## 3.2. Central Air Conditioning and Inverter Heat Pump Units See also Sec. 3.37. "Window Mounted Air Conditioning Units"

The central air conditioning or heat pump units shall be located only in the rear or side yards, and shall not be visible from the street. In addition, central air conditioning units should be located to minimize the visual and noise effect (maximum 55 dB's daytime/45 dB's nighttime) on adjacent properties when measured from the middle of unit to the property line. Cooling units with sound power levels that exceed 55 decibels are permitted by following the sound charts provided in additional section. Mitigation measures are permitted to lower decibel levels. Please *see* Sec. Appendix C "Air Conditioning Additional Information" for more information regarding acceptable sound levels and options to reduce noise.

When visible from the street, the unit must be screened with the following; permanent landscaping with plants, or; screening with an approved fence design (*see* Sec. 3.10. "Fences and Gates"); or a permanent structural screen matching the house siding.

A site plan showing location, dimensions, setbacks, and the relationship to adjacent houses, and a product specifications or product data sheet showing the decibel level rating for the proposed unit and screening design, must accompany the application. A product brochure will only often mention the lowest noise level of the line with term "as low as." Generally, air conditioners and heat pumps will publish a product data sheet, or have a product line with multiple sizes or options, with differing sound level ratings for each model. Please *see* Sec. Appendix C "Air Conditioning Additional Information" for references to acceptable product data sheets.

A permit from the City of Sammamish may also be required to install central air-conditioning units. Alternate designs not listed as approved require an ACA and need to be reviewed by the ACC for approval.

# Appendix C
# Air Conditioning Additional Information

Example of Product Data Sheet for Bryant 113A Legacy Line 13 SEER:

## A-WEIGHTED SOUND POWER LEVEL

| UNIT SIZE–SERIES (VOLTAGE) | STANDARD RATING dBA | TYPICAL OCTAVE BAND SPECTRUM (dBA, without tone adjustment) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 |
| 18–G (N) | 71 | 64.0 | 62.0 | 63.0 | 68.0 | 64.0 | 62.0 | 57.0 |
| 24–H (N) | 74 | 50.9 | 60.6 | 66.4 | 71.0 | 65.5 | 61.1 | 59.2 |
| 30–G (N) | 72 | 54.8 | 59.3 | 65.1 | 68.2 | 66.4 | 61.6 | 57.3 |
| 30–E (P) | 74 | 55.0 | 63.5 | 68.5 | 68.5 | 65.5 | 61.0 | 54.0 |
| 36–I (N) | 75 | 50.5 | 61.0 | 64.5 | 67.0 | 62.5 | 60.0 | 52.5 |
| 36–E (P,E) | 75 | 59.5 | 63.0 | 68.5 | 70.0 | 65.5 | 61.5 | 53.5 |
| 42–C (N,P,E) | 78 | 57.5 | 65.0 | 71.0 | 73.0 | 70.5 | 67.5 | 62.5 |
| 48–J (N) | 76 | 55.5 | 62.9 | 69.6 | 71.2 | 69.5 | 66.3 | 59.1 |
| 48–E (P,E) | 80 | 58.5 | 67.5 | 73.5 | 75.0 | 70.5 | 67.5 | 64.5 |
| 60–H (N) | 79 | 57.5 | 67.0 | 72.0 | 75.0 | 72.5 | 68.0 | 61.0 |
| 60–G (P,E) | 79 | 59.5 | 69.5 | 72.5 | 73.5 | 71.0 | 68.0 | 63.5 |

NOTE: Tested in accordance with AHRI Standard 270–2008 (not listed in AHRI).

## A-WEIGHTED SOUND POWER LEVEL WITH SOUND SHIELD

| UNIT SIZE–SERIES (VOLTAGE) | STANDARD RATING dBA | TYPICAL OCTAVE BAND SPECTRUM (dBA, without tone adjustment) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 |
| 18–G (N) | 70 | 66.0 | 64.0 | 64.0 | 67.0 | 63.0 | 60.0 | 54.0 |
| 24–H (N) | 74 | 51.1 | 61.3 | 66.6 | 71.2 | 65.0 | 60.0 | 55.6 |
| 30–G (N) | 72 | 51.9 | 59.3 | 64.8 | 67.3 | 65.2 | 61.1 | 54.8 |
| 30–E (P) | 73 | 55.5 | 64.0 | 68.0 | 67.0 | 64.0 | 60.0 | 52.5 |
| 36–I (N) | 75 | 51.0 | 62.0 | 64.5 | 65.5 | 62.0 | 59.5 | 51.5 |
| 36–E (P,E) | 74 | 59.5 | 63.0 | 68.0 | 69.5 | 65.0 | 60.5 | 50.5 |
| 42–C (N,P,E) | 77 | 57.5 | 65.0 | 70.5 | 72.0 | 70.0 | 67.0 | 62.0 |
| 48–J (N) | 75 | 55.8 | 62.6 | 69.7 | 70.6 | 68.7 | 65.4 | 58.6 |
| 48–E (P,E) | 79 | 60.5 | 67.5 | 73.5 | 74.5 | 71.0 | 68.0 | 63.5 |
| 60–H (N) | 79 | 57.5 | 68.0 | 72.5 | 74.5 | 72.5 | 68.0 | 60.5 |
| 60–G (P,E) | 78 | 60.5 | 69.5 | 72.5 | 73.0 | 71.0 | 67.5 | 61.5 |

NOTE: Tested in accordance with AHRI Standard 270–2008 (not listed in AHRI).

Example of Product Data Sheet for Bosch Heat Pump Inverter 18 SEER:

| Model | Sound Power Level [dB(A)] | Full Octave Linear Sound Power Level dB -Center Frequency -Hz | | | | | | | | Sound Power Level [dB(A)] with Sound Blanket |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 100 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | |
| 3 Ton | 56 (Low) | 26.1 | 28.9 | 37.5 | 44.4 | 48.1 | 42.5 | 47.1 | 40.7 | Sound Blanket - Standard |
| | 77 (High) | 48.4 | 54.3 | 60.5 | 66.2 | 68.7 | 63.6 | 62.3 | 53.7 | |
| 5 Ton | 60 (Low) | 30.5 | 36.0 | 47.6 | 50.1 | 48.5 | 50.1 | 50.5 | 41.3 | |
| | 79 (High) | 51.6 | 47.6 | 62.3 | 67.0 | 68.6 | 64.2 | 64.6 | 56.5 | |

Example of Product Data Sheet for Trane XR16 Side Discharge 16 SEER:

| MODEL | A-Weighted Sound Power Level [dB(A)] | Full Octave Sound Power(dB) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 63 Hz | 125 Hz | 250 Hz | 500 Hz | 1000 Hz | 2000 Hz | 4000 Hz | 8000 Hz |
| 4TWL6018A1 | 69 | 72 | 70 | 72 | 66 | 65 | 59 | 52 | 44 |
| 4TWL6024A1 | 69 | 72 | 72 | 71 | 66 | 65 | 59 | 53 | 43 |
| 4TWL6030A1 | 70 | 72 | 76 | 72 | 68 | 65 | 60 | 52 | 44 |
| 4TWL6036A1 | 71 | 72 | 77 | 74 | 68 | 65 | 59 | 53 | 46 |
| 4TWL6042A1 | 71 | 75 | 75 | 73 | 68 | 66 | 60 | 53 | 46 |
| 4TWL6048A1 | 74 | 75 | 80 | 77 | 70 | 68 | 62 | 54 | 48 |

Sound Power Level Charts

Acceptable sound power level in decibels for proposed units when measured from middle of unit to property line during Daytime:

| Sound Power Level | Minimum Distance to Meet the 55 dBA Limit without Mitigation | Minimum Distance to meet the 55 dBA Limit with Mitigation |
|---|---|---|
| Less than or equal to 70 | 5 feet | n/a |
| 71-75 | 10 feet | 5 feet |
| 76-79 | 15 feet | 10 feet |
| 80-81 | 20 feet | 15 feet |
| 82-83 | 25 feet | 15 feet |
| 84-85 | 30 feet | 20 feet |
| 86 | 35 feet | 20 feet |

Acceptable sound power level in decibels for proposed units when measured from middle of unit to property line during Nighttime:

| Sound Power Level | Minimum Distance to Meet the 45 dBa Limit without Mitigation | Minimum Distance to meet the 45 dBA Limit with Mitigation |
|---|---|---|
| Less than or equal to 60 | 5 feet | n/a |
| 61-65 | 10 feet | 5 feet |
| 66-69 | 15 feet | 10 feet |
| 70-71 | 20 feet | 15 feet |
| 72-73 | 25 feet | 15 feet |
| 74-75 | 30 feet | 20 feet |
| 76 | 35 feet | 20 feet |

The purpose of this section is to maintain an acceptable level of noise from mechanical units. The intent is to align with Washington Administrative Code 173-60 Maximum Environmental Noise Levels. WAC Code 173-60 applies to residential properties adjacent to residential properties in which mechanical units are planned to be installed and must follow the below noise limit times:

- *Between the hours of 7:00 AM to 10:00 PM, noise at the adjacent residential property from the mechanical unit must not exceed 55 dBA.*
- *Between the hours of 10:00 PM to 7:00 AM, noise at the adjacent residential property from the mechanical unit must not exceed 45 dBA.*

The following sound level charts are based on sound pressure levels compared to sound power level, which is a less common sound level rating for outdoor air conditioning units and heat pumps. Typically, the manufacturers who publish these sound ratings are international, such as Mitsubishi.

Acceptable sound pressure level in decibels for proposed units when measured from middle of unit to property line during Daytime:

| Sound Pressure Level dBA at 5 ft | Minimum Distance to Meet the 55 dBA Limit without Mitigation | Minimum Distance to meet the 55 dBA Limit with Mitigation |
|---|---|---|
| Less than or equal to 55 | 5 feet | n/a |
| 56-60 | 10 feet | 5 feet |
| 61-64 | 15 feet | 10 feet |
| 65-67 | 20 feet | 15 feet |
| 68-69 | 25 feet | 15 feet |
| 70 | 30 feet | 20 feet |
| 71 | 35 feet | 20 feet |

Acceptable sound pressure level in decibels for proposed units when measured from middle of unit to property line during Night time:

| Sound Power Level dBA at 5 ft | Minimum Distance to Meet the 45 dBA Limit without Mitigation | Minimum Distance to meet the 45 dBA Limit with Mitigation |
|---|---|---|
| Less than or equal to 45 | 5 feet | n/a |
| 46-50 | 10 feet | 5 feet |
| 51-54 | 15 feet | 10 feet |
| 55-57 | 20 feet | 15 feet |
| 58-59 | 25 feet | 15 feet |
| 60 | 30 feet | 20 feet |
| 61 | 35 feet | 20 feet |

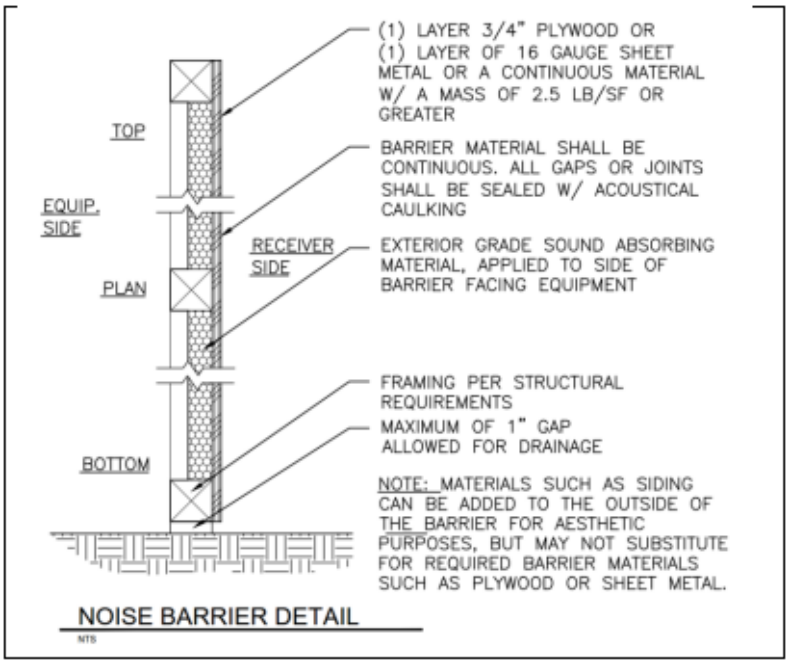
Noise Mitigation

If the mechanical units are placed in the distance between the two columns of the applicable minimum distance tables above, they will need to have five (5) dBA of mitigation to meet the limit. To provide the necessary noise reduction, a noise barrier will need to be constructed as follows:

- Install a noise barrier between the mechanical unit and the nearest property line.
    - The noise barrier should be as close to the unit(s) while maintaining proper clearances outlined by the manufacturer for access and airflow.

    - The noise barrier should be constructed in a "U" shaped with the short sides extending from the main portion of the barrier to in line with the property line side of the mechanical unit. The house itself can be part of the noise barrier.
- The top of the noise barrier shall be six (6) feet above grade.
- Construct the noise barrier with a continuous solid material that has a surface area of at least two (2) lbs/sq ft. The following are common barrier materials that meet this requirement:
    - 3/4-inch exterior grade plywood
    - 16-gauge sheet metal
    - HardiPanel Vertical Siding or HardiBacker 1/2-inch
- Additional siding can be installed for aesthetic purposes but should not replace the required mass layer of the barrier material.
- Line the barrier around the equipment with sound absorbing material that has a minimum Noise Reduction Coefficient (NRC) of 0.70.
    - The extents of the barrier shall be fully lined on the equipment side.
    - Recommended products for this application include minimum 1" thick polyester absorption panels
        - F-Sorb polyester acoustical panels
        - PolySorb polyester acoustical panels
        - Pyrotek Sorberpoly 2D polyester acoustical panels

Noise Barrier Detail:



Example Site Plan to Noise Barrier: