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## **Asbestos Issues in Poland**

### **Introduction**

Poland has no asbestos deposits and in the past asbestos used to be imported, mostly from the former Soviet Union. A large-scale commercial application of asbestos in the construction industry began in the 1960s, when four big asbestos-cement plants started operating. Chrysotile asbestos was the most commonly used raw material, but until the mid 1980s, crocidolite and small amounts of amosite were also used, to manufacture pressure pipes. In the manufacture of asbestos-cement products, the total consumption of asbestos since 1960's to 1993 is estimated to be about 1.4 million tonnes; including about 8,500 tonnes of amosite and about 86,000 tonnes of crocidolite. In the period of 1959-1984, about 72% (ca. 60,000 tonnes) of the total volume of crocidolite asbestos used to produce construction materials in Poland was consumed by a single plant manufacturing large-diameter pressure pipes. Since 1985, crocidolite asbestos is no longer used in Poland.

According to the parliamentary Act of 1997, the import manufacture and sale of asbestos and asbestos contained materials is prohibited (1). Thus, the assessment of exposure to asbestos dust and the monitoring of health conditions of workers at asbestos-processing plants have become irrelevant. However, the delayed health effects attributable to previous occupational exposure remain the cause for concern for public health. Likewise, the environmental pollution from asbestos containing materials and from waste landfills in the vicinity of asbestos-processing plants, where high levels of asbestos fibre concentration in ambient air have been recorded, will

continue to be a serious problem as well.

Presently, two projects aimed at minimising the adverse effects of asbestos on population health and the environment are underway. One of them is the project on "Elimination of asbestos and asbestos contained products used in Poland" covering the workers contracted to perform demolition work and install protective coverage at asbestos waste landfills. This will be the exposed group who need prophylactic health care. The other is a programme of prophylactic examinations of former asbestos workers and is referred to as the Amiantus Project

### **Hygienic standards and asbestos dust concentrations**

The earliest available information concentration of asbestos on the air at a plant manufacturing asbestos yarns and fabrics dates back to 1949. At that time, the maximum admissible number of asbestos particles was 180 million per 1 m<sup>3</sup> of air. The measurements performed in that plant had revealed values from two to 24 times as high as the hygienic standard. In 1954, the maximum admissible concentration (MAC) of asbestos dust in workplace was set at 2 mg/m<sup>3</sup> (Table 1). In the 1950s, asbestos dust concentration measured in some workplaces was found to exceed the standard value more than 50 times. The workers at asbestos plants where the production started shortly after World War II reported that the asbestos dust at the shop floor had resembled a snowfall. Later on, the application of machine casing and closed air circulation systems helped to significantly reduce the concentration levels. Nevertheless, in the 1970s, asbestos dust concentrations at some plant departments (e.g. spinning dept.) were still ca. four times as high as the adopted MAC value. At many workposts, asbestos fibre concentration would range from 1 to 25 mg/m<sup>3</sup>. The average maximum concentrations of asbestos fibres were recorded in the 1980s at the plants manufacturing asbestos yarns and fabrics; they varied from 7 to 8.3 fibre/m<sup>3</sup>.

**Table 1. Maximum admissible concentration (MAC) values for dusts containing mineral fibres in Poland (time-weighted average for 8-h work shift)**

Year	Dust containing chrysotile and other fibres (except crocidolite)		Dust containing fibrous crocidolite and antigorite		Legal background
	total dust	fibres, diameter < 3 µm, length > 5 µm	total dust	fibres, diameter < 3 µm, length > 5 µm	
1954 - 1985	2 mg/m <sup>3</sup>	-	2 mg/m <sup>3</sup>	-	Law Gazette No. 13, 1976 (as further amended)
1985 - 1991	2 mg/m <sup>3</sup>	2 f/cm <sup>3</sup>	2 mg/m <sup>3</sup>	1 f/cm <sup>3</sup>	Law Gazette No. 40, 1985
1991 - 2002	1 mg/m <sup>3</sup>	0.5 f/cm <sup>3</sup>	0.5 mg/m <sup>3</sup>	0.2 f/cm <sup>3</sup>	Law Gazette No. 114, 1991
2003 - 2005	1 mg/m <sup>3</sup>	0.2 f/cm <sup>3</sup>	0.5 mg/m <sup>3</sup>	0.2 f/cm <sup>3</sup>	Law Gazette No. 217, 2002
2005 -	Dust containing asbestos: fibres: 0.1 f/cm <sup>3</sup> total dust: 0.5 mg/m <sup>3</sup>				Law Gazette No 212, 2005

Routine measurements of respirable fibres concentrations in 1 cm<sup>3</sup> of workplace air were initiated as late as in the 1990s, when the hygienic standard that covered this specific parameter came into force. Standard methods, involving air sample passage through membrane filters, are employed to determine the gravimetric and numerical data on the fibre content.

A measured volume of air is drawn through a membrane filter by a vacuum pump. The filters are made with cellulose esters, its diameter is 25 mm and pore diameter 0,8 µm. Fibres on measured area of filter are counted using phase contrast microscopy. Only the fibres longer than 5 µm, with diameter less than 3 µm, and with length/diameter ratio higher than 3:1, are subject to counting (respirable fibres). Counting of respirable asbestos fibres is according to the principles described in PN-88/Z-04202/02 in randomly selected 100 areas of Walton–Beckett graticule.

Phase contrast optical fibre counting method is standardized method in common use in routine asbestos exposure measurement in European Union and worldwide and it is WHO recommended method. In Poland this method is based on:

- Evaluation of total dust in the workplace by the method PN-91/Z-04030/05.
- Evaluation of the concentration of asbestos respirable fibres by the standardized microscopic method PN-88/Z-04200/02.

The limit of quantification (LOQ) of this method is at least 0,016 fibres in 1 cm<sup>3</sup>.

(This method is compatible with MDHS, 39/4 “Asbestos fibres in air”, HSE 1995 and NIOSH, Method: 7400 Issue 2)

Since 1990, the Nofer Institute of Occupational Medicine, Lodz, Poland, has been running an interlaboratory quality assurance programme which permits standardisation of the whole analytical procedure. The FM-7400 Mineral Fibre Laser Monitor has been used to determine asbestos fibre concentration in workplace.

In some asbestos-cement plants that started operating as early as in 1960s and 1970s, high asbestos dust concentrations were recorded until late 1980s; unfortunately, the relevant values were then expressed only as mg/m<sup>3</sup>. It may be assumed that during the period when the dry processing was used, the fibre concentrations could be as high as a dozen or even several dozen fibres in 1 cm<sup>3</sup> air. The introduction of wet processing has considerably reduced workplace dust concentrations. However, even as recently as in 1990, asbestos dust concentrations of 8 f/cm<sup>3</sup> could be recorded at asbestos milling and delivery units. The transportation of asbestos as the raw material and the initial processing (defibering), that are associated with high fibre concentrations in ambient air, posed a major workplace hygiene problem. The imported asbestos was frequently supplied in damaged packages; the spillage causing an additional environmental pollution. The implementation of an automatic system of asbestos supply made the workplace concentrations of chrysotile asbestos not to exceed the MAC value of 0.5 f/cm<sup>3</sup> which was binding till June 2003. The use of amphibole asbestos was discontinued in mid 1980s.

### **Health protection for asbestos-exposed workers**

Providing prophylactic health care for workers is the responsibility of the occupational health services. The preventive measures for asbestos-exposed workers are specified in EU legislation and International Labour Office conventions.

In Poland, the Labour Code makes it obligatory both for the employer and employee to arrange for the prophylactic examinations of workers, especially those working under hazardous conditions. As regards asbestos exposure, the health care covers the workers under conditions of occupational exposure to asbestos as well as former asbestos workers, including the workers of asbestos plants listed in the Act on the Ban on Use of Asbestos Contained Materials

For workers occupationally exposed to asbestos the prophylactic activities include: pre-placement examinations; periodic examinations: the first one – after 3 years' duration of work, then – every two years, after 10 years of work – every year; active counselling; health promotion activities

The conducting physician determines the frequency of prophylactic examinations, taking into account:

- the worker's health condition
- job description
- exposure level
- duration of employment
- latency period for asbestos-related diseases

### **Size of population occupationally exposed**

Before the Amiantus Project was launched, no register of workers occupationally exposed to asbestos dust had been compiled in Poland. Based on the data collected from regional divisions of the State Sanitary Inspectorate, the number of workers at asbestos processing plants has been estimated to be about 20,000. Considering other sectors of the national economy (insulation work, building industry, car repair shops, shipbuilding industry, etc.), the number of workers exposed to asbestos dust from the use of asbestos contained products is estimated to have reached 35,000, and 45% of this population was exposed in the past to concentrations higher than the relevant MAC values.

### **Legal regulations of the health protection**

Polish legal regulations regarding the protection of human health against adverse effects of asbestos dust, as well as the management of asbestos wastes, are in compliance with the international standards and the European Union legislation (EU Convention No. 162 and Recommendation No. 172, and EU Directives 83/477, 91/382, 98/24, 91/689, 94/31, 03/18). However, they are scattered over regulations of different type and rank. The most important provisions are included in the Act of 19 June 1997, on the prohibition of use of asbestos contained materials and on the regulations based thereon. By virtue of Article 1 of this Act, the manufacture of asbestos contained products was banned and so was their introduction and trading over the territory of Poland. The revoking of this prohibition is possible only under strictly defined and exceptional conditions when, for technological reasons, no asbestos substitutes can be used.

Presently, the main problem in Poland is the safe use of the already existing asbestos products and their gradual elimination. The executory provisions to the Act specified above determine the ways and conditions of safe use and elimination of asbestos products, as well as the principles of work safety and hygiene regarding the management and disposal of asbestos wastes and a training programme in this respect. Of relevance to human safety and health protection against asbestos hazard are the Labour Code provisions. The executory provisions thereto determine

the procedure and frequency of measurements of asbestos dust concentration in the workplace atmosphere, the procedure for recording and storage of their results and communicating them to the workers, and the maximum admissible air concentrations (MAC values) of asbestos dust in workplace (8, 9). It should be stressed that the Polish legal regulations provide for special health care for current and former workers exposed to asbestos dust, covering prophylactic examinations, free medications in asbestos-related diseases, and treatment in health resorts (1, 7, 10-13). An issue essential for the protection of human life and health against asbestos hazard is the proper management of asbestos wastes.

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**ABSTRACT**

The presentation addresses current problems of health risk and health effects associated with exposure to asbestos, including data on historical exposure and on currently valid occupational exposure limits. The quantity and types of the raw material used for the production of various asbestos products have also been discussed in relation to the particular types of asbestos-induced occupational diseases. The authors describe the medical care system for former asbestos workers and those currently exposed during removal of asbestos-containing products. The national system for medical certification of occupational asbestos-related diseases and the compensation procedure have been outlined as well.

According to the parliamentary Act of 1997, importing, manufacture and sale of asbestos and asbestos-containing materials are prohibited in Poland. Thus, the assessment of asbestos exposure and the monitoring of health conditions of workers at asbestos-processing plants have become irrelevant. However, the delayed health effects attributable to past exposure continue to be the matter of concern for public health. Likewise, the environmental pollution from asbestos waste landfills in the vicinity of asbestos-processing plants (where high levels of asbestos fibre in ambient air have been recorded) will continue to be a serious public health problem.

Presently, two programmes aimed at minimising the adverse effects of asbestos on population health are underway. One of them is the governmental programme for "Elimination of asbestos and asbestos-containing products used in Poland, 2002-2032". The programme was updated in 2009 to cover the workers contracted to perform demolition works and provide protective covers to asbestos waste landfills. This will be the exposed group who need prophylactic health care. The other is a programme of prophylactic examinations for former asbestos workers and is referred to as the AMIANTUS programme. Both programmes have been briefly described.

**Key words:**

Asbestos consumption, Occupational exposure, Health care, Occupational asbestos-related diseases, Compensation system