



Troy Acoustics Corporation

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NOISE

is hazardous to your health

NRC values and how it impacts (or doesn't impact) noise in your facility

To better understand how quiet it is going to be in your facility, whether you have noisy equipment, barking animals, or are operating a shooting range, you need to understand the acoustical rating process.

NRC values, reverb time, OSHA limits are provided in specifications, however, they rarely include a post installation test procedure to assure compliance. ...unless... Yes, there is always an unless: (i) you have been either cited by OSHA, or (ii) cited by your environmental health and hygiene personnel, or (iii) have complaining employees or neighbors. You can avoid these time consuming problems and newly required pre and post testing procedures, by getting a better understanding of NRC and what works in your environment.

NOT ALL NRC TESTING IS CREATED EQUAL. TROY rated at 1.10 or 110% PEPP rated at .50 or 50%

Many specifications will cite NRC values or equivalent when putting together a proposal. Unfortunately all NRC values are not created equal since the NRC value ASTM testing procedure is based on only the mid-frequency sound absorption coefficients at four octave bands (i.e. 250,500,2000 and 2000 Hertz) rounded to the nearest 5% and has very little value if your facility noise is outside this range. If you are experiencing loud noises, you need to be concerned about all frequencies. The purpose of this document is to give you a better understanding as to how to interpret these test procedures.

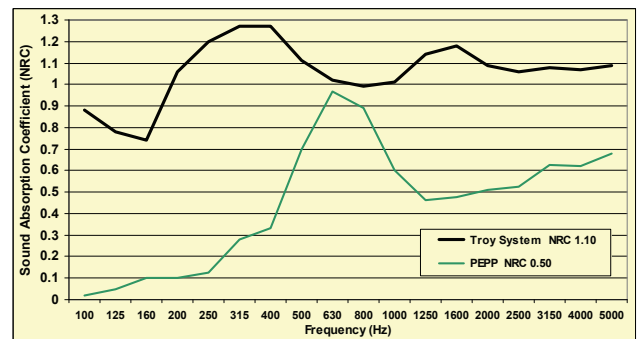
ABSORPTION ACROSS ALL FREQUENCIES IS CRITICAL IN MOST LOUD ENVIRONMENTS

So, you may ask, "Why should I care? What difference does it make?" If you are experiencing loud noises, it is critical that you absorb all of the sounds or you will experience excessive reverb, which will have a physiological effect or psychological effect on the human body. You will also experience excessive reverberation if the product you select does not have a high absorptive value across all frequencies.

How does this happen? Let's take a look at the product comparison shown to the right. As an example: The specification for PEPP shows

an NRC Value of .50 or 50% tested at 2" thick with a density of 2.8 pcf in accordance to ASTM C423 test procedure. However, if you take a look at the lower frequencies the value is .02, or nominally 2% sound absorption at 100 HZ. It has an NRC value of .46 or 46% sound absorption at 1250 HZ. These lower NRC levels are not taken into account when establishing an NRC value. When using PEPP, the rest of the noise, nominally 98% at 100 HZ and 54% of the noise at 1260 HZ starts to "bounce off any reflective surface" causing a loud echo. This reverb (or echo) is what results in headaches, lethargy and all sorts of physiological problems associated with noise.

Sound Absorption Coefficient (NRC) The Troy System Versus, PEPP,



**The world's highest acoustical rating.
The industry's only guaranteed solution.**



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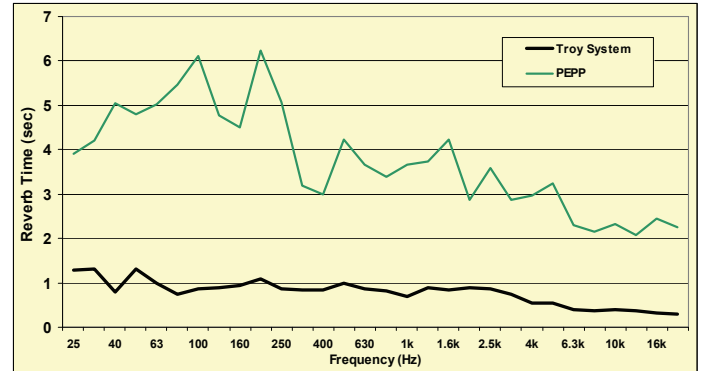
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LET'S COMPARE ABSORBANCY TO REVERB ECHO

Shown to the right is an ASTM RT60 REVERB test showing the PEPP product vs. the Troy System in a shooting range. The reverb times are significantly different for the two product offerings given the exact same conditions. Troy has done sound testing or received results of sound testing for several shooting ranges nationwide. Typically, Troy Acoustics does sound testing upon completion of most installations, since they guarantee a 1.25 second or less reverb time, which provides a safe environment for the shooter. Any excessive reverb or reflective levels result in an unsafe environment for the shooter. This would apply in other applications where loud noises need to be controlled.

Indoor Range Reverb Time (ASTM RT60)
Treated With The Troy System Versus, PEPP, 2"



LISTEN TO THE DIFFERENCE

As an example, at 63 HZ, the PEPP product shows a reverb time of 5.02 seconds as compared to Troy at .87 seconds. This is significant. If you can't relate to charts you can visit the Troy Acoustics website at <http://www.troysoundwalls.com/Downloads/TroyReverbPPTShow/Troy%20Reverb%20Time%20Presentation.pps> and actually listen to the difference. If the link is not working, just copy the link and put it in your browser. It is recommended that you use headphones or ear buds when listening to the presentation.

This demonstration allows you

- To hear the difference between 6 seconds (an untreated noisy facility with noise over 120 db);
- 3 seconds (a poorly treated facility)
- 1.25 seconds (a Troy engineered acoustic system).

This test procedure, although specific to shooting ranges, applies to any facility with high decibel readings, using a Troy engineered site specific acoustic system.

This document is intended to assist you in understanding the differences between Troy and all other products on the market today. If you would like us to compare it to a product that you are considering because it appears to be equivalent to the Troy System, we would be pleased to assist you in evaluating independently audited test criteria.

Write us at info@troyacoustics.com for further details.

Another interesting link re animal shelter noise study: <http://www.grandin.com/references/noise.in.animal.shelter.html>

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