

Controlling Genset Noise

Generator Noise Control

Effectively controlling sound levels produced by operating generator sets is becoming a higher priority. Numerous governmental agencies are enacting noise ordinances, aiming to cut noise pollution. This directly affects genset installation design.

Understanding Noise

Noises are quantified by their sound pressure, and most commonly measured in decibel levels heard by humans, noted as dB(A). The relationship between decibel level is logarithmic. In terms of loudness, doubling the sound pressure roughly equates to a 6 dB(A) increase. However, doubling the distance from the noise reduces the noise level by 50%. The really difficult aspect of noise control is its subjective nature. Trying to judge what is acceptable to a majority can be very difficult.

Typical noise level ratings are noted in Table 1.

Table 1

Typical noise levels	Sound pressure in dB(A)
Common sounds	
Jet engine	160
Riveting	140
Punch press	120
City traffic	100
Busy office	80
Normal speech	60
Quiet suburb	40
Whisper	20
Threshold of hearing	0

Controlling Genset Noise

Noise from gensets can be effectively controlled with good engineering practices at installation. Table 2 estimates the relative effectiveness of various sound barriers.

Table 2

Approximate sound level reduction	dB(A)
Original machine	0
Vibration isolators	2
Baffle	5
Absorption material only	5
Rigid sealed enclosure	15-20
Enclosures and isolators	25-30
Enclosures, absorption, and isolators	35-40
Double walled enclosures, absorption, and isolators	60-80

Attenuating mechanical noise can be completed with a combination of sound dampening design and by isolating vibration produced by the operating genset. Table 2 shows the sound level reduction possible. Completely sealed enclosures are included as a reference, but openings for piping, airflow, etc. will adversely affect these reduction levels.

Note: Loudness is also affected by the frequency of sound, but to a much less degree than sound pressure. It's important to note that decibel levels are not additive. For example, two gensets operating do not produce a 2X decibel level, but increase total sound level by approximately 3 dB(A).

Note: It's critical for designers to consider two noise sources -- the actual mechanical noise of the genset and the engine combustion exhaust noise.

Controlling Genset Noise

Exhaust silencers are relatively inexpensive when dB(A) reduction levels are considered. This is because the noise signature is higher at higher frequencies, which do not travel as far and are more easily dispersed, plus the flow is relatively low.

Engine/Fan mechanical noise is much harder and more expensive to attenuate because the noise signature is higher at lower frequencies, which travel farther, and because the radiator fan moves so much air.