

Ambient Air Monitoring Glossary of Terms



Note: These terms are defined as they relate to the science of ambient air monitoring. There are two main forms of ambient air monitoring in Alberta:

- **Community monitoring** uses strategically located monitoring stations to measure the level of air pollution where people live and to track trends over time.
- **Perimeter (or fence line) monitoring** involves discrete sampling of substances at various locations along an industrial facility's property

Acid rain: industrial processes and fuel combustion (in vehicles for example) that produce large quantities of carbon dioxide, sulphur dioxide and nitrogen dioxide. In the air, these chemicals dissolve into water droplets to form acids. Acid rain is harmful to the environment.

Air dispersion modeling: a set of scientific equations used to describe and simulate the dispersion, transformation and deposition of substances sent into the air.

Air monitoring: measuring and recording the concentration levels of substances in the air to see if they exceed objectives set by government.

Airshed: a designated region that monitors, collects and reports on local air quality.

Air quality: the quality of the air as determined using measurements of various substances and particles in the air.

Air Quality Health Index (AQHI): an information tool that uses data from specific substances to calculate (daily and forecast) the quality of local air quality and potential health impacts.

Alberta Air Monitoring Directive: a government directive that specifies how environmental monitoring and reporting shall be carried out in Alberta.

Ambient air: air found outside buildings, houses and other structures.

Ambient concentration: concentration of airborne substances measured outside buildings, houses and other structures.

Calibration: a process in which an air quality measurement device is challenged with known gas concentration values to ensure accurate measurements of ambient air.

Clean Air Strategic Alliance: a multi-stakeholder group in Alberta composed of industry, government and non-government organizations to provide strategies to assess and improve air quality for Albertans, using a collaborative, consensus based, decision making process.

Continuous air monitoring: an approach that provides almost real time measurement of ambient air concentrations. Continuous monitoring is used when substance concentrations may vary significantly in a short time.

Deposition: a process by which a substance emitted into the air leaves the air and is deposited on land or water.

Diffusion: a process in which molecules move from an area of higher concentration to one of lower concentration.

Dispersion: the scattering of a substance away from its source.

Ecosystem: a biological community of interacting organisms and their physical environment.

Emissions: pollution released from sources such as industrial plants, fireplaces in homes and the exhausts of vehicles.

Emission factor: a value used to estimate an emission rate for an activity.

Environmental regulatory approval: government approval that defines the emission levels, required pollution control equipment, monitoring and reporting practices a company must follow and use to operate in Alberta.

Fossil fuel: a fuel formed from dead plants and animals; including coal, oil and natural gas.

Global warming: increased average temperatures worldwide caused primarily by greenhouse gases.

Greenhouse gases: gases in earth's atmosphere that trap heat that forms when energy from the sun reaches earth's surface. Water vapour, carbon dioxide, methane and nitrogen oxide are all greenhouse gases. Human activities, such as burning fossil fuels and clearing land, add greenhouse gases to the atmosphere.

Inversion: a weather condition where temperature increases with height above the earth's surface. A warm air mass moving over a colder one can cause cooler air to be trapped at the surface. This can prevent harmful substances from dispersing. These substances can then build up at ground level and lead to smog formation.

Meteorology: the science that focuses on the Earth's atmosphere, including air pressure, wind speed and direction, temperature, humidity, weather patterns, and other information.

Particulates: tiny particles of solid or liquid suspended in the air. The biggest human sources are burning of fossil fuels in vehicles and power plants. A significant natural source is forest fires.

Passive air monitoring: a monitoring method often used in rural and remote areas because they require no power to operate. Air flows over the surface of filters in passive monitors. The filters are usually collected once per month to see how much of a substance is on the filter.

Parts per billion (ppb): used to describe very small concentrations of chemicals. A pinch of salt in a 10 ton bag of potato chips or one drop of ink in a large gasoline tanker truck would approximately equal a concentration of 1 ppb.

Parts per million (ppm): used to describe very small concentrations of chemicals. One second in 11.5 days or one drop in a 208 litre barrel would approximately equal one ppm.

Pollutants: chemicals and particles in the air that affect air quality, from either man-made or natural sources. Pollutants are also referred to as substances.

Pollution: any change in the environment that produces a condition that is harmful to living things.

Regional ambient air monitoring: monitoring of the air outside of the fence lines of industrial facilities. This type of monitoring looks at the cumulative impacts of various forms of emissions on air quality in a broad area.

Scrubbers: devices used on sources of pollution like vehicles and industrial plants to reduce harmful emissions.

Smog: air pollution that is normally visible.

Substances: chemicals and particles in the air that affect air quality. Substances are also referred to as pollutants.

Topography: the structure and orientation of terrain features such as trees, hills and valleys. These will often influence and even control air motion (wind speed and direction) and cause turbulence in the lower atmosphere.

Toxic: poisonous.

Toxicity: how poisonous a substance is.

Transformation: the chemical change in a substance as a result of a process that occurs in the atmosphere.

Troposphere: the layer nearest the surface of Earth and where most “weather” occurs. It extends up from eight to 12 kilometres above the Earth’s surface.

Vertical mixing height: the height in the atmosphere where an airborne substance is relatively well mixed due to atmospheric turbulence. The height varies depending on atmospheric conditions. For example, the mixing height can be low during the winter or at night.