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On a Mac

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A solid red square is located in the bottom left corner of the page.

Hearing Conservation: Hearing Protection for the Workplace and Beyond

Janette Mongelli, Au.D., CCC-A
Education & Training Audiologist



Webinar FAQs

Hearing Conservation:

Hearing Protection for the
Workplace and Beyond

Janette Mongelli, Au.D., CCC-A

How to Ask a Question

Click Q & A, type your question, and Send

Where to get the handout

A PDF handout for this presentation may be accessed through your Pending Courses on Audiology Online or by clicking on the link in Chat within the classroom

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Call 800-753-2160

customerservice@audiologyonline.com

Use the Q&A window

Risks and Benefits

The applicability and accuracy of the course content may vary by the clinical, geographical, and cultural context; you should evaluate the course accordingly.

As healthcare is rapidly evolving, new findings may change the validity of the information presented in this course. Providers should always consult the latest research and guidelines from professional associations.

The interventions discussed in this course may be limited in generalizability, requiring practitioners to consider specific individual and population factors.

The course may not cover all possible risk factors, diagnostic methods, or treatment options, and complex cases may require additional considerations.

Healthcare providers should apply cultural competence and sensitivity to ensure effective and respectful care based on their patients' diverse needs.

Providers should always evaluate the limitations of diagnostic and screening tools, considering their potential for false results as well as any ethical implications.

It is the responsibility of course participants to critically evaluate the evidence from multiple sources to guide professional practice.

Learning Outcomes

1

Explain the impact of noise exposure and how to involve safety in the design of hearing conservation processes

2

Provide the rationale for providing hearing conservation services and products in the clinic

3

Identify which Hearing Protection Devices are recommended for the patient based on their noise exposure and hearing loss

Reminders

Evidence-Based

All CE courses on continued.com must be evidence-based. In evidence-based continuing education sessions, the presenter provides:

- The best available, current, scientific evidence to support a particular practice or guideline which can include exploratory or pilot study data and the related evidence
- Information about his/her clinical expertise, expert opinion, and experience in this topic area
- Information related to client/patient/caregiver values.
- An indication of the level of evidence (e.g., systematic review, randomized control trial, cohort study, expert opinion, etc.) for each piece of evidence presented, ensuring clarity on the strength and reliability of the supporting data.

For additional information regarding evidence-based requirements, please see this ASHA resource.



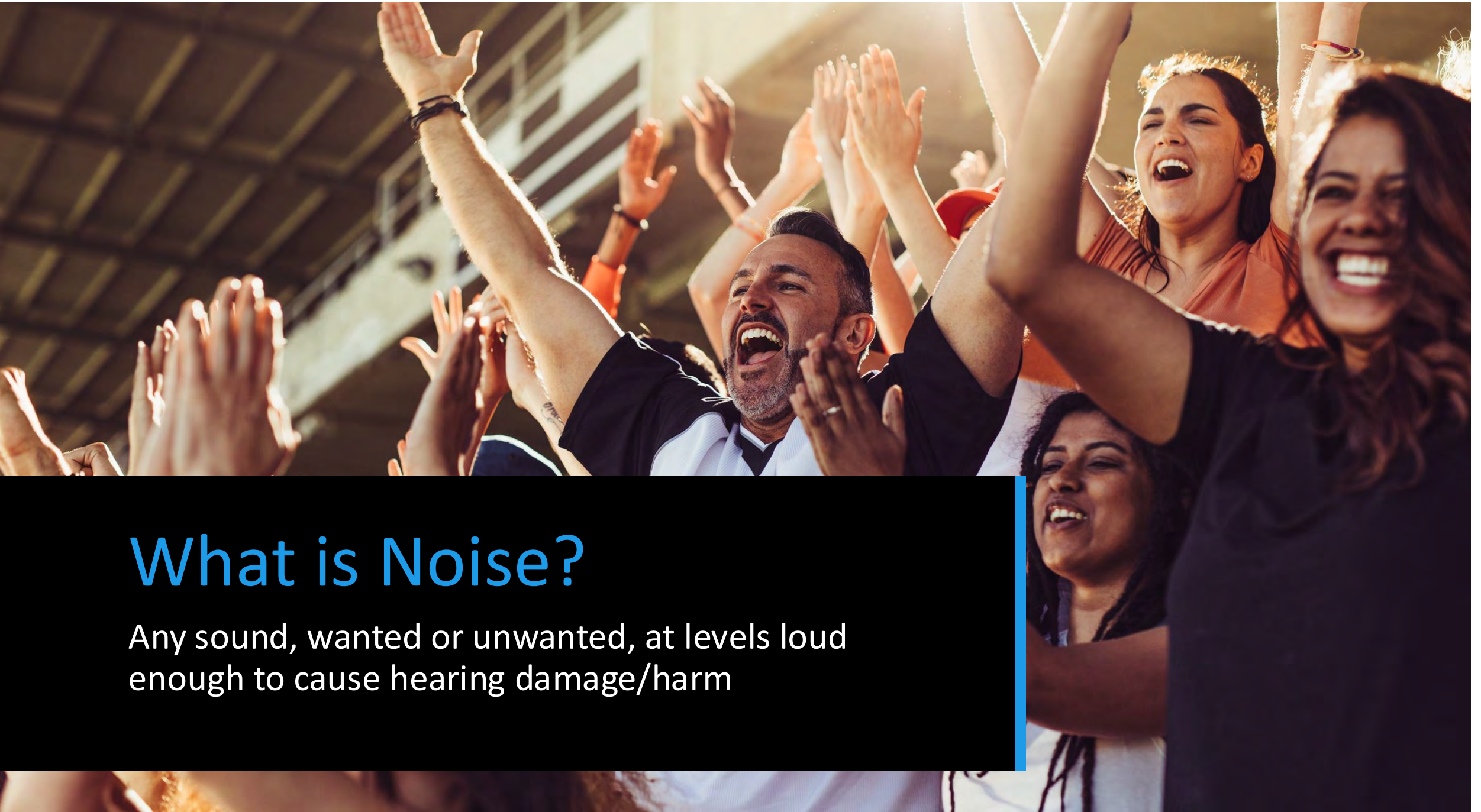




noise
/noiz/

noun

1. a sound, especially one that is loud or unpleasant or that causes disturbance.



What is Noise?

Any sound, wanted or unwanted, at levels loud enough to cause hearing damage/harm



~40 million
adults in the U.S.

Carroll YI, Eichwald J, Scinicariello F, et al. Vital Signs:
Noise-Induced Hearing Loss Among Adults — United States
2011–2012. MMWR Morb Mortal Wkly Rep 2017;66:139–144



1 in 6 teens

has permanent hearing loss
due to high-volume sounds

Noise Induced HL in Teens

88%

admit participating in activities they know may damage their hearing

40%

are around dangerously loud noises during events

46%

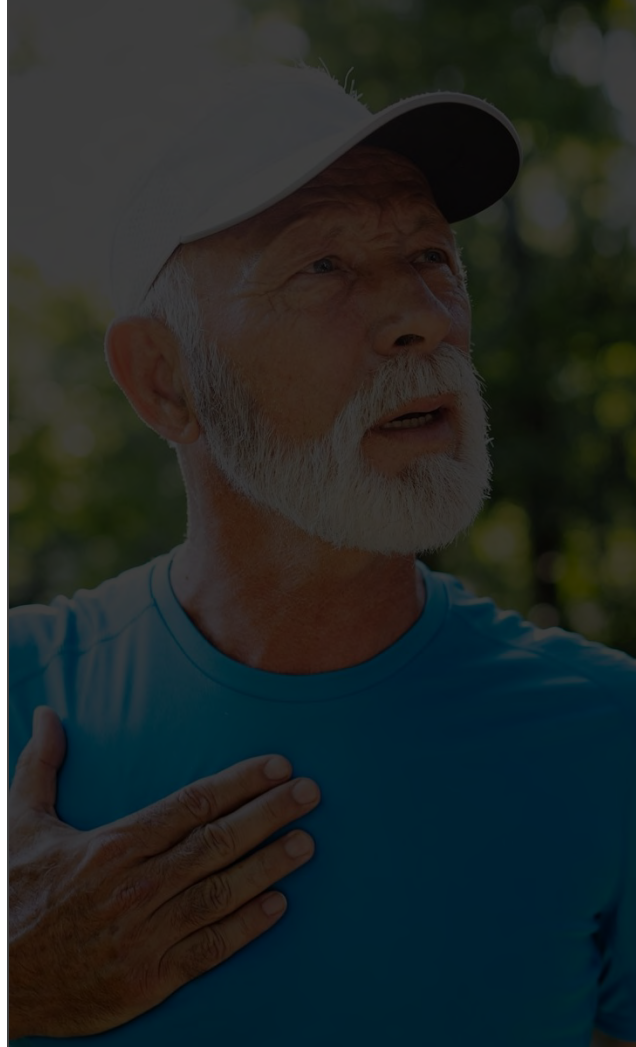
report tinnitus after engaging in risky hearing practices

50%

listen to music too loudly



Annoyance



Cardiovascular
Disease



Cognitive
Performance



Communication
Interference



Annoyance



Cardiovascular
Disease



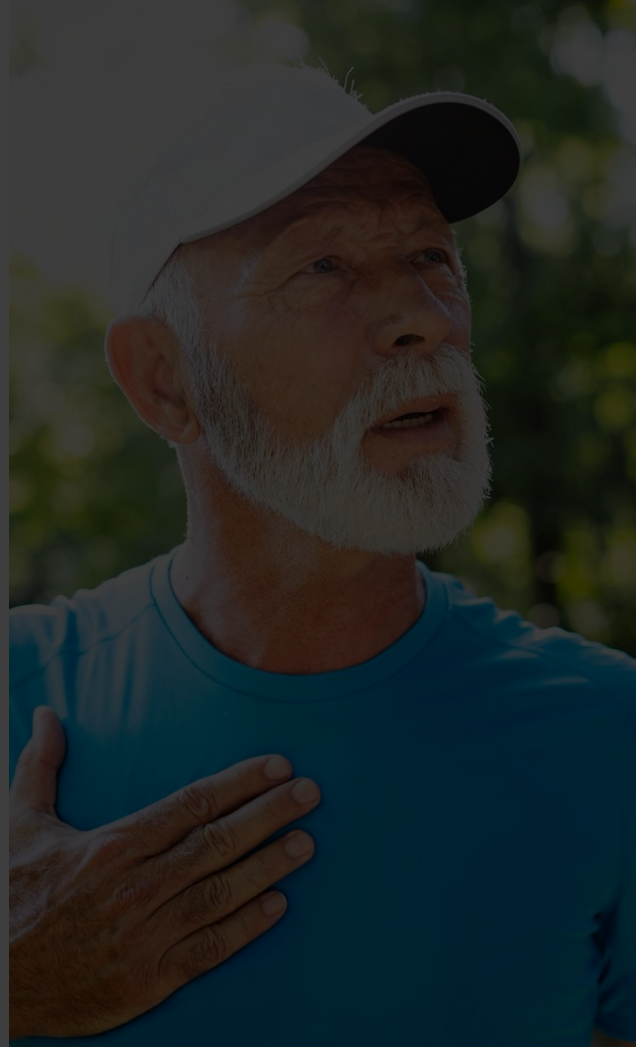
Cognitive
Performance



Communication
Interference



Annoyance



Cardiovascular
Disease



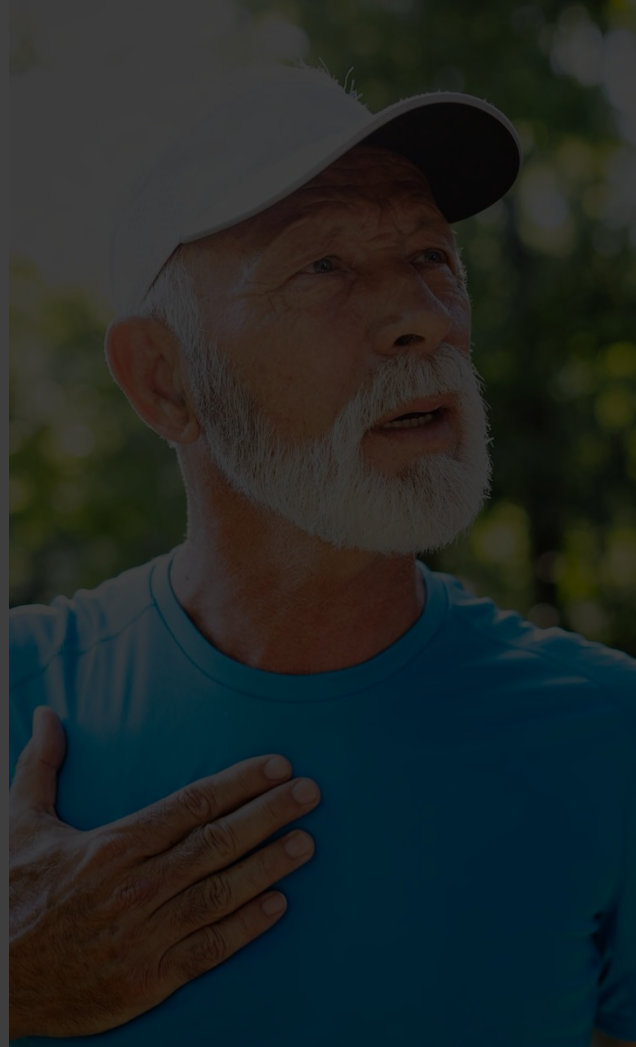
Cognitive
Performance



Communication
Interference



Annoyance



Cardiovascular
Disease

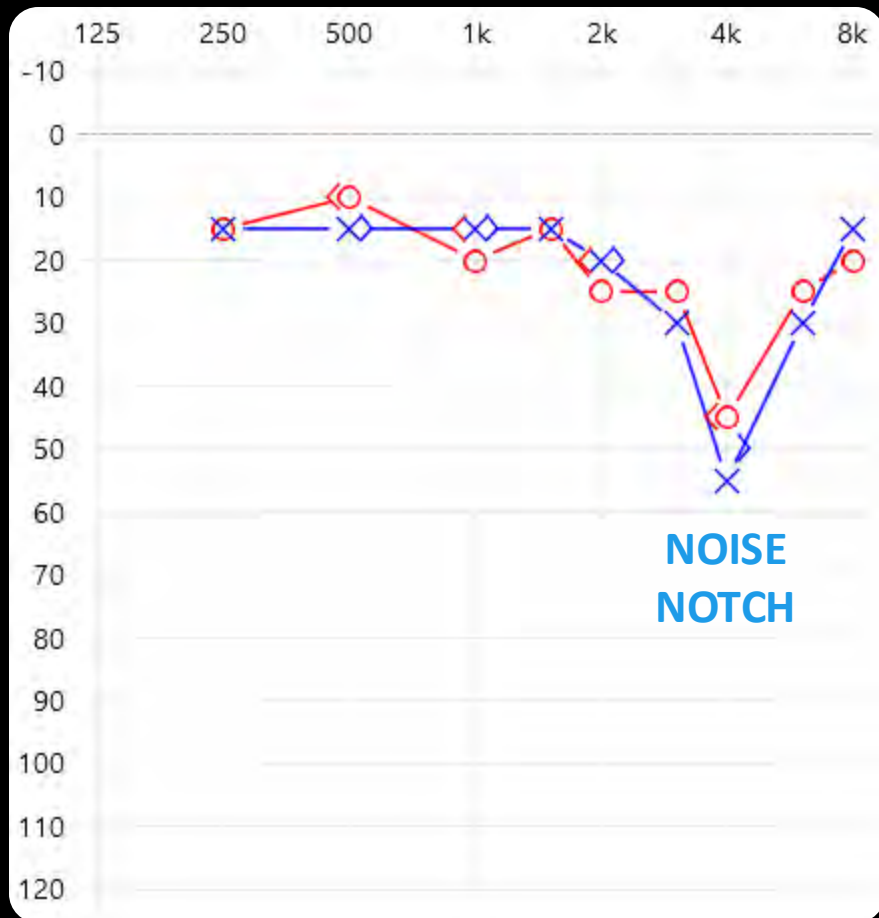


Cognitive
Performance



Communication
Interference

Clinical Presentation of NIHL



**History of
Noise Exposure**



**Audiometric Notch
at 4 kHz**



Tinnitus

“The effects of noise are often underestimated because the damage takes place so gradually, loud noises have become so common in our culture, and there are no externally-visible physical changes...”

- Brian Fligor, Sc.D.

“...People have traditionally not appreciated the serious impact of noise induced hearing loss on their daily living until they’re frustrated by a permanent communication problem or ongoing ringing in their ears.”

- Brian Fligor, Sc.D.

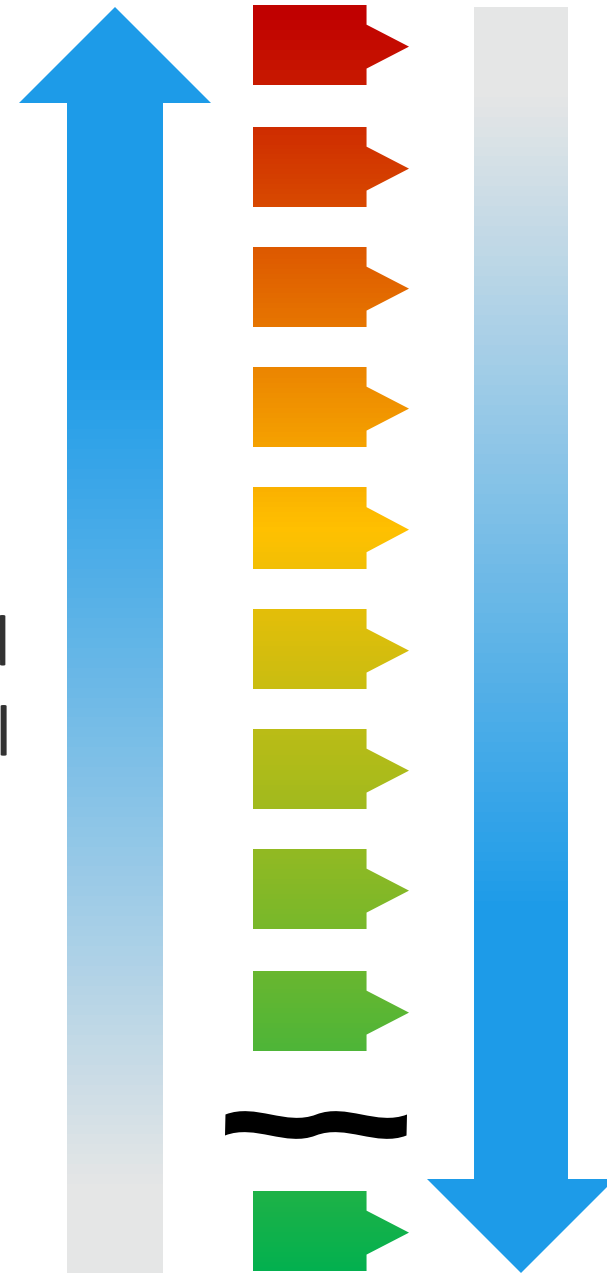
Time Weighted Average

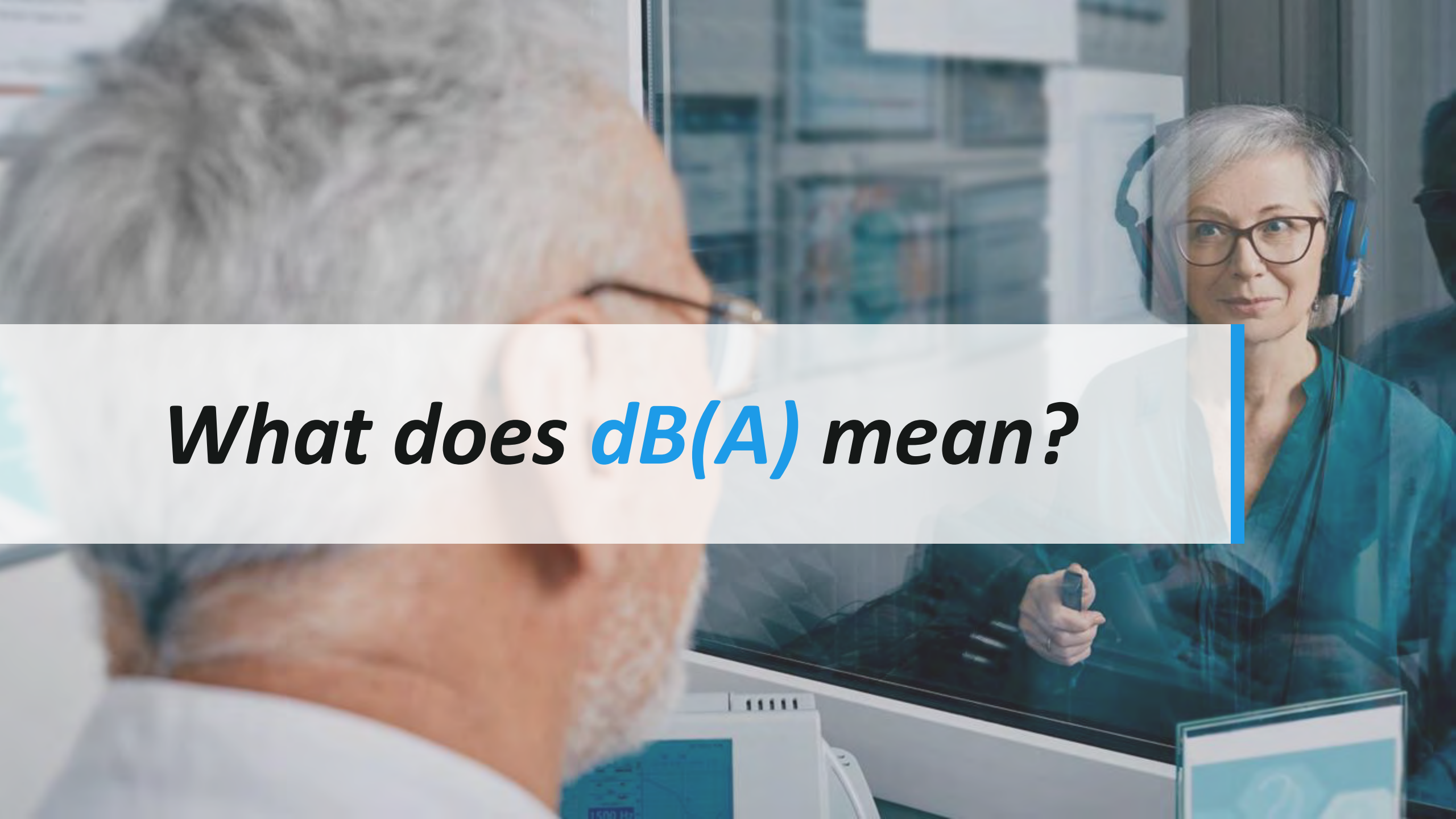
TWA

The average of noise exposure over an 8-hour day

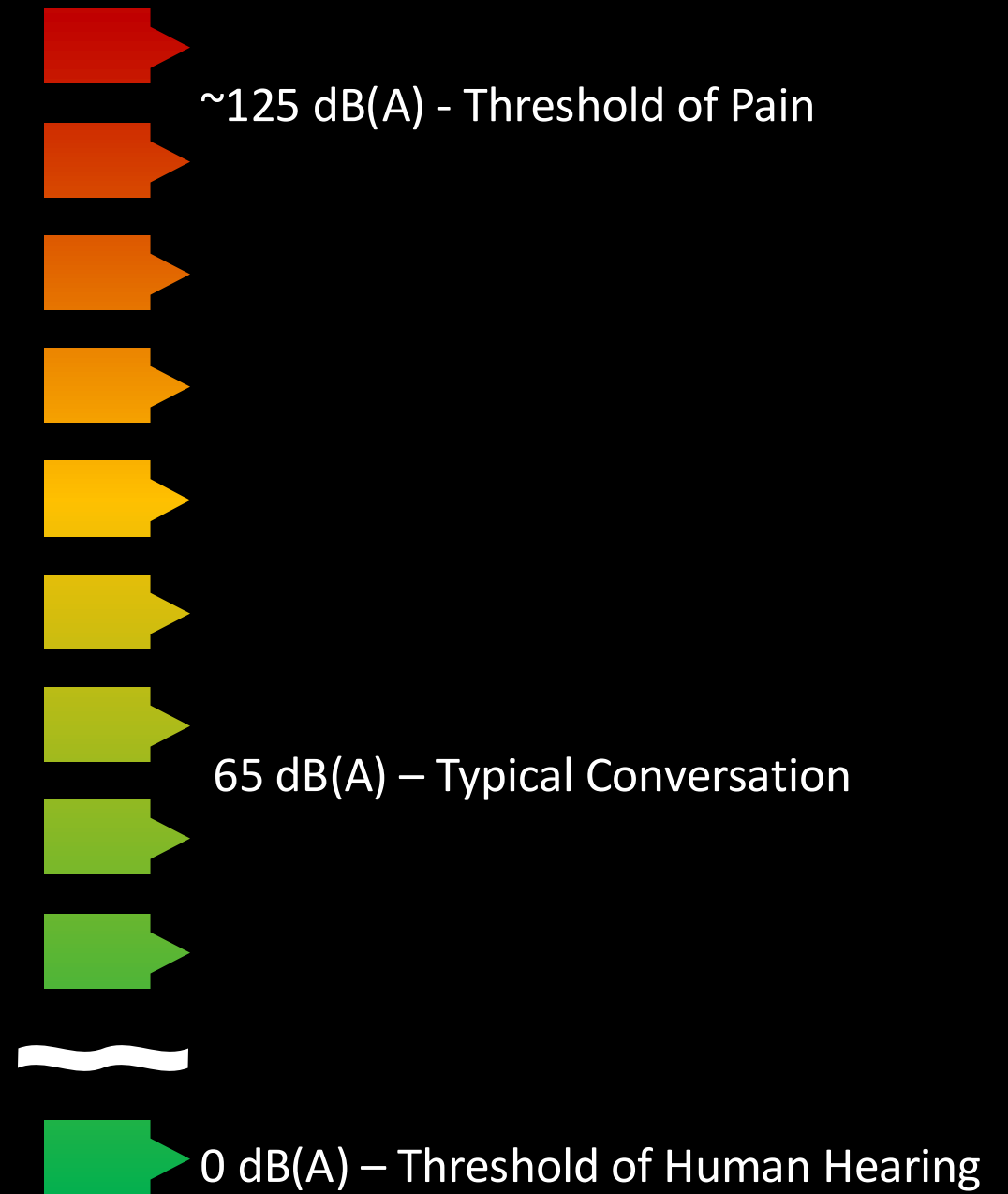
Sound level

Exposure time





*What does **dB(A)** mean?*



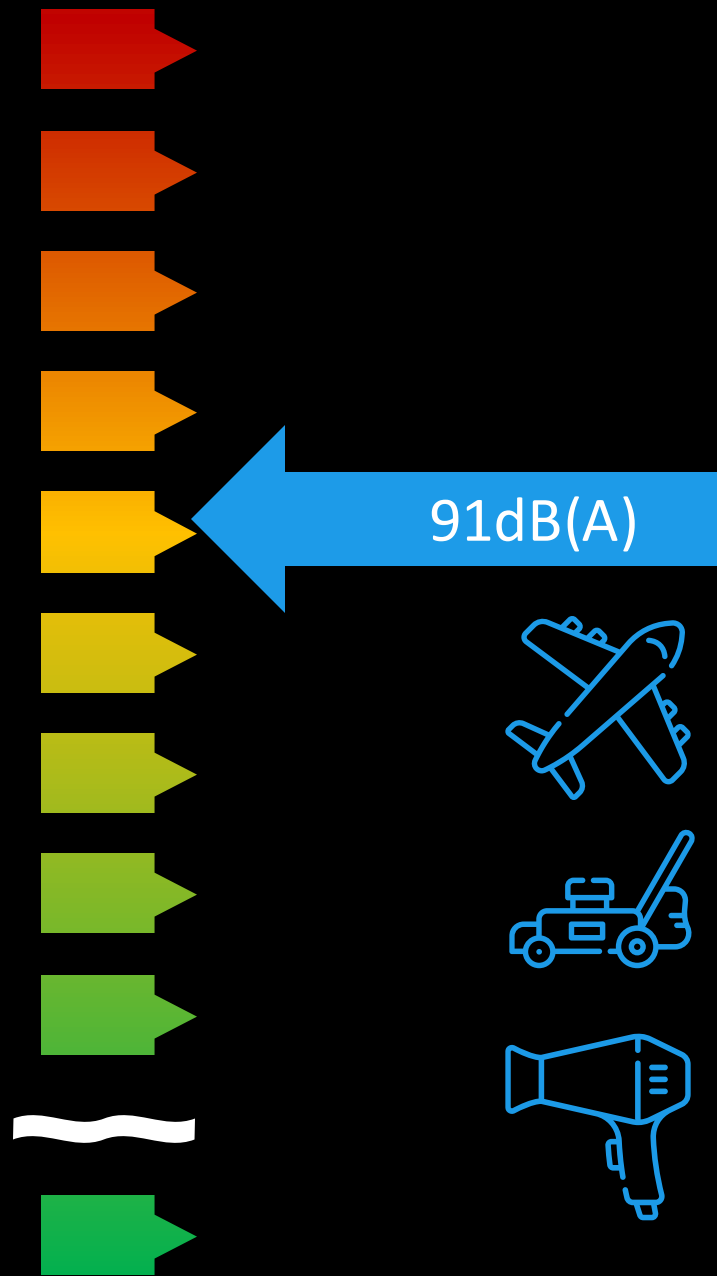


Exposure to
sound levels of

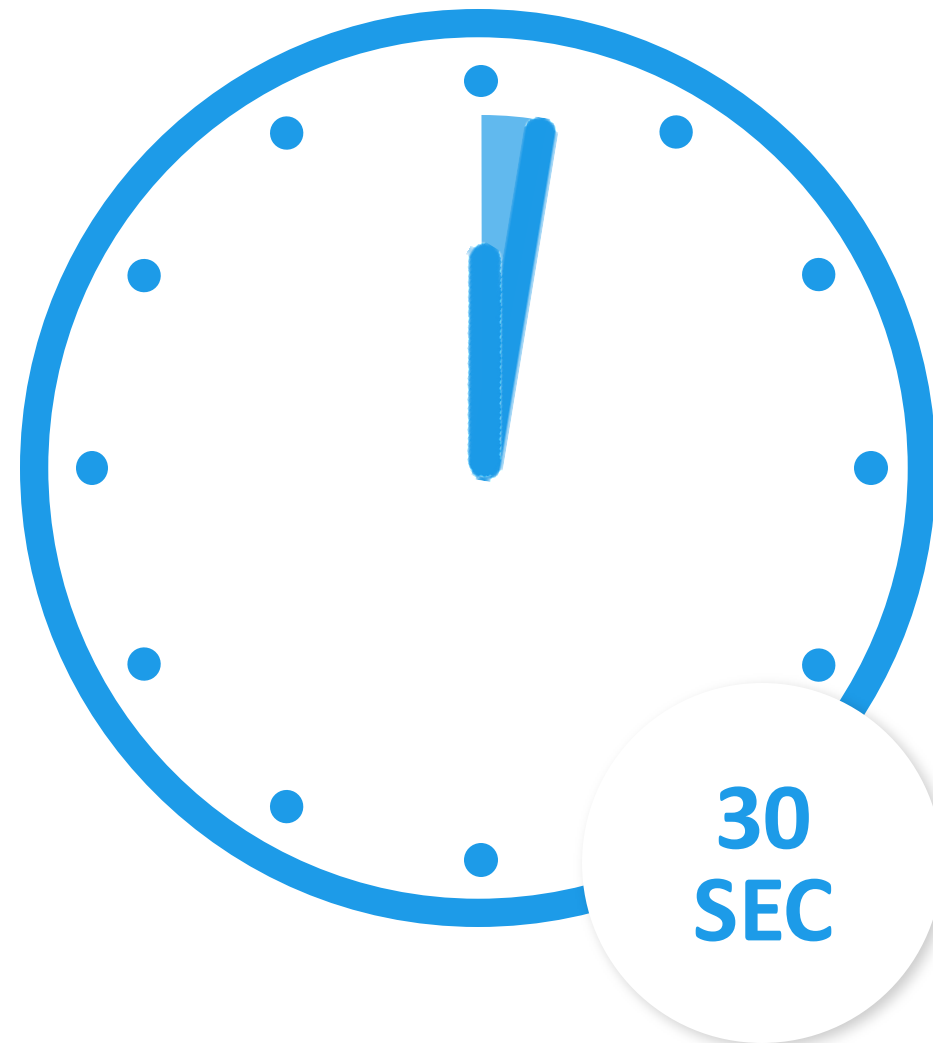
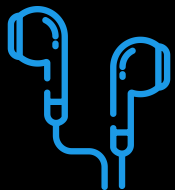
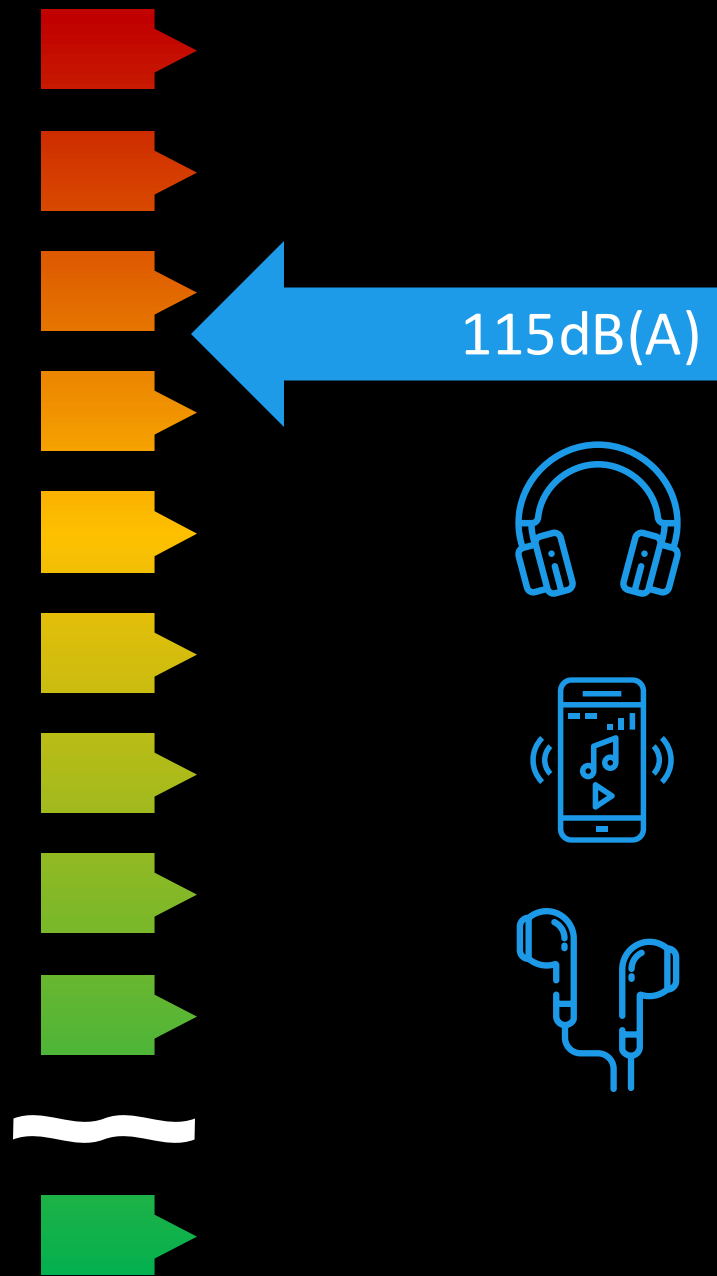
86dB(A)

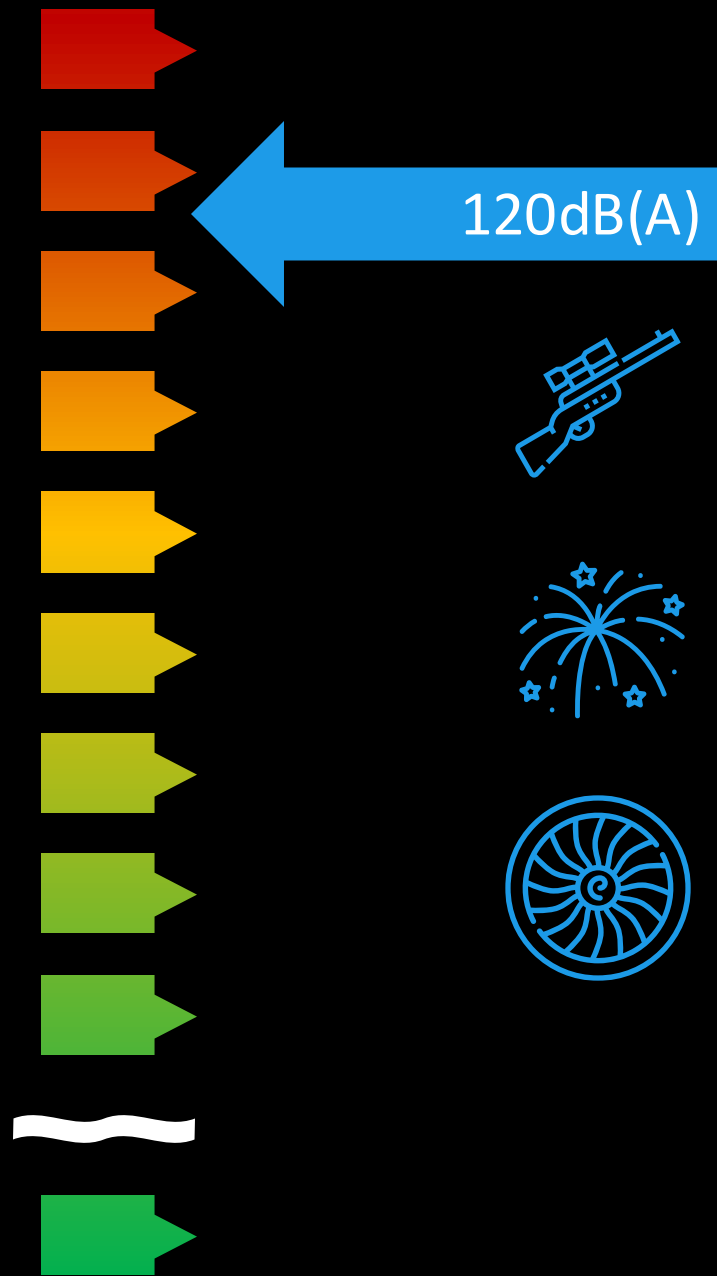
for 8+ continuous
hours can result in
**NOISE-INDUCED
HEARING LOSS**





National Institute for Occupational Safety and Health (1998)







Noise is the most common modifiable environmental cause of hearing loss among young and middle-aged adults

Carroll Y. I., et al., 2012

Hearing Conservation

Remove/reduce Source of Noise

Hearing Protection Devices

Education

Advocate

Clinical Rehabilitation





(REL)

Recommended Exposure Limits



90 dB(A)
5 dB exchange rate



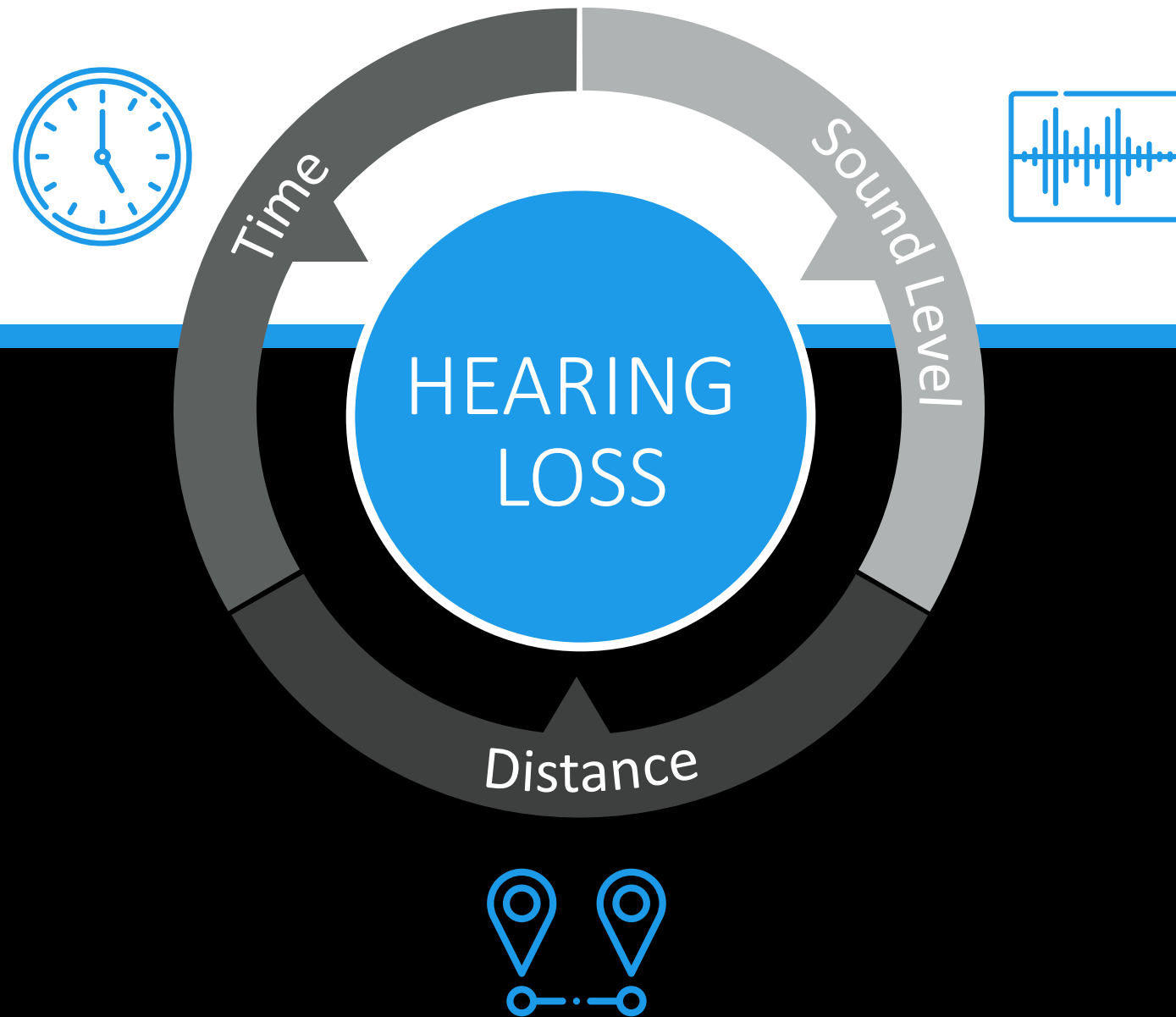
85 dB(A)
3 dB exchange rate



75 dB(A)
3 dB exchange rate

..... STRICTER REGULATION







Sound Level Meter

Specialized instrument used to measure environmental sound to ensure levels fall within recommended exposure limits

Typically, handheld with an external microphone

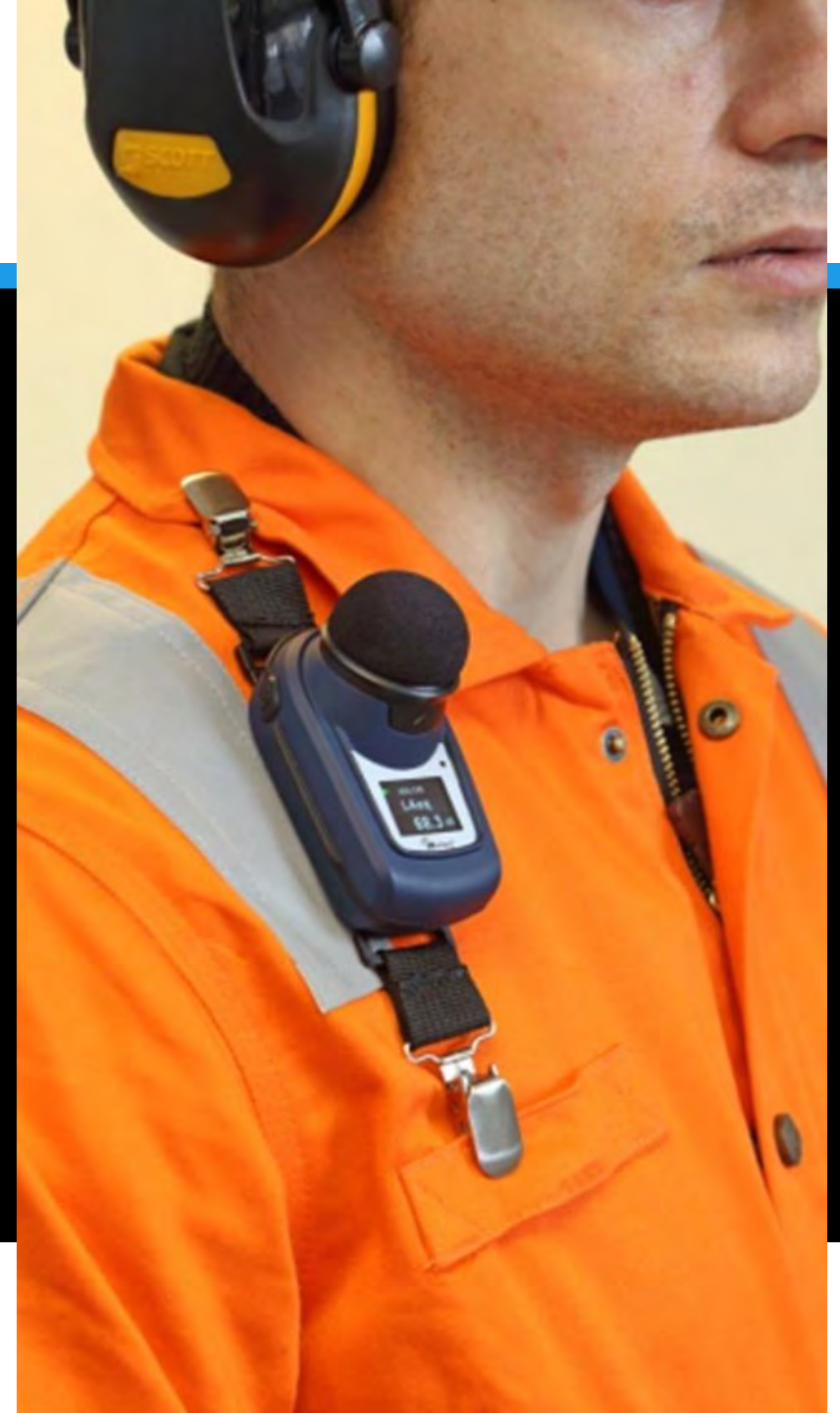
Various types intended for specific environments/uses

Personal Noise Dosimeters

Body worn instrument to measure the noise exposure of an individual

In workplaces where employees are mobile or where noise levels fluctuate over time

Provides calculations of data such as noise dosage, time-weighted average, minimum and maximum levels

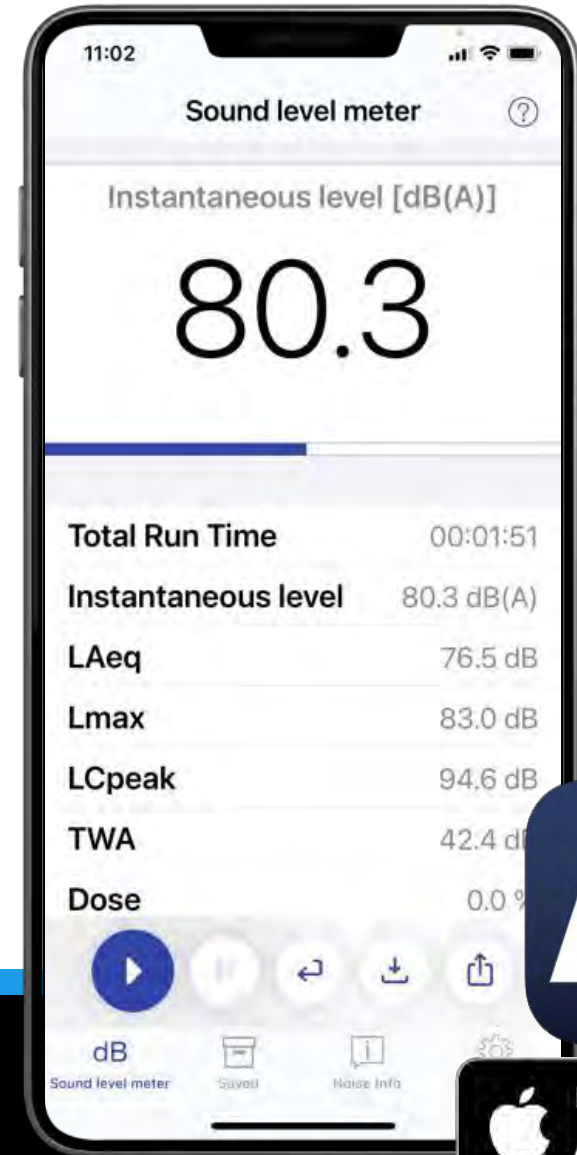


NIOSH Sound Level Meter App

Can be used with the smartphone's internal or an external microphone

Meets requirements for General Purpose SLM use when paired with an external microphone

Informational screens on noise hazards, hearing protection, and preventing hearing loss



 Download on the
App Store

SoundCheck Live

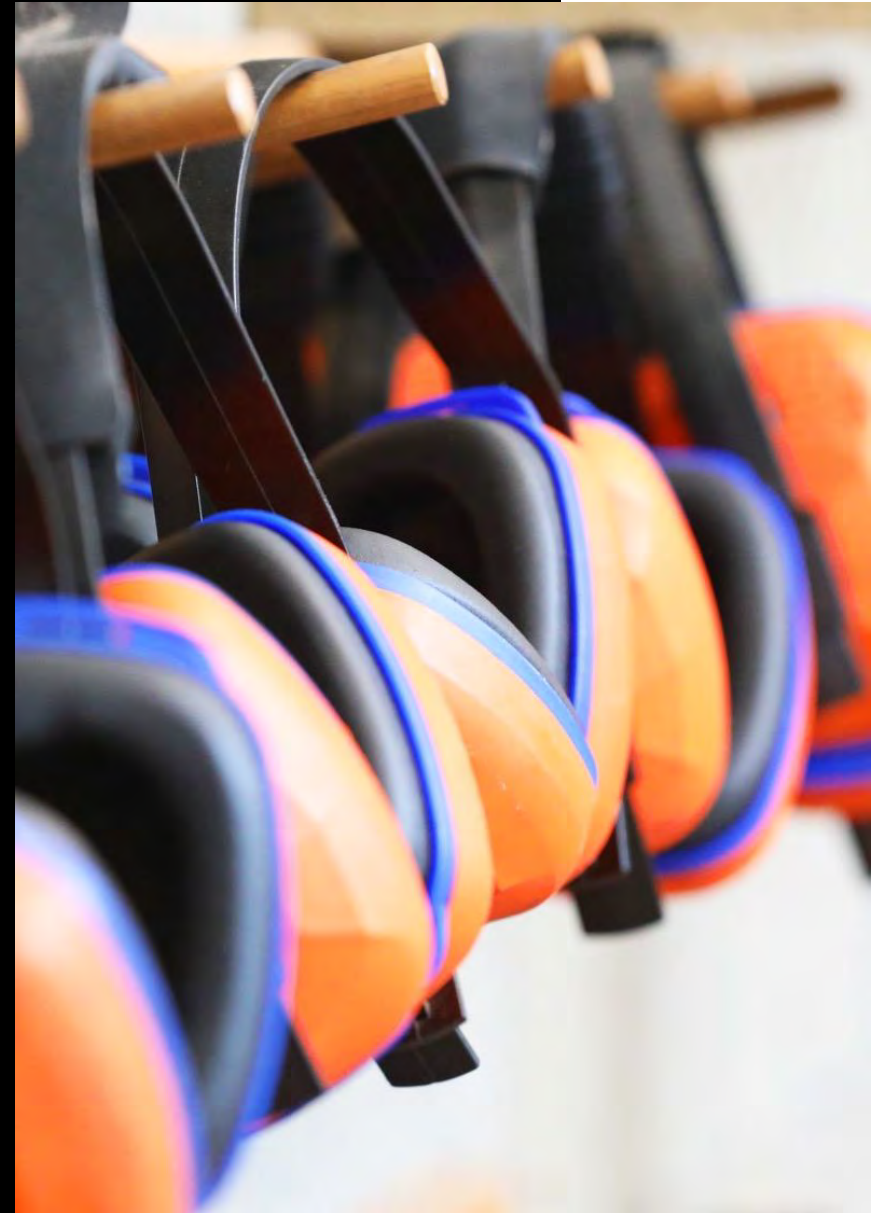
Find out if noise around you is safe or potentially harmful to your hearing using the SoundCheck Live sound level meter

Learn about environmental noise and how it may impact your hearing

Discover ways you can protect your hearing — everything from hearing protection devices like SoundGear, to limiting your exposure



Hearing Protection Devices (HPDs)





About **70%** of people exposed to loud noise never or seldom wear hearing protection

(NRR)

Noise Reduction Rating

The degree of noise reduction offered by a specific hearing protector

A standardized label is printed on the HPD's packaging

Rating is derived in a laboratory setting and may not reflect real-world reduction

Noise
Reduction
Rating

25 DECIBELS

(WHEN USED AS DIRECTED)

THE RANGE OF NOISE REDUCTION RATINGS
FOR EXISTING HEARING PROTECTORS
IS APPROXIMATELY 0 TO 30
(HIGHER NUMBERS DENOTE GREATER EFFECTIVENESS)

Starkey Laboratories, Inc. Eden Prairie, MN

Model No.: SoundGear BTE

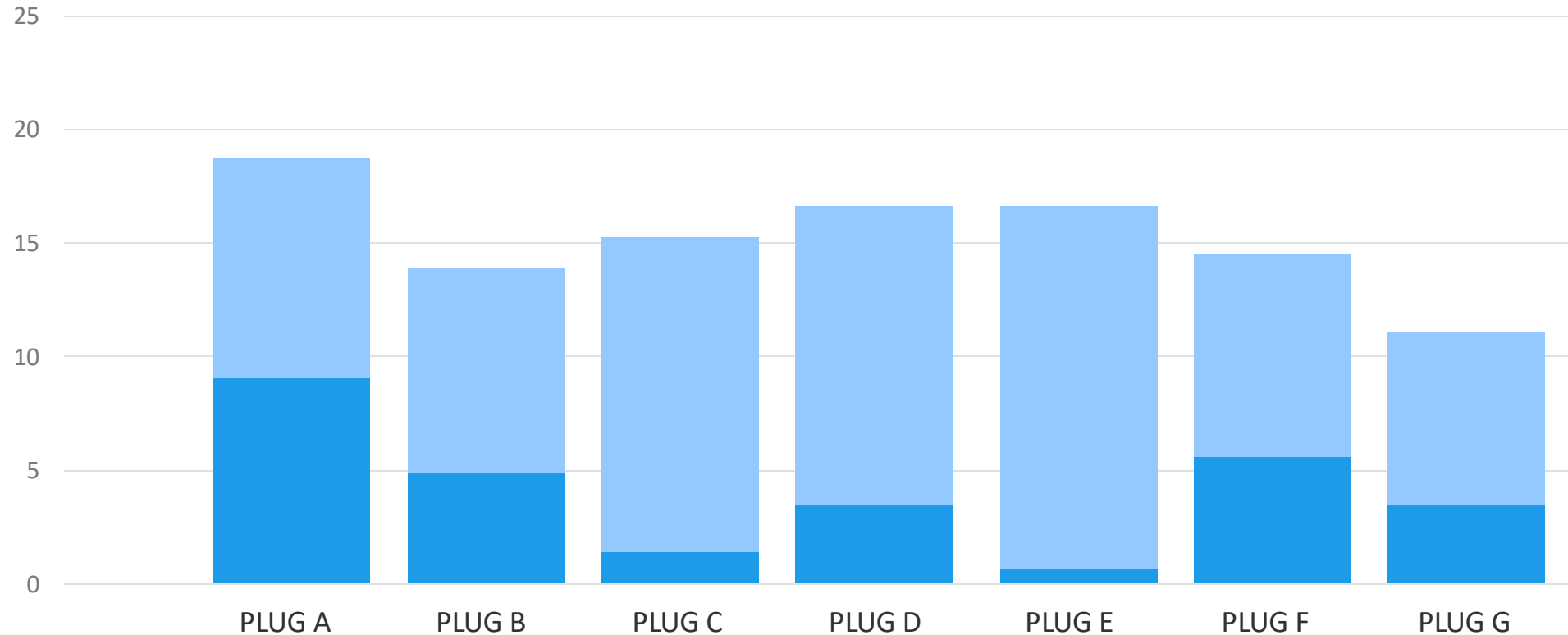
Federal law prohibits
removal of this label
prior to purchase



LABEL REQUIRED BY
US EPA REGULATION
40 CFR Part 211 Subpart B

Earplugs are rarely worn effectively

Why Consider Different Types of HPDs?



Hudak, R. (2005)

amount of protection listed on box (decibels) likely protection as worn by an untrained worker

What is the Right Amount of Attenuation?

Effective Level at the Ear Resulting from HPD Use	Protection Outcome
85 dB(A)+	Insufficient
80-85 dB(A)	Acceptable
75-80 dB(A)	Optimal or Ideal
70-75 dB(A)	Acceptable
Less than 70 dB(A)	Possible overprotection



Too much attenuation
= **Overprotection**

Interfere with communication

Compromise hearing of warning signals

Feeling of isolation

May result in

HPD use only when someone is watching

Incomplete insertion to hear better

Non-Custom Earplugs

Disposable Foam

Pre-molded and Banded

Earmuffs

Custom Earplugs

Solid

Musicians/Filtered

Electronic Protection



Foam Earplugs



Disposable

Single-use

Not designed for reinsertion

Multiple sizes and materials

**Attenuation depends
on proper insertion**

Highest NRR is 31 dB



Pre-molded Earplugs

Washable and reusable

**Multiple sizes, shapes,
and materials**

**Attenuation depends on
proper size selection**

Highest NRR is 26 dB

Banded Earplugs

**Convenient for
intermittent noise**

**Hangs around neck
when not in use**

**Occlusion effect most
noticeable with this type**

Lower attenuation

Highest NRR is 18 dB





Earmuffs

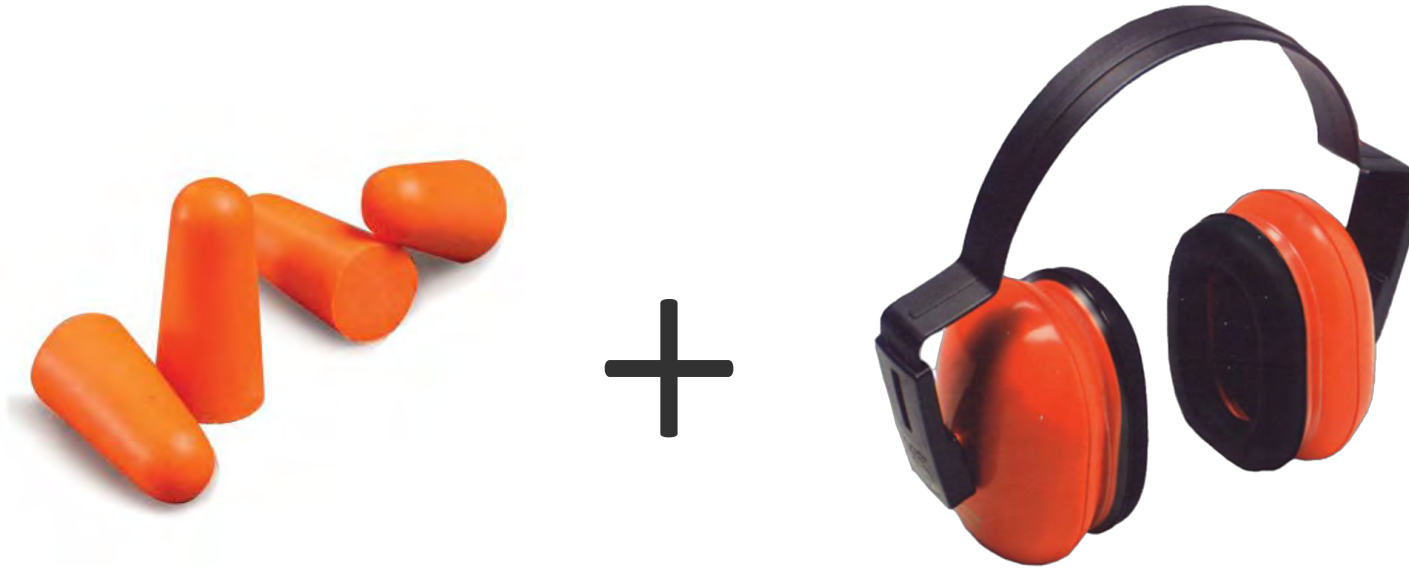
Easy to fit

Can be removed easily

**Can feel hot or heavy with
extended use**

Highest NRR is 31 dB

*Earmuffs with noise cancellation and/or
amplification are available*



Dual Protection

Provides approximately **5 dB more protection**
than the higher rated of the two devices

Does NOT double the NRR

Custom Solid Earplug



Outstanding noise protection
for a variety of recreational and
occupational environments

OFFERED BY STARKEY

NRR 27 dB

High Strength Silicone

High Frequency Noise Filter

(Hocks)



Contains a patented chamber to gradually attenuate sound to appropriate levels by reducing high frequencies while allowing low frequencies through

Recommended for general noise reduction while preserving speech for flight attendants, motorcyclists, and sports enthusiasts

OFFERED BY STARKEY

NRR 19-22 dB

High Strength Silicone

Custom Musicians and Filtered Earplug



“Flat attenuators”

Allows users to hear speech
and the nuances of music

OFFERED BY STARKEY

Mini Filtered Earplug

High Strength Silicone

Filter Options:

10 dB Filter

17 dB Filter

26 dB Filter

IPIL 33.1 dB Impulse Filter



ACTIVITY OR PRODUCT USE



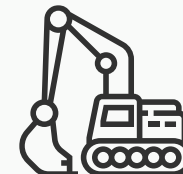
Music
Entertainment



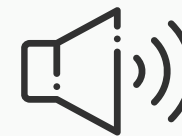
Audiophile/
Musician



Hunter/
Shooter



Industrial



General
Loud Noise

CUSTOM EARMOLDS

Solid Earplug



Sleeping
Earplug



Mini Filtered
Earplug



Electronic Protection



TYPES

Level Dependent – attenuate high levels [~ 80 -85 dB(A)] while allowing in low to moderate sounds

Noise-canceling



SOUNDGEAR

**A SOLUTION FOR
EVERY ENVIRONMENT**



SOUNDGEAR

Official NRA Licensed Product

Uses seamless sound-activated compression to trigger instant and automatic suppression of any noise over 95 dB for shooters

Represents Starkey's commitment to hearing protection and conservation

Applications:

- Hunting
- Competitive shooting
- Military
- Law enforcement
- Anyone who works with industrial machinery

Form Factors

Active

- ▼ **SoundGear Custom ITE**
 - Phantom Bluetooth
 - Silver
- ▼ **SoundGear Shield CIC**
 - Recreational (93 dB SPL)
 - Industrial (80 dB SPL)

Passive Custom

- ▼ **SoundGear Solid Ear Plug**
- ▼ **SoundGear Filtered Ear Plug**
- ▼ **SoundGear High Frequency Filter**
(Hocks)



Shield

Recreational

- 93/15 Matrix
- NRR
 - 26 dB with tri-flange buds
 - 32 dB with foam buds
- No VC or memories
- 10 battery – 140 hours

Industrial

- 80/8 Matrix
- NRR 25 dB
- No VC or memories
- 10 battery – 140 hours





Custom ITE

Silver

- Volume Control
- 1 digital listening mode (Normal)
- 95/30 Matrix
- 24 dB NRR
- 13 battery – 500 hours
- All ITEs come standard with “SoundGear” removable lanyard





PHANTOM

CUSTOM, BLUETOOTH®, RECHARGEABLE HEARING PROTECTION



Now an FDA Registered Hearing Aid

Discover the Innovation

BLUETOOTH, CUSTOM, CONVENIENT, COMFORTABLE

22 dB NRR

2.4 GHz technology
for audio streaming

Adaptive Feedback Canceller

Enhanced power management
features

Wind Noise Management

2-way Audio mic (iOS only)

Push Button and Rotary VC

23 hours of battery life including
4 hours of streaming

Lithium-ion rechargeable battery
and Custom Charger

Apple & Android Compatibility

4 digital listening modes

90/30 Matrix

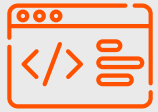
Faceplate Color



Shell Colors



Easy to Fit



No programming required by the professional

(Adjustments unavailable within Inspire software)



Automatically engages Stream Boost memory when streaming



4 Pre-programmed memories:

- Normal
- Max Compression
- HF Boost
- Mute



Maximum Wind Reduction applied to all memories



SOUNDGEAR

**A SOLUTION FOR
EVERY ENVIRONMENT**

The only effective hearing protection device is the one that is worn properly

Hearing Conservation in the Clinic



OSHA Compliance vs. Workers' Compensation



OSHA is intended to be a loss prevention program

Workers' Compensation is litigation for compensation toward rehabilitation

Generally, if a company is referring to you, they are getting audiometric monitoring from their own occupational hearing conservation trained technician or an outside audiometric provider

Referral to you is an indication of concern for their employees, they are looking for your professional judgment

Is this in Audiologists' scope of practice?

OSHA 1910.95(G)(7)(III):

“The audiologist, otolaryngologist, or physician shall review problems audiograms and shall determine whether there is need for further evaluation...”

ASHA Technical Report

2004-9(9): “Determine or assist in determining through evaluation or referral, work-relatedness of hearing loss for the purposes of otologic and/or audiologic referral and recording on the OSHA Log 300”

OSHA Log/Form 300:

A form employers use to record occupational illness and injuries throughout the year



Patient
Intake



Case
History



Otoscopy



Hearing
Evaluation



Referral
(if necessary)



Report

Scheduling and Patient Intake

Typically, the referring company covers costs for the assessment

When scheduling, request:

- Reason for referral

- Noise levels for job(s)

- Past audiograms



Thorough Case History

GOAL Avoid assuming all hearing loss is work-related

Inquire about

Noisy hobbies

(i.e. carpentry or motorcycle racing)

Military service

Recreational shooting

Prior/other employment
in noisy environments

Timing

Ask about hearing protection use

How often

When was the last time

Circumstances

(i.e. target practice but not hunting)

Don't forget to note
ototoxic exposures



Otoscopy

Cerumen impaction is not uncommon
with regular HPD use



Hearing Evaluation

Audiogram

Pure Tone Testing
Air Conduction, Bone Conduction

Speech Testing

Reporting Results

Note any Standard Threshold Shifts (STS):
Decrease of 25 dB or more at 2000, 3000, and 4000 Hz
compared to previous audiogram

Include determination of whether the noise at the current
employer caused or contributed to the hearing loss

OSHA "If an event or exposure in the workplace either caused or
contributed to the hearing loss, or significantly aggravated a pre-
existing hearing loss, you must consider the case to be work related"

Employers are looking to rule out changes in hearing that
are non-work related

"In my professional opinion" - then cite justification for
conclusions based on history, changes in hearing, etc.



Additional Follow Up

Discuss hearing protection device use

At work and at home

Emphasize safety and preserving hearing

Counsel on effective HPD use

Proper insertion

Appropriate times to wear

Alternatives if communication
is a concern

Discuss hearing aids if appropriate



Hearing Conservation

Remove/reduce Source of Noise

Hearing Protection Devices

Education

Advocate

Clinical Rehabilitation







Trade Shows

CUSTOM

SoundGear Custom products are for hunters and shooters who refuse to compromise when it comes to performance and personalization. These 100 percent digital devices feature the most advanced electronic hearing protection and enhancement technology on the market and are manufactured by the largest privately-held U.S. Hearing aid manufacturer — Starkey Hearing Technologies.



PLATINUM SERIES

FEATURES & BENEFITS

- Four digital programs to choose from
- Adjustable volume with up to 10 times normal hearing boost
- Custom Fit for all day comfort
- Patented HearClear™ wax protection system
- Right and left ear color coded
- 24dB NRR

INCLUDES

- Removable lanyard
- Cleaning brush
- Two-year warranty
- Bonus: 2 Cartons of #13 Zinc Air Batteries (Show Exclusive - \$50 Value)

MSRP: \$1,199.00
SHOW PRICE: \$ 999.00

Custom products are available in three colors:



• Buff and Clear • Black and Clear • Black and Black

SILVER SERIES

FEATURES & BENEFITS

- One digital listening program
- Adjustable volume with up to 10 times normal hearing boost
- Custom Fit for all day comfort
- Patented HearClear™ wax protection system
- Right and left ear color coded
- 24dB NRR

INCLUDES

- Removable lanyard
- Cleaning brush
- Two-year warranty
- Bonus: 2 Cartons of #13 Zinc Air Batteries (Show Exclusive - \$50 Value)

MSRP: \$ 999.00
SHOW PRICE: \$ 699.00



© SoundGear.com | @SoundGearHear | @SoundGear_Official | Facebook.com/SoundGearHearing



INSTANT FIT

SoundGear In-the-Canal is the smallest and lightest dynamic digital hearing protection product on the market. Ready to wear right out of the box, it rests discreetly inside your ear to deliver natural wind reduction and superior sound quality.

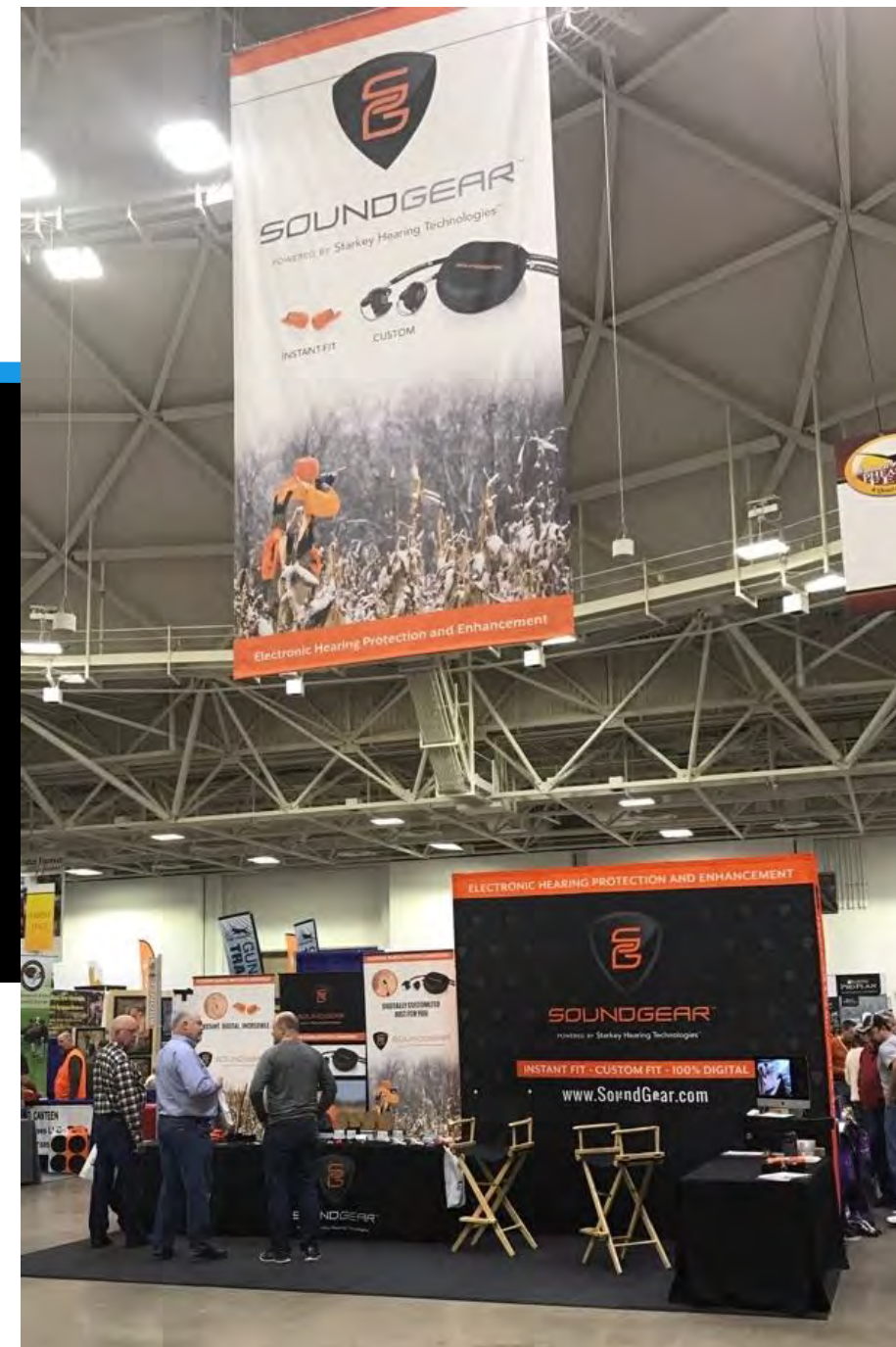
FEATURES

- Hearing enhancement up to five times normal hearing boost
- 25dB NRR
- Ready to wear

INCLUDES

- One pair of SoundGear digital hearing protection devices
- Carrying case
- Two pairs of orange silicone sleeves - (1) small (1) large
- Two pairs of black silicone sleeves - (1) small (1) large
- Two packs of batteries (Size 10)
- Cleaning brush
- One-year warranty
- BONUS: 1 carton of #10 Zinc Air Batteries (Show Exclusive - \$25 value)

MSRP: \$399.00
SHOW PRICE: \$275.00

Resources



It's A Noisy Planet
PROTECT THEIR HEARING
A program of the National Institutes of Health



**DID YOU KNOW
THAT MANY MUSIC
DEVICES HAVE
VOLUME LIMITING
CONTROLS?**

**Set a safe maximum
listening volume for
yourself and your kids.**

The Noisy Planet logo is a registered trademark of the
U.S. Department of Health and Human Services (HHS).



Resources

Council for Accreditation
in Occupational Hearing
Conservation

caohc.org



Thank you

