HEARING PROTECTION

NORMAL HEARING

0 dB	Softest sound that can be heard
60 – 70 dB	Normal Conversation
85 dB	iPod set to 75% loudness
107 dB	Power Saw
125 dB	Onset of pain

SOUND EXPOSURES THAT CAN LEAD TO HEARING LOSS

85 dB	gradual hearing loss with repeated exposures
100 dB	hearing loss with 15 minutes of repeated exposures
110 dB	hearing loss with repeated exposures of > 1 minute

SOUND LEVELS EXPERIENCED BY MUSICIANS

Normal piano practice	60 - 70dB
Fortissimo singer at 3 ft.	70 dB
Chamber music in a small auditorium	75 - 89 dB
Piano fortissimo	92 - 95 dB
Violin	84 - 103 dB
Symphonic music peak	110 - 120 dB

WHY YOU SHOULD WEAR HEARING PROTECTORS

- Musicians are routinely exposed to noise levels that can damage hearing.
- Most musicians have evidence of hearing loss
- The hearing loss was not found in musicians who wore hearing protection.
- Hearing loss present in up to 58% of classical and 49% of rock/pop, musicians.

RISK FACTORS FOR NOISE INDUCED HEARING LOSS

- music loudness
- closeness to source of sound
- length of exposure
- frequency of exposure
- headphone/ear bud use
- family history of hearing loss

WHAT MAKES A MUSICIAN'S HEARING PROTECTOR (HP)?

- Adequate Noise attenuation
  - degree of "quietness" caused
  - 10 dB reduction can be effective
  - HPs may have interchangeable filters giving 9, 15, or 25 dB reductions
- Attenuation that mimics the normal ear
  - More attenuation occurs at high frequencies vs. lower ones in a plugged ear. This can lead to mishearing and overplaying.
  - Attenuation distorts harmonics necessary to perceive music loudness & richness.
  - Therefore, getting a hearing protector which mimics the normal ear is important. This is called "flat" attenuation.
- Minimizing "Occlusion Effect"
  - Blocking ear canal causes low frequencies to reflect back to eardrum.
  - This can boost low frequencies 20 dB.
  - The occlusion effect can lead to:
    - Change in perception of voice quality
    - increased perception of other body sounds (breathing, chewing)
    - A sense of pressure in the ear
  - Ways to minimize the occlusion effect
    - Leave a vent hole in the ear plug
    - use very long and tight ear mold

TYPES OF EARPLUGS USED BY MUSICIANS

- User Formable Earplugs
  - wearer compresses material before insertion
  - only attenuates sound
  - PROS: cheap, effective for high noise levels, portable
  - CONS: need to be kept clean, hard to fit properly, poor attenuation characteristics, occlusion effect
- Pre-molded earplugs
  - Automatically shape to the ear canal
  - Only attenuate sound
  - PROS: cheap, effective for high noise levels, portable
  - CONS: need to be kept clean, poor attenuation characteristics, occlusion effect
- Musician Quality Earplugs
  - Attenuation with flat response
  - PROS: preserved sound quality, increased comfort, last longer
  - CONS: more expensive than user formable or pre-molded earplugs, need proper maintenance

PRE-MOLDED MUSICIAN EARPLUGS

- PROS:
  - preserved sound quality
  - increased comfort
  - available off-the-shelf
- CONS:
  - more expensive than generic earplugs
  - need proper maintenance
  - acoustics not as good as custom plugs

CUSTOM-MOLDED MUSICIAN EARPLUGS

- Professionally molded to fit the shape of your ear
- PROS
  - best performance of all earplugs
  - increased comfort
  - can match color to flesh tone
  - long life (4-5 years)
- CONS
  - most expensive option
  - need proper maintenance

OTHER HEARING PROTECTOR OPTIONS

- Interchangeable filters
- Vented earplugs
- In-ear monitoring
- Adaptive noise reduction

HOW TO GET USED TO USING HEARING PROTECTORS

- It may take 2-3 months to get used to them
- Gradually build up using them:
  - non-musical situations first
  - then use during practice
  - then use in group rehearsals or performances

SYMPTOMS OF HEARING LOSS

- Ringing or buzzing in ears
- Intolerance of sounds at levels that are normally not bothersome
- Ability to hear sounds but they lack clarity
- Perceiving sounds at a wrong pitch
- Trouble understanding phone conversations
- Trouble hearing above background noise
- Trouble following a conversation when more than one person speaks
- Thinking that people are not speaking clearly or mumbling
- Often misunderstanding what people say
- Often having to ask people to repeat themselves
- Frequent complaints by others that the TV is too loud