

# **Environmental and Health Effects of Using Leaf Blowers**

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## **Leaf Blowers Threaten Health!**

Recently, gas-powered leaf blowers have been subject to restriction and bans due to health - related concerns. Today, about 300 communities nationwide have limits or are proposing limits on the machines. City officials receive complaints of noise, dust, and debris caused by the use of motorized leaf blower equipment. Neighborhood noise and air pollution are the most common reasons. Backyard and garden noise is the greatest source of noise nuisance and complaints worldwide.

More than one dozen communities in the United States have banned the use of gas-powered leaf blowers, having deemed them too noisy and smelly. Other communities have placed restrictions on their use. Leaf blowers, weed trimmers, mowers, and contribute about 5 to 10 percent of the total global air pollution.

## **Noise Pollution from Leaf Blowers**

Noise is unwanted sound. It is derived from the Latin word "nausea" meaning seasickness. Noise is among the most pervasive pollutants today. Second-hand noise is the most troubling because it has negative impacts on us but is put into the environment by others, without our consent. Effective noise control guidelines were not pursued in earnest until very recently. Noise seems to have been taken for granted or assumed as inevitable until recently.

If the ear is subjected to a noise of more than 90 dB which lasts longer than 10 milliseconds or more, a reflex action will occur which tightens the tensor tympani and stiffens all the mechanical parts of the middle ear, the result being a reduction in sensitivity to low and middle-frequency sound. If subjected to noise over 140 dB, the whole mode of oscillation of the malleus, incus, and stapes changes, causing them to rock from side to side. As a result the pressure fluctuations in the perilymph are greatly reduced, and the effect is a sudden loss of loudness.

Noise-induced hearing loss is so wide spread that it is difficult to establish criteria for normal hearing parameters, especially in adult men. Some noise is unavoidable, but the noise created from machines can be avoided for a large degree, but the reason it does exist is that the maker of the machine does not know how or can not afford to silence it. It can cost twice as much to modify a machine once it is built, as it is to build quietness into the machine in the first place. Noise control costs money. Often it is a response to complaints from neighbors or workers.

## **Can You Hear Me??**

The most widespread and serious cause of noise-induced hearing loss is subjection to high noise levels in the person's place of work. Noise can affect hearing in three ways. It can deafen and damage ears immediately, it can severely reduce the ears' sensitivity to sounds of certain frequencies over a period of time, or it can numb the ears for a limited amount of time which return to normal within a matter of minutes, weeks, or months.

The first sort of damage, called acoustic trauma, is usually the result of a very high-intensity impulse noise, perhaps from an explosion or sonic boom. An impulsive noise of over 150 dB would probably be instantly damaging. The eardrum can be ruptured beyond repair and the ossicles can be damaged or displaced.

Ear damage from impulse noise is not the major cause for concern. Of far greater importance are the effects of continuous periods of high-intensity noise. This affects people's hearing in two ways. First, a temporary threshold shift occurs, where hearing sensitivity is impaired for a brief time, about half an hour. If continually exposed to high intensity noise the threshold shift becomes permanent. Tinnitus, or ringing in the ears may occur, and noises with frequencies around 4000 Hz are no longer heard.

A great reference to look at on the web is:

**Columnist's Noise Test Finds that Leaf Blowers are as Loud as Dynamite (Jul. 20, 1997) at:**

<http://www.nonoise.org/news/lib.htm>

Noise-induced hearing loss is the most serious effect of noise, but it is not the only effect. Certain types of noise and vibrations can cause disease, can seriously impair communication, causes accidents, and psychological stress through persistent annoyance, and disturbs and prevents sleep. In general, noise reduces the quality of life.

It is nearly always the harmonics of the machine frequency which have the most harmful effects. High-intensity noise can cause resonance in the semi-circular canals, which are the organs of balance in the inner ear, with subsequent feelings of nausea and dizziness. Intense low-frequency sound can excite resonance in the organs of the body, including the heart and lungs. Middle frequency sounds can make it difficult to think, possibly because of resonance in the brain. If for any reason, a person simply must be exposed to high frequency sounds, a sound-resistance helmet should be worn, not just ear protection. If landscape contractors are not protecting their ears with earplugs or earmuffs, they are routinely exposing their ears to sounds above 85 dB - the level that experts agree may threaten hearing over a period of time. If exposure to hazardous noise is continual, hair cells in the ears wither and die from the assault. Hair cells do not spontaneously regenerate and there is currently no medical treatment that can restore hair cell function. The hearing loss is permanent. The hair cells translate sound into electric signals that the brain can interpret. Properly used, earplugs and earmuffs decrease the intensity of sounds reaching the inner ear by 15 to 30 decibels. The best protection is achieved by using both at once.

Probably more bothersome than the measurable physiological effects of noise, are the immeasurable psychological effects. Prolonged loss or interruption of sleep can lead to disturbance of the mind, irritation and annoyance can drive people to anger and outbursts, and noise tends to kill efficiency and inspiration. Noise interferes with communication which creates diverse results. The quality of life is lowered, normal activity is hampered, and danger signals and warnings may be masked.

The psychological effects of noise are hard to measure. How does one measure a bad temper? People may become unnaturally violent, or make disastrous decisions, become depressed, or complain of diverse psychosomatic diseases. Accidents can be caused, industrial relations may be strained. Fatigue and an inability to concentrate can result. The result is inefficiency and more accidents. Work absenteeism is high.

The following should not be exceeded for more than ten percent of the time:

The figure of 90 dB is becoming more and more accepted as a maximum safe level for the general noise climate in the workplace. 55 percent is more acceptable for general office environments.

The question of mental upset as a result of noise centers around the proposition that noise can increase the appearance of symptoms of any nervous condition to which a person may be predisposed.

Environmentalists suggest that buildings and public areas should display notices that read:

**Noise Index:**

Below 49 dB is **Pleasant**

Below 60 dB is **Tolerable**

Above 70 dB is **Annoying**

Above 85 dB **Dangerous**

The Noise Index at this location is currently \_\_\_\_ dB.

Physical symptoms related to noise exposure include an increase in heart rate, respiration rate,

muscular activity, and constriction of small blood vessels in the hands and feet.

An increase in 10 decibels means a ten-fold increase in sound intensity, a 20 decibel rise is a hundred-fold increase, and a 30 decibels increase is a thousand-fold increase in sound intensity!

- increase fatigue and anxiety,
- blood pressure can rise,
- the heart rate can change,
- and the body produces adrenaline and other hormones that affect the blood vessels.

Hearing loss and other medical implications also begin occurring after only twenty minutes of exposure to the machines a day. Leaf blowers have a whiny, annoying pitch that grates on the human ear - a high-pitched droning noise. Although they are not the loudest sound around, registering at about 70 to 75 decibels from 50 feet away, they have a particular quality of sound that irks the nerves. Leaf blowers can be compared to airplanes. Both emit a wide range of high and low frequency sounds from several sources.

There is a tone superimposed on it, like a rotating propeller, which makes them more annoying. A leaf blower engine rumbles at relatively low pitch. The more complicated, high pitched noise comes from air being sucked into the machine with a fan, compressed in an tube, then blown out of the blower. Gasoline-powered blowers also have an up and down sound of a throttle being revved. Full throttle makes maximum power and maximum scream. The amplitude of sound is constantly changing, which affects the listener in a distracting, irritating fashion. The source of aggravation triggers a fight or flight response in the body, producing adrenaline and other chemicals, and suppressing the immune system to save energy for the "danger" at hand. A chronic state of noise-induced stress can erode health.

Noise constitutes a real and present danger to people's health. Day and night, at home, at work, and at play, noise can produce serious physical and psychological stress. No one is immune to this stress. Though we seem to adjust to noise by ignoring it, the ear never closes and the body still responds, sometimes with extreme tension. Youngsters exposed to high noise levels may experience learning difficulties and generally suffer poorer health. 20 million or more Americans are estimated to be exposed daily to noise that is permanently damaging to their hearing. People with hearing loss suffer discomfort and social isolation.

Some useful websites to visit, to learn about noise pollution can be found at:

**Noise Pollution Clearinghouse:**

<http://www.nonoise.org/aboutno.htm>

**Noise At Work:**

<http://www.ukbusinessnet.com/datafile/hse-09.htm>

**NPC Library: Noise: A Health Problem:**

<http://www.nonoise.org/library/epahlth/epahlth.htm>

**Leaf Blowers Cause Air Pollution**

A typical 3.5 horsepower leaf blower can emit the same amount of volatile organic compounds (VOC) - key precursors to smog- in an hour as a new car driven 340 miles. Leaf blowers emit high levels of carbon monoxide, a odorless, colorless, poisonous gas. Also hydrocarbons, and nitrogen oxides which contribute to the formation of ground-level ozone known as smog.

Americans spill 17 million gallons of gasoline every year refilling lawn mowers, leaf blowers, chain saws and other lawn and garden equipment. That's more than the 1989 oil spill in Alaska. Every time a leaf blower is refueled, toxic fumes called Volatile Organic Compounds (VOCs) can be released into the air. Spilling and overfilling equipment will also result in the release of VOCs. When VOCs react with the sun, ground-level ozone or smog, is produced. Ozone can affect not only the lungs, but many other organs and systems of the body. Children, the elderly, and people with chronic illness are the most susceptible. Gasoline spilt on lawns can seep into the groundwater and waterways, affecting drinking water and polluting rivers, lakes, and oceans.

Go to this website to learn how to:

**Improve Your Pour Performance** at:

<http://www.intr.net/napenet/brochure/improve.html>

Ozone, the main component of smog, is harmful to breathe at ground-level. Ozone occurs when nitrogen oxide and volatile organic compounds combine. A gas is formed from these substances, which combine with those emitted from vehicles, power plants, refineries, factories and production plants. During hot weather, these gases form ozone. Adverse health effects from ozone include lung and respiratory complications. Ozone can also worsen existing health problems such as asthma and bronchitis.

Ground-level ozone also has a detrimental affect on many types of trees, plants and agricultural crops. The current ground-level limit for ozone is measured at midday and is set at 0.12 parts per million. Certain studies suggest, however, that adverse effects from ozone occur at less than the 0.12 parts per million, indicating the need for a new standard.

Production of tropospheric ozone caused by the unburned hydrocarbons emitted from leaf blower engines is serious. The small engines in leaf blowers are a significant source of smog. Garden equipment engines emit high levels of carbon monoxide, volatile organic compounds and nitrogen oxides, producing up to 5 to 10 percent of the nation's air pollution and a good deal more in metropolitan areas like Los Angeles. Two-cycle engines, commonly used in leaf blowers, depend on a mixture of oil and gas to lubricate the engine - an inherently dirty and toxic process.

The particulates spewed into the air by leaf blowers contribute to and aggravate respiratory and allergy problems, as well as add a significant amount of pollution. They also act like hair dryers to dry and destroy the fragile top soil, hurting the environment. . For more information about maintaining healthy air visit these websites:

<http://www.state.nh.us/des/ard-22.htm>

<http://www.epa.gov/OMSWWW/19-yard.htm>

<http://www.aqmd.gov/monthly/garden.html>

### **Who's At Risk?**

There is a growing link between exposure to noise and the development and aggravation of a number of heart diseases. Noise causes stress, and the body reacts with increased adrenaline, changes in heart rate, and elevated blood pressure. Noise can aggravate diseases of adaptation including ulcers, asthma, high blood pressure, headaches and colitis. A high proportion of low-weight babies have been found in noisy areas of Japan., most under 5 ½ pounds. Noise can potentially aggravate birth defects, and inhibit fetal growth during pregnancy. Noise can interfere with the perception of speech by children and the acquisition of speech, language, and language-related skills in children such as reading ability.

### **Is Noise making You Ill?**

Do you experience any of the following when exposed to noise?

- Stomach cramps
- Rapid Heart Beat
- Diarrhea
- Trembling
- Cold Sweat
- Anger
- Violent thoughts against the culprit
- Anxiety
- Muscular tension
- Ringing in the ears
- Waking from a sound sleep

- Have to shout to be heard
- Cold hands or feet

If you answered yes to one or more of the above, chances are noise is harming your health

### **- Protect Your Health and Ears!**

The elderly are more easily awakened by noise and have more difficulty returning to sleep. Shifts from deep to light sleep were more numerous than total awakening from noise. Hearing loss inhibits the ability to converse. People with hearing loss may tend to adopt a lifestyle devoid of communication and social interaction. Noise reduces the accuracy of work especially with complex tasks. Noise can strain relations between individuals, cause people to be less tolerant of frustration and ambiguity, and make people less willing to help others.

### **Interventions to Reduce Risks**

No one should ever be exposed to a noise level as high as 135dB for any period, however short, and even with ear protection, the absolute limit is 150 dB. One company, Echo claims to have developed a new blower that produces 50 percent less noise without affecting its air volume and air velocity. The blower still produces 65 decibels at 50 feet.

Resources to find on the Web to help you cope with noise include:

#### **Noise and Your Health**

<http://www.torfree.net/ip/cg343/health.htm>

#### **Preventing noise- induced hearing loss (Mayo Clinic):**

<http://www.mayohealth.org/ivi/mayo/9507/htm/tips>

#### **Healthline - Why Noise Contributes to Urban Stress**

<http://www.health-line.com/articles/hl94100>

Emission control for small gasoline engines has not been a crucial design consideration for manufacturers until recently. Consequently, small engines contribute more emissions per hour of use than most cars, which utilize complex emission control technologies. In addition, power equipment users may inadvertently contribute to pollution by careless fuel handling and improper maintenance. The solution?

Electric models require no gas, oil, tune-ups or spark plugs, making them a bargain to maintain. Noise levels are about half of those of gas-powered ones. With no smell!

Over the past few years, new U.S. Environmental Protection Agency (EPA) regulations have resulted in cleaner lawn and garden power equipment. EPA and the power equipment industry are working to identify and bring to market cleaner technologies for small engines. Meanwhile, consumers can make a difference by adopting practices that will help protect the environment both now and in the future. You can prevent pollution in your own backyard!

EPA's action establishes the first phase of regulations to control emissions from new non-road spark-ignition engines at or below 19 kilowatts (25 horsepower). Regulatory requirements will for the first time control emissions from these engines, which cause or contribute to non-attainment of National Ambient Air Quality Standards for carbon monoxide (CO) and ozone. These engines are used principally in lawn and garden equipment. The new standards are expected to result in a 32 percent reduction in hydrocarbon (HC) emissions and a 7 percent reduction in CO emissions from these engines in the year 2020 when complete fleet turnover is projected. A second phase of regulations addressing emissions from these engines is currently under development.

### **No Cap on Noise**

Noise control is important, without standards and test procedures, minimum requirements are not enforceable. The EPA expects modifications to current engine design that will be performed to assure compliance with the standards.

Adverse health effects also were documented below the current emission standard standards and will not impact noise levels.

Visit the EPA on-line for more Leaf Blower Regulation information at:

<http://www.epa.gov/OMSWWW/equip-ld.htm>

OR <http://www.epa.gov/OMSWWW/nonroad.htm>

Visit this website to find out ways that you can reduce pollution in your own backyard and help the environment:

<http://www.atco.co.uk/wildlife.html>

OR <http://www.buscom.com/archive/E064.html>

AND <http://www.aqmd.gov/monthly/garden.html>