



# ***“WHAT DID YOU SAY?”***

**HOW TO PREVENT NOISE INDUCED HEARING LOSS IN AGRICULTURE**

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# INTRODUCTION TO PREVENTING NOISE INDUCED HEARING LOSS IN AGRICULTURE

Farming can be noisy, whether you are operating machinery like a tractor or combine, working in a livestock barn or near a grain auger, consider the effects all of these noises can have on your hearing. Protect your hearing and prevent noise induced hearing loss, which is 100% preventable!

Protecting your hearing means recognizing hazardous noise exposures in your work environment, avoiding or reducing your exposure and using appropriate hearing protection.

Once you lose your hearing it's gone. Hearing aids can help, but they can't replace your hearing. Without your hearing, you yourself, can actually become a hazard. People with hearing loss are less aware of their surroundings and can contribute to an incident if they fail to hear warnings. Hearing loss affects not only farm productivity, but also the social and personal lives of farm families.

Use this resource to better understand how hearing works, learn how loud noises really are, and review some of the ways to protect your hearing!



**IT'S NOT ALWAYS QUIET ON THE FARM, PROTECT YOUR FAMILY FROM FARM NOISE!**

## ***Why is it important for farmers and agricultural workers to be concerned about hearing?***

- Hearing loss from exposure to noise is common among farmers and agricultural workers
- Hearing loss from noise is PERMANENT and IRREVERSIBLE, but.... 100% PREVENTABLE

# What is Noise Induced Hearing Loss (NIHL) ?



Continuous exposure to harmful levels of noise over extended periods of time without proper hearing protection can result in NOISE INDUCED HEARING LOSS.

- Noise Induced Hearing Loss can occur at **any** age
- Noise Induced Hearing Loss is **100% preventable**

## NIHL Is:

- Painless
- Permanent
- Progressive
- PREVENTABLE

Studies show that farmers and farm workers experience higher rates of hearing loss than the rest of the population. In fact the prevalence of hearing loss in adult farmers is almost **double** that of non-farmers.

Farmers are exposed to loud noises from a variety of sources including machinery (tractors, combines, etc.), chain saws, power tools, ventilation fans, livestock (eg. squealing pigs), and more.

**NIHL is PERMANENT  
and  
100% PREVENTABLE**

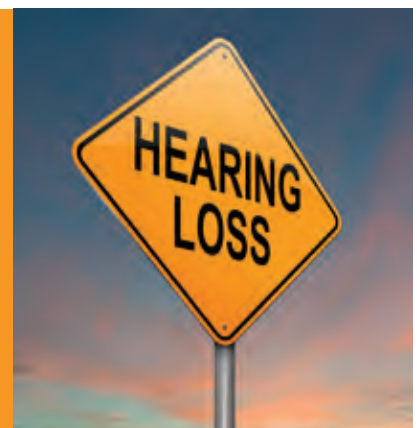
**Sounds that are too loud for too long can  
damage your hearing permanently!**

*Louder the noise = Faster the damage to your hearing*

*Not as loud noise = Hearing damage that builds slowly*

## What are the signs of NIHL?

- When noise stops, sound may seem muffled or distorted
- People may seem to mumble or their words run together
- Speech cannot be distinguished from background noise
- Your ears may ring
- You may find it hard to hear high-pitched sounds
- People tell you to turn down the radio or TV
- You have to turn up your phone, TV or radio at the end of the workday to hear it more clearly
- You may have a vague feeling of pressure or fullness in your ears

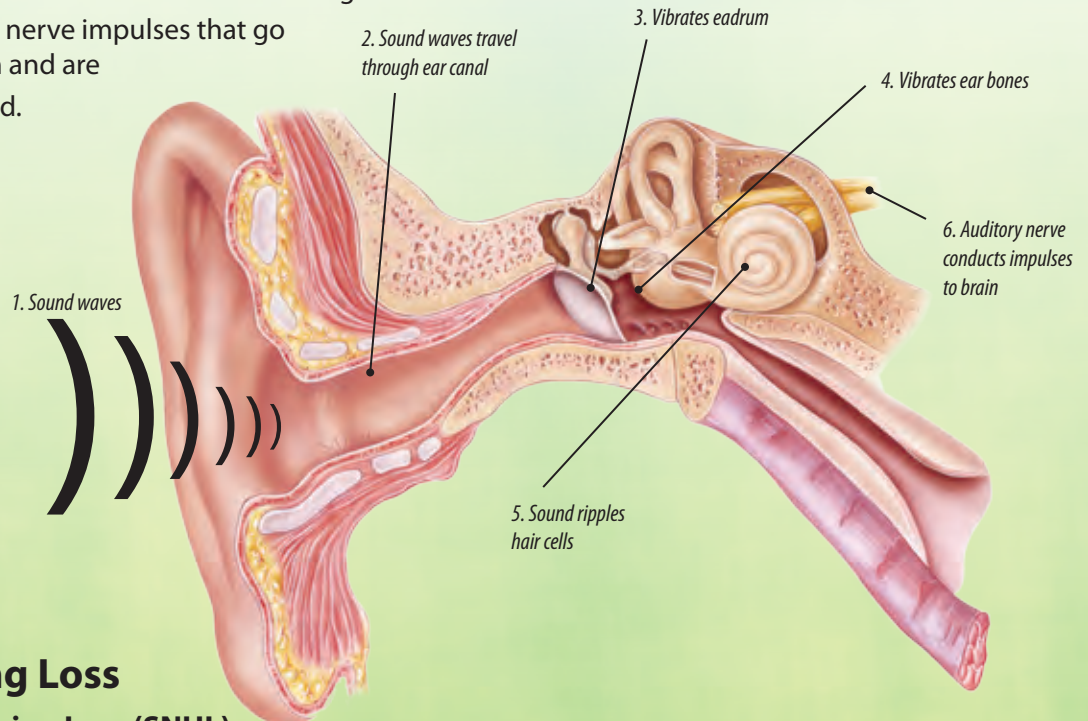


**Remember:** the effects of exposure to loud sounds add up over a lifetime. Damage from noise exposure is usually gradual, you might not notice it, or may ignore the signs of NIHL until they become more serious.



# HOW DO YOU HEAR?

1. Sound sends vibrations or sound waves through the air.
2. Sound waves are funneled through the ear opening, down the ear canal and strike your eardrum, causing it to vibrate.
3. The vibrations are passed to the small bones of the middle ear
4. Ear bones transmit vibrations to hair-like hearing cells in the inner ear.
5. Vibrations turn into nerve impulses that go directly to the brain and are interpreted as sound.



## Types of Hearing Loss

### Sensory/ Neural Hearing Loss (SNHL)

SNHL occurs when there is damage to the inner ear, or to the nerve pathways between the ear (cochlea and the brain). This is the most common type of permanent hearing loss. Most of the time, SNHL cannot be medically or surgically corrected.

### Conductive Hearing Loss

Conductive hearing loss occurs when sound is not conducted efficiently through the outer ear canal, to the eardrum and to the tiny bones (ossicles) of the middle ear. Conductive hearing loss is often medically or surgically treatable.

### Causes of Hearing Loss

A combination of factors typically contribute to hearing loss.

**Presbycusis** – Occurs as a result of the aging process or extended exposure to environmental noise factors throughout a lifetime

- Permanent change in inner ear

**Sociocusis** – Noise induced

- Damage to hair cells and cochlea
- Occurs suddenly or gradually
- Includes 26 million North Americans

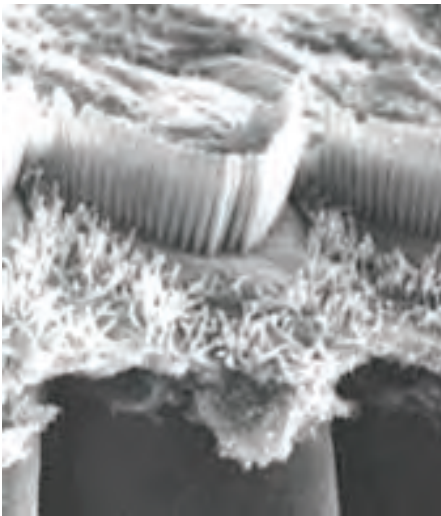
**Congenital** – Genetic, results from a family history of hearing loss or predisposition

**Ototoxicity** – Drug-related

- There are many known ototoxic (toxic to the ear) prescription and over-the-counter medications on the market, such as Aspirin, Quinine, certain antibiotics, some anticancer drugs and some anesthetics

*Noise Induced Hearing Loss is **PERMANENT**, but also **PREVENTABLE!***

# HOW DOES HEARING DAMAGE OCCUR?



Hearing Cells

Our ears have about 40,000 hair-like hearing cells that help us hear. If you are exposed to a lot of noise (eg. driving a tractor all day) or a really sudden loud noise (eg. a gunshot), then your hearing cells become damaged. Resting your ears by getting away from the noise may give your hearing cells a chance to regenerate and heal. However, if you are constantly exposing yourself to a lot of noise day after day your hearing cells do not have a chance to heal. They eventually will not recover and your hearing cells will die resulting in hearing loss.



Hearing Cells



Your hearing cells can be compared to grass when it is walked on. If you walk on grass a little, it will bounce back after a while and recover. However, if you are continually walking on the grass it will eventually die.



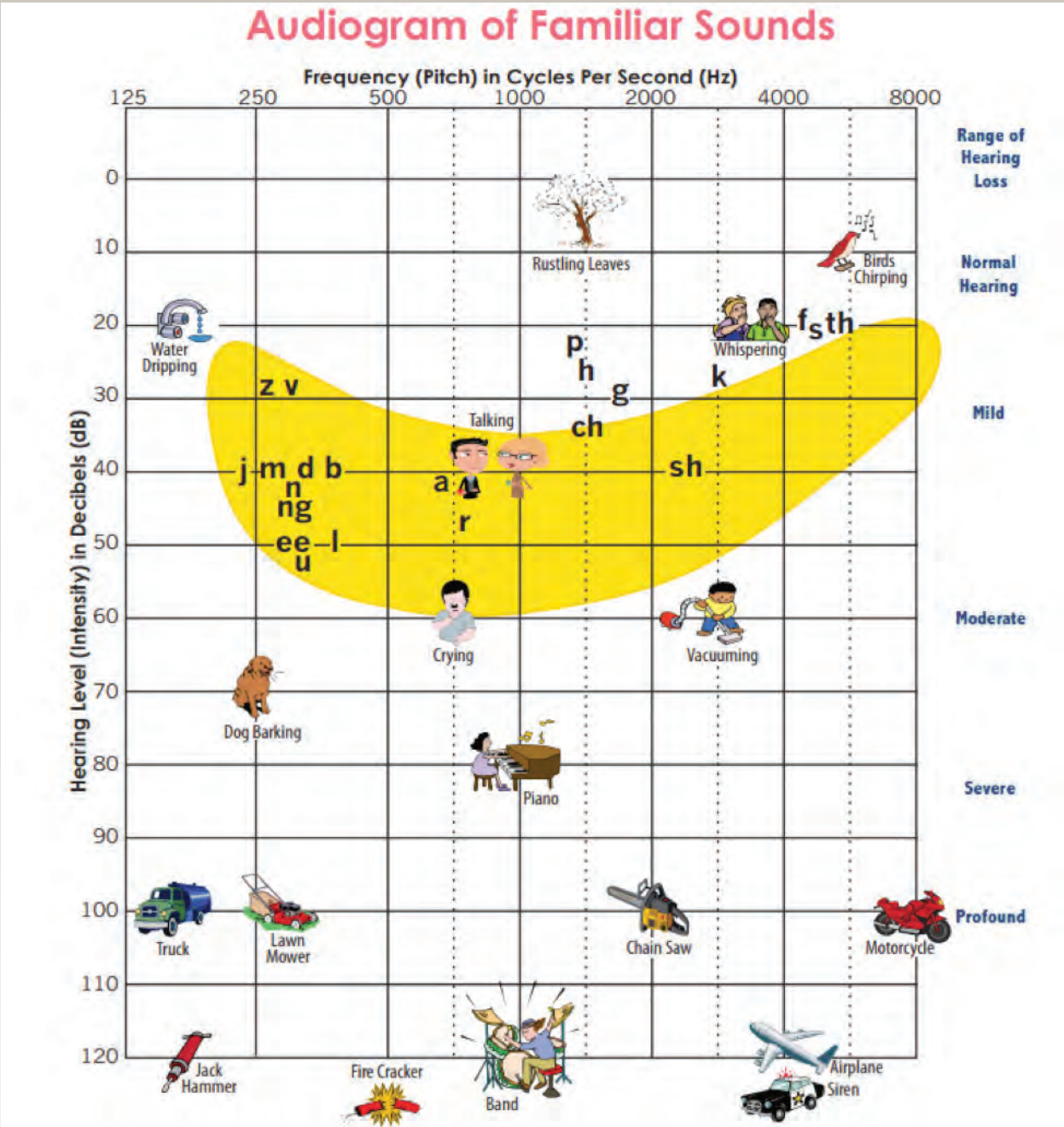
As exposure time to a lot of noise or sudden loud noises continues, more and more hearing cells are damaged and destroyed. This hazardous noise adds up over time and your hearing decreases as the number of damaged and destroyed hearing cells increases. Dead hearing cells cannot be restored. The damage is **PERMANENT** and results in **NOISE INDUCED HEARING LOSS**.

*Noise Induced Hearing Loss (NIHL) is the most common permanent and preventable occupational injury in the world. – WHO*





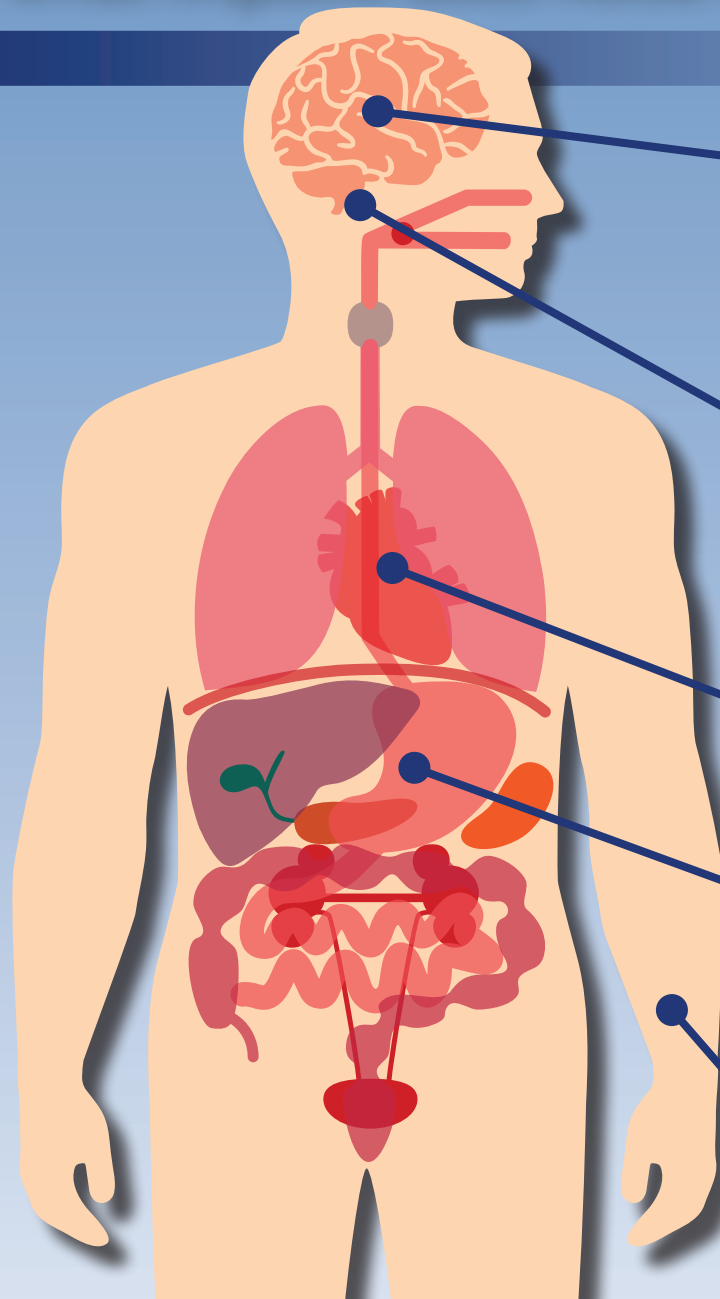
# Speech Banana: Visualizing Familiar Sounds



The speech banana is an aptly named graph that shows a banana-shaped range on an audiogram that covers the frequencies and decibels that are needed to understand speech. This helpful diagram provides a visual aid for understanding different sounds and can help identify sounds you can no longer hear.

*You do not get used to noise. If you think that you have grown used to noise, it has probably damaged your hearing.*

# What impacts does noise have on your health?



## Psychological

- Increased stress
- Irritability or “edginess”
- Sleep disturbances, tiredness
- Loss of concentration

## Hearing

- Ringing or buzzing noises in head or ears
- Temporary hearing loss
- Permanent hearing loss
- Difficulty communicating with others

## Heart

- Increased heart rate & blood pressure

## GI

- Digestion problems and reduced gastric activity

## Work Impacts

- Distraction from task resulting in more errors
- Decrease in work efficiency & productivity
- Increased risk of accident or injury

Hearing loss affects the productivity of farm operations, is expensive and is linked to increased rates of injury. Every decibel of hearing loss increases a worker’s risk of hospitalization for a work-related injury by 1%.

- ↓ Reduce noise
- ↓ Reduce fatigue
- ↓ Reduce mishaps & injury

=

- ↑ Increase your wellbeing
- ↑ Increase productivity

**Your hearing health contributes to your overall well-being and quality of life!**



## How is sound measured?

Loudness or intensity of sound is measured in decibels (dB)

**Take home message:** If you need to raise your voice to be heard by someone 1 meter (3 feet) away from you then noise levels are potentially harmful and **hearing protection is needed.**

## How loud is too loud?

The higher the noise level the shorter the exposure time required before damage to hearing can occur. Sustained exposure to sounds over 85 dB can produce hearing loss without noticeable pain or discomfort. Consider wearing hearing protection when noise levels are at 85 dB.

**Hearing Damage Formula**  
**Damage = Noise Level X Exposure Time**

## What is the maximum daily noise exposure limit?

With an increase of just 3 dB the maximum daily exposure time halves!

Noise Level (dB)	Maximum Daily Exposure Time (hours)
85	8
88 +3	4 ÷ 2
91	2
94	1
97	.5
100	.25
> 100	0

Hearing protection required at 85 dB!

The risk for hearing damage starts getting significant at **85 dB**, with each increase of **3 dB**, the "safe time" is cut in **half**. However, many guidelines suggest considering taking steps to reduce noise exposure even before that, between 80-85 dB.

160 dB	Instant damage
120 dB	Pain threshold
85 -120 dB	Action level – hearing protection advised
60 dB	Comfortable level of noise



*A decreased ability to hear means we lose one of our most important warning devices.*

# Tractor Noise Facts



## Did you know...

- By having the radio on in the cab of a tractor it increases the noise level by 3-5 dB
- Cabs can reduce noise levels by 16 dB, but this is halved to 8 dB if the door is open
- Older tractor cabs tend to be 6 dB louder than newer tractor cabs
- The amount of noise changes based on where you are and what you are doing.

For example consider the following tractor:

John Deere 8520 16 Speed Tractor — sound level with cab - Front wheel drive disengaged	dB
No load — 8th Gear	73.8
Transport speed — no load — 16th gear	77.8
Bystander in 16th gear	86.9

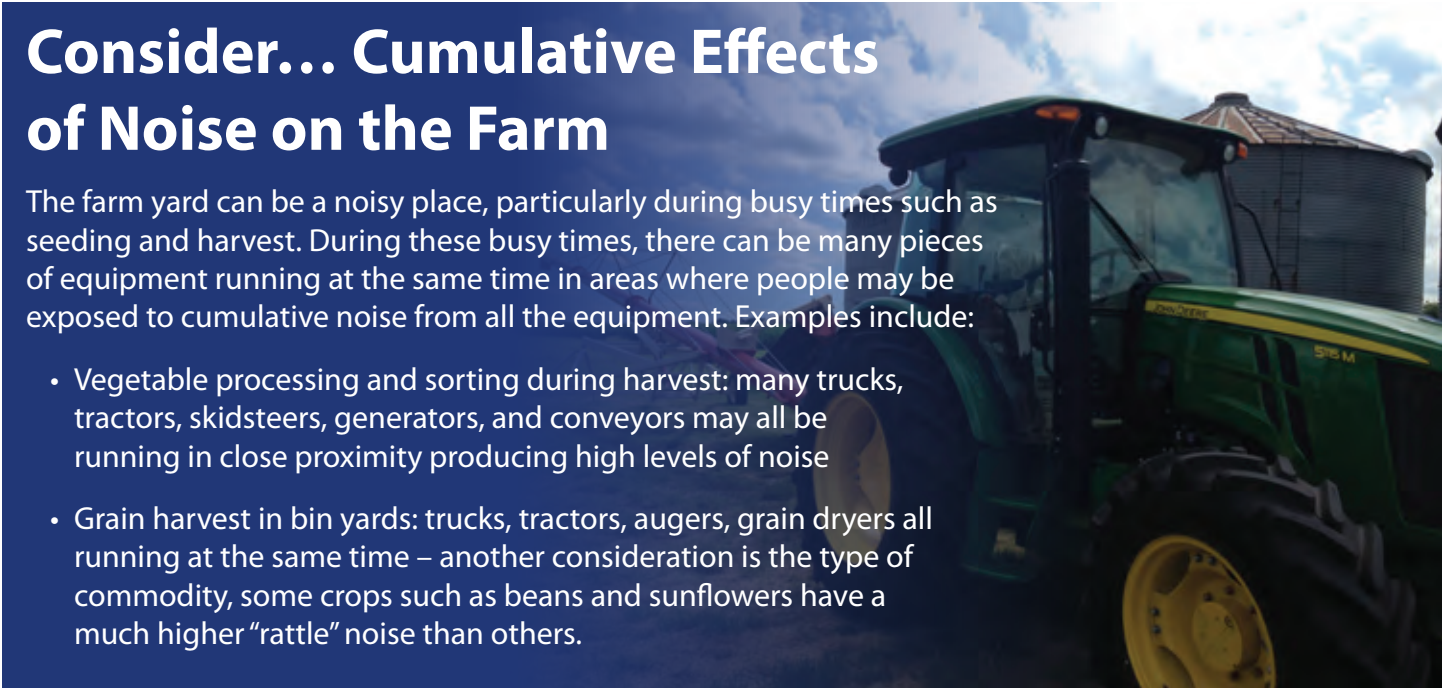
*Hearing loss often goes undetected because it is gradual and painless.*

**Key message:** If you have to **SHOUT** to be understood over background noise when standing one arm-length away from someone, then that background noise is hazardous!

## Consider... Cumulative Effects of Noise on the Farm

The farm yard can be a noisy place, particularly during busy times such as seeding and harvest. During these busy times, there can be many pieces of equipment running at the same time in areas where people may be exposed to cumulative noise from all the equipment. Examples include:

- Vegetable processing and sorting during harvest: many trucks, tractors, skidsteers, generators, and conveyors may all be running in close proximity producing high levels of noise
- Grain harvest in bin yards: trucks, tractors, augers, grain dryers all running at the same time – another consideration is the type of commodity, some crops such as beans and sunflowers have a much higher “rattle” noise than others.





# Sources of Noise in Agriculture and dB Levels

Tractors	dB
<b>&lt; 50 HP</b>	
John Deere 4520	86
Massey Ferguson 263	92
Case IH 685	97
NH WorkMaster 50	89
Kubota M5700DT	92
John Deere 2155	95
Massey Ferguson 360	95
Bobcat CT450	89
<b>&lt; 75 HP</b>	
Massey Ferguson 399	81
Case IH DX 48	92
NH WorkMaster 70	93
John Deere 5055DE	92
<b>100 HP</b>	
AGCO Allis 8610	78
Kubota M120DT	79
Massey Ferguson 3140	76
John Deere 4255	78
John Deere 5115M	75
<b>150+ HP</b>	
Case 2470	83
Case 2394	76
Case IH 2094	77
Case 7120	73
John Deere 6170R	74
John Deere 7200R	70
John Deere 8560	77
Versatile 876	84
New Holland T7.210	67
<b>300+ HP</b>	
NH TJ 325	72
Case IH Optimum 300	68
John Deere 9360R	72
John Deere 9200	73
John Deere 8690	80
Versatile 936	80

Equipment (based on published estimates, specific levels may vary). Equipment with no dB value listed has no published dB levels currently available.

<b>400+ HP</b>	
NH T9050	74
NH T9.670	75
Case IH Steiger 420	74
Case IH STX 440	78
John Deere 9400T	76
John Deere 9520	77
John Deere 9560R	75
John Deere 9620T	74
Versatile 400	72
<b>Swathers (from operator's seat) 81-91 dB</b>	
John Deere W150	
MF Hesston 9230	
International 4000	91
New Holland H8060	
Massey Ferguson 220	
Massey Ferguson 885	87
New Holland 1100	89
MF Hesston 6400	91
Versatile 400	90
<b>High Clearance Sprayers 71-116 dB</b>	
Apache	71
John Deere R4045	79
Rogator 874	
Spra Coupe 7660	
Case IH 3340	
Orchard Sprayer	85-100
Crop Dusting Air Craft	83-116
<b>Augers 89-102+ dB</b>	
Bergen 8x41 14 HP engine	102
Coop 7x41 12 HP engine	98
Westfield 707-36 12 HP engine	102
20 HP engine	>105
40 HP engine	>105

# Sources of Noise in Agriculture and dB Levels

<b>Combines (from operator's seat) dB</b>	
Roller Mills	87
Crusher Mills	95
Grain Grinding	93-97
Hammermill	94
Grain Dryers	96 dB
Adams	107
Cascade Grain Drier	93
Drymore Redbird	90
Moridge 8440	102
Superb 5500C	85
Vertec VT 5600 R	69
<b>Balers dB</b>	
JD 4240 Running Baler	75
Vermeer 605F Round Baler	90
<b>Feed Processors dB</b>	
Roller Mills	87
Crusher Mills	60-85
Grain grinding	95
Hammermill	93-97
<b>Grain Dryers 81-102 dB</b>	
Adams	107
Cascade Grain Drier	93
Drymore Redbird	90
Moridge 8440	102
Superb 5500C	85
Vertec VT 5600 R	69
<b>Aeration Fans (2ft from motor) 60-85+</b>	
Caldwell 1LC 24-312	60-85
CECO 24501	85+
Farm Fan 114SHG	60-85
Flaman FCJ 24-5-1	85+
Keho 15000	60-85
Westeel WVA 247-1	85+

<b>All generators described are single cylinder, overhead valve, air cooled and at rate loaded.</b>	
<b>Generators dB</b>	
6.5 HP	68
8 HP	71
11 HB	72
13 HP	75
20 HP	80
<b>Ventilation Fans dB</b>	
Agrifan 20"	60-85
Chore Time 18RLX	77
Danor Pleasantaie SD 24-FVX	74
Del Air F6	66
Hurst BF-12	73
Koenders KS18	75
Siemens 2CC2-506	73
<b>Tools dB</b>	
Air Compressor	77-95
Angle Grinder	96-100
Band Saw	88-94
Shop Vac	95
Circular Saw	96-104
Hammer Drill	114
Hand Drill	98
Impact Wrench	103
Jackhammer	101-120
Pneumatic Drill	110-119
Power Saw	100
Log Splitter	82-102
<b>Pressure Washers dB</b>	
Gas	85+
Electric	102
<b>Other Equipment dB</b>	
ATV	90
Bobcat	85-88
Brush Cutter	80-92
Road Grader	76-88
Snowmobile	120
Utility Trucks/Vehicles	69-82



# Sources of Noise in Agriculture and dB Levels

Firearms	dB
12 Gauge Shot Gun	135-139
22 Gauge Shot Gun	108-113
38 Special Handgun	135-140
270 Winchester High Power Rifle	141
Yard Equipment	dB
Rotary mower	89
Wood chipper	101-120
Chain saw	91-120
<i>Idle</i>	90-96
<i>Operating</i>	94-116
Trimmer	
<i>Huskavarna 324 Lx</i>	90-97
<i>Kawasaki</i>	90-93
Leaf Blower	106-115
Push lawnmower	85-90
Riding lawnmower	95-100
Rototiller	95-100
Personal Music Device	dB
iPhone at max volume	100-110
Samsung at max volume	100-107
Average volume	94
<p>The dB level when listening to music on your phone also depends on the type of headphones you use.</p>	

Dairy	80 dB
Vacuum pump	73
Rotary milking parlor	73
Tandem milking parlor	61
Herringbone milking parlor	71
Swine	dB
Breeding barn	94
Moving pigs	79-89
At feeding	121-133
Processing piglets	86-96
Gestation barn	92
Pig squels	85-115
Poultry	dB
Poultry barn	105
Turkey housing	94
Turkey dry pluckers	99
Sheep	dB
Feeding	70-91
Shearing shed	75-80
Commercial Fishing	dB
Deck	88-100
Wheelhouse	80-90
Winch	90-100
Forestry	dB
Chokerman	82
Log truck driver	85
Feller buncher operator	94
Manual faller	103
Landingman	109
Vegetable Packing/Shed Operations	dB
Vegetable Cleaners	104
Vegetable Harvester	88
Grader / Sorter	88
General operating area	91
Potato lifter	88-93
Sugar beet harvesting	91

# How Loud is Too Loud on the Farm?

Farm Equipment	Noise Level (dB)	Max Time without Hearing Protection*
<b>*HEARING PROTECTION IS RECOMMENDED AT 85 DB</b>		
ATV Push Mower	90 dB	2.5 HRS
Tractor/ Combine with Cab Grain Auger	92 dB	1.5 HRS
Air Compressor Shop Vac	95 dB	47 MIN
Pigs Squealing Irrigation Pump	100 dB	15 MIN
Riding Mower Pressure Washer	102 dB	9 MIN
Tractor (No Cab) Grain Dryer	105 dB	4 MIN
Leaf Blower	110 dB	1-2 MIN
Chain Saw	115 dB	< 1 MIN

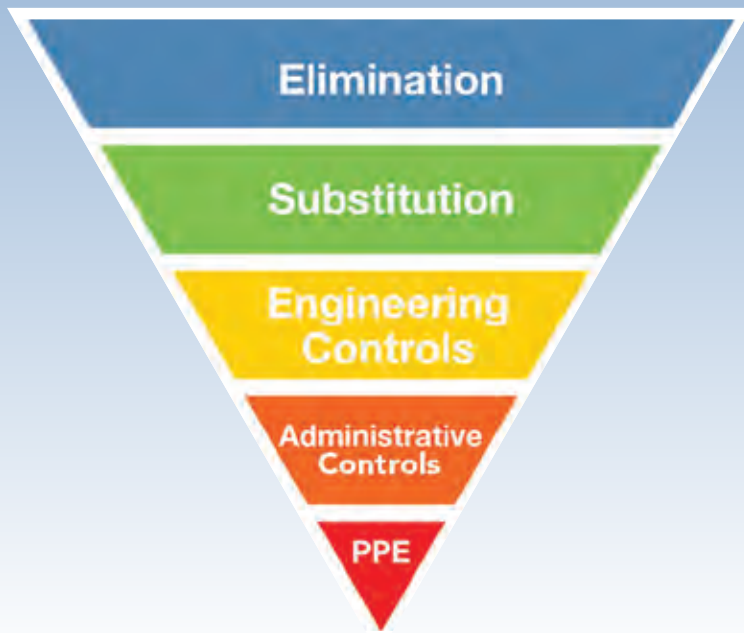
AS NOISE LEVEL ↓ TIME OF SAFE EXPOSURE ↓



# HOW DO I REDUCE NOISE EXPOSURE?

## A Noise Reduction Plan

The Hierarchy of Control can be used to address different hazardous exposures to noise on your farm. Most farm machinery is noisy. The louder the noise, the less time you can be exposed before your hearing is damaged. Utilize the below actions to reduce your noise exposure levels.



**Elimination** – Physically remove hazard; most effective way to protect yourself and others

**Substitution** – Replace the hazard

**Engineering Controls** – Isolate the hazard or people from the hazard

**Administrative Controls** – Change the way you work

**Personal Protective Equipment** – protect yourself with PPE

	REDUCE NOISE LEVELS	ISOLATE NOISE	ADMINISTRATIVE CONTROLS	PERSONAL PROTECTIVE EQUIPMENT
<b>PREVENTION STRATEGIES</b>	Replace and lubricate equipment	Choose tractors and other machinery with cabs	Rotate jobs so exposure time to loud noises is reduced	Use earplugs, or muffs when around any noise 85 dB or greater
	Repair worn, loose or unbalanced machinery			
	Operate machinery at low speeds	Make sure doors and windows fit tightly and are closed	Take breaks from noisy operations	Ensure correct fit of hearing protection
	Reduce and isolate vibration – make sure vibrating parts are mounted on structurally rigid part of machine	Choose farm implements with sound dampening and absorbing features; noise barriers	Limit the amount of time near noise	If you need to shout when less than 3 ft away = hearing protection necessary
	Turn down tractor radio			
	Install or repair mufflers			

Tip: Regular maintenance is often easier and more effective than replacing old machinery!

# How Can I Measure My Noise Exposure?

A sound meter or dosimeter can be used to measure noise in your work environment and can provide valuable information on your noise level exposure over time.

Dosimeters measure sound pressure levels and noise. These measurements are integrated to provide a noise exposure reading. In many industrial occupations dosimeters are either worn by employees or are placed in areas where noise levels may be a concern and are monitored.

The increased use and advances in technology mean you don't need a dosimeter to measure your noise exposure. There are many apps available for your Smartphone that can be used to measure noise levels.

The National Institute for Occupational Safety and Health (NIOSH) has developed their own sound level meter (SLM) app and is available for download for iOS devices.

NIOSH also conducted a study testing the effectiveness of a variety of dosimeter apps that are available for both Android and iOS devices. The top rated apps are listed below. To read a summary of the study and learn more visit <https://blogs-origin.cdc.gov/niosh-science-blog/2014/04/09/sound-apps/>



**TRY THESE APPS!**  
SoundMeter - Android  
NoisEE - iOS  
NoiseHunter - iOS  
SPLnnFFT - iOS

## Check out how loud your tractor or combine is!

There are many other apps available to choose from, if you are interested in getting a better idea of your noise exposures when on the tractor, combine or doing other tasks around the farm. Download one of these apps as a simple and easy way to find out your noise exposure level and make an informed decision on when you may need to use hearing protection.

# What Type of Hearing Protection is Most Effective?

Ears come in all shapes and sizes. Find the most comfortable hearing protection for **YOU**, for the work **YOU** do so **YOU** will wear it. As ear canals are all shaped differently make sure you find hearing protection that is comfortable and provides a good fit.

## Hearing Protection That Works the Best Is:

- ✓ Comfortable
- ✓ Convenient
- ✓ Close at hand
- ✓ Suits the work environment

*Put your hearing protection in at the start of your work day or keep it close for easy access.*

Hearing protection should reduce your exposure to below 85 dB, but not below 70 dB, this means you are still capable of hearing important noises when wearing hearing protection.

## **Remember!**

*When choosing hearing protection, account for other equipment and clothing you will be wearing such as glasses, hard hats, face shields, welding helmets, respirators and the climate you are working in.*

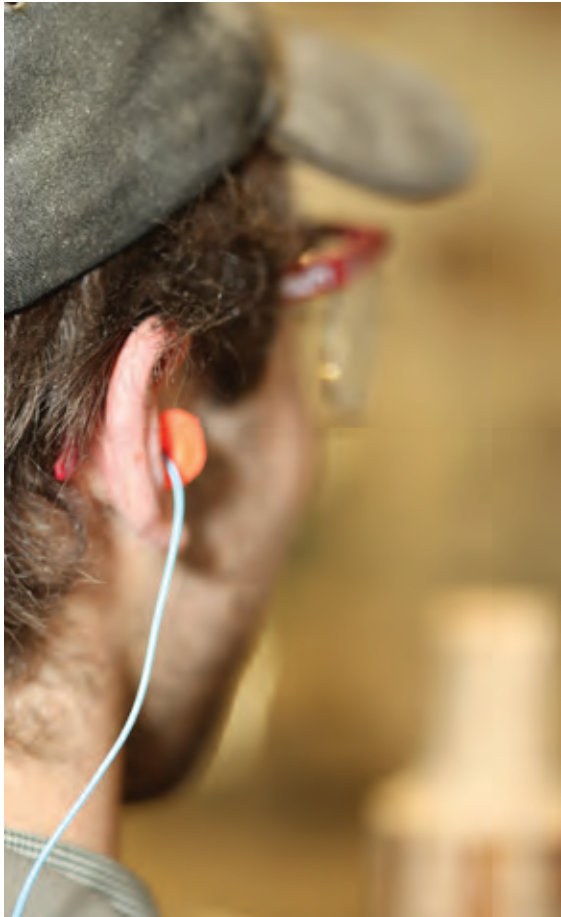
**Myth:** *I can't wear ear plugs because I will not be able to hear if something goes wrong with the machine when I am working.*

**Myth buster:** *The right hearing protection reduces overall noise to a safe level so the ear operates more efficiently but does not compromise communication and work safety.*





# NOISE REDUCTION RATING (NRR) AND WHAT IT MEANS FOR YOU



Noise Reduction Rating (NRR) is the unit of measurement that is used to determine how effective hearing protection devices are within a given working environment. The higher the NRR value associated with a type of hearing protection, the greater the potential for noise reduction.

NRR is a laboratory estimate of the amount of attenuation achievable by most users when properly fit. The NRR is only a population estimate, not a predictor of individual attenuation.

It is important to remember that NRR ratings may often overestimate the protection provided, since they are calculated in a lab under perfect conditions and don't account for 'real-world' variability in usage, fit and other circumstances. NIOSH recommends the following adjustment to determine the actual level of protection your device provides:

- a. Subtract 7 from NRR number (in decibels)
- b. Divide the result from step a. by 2
- c. Subtract the result from step b. from the level of noise you are being exposed to (in decibels)

Fifty percent of the NRR is a reasonable estimate for the hearing protection you are getting but be aware that the rating is often even less. To be safe use the highest NRR that is comfortable for you!

*PPE may not be the most appealing fashion accessory, but neither is a hearing aid.*

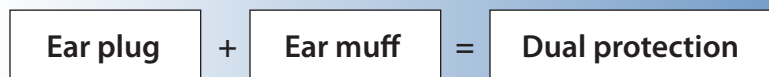
## Hazards of Overprotection

Choosing hearing protection with higher attenuation than necessary may result in over protection.

Overprotection can affect:

- Verbal communication
- Warning alarms
- Machine noises

Dual Protection: for extreme environments

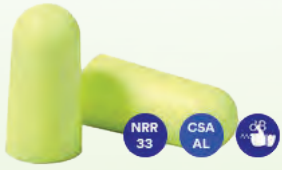








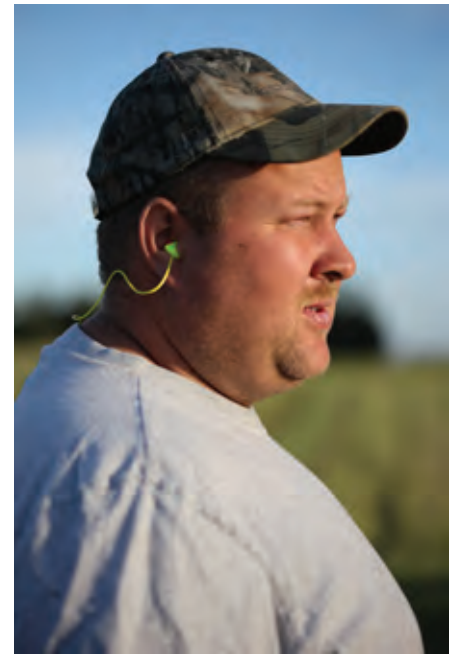
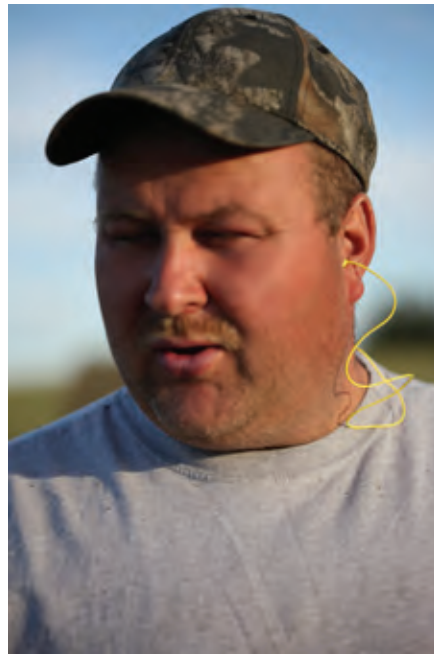
To estimate the protection level, add about 5 dB to the higher dB level protector.

For example:	Earplug	30 dB
	Ear muff	25 dB
	Max. Dual Protection	35 dB



# Types of Hearing Protection Available

Hearing Protection	Examples	Noise Reduction Rating (NRR) in dB
<p>Foam earplugs</p> 	<p>Classic 3M 1100 Maxlite Laserlite SuperFit 33</p>	<p>29 29 30 32 33</p>
<p>Pre-molded earplugs</p> 	<p>Mack's Hear Plugs Howard Leight AirSoft Heartech Silent Ear 3M EAR UltraFit</p>	<p>20 27 33 25</p>
<p>Semi-inserts</p> 	<p>QB3 QB2 QB1</p>	<p>19 25 29</p>
<p>Push-to-Fit earplugs</p> 	<p>3M EAR Express Pods Howard Leight Trustfit Pod</p>	<p>25 28</p>
<p>Earmuffs</p> 	<p>Tactical 7S Electronic Muffs Pro Ears Dimension Series Peltor Tactical Pro Muffs</p>	<p>24 25-33 26</p>
<p>Noise Cancelling</p> 	<p>Howard Leight by Honeywell 3M WorkTunes Wireless ISOtunes Wired Earplug</p>	<p>20 (active); 26 (passive) 26 29</p>
<p>Custom Hearing Protection</p> 	<p>Decibullz dB Blocker Classic</p>	<p>31 28</p>



## Foam Earplugs

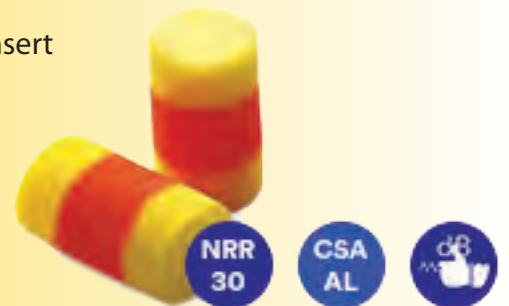
### Pros:

- Can provide a high level of protection that is snug, secure and comfortable
- Available in different sizes
- Disposable but may be re-used
- Inexpensive
- Comfortable for long term wear in hot/ humid weather
- Can be worn without worrying about helmets or glasses interfering



### Cons:

- Not the best choice for people who must remove and re-insert hearing protection during work
- Can be difficult to insert properly, protection dependent on deep fit
- Critical to select proper size
- Easy to misplace
- Can irritate the ear canal and require good ear hygiene



### Care Tips:

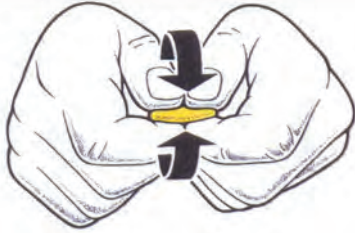
- Dispose of single-use earplugs daily
- Wash reusable earplugs with mild soap and water, dry thoroughly

Earbuds and hearing aids are NOT good hearing protectors.



# How to Properly Insert Earplugs

1. Using both hands, roll and compress the foam plug as tight as possible into a thin creaseless tube – *this may take a minute*. Make sure your hands are clean.



2. With your opposite hand pull your ear **upward** and **back** to straighten your ear canal. This makes it easier to insert the ear plug properly into your ear.



3. Hold the plug in place until it expands to form a snug seal blocking the ear canal – **this takes a few seconds**. The deeper the plug is inserted the more effective and comfortable it will be.



Wash your hands and make sure your hands are clean, as dirty hearing protection can cause skin irritation and ear infections.

- Do not re-adjust plugs while in your ear. Remove, re-roll and re-insert.
- Inserting ear plugs should not be painful.
- Not all ear canals are the same size. You may need a different size plug for each ear to get a good fit.

**There is no such thing as one-size fits all for hearing protection!**

**Key:** To protect hearing, it is not sufficient to just have an earplug in the ear, it **MUST** be properly fit. A well fit earplug should not be visible when viewed from the front.

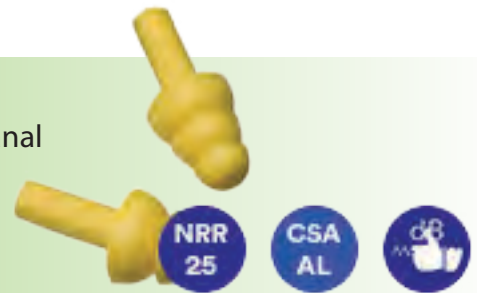




## Pre-molded Earplugs

### Pros:

- Made of flexible material that is pre-molded to fit the ear canal
- Available in different sizes
- Usually available with a joining cord
- Reusable
- Can be worn without worrying about helmets or glasses interfering



### Cons:

- Can be difficult to obtain and maintain a good seal
- Does not fit individual ear or mold to ear
- Requires something to be in ear

### Fit Tips:

- Do not need to be rolled
- Insert and push the plug tightly into your ear canal until you feel a snug seal
- May re-adjust plug while in the ear
- Remove plugs slowly to gradually break the seal – twisting motion may be helpful

Remember: the more noise you hear today the less you will hear tomorrow.

## Semi-insert Earplugs

### Pros:

- Flexible tips on a lightweight band that can rest on the neck when not in use
- Ideal for when hearing protection must be removed and replaced repeatedly so it stays within easy reach.



### Cons:

- Not recommended for continuous long term wear, as they do not provide as much protection as other plugs or muffs

### Fit Tips:

- Pull out the outer ear while holding the large ends of the pod. Swivel the pod, directing the tip into the ear canal. Firmly push and wiggle the pod into the ear canal to create a snug seal
- Replace when band is stretched

**Set an example: If you don't wear your hearing protection no one else will either.**

## Push-to-Fit Earplugs

### Pros:

- Easy to insert, no need to roll down
- Molds to ear canal shape
- Clean insertion
- Reusable



### Cons:

- Require good seal to be effective
- Need correct size to work properly
- Can irritate ear canal





# Earmuffs

## Pros:

- Rigid molded plastic cups with cushions filled with foam, liquid, or a combination that seals around the entire ear to block noise
- Easily removed and replaced repeatedly. Ideal for intermittent use
- One size fits all
- Reusable and hard to lose



## Cons:

- Can feel tight, hot, bulky and heavy compared to other hearing protection – BUT there are light weight earmuffs and cooling pads available
- Pressure may make you uncomfortable
- Earmuff performance will be reduced by anything that interferes with the seal around the ear including, glasses, long hair and hats
- Bulky and can restrict head motion



## Fit Tips:

- Earmuffs must be centered so they fully enclose the ears to seal against the head
- Replace earmuffs when the head band is stretched or muffs are cracked

# Custom Hearing Protection

## Pros:

- Molded to fit your individual ears
- Comfortable
- Reusable
- Can be worn with other accessories



## Cons:

- Requires ear mold impression
- Requires cleaning to avoid infection
- Variable quality and attenuation

## Fit Tips:

- Keep clean and wash when necessary
- Audiologist will provide information on how to properly insert



## Noise Cancelling Headphones & Hearing Protection

Noise cancelling headphones are a growing trend, but can they help protect your hearing?

The short answer is yes, BUT it depends on the situation.

There are two types of noise cancelling headphones: passive and active.

### 1. Passive Noise Cancelling Headphones:

- Rely on materials of the headphones alone to cancel noise. No battery or power source and work by physically blocking sound.
- Work best for protection from mid-high frequency sounds.
- Not effective for low-frequency sounds – such as engine noises or bass from speaker systems.
- Usually just like earmuffs (see “Earmuffs” section), but can be connected to play music.

### 2. Active Noise Cancelling Headphones:

- Measure sound waves of external noises and then create sound waves that are out of phase this effect creates an anti-noise that is mixed into audio playback to cancel noise.
- You can listen to music at low volumes even in a noisy environment which is good for protecting your hearing.
- Most effective for consistent noises such as airplane engines.
- Not effective for high pitch or sudden transient noises.

A final note on noise cancelling headphones, **if you are only wanting hearing protection choose earmuffs or earplugs over passive noise cancelling headphones.** If you would like to listen to music and protect your hearing choose active noise cancelling headphones in either an earmuff or earplug type depending on your work and preference.

# HOW DO I KNOW IF MY HEARING PROTECTION IS WORKING?



## Test for a Good Fit

To determine the level of protection a person using hearing protection is receiving from their hearing protectors. There are quantitative and qualitative methods of fit-testing.

### Qualitative Testing

1. Insert or put on your hearing protection
2. Cup your hands over your ears or push on the muffs
3. Concentrate and ask yourself *"Is the noise I hear now that my ears are cupped different from the noise I hear when my ears are not cupped?"*
4. If your hearing protection fits and is working properly there will be no difference in the noise you can hear

### Earplug Fit Testing: Quantitative

- Quantitative and objective testing methods generates a personal attenuation rating (PAR) that indicates a worker's noise reduction level for a given fitting
- Ideal for training and hearing protection device protection
- Assists to motivate hearing protection user, by helping them realize the control they have in protecting their hearing
- Provides documentation for compliance reporting

### Care and Cleaning

- Store hearing protection in clean container – Ziploc bag, plastic container, coffee can, etc.
- Plugs may last several months depending on the type of plugs, your work environment, personal hygiene and body chemistry.
- Muff cushions can be cleaned by washing with warm soapy water, rinsing well and air drying.
- Discard plugs or muffs if they are dirty, shrunken, hardened, torn, cracked or permanently deformed and not expand back to original size and shape. Such hearing protection does not seal well and can irritate your ear.
- Store hearing protection in areas of the farm where it is **NEEDED** such as in the tractor, in the shop, near the auger, or on the seat of the riding lawn mower.

### 4 C's for Wearing Hearing Protection

Clean – plugs and hands for insertion  
Consistent – for levels 85 dB and above  
Correct – insertion method  
Comfortable – for user  
(NIOSH)



# Youth: Protecting Your Hearing on the Farm



Almost 50% of farm youth show some signs of noise induced hearing loss compared to youth from non-farm backgrounds. NIHL is cumulative over the first 10 years of exposure, and the damage may not be apparent until later in life. It is important for both parents and their kids to learn about the hazardous noise exposures on the farm, it is never too early to protect your hearing!

Studies demonstrate that hearing loss at high frequencies (4000-6000 hz) is the most common range and occurred in 50% of adolescents with a farming background.

Hearing loss in youth can have a major impact on learning and communication because speech and listening abilities are still developing.

## What Can Harm Youth's Ears:

- Tractors, combines
- Grain dryers
- Chain saws
- Skid-steer loaders
- Livestock
- Dirt bikes, ATVs, ski-dos
- Augers, grain vacuums
- Firearms
- Personal listening devices

MOST HEARING LOSS OCCURS IN YOUTHS AGES 10-18 YEARS OLD

90% of adolescents listen to music on a regular basis  
26% listen for more than 3 hours per day  
48% listen at high or near-to-maximum volume

For example an iPod at medium-high volume is 120-125 dB

## Perceptions & Influences About Hearing Protection

- Adolescents think it's inconvenient to wear effective hearing protection and opt not to wear any hearing protection at all.
- Remembering to wear hearing protection is burdensome.
- **Family members are the main source of influence for adolescents in wearing hearing protection.**

It is important for children who are exposed to noise to wear hearing protection - set an example and wear your own hearing protection!



**Key:** To prevent hearing loss

- Avoid loud noises
- Use hearing protection when around loud noises
- Limit how long you are exposed to loud noises

### **Tips for Youth:**

Loud noises are the most common cause of hearing loss, so if you start the habit now your sense of hearing will be preserved for decades to come. Try preventing hearing loss by:

- Lowering the volume of your music
- Moving away from loud noises
- Wearing your hearing protection – the best type of hearing protection is the kind you like and will use!

### **Tips for Parents:**

- Reduce noise at the source
- Avoid competing noises in the same area
- Make your family aware of noise sources, levels and avoid unsafe noise levels
- Set clear rules for when hearing protection should be worn
- Always wear hearing protection when working with machinery or in a noisy environment on the farm – set a good example!
- Keep hearing protection in accessible locations such as in the tractor or combine or work truck so that it is always there when you need it
- Make sure your kids are aware that by protecting their hearing now they are preventing hearing loss down the road – there is no substitute for your own ears!
- Post signs in potentially noisy areas to help identify when hearing protection is essential
- Remind your kids to wear hearing protection when performing chores around noisy equipment or environments

# Have You Noticed Changes in Your Hearing?



- Do you have trouble understanding what people say? Especially in noisy places?
- Do you hear what people are saying but have trouble making out the words?
- Do people seem to mumble?
- Do your ears ring?
- Do people complain because you turn the radio or TV too loud?

Answering **yes** to any of these may be a sign of hearing loss. Reduce your exposure to noise and have your hearing tested.

To have your hearing tested contact:  
Your family doctor  
OR  
The nearest audiologist

***Did you know? Hearing aids amplify sound. They do not help to discriminate between different sounds so there is no substitute for your NORMAL hearing. Protect your hearing!***

## When to Seek Medical Attention

- Notice changes in your ability to hear
- Experience trauma affecting your head or ears – such as a head injury, being near an explosion, protrusion or puncture of the ear, exposure to a gunshot
- Wax build up or discharge from ear
- Ringing in your ears or changes in balance or feeling of dizziness

Hearing loss can affect a person's quality of life in many ways, convincing a loved one to seek help is the right thing to do, but is not always easy.



**Myth:** A little hearing loss is no big deal.

**Myth buster:** Studies have linked untreated hearing loss to things like increased stress, depression, social isolation and increased risk to personal safety and the safety of others. The earlier you detect hearing loss, the better the chance you have of effectively treating your problem.



# ALL ABOUT HEARING TESTS



## What is a Hearing Test About?

An audiogram (hearing test) is an exam that uses your response to different sounds (loud to soft, low frequency to high frequency) to detect and diagnose hearing loss.

If hearing loss is detected and diagnosed, action can be taken to prevent additional permanent hearing loss and/or correct temporary hearing loss.

Temporary hearing loss can be due to wax build up or an ear infection that makes it difficult for you to hear. These problems can be corrected by your doctor.

## What Happens When You Visit an Audiologist?

Audiologists offer a variety of services:

- Advice on conditions such as tinnitus, hearing loss, wax build up and communication issues.
- Product selection advice for hearing aids, tinnitus and hearing protection
- Hearing tests
- Hearing aid fitting
- Custom fit hearing protection



When you visit an audiologist they will do a visual examination of your ears with an otoscope and conduct a hearing test. Hearing tests consist of more than one test, each different test is designed to detect different problems in different parts of the ear.

## Why get a Hearing Test?

- Most people do not notice their own hearing loss right away, as it happens gradually over time.
- Without testing, early hearing loss goes unchecked.
- Regular hearing tests act as a check to see that your hearing protection is working.
- Once hearing damage occurs, it cannot be repaired!

**But you can prevent the damage from becoming worse by wearing hearing protection.**

### Why Audiograms?

- To determine if noise could be affecting your hearing
- To determine if hearing protectors are effectively protecting you
- Track changes in your hearing over time

# FAQs



- **Are you having trouble with ear wax?**

Ear wax normally protects our ears from the harmful effects of dust, dirt and bacteria. Some of us have ear wax that becomes hard and trapped inside the ear canal. This is annoying and makes it difficult to hear.

**Do not put Q-tips, bobby pins, car keys, etc into your ear in the hope of getting the wax out.** Putting these objects in your ear can push the built-up wax further in and you risk puncturing your eardrum, causing an infection or damaging your ear canal.

If you have wax-build-up see your doctor and have it removed safely.

- **What about ear candling?**

No proven medical benefits have been shown and candling comes with a lot of risks connected to hot wax and fire near your ear, skin and hair.

- **What about ringing in my ears?**

Ringing, buzzing, or a whistling noise that can be heard in one or both of your ears is called tinnitus.

## ↳ Tinnitus

It is not uncommon and is especially noticeable in a quiet place. Usually ringing is from damage to tiny hairs in your inner ear. This changes the signals sent to your brain that control how you hear sound. Do not ignore it. This is often the way your body tells you something is wrong. If you have ringing in your ears seek medical attention. The exact cause is not known but there are six distinct factors which trigger the onset of tinnitus.

1. Sudden loud noises: Such as gunshots, explosions, or fireworks.
2. Age: Damage to the hair cells and nerves in your inner ear due to wear and tear.
3. Head and neck injuries: Can result in temporary or permanent hearing loss.
4. Listening to music loudly for long periods of time.
5. Some medications or chemicals: Can cause ototoxicity.
6. Traumatic life events: "Cycle of distress", a chain reaction to a situation or stimulus that your brain turns into a negative emotion that leads to physical changes and increased awareness.
7. There are other much rarer conditions such as tumors or neurological conditions that can cause tinnitus, **be sure to speak with your doctor if you have a concern.**

- **What is Ototoxicity and what causes it?**

Chemical induced hearing loss which can affect the structure and function of the inner ear. Strong antibiotics, anticancer drugs, loop diuretics, and high doses of aspirin can all cause ototoxicity. Toluene (found in adhesives, thinners, degreasers, and fuel adhesives), styrene (rubber, glass fibers, and plastic manufacturing), carbon monoxide, cyanides, lead and mercury can all cause irreversible hearing damage.

Learn if your workplace has these chemicals and remove the source to reduce risk or wear PPE.

## What About Hearing Aids?

Hearing aids are designed to improve hearing and speech comprehension of people who have some degree of hearing loss. Hearing aids work by magnifying sound vibrations that enter the ear, but there are practical limits to the amount of amplification a hearing aid can provide. Remember, there is no substitute for your own hearing.

There are a variety of different kinds of hearing aids available depending on the type of hearing loss you are experiencing. **An audiologist can answer any questions you may have about selecting and buying the right hearing aid for you.**



# Provincial OH &S Regulations for other industries (2016)

Province	Continuous Noise Max Permitted Exposure Level for 8 hours dB (A)	Impulse Noise Maximum Peak Pressure Level db (peak)
British Columbia	85	140
Alberta	85	-
Saskatchewan	85	-
Manitoba	85	-
Ontario	85	-
Quebec	90	140
New Brunswick	85	140
Nova Scotia	85	-
Prince Edward Island	85	-
Newfoundland & Labrador	85	-
Northwest Territories	85	-
Nunavut	85	140
Yukon Territories	85	140
Canada (Federal)	87	140

Requirements for audiometric tests in Canada are by province:

1. The jurisdictional occupational noise exposure limit – Alberta, British Columbia, Newfoundland and Labrador, Prince Edward Island and Quebec
2. Greater than 85 dB – Manitoba, Saskatchewan, Northwest Territories and Nunavut
3. Greater than 80 dB – Yukon

There are no audiometric testing requirements for Nova Scotia, Ontario or federally.

Regulations for Hearing Conservation Programs in Canada:

↳ 8 Provinces require a hearing conservation program when:

1. Noise exceeds the provincial occupational exposure limit – British Columbia, Newfoundland and Labrador, Prince Edward Island and federally
2. Noise exceeds 85 dB – Saskatchewan, Northwest Territories and Nunavut
3. Excess noise – Alberta

No specific requirements for hearing conservation programs in Manitoba, Ontario, New Brunswick or Yukon.

Visit Canadian Centre for Occupational Health and Safety (CCOHS) for more information on noise exposure limits in Canada. [www.ccohs.ca](http://www.ccohs.ca)



## Resources

### More Great Resources, Check Them Out!

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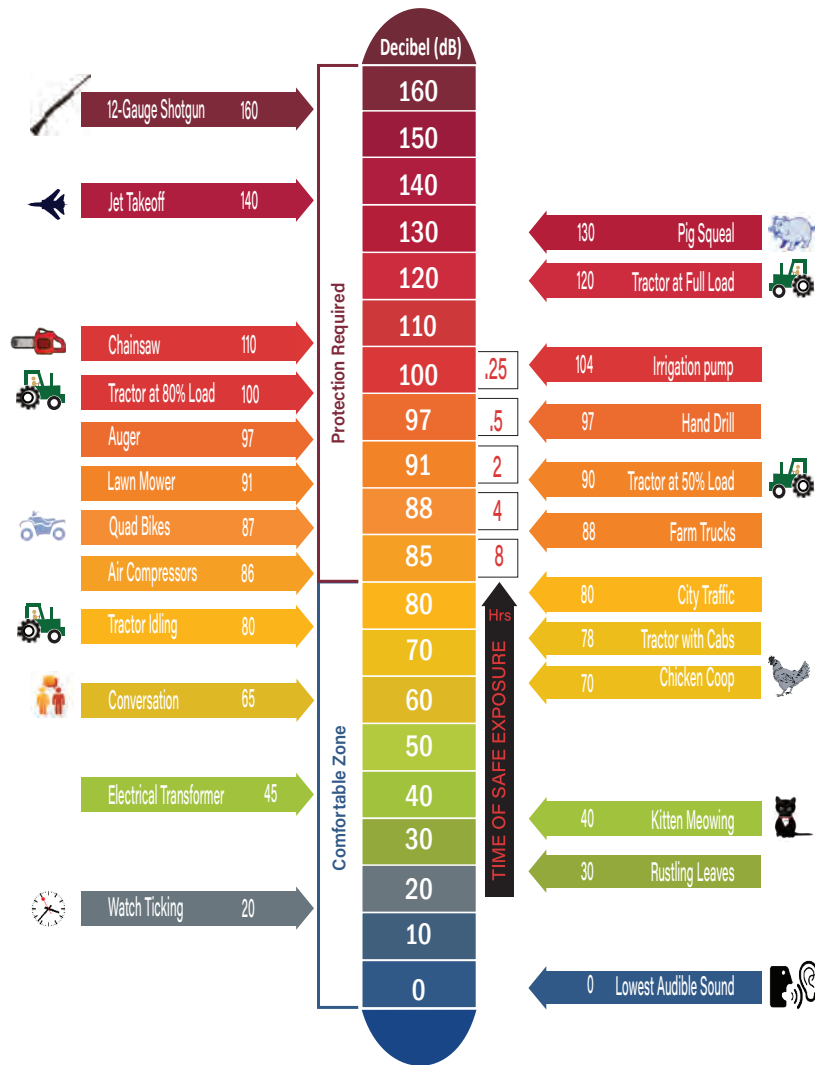
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The information in this booklet is intended to educate the reader about hearing conservation. It is not a substitute for examination, diagnosis, and medical care provided by a licensed and qualified health professional.



Disclaimer

# What DID YOU SAY?



ARE YOU SHOUTING TO TALK TO SOMEONE?  
**YOU NEED PROTECTION**