Noise Advisory Training – 2025

Photo by John Skelton

Seattle Department of Construction & Inspections

SDCI Noise Abatement Group
(revised in 2025)

RESIDENTIAL MECHANICAL SOUND LEVEL COMPLIANCE

This presentation is focused on Residential Heat-Pump (HP) or Air-Conditioner (A/C) installations and will cover the following topics:

- What sound level does Seattle Municipal Code (SMC) Chapter 25.08 Noise Control require for my property?
- Guidance on what factors to consider before deciding on condenser placement.
- What is a solid sound barrier, how much sound reduction can it provide.
- Identifying reflective surfaces and how they affect sound level calculations.
- How SDCI Noise Abatement reviews residential installations for compliance.
- What happens if a noise complaint is filed against my installation?
- City Resources available during planning and permitting.

SMC EXTERIOR SOUND LEVEL LIMITS

SMC 25.08.410 - Exterior sound level limits.

A. The exterior sound level limits are based on the Leq (equivalent continuous sound level) during the measurement interval, using a minimum measurement interval of 1 minute for a constant sound source, or a one-hour measurement for a non-continuous sound source. For sound sources located within the City, the exterior sound level limits are as follows:

District of Sound Source	District of Receiving Property		
	Residential (dB(A)LEQ)	Commercial (dB(A)LEQ)	Industrial (dB(A)LEQ)
Residential	55	57	60
Commercial	57	60	65
Industrial	60	65	70

SMC 25.08.420 - Modifications to exterior sound level limits

A. Between the hours of 10 p.m. and 7 a.m. during weekdays, and between the hours of 10 p.m. and 9 a.m. on weekends and legal holidays, the exterior sound level limits established by Section 25.08.410 are reduced by 10 dB(A) where the receiving property lies within a residential district of the City.

SMC EXTERIOR SOUND LEVEL LIMITS CONT.

Using the chart from SMC 25.08.410, a Residential Source to a Residential Receiver would require a daytime sound level limit of **55dBA**.

Including the 10dB drop in the allowable exterior sound level limits of SMC 25.08.420, the nighttime sound level limit is **45dBA** between 10:00 PM to 7:00 AM weekdays and 10:00 PM to 9:00 AM weekends and legal holidays.

*A/C user agreement – are only available for A/C only installations. The agreement states the homeowner understands the A/C only complies with daytime sound level limits and cannot be utilized past 10pm daily.

FACTORS TO CONSIDER PRE-INSTALLATION

Before deciding on where to install a condenser these factors should be a part of the discussion:

1) Is the equipment's published sound rating from the manufacturer too high for the selected location?

2) Is the distance from the property line to the equipment sufficient for compliance daytime and nighttime SMC exterior sound level limits?

3) Would sound mitigation like a sound barrier provide enough attenuation to provide compliance with SMC exterior sound level limits?

PRE-INSTALLATION FACTORS - 1

The equipment's published sound rating too high for the selected location.

- Change the equipment to a quieter model or install the manufacturers recommended "quiet package".
- "quiet package" (if available) include compressor blankets, quieter fan blades, etc.
- Locating the equipment further away from the property line will reduce the noise levels and will limit complaints from neighbors.

Outdoor unit	Airflow Rate (Cooling / Heating)	CFM	3,885 / 3,885
	Refrigerant Control		LEV
	Defrost Method		Reverse Cycle
	Heat Exchanger Type		Plate fin coil
	Heat Exchanger Coating		Blue Fin Coating
	Sound Pressure Level,Cooling[1]	dB(A)	49
	Sound Pressure Level,Heating[2]	dB(A)	53
	Compressor Type		Hermetic
	Compressor Model		ANB33FJSMT
	Compressor Motor Output	kW	2.8
	Compressor Rated Load Amps	A	19
	Compressor Locked Rotor Amps	A	22.0
	Compressor Oil Type // Charge	oz.	FV50S // 73
	Base Pan Heater		Built-in
	Unit Dimensions	W: In. [mm]	41-11/32[1,050]
		D: In. [mm]	13[330]
		H: In. [mm]	52-11/16[1,338]
	Package Dimensions	W: In. [mm]	43 [1,090]
		D: In. [mm]	18 [450]
		H: In. [mm]	57 [1,430]
	Unit Weight	Lbs.[kg]	278 [126]
	Package Weight	Lbs.[kg]	302 [137]

*MXZ-SM36NAMHZ-U1 data

PRE-INSTALLATION FACTORS - 2

Knowing the distance from unit to the property line is critical for compliance with SMC.

- This is typically a problem for H/P's and A/C's installed in "minimum" (3') side yards.
- Front or rear yards are a better choice for H/P installation.
- Installing the unit facing the street or alley typically will provide the required distance to the neighboring property line.

Table 2. Distance Factor

ft.	[m]	Factor Value (dB)
4	1.2	9.5
5	1.5	11.5
6	1.8	13.0
7	2.1	14.5
8	2.4	15.5
9	2.7	16.5
10	3.0	17.5
15	4.6	21.0
20	6.1	23.5
25	7.6	25.5
30	9.1	27.0
40	12.2	29.5
50	15.2	31.0
60	18.3	33.0
70	21.3	34.5
80	24.4	35.5
90	27.4	36.5
100	30.5	37.5
125	38.1	39.5
150	45.7	41.0
175	53.3	42.5
200	61.0	43.5
400	122.0	49.5

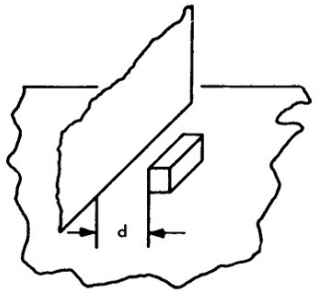
PRE-INSTALLATION FACTORS - 3

What kind of sound mitigation is needed to gain compliance. Will it be enough and how can it be improved?

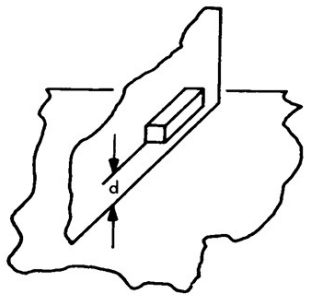
- Using recesses in the structure can be very effective in shielding the unit from view and reducing the sound levels at the property line. Though this may cause additional reflective sound, so preplanning is essential.
- Blocking line of sight with sound attenuating barrier can provide a predictable reduction in noise levels. Typically, solid sound wall can provide 5-8dBA of reduction.
- Cantilevering the top of barriers away from the neighbor can increase its virtual height and performance.
- Moving the equipment and the barrier further away from the property line will reduce the angle to the higher floors of the neighboring home and increase the effectiveness of the barrier.

REFLECTIVE SURFACES EXAMPLES

1. Equipment Location Factor	Factor Value
a. Equipment on ground or roof or in side of building wall with *no* adjacent reflective surface within 10 ft. [3 m] (d greater than 10 ft. [3 m])	0 dB
b. Equipment on ground or roof or in side of building wall with a *single* adjacent reflective surface within 10 ft. [3 m] (d less than 10 ft. [3 m])	3 dB

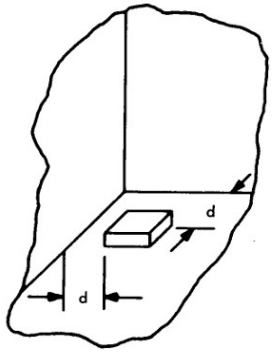


On Ground or Roof
Single Reflective Surface

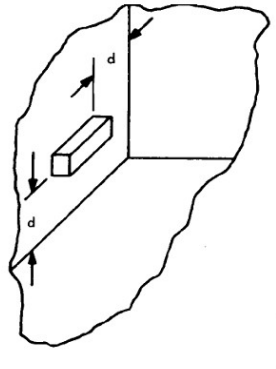


In Side of Building
Single Reflective Surface

c. Equipment on ground or roof or in side of building wall within 10 ft. [3 m] of *two* adjacent walls forming an inside corner (d less than 10 ft. [3 m] to both surfaces)	6 dB

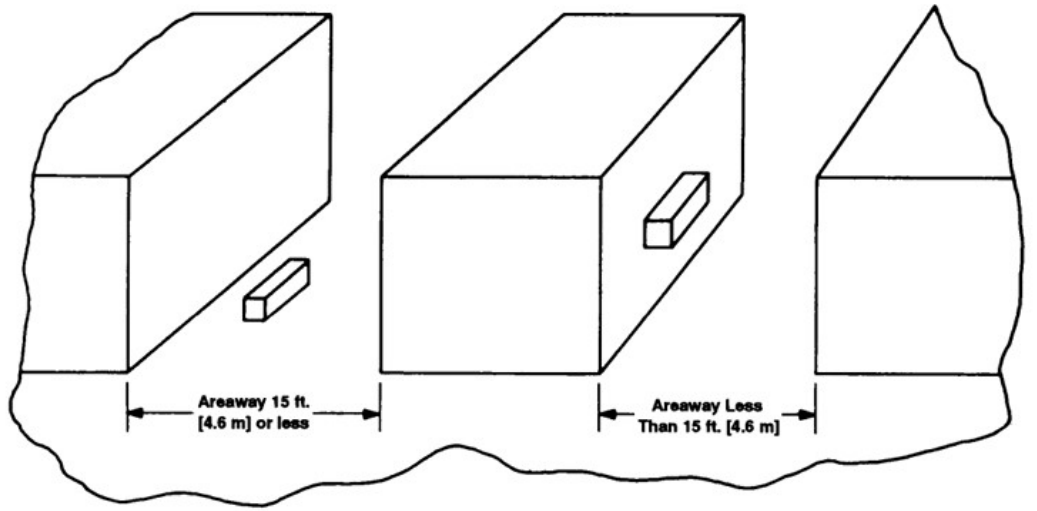


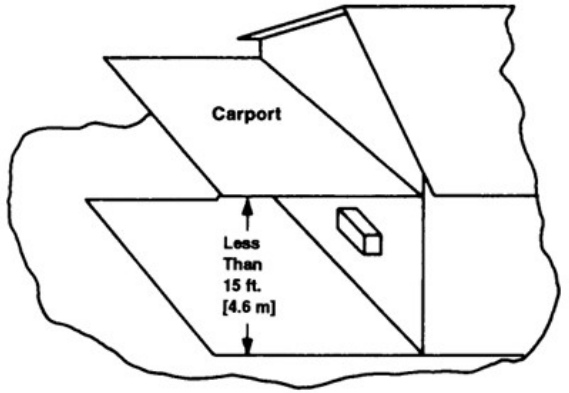
On Ground or Roof
Two Adjacent Reflecting Surfaces



In Side of Building
Two Adjacent Reflecting Surfaces

d. Equipment on ground or roof or in side of building wall and between two opposite reflecting surface less than 15 ft. [4.6 m] apart	6 dB





BARRIER EXAMPLE - 1

Barriers, if properly installed, can be the most cost-effective means of noise reduction. Common barrier materials include earth, steel, plywood and concrete. General guidelines for barrier walls include the following:

- Place barriers as close to the source as possible without restricting airflow to/from the unit. This will ensure the deflection of most of the sound away from the evaluation point. Care must be taken not to restrict the airflow of the unit as this would lead to a decrease in unit efficiency. Consult the manufacturer for minimum distance requirements.

- Barriers must be solid (like ¾" plywood or greater) extend all the way to the ground or deck and be free of holes, gaps, cracks, etc. Noise will be transmitted through the wall if this condition is not met.

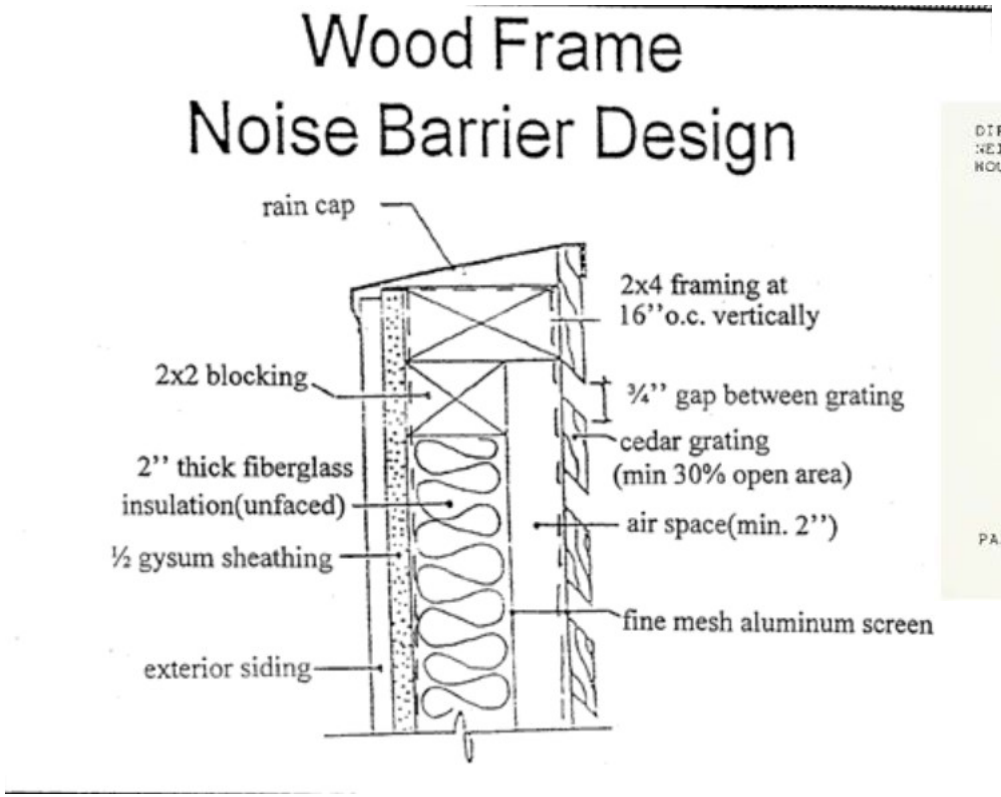
- Weatherproof absorptive treatment can be provided with the barrier to reduce the noise reflected from the house wall.

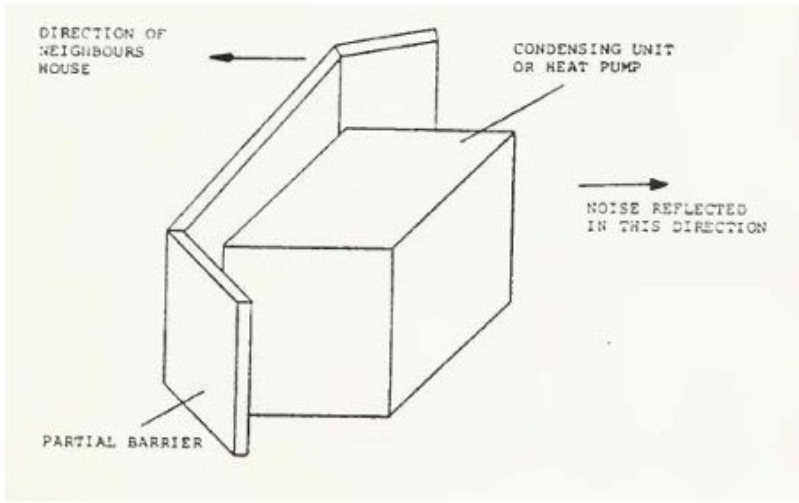
- A partial barrier can be provided for the unit in order to reduce the noise that would otherwise be radiated towards the neighbor's house. The sketch above shows the use of the barrier.

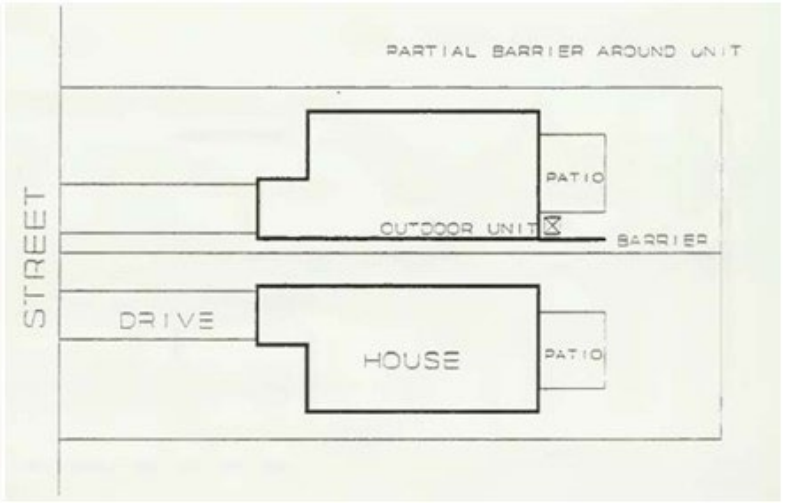
- Simple noise barriers generally do not require sound absorbing surfaces.
  Absorptive treatment on the source side of the barrier makes only a minor improvement in reducing noise and is generally not cost-effective.

- In situations where house walls will reflect sound back at the barrier, the effectiveness of the barrier shielding will be significantly reduced. To remedy this, wall surfaces facing the unit could be covered with sound absorbing material.

BARRIER EXAMPLE - 2







SDCI SIDE YARD NOISE REVIEW PROCESS

- During the Mechanical inspection, photos of the equipment badge and location are taken, distance to property line is measured. This info is emailed to SDCI Noise Abatement.
- SDCI reviews the manufacturer's product data to get the sound ratings for heating and cooling.
- SDCI takes the heating sound level rating and utilizes the info sent by mechanical inspections to get a predicted sound level at the property line. This includes reflective surfaces and distance to the property line.
- If the predicted sound level is 47dBA or lower, then is approved. If it is above 47dBA the noise advisory is failed, and the permit applicant and contractor are emailed. A sound level measurement can be requested to verify our findings.
- If the noise advisory if failed, some form of sound mitigation is required. This could be a sound level barrier, compressor blanket, or other manufacturer’s recommendation or a combination of mitigations. Relocation to the front or backyard is an option, as is replacing the equipment with a quieter model.
- Once mitigation is installed, we ask the contractor contact us to set up a compliance sound level measurement.

NOISE COMPLAINT – RESIDENTIAL A/C OR HP

What happens if the City receives a noise complaint about a mechanical equipment installation?

Answer: SDCI reviews the Refrigeration permit history at the address provided. We review whether or not a noise advisory was done during the SDCI inspection process.

A) If a noise advisory was done, we respond to the complainant with that information. A sound level compliance measurement may be required.

B) If a noise advisory wasn't done, we schedule a site visit and take a sound level compliance measurement.

* If a noise review was approved prior, that does not mean it will be in compliance for the life of the equipment. A site visit including compliance measurement may be required at anytime if a complaint is received.

NOISE COMPLAINT - CONTINUED

- When mechanical noise complaints are received for residential installations a compliance sound level measurement is required. On rare occasions, the results found during those investigations leads our group to utilize our measured sound level data in lieu of a manufacturer's published ratings.

- In those cases, we confirm our results with multiple sound level measurements at different properties before concluding there is a discrepancy.

- We also let the installer know as soon as possible and will explain the discrepancy and our rationale for using our field data in lieu of the manufacturer.

CITY OF SEATTLE RESOURCES

SDCI Noise Abatement Group

- james.dasher@seattle.gov - 206-615-1190
- anthony.jagow@seattle.gov – 206-615-1760
- dan.powers@seattle.gov – 206-615-1394
- John.thomas@seattle.gov - 206-684-8449

Links to additional project planning resources:

https://www.seattle.gov/documents/Departments/SDCI/Codes/NoiseTipsForSitingEquipment.pdf

https://www.seattle.gov/sdci/codes/codes-we-enforce-(a-z)/noise-code