

Sound Microphone Installation Methods



Stand-Mounted (Free-Field in Open Air)

Stand-mounted microphones are commonly used to measure environmental sound levels (such as L_{max} and L_{Aeq}), construction-related noise from equipment and machinery, and traffic-generated ambient sound. Depending on the measurement objectives and applicable standards, the microphone may be oriented vertically (facing upward) or directionally. Mounting height varies based on project requirements, but a typical installation height is 1.2 to 1.5 m (4 to 5 ft) above ground level. According to ISEE guidelines, the microphone must be positioned away from reflective

surfaces, fitted with an appropriate windscreen, and calibrated in accordance with standard procedures prior to measurement.

Typical Use Cases

- Residential compliance monitoring
- Construction monitoring
- Long-term unattended monitoring



Micromate Plus Sound Level Microphone
Model #727A3001

Benefits of Tripod Mounting

Consistent and Repeatable Measurements

Provides a stable, fixed position, reducing movement induced noise and ensures repeatability between measurement locations, days, or projects.

Compliance with Standards and Regulations

Tripods make it easier to meet requirements in ISEE standards (and others), including the requirement for proper placement away from reflective surfaces and height.

Flexible and Fast Deployment

Tripod mounting allows quick deployment and relocation for short-term investigations or projects and is easily adjusted for height and levelling on uneven terrain.

Improved Environmental Performance

Elevated mounting keeps the microphone clear of vegetation, snow, dust, and standing water. It also allows better airflow around the windscreen, reducing wind-induced noise and preventing false low-frequency noise caused by ground movement during blasting or heavy equipment operation.

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Structure-Mounted

With this installation method, a microphone is mounted using a wall-bracket affixed to a building. It measures noise as it is received at a structure rather than in a free-field location. Because reflections and mounting effects can strongly influence results, this installation method is governed by international, national, and project-specific standards, including ISO 1996 (Acoustics: Description, Measurement, and Assessment of Environmental Noise) and ANSI S12 Series (Environmental and Community Noise). The ISO standard specifies

a -6 dB correction between a façade-mounted (flush) microphone and a free-field microphone, representing an idealized case and understanding that smaller deviations commonly occur in practice. The normative text provides limited guidance on façade mounting, with Annex B (informative) describing two acceptable approaches—mounting the microphone on a plate attached to the surface or directly flush with the surface—each subject to strict requirements for microphone size, surface flatness, material, and geometry, as supported by analyses of the -6 dB correction in urban environments. For blasting or construction-related activity, free-field mounting is strongly preferred; however, far-field and structure-mounted microphones are often used in tandem to provide stronger, more defensible noise assessments.

Typical Use Cases

- Noise impact studies
- Legal or dispute investigations
- Worker exposure
- Large construction and mining projects (used in tandem with far-field)

Benefits of Structure Mounting

Measurement of Noise Where it is Experienced

Capturing sound levels at the building façade provides a more representative assessment of human exposure. It is especially useful for hospitals, schools, and worker-occupied buildings near construction.

Enables Receiver-Specific Compliance Assessment

Some permits and municipal bylaws define limit requirements at the receiver.

Improved Security and Reduced Risk of Tampering

Microphones mounted on structures are less visible and harder to disturb or vandalize. They are particularly valuable for long-term unattended monitoring.

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Pole-Mounted or Elevated Microphones

Pole-mounted or elevated microphones are often used to avoid ground effects or obstructions, typically 3 to 10 m above ground level. They are mounted on poles or masts and are often coupled with solar-powered monitoring stations and remote access via software. They do require a more robust wind protection as they are more sensitive to wind-induced noise. Pole-mounted microphones are not usually mandated outright by compliance standards, but they are explicitly allowed and conditionally permitted in several international and national standards when specific

measurement objectives or site constraints apply for noise measurement. For the ISEE standard, if pole-mounting is used, the measurements must remain compliant with free-field requirements and the installation must be proven not to increase wind noise.

Typical Use Cases

- Large construction corridors
- Mines with complex topography
- Long-range blast-noise studies

Benefits of Pole-Mounting

Reduced Ground and Near-Field Effects

Elevating the microphone minimizes interference from ground reflections, vehicle-induced vibrations, and site activity. It improves consistency for long-range or area-wide sound measurements.

Security Against Vandalism or Theft

Elevated mounting is well suited for long-term, unattended monitoring where the risk of vandalism or theft exists. It is commonly used when compliance monitoring lasts weeks or months.

Linear Microphone Installation Methods



Blast Air Overpressure Microphones (Near-Field and Far-Field)

When measuring blast air overpressure, a linear (unweighted) microphone is used to capture peak sound pressure levels, reported in dB(L). The microphone is typically mounted on a short stand, stake, or ground plate at a height of 1.2 to 1.5 m (4 to 5 ft) above ground level; structural attachment is discouraged to avoid reflective and vibrational influences. Where possible, the microphone is positioned with line-of-sight to the blast and located well away from buildings, walls, vehicles, or other reflective surfaces to maintain free-field conditions. The microphone is generally oriented vertically (facing upward) and must be fitted with a windscreens, which is mandatory for air overpressure measurements.

The International Society of Explosives Engineers (ISEE) provides widely accepted guidance for air overpressure (airblast) monitoring through the ISEE Blasters' Handbook and related best-practice documents. Airblast limits may differ depending on local regulations and project-specific requirements; however, 134 dB(L) is generally recognized as the maximum acceptable level.¹ To ensure accurate measurement, a high-pressure, calibrated linear microphone specifically designed for air overpressure monitoring must be used, with the capability to accurately capture low-frequency energy and high peak pressures. Monitoring should be avoided during high wind conditions or when rapid wind direction changes are present, as these can introduce false or distorted readings.

Air overpressure measurements target low-frequency impulsive pressure waves (<250 Hz) that can reach 1,000 Pa (0.145 psi or 154 dB(L)). Sound microphones, on the other hand, are designed to characterize how humans perceive sound, using frequency weightings (A or C) and slow or fast response settings, with operating ranges up to 20 kHz and 140 dB. Results are interpreted as blast pressure, not environmental noise. In many cases, air overpressure is measured alongside sound for a complete picture.

Typical Use Cases

- Open-pit mining blasts
- Quarry blasting
- Regulatory blast compliance



Micromate Plus Linear Microphone
Model #727A3101

Benefits of Air Overpressure Monitoring

Protection of Nearby Structures and Infrastructure

Measuring air overpressure ensures that blast-induced air pressure remains below levels associated with structural damage.

Human Annoyance

Airblasts are often heard or felt even when the vibration is low. Ensuring the air blast remains under specified limits reduces complaints and community concerns and builds trust with nearby residents and stakeholders.

¹ United States Bureau of Mines (USBM RI 8485/OSMRE - 30 [CFR 816.67](#))