2. Techniques which determine all the asbestos in the sample at the same time.

   a. X-ray diffraction (Figure IV-3). Based on the property that X-rays are diffracted by crystalline matter under angles which are characteristic for the minerals which are contained in the sample, qualitative and quantitative analysis is in principle possible. One of the methods which can be used is the determination of the ratio of the intensity of radiation from calibration samples - containing known quantities of asbestos and irradiated under the same circumstances as the sample containing an unknown quantity of asbestos - with corresponding diffraction points or lines from the latter. From this ratio the unknown quantity of asbestos can derived. A more detailed treatment is given in more specialised articles on this subject (Goodhead et al 1965, Keenan et al 1970, Rickards 1972).

   b. Infrared spectroscopy (figure IV-3). Based on the property that there are characteristic absorption wavelengths in the infrared belonging to the stretch if the O-H bond in chrysotile (Bayioni 1975, Gadsden et al 1970, Keenan et al 1970). By comparing the transmittance at 2.72µm of a sample with an unknown asbestos content with the transmittance at the same wavelength of calibration samples, the unknown asbestos content can be established.

   For both X-ray diffraction and infrared spectroscopy the most suitable sample size is approximately between 100 µg and 10 mg. The limits of both methods are described in table IV-3.

Table IV-1. Data on microscopical techniques used to determine the asbestos concentration of air

technique	estimate of minimum concentration	relative reproducibility *) at the 95% conf. level	total time necessary to analyse one sample
optical microscopy	1 fibre/ 100 cm^3	~ 60%	~ 1/4 days
transmission electron microscopy	10^{-10} g/m^3	~ 100 - 1000%	~ 2 days

* (See following page)

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