

# OCCURRENCE OF ASBESTOS FIBERS IN THE AIR AT SOME CROATIAN CITIES

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Asbestos, or "miracle fiber", is a natural occurring silicate mineral that has been incorporated into more than 3000 products (eg plaster, roof covering, concrete slabs and pipes, fireproofing, ropes, etc.). Chrysotile, amosite, crocidolite, tremolite, actinolite and anthophyllite are commercially the most commonly used asbestos. Although the import and production of asbestos-containing material is prohibited in Croatia, asbestos is present throughout the territory of the Republic of Croatia.

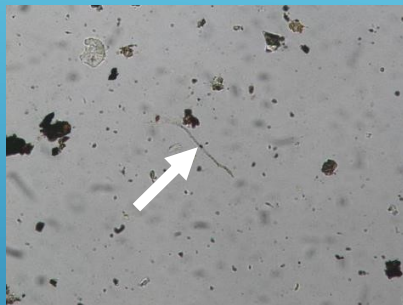


Figure 2. Chrysotile asbestos under bright field polarized light microscopy

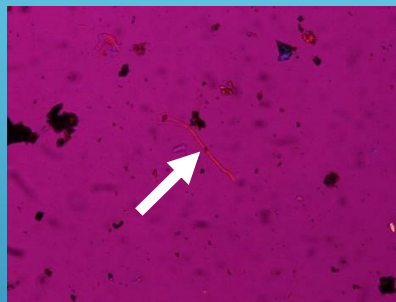


Figure 4. Chrysotile asbestos under gypsum retardation plate polarized light microscopy

In order to determine concentrations of total and asbestos fibres in the air, air was sampled at measurement points of Zagreb, Karlovac, Split and Ploče. The sampling was conducted during dry, stable and sunny weather without precipitation. Samples of air were taken at the height of the breathing zone starting from the ground. The concentration of total and asbestos fibres was determined using membrane filter method. Samples were analysed by means of polarized light microscopy (PLM). By PLM analysis, unlike microscopy with phase contrast (PCM), it is possible to establish characteristic traits of asbestos fibers; anisotropy, morphology, relief, shape, shine, twist, polarization and color. In Croatia, allowable values of respirable size of asbestos fibers in the air in the general environment are not prescribed. However, Croatian Occupational Safety and Health Law (NN 59/96, 94/96, 114/03 and 100/04), and the Risks related to exposure of workers to asbestos bylaw (NN 40/07), where the Article 9. instruct that the eight-hour time-adjusted average single worker is allowed to be exposed to a concentration of asbestos in the air no more than 0.1 fibres per cm<sup>3</sup>.



Figure 1. Olympus/Evident polarized light microscope

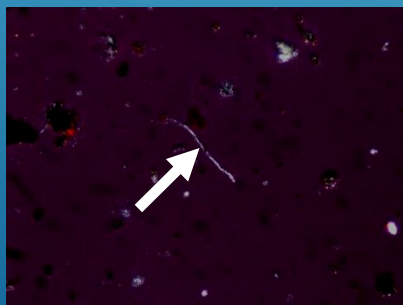


Figure 3. Chrysotile asbestos under dark field polarized light microscopy

Table 1. The concentration range of the total fiber and asbestos fiber in the air at different sampling station

Sampling Station	Sampling Duration (min.)	Flow (m <sup>3</sup> )	Fiber Total Number (v/cm <sup>3</sup> )	Asbestos Total Number (v/cm <sup>3</sup> )
Zagreb	301-235	0.471-0.381	0.003-0.001	0
Karlovac	256	0.311	0.009	0
Ploče	307-253	0.396-0.348	0.003-0.001	0.001-0.003
Split	298-246	0.421-0.367	0.007-0.001	0.001-0.002