

What are appropriate sound levels during worship?

("Every time I leave church I hear a ringing and we don't have a bell!")

A Simple Guide to How Loud Is Too Loud

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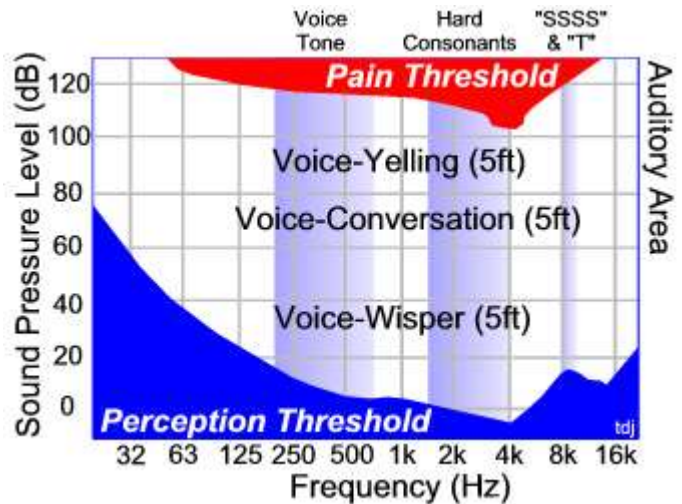
Hi, what are appropriate sound levels during worship? I have been told by others and I agree, that the music is too loud in our services. However, the soundman, does not agree. At times, it is so loud it is painful.

As with any thing sound related, there are many factors involved in this answer. From a design stand point; our goal at Integrated Audio Systems is to provide the church with equal (Plus or minus 2 dB) sound pressure levels though out the seating area of the sanctuary. This means that a person in the third row will hear at levels near the same levels as the person in the back row. Plus or minus 6 dB which is a range of 12 dB, would mean a person in one seat would hear at levels over twice as loud as another person. Example: the person in the third seat of the sanctuary would hear sounds twice as loud as the sound operator in the back row. This means that the person in the front is squirming in agony while the sound operator is sitting comfortably.

Another factor is a lack of clarity or uneven levels from frequency to frequency. Say your sound system has a boost at 125 Hz and a cut at 2 kHz. This leaves your vocal channel(s) muddy. The tendency of a sound operator is to turn up the volume to be able to hear the words clearly, but this knocks granny out of her pew. This may be helped by having the system professionally tuned and by turning down the monitors on the platform. If your system is tuned properly, you can generally turn the system up much louder with less discomfort.

Another factor is that *we all hear differently*. If your sound person has a hearing problem then this person needs to learn how to compensate for that problem or resign. If a person in the congregation has a hearing problem then. . . well that's a different topic.

One Sunday morning I sat in my church with a SPL meter in my hand. I was searching for what I perceived as a comfortable level and what was not. Mike, the sound operator had been doing a good job with levels and I found a good level for a talker averaged around 72 dB. The chart to the right shows the average conversational speech (unamplified) is some where around 70 dB and a person yelling is some where around 90 dB. The basic purpose of a sound system is to compensate for a talker that is 40 feet away, attempting to make the talker sound like they are 5 feet away. This is Equivalent Acoustic Distance (EAD) explained in the "Church Sound Workshop handbook." The chart above shows us that average levels for a person talking/yelling at 5 foot are 70/90 dB.



In churches which I have measured sound during a Sunday morning service, the music tended to be an average of 15 to 20 dB higher than the talker. The music level that I measured when Mike was mixing averaged around 90 dB. The average contemporary **music** level will range somewhere from 85 dB to 105 dB. Again, there is no perfect answer in saying how loud is to loud because sound is quite subjective...(but don't skip the OSHA standards below)

How loud is too soft? Again this is subjective, but it is "ideal" to have a talker or music be 25 dB greater than your ambient noise level (ie., Furnace Noise, Noise from people in the congregation.)

GETTING TO KNOW YOUR SANCTUARY.

STEP 1: Play pink noise through your system and take a SPL meter (radio shack has decent ones) and map out your sanctuary seating. Find the hottest and softest levels in the sanctuary.

STEP 2: Find a song that has a fairly flat response (something with a fairly constant level) and typical to your churches music style. Hit the repeat song function so it is the same song plays repeatedly. Sit at the mixer for a minute and set the level as you would during your services. Then walk around your sanctuary and listen to the different levels. Remember to stay at different locations for five or six seconds then move on.

If nothing else, skip STEP 1 and go directly to STEP 2.

OSHA Standards

Again, sound is very subjective but there are limits. OSHA (a government agency for health and safety) publishes the following guidelines for maximum daily duration of sound levels. OSHA recommends not exceeding these daily durations because permanent damage may occur.

| dBA SPL (slow response) | Maximum Duration Per Day |
|-------------------------|-----------------------------------|
| 90 dBA | 8 Hr |
| 92 dBA | 6 Hr |
| 95 dBA | 4 Hr |
| 97 dBA | 3 Hr |
| 100 dBA | 2 Hr |
| 102 dBA | 1.5 Hr |
| 105 dBA | 1 Hr |
| 110 dBA | 0.5 Hr |
| 115 dBA | 0.25 Hr |
| 120 dBA | uh...Pain...don't do that at all! |