



When laying out a Voice Evacuation or Mass Notification system, determining the size of the amplifiers and the number of speakers depend upon a number of factors.

Primarily the size of the area that needs to be covered and the existing noise level in that area.

The National Fire Alarm Code (NFPA 72) specifies that they “shall have a sound pressure level at least 15 dB above the average ambient sound level or 5 dB above the maximum sound level having a duration of at least 60 seconds, whichever is greater, measured 5 feet above the floor in the occupiable area, using the A-weighted scale (dBA).”

To properly do a system design, the ambient noise level of the area must be measured as stated above, but to do an initial concept, the use of ‘typical’ readings can be used.

The following chart has the relationship between some noise sources, the area environment, and the dBA level that one might expect to find there. Other sources and descriptions are included to provide a reference to commonly identifiable items.

| Level | dBA | Speech | Environment | Source |
|---|------------|--------------------------------|--|---|
| <i>Deafening</i> | 150 | | | Pistol |
| OSHA max exposure | 140 | | | Jet Aircraft on Runway |
| <i>Threshold of pain</i> >130 hearing damage | 130 | | | Propeller aircraft, Pneumatic Hammer |
| Discomfort threshold Max NAC Level | 120 | Maximum vocal effort | Engine / Generator Room | Thunder nearby, Police Siren, Rock music front row |
| <i>Extremely Loud</i> Visual NAC required | 110 | | Heavy Machine shop | Nearby Train, Chainsaw, Power tools, Headphones |
| <i>Very Loud</i> | 100 | | Loud Factory, Disco | Lawnmower, Car Horn, |
| Possible hearing damage (8 hrs) OSHA hearing protection required | 90 | Conversation almost impossible | Noisy Factory, Machine Shop, Construction Site | Symphony or band, Food Blender, semi-Truck, maximum legal motorcycle exhaust at 55' |
| <i>Loud</i> | 80 | Conversation difficult | Heavy Street noise, Average Factory. | Alarm Clock, Whistle, Shaver, Hair Dryer |
| | 70 | Must raise voice | Noisy Office, Restaurant, Street Noise | Average Radio, Vacuum Cleaner, Dot Matrix Printer |
| <i>Moderate</i> | 60 | Conversation easy | Light Street noise, Business Office | Air Conditioner, Laser/Inkjet Printer, Server |
| | 50 | Typical Conversation | Typical Office, Average Home | Refrigerator, Desktop Computer |
| <i>Faint</i> | 40 | Quiet Conversation | Private Office, Living Room, Library | |
| | 30 | Whisper | Bedroom | |
| <i>Very Faint</i> | 20 | | Empty Theater, Forest | Watch Ticking |
| <i>Threshold of hearing</i> | 10 | | | Rustling Leaf |
| <i>Silence</i> | 0 | | | |

It should be noted that the actual measurements are in dBA, however, it is common for many Sound Pressure Level measuring instruments to default to the dBc weighting, and fast response. Be sure to set them to the **A-Weighting**, **Slow-Response** settings, and measure the sound level **5 feet** above the floor, not at the convenient waist high level.