

REPORT

on all potential and common uses of

ASBESTOS in RESIDENTIAL,
COMMERCIAL and INDUSTRIAL

buildings and facilities



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Abbreviations

ACM	Asbestos Containing Materials
ARD	Asbestos-Related Disease
IARC	International Agency for Research on Cancer
ICOH	International Commission on Occupational Health
EU	European Union
EC	European Commission
WHO	World Health Organization
NAP	National Asbestos Profile
USGS	U.S. Geological Survey
WHO MDB	World Health Organization Mortality Database,
GBD	Global Burden of Disease
WHO GHE	World Health Organization Global Health Estimate
WHO GCO	Global Cancer Observatory
VRU	Verkhovna Rada of Ukraine
CMU	Cabinet of Ministers of Ukraine
PVC	Polyvinyl Chloride
EPA	U.S. Environmental Protection Agency
HSE	The UK Health and Safety Executive
NSRUEO	National State Registry of Ukrainian Enterprises and Organizations
AIB	Asbestos Insulating Board
SSU	State Standard of Ukraine
BCR	Building Codes and Rules
NIP	Nomenclature of Industrial Products

1. INTRODUCTION

Asbestos ("mountain flax") is a natural mineral from the class of hydro silicates, consisting of thin and elastic fibers and having a number of useful properties.

There are two main types of asbestos - CHRYSOTILE and AMPHIBOLE asbestos.

Chrysotile asbestos is a mineral of the serpentine group, structurally belonging to a subclass of layered silicates.

Amphibole asbestos (*from the Greek "amphibolos" - ambiguous, which is associated with a complex variable composition*) structurally belongs to a subclass of ribbon silicates. Similar in physical and mechanical properties to chrysotile asbestos, but has significant differences from it in the crystal structure.

There are five forms of amphibole asbestos: actinolite, amosite, anthophyllite, crocidolite and tremolite.

Due to its properties, asbestos has had significant industrial uses since the 1880s. In the production of building materials, crocidolite (blue asbestos), amosite (brown asbestos) and chrysotile (white asbestos) were most commonly used.

Ukraine does not have its own asbestos deposits, so the producers of asbestos-containing materials (ACMs) exported chrysotile asbestos from Russia and Kazakhstan¹.

Chrysotile asbestos has been widely used as refractory, wear-resistant and fibrous filler in a variety of products such as slate, asbestos panels, water pipes, fire retardant coatings, brake shoes, gasket O-rings (paronite) and electrical insulation. Asbestos was included in textiles, plastics, papers, cardboard, threads and industrial mastics.

Vermiculite is often found in the environment as «a neighbour» of asbestos.

Vermiculite (*from Latin «vermiculus» - worm*) is a mineral of the silicate class from the group of three-octahedral hydro mica with a layered structure; is a product of secondary alteration (hydrolysis and subsequent weathering) of dark micas of biotite and phlogopite.

It exists in the form of large lamellar crystals of golden yellow or brown colour. In the process of heating, worm-like columns or threads of golden or silver colour are formed from the plates with a transverse distribution into the thinnest flakes (**expanded vermiculite**).

Vermiculite is used to produce heat-insulating products, sound-absorbing materials, incl. in aviation and automotive industry, lightweight concrete, decorative plaster solutions. In addition, it is used as filler in the manufacture of wallpaper, rubber, plastics, paints, pesticides in the production of anti-friction materials. Vermiculite is an adsorbent for gaseous and rare industrial wastes. In the nuclear power industry, it is used as a reflector of gamma radiation and an absorber of radiation of radioactive isotopes of chemical elements, such as strontium-90, cesium-137 and cobalt-58.

Vermiculite can be contaminated by asbestos, because the geological formation processes of both minerals are similar. Currently, vermiculite mines around the world are regularly inspected and are expected to be free of asbestos.

¹ URL: http://mama-86.org.ua/archive/files/asbest_web.pdf

There are also facilities for the production of asbestos-vermiculite molded heat-insulating products².

There are three geological provinces in Ukraine that are promising for vermiculite raw materials. More than 10 deposits with total reserves exceeding 10 million tons were discovered and partially explored: Priazovska, Pobuzhska and Pridneprovska³.

“NPP Ukrvermiculite” LLC⁴ (Kyiv region, Fastovskyi district) produces heat-insulating mixtures, expanded perlite, expanded vermiculite, vermiculite boards, high-temperature glue, etc.

2. ASBESTOS AND HAZARDS

2.1. Carcinogenicity of Asbestos

Worldwide, 230,000+ people die annually from asbestos-related diseases (ARDs)⁵.

Today, three of the major health effects that asbestos causes are: cancer of the lung, larynx, and ovaries; mesothelioma, which is a rare form of cancer that affects the thin lining of the lungs, chest, abdomen, and heart⁶; asbestosis – a serious, progressive, long-term non-cancerous disease of the lung⁷.

Chrysotile and crocidolite asbestos have been proven as a big negative effect on the lung and mesothelioma cancer development among all types of asbestos fibers. People working with asbestos may develop asbestosis - gradually progressive pulmonary fibrosis, which refers to pulmonary diseases and develops over 10-20 years, although its occurrence has been observed already after 1-2 years of permanent contact with asbestos.

Along with asbestosis, as a result of inhalation of asbestos fibers, cancerous diseases can also appear. Lung diseases such as bronchial carcinoma (lung cancer) and mesothelioma are associated with the activity of asbestos.

In the early 1970s, large-scale fundamental research by medical scientists confirmed the oncological danger for people who work with asbestos for a long time. The scientific community has recognized the carcinogenic hazard of all six forms of asbestos, which are classified by the International Agency for Research on Cancer (IARC) as a Group 1 of substances with proven carcinogenicity to humans, causing such occupational diseases as asbestosis, cancer of the larynx, bronchi and lungs, ovary, as well as malignant mesothelioma of the pleura, peritoneum, and pericardium⁸.

Asbestos fibers from asbestos-containing products can be emitted into the air due to the breakdown of asbestos-containing material during use, demolition work, home construction or maintenance, repairs and renovations. Typically, exposure can only occur

² URL: <https://works.doklad.ru/view/NDnlHAGYayWY/all.html>

³ Мінерально-сировинний потенціал України : навч. посібник / І. С. Паранько, Л. В. Бурман, С. В. Ярков. – Кривий Ріг : Видавничий дім, 2011. – 332 с. – Access mode: <http://elibrary.kdpu.edu.ua/bitstream/123456789/5151/9/Мінерально-сировинний%20потенціал%20України-183-209.pdf>

⁴ URL: https://youcontrol.com.ua/ru/catalog/company_details/31101383/

⁵ URL: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7917934/>.

⁶ Couespel, N. and Price, R., 2020, Strengthening Europe in the fight against cancer, European Parliament, Policy Department of Life Policies/ – Access mode: [https://www.europarl.europa.eu/thinktank/en/document/IPOL_STU\(2020\)642388](https://www.europarl.europa.eu/thinktank/en/document/IPOL_STU(2020)642388)

⁷ URL: <https://news.un.org/ru/story/2018/04/1329172>

⁸ URL: <https://monographs.iarc.who.int/wp-content/uploads/2018/06/mono100C.pdf>

when the asbestos-containing material is destroyed or damaged in some way, resulting in the emitted of particles and fibers into the air⁹.

2.2. Prohibition of Use

Asbestos is the world's top crime culprit. Asbestos continues to be the number one source of occupational cancer in the EU. According to the International Commission on Occupational Health (ICOH) asbestos claims approximately 88 000 lives in Europe annually, accounting for 55-85% of lung cancers at work¹⁰ (EC, 2019). Workers who handle asbestos products are most at risk of adverse health effects from asbestos. Occupations that pose the greatest risk of exposure to asbestos include¹¹:

- Miners
- Millers
- Insulators
- Boilermakers
- Auto mechanics
- Electricians
- Plumbers
- Firefighters
- Construction workers
- Industrial workers
- Shipyard workers
- Power plant workers

Also, anyone who lived with an asbestos worker was at risk of secondary exposure. This kind of influence has happened to many family members of asbestos workers. Laundering of work clothes was a particularly common source of secondary exposure.

The World Health Organization (WHO) recommends that countries develop a **National Asbestos Profile (NAP) to eliminate ARDs**.

In 2021, a study was conducted on the development of a national profile for the elimination of asbestos-related diseases in 195 countries of the world and the global status of NAPs was assessed¹². This document notes that in Ukraine there is consumption of untreated asbestos (U.S. Geological Survey, USGS) and ACMs (UN Comtrade).

There are no reported deaths from mesothelioma or asbestosis in Ukraine (WHO Mortality Database, WHO MDB), but there are estimated incidences of mesothelioma (Global Burden of Disease, GBD), estimated deaths from mesothelioma (WHO Global Health Estimate, WHO GHE), or estimated deaths from mesothelioma (WHO Global Cancer Observatory, WHO GCO).

Any use of asbestos has been banned in EU countries since 2005, and several EU Member States had banned asbestos long before that. Although updated data are not available, a 2014 study found that by 2012 asbestos use was practically negligible in most European countries^{13,14}.

⁹ URL: <https://www.epa.gov/asbestos/learn-about-asbestos#exposed>

¹⁰ EC, 2019, Opinion of the European Economic and Social Committee on 'Working with Asbestos in Energy Renovation' (own-initiative opinion) (C/240/04) / – Access mode: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52018IE4791&from=EN>

¹¹ URL: <https://www.asbestos.com/asbestos/statistics-facts/>

¹² URL: <https://pubmed.ncbi.nlm.nih.gov/33673264/>

¹³ URL: [https://www.eea.europa.eu/publications/environmental-burden-of-cancer/asbestos#:~:text=All%20use%20of%20asbestos%20has,et%20al.%2C%202014\)](https://www.eea.europa.eu/publications/environmental-burden-of-cancer/asbestos#:~:text=All%20use%20of%20asbestos%20has,et%20al.%2C%202014))

¹⁴ Kameda, T., et al., 2014, 'Asbestos: use, bans and disease burden in Europe', Bulletin of the World Health Organization 92(11), pp. 790-797 (DOI: 10.2471/BLT.13.132118). – Access mode: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4221761/>

Since 2008, a public campaign has been launched in Ukraine. A number of stakeholders joined to support the decision of Ukraine to include chrysotile asbestos in the list of substances of the Rotterdam Convention and a complete ban on the use of asbestos in the country¹⁵.

This process lasted more than 15 years, and on September 6, 2022, the Verkhovna Rada of Ukraine (VRU) made a historic decision - they generally adopted the draft Law of Ukraine "On the Public Health System", in which Article 28 (part 3) prohibits the use of asbestos in Ukraine, regardless of the type, as well as the production of asbestos-containing products and their use in technological processes and during construction and installation works at any facilities.

This decision was the first step towards the implementation of a full prohibition of the production, sale and use of asbestos-cement products on the territory of Ukraine, incl. their import into the customs territory of the country.

3. NOWADAYS USE OF ASBESTOS IN UKRAINE: FINDING IN MATERIALS AND PRODUCTS

3.1. Asbestos-cement industry of Ukraine

The most common types of products of the asbestos-cement industry are slate materials for construction (roofing, wall fencing, acoustic ceiling, etc.), pipes with a thickness of 100-500 mm for various purposes (water supply, sewerage, working in non-pressure pipelines and under pressure from 6 to 15 atmosphere); wall tiles, ventilation ducts, electrical insulation boards, wall panels, etc.

The asbestos-cement industry in Ukraine began to develop in 1929, when the first slate plant was launched in Kramatorsk city, Donetsk region¹⁶.

In 1990, the Ukrainian State Concern for the production of cement and asbestos-cement products (Ukr cement) was established¹⁷. The Concern united 16 manufacturing enterprises and 2 research institutions.

The dynamics of production of the main products of the asbestos-cement industry in Ukraine is presented below:

Table 1 – Production ACMs in Ukraine

Products	1940	1950	1960	1985	1990	1995	2000
Corrugated slate (million standard plates)	42,4	87,7	338,3	1360,7	1462,9	530,9	584,3
Asbestos-cement pipes (km standard pipes)	-	-	1791	15277	16456	1758,1	1086

In 2008, the country's asbestos-cement industry consisted of 12 enterprises producing more than 3,000 types of products. The largest part of the production of the asbestos-

¹⁵ URL: <https://youcontrol.com.ua/ru/catalog/court-document/74483592/>

¹⁶ URL: https://esu.com.ua/search_articles.php?id=42753

¹⁷ URL: <https://zakon.rada.gov.ua/laws/show/238-90-%D0%BF#Text>

cement industry belonged to the production of asbestos-cement slates (flat and corrugated), asbestos-cement roof facades, asbestos-cement pipes (water and sewer), couplings and fittings for them and similar materials.

Thus, the main asbestos-cement products in Ukraine can be divided into **roofing**, **facade** and **technological** ones.

Also in Ukraine there was the production of asbestos products. The goods were produced at the enterprises of the rubber-asbestos industry - at the enterprises of which rubber and asbestos products are manufactured based on various types of synthetic and natural rubbers using carbon black, various chemicals and fillers¹⁸.

3.2. Asbestos-cement roofing products and their using in Ukraine

The volume of use of asbestos-cement slate (mainly corrugated) as a roofing material for roofs is evidenced by the fact that today about 90% of roofs in Ukraine are covered by asbestos-cement slate¹⁹, which includes asbestos in the amount of 13-17% of the total weight of the product²⁰. Today, in Ukraine, more than 30% of roofs are still covered with asbestos-cement coatings²¹. It should be noted that the use of corrugated asbestos-cement sheets for roofing was not limited to low-rise construction. They were used in the construction of multi-storey buildings for any purpose.

Corrugated asbestos-cement slate (State Standard of Ukraine (SSU) B V 2.7.-53-96) is thin sheets with a corrugated profile and tiles of various sizes. To cover the roofs, pressed material with 6, 7 or 8 waves of natural grey colour or painted with a polymer dye is used.

The production of corrugated asbestos-cement sheets was regulated by the SSU 30340-95, according to which two types of slate were regulated: type slate 40/150 - a wave height of 40 mm and a wave pitch of 150 mm, and type slate 54/200 - a wave height of 54 mm and a wave pitch of 200 mm.

6-corrugated slate has a size of 1125x1750 mm with a sheet thickness of 6.0 to 7.5 mm. It is called a reinforced profile coating because it has a greater load-bearing capacity and lasts longer.

7-corrugated slate has a sheet size of 980x1750 mm or 1130x1750 mm, with a sheet thickness of 5.2 or 5.8 mm. It is in demand in private construction, where the roof usually has a small area.

8-corrugated slate has a sheet size of 1130x1750 mm with a sheet thickness of 5.2/5.8 or 6.0/7.5 mm. It is used in industrial construction due to its large size and usable coverage area. This slate is in demand for covering roofs of simple geometry and shape.

Currently, roofing material is not subject to mandatory certification, which means that it does not have typical sheet sizes. Manufacturers create their own specifications that regulate the dimensions and quality of slate.

¹⁸ URL: https://esu.com.ua/search_articles.php?id=24710

¹⁹ URL: http://mama-86.org.ua/archive/files/asbest_web.pdf

²⁰ URL: https://uk.wikipedia.org/wiki/Азбоцементний_шифер

²¹ URL: <http://poradu24.com/remontu/rozmiri-7-mi-ta-8-mi-xvilovogo-lista-shiferu-foto-video.html>

Table 2 – Characteristics of corrugated asbestos slate²²

Type slate / sheet size, mm	Sheet weight, kg
7-corrugated slate	
type 40/150, 1750×980x5,2	18,0
type 40/150, 1750×980x5,8	21,8
type 40/150, 1750×1130x5,2	18,7
type 40/150 1750×1130x5,8	23,2
8-corrugated slate	
type 40/150, 1750×1130x5,2	20,6
type 40/150, 1750×1130x5,8	26,1
type 54/200, 1750×1130x6,0	26
type 54/200, 1750×1130x7,5	35

3.3. Asbestos cement facade products and their use in Ukraine

Unlike corrugated asbestos-cement slate, which is used mainly for roofing, flat asbestos-cement slate is most often used for another, although its use is also possible as a roofing material.

Flat asbestos-cement slate or asbestos-cement flat slabs (SSU B V 2.7-52-96 Asbestos-cement flat sheets. Specifications (SSU 18124-95)²³) is a monolithic rectangular product with a thickness of 4 to 40 mm.

Flat asbestos-cement slate is divided into two subtypes depending on the production method: **unpressed** and **pressed**²⁴.

For retail trade, sheets of flat asbestos-cement slate are produced, having the following characteristics²⁵:

- Thickness - from 6 to 10 mm;
- Length - from 2 to 3.6 meters;
- Width - from 1.2 to 1.5 meters.

The weight of each sheet ranges from 10 to 14 kg.

Wider and thicker sheets of flat asbestos-cement slate are also produced, which are used only in industry, for example, in the construction of large buildings.

For finishing facades, sheathing of low-rise buildings, residential buildings using flat asbestos-cement pressed and non-pressed slate slabs of smaller thickness and weight than for roofs.

Most often flat asbestos-cement slate (according to SSU B V.2.7-52-96) is used for the following purposes²⁶:

- installation of flat roofs;
- internal lining of walls and partitions;

²² URL: <https://vseokrovle.com/shifer/203-ves-shifera.html>

²³ URL: http://online.budstandart.com/ua/catalog/doc-page.html?id_doc=40042

²⁴ URL: <http://poradu24.com/remontu/ploskij-shifer-rozmiri-i-texnichni-xarakteristiki-foto-video.html>

²⁵ URL: <https://remontu.com.ua/shifer-ploskij-rozmiri-lista-tovshhina-i-gost-materialu>

²⁶ URL: <https://krovgid.com/krovlya/ploskij-shifer.html>

- cladding of buildings facades and premises for different purposes (residential, industrial, etc.);
- constructions of fences, arbours, galleries of industrial enterprises, fences of balconies and loggias;;
- arrangement of walls of trade pavilions;
- installation of boxes, slopes, sill boards;
- covering floors or arrangement of suspended ceilings;
- constructions of wall panels (blocks) with sandwich insulation – in the construction of residential buildings, pavilions, kiosks, utility blocks, etc.;
- creation of fixed formwork (forms of the future structure filled with concrete) for foundations and walls during the construction of low-rise buildings (flat sheets in this case play the role of finishing and external retaining reinforcement for the concrete structure);
- creation of constructions for the local area and garden, that is, as a material for covering paths, building walls for compost pits, fencing beds, etc;
- creation of outbuildings (workshops, warehouses, utility rooms, etc.);
- creation of sprinklers in the cooling tower.

Flat asbestos-cement slate is especially popular among summer residents, who make aviaries, fences, barriers, etc. from it in gardens and horticultural areas.

In agriculture, it is used as a building material for the construction of fences, make fences for livestock, cages in poultry farms, etc.

In industry, flat slate is used for fencing boxes, technical shafts, making formwork as a facing material for interior and exterior walls. Flat asbestos-cement slate is also widely used in the chemical industry due to its resistance to aggressive chemicals.

3.4. Asbestos-cement technological products and their use in Ukraine

Initially, asbestos-cement pipes were used only for the construction of ameliorative facilities and were produced in accordance with the requirements necessary for this. SSU 11310-90 (Asbestos-cement pipes and couplings) determined the load they must withstand, and SSU 539-80 (Asbestos-cement pressure pipes and couplings) determined their type and size.

Later they began to be used in industrial and residential construction, but the above standards remained. Additionally, Building Codes and Rules (BCR) 41-02-2003 were developed, which regulated the parameters of the coolant that asbestos-cement pipes can withstand (temperature - up to 115 C, pressure - up to 16 atmospheres)²⁷ and BCR 20402-84, which regulate the use of asbestos-cement pipes for laying underground systems for transporting water.

Subsequently, asbestos-cement pipes became one of the main technological products from asbestos cement material and were used for laying sewers, providing technical water supply, installing drainage and drain systems as casing pipes for water wells, for creating

²⁷ URL: <http://poradu.pp.ua/dim/51242-azbestocementna-truba-vidi-rozmri-gost-zastosuvannya-virobniki.html>

chimneys, and for forming columnar foundations. Asbestos-cement pipes were used as a protective channel for laying electrical networks, telephone and Internet cables, etc.

Asbestos-cement pipes are characterized by: high weight - from 8 to 140 kg / linear meter, depending on the diameter and wall thickness; low strength, therefore, when cutting and fitting asbestos-cement pipes, a lot of dust is generated!

Asbestos-cement pipes have a lifetime of up to 40 years.

Non-pressure and pressure asbestos-cement pipes were produced, which differed in thickness and strength characteristics. Depending on the value of the working pressure, asbestos-cement pipes and clutches were divided into 4 classes²⁸:

Table 3 – Characteristics of pipes and clutches

Pipe class	Clutch class	Working pressure	
		MPa (*)	kgf/cm ² (**)
BT6	CAM6	0,6	6
BT9	CAM9	0,9	9
BT12	CAM12	1,2	12
BT15	CAM15	1,5	15

*) MPa – Mega pascal - Pascal, a unit of pressure (mechanical stress).

**) Kilogram-force per square centimetre

Pressure asbestos-cement pipes are designed for transportation in a pressurized medium, which can be either liquid or gaseous.

Non-pressure asbestos-cement pipes have been used for systems where there is little or no pressure.

Pressure asbestos-cement pipes are used in water and sewer systems, as well as heating mains.

The length of pressure asbestos-cement pipes is 395 cm or 5 m, the pipe section can be as follows:

- 100 and 150 mm - pipes for laying water supply and ventilation systems;
- 200 mm and 250 mm - pipes for laying network lines;
- 300 mm - pipes for arranging a drain;
- 400 mm - pipes for laying water supply systems;
- 500 mm is the internal diameter of pipes used only in industrial buildings.

Non-pressure asbestos-cement pipes have been used for systems where there is little or no pressure. Non-pressure asbestos pipes are suitable for ventilation systems, also for laying gas supply systems, for laying cables, drainage collectors, for non-pressure sewers, chimneys. The same products can also be decorative, for example, as a fence. Also, non-pressure pipes are very often used for the construction of garbage chutes or stoves in

²⁸ URL: <https://legalexpert.in.ua/standarty-i-normativi/ministerstva-i-vedomstva/gost/8672-gost-539-80.html>

private houses to put them in order or when creating an irrigation system for a suburban area.

Size of non-pressure asbestos-cement pipes:

- Diameter - 100, 150 mm, length - 295cm or 395cm.
- Diameter - 200, 300 and 400 mm, length - 395cm.

3.5. Production volumes of asbestos-cement products in Ukraine

Overview of statistical information "Production of the main types of industrial products"²⁹ for the period from 1990 to 2020 in independent Ukraine demonstrates that in the period 1990-2002 there was no information on the output of asbestos-cement industry products³⁰.

According to the Nomenclature of construction products, approved by the Order of the State Statistics Service (SSS) of August 30, 2002 No. 321 (later this Order became invalid on the basis of the order of the SSS of December 29, 2017 No. 356), in Ukraine the **production of asbestos-cement sheets (slate)** fell under statistical observation; **pipes, couplings and fittings to them from asbestos cement and similar materials**.

Statistical information on the volume of output of asbestos-cement products (corrugated slate, sheets and similar products from asbestos cement) in 2003 - 2010³¹ are given below:

Table 4 – Production volume of asbestos-cement products in 2003-2010

Corrugated slates, sheets and similar products made of asbestos-cement, <u>million standard plates</u>	2003	2004	2005	2006	2007	2008	2009	2010
	733	716	811	748	632	599	389	450

Thus, for the period from 2003 to 2010, Ukraine produced 5,078 million standard plates of corrugated slate, sheets and similar products from asbestos-cement.

Since 2011, the requirements for the provision of statistical information from enterprises in the asbestos-cement industry have changed, and since that time, there has been information about products made from asbestos cement, from cement with cellulose fibers or similar fibrous mixtures (asbestos, cellulose and other plant fibers, synthetic polymers) metal fibers etc.) and cement or other hydraulic binders containing asbestos, and **the units of measurement have changed from million standard plates to thousand tons**. Statistical information on the volume of output in 2011 - 2020 are given below³², and since 2014 - excluding the temporarily occupied territory of the Autonomous Republic of Crimea, Sevastopol city and the temporarily occupied territories in the Donetsk and Lugansk regions:

Statistical information on the volume of output of asbestos-cement products (corrugated slate, sheets and similar products from asbestos cement) in 2003 - 2010³³ are given below:

²⁹ URL: https://ukrstat.gov.ua/operativ/operativ2006/pr/prm_ric/prm_ric_u/vov2005_u.html

³⁰ URL: https://ukrstat.gov.ua/operativ/operativ2006/pr/prm_ric/prm_ric_u/vov_u.html

³¹ URL: https://ukrstat.gov.ua/operativ/operativ2006/pr/prm_ric/prm_ric_u/vov2004_u.html

³² URL: https://ukrstat.gov.ua/operativ/operativ2006/pr/prm_ric/prm_ric_u/vov2005_u.html

³³ URL: https://ukrstat.gov.ua/operativ/operativ2006/pr/prm_ric/prm_ric_u/vov2004_u.html

Table 5 – Production volume of asbestos-cement products in 2011-2020

Name of products according to the nomenclature of industrial products (NIP)	The number of manufactured industrial products (gross production) for:									
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Products made of asbestos-cement, cellulose fiber cement or similar fibrous mixtures (asbestos, cellulose and other vegetable fibers, synthetic polymers, glass or metal fibers, etc.) and cement or other hydraulic binders containing asbestos, thousand tons	478	396	358	202	133	147	163	148	115	106

Thus, for the period from 2011 to 2020, 2,246 thousand tons of asbestos-cement products were produced in Ukraine.

It should be noted that since 2011 in Ukraine there has been a steady downward trend in the output of asbestos-cement products, which is associated with a number of factors, and, first of all, the transition to the production of asbestos-free slate and the closure of a number of industries due to a drop in demand for products that contain chrysotile asbestos.

4. USE OF ASBESTOS IN RESIDENTIAL, COMMERCIAL AND INDUSTRIAL BUILDINGS AND FACILITIES IN UKRAINE

Due to the availability and properties of asbestos fibers (flexibility, tensile strength, insulation against heat and electricity, chemical inertness), this material has had more than 3,000 examples of applications worldwide³⁴ and has been especially widely used in various building structural materials for insulation and as a flame retardant material.

Asbestos has also been used in a wide range of industrial products, mainly building materials (roofing tiles, floor tiles, paper products, and asbestos-cement products). Also used in friction materials products for the manufacture of parts operating in friction and sliding conditions and having a high coefficient of friction (automobile clutches, brakes and transmission parts), in heat-resistant fabrics, packaging, gaskets and coatings.

Considering the foregoing, asbestos in the form of asbestos-containing materials and products can be found in residential, commercial and industrial buildings and facilities in Ukraine.

³⁴ URL: https://www.asbestossafety.gov.au/sites/default/files/documents/2019-11/ASEA_National_Strategic_Plan_2014-18_final.pdf

Residential buildings – designed for human habitation. These are apartment houses, low-rise and individual buildings - cottages, houses, townhouses.

Commercial buildings are used for commercial activities. These include hotels, offices, retail premises, entertainment complexes, as well as consumer services and catering. Warehouses are sometimes referred to as commercial real estate, but they are more related to industrial real estate.

Industrial buildings are designed to accommodate industrial enterprises and provide the necessary operational requirements and livelihoods of people who are engaged in production processes, as well as the necessary conditions for the operation of technological equipment.

Currently, in the legal literature, the concepts of "**building**" and "**construction**" are **synonymous**. However, historically, buildings were called those objects that have an above-ground part and separate rooms. Some of them are adapted for living, some for education, trade, production, etc. Constructions were any object built by people, be it a stadium, a bridge, a bunker, a firing point, a column, etc. In this case, constructions can be completely devoid of the above-ground part³⁵.

4.1 Asbestos in residential buildings in Ukraine

1. Roofing and its related elements: outer covering of asbestos-cement slate (mainly 7-corrugated slate), asbestos-cement tiles (or flat asbestos-cement slate); chimneys from asbestos-cement pipes; in older buildings, concrete drainpipes and gutters in which asbestos was used as a binder in cement.

Asbestos content:

- Slates and tiles: 10 – 15 %
- Semi-compressed flat sheets: 10 – 25 %
- Asbestos-cement pipe: 15%
- Drainpipes: 15%

Table 6 – Asbestos in roofing and its related elements (residential buildings)

Outer covering of asbestos-cement slate (mainly <u>7-corrugated slate</u>)	Asbestos-cement tiles / flat asbestos-cement slate
	

³⁵ URL: <https://dovidka.biz.ua/riznitsya-mizh-budivlya-ta-sporuda/>

Chimneys from asbestos-cement pipes



Concrete drainpipes and gutters



2. Attic - the space between the surface of the outer covering (roof), outer walls and the ceiling of the upper floor of the building: water tanks made of asbestos cement; bulk asbestos insulation made from unprocessed asbestos, crushed to a fine state and installed in the under-roof space as ceiling insulation; pipe insulation or pipe lagging with ACMs; panels from asbestos-cement tiles.

Asbestos content:

- Loose (bulk) insulation: usually 100%
- Thermal insulation: 6 – 85 %
- Insulation board: usually 15 – 25%, some up to 40%

Table 7 – Asbestos in attic elements (residential buildings)

Bulk asbestos insulation made from unprocessed asbestos



Pipe insulation or pipe lagging with ACMs



Panels from asbestos-cement tiles



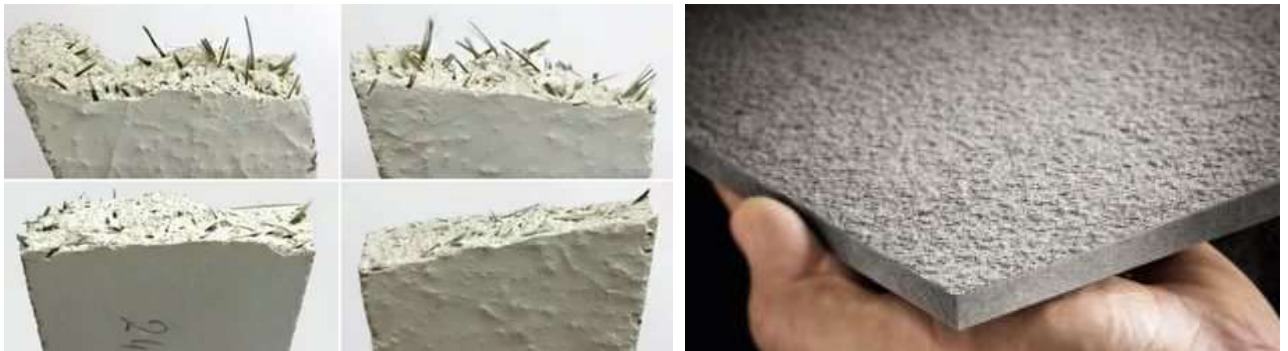
Water tanks made of asbestos cement



3. Exterior walls: fiber cement siding (cladding material made from a cement mortar called matrix-concrete and its reinforcing fibers: asbestos, fiberglass, polyvinyl acetate or cellulose).

Table 8 – Asbestos in exterior walls (residential buildings)

Fiber cement siding based



4. Facades painted with organosilicate paint containing asbestos.
5. Windows and doors: Asbestos was commonly used as putty in window glazing and sealing windows and glass panels.

Table 9 – Asbestos in windows and doors (residential buildings)

Putty in window glazing



6. Living quarters and internal walls: vinyl products - floor tiles and linoleum, wallpaper for walls of the "Soviet" period, to which asbestos was added mainly as a fire retardant component; fillers and plasters containing asbestos; fire-resistant wall and ceiling panels; asbestos filler frame walls; textured coating of asbestos-containing materials, such as Artex; panels and boards made of aceid (asbestos-cement electrical arc-resistant boards used as protection against high voltage), insulation around electrical outlets in "Soviet"-era houses; pipe insulation or pipe lagging with asbestos-containing materials.

Asbestos content:

- Thermoplastic floor tiles: up to 25%
- PVC vinyl floor tiles: 7%
- Textured coating: 3 – 5%
- Electrical insulation: 1 – 10%
- Thermal insulation: 6 – 85 %

Table 10 – Asbestos in living quarters and internal walls (residential buildings)

<p>Vinyl products - floor tiles and linoleum</p> 	<p>Wallpaper for walls of the "Soviet" period</p> 
<p>Fire-resistant wall and ceiling panels</p> 	

<p>Asbestos filler frame walls</p> 	<p>Textured coating of asbestos-containing materials, such as Artex</p> 
<p>Panels and boards made of acid</p> 	<p>Insulation around electrical outlets in "Soviet"-era houses</p> 
<p>Pipe insulation</p> 	<p>Pipe lagging</p> 

7. Bathrooms and toilets: panels on walls and ceilings; cisterns and toilet seats; textured coating (Artex) on walls and ceilings; vinyl tile or flooring; pipe riser panels and boxes, gaskets and washers, textile cloth and asbestos cord

Asbestos content:

- Panels on walls and ceilings: 10 – 15 %
- Textured coating: 3 – 5%
- PVC vinyl floor tiles: 7%

- Gaskets and washers: approx. 90 %
- Textile cloth: approx. 100 %
- Asbestos cord: approx. 100 %

Table 11 – Asbestos in bathrooms and toilets (residential buildings)

<p>Panels on walls and ceilings</p> 	<p>Textured coating</p> 
<p>PVC vinyl floor tiles</p> 	<p>Gaskets and washers</p> 
<p>Textile cloth</p> 	<p>Asbestos cord</p> 

8. Water supply and sewerage: thermal insulation of old gas water heaters, thermal insulation of pipes with asbestos wool, asbestos cloth; asbestos-cement pipes for water supply systems, drains, storm sewers and garbage chutes.

Asbestos content:

- Thermal insulation: 6 – 85 %
- Asbestos cloth: approx. 100 %
- Asbestos-cement pipe: 15%
- Drainpipe: 15%
- Storm sewers: 15%
- Garbage chutes: 15%

Table 12 – Asbestos in water supply and sewerage (residential buildings)

Thermal insulation of
old gas water heaters



Thermal insulation of pipes
with asbestos cloth



Asbestos-cement pipes for
water supply systems



Drains



Storm sewers



Garbage chutes



9. Heating appliances and gas appliances (including gas stoves and ovens, electric fireplaces): refractory cords, plates, asbestos fabric, asbestos cardboards, panels of old "Soviet" and modern production.

Asbestos content:

- Asbestos cord: approx. 100 %
- Asbestos fabric: approx. 100 %
- Asbestos cardboard: approx. 100 %
- Asbestos panels: 10 – 15 %

Table 13 – Asbestos in heating and gas appliances (residential buildings)

<p>Refractory cords</p> 	<p>Asbestos fabric</p> 
<p>Asbestos cardboard</p> 	<p>Asbestos panels</p> 

10. Aviaries, fences, railings, etc. in summer cottages and household plots: they can be made of flat asbestos-cement slate.

Table 14 – Asbestos in aviaries, fences, railings etc. (residential buildings)

<p>Fence (corrugated slate sheets)</p> 	<p>Fence (flat slate sheets)</p> 
<p>Fencing for garden beds in the greenhouse</p> 	<p>Outdoor toilet</p> 
<p>Barn</p> 	<p>Aviaries</p> 

4.2 Asbestos in commercial buildings in Ukraine

1. Roofing and its related elements: flat and corrugated roofing using asbestos-cement tiles (or flat asbestos-cement slate), asbestos-cement slate (mainly 8-corrugated); inner lining of the roof; gutters in old buildings, where there may be concrete gutters in which asbestos was used as a binder in cement; chimneys from asbestos-cement pipes; facades and soffits.

Table 15 – Asbestos in roofing and its related elements (commercial buildings)

<p>Flat roofing asbestos-cement slate</p> 	<p>Corrugated roofing asbestos-cement slate (mainly 8-corrugated)</p> 
<p>Asbestos inner lining of the roof</p> 	<p>Chimneys</p> 
<p>Gutters</p> 	<p>Facades</p> 

2. Internal voids of the roof and attic: water tanks; bulk asbestos insulation; ceiling insulation from asbestos-cement slabs; pipe insulation or pipe lagging with asbestos-containing materials; panels from asbestos-cement tiles.

Table 16 – Asbestos in internal voids of the roof and attic (commercial buildings)

<p>Asbestos water tanks</p> 	<p>Bulk asbestos insulation</p> 
<p>Ceiling insulation from asbestos-cement slabs</p> 	<p>Pipe insulation or pipe lagging with asbestos-containing materials</p> 
<p>Internal tiles panels</p>	
	

3. General internal construction (office-type premises): asbestos cement ceiling or wall panels; asbestos cement partitions; textured decorative coating made of asbestos-containing materials, such as Artex; old resin/vinyl (PVC) skirting boards, resin stair linings, vinyl floor tiles/covering that may contain asbestos; bituminous glue.





Table 17 – Asbestos in general internal construction (commercial buildings)

<p>Textured decorative coating (Artex)</p> 	<p>Old resin/vinyl (PVC) skirting boards</p> 
<p>Asbestos cement partitions</p> 	<p>Asbestos cement ceiling or wall panels</p> 

4. General internal structure (warehouse): cement coating; sheathing boards / panels; spray coating; insulation; gaskets.

Table 18 – Asbestos in general internal structure (commercial buildings)

<p>Cement coating</p> 	<p>Sheathing boards / panels</p> 
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<p>Asbestos spray coating</p> 	<p>Insulation</p> 
<p>Gaskets</p> 	

5. Ceiling and floor voids: fire barrier; flooring to beams and logs; sprayed insulation on the structure; pipe insulation or pipe lagging; sheathing for all areas with slabs and panels.
6. Windows and doors: cement or timber window panels, board linings, cement window sills, gaskets and cables.

Table 19 – Asbestos in windows and doors (commercial buildings)

<p>Asbestos cement window panels</p> 	<p>Asbestos cement window sills</p> 
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7. Bathrooms, toilets and kitchens: ceiling and wall panels, textured finishes, vinyl floor tiles/covering, gaskets, textile and cords.

Table 20 – Asbestos in bathrooms, toilets and kitchens (commercial buildings)

<p>Vinyl floor tiles/covering</p> 	<p>Ceiling and wall panels</p> 
<p>Gaskets</p> 	<p>Textile and cords</p> 



8. Technical premises (water supply and heating): water pipes and areas around them, water heaters, hot water tanks and electrical panels; thermal insulation materials; sprayed insulation on the construction; insulation or pipe lagging; gaskets for pipes and boilers; sheathing for all areas by slabs and panels; formwork panels.

Table 21 – Asbestos in technical premises (commercial buildings)

<p>Formwork panels</p> 	<p>Water pipes and areas around them</p> 
<p>Hot water tanks</p> 	<p>Water heaters</p> 

9. Electrical and gas cabinets: areas around electrical panels; plinths of electricity meters; electrical insulating materials; panels; gaskets, ropes and cords; sheathing of electric and gas pipes; protection of safety locks; fuse base panels.

Table 22 – Asbestos in electrical and gas cabinets (commercial buildings)

<p>Electrical insulating materials</p> 	<p>Protection of safety locks</p> 
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Areas around electrical panels



Fuse base panels



Electrical and gas cabinets



10. Asbestos can be found around firewalls - near the fire walls of a building made of non-combustible materials, designed to prevent the spread of fire to other buildings or adjacent parts of the building; doors; sewer pipes; cladding and fencing; chimneys and drain traps (U-shaped parts of pipes designed to trap liquid or gas to prevent unwanted flow); in lifting ropes.

4.3 Asbestos in industrial buildings in Ukraine

Regardless of the industry, buildings are divided into four main groups:³⁶

- industrial buildings;
- buildings for energy purposes (transformer substations and thermal power stations);
- buildings for transport and storage facilities (warehouses);
- auxiliary buildings (administrative/office premises).

In industrial buildings and buildings for energy purposes, such asbestos building materials could be used during their construction³⁷:

- | | | |
|----------------------|--------------|------------|
| • Acoustical panels | • Flooring | • Shingles |
| • Acoustical plaster | • Floor tile | • Siding |
| • Asbestos felt | • Furnaces | • Sleeves |
| • Asbestos paper | • Gaskets | • Stucco |

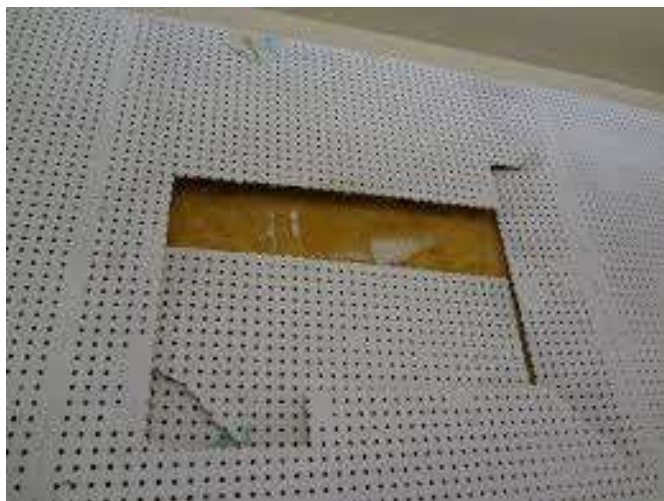
³⁶ URL: <https://pp-budpostach.com.ua/ua/a115863-klassifikatsiya-promyshlennyh-zdanij.html>

³⁷ URL: <https://www.mesothelioma.com/asbestos-exposure/products/construction/>

- Asphalt
- Cables and wires
- Ceiling tiles
- Corrugated paper
- Duct adhesive
- Duct insulation
- Dust masks
- Electric boards
- Filler
- Flashing
- Flexboard
- Generators
- Heating ducts
- Panels
- Permaboard
- Plaster
- Popcorn ceiling covering
- Roofing
- Roof coating
- Roofing felt
- Preformed pipe wrap
- Sheetrock
- Tank jackets
- Tar paper
- Textured coating
- Tiles
- Turbines
- Valves
- Vinyl floors
- Vinyl wallpaper
- Wall tile
- Wiring insulation

Table 23 – Asbestos in industrial buildings and buildings for energy purposes

Acoustical panels



Acoustical plaster



Cables and wires



Ceiling tiles



Asbestos felt



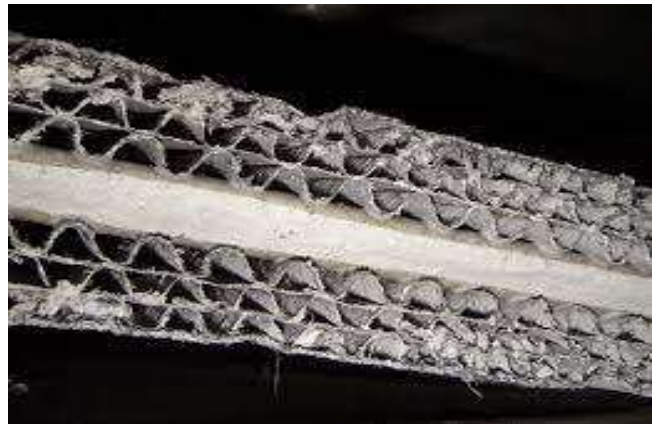
Asbestos cardboard



Asbestos paper



Asbestos corrugated paper



Asbestos duct insulation



Asbestos in electric boards



Floor tile



Furnaces with asbestos



Generators with asbestos



Asbestos gaskets



Heating ducts with asbestos



Asbestos panels



Asbestos plaster



Asbestos popcorn ceiling covering



Asbestos siding



Asbestos roofing



Valves



Asbestos sleeves



Vinyl wallpaper



Asbestos wall tile



Wiring insulation



Thermal insulation



In addition, asbestos-containing materials can also be found in special equipment that produces industrial products, and, first of all, it concerns chemical plants and power plants. In the process of construction of buildings for transport and storage facilities, administrative and office premises - asbestos could also be used in the construction of commercial buildings.