

# A Guide to Noise Control in Minnesota

Acoustical Properties, Measurement, Analysis, and Regulation



Minnesota Pollution Control Agency

November 2015

## **Authors**

Amanda Jarrett Smith, MPCA  
Anne Claflin, MPCA  
Melissa Kuskie, MPCA

## **Editing and graphic design**

Tanja Michels  
PST Staff  
PIO Staff

The Minnesota Pollution Control Agency (MPCA) is reducing printing and mailing costs by using the Internet to distribute reports and information to wider audience. Visit our website for more information.

MPCA reports are printed on 100% post-consumer recycled content paper manufactured without chlorine or chlorine derivatives.

## **Minnesota Pollution Control Agency**

520 Lafayette Road North | Saint Paul, MN 55155-4194 | [www.pca.state.mn.us](http://www.pca.state.mn.us) | 651-296-6300  
Toll free 800-657-3864 | TTY 651-282-5332

This report is available in alternative formats upon request, and online at [www.pca.state.mn.us](http://www.pca.state.mn.us)

**Document number:** p-gen6-01

# Foreword

---

The Minnesota Pollution Control Agency (MPCA) is empowered to enforce the State of Minnesota noise rules. These rules and supporting acoustical information can be viewed in the document, “A Guide to Noise Control in Minnesota.” This publication is intended to provide information on the basics of sound and noise regulation.

Revised 2015

---

# Contents

---

- Foreword.....2**
- Contents.....1**
- Introduction .....1**
- 1. Noise rules in Minnesota .....2**
  - 1.1 The basics ..... 2
  - 1.2 Noise area classifications ..... 2
  - 1.3 Common noise concerns ..... 3
  - 1.4 Regulatory agencies ..... 4
- 2. Basics of how sound works .....6**
  - 2.1 Waves and sound pressure level..... 6
  - 2.2 Sound weighting networks..... 8
  - 2.3 Human perception of sound ..... 9
  - 2.4 Using decibel measurements ..... 10
- 3. Measurement procedures .....13**
  - 3.1 General procedures..... 13
  - 3.2 Noise Test Procedure 1: Measurement procedure for non-impulsive noise ..... 14
  - 3.3 Noise Test Procedure 2: Manual measurement procedure for non-impulsive noise ..... 14
- 4. Minnesota noise pollution statutes and rules.....18**
  - Minn. Rules § 7030 NOISE POLLUTION CONTROL..... 19
  - Minn. Stat. § 86B WATERCRAFT OPERATION ..... 27
  - Minn. Stat. § 84.8 SNOWMOBILES ..... 29
  - Minn. Stat. § 87A. SHOOTING RANGES ..... 31
  - Minn. Rules § 6102, RECREATIONAL VEHICLES ..... 31

---

# Introduction

---

Noise is a pollutant. While its physical and emotional effects are difficult to define quantitatively, the noise level itself can be measured.

**Sound:** An alteration of pressure that propagates through an elastic medium such as air and produces an auditory sensation.

**Noise:** Any undesired sound.

The Minnesota Pollution Control Agency (MPCA) is empowered to enforce the State of Minnesota noise rules ([Minn. Rules Ch. 7030](#)). Minnesota's primary noise limits are set by "noise area classifications" (NACs) based on the land use at the location of the person that hears the noise. They are also based on the sound level in decibels (dBA) over ten percent ( $L_{10}$ ), or six minutes, and fifty percent ( $L_{50}$ ), or thirty minutes, of an hour.

For residential locations (NAC 1), the limits are  $L_{10} = 65$  dBA and  $L_{50} = 60$  dBA during the daytime (7:00 a.m. – 10:00 p.m.) and  $L_{10} = 55$  dBA and  $L_{50} = 50$  dBA during the nighttime (10:00 p.m. – 7:00 a.m.) ([Minn. R. 7030.0040](#)). This means that during a one-hour period of monitoring, daytime noise levels cannot exceed 65 dBA for more than 10 percent of the time (six minutes) and cannot exceed 60 dBA more than 50 percent of the time (30 minutes).

# 1. Noise rules in Minnesota

---

## 1.1 The basics

Minnesota's noise pollution rules are based on statistical calculations that quantify noise levels over a one-hour monitoring period. The  $L_{10}$  calculation is the noise level that is exceeded for 10 percent, or six minutes, of the hour, and the  $L_{50}$  calculation is the noise level exceeded for 50 percent, or 30 minutes, of the hour. There is not a limit on maximum noise.

The statutory limits for a residential location are  $L_{10} = 65$  dBA and  $L_{50} = 60$  dBA during the daytime (7:00 a.m. – 10:00 p.m.) and  $L_{10} = 55$  dBA and  $L_{50} = 50$  dBA during the nighttime (10:00 p.m. – 7:00 a.m.) ([Minn. R. 7030.0040](#)). This means that during the one-hour period of monitoring, daytime noise levels cannot exceed 65 dBA for more than 10 percent of the time or 60 dBA more than 50 percent of the time.

The basic noise rules for other noise area classifications are:

Noise Area Classification	Daytime		Nighttime	
	$L_{10}$	$L_{50}$	$L_{10}$	$L_{50}$
1	65	60	55	50
2	70	65	70	65
3	80	75	80	75

## 1.2 Noise area classifications

Noise area classifications (NAC) are based on the land use at the location of the person who hears the noise, which does not always correspond with the zoning of an area. Therefore, noise from an industrial facility near a residential area is held to the NAC 1 standards if it can be heard on a residential property.

Some common land uses associated with the NACs include:

NAC 1: Residential housing, religious activities, camping and picnicking areas, health services, hotels, educational services

NAC 2: Retail, business and government services, recreational activities, transit passenger terminals

NAC 3: Manufacturing, fairgrounds and amusement parks, agricultural and forestry activities

NAC 4: Undeveloped and unused land

Note that, although there is a NAC 4, there are no noise standards for these areas. The full list of NAC land uses can be found starting on [page 21](#) of this guide or in Minnesota Rule [7030.0050](#).

## 1.3 Common noise concerns

By Minnesota law, the MPCA is empowered to enforce the state's noise rules. Many other agencies and levels of government, however, have an important role to play in upholding the noise standards. Depending on the source and location of the noise, some agencies may be in a better position than others to help citizens with noise concerns.

### Industrial facilities

The MPCA enforces noise standards at facilities for which it has issued an air permit. For complaints about noise at one of these facilities, please use the [Online Citizen Complaints Form](#). If you prefer, you may call the MPCA to make your complaint: 651-296-6300 within the Twin Cities metropolitan area or 1-800-657-3864 if you are outside of this area.

### Local land uses

Local law enforcement agencies are empowered to enforce Minnesota state rules and laws relating to the prevention and control of pollution ([Minn. Stat. 115.071](#)). Many local governments also have nuisance noise ordinances or general public nuisance ordinances that can be used to enforce local noise concerns.

Local governments are required to take reasonable measures to prevent the approval of land use activities that will violate the state noise standard immediately upon establishment of the land use ([Minn. R. 7030.0030](#)). Municipalities should consider the state noise standard when reviewing and approving new projects in their jurisdiction. The MPCA can provide some expertise to support this review process. Please contact [noise.pca@state.mn.us](mailto:noise.pca@state.mn.us).

### Roads and highways

The Minnesota Department of Transportation (MnDOT) handles complaints about noise on highways and other roads it manages. According to [Minn. Stat. 116.07.2a](#), most roads are exempt from Minnesota's state noise rules. MnDOT does, however, have policies, agreed on with the MPCA, for providing noise mitigation when it is determined to be both feasible and reasonable. MPCA reviews some MnDOT projects and noise mitigation decisions. For further information on MnDOT's noise policies, please visit its [website](#).

### Vehicles

[Minn. R. 7030.1000-1060](#) outlines Minnesota's state rules relating to motor vehicle noise. In addition to the state rules, local governments may have nuisance sound ordinances, which are often easier to enforce than the state rule. As with noise relating to local land-use decisions, contacting your local government or law enforcement is your best course of action.

### Airplanes

The Metropolitan Airports Commission (MAC) responds to all concerns regarding noise relating to aircraft or the airports. For more information, please see its [website](#).

## Snowmobiles, off-highway vehicles, and motor boats

The Minnesota Department of Natural Resources (MDNR) has source-specific noise rules for snowmobiles ([Minn. R. 6100.5700.5](#)), off-highway vehicles ([Minn. R. 6102.0040.4](#)), and motor boats ([Minn. Stat. 86B.321](#)), requiring them to be equipped with proper mufflers and conform to certain noise standards. For more information on MDNR regulations for snowmobiles, off-highway vehicles, and boats, please visit its [website](#).

## Mining

The MDNR also has source-specific rules to restrict noise and vibrations from different types of metallic mining operations ([Minn. R. 6130.3900](#) and [6132.2900](#)). Local governments are relied upon to consider noise when approving and permitting sand and gravel mining operations. The MPCA enforces noise standards at mining facilities for which it has issued an air permit. For complaints about noise at one of these facilities, please use the [Online Citizen Complaints Form](#). If you prefer, you may call the MPCA to make your complaint: 651-296-6300 within the Twin Cities metropolitan area or 1-800-657-3864 if you are outside of this area.

## Gun clubs

[Minn. Stat. 116.07.2a](#) exempts gun clubs from the receiver-based noise standards administered by the MPCA. However, [Minn. Stat. 87A](#) includes some standards regarding gun club noise. Through this statute, the MDNR is authorized to regulate gun club noise. For further information, please visit its [website](#).

## Motor vehicle race track

[Minn. Stat. 116.07.2a](#) exempts motor vehicle race tracks built before July 1, 1996 from Minnesota's noise standards. All tracks built since that date must comply with the noise rules. Local governments have often been successful in working with exempt tracks to mitigate noise concerns by establishing time and date restrictions, muffler requirements, and noise barriers.

## 1.4 Regulatory agencies

Several agencies have noise regulations for different noise sources. Noise rules either set standards based on the source of the noise (source standards) or based on who hears the noise (receiver-based standards).

**Minnesota Pollution Control Agency** - The MPCA has a receiver-based standard intended to limit noise levels and protect the health and welfare of the general public. The MPCA enforces the standard at facilities for which the agency issues air quality permits. The MPCA also works with other agencies and levels of government to enforce noise standards and reduce violations through pre-construction project reviews.

**Local Agencies** - Local governing agencies, such as a cities and counties, are relied upon to enforce noise standards relating to local land use and often have ordinances regulating noise levels. They are also responsible for not allowing land uses that would immediately violate the state noise standard. For instance, local governments should be cautious of allowing a loud local utility facility to locate in a residential area.



**Minnesota Department of Natural Resources** - The MDNR has source standards for snowmobiles, motorboats, personal watercraft, off-highway vehicles, and gun clubs. MDNR also has source standards for metallic mining operations. For more information, see its [website](#).

**Metropolitan Airport Commission** - The MAC is responsible for all noise issues related to the Minneapolis-St. Paul International Airport and reliever airports. For more information, see its [website](#).

**Federal Aviation Administration** - The FAA has source regulations for commercial jet engines. All commercial jet engines must meet noise emission criteria prior to being certified for flight. However, the Metropolitan Airport Commission is the best contact for noise concerns related to its airports. Additional information on the FAA's noise standards can be found on its [website](#).

**Minnesota Department of Transportation** – MnDOT is responsible for state highway noise mitigation. It works with the Federal Highway Administration (FHWA) and the MPCA to evaluate road projects for noise impacts and possible mitigation measures. For more information see the Department's [website](#).

**Federal Highway Administration (FHWA)** - The FHWA does not have actual noise standards, but has a 70 dBA L<sub>10</sub> guideline that is used to determine federal funding for noise abatement on highway projects. New highway projects must go through a noise impact analysis and be considered for abatement measures. Information on FHWA's noise policies can be found on its [website](#).

**Federal Railroad Administration (FRA)** - Regulation of railroad-related noise is the responsibility of the FRA. For more information see the Administration's [website](#) and to contact them about a noise concern, call 1-800-724-5040.

**Occupational Safety and Health Administration (OSHA)** - OSHA has regulations to protect against hearing loss in the workplace. These are "dose standards" that restrict the amount of noise an employee receives over a period of time, such as eight hours. For additional information, visit OSHA's [website](#).

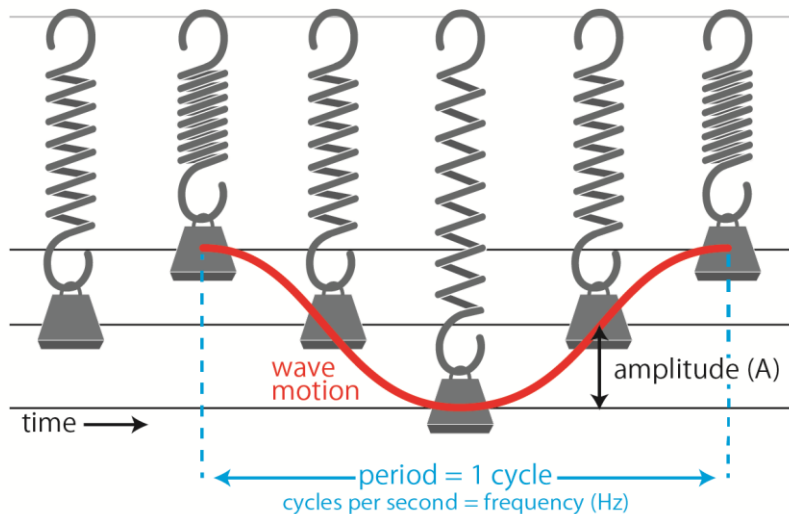
**Housing and Urban Development (HUD)** - HUD has noise regulations that establish acceptable noise zones for HUD housing projects. More information can be found on HUD's [website](#).

## 2. Basics of how sound works

### 2.1 Waves and sound pressure level

Sound travels in a wave motion through the air to our ears. A good way to imagine wave motion is with a weight hanging from a spring. Picture the following diagram (Figure 1) as a single weight and spring combination varying as time progresses along the horizontal axis.

In Figure 1 the first position of the weight on the spring is at rest with no forces exerted upon the system. If the weight is raised above its point of rest and the progression of the weight moving down and up again is observed over a period of time, a wave form is produced.

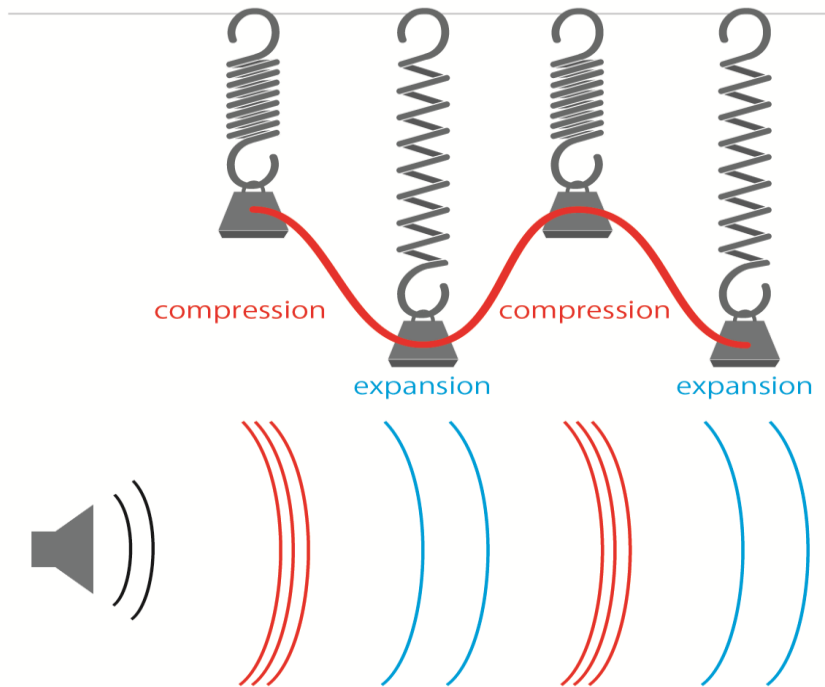


**Figure 1. Weight on a spring – example of periodic motion**

The *amplitude* of the moving weight is labeled as “A” in Figure 1 and corresponds with the maximum movement of the weight from its “at rest” position to the peak of the wave form either up or down. We hear changes in amplitude as changes in volume.

The *period* of the vibration is the amount of time taken to produce one complete cycle or, in this example, how quickly the weight moves from top to bottom and back. The number of cycles per second defines the *frequency* of the periodic (up and down) motion, which is given the unit of *hertz*, or *Hz*. We hear different frequencies as higher or lower pitched sounds.

Figure 2 shows how the weight on a string (two-dimensional) example of sound waves compares to the compression and expansion of sound waves through space (three-dimensional).



**Figure 2. Comparison of periodic motion to sound waves**

The graphical representation of sound waves in Figure 2 is of *pure tones*, which are sounds made up of a single frequency. A familiar example of a pure tone is the sound produced when a single key of a piano is pressed. For instance, the middle C key on a piano vibrates the associated wire at a rate of approximately 260 times per second or 260 Hertz. The vibration of the wire transfers its motion to the sound board of the piano, which then vibrates at the same frequency, causing the air adjacent to the sound board to form compression and expansion waves in the air emitting outward from the sound board. When received by the human ear, this is regarded as sound. Most sounds are not pure tones, but a mixture of tones of varying amplitude, frequency, and duration.

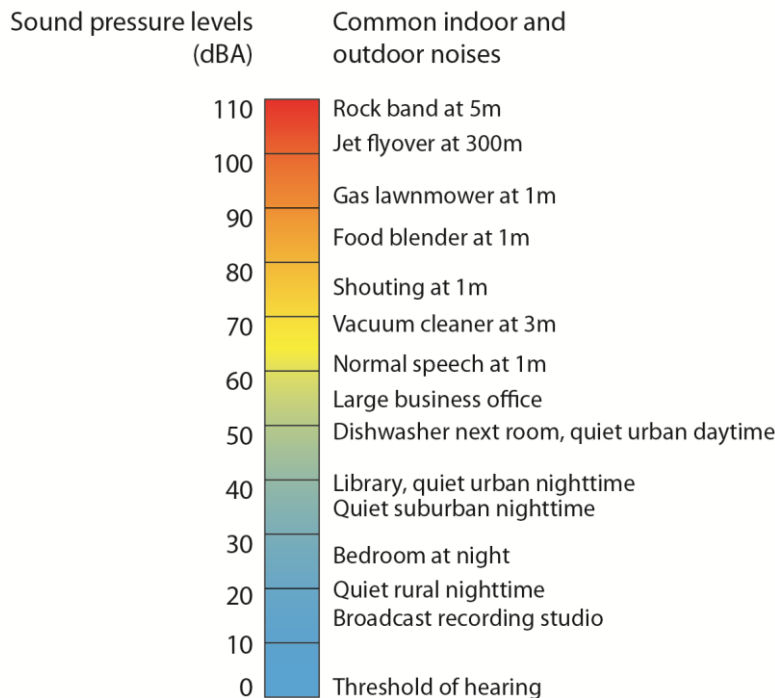
The *intensity* of a sound is the amount of sound energy at a given moment in a given area. The *sound pressure level*, measured in a unit called the *decibel*, or *dB*, is the ratio between the intensity of a sound and that of a reference pressure, which is the threshold of perception. The decibel is a logarithmic measurement which can accommodate a large range of values. The human ear can detect sounds more than a million times quieter than a jet aircraft during take-off; therefore, to have a system with a manageable range of numbers, the logarithm is used.

$$\text{Sound pressure level} = 20 \text{ Log}_{10} * (\text{Measured Sound Pressure} / \text{Reference Pressure})$$

$$\text{Reference Pressure} = 0.00002 \text{ Newtons} / (\text{meter})^2$$

Many different properties affect the noise level of a specific source type. For example, three lawn mowers may have three different noise levels because of differences in each specific piece of equipment. Noise level also depends on the distance from the noise source and features of the surrounding environment.

Figure 3 provides a rough estimate of decibel levels of some common noise sources.



**Figure 3. Decibel levels of common noise sources**

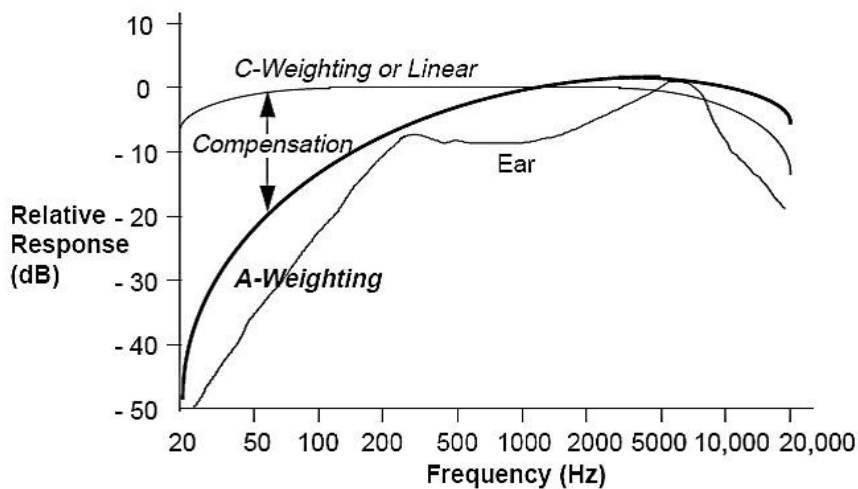
## 2.2 Sound weighting networks

Sound level meters (SLM) used for monitoring can pick up sounds as a perfect computer, but the human ear is not as precise. The human ear cannot hear very low frequencies or very high frequencies. Weighting networks are used in noise monitors to adjust specific frequencies in the audio spectrum to attempt to duplicate the response of the human ear.

The C-weighting network represents the actual sound pressure level that is received by the sound level meter, and does not noticeably vary in its amount of compensation throughout the audio spectrum. C-weighting is used during the calibration of sound level meters to ensure that the sound level displayed on the meter is accurate and the same as the frequency of the calibrator.

The A-weighting network is used to duplicate the sensitivity of the human ear. At 100 Hertz, the A-weighting network filters out approximately 20 dB from the incoming signal before it is combined with the levels from the other frequency ranges to produce an A-weighted sound level.

The graph in Figure 4 represents the sensitivity of the human ear in comparison to the compensation of a C-weighting network and an A-weighting network. This illustration is useful in understanding how the ear is inefficient in the detection of lower frequencies and is very sensitive to higher frequencies.



**Figure 4. Weighting networks with sound measurements done in the A-weighting network are reported with the unit dBA**

## 2.3 Human perception of sound

Sound has qualitative aspects that can be described with adjectives and quantitative aspects that can be described with measurements. Sound can be qualitatively perceived as pleasant or annoying, and quantitatively (as loudness) measured in terms of decibels.

Changes in loudness are described on a logarithmic scale because the human ear can hear such a wide range of sound levels. The human ear can usually tell the difference when sound changes by 3 dBA and a 5 dBA change is clearly noticeable. Because of how the logarithmic scale functions in compressing the measurements associated with sounds, an increase of 10 dBA sounds twice as loud.

± 1 dBA.....	Not Noticeable
± 3 dBA.....	Threshold of Perception
± 5 dBA.....	Noticeable Change
± 10 dBA.....	Twice (Half) As Loud
± 20 dBA.....	Four Times (One Fourth) As

**Figure 5. Change in decibel level and perceived change in loudness**

## 2.4 Using decibel measurements

Addition and subtraction of decibels is often necessary for estimating total noise levels or background noise. Because decibels are measured using a logarithmic scale, conventional linear mathematics cannot be used. The following rules of thumb provide a good estimate of the effect that type, distance, and number of sources have on measured sound pressure level.

### Sound propagation and sources

Sources of sound can be defined as *point* or *line* sources, based on the way sound pressure waves spread away from the source. Sound waves move out from sources in a way similar to waves traveling away from a rock dropped in a pond. A *point* source, like a factory, emits sound that spreads out in a sphere. A *line* source, like a busy highway, emits sound that spreads out in a cylinder. Knowing the sources of sounds makes it possible to make assumptions about how the sound behaves.

### Distance attenuation

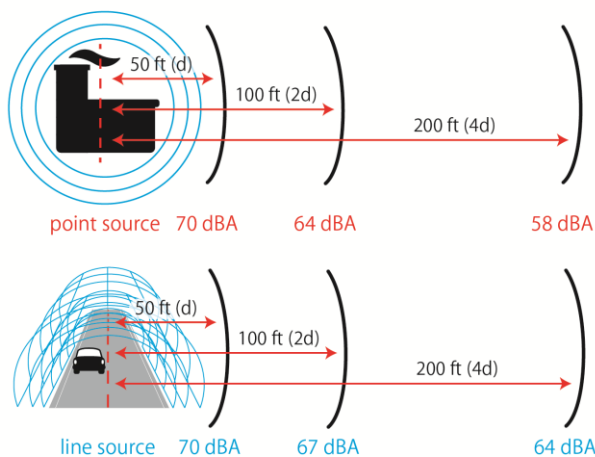
Over distance, sound *attenuates*, or is reduced in amplitude, and is perceived as becoming quieter. This occurs as the sound travels outward to an increasingly larger sphere or cylinder, and the energy per unit of area decreases. These basic principles allow us to make generalized assumptions about sound.

When the distance is doubled from a *line* source, the sound level decreases three decibels.

**Example:** If a sound level is: **70 decibels at 50 feet it will be**  
**67 decibels at 100 feet, and**  
**64 decibels at 200 feet**

When the distance is doubled from a *point* source, the sound level decreases six decibels (Figure 6).

**Example:** If a sound level is: **70 decibels at 50 feet it will be**  
**64 decibels at 100 feet, and**  
**58 decibels at 200 feet**

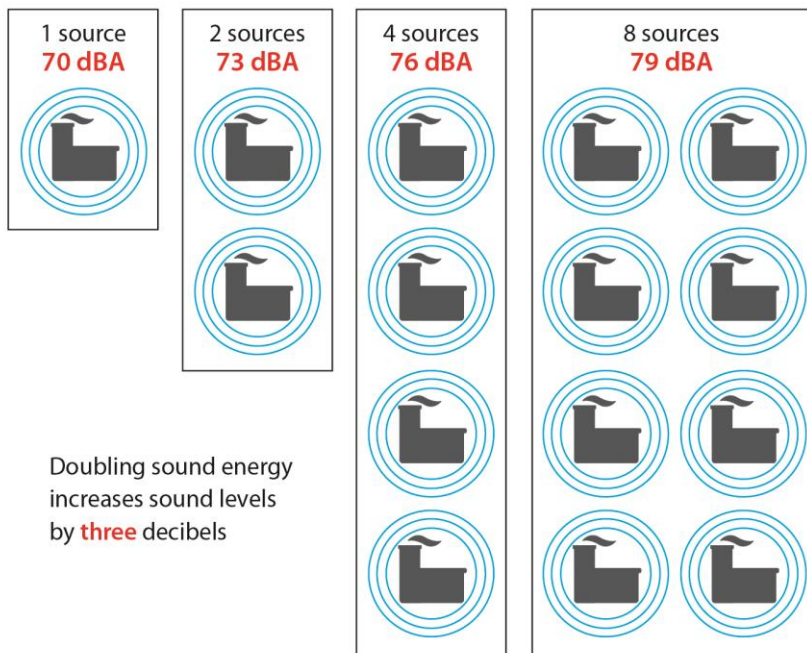


**Figure 6. Distance attenuation of noise levels from a point source (top) and a line source (bottom)**

## Number of sources

In many situations pertaining to noise control and monitoring, it is very useful to be able to add and subtract multiple sources of sound. This can be done with principles similar to how sound attenuation over distance is estimated.

A doubling of sound energy yields an increase of three decibels. For example, each generator at a factory produces sound that is measured at 70 decibels, so running one generator would create sound measured at 70 dBA, turning on a second generator would increase sound by 3 dBA to 73 dBA, and doubling again to four generators would increase sound levels to 76 dBA. Figure 7 illustrates this principle.



**Figure 7. Addition and subtraction of decibel levels**

In the same way, reducing the number of sources by half will reduce the sound pressure by 3 dBA.

Consider the perception of changes in decibel levels (Figure 5) compared to the example of addition or subtraction of sources (Figure 7). Doubling sources yields an increase of 3 dBA, which is a change that is just perceptible.

## Background noise

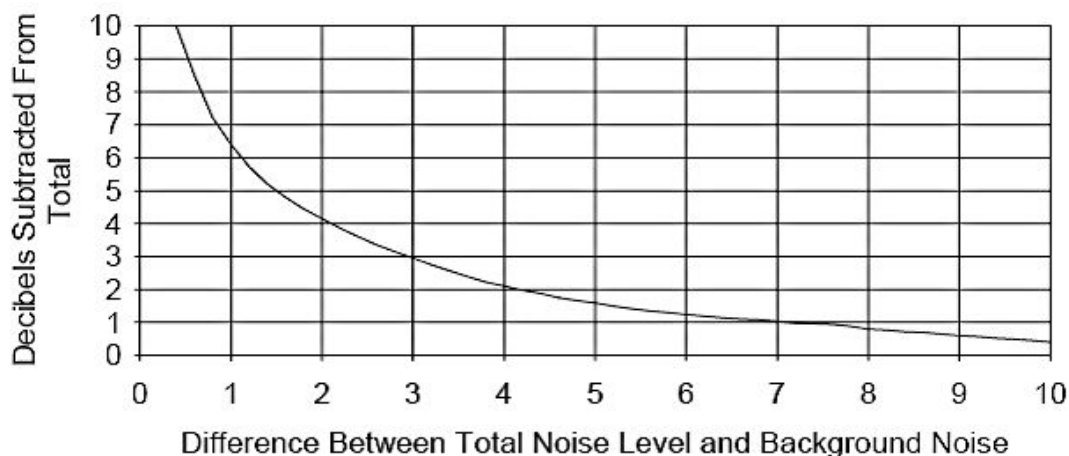
Background, or ambient, noise consists of all noise sources other than the noise source of concern. This can include traffic, animals, machinery, voices, and other sounds.

Wind is often a major source of ambient noise and can frequently be a problem when trying to monitor a specific source of noise. The MPCA's noise test procedures state that measurements should not be made when noise from wind or precipitation results in a difference of less than 10 dBA between the background sound level and noise source being measured. In practice, this means that wind speeds must be below 11 mph when making noise measurements and rainy weather conditions should be avoided. When background noise is less than 10 dBA from the decibel level of the noise source to be measured, confidence in the accuracy of the measurement decreases.

In certain instances, when a single noise source is analyzed along with other noise sources, correction factors can be used to isolate the noise source being monitored and calculate its individual noise level. This is done by measuring and recording the total noise level of all sources. Next, the noise source to be isolated is turned off and a noise level reading is taken with all the other existing noise sources in operation. The background noise level is then subtracted from the total noise level. The result is used in conjunction with the following background noise correction chart (Figure 8) to find the approximate noise level of the source.

Figure 8 is a graph used to estimate the amount of background noise influencing a measurement. Based on the measured background noise it gives the corresponding decibel level to be subtracted from the total measurement to determine the decibel level of the noise source being monitored.

For example, if the total noise level is 74 dBA, and then falls to 70 dBA when the source of interest is turned off, the difference of four decibels between the total noise level and background noise indicates that two decibels should be subtracted from the total. This means that a 72 dBA noise level can be attributed to the monitored source in the absence of background noise.



**Figure 8. Background noise correction**



## 3. Measurement procedures

---

This guide contains two measurement procedures. The general protocols remain the same, but your choice of procedure depends on the capabilities of your sound level meter (SLM). Noise Test Procedure 1 (NTP-1) should be used if your SLM is capable of calculating monitoring results and Noise Test Procedure 2 (NTP-2) should be used if your SLM only displays instantaneous readings.

### 3.1 General procedures

#### Sound level meter

Your sound level meter and microphone must comply with the specifications for ANSI S1.4-1983 Type 0, 1, 2, or S.

#### Calibration

You must also have a calibrator of a known frequency and sound level. Calibrators should be compared to a lab standard periodically. Calibration must be performed before and after the monitoring period. Adjustments should be made if necessary.

#### Weather conditions

Measurements should not be made when noise from wind or precipitation results in a difference between the background sound level and noise source being measured that is less than 10 dBA. In practice, this means that wind speeds must be below 11 mph and rainy weather conditions should be avoided. Temperature and humidity should be within equipment specifications.

#### Background noise

As mentioned in the previous section, background noise is any ambient noise other than the noise to be measured, including wind, precipitation, traffic, etc. The difference between the sound level of the source being monitored and that of the background noise must be less than 10dBA. See [page 11](#) for suggestions on how to correct for background noise.

#### Location of measurement

Properly choosing a monitoring location is an important consideration. Measurements should be made in the appropriate NAC, at the area of normal outdoor human activity nearest to the noise source. The monitoring location may not necessarily be at the property line; for instance, if the property of the complainant is large and residential outdoor activity is limited to a backyard patio (possibly such as on a farm).

Measurements must be made outdoors from at least three feet off of the ground (a tripod is helpful for this). Another important part of site selection is the consideration of errors caused by reflecting objects, such as a house or other large manmade or natural structures. Measurements should be made at least as far away from any large reflecting object as from the noise source being measured. If this is not possible, stay at least 30 feet from structures.

## Documentation of measurement

A survey form must be completed containing date, time, location, noise source, wind speed/direction, temperature, humidity, equipment information (make, model, serial number), site sketch with the location of the noise source and measurement location (including appropriate distances), data and calibration information. A sample survey form can be found on page 16.

## 3.2 Noise Test Procedure 1: Measurement procedure for non-impulsive noise

The following test procedure has been approved by the Commissioner of the MPCA for the measurement of non-impulsive noise. The general procedures described above ([3.1 General procedures](#)) should be followed whether you are using the NTP-1 or NTP-2 procedures.

### Instrumentation:

- Sound level meter and a microphone conforming to type 0, 1, 2, or S specifications under ANSI S1.4-1983
- Calibrator of known frequency and level
- Small screwdriver for sensitivity adjustment
- Microphone windscreen
- Noise survey form
- Tripod (optional)

### Monitoring procedure:

Monitoring must be conducted for at least a one hour time period. Sound meter must use the "A" weighting and FAST response characteristics. Follow your manufacturer instructions to obtain the  $L_{10}$  and  $L_{50}$  results.

## 3.3 Noise Test Procedure 2: Manual measurement procedure for non-impulsive noise

The following test procedure has been approved by the Commissioner of the MPCA for the measurement of non-impulsive noise. The general procedures described above ([3.1 General procedures](#)) should be followed whether you are using the NTP-1 or NTP-2 procedures. The NTP-2 procedure is to be used with SLMs that cannot calculate noise statistics and only provide instantaneous readings.

### Instrumentation:

- Sound level meter and a microphone conforming to type 0, 1, 2, or S specifications under ANSI S1.4-1983
- Calibrator of known frequency and level
- Small screwdriver for sensitivity adjustment
- Microphone windscreen
- Noise survey form
- Tripod (optional)

## Manual monitoring procedure:

Using a hand-held SLM, take an instantaneous sound reading every 10 seconds and record on a data sheet. A partner is very helpful.

Continue taking sound readings for one hour, which will give you 360 individual readings. Figure 9 provides an example of a manual monitoring data sheet.

To determine the  $L_{10}$ , take the 36th loudest (10 percent of 360 = 36) individual sound reading by counting from the loudest to the quietest on the data sheet. For example, in Figure 9, the  $L_{10}$  = 63 and is the 36th X from the top of the sheet.

To determine the  $L_{50}$ , take the 180th loudest (50 percent of 360 = 180) individual sound reading. In Figure 9, the  $L_{50}$  = 57 and represents the 180th X from the top of the sheet.

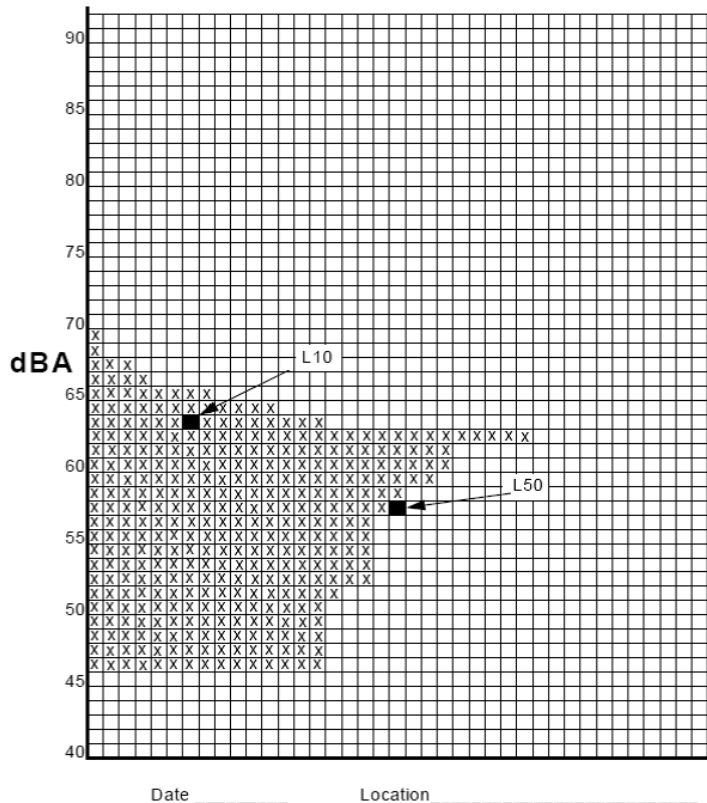
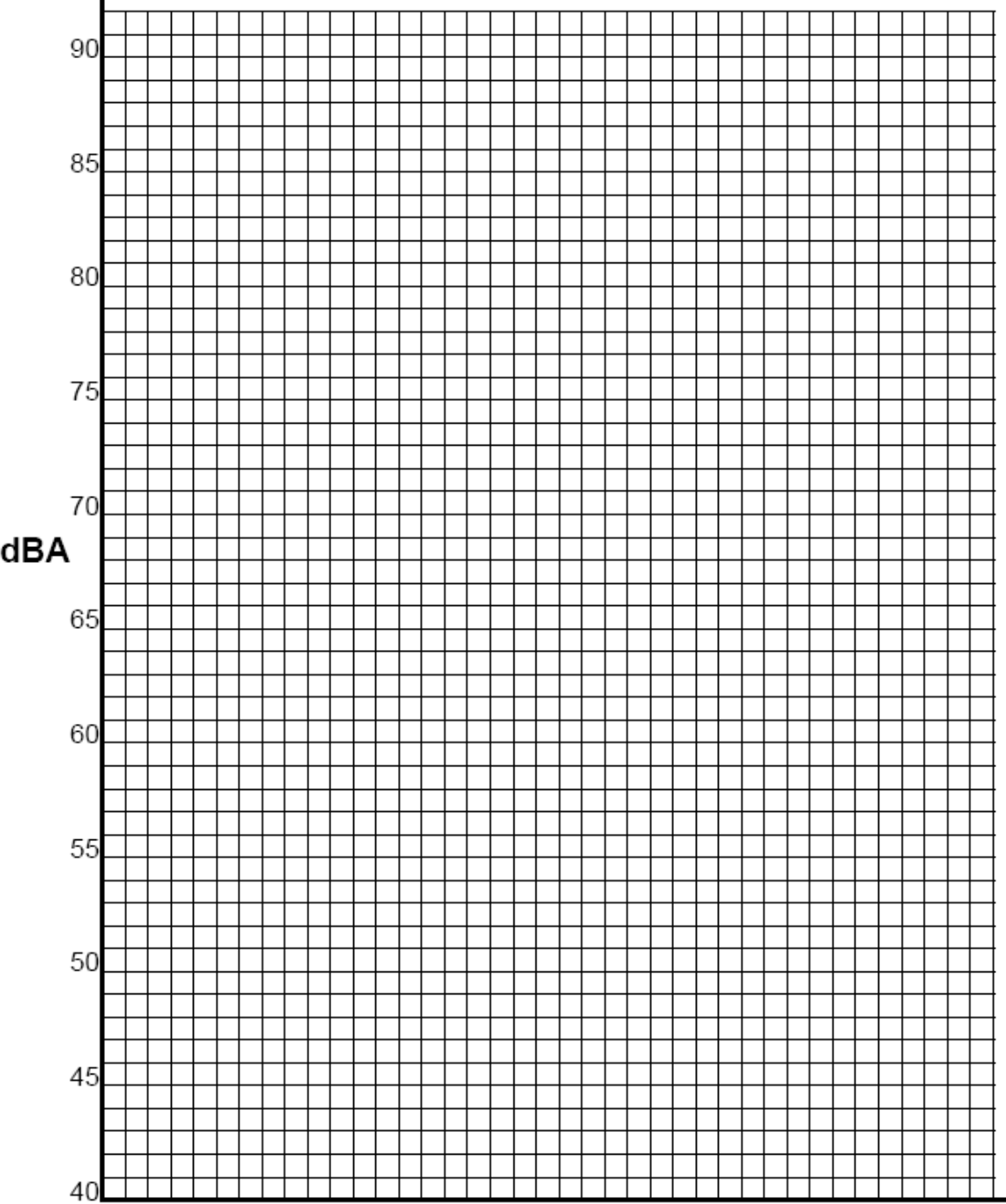


Figure 9. Example manual monitoring data sheet

# Manual Monitoring Data Sheet



Date \_\_\_\_\_

Location \_\_\_\_\_

# Noise survey

Investigator \_\_\_\_\_ Date \_\_\_\_\_

SLM Manufacturer and Model \_\_\_\_\_ Serial Number \_\_\_\_\_

Calibrator Manufacturer and Model \_\_\_\_\_

Calibrator Serial Number \_\_\_\_\_ Calibrator Frequency (Hz) \_\_\_\_\_

Initial Calibration (dBA) \_\_\_\_\_ Final Calibration (dBA) \_\_\_\_\_

Meteorological Conditions: Wind Speed \_\_\_\_\_ Direction \_\_\_\_\_ Temperature \_\_\_\_\_

Source \_\_\_\_\_

Monitor Location \_\_\_\_\_

Time Start \_\_\_\_\_ Time End \_\_\_\_\_

Results L<sub>10</sub> \_\_\_\_\_ dBA L<sub>50</sub> \_\_\_\_\_ dBA

Diagram (*Indicate noise source, receiver, microphone location, reflecting objects, obstructions, landmarks, and distances*)

## 4. Minnesota noise pollution statutes and rules

---

### **Minn. Stat. § 116.07 POWERS AND DUTIES.**

Subdivision 1. **Generally.** In addition to any powers or duties otherwise prescribed by law and without limiting the same, the Pollution Control Agency shall have the powers and duties hereinafter specified.

Subd. 2. **Adoption of standards.** (c) The Pollution Control Agency shall also adopt standards describing the maximum levels of noise in terms of sound pressure level which may occur in the outdoor atmosphere, recognizing that due to variable factors no single standard of sound pressure is applicable to all areas of the state. Such standards shall give due consideration to such factors as the intensity of noises, the types of noises, the frequency with which noises recur, the time period for which noises continue, the times of day during which noises occur, and such other factors as could affect the extent to which noises may be injurious to human health or welfare, animal or plant life, or property, or could interfere unreasonably with the enjoyment of life or property. In adopting standards, the Pollution Control Agency shall give due recognition to the fact that the quantity or characteristics of noise or the duration of its presence in the outdoor atmosphere, which may cause noise pollution in one area of the state, may cause less or not cause any noise pollution in another area of the state, and it shall take into consideration in this connection such factors, including others which it may deem proper, as existing physical conditions, zoning classifications, topography, meteorological conditions and the fact that a standard which may be proper in an essentially residential area of the state, may not be proper as to a highly developed industrial area of the state. Such noise standards shall be premised upon scientific knowledge as well as effects based on technically substantiated criteria and commonly accepted practices. No local governing unit shall set standards describing the maximum levels of sound pressure which are more stringent than those set by the Pollution Control Agency.

Subd. 2a. **Exemptions from standards** No standards adopted by any state agency for limiting levels of noise in terms of sound pressure which may occur in the outdoor atmosphere shall apply to (1) segments of trunk highways constructed with federal interstate substitution money, provided that all reasonably available noise mitigation measures are employed to abate noise, (2) an existing or newly constructed segment of a highway, provided that all reasonably available noise mitigation measures, as approved by the commissioners of the Department of Transportation and Pollution Control Agency, are employed to abate noise, (3) except for the cities of Minneapolis and St. Paul, an existing or newly constructed segment of a road, street, or highway under the jurisdiction of a road authority of a town, statutory or home rule charter city, or county, except for roadways for which full control of access has been acquired, (4) skeet, trap or shooting sports clubs, or (5) motor vehicle race events conducted at a facility specifically designed for that purpose that was in operation on or before July 1, 1996. Nothing herein shall prohibit a local unit of government or a public corporation with the power to make rules for the government of its real property from regulating the location and operation of skeet, trap or shooting sports clubs, or motor vehicle race events conducted at a facility specifically designed for that purpose that was in operation on or before July 1, 1996.

# Minn. Rules § 7030 NOISE POLLUTION CONTROL

## 7030.0010 INCORPORATION BY REFERENCE.

For the purpose of chapter 7030, American National Standards Institute, Specification for Sound Level Meters, S1.4-1983 is incorporated by reference. This publication is available from the American National Standards Institute, 1430 Broadway, New York, N.Y. 10018 and can be found at: the offices of the Minnesota Pollution Control Agency, 1935 West County Road B-2, Roseville, Minnesota 55113; the Government Documents Section, Room 409, Wilson Library, University of Minnesota, 309 19th Avenue South, Minneapolis, Minnesota 55454; and the State of Minnesota Law Library, 25 Rev. Dr. Martin Luther King Jr. Blvd., Saint Paul, Minnesota 55155. This document is not subject to frequent change.

The Federal Highway Administration publication, Sound Procedures for Measuring Highway Noise: Final Report, FHWA-DP-45-1R (August 1981) is incorporated by reference. This publication is available from the United States Department of Transportation, Federal Highway Administration, 1000 North Globe Road, Arlington, Virginia 22201 and can be found at: the offices of the Minnesota Pollution Control Agency, 1935 West County Road B-2, Roseville, Minnesota 55113; the Government Documents Section, Room 409, Wilson Library, University of Minnesota, 309 19th Avenue South, Minneapolis, Minnesota 55454; and the State of Minnesota Law Library, 25 Rev. Dr. Martin Luther King Jr. Blvd., Saint Paul, Minnesota 55155. This document is not subject to frequent change.

## 7030.0020 DEFINITIONS.

**Subpart 1. Application.** The terms used in this chapter have the meanings given them in this part.

**Subp. 2. A-weighted.** "A-weighted" means a specific weighting of the sound pressure level for the purpose of determining the human response to sound. The specific weighting characteristics and tolerances are those given in American National Standards Institute S1.4-1983, section 5.1.

**Subp. 3. Daytime.** "Daytime" means those hours from 7:00 a.m. to 10:00 p.m.

**Subp. 4. dB(A).** "dB(A)" means a unit of sound level expressed in decibels (dB) and A-weighted.

**Subp. 5. Decibel.** "Decibel" means a unit of sound pressure level, abbreviated as dB.

**Subp. 6. Impulsive noise.** "Impulsive noise" means either a single sound pressure peak (with either a rise time less than 200 milliseconds or total duration less than 200 milliseconds) or multiple sound pressure peaks (with either rise times less than 200 milliseconds or total duration less than 200 milliseconds) spaced at least by 200 millisecond pauses.

**Subp. 7. L<sub>10</sub>.** "L<sub>10</sub>" means the sound level, expressed in dB(A), which is exceeded ten percent of the time for a one hour survey, as measured by test procedures approved by the commissioner.

**Subp. 8. L<sub>50</sub>.** "L<sub>50</sub>" means the sound level, expressed in dB(A), which is exceeded 50 percent of the time for a one hour survey, as measured by test procedures approved by the commissioner.

**Subp. 9. Municipality.** "Municipality" means a county; a city; a town; a regional planning and development commission established under Minnesota Statutes, chapter 473; the metropolitan council; or other governmental subdivision of the state responsible by law for controlling or restricting land use within its jurisdiction.

**Subp. 10. Nighttime.** "Nighttime" means those hours from 10:00 p.m. to 7:00 a.m.

**Subp. 11. Person.** "Person" means any human being, any municipality or other governmental or political subdivision or other public department or agency, any public or private corporation, any partnership, firm, association, or other organization, any receiver, trustee, assignee, agency, legal entity, other than a court of law, or any legal representative of any of the foregoing, but does not include the agency.

**Subp. 12. Sound pressure level.** "Sound pressure level", in decibels, means 20 times the logarithm to the base 10 of the ratio of the pressure to the reference pressure. The reference pressure shall be 20 micronewtons per square meter.

### **7030.0030 NOISE CONTROL REQUIREMENT.**

No person may violate the standards established in part [7030.0040](#), unless exempted by Minnesota Statutes, section [116.07](#), subdivision 2a. Any municipality having authority to regulate land use shall take all reasonable measures within its jurisdiction to prevent the establishment of land use activities listed in noise area classification (NAC) 1, 2, or 3 in any location where the standards established in part [7030.0040](#) will be violated immediately upon establishment of the land use.

### **7030.0040 NOISE STANDARDS.**

**Subpart 1. Scope.** These standards describe the limiting levels of sound established on the basis of present knowledge for the preservation of public health and welfare. These standards are consistent with speech, sleep, annoyance, and hearing conservation requirements for receivers within areas grouped according to land activities by the noise area classification (NAC) system established in part [7030.0050](#). However, these standards do not, by themselves, identify the limiting levels of impulsive noise needed for the preservation of public health and welfare. Noise standards in subpart 2 apply to all sources.

#### **Subp. 2. Noise standards.**

Noise Area Classification	Daytime		Nighttime	
	L <sub>10</sub>	L <sub>50</sub>	L <sub>10</sub>	L <sub>50</sub>
1	65	60	55	50
2	70	65	70	65
3	80	75	80	75



## 7030.0050 NOISE AREA CLASSIFICATION.

**Subpart 1. Applicability.** The noise area classification is based on the land use activity at the location of the receiver and determines the noise standards applicable to that land use activity unless an exception is applied under subpart 3.

**Subp. 2. Noise area classifications.** The noise area classifications and the activities included in each classification are listed below:

Noise Area Classification	Land Use Activities	
1	Household Units (includes farm houses)	Transient lodging
	Group quarters	Mobile home parks or courts
	Residential hotels	Other residential
	Cultural activities and nature exhibitions	Medical and other health services
	Correctional institutions	Educational services
	Religious activities	Motion picture production
	Entertainment assembly	Resorts and group camps
	Camping and picnicking areas (designated)	Other cultural, entertainment, and recreational activities.
2	Railroad terminals (passenger)	Bus passenger terminals (intercity)
	Railroad terminals (passenger and freight)	Bus passenger terminals (local)
	Rapid rail transit and street railway passenger terminals	Bus passenger terminals (intercity and local)
	Other motor vehicle transportation	Marine terminals (passenger)
	Airport and flying field terminals (passenger)	Marine terminals (passenger and freight)
	Airport and flying field terminals (passenger and freight)	Automobile parking
	Telegraph message centers	Transportation services and arrangements
	Wholesale trade	Retail trade -- apparel and accessories
	Retail trade -- building materials, hardware, and farm equipment	Retail trade -- automotive, marine craft, aircraft, and accessories
	Retail trade -- general merchandise	Retail trade -- furniture, home furnishings, and equipment
	Retail trade -- food	Retail trade -- eating and drinking
	Other retail trade	Finance, insurance, and real estate services

	Personal services	Repair services
	Business services	Legal services
	Other professional services	Contract construction services
	Governmental services (except correctional institutions)	Miscellaneous services (except religious activities)
	Public assembly (except entertainment assembly and race tracks)	Amusements (except fairgrounds and amusement parks)
	Recreational activities (except designated camping and picnicking areas)	Parks.
3	Food and kindred products -- manufacturing	Textile mill products -- manufacturing
	Apparel and other finished products made from fabrics, leather, and similar materials -- manufacturing	Lumber and wood products (except furniture) -- manufacturing
	Furniture and fixtures -- manufacturing	Printing, publishing, and allied industries
	Paper and allied products -- manufacturing	Chemicals and allied products -- manufacturing
	Petroleum refining and related industries	Primary metal industries
	Rubber and miscellaneous plastic products -- manufacturing	Stone, clay, and glass products -- manufacturing
	Professional, scientific, and controlling instruments; photographic and optical goods; watches and clocks -- manufacturing	Railroad, rapid transit, and street railway transportation (except passenger terminals)
	Miscellaneous manufacturing (except motion picture production)	Fabricated metal products -- manufacturing
	Motor vehicle transportation (except passenger terminals)	Aircraft transportation (except passenger terminals)
	Marine craft transportation (except passenger and freight terminals)	Communication (except telegraph message centers)
	Highway and street right-of-way	Utilities
	Race tracks	
	Fairgrounds and amusement parks	Agricultural
	Agricultural and related activities	Fishing activities and related services
	Other transportation, communication, and utilities (except transportation services and arrangements)	Forestry activities and related services (including commercial forest land, timber production, and other related activities)
	All other activities not otherwise listed.	

4

---

Undeveloped and unused land area (excluding non-commercial forest development)	Non-commercial forest development
Water areas	Vacant floor area
Under construction	Other undeveloped land and water areas.

---

**Subp. 3. Exceptions.** The noise area classification for a land use may be changed in the following ways if the applicable conditions are met.

A. The daytime standards for noise area classification 1 shall be applied to noise area classification 1 during the nighttime if the land use activity does not include overnight lodging.

B. The standards for a building in a noise area classification 2 shall be applied to a building in a noise area classification 1 if the following conditions are met:

- (1) the building is constructed in such a way that the exterior to interior sound level attenuation is at least 30 dB(A);
- (2) the building has year-round climate control; and
- (3) the building has no areas or accommodations that are intended for outdoor activities

C. The standards for a building in a noise area classification 3 shall be applied to a building in a noise area classification 1 if the following conditions are met:

- (1) the building is constructed in such a way that the exterior to interior sound level attenuation is at least 40 dB(A);
- (2) the building has year-round climate control; and
- (3) the building has no areas or accommodations that are intended for outdoor activities.

D. The standards for a building in a noise area classification 3 shall be applied to a building in a noise area classification 2 if the following conditions are met:

- (1) the building is constructed in such a way that the exterior to interior sound level attenuation is at least 30 dB(A);
- (2) the building has year-round climate control; and
- (3) the building has no areas or accommodations that are intended for outdoor activities.

## **7030.0060 MEASUREMENT METHODOLOGY.**

**Subpart 1. Measurement location.** Measurement of sound must be made at or within the applicable NAC at the point of human activity which is nearest to the noise source. All measurements shall be made outdoors.

**Subp. 2. Equipment specifications.** All sound level measuring devices must meet Type O, I, II, or S specifications under American National Standards Institute S1.4-1983.

**Subp. 3. Calibration.** All sound level measuring devices must, at a minimum, be externally field calibrated before and after monitoring using a calibration device of known frequency and sound pressure level.

**Subp. 4. Measurement procedures.** The following procedures must be used to obtain representative sound level measurements:

A. Measurements must be made at least three feet off the ground or surface and away from natural or artificial structures which would prevent an accurate measurement.

B. Measurements must be made using the A-weighting and fast response characteristics of the sound measuring device as specified in American National Standards Institute S1.4-1983.

C. Measurements must not be made in sustained winds or in precipitation which results in a difference of less than ten decibels between the background noise level and the noise source being measured.

D. Measurements must be made using a microphone which is protected from ambient conditions which would prevent an accurate measurement.

**Subp. 5. Data documentation.** A summary sheet for all sound level measurements shall be completed and signed by the person making the measurements. At a minimum, the summary sheet shall include:

- A. Date
- B. Time
- C. Location
- D. Noise source
- E. Wind speed and direction
- F. Temperature
- G. Humidity
- H. Make, model, and serial number of measuring equipment
- I. Field calibration results
- J. Monitored levels
- K. Site sketch indicating noise source, measurement location, directions, distances, and obstructions.

## **7030.0070 SOUND ATTENUATION MEASUREMENT METHODOLOGY.**

**Subpart 1. Purpose.** Sound level measurements made for assessing sound attenuation as specified in part [7030.0050](#), subpart 3, item B, C, or D, shall be made according to the requirements of this part.

**Subp. 2. Equipment.** The equipment shall meet the requirements specified in part [7030.0060](#), subpart 2.

**Subp. 3. Calibration.** The equipment must meet the calibration requirements specified in part [7030.0060](#), subpart 3.

**Subp. 4. Measurement procedure.**

The measurement procedure described in FHWA-DP-45-1R, section 8 must be used for determination of the sound attenuation.

**Subp. 5. Equivalent methods.** Methods equivalent to those described in subpart 4 may be used provided they are approved by the commissioner of the Minnesota Pollution Control Agency. The commissioner shall approve an alternative method if the commissioner finds that the method will produce representative data and results which are as reliable as the methods specified in subpart 4.

### **7030.0080 VARIANCE.**

If, upon written application of the responsible person, the agency finds that by reason of exceptional circumstances strict conformity with any provisions of any noise rule would cause undue hardship, would be unreasonable, impractical, or not feasible under the circumstances, the agency may permit a variance upon the conditions and within the time limitations as it may prescribe for the prevention, control, or abatement of noise pollution in harmony with the intent of the state and any applicable federal laws.

### **7030.1000 DEFINITION.**

"Motor vehicle" means any self-propelled vehicle not operated exclusively upon railroad tracks and any vehicle propelled or drawn by a self-propelled vehicle and includes vehicles known as trackless trolleys which are propelled by electric power obtained from overhead trolley wires but not operated upon rails, except snowmobiles.

### **7030.1010 PROHIBITIONS.**

**Subpart 1. Operation of vehicle.** No person shall operate either a motor vehicle or combination of vehicles of a type subject to registration pursuant to Minnesota Statutes, chapter 168 at any time or under any condition of grade, load, acceleration, or deceleration in such a manner as to exceed the noise limits contained herein for the category of motor vehicle and speed limits specified, when tested with a measurement procedure approved by the commissioner.

**Subp. 2. Sale of vehicle.** No person shall sell or offer for sale a new motor vehicle or combination of vehicles of a type subject to registration pursuant to Minnesota Statutes, chapter 168 which when maintained according to the manufacturer's specifications would exceed the noise limits contained herein for the category of motor vehicle and speed limits specified, when tested with a measurement procedure approved by the commissioner.

**Subp. 3. Modification of vehicle.** No person shall modify a motor vehicle or combination of vehicles of a type subject to registration pursuant to Minnesota Statutes, chapter 168 in a manner which will amplify or increase the noise emitted by the vehicle, above the noise limits contained herein for the category of motor vehicle and speed limits specified, when tested with a measurement procedure approved by the commissioner. No person shall operate a motor vehicle so modified.

**Subp. 4. Sale of parts.** No person shall sell or offer for sale replacement or additional parts for a motor vehicle or combination of vehicles of a type subject to registration pursuant to Minnesota Statutes, chapter 168 which when installed in the vehicle will amplify or increase the noise emitted by the vehicle, above the noise limits

contained herein for the category of motor vehicle and speed limits specified, when tested with a measurement procedure approved by the commissioner. No person shall operate a motor vehicle incorporating such parts.

### **7030.1020 SCOPE.**

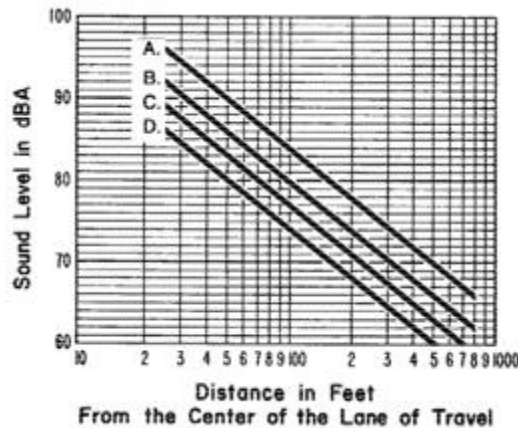
This chapter applies to the total noise from a vehicle or combination of vehicles of a type subject to registration pursuant to Minnesota Statutes, chapter 168 and shall not be construed as limiting or precluding the enforcement of any other provision of law relating to motor vehicle exhaust noise.

### **7030.1030 EXCEPTIONS.**

Vehicles under parts [7030.1050](#) and [7030.1060](#) are allowed to exceed the noise limits contained herein when performing acceleration maneuvers for safety purposes.

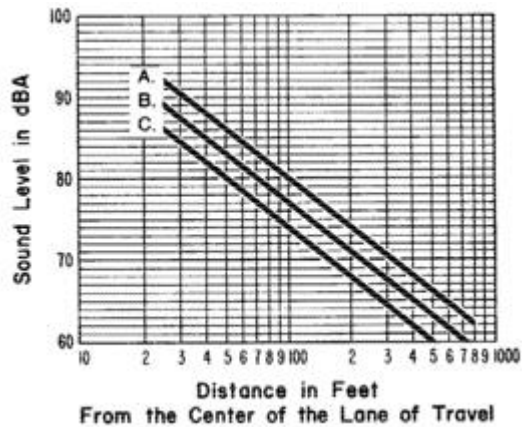
### **7030.1040 NOISE LIMIT FOR VEHICLES OVER 10,000 POUNDS.**

Motor vehicle noise limits for vehicles with a manufacturer's gross vehicle weight rating of more than 10,000 pounds and any combination of vehicles towed by such motor vehicle.



- A. Speed limits greater than 35 mph.
- B. Speed limits equal to or less than 35 mph and stationary run-up tests (for vehicles with governed engines). For stationary run-up tests on all-paved surfaces, add 2 dBA.
- C. Speed limits equal to or less than 35 mph and stationary run-up tests (for vehicles with governed engines), for vehicles manufactured on or after January 1, 1978. For stationary run-up tests on all-paved surfaces, add 2 dBA.
- D. Speed limits equal to or less than 35 mph and stationary run-up tests (for vehicles with governed engines), for vehicles manufactured on or after January 1, 1982. For stationary run-up tests on all-paved surfaces, add 2 dBA.

## 7030.1050 MOTOR VEHICLE NOISE LIMITS FOR MOTORCYCLES.



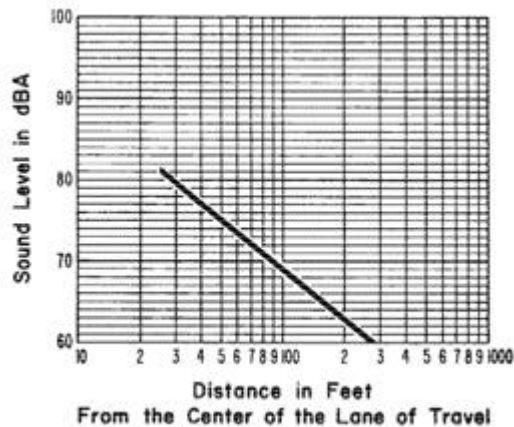
A. For vehicles manufactured before January 1, 1975.

B. Speed limits greater than 35 mph for vehicles manufactured on or after January 1, 1975.

C. Speed limits equal to or less than 35 mph for vehicles manufactured on or after January 1, 1975.

## 7030.1060 NOISE LIMITS FOR OTHER VEHICLES.

Motor vehicle noise limits for any other motor vehicle not included under parts [7030.1040](#) and [7030.1050](#) and any combination of vehicles towed by such motor vehicle.



## Minn. Stat. § 86B WATERCRAFT OPERATION

### 86B.321 NOISE LIMITS.

Subdivision 1. **Operation in excess of noise limits prohibited.** A person may not operate a motorboat under any condition of load, acceleration, or deceleration in a manner that exceeds the noise limits contained in subdivision 2.

**Subd. 2. Noise limits.** (a) The noise limits for the total noise from the marine engine or motorboat may not exceed:

(1) for marine engines or motorboats manufactured before January 1, 1982, a noise level of 84 decibels on the A scale measured at a distance of 50 feet from the motorboat or equivalent noise levels at other distances as specified by the commissioner in a pass-by test or 86 decibels on the A scale measured at idle in a stationary test at least four feet above the water and at least four feet behind the transom of the motorboat being tested; and

(2) for marine engines or motorboats manufactured on or after January 1, 1982, a noise level of 82 decibels on the A scale measured at a distance of 50 feet from the motorboat or equivalent noise levels at other distances as specified by the commissioner in a pass-by test or 84 decibels on the A scale measured at idle in a stationary test at least four feet above the water and at least four feet behind the transom of the motorboat being tested.

(b) The noise limits in paragraph (a) do not preclude enforcement of other laws relating to motorboat noise. The officer or deputy doing the testing shall determine which test or tests shall be used. Failure to pass either the pass-by or stationary idle test is a violation of this section.

(c) Equivalent noise levels under paragraph (a) shall be specified by the commissioner by written order and published in the State Register. The noise level determinations are exempt from the rulemaking provisions of chapter 14 and section [14.386](#) does not apply.

**Subd. 3. Applicability.** The provisions of this section do not apply to motorboats operating under a permit issued under section [86B.121](#) or a United States Coast Guard marine event permit in a regatta or race while on trial runs or while on official trials for speed records during the time and in the designated area authorized by the permit.

## **86B.521 MOTORBOAT NOISE CONTROL.**

**Subdivision. 1. Exhaust muffling system required.** A motor may not be used on a motorboat unless it is equipped with an efficient muffler, underwater exhaust, or other device that adequately muffles or suppresses the sound of the exhaust of the motor so as to prevent excessive or unusual noise. A motor may not be equipped with an altered muffler, muffler cutout, muffler bypass, or any other device designed or installed so that it can be used to continually or intermittently bypass any muffler or muffler system installed in the motorboat or to reduce or eliminate the effectiveness of such a muffler or muffler system.

**Subd. 2. Sale of motor that exceeds noise limits prohibited.** A person may not sell or offer for sale a marine engine or motorboat that would exceed the noise limits contained in section [86B.321, subdivision 2](#), under a test procedure approved by the commissioner if the motor is maintained according to the manufacturer's specifications.



Subd. 3. **Modification of engine to exceed noise limits prohibited.** (a) A person may not modify a marine engine or motorboat in a manner that will amplify or increase the noise emitted by the marine engine or motorboat above the noise limits contained in section [86B.321, subdivision 2](#), under a test procedure approved by the commissioner.

(b) A person may not operate a motorboat with an engine modified to increase noise above the noise limits.

Subd. 4. **Sale of parts that cause excessive noise prohibited.** (a) A person may not sell or offer for sale replacement or additional parts for a marine engine or motorboat which when installed in the marine engine or motorboat will amplify or increase the noise emitted by the marine engine or motorboat above the noise limits contained in section [86B.321, subdivision 2](#), under a test procedure approved by the commissioner.

(b) A person may not operate a motorboat incorporating parts prohibited to be sold under paragraph (a).

Subd. 5. **Applicability.** The provisions of this section do not apply to motorboats operating under a permit issued under section [86B.121](#) or a United States Coast Guard marine event permit in a regatta, or race, while on trial runs, or while on official trials for speed records during the time and in the designated area authorized by the permit.

Subd. 6. **Rulemaking exemption.** The test procedures under subdivisions 2, 3, and 4 shall be established by written order by the commissioner and published in the State Register. The establishment of test procedures is exempt from the rulemaking provisions of chapter 14 and section [14.386](#) does not apply.

## **Minn. Stat. § 84.8 SNOWMOBILES**

### **84.871 EQUIPMENT REQUIREMENTS.**

Subdivision. 1. **Mufflers.** Except as provided in this section, every snowmobile shall be equipped at all times with a muffler in good working order which blends the exhaust noise into the overall snowmobile noise and is in constant operation to prevent excessive or unusual noise. The exhaust system shall not emit or produce a sharp popping or crackling sound. This section does not apply to organized races or similar competitive events held on (1) private lands, with the permission of the owner, lessee, or custodian of the land; (2) public lands and water under the jurisdiction of the commissioner of natural resources, with the commissioner's permission; or (3) other public lands, with the consent of the public agency owning the land. No person shall have for sale, sell, or offer for sale on any new snowmobile any muffler that fails to comply with the specifications required by the rules of the commissioner after the effective date of the rules.

## **6100.5700 REQUIRED EQUIPMENT.**

### **Subp. 5. Mufflers.** Mufflers:

A. No person shall operate a snowmobile unless it is equipped with a muffler as required by law and these rules, except that snowmobiles may be operated in organized events as authorized by Minnesota Statutes, section [84.871](#), without such a muffler.

B. No snowmobile manufactured on or after June 30, 1970, and before February 1, 1972, for sale in Minnesota, except snowmobiles designed for competition purposes only, shall be sold, or offered for sale, unless it is equipped with a muffler that limits engine noise to not more than 86 decibels on the A scale at 50 feet.

C. No snowmobile manufactured on or after February 1, 1972, for sale in Minnesota, except snowmobiles designed for competition purposes only, shall be sold, or offered for sale, unless it is equipped with a muffler that limits engine noise to not more than 82 decibels on the A scale at 50 feet.

D. No snowmobile manufactured on or after April 1, 1975, except a snowmobile designed for competition purposes only, shall be sold, offered for sale, or operated in Minnesota unless it is so equipped and has been certified by the manufacturer to conform to a sound level limitation of not more than 78 decibels on the A scale at 50 feet as originally equipped.

E. In certifying that a new snowmobile complies with the noise limitation requirements of this rule, a manufacturer shall make such a certification based on measurements made in accordance with the SAE Recommended Practice J192(a), as set forth in the Report of the Vehicle Sound Level Committee, as approved by the Society of Automotive Engineers September 1970 and revised November 1973.

F. No snowmobile shall be sold or offered for sale in Minnesota unless its maker has previously furnished the commissioner with a certificate of compliance certifying that all snowmobiles made by that maker meet or exceed the applicable noise level restrictions established by these rules. The certification of compliance shall be in the form of a "Snowmobile Safety Certification Committee" label conspicuously attached to the machine showing certification by the Snowmobile Safety and Certification Committee, Inc., or a label showing compliance with Snowmobile Safety Certification Committee standards accompanied by a letter containing test results of an evaluation of noise levels by a competent independent testing laboratory. Snowmobiles intended for competition purposes only shall be exempt from this part provided a separate placard identifying that such snowmobile is not so equipped is conspicuously and permanently affixed thereto.

G. Except for organized events as authorized by Minnesota Statutes, section [84.871](#), no snowmobile shall be modified by any person in any manner that shall amplify or otherwise increase total noise level above that emitted by the snowmobile as originally equipped, regardless of date of manufacture.

## **Minn. Stat. § 87A. SHOOTING RANGES**

### **87A.05 NOISE STANDARDS.**

Allowable noise levels for the operation of a shooting range are the levels determined by replacing the steady state noise  $L_{10}$  and  $L_{50}$  state standards for each period of time within each noise area's classification with a single  $Leq(h)$  standard for impulsive noise that is two dBA lower than that of the  $L_{10}$  level for steady state noise. The noise level shall be measured outside of the range property at the location of the receiver's activity according to Minnesota Rules, parts 7030.0010 to 7030.0080, as in effect on May 28, 2005. For purposes of this section, " $Leq(h)$ " means the energy level that is equivalent to a steady state level that contains the same amount of sound energy as the time varying sound level for a 60-minute time period.

## **Minn. Rules § 6102, RECREATIONAL VEHICLES**

### **6102.0002 DEFINITIONS.**

**Subpart 1. Scope.** For the purposes of parts [6102.0002](#) to [6102.0080](#), the terms defined in this part have the meanings given them.

**Subp. 2. ATV.** "ATV" means an all-terrain vehicle.

**Subp. 3. Commissioner.** "Commissioner" means the commissioner of Natural Resources.

**Subp. 4. Department.** "Department" means the Department of Natural Resources.

**Subp. 5. OHM.** "OHM" means an off-highway motorcycle.

**Subp. 6. ORV.** "ORV" means an off-road vehicle.

**Subp. 7. Vehicle.** "Vehicle" means an OHM, ORV, or ATV.

### **6102.0040 REQUIRED EQUIPMENT.**

#### **Subp. 4. Mufflers.**

A. No person shall operate a vehicle unless it is equipped with a muffler having a spark arrestor approved by the United States Forest Service as described by Code of Federal Regulations, title 36, chapter II, section 261.52, paragraph (j).

B. Vehicles shall not be sold, offered for sale, or operated in this state unless equipped so that overall noise emission does not exceed a sound level limitation of not more than 99 decibels on the A scale from a distance of 20 inches using test procedures and instrumentation as set forth in the Society of Automotive Engineers' Standard, SAE J1287, June 1988, or, if different procedures or instrumentation are used, a noise level equivalent to that level.

C. No noise suppressing system or muffler shall be equipped with a cutout, bypass, or similar device and no person shall modify or alter that system or its operation in any manner which will amplify or increase the noise emitted by the vehicle's motor to exceed the noise limits established in this subpart, except for organized events as authorized by Minnesota Statutes, sections [84.795](#), subdivision 7; [84.804](#), subdivision 5; and [84.928](#), subdivision 5.