

Nitrogen Oxides

Nitrogen gas, normally relatively inert (unreactive), comprises about 80% of the air. At high temperatures and under certain other conditions it can combine with oxygen in the air, forming several different gaseous compounds collectively called nitrogen oxides (NO_x). Nitric oxide (NO) and nitrogen dioxide (NO₂) are the two most prevalent compounds found. Nitrogen dioxide, (along with particles in the air) can often be seen as a reddish-brown layer over many urban areas.

Sources

Nitrogen oxides form when fuel is burned at high temperatures (as in combustion processes). Major sources of nitrogen oxides include

- Automobiles
- Power plants
- Processes used in chemical plants.

Health Effects

Certain members of this group of pollutants, especially nitrogen dioxide (NO₂), are known to be highly toxic to various animals as well as to humans. High levels may be fatal, while lower levels affect the delicate structure of lung tissue. In experimental animals this leads to a lung disease that resembles emphysema in humans. As with ozone, long-term exposure to nitrogen oxides makes animals more susceptible to respiratory infections. Nitrogen dioxide exposure lowers the resistance of animals to such diseases as pneumonia and influenza. Humans exposed to high concentrations suffer lung irritation and potentially lung damage. Increased respiratory disease has been associated with lower level exposures. The human health effects of exposure to nitrogen oxides, such as nitrogen dioxide, are similar to those of ozone. These effects may include:

- Short-term exposure at concentrations greater than 3 parts per million (ppm) can measurably decrease lung function.
- Concentrations less than 3 ppm can irritate lungs.
- Concentrations as low as 0.1 ppm cause lung irritation and measurable decreases in lung function in asthmatics.
- Long-term lower level exposures can destroy lung tissue, leading to emphysema.

Children may also be especially sensitive to the effects of nitrogen oxides.

Other Effects

Oxides of nitrogen also can:

- Form smog. NO_x is one of the main ingredients involved in the formation of ground-level ozone, which can trigger serious respiratory problems.
- Contribute to the formation of acid rain
- Contribute to nutrient overload that deteriorates water quality.
- Contributes to global warming.
- Seriously injure vegetation at certain concentrations. Effects include:
 - Bleaching or killing plant tissue.
 - Causing leaves to fall.
 - Reducing growth rate.
- Deteriorate fabrics and fade dyes.
- Corrode metals (due to nitrate salts formed from nitrogen oxides).
- Reduce visibility.

Download this brochure from the Environmental Protection Agency to find out more [How Nitrogen Oxides effect the way we live and breathe.](#)