



Version 1.4

Australian Carpet Classification Scheme Incorporating The Environmental Certification Scheme

TECHNICAL GUIDELINES

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Introduction

The Australian Carpet Classification Scheme (ACCS) is a voluntary industry labelling and grading scheme for textile floor coverings (carpets) manufactured in Australia or imported for use within Australia.

Under the Scheme, textile floor coverings are classified by an independent Panel of experts (the ACCS Panel) in accordance with the ACCS Technical Guidelines as amended from time to time.

The ACCS, which is a multi fibre grading scheme, has been designed to provide buyers of carpet (both residential and contract) with easy to understand information on carpet quality and performance in terms of durability and appearance retention (Location Guidance Classification) and environmental factors (ECS Certification).

The ACCS is a Certification Trademark Scheme. Under the Certification Agreement, signatories to the ACCS (licensees) agree to abide by strict Rules and Licensing Arrangements and are required to submit their products for assessment against the ACCS Technical Guidelines.

AUSTRALIAN CARPET CLASSIFICATION SCHEME

Appearance Retention

It is now widely held that the performance or useful life of a carpet is determined by appearance retention properties rather than simply wear in the sense of fibre loss. Appearance retention refers to the ability of a carpet to resist excessive or premature appearance loss – usually seen as flattening, loss of texture or structure, colour change or pattern loss. Appearance retention also takes into account the ability of the carpet to resist or conceal soiling.

The ACCS Panel believes that there is as yet no definitive test or tests to accurately predict the appearance change in a carpet which can occur in actual use.

It may be that for a particular type of construction in a single fibre, useful comparisons can be made between different densities, pile heights etc. However, it is not possible to make consistent comparisons between different constructions across the range of fibres with any single test or group of tests. The consequence is that some elements of appearance retention must be assessed subjectively.

The ACCS awards up to 81 points out of 100 for objectively assessed attributes and the remaining 19 points are awarded for appearance retention attributes by an experienced industry panel. The breakdown of the allocation of points is detailed in the section titled 'Method of Classification'.



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Major Technical Features

Surface Pile Mass/Pile Height Ratio

Two similar constructions of different pile height but having identical surface pile mass will perform differently. The one having the lower pile height will have a higher density and a correspondingly better performance. This relationship is assessed against a pile height standard of 10mm for Residential gradings and 5.5mm for Contract gradings.

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

Volume Density

It is a measure of the g/cm^3 in the surface pile and is compared with a standard of 0.150g/cm^3 for loop pile carpets and 0.175g/cm^3 for cut pile carpets. Any carpet achieving these figures or better achieves the maximum points allocation. To put this in perspective, a 'balanced' 1/8th gauge loop pile constructed of R800 Tex yarn just achieves the maximum. Such a carpet would be expected to perform well.

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 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. Again, points awarded relate directly to test results achieved.

Propensity for Soiling

This is an experience based 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. There have also been large discrepancies between laboratories using the same test apparatus and method. 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.



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The Hexapod Tumbler Test

The Hexapod Tumbler Test is used by the ACCS 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). In addition, the ACCS conducts an ongoing program of carpet floor trials to assess the predictability of the Hexapod across a wide range of carpet constructions. The trials are being used to monitor in situ appearance retention with corresponding Hexapod tests.

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

No carpet will be classified unless it meets all the relevant criteria which are set out in pages 14-16.

Additional Criteria

During the 1998 review of the scheme, additional criteria were developed (Density Factor and Overall Appearance Factor) to further segment the Residential Heavy Duty and Residential Extra Heavy Duty categories. If carpet can't meet the desired OAF and Density factors for particular grading categories, it simply can't be graded at those levels.

– 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.

– 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 scores to better predict early appearance loss within the first twelve months of carpet life.



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ACCS Panel**Mr T Akroyd**

Cavalier Bremworth

Mr J Cullen

Godfrey Hirst Australia

Mr P Roberts

Tarkett Australia

Ms A Attenborough

Interface

Mr B Dacre

Beaulieu of Australia

Mr G Robinson (Chairman)

Independent

Mr I Benjamin

Aywon Carpet Contractors

Mr J Dupree

Victoria Carpets

Mr C Szakiel

Independent

Mr M Boyd

Interface

Mr Z Khan

Ontera – a Milliken company

Mr T Brown

Colstan Carpet Court

Mr C Leach

Tuftmaster Carpets

Basis of Classification

Carpet qualities are classified under the ACCS labelling system according to their ability to perform to expected traffic loadings in standard site conditions. The method of determining the location guidance classifications is set out in this document.

The ACCS Grading Panel assigns the classification. The classification is determined after an examination of technical data supplied by Licensees, on the basis of test results conducted by independent testing laboratories (NATA or equivalent) and a point score generated by the ACCS calculations.

In determining the location guidance classification, the overriding criterion is the appearance retention properties of the carpet. Appearance retention assessment is reflected in both the objective scoring system (81 out of 100 points) and assessment (the remaining 19 points). Carpet qualities submitted to the ACCS must also meet minimum standards for a range of construction and performance properties before they will be graded. The method of calculating the ACCS points, the independent testing requirements and the mandatory minimum criteria are detailed in the following section, 'Method of Calculation'.

Pure wool and wool blend carpets can also be classified under the Woolmark/Woolmark Blend Scheme and the administrator of that scheme, Australian Wool Innovation / The Woolmark Company, will use its own assessment criteria, as does the Wools of New Zealand grading scheme.

If the Woolmark/Woolmark Blend Licensee is also an ACCS Licensee, the test results supplied and grading assigned by the Woolmark/Woolmark Blend Scheme can subsequently be used by the Licensee in the ACCS grading process. The ACCS Licensee is obliged to make known the Woolmark/ Woolmark Blend rating at the time of applying for an ACCS rating.

No differences in classifications assigned by the three Schemes are expected. Excellent correlations exist between the classifications awarded by the ACCS, Wools of New Zealand grading scheme and Woolmark /Woolmark Blend. The classifications awarded for products rated by all Schemes are closely monitored.

It is anticipated that carpets complying with Woolmark /Woolblendmark and ACCS requirements should carry both classification levels.





Method of Classification

Classification Categories

ACCS Residential Gradings

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 Gradings.

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 or commercial use. Contract ratings have a maximum of four stars. Some carpets will carry both Residential and Contract gradings.



Commercial or 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. 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. Further information on PPRS may be obtained by clicking on the link <http://www.carpetinstitute.com.au/downloads/shading.pdf>.

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 Australasian standard AS 2455: 2019 (Textile floorcoverings – installation practice – Part 1: General and Part 2: Carpet tiles)
- maintained in accordance with Australasian standard AS/NZS 3733: 2018 (Textile floor coverings – cleaning maintenance of residential and commercial carpeting)



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Methods of Calculating Points Scores for Carpet Classification and Mandatory Minimum Criteria

Allocation of Points

Properties for which points are allocated and the maximum values are:

Surface pile mass/Pile Height	16 points
Volume density	20 points
Tuft density	9 points
Dynamic loading	5 points
Static loading	5 points
Propensity for soiling	16 points
Abrasion resistance	10 points
Panel's discretion	19 points
Total =	100 points

Details of Points Calculations

Each calculation result is rounded off to the nearest tenth of a point (0.1), up or down, depending on whether the next digit is above or below 5.

- (a) Surface Pile Mass/Pile Height
(Calculated Value)
– 16 points maximum value

Points are assigned by the following calculations:

Residential gradings

$$\frac{\text{surface pile mass}}{\text{guideline surface pile mass}} \times \frac{10}{\text{pile height}} \times 12$$

Contract gradings

$$\frac{\text{surface pile mass}}{\text{guideline surface pile mass}} \times \frac{5.5}{\text{pile height}} \times 12$$

The surface pile mass in g/m² is assessed by AS/NZS 2111.4. The pile height in millimetres is calculated from:

$$\text{Surface pile mass} \times 10^4$$

$$2 \times \text{pitch or gauge}/100\text{mm} \times \text{rows or stitches}/100\text{mm} \times \text{resultant tex}$$

The Guideline Surface Pile Mass for the relevant fibre and gauge is shown in the following table, the values for



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Guideline Weights for Surface Pile Mass (G/M ²)									
Gauge	/100mm	Style	Polypropylene Spun	Nylon Spun	Polypropylene BCF	Nylon BCF	Wool	Acrylic	Polyester
1/16	63.0	Loop	555	485	415	365	695	655	625
		Cut	680	590	505	445	850	800	765
5/64	50.4	Loop	595	520	445	390	745	705	670
		Cut	925	635	545	475	910	860	820
1/10	39.4	Loop	630	555	475	415	790	745	710
		Cut	770	680	580	505	965	910	865
1/9	35.4	Loop	650	570	490	430	815	765	735
		Cut	795	695	600	525	995	935	900
1/8	31.5	Loop	670	590	505	445	840	795	755
		Cut	820	720	615	545	1025	975	920
1/7	27.6	Loop	700	610	525	460	875	830	790
		Cut	855	745	640	560	1070	1015	965
5/32	25.2	Loop	725	635	545	475	905	855	815
		Cut	885	775	665	580	1105	1045	995
1/6	23.6	Loop	740	650	55	485	925	875	835
		Cut	905	795	680	590	1130	1075	1020
3/16	21.0	Loop	770	670	575	505	960	905	865
		Cut	940	820	700	615	1170	1105	1055
1/4	15.7	Loop	840	735	630	550	1050	990	945
		Cut	1025	895	770	675	1280	1210	1155
5/16	12.6	Loop	890	780	670	585	1115	1055	1005
		Cut	1085	950	820	715	1360	1290	1225
3/8	10.5	Loop	930	815	700	615	1165	1100	1050
		Cut	1135	995	855	750	1420	1345	1280
15/32	8.4	Loop	975	850	730	640	1215	1130	1095
		Cut	1190	1040	890	780	1485	1405	1335
5/8	6.3	Loop	1020	895	765	670	1275	1205	1150
		Cut	1245	1090	935	820	1555	1470	1405



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loop pile being lower than for cut pile. In a cut and loop construction the values are interpolated according to the percentage by area covered by each pile type.

Example: A 25.2/100mm gauge cut and loop BCF nylon has 36 stitches per 100mm, Resultant yarn Tex 320, 80% cut pile and 20% loop pile.

The surface pile mass assessed by AS/NZS 2111.4 is 930g/m². The Guideline Surface Pile Mass for 25.2/100mm gauge BCF nylon is 580g/m² cut pile and 475g/m² loop pile, therefore:

$$\frac{80/100 \times 580 + 20/100 \times 475 = 559\text{g/m}^2}{}$$

The pile height is:

$$\frac{930 \times 10^4}{2 \times 25.2 \times 36 \times \sqrt{320}} = 16$$

Finally the points calculation is:

$$930/559 \times 10/16 \times 12 = 15.78 \text{ rounded to } 15.8 \text{ points}$$

- (b) Volume Density (Calculated Value) - 20 points maximum value.

The simplest measure of density that works for both woven and tufted constructions is the formula:

$$\text{Density in g/cm}^3 = \frac{\text{No. of tuft legs per m}^2 \times \text{resultant tex}}{10^9}$$

For a normal tufted or woven construction this can be restated as:

$$\text{Density in g/cm}^3 = \frac{2 \times \text{pitch or gauge (per 100mm)} \times \text{rows or stitches (per 100mm)} \times \text{resultant tex}}{10^7}$$

Care must be taken to ensure that the value for Resultant Tex takes into account any less common features such as two ends per needle or partial and double lifts in a Wilton carpet. In the former case, the yarn count is taken as the sum of the yarn counts of the two ends.

The density figure calculated is divided by either 0.175 g/cm³ for cut or cut and loop styles, or by 0.150 for loop styles, and then multiplied by 20 to give the points value for volume density, up to a maximum value of 20 points.

For example, a loop pile carpet of 31.5/100mm gauge, 32 stitches per 100mm and R800 Tex yarn has a volume density points score of:

$$2 \times 31.5 \times 32 \times 800 \times 20 = 21.5 \text{ rounded to the maximum of } 20 \text{ points}$$



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$$10^7 \quad 0.150$$

a cut loop carpet of 21.0/100mm gauge, 36 stitches per 100mm and R250 Tex yarn has a volume density points score of:

$$2 \times 21.0 \times 36 \times 250 \times 20 = 4.32 \text{ rounded to } 4.3 \text{ points}$$

$$10^7 \quad 0.175$$

- (c) Tuft Density (Calculated Value) - 9 points maximum value.

A point is awarded for each 200 tufts per square decimetre up to a maximum of 9 points. For example, if a carpet has a gauge of 32/100mm and rows of 25/100mm, the tufts/10,000mm are 800 and a points value of 4 is obtained.

- (d) Dynamic Loading (Test Method: AS/NZS 2111.2) - 5 points maximum value.

Points values are determined on the basis of pile thickness loss after 1000 impacts (no recovery time) as follows:

$\leq - 15\%$ loss	5 points
16 – 25% loss	4 points
26 – 35% loss	3 points
36 – 45% loss	2 points

The ACCS Panel will retain the right to refuse to classify a carpet with a loss of thickness of greater than 45%.

Carpets having integral backings of foam rubber, PVC or urethane are tested after the backings have been removed as far as is practical without damaging the substrate. This does not apply to carpet tiles. The dynamic loading test is carried out with the carpet only; no underlay is to be used in the test.

- (e) Static Loading (Test Method: AS/NZS 2111.14) - 5 points maximum value.

Points values are based on the pile thickness loss after 24 hours recovery time, as follows:

$\leq - 10\%$ loss	5 points
11 – 20% loss	4 points
21 – 30% loss	3 points
31 – 40% loss	2 points

The ACCS Panel will retain the right to refuse to classify a carpet with a loss of thickness of greater than 40%.

Carpets having integral backings of foam rubber, PVC or urethane are tested after the backings have been removed as far as is practical without damaging the substrate.



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This does not apply to carpet tiles. The static loading test is carried out with the carpet only; no underlay is to be used in the test.

(f) Appearance Retention Testing (Test Method: IWS 247/251/284)

Minimum Hexapod results for ACCS gradings are shown in the table below. Pile thickness loss results will be assessed according to the construction parameters of the carpet.

Carpets tested without underlay:

Cycles	Texture Change	Colour Change
1500	3	2-3
8000	2	1-2

Carpets tested with underlay:

Cycles	Texture Change	Colour Change
4000	3	2-3
12000	2	1-2

Hexapod results are used to assist the Panel in the allocation of discretionary points. The ACCS Panel reserves the right to override these minimums or request the Licensee to carry out further Hexapod testing including participation in CIAL floor trial programs.

(g) Propensity for soiling - 16 points maximum

Points are allocated on the basis of accepted soiling propensity characteristics of the major carpet fibres as follows:

	Basic Points	Anti-Soiling Points	Stain Resist Points
Wool	14	1	1
Wool/nylon: 80/20	14	1	1
Nylon* (Cat.1)	12	1	1
Nylon** (Cat.2)	11	1	1
Polypropylene	10	0	0
Acrylics	6	1	0
Polyester	6	1	0
Modified Rayon	2	0	0

* Nylon category 1: modified cross section with integral anti-static component

** Nylon category 2: modified cross section

Anti-Soiling Treatments

100% wool, 100% nylon, 80/20 wool/nylon and 100% polyester carpets will be eligible for an extra one (1) point if



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treated in manufacture with an approved low environmental impact oil and water repellancy and dry soil resistancy agent (anti-soiling agent).

The following criteria must be observed:

- (i) the resultant treatment must pass the chemical manufacturer's minimum standards for oil and water repellancy and dry soil resistancy;
- (ii) the provision of a written warranty from the carpet manufacturer and/or fibre supplier in relation to the performance of anti-soiling treatments for respective end-use markets. If the manufacturer/fibre supplier warranty applies to only one end-use market (eg Residential but not Contract installations) then the additional point is only available for the Residential grading, and vice versa.

For fibre blends, a proportion of the additional point is applied according to the components of the blend.

Stain Resist Treatments

100% wool, 100% nylon, 80/20 wool/nylon and 100% polyester carpets will be eligible for an extra one (1) point if treated in manufacture with an approved stain resist chemical. The following criteria must be observed:

- (i) carpet treated must achieve a level of stain resistance that satisfies the minimum requirements of the chemical manufacturer's standards appropriate to the fibre being treated;
- (ii) the provision of a written warranty from the carpet manufacturer and/or fibre supplier in relation to the performance of stain resistant treatments for respective end-use markets. If the manufacturer/fibre supplier warranty applies to only one end-use market (eg Residential but not Contract installations) then the additional point is only available for the Residential grading, and vice versa.

- (h) Abrasion Resistance (Calculated Value) – 10 points maximum value.

Information available through the British Carpet Performance Rating Scheme has led to the construction of a table of surface pile mass wear relationship factors. Dividing 1980 g/m² by the fibre's factor gives the guideline pile mass (abrasion) for use in calculation of the durability points value.

For fibre blends, a proportion of the additional point is applied according to the components of the blend.

Fibre	Factor	Guideline Surface Pile Mass (Abrasion)
Modified rayon	1.0	1980g/m ²
Modacrylic	1.2	1650
Cotton	1.3	1523
Wool	1.5	1320
Acrylic	2.0	990
Polypropylene		
Staple	4.8	413
Polyester	4.8	413
Nylon staple	5.8	341
BCF		
Polypropylene	6.0	330
BCF Nylon	7.2	275



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The factors apply proportionally for blends. For example, 80/20 wool/nylon has a factor of: $80/100 \times 1.5 + 20/100 \times 5.8 = 2.36$

Then, $1980/2.36 = 839$ which is the Guideline Surface Pile Mass (Abrasion) for 80/20 wool/nylon.

The Surface Pile Mass of the carpet being considered is divided by the appropriate Guideline Surface Pile Mass (Abrasion) and multiplied by 7 to give the durability points score, to a maximum value of 10 points.

For example, 100% wool with a Surface Pile Mass of 1000 g/m^2 would score $1000/1320 \times 7 = 5.3$, while a BCF nylon with a Surface Pile Mass of 750 g/m^2 would score:

$750/1320 \times 7 = 19.1$ rounded to the maximum 10 points.

- (i) Discretionary Points (allocated by ACCS Panel) - 19 points maximum value.

The ACCS Panel will award discretionary points on the basis of a collective assessment of the various characteristics of the carpet submitted as outlined below. The Panel will collectively score the carpet on each of these factors and the individual factor scores will be totalled.

	Maximum
1. Yarn twist, set, appearance and construction	8 points
2. Pile construction and character	8 points
3. Special properties	3 points

The ACCS Panel will retain the right to refuse to classify a carpet submitted to protect the Scheme from a contrived construction.

Mandatory Minimum Criteria:

- (a) Colourfastness to Water (Test Method: AS 2001.4.EO1) - Minimum result of 3-4 is required.
- (b) Colourfastness - Shampoo Solution (Test Method: AS/NZS 2111.19.2) - Minimum result of 3-4 is required.
- (c) Light Fastness (Test Method: BS1006-B02) - Minimum result of 5 is required. For those products which cannot achieve rating 5 it is recommended that manufacturers state this qualification on samples.
- (d) Extractable Matter (Test Method: AS 2001.3.4) - wool and artificial fibres 1.5%. The solvent used in this test will depend on the fibre type being tested.

Fibre Composition	Solvent Used
100% Wool	Dichloromethane (DCM)
Wool/Nylon Blend	Dichloromethane (DCM)
Wool/Nylon/Polypropylene Blend	Petroleum Spirit
Wool/Polypropylene Blend	Petroleum Spirit
Wool/Polyester Blend	Petroleum Spirit
Wool/Nylon/Polyester Blend	Petroleum Spirit
Wool/Acrylic Blend	Dichloromethane (DCM)
100% Nylon	Dichloromethane (DCM)
Nylon/Polypropylene Blend	Petroleum Spirit
100% Polypropylene	Methanol



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100% Polyester	Petroleum Spirit
Polyester Blend	Petroleum Spirit
100% Acrylic	Dichloromethane (DCM)

(e) Tuft Anchorage (Test Method: AS/NZS 2111.15)

The following minimums are applicable.

	Residential	Contract
<u>Woven Carpet Construction</u>		
Loop	10 newtons	10 newtons
Cut	3 newtons	6 newtons
<u>Tufted Carpet Construction</u>		
Loop	20 newtons	30 newtons
Cut/Stepover*	6 newtons	6 newtons
Cut**	10 newtons	10 newtons

* A construction of 'stepover' or 'crossover' stitching has a requirement of 6 newtons

** All other cut constructions have a requirement of 10 newtons

(f) Secondary Backing Delamination (Test Method: AS/NZS 2111.16)

The following minimums are applicable – based on a 50mm strip.

Secondary Backing Type	Open-weave Synthetic	All other Backings
<u>Installation system: conventional underlay</u>		
Residential	30 newtons	30 newtons
Contract	40 newtons	40 newtons
<u>Installation system: direct stick or double stick</u>		
Residential	30 newtons	30 newtons
Contract	35 newtons	40 newtons

(g) Burning Behaviour – must pass AS/NZS 2111.18 when read in accordance with AS 2404.

(h) Foam Delamination (Test Method: AS/NZS 2111.16) - Residential only, 50mm strip, 6 newtons.

(i) Foam Density (Test Method: BCMA 1076) - Residential only, 0.17g/cubic cm.

(j) Ageing Properties – Foam Backed Carpet

A sample of carpet should be subjected to 12°C for 48 hours in an air-circulating oven. The sample is removed and conditioned to room temperature, then bent through 180°. The sample should not rupture or crack on bending.

(k) Minimum Twist for Certain Yarns

Minimum twist for balance plied heat-set BCF Nylon finished yarns on cone shall be

145 t.p.m. in the range 2 x 1000 to 2 x 1500 decitex and 135 t.p.m. for those yarns exceeding 2 x 1500 decitex.

(l) Insect Resist Treatments

Where yarns used in the carpet are wool or wool blends, the pile fibre should be treated against moth and carpet



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beetle attack by applying an approved insecticide in accordance with the requirements laid down from time to time by the ACCS Panel. These are currently The Woolmark Company recommended treatments.

ACCS Grading Calculator

NYLON		WOOL (80 TO 100%)		WOOL BLEND (0 TO 79% WOOL)		POLYPROPYLENE		WOVEN
Loop Pile	Cut Pile	Loop Pile	Cut Pile	Loop Pile	Cut Pile	Loop Pile	Cut Pile	
★ RESIDENTIAL LIGHT DUTY								
37-46 points	37-46 points	37-46 points	37-46 points	37-46 points	37-46 points	37-46 points	37-46 points	37-46 points
★★ RESIDENTIAL MEDIUM DUTY								
47-57 points	47-57 points	47-57 points	47-57 points	47-57 points	47-57 points	47-57 points	47-57 points	47-57 points
★★★ RESIDENTIAL HEAVY DUTY (Lower to Mid Range)								
Existing RHD or min. 58 points	Existing RHD or min. 58 points	Existing RHD or min. 58 points	Existing RHD or min. 58 points	Existing RHD or min. 58 points	Existing RHD or min. 58 points	Existing RHD or min. 58 points	Existing RHD or min. 58 points	Existing RHD or minimum 54 points
★★★★ RESIDENTIAL HEAVY DUTY (Mid to Higher Range)								
min. 58 points and density 0.090g/cm ³ and 3.5 OAF	min. 58 points and density 0.103g/cm ³ and 3.5 OAF	min. 58 points and density 0.136g/cm ³ and 2.7 OAF	min. 58 points and density 0.138g/cm ³ and 2.7 OAF	min. 58 points and density 0.138g/cm ³ and 3.0 OAF	min. 58 points and density 0.140g/cm ³ and 3.0 OAF	min. 58 points and density 0.120g/cm ³ and 2.7 OAF	min. 58 points and density 0.138g/cm ³ and 3.0 OAF	min. 54 points and density 0.126g/cm ³ and 2.7 OAF
or 70 contract points	or 70 contract points	or 70 contract points	or 70 contract points	or 70 contract points	or 70 contract points	or 70 contract points	or 75 contract points	or 62 contract points
or existing CMD	or existing CMD	or existing CMD	or existing CMD	or existing CMD	or existing CMD	or existing CMD	or Floor trial results	or existing CMD
★★★★★ RESIDENTIAL EXTRA HEAVY DUTY (Lower to Mid Range)								
min. 69 points and density 0.090g/cm ³ and 3.5 OAF	min. 69 points and density 0.103g/cm ³ and 3.5 OAF	min. 69 points and density 0.136g/cm ³ and 2.7 OAF	min. 69 points and density 0.138g/cm ³ and 2.7 OAF	min. 69 points and density 0.138g/cm ³ and 3.0 OAF	min. 69 points and density 0.140g/cm ³ and 3.0 OAF	min. 69 points and density 0.120g/cm ³ and 2.7 OAF	min. 69 points and density 0.138g/cm ³ and 3.0 OAF	min. 64 points and density 0.126g/cm ³ and 2.7 OAF
or 70 contract points	or 70 contract points	or 70 contract points	or 70 contract points	or 70 contract points	or 70 contract points	or 70 contract points	or 75 contract points	or 62 contract points
or existing CMD	or existing CMD	or existing CMD	or existing CMD	or existing CMD	or existing CMD	or existing CMD	or Floor trial results	or existing CMD
★★★★★★ RESIDENTIAL EXTRA HEAVY DUTY (Mid to Higher Range)								
69 points and density 0.120g/cm ³ and 3.5 OAF	69 points and density 0.140g/cm ³ and 3.5 OAF	69 points and density 0.140g/cm ³ and 3.0 OAF	69 points and density 0.143g/cm ³ and 3.0 OAF	69 points and density 0.143g/cm ³ and 3.2 OAF	69 points and density 0.145g/cm ³ and 3.2 OAF	69 points and density 0.132g/cm ³ and 2.7 OAF	69 points and density 0.150g/cm ³ and 3.5 OAF	64 points and density 0.130g/cm ³ and 3.0 OAF
or 78 Contract points	or 78 Contract points	or 78 Contract points	or 78 Contract points	or 78 Contract points	or 78 Contract points	and either 70 calculated points or 78 Contract points	and 80 contract points or Floor trial results	or 69 contract points
or existing CHD	or existing CHD	or existing CHD	or existing CHD	or existing CHD	or existing CHD			or existing CHD

PANEL DISCRETIONARY POINTS	
Yarn twist, set, appearance and construction	8 points
Pile construction and character	8 points
Special properties	3 points

RESIDENTIAL	POINTS	WOVEN POINTS	CONTRACT	POINTS	WOVEN POINTS
Light Duty	37-46		Light Duty/Stairs	60-69	60-63
Medium Duty	47-57		Medium Duty/Stairs	70-77	64-68
Heavy Duty/Stairs	58-68	54-63	Heavy Duty/Stairs	78+	69+
Extra Heavy Duty/Stairs	69+	64+	Extra Heavy Duty/Stairs	Panel Discretion	Panel Discretion



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ENVIRONMENTAL CERTIFICATION SCHEME

Introduction

This Scheme consists of 4 levels of certification and requires licensees of the scheme to satisfy incrementally more demanding performance criteria.

ECS Level 1 (Entry Level Certification)

ECS Level 2

ECS Level 3

ECS Level 4 (with 2 options)

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.

The Scheme provides a guide to the environmental performance of certified textile floor covering products through their full lifecycle. In this case, lifecycle is defined as the processes involved in the production of raw materials, manufacturing of carpet, installation and use of carpet through to its final disposal, recycling, or reuse.

ECS Level 1

Mandatory Criteria

1. Carpets must carry an ACCS location guide classification.
2. The manufacturer of the carpet must sign and agree to be bound by the provisions of the attached CIAL Environmental Code of Practice. The Code of Practice provides performance standards for choice of raw materials and their production, good environmental manufacturing practices with appropriate measures to control environmental impacts, reduce raw material consumption and performance reporting.

The CIAL Environmental Code of Practice includes a section on product stewardship so that recommended practices are provided for carpet installation and uplifted carpet disposal. This requires the manufacturer to provide information about the systems available to reduce environmental impacts at installation, during use and at the end of the carpet's life.

3. The following product performance criteria must be satisfied for environmental certification:
 - a) Indoor Air Quality
 - b) Acoustics
 - c) Thermal insulation

Performance Criteria

Indoor Air Quality

The certified carpet must pass a test in which its emissions of Volatile Organic Compounds (VOCs) are assessed to be below the criteria set out in Table 1.

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 gram per square meter of floor covering).

ECS Lables



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Table 1: VOC EMISSIONS	
Chemical of Concern	Criterion 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 ($\text{C}_{10} - \text{C}_{14}$)	300
Vinyl Cyclohexene	85
Xylenes	50
TOTAL VOC	500

These VOC criteria have been set after investigation of:

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

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 scrapped 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 Standard AS/NZS 2107:2000 recommendations for T_{60} levels are given in Table 2.

Table 2: RECOMMENDED REVERBERATION TIMES FROM AS/NZS 2107:2000	
Type of occupancy / activity	Recommended² T_{60}
General Office areas	0.4 to 0.6 seconds
Private offices	0.6 to 0.8 seconds
Primary school teaching areas	0.4 to 0.5 seconds
Secondary school teaching areas	0.5 to 0.6 seconds

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

² Australian 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, particularly over the phone, difficult.



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The test method used for impact sound reduction and noise attenuation is AS ISO 140.6 –2006 and AS ISO 717.2–2004 for the determination of Impact Sound Pressure Level $L_{n,w}$ and the Spectrum Adaption term C_1

Table 3: ACOUSTIC CRITERIA	Impact Sound Insulation	Absorption Performance	
		Noise Reduction Coefficient (NRC) ^B	Weighted Sound Absorption Coefficient (α_w) ^C
	$L_{n,w} + C_1$, dB ^A		
ACCS ECS – Broadloom carpet	≤ 45	≥0.2	≥0.2
ACCS ECS – Modular carpet	≤ 55	≥0.15	≥0.15
BCA (Class 2 and 3 buildings)	≤ 62	none	

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 ECS 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) ³
ACCS ECS Broadloom carpet	≥ 0.10
ACCS ECS Modular carpet	≥ 0.075

³. 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 metre squared per degree Kelvin.



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ECS Levels 2, 3 & 4 (with 2 options)

The technical specifications of the Scheme have been developed to comply with the requirements of GBCA's Assessment Framework for Product Certification Schemes.

While retaining the validity of existing ECS certifications, licensees have the option of complying with more demanding performance criteria.

Mandatory Criteria

Carpets must carry a current ACCS location guide classification.

If the ACCS grading was awarded more than 2 years prior to the date of the ECS grading application, the licensee must confirm that the main construction parameters of the graded carpet are true to the registered ACCS product specification by submitting to the Panel an Abbreviated ACCS QA Test Report from a NATA registered laboratory.

The manufacturer of the carpet must sign and be bound by the provisions of the ACCS Code of Practice for Environmental Management.

Where the licensee is required to submit a report from an independent assessor, the assessor must be registered by RABQSA (in Australia) or other international accreditation systems.

The new ECS certification levels and associated performance criteria are:

ECS Level 2

- Raw Materials (Toxicity)
- Fitness for Purpose
- Product Emissions

ECS Level 2



ECS Level 3

- Raw Materials (Toxicity)
- Fitness for Purpose
- Product Emissions

+

Manufacturing

ECS Level 3



ECS Level 4 (with 2 options)



ECS Level 4 (A)

- Raw Materials (Toxicity)
- Fitness for Purpose
- Product Emissions
- Manufacturing

+

Product Stewardship



ECS Level 4 (B)

- Raw Materials (Toxicity)
 - Fitness for Purpose
 - Product Emissions
 - Manufacturing
- +
- Greenhouse Gas Impact Management
 - Water Use Management
 - Social Accountability Reporting

ECS Level 4



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Performance Criteria**RAW MATERIALS**

The aim of this criterion is to:

- restrict or ban the use in certified textile floor coverings of toxic substances, heavy metal and hazardous substances
- ensure that any substance with an adverse health effect is kept at a level below the No Observable Adverse Effect Level (NOAEL) for that substance during the useful life and at the end of life of the textile floor covering.

It is recognized that some regulated substances may be inadvertently produced in manufacture, or may be present although not declared in proprietary products used in carpet manufacture. It is incumbent on manufacturers to ensure that carpets do not contain more than 0.1% by weight of these substances unless a lower concentration is required in other sections of this document.

Manufacturers must examine material safety data sheets to identify chemicals that are either banned, limited in the final product, or of concern to evaluate compliance with the Technical Guidelines.

Additionally, selection criteria for raw material suppliers should include their ability to control environmental outcomes, reporting on environmental performance and their regulatory compliance record.

Attachment 1 provides guidance on the evaluation of raw material toxicity.

Regulated Substances that Must Not be Used in the Production of Textile Floor Coverings

Attachment 2 contains a list of banned chemicals. For the purposes of the Technical Guidelines, banned substances include:

- all materials that are not registered for use in Australia by the National Industrial Chemicals Notification and Assessment Scheme (NICNAS)
- IARC classified carcinogens in groups 1 and 2A¹ available at <http://monographs.iarc.fr/ENG/Monographs/vol91/index.php>,
- Substances listed in the Stockholm Convention on Persistent Organic Pollutants (Annex A) available at <http://chm.pops.int/Convention/tabid/54/language/en-US/Default.aspx>,
- Substances classified as carcinogenic, mutagenic, or reproductive toxins (CMR) Categories 1 and 2 listed in Annex 1 of EU Directive 67/548/EEC available at <http://www.reach-compliance.eu/english/legislation/docs/launchers/launch-annex-1-67-548-EEC.html>

A list of banned dyestuffs is contained in **Attachment 3**.

Substances to be Controlled in the Production of Textile Floor Coverings

Attachment 4 contains a list of controlled or restricted use chemicals.

¹ IARC Monographs Volumes 1-100A group 1: carcinogenic to humans, 2A: probably carcinogenic to humans



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Lead and Other Heavy Metals

A maximum level of toxic heavy metals shall be restricted to below the NOAEL as determined as the health investigation level (HIL A) for metals listed in Table 5-A of Schedule B(1) of the National Environmental Protection Measures (NEPM) See: <http://www.ephc.gov.au/taxonomy/term/44>.

This covers the following metals: Arsenic, Barium, Beryllium, Cadmium, Chromium (III and VI), Cobalt, Copper, Lead, Manganese, Mercury, Nickel and Vanadium.

Monomer Residues

The monomer residues present in the polymeric substances used to manufacture textile floor coverings shall be restricted to a maximum of concentration in the finished polymer of 10 mg/kg of the polymer weight. The VOC emission requirements take precedence over this limit.

Substances of Concern

Other substances that have a high level of concern may be found at: http://echa.europa.eu/chem_data/authorisation_process/candidate_list_table_en.asp

Products containing these substances at levels greater than 0.1% by weight must be registered if entering EU countries on or before June 1, 2011 (see: http://echa.europa.eu/doc/candidate_list/candidate_list_obligations.pdf).

The EU REACH "Substitute It Now" (SIN list) reviewed as PBT, CMR or of equivalent concern should be consulted as a source of chemicals of concern - available at <http://www.chemsec.org/list/use-the-sin-list>.

The key substances that may be used in carpet manufacture may include those in **Attachment 5**.

Some worked examples of chemical evaluation are contained in **Attachment 6**.

Verification and Assessment

The material formulations of the certified textile floor covering must be provided by the licensee together with a declaration of compliance with the above mentioned criteria supported by Material Safety Data Sheets and relevant test reports.

The ACCS administration will take random samples of ECS certified carpets and subject them to chemical analysis by a NATA registered laboratory to confirm compliance for the substances listed.

MANUFACTURING

The aim of this criterion is to promote good environmental practice at the plant-level by requiring licenses to collect relevant data with a view to optimizing production processes and mitigating any consequential adverse environmental impacts.

Data Collection

Licensees are required to gather data on material usage and waste generation with a view to optimizing the production process so as to achieve better environmental outcomes at the plant level.



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Process Improvement to Achieve Better Environmental Outcomes

As part of this criterion, licensees are required to:

- monitor water consumption as a function of production and develop water conservation strategies, which may include recycling cooling water and other clean wastewater streams; rain water harvesting and use and appropriate boiler management;
- apply the hierarchy of waste management to all waste streams in all manufacturing processes:
 - o avoid or reduce the waste
 - o recover and reuse the waste
 - o recycle the waste raw materials
 - o recover energy in wastes
 - o dispose of wastes safely.
- ensure that no recyclable materials can be co-mingled with solid waste – paper and cardboard, drink cans, metals, or recyclable plastics. These materials will be collected for external recycling
- segregate and recycle soft fibre, face fibre yarn and other mono-compositional wastes.

An environment management system in line with the requirements of ISO 14001 will facilitate regular environmental monitoring and reporting.

Licensees must seek to optimize materials sourcing and production processes in accordance with resource and materials efficiency measures that reduce negative environmental impacts from materials sourcing, use and disposal of environmentally certified textile floor coverings.

These measures may include, but are not limited to:

- use of recycled materials;
- use of rapidly renewable materials
- reduction and and/or reuse of manufacturing waste
- dematerialization.

Verification and Assessment

The licensee shall provide a declaration of compliance with the criterion and supporting documentation.

FITNESS FOR PURPOSE

The aim of this criterion is to ensure that an ECS certified textile floor covering has a positive effect on indoor environmental quality and is fit for its intended use.

ACCS Grading

A certified textile floor covering must be graded by the Australian Carpet Classification Scheme (ACCS). The ACCS classifies textile floor coverings according to their suitability for use in residential and contract installations. ACCS assesses the durability and appearance retention properties of textile floor coverings.

If at the time of application for ECS certification the ACCS grading is more than two years old, the licensee must demonstrate that the main construction parameters of the product remain within 5% manufacturing tolerance of the original specification registered with the ACCS. This requires the licensee to have the product tested at a NATA registered laboratory to the requirements of the ACCS Abbreviated Quality Assurance Test Package.



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Acoustical Performance

Textile floor coverings function in an indoor environment to dampen the noise level by, firstly, 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). And secondly, – 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 Standard AS/NZS 2107:2000 recommendations for T_{60} levels are given in **Attachment 7**.

The ACCS ECS technical criteria for impact sound insulation and reverberation control requirements are compared to the Building Code of Australia requirements for Class 2 and 3 buildings. The ACCS ECS criteria easily exceed the BCA criteria, demonstrating that carpet provides for a superior acoustic environment.

Table: Acoustic Criteria for Textile Floor Coverings

	Impact Sound Insulation $Ln,w + C_1$	Noise reduction Coefficient (NRC) (Reverberation Control)
ACCS ECS – Broadloom carpet	≤ 45	≥ 0.2
ACCS ECS – Modular carpet	≤ 55	≥ 0.15
BCA (Class 2 and 3 buildings)	≤ 62	none

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.

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.

A certified textile floor covering must meet the relevant criterion specified in the Table below.

Table: ACCS ECS Thermal Insulation Criteria for Textile Floor Coverings

	‘R’ Value (m^2K/W)
Broadloom carpet	≥ 0.1
Modular carpet	≥ 0.075

Verification and Assessment

The licensee must provide an ACCS Abbreviated Quality Assurance test report from a NATA registered laboratory if the ACCS grading was awarded more than two years prior to date of the application for environmental certification.

Compliance with the acoustical and thermal insulation performance criteria is evaluated by the ACCS Panel on a *deemed to satisfy* basis.



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

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Thermal Resistance ('R' value)

The R value is proportional to carpet pile thickness and inversely proportional to carpet pile density. Modular carpets have a lower pile thickness (average 3.6 mm) compared to broadloom (average 6.4 mm). Wool is a significantly better insulator than nylons and polyolefins. Wool carpet yields an R-value 1.5 times better than synthetic yarns.

The thermal resistance of carpets is useful in saving energy only when there is a temperature differential between the room and the sub floor.

The ACCS ECS criteria for broadloom textile floor coverings are:

- Actual: R-value ≥ 0.10
- Deemed to satisfy:
 - o Synthetics (Pile thickness above backing)² x 1000 / Surface pile mass ≥ 30 , where pile thickness is measured in mm and surface pile mass in g/m²
 - o Wool and wool rich blends (Pile thickness above backing)² x 1000 / Surface pile mass ≥ 20

The ACCS ECS actual and deemed to satisfy criteria for broadloom textile floor coverings having a pile thickness ≤ 5 mm and modular products are:

- Actual: R-value ≥ 0.075
- Deemed to satisfy ((Pile thickness above backing)² x 1000 / Surface pile mass ≥ 15

Acoustical Performance

Both the Noise Reduction Coefficient and the impact of sound insulation of carpets are related to the total thickness of the carpet and underlay combined, with thicker products generally providing better performance in both these areas.

The ACCS ECS criteria for broadloom carpets having a pile thickness ≥ 6 mm are:

- Actual: NRC ≥ 0.20
- Deemed to satisfy: total thickness ≥ 7 mm

The ACCS ECS actual and deemed to satisfy criteria for broadloom carpets having a pile thickness ≤ 5 mm and modular products are:

- Actual criterion: NRC ≥ 0.15
- Deemed to satisfy: total thickness ≥ 5 mm

PRODUCT EMISSIONS

The aim of the criterion is to ensure that emissions of volatile organic compounds (VOCs) from environmentally certified carpets do not exceed prescribed target levels for total emissions and 13 chemicals of concern.

The certified carpet must pass a test in which its emissions of VOCs are assessed to be below the criteria set out in **Attachment 8**.

Testing must be undertaken according to the test method: 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 per hour.

Verification and Assessment

The licensee shall provide a relevant test report from a NATA registered laboratory.



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GREENHOUSE GAS IMPACT MANAGEMENT

The aim of this criterion is to encourage manufacturers to:

- publicly report the product lifecycle greenhouse gas footprint for each 'family' of certified textile floor coverings; and
- develop greenhouse gas abatement strategies.

Licensees are required to provide a product declaration in accordance with ISO 14025 and may use the *specification PAS 2050:2008 Specification for the assessment of life cycle greenhouse gas emissions of goods and services* or the standard *AS ISO 14064.1-2006 Greenhouse Gases Part 1: Specification with guidance at an organisation level for the quantification and reporting of greenhouse gas emissions and removals*.

The functional unit to which inputs and outputs should be related is 1m² of finished textile floor covering. This and lifecycle boundary conditions specified in the Product Category Rules for floor coverings², shall be followed using the product life cycle from raw material extraction to final product disposal.

The current lack of industry benchmarks for green house gas emissions is a significant impediment to the satisfaction of this criterion. Partial compliance – such as would be the case if a licensee uses the manufacturing stage of the lifecycle for improvement measurement – is encouraged but of itself would not satisfy the Green House Impact Management component of the ECS.

Verification and Assessment

The licensee shall provide a declaration of compliance and supporting documentation, which shall include a copy of the publicly reported product lifecycle greenhouse gas footprint for each 'family' of certified textile floor coverings.

The licensee is also required to obtain confirmation from an independent assessor that the life cycle analysis complies with the requirements of ISO 14040 series of Environmental Life Cycle Assessment standards.

The independent assessor providing the confirmation must be adequately qualified to undertake a life cycle assessment.

WATER USE MANAGEMENT

The aim of this criterion is to encourage manufacturers to:

- publicly report the product lifecycle water use footprint for each 'family' of certified textile floor coverings; and
- develop water use abatement strategies across the life cycle of the carpet.

The licensee is required to follow the reporting format that provides water consumption for each life cycle stage using the standard AS/NZS ISO 14040 Life cycle assessment principles and framework. This and lifecycle boundary conditions specified in the Product Category Rules for floor coverings, shall be followed using the product life cycle from raw material extraction to final product disposal.

The functional unit to which inputs and outputs should be related is 1m² of finished textile floor covering.

The current lack of industry benchmarks for water use reporting is a significant impediment to the satisfaction of this criterion. Partial compliance – such as would be the case if a licensee uses the manufacturing stage of the lifecycle for improvement measurement – is encouraged but of itself would not satisfy the water use reporting component of the ECS.

² PCR – Floor Coverings, Environmental Product Declarations, Harmonised Rules for Textile, Laminate and Resilient Floor Coverings. <http://bau-umwelt.de/download/CY420fL039x11dcde2ccb7xy3bod/pcr>



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Verification and Assessment

The licensee shall provide a declaration of compliance and supporting documentation, which shall include a copy of the publicly reported product lifecycle water use footprint for each 'family' of certified textile floor coverings.

The licensee is also required to obtain confirmation from an independent assessor that the life cycle analysis complies with the requirements of ISO 14040 series of Environmental Life Cycle Assessment standards. The independent assessor providing the confirmation must be adequately qualified to undertake a life cycle assessment.

SOCIAL ACCOUNTABILITY REPORTING

The aim of this criterion is to encourage licensees to integrate into their operations corporate social responsibility over and above legal responsibilities.

As a mandatory minimum requirement, licensees and their key suppliers/subcontractors must comply with all relevant social and environmental legal obligations in the countries in which the textile floor coverings and major materials inputs are produced. At the same time manufacturers must also comply with relevant Australian laws and regulations.

In relation to the discretionary elements, licensees may choose between:

Option 1

Independent Verification of Compliance with SA 8000 - International Social Accountability Standard

SA 8000 is the most widely recognized standard for managing human rights in the workplace. An auditable standard for a third party verification system, SA 8000 sets out the voluntary requirements to be met by employers in the workplace, including workers rights, workplace conditions and management systems. The normative elements of SA 8000 are based on national law, international human rights norms and International Labor Organization (ILO) conventions. (A copy of SA 8000 may be obtained from http://www.sa-intl.org/_data/n_0001/resources/live/2008StdEnglishFinal.pdf.)

Option 2

There are 3 components of equal value, 2 of which must be satisfied.

Compliance with ILO Conventions

Licensees must submit independent verification that their major suppliers comply, as a minimum requirement, with the following conventions of the International Labor Organization if the conventions are ratified by the country of origin:

Convention 29	Forced Labour
Convention 87	Freedom of Association and Protection of the Right to Organize
Convention 98	Right to Organize and Collective Bargaining
Convention 100	Equal Remuneration
Convention 105	Abolition of Forced Labour
Convention 111	Discrimination (Employment and Occupation)
Convention 155	Occupational Health and Safety (Protocol of 2002)
Convention 161	Occupational Health and Safety
Convention 164	Health Protection and Medical Care (Seafarers)
Convention 171	Night Work

Refer to <http://www.ilo.org/ilolex/english/conventions.pdf> for a full list of ILO conventions.



TECHNICAL GUIDELINES

Environmental Claims Consistent with AS/NZS ISO 14021:2000

Any environment performance claims made by licensees about certified products must comply with:

- AS/NZS ISO 14021:2000 – Environmental Labels and Declarations – Self Declared Environmental Claims – Type 11 – Environmental Labelling (Refer **Attachment 9**)
or
- Global Reporting Initiative Sustainable Reporting Guidelines (Refer http://www.globalreporting.org/NR/rdonlyres/A1FB5501-B0DE-4B69-A900-27DD8A4C2839/0/G3_GuidelinesENG.pdf)

Additionally, licensees are advised to ensure that any claims are consistent with the Australian Competition and Consumer Commissions' guidelines on green marketing published in the ACCC's paper entitled 'Green Marketing and the Trade Practices Act'. Reference: <http://www.accc.gov.au>

Public Reporting

As a minimum requirement, licensees are required to report publicly in accordance with the Global Reporting Initiative on the environment, human rights and labour.

Assessment and Verification

The licensee shall provide a declaration of compliance and relevant supporting documentation. Supporting documentation shall include but not be limited to:

- report from an independent assessor confirming compliance with SA 8000 (for Option 1)
- report from an independent assessor showing compliance of major suppliers with relevant ILO conventions ratified by the country of origin (for Option 2)
- report from an independent assessor confirming that any environmental claims made by the licensee comply with the requirements of AS/NZS ISO 14021:2000 or the GRI Sustainable Reporting Guidelines (for Option 2)
- copy of publicly reported information (for Option 2).

PRODUCT STEWARDSHIP

The aim of this criterion is to maximize textile floor coverings useful life and then minimize the impacts to the environment associated with disposal of the product after recycling and reuse options are exhausted.

Mandatory Performance Criteria

In the interests of extending the useful life of certified products, licensees and/or suppliers of textile floor coverings shall be required to provide advice to purchasers on proper installation and maintenance in line with the requirements of:

- AS 2455.1:2019 (Textile Floor coverings – Installation Practice - General)
- AS 2455.2:2019 (Textile Floor coverings – Installation Practice - Carpet Tiles)
- AS 3733:2018 (Textile Floor coverings – Cleaning Maintenance of Residential and Commercial Carpeting).

Licensees and/or suppliers of certified textile floor coverings must have a product stewardship program in place. The program shall be publicly available and include contractual arrangements with their customers to take back product at the end of the products useful life for reuse, recycling or reprocessing.

Licensees and/or suppliers of certified textile floor coverings must provide independent verification that the product stewardship program is in place and is capable of delivering the outcomes claimed by the licensee.



TECHNICAL GUIDELINES

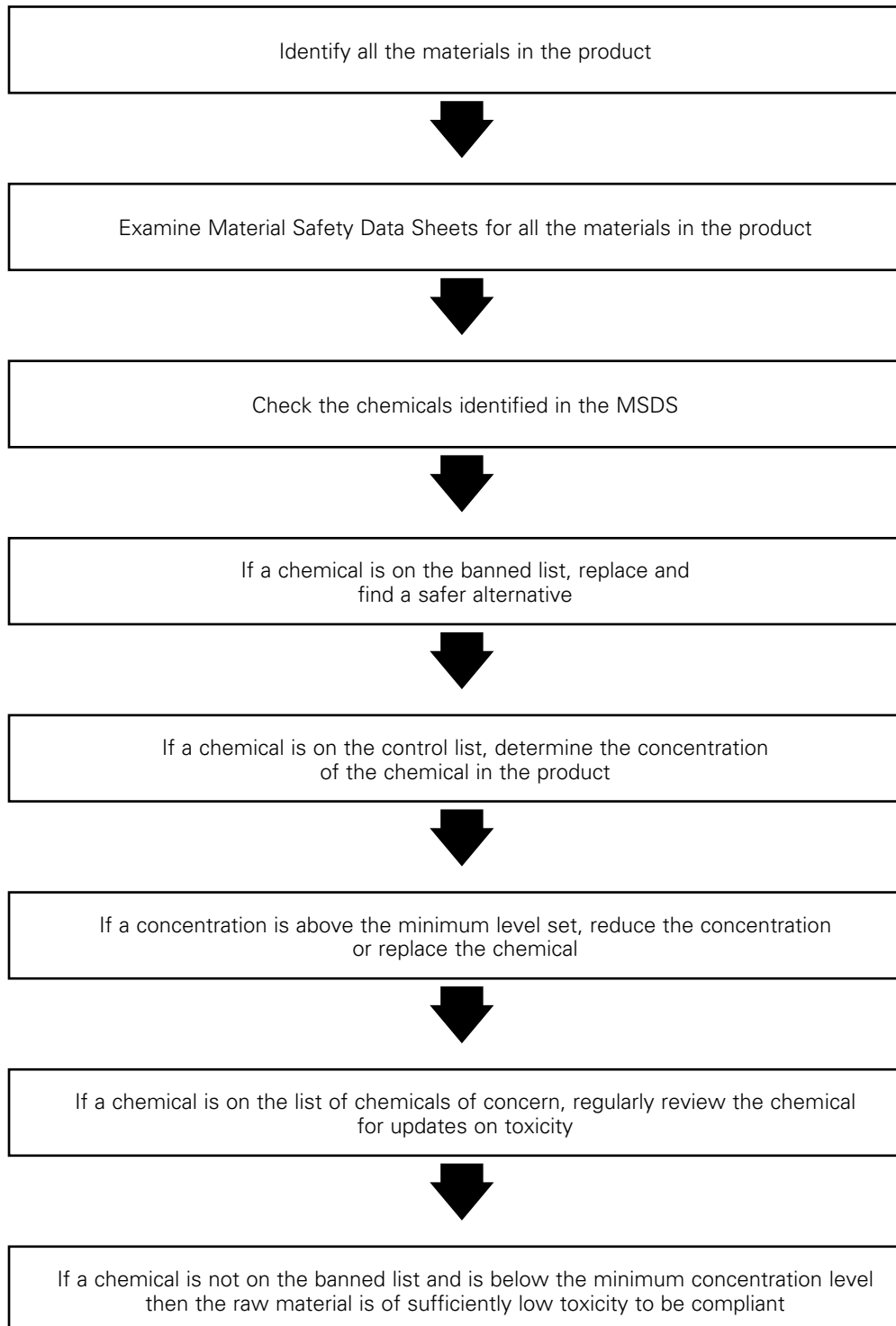
Discretionary Criterion

Certified textile floor coverings must be separated into elemental components for reuse, recycling or reprocessing. Use of specialist tools to facilitate the disassembly of certified textile floor coverings products is permitted.

Assessment and Verification

The licensee shall provide a declaration of compliance and a report from an independent assessor confirming that the product stewardship program is capable of delivering the outcomes claimed by the licensee.



ATTACHMENT 1**Evaluation of Raw Material Toxicity**

TECHNICAL GUIDELINES

ATTACHMENT 2

Table: ECS Banned Chemicals

Raw materials banned from use in carpets*	Why	Probable Application / Source
Acetaldehyde	Probable carcinogen	Biocide / antimicrobial
Arsenic and arsenic compounds	Carcinogen	Filler contaminant
Asbestos	Carcinogen	Filler contaminant
Cadmium and compounds	Carcinogen	Dyes and pigments
Chromium (VI) compounds <i>Chromate – Chromic Acid - Dichromate</i>	Carcinogen	Dyes and pigments
Dyes that are toxic or metabolise to toxic substances	Probable carcinogen, mutagen, toxic to reproduction	Dyes (see list in Attachment 3)
Dyes that are potentially sensitising	Skin and eye irritants	Dyes (see list in Attachment 3)
Formaldehyde	Carcinogen	Biocide / antimicrobial
Lead and compounds	Probable carcinogen	Heat stabilizer
Mineral oils (untreated, mildly treated)	Carcinogen	Lubricants, spinning oils
Nonyl Phenol Ethoxylates	Persistent pollutant - toxic	Surfactant
PAHs (Polyaromatic Hydrocarbons)	Probable carcinogen	Tar constituent
PBDE (Polybrominated diphenyl ether)	Persistent pollutant - toxic	Flame retardants
PCP (Pentachlorophenol)	Persistent pollutant - toxic	Disinfectant
Trichloroethylene	Probable carcinogen	Solvent degreasing
Tetrachloroethylene	Probable carcinogen	

* Other materials may be banned but not mentioned in this list as they were not identified as in current use. New chemicals should be checked for safety and health impacts.



TECHNICAL GUIDELINES

ATTACHMENT 3**Table: Banned Dyestuffs**

These include those dyes that may induce a toxic effect on exposed people. There are a number of categories of toxic impact that a chemical may affect and the guidelines derived in this code are derived from European Commission decisions for Eco-Labeled textiles¹. The toxic impacts covered are cancer, mutation, reproductive toxicity and sensitization.

EC Decision 1999/178/EC and amendments (2002)

Clause 20.

Azo dyes shall not be used that may cleave to any one of the aromatic amines as listed²:

CAS no.

4-Aminobiphenyl	92-67-1
Benzidine	92-87-5
4-Chloro-o-toluidine	95-69-2
2-Naphthylamine	91-59-8
o-Aminoazotoluene	97-56-3
2-Amino-4-nitrotoluene	99-55-8
p-Chloroaniline	106-47-8
2,4-Diaminoanisol	615-05-4
4,4'-Diaminodiphenylmethane	101-77-9
3,3'-Dichlorobenzidine	91-94-1
3,3'-Dimethoxybenzidine	119-90-4
3,3'-Dimethylbenzidine	119-93-7
3,3'-Dimethyl-4,4'-diaminodiphenylmethane	838-88-0
p-Cresidine	120-71-8
4,4'-Methylenebis(2-chloroaniline)	101-14-4
4,4'-Oxydianiline	101-80-4
4,4'-Thiodianiline	139-65-1
o-Toluidine	95-53-4
2,4-diaminotoluene	95-80-7
2,4,5-Trimethylaniline	137-17-7
4-Aminoazobenzene	60-09-3
O-Anisidine	90-04-0



¹ EC Decision 1999/178/EC establishing the ecological criteria for the award of the Community eco-label to textile products and subsequent decisions

² http://www.etad.com/information/etad_information_19th_amendment.pdf

TECHNICAL GUIDELINES

Clause 21.

Dyes that are carcinogenic, mutagenic or toxic to reproduction

C.I. Basic Red 9

C.I. Disperse Blue 1

C.I. Acid Red 26

C.I. Basic Violet 14

C.I. Disperse Orange 11

C.I. Direct Black 38

C.I. Direct Blue 6

C.I. Direct Red 28

C.I. Disperse Yellow 3

or dyes that contain more than 0.1% by weight of substances specified under the following risk phrases³

R40 (limited evidence of carcinogenetic effect)

R45 (may cause cancer)

R46 (may cause heritable genetic damage)

R49 (may cause cancer by inhalation)

R60 (may cause infertility)

R61 (may cause harm to an unborn child)

R62 (possible risk of infertility)

R63 (possible risk of harm to an unborn child)

R68 (possible risks of irreversible effects)

Clause 22.

Potentially sensitizing dyestuffs

C.I. Disperse Blue 3

C.I. Disperse Blue 7

C.I. Disperse Blue 26

C.I. Disperse Blue 35

C.I. Disperse Blue 102

C.I. Disperse Blue 106

C.I. Disperse Blue 124

C.I. Disperse Red 1

C.I. Disperse Red 11

C.I. Disperse Red 17

C.I. Disperse Orange 1

C.I. Disperse Orange 3

C.I. Disperse Orange 37

C.I. Disperse Orange 76

C.I. Disperse Yellow 1

C.I. Disperse Yellow 9

C.I. Disperse Yellow 39

C.I. Disperse Yellow 49



³ classification, packaging and labelling of dangerous substances - Directive 67/548/EEC and amendments consolidated at http://ec.europa.eu/environment/dansub/main67_548/index_en.htm

TECHNICAL GUIDELINES

ATTACHMENT 4**Table: Chemical Control List**

May be present in raw materials*	Problem	Probable Application of Concern	Maximum Concentration Allowable mg/kg	Maximum Emission Factor (24 hr) ug/h/m²#
Acetaldehyde	Probable carcinogen	Biocide		20
Acrylamide	Probable carcinogen	Monomer of various acrylamide polymers	10	
Arsenic and arsenic compounds	Carcinogen	Filler contaminant	20	
Barium and compounds	Toxic	Filler contaminant	300	
Benzene	Carcinogen	Solvent constituent		55
Benzo[a]anthracene	Probable carcinogen	Tar constituent	5	
Benzo[a]pyrene	Carcinogen	Tar constituent	1	
Beryllium	Carcinogen	Impurity in fillers	20	
Boron and compounds	Toxic	Moth proofer	3,000	
1,3-Butadiene	Carcinogen	Monomer in latex	10	
Cadmium and compounds	Carcinogens	Dyes and pigments	20	
Caprolactam	Toxicity	Polyamide monomer		120
Chromium (VI)	Carcinogen	Dyes and pigments	10	
Chromium (III)	Toxic	Dyes and pigments	120,000	
Cobalt and compounds	Probable carcinogen	Dyes and pigments	100	
Copper	Toxic	Dyes and pigments	1,000	
DDT	Probable carcinogen / Persistent Pollutant	Pesticide	200	
Dioxins and Furans	Carcinogen	Products of combustion of Chlorinated organics		
2-Ethyl-1-Hexanol	Toxic	Solvent constituent		50
Formaldehyde	Carcinogen	Biocide / antimicrobial		10
Lead and compounds	Probable carcinogen	Heat stabilizer / pigment	300	
Manganese	Toxic	Impurity in fillers	1,500	
Mercury	Toxic	Impurity in fillers	10	
1-Methyl-2-Pyrrolidone (NMP)	Toxic	PVC adhesive		300
Naphthalene	Toxic / Probable carcinogen	Moth proofer		20



TECHNICAL GUIDELINES



May be present in raw materials*	Problem	Probable Application of Concern	Maximum Concentration Allowable mg/kg	Maximum Emission Factor (24 hr) ug/h/m²#
Nickel compounds	Carcinogen	Impurity, pigments	600	
Nonanol	Toxic	Solvent constituent		24
Nonyl Phenol Ethoxylates	Persistent Pollutant toxic	Detergent	100	
Octanol	Toxic	Solvent constituent		24
PAHs (Polyaromatic Hydrocarbons)	Probable carcinogen	Tar constituents	20	
4-Phenylcyclohexene	Toxic	Latex impurity		50
Pesticides	Probable carcinogen / Persistent Pollutant	Pesticide residues	10	
Styrene	Probable carcinogen	Monomer in latex		410
Toluene	Toxic	Solvent constituent		400
Vanadium	Toxic	Impurity	50	
Vinyl Acetate	Probable carcinogen	Solvent constituent		400
Vinyl Chloride	Carcinogen	Monomer PVC	10	
Vinyl Cyclohexene	Probable carcinogen	Latex impurity		85
Xylenes	Toxic	Solvent constituent		50
Other pesticides	Toxic / Persistent Pollutants	Natural fibres	100	

* This list is not exhaustive and other chemicals may require controls to reduce their impact below NOAELs

VOC emission rate limits are designed to protect user health and are tested as a requirement of the Technical Guidelines



TECHNICAL GUIDELINES

ATTACHMENT 5**Table : Chemicals of Concern**

Chemicals of Concern	Why	Probable Application / Source
Antimony Trioxide	Probable carcinogen	Flame retardant
Benzyl Butyl Phthalate	Reproductive toxin	Plasticizer PVC
DBP (Di Butyl Phthalate)	Reproductive toxin	Plasticizer PVC
DEHP (DIOP) (DOP)	Reproductive toxin	Plasticizer PVC
DINP	Reproductive toxin	Plasticizer PVC
Dimethyl Fumerate	Irritant	Anti fungal agent
EDTA	Toxic	Dyeing auxiliary
Tin compounds (Tributyl Tin)	Persistent pollutant - toxic	Heat stabilizer
Triclosan	Persistent pollutant - Chlorinated phenolic	Biocide / antimicrobial

Chemicals of concern may change as knowledge of toxicity of these chemicals is improved.



TECHNICAL GUIDELINES

ATTACHMENT 6**Examples of Chemical Evaluation****Latex filler**

The Material Safety Data Sheet reveals that the filler contains 400 mg/kg of Barium)

Barium is not in the banned list (**Attachment 2.**)

Barium and compounds is in the Control List (**Attachment 4.**)

If the filler represents 29% of the product weight, the final concentration of Barium in the product is $400 \text{ mg/kg} \times 29\% = 116 \text{ mg/kg}$.

The concentration of Barium is below the level of concern (300 mg/kg).

Therefore the filler is compliant and no formulation change is required.

Solution Dyed Fibre

A solution dyed fibre contains 150 mg/kg of Lead Chromate (PbCrO_4) pigment

Chromate is Chromium (VI) which is banned in **Attachment 2**. The facility should consider the use of alternate pigments that do not use Chromium (VI).

If the pigmented fibre represents 30% of the product weight then the concentration of Lead Chromate in the product is 30% of 150 mg/kg = 45 mg/kg. Lead Chromate contains 16% Chromium therefore the concentration of Chromium (VI) in the product is 7.2 mg/kg, whereas the minimum concentration of concern (**Attachment 4**) is 100 mg/kg. Therefore the product is compliant in its Chromium (VI) content.

The pigment used also contains Lead at 64%, so the Lead level in the product is $45 \times 64\% = 29 \text{ mg/kg}$ Lead. The minimum concentration of concern in Table 2 for Lead is 300 mg/kg, therefore the product is also compliant in its Lead content.

Formaldehyde

Formaldehyde is used in a 50% mixture and applied to the fibre as a biocide at 1% of the carpet weight.

Formaldehyde is a classified Group 2A carcinogen and is a skin irritant. It is listed in **Attachment 2** as a banned raw material and therefore needs to be substituted with a less toxic and persistent biocide.



TECHNICAL GUIDELINES

ATTACHMENT 7**Table: Recommended Reverberation Times from AS/NZS 2107:2000**

Type of occupancy / activity	Recommended¹ (RT60)
General Office areas	0.4 to 0.6 seconds
Private offices	0.6 to 0.8 seconds
Primary school teaching areas	0.4 to 0.5 seconds
Secondary school teaching areas	0.5 to 0.6 seconds



¹ Australian 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, particularly over the phone, difficult.

TECHNICAL GUIDELINES

ATTACHMENT 8**Table: ECS Specification for Volatile Organic Compound Emissions**

Chemical of Concern	Criterion 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



ATTACHMENT 9

Brief Overview of the Requirements from AS/NZS ISO 14021:2000 – Environmental labels and declarations – Self-declared environmental claims (Type 11 environmental labelling)

Licensees are advised to purchase the standard (<http://www.infostore.saiglobal.com/store/Default.aspx>) and not rely on this brief overview.

Misleading Terms

Environmental claims that are vague or non-specific should not be used.

Use of Explanatory Statements

Self-declared environmental claims should be accompanied by an explanatory statement if the claim alone is likely to result in misunderstanding.

Self-declared environmental claims, including any explanatory statement, should be:

- accurate and not misleading
- substantiated and verified
- relevant to that particular product, and used only in an appropriate context
- unlikely to result in misinterpretation;
- true not only in relation to the final product but also take into consideration all relevant aspects of the product life cycle
- not be made if, despite the claim being literally true, it is likely to be misinterpreted or is misleading through the omission of relevant facts;
- reassessed and updated as necessary to reflect changes in technology, competitive products or other circumstances that could alter the accuracy of the claim;

Evaluation and Claim Verification Requirements

The claimant is responsible for evaluation and provision of data necessary for the verification of self-declared environmental claims.





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