CARPET INSTITUTE OF AUSTRALIA LIMITED

Version **1.0**

ECS

Resilient Technical Specifications

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Product definition:

Resilient flooring provides a solid floor covering placed on top of a flooring base such as concrete, masonite, fibre cement sheeting, or acoustic underlay. Resilient flooring comes in a number of forms of homogenous composition or heterogeneous laminated layers that can include a backing material to enhance the flooring characteristics. The common element of resilient flooring is the base resin which is often polyvinyl chloride, (or PVC), but can also be a range of other thermosetting resins. Resilient flooring can have a "rigid core" of mineral filler or wood fibre filler bound in a resin matrix.

The forms that resilient flooring takes include rolls, tiles and boards/planks that click into each other to form a continuous floor covering. The range of resilient flooring types is designed to suit particular applications.

The key characteristic that separates resilient flooring from carpet is a hard surface finish to protect it from wear. This may take the form of an acrylic or polyurethane lacquer, which can be smooth or embossed and is applied over the decorative layer.

Resilient flooring can use acoustic foam layers, reinforcing glass fibre, backing layers and other additives that enhance the resilient flooring properties.

The composition of resilient flooring types varies but is approximately as per Table 1.

Product	**Heterogeneous**	**Homogeneous**	**Rigid Core**	**Luxury Vinyl Tile**
(tiles, rolls, sheets and planks)				
Fillers	25	43	48-68	53-79
Resin	39	34-35	26-43	10-35
Plasticiser	20	17-19	5	4-10
Pigments	1	1.5-2.6	0.4	0.8
Additives	0.8	1.1	2.4	<1
Backing	14			
Other	1	0.5-1.4	1.6	<1
Recycled	<1	<1	<1	<10

Table 1. Resilient flooring approximate composition

There are other floor covering systems that have laminated natural timber or cork surface finishes. Linoleum is another resilient flooring sheet derived from natural ingredients. These flooring systems are not covered in this specification standard, which concentrates on products that use a synthetic polymer resin as a binder in their composition.

Objectives of the ECS resilient flooring

1. **Provide consumers with a certification system that shows certified products as good and best performing in safety, health, and environmental standards.**
2. **Allow the manufacturing industry to demonstrate these credentials.**
3. **Raise the bar for flooring products to meet exacting health and environmental performance standards.**

The ECS resilient flooring standard is structured with a series of performance criteria designed to meet the requirements of environmentally conscious procurement agencies and building standards bodies such as the Green Building Council of Australia, GBCA.

The ECS resilient flooring is set at two performance levels:

Level 1 will meet a credit rating under the GBCA's Responsible Products Framework.

Level 2 will meet an exceptional performance rating under the GBCA's Responsible Products Framework as shown in the following table.

Level 2+ allows for additional product environmental performance standards.

Criterion no.	Level achievement	RPV points
1. Fit for purpose	ECS 1	
2. Manufacturing environmental management	ECS 1	1
3. low VOC emitting product	ECS 1	1
4. Raw material (low toxicity)	ECS 1	
5. Transparency of product materials	ECS 1	1
6. Manufacturing health and safety	ECS 1	1
7. Health product declaration	ECS 1	2
8. Industry environmental product declaration	ECS 1	1
		7
9. Product stewardship	ECS 2	1
10. Manufacturing efficiency improvement	ECS 2	4
11. Modern slavery declaration	ECS 2	1
		14
12. Environmental product declaration	ECS 2+	5
13. No chemicals of concern	ECS 2+	2
14. Product carbon neutral	ECs 2+	3
		24

Table 2. Summary of criteria

Note: The points provided are equivalent to Green Building Council of Australia's Responsible Product Framework point scores at the time of publishing. This may change in time.

ECS LEVEL 1 criteria

Level 1 criteria are all mandatory for a licensee to meet the requirements of the ECS. Points achieved are cumulative for each criterion.

Criterion 1. **Fit for Purpose**

The resilient flooring must meet the relevant standards set for that particular class of product under Australian conditions. The product must have suitable guarantees of performance for the intended application. Specifications of products where standards exist are provided in Table 3. These standards may be amended from time to time and it is the responsibility of the licensee to meet the standards as they are updated.

EN-ISO 10581	Resilient floor covering Homogeneous floor covering specification
EN-ISO 10582	Resilient floor covering Heterogeneous floor covering specification
EN 651	Resilient floor covering PVC floor covering with a foam layer specification
ASTM F1303	Vinyl sheet floor covering with backing
ASTM F3261	Resilient floor covering modular with rigid core
ASTM F1913	Resilient floor covering modular with rigid core without backing

Table 3. specification standards

Flooring performance requirements are determined within the Australian National construction code, (NCC). These depend on the specific application of the flooring and the building class. The product must meet the requirements of the NCC indicated in Table 4. or the international equivalent standards.

National Construction Code	Requirement		
Specification for Fire Resistance	Critical Radiant Flux	2.2 kW/m^2	AS ISO 9239.1
Slip resistance	Slip resistant coverings on stairway treads and ramps	P3/P4 or R10 (dry)	AS 4586
Acoustic performance	Floor impact noise (apartments and studios)	L'nT,w <62	AS/NZS/ISO 717.1
Thermal conductivity	Through the floor covering	0.25 W/(m.K)	EN/ISO10456

Table 4. Standards to be met by complying flooring systems (for specific applications)

Manufacturers must declare compliance with specification standards with their application for ECS ratings.

Criterion 2. **Manufacturing safety and environmental management**

The manufacturer must declare compliance with all elements of the ECS Manufacturing Code of Practice for Environmental Management. These include the provision of a safe and healthy workplace in which employees are not exposed to risks from the raw materials used for the product.

This code is available on the CIAL website.

The manufacturing declaration is available in the form attached to the ECS Resilient Guidance Manual.

Criterion 3. **Indoor air quality – low VOC emitting product**

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

The certified floor covering must pass a test in which its emissions of VOCs are assessed to be below the criteria set out in Table 5.

Chemical of Concern	**Criterion Maximum Emission Factor (24 hr) µ/h/m²**
Acetaldehyde	20
Benzene	55
Butylated Hydroxy Toluene	300
Caprolactam	120
Chloro-benzene	937
Chloroform	281
Dichloroethylene (1,1)	66
2-Ethylhexanoic Acid	46
Formaldehyde	10
1-Methyl-2-Pyrrolidone	300
Naphthalene	20
Nonanal	24
Octanal	24
4-Phenylcyclohexene	50
Styrene	410
Trichloroethylene	562
Toluene	280
Vinyl Acetate	400
2-Ethyl-1-Hexanol	50
Hydrocarbons (C_{10} – $C1_4$)	300
Vinyl Cyclohexene	85
Xylenes	50
MAXIMUM TOTAL VOC	500

Table 5. VOC emission rate limits

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 product manufacture. The emission rate is measured as an emission factor (EF) in micrograms per square metre of floor covering per hour.

The licensee shall provide a relevant test report from a NATA registered laboratory provided as per the declaration in Schedule 11 – Product Emissions.

Criterion 4. **Raw material (low toxicity)**

Chemical constituents in resilient flooring have been reviewed, and restrictions have been placed on these chemicals to ensure that the product and its manufacturers do not suffer from toxic impacts of the product over its full lifecycle.

The CIAL has used health screening to establish the potential adverse health impact of the product, which is kept below the No Observable Adverse Health Level (NOAEL) during the manufacturing, use, and end of life of the floor covering.

It is recognised that some regulated substances may be inadvertently produced in manufacture or may be present although not declared in proprietary products used in manufacture. It is incumbent on manufacturers to ensure that products 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 (SDS) or other raw material technical specifications, to identify chemicals that are either banned, limited in the final product, or of concern to evaluate compliance with the ECS Resilient Technical Specifications.

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

Schedule 9, Attachment 1, provides guidance on the evaluation of raw material toxicity.

Regulated Substances that Must Not be Used in the Production of resilient floor coverings.

Schedule 9, 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 Australian Industrial Chemicals Introduction Scheme (AICIS) in the Australian Inventory of Industrial Chemicals (AIIC).

– IARC classified carcinogens in groups 1 and 2A available at http://monographs.iarc.fr/ENG/Monographs /vol91/index. php

– Substances listed in the Stockholm Convention on Persistent Organic Pollutants (Annex A) are 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/launchannex-1-67-548-EEC.html

– Chemicals listed in Annex III of the Rotterdam Convention as toxic industrial chemicals and pesticides with impacts on human health and ecology

– Substances with a hazard rating provided in SDS under the GHS system for chemical labelling.

A list of banned dyestuffs is contained in Schedule 9, Attachment 3.

Schedule 9 Attachment 4 contains a list of controlled or restricted use chemicals, in the production of floor coverings.

A maximum level of toxic heavy metals shall be restricted to below the NOAEL as determined by the health investigation level (HIL A) for metals listed in Table 5-A of Schedule B (1) of the National Environmental Protection Measures (NEPM).

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

Criterion 5. **Product composition transparency**

This standard requires complete transparency of product composition as declared in the raw material declaration.

Substance compositions down to 0.1% must be provided by the manufacturer for all chemical components, and the demonstration that the composition meets the low toxicity requirements of the standard.

If a manufacturer wants to maintain a substance confidential, they must provide adequate independent evidence of the safety and level of toxicity to the satisfaction of the panel.

Criterion 6. **Manufacturing performance efficiencies**

Manufacturers must provide data on their plant efficiencies in energy usage, water consumption, carbon emissions (tier 2) and waste/recycling performance to meet this criterion. They must provide this on an annual basis, and their plans for improvement in these facets of operations.

This criterion also requires manufacturers to declare their conformance to the International Resilient Floor Covering Institute's industry-wide environmental product declaration or equivalent EPD in accordance with ISO14025.

The EPD must be provided with the ECS application and be current at the time of the application.

Criterion 7. **Health Product Declaration**

This declaration must be based on the product composition as provided in Criterion 5. The Health Product Declaration (HPD) must include all materials and substances that are a part of the product concerned (or family of products) and provide their impact on human health and the environment, even if the substances are not currently regulated. The declaration must screen all substances for toxic impact.

The declaration must be published according to the rules and in a format as set out in the Open Standard for Health Product Declarations and be publicly available on the licensee's website.

Criterion 8. **Industry based Environmental Product Declaration**

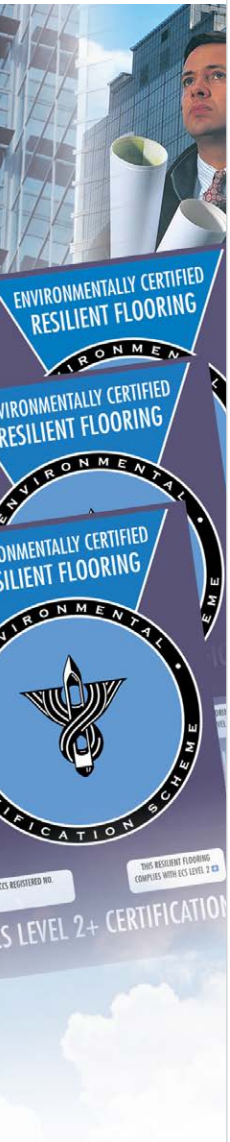
The manufacturer must declare the product's conformance to an industry environmental product declaration (EPD) published according to the standard ISO 14025 (EN 15804). This EPD must cover the family of resilient flooring products to which the product belongs.

The industry EPD will be reviewed by the panel to confirm compliance.

If this is not the case, the manufacturer must provide their own life cycle assessment report covering the product that is independently verified and published according to ISO 14025.

All criteria 1 to 8 are mandatory and will provide a total ECS Level 1 point score of 9. This should provide the product with a credit under the GBCA's Responsible Product Framework.

[1] Health Product Declaration Collaborative www.hpd-collaborative.org



ECS LEVEL 2 criteria

The level 2 criteria are mandatory for the ECS for resilient flooring and must be achieved in addition to those given in Level 1.

Criterion 9. Product stewardship

The aim of this criterion is to maximize resilient flooring's useful life and then minimize its impacts on the environment associated with disposal of the product after recycling and reuse options are exhausted.

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

– AS 1884: 2021 (Floor coverings - Resilient sheet and tiles – Installation Practice)

Licensees and/or suppliers of certified resilient 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 products at the end of the products' useful life for reuse, recycling or reprocessing.

This must be demonstrated to the panel with an independent assessment of the product stewardship system, stating its ability to achieve the product stewardship goals.

Criterion 10. Manufacturing efficiency improvement

The aim of this criterion is to require manufacturers to achieve year on year improvements in manufacturing efficiencies per square metre of certified floor covering produced. These efficiencies must include the following metrics of manufacturing at the facility that produces the licensed floor covering:

a) Total energy (electricity, gas, liquid fuels and other forms of energy used in MJ/m2 of product),

b) Total carbon produced as a tier 2 measure of carbon (kg CO2eq/m2),

c) Water consumption is expressed as L/m2 of production and

d) Total waste generated and sent to landfill is expressed as kg/m2 of production.

This data is to be provided on an annual basis for the manufacturing facility through the manufacturing declaration (Criterion 6.).

To satisfy this criterion, a minimum 5% efficiency improvement over 5 years or a 1% reduction per year over the same period, must be achieved.

Criterion 11. Modern slavery

The aim of this criterion is to require manufacturers to investigate, act on and report on:

– the risks of modern slavery in their operations and supply chains

– findings of supply chain investigations and corrective actions undertaken to address these risks

– annual updates of plans to address all modern slavery risks.

The declaration must be published in the format as set out in the federal Government document entitled – Commonwealth Modern Slavery Act 2018 - Guidance for Reporting Entities – https://antislavery.org.au/commonwealth-modern-slavery-act-2018-guidance-for-reporting-entities/ or equivalent reporting standard.

All criteria 1 to 10 are mandatory and will provide a total ECS Level 2 point score of 16. This should provide the product with an exceptional rating under the GBCA's Responsible Product Framework.

ECS Level 2+

Additional ECS awarded credits are given as specific credits at ECS Level 2+.

Criterion 12. **Environmental product declaration**

The aim of this criterion is to encourage manufacturers to have a product specific, publicly available declaration showing the life cycle environmental impacts of specific classes of resilient floor covering products, in accordance with a recognised standard e.g. EN 15804 (ISO 14025).

The EPD must be written in accordance with the Product Category Rules: Floor Coverings (2018), with a functional unit of 1m^2 of textile floor covering over one year of use and be officially registered.

Criterion 13. **No chemicals of concern**

The aim of this criterion is to encourage manufacturers introduce risk management practices to eliminate chemicals of concern with human and environmental exposure to a level that is beyond regulatory compliance at each stage in the life cycle of the resilient floor coverings manufactured (production, installation, and maintenance).

The inventory and risk assessment showing residual risks after management actions have been taken, and must be reviewed by a suitably qualified and experienced assessor prior to lodgement. This can be achieved through a recognised system of risk assessment following the ISO 31000 standard, using the Toxnot, or Toxscreen systems, or making sure that the chemical inventory is free from chemicals of concern as defined in criterion 4.

The licensee may meet this requirement by providing evidence of it being Red List free.

Criterion 14. **Carbon neutral product**

The aim of this criterion is to encourage manufacturers to achieve a carbon neutral position for the product and publish a carbon neutral declaration endorsed by the federal government.

Manufacturers must provide a third party verified product LCA or EPD that includes carbon emissions taken to mean climate change impacts in CO2eq per square meter of resilient floor covering over the product life cycle. This must be accompanied by a certificate of carbon offset purchased by the licensee and its share allocated to the textile floor covering submitted for ECS certification. OR The licensee can submit a verified Climate Active carbon neutral declaration for their product.

ATTACHMENT 1

Evaluation of Raw Material Toxicity

Step 1: Identify all materials in the product

Step 2: Examine the chemicals identified in the Safety Data Sheets for each material

Step 3: If a chemical is on the banned list, replace the product and find a safer alternative

Step 4: If a chemical is on the control list, determine the concentration of the chemical in the product

Step 5: If a concentration is above the maximum level set, reduce the concentration or replace the chemical

Step 6: If a chemical is otherwise of concern, regularly review the chemical for updates on toxicity and hazards

Step 7: If a chemical is not on the banned list and is below the maximum concentration level, then the raw material is of sufficiently low toxicity to be compliant

ATTACHMENT 2

ECS Banned Chemicals

Raw materials banned from use in carpets*	Why	Probable Application / Source
1,4-Dioxane	Carcinogenic	Solvent
Acetaldehyde	Probable carcinogen	Biocide/antimicrobial
Antimony Trioxide	Probable carcinogen	Flame retardants
Arsenic and arsenic compounds	Carcinogen	Filler contaminant
Asbestos	Carcinogen	Filler contaminant
Benzyl Butyl Phthalate (BBP)	Reproductive toxin	Plasticiser
Di Butyl Phthalate (DBP)	Reproductive toxin	Plasticiser
Cadmium and compounds	Carcinogen	Dyes and pigments
Chromium (VI) compounds Chromate – Chromic Acid – Dichromate	Carcinogen	Dyes and Pigments
Chlorinated hydrocarbon waxes	Persistent, bio accumulative, toxic	Plasticiser
Di Ethyl Hexyl Phthalate	Reproductive toxin	Plasticiser
Di Isononyl Phthalate	Reproductive toxin	Plasticiser
Dimethyl Fumerate	Irritant	Anti-fungal agent
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)
Ethylene Diamine Tetra Acetic acid (EDTA)	Toxic Respiratory sensitiser	Dyeing auxiliary Biocide
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
Para alkyl phenols	Endocrine disruptor	Surfactant precursor
PAHs (Polyaromatic Hydrocarbons)	Probable carcinogens	Tar constituent
PBDE (Polybrominated diphenyl ether)	Persistent pollutant – toxic	Flame retardants
PCP (Pentachlorophenol)	Persistent pollutant - toxic	Disinfectant
PFAs (Perfluoro alkane substances)	Persistent toxin	Stain resist treatment
Organotin complexes	Toxic	Biocide
Silica	Chronic toxicity (dusts)	Filler
Trichloroethylene	Probable carcinogen	Solvent degreasing
Tetrachloroethylene	Probable carcinogen	
Triclosan	Persistent pollutant	Biocide / antimicrobial

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

ATTACHMENT 3

Banned Dyestuffs and Pigments

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-Labelled textiles . The toxic impacts covered are cancer, mutation, reproductive toxicity and sensitization.

EC Decision 1999/178/EC and subsequent amendments:

Clause 20.

Azo dyes shall not be used that may cleave to any one of the aromatic amines as listed[3]:

	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
2,4-Xylidine	95-68-1
2,6-Xylidine	87-62-7
2-amino-2-ethoxy naphthalene	293733-21-8
4-amino-3-fluoro phenol	399-95-1
o-Anisidine (2-methoxy aniline)	90-40-0

[3] http://www.etad.com/information/etad_information_19th_amendment.pdf

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 3
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
C.I. Basic Blue 4
C.I. Basic Blue 26
C.I. Pigment Black 25
C.I. Pigment Yellow 34
C.I. Pigment Yellow 157
C.I. 77332
C.I. Pigment Red 104

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

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 1
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 Orange 149
C.I. Disperse Yellow 1
C.I. Disperse Yellow 9
C.I. Disperse Yellow 23
C.I. Disperse Yellow 39
C.I. Disperse Yellow 49
C.I. Disperse Brown 1

ATTACHMENT 4

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	Pesticide	3,000	
1,3-Butadiene	Carcinogen	Monomer in latex	10	
Butylated Hydroxy Toluene	Toxic	Antioxidant	1,000	
Cadmium and compounds	Carcinogens	Dyes and pigments	20	
Caprolactam	Toxicity	Polyamide monomer		120
Chloroform	Toxicity	PVC breakdown		281
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	1000	
DDT	Probable carcinogen / Persistent Pollutant	Pesticide	200	
Dichloroethylene (1,1)	Toxic	Solvent / PVC		66
Diphenyl Methane Diisocyanate (MDI)	Sensitizer	Polyurethane monomer	35	
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	

Table: Chemical Control List (continued)

May be present in raw materials*	Problem	Probable Application of Concern	Maximum Concentration Allowable mg/kg	Maximum Emission Factor (24 hr) ug/h/m²#
Mercury	Toxic	Impurity in fillers	10	
Methanol	Toxic	Solvent Compound	143	
1-Methyl-2-Pyrrolidone (NMP)	Toxic	PVC adhesive		300
Naphthalene	Toxic/Probable carcinogen	pesticide		20
Nickel compounds	Carcinogen	Impurity, pigments	600	
Nonanal	Toxic	Solvent constituent		24
Octanal	Toxic	Solvent constituent		24
PAHs Polycyclic aromatic hydrocarbons	Probable carcinogen	Tar constituents	20	
4-Phenylcyclohexene	Toxic	Latex impurity		50
Pesticides	Probable carcinogen/ Persistent pollutant	Pesticide residues	10	
Silica	Chronic toxicity	Impurity in limestone	5000	
Styrene	Probable carcinogen	Monomer in latex		410
Trichloroethylene	Probable carcinogen	Solvent/PVC		300
Toluene	Toxic	Solvent constituent		400
Vanadium	Toxic	Impurity	50	
Vinyl Acetate	Probable carcinogen	Solvent constituent		400
Vinyl Chloride	Carcinogen	Monomer PVC	10	
Vinyl Cyclohexane	Probable carcinogen	Latex impurity		85
Xylenes	Toxic	Solvent constituent		50

Table 6. Chemical Control List

* 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 Specifications

About the Carpet Institute of Australia

The Carpet Institute of Australia Limited (CIAL) is the lead industry body for Australia's Flooring industry. CIAL represents carpet and resilient manufacturers, flooring retailers and other suppliers of goods and services to the industry.

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Version **1.0**

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