

What does the caution statement on hearing protector packages about noises dominated by frequencies below 500 Hz, and C-weighted noise levels mean? Does it indicate that the plugs are not appropriate in those environments?

The cautionary statement has to do with how to compute protection; it has nothing to do with the performance of the product per se.

The cautionary statement's precise wording is required by the U. S. Environmental Protection Agency (EPA). It appears on the labeling for all hearing protectors sold in the U. S. and pertains to the fact that when the mathematics behind the NRR was developed, the rating was intended to be subtracted from dBC, rather than dBA sound levels. Regardless, the EPA directs the user (also in prescribed wording) to subtract NRRs from A-weighted, and not C-weighted sound levels in order to compute protection. Both procedures give about the same answer when the dBA and dBC values are equivalent; when they are not, which occurs when there is substantial energy below 500 Hz, then the "incorrect" approach of using the dBA values will be underprotective. This is the reason for the "below 500Hz" warning. In spite of this potential error, EPA selected dBA for the example computation because A weighting is much more commonly utilized than C weighting, and it is the weighting specified by OSHA to regulate permissible noise exposure.

EPA presumes, and correctly so, that most consumers (and the labeling regulation was heavily influenced by the needs of the consumer market) would not be able to measure C-weighted levels or understand what they mean. Unfortunately, most consumers are also unable to tell if noises are "dominated by frequencies below 500 Hz," and hence they are unable to determine whether the use of C weighting is required.

For a more comprehensive description of the use of NRRs with dBA and dBC sound levels see p.2 of [EARLog 12](#) For a discussion of the meaning of A weighting, and a comparison of A and C weighting, see the [question](#) on that topic under *Ask the Expert*. The comparison of A and C weighting shows that they primarily differ in the low frequencies, which is why the EPA's cautionary statement only applies below 500 Hz.