3M Personal Safety Division
Hearing Conservation Solutions

Detection  Protection  Validation

Hearing Conservation in the Mining Industry

Solutions Made Innovatively Easy

The power to protect your world.

3M
Every mining operation depends on a skilled workforce for its continued success. Protecting employees from the hazards of workplace noise is a global problem and an ongoing challenge, because miners still experience one of the highest levels of occupational hearing loss. Improving hearing conservation in the mining industry requires accurate detection of noise hazards, proper selection of hearing protection solutions and comprehensive hearing conservation programs designed for the rigors of mining.

The Extreme Environmental Conditions:
Miners work in a wide range of climates and conditions. It can be extremely hot or very cold, depending on the location and time of year. Hands are seldom clean, and miners’ hearing protection equipment must be designed to handle the challenges of these environments.

The Requirement for Detection:
Noise levels are closely monitored in many mines and operators need the ability to accurately measure each miner’s noise dose. Instrumentation for noise measurement often requires intrinsic safety standards.

The Importance of Listening:
While most miners need hearing protection, they may also need the ability to listen for warning sounds like approaching vehicles and equipment problems. Hearing protection solutions must have the correct attenuation for the environment to avoid overprotection.

The Value of Communication:
Many miners and maintenance teams need the ability to clearly communicate with co-workers and supervisors throughout the operation. In these situations, communication devices can be key to both safety and productivity.

The Human Factor:
Each worker is physically unique, so there is no one-size-fits-all solution – miners working in the same environments may need different protection solutions. The key to achieving success is offering enough different solutions to fit each miner comfortably.

Fit Test Validation:
Integrating hearing protector fit testing into your hearing conservation program helps fit workers by calculating Personal Attenuation Rating (PAR) and teaches proper wear. The 3M™ E-A-Rfit™ Validation System makes it easier to fit, train and motivate workers, and to assess and manage the long-term performance of your hearing conservation program.

Mining operations around the globe face skilled labor shortages that can impact both productivity and growth. Prolonged or repeated exposure to loud sounds may cause hearing loss and tinnitus (“ringing” in your ears), and may contribute to sleep disturbance, hypertension, anxiety, and stress. Retaining and protecting your workforce is essential to the success of your operation, making it more important than ever to implement comprehensive hearing conservation solutions.

1 http://www.cdc.gov/niosh/mining/researchprogram/hearingpreventionnoisecontrol.html
Key Sources of Sound in Mining Operations

Nearly every aspect of the excavation process is noisy. From earthmovers removing overburden, to excavators and shovels extracting minerals, noise and dust are everywhere. Mines that use augers, surface drills, scrapers, or stone saws add to the complexity of the noise exposure. Heavy equipment operators and miners who work in this stage of the process face a wide range of hearing protection challenges:

- **Noise Measurement**: Miners who work in the excavation process can be exposed to a wide range of potential noise hazards. Understanding the noise exposure will allow you to more effectively manage your hearing conservation program.
- **Dirty Hands**: Hands and gloves are seldom clean, and are usually covered with ever-present dirt and dust. 3M Push-Ins™ Earplugs are a perfect choice because there is no roll down required for a clean and comfortable fit.
- **Noise Level**: Miners need the correct level of noise protection for the job. The versatile 3M Peltor™ Optime™ earmuff product line makes it easy to match the protection level of the hearing protector to the noise reduction needs of people in different areas of the mine.
- **Communication**: Clear communication between co-workers is essential to both productivity and safety. 3M Peltor Lite-Com Pro II UHF Two-Way Radio Headset enables clear communication.

Downstream processing of minerals, ore, and rock involves a variety of bulldozers, front-end loaders, trucks, conveyors, crushers, and processes. While the equipment may vary from mine to mine, haulage and processing can create noise hazards as material is loaded, dumped, moved, and screened. Miners, heavy equipment operators and drivers all encounter challenges to their safety and productivity:

- **Noise Measurement**: Miners who operate and work around dump trucks, front-end loaders and other vehicles face a wide range of noise hazards. Measure variable noise levels with 3M Sound Examiner SE-400 Series Sound Level Meter.
- **Personal Protection Equipment (PPE) Integration**: Many processes require miners to wear respirators that should not be removed while they are on the job. 3M offers a variety of in-ear hearing protection solutions that are compatible with respirator facemasks, including 3M Push-to-Fit and Reusable Earplugs and the 3M Peltor ORA TAC In-Ear Tactical Communications Headset.
- **Communication**: Hauling equipment is large and operators may not be able to see the people with whom they are communicating. They need both hearing protection and clear communication with team members who may be out of sight. 3M Peltor Lite-Com Pro II UHF Two-Way Radio Headset enables communication between workers.
- **Dirty Hands**: Hands and gloves are seldom clean, and temperature extremes often dictate the type of protection equipment that workers prefer. Providing workers with both earmuffs and earplugs allows workers to select the right protection for variable conditions.

MSHA Mining Regulations
Title 30 Code of Federal Regulations
30 CFR Part 62 – Occupational Noise Exposure


Hearing Conservation Program
30 CFR 62.150
If the miner’s noise dose exceeds the permissible exposure level of 90 dBA, per 30 CFR 62.130, the miner must be enrolled in a hearing conservation program that complies with 62.150, which includes:

- **Noise Measurement**: 62.110
  Measurement of each miner’s noise dose, integrating all sound levels over the appropriate range to determine if the miner’s noise exposure exceeds the action level, and identify areas of the mine where hearing protectors are required.

- **Provision and Use of Hearing Protectors**: 62.160
  Allow miners who are exposed at or above the action level to choose from two earmuff types and two earplug types and ensure that the hearing protector is in good condition and is fitted and maintained in accordance with the manufacturer’s instructions. Miners must wear earmuffs and earplugs together when their exposure exceeds the daily hearing protection level.

- **Training**: 62.180
  Annual training of miners must include the purpose and value of hearing protection, the types of hearing protectors offered and canister, fitting and use of each type.
Detecting and monitoring noise exposure in mining is the first step in identifying where hearing protection may be needed.

**3M™ The Edge 5 Personal Noise Dosimeter**
Lightweight, shoulder-mount design with MSHA, SIRA (ATEX), CSA, and Simtars Intrinsic Safety Approvals.

**3M™ NoisePro™ Personal Noise Dosimeter**
Rugged design with features that allow miners to monitor noise exposure levels. Intrinsic Safety Certification with UL, cUL, MSHA, Ex, ATEX.

**3M™ Sound Examiner SE-400 Series Sound Level Meter**
Accurately measures highly variable noise levels by computing average sound pressure level over run time.

**3M™ Detection Management Software (DMS)**
Works with all 3M Detection Solutions data logging instruments to easily export, report and share data.

Protecting hearing and enhancing communication requires comfortable solutions with options that make it easy to select the right protection for every miner.

**3M™ Push-to-Fit Earplugs**
Easy insertion without rolling the foam tips makes them ideal for miners’ gloved and dirty hands.

**3M™ Disposable Earplugs**
Provides the best combination of protection and comfort for long mining shifts.

**3M™ Reusable Earplugs**
Durable enough to withstand the rigors of the mining environment, yet soft and comfortable. Washable earplugs can be reused many times, reducing waste.

**3M™ Banded Earplugs**
Easy on and off makes them perfect for workers in areas of the mine who need only intermittent hearing protection.

Training on the proper use of protection and measurement of attenuation levels can help you validate that your miners and maintenance teams are protected.

**3M™ E-A-Rfit™ Validation System**
The E-A-Rfit validation system objectively measures the noise reduction obtained by individual workers and makes it easy to document how well each hearing protector performs. It can help determine the right level of protection for the job while training miners to properly fit their 3M earplugs.

**3M™ Detection Protection Validation**
Training on the proper use of protection and measurement of attenuation levels can help you validate that your miners and maintenance teams are protected.

**3M™ Peltor™ Optime™ Earmuffs**
Designed for comfortable wear in challenging mining conditions. Multiple protection levels help provide the right protection for the job. Behind-the-head earmuffs work with most full brim hard hats.

**3M™ Peltor™ Earmuffs X Series**
Innovative foam earcup inserts help improve attenuation while new ear cushion foam technology helps provide a more effective acoustic seal against a variety of mining noise hazards.

**3M™ Peltor™ Lite-Com Pro II UHF Two-Way Radio Headset**
Hearing protection and frequency programmable two-way radio communication. Factory Mutual (FM) certified intrinsically safe. Behind-the-head earmuffs work with most full brim hard hats.

**3M™ Peltor™ ORA TAC In-Ear Tactical Communications Headset**
Combines hearing protection, ambient listening and two-way radio communication. Fits with most respirators, eyelwear, face masks, helmets, and hard hats.

Hearing Conservation Support
At 3M, we understand the challenges of the workplace, the complexities of fitting hearing protection and the importance of creating adaptable solutions for maximizing hearing protection. The 3M team of application specialists, sound engineers and support personnel provides an unmatched level of support you can rely on to advance your hearing conservation program.
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For More Information In U.S.:
Technical Assistance: 1-800-243-4630
Customer Care Center: 1-800-338-1667
Detection Support: www.3M.com/hearing

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<thead>
<tr>
<th>SKU NO.</th>
<th>DETECTION SOLUTIONS</th>
<th>3M PRODUCT NO.</th>
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<tbody>
<tr>
<td>70071579307</td>
<td>The Edge 5 Personal Noise Dosimeter, 1/case</td>
<td>EED-05</td>
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<tr>
<td>70071621141</td>
<td>Sound Examiner Sound Level Meter, 1/case</td>
<td>SE-402</td>
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<td>70071533536</td>
<td>NoisePro™ Personal Noise Dosimeter, 1/case</td>
<td>NP-GL</td>
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<td>70071608213</td>
<td>Detection Management System (DMS), 1/case</td>
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<tr>
<td>70071515129</td>
<td>E-A-R™ Re-Use™ “Pink Neons” Corded Earplugs in polybag, 2000 pr/case, NRR 33 dB*</td>
<td>311-1250</td>
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<tr>
<td>70071515046</td>
<td>E-A-R™ Re-Use™ “FK™” Uncorded Earplugs in polybag, 2000 pr/case, NRR 35 dB*</td>
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<td>70071515756</td>
<td>E-A-R™ UltraFit™ 27 Corded Earplugs, 400 pr/case, NRR 27 dB*</td>
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<tr>
<td>70071515632</td>
<td>Skull Screw™ Corded Earplugs, 400 pr/case, NRR 32 dB*</td>
<td>P2001</td>
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<tr>
<td>70071515923</td>
<td>Tri-Flange™ Corded Earplugs, 400 pr/case, NRR 26 dB*</td>
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<tr>
<td>90001651271</td>
<td>Optime™ 60 Behind-the-Head Earmuffs, 10 pr/case, NRR 21 dB*</td>
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<td>Optime™ 100 Behind-the-Head Earmuffs, 10 pr/case, NRR 26 dB*</td>
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<td>90001551279</td>
<td>Optime™ 105 Behind-the-Head Earmuffs, 10 pr/case, NRR 29 dB*</td>
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<td>60007079889</td>
<td>X Series 1 Hard Hat Attached Earmuffs, 10 pr/case, NRR 21 dB*</td>
<td>XP3E</td>
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<td>60007079897</td>
<td>X Series 2 Hard Hat Attached Earmuffs, 10 pr/case, NRR 24 dB*</td>
<td>X2P3E</td>
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<td>60007079905</td>
<td>X Series 3 Hard Hat Attached Earmuffs, 10 pr/case, NRR 25 dB*</td>
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<td>60007079913</td>
<td>X Series 4 Hard Hat Attached Earmuffs, 10 pr/case, NRR 25 dB*</td>
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<td>X Series 5 Hard Hat Attached Earmuffs, 10 pr/case, NRR 31 dB*</td>
<td>X5P3E</td>
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<td>60007040939</td>
<td>Wearing Behind-the-Head Earmuffs, 10 pr/case, NRR 17 dB*</td>
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<tr>
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<td>HT Series Listen Only Hard Hat Attached Headset, 1/case, NRR 23 dB*</td>
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<tr>
<td>90007161526</td>
<td>MT Series Two-Way Hard Hat Attached Headset, 1/case, NRR 21 dB*</td>
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<td>90007161287</td>
<td>ORA TAC-In-Ear Tactical Communications Headset, 1/case</td>
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<td>ORA TAC Big Button Connector, 1/case</td>
<td>COM-GBB</td>
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<td>TacticalPro Hard Hat Attached Headset, 1/case, NRR 22 dB*</td>
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<td>90001600644</td>
<td>WS 100 Communications Hard Hat Attached Headset, 1/case, NRR 20 dB*</td>
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Noise Reduction Rating (NRR): *Research suggests that many users will receive less noise reduction than indicated by the NRR due to variation in hearing protector fit, design and motivation of the user. It is recommended that the NRR be reduced by 50% to better estimate typical workplace exposure.

These hearing protectors help reduce exposure to hazardous noise and other loud sounds. Misuse or failure to wear hearing protectors at all times that you are exposed to noise may result in hearing loss or injury. For proper use, see supervision, issue instructions and call 3M PSD Technical Service in the USA at 800-243-4630. If there is any drainage from your ear or you have an ear infection, consult with your physician before wearing. Failure to do so may result in hearing loss or injury.

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