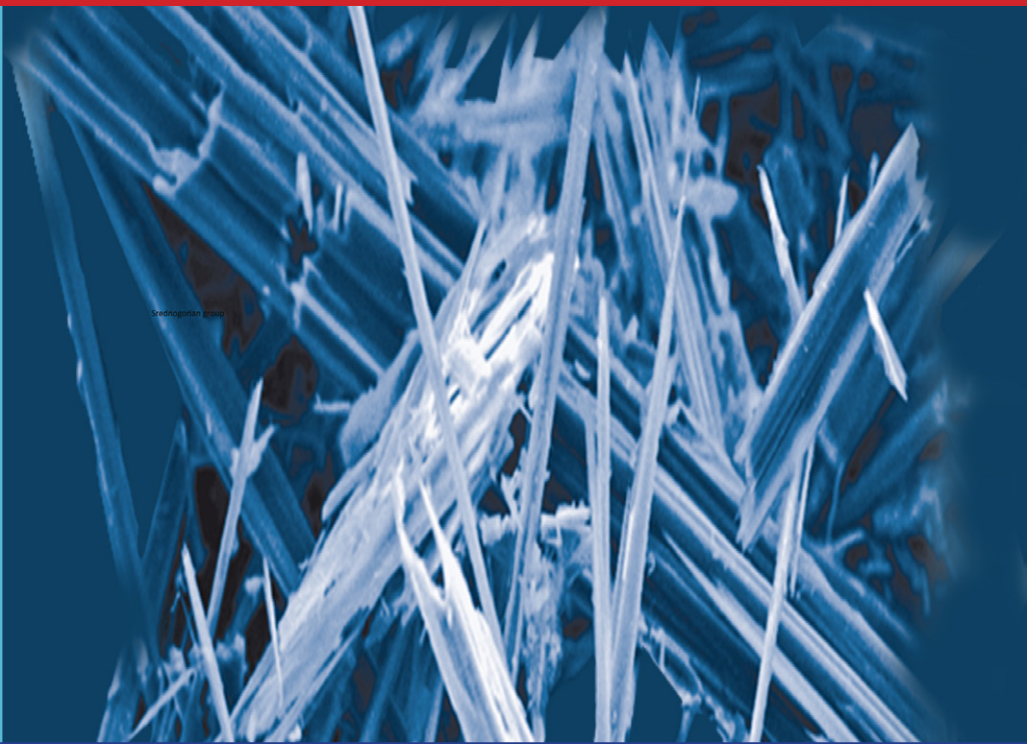


# National Asbestos Profile of BULGARIA

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National Center  
of Public Health and Analyses,  
Bulgaria



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*The preparation of National Asbestos Profiles was initiated by the World Health Organization Regional Office for Europe. The National Asbestos Profiles are part of the development of national programs for the elimination of asbestos-related diseases and is prepared according the guidelines of WHO and International Labour Organization (ILO).*

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*The sole responsibility for the contents of this publication lies with the authors.*

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## NATIONAL ASBESTOS PROFILE OF BULGARIA

### ABSTRACT

*At the Fifth Ministerial Conference on Environment and Health held in Parma, Italy, in 2010 the Member States of the WHO European Region adopted a declaration to develop national programmes for the elimination of asbestos-related diseases (ARDs) by 2015 in collaboration with WHO and the International Labour Organization (ILO).*

*The National Asbestos Profile is an instrument, providing information to the member states and defining the baseline situation with regards to the elimination of asbestos related diseases, populations at risk from current and past exposures. It also determines the system for inspection and enforcement of exposure limits of asbestos. The aim of the National Profile is to work as a starting point for development and enforcement of national programs for the elimination of asbestos-related diseases. It shall serve as an instrument to measure the progress made towards the objectives and targets set by the national programs.*

*The National Profile of Bulgaria follows the structure, which was proposed by the WHO for the National Profiles. Different sources are used. The information for consumption of asbestos in the past is based on the data from several publications, with some differences between the sources. The reporting on asbestos-related diseases is based on recognized cases from National Social Security Institute and provided data by National Cancer Register. Besides asbestos related diseases are recognized as occupational in the country, the occupational diseases as a whole are underreported and the malignant ones are rather unreported, which makes impossible to quantify the burden of asbestos-related diseases.*

#### **Key words:**

*Asbestos production and use, asbestosis, lung cancer, mesothelioma, enforcement of ban, occupational exposure, exposure limits*

## DEMOGRAPHIC AND SOCIOECONOMIC SITUATION

Bulgaria is a small country in South-East Europe, member of European Union (EU), with population of 7.245 million in 2014. Life expectancy at birth of population in Bulgaria remains lower than the mean for EU (74.2 years compared to 80.4 in EU), both for men (70.7 years compared to 77.4 years in EU) and women (77.8 years compared to 83.2 years in EU). Eurostat data show that Bulgaria continues to rank as the lowest-income member state of the EU, with GDP per capita calculated to be 5,800 Euros in 2014, less than 50 per cent of the EU28 average GDP.

### 1. Current Regulations on the Different Forms of Asbestos

#### 1.1. Introduction

Bulgaria has presence of natural asbestos admixture (anthophyllite) in cultivated soil layer in Eastern Rhodopes and Belasitza. Exploitation the natural country deposits of anthophyllite – tremolite asbestos, production and use of asbestos products was intensive during the last 3-4 decades of the past century. The in-house asbestos was input in insulation putties of pipelines, turbines, furnaces in energetics and metallurgy. Further asbestos was imported, mainly chrysotile for production of asbestos-cement products (pipes, plates, panels), asbestos-perlite insulation blocks, segments, asbestos textile articles (ropes, cords, fillings, tissues), squirted insulations of industrial equipment, friction products, pressed materials for electronics, diaphragms for electrolysis in chemical industry, etc. The imported crocidolite was used as a component in some types of asbestos-cement pipes.

#### 1.2. Classification

Asbestos is classified as a carcinogenic substance (Carc. 1A; H350, STOT RE 1; H372) in Annex VI of the CLP Regulation (EC) No. 1272/2008.

#### 1.3. Ban of Asbestos

Bulgaria has banned the import, production and use of all asbestos fibers and asbestos-containing products since January 1, 2005. The ban was issued with the Ordinance on the hazardous chemical substances and preparations subject to prohibition or restrictions on marketing and use (State Gazette No 69, 2002; amendment No 64, 2004; No 97, 2005).

The following fibrous silicates are considered to be asbestos in accordance with Annex XVII (6) of the Regulation (EC) No. 1907/2006 and Ordinance № 9 of 4 August 2006 on the protection of workers from risks related to exposure to asbestos at work:

1. Asbestos Actinolite, CAS number 77536-66-4;
2. Asbestos Amosite, CAS number 12172-73-5;
3. Asbestos Anthophyllite, CAS number 77536-67-5;
4. Chrysotile, CAS number 12001-29-5;
5. Crocidolite, CAS number 12001-28-4;
6. Asbestos Tremolite, CAS number 77536-68-6.

### 1.4. Supplementary Provisions concerning the Protection against Risks from Asbestos

With the amendment of Article 73 of the Health Act in 2006 the manner and form for obtaining permission for activities with asbestos products are specified. With Ordinance № 9 of 4 August 2006 on the protection of workers from risks related to exposure to asbestos at work the following requirements were introduced:

- Prohibition of application of asbestos by spraying, as well as activities involving the use of asbestos insulation or soundproofing materials with low density. All activities with asbestos were prohibited except the activities of treatment and disposal of products obtained in result from demolition or dismantling of asbestos and / or asbestos-containing products.
- Identification and assessment of the risk from asbestos exposure is responsibility of the employer. This applies in particular with respect to demolition, reconstruction and maintenance work involving articles or materials containing asbestos.
- For activities of demolition and / or removal of asbestos and asbestos products permits have to be issued under the Health Act (State Gazette No 70, 2004, amend. No 59, 2006).
- Notification to the competent authorities prior to commencement of the activities by the employer, containing the following details: location of the work site, types and quantities of asbestos used or handled, activities performed and processes applied, number of workers involved, starting date and duration of the work, measures taken to limit the release of asbestos and to limit the workers' exposure to asbestos. The employer has to provide information to workers and their representative.
- The limit of concentration of asbestos fibers in the air should not exceed 0.1 f/cm<sup>3</sup> as average of 8-hour period of exposure.
- The spread of asbestos dust has to be prevented by the dust-tight separation of the working area or by means of suitable protective measures which ensure an equivalent safety standard. Appropriate ventilation system has to be maintained and workers to be provided with suitable respiratory protective equipment, protective suits and, where necessary, other personal protective equipment. Contaminated personal protective equipment and the work clothing have either to be cleaned or disposed. The workers have to be provided with suitable washrooms with showers.
- The employer has to provide health surveillance of the workers and keep register of exposed workers with information concerning the exposure type and duration.
- The employer has to provide information to workers concerning the properties of asbestos and its effects on health, the types of products and materials likely to contain asbestos, activities during which asbestos exposure may arise, measures taken to minimize exposure, the proper application of safe processes and personal protective equipment, measures taken in the case of operational disturbances, proper waste disposal, requirements for medical checks.

Further, the legislation requires declaration to competent authorities for activities of demolition/removal of asbestos-containing thermal insulations, buildings and structures (Ordinance No 3/2010, State Gazette No.19, 2010) in accordance with article 15 (1) of the Law for Health and Safety at Work, as well as classification and management of the waste (Ordinance No 2, 2014) according Waste Management Act. (State Gazette No 53, 2012; last amend. No 61, 2014).

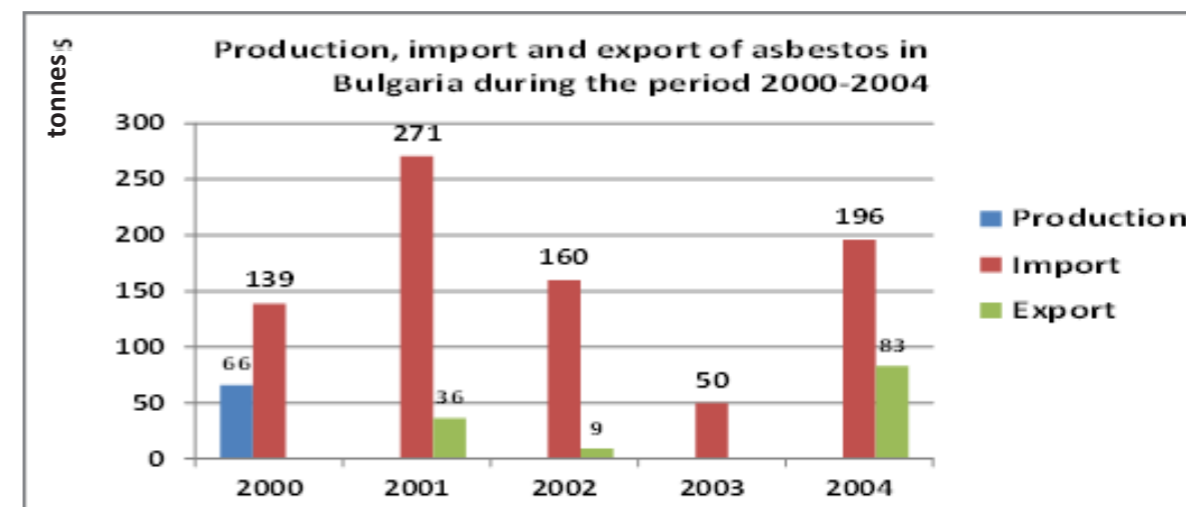
### 2. Import and consumption of asbestos per year (total and per major uses and forms)

The available data for domestic production, import and consumption show some differences between the sources and years. Data of supply and consumption of asbestos of USA Geological Survey are presented on Table 1 and show as start point of domestic production and consumption 1960. The available data for import and consumption of asbestos in the country according European Mineral Statistics for the period 2000-2004 show lower quantities in comparison to USA Geological Survey (Figure 1).

**Table 1.**  
Asbestos production, import, export and consumption in Bulgaria from 1960 through 2003: U.S. Geological Survey.

Year	Domestic production (tonnes)	Import (tonnes)	Export (tonnes)	Consumption (tonnes)
1960	1118	-	-	1118
1970	3046	-	-	3046
1975	-	28812	-	28812
1980	650	500	-	1150
1985	400	35472	-	35872
1990	500	-	-	500
1995	100	-	-	100
1996	400	-	-	400
1997	300	-	-	300
1998	350	1673	<0.5	2023
1999	350	781	-	1131
2000	350	391	324	417
2001	-	529	36	493
2002	-	612	9	603
2003	-	108	<0.5	108

**Figure 1.**  
European Mineral Statistics. British Geological Survey: 2006, Keyworth, Nottingham.





Rather higher asbestos consumption (Table 2) was calculated by national experts (Tcherneva and Lukanova, 2001), however these data were neither confirmed nor denied by responsible institutions.

**Table 2.**  
Asbestos consumption in Bulgaria according national experts  
(Tcherneva and Lukanova, 2001)

Asbestos type	Annual asbestos consumption (in tonnes)		
	1980	1993	2000
Chrysotile	32000	< 10000	< 2000
Crocidolite	1000	-	-
Anthophyllite and tremolite	7000	500	-

By 1980 the exploitation the deposits of anthophyllite and tremolite were carried in 7 premises – 3 underground mines and 4 surface ones. The processing of asbestos was carried in several plants and workshops, as follow: initial processing of the raw material in 2 plants, production of asbestos-cement in 6 plants, production of asbestos perlite – in 1 plant, production of asbestos textile materials – 1 plant, production of friction materials – 1 plant and several shop facilities, production of the pressed materials – in 3-4 shop facilities.

### 3. Import of asbestos-containing materials

The total ban on import, manufacture, placing on the market and use of asbestos fibers is in force since 2005. However, illegal import of asbestos-containing materials and products from Non-EU countries violating the mass-volume threshold of 0.1% could not be excluded. To protect health at work, at home and in leisure areas various general and special European directives for technical products (e.g. regarding machines, electrical devices, toys, etc.) are implemented and enforced.

### 4. Domestic production of asbestos (if applicable)

The domestic production of asbestos was stopped several years before the total ban of import, production and use of all asbestos fibers and asbestos-containing products in 2005.

In the period 1960 -1995 three underground and 4 surface mines are exploited, as well as a lot of small carriers with deposits mainly of anthophyllite asbestos. The biggest are the deposits of Kurdgali (1), Asenovgrad (2) and Srednogorian group (3) (Figure 2). Industrial production has been carried in these regions and for the period to 1978 according the data of Boginov K. and Geljazkova- Panajotova M. (1979) the total amount of produced and processed asbestos is around 105 tons. The production near village Dorkovo (Asenovgrad group), were production was carried up to 1995 is not included in the above calculation. The data of Boginov K. and Geljazkova- Panajotova M. (1979) exceed the data of geological study of USA for production of asbestos in Bulgaria for the period 1900 - 2003, but we have no official data from the responsible institutions.

**Figure 2.**  
Location of asbestos deposits, where industrial production of asbestos is carried up to 1978  
(Boginov K. and Geljazkova- Panajotova M., 1979)



### 5. Domestic production of asbestos-containing materials

Since 2005 the production of asbestos-containing materials in Bulgaria is banned. However, asbestos can appear as an impurity during the production of products using contaminated with asbestos materials. An important example is the extraction of ore and industrial minerals. Minerals such as talc and vermiculite may also contain asbestos.

Asbestos waste is defined by Waste Management Act as a product. Thus, disposal of waste containing asbestos as outcome of demolition work in asbestos polluted buildings or waste of technical equipment containing asbestos can be considered as the production of asbestos-containing materials. According to the Bulgarian legislation asbestos waste disposal has to be documented, providing information on the type and content of asbestos and quantity of asbestos-containing waste.

The classification of hazardous waste is carried out on the base of EU Directive. According to this provision asbestos waste disposal is classified as hazardous, if the mass-percentage of asbestos in the waste exceeds 0.1%. In this case the classification number is marked by an asterisk (\*). The country has 52 landfills with permits for acceptance of asbestos-containing materials and waste. Three of them were closed due to exhausted capacity. According to data from Ministry of Environment and Water 84 employees are currently involved in waste disposal activities. Asbestos exposure is possible for these employees. Table 3 gives an overview on quantities of different types of asbestos containing disposal.

**Table 3.**  
Asbestos waste disposal (in 1,000 tons)

Waste code	Waste type	m3	Tonnes x 1000
06 07 01*	Asbestos waste from chlorine-alkali electrolysis		68.05
16 01 11*	Asbestos-containing brake pads		22.86
16 02 12*	Used Technical equipment and devices containing asbestos		0.36
17 06 01*	Insulating material containing asbestos	300	1253.91
17 06 05*	Asbestos containing building materials	1704	184.57
17 06 01*	Insulating material containing asbestos		64.60
17 06 05*	Asbestos-containing building materials		
16 01 11*	Asbestos-containing brake pads		<b>189.34</b>
17 06 01*	Insulating material containing asbestos		
No data	No data for the source		7255.94
<b>Total</b>		<b>2004</b>	<b>9039.63</b>

Source: Data provided by Ministry of Environment

### 6. Estimated total number of workers exposed to asbestos in the country

An actual number of workers exposed is not directly available, but is estimated to 27 000. Employers declaration according Ordinance No 3/ 2010 (State Gazette No.19, 2010) show that 1188 workers have been occupationally exposed to asbestos in 2012, but their number could be higher.

### 7. Full list of industries where exposure to asbestos is present in the country and list of industries with the largest numbers of workers potentially exposed to asbestos

The majority of workers currently at risk of exposure are working in demolition, reconstruction or maintenance industries involving work on asbestos containing buildings and installations and asbestos waste disposal.

In addition non-occupational asbestos exposures may occur during:

- Demolition and/or reconstruction works with asbestos-containing materials at home, not compliant with the legislative requirements for health and safety at work;
- Relatives of exposed people performing reconstruction works with asbestos-containing materials at home may be exposed coming into contact with contaminated work clothes;
- Asbestos fiber emissions from encapsulated asbestos-containing materials building residential and public buildings and / or improperly stored waste materials containing asbestos;
- Use of asbestos-containing products in the household.

In the past, the workers mining anthophyllite and tremolite asbestos and workers involved in the processing of raw materials and manufacture of various asbestos-containing products have been exposed to asbestos (Table 4).

**Table 4.**  
List of major asbestos productions in Bulgaria in the past

Production type	Number of plants
Exploitation of the deposits of: antophyllite and tremolite	3 – underground , 4 – surface
Initial processing of the raw material	2
Production of asbestos-cement	6
Production of asbestos perlite	1
Production of asbestos textile materials	1
Production of friction materials	1 plant and several shop facilities
Production of the pressed materials	3 - 4 shop facilities

### 8. Industries with high risk of exposure (where overexposure is documented as exceeding exposure limits) and estimated total number of workers at high risk

Currently not relevant: no high risk of exposure following strictly the compliance with the legislation and performing legally the demolition of asbestos materials.

Data from the analyses at the National Center for Public Health and Analysis (NCPHA) in the period 1977 to 1989 show that the average shift concentrations of asbestos in all major asbestos industries in Bulgaria exceeded the limits values, for some working places by 10 to 15 times (Table 5).

**Table 5.**  
Data for the average shift concentration of asbestos in the major asbestos industries in Bulgaria in the period 1977 – 1989

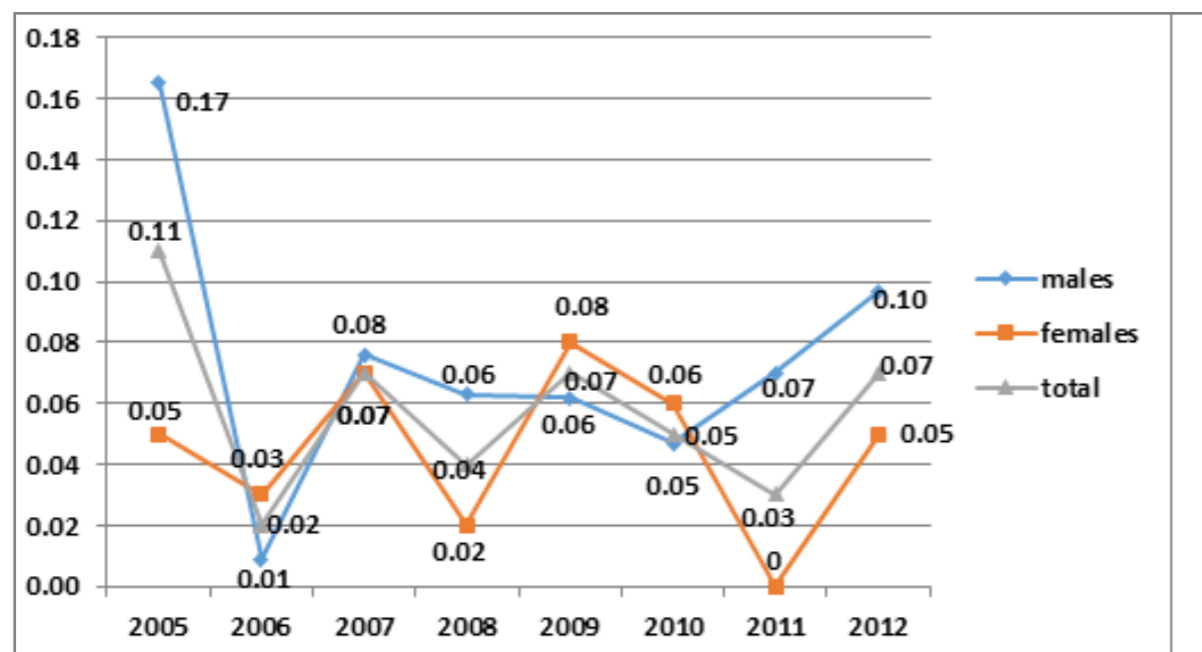
DUST RELEASING OPERATIONS	AVERAGE SHIFT CONCENTRATION (f/cm3)
Primary asbestos material processing;	5 - 30
Torque converting and destroying asbestos insulation's	4-12
Preparation of asbestos putties	2
Unpacking and dosing asbestos materials and mechanical processing of asbestos products in asbestos-cement industry;	2-24
Dosing, combing, twisting in asbestos-textile production;	1-8
Polishing gaskets and grinding of waste material	1-6

After the limit value for average shift concentration of respirable asbestos fibers was set to 1 f/cm<sup>3</sup> in 1992, the data of the NCPHA show that most of the studied work places met the requirements, except for work places during destroying turbine asbestos insulation (6.5 f/cm<sup>3</sup>) in Thermal power plant and few work places in Asbestos-textile products manufacturing with of 4.7 – 5.0 f/cm<sup>3</sup>.

**9. Estimate of the burden of diseases related to asbestos: disability adjusted life years (DALY/PLY) and deaths attributable to asbestos exposure**

**Figure 3.**

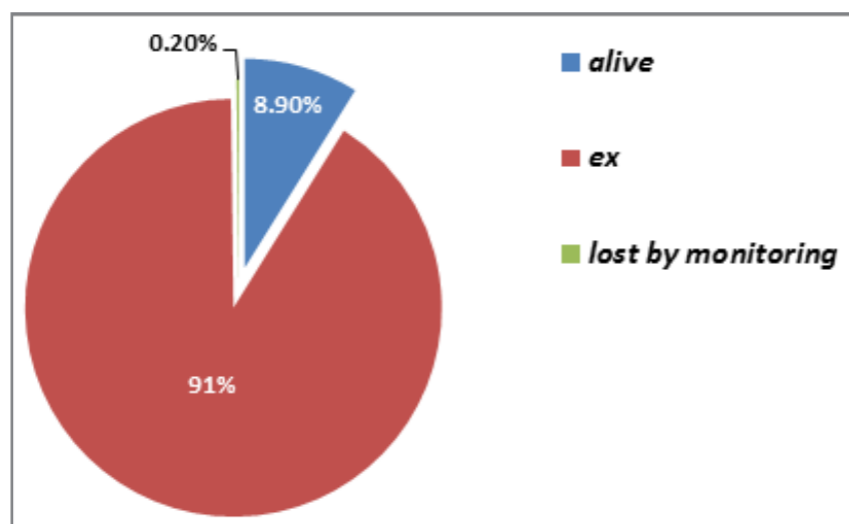
Standardized mortality of mesothelioma (per 100 000), total and by gender in Bulgaria for the period 2004-2012 (Data provided by the National Cancer Register)



There are no comprehensive data for assessing the burden of diseases related to asbestos. Figure 3 presents the standardized mortality rates from mesothelioma / C45 / in Bulgaria in total and by gender for the period 2005-2012, and in Figure 4 the vital status of individuals with mesothelioma registered in the period 1993 - 2012, showing that from all registered for the period 1993 - 2012 only 8.9% were alive at the end of 2012.

**Figure 4.**

Vital status of subjects with registered mesothelioma for the period 1993 -2012 (Data were provided by the National Cancer Register)



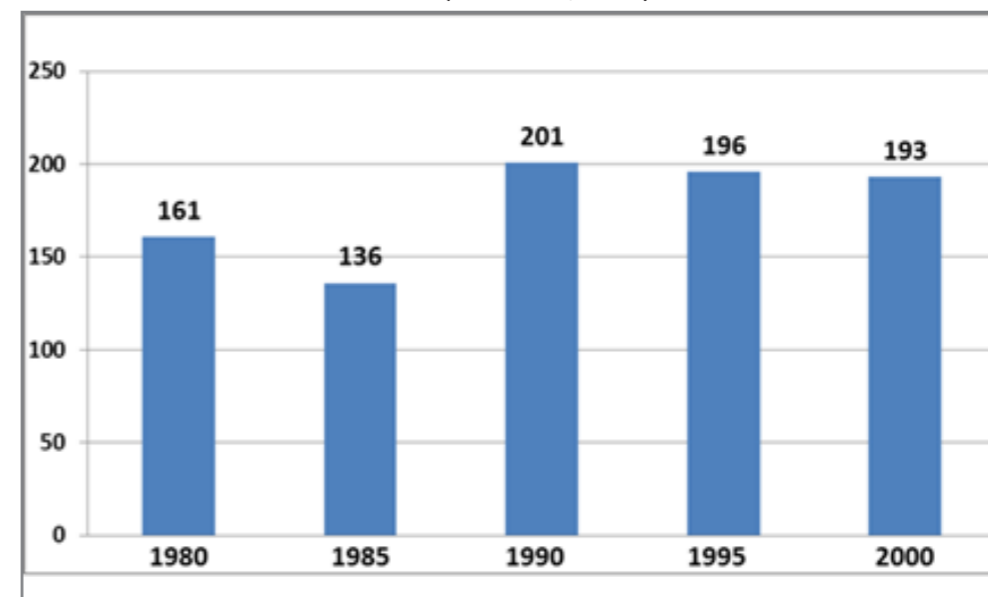
**10. Prevalence of asbestosis (total number of workers with diagnosed asbestosis, asbestos-related lung cancer and mesothelioma to-date) – national data, a breakdown**

The situation in Bulgaria is complicated by the country's deposits of anthophyllite and tremolite and regions naturally contaminated with asbestos admixtures in the soil. A survey of Burilkov (1983) of 96,059 subjects from the affected regions conducted from 1973-1978 identified 720 cases of pleural plaques, 94.6% of which were in subjects over 40 years old.

Further the data of Burilkov (1983) from systematic 15-year monitoring of 9142 workers (1967-1982) evidence 206 cases with asbestosis and 492 cases with pre-morbid changes, the greatest percentage were insulation workers and workers in power-repair (37%), followed by miners and workers in primary processing of asbestos raw material (21%), asbestos-cement production (16%), asbestos textile (10%), asboplasts (10%) and about 10% - others. The study shows that five cases of lung cancer were recorded among subjects with asbestosis. The study of Petrova E. (1980) for the period 1980-2000 shows that the new cases of asbestosis, pleural plaques and thickening varied from 136 to 201 (Figure 4). The newly registered cases of asbestosis are 1-4 annually nowadays, but as a whole the occupational diseases detection and reporting is considered unsatisfactory by the Annual report for the health of population and implementation of National Health Strategy 2013 of Ministry of Health of Republic Bulgaria.

**Figure 5.**

New cases with asbestosis, pleural plaques and thickening in the period 1980 – 2000 (Petrova E., 2005)



**11. Incidence of lung cancer among workers exposed to asbestos**

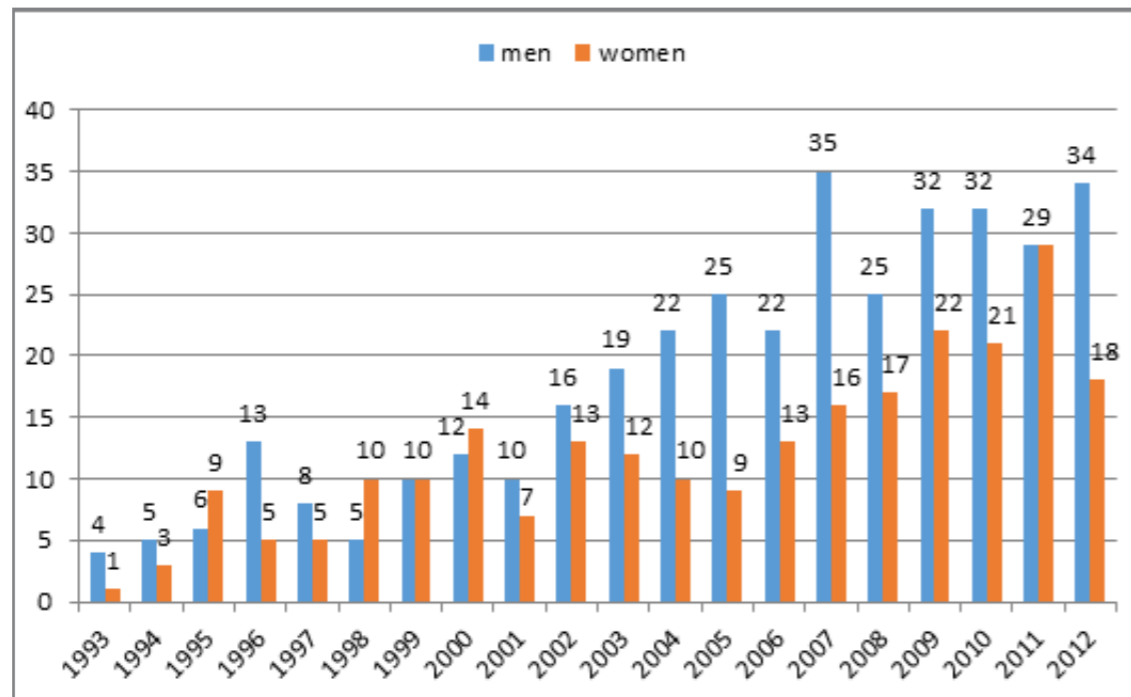
There are no data on incidence of lung cancer among workers exposed to asbestos, but according the National Cancer Register the cases of lung cancer of all reasons are increasing and 4057 new cases were reported in 2012, 3393 of males and 764 of females. Trachea and lung cancer are leading reason of the most common cancer deaths in males in 2012 in Bulgaria with 27.5 % and take third position in females with 9.5 % after breast cancer (18.3 %) and colon cancer (9.8 %).



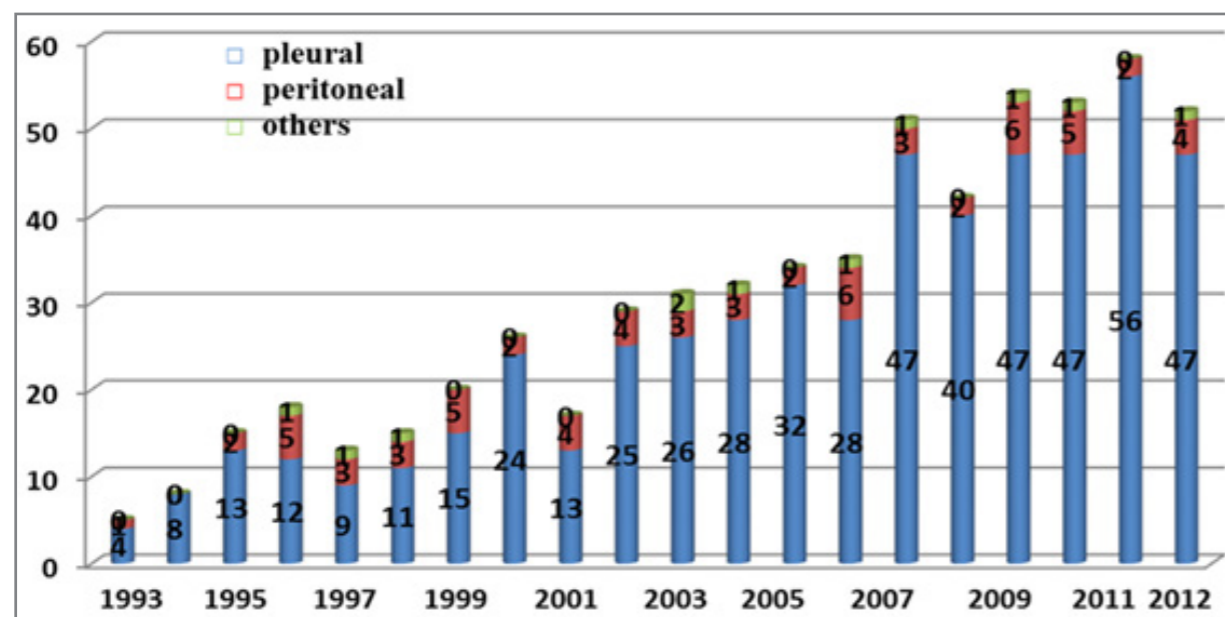
## 12. Incidence of mesothelioma

National cancer register data show increase in mesothelioma cases in both genders for the period 1993 -2012, but they are not studied for occupational etiology (Figure 5). Following the cases by location pleural mesothelioma is dominating (Figure 6). The crude rate per 100000 persons varies from 0.2 to 1.0, with higher values for male population (Figure 7).

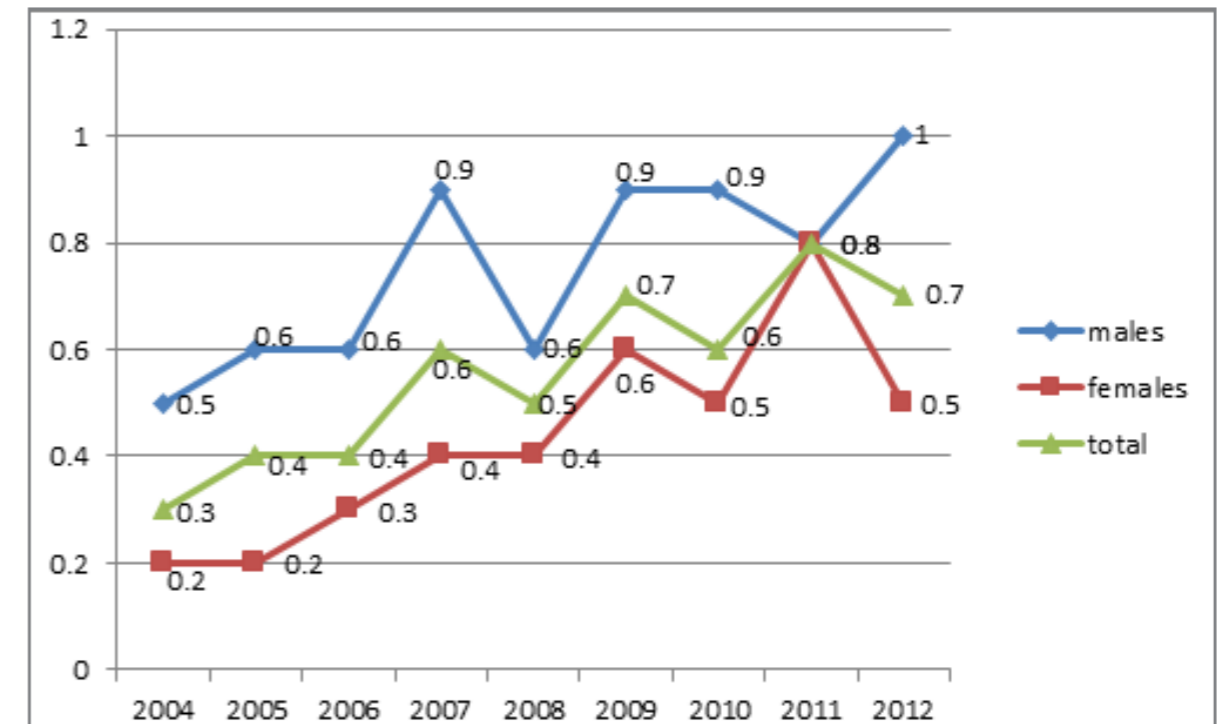
**Figure 6.**  
Number of registered cases of mesothelioma by gender for the period 1993 -2012  
(Data provided by the National Cancer Register)



**Figure 7.**  
Number of registered cases of mesothelioma by location for the period 1993 -2012  
(Data provided by the National Cancer Register)



**Figure 8.**  
Crude rate of mesothelioma per 100 000 persons, total and by gender in Bulgaria  
for the period 2004-2012 (Data provided by the National Cancer Register)



## 13. Estimates on the percentage of house stock and vehicle fleet containing asbestos

No data are available for the percentage of house stock and vehicle fleet containing asbestos. The water supply system of the country, constructed mostly in the period 1960–1980, is with length of 73 000 km and is developed about 70 % with asbestos cement pipes. Annual reconstructions and substitution of asbestos cement pipes are carried according National Strategy for control and development of water sector of Republic Bulgaria and National Strategy for development and control of water supply and sanitation of Republic Bulgaria.

## 14. Total number of workers eligible for compensation for asbestos-related diseases, as lung cancer and mesothelioma (per year) and the numbers of individuals compensated yearly

The following asbestos related diseases are recognized as occupational according the list of recognized occupational diseases:

- Asbestosis (bronco-pulmonary fibrosis), with or without complications, pulmonary emphysema, chronic bronchitis, respiratory failure, bronchiectasis, pulmonary hypertension, cardiac insufficiency, etc.;
- Pleural plaques (fibrous, hyaline, calcium), with or without complications, pulmonary emphysema, respiratory failure, pulmonary hypertension, cardiac insufficiency, etc.;
- Pleurisy;



- Lung cancer;
- Pleurisy (a complication of lung cancer)
- Malignant mesothelioma (pleura, peritoneum, pericardium);
- Cancer of the larynx;
- Ovarian Cancer;
- Cancer of the gastrointestinal tract;
- Skin changes (dermatitis, warts).

Besides asbestos related diseases are recognized as occupational, the compensations related to asbestos are few due to underreporting or even not reporting of asbestos diseases, especially malignant ones.

### 15. National enforceable occupational exposure limits for chrysotile asbestos

Ordinance № 9 of 4 August 2006 on the protection of workers from risks related to exposure to asbestos at work enforces average shift limit value of concentration of asbestos fibers in the air of 0.1f/cm<sup>3</sup> for 8-hour period.

The following control limit values of sporadic and low intensity exposures according the requirements of Art. 3 (4) of the Directive 2009/148/EC of the European Parliament and of the Council of the 30 November 2009 have been adopted in practice as follows:

- Control limit value of concentration of asbestos fibers, average for 10 minutes of 0.6 f / cm<sup>3</sup>, regardless of the respiratory personal protective equipment;
- Control limit value of concentration of asbestos fibers, average for 4 hours of 0,1 f / cm<sup>3</sup>, regardless of the respiratory personal protective equipment.

The control limit values apply to all types of asbestos fibers. The following activities are classified as sporadic and low intensity exposures, in case appropriate technical and technological methods and practices to minimize the risk of exposure to asbestos fibers are taken:

- short, non-continuous maintenance activities in which only non-friable materials are handled and include 1 hour of a work of an employee in any seven-day period with asbestos materials, asbestos cardboard, asbestos gaskets, asbestos sails;
- removal without deterioration of non-degraded materials from asbestos cement, roof decoration, bituminous coatings, etc., in which the asbestos fibres are firmly linked in a matrix;
- encapsulation (cover with a product that penetrates the material and strengthens) or sealing (application of appropriate surface coating for isolating the material from the outside air) of asbestos-containing materials which are in good condition;
- air monitoring and control, and the collection of samples to ascertain whether a specific material contains asbestos.

### 16. The system for inspection and enforcement of the exposure limits

After the ban of import, production and use of all asbestos fibers and asbestos-containing products in 2005 the Amendments of Health Act concerning the health risks of asbestos and Ordinance № 9 of 4 August 2006 on the protection of workers from risks related to exposure to asbestos at work enforced permit regime for asbestos exposure during demolition of asbestos containing structures, reconstruction and maintenance work, etc.

Information from regional control authorities show that permit regime for demolition/ removal of asbestos materials was in general followed and asbestos exposures were declared at Labour Inspectorates, but some inconsistencies were found and measures for strengthening the control are discussed.

Control of the asbestos concentrations at work by regular measurements of asbestos fibres in the workplace air and tests of suspected materials for asbestos are carried. During the period 2005-2014 NCPHA tested 398 samples of various products, insulation materials and waste for the substance of asbestos using polarized light microscopy (PLM) method. In 294 samples (74%) asbestos substance was confirmed, in 42 % chrysotile, in 5% amphibolite and in 27 % mixture of chrysotile and amphibolite.

In addition to risk control, medical examinations and training and instruction of workers are required. The number of exposed workers has to be reduced to the lowest possible number. Organizational and technical measures for reduction of dust release are planned and implemented as follows: separation/ enclosure of working areas and reduction of the pressure in them; the access is limited for persons not directly engaged in reconstruction and demolition, etc. Suitable respiratory protective equipment, disposable protective suits, etc. are provided.

### 17. Estimated economic losses due to asbestos related diseases

No available data

### 18. Major studies on epidemiology of asbestos-related diseases in Bulgaria

Ten publications with data on epidemiology of asbestos-related diseases in the country were identified, but the list may be incomplete:

- Burilkov T. Study on biological effects of asbestos minerals. PhD. National Institute of Hygiene and Occupational Diseases, Sofia, 1983 (in Bg).
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# National Asbestos Profile of BULGARIA