

LABORATORY NO. 3**3. CHECKING METHODS FOR AIR POLLUTION IN A POPULOUS CENTRE****3.1. THE IMPORTANCE OF THE DETERMINING**

The main atmospheric air pollutants result from artificial sources of pollution: industry, traffic, house warming sources and liquid and solid residues.

The pollutants are represented by dust particles (toxic and nontoxic) and gases or toxic vapors.

Their action is specific (acute and chronic) and non-specific (immediate and for long term).

The action of air pollution can appear also indirectly, through flora, fauna, modification of sun radiations intensity, decreasing of air ionisation with small ions, and rising of the condensation nucleus in the air.

Thus, it is necessary a continuous monitoring of the air quality. It consists of repeated and systematic measuring of the pollutant concentrations, for estimating the pollution level.

These concentrations are established through organizing of checking networks in the city and in industrial centers with pollution sources.

The results are compared with the maximal admitted concentration (CMA) for pollutants in the air of populated areas.

3.2. GENERAL RULES FOR THE METHODS

Should the air testing samples be representative, we must respect the following conditions:

3.2.1. TYPES OF TEST TAKING

They are:

- stationary points - for detecting the long term air pollutants;
- mobile (movable) points - for detecting the short term air pollutants.

3.2.2. THE NATURE OF THE POLLUTANTS

They are:

- deposited particles;
- suspended particles and gases or toxic vapors.

For the first type we use the sedimentation method and for the second the aspiration method.

3.2.3. THE CHECKING POINTS POSITIONING

If the pollution sources are situated out of the city, the checking points are placed on a main circle, with pollution sources in its center and the circle ray equal with 20 times of the source's height (from where the pollutants are eliminated).

The checking points are situated at the intersection of the circle and the eight lines of the cardinal points: north, south, east, west, north-east, south-east, north-west, south-west.

In the city, the checking points are situated in central area, in populated areas, in intense traffic areas, in the main crossing points and in industrial areas.

3.2.4. NUMBER OF THE CHECKING POINTS

For suspended particles and gase pollutants the minimal number of the checking points is established depending on the number of the population.

For deposited particle pollutants the minimal number of the checking points is established depending on the city surface.

3.2.5. THE FREQUENCY AND DURATION OF TEST TAKING

For MMC (maximal momentan concentration) time of the test taking is 30 minutes.

For ACM (average concentration in a month) we use the average of the minimum 15 daily tests in a month.

For ACY (average concentration in a year) we use the average of the minimum 100 daily tests in a year.

3.3. ESTABLISHMENT METHODS

We use two methods:

- sedimentation method - for deposited particles;;
- aspiration method - for suspended particles, gases and toxical vapors.

3.3.1. SEDIMENTATION METHOD

The principle of this method consists of the sedimentation of the deposited particles (particles with size higher than 5 μm) in a sedimentation vessel, situated at 2,5 meters distance from the soil. The term of exposure is 30 days. In the laboratory, the value is calculated with a formula and is expressed in $\text{g/m}^2/\text{month}$ or $\text{t/Km}^2/\text{year}$.

NORMAL VALUES:

We admit maximum 17 $\text{g/m}^2/\text{month}$ or 200 $\text{t/Km}^2/\text{year}$.

3.3.2. ASPIRATION METHOD

The principle of this method consists of the aspiration of a known air volume by an electric aspirator, and keeping (retain) the pollutants from the air (gases, toxical vapors and suspended particles) within a filter, that can be solid or liquid. Afterwards, the retained quantities are weigh in a balance.

The solid filter is weight before and after the aspiration, and the surplus of quantity represents the retained pollutants.

We can also use a reflectometer, that shows the quantity of air pollutants depending on the blackening degree of the filter's texture.

NORMAL VALUES:

For suspended particles - MMC - maximum 0,5 mg/m^3 air
 - ADC - maximum 0,15 mg/m^3 air

For gases the filter is a liquid which retains them.

For SO_2 (sulfur dioxide) the solution is kalium nitrate, and for O_3 (ozone) the filter is a solution of kalium iodine. There are two titration methods.

The results are expresed in mg/m^3 air.

For SO_2 - MMC - maximum 0,75 mg/m^3 air
 - ADC - maximum 0,25 mg/m^3 air

For O_3 - MMC - maximum 0,1 mg/m^3 air
 - ADC - maximum 0,03 mg/m^3 air