

Anti-Vibration Gloves: Standards, Science, and Safety

When power tools start their relentless shake, rattle, and roll, your hands shouldn't have to suffer the consequences. Hand-arm vibration syndrome (HAVS) isn't just an occupational nuisance—it's a serious, progressive condition that can lead to permanent nerve damage, reduced grip strength, and the painful "white finger" phenomenon.

While proper tool selection and work practices remain the first line of defense, anti-vibration gloves play a crucial supporting role in protecting workers from harmful vibrations.



Understanding Hand Arm Vibration Syndrome (HAVS)

Hand-arm vibration is the transfer of vibration from a tool or work piece to a worker's hands and arms, occurring most commonly through prolonged contact with vibrating tools or surfaces.

Common Vibrating Tools

- Jackhammers and pneumatic drills
- Chainsaws and brush cutters
- Grinders and sanders
- Impact wrenches
- Concrete breakers

HAVS Progression

Left unchecked, HAVS can progress from mild tingling to severe symptoms including numbness, reduced dexterity, pain, and circulatory problems that make it difficult to perform even simple tasks.

HAVS is a chronic and progressive disorder where [early recognition and prevention is the key](#) to managing vibrating tool exposures and health effects.



The Science Behind Anti-Vibration Standards

ISO 10819 and ANSI S2.73

These standards specify methods for laboratory measurement, data analysis, and reporting of vibration transmissibility of gloves with vibration-reducing material.

Key requirements for certification:

- Medium frequency (25-200 Hz): At least 10% reduction
- High frequency (200-1,250 Hz): At least 40% reduction
- Full coverage: Damping material must cover palm, fingers, and thumb
- Thickness limits: Palm padding capped at ~8mm

Regulatory Frameworks

European (EU Directive 2002/44/EC):

- Exposure Action Value: $2.5 \text{ m/s}^2 \text{ A(8)}$ daily exposure
- Exposure Limit Value: $5.0 \text{ m/s}^2 \text{ A(8)}$ daily exposure

North American:

OSHA doesn't set specific limits, relying on the General Duty Clause and industry guidance from ISO 5349 and ACGIH Threshold Limit Values.

Materials Science: What Makes Anti-Vibration Gloves Work

Anti-vibration gloves rely on carefully engineered materials that convert mechanical vibration energy into heat and distribute forces across a broader area.



Viscoelastic Materials

- Viscoelastic foams ("memory foam")
- Gel inserts (silicone and urethane)
- Advanced polymers (neoprene and synthetic rubbers)



Air-Based Systems

- Air bladders: Individual chambers providing consistent protection
- Air pods: Small pockets of compressed air that decouple the hand from direct tool contact



Cutting-Edge Innovations

3D knitted fabrics with integrated silicone tubes, engineered textiles, and breathable damping pads that provide protection without sacrificing comfort or dexterity.



How Anti-Vibration Gloves Are Manufactured

1

Foundation Construction

The base glove uses durable textiles or synthetic leather for its chassis. Examples include nylon/spandex for flexibility and microfiber/polyurethane for palm grip, enhancing durability.

2

Strategic Padding Placement

Vibration-reducing materials are precisely placed across the palm, fingers, and thumb, adhering to testing standards. Damping materials are concentrated in high-force areas while maintaining glove flexibility.

3

Pattern Engineering and Assembly

Manufacturing involves precise panel cutting to avoid gaps and strategic stitch line placement outside high-pressure zones. Lamination techniques are used to prevent rigid "bridges" that bypass damping.

4

Quality Control and Testing

Finished gloves undergo rigorous testing with specialized vibration measurement equipment. This verifies compliance with ISO 10819/ANSI S2.73 requirements, ensuring certification before market release.

RealWorld Performance: What to Expect

Where Anti-Vibration Gloves Excel

- Mid to high-frequency tools: Grinders, sanders, and some impact tools
- Surface grinding operations: Where palm contact is significant
- Consistent grip applications: Tools requiring sustained contact



Limitations to Understand

- Low-frequency limitations: Large percussive tools like jackhammers see minimal benefit
- Tool-specific performance: The same glove may perform differently on various tools
- Dexterity trade-offs: Heavy padding can reduce grip strength and fine motor control
- No magic bullet: Should be combined with other control measures

⊗ Anti-vibration gloves are not a complete solution on their own. They must be part of a comprehensive vibration control program.

Building a Robust Vibration Control Program

An effective hand-arm vibration control program is a systematic approach to identify, assess, and mitigate risks associated with vibrating tools, ensuring worker safety and regulatory compliance.

	Risk Assessment Identify all sources of hand-arm vibration, including tools and processes. Evaluate the level and duration of exposure for workers, considering task-specific variations and tool types. Document findings and prioritize risks. - Identify tools and tasks causing vibration. - Assess exposure duration and intensity. - Prioritize high-risk activities and workers.
	Exposure Monitoring Implement a system to monitor and record individual or group vibration exposures using accelerometers or exposure calculators. Regularly review data against exposure action values (EAV) and exposure limit values (ELV). - Use vibration meters for accurate measurements. - Maintain detailed exposure records for each worker. - Regularly review data against EAV and ELV.
	Tool Selection & Maintenance Procure low-vibration tools whenever possible. Establish a robust maintenance schedule to ensure tools operate efficiently and do not degrade to produce higher vibration levels over time. Implement a "tool graveyard" for high-vibration tools. - Prioritize low-vibration rated tools. - Regularly inspect and maintain all vibrating equipment. - Replace worn or faulty tools promptly.
	Worker Training Provide comprehensive training to all workers who use vibrating tools. Cover HAVS symptoms, risks, proper tool handling techniques, and the importance of anti-vibration gloves and other control measures. - Educate workers on HAVS symptoms and risks. - Train on correct tool use to minimize vibration. - Promote use of anti-vibration PPE.
	Program Evaluation & Improvement Periodically review the effectiveness of the entire vibration control program. Use audit results, health surveillance data, and worker feedback to identify areas for continuous improvement and adapt to new technologies or regulations. - Regularly audit program effectiveness. - Incorporate worker feedback for improvements. - Stay updated on best practices and regulations.

Selecting the Right Anti-Vibration Gloves

1

Certification Verification

Verify ANSI S2.73/ISO 10819 compliance—not just marketing claims. Look for official certification marks on packaging and documentation.

2

Full Coverage Design

Ensure vibration-reducing material covers the entire palm, all fingers, and thumb. Avoid half-finger designs that can't meet certification requirements.

3

Appropriate Thickness

Look for palm padding around 8mm or less for optimal dexterity while maintaining protection. Thicker isn't always better.

4

Quality Construction

Check for continuous padding without gaps in critical areas. Examine stitching quality and material durability for long-term performance.

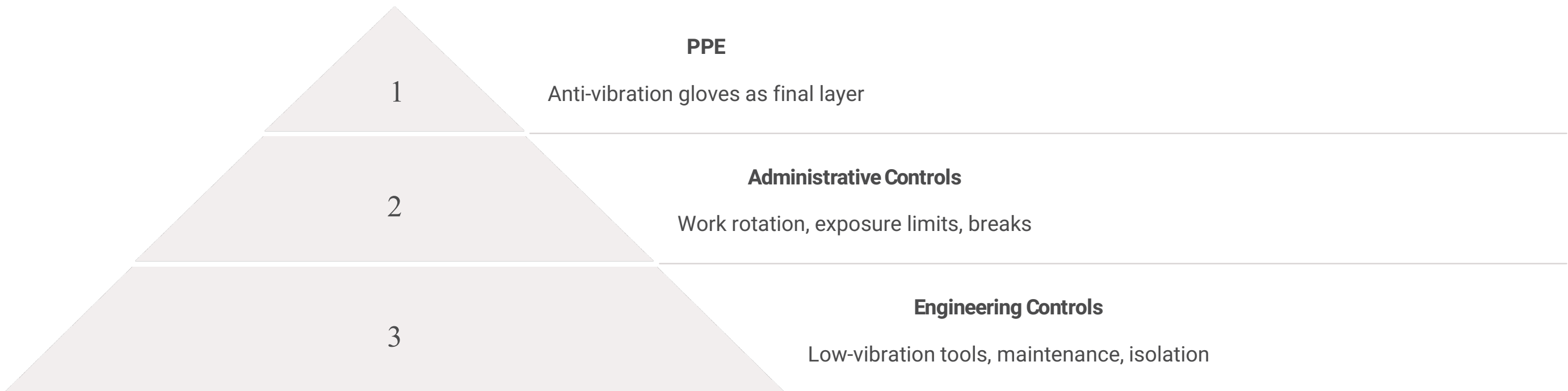
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Application-Specific Factors

Consider tool-specific data, environmental factors (temperature, chemicals), and multi-hazard protection needs (cut resistance, impact protection).

Best Practices for Implementation

The Hierarchy of Controls



Supporting Measures

Thermal Protection

Provide employees with protective clothing to keep them warm and dry, encouraging good blood circulation—even basic thermal protection helps prevent HAVS progression.

Health Surveillance

Implement regular health monitoring for workers using vibrating tools to identify early signs of HAVS and prevent progression through early detection and intervention.



Conclusion: Protection That Works

Anti-vibration gloves represent a crucial component of modern workplace safety, but they're not a silver bullet.

Effective protection starts with choosing tools wisely, maintaining equipment properly, and managing exposure time—then backing up these primary controls with properly certified anti-vibration gloves that meet established standards.

- ❏ Your hands are irreplaceable. Don't leave their protection to chance—invest in the science-backed, standards-certified protection they deserve. Because when the tools start shaking, your safety shouldn't be left to luck.

Looking to implement a vibration control program? Consider consulting with occupational safety professionals who can help assess your specific risks and recommend appropriate control measures, including the right anti-vibration gloves for your applications.