



October 14, 2004

To De-rate or not De-rate dB Blocker® Hearing Protection

Why do you de-rate hearing protector's? Studies have shown that actual attenuation in the Real World differ widely from those results achieved under scientific laboratory testing conditions according to ANSI standard S3.19-1974. The following data was compiled from a review of many research studies by Berger, Franks and Lindgren.

Device Type/ Device	No. of Studies	No. of Tests	Mean RW NRR (dB)	Labeled NRR (dB)	NRR Labeled NRR (%)
Foam E-A-R /Decidamp	15	633	13.4	29	46
Misc. 3-flange	2	31	4.5	26	17
Earplugs (Average)			6	22.3	27
Earmuffs Peltor H7P3E	1	36	13.0	24	54
Earmuffs (Average)			14.3	23.1	62
Grand Average			10.1	22.7	45




¹ E-A-R 94-17/HP Berger, Franks & Lindgren

Does This Apply To dB Blockers®?

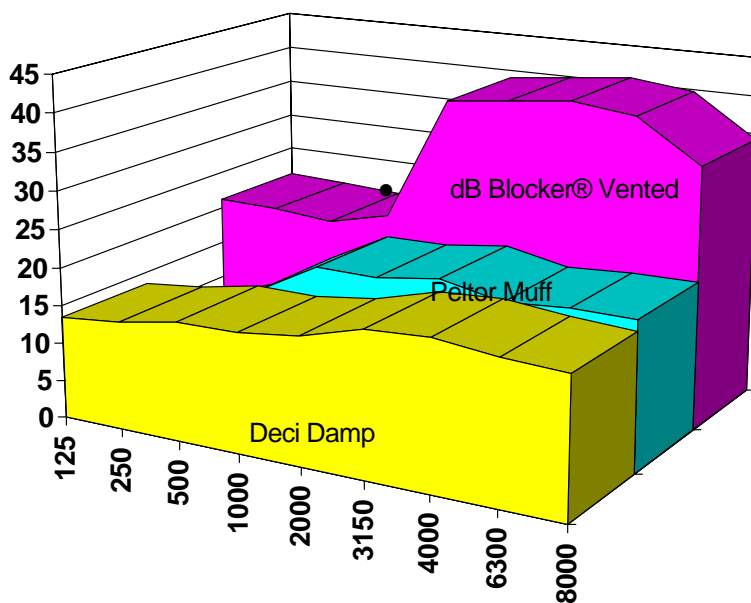
There are two reasons why real attenuation varies from laboratory NRR with disposable and muff type hearing protection. There is a difference from worker to worker in ear shape. Every ear is unique. Trying to fit a single shaped protector into the many different ear shapes results in some workers being under protected and some over protected; it is like everyone wearing the same prescription eye glasses or one size of work boots.

The second variation comes from insertion technique. To insert a disposable earplug properly each time the same technique must be followed. As you can see from the chart above that just doesn't happen. With muffs, glasses, facial hair and muff condition all adversely affect the protection muffs provide.

In fact from the chart below you can see that the Real World attenuation of dB Blockers® when compared to the Real World attenuation of disposable earplugs is considerably greater.

Frequency		125	250	500	1000	2000	3150	4000	6300	8000
Deci Damp Real World 13.3	 NRR (29)	13.8	14.26	15.64	15.64	16.64	18.86	19.32	18.4	17.94
Peltor Real World 12.4	 NRR (24)	7.56	10.26	15.12	19.44	19.44	20.52	18.9	19.44	19.44
dB Blocker Vented	 NRR 23	21.25	20.93	20.35	22.25	38.93	39.84	40.63	39.67	34.33

Fitcheck™



With dB Blockers® Ear Shape Doesn't Matter.

The shape of the ear doesn't affect the attenuation of the dB Blocker®. They are custom molded to the wearer's ears. They fit like a key in a lock in that they fit only one way. For them to be comfortable, they must lock into the tragus, concha bowl and helix. If they do not, the wearer feels discomfort.

We have measured Real World attenuation with Fitcheck™¹. Our testing has shown that we are able to achieve 88% of our rated NRR in the field.

Method B Testing

NIOSH (National Institute for Occupational Safety and Health), in an effort to find an alternative testing method to de-rating, that would more accurately reflect Real World attenuation worked with the ANSI S319 committee to develop alternative test methods. In

¹ Fitcheck™ - a means of measuring hearing protection attenuation in the field developed by Dr. Kevin Michaels.

response, the ANSI S319 committee developed a method of testing called Method B. It uses naive test subjects who use only the instructions provided by the manufacturer to guide them on usage and insertion of hearing protection. As well, with Method B, the number of test subjects increases from 10 to 20. NIOSH recognizes test results obtained under this methodology as a preferable alternative to de-rating to estimate Real World attenuation.

On the NIOSH website, (<http://www.cdc.gov/niosh/homepage.html>), is the Compendium on Hearing Protection. This compendium lists all types of protection NIOSH is aware of in North America. If you key in a specific noise level on this website it will use Method B results to define which protectors are safe to use. If Method B results are not available it will revert to de-rate the hearing protection based on the following formula. If noise measurements are made with the dB (A) scale, Noise level [98 dB] minus NRR divided by 2 [25 dB minus 7 dB divided by 2] = Noise level at ear, 89dB.

CPE Method B test results can be found in the Appendix to this document. A comparison with our Method A results are in the table below. In determining what level is suitable to the workplace, Method B most accurately shows what untrained workers would experience when they use a product.

Product	Method A Results	Method B Results	Percentage Difference
dB Blocker Vented(G)	NRR 23	NRR 20.3	13%
dB Blocker Solid	NRR 28	NRR 25	11%

Using Method B test results for dB Blocker® hearing protection you can be assured of the hearing protection your associates will receive in the Real World.

Test Method: ANSI S12.6-1997 (Subject Fit)
Manufacturer: Custom Protect Ear

Position: Insert
Date: 8/9/04

	Frequency in Hz						
	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Model:	Vented Convertible						Test ID: Q672A
MEANS	24.4	24.7	26.2	25.0	33.4	40.7	37.8
STD. DEV.	5.7	4.5	4.5	4.5	3.7	5.2	6.3

NRR (SF) = 21.4 dB

Model:	DB X Special (DBXS)						Test ID: Q673A
MEANS	25.8	25.8	25.6	25.1	33.3	39.4	34.6
STD. DEV.	5.0	5.3	3.9	4.3	3.9	5.1	6.9

NRR (SF) = 21.4 dB

Model:	Solid DB Blocker (SDBB)						Test ID: Q674A
MEANS	29.1	28.9	29.1	27.7	34.5	41.6	40.9
STD. DEV.	5.7	4.0	5.0	2.8	3.4	4.2	4.1

NRR (SF) = 25.0 dB

Model:	DB Vented (DBV)						Test ID: Q675A
MEANS	23.9	23.8	25.5	24.6	32.6	38.6	32.6
STD. DEV.	5.3	4.6	4.7	5.2	3.1	4.7	5.6

NRR (SF) = 20.3 dB

Model:	Vented Intercanal (VI)						Test ID: Q676A
MEANS	23.6	22.8	22.9	23.6	32.5	37.8	35.0
STD. DEV.	4.2	3.7	4.3	3.9	3.2	3.5	5.6

NRR (SF) = 20.0 dB