PROFESSIONAL EXPOSURE TO NANOPARTICLES IN THE MANUFACTURE OF PARTS BY LASER WELDING

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Some studies on occupational exposure to particulates have pointed out to dangerous effects for workers as regards inhalable and respirable particles. These scenarios of occupational exposure are extremely complex, since they involve components inherent to individuals, working conditions and the activity itself [1]. The influence of welding fumes on the human body has different effects depending on the composition of these fumes [2]. Some of these compositions have short-term effects, such as the so-called welding fever. However, welding fumes may cause long-term effects, in particular: skin irritation, respiratory tract irritation, kidney and liver damage, dermatological effects, asthmatic-type lung diseases; chronic effects including cancer (nose, larynx, lung). Taking these considerations into account, we have conducted a study evaluating the professional exposure to nanoparticles in the production of parts by laser addition. This study aims to characterize and evaluate the occupational exposure of workers to nanoparticles in this industry, namely: identify scenarios of exposure in the workplace and characterize the exposure in the manufacturing of the parts; identify relevant nanomaterials and assess their toxicity; contribute to increase knowledge about the health effects of workers' exposure to nanoparticles in this industry typology. To perform the toxicological evaluation in this industry nanoparticles were monitored using the Nanoparticle Surface Area Monitor (NSAM) and the NanoScan Scanning Mobility Particle Sizer Spectrometer (SMPS) and the capture of nanoparticles in copper grids took place with the Nanometer Aerosol Sampler (NAS) for further analysis by Transmission Electron Microscope (TEM), in order to observe the morphology of the nanoparticles and Energy Dispersion X-Ray Spectrometry (EDS), to determine their elemental chemical composition.

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[2] F. Golbabaei, M. Khadem, Air Pollution in Welding Processes – Assessment and Control Methods. Chapter 2 *in Current Air Quality Issues* (2015).