



*An informational service of the*  
carpet cushion council

NOISE IN THE WORKPLACE

SOUNDBASICS

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SPECIFICATION TIME

## Sound Absorption in the Workplace

Today's facility manager can choose between a carpeted floor system, which includes the many benefits of carpet cushion or one that omits these same benefits. This opportunity for improving workspaces arises because a carpet may be glued directly to the floor (direct stick) or supplemented with carpet cushion using one of the popular flooring installation methods (stretch-in or double-glue). Results of professional testing for sound performance which compared the no-cushion choice with the use of typical commercial carpet cushions in properly installed simulations produced dramatic results.

The absorption of sound when carpet cushion was included in the test space (as measured by the Noise Reduction Coefficient (NRC)) was doubled over the same carpet when no cushion was used. More absorbed sound means that a facility becomes a quieter workplace with fewer distractions to employees, paving the way for productivity gains and a more satisfied workforce.

Comprehensive noise management has become an integral part of interior design, driven by the need for improved productivity. That such a seemingly small improvement in productivity could provide an attractive payback is an indicator of the potential value realized when selecting sound-improving carpet cushion for workspaces.

## NOISE IN THE WORKPLACE

Management of noise in the workplace is receiving attention due to its potential impact on productivity. Unlike individual productivity issues such as absenteeism, negative workplace conditions can affect large numbers of employees on a regular basis.

Cumulative productivity problems can present a staggering penalty to the health of a company – a situation made more critical in today's competitive environment. Likewise, the cumulative effect of productivity improvements can present a compelling justification for investment. The key is understanding the impact across the workforce over the life cycle of the improvement.

A recent study by The Department of Energy found that productivity improvements of less than one percent could provide justification for significant upgrades in certain systems that impact the working environment. That such a seemingly small improvement in productivity could provide an attractive payback is an indicator of the potential value of the investment in cushion to be realized when selecting sound-improving carpet cushion for workspaces.

## SOUND BASICS

To effectively deal with noise management, it is helpful to have a basic understanding of sound and how it moves through a building. Much like the expanding ripples that result from tossing a pebble into the water, sound begins from a point of disturbance. From that point, a series of pressure waves expand out in all directions. When these pressure fluctuations reach our ears, they are processed by the brain and interpreted as sound. The objective in noise management is the control of these pressure waves, typically by the use of materials that will absorb the waves before they arrive in a location occupied by people.

The sources of unwanted noise in the workplace are numerous and varied. Foot traffic, phone or local conversations, machinery and workstation noises are but a few examples. To the employee, such sources combine with others, creating unwanted noise distractions and a counter-productive work environment.

## ACOUSTICS RESEARCH

A comprehensive acoustics research project involving multiple carpets, cushions and installation techniques was co-sponsored by the Carpet

Cushion Council and the Alliance for Flexible Polyurethane Foam. Testing was conducted by Intertek Testing Services (ITS), an independent laboratory with specific expertise and capability in acoustic evaluations under controlled conditions.

In every case, significant sound absorption and impact sound were improved. Carpet was chosen as representative of the multi-family, school and office markets, as were the cushions and installation systems. When a typical rubber, synthetic or bonded polyurethane commercial cushion was utilized, the NRC rose as much as 60% compared to direct-glue without cushion.

Using a commercial cut pile carpet having a face weight of 36 ounces per square yard, it was found that the carpet alone (installation method of double-glue to concrete subfloor) absorbed approximately 25% of the sound directed at it, hence a NRC of 0.25. When several commercial carpet cushions were installed with the same carpet (installation methods were double-glue and stretch-in), the NRC rose to an average of 0.50 indicating that 50% of the sound directed at the carpet/cushion composite was absorbed...twice that of carpet without cushion. Results were similar for a stretched-in 28-ounce loop pile carpet.

Impact Insulation Class (IIC) testing was also conducted to understand the ability of carpet and cushion to lessen the sounds transferred from one room to a room below. The higher the rating, the more efficient a material is in reducing the impact sound transferred between floors. For example, in the current test a bare concrete slab had an IIC

rating of 19. This improved to 58 with the addition of the 36-ounce carpet. When the carpet and the carpet cushion were tested as an installed assembly (double glue or stretch-in installation methods), the average IIC class went from 58 to 72 representing a gain of 11 versus carpet alone. This kind of improvement can result in cutting the noise in the room below by 50%.

## MULTI-INDUSTRY SUPPORT

Carpet cushion in commercial installations has broad support from key industry groups. Responding to years of installation experience across the country, the consensus is clear – cushion works.

The relationship between noise distraction and productivity has been documented in a study reported by the American Society of Interior Designers (ASID) where 70% of those surveyed responded that their productivity would be positively impacted through reduction of noise distractions in the workplace. One solution in the ASID study was the proper choice of floor covering, which was determined to be an important element in minimizing unwanted noise in the workplace.

The importance of acoustics on productivity is reinforced by work reported by the Rocky Mountain Institute. Relative to productivity enhancements, the study states...“buildings with superlative lighting, thermal and acoustic comfort and air quality have consistently shown 6 to 16% higher labor productivity, where it was rigorously measured.

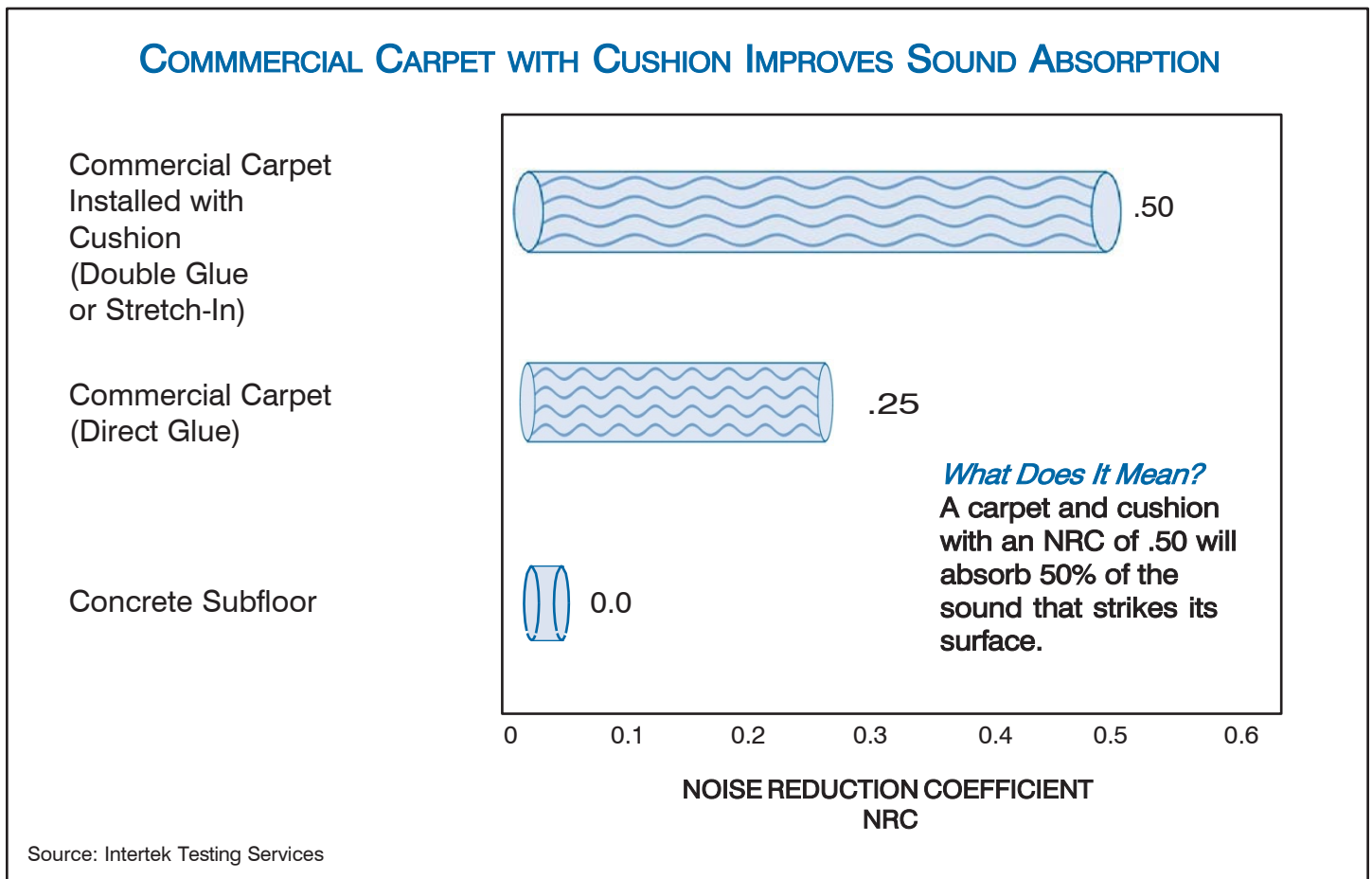
The Construction Specifications Institute (CSI) has also reported on the use of carpet cushion for acoustic control. An article published on the CSI website states “The floor is another major design area affecting noise levels.” Focusing on solutions, the article continues “for added sound absorption, lay carpet over a pad with adhesive on both sides for long-lasting placement.” The approach, commonly known as the double-glue or double-stick installation method, is the same as employed in the current test program. It is an approach widely used in commercial carpet cushion applications.

The Carpet & Rug Institute and the Carpet Cushion Council have each published information supporting the value and benefits of commercial

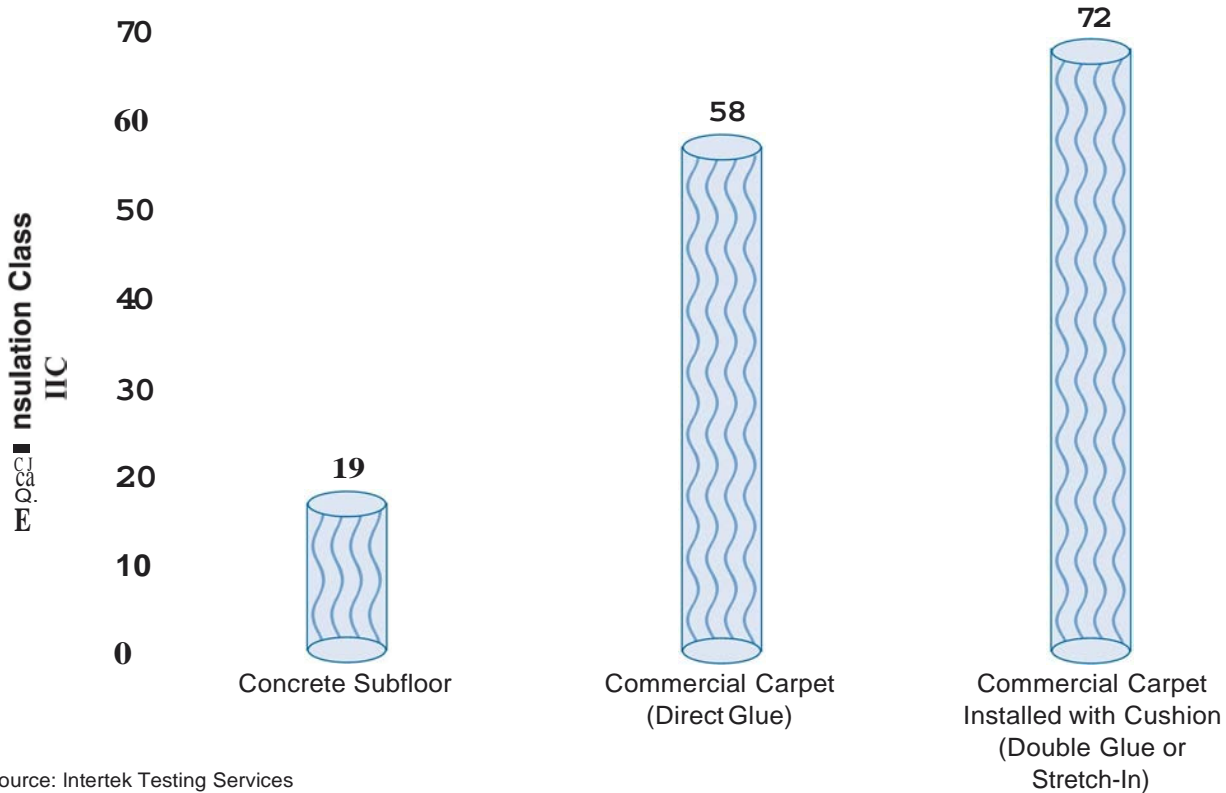
carpet cushion. According to Bill Oler, executive director of the Carpet Cushion Council (CCC), “We have long promoted the many benefits of carpet cushion in the commercial environment. The acoustic improvement that can be achieved through the use of carpet cushion is one benefit that has become important with the increase in open-office plans.”

### PERFORMANCE-IN-USE

Field Installations bear out the results, providing validation of the current study. For example, input concerning carpet and carpet cushion from internationally accredited acoustical and vibration engineering firm of CAMETS Acoustics, confirms that results from field installations are consistent with those of the current study. CAMETS states



## COMMERCIAL CARPET CUSHION REDUCES NOISE FROM ONE FLOOR TO THE NEXT



"The absorption coefficient differences between carpets lies with the type of pile and its thickness. These important carpet features were borne out in the current study, as were cushion density, thickness and porosity."

### SPECIFICATION TIME

In the hectic days leading up to specification deadlines, budget overruns or time constraints sometime lead to last minute substitutions. When it comes to sound, deficiencies are obvious. The occupants hear it without fail. It is always in their consciousness, never hidden, never missed. Obtaining expert acoustical guidance and utilizing proven products - those having the credentials of performance-in-use and independent test results - are steps toward a comprehensive acoustic

management program and ultimately, a satisfied client.

*Data presented is from studies jointly conducted by the Carpet Cushion Council and the Alliance for Flexible Polyurethane Foam.*

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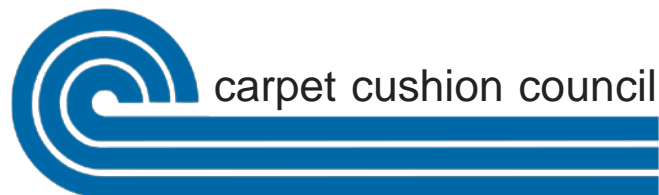
## THE CARPET CUSHION COUNCIL

Founded in 1976, the Carpet Cushion Council serves as the trade association of U.S. and Canadian carpet cushion manufacturers of prime polyurethane foam, bonded polyurethane, sponge rubber, natural fiber and synthetic fiber cushion; and suppliers such as chemical producers and equipment suppliers.

The Council has spent many years working with every aspect of the carpet industry, from carpet mills to professional installers to retailers.

Among numerous services, the Council:

- Provides retailers and installers the necessary information to sell and use quality separate carpet cushion
- Demonstrates how quality cushion can make carpet look better, longer
- Tests types of carpet cushion and establishes guidelines for use
- Monitors legislation and regulations to keep the industry informed of changes and to help officials understand carpet cushion
- Surveys the industry to gather statistics on amount of cushion sold.



### RESOURCES:

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