**Section 910.105 Measurement Techniques for 35 Ill. Adm. Code 901**

To determine a noise source's compliance with 35 Ill. Adm. Code 901, sound pressure level measurements are obtained using the following measurement techniques:

a) Site Selection

1) One or more outdoor microphone positions may be chosen within the boundaries of the receiving land, as long as the positions are at least 25 feet (7.6 meters (m)) from the property-line noise source. The 25-foot setback distance is from the noise source and not the property line unless the noise source is contiguous to the property line.

2) Other measurement locations may be used for investigatory purposes, including the following:

A) Determining the extent of noise pollution caused by the source of sound;

B) Determining the ambient; and

C) Analyzing those acoustical parameters that describe the sound source.

3) For measurements of sound sources with no audible discrete tones, set up the microphones at least 25 feet (7.6 m) from any reflective surface that may affect data. If microphones are within 25 feet, determine the effect, if any, of the reflective surface on the measured data.

4) For measurements of sound sources with audible discrete tones, set up the microphones at least 50 feet (15.2 m) from any reflective surface that may affect data. If microphones are within 50 feet, determine the effect, if any, of the reflective surface on the measured data.

5) Microphones need to be at least 5 feet (1.5 m) from small objects (trees, posts, bushes, etc.). If microphones are within 5 feet of small objects, determine the effect, if any, on the measured data.

b) Instrumentation Set Up

1) Set up a microphone tripod at the chosen site, extended to a height between 3 feet 8 inches (1.12 m) and 4 feet 10 inches (1.47 m) above ground.

2) Attach the microphone at the top of the tripod and connect it to the measuring instrument with a 5-foot (1.5 m) or longer cable.

3) Adjust the angle of incidence of the microphone to yield the flattest frequency response compliant with the manufacturer's specifications.

4) Separate the measuring instrument from the microphone to minimize any influence on the measurements, and minimize any cable movement during the measurement period.

c) Measurement Site Operation and Instrument Calibration

1) Before taking sound pressure level measurements, measure and record (near the measurement site):

A) Wind speed and direction;

B) Ambient temperature;

C) Relative humidity; and

D) Barometric pressure.

2) Turn the measuring instrument on and allow the instrument to stabilize. Monitor and record the battery condition of the calibrator and all measuring instruments.

3) Turn the calibrator on at its appropriate frequency. Allow the calibrator to stabilize and calibrate the measuring system according to the manufacturer's specifications. After the measuring system has been calibrated, remove the calibrator and attach a windscreen to the microphone.

4) Adjust the microphone to the angle of incidence that will yield the frequency response compliant with the manufacturer's specifications.

5) Measure the sound pressure level data within the limitations of subsection (d) and according to the manufacturer's recommended procedures. Other sound pressure levels may be used for investigatory purposes, including the following:

A) Determining the extent of noise pollution caused by the source of sound;

B) Determining the ambient; and

C) Analyzing those acoustical parameters that describe the sound source.

6) While sound measurements are being taken, maintain distance between the operator and the microphone to minimize any influence on the measurements.

7) While measurements are being taken, make visual and aural surveillance of extraneous sound sources and varying wind conditions to ensure that the conditions of measurement are accurately known. Record any variations in these parameters that may affect data. Record the number and basis for the affected data block. When using a tape recorder, record voice commentary concerning conditions on the cue track.

8) Minimize wind effects on the microphone by taking sound measurements when the wind velocity is less than 12 miles per hour (5.4 m/second) at the microphone position.

9) For the purposes of data correction, determine the ambient sound at the measurement site by means of measurement or analysis.

10) After taking sound pressure level measurements, remove the windscreen and attach the calibrator to the microphone. Turn the calibrator on at its appropriate frequency. After allowing the calibrator to stabilize, monitor and record the measuring system response. If the measuring system response varies by more than ± 0.5 dB from the most recent field calibration, the sound pressure level measurements obtained since such most recent field calibration cannot be used for enforcement purposes.

11) Before removing the calibrator from the microphone, turn the calibrator off. If the ambient sound has not been determined by means of measurement, determine the noise floor of the measuring system. If the noise floor is within 10 dB of the measured sound pressure level data, record the noise floor measurements.

12) At the end of the sound survey, monitor and record the battery condition of the calibrator and all measuring instruments. Near the measurement site, measure and record:

A) Windspeed and direction;

B) Ambient temperature;

C) Relative humidity; and

D) Barometric pressure.

13) Record the physical and topographical description of the ground surface within the vicinity of the measurement site, survey site location, a description of the sound source, a diagram of the area, the location of reflective surfaces near the microphone, and the approximate location of the noise source relative to the microphone position.

14) A magnetic tape recorder may be used to preserve the raw data. Record calibration signals at the beginning and end of each tape as well as at intermediate times such as when relocating to a new measurement site. Record voice commentary concerning local conditions and affected data blocks on the cue track. Preserve the original tape recording for subsequent evaluation.

15) Any laboratory analyses of magnetic tape-recorded field data must include a description of the laboratory instrumentation and procedures, along with correlation of the laboratory analyses and field measurement techniques.

d) Limiting Procedures for Specific Types of Data Acquisition

1) For measurements of non-impulsive sound with audible discrete tones, measure ⅓ octave-band sound pressure levels to determine if a noise source complies with 35 Ill. Adm. Code 901.106.

2) For measurements of non-impulsive sound with no audible discrete tones, measure octave-band sound pressure levels to determine if a noise source complies with 35 Ill. Adm. Code 901.102 and 901.103.

e) Correction Factors

If necessary, apply correction factors rounded to the nearest ½ decibel to sound pressure level measurements. The correction factors applicable to the measurement system may include corrections for windscreen interference and the sound pressure level difference between consecutive field calibrations. Use calibration correction factors only to make negative corrections (subtraction from the field data). Do not add calibration correction factors to the measured sound pressure levels to raise the sound pressure level field data. The correction factors applicable to the measurement site may include corrections for reflective surfaces and ambient sound.

(Source: Amended at 42 Ill. Reg. 20487, effective November 1, 2018)