CARPET
IT JUST FEELS BETTER

FACT SHEET

Acoustic Comfort

Excessive indoor noise is a major problem in the community. Unwanted noise can:

- cause stress and affect human wellbeing
- impair productivity in the workplace and the classroom, and
- affect patient outcomes in hospitals and aged care facilities.

A range of factors contribute to the increased level of concern about acoustic privacy and these include[1]:

- open plan offices and homes
- a large increase in the number of people living in town houses and apartments
- inadequacy of existing impact sound insulation regulations.

Carpet can significantly improve the functionality of indoor spaces by reducing unwanted noise.

Floor Impact Noise

Carpet virtually eliminates floor impact sounds such as noise produced by footfalls, chairs scraped across the floor, and objects dropped onto the floor.

According to acoustical consultants, Graeme E Harding and Associates[1] (GEHA):

"The installation of carpet or similar types of floor covering is the only method available for eliminating excessive noise generated by floor impacts. Carpeted floors can result in a reduction in noise of over 20 decibels[2]." This is particularly important in schools, busy offices, health care facilities and in the home with children, where floor impact sounds can contribute greatly to ambient noise levels.

"Carpeted floors can result in a reduction in noise of over 20 decibels."

Reverberation Control

The pile structure of carpet also helps to control reverberation[3]. A material's potential for reverberation control is quantified by its Noise Reduction Coefficient (NRC) and/or by its Weighted Sound Reduction Coefficient, α_w (pronounced 'alpha w').[4] A typical broadloom carpet has an NRC of 0.35 and will absorb approximately 35% of sound that strikes it. The NRC rating of carpet is directly proportional to the thickness of the floor covering[5]. If the carpet is installed with an underlay its NRC rating will almost double. NRC ratings of common room finishes are provided in Table 1.

Table 1 Noise Reduction Coefficients (NRC)

Material	Noise Reduction Coefficient (approximate)
Carpet with underlay	0.65
Acoustic ceiling tile	0.55 to 0.95
Carpet	0.35
Timber floor	0.09
Plasterboard	0.07

AS/NZS 2107:2000: Recommended Design Sound Levels and Reverberation Times for Building Interiors provides recommended reverberation times (T_{60}) for a range of indoor environments in order to ensure good speech intelligibility, control of noise and a degree of acoustic privacy. Recommendations for common spaces are shown in Table 2.

Table 2 Recommended Reverberation Times

Type of occupancy	Recommended reverberation time (T_{60})[4]
General office areas	0.4 to 0.6 seconds
Private offices	0.6 to 0.8 seconds
Primary school classrooms	0.4 to 0.5 seconds
Domestic living areas	Less than 0.8 seconds[A]

A: GEHA recommendation (AS/NZS 2107 does not include advice for T_{60} in domestic spaces).

For peace of mind buy ACCS graded carpet

Reverberation times for common spaces with and without carpet were calculated by GEHA using CSIRO test data commissioned by the Carpet Institute. In all cases, installation of carpet and underlay was predicted to bring excessively long reverberation times down to acceptable levels.

Noise attenuation is another reason why carpet is the best floor covering choice where functionality and fashion are important.

Impact Sound through Floor / Ceiling Systems

Noise from footfall in the apartment above is a common source of complaint among modern apartment dwellers.

Building Code of Australia (BCA) Acoustic Criteria

The BCA incorporates Deemed-to–Satisfy provisions for impact sound insulation of floor / ceilings separating apartments.

The Carpet Institute commissioned CSIRO acoustical laboratories to test a range of carpets for impact sound insulation in accordance with the BCA requirements. All floors tested with carpet were found to easily pass the BCA criterion for impact sound. Results are summarized in Table 3.

Table 3 Impact Sound Insulation Values and BCA Requirements

Product	Impact sound rating $L_{n,w} + C_I$, dB	Performance
Requirements for Class 2 & 3 buildings	62 or less	
Carpet with underlay on concrete	30	Excellent impact sound insulation
Carpets without underlay on concrete	42	Good impact sound insulation
Concrete floor	68	Inadequate impact sound insulation

Carpet is the most effective and practical option for protecting residents of multi-storey buildings from impact generated noise from occupancies above.

About the Carpet Institute of Australia

The Carpet Institute of Australia Limited (CIAL) is the lead industry association for Australia's $1.6 billion carpet industry. CIAL represents carpet manufacturers accounting for 95% of Australian carpet production, as well as retailers and suppliers of goods and services to the industry.

Footnotes

1. Graeme E Harding and Associates, Review of the Acoustical Properties of Carpet, August 2006 commissioned by the Carpet Institute to interpret the CSIRO acoustical test results.
2. The decibel scale is logarithmic and a change in level of 10 dB is typically perceived as an approximate doubling or halving of noise level. A 20 decibel increase is approximately equal to the change in noise level experienced when opening a car window in busy traffic.
3. Reverberation describes the build up of sound within a space due to multiple reflections from the surfaces within the room. Reverberation is quantified by measuring the time it takes for sound to reduce in level by 60 decibels. This is the reverberation time (T_{60}) and is measured in seconds.
4. The Noise Reduction Coefficient, NRC, and Weighted Sound Reduction Coefficient, αw (pronounced 'alpha w') are single figure values derived from the one third octave band measured absorption coefficients of a material. Both quantities are a measure of the sound energy absorbed by a particular surface. An NRC or αw of 0 indicates perfect reflection (no sound absorbed); an NRC or αw of 1 indicates perfect absorption (no sound reflected). The NRC and αw rating systems can provide similar results however the ratings can also vary appreciably for some materials.
5. P.G.Bakker "Acoustic Properties of Carpets - International Wool Secretariat paper V.4, no. 76 (1979)

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