia.bustin@tsi.com

² Institute of Industrial Engineering, Management, Environmental Engineering and Applied, Mathematics Technical University of Kosice, Park Komenského 5, 042 00 Košice, Slovakia

³ European Science and Research Institute, A. Hlinku 2556/29, 960 01 Zvolen, Slovakia

There is increasing interest in information about nanoparticles emissions as their exposure relates to potential health risks. Due to the fact, the particulate matter closely correlates with their size, which is determining their behaviour in respiratory system and their potential toxicity. Measuring exposure to nanoparticles has typically been conducted as academic research using high-end instrumentation and sophisticated software. For many applications, e.g., in the field of Indoor Air Quality and Occupational Health and Safety, this may not be necessary. This contribution presents a case study on nanomaterial exposure using portable online spectrometers measuring particle emissions from 10 nm to 10 µm. Data were collected to analyse workers exposure during industrial operation of metal laser cutting process. This study approached the Nanoparticle Emission Assessment Technique (NEAT) developed by the NIOSH nanotechnology field research team to evaluate airborne nanomaterial concentrations in the workplace¹. The results show the levels of nanoparticles number concentration highly exceed the recommended value limit for ultrafine particles exposure recommended by WHO² in ambient air.

1. Methner M. et al.: "Nanoparticle Emission Assessment Technique (NEAT) for the Identification and Measurement of Potential Inhalation Exposure to Engineered Nanomaterials — Part A," Journal of Occupational and Environmental Hygiene, 7: 127-132, (2010).
2. WHO global air quality guidelines: particulate matter (PM2.5 and PM10), ozone, nitrogen dioxide, sulfur dioxide and carbon monoxide, <https://www.who.int/publications/i/item/9789240034228> , (2021).