

HOW FLOORING

IN SENIOR LIVING & RESIDENTIAL CARE ENVIRONMENTS

N oise is typically defined as unpleasant and unwanted sound.

In senior living and residential care environments, noise can diminish the quality of residents' lives and can cause agitation and confusion, particularly for those with dementia. Background noise can also make it difficult for those with hearing loss to follow conversations and for hearing aids to work properly.

As one of the most abundant finishes in the built environment, flooring can positively influence the acoustics of senior living and residential care environments.

ACOUSTICAL PROPERTIES OF FLOORING

According to the World Health Organization, noise pollution interferes with the ability to comprehend speech and may lead to a number of personal disabilities, handicaps and behavioral changes. (Brandon)

Different commercial floorcoverings such as rubber, resilient sheet vinyl, LVT, carpet, and Kinetex textile composite flooring control sound differently. Harder materials such as rubber and resilient sheet vinyl absorb little or no sound and have greater potential to transmit sound, contributing to a noisier environment.

Softer materials such as carpet and Kinetex textile composite flooring absorb significantly more sound and transmit less sound, contributing to a quieter environment.

Laboratories typically use two tests to measure the acoustic properties of interior surfaces and finishes—airborne noise reduction and structure-borne noise reduction.

1. AIRBORNE NOISE REDUCTION

The typical frequency range for normal human hearing is 100-10,000 Hz. The human voice falls within the low-frequency end of the spectrum, at around 100 Hz.

Building noises such as those coming from elevators, HVAC systems, and mechanical systems fall near the 1,000 Hz range. Loud noises such as alarms and bells are in the high-frequency end, up to 10,000 Hz.

A floorcovering's measure of effectiveness in absorbing airborne sound is expressed as a Noise Reduction Coefficient (NRC). The greater the absorption of airborne sound, the higher the NRC number.

- A surface that completely eliminates sound has an NRC of 1.0.
- Hard surfaces such as rubber and vinyl typically have NRCs of about 0.0-0.015, absorbing little to no airborne sound.
- Commercial carpets have NRCs typically ranging between .15 and .2, absorbing about 15-20 percent of airborne sound.



Kinetex's NRC is about .30, or 30 percent sound absorption.

2. STRUCTURE-BORNE NOISE REDUCTION

Structure-borne noise reduction is the ability to minimize impact sound transmission into the space below. Footsteps and objects dropping on the floor are examples of impact noises.

A floorcovering's measure of effectiveness in structure-borne noise reduction is expressed as a whole number, Impact Insulation Class (IIC). The higher the numerical IIC rating for flooring, the greater the sound insulation.

Flooring IIC ratings vary, depending on materials and construction. (see fig. 1)



SPEECH INTELLIGIBILITY

Speech intelligibility, or speech recognition, is the degree to which speech can be understood. The Acoustical Society of America recommends 95 percent speech recognition for effective learning in schools, which means that listeners with normal hearing can understand 95 percent of the words read from a list.

This level of speech recognition is equally important for effective communication between residents and staff and residents with each other.

Excessive noise impedes speech recognition. As speaking volume approaches that of background noise, speech recognition declines dramatically. When speaking volume equals background noise, a person achieves just 40 percent speech recognition.



(Nelson, Soli, Seltz)

A person must speak 12 decibels (dB) louder than the ambient noise to achieve 95 percent speech recognition. (Nelson, Soli, Seltz) Every 10 dB increase seems twice as loud to the human ear. (*see fig.2*)

Materials with higher NRC ratings are much more effective in absorbing ambient noise and improving speech recognition.



REVERBERATION TIME

Reverberations are continuing effects of a sound. Like echoes, they occur when sound waves strike a surface and are reflected back into the space.

Shorter reverberation times aid speech recognition. Excessive reverberation interferes with speech intelligibility. To reduce reverberation time, sound absorption must be increased or noise volume decreased.

Soft-surface materials such as carpet or Kinetex can help mute reverberation.

For more information visit jjflooring.com.

SOURCES

Brandon P. "Noise Pollution and Older Adults: A Real Health Hazard." Retrieved from http:// www.ageucate.com/blog/noise-health-hazardseniors-dementia/; accessed May 7, 2019.



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