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FOR COMMENT:

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**Floor coverings—Resilient sheet and tiles—
Installation practices**

(Revision of AS 1884—1985)

STANDARDS
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Comments are invited on the technical content, wording and general arrangement of the draft.

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Draft for Public Comment
STANDARDS AUSTRALIA
Committee PL-015—Resilient Flooring

DRAFT

Australian Standard

Floor coverings—Resilient sheet and tiles—Installation practices

(Revision of AS 1884—1985)

(To be AS 1884—2XXX)

Comment on the draft is invited from people and organizations concerned with this subject. It would be appreciated if those submitting comment would follow the guidelines given on the inside front cover.

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This document is a draft Australian Standard only and is liable to alteration in the light of comment received. It is not to be regarded as an Australian Standard until finally issued as such by Standards Australia.

PREFACE

This Standard was prepared by the Standards Australia committee PL-015 Resilient Flooring to supersede AS 1884—1985.

The objective of this Standard is to provide minimum requirements for the installation and application of resilient coverings for Australian conditions to ensure that the installed product is fit for purpose.

This edition of the Standard differs from previous editions in the following significant ways:

- (a) The inclusion of separate sections to explain the different resilient flooring products and their installation methods.
- (b) The requirement for underlay and underlayment with particleboard substrates.
- (c) More rigorous environmental temperature controls during product installation.
- (d) A new method for moisture testing of concrete substrates.

The terms 'normative' and 'informative' have been used in this Standard to define the application of the appendix to which they apply. A 'normative' appendix is an integral part of a Standard, whereas an 'informative' appendix is only for information and guidance.

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STANDARDS AUSTRALIA

Australian Standard**Floor coverings—Resilient sheet and tiles—Installation practices**

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard sets out procedures for the preparation, laying and fixing of resilient sheet and tile floor coverings in all forms including flexible PVC, semi-rigid PVC, linoleum, and rubber. It also applies to self-adhesive tiles.

It gives details of the work necessary to prepare substrate surfaces, together with procedures to be adopted for laying the resilient covering.

It does not apply to the laying of synthetic or natural fibre carpet, carpet tiles, timber products or cork.

1.2 REFERENCED DOCUMENTS

The following documents are referred to in this standard:

AS

- 1684 Residential timber-framed construction
- 1684.2 Part 2: Non-cyclonic areas
- 1684.3 Part 3: Cyclonic areas
- 1684.4 Part 4: Simplified—Non-cyclonic areas
- 1860 Particleboard flooring
- 1860.2 Part 2: Installation
- 2870 Residential slabs and footings
- 3600 Concrete structures
- 3740 Waterproofing of domestic wet areas

AS/NZS

- 1080 Timber—Methods of test
- 1080.1 Part 1: Moisture content
- 1859 Reconstituted wood-based panels—Specifications
- 1859.1 Part 1: Particleboard
- 1859.2 Part 2: Dry-processed fibreboard
- 1859.4 Part 4: Wet-processed fibreboard
- 2098 Methods of test for veneer and plywood
- 2098.1 Part 1: Moisture content of veneer and plywood
- 2269 Plywood—Structural
- 2269.0 Part 0: Specifications
- 2908 Cellulose-cement products
- 2908.2 Part 2: Flat sheets
- 4858 Wet area membranes

BS EN
649 Resilient floor coverings. Homogeneous and heterogeneous polyvinyl chloride floor coverings. Specification

CSIRO DIVISION OF BUILDING RESEARCH
Testing Timber for Moisture Content

ASTM
F2170 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes

1.3 DEFINITIONS

For the purpose of this Standard, the following definitions apply:

NOTE: A glossary of terms used in the resilient flooring industry may be found in Appendix D.

1.3.1 Butt seam

Butt seams are joints that are true and parallel without gaps and peaking to provide an even and flush finish.

1.3.2 Conditioning

Conditioning is the process of placing the resilient flooring products within an environment into which they are to be installed for an appropriate period as recommended by the manufacturer in order to acclimatize.

1.3.3 Coving

Coving is a process that is used to create a continuous surface between a floor and wall junction.

1.3.4 Cross join

A cross join occurs where two ends of the resilient floor covering have been joined together.

1.3.5 Heat welding

A process for filling seams produced by grooving abutting edges of resilient flooring and filling said grooves with heated, fused, or melted material to provide a bonded and sealed continuous surface.

1.3.6 Linoleum

A surfacing material composed of a solidified mixture of linseed oil, pine rosin, fossil or other resins or rosins, or an equivalent oxidized oleoresinous binder, ground cork, wood flour, mineral fillers, and pigments, bonded to a fibrous or suitable backing.

1.3.7 Mechanical means

'Mechanical means' is the process of surface preparation performed by application of applied physical forces to the substrate surfaces to remove contamination. For the purposes of installations on concrete this refers to the use of diamond grinders, scarifiers and captive shot blasters. For smaller areas this can include chippers and nail gun type scabblers. When installations are to be performed on timber floors 'mechanical means' refers to floor sanders. Regardless of the means used the final process in a mechanical preparation is vacuum cleaning.

1.3.8 Subfloor

That structural layer intended to provide support for design loadings which may receive resilient floor coverings directly if the surface is appropriate or indirectly via an underlayment or underlay if the surface is not suitable.

1.3.9 Substrate

The surface on which the resilient covering is to be installed (see Figure 1.1).

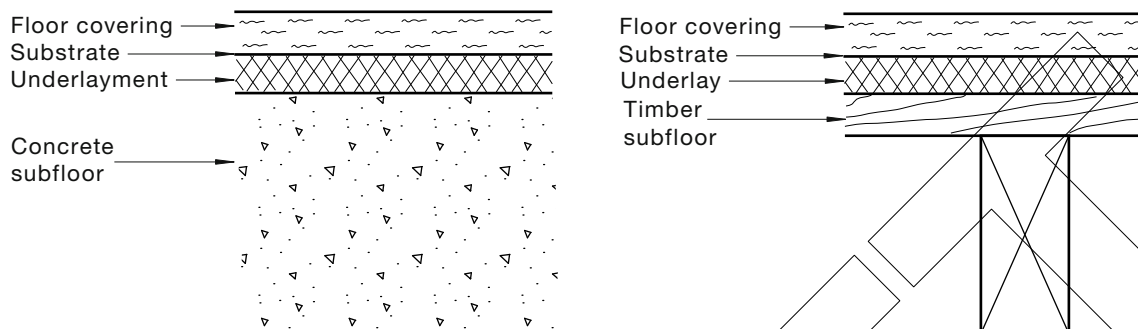


FIGURE 1.1 ILLUSTRATION OF CONCRETE AND WOOD FLOORS AND EXPLANATION OF TERMS

1.3.10 Underlay

A prefabricated board applied to a subfloor to provide a smooth, even surface suitable for the installation of a floor covering.

1.3.11 Underlayment

A term used in this Standard to describe a smoothing compound or a levelling compound.

1.3.12 Purchaser

The principal to the contract or the person authorized by the principal to superintend the work on his behalf.

1.3.13 Flooring contractor

The company or person authorized by the purchaser to carry out any necessary preparation of the substrate surface and or the installation of the resilient covering.

1.4 MATERIALS

1.4.1 Resilient covering

The resilient covering shall comply with the requirements of the appropriate Australian Standard. Where no Australian Standards exists the covering should be fit for purpose and agreed between the purchaser and the supplier.

1.4.2 Adhesive

The nature or type of adhesive used and the manner of use shall be that recommended for the particular installation by the manufacturer or supplier of the resilient covering, and comply with the adhesive manufacturer's recommendation.

1.4.3 Underlay and underlayment

Unless the substrate is substantially free from grooves, ridges, gaps (not to exceed 1 mm), holes and similar imperfections, an underlay shall be used.

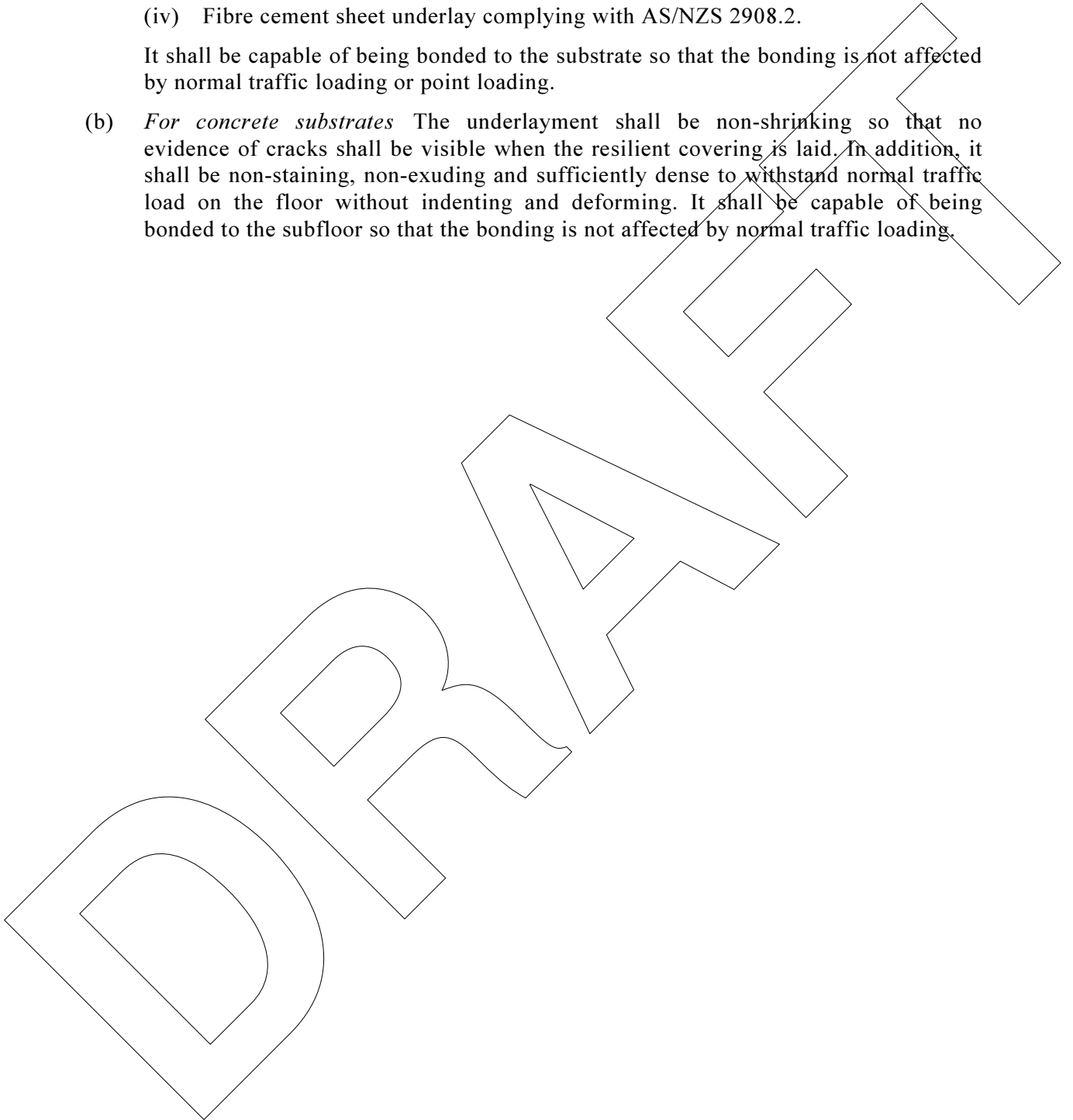
The underlay and underlayment shall have an estimated service life not shorter than that of the resilient covering. It shall be compatible with the resilient covering and adhesive(s) to be used and shall comply with the following requirements:

- (a) *For timber, plywood and particleboard subfloors* The underlay shall be any one of the following:

- (i) Standard hardboard underlay of Type RD complying with AS/NZS 1859.4.
- (ii) High performance medium density fibreboard (HP MDF) complying with AS/NZS 1859.2.
- (iii) Plywood underlay of Grade C complying with AS/NZS 2269.0.
- (iv) Fibre cement sheet underlay complying with AS/NZS 2908.2.

It shall be capable of being bonded to the substrate so that the bonding is not affected by normal traffic loading or point loading.

- (b) *For concrete substrates* The underlayment shall be non-shrinking so that no evidence of cracks shall be visible when the resilient covering is laid. In addition, it shall be non-staining, non-exuding and sufficiently dense to withstand normal traffic load on the floor without indenting and deforming. It shall be capable of being bonded to the subfloor so that the bonding is not affected by normal traffic loading.



SECTION 2 PRE-INSTALLATION REQUIREMENTS

2.1 SITE INSPECTION

2.1.1 Information to be provided by flooring contractor

For resilient floor coverings to be installed, a state of cleanliness for both concrete and timber floors is required. Cleanliness of floors may require as a minimum, sanding, grinding, wet/dry vacuuming or similar.

If dry clean processes are used, then remove all residual waste materials by vacuuming. If wet clean processes are used, ensure floors are dry enough to vacuum waste surface materials before installing resilient floor coverings.

The flooring contractor shall obtain the site information on the subfloor, outlined in Appendix C, from the purchaser and inspect the following:

- (a) Each of the relevant particulars required in Appendix C.
- (b) Whether any repairs to the subfloor are required, and whether the surface of timber subfloors needs to be sanded.
- (c) Whether the surface of the subfloor requires cleaning to remove existing floor covering, any deleterious materials such as grease, oil, paint curing or parting agents, or any surface treatment which could adversely affect adhesion.

2.1.2 Report by flooring contractor

If the flooring contractor considers the subfloor under inspection to be unsuitable the flooring contractor shall submit a report in writing to the purchaser, and where appropriate, the builder.

The report shall state—

- (a) whether the subfloor over which the resilient floor covering is to be laid is in suitable condition; and
- (b) any and all conditions that, in the flooring contractor's opinion, will affect the satisfactory execution of the installation work or impair the durability and serviceability of the resilient floor covering or installation systems.

Where the flooring contractor indicates that the subfloor is not in a suitable condition for laying of the floor coverings, the flooring contractor shall specify reasons for the unsuitability of the subfloor.

Where the flooring contractor indicates that removal or rectification work on the subfloor is needed, the flooring contractor shall advise the purchaser that this work is the responsibility of others or as otherwise agreed.

2.2 INSTALLATION SITE-RESIDENTIAL INSTALLATIONS

The flooring contractor shall advise the purchaser, prior to installation, of the factors which can make the subfloor unsuitable to receive the new floor covering/s. Where the condition of the subfloor can be practically determined, the flooring contractor shall advise the purchaser of necessary remedial work.

2.3 EXCHANGE OF INFORMATION

2.3.1 General

The information to be exchanged between the flooring contractor and the purchaser shall include advice as to whether the installation is to be in accordance with the commercial or residential laying requirements of this Standard.

2.3.2 Commercial installations

In addition to the information required to be provided by the flooring contractor, elsewhere specified in this Standard, there shall be consultation, preferably early in the design stage and generally throughout the whole course of the contract, between all parties concerned with the work. Information that is to be exchanged shall include the following, as applicable:

(a) *Site*

Factors of the site such as location, access, other contractors on site, unloading, hoisting and storage facilities, air-conditioning, heating, lighting and power supply, floor loading and security arrangements.

(b) *Building*

Factors of the building such as its nature, assessment of type and density of traffic, particulars of environmental and substrate surface conditions or other potentially damaging conditions in order that appropriate materials are selected and are fit for purpose.

(c) *Specifications*

Specifications for, or details of—

- (i) the floor structure;
- (ii) the damp-proof membrane and its location within the floor construction;
- (iii) screed curing and drying times;
- (iv) floor warming installations;
- (v) underlays/underlayments;
- (vi) adhesives and accessories, including floor preservation treatments;
- (vii) resilient floor coverings, including type, classification, supplier, dimensions and repeat pattern size if applicable; and
- (viii) subsequent maintenance of the resilient floor covering.

(d) *Associated work*

Details of associated work including services embedded in or passing through the floor, skirtings and abutments, ducts and junctions with other adjacent floorings.

(e) *Planning and procedures*

Details on the plans and procedures for the installation shall include—

- (i) adequate details of total area, including landings and stairs;
- (ii) number of stair treads and landings;
- (iii) where direction of seams or direction of manufacture are outside normal practice; and
- (iv) method of installation and seaming.

(f) *Protection*

Details on the intended means of protection including the method of, and responsibility for, the protection of the stored resilient floor covering and the completed work and fabric of building.

(g) *Storage*

The resilient floor covering and ancillary materials shall be stored to manufacturers' instructions.

(h) *Contract*

Information on the contract shall include particulars of the form and type of contract, whether the work is to be completed in any specific order or in sections, safeguarding against damage and theft, safety and health provisions, welfare facilities, air-conditioning, heating, lighting and power supply, and insurance.

(i) *Time schedule*

A time schedule for the progress of the work in relation to other trades and services (see Appendix C).

(j) *Time lapse before use*

Resilient floor covering adhesive shall have achieved cure as per manufacturer's instructions before concentrated foot and wheeled traffic upon it is permitted.

(k) *Floor covering plan*

Prior to the installation, the purchaser shall be supplied with a floor covering plan setting out the details required by this Clause.

The floor covering plan shall include the following:

- (i) A scaled drawing or proportional sketch of the areas in which the installation shall take place.
- (ii) All dimensions necessary to the installation in accordance with this Standard.
- (iii) All dimensions recorded in millimetres.
- (iv) All dimensions recorded in a manner that enables them to be read from the bottom right hand corner.
- (v) Where possible, all dimensions recorded inside the scaled drawing or proportional sketch.
- (vi) The approximate position of all seams and cross joins.
- (vii) The manufacturer's description of the resilient floor covering for the installation.
- (viii) The manufacturer's description of the underlay/underlayment for the installation.
- (ix) The manufacturer's description of the accessories for the installation.
- (x) Safe work method statements and material safety data sheets.
- (xi) So far as is possible, a description of the condition of the subfloor.
- (xii) So far as is possible, details of the subfloor preparation required to obtain a substrate or finish that complies with Clause 3.1.1.4.
- (xiii) The method of seaming to be used for the installation.

2.3.3 Residential installations

The flooring contractor shall provide the following:

- (a) The manufacturer's description of the resilient floor covering material to be installed.
- (b) The manufacturer's description of the type of underlay/underlayment to be used for the installation.
- (c) Where appropriate, a description of accessories and fittings.
- (d) Necessary subfloor preparation to comply with Clause 3.1.1.4. where the condition of the subfloor can be practicably determined by the flooring contractor.

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SECTION 3 SUBSTRATES AND UNDERLAYS

3.1 CONCRETE SUBSTRATES

3.1.1 General requirements

3.1.1.1 Construction

Concrete substrates shall be finished off to specification and in accordance with good building practice.

NOTE: AS 3600 is not an appropriate standard for installation of resilient finishes as its specified tolerances for smoothness and planeness are too broad in scope.

3.1.1.2 Dryness

Before substrate preparation is performed and a floor covering is laid on a concrete substrate the dryness of the concrete shall be determined as described in Appendix A. Dryness shall be considered satisfactory when relative humidity does not exceed 75%.

3.1.1.3 Surface pH

Before substrate preparation is performed and a floor covering is laid on a concrete substrate the concrete surface pH shall be determined as described in Appendix B. Allowable surface pH shall be as specified by the adhesive manufacturer but typically should be in the range 9 to 10.

3.1.1.4 Surface quality

The surface of a concrete substrate shall be thoroughly checked for the following:

- (a) *Planeness* When a straightedge 3000 mm long is placed at any position at rest at two points on the surface, no part of the surface shall be more than 3 mm below the straightedge.
- (b) *Smoothness* When a straightedge 150 mm long is placed at any position at rest at two points on the surface, no part of the surface shall be more than 1 mm below the straightedge.
- (c) *Soundness* The surface shall be without cracks, crazing, dusting, rain damage, spalling, efflorescence or blistering.

3.1.1.5 Surface preparation

When substrate repairs form part of the resilient laying contract, all grooves, holes and other concave imperfections shall be filled with a suitable material and any ridges or protrusions likely to impair the subfloor surface shall also be removed by mechanical means to achieve the required surface quality (see Clause 3.1.1.4). Any filling or levelling materials used shall be allowed to dry before floor coverings are laid as per the manufacturers' instructions.

Where a substrate is so rough or uneven that it is unsuitable for the direct application of the resilient covering, corrective action should be taken (e.g. steel-trowelled underlayment).

Before laying operations begin, materials such as grease, oil, paint, existing floor coverings and their adhesives, curing or parting agents, or any surface treatment, particularly oxides, markout paints, wax crayons which could adversely affect adhesion, discolouration or any other detrimental affect shall be removed from the substrate via mechanical means.

3.1.2 New concrete substrates

In addition to the general requirements listed in Clause 3.1.1, the following conditions shall apply to new concrete substrates:

- (a) *Construction* New concrete substrate shall be constructed so as to remain free from rising moisture. When in contact with fill, hardcore, or the ground, it shall be protected from the entry of moisture by means of a continuous impermeable membrane as per AS 2870. Concrete waterproofing additives and curing compounds shall not be considered adequate replacements for a water-vapour-proof membrane.
- (b) *Dryness* The resilient covering shall be laid on a new concrete subfloor only after the concrete has cured and dried sufficiently as indicated by the test procedures described in Appendix A.
- (c) *Surface* New concrete substrates on which floor preparation materials, and the resilient covering are to be laid without underlay, shall be finished to a smooth and porous surface. Burnished concrete surfaces, waterproofing additives, curing compounds and other types of treatments or coatings will adversely affect the adhesion of the floor preparation and resilient covering to substrate and shall be removed by mechanical treatment methods. Concrete surface physical defects which also compromise adhesion of flooring systems, such as laitance or rain damage to the concrete surface, shall also be removed by mechanical preparation methods. All loose materials or dust present either as building debris, or residue from mechanical preparation shall be removed by vacuum cleaning. Surface cosmetic defects such as score marks, grooves or depressions shall also be removed either by mechanical preparation methods or the installation of an underlayment.

3.2 TIMBER, PLYWOOD AND PARTICLEBOARD SUBFLOORS

3.2.1 New construction

Timber subfloors shall comply with the relevant requirements for flooring given in the AS 1684 series.

Plywood used for subfloors shall comply with the relevant requirements of AS/NZS 2269 for Tongue and Groove C/D Grade plywood, and shall be installed in accordance with the requirements for structural sheet flooring given in the AS 1684 series. Particleboard used for subfloors shall comply with the relevant requirements of AS/NZS 1859.1 for Class 1 particleboard and shall be installed in accordance with AS 1860.2.

All timber framing used to support subfloors shall comply with AS 1684. Where unseasoned subfloor timbers are used, they shall be allowed to dry for as long as possible.

NOTE: The moisture content of timber, plywood or particleboard subfloors or structural supports at the time of installation of the floor covering may be determined with electrical resistance type moisture meters. For timber subfloors and supports, refer to AS/NZS 1080.1; for plywood subfloors refer to AS/NZS 2098.1. Further information on the use of moisture meters may be available from State forestry departments or the CSIRO publication *Testing Timber for Moisture Content*.

3.2.2 Existing timber subfloors

Where existing timber, plywood or particleboard subfloors are to be used as a substrate worn, rough, cupped or warped surfaces shall be sanded or filled, but must retain structural adequacy.

In some circumstances, it may be necessary to re-nail the old floor or to repair it by replacing the worn and unsound sections.

3.2.3 Existing coverings and finishes

Resilient sheet and tile finishes are generally not considered a suitable surface for adhering resilient coverings. Refer to individual manufacturers' instructions.

Adequate precautions shall be taken to identify possible asbestos content in existing resilient floor coverings, adhesives and underlays before any work is undertaken. Removal of asbestos products shall be undertaken as required by legislation.

3.2.4 Ventilation

Unventilated spaces shall not be permitted beneath floors constructed from or supported by timber. Particular attention shall be given to subfloor areas which are to be covered with impervious materials.

The requirements of the relevant local regulatory authority for underfloor clearance and provision of ventilators shall be followed. In the absence of such requirements, the following precautions shall be observed:

- (a) At the lowest point, a minimum of 400 mm clearance shall be provided between the surface of the ground beneath the building and the underside of the subfloor.
- (b) The subfloor space shall be ventilated and cross ventilated by means of openings in the substructure walling. The openings should have an unobstructed area of not less than 7500 mm² per metre length of external wall and shall be evenly spaced. Particular care should be given to ventilation of internal corners.
- (c) In buildings of brick cavity wall construction, the openings recommended in (b) above shall be provided in both leaves of brickwork, with inner-leaf openings aligned with outer-leaf openings as precisely as possible.
- (d) Internal walling constructed in subfloor spaces shall be provided with openings having an unobstructed area of not less than 22 000 mm² per metre length of internal wall. The openings shall be evenly distributed throughout such internal walling.

NOTES:

- 1 Good ventilation is essential under floors to prevent distortion, possible decay and excessive movement of the subfloor, frame supports and underlay, or subsequent damage to the floor covering material or adhesive system.
- 2 Clearances required by local regulatory authorities should be regarded as minimum.
- 3 Structural substrate movement as a result of changes in climatic conditions could adversely affect the installation.

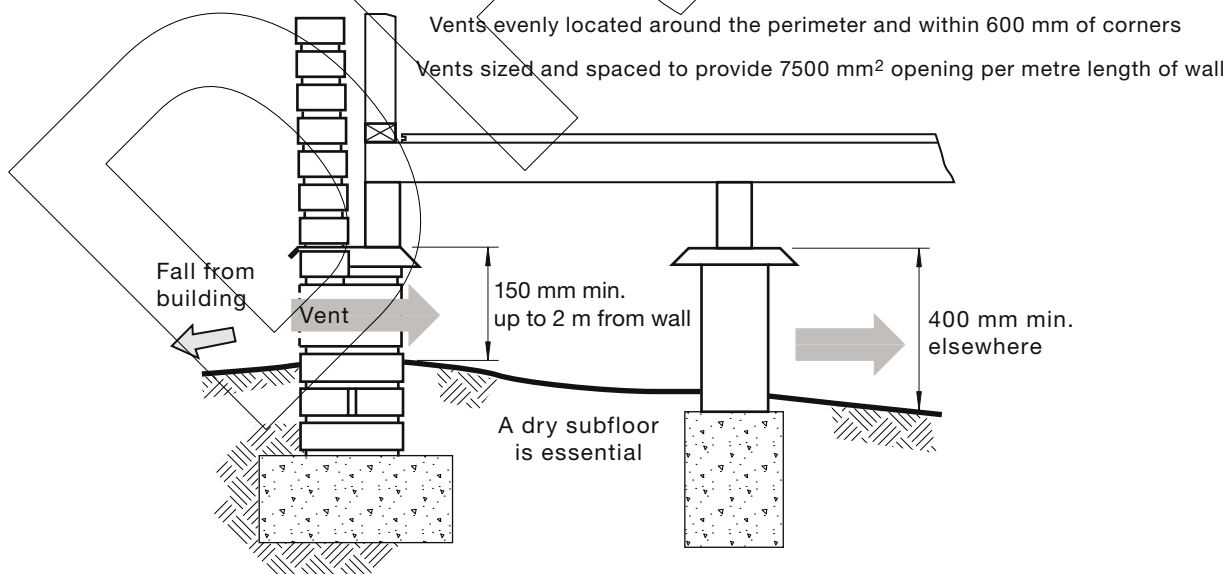


FIGURE 3.1 LOCATION OF UNDERLAY OVER PLYWOOD OR PARTICLEBOARD SUBFLOOR

3.2.5 Preparation of timber, plywood and particleboard subfloors

When an underlay is to be used or the floor is to be used as a substrate:

- (a) The subfloor shall be inspected for dampness before proceeding with finishing operations. This is particularly important for platform construction where exposure to the weather has occurred. The underside of the floor shall also be inspected. Damp subfloor surfaces shall be left to dry until a moisture content of less than 15% is obtained throughout.
- (b) Where the subfloor has been exposed to the weather during construction, the entire surface shall be finished to a firm tight plane surface, e.g. by sanding or planing.
- (c) Where the subfloor has not been exposed to the weather during construction, finishing may be confined to removing trades contamination and levelling of board joints.
- (d) All surfaces shall be mechanically cleaned to remove dust which would affect the adhesive bond.
- (e) Timber, plywood and particleboard subfloors shall comply with Clause 3.1.1.4(a).

3.2.6 Installation of underlay for timber, plywood and particleboard subfloors

3.2.6.1 Underlay joint show-through

Where underlay sheet is applied over timber, plywood or particleboard subfloors, the outline of underlay sheet joins may show through resilient floor covering materials under certain lighting conditions. This show-through may also occur as the moisture content of timber changes in response to variations in atmospheric relative humidity conditions.

At time of installation underlay joint show-through shall not exceed 1 mm below a 150 mm straightedge when the straightedge is placed on the surface of the resilient flooring.

3.2.6.2 Hardboard underlay

Hardboard underlay (as defined at Clause 1.4.3) is not considered suitable for use in wet areas. In these areas fibre cement sheet shall be used and installed as per manufacturers' instructions.

Underlay sheets shall be installed to manufacturers' instructions using recommended fasteners and fastener spacing.

Sheets shall be laid closely in a staggered (brick) pattern, perpendicular to the direction of the flooring substrate. Joins in the underlay sheets shall not coincide with joints in the timber floor substrate (a minimum offset of 100 mm is required). Sheet edges shall be 3 mm back from walls.

Sheets shall be fixed using the manufacturers recommended fasteners and nailing pattern.

Underlay staple fasteners shall be used on hardwood flooring substrates. Special underlay nails shall be used on all other timber substrates in accordance with the manufacturer's instructions.

Staples shall be driven so the crown finishes approximately 0.5 mm below the sheet surface. Nails shall be driven absolutely flush with the surface of the sheet. Failure to do this can result in nail heads showing through floor coverings.

All joints between sheets shall be sanded flush. Sanders shall be fitted with effective dust collection devices and the sanded floor shall be vacuumed only and not swept.

NOTE: Failure to provide an absolutely smooth ridge and indentation-free underlay surface will cause unsightly blemishes to appear on the resilient sheet or tile surface. See Clause 3.2.6.1.

Where hardboard underlay is installed over plywood and particle board subfloors, a compatible timber construction adhesive as recommended by the hardboard manufacturer

shall be used in conjunction with the other recommended fixings to adhere the hardboard sheet to the timber substrate.

3.2.6.3 Fibre cement underlay

3.2.6.3.1 General

Where fibre cement underlay is used it should be manufactured to comply with AS/NZS 2908.2 and be installed in accordance with the manufacturer's instructions.

The fibre cement sheets used should be purpose made to accept resilient sheet and tile application.

NOTES:

- 1 Where fibre cement underlay is used in wet areas additional flashing and waterproofing may be required depending upon the application and local code requirements.
- 2 Fibre cement underlay is not suitable over concrete slabs. Purpose made underlayment should be used in conjunction with concrete slabs.

3.2.6.3.2 Substrate preparation

Cross flow ventilation shall exist under all timber floors and the area under the floor shall be free from damp. See Figure 3.1.

The existing flooring and supporting structure shall be structurally sound. Floor boards or floor sheeting shall be flat prior to installing underlay sheets. A straightedge should be used to ensure that floors are smooth and plane as specified in Clause 3.1.1.4.

If the floor is warped or cupped, the floor shall be rough sanded before the underlay is applied. After sanding, the floor shall be clean from dust and other contaminants before underlay sheets are applied.

3.2.6.3.3 Fibre cement underlay installation

Underlay sheets shall be installed to manufacturers' instructions using recommended fasteners and fastener spacings.

Sheets shall be laid closely in a staggered (brick) pattern, perpendicular to the direction of the flooring substrate. Joins in the underlay sheets shall not coincide with joints in the timber floor substrate (a minimum offset of 100mm is required). Sheet edges shall be 3mm back from walls.

Sheets shall be fixed using the manufacturers' recommended fasteners and nailing pattern.

Underlay staple fasteners shall be used on hardwood flooring substrates. Special underlay nails shall be used on all other timber substrates in accordance with the manufacturer's instructions.

Staples shall be driven so the crown finishes approximately 0.5mm below the sheet surface. Nails shall be driven absolutely flush with the surface of the sheet. Failure to do this can result in nail heads showing through floor coverings.

All joints between sheets shall be sanded flush. Sanders shall be fitted with effective dust collection devices and the sanded floor shall be vacuumed only and not swept.

NOTE: Failure to provide an absolutely smooth ridge and indentation-free underlay surface will cause unsightly blemishes to appear on the resilient sheet or tile surface. See Clause 3.2.6.1.

Where fibre cement underlay is installed over plywood and particle board subfloors, a compatible timber construction adhesive as recommended by the fibre cement manufacturer shall be used in conjunction with the other recommended fixings to adhere the fibre sheet to the timber substrate.

3.2.6.4 *Plywood subfloors*

Plywood subfloors to be used as a substrate shall be prepared in the following manner and comply with Clauses 3.2.1 and 3.2.2. If an underlay is not used, joins may show through. Plywood subfloors shall be prepared in the following manner:

- (a) Panel joins, holes, splits and gaps greater than 1 mm, nail holes and knot holes shall be filled with a hardening filler.
- (b) The subfloor shall be inspected for dampness before proceeding with sanding and other finishing operations. This is particularly important for platform construction where exposure to the weather has occurred. The underside of the floor shall also be inspected. A damp plywood subfloor shall be left to dry until a moisture content of less than 15% is obtained throughout.
- (c) Where plywood has been exposed to the weather during construction, the entire surface shall be sanded to a firm tight level surface using normal timber sanding equipment. The first cut shall be with not less than 60 grit paper and may be followed with 100 grit paper as a finishing cut.
- (d) Joints and filled areas shall be sanded lightly as required by the surface preparation instructions of the manufacturer of the floor covering.
- (e) All surfaces shall be vacuum cleaned to remove dust which would affect the adhesive bond.

3.2.6.5 *Particleboard subfloors*

Resilient flooring shall not be adhered directly to particleboard substrates. If the resilient flooring is to be adhered an underlay shall be used. Particleboard subfloors shall be prepared in the following manner and comply with Clauses 3.2.1 and 3.2.2:

- (a) All panel joins and nail holes shall be filled with elastomeric filler.
NOTE: An elastomeric filler is one that will remain flexible and not set hard in service.
- (b) The subfloor shall be inspected for dampness before proceeding with sanding and other finishing operations. This is particularly important for platform construction where exposure to the weather has occurred. The underside of the floor shall also be inspected. A damp particleboard subfloor shall be left to dry until a moisture content of less than 15% is obtained throughout.
- (c) Where particleboard has been exposed to the weather during construction, the entire surface shall be finished to a firm tight level surface using normal timber sanding equipment.
- (d) Where particleboard has not been exposed to the weather during construction, sanding may be confined to levelling of board joins. If unsanded particleboard has been used, the whole surface shall be sanded in accordance with (c) above.
- (e) The depth of sanded material removed shall not exceed the manufacturers' instructions. A depth of 1 mm in the general sheet area and 2 mm for joins and supported edges is recommended where sanded particleboard flooring has been laid. The depth of sanding may be greater for unsanded particleboard flooring.
- (f) All surfaces shall be cleaned to remove dust and any foreign material.

3.3 SAND-CEMENT SCREED SUBFLOORS

Sand-cement screed subfloors shall not be used for the installation of resilient flooring and their preparation products. This form of subfloor does not possess the required tensile and compressive strength for resilient floor covering installation.

SECTION 4 GENERAL CONDITIONING AND INSTALLATION PROCEDURES

4.1 CONDITIONING OF FLOOR COVERING AND SUBFLOOR

4.1.1 On site storage

Before installation, the floor covering shall be stored and allowed to condition within or near the installation area for a period not less than 24 h or until such time as the product has achieved ambient room temperature range of 15°C to 28°C. Reference shall also be made to the recommendations of the manufacturer of the floor covering.

In areas that do not have temperature control methods in place and the ambient temperature is below 15°C heating devices such as electric radiant heat or electric heat blowers shall be used. LPG gas blower heaters are not a suitable device for raising the ambient room temperature due to the humidity that they produce.

It is the responsibility of the builder, building owner and or end user to provide temperature control devices. In conditions that are below 15°C ambient temperature, no underlay or floor covering shall be laid on the subfloor until these devices have been in operation for at least 48 h prior to the material being conditioned. These devices shall remain on during the installation and for a minimum 48 h thereafter.

4.1.2 Air-conditioned areas

Where air conditioning is installed, no underlay or floor covering shall be laid on the subfloor until the conditioning units have been in operation at expected operating temperature and humidity for at least 7 days. During this period the temperature and humidity shall not be allowed to fall outside the recommended limits of the manufacturer of the floor covering. These conditions shall be maintained during laying and for 48 h thereafter.

NOTE: Without such temperature control at this stage, subsequent failure of the subfloor, underlay or underlayment and floor covering may occur.

4.1.3 Heated subfloors

Where underfloor heating units are installed the heating units shall be—

- (a) turned on prior to laying of the floor covering for a minimum of 7 days to ensure that the moisture condition of the heated subfloor will permit successful laying of the coverings; and
- (b) turned off 48 h prior to the commencement of installation to allow the subfloor to return to the temperature range recommended by the manufacturer of the floor covering. The heating units shall remain turned off during the laying operations and shall not be turned on again until 48 h after the laying is completed, in order to allow the adhesive to set.

Once the heating unit is turned back on it shall be increased at no more than 2°C per day until the desired temperature has been achieved and shall not exceed a temperature greater than 28°C.

NOTES:

- 1 Because underfloor heating may cause some localized hot spots which may be damaging to a newly laid floor, it is advisable to avoid maximum heating conditions for a period of 7 days after installation.
- 2 Where seam sealing is required, special precautions may be necessary and the manufacturer's recommendations should be obtained.

4.1.4 Subfloors in cool rooms and cold stores

For resilient floor coverings to be installed in cool rooms and cold stores the resilient floor covering manufacturer's instructions shall be followed.

4.2 GENERAL INSTALLATION PROCEDURES

All overhead work in areas where resilient floor coverings are to be installed shall be completed before floor covering installation commences. The presence of underfloor heating and security systems shall be checked and all preliminary work, such as the fixing of floor sockets for service plugs, shall be completed. The base shall be sound, smooth, clean and dry before installation commences.

NOTE: Installing floor coverings before other trades have completed their work may result in problems with overall appearance, visible damage, soiling, adhesive failure, delamination and dimensional stability. These conditions may not be immediately evident.

The floor covering shall be installed by the flooring contractor in accordance with the following procedure:

- (a) Check that the correct material (colour, pattern and quantity) has been supplied and that batch numbers are the same.
- (b) The material shall be rolled out and inspected for visual defects in good natural light before proceeding to install.
- (c) Should the material or batching be incorrect or if defects are apparent the supplier shall be contacted before the material is installed.

NOTE: For sheet flooring every effort should be made to install rolls with sequential roll numbers adjacent to each other to minimize problems of inconsistency between rolls.

- (d) Areas to receive flooring shall be adequately lit to allow for proper inspection of the substrate, installation and seaming of the flooring, and for final inspection.
- (e) The contractor and purchaser shall agree on the direction and layout of the material and the positioning of any joints. All efforts shall be made to position joints away from areas of high stress such as the centre of walkways and doorways. Areas of installation shall be marked out to ensure there are the least number of joints and that fill pieces are placed away from entrances.
- (f) Floor coverings shall not be laid over structural expansion joints or construction joints.

- (g) Where an adhesive is to be used it shall be as recommended by the manufacturer of the floor covering so that the floor covering adheres permanently to the underlay or subfloor under the conditions of service for which the floor was designed. The floor covering shall be laid and rolled well down in the manner recommended by the manufacturer.

NOTE: Some floor coverings are loose-laid or perimeter fixed and in these cases the manufacturers' instructions should be followed.

- (h) When using adhesives that are classified as flammable or as hazardous goods the relevant state and federal regulations shall be followed.

NOTES:

- 1 Where possible all consideration should be given where possible to using adhesives that are free from hydrocarbon solvents.
- 2 Adhesives may be difficult to apply at low temperatures and may not set. The correct substrate temperature range for application should be followed and should not be less than 10°C.
- 3 Adhesives (and primers and sealers if used) should be applied only to dry, clean surfaces and should be as recommended by the adhesive manufacturer.

- 4 Where underfloor heating is installed, care should be taken to ensure that the adhesive used will be suitable for this application.
- (i) Any adhesive contaminating the face of the floor covering shall be removed as work proceeds, care being taken to avoid smearing adjacent surfaces. Any surplus adhesive shall be removed from the surface while still wet.
 - (j) Where floor covering is bent to fit a coving or other detail the minimum radius of curvature shall be as recommended by the manufacturer of the floor covering. Coved floor coverings shall be fully supported by a solid backing.
NOTE: In wet areas precautions should be taken to control condensation migration by sealing or capping the edges of the floor/wall coverings or covings.
 - (k) If necessary some sheet floor coverings may be welded. The main processes are heat welding (using hot air technique) and chemical welding (using special seaming or sealing compounds). In each case the instructions of the manufacturer of the floor covering shall be followed.
 - (l) All exposed edges of resilient sheet and tile floor coverings or edges abutting other floor covering materials shall be protected by means of diminishing strips or other suitable mouldings.
 - (m) The flooring contractor shall clean and remove excess materials and trimmings immediately upon completion of the work.
NOTE: On loose-laid or perimeter fixed floor coverings special precautions should be taken when moving furniture or heavy items.

4.3 CLEANING AND MAINTENANCE

Manufacturer's care and maintenance instructions form part of the manufacturer's warranty requirements and shall be supplied to the end user. These instructions are specific to individual products.

SECTION 5 INSTALLATION PROCEDURES FOR SPECIFIC FLOORING TYPES

5.1 RESILIENT SHEET

5.1.1 General

Homogeneous and heterogeneous resilient sheet shall conform to BS EN 649.

Before installation starts the material shall be rolled out in good natural light to ensure the correct material has been supplied and to inspect for visual defects. Most manufacturers require selvage edges to be trimmed to ensure uniform seams, refer to those manufacturers' instructions.

5.1.2 Setout

Setout should be approved by the client prior to the installation commencing.

Cut lengths of resilient sheet installed in the same area shall run in the same direction unless otherwise specified and shall run parallel to the longest straight wall.

Cross joins in multiple widths should be staggered.

'T' joins should not be placed in doorways.

In areas where fill widths are required the following guidelines apply:

- (a) For fills of a half width one cross join is acceptable.
- (b) For fills of a third width two cross joins are acceptable.
- (c) For fills of a quarter width three cross joins are acceptable.

5.1.3 Adhesive

Adhesives may be trowelled, rolled or sprayed. The manufacturer's instructions for the resilient floor covering shall be followed with respect to trowel notch size and application rate. It is essential that notch size and application rate remain constant for the duration of the installation.

The amount of adhesive that may be spread at any one time depends upon the prevailing site conditions, such as temperature, humidity and flow through of air, which will affect the open time of the adhesive. The adhesive manufacturer's details of open time and initial tack times shall be followed.

5.1.4 Seaming

There are two methods of seaming:

- (a) Scribing joints are where two trimmed edges are joined together.
- (b) Double cut or trace cut are where two edges are overlapped and either cut through or followed along an edge or pattern.

NOTE: Consideration should be given to different manufacturers' seaming instruction.

Seams shall be true and parallel without gaps and peaking to provide an even and flush finish.

A heat weld shall be flush, even and impervious, free from burns and crazing. Heat welding shall be carried out at least 24 h after installation to ensure adhesive has cured. Manufacturers' procedures for trimming, routing and grooving shall be followed.

A chemical weld shall be flush, even and impervious with no overflow of chemical residue. Manufacturers' instructions shall be followed.

5.1.5 Coving

When resilient sheet is coved up a wall or fixture it must be in continuous contact with the substrate it is being adhered to. There are three types of cove:

- (a) A pencil cove is where an integral resilient sheet is coved up a wall or fixture with a maximum 5 mm radius without the use of a preformed base.
- (b) A preformed cove is where a cove former is installed to achieve the nominated radius. The resilient sheet must be in continuous contact with the substrate.
- (c) A border cove is a separate piece of sheet that is joined at the floor to form a cove.

Internal and external corners shall be cut and heat welded. The join should be at 45° back from the corner.

5.1.6 Completion

All exposed edges of resilient sheet floor covering or edges abutting other floor covering materials shall be protected by means of diminishing strips or other suitable mouldings.

When the installation is completed all scrap material and debris shall be removed from the floor which shall be swept or suction cleaned to remove all dust and debris. All traces of adhesive shall be removed using a method recommended by the adhesive manufacturer.

5.2 WET AREA FLOOR AND WALL RESILIENT SHEET

5.2.1 Floor resilient sheet

5.2.1.1 General

Welded resilient floor coverings as defined in AS 3740 are classified as water resistant not waterproof. In wet areas where there is a floor waste or in other areas where waterproofing is required as identified in AS 3740 and cross referenced with the Building Code of Australia (BCA) a waterproof membrane complying with AS/NZS 4858 shall be installed. The installed membrane shall be a Class 3 waterproofing membrane compatible with cementitious fairing underlayments and preferably composed of cement and acrylic constituents.

5.2.1.2 Adhesive

To ensure optimum installation performance of the vinyl floor covering a two-part total cure adhesive that is humidity and weather resistant after it has fully hardened shall be used. This type of adhesive is recommended for areas that will be subject to moisture ingress such as en-suites, kitchens and any other high stress installation area. This type of adhesive should be used to the top of the preform cove and to within 20 mm of the rim of the push-in or clamping waste. A contact style adhesive may be used to aid in the installation into wastes and on to walls. Refer to the adhesive manufacturer's instructions for mixing components and for application.

5.2.1.3 Seam welding

When installing sheet safety floor coverings refer to the resilient sheet manufacturer's instructions for wet areas such as showers and bathrooms particular attention must be given to heat welding (refer Clause 5.1.4). It is important that the joins to be welded are correctly grooved and welded to ensure a water resistant finish.

Wherever possible joins should be avoided in the shower floor area. Should a join be necessary it is best to plan the join as far away from the running water as possible. Joins shall not be positioned at floor wastes.

5.2.1.4 *Coving*

Showers and areas subjected to running water should be coved up the wall at least 150 mm. In order to achieve a consistent radius, PVC cove former should be fitted to the floor/wall junction around the perimeter of the installation before the floor covering is installed. Refer to Figures 5.1 and 5.2.

When coving (min 150 mm) the internal corner shall be cut from the top of the preform cove and at 45° to the corner. Refer Figure 5.3. Welds shall not be made directly into the corner as this becomes a weak point during substrate movement which may lead to a breach of the water resistant finish.

External corners should be treated in the same way as internal corners. Refer to Figure 5.3. However where there is a single external corner it is acceptable to cut both sides on the wrap of the cove at 45° and cut a separate infill to wrap around the corner.

It is recommended that a push-in vinyl sheet floor waste be fitted when installing resilient sheet floor covering in showers and areas that are subjected to running water. Refer to Figure 5.4.

NOTE: There are various sizes of floor wastes available including one that is fitted with an 'O' ring designed to be pushed inside the waste pipe. Push-in or clamping type floor wastes are designed to allow the floor covering to be fitted into the drain and be held in place with a fitted flange allowing a waterproof connection to the drain.

5.2.2 **Wall resilient sheet**

5.2.2.1 *General*

Fitting resilient wall sheet to showers and wet areas requires some planning to minimize joints in areas subjected to running water. It is better to avoid welded wall joints in a shower cubicle if possible. Where that option is not possible the welded joint should not be closer than 200 mm to the internal corner. Refer to Figure 5.3.

5.2.2.2 *Adhesive*

A total cure hard set type adhesive shall be used for this type of installation. Pressure sensitive type adhesives shall not be used. The adhesive shall be applied as recommended by the manufacturer of the wall covering so that the wall covering adheres permanently to the wall under the conditions of service for which the installation was designed. The wall covering shall be installed into the adhesive and rolled to ensure full transfer as recommended by the manufacturer. For application of the adhesive refer to Clause 5.1.3.

5.2.2.3 *Overlap method*

Lengths should be cut a minimum 75 mm longer than the measurement from the top of the floor cove to the ceiling or the pre marked required height of the resilient wall sheet. A diminishing strip shall be fixed to the top of the cove using a contact type adhesive. Refer to Figure 5.1.

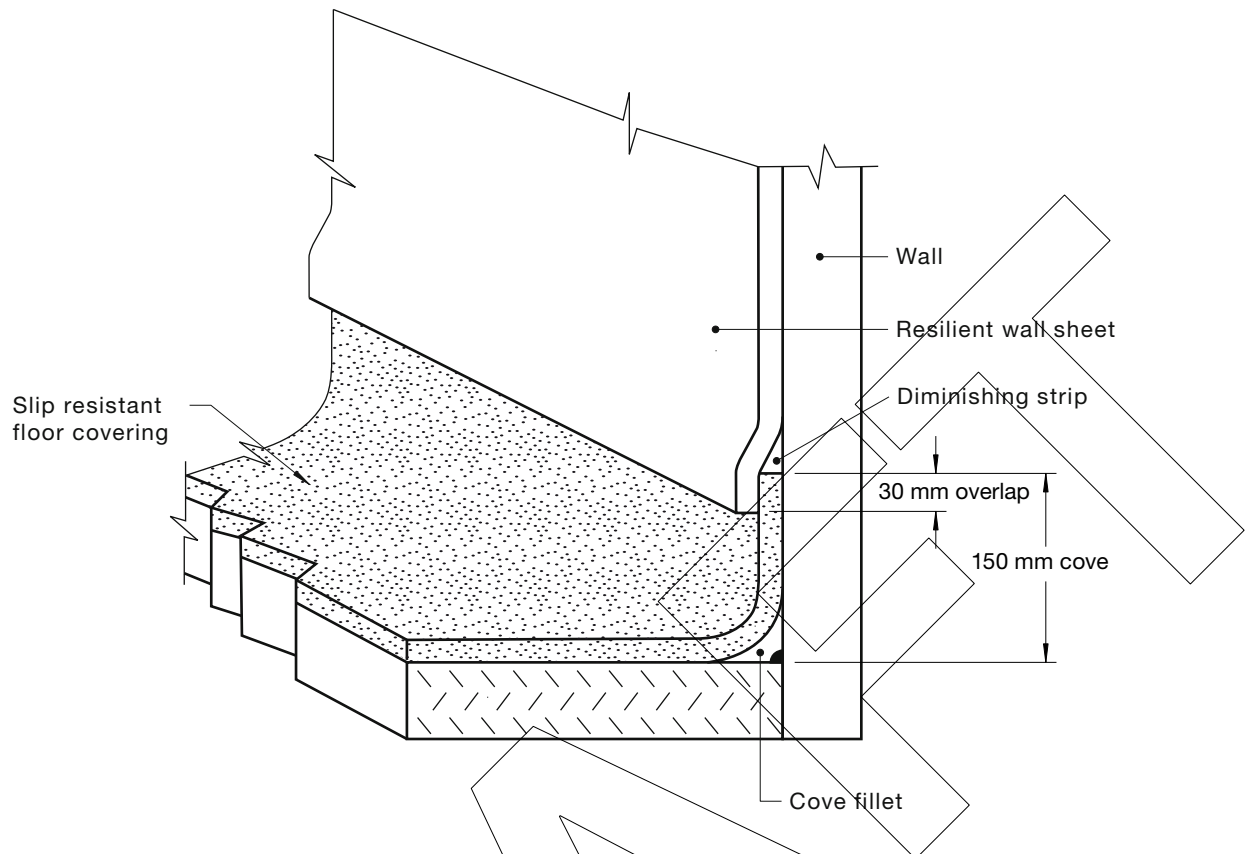


FIGURE 5.1 OVERLAP METHOD

The first sheet should be installed in the corner of the wet area. The width of the sheet should be measured by finding the centre and marking with a pencil. An appropriate contact style adhesive should be applied in a 200 mm band down the centre line of the resilient wall sheet and in the same position on the internal corner. A minimum 100 mm of an appropriate adhesive should be applied across the top of the sheet and on the corresponding wall and allowed to tack off.

The same method may be used on external corners using a hand roller.

An accurate vertical chalk line should be made on the wall the full length of the drop. This will give a straight edge for the next sheet. An appropriate adhesive should be applied as per previous instructions. The first drop is fitted by pushing the material firmly into the corner using a corner roller, making sure that the sheet overlaps the cove by at least 50 mm.

The material should be rolled into the adhesive using an appropriate hand and wall roller working from the top and from the centre to the edge of the drop ensuring full transfer of adhesive to the back of the resilient wall sheet. The next drop should be fitted using the same method and positioned leaving a 0.5 mm gap between the sheets. This process should be continued until the installation of the resilient wall sheet is complete. Any excess adhesive should be cleaned up.

An appropriate adhesive should be applied to the face of the cove down a minimum of 30 mm and the resilient wall sheet rolled into the adhesive. A heat gun should be used to assist with the overlap. A straightedge should be used to trim the overlap to the desired length leaving a minimum of 30 mm overlap. Refer to Figure 5.1.

All joins to wall sheet should be grooved using a grooving tool to a depth $2/3$ the thickness of the material.

Joins shall not be welded until the adhesive has achieved cure. Welds shall not be trimmed until the weld is cool.

5.2.2.4 *Welded method*

The welded method follows the same installation procedure as the overlap method with the exception that the wall and floor sheets are not overlapped but finished together leaving a gap of 0.5 mm to allow for grooving and welding. A diminishing strip is still required if the wall and floor resilient finishes have different thicknesses. Refer Figure 5.2.

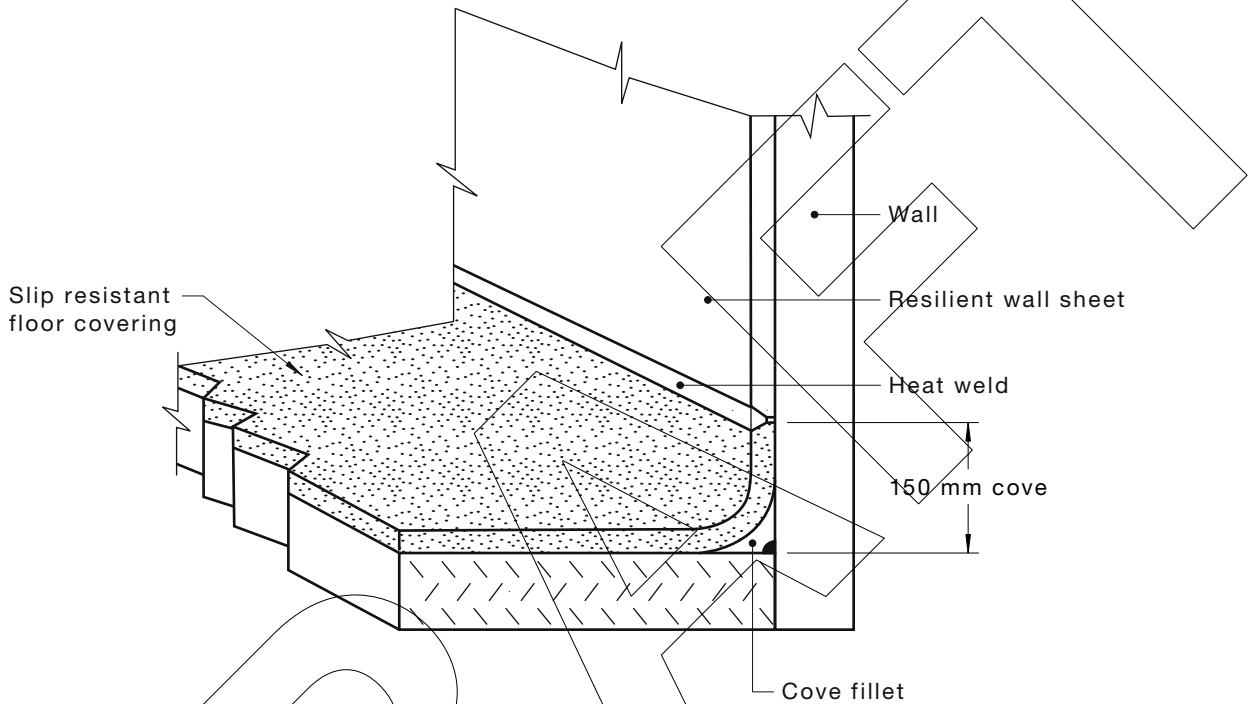


FIGURE 5.2 WELDED METHOD

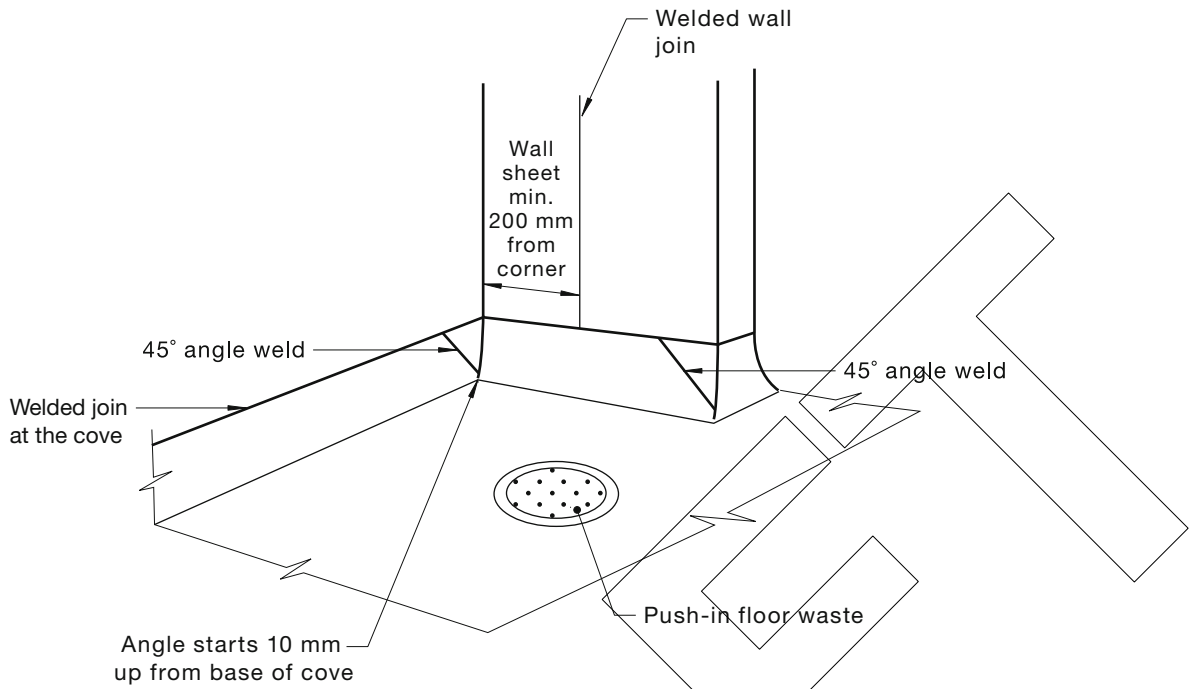


FIGURE 5.3 HEAT WELDED METHOD (INTERNAL AND EXTERNAL CORNERS)

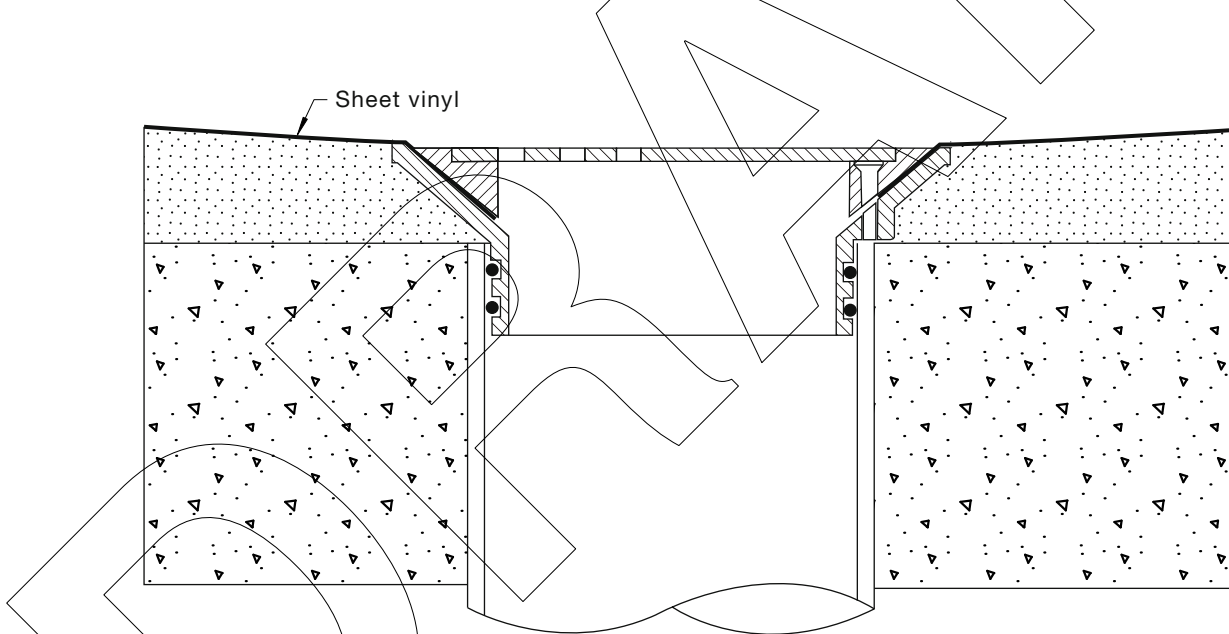


FIGURE 5.4 PUSH-IN VINYL SHEET WASTE

5.3 LINOLEUM

5.3.1 Product inspection and conditioning

Dye batch numbers of rolls shall be checked to ensure uniformity of the materials supplied.

The material shall be rolled out and inspected for visual defects in good natural light before proceeding to install.

For on site storage of materials see Clause 4.1.1.

In order to acclimatize linoleum prior to installation, cut lengths should be back rolled, secured with adhesive tape and left for 24 h.

5.3.2 Adhesive

Purpose made adhesive shall be used for the installation of linoleum as recommended by the linoleum manufacturer.

The resilient floor covering manufacturer's instructions shall be followed with respect to trowel notch size and application rate. It is essential that notch size and application rate remain constant for the duration of the installation.

The amount of adhesive that may be spread at any one time depends upon the prevailing site conditions, such as temperature, humidity and flow through of air which will affect the open time of the adhesive. The adhesive manufacturer's details of open time and initial tack times shall be followed.

5.3.3 Setout

See Clause 5.1.2.

5.3.4 Installation

Adjacent sheets should run in the same direction or as specified by the linoleum manufacturer.

Sheets shall be closely fitted parallel to walls, perimeters and door jams.

Sheets should be cut to allow for shrinkage of 1 mm per metre of length of the material and expansion of 0.2 mm per width of material.

Sheets shall be placed into wet adhesive, the air under the sheet expelled and the sheet rolled in multiple directions with 65 kg roller before adhesive sets up.

5.3.5 Seaming

Tight seams shall have the manufactured edges removed, be true and parallel without gaps and peaking to provide an even flush finish.

Thermally welded seams shall be flush, even and impervious, free from burns and crazing. Thermal welding shall be carried out using purpose made weld rod. Thermal welding shall be conducted 24 h after installation or once the adhesive has cured. Manufacturer's procedures for trimming, routing and grooving shall be followed using purpose made equipment.

5.3.6 Border coving

Border coving may be manufactured as a preformed product or formed on site. Preformed border cove shall be fitted such that the manufactured lengths of cove are installed using an adhesive as recommended by the linoleum manufacturer with the linoleum cove in continuous contact with the substrate.

Site formed border cove should be installed over a preformed cove fillet to achieve a radius nominated by the manufacturer. It should be installed using an adhesive as recommended by the linoleum manufacturer with the linoleum sheet in continuous contact with the substrate.

Internal and external corner joints should form a mitre from the wall onto the floor and be thermally welded at the corners and to the field of the installation.

5.3.7 Completion

All exposed edges of linoleum sheet floor covering or edges abutting other floor covering materials shall be protected by means of diminishing strips or other suitable mouldings.

When the installation is completed all scrap material and debris shall be removed from the floor which shall be swept or suction cleaned to remove all dust and debris. All traces of adhesive shall be removed using a method recommended by the adhesive manufacturer.

5.4 RUBBER SHEET AND TILES

5.4.1 Conditioning

To achieve best results, site conditions should be as described in Clause 4.1.1. All sheet and tile rubber flooring shall be placed face upward, taking care not to damage the surface, and cut approximately to size. Allowance of at least 75 mm should be made at the ends for trimming in. Ideally the slabs should then be left overnight and preferably for 24 h to condition at a minimum temperature as recommended by the manufacturer.

5.4.2 Adhesive

The resilient floor covering manufacturer's instructions shall be followed with respect to trowel notch size and application rate. It is essential that notch size and application rate remain constant for the duration of the installation.

The amount of adhesive that may be spread at any one time depends upon the prevailing site conditions, such as temperature, humidity and flow through of air which will affect the open time of the adhesive. The adhesive manufacturer's details of open time and initial tack times shall be followed.

NOTE: Where direct sunlight creates high surface temperatures on the floor, an approved epoxy or polyurethane adhesive should be used.

5.4.3 Tile setout

The installation from the centre of the area shall be balanced to minimize waste.

The starting point shall be marked out at a perpendicular axis adjacent to the longest straight wall.

Installations containing connecting areas and link-ups may require a number of perpendicular axes.

5.4.4 Sheet setout

See Clause 5.1.2.

5.4.5 Installation

See Clause 4.2.

5.4.6 Seaming

Sheet rubber joins shall be butt seamed or welded. Welding of rubber sheet is not a prerequisite in most installations. However where there is heavy wet cleaning or where due to hygiene requirements a continuous smooth surface is demanded, the joints shall be heat welded using the recommended weld rod.

NOTE: Welded external corners are prone to breaking open due to damage from wheeled traffic. To prevent this from occurring, and as an alternative to the traditional mitre, the joint may be cut at an angle and taken around the corner and welded.

5.4.7 Completion

All exposed edges of rubber sheet and tile floor coverings or edges abutting other floor covering materials shall be protected by means of diminishing strips or other suitable mouldings.

There is not to be any foot traffic for 12 h or heavy foot traffic for 24 h. Heavy equipment or vehicular traffic shall be kept off the installation for 72 h.

When the installation is completed all the scrap material and debris shall be removed from the floor swept or suctioned cleaned to remove all dust and debris. All traces of adhesive shall be removed using the method recommended by the adhesive manufacturer.

It is crucial that for the 48 h following installation the area shall be shielded from direct sunlight and that the recommended ambient room temperature be maintained.

5.5 VINYL COMPOSITE TILES (VCT)

5.5.1 Conditioning

VCT tiles shall be checked for obvious manufacturing defects in good daylight conditions prior to installation.

Material shall be checked against customer order for correct colour, pattern and quantity.

Cartons shall have the same 'batch number' when using more than one carton.

Tiles should be stored in full boxes no more than five boxes high on site for 24 h.

Dye batch numbers of boxes should be checked to ensure uniformity of materials supplied.

Material shall be allowed to acclimatize to job climatic conditions for 24 h at 15°C.

Tiles should be mixed/blended when installing multiple boxes of tiles.

5.5.2 Adhesive

Adhesives may be trowelled, rolled or sprayed. The resilient floor covering manufacturer's instructions shall be followed with respect to trowel notch size and application rate. It is essential that notch size and application rate remain constant for the duration of the installation.

The amount of adhesive that may be spread at any one time depends upon the prevailing site conditions, such as temperature, humidity and flow through of air which will affect the open time of the adhesive. The adhesive manufacturer's details of open time and initial tack times shall be followed.

NOTE: In cases where the VCT will be exposed to prolonged high temperatures from direct sunlight a two part adhesive should be used.

5.5.3 Setout

Tile grain direction should be confirmed and the installation should be balanced from the centre of the area to minimize waste.

The starting point shall be marked out at a perpendicular axis adjacent to the longest straight wall.

Installations containing connecting areas and link-ups may require a number of perpendicular axes.

5.5.4 Installation

Installation shall commence from the intersection of the perpendicular axis.

Tiles should be laid true to the axis lines to maintain square. They shall be laid in a step or pyramid fashion to minimize tile creep.

Perimeter tiles shall be cut and closely fitted to walls, thresholds and door jams.

Resilient tiles shall not be installed over expansion joins.

The installation shall be rolled in multiple directions with a 68 kg articulated roller.

5.5.5 Completion

All exposed edges of resilient tile floor covering or edges abutting other floor covering materials shall be protected by means of diminishing strips or other suitable mouldings.

When the installation is completed all scrap material and debris shall be removed from the floor swept or suctioned cleaned to remove all dust and debris. All traces of adhesive shall be removed using a method recommended by the adhesive manufacturer.

5.5.6 Protection

Protection of the VCT, as agreed between purchaser and flooring contractor, shall be via the application of polish as recommended by the resilient floor manufacturer. Additional protection may be required where there is heavy traffic or additional work is to be carried out over the flooring.

5.6 LUXURY VINYL TILE AND PLANK (LVT)

5.6.1 Conditioning

To achieve conditioning LTV shall be stored on site in an ambient room temperature range of 15°C to 28°C for 24 h before installation. The ambient temperature range shall be maintained during installation for 24 h after completion.

The substrate shall not be exposed to direct sunlight for the period 24 h prior to installation, during installation and 24 h after installation. This is to prevent thermally induced dimensional changes of the product.

A two part adhesive shall be used where the LVT will be exposed to prolonged high temperatures from direct sunlight.

5.6.2 Adhesive

A total cure hard set type adhesive shall be used for LVT and plank installations. Pressure sensitive type adhesives are not appropriate and shall not be used.

The amount of adhesive that may be spread at any one time depends upon the prevailing site conditions such as temperature, humidity and flow through of air. These factors will affect the open time of the adhesive. Open time and initial tack time shall be as specified by the adhesive manufacture.

The installation area should be divided into workable sections. Adhesive shall not be applied to the perimeter until the main body of the floor has been laid.

5.6.3 Setout

Tile grain direction should be confirmed and the installation should be balanced from the centre of the area to minimize waste.

For tiles the starting point shall be marked out at a perpendicular axis adjacent to the longest straight wall. Installations containing connecting areas and link-ups may require a number of perpendicular axes.

For planks the starting point shall be marked out at a perpendicular line adjacent to the longest straight wall.

5.6.4 Installation

The decoration of tiles and planks is randomly distributed and can be heavier on some tiles than others. To prevent heavy and light colour shading areas, the tiles should be unboxed and, if required, shuffled. Alternating the direction of tiles may be required to avoid repeat patterns.

When a section has been laid, except for the perimeter, the flooring should be rolled in both directions with a minimum 45 kg articulated roller as specified by the resilient flooring manufacturer.

LVT and planks should be closely fitted and cut flush to any walls and fittings.

5.6.5 Completion

All exposed edges of resilient floor coverings or edges abutting other floor-covering materials shall be protected by means of diminishing strips or other suitable mouldings.

When the installation is completed all scrap material and debris shall be removed from the floor which shall be swept or suction cleaned to remove all dust and debris. All traces of adhesive shall be removed using a method recommended by the adhesive manufacturer.

5.6.6 Protection

Protection of the LVT may be required where heavy traffic or additional work is to be carried out over the flooring.

5.7 LOOSE LAY INSTALLATION

5.7.1 General

Loose lay installation is a method of installation with a minimal use of adhesive and for a product specifically designed for this procedure. This product is generally heterogeneous sheet flooring with a fibreglass interlayer.

Maximum areas to be installed using this method shall be checked against specific product manufacturer's recommendation, as installing outside these parameters may in instances void manufacturer's warranty terms. This method of installation shall be agreed upon in writing by both the flooring contractor and the purchaser prior to the commencement of any works and shall form part of the contract.

5.7.2 Conditioning

Although floorings with fibreglass inter-layers are generally quite stable, manufacturer's recommendations should always be followed with regards to conditioning and to the provision of a gap around the perimeter of the installation to allow for the impact of climatic changes. In some instances re-trimming of floorings around the perimeter may be required at a later date once the floorings have relaxed after installation.

5.7.3 Seaming

All joints in loose-lay installations shall be chemically welded, flush, even and impervious with no overflow of chemical residue. Manufacturers' instructions should be followed.

5.7.4 Mechanical fixings

The use of hook and loop tape and single and double sided tape at joints and doorways for securing joints and perimeters of loose lay resilient sheet flooring shall be as directed by manufacturers' recommendations.

5.7.5 Completion

Flooring should be allowed to relax for 24 h before locating furniture and fittings on top of the floor covering. Heavy furniture should never be dragged over any loose lay installation and care shall be taken when wheeling heavy loads over this type of installation as it may result in damage.

APPENDIX A TESTING FOR MOISTURE CONTENT IN SUBSTRATES

(Normative)

A1 BACKGROUND

Recent research and changes in test equipment technology have shown that test methods identified in the previous version of this Standard are no longer satisfactory for determining moisture content in substrates. This is partly due to changes in construction technology, but also to be consistent with international testing best practice (see Paragraph A5).

A2 TEST OBJECTIVE

The objective of the test is to determine whether the substrate moisture content is suitable for the installation of resilient floor coverings.

A2.1 Concrete substrates

Concrete substrates shall be considered sufficiently dry when measurements taken at 40% depth of the substrate do not exceed 75% relative humidity. Three tests shall be performed for the first 100 m² and at least one additional test for each additional 100 m² and other recommended positions in accordance with ASTM F2170.

A2.2 Timber substrates

Timber substrates shall be considered sufficiently dry when moisture content measurements are within a range of 10% to 14%. Similarly as for concrete substrates three tests shall be performed for the first 100 m² and at least one additional test for each additional 100 m².

A3 TEST REPORT

The value of adequate moisture testing often is not realized until a problem arises with an installation some time after completion. Accordingly, written records of moisture testing results should capture the following:

- (a) Physical address of substrate tested.
- (b) Type of substrate tested.
- (c) Testing regime.
- (d) Date and time of measurements taken.
- (e) Location of testing equipment.
- (f) Results of readings taken.
- (g) Substrate temperature and relative humidity at time of test results.
- (h) Ambient temperature and relative humidity at time of test results.
- (i) Type, make, model and serial number of the test equipment and its calibration status.

A4 TESTING PROCEDURES

A suitable test procedure for determining moisture content of concrete substrates is as described by ASTM F2170.

For timber substrates suitable testing procedures may be found in AS/NZS 1080.1 or AS/NZS 2098.1 depending on the type of timber.

Any other procedure able to achieve the objectives stated in Paragraph A2 and be recorded as stated in Paragraph A3 may also be used.

A5 BIBLIOGRAPHY

The reader's attention is drawn to the following related documents.

- (a) Rantala J, and Leivo V, Drying of in situ cast concrete ground slabs and covering criteria. Institute of Structural Engineering, Tampere University, Finland by Elsevier Ltd, 2008.
- (b) Moisture in Concrete and Moisture-sensitive Finishes and Coatings by Cement Concrete & Aggregates Australia, 2007.
- (c) Concrete and Moisture Sensitive Coverings TN 024. Sydney, Building & Construction Research & Consultancy, 2009.
- (d) Advanced research into floor performance issues – Concrete slab moisture and associated ongoing timber performance PNA010-0708. Forest & Wood Products Australia, 2009.
- (e) Moisture Vapor Testing Position Statement. Anaheim CA 92806, USA. World Floor Covering Association, 2001.

APPENDIX B

TESTING FOR pH CONTENT IN CONCRETE SUBSTRATES

(Normative)

B1 BACKGROUND

High alkalinity in concrete substrates is now recognized as being a cause of failure of adhesion between floor coverings and the substrate. Changes in the materials now used and the current technology have made this property of the substrate a critical factor. This was not the case in the previous version of this Standard.

B2 TEST OBJECTIVE

The objective of the test is to determine whether the substrate pH value is suitable for the installation of resilient floor coverings.

Concrete substrates shall be considered suitable for the installation of resilient floor covering and ancillary products when the measured pH does not exceed 10 or as specified by the adhesive manufacturer.

Three tests shall be performed for the first 100 m² and at least one additional test for each additional 100 m².

B3 TEST REPORT

The value of adequate pH testing often is not realized until a problem arises with an installation sometime after completion. Accordingly, written records of pH testing results should capture the following:

- (a) Physical address of substrate tested.
- (b) Type of substrate tested.
- (c) Testing regime.
- (d) Date and time of measurements taken.
- (e) Location of testing equipment.
- (f) Results of readings taken.
- (g) Type, make, model and serial number of the test equipment and its calibration status where such equipment is used.

B4 TESTING PROCEDURES

B4.1 Apparatus

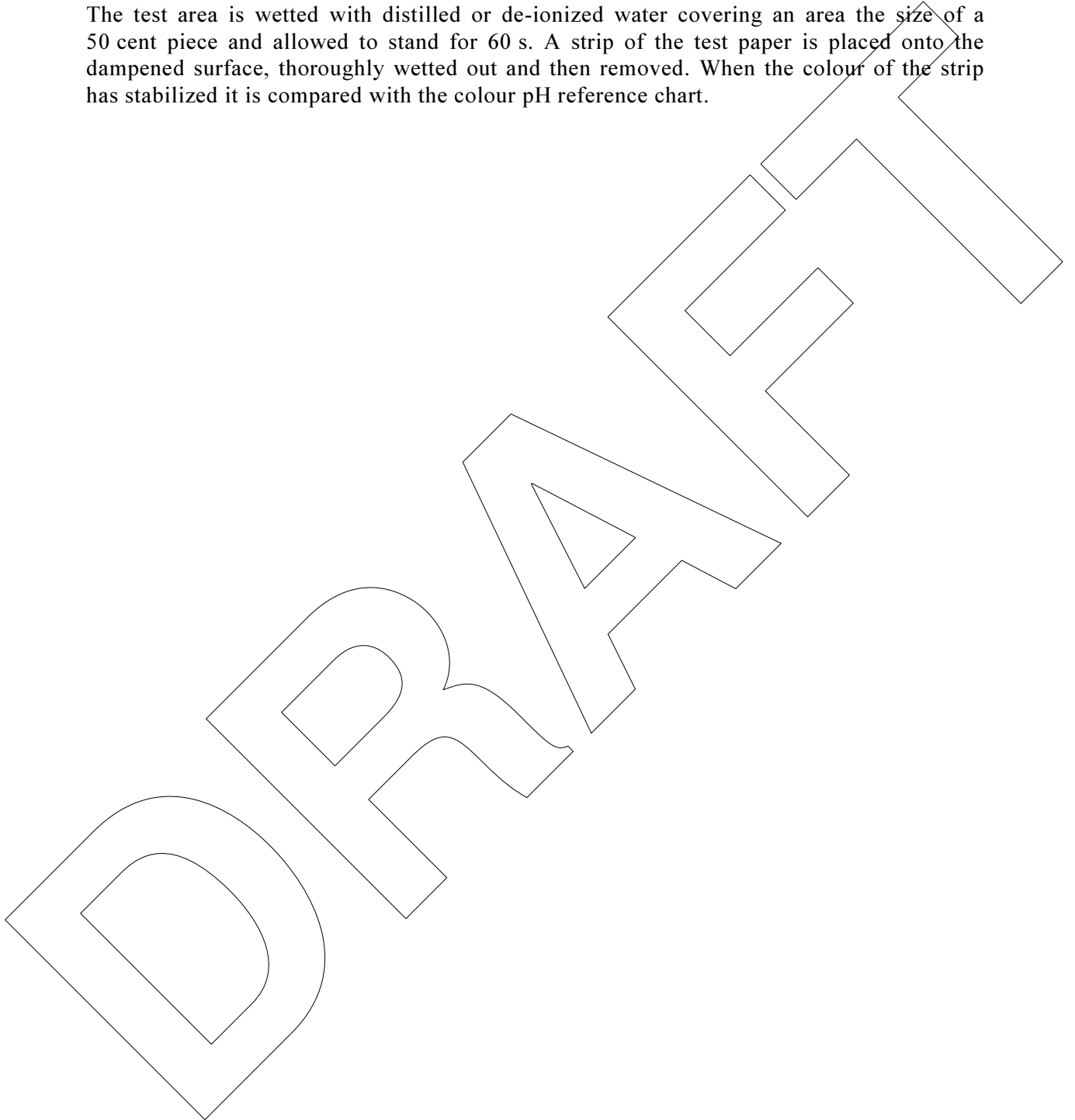
Spot tests for pH levels are performed using pH test papers with a reference pH colour chart and distilled or de-ionized water for wetting the test materials.

The measurable pH range required for spot test measurements should be pH 6 to pH 13.

B4.2 Procedure

A section of the concrete floor is mechanically prepared to remove contaminants and burnishing to expose the open matrix of the substrate. The surface is swept and vacuumed to remove dust and contamination.

The test area is wetted with distilled or de-ionized water covering an area the size of a 50 cent piece and allowed to stand for 60 s. A strip of the test paper is placed onto the dampened surface, thoroughly wetted out and then removed. When the colour of the strip has stabilized it is compared with the colour pH reference chart.



APPENDIX C

SITE INFORMATION TO BE REQUESTED BY THE CONTRACTOR
FROM THE PURCHASER

(Normative)

C1 SITE INFORMATION—GENERAL

The contractor shall request the purchaser to supply the following information where appropriate:

- (a) The position and depth of electric power cables and cold and hot water pipes.
- (b) The nature of any additives, curing agents, parting compounds, surface treatments or similar used in the construction of the subfloor, as these may have a deleterious effect on any floor adhesive used.
- (c) Particulars and location of damp course to ensure that the subfloor is free from rising moisture. Where the subfloor is constructed on fill, hardcore or the ground, the contractor shall be advised as to whether the subfloor has been protected from entry of moisture by the recommended means of a continuous impermeable membrane of minimum thickness of 0.2 mm.
- (d) If the subfloor is concrete, whether the concrete is sufficiently dry when assessed in accordance with Appendix A.

NOTES:

- 1 Concrete waterproofing additives and curing compounds are not considered a substitute for a water-vapour-proof membrane.
 - 2 Certain concrete waterproofing additives and curing compounds may adversely affect adhesives used during the installation process.
- (e) The location and type of air conditioning, or other type of space heating not mentioned above.
 - (f) The position and depth of any other structural elements which may affect the work or the quality of the work being undertaken by the contractor.
 - (g) Assurance that the subfloor on which the textile floor covering is to be installed, shall be provided clear of the tools and goods of other trades.
 - (h) Assurance that the site meets occupational health and safety requirements.

C2 SITE INFORMATION—CONCRETE SUBFLOORS

In addition, for concrete subfloors, the contractor shall request the purchaser to supply the following information where appropriate:

- (a) The position and depth of heating elements, whether electric or heated water pipes and whether these have been insulated.
NOTE: Unless the heated elements are insulated sufficiently, hot spots can occur which could result, in time, in the failure of the adhesive or the floor covering.
- (b) Particulars of the ventilation under the subfloor.
- (c) The details of the concrete subfloor including the thickness and compression strength of the concrete throughout the installation area.
- (d) The date concrete subfloor was completed.

- (e) Whether the surface is plane, smooth and sound.

NOTE: Where a subfloor is so rough or uneven that it is unsuitable for the direct application of the floor covering, corrective action should be taken (e.g. steel-trowelled concrete layer) to level the subfloor.

C3 SITE INFORMATION—TIMBER SUBFLOORS

The contractor shall request the purchaser to supply the following details on timber subfloors:

- (a) Whether the timber subfloor has been kiln-dried or air-dried in order to achieve a moisture content which is at equilibrium with the environment.
- (b) Whether the subfloor ventilation complies with AS 1684 in Australia.

NOTE: Failure of resilient floor coverings can occur when they are laid over timber subfloors subjected to conditions which might cause the timber subfloor to buckle, rot or otherwise deteriorate.

APPENDIX D

GLOSSARY OF TERMS

(Informative)

Above grade	Above the surface of the ground, as related to floor location, above a well ventilated space with at least 400 mm between the bottom of the lowest horizontal structural member and any point of the ground.
Abrasion resistance	Determined by one of several tests, this shows degree to which the floor withstands foot traffic and daily wear.
Across machine direction	The direction perpendicular to which a product moves through the manufacturing process.
Asphalt tile	An obsolete floor surfacing unit composed of asphalt or hydrocarbon resins, or both, crysotile asbestos fibres, mineral fillers, and pigments. Asbestos containing floor covering could not be manufactured in the Australia after 1982.
Below grade	Below the surface of the ground, as related to floor location, part or all of the floor is below the ground.
Capping	Procedure and material used for self covered tile and/or sheet goods installation. The cap strip, usually metal, but also can be vinyl or rubber, has a flange into which the top edge of the covered floor covering fits.
Chemical Resistance	The degree to which the floor covering resists stains and/or corrosive action of various household and industrial chemicals.
Cork tile	A floor surfacing unit made from natural cork shavings compressed and baked to be thoroughly and uniformly bonded together.
Cove fillet	Made of vinyl, rubber and/or metal in a variety of heights and shapes for a wide range of sheet goods and tile installations. Installed with adhesive, or self stick.
Cushioned vinyl flooring	Any vinyl sheet floor covering incorporating a foam layer as part of its construction.
Dimensional stability	The ability of resilient flooring to retain its original dimensions during the service life of the product.
Double cut	Double cutting is done by overlapping the edges of the material and cutting through both sheets at the same time.
Drop match	A drop match pattern is pattern match where there is a vertical drop between the matching design elements repeating diagonally across the floor covering. Note: A drop match is simply a set match split in half.
Drying room yellowing	A yellowish cast on linoleum resultant from the oxidation process that will go away with light exposure. Without continued light exposure, the cast may reappear.

Embossed	Having a permanent raised patterned surface produced by mechanical or chemical means.
Feature strip	Special stripping made of rubber, vinyl, or of the floor covering being installed; used to create borders and/or special effects in the finished floor.
Finishing strip	Made of metal, vinyl or rubber and used to finish off raw edge, such as doorways or between two different types of floors.
Full spread	A procedure for installing resilient floor covering whereby it is fully adhered to the substrate.
Gauge	The overall thickness of the tile or sheet goods.
Grade level	Relationship of a subfloor to exterior ground.
Heterogeneous rubber flooring	A rubber floor surfacing material consisting of layers of dissimilar compositions or colours, or both.
Heterogeneous vinyl flooring	A vinyl flooring surfacing material consisting of layers of dissimilar compositions or colours, or both.
Homogenous rubber flooring	A rubber floor surfacing material, in sheet or tile form, that is of uniform structure and composition throughout. It usually consists of compounded natural or synthetic rubbers, or both, in combination with mineral fillers, pigments, and other additives
Homogenous vinyl flooring	A flooring surfacing unit in sheet or tile form that is of uniform structure and composition throughout, usually consisting of vinyl plastic resins, plasticizers, fillers, pigments and stabilizers.
HVAC	An abbreviation for heating, ventilation, and air conditioning.
Impact resistance	Tests the degree to which the floor covering recovers from an indentation created by objects being dropped or by static load.
Impact noise rating	The minimum noise level reduction standards for floors in multiple story housing. The test measures the noise that results from dropped objects, foot traffic and the like.
Indentation	A recess in the surface of a resilient floor produced by a heavy static load or a dropped object.
Inset	The art of inseting a separate colour or pattern into a piece of material, forming a design.
Inlaid sheet flooring	A floor surfacing material in which the decorative pattern or design is formed by coloured areas set in to the surface. The design so formed may or may not extend through to a backing.
Light reflective values	The percentage of total light reflected back to the eye from the floor. Colour of the floor covering surface is the influencing factor. Measured with a reflectometer, using standard light source.
Loose lay	A method of installing sheet goods without the use of

adhesive.

Machine direction The direction in which a product moves through the manufacturing process.

Magnesite A type of underlayment composed of magnesium oxychloride cement and fillers such as sawdust, cork or sometimes asbestos. This underlayment is unstable to moisture and has been associated with concrete cancer and chloride attack to metal fixtures and reinforcement.

Match marks Marks on two successive widths of material, usually in the centre. Used to indicate the pattern match alignment.

Mitre Installation of two pieces of material coming together at an angle (usually 45° angle).

Non porous A substrate that will not absorb water. Usually an indication of a sealer or residue on the surface.

On grade A concrete slab that is on ground level.

Open time The length of time that an exposed adhesive is able to achieve full transfer to the resilient floor covering.

Pattern repeat Vertical distance between one point on a design element to the next identical design element.

Pattern scribing An accurate and convenient procedure for fitting resilient flooring using templates.

Perimeter installation A method of installation in which the material is adhered by a band of adhesive around the perimeter of the room, at the seams and around all fixtures.

Porous A substrate that will absorb water. Normally an indication of an open and prepared substrate matrix.

Recess scribe See underscribe

Resilience Measure of the floor covering's ability to return to its original shape and gauge after heavy foot traffic, dropped objects or static loads.

Rosin Translucent amber to almost black brittle friable resin that is obtained by chemical means from the oleoresin or dead wood of pine trees or from tall oil.

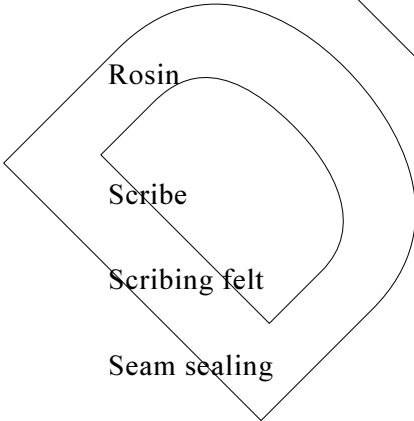
Scribe Procedure for scoring the floor covering to facilitate and achieve accuracy when cutting.

Scribing felt A saturated or unsaturated felt used for pattern scribing. This is the most accurate method of fitting floor coverings.

Seam sealing A chemical fusion of two edges of sheet vinyl at the seam. Care must be taken to keep seams clean.

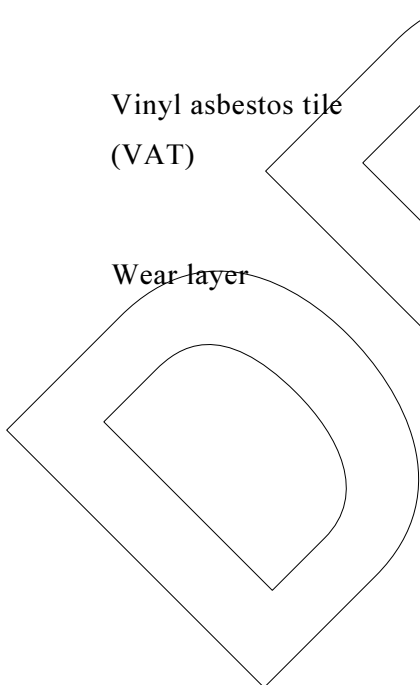
Selvage A strip of excess material down the edge of sheet goods for trimming purposes. Some are marked with codes for matching and pattern repeat data. Selvages provide for overlap for seam cutting.

Set match The vertical distance between one point on a design element to the next identical point of the design element of the pattern repeat.



Skiving	The method of cutting the heat weld rod flush with the surface of the material.
Solid vinyl flooring	<i>See</i> homogenous vinyl flooring.
Stair nosing	A metal, rubber or vinyl nosing used on the leading edge of a stair tread. Resilient products are either beneath or scribed to the nosing.
Static load resistance	The resistance of a floor covering to permanent indentions by heavy static loads, such as furniture and appliances.
Straight scribing	The art of scribing resilient products at a right angle to obtain a fit of an irregular surface.
Stringers	The decorative resilient strip that goes down the sides of a stairway. It is normally fitted to the contour of the steps.
Tack time	The time required for adhesive to achieve its initial tack before the floor covering is laid into it.
Thermal conductivity	The measure of heat flow through the floor covering.
Underscribe	A procedure for seaming resilient flooring. The selvage edge of the first piece is trimmed square and the second piece is placed so that the overlap is over the trimmed edge of the first piece. The adhesive is applied and materials are placed into it. The edge of the top piece is inserted in the underscriber, and with the guide pressed against the squared edge of the bottom piece, the top piece is scored by drawing the underscriber along the edge of the bottom sheet. The needle traces the contour of the lower sheet's edge, making a guide line for the knife.
Vinyl asbestos tile (VAT)	An obsolete form of resilient tile composed of vinyl plastic binders, crysotile asbestos fibres, mineral fillers and pigments.
Wear layer	The portion of a resilient floor covering that contains or protects the pattern and design.

*** END OF DRAFT ***



PREPARATION OF AUSTRALIAN STANDARDS

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During the development process, Australian Standards are made available in draft form at all sales offices and through affiliated overseas bodies in order that all interests concerned with the application of a proposed Standard are given the opportunity to submit views on the requirements to be included.

The following interests are represented on the committee responsible for this draft Australian Standard:

Australian Chamber of Commerce and Industry

Australian Industry Group

Australian Resilient Floorcovering Association

Construction, Forestry, Mining and Energy Union

Floorcovering Association of Victoria

TAFE NSW

Vinyl Council of Australia

West Australian Floorcovering Association

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