

## Frequently Asked Questions:

**Q** What's wrong with conventional earplugs?

**A** They muffle speech and music. Conventional earplugs reduce sound more in the high frequencies than in the low and mid frequencies, which makes music and voices *unclear* and unnatural. Deeply-inserted foam earplugs can provide 30-40 dB of sound reduction, but only a small amount is typically needed.

**Q** How much protection do people need?

**A** Hearing loss is a function of exposure time, the average sound level, and the peak level of very loud sounds. Some persons are more susceptible to hearing loss from high-level sound than others. Most musicians do not need maximum protection, and many industrial workers can be adequately protected with as little as 10 dB of sound reduction. The majority of eight-hour-equivalent noise exposure in industry falls between 85 and 95 dB.

**Q** Is there a non-custom high fidelity earplug?

**A** Yes. Etymotic Research designed and patented *ETY•Plugs™* which are high fidelity ready-fit earplugs that reduce sound evenly by 20 dB at all frequencies, so that music and speech are heard clearly. Available in two sizes, for regular and small ear canals.



**Q** Why are deep earmolds required for Musicians Earplugs?

**A** Earmolds need to seal deeply in the bony portion of the ear canal or the wearer will hear a hollow or boomy sound in their own voice when speaking, singing or playing a brass or wind instrument. This unpleasant or distracting sound is called the *occlusion effect*. Deep earmolds (past the second bend of the ear canal) will eliminate this problem.

**Q** What is the noise reduction rating (NRR)?

**A** The U.S. Environmental Protection Agency requires manufacturers to print a noise reduction rating (NRR) on all non-custom earplugs. The formula used to determine NRR includes an adjustment for test variability, individual variability, and for those persons who do not wear ear protection as instructed. When worn properly, Etymotic earplugs provide more sound reduction than the assigned NRR value. Laboratory data on subjects wearing properly sealed *ETY•Plugs™* shows between 18-22 dB average sound reduction over the 250-8000 Hz frequency range, but the NRR calculated from the same data is 12 dB.

## Who uses Musicians Earplugs?

**Aircraft**  
crew  
flight instructors  
passengers  
pilots



**Leisure**  
concerts  
night clubs  
noisy restaurants



**Athletics**  
athletes  
coaches  
sporting events



**Medical-Dental**  
dentists  
dental hygienists  
dental technicians  
surgeons



**Construction**  
carpenters  
equipment operators  
road builders  
steel workers



**Motor Sports**  
motorcyclists  
pit crews  
race car drivers  
spectators



**Emergency Vehicles**  
EMTs  
highway patrol  
firefighters



**Music**  
concerts  
marching bands  
musicians  
night clubs



**Industrial**  
factory workers  
shop teachers  
students  
supervisors



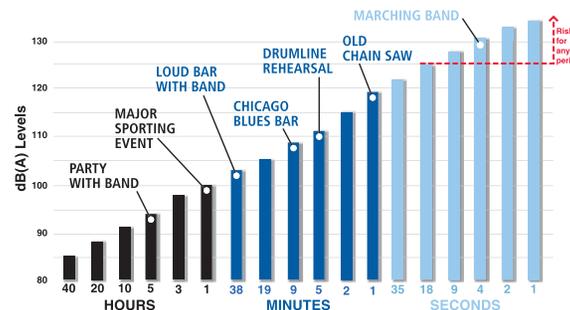
**Others**  
delivery drivers  
market traders  
night club staff  
truck drivers



# Musicians Earplugs™

ER-9 • ER-15 • ER-25

## Permissible Sound Exposure Guidelines



Hearing loss is a function of exposure time, the average noise level and the peak level of very loud sounds.

NIOSH (1998). Criteria for a recommended standard: occupational noise exposure. Cincinnati, OH: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, and National Institute for Occupational Safety and Health. DHHS (NIOSH) Publication No. 98-126.



- Custom high-fidelity hearing protection
- Sound quality is clear and natural, not muffled
- Noise fatigue and ear overload distortion are reduced

## ETYMOTIC RESEARCH INC.

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Musicians Earplugs™ is a trademark of Etymotic Research, Inc. The ER family of earplugs is covered by one or more of the following U.S. patents: #4,852,683, #5,113,967, #5,887,070 and other patents pending.

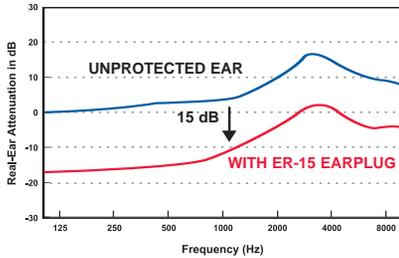
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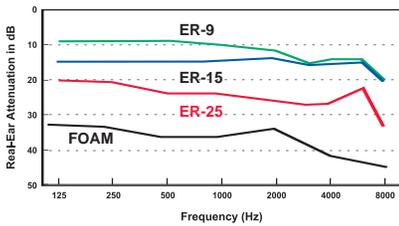
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## What Makes Musicians Earplugs High Fidelity?

Musicians Earplugs™ replicate the natural response of the ear canal so that sound heard with these earplugs has the same quality as the original, just quieter.



ER-15 Musicians Earplugs provide 15 dB sound reduction at each frequency.



Average sound reduction of Musicians Earplugs and foam earplugs.

## About Musician Earplugs

Musicians Earplugs were designed to protect hearing while preserving all the subtleties and richness of music. Other earplugs, particularly foam, muffle sound so music and speech are not heard distinctly. Musicians Earplugs are made from custom ear impressions and tested to ensure that sound heard with them is accurate and true—the definition of high fidelity. Music and speech reproduced through these earplugs sounds exactly as it would in an ear without an earplug, but at a lower (safer) loudness level.

Musicians practice and perform in a variety of different settings and they are exposed to high levels of sound, sometimes for long periods. They require different amounts of hearing protection depending on the sound levels they encounter during rehearsals and performances. See the table to the right.

## Which Earplug is Best for You?

	ER-9	ER-15	ER-25	ER-20 Eyrplugs™	Harmful Sound Comes From:
Small strings	●	●	●	●	Own instrument, other strings
Large strings	●	●	●	●	Brass
Woodwinds	●	●	●	●	Brass, percussion
Brass	●	●	●	●	Own instrument, other brass
Flutes	●	●	●	●	Percussion
Percussion	●	●	●	●	Own instruments, other percussion
Vocalists	●	●	●	●	Own voice, speakers, monitors
Acoustic guitar	●	●	●	●	Drums, speakers, monitors
Amplified instruments	●	●	●	●	Speakers, monitors
Marching bands	●	●	●	●	Multiple sources
Music teachers	●	●	●	●	Multiple sources
Recording engineers	●	●	●	●	Speakers, monitors
Sound crews	●	●	●	●	Speakers, monitors

Ref. Chasin, M. *Musicians and the Prevention of Hearing Loss*, Singular Publishing Group, 1996.

## fidelity

- /fidélite/ n.  
 1. faithfulness; loyalty. 2. strict conformity to truth or fact. 3. exact correspondence to the original. 4. precision in reproduction of sound or video

## Permissible Sound Exposure Guidelines

Continuous Sound dBA	Unprotected Permissible Exposure Time
85	8 hours
88	4 hours
91	2 hours
94	1 hour
97	30 minutes
100	15 minutes
103	7.5 minutes
106	< 4 minutes
109	< 2 minutes
112	~1 minutes
115	~30 seconds

NIOSH (1998)

Three types of attenuator buttons are available: ER-9, ER-15, and ER-25. The number corresponds with the amount of sound reduction provided in dB.



## Quick Reference Guide

	ER-9 Musicians Earplug	ER-15 Musicians Earplug	ER-25 Musicians Earplug
Description	Flat 9 dB sound reduction through the mid range. Same high frequency protection as the ER-15	Provides uniform 15 dB sound reduction across all frequencies	Provides 25 dB of relatively flat sound reduction across all frequencies
Button Colors	Clear	Beige	Brown
Interchangeability	Identical dimensions. Change buttons for different listening conditions.		
Earmold styles	Standard	Partially countersunk	Countersunk
Insertion	Moisten the mold for ease of insertion. Pull the ear outward and upward while easing the mold into the ear canal.		
Cleaning	Remove button from mold. Use water and mild soap on the mold only. Dry mold thoroughly before replacing button.		
Replacement	Discoloration, shrinkage, cracking, hardening of earmold material, deterioration in performance.		

Musicians Earplugs require custom earmolds. Deep impressions past the second bend of the ear canal must be taken to ensure the effectiveness of these earplugs and to reduce the occlusion effect.