

ACCS User Guide

The Australian Carpet Classification Scheme (ACCS) is a product certification scheme administered by the Carpet Institute of Australia. Established in 1985, the ACCS is one of the most comprehensive 'all fibre' carpet grading schemes in the world.

Carpets are classified under the ACCS according to their performance characteristics.

The carpet classification is determined using technical data supplied by manufacturers and results from testing conducted by independent (NATA or equivalent) laboratories.

An expert panel assesses the test results and samples of carpet provided by the manufacturer to determine a 'star' classification for that particular carpet, which relates to the performance characteristics of the carpet. The more stars the higher the ACCS grading.

Carpets are classified according to suitability for use in residential and/or contract installations and in different walking 'traffic' conditions described as light, medium, heavy and extra heavy.

In determining the ACCS end-use classification, the overriding criterion is the appearance retention properties of the carpet. Carpets submitted to the ACCS must also meet minimum standards for a range of construction and performance properties before they will be graded.

Strong correlations exist between the classifications awarded by the ACCS, the Woolmark / Woolmark Blend, and Wools of New Zealand carpet grading schemes.



ACCS Residential Gradings

The yellow and blue labels identify carpets graded for residential use.

Residential carpets are rated using a 6-star classification system.

The categories are:

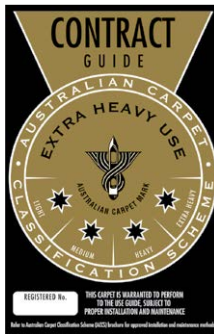
Residential Light Duty	
Residential Medium Duty	
Residential Heavy Duty	
Residential Heavy Duty	
Residential Extra Heavy Duty	
Residential Extra Heavy Duty	

Location Guidance for ACCS Residential Carpet Grading.

Location guide	Trafficking passages per week	RLD R1*	RMD R2*	RHD1 R3*	RHD2 R4*	REHD1 R5*	REHD2 R6*
Bedroom with light traffic flow	Less than 500	✓	✓	✓	✓	✓	✓
Living room, entertainment area with light to medium traffic flow	Less than 1,500		✓	✓	✓	✓	✓
Hallway, entertainment area with heavy traffic flow	1,500 – 2,499			✓	✓	✓	✓
Hallway, entertainment area with heavy traffic flow	2,500 – 3,999				✓	✓	✓
All surface areas with extra heavy traffic flow	4,000 – 5,500					✓	✓
All surface areas with extra heavy traffic flow	4,000 – 5,500						✓

A trafficking passage is defined as one person walking through a particular area once.





ACCS Contract Gradings

The gold and black labels identify carpets graded for contract use and have a maximum of four stars.

Contract carpets are rated using a 4-star classification system.

The categories are:

Contract Light Duty	
Contract Medium Duty	
Contract Heavy Duty	
Contract Extra Heavy Duty	

Location Guidance for ACCS Contract Carpet Gradings.

Location guide	Trafficking passages per week	CLD C1*	CMD C2*	CHD C3*	CEHD C4*
Hotel bedroom, office, shops with light traffic flow	Less than 2,999	✓	✓	✓	✓
Shop, office, hotel lounge with frequent traffic flow	3,000 – 6,999		✓	✓	✓
Busy shop, public areas, office, club, hotel with very heavy traffic flow	7,000 – 14,999			✓	✓
Very busy shop, public area, office, club, hotel with extremely heavy traffic flow	More than 15,000				✓

A trafficking passage is defined as one person walking through a particular area once.





Suitable for Use on Stairs Icon

The 'Stair' icon means the product is suitable for use on stairs in terms of its durability and appearance retention characteristics. Carpet installed on stairs is subject to severe wear and, as a result, will demonstrate change in appearance in a shorter time than a carpet installed on a level surface. This is due to the narrow trafficking pattern as well as the particular foot action that occurs on the stair tread and nosing.

A primary requirement for a carpet to be considered as 'suitable for use on stairs' is that it must meet the specifications for Residential Heavy Duty (3-stars) as a minimum. There is also a minimum pile density, a maximum pile height and the carpet must not show 'grin-through to the backing' when bent around a stair nosing.

As a result of the very concentrated wear, the performance life of a carpet carrying the 'stair icon' installed on multi step stairs will be significantly reduced.

Items Not Covered by ACCS Grading

Carpet Subjected to Unprotected Use by Furniture with Castor Wheels

Carpet subject to use by furniture with castor wheels, such as office chairs, is designated by carpet manufacturers globally as a 'sever-use situation', and a chair pad to protect the carpet pile as well as the total carpet structure is necessary.

Failure to provide a chair mat to protect the carpet can result in localized severe pile distortion and pile damage. The total carpet structure can also be affected causing pile removal and loss of dimensional stability. In the case of tufted carpets, this loss of stability may be due to the break down of adhesion between the primary and secondary backings.

Where carpet protection is not used for furniture with castor wheels, the carpet may not perform in accordance with the star grading recommended by the ACCS and any damage to carpet found to be caused by furniture with castor wheels is unlikely to be covered by any warranty or guarantee issued by the manufacturer/supplier of the carpet. Please check the warranty information.

Localised Severe Wear

Accelerated appearance change can also occur where the carpet is subject to very concentrated, localized abrasive conditions e.g. in front of chairs where there is constant scuffing and grinding motion of footwear. Accelerated change in carpet appearance is usually most evident in front of seating used for TV viewing.

Protective mats are a very useful form of carpet pile protection in these areas. However, the risk of trips and falls associated with this use of loose mats needs to be carefully considered.

Permanent Pile Reversal Shading Effects

The phenomenon of Permanent Pile Reversal Shading (PPRS) can affect the appearance of carpet, however a propensity towards pile reversal or non-pile reversal of any carpet structure cannot be assessed by testing to establish grading data or during ACCS rating. As a result it is excluded from the ACCS grading system.

A brochure on PPRS may be obtained from the publications section of the Carpet Institute's website www.carpetinstitute.com.au

Warranties

The Carpet Institute of Australia Limited does not provide any warranty in respect of any carpets assessed by the Australian Carpet Classification Scheme (ACCS).

ACCS licensees may warrant their products to performed in accordance with the grading shown on the ACCS label, subject to proper installation and correct care of the carpet in line with the manufacturer's recommendations.

Most carpet manufacturers/suppliers require their products to be:

- installed in accordance with the requirements of Australian standard AS 2455.1:2019 (Textile floorcoverings – Installation practice – Part 1: General and Part 2: Carpet Tiles)
- maintained in accordance with Australian and New Zealand standard AS/NZS 3733:2018 (Textile floor coverings – Cleaning maintenance of residential and commercial carpeting)

Major Technical Features

Surface Pile Mass/Pile Height Ratio

Two similar carpet constructions of different pile height but identical surface pile mass will perform differently. The one having the lower pile height will have a higher density and a correspondingly better performance.

The Guideline Surface Pile Mass (GSPM) figure used in the ACCS calculations is based on a database of performance information on carpets of various constructions and of differing fibre composition. For each fibre the GSPM is related to gauge and differs for cut or loop pile. For any blend, the GSPM figures are taken in the same proportion as the components of the blend.

Volume Density

Volume density is a measure of the surface weight of yarn per cubic centimetre (g/cm^3) and is compared with a standard of $0.150\text{g}/\text{cm}^3$ for loop pile carpets and $0.175\text{g}/\text{cm}^3$ for cut pile carpets. Any carpet achieving these figures or better receives the maximum points allocation.

Tuft Density

During the period of development of the ACCS it became apparent that high tuft density, low pile height carpets in synthetic fibre were being under-rated. To redress this imbalance the tuft density parameter was introduced.

Dynamic Loading

This test makes an estimate of pile crushing or flattening under walking traffic loadings. Points awarded relate directly to test results achieved.

Static Loading

This test measures the ability of the carpet pile to recover from flattening produced by pressure such as under furniture. Points awarded relate directly to test results achieved.

Propensity for Soiling

This is a rating of resistance to soiling of the various carpet fibres. The relative values have been accepted by the various fibre interests. The allocation of points to particular fibres is monitored closely and reviewed with changes in fibre technology and developments in fibre treatments.

Abrasion

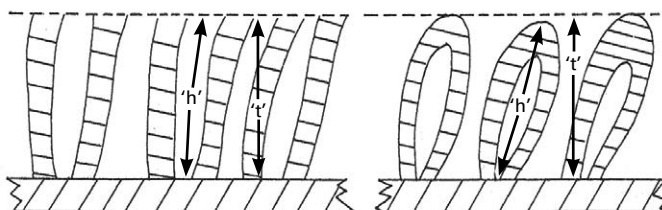
The variety of abrasion tests produce different relativities between the various fibres. It is very doubtful that any abrasion test can consistently and effectively rate all fibres across the range of constructions. For these reasons an experience-based table of relative abrasion resistance has been established.

The Hexapod Tumbler Test

The Hexapod Tumbler Test is used to assess anticipated short term and long term appearance change in the texture and colour of carpets. Currently, assessments of texture and colour change are made at 1500 cycles (simulated 9-12 months in-service) and 8000 cycles (3-4 years in-service equivalent). Pile thickness loss occurring during the test is taken into account. In addition, the ACCS conducts an ongoing program of carpet floor trials to assess the predictability of the Hexapod Tumbler Test across a wide range of carpet constructions. The trials are used to monitor in-situ appearance retention with corresponding Hexapod tests.

Density Factor

The Density Factor is the relationship between Surface Pile Weight above the backing and Pile Thickness. It measures surface weight of yarn per cubic centimetre as this provides a much better method of comparing one carpet to another, taking into account different pile thickness. The ACCS Panel has set a density 'benchmark' for each grading classification level, fibre and construction type.



h = Pile Height

t = Pile Thickness
(under standard pressure)

Overall Appearance Factor (OAF)

The OAF is a point score derived from the Hexapod Tumbler Test – the internationally used short-term and long-term carpet appearance retention test. The OAF is a weighted system and uses the hexapod ratings and pile thickness loss to better predict early appearance loss within the first 12 months of carpet life as well as for the longer term of 3 – 4 years of carpet life.

Panel Assessment

Carpet classifications are assigned by the ACCS Panel. While calculated factors and the results of performance testing remain the most important determinant of the classification awarded, all carpets are subject to review by the ACCS Panel. The Panel awards points for yarn and fibre characteristics (yarn twist, set, appearance and construction) and pile construction and character.

Mandatory Minimum Criteria

ACCS graded carpets must achieve the scheme's mandatory minimum criteria relating to colourfastness to water, shampoo and light, extractable matter, tuft anchorage, secondary backing adhesion, fire safety, yarn twist and, when applicable, insect resist treatments.

The Environmental Certification Scheme

The Environmental Certification Scheme (ECS) is an environmental labelling scheme for carpets. The ECS provides a guide to the environmental performance of certified carpets throughout the full product lifecycle

Code of Practice for Environmental Management

As a precondition of environmental certification, manufacturers must comply with the Code of Practice, which provides performance standards for carpet raw materials, carpet manufacturing, carpet installation and use through to final disposal, recycling or reuse. The ECS has 4 certification levels with incrementally more demanding performance criteria.

ECS Level 1 (entry level) Criteria:

- Fitness for purpose: certified carpets must have a current Australian Carpet Classification Scheme (ACCS) grading and achieve benchmarks for acoustics and thermal insulation.
- Product emissions: ECS has maximum allowable emission factors for 17 chemicals as well as a limit on total volatile organic compound (TVOC) emissions from the carpet.

ECS Certification and Associated Performance Criteria for Levels 2, 3 & 4 are:



ECS Levels 2, 3 & 4 (with 2 options) have been developed to comply with the requirements of Green Building Council of Australia’s (GBCA) Assessment Framework for Product Certification Schemes.

Carpets certified under ECS Levels 2, 3 and 4 certification may achieve points under the Materials category in the Green Star environmental rating tools for buildings. See the table below and for further information, visit www.gbca.org.au/green-star/materials-category/product-and-forest-certification-schemes/1616.htm

ECS	GBCA Recognition Level
Level 1	None (see Note)
Level 2	Level C
Level 3	Level B
Level 4 (with 2 options)	Level A

Note: ECS Level 1 is the pre-qualifier for higher ECS certification levels

Selected ECS Performance Criteria

Product Emissions

The certified carpet must pass a test in which its emissions of Volatile Organic Compounds (VOCs) are assessed.

Testing must be undertaken according to ISO 10580: 2010 Resilient, Textile and Laminate Floor Coverings – Test method for Volatile Organic Compound (VOC) Emissions.

This standard method provides a 24 hour emission rate for VOC emissions immediately after carpet manufacture. The emission rate is measured as an emission factor (EF) in micro grams per square metre of floor covering.

The VOC criteria given in Table 1 have been set after investigation of:

- emissions from a range of carpet systems and fibre types
- health standards for chronic exposure to volatile chemicals.

Table 1: VOC Emissions

Chemical of Concern	Maximum Emission Factor (24 hr) $\mu\text{g}/\text{h}/\text{m}^2$
Acetaldehyde	20
Benzene	55
Caprolactam	120
2-Ethylhexanoic Acid	46
Formaldehyde	10
1-Methyl-2-Pyrrolidone	300
Naphthalene	20
Nonanal	24
Octanal	24
4-Phenylcyclohexene	50
Styrene	410
Toluene	280
Vinyl Acetate	400
2-Ethyl-1-Hexanol	50
Hydrocarbons (C10 – C14)	300
Vinyl Cyclohexene	85
Xylenes	50
Total VOC	500

Acoustic Performance

Carpets function in an indoor environment to dampen the noise level through two mechanisms:

sound absorption – carpet increases the amount of sound absorption in a room and reduces ‘reverberation’ (the term used to describe the degree to which sounds live on within a room)

impact sound isolation – a carpeted floor almost eliminates impact noises produced by footsteps, items dropped on the floor and chair legs scraped across a floor.

These factors are critical to the indoor environment as high background noise levels can create stress and productivity loss in work areas. To ensure good speech intelligibility, a room needs a reverberation time T_{60} not more than 1.0 seconds for normal speech¹. Australian and New Zealand Standard AS/NZS 2107:2016 recommendations for T_{60} levels are given in Table 2 below.

Table 2: Recommended Reverberation Times from AS/NZS 2107:2000²

Type of occupancy / activity	Recommended T_{60}
General Office areas	0.4 to 0.6 seconds
Executive offices	0.6 to 0.8 seconds
Open plan teaching spaces	0.3 to 0.7 seconds ³
Classrooms	0.3 to 0.7 seconds

¹ World Health Organisation (WHO) Guidelines for Community Noise in Specific Environments, 2000

² Australian and New Zealand Standard AS/NZS 2107:2000 – Acoustics – Recommended Design and Sound Levels and Reverberation Times for Building Interiors. Recommendations are not included in AS/NZS 2107 for domestic living spaces. This is because, traditionally, reverberation has been controlled in residences through the installation of carpet and through the incorporation of sufficient soft furnishings. However, in more recent times, excessive reverberation in living areas has been linked to the increased use of hard floor coverings. Uncarpeted living areas can sound noisy and make speech communication difficult.

³ Reverberation time should be minimised for noise control.



The ACCS ECS criteria contained in Table 3 easily exceed Australian Building Code requirements for Class 2 and 3 buildings and provide for superior indoor acoustics.

Table 3: Acoustic Criteria

	Impact Sound Reduction	
	$L_{n,w}$	Noise Reduction Coefficient (NRC) ^B
ACCS ECS – Broadloom carpet	≤ 45	≥ 0.20
ACCS ECS – Modular carpet	≤ 55	≥ 0.15
BCA (Class 2 and 3 buildings)	≤ 62	none

NOTE A: Laboratory measure of impact sound insulation of a flooring system. Measurements in accordance with 'AS ISO 140.6 – 2006 Acoustics – Measurement of sound insulation in buildings and of building element, Part 6: Laboratory measurements of impact sound insulation of floors'. The single figure value is derived in accordance with 'AS ISO 717.2 – 2004 Acoustics – Rating of sound insulation in buildings and of building elements, Part 2: Impact sound insulation'.

NOTE B: The NRC rating is an industry accepted definition of a material's absorption property and is the arithmetic average of the 250 Hz, 500 Hz, 1000 Hz and 2000 Hz one third octave band absorption coefficients, measured in accordance with 'AS 1045 – 1988 Acoustics – Measurement of sound absorption in a reverberation room'.

Thermal Insulation

The comfort factor supplied by carpet is due to its insulating and low thermal conduction properties. Thermal comfort also translates into energy and Greenhouse savings in room heating and cooling.

A certified carpet must meet the relevant criterion specified in Table 4. The test method required for thermal insulation is ISO 8302:1991 Thermal Insulation – Determination of steady state thermal resistance and related properties – guarded hot plate apparatus.

Table 4: Thermal Insulation Criteria

	"R" value (m ² K/W)
Broadloom carpet	> 0.10
Modular carpet	> 0.075

R value for Thermal Resistance will vary with the thickness of the carpet installation. The R value is measured in metric units of Watts per meter squared per degree Kelvin.w

The ECS Labels



Further Information

The ACCS ECS Technical Guidelines, Code of Practice for Environmental Management and a list of ECS certified carpets are available from the Carpet Institute website www.carpetinstitute.com.au

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.

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The “*Carpet It Just Feels Better*” campaign is an initiative of the Carpet Institute of Australia, a non-profit association sponsored by carpet manufacturers, their suppliers and other companies that provide goods and services to the broader carpet industry.