

BEST PRACTICE GUIDELINES FOR THE NEW ZEALAND FLOORING INDUSTRY

RESILIENT FLOOR COVERINGS PLANNING AND INSTALLATION



ACKNOWLEDGEMENT

The Floor NZ board would like to acknowledge the support and valuable contribution of the sponsors for this project.



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EXPLANATORY NOTE

The Best Practice Guidelines for Resilient Floor Coverings Planning and Installing sets out industry recognised methods for planning and installation that supports retail, supplier, installers, and apprentice training.

The purpose is to make available flooring information for everyday flooring practices that are collectively supported by the flooring industry via the Floor NZ website. Where further information is needed a link with further direction is included.

The information provided are guidelines for best practice and do not replace or are not a substitute for Industry Standards, Government or local Legislative Acts, Codes or Manufacturer recommendations.

INDUSTRY STANDARDS

Floor NZ recommend flooring companies have a copy for their own reference of:

NZS AS 1884:2013 Floor coverings – Resilient sheet and tiles – Installation practices

Industry standards are held by and are available online through Standards NZ.

Standards New Zealand is a business unit within Ministry of Business, Innovation & Employment (MBIE) Consumer Protection and Standards branch.

<https://www.standards.govt.nz/>

INFORMATION

The writer has made every effort to ensure the information contained in this edition is reliable.

While the information covers situations in general, it is not possible for Floor NZ to guarantee the information will cover or provide solutions for every situation due to variable or unforeseen events that can occur during planning, installation or after care following installation.

Floor NZ may update the contents of this guideline at any time without notice.

VERSION UPDATE 2024

Key sections updates:

2.11 - Silica section added

5.0 - Concrete floor preparation

7.0 - Installing resilient tile

8.0 - Adhesives for resilient floor coverings

9.12 - Section added for Installing Linoleum

9.13 - Section added for Installing resilient floor coverings to sanitary areas. Updated to reflect Building System reforms.

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ABOUT US

Floor NZ is a membership organisation representing manufacturer/supply, retail and Contract Installers for the flooring industry,

Floor NZ advocates for members with government departments, provides technical support and training for the flooring industry.

TRAINING

Floor NZ owns the Allied Trades Institute (ATI) which is a P.T.E (private training establishment) for flooring that allows the delivery of NZQA approved programmes and training schemes. Current programmes delivered through ATI are:

Flooring Fundamentals – training on floor covering knowledge, care and maintenance and installation methods. This course is held in Auckland and Christchurch and can be regionalised and customised for groups.

Introduction to flooring – optional pre apprentice blended online learning with work placement.

Upskill courses – customised upskill courses in carpet and vinyl can also be arranged.

Full details about these courses can be found on the Floor NZ website:

<https://floornz.org.nz/training/floornz-training-courses/>

APPRENTICESHIPS

Flooring apprenticeships are provided by the Building and Construction Industry Training Organisation (BCITO). ATI has an arrangement with the BCITO to deliver both block course training for apprentices in Christchurch, and regional Flooring Planning and Design courses. Tools and materials are supplied by Floor NZ members.

Current flooring apprenticeships for flooring include:

- Carpet - conventional and/or bonded.
- Resilient floor coverings - commercial and/or residential.
- Timber installation - bonded and/or fine sanding and finishing,
- Surface preparation (available later in 2024) - strands in mechanical grinding,

- moisture control systems underlayment systems, concrete polishing.
- Floor Planning and Design - optional strands in site measuring and site assessment.

BCITO contact information

Phone: 0800 4 BCITO / +64 4 381 6430,

Email: info@bcito.org.nz

FLOOR NZ MEMBERSHIP BENEFITS

As a valued Floor NZ member you have free access to download these guidelines from our website when you log in, where you can also access the other benefits and services we offer including:

- Basic free legal and tax advice and guidance
- Discount on Site Safe fees
- Discounted fuel prices with Mobil
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- Window transfers for you building and vehicle
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1

PLANNING FOR A RESILIENT FLOOR COVERING INSTALLATION

IN THIS SECTION

- 1.1 Site conditions
- 1.2 Access to the flooring site
- 1.3 Heavy or awkward manual lifting
- 1.4 The work area
- 1.5 Finishing to the edges and doorways
- 1.6 Natural light and temperature
- 1.7 Moisture issues
- 1.8 Flammable or hazardous chemicals
- 1.9 Equipment to be used
- 1.10 Fitting to walls and vertical surfaces
- 1.11 The conditions of the flooring surface
- 1.12 Site measurements

1.1 SITE CONDITIONS

Having a system or checklist at the early planning or measuring stage will help to gather and process site information accurately so everything that is needed is pre organised before the installation takes place.

Experienced installers can provide valuable input when developing a system for pre checking site conditions.

Planning for an installation or carrying out an installation involves pre checking three key areas at a work site.

1. Site conditions.
2. The condition of the floor/walls.
3. Site measurements.

Pre checking a site is about having a good look at what is happening about the site that could affect:

- The choice of floor covering.
- Safety during the job.
- Time allowed completing the job.
- The quality of the installation.

Understanding the resilient floor covering type is also important in terms of selling:

- the correct floor covering for the area;
- organising the installation; and
- any necessary installation techniques associated for the floor covering type.

1.2 ACCESS TO THE FLOORING SITE

Flooring materials and equipment can be heavy or awkward to move around when unloading from vehicles or getting gear to the flooring site.

Examples to identify and plan for.

- A clear pathway is needed to avoid injury or damage to materials and equipment. Diggers/machinery operating on site and open drains, trenches are situations that are dangerous.
- Scaffolding used by other trades that may be in the way.
- The stairs are in place to move gear safely to different levels.
- Houses built on hills with steep drives and steps.
- Parking for vehicles.

1.3

HEAVY OR AWKWARD MANUAL LIFTING

The type and amount of materials and equipment to get to the work area.

Examples to identify and plan for.

- Compressors, grinding/sanding machinery.
- Bags of resurfacing compounds, adhesives, board underlayment, roller, tools.
- The length sizes, weight and amount of vinyl floor coverings.

1.4

THE WORK AREA

Needs to be clear and safe for flooring work.

Examples to identify and plan for.

- The flooring space should be clear of other people or workers about at the time of an installation.
- The customer's children and pets are kept away from the flooring workers.
- Areas are cleared out and cleaned up at the time of installation.
- Appliances such as stoves, fridges, freezers, dishwashers need to be cleared from the area. Professional trades organised to disconnect and reconnect after the installation is complete.
- Installing floor coverings into toilet areas will involve consideration and planning for. This may involve planning the installation before the toilet is fitted, or arranging a plumber to remove the toilet before the time of installation.

- Often doors will need to be removed as part of the installation process. Trimming or adjusting door heights may need to be part of the discussion with the customer along with paint touch ups.
- Baths with footings or vanity units where plumbing is exposed. Arrangement for removal might need to be planned for, along with preparation around any plumbing at the floor or wall junctions.



What to look for - the plumbing is above the floor surface.

What to do - the pipe needs to be removed and lowered, the surface made smooth, flat and sound with an appropriate compound so the vinyl can be fitted neatly around the plumbing.

- Arrangements made for smoke alarms that can be easily activated with any heat or dust created from the flooring work.
- The flooring work should be planned so it does not clash with other trades affecting the work area such as dust, flammable/toxic fumes, wet paint or noise.

New paint needs sufficient time to set. This will help mitigate paint damage. As part of the installation process, sheet vinyl will brush against the skirting board, wall/ door /architrave as it is fitted into place.

1.5

FINISHING TO THE EDGES AND DOORWAYS

The condition at the edges of a room.

Examples to identify and plan for.

- The skirting edge should be touching the floor and be square at the floor junction.
- If the existing floor covering is to be removed and is thicker than the new covering, the skirting may need to be painted or replaced.
- If it is to be covered, the wall surface will need to be smooth, straight and solid enough at the bottom for the type of coving system to be used.
- If there is existing capping, is it appropriate, or is new capping needed.
- If there is new capping needed, how can it be fixed to the wall.

- The type of transition bar identified if joining to a different floor covering.
- Floor window sills/door frames are finished neatly to the floor so the floor covering can be cut and fitted neatly to it. See the photo below.



A gap between the concrete and door sill will not allow the resilient floor covering to finish neatly against it.

1.6 NATURAL LIGHT AND TEMPERATURE

Possible cause of problems at the time of the installation and also after the installation.

Examples to identify and plan for.

- A high amount of window light may influence the decision on material/quality or type to be used. For example, plan for a wider width of sheet vinyl rather than a 2 metre width to eliminate seams.

Ceramic tiles may be more suited to the situation—areas in holiday homes that are exposed to high temperatures/natural light and lack appropriate ventilation/UV protection when locked up for long periods.

- Temperature at the time of installation, either too low or high will affect the setting process of adhesives and resurfacing compounds.
- Windows that will need covering during the installation.
- Temperature brought up to the manufacturer guideline at the time of installation.
- Appropriate recommended adhesive used for the situation.
- Identifying if there is underfloor heating; including the type of heating system. The underfloor heating should be off during the installation.

Refer to the floor covering instructions regarding underfloor heating before specifying/recommending and installing the floor covering.

1.7 MOISTURE ISSUES

Be on the lookout for any signs of moisture that could affect the installation at the time or the future. Bringing moisture related problems to the client's attention allows the time for these problems to be fixed before the installer arrives to the site.

Examples to identify and plan for.

- Leaks around dishwashers, washing machines or shower doors.
- Swollen skirting boards or toe kicks.
- Signs of any bubbling, staining, rippling or swelling beneath existing vinyl floor coverings.
- Discolouration of concrete.
- Mould present on the substrate surface.
- Efflorescent forming on a concrete surface.

1.8 FLAMMABLE OR HAZARDOUS CHEMICALS

Any products used in the installation that have the potential to cause fire or harm to people at the flooring site.

Examples to identify and plan for.

- Substitutions for these products or equipment.
- The client and people on the worksite are informed on the safety procedures to be taken if flammable adhesives, solvents, gas bottles are to be used.
- Pilot lights or sources of ignition and ventilation are identified that could be a concern.

See section 2.10 for procedures to follow for using flammable or hazardous chemicals.

2.10

1.9 EQUIPMENT TO BE USED

The types of equipment used in an installation that need discussion with the client.

Examples to identify and plan for.

- Power on and water available at the time of installation.
- Information for the client and people at the worksite on safety procedures regarding the work, any noise or dust created.

1.10 FITTING TO WALLS AND VERTICAL SURFACES

The types of equipment used in an installation that need discussion with the client.

Examples to identify and plan for.

- Timing with any plumbing or electrical services i.e. taps and plugs.
- Scaffolding for reaching heights.
- Finishing to edges and ceiling.

1.11 THE CONDITION OF THE FLOORING SURFACE

When organising an installation for a resilient floor covering, or preparing a surface for an installation, the five key areas below can be used to work through and identify what is needed to appropriately prepare the flooring surface.

1) Clean

The floor surface needs to be clean of any existing floor coverings (including existing cork tiles), all surface contaminants—old asbestos-backed floor coverings, white plaster, dust, paint, wax, adhesive, oil or grease residue, rubber underlay residue etc.

Reason

Anything that will affect the adhesive bond between the vinyl and the floor; or anything that may cause a reaction between the properties that make up the vinyl (plasticisers) and any residue of latex/rubber, oil, paint, rubber waffle underlay etc. Reactions of this type can cause discoloration, swelling or softening of the vinyl and/or vinyl adhesive.

2) Sound

The floor needs to be firm in that it will not crumble, move (springiness), crack or break up.

Reason

A surface that is not firm may result in the resilient floor covering from lifting, bubbles, bulges or pimples showing through the finished surface.

3) Flat (Plane)

The floor surface needs to be flat/or level.

Reason

Uneven surfaces may not allow furniture, tables, chairs and whiteware to sit flat on the floor. Tile corners can also step out.

The flatness of a surface can be determined with a metal straightedge. The tolerance for how flat or plane a surface should be is governed by the tolerance specified by the floor covering manufacturer.

The general rule in New Zealand for resilient floor coverings where no tolerance is given, are no gaps greater than 3mm beneath a three metre straightedge and the surface.

4) Smooth

The floor surface must be smooth with no roughness or lipping when you run your hand across it.

Reason

Similar to a surface for a painted finish, any surface imperfections will show through a finished vinyl floor covering. Natural light cast across a floor can also emphasize any imperfections of a substrate.

Measurement: the general rule in New Zealand is no gaps beneath a 200mm straightedge.

5) Dry

There should be no visible signs of surface moisture. The floor substrate must also be dry enough to install resilient floor coverings on.

Reason

Moisture can affect the adhesive bond resulting in the floor covering swelling or bubbling. Board underlayment or surface repairing compounds may also swell up. New concrete that has not had sufficient time to dry can also have high pH levels that break down the adhesive bond. Problems caused through high pH levels may not be apparent until several months later.

Moisture substrate levels—the acceptable level for concrete floors is 75% RH or less when measured over 24 hours with a hygrometer testing device. Refer to section 5.2 for more information on these testing methods. **5.2**

Always refer to both the floor covering manufacturer and adhesive supplier as there may be variations on acceptable RH levels—plus the test methods used.

With timber floors, 16% MC or less is the measurement when measured with a pin (resistance) test.

1.12 SITE MEASUREMENTS

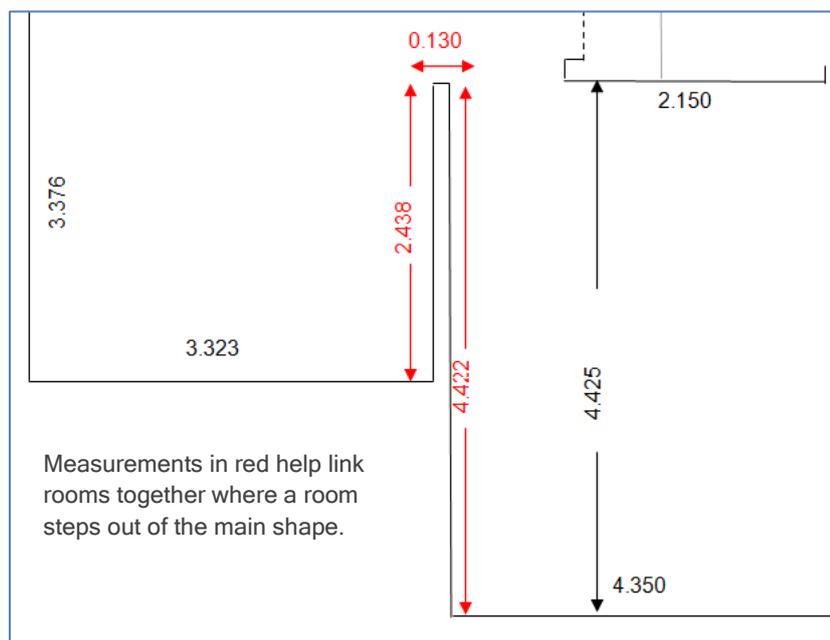
Accuracy when confirming measurements or taking measurements to produce a scale plan is a critical part of the process.

Lack of attention or accuracy in this area can result in losing the job with over quoting or losing money with under quantifying.

As well as overall measurements of areas, incremental measurements along walls and

door openings are also important to allow accuracy in quantifying floor coverings, transition bars, plus coving when required.

Measurements that run along walls into adjacent rooms are also important to accurately link rooms together, particularly with digital software where rooms are formed in blocks then merged together.



VERIFYING A PLAN'S SITE MEASUREMENTS

Before ordering materials, measurements should be checked on site to verify the plan's accuracy.

Before starting an installation, the plan's measurements should also be verified before cutting any material.

With installations that require multiple rolls, the cutting sequence should be checked before cutting into any material.

Plans received digitally need verification that the scale is correct.

2

LEGISLATION

IN THIS SECTION

- 2.1 The Health and Safety at Workplace Act 2015
- 2.2 Arriving to a flooring worksite
- 2.3 Risk assessing overview
- 2.4 General risk assessing procedure
- 2.5 Health and Safety at Work (Asbestos) Regulations 2016
- 2.6 Duty to prepare an Asbestos Management Plan (AMP)
- 2.7 Duty to ensure asbestos is identified in the workplace
- 2.8 Duty to carry out air monitoring
- 2.9 Encapsulating asbestos-backed floor coverings
- 2.10 Hazardous products used in the flooring industry
- 2.11 Risk assessing procedure for using an organic-solvent and silica dust
- 2.12 Consumers Guarantees Act 1993
- 2.13 Contracting out of the CGA

2.1 THE HEALTH AND SAFETY AT WORKPLACE ACT 2015

All flooring businesses (including contractors) are required by law to have, and put into practice their own health and safety manual of procedures.

- The person conducting a business or undertaking (PCBU) is often the flooring business who first measures and prices the job. The person representing the flooring business has a responsibility to assess and gather information around safety for the purposes of planning a possible installation.
- If the job goes ahead any concerns around safety that can be sorted before the job begins should be communicated with the client and taken care of before the job begins.
- For building areas, a Site-Specific Safety Plan may be needed. The SSSP is an agreement between businesses working on a specific site that determines how health and safety will be managed.
- Before the job is started, the flooring contractor (also a PCBU) or the flooring company's waged worker (not a PCBU) also has responsibilities.

- Communicate with other tradespeople onsite about anything that may not be safe.

2.3 RISK ASSESSING OVERVIEW

Two key changes in the Act that affects the flooring industry are around chemicals and dust; also monitoring workers' health. As an overview, the following procedure is a guiding framework to manage work risks.

Plan	Identify and assess anything that is dangerous.
Do	Use the following control system below to eliminate or minimise the risk.
Check	Monitor the control process, any forms, paper work completed to support the processes, keep a regular check that everything is going okay, including monitoring workers' health.
Act	Review for continuous improvement.

Adapted from the WorkSafe Model of Risk Assessing Overview

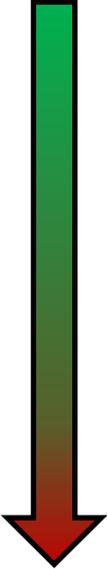
2.2 ARRIVING TO A FLOORING WORKSITE

- Report to the client/site foreman if onsite.
- Assess the worksite and be satisfied it is safe before starting any work.
- Complete where needed, a site assessment form (hard copy or electronic) to document that the assessment has been completed and anything that needs attending to has been done. **Digital apps available** can make this process very easy. <https://clockit.co.nz>

2.4 GENERAL RISK ASSESSING PROCEDURE

Adapted from the WorkSafe Model of Assessment Procedure

'If it is not possible to eliminate a risk, then you must work down the process of minimising the risks'

1. Eliminate		Completely removing from the work place, something that could be dangerous e.g. removing rubbish from a work area.
2. Minimize		If eliminating is not possible then work down the minimize controls.
Most Effective  Least Effective	Substitute	Substitutions of products e.g. change from a flammable/high toxic product to water-base/less toxic product.
	Isolate	Isolate the worksite e.g. barrier off, prevent people from coming into contact with a hazard; switch off pilot lights where necessary.
	Engineering	Physical controls such as modify tools or equipment e.g. protection guards on equipment, use vacuum systems for dust, ventilation systems for fumes, set up signage etc.
	Administrative controls	Organizing a job differently, make a change in a way a task is done, documentation, training, following company policies, hazard site assessment, plans and procedures for work e.g. cleaning machines/filters etc.
	Use personal protective equipment (PPE)	This is the last method for controlling hazardous situations after all of the other options are put in to place.

A risk assessing procedure will also need to be carried out where an unfinished jobsite is left over night and the customer/occupant is living in the dwelling.

The area must be made safe and the occupant consulted with on the controls that are put into place, plus any responsibilities the occupant needs to be aware of.

2.5 HEALTH AND SAFETY AT WORK (asbestos) REGULATIONS 2016

Asbestos in flooring can be found in older vinyl backings, vinyl tiles or old adhesives. The era of assuming asbestos in buildings or refurbishments is prior 1 January 2000 (**Duty 19** of the Health and Safety at Work (Asbestos) regulations 2016).

While the asbestos is bonded throughout the floor coverings (non-friable) it is in a safe state. When broken, or the vinyl wear layer is separated from the backing exposing the fibres it is in an unsafe state (friable).

Photo 1 the area and tools used could be now contaminated with asbestos fibres. This situation requires the immediate advice and services of an accredited asbestos-specialist.

Photo 2 is a close-up view of an asbestos-backed vinyl.

Photo 3 is vinyl tile that has asbestos as part of the whole tile, and possible asbestos fibres in the bitumen adhesive.

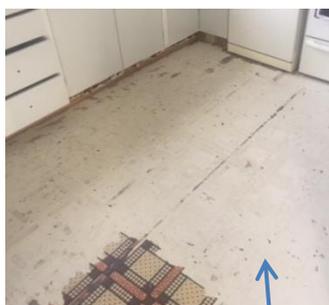


Photo 1
Vinyl wear layer
Asbestos contaminated backing beneath the wear layer.

Photo 2 Vinyl wear layer

Cardboard type backing
with asbestos fibres as
part of the make-up.

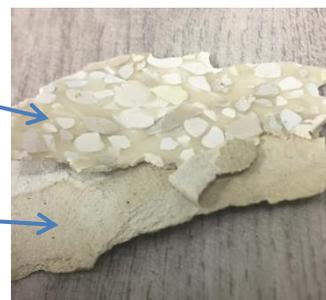


Photo 3 Vinyl asbestos tiles
Bitumen adhesive with asbestos
fibres.

See Worksafe Issues Inspectors Find on site presentation–
<https://www.youtube.com/watch?v=G4XvNPPzdQY>

For further information on Asbestos visit–
<https://worksafe.govt.nz/topic-and-industry/asbestos/>

<https://worksafe.govt.nz/topic-and-industry/asbestos/management-and-removal-of-asbestos/>

2.6

DUTY TO PREPARE AN ASBESTOS MANAGEMENT PLAN (AMP)

Due to previous floor coverings installed containing asbestos, flooring businesses are required to have an Asbestos Management Plan (AMP) in the workplace (**Duty 13** of the Health and Safety at Work (Asbestos) regulations 2016).

An Asbestos Management Plan sets out where any suspected asbestos or Asbestos-containing Material (ACM) is, plus the steps being taken to manage the asbestos and protect the health of building occupants (**Duty 10**).

If a flooring company has no intended involvement with removing or encapsulating floor coverings, an asbestos management plan should still be in place to ensure workers are aware of the asbestos material and any future contractors or maintenance workers don't accidentally disturb or abrade the material. Included should be a safe set of procedures and options to follow for typical flooring scenarios when contractors/workers discover suspected asbestos; in particular flooring materials hidden beneath floor coverings (**Duty 26**).

It is advisable to use the assistance of an accredited asbestos professional to develop an AMP that complies with the Asbestos regulations.

2.7

DUTY TO ENSURE ASBESTOS IS IDENTIFIED IN THE WORKPLACE

As part of the plan, a flooring business must provide **training in asbestos awareness** for their staff that provide flooring advice to potential customers, visit homes or buildings as part of their flooring work (**Duty 10, Duty 17, Duty 25**).

Potential customers should be advised that any existing floor coverings in dwellings prior 1 January 2000 may contain asbestos.

Any flooring workers that come across suspected asbestos when carrying out flooring work must '**STOP**' immediately and follow their company's asbestos workplace procedures.

It is not recommended by **Worksafe** or the **Ministry of Health** that a home owner/occupier removes asbestos containing flooring material. While home owner/occupier is not legislated by the Health and Safety at Work Act, there is a risk to:

- their own health;
- others in the house; also
- the flooring people who will be preparing the surface or installing the new floorcoverings.

The clean-up of a house that is contaminated with asbestos fibres is extremely expensive as all contaminated soft furnishings may need to be replaced.

Advice to the customer should be to engage the services of a **specialist in asbestos testing**.

2.8

DUTY TO CARRY OUT AIR MONITORING

Any work involving the removing of friable asbestos needs the services of a **Class A licenced operator (Duty 27)**. On completion a clearance inspection is required by an **independent asbestos assessor**, who will supply a clearance certificate (**Duty 41**). A clearance certificate that validates an asbestos removal activity can only be issued by a licenced assessor to a licenced removal contractor.

No future flooring work should start until the flooring company has been supplied with a copy of the clearance certificate (**Duty 42**).

For a private homeowner that has chosen to remove the asbestos themselves, (not

recommended) the private homeowner will need to provide evidence that an area is free of asbestos materials or airborne contamination. They will need to engage the services of an asbestos consultant/surveyor or accredited laboratory to produce a survey/inspection report.

The asbestos consultant will be able to visually identify any materials still present in an area/premise and also undertake air monitoring to quantify the level of any airborne asbestos fibres. The inspection report will not relate to any historical activities that have occurred, the report will simply be stating any observed materials or contamination on the day of the inspection.

Flooring businesses (Person conducting a business or undertaking - PCBU) must ensure, so far as is reasonably practicable, that the health and safety of their workers or contractors are not put at risk from work carried out as part of the conduct of the business or undertaking (**Duty 36** Health and Safety at Work Act 2015).

Confirming that any asbestos is present can only be identified by an **accredited asbestos laboratory** (**Duty 11**). Using any other means of testing is subject to a fine up to \$10,000.

2.9

ENCAPSULATING ASBESTOS BACKED FLOOR COVERINGS

For situations where it is not feasible or is difficult to remove the asbestos backed floor coverings, a procedure will need to be devised and included as part of the flooring companies [Asbestos Management Plan](#). The procedure will need to comply with the Asbestos regulations. This will include identifying if the work is [demolition, refurbishment or maintenance](#).

While **Duty27 (2,3)** makes provision for unlicensed work as Minor contamination, the criteria of trained by a 'Competent person'

applies and follows the **Worksafe** 'Approved Management and Removal Code of Practice'.

Examples that need a procedure as part of the Asbestos Management Plan.

Encapsulation - a timber substrate where the option is taken to overlay an asbestos contained vinyl floor covering with board underlay.

This option if considered should be part of the company's Asbestos Management Plan

Because the asbestos will remain in place beneath the new floorcoverings, a warning notice for people doing future flooring work is also recommended. This can be:

- placed on the existing floor covering; or
- a warning written in pencil on the board underlay. Pen or ink should not be used as it may show through a new vinyl floor covering at a later stage.



Sealing - where carpet is to be replaced or refitted over a suspected asbestos-backed floor covering and an installer finds an exposed damaged edge/doorway of the asbestos-backed vinyl. Asbestos-contaminated Dust or Debris (ACD) procedures should be put into place (from the Asbestos Management Plan) if sealing with an appropriate liquid is a feasible safe option for providing a protective coating to an exposed edge (**Duty 27 (3)** along with **Duty 17**).

Applying a cementitious compound as an underlayment over an exposed asbestos backing is **not** a safe option. This will disguise the problem and endanger any people that are involved with the future uplift or grinding of the cementitious surface.

HAZARDOUS PRODUCTS USED IN THE FLOORING INDUSTRY

Hazardous products used in the flooring industry contain hazard substances as part of their makeup.

WHAT IS A HAZARDOUS SUBSTANCE?

The hazardous substance criteria in the Health and Safety at Work Act 2015 is any substance that has the following properties:

'Explosiveness, Flammability, Capacity to oxidise, Corrosiveness, Toxicity or Eco Toxicity'.

WHAT IS A VOLATILE ORGANIC COMPOUND?

Most solvents used in flooring are Volatile Organic Compounds (VOC) that are refined from oil which is extracted from the earth. This type of oil originates from dead organisms deep beneath the earth's surface that have been subject to heat and pressure over many years.

ORGANIC SOLVENTS

Organic solvent-based adhesives have been one of the most common types of hazardous products used in the New Zealand flooring industry. Their main advantage over water-based adhesives is the solvent liquid that keeps the adhesive in a liquid state. This liquid evaporates quickly helping to speed up the installation. Solvents can evaporate in colder temperatures which is an advantage over water-based technology.

The main concern with solvent-based products is their potential to cause harm and damage to property. The immediate dangers of serious harm can be caused through high concentrations of fume inhalation or fire, plus the long-term effects which can have adverse effects on the body's organs. The brain is most likely to be affected by long term exposure. Symptoms can range with mood changes, memory problems, concentration difficulties, tiredness and weakness.

Solvent vapour is heavier than air so it stays low to the floor.

The solvent carbon properties are also not helpful to the environment.

MONITORING WORKER'S HEALTH

Safety around dust and chemicals is a key part of the Health and Safety at Work Act 2015.

The health monitoring of flooring workers that use solvent-based products or create dust in the work place is one control intended to keep workers safe. More information on this process can be found at Worksafe.

<https://worksafe.govt.nz/topic-and-industry/work-related-health/monitoring/health-monitoring-fs/>

An awareness of hazardous products used as part of the installation process is needed at both the initial pricing/planning stage and the installation stage.

All parties involved with the process of planning and installation have a duty of care to recognise whether any intended hazardous products to be used are suitable for the floor covering; plus, any impacts their use may have on the associated warranties for the floor covering.

Examples to identify and plan for when working with flammable or hazardous products

- Create a workplace procedure to put into place at the initial pricing and planning stage of an installation where flammable or hazardous products are intended to be used.
- Consider if the hazardous products can be substituted (wholly or partly) with non-Volatile Organic Products (VOC)
- All people in the flooring business who are part of the process that are involved with planning, pricing, storage and installation should be familiar with the appropriate Safety Data Sheet of the Flammable or Hazardous product information.
- A site assessment will need to be carried out to identify:
 - any possible sources of ignition during the installation; e.g. electrical appliances/equipment, pilot lights, heat guns, gas bottles;
 - areas with confined spaces or areas with lack of ventilation;
 - how the area will be ventilated; and
 - how to notify and keep people/pets away from the affected areas until it is safe to return to the area.

Using the gathered site assessment information, a plan will need to be formulated and put into place to carry out the work.

HEADS UP ARTICLE FROM A FIRE RESEARCH & INVESTIGATION

Issue 16 - Vapour explosions during flooring preparation
Released 10th January 2014

Fire Research & Investigation Unit

Heads Up



PRODUCT WARNINGS

All warnings on appliances and the adhesive containers need to be read and understood prior to opening the adhesive.



Warning label on gas heated hot water cylinder.



Typical warning label on drum of adhesive.



Use extreme caution when using naked flames.

LESSONS LEARNED/RECOMMENDATIONS

- prior to opening any container of adhesive with a red 'diamond label' users should ensure that there are no flames or other likely ignition sources in the vicinity
- ask the client if there are any gas fuelled appliances in cupboards or near the room. Remember, some gas appliances have pilot flames while other use electrical ignition. Both systems may ignite flammable vapours. Walk around the building to see if there is a gas meter
- do not operate electrical appliances or flame producing equipment or restore power to the room until the area is adequately ventilated.

Adapted from the WorkSafe Model of Assessment Procedure

‘Before starting work using organic solvents, PCBUs must complete a risk assessment and review their controls’

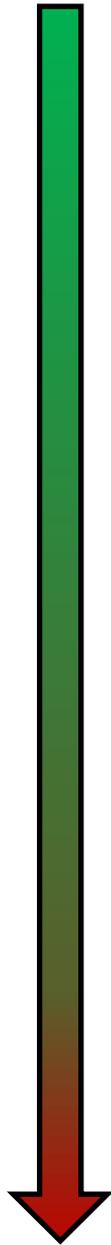
1. Eliminate

Plan work so no flammable or hazardous substance is used as part of the installation.

2. Minimize

‘If eliminating is not possible then work the minimizing controls’

Most Effective



Substitute

Substitutions (wholly or partly) of products/equipment. Two common flooring industry examples could be changing from a flammable/high toxic product to water-base/less toxic product, or substitute gas bottles with heat guns where it is appropriate.
‘If risk remains’

Isolate

Isolate the worksite e.g., barrier/close off areas to prevent people from coming into contact with hazardous fumes. Investigate any source of ignition.
Examples being gas bottles, heat guns, vacuum cleaners (tools/equipment with an electric motor) and pilot lights/electronic devices that are used for gas fuelled appliances i.e., water heaters.

Engineering

Physical or mechanical controls e.g., ventilation, purpose designed extraction fans (that are not a source of ignition) to remove fumes, open doors and windows.

Administrative controls

Work practices. Before starting work, carry out a site assessment. Identify work to be done in confined spaces or large spaces with lack of ventilation, identify pilot lights or possible sources of ignition (including gas bottles and heat guns). Other people/pets are cleared from the workspace until it is safe to re-enter.
Organise the job appropriate to the situation. For example, make a change in a way a task is done, plan for two people to work on the job, set up signage.
Companies are required to have policies in place for this type work. Flooring staff and contractors should be familiar with, and follow company policies. SDS information needs to be readily available and the users/handlers are familiar with the information that is appropriate to the situation.

Use personal protective equipment (PPE)

This is the last method to use as part of controlling hazardous situations after the above controls have been applied.
Respiratory masks should be suitable for the substance and situation. They need to be regularly cleaned; filters changed and are stored in a closed container.
The face needs to be clean shaven to provide a seal with the mask that prevents fumes entering through the side.

Least Effective

SILICA DUST

Respirable Crystalline Silica dust - silica is naturally found in concrete (stone and sand) which is known to cause cancer. Silica dust is created when cut, ground drilled, sanded or polished. The particles are extremely small; they can't always be seen to the naked eye.

Industrial vacuums rated for use with hazardous dusts are classed as:

- L - dust representing a Low risk,
- M - dust representing a Medium risk; or
- H - dust representing High risk

H does not mean Hepa filter. HEPA stands for "high-efficiency particulate air" (filter). They are a mat of randomly arranged synthetic fibres that are able to capture extremely fine particles.

H-class vacuum cleaners should be used for Respirable Crystalline Silica dust. Workers should not use a house hold vacuum cleaner or classes L or M to remove silica dust.

The same organic risk assessing procedure on the previous page should be used to put controls in place to stay safe when exposed to silica dust while grinding concrete.

MINIMISING CONTROLS

Isolate - the area/s to reduce risk.

- Cordon off the area to prevent unnecessary dust exposure to others.

Engineering controls - physical or mechanical controls to reduce risk.

- Use machinery and vacuum systems that are suitable for the work and the size of the area.
- Appropriate dust shrouds and set ups on the grinding machines.
- Grinding segments/cups are suitable for the work to be done—as not to create more dust than necessary.
- Vacuum filters are checked for damage and changed as required.

- Vacuum filters are changed at time-based intervals as per the manufacturer's instructions.

Administration controls - work practices to reduce risk. Plan how the work is best done to reduce risk of dust contamination. Some examples of what this may include are.

- Prechecking the site conditions to confirm that the work can be carried out safely prior to starting.
- Prechecking the equipment is set up correctly e.g., hose connections secured and not leaking, the shroud set up allows for maximum dust collection.
- Avoid brooming and use a suitable vacuum where possible to minimise airborne dust.
- Cleaning down the equipment, where any dust containment bags can be safely disposed. Use a damp cloth to clean the dust off the outside of the vacuum, and any parts that can be accessed.
- Dispose of any dust containment bags and contaminated damp cloths appropriately by using tightly sealed bags or containers.

For a more thorough clean, using another industrial vacuum cleaner is an option. Use only this method if the other vacuum cleaner is rated at the same class, or higher.

Dry brushing or using compressed air should never be used to clean vacuums. These methods cause hazardous dust to spread and become airborne. Compressed air can also damage filters, which means they may not work properly.

Personal Protective Equipment (PPE) - the last line of protection for controlling Silica dust.

- Use correctly rated PPE gear that is designed specifically for the environment, conditions and work that you will be performing.

As silica dust particles are very small, the respiratory protection must be appropriate. Respiratory masks should:

- be rated for the type of concrete or other substrate abrasive/grinding work to be done;
- properly fit the person using it and have a full seal to the face; and
- be used only used with filters that are within the service life of the mask.

2.12 CONSUMERS GUARANTEES ACT 1993

To provide consumers with realistic expectations, floor coverings or associated products sold to the consumer must be appropriate to the situation. Both customer and site information gathered in the planning process should be used to match both an appropriate floor covering and the installation materials for the environment it is going in to.

In areas where the likes of heat, ultra violet light (UV), water or moisture will affect the performance of a floor covering, the appropriate adhesive, moisture control system and any surface preparation systems should be used in accordance to manufacturer's specifications.

The Consumer Guarantees Act gives consumers rights if the floor coverings (products) or installation (service) does not meet guarantees that are set out in the Act.

Floor coverings should be of acceptable quality (durable, safe, fit for purpose, free from defects, acceptable in look or finish) and the installation carried out with reasonable care and skill.

More advice

<https://www.consumerprotection.govt.nz/contact-us/>

2.13

CONTRACTING OUT OF THE CGA

A retailer or supplier cannot state the CGA does not apply (contracting out of their obligations). The only exception to this is where products or services are acquired for a business purpose and:

- you as the buyer and the seller are in trade and agree to this;
- the agreement is in writing; and
- it is fair and reasonable to do so.

A business who tries to contract out of the Act in any other circumstances commits an offence under the Fair Trading Act.

More advice

<https://www.consumerprotection.govt.nz/contact-us/>

3

MEETING THE CUSTOMER EXPECTATIONS OF A RESILIENT FLOOR COVERING

IN THIS SECTION

- 3.1 The starting point
- 3.2 The site environment
- 3.3 Future care and maintenance

3.1 THE STARTING POINT

What does the customer expect from their floor?

Providing the customer with realistic expectations starts with the sales person.

While colour, design and price are at the forefront of a customer's mind, there are also three other key areas that need to be taken into account at the point of sale or specification.

1. The environment the floor covering is going in to.
 - The sales person has a duty of care to propose a floor covering that is fit for purpose to the environment, plus the usage requirements.
2. The installation process.
 - The installer has a duty of care to carry out the installation in accordance to manufacturers' recommendations and Industry Standards; including manufacturers' recommendations for materials that are part of the installation process.
3. The ongoing care and maintenance for the floor covering.
 - The customer or end-user has a duty of care to carry out the recommended ongoing care and maintenance procedures for the floor covering so the floor covering remains fit for purpose over its life span.
 - To allow the customer to take the appropriate actions, the reseller either wholesaler or retailer has a responsibility to pass on the information and ensure it is understood.

3.2 THE SITE ENVIRONMENT

Examples of situations to consider when choosing floor coverings and providing care and maintenance information.

- Changes in temperature.
- Extreme heat, UV light through windows or opened doors.
- Holiday homes locked up for periods of time without adequate ventilation.
- Pets - claws, water splash from pet bowls.
- Water splash from taps, bath and shower.
- Type of floor or wheel traffic - staining from rubber.
- The condition of the substrate.
- Site conditions at the time of installation.

See the previous section on **Site conditions**

1.1

1.2

Planning of the installation so the site environment, (particularly temperature) meets the installation criteria for vinyl planks/tiles

Room temperature - is relative to the specifications for the resilient planks/tiles which will be from the acclimatisation stage through to the adhesive setting time frame.

Starting point - the area or part of a room that the installation will start from will be determined by the plank/tile set up. The starting point should not be compromised or influenced by other trades that need to work in the area. The installer should be totally satisfied that the start point will give the best standard of finish.

Clear areas - during the installation the areas should be clear of other people until the adhesive sets. Any scaffolding or ladder work should be completed before the tiles are installed.

See section on **Site conditions**.

3.3 FUTURE CARE AND MAINTENANCE

Future care and maintenance falls into three categories.

1. Preventative maintenance - measures taken to avoid damage.
2. Regular maintenance - regular vacuuming, spot cleaning and washing.
3. Periodic maintenance - involves a more in-depth clean over a longer period.

Good care and maintenance guidelines are available on manufacturer and retail outlets websites.

1. PREVENTATIVE MAINTENANCE

Providing the owner/occupier with care and maintenance information is an essential part of the process. It helps to prevent unnecessary damage after installation.

For examples, information provided on chair protector pads, not dragging furniture across the floor; walk off mats outside of the area to prevent fade marks or staining on the floor covering, clean up any spills immediately, water spillage seeping under pet bowls on a resilient tile floor covering.

Any other finishing trades that need to work on the new floor covering after the installation should be made aware of keeping the new floor clean of their tools, chemicals or nails/screws. Anything hard or sharp left on a resilient floor covering can damage the surface if it is walked on.

UV protection - windows with no UV protection or doors left open at the heat of the day for long periods will expose vinyl directly to the UV rays (direct sunlight). Overtime this can result in fading or damage to resilient floor coverings.

Examples of preventative measures used in areas that are exposed to direct sunlight are curtains, blinds, window tinting, awnings, keeping outside doors closed to direct sunlight at the heat of the day.

Lift furniture when moving it about; do not drag it over a resilient floorcovering. For heavy furniture or whiteware place a board and carefully walk or wheel over.

Plane the bottom of doors if they are touching the surface. Opening and closing doors will scratch a resilient floor covering surface.

Humidity control - regularly airing or humidity control is essential to prevent mould growth or

moisture-related issues or tile contraction where a house is locked up creating an extremely dry environment (low humidity).

Check edge sealants to critical areas such as in front of shower doors or baths for mould or damage.

2. REGULAR MAINTENANCE

Cleaning products used should be taken from the maintenance recommendations specific for the floor covering. Using cleaning products with high pH levels, oil or solvent based cleaners may damage the surface of the floor covering.

Any cleaning residue must be washed off with clean water. If it is not removed the residue will build up over time creating a soiled appearance.

Soil build-up over time

Newly cleaned



Steam mops are generally not recommended, particularly for tiles/planks as the steam may cause damage if it protrudes the wear layer at the tile edge.

2. PERIODIC MAINTENANCE

Vinyls that have a slightly textured surface for slip resistance, or the pattern may imitate a timber or tile surface might involve a periodic scrub with a soft brush to remove any soiling that may start to build up.

Replace any damaged edge sealant to critical areas such as in front of shower doors or baths.

Stripping agents, sealers, dressings or polish should only be used if recommended in the Care and Maintenance Information supplied by the floor covering manufacturer.

4

TIMBER FLOOR PREPARATION

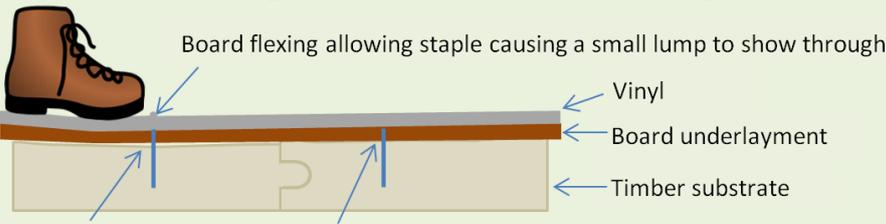
IN THIS SECTION

- 4.1 Tongue and groove substrate
- 4.2 Board underlayment
- 4.3 Sanitary areas - refer to Section 9.13
- 4.4 Timber sheet subfloors
- 4.5 New timber sheet subfloors
- 4.6 Existing timber sheet subfloors
- 4.7 Repairs to water damaged timber subfloors

4.1 TONGUE AND GROOVE TIMBER SUBFLOOR

When organising or preparing a tongue and groove subfloor for a resilient floor covering, the five key areas below can be used to work through and identify what is needed to appropriately prepare the surface.



<p>1) Clean</p>	<p>Any adhesive or tacky adhesive residue should be mechanically removed to prevent any clicking noises that may be heard when the finished floor is walked across.</p>
<p>2) Sound</p>	<p>Any loose, rotten, springy boards repaired so the board stays securely fixed and any staples will not work loose and show through the finished floor.</p> <p>Any soft cushioned back vinyl should be removed to prevent the board flexing and working loose around the staples.</p>
<p>3) Flat (Plane)</p>	<p>Sand/grind flat to prevent movement that would cause the board to flex and work loose around the staples. If this happens the staple causes a pimple affect that shows through the vinyl surface. See the following illustration.</p> 
<p>4) Smooth</p>	<p>To help the board to remain securely fixed and prevent staple popping.</p>
<p>5) Dry</p>	<p>A moisture content reading that is in excess of 15% may indicate a moisture problem beneath the floor. For example, there may be problems around lack of effective subfloor ventilation, blocked vents, leaking pipes, irrigation systems, water from drainage or hill run off. If there are any concerns around the dampness of a timber subfloor, the client must be notified so the problem can be looked at and fixed by the appropriate trade.</p> <p>When the problem is fixed, no work should start until moisture tests have been taken to make sure any new or existing timber is sufficiently dry.</p> <p>Timber takes a considerable amount of time to dry when flooded or it has been dampened by moisture. The meter type used to provide an acceptable test before a board underlayment is installed is a resistance meter; also known as a pin test.</p> 

4.2 BOARD UNDERLAYMENT

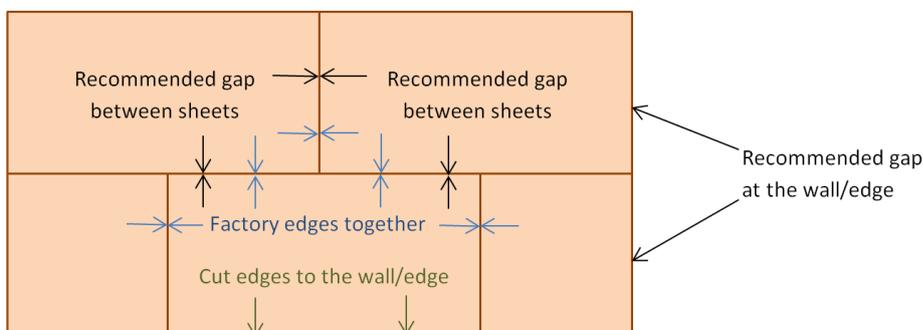
Board underlayment used for flooring must be fit for purpose in both type and thickness as recommended by the board manufacturer or supplier. Oil tempered hard board is not a suitable option for a board underlayment as it may react with the adhesive or the vinyl backing causing the adhesive to fail or staining in the vinyl.

Any board underlayment with timber content is affected by moisture or changes in climatic conditions. When used in areas of humidity or bathroom areas (sanitary areas), only recommended flooring grade board underlayment for these areas should be used.

- Expansion gaps between board sheets and skirting/edges should be as recommended for the board underlayment type to allow any movement with climatic changes.

In general, there should only be a slight gap at the edges for the installation of resilient floor coverings. While manufacturers may provide an overall maximum gap size at the edge, consider the size of the area as the expansion will be relative to the size of the area.

- The factory edges are used at the board underlayment joints.
- Sheet join position in terms of staggering should be followed to provide stability at the joint ends.



- A stapling test area should be first carried out so the air pressure can be adjusted.

The staple/nail heads should go in just below the surface of the underlayment; as a guide the thickness of a utility knife blade.

- If a staple has not gone in securely, or has gone in too far, then another staple should be placed close to the insecure staple.
- While stapling sequence is relevant to the board type, consideration to the tongue and groove substrate condition is also important. If the installer's judgement is that more staples are needed then the sequence of 100 mm centres, 25mm spacing at the board edges and 10mm in from the board edge can be applied.
- On completion staples should be checked that they do not protrude, or have gone too far into the board.
- Staples used are coating (corrosion) protected 22mm resin coated staples, or 25mm x 2.5mm head ring grooved buttress type underlay nails.
- Using adhesive with stapling is appropriate to the situation and should be in accordance with the board supplier specifications. If adhesive is not used the flooring business must be totally satisfied that the installation will be fit for purpose and provide the necessary warranty.

4.3 SANITARY AREAS

Refer to section **9.13**

INSTALLING RESILIENT FLOOR COVERINGS TO SANITARY AREAS

4.4 TIMBER SHEET SUBFLOORS

Timber sheet board used as a timber subfloor are a make of chips, flakes or plies of dried timber that are compressed and bonded together with a mixture of resins, waxes and or adhesives.



Particleboard



Strandboard



Plywood

Because timber sheets are made up of timber, the rules of movement caused through high or low moisture content still apply. How much movement will be dependent on the levels of moisture exposure and also the construction method of the timber sheet.

4.5 NEW TIMBER SHEET SUBFLOORS

Best practice techniques to prepare new Timber sheet boards for resilient floor coverings.

- Fit an approved flooring board underlayment (minimum 4.75mm) by fixing with adhesive and staple. If adhesive is not used the flooring business must be totally satisfied that the installation will be fit for purpose and provide the necessary warranty.
- An approved cementitious reinforced fibre type applied compound. Minimum thickness specified by the manufacturer.

The flooring business must be totally satisfied that the timber sheet is soundly fixed and within the moisture content tolerance of the manufacturer's specifications before proceeding.

Part of the process should include information provided from the builder regarding drying time allowance and any moisture readings for the joist's pre-timber sheet installation.

When organising or preparing a new timber sheet substrate for a resilient floor covering, the five key areas on the following page can be used to work through and identify what is needed to appropriately prepare the surface.

1) Clean	Mechanically clean the surface to remove all surface contaminants—any weathering or paint residue; anything that would affect the bond of an adhesive or an applied cementitious compound.
2) Sound	<p>If there are obvious signs of any squeaking or movement of the timber sheet, the screws or nails may need retightening if the joists/timber sheet have shrunk while drying out.</p> <p>This is part of the building process so should be raised with the builder/client. Before a builder fixes the timber sheet board, the joists should have a moisture content of less than 18% MC.</p> <p>If a timber sheet is fitted on joists with raised moisture content, then any shrinkage that occurs as it dries may cause movement at the joins and fixings of the timber sheet.</p> <p>Timber sheet board nail/screw fixings showing through a vinyl that has been installed directly to a timber sheet board. Reasons for fixings showing through are:</p> <ol style="list-style-type: none"> 1. Joists drying out over time. 2. The new timber sheet will shrink as it acclimatises to the new dryer environment causing timber shrinkage around the fixings. 3. Filler not shrinking with the timber sheet can add to the problem.
3) Flat (Plane)	A straightedge can be used to identify any sagging in the centre of a timber sheet. The preparation method chosen should provide a surface that is within the tolerance for the floor covering.
4) Smooth	The sanding or grinding process leaves the surface in a smooth condition to ensure the board can be securely fixed or is suitable for the applied compound option.
5) Dry	<p>Moisture testing structural sheet boards provides an indicator of moisture content (MC), not a true MC. The pin test works on moisture resistance between the pins. The resin or adhesive that is part of the board construction can interfere with the accuracy of the result; therefore, is not the exact true MC.</p> <p>Readings up to and over 15% MC would indicate issues and further investigation will be needed to identify the problem to avoid floor covering issues that may occur at a later date. For example, a building that will be locked up for long periods without ventilation and is exposed to high temperatures can dry the board down to 10% MC causing timber shrinkage/movement.</p> <p>In this situation more time for the sheet board to acclimatise and dry will be needed before installing the floor coverings.</p>



4.6 EXISTING TIMBER SHEET SUBFLOORS

Best practice techniques to prepare existing timber sheet boards for resilient floor coverings are the same for new timber sheet board.

- Fit an approved flooring board underlayment (minimum 4.75mm) by fixing with adhesive and staple. If adhesive is not used the flooring business must be totally satisfied that the installation will be fit for purpose and provide the necessary warranty.
- An approved cementitious reinforced fibre type applied compound. Minimum thickness specified by manufacturer.

The flooring business must be totally satisfied that the timber sheet is soundly fixed and within the moisture content tolerance of the manufacturer's specifications before proceeding.

'Installing over existing timber sheet board'

The option to install directly to an existing timber board would involve the flooring contractor being totally satisfied that the system used is fit for purpose and therefore warrantable. For example, small domestic areas kitchens, toilets and bathrooms where the house has stabilised over years and the temperature will remain relatively constant.

When organising or preparing an existing timber sheet substrate for a resilient floor covering, the five key areas below can be used to work through and identify what is needed to appropriately prepare the surface.

1) Clean	Mechanically clean the surface to remove all surface contaminants—any weathering or existing adhesive; anything that would affect the bond of an adhesive or an applied cementitious compound. A thorough examination to make sure there are no traces of oil or old rubber underlay residue. Any oil or rubber residue in a board can migrate to the surface and react with the PVC backing and result in adhesive breakdown or yellow staining. Heat or sunlight will accelerate this process.
2) Sound	The screws and nails tightened or new screws inserted where needed. Any areas of the board repaired that may have been affected by moisture.
3) Flat (Plane)	A straightedge can be used to identify any sagging in the centre of a structural sheet. The preparation method chosen should provide a surface that is within the tolerance for the floor covering.
4) Smooth	<p>The sanding or grinding process leaves the surface in a smooth condition. Sealing the surface is a critical part of the process as structural sheet board is often made up of wax and resins or treatment chemicals. A fine smoothing cementitious compound fit for purpose is applied over the surface to act as a sealer and smooth out any grinding or sanding marks.</p> <p>The installer must be totally satisfied the sealer whether liquid or cementitious is appropriate to the situation.</p> <p>'If in doubt check it out' contact the supplier and trial an area first.</p> <p>In some circumstances manufacturers may recommend priming the surface prior to applying the smoothing compound, or mix with a specified emulsion instead of water.</p>
5) Dry	Refer to 5) Dry in previous section 4.6



REPAIRS TO WATER DAMAGED TIMBER SUBFLOORS

Any repairs to a timber subfloor as a result of a flood or water damage will need the joists to be moisture tested; including new joists. Moisture in timber takes considerable time to dry. If the joists are not sufficiently dry, shrinkage will cause movement of the timber sheet. Screw/nail holes may protrude and show through the resilient floor covering.

Recommended procedure for repairing flood damaged timber subfloors

- ✓ Engage a builder to check the structure and joists for saturation and carry out a moisture pin test.
- ✓ The customer should be made aware of the time needed to allow for drying. Being a natural product timber can take a very long time to dry due to its cell/wall structure.
- ✓ Remove the existing floor covering and allow time to dry. A builder may need to remove some of the subfloor to allow airflow to dry out the structure.
- ✓ Before any timber sheet board or floor boards are refitted or replaced, a moisture pin test should be recorded of the timber structure by the builder.
- ✓ Before organising the installation carry out a moisture pin test to verify the timber sheet is sufficiently dry. The reading should not only be beneath 15% MC, it should read within 2% MC of the dry areas close by to the affected area.

5

CONCRETE FLOOR PREPARTION

IN THIS SECTION

- 5.1 Preparation for concrete surfaces
- 5.2 Acceptable methods of moisture testing concrete
- 5.3 Moisture control systems

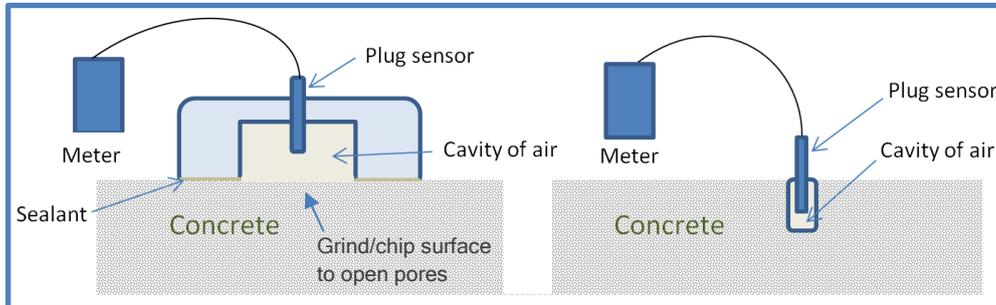
5.1 PREPARATION FOR CONCRETE SURFACES

When organising or preparing a concrete surface for a resilient floor covering, the five key areas below can be used to work through and identify what is needed to appropriately prepare the surface.

1) Clean	The surface must be mechanically cleaned to remove all surface contaminants—traces of existing adhesive, dust, paint, wax, oil, old rubber underlay residue or grease residue, bond breakers or curing compounds. If any remaining oil or rubber residue is able to migrate to the surface, it may react with the PVC backing of the installed vinyl flooring—resulting in adhesive breakdown or yellow staining. Heat or sunlight will accelerate this process. Remove/clean out thoroughly any existing synthetic type jointing compound that could create a stain from the back of the vinyl through to the surface. ‘If in doubt, check it out’. Replace with a recommended epoxy or cementitious compound that is suitable for flooring products to install over.
2) Sound	The surface should be solid, not loose, powdery or efflorescent emerging.
3) Flat (Plane)	The flatness of a surface can be determined with a metal straightedge. The tolerance for how flat or plane a surface should be is governed by the tolerance specified by the floor covering manufacturer. If there is no reference given for the floor covering then refer to tolerances set in NZS AS 1884:2013 .
<p>For the concrete industry NZS 3114:1987 Finishing Concrete Surfaces governs the finishing tolerance for a concrete placer who finishes the concrete surface. The finish is generally specified as an unformed (U) finish using a steel trowel blade (U3). A formed finished is created in a mould.</p> <p>The concrete surface finish tolerance set for a U3 finish are gaps no more than 5mm beneath a 3m straightedge that has been placed on the surface. Where the floor has a thin sheet or tile flooring specified, a 3mm over 3m maximum applies. The 3mm over 3m tolerance is extremely difficult to consistently achieve from a practical sense when placing concrete. In most cases further remedial work will be required to meet the acceptable tolerance for the floor covering. Recommendations and accurate pricing for remedial work is best achieved at a site inspection prior to the installation.</p>	
4) Smooth	<p>The surface should be smooth with no ridges that can be felt when a hand is run over it. A new concrete surface finished to the concrete standard NZS 3114:1987 U3 finish is 0mm over a 200mm straightedge.</p> <p>As preparation, a new concrete surface will need to be mechanically abraded to open the pores. A steel trowelled finish can produce a very smooth shiny surface that has little porosity. This can affect the bond of flooring water-based adhesives which need a level of porosity to allow the water to disperse (move) out of the adhesive.</p>
5) Dry	As well as no visible signs of dampness on the surface, the slab should also be dry in terms of any excess moisture that is in the slab which may cause a flooring failure.
<p>Some of the typical signs of flooring failures caused by excess moisture are vinyl bubbling, swelling, adhesive breakdown, vinyl surface discolouring, resurfacing compound swelling or breaking down, toe spaces/skirting swelling causing vinyl to bubble at the edges.</p> <p>A consequence of high moisture levels in concrete relate to high pH levels in concrete which can also cause adhesive failure. This type of failure may not occur until several months or more after the installation.</p> <p>In flooring terms, the measurement of dryness for a concrete floor is taken as the partial pressure of invisible water vapour (humidity) that is rising to the surface of a concrete floor; not how much moisture is in the concrete (moisture content) these are two different things. The humidity is measured as a mixture of moisture vapour and air and is also relative to the temperature as water vapour condenses when the temperature lowers. It is recorded in a percentage form as relative humidity (RH).</p>	

5.2 ACCEPTABLE METHODS OF MOISTURE TESTING CONCRETE

While acceptable tests in [NZS AS 1884:2013](#) are either a 24 hour hood test (surface mount) or a drill and plug test, the most accurate test is the drill and plug test. The hygrometer test involves taking a relative humidity percentage reading from a sealed cavity where the moisture in the slab moves up as it equalises with the above environment over a 24-hour period.



1. Hood test - a casing sealed to the concrete surface. A plug inserted into a cavity of air that is readable by a digital meter.

2. Drill and plug - a sleeve inserted into the concrete surface. A plug inserted into a cavity of air in a sleeve that is readable by a digital meter. Plugs can be fitted after the drilled hole has cooled from the friction of the drill bit,

Other devices such as the electrical capacitor test may provide an instant result, however it is not a recognised test. It is useful as an indicative test to find a place to take a hygrometer test. A good example is a concrete floor pod system where the total depth between pods and the concrete floor topping total to 300mm.



3. Concrete floor pod system.



4. Capacitance test - instant reading that can be used to find the dampest part of the floor to perform a hygrometer test. It is useful to help find the deep concrete between pods.

Both Hygrometer tests are a process of measuring moisture vapour in a small parcel of air. While both methods are acceptable in [NZS AS 1884:2013](#), they will produce slightly different readings. The drill in plug reading below the surface will provide a slightly higher reading due to lower slab temperature deeper in the concrete.

The drill and plug test is the more accurate and recent technology to use. The surface mount test may be a more preferable method in situations where drilling into a concrete floor provides risk to underfloor heating systems.

The procedure for moisture testing is set out in [NZS AS 1884:2013](#).

While many worldwide resilient floor covering manufacturers still recognise 75% RH as the limit for resilient floor coverings, there has been a shift above this level by some manufacturers.

The 75% limit is still used in:

- E2/AS1 Clause 10.2 of the NZ Building code acceptable solution;
- Concrete NZ - Code of Practice for Weathertight Concrete and Concrete Masonry Construction; also
- NZS AS 1884:2013.

See section 5.3 for using moisture control systems.

5.3

With the development of adhesives that are rated over 75%RH, it is important to fully understand the limitations and conditions of use for these adhesives.

High pH levels of new concrete are often related with high RH levels, therefore manufacturer information about pH levels for the adhesives, or any cementitious compounds including the floor covering manufacturer should be referred to in the respective technical data sheets.

Common reasons for a concrete floor to exceed recommended RH levels

- The moisture has not had sufficient time to leave the slab. Not enough time allowed between the close in stage of a building and the timing of the flooring installation.
- A curing compound (retarding the moisture evaporation from the slab) has been applied at time of concrete placement.
- Moisture penetrating through the concrete slab from another source. For example, water run-off from a hill into the side of the concrete foundation (hydrostatic pressure), water from gardens next to a concrete foundation.
- A damaged plastic vapour membrane that is beneath the concrete slab.
- An older slab that may have no plastic vapour membrane beneath the concrete slab.
- Leaking heating pipes in a concrete floor.

At the initial planning stage of any resilient flooring installation, the client/builder should be made aware of any concerns and potential problems associated with high moisture readings by the flooring company.

Unacceptable methods of moisture testing concrete floors

1. While it may be a rule of thumb guide, it is a very high risk to rely on the belief that every concrete slab will be dry after allowing 25mm per month (from building has been closed in).
2. A plastic sheet taped to the floor.
3. Capacitance test—an indicative test to determine where to perform a recognised test.

These are not recognised tests and do not produce definitive results; plus, do not allow for any additives or curing compounds that may have been used in or on the concrete.

Likewise, the curing time of the concrete (time taken to harden) is not an indication that the concrete is sufficiently dry for the safe installation of resilient floor coverings.

MOISTURE CONTROL SYSTEMS

A moisture control system in flooring terms, refers to the different systems available for controlling moisture. The purpose for using a system needs to be first established. Is it needed to protect the building from top-down moisture damage—or protect the floor covering through rising moisture from the subfloor, or both.

Choosing a moisture control system should be looked at as an entire process from the concrete slab through to the finished floor covering installation.

The best time to plan for a floor covering type and the time of installation is at the building design stage. Two major factors to plan for together are environmental conditions and product systems:

1. Environmental conditions - the natural slow drying rate of concrete, particularly in the winter months.

Floor coverings and associated installation/preparation applied products, including some moisture control systems require:

- maximum slab RH readings before applying a system or installing floor coverings; and
- minimum concrete slab and air temperatures on site at the time of installation.

Favourable onsite environmental conditions are needed to allow the chemical process for applied products to work as designed by the product manufacturer. If products are used outside of their limitations and not able to work as designed, then the risk of failure occurring either immediately or long term can be an expensive outcome.

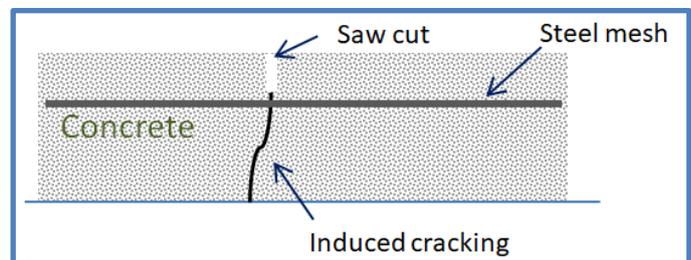
2. Product systems - key considerations to take into account with specifying systems are:

- The maximum RH levels of a concrete slab required for the products (including moisture control systems).

- The minimum temperature application/installation requirements for the products.
- Compatibility or use with underfloor heating systems.
- The floor covering type.
- The areas the floor coverings will be installed in to.
- The methods and/or curing products used at the time of concrete placing.

To assist specifiers and product users to choose an appropriate system, the product information (e.g. moisture control products, primers, levelling compounds, adhesives) should align with the involved manufacturer/suppliers—including any floor covering supplier guidelines.

Moisture will always find its way to the easiest path of least resistance. Consideration should also be given to moisture control systems regarding their effectiveness at the control /contraction joints that control concrete shrinkage as the water evaporates during the curing process.



The flooring business pricing and planning the installation must be satisfied the system is fit for the situation. Information from the moisture control system supplier regarding the system should be followed strictly, particularly with any additional products that are needed to treat control joints before the moisture system is applied.

The flooring business must be satisfied that the system will allow for warranties to be provided to the client that the installation will meet the fit for purpose criteria; including any associated resurfacing compounds and adhesives used for the installation process.

Where a client or builder is organising the application of a moisture control system, the flooring business should be supplied with proof in writing that the system has been applied by an approved applicator under the conditions set out by the manufacturer or supplier of the system; plus, it is compatible with the floor covering to be installed and the associated resurfacing compounds and adhesives used.

For future reference should it be needed, the flooring contractor and system provider should have clear easily available records of the products used and job information; including where necessary the training details provided for the applicator.

The moisture control system that is to be used should be included in a quotation for the work along with the warranties which meet the fit for purpose criteria in a domestic situation and any contractual agreements for a commercial installation.

The applicator has a duty of care to familiarise themselves with the system and ensure that all the manufacturer instructions are carried out.

Internal leaks - accidental overflow, leaks or floods are not an everyday occurrence, they are an event. As an example, water leaking within an internal wall cavity or cabinetry space can penetrate the bottom plate or toe space. It can also further penetrate the substrate and travel horizontally, damaging the floor covering or other rooms in the building. This situation is beyond the limitations of the floor covering or moisture control system where used.



Leak in an internal wall lining caused by a faulty connection in a new toilet cistern.



Damage caused 2 metres away from the source of the leak in another room.

6

PREPARATION FOR A JOINT CONCRETE/TIMBER SUBSTRATES

IN THIS SECTION

6.1 Joint concrete/timber substrate site assessment

6.1 JOINT CONCRETE/TIMBER SUBSTRATE SITE ASSESSMENT

Two substrates that are made up of different compositions will react differently to heat, moisture (climatic conditions) or seismic movement. This joint will more often than not be noticeable through a resilient floor covering even if it is covered with a board underlayment or a cementitious resurfacing compound.

These situations are better suited to a floating floor covering that will allow movement beneath it.

1) Clean	Remove all surface contaminants—any adhesive or tacky adhesive residue must be mechanically removed to prevent any clicking noises that may be heard when the finished floor is walked across
2) Sound	Along with any loose, rotten, springy boards, check for flexing and secureness along the joint between the timber and concrete. This is the weakest point which can move under load, heat, moisture or seismic movement.
3) Flat (Plane)	The flatness of a surface can be measured with a metal straight edge. The tolerance for how flat or plane a surface should be is governed by the tolerance specified by the floor covering manufacturer. If there is no reference given for the floor covering then refer to tolerances set in NZS AS 1884:2013 .
4) Smooth	The surface should be smooth with no ridges that can be felt when a hand is run over it. For floating floors that have no underlay or slip sheet, the surface must be consistently smooth across the whole area to allow the floor covering to move across it.
5) Dry	<p>These types of substrates can be deceptive. While the surface of these substrates may appear dry, it is after installation of resilient floor coverings when any potential moisture can be drawn to surface causing swelling and bubbling of the floor covering.</p> <p>This can be caused by the concrete slab blocking off the cross-flow ventilation. The result creating moisture build-up beneath the building. Also, if the concrete slab section does not have a vapour membrane, then ground moisture may also be absorbed through the slab.</p> <p>Both substrates should be moisture tested at the early planning stages of an installation. If there are any concerns advise the client to engage a builder or engineer with expertise in this area to report on the timber substrate ventilation and if needed provide adequate subfloor ventilation.</p>

7

INSTALLING RESILIENT TILES AND PLANKS

IN THIS SECTION

- 7.1 Installation guidelines for resilient tiles/planks
- 7.2 Acclimatising tiles/planks
- 7.3 Shuffling tiles/planks
- 7.4 Underfloor heating
- 7.5 Temperature for the process
- 7.6 Resilient plank set out
- 7.7 Resilient tile set out
- 7.8 Forming a set out line
- 7.9 Forming a right angle
- 7.10 Forming a square set out line on a floor
- 7.11 Tile step out

7.1

INSTALLATION GUIDELINES FOR RESILIENT TILES

The term resilient tiles in this section may include luxury vinyl tiles, planks (dry back), Hybrid (click), vinyl composite tiles, rubber tiles or linoleum tiles.

Best practice for planning an installation or carrying out the installation is to become familiar with:

- ✓ The manufacturer's installation guidelines of the product; and
- ✓ NZS AS 1884:2013 Floor coverings - Resilient sheet and tiles - Installation practices.

7.2

ACCLIMATISING RESILIENT TILES

PVC products by nature tend to expand with increase of temperature and then contract when the temperature drops. While vinyl tile manufacturers have varying methods for creating tile dimensional stability, the installation practices used are also an important part of the process to control any movement during and after installation.

Resilient tiles and planks designed to be adhesive fixed (dry back) require the correct type and amount of adhesive applied for the situation; along with appropriate rolling after installation to provide a strong bond.

The reason for acclimatisation is to allow the resilient planks/tiles to move and adjust to its new environment before the installation starts. Manufacturer's installation guidelines set out the procedures and time planks should be delivered to site. Typically, this involves storing planks/tiles on site for 24 hours before the installation on a flat surface, in straight piles, out of direct sunlight and at a recommended temperature range.

Where Hybrid flooring is installed by floating method, acclimatizing guidelines may vary between manufacturers as these floors are designed to move with variance in temperature.

However, where temperatures are outside of normal living conditions as in very hot or very cold, acclimatisation, guidelines should be always be referred to before installing.

Tiles and planks rarely contract to less than their manufactured size so the cooler side of the recommended temperature range is often more suitable to the New Zealand environment.

It is important to inspect the batch numbers. These should be the same. If they are not then shading variation may occur.

'Always check that the colour number is correct for the job.'

Always be on the lookout for any damage to tiles or tile edges. If these tiles are unable to be used for cutting, contact the supplier to make sure there will be enough planks/tiles of the same batch available to complete the job.

While vinyl planks/tiles may look similar, the recipe, ingredients and technology used will vary with each manufacturer. Linoleum and rubber properties are different again to PVC. Because of these differences, the procedures for acclimatising resilient tiles/planks may vary.

When it comes to acclimatising any resilient planks/tiles to the area, both the person pricing the work and the installer have a duty of care to make themselves familiar with acclimatising instructions that are specific to the make of the resilient tile.

7.3

SHUFFLING RESILIENT TILES

- Make stock piles of planks from different packets as recommended. This helps to vary the patterns/grains and avoids blocks of similar shades.
- Check with the client or homeowner whenever possible to ensure they are happy with the pattern/grain layout before installing.

- Be on the lookout for any heavily grained patterns so they can be strategically placed throughout the installation.
- Check with the installation guidelines for any arrows on the back of the planks/tiles and if there is a direction they are to be installed to.
- With linoleum tiles, do not remove more tiles from the box than can be installed within 1 hour.

7.4 UNDERFLOOR HEATING

Underfloor heating in a new building should first be run for a period of time to remove any surplus subfloor moisture that will rise when the heating is first turned on. This should be organised at the initial planning stage; well in advance of the installation.

Always refer to the instructions for the planks/tiles to be installed. Underfloor heating should be turned off at least 48 hours in advance of the installation and remain off until 72 hours after the installation. When the heating is turned on gradually day by day, the temperature can be increased in small 5-degree amounts until the desired temperature (that is within specified range) has been achieved.

Exceeding the maximum recommended temperature after installation can damage the new floor.

At the point of sale, the underfloor heating should be discussed including what the maximum temperature is for the product.

As part of resilient tile/plank care and maintenance, information should be passed on to the user to make sure they understand and can take responsibility for using the underfloor heating correctly.

7.5 TEMPERATURE FOR THE INSTALLATION PROCESS

The temperature must be stable from pre-installation through to the recommended adhesive setting time after the installation. This includes the floor temperature where it has or will be exposed to the sun. Windows must be covered throughout the installation process through to the time allowed for the adhesive to set.

Similarly, in winter conditions the room must be brought up to temperature in advance to the installation.

The manufacturer of the plank/tile will have a room temperature range for the installation in their guidelines. These ranges are often set by the limitations of the products and also overseas conditions where heating systems and/or building designs provide for more stable conditions.

Because tiles and planks rarely contract to less than their manufactured size, the cooler side of the temperature range is often more suitable to the New Zealand environment.

New Zealand's building designs allowing in more natural light and have heating systems that are often turned on when needed so room temperatures are prone to fluctuate.

The planning part of an installation is where stabilised heating to the areas is discussed with the client/builder. The conditions need to be suitable for the entire installation process. This includes prior acclimatisation through to a period after the installation that allows the adhesive sufficient time to set.

It is too late to discuss issues around temperature conditions at the time of an installation. Any installation that is carried out in conditions that are not suitable to the planks/tiles or adhesives will not meet the fit for purpose criteria in the Consumers Guarantees Act (CGA). It is important to note also that contracting out of warranties is not an option under the CGA.

New Zealand technical advisors for the manufacturers should be contacted to clarify any areas of guidelines that may not be clear for New Zealand conditions. All planks vary in design and product make up. Often there are critical criteria around the recommended temperature.

Adhesives have a minimum temperature needed for a correct set up (including a minimum surface temperature). Adhesives that contain water as the carrier are limited through physics by low temperature or high humidity. The water will simply not move out of the adhesive. Chemical reactions that are part of the setting process for two-part adhesives can also be affected at low temperatures.

The tolerance of movement in temperature over a day with the areas is throughout the entire installation process. For example, this may vary from 2-5 degrees over a day depending on the plank/tile type and manufacturer.

Hybrid (rigid floor) click - installation by floating method has important criteria to follow for both planning and installation.

Planning - hybrid products differ in design and makeup across different manufacturers. There is a duty of care when pricing or planning an installation to first become familiar with the manufacturer's technical information of the product to be used. Understanding the performance requirements of hybrid products is integral to both specifying correctly for the situation and installation planning.

Planning

- The substrate must be flat and sound. Click systems raft across a floor surface so any deviation above the recommended tolerance may damage the joining system. There may be some older buildings where a click system product may not be suitable due to the condition of the floor.
- The surface must be clean and smooth to allow the hybrid floor to move freely. Where a floor surface is not smooth across

the entire surface, refer to product guidelines to establish if a plastic slip sheet is appropriate to use.

- Evaluate the environment and plan accordingly for high sun or high water splash areas; this includes planning for acclimatisation of the product prior to installation and any elevated substrate moisture levels.
- The recommended expansion gap at all edges is a critical requirement to allow the floor to freely move with climatic changes. There must be no point in the floor area or edge that restricts movement. Plan accordingly for timing of skirting/toe space fitting or removal and expansion thresholds.
 - Discussion points with the client/builder/joiner include the fitting of skirtings. The skirting when fitted over the hybrid floor surface should not restrict floor movement at any point. Where joiners adhesive fix toe spacings to cabinetry footing, care is needed that the adhesive does not come in touch with the floor surface, or impedes the expansion gap at any point.
- Where a manufacturer recommends an adhesive to be used in an area of the floor e.g. a kitchen area, the floor must be allowed to freely move away from this area, or an expansion threshold used to separate/compartmentalise this space.
- Where the floor flows through multiple rooms or complex areas, a recommended expansion threshold can be used to allow free movement. Each job should be considered on an individual basis. Consideration should be given to the size of the areas, temperature change between living areas and back of a house areas, passage size and number of door openings between areas.

Installation

- Always check the locking mechanisms for any visual defects, damage when

unpacking tiles and during the installation. Be on the look-out and clean out any debris from the locking system before installation.

- Identify the locking mechanism type and the recommended joining technique to be used. Avoid undue force that could damage the mechanism. If the joining system is not fitting correctly, stop and investigate further as to the reason and rectify before continuing. When joins are fitted correctly the plank should be flush and sitting flat and under no pressure.
- Use the recommend spacers. To make sure the floor does not move during the installation, do not remove spacers until the installation is complete.
- Stagger the boards randomly so the end joins are well spread out and do not line up in close proximity. Take moments in time during the installation to stand back to have an overall visual check of the floor. End join stagger can vary between 150-300mm between manufacturers so always refer to the manufacturer guidelines. Refer also for any minimum first and last row measurement recommendations.
- Plan the set out before starting the installation. Consider the main visual walls, or the longer walls to set out from; also check how the planks will line up against any cabinetry. Check at all times for straightness during the installation.

Refer section **7.6**

7.6 PLANK SET OUT

Time spent planning can save time spent with tricky cutting. Setting out where to place the main gridline will vary with the complexity and size of the area/s.

Discussing the set out and limitations caused by walls out of square with the customer, allows for any adjustments before the installation. There are a number of things that need careful thought about at the set out stage.

- Planks that will run through different rooms, also where planks re-join around island benches, rooms or passageways.
- Staying parallel with the longest obvious walls.
- Avoiding where possible, very small pieces along main skirting edges in passageways.
- Allowing for the widest possible even sized planks at the edges in small areas or entrance ways.
- Working away from the adhesive where possible when using wet adhesives, particularly single-component / two-component (two-part) high performance adhesives.
- Setting out small areas or entrance ways to achieve the widest possible edge plank will not always work by starting at the exact centre of the room. This is due to the width size of the plank and its mathematical relationship with the width size of the area.
- Set out off long walls. Setting out off shorter walls and areas then working into larger areas can increase the risk of the tiles not staying parallel with longer walls.
- Moving the set out across a half plank as shown in **Illustration 2** will allow for a wider fill plank at the edges.

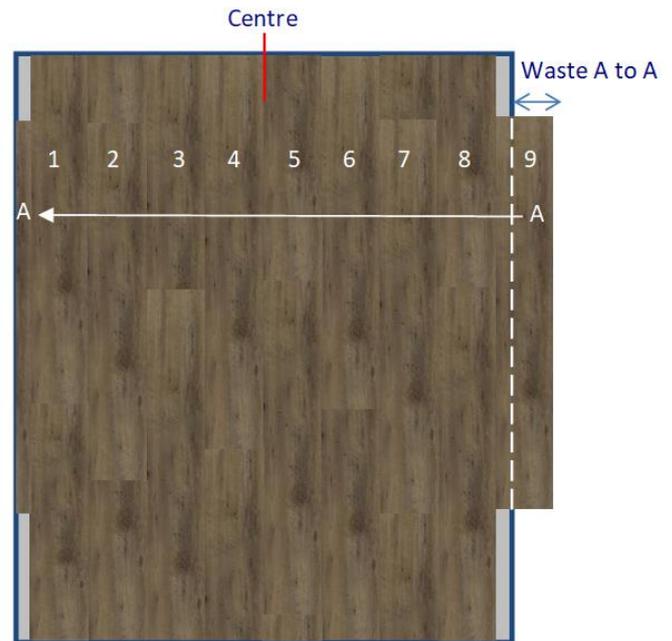


Illustration 1 is a plank set out from the center. Because of the relationship of the width of the area and plank width, a thin strip is needed to be cut in at both edges.

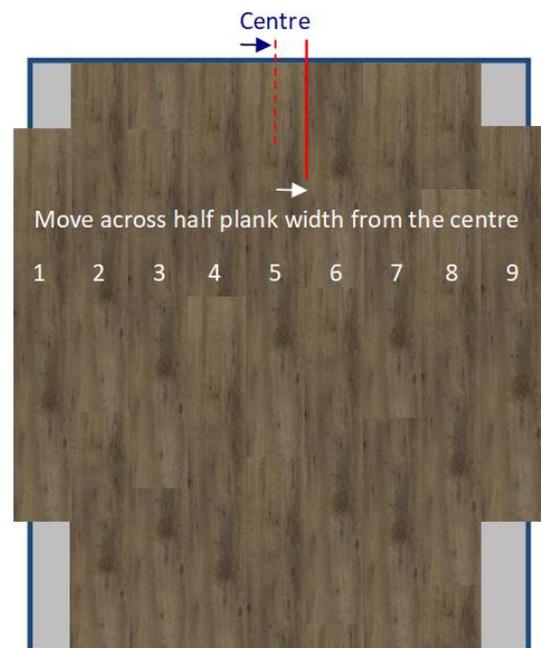


Illustration 2 is moving a plank set out across from the center by half a plank width. The same number of planks are used but with a wider edge plank.

- Having larger cut planks at the edges makes cutting easier, and in some situations, can help disguise a plank edge that might not be parallel to an out of square wall.

7.7 TILE SET OUT

Similar to a plank set out, time spent planning can save time spent with tricky cutting. Discussing the set out and limitations caused by walls out of square with the customer allows for any adjustments before the installation.

There are a lot of factors to consider at the set out stage, therefore not all set outs and starting points will be the same. Setting out where to place the main gridline will vary with the complexity and size of the area/s. Tiles that will run through different rooms; also, where tiles re-join around island benches, rooms or passageways.⁷

- Staying parallel with the longest obvious walls.
- Avoiding where possible, very small pieces along main skirting edges in passageways.
- Allowing for the widest possible even sized tile at the edges in small areas or entrance ways.
- Working away from the adhesive where possible when using wet adhesives, particularly single-component / two-component (two-part) high performance adhesives.
- Setting out small areas or entrance ways to achieve the widest possible edge tile will not always work by starting at the exact centre of the room. This is due to the size of the tile width and its mathematical relationship with the area width.
- The tile/pattern direction chosen for the installation.
- Moving the set out across a half tile as shown in **Illustration 4** will allow for a wider fill tile at the edges.
- The starting point should be controlled by the installer not through job conditions because of other trades working in the same area.

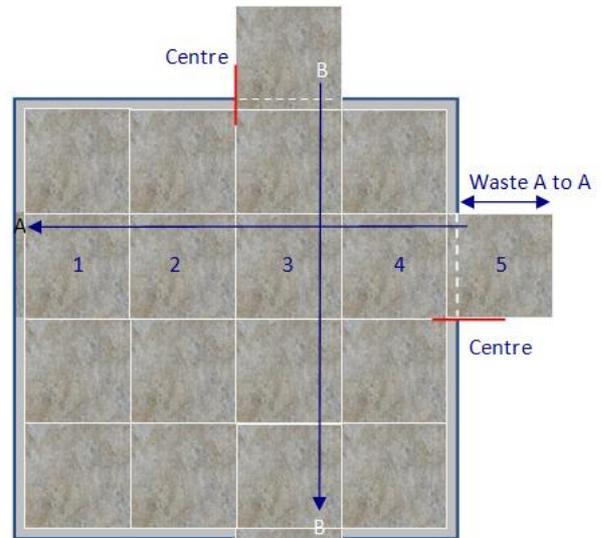


Illustration 3 is a tile set out from the center providing a balance at each edge. See **Illustration 4** for the solution that provides a larger cut tile at the edge.

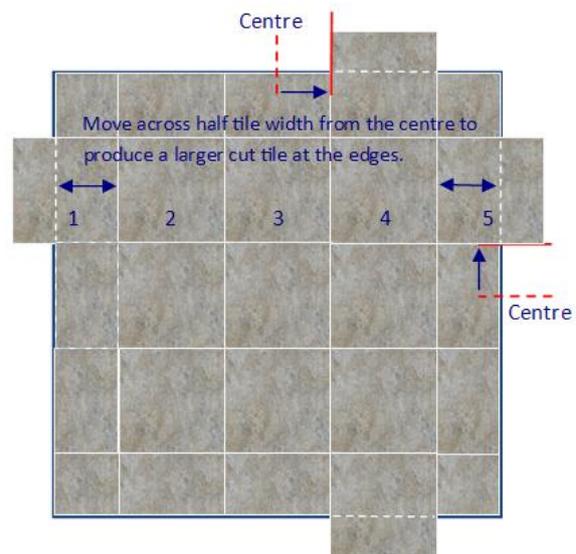


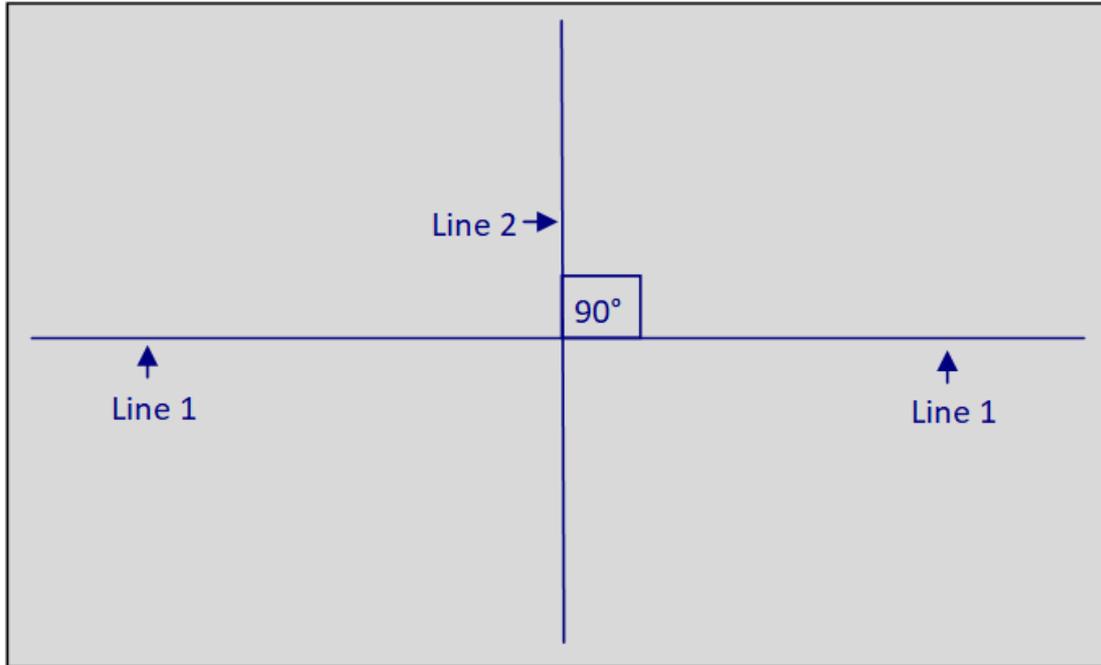
Illustration 4 shows how moving a tile set out across from the center by half a tile width increases the size of edge cut tile. The same number of tiles are used but with a wider edge tile.

- Having larger cut tiles at the edges makes cutting easier, and in some situations, can help disguise a tile edge that might not be parallel to an out of square wall.
- Set out off long walls. Setting out off shorter walls and areas then working into larger areas can increase the risk of the tiles not staying parallel with longer walls.

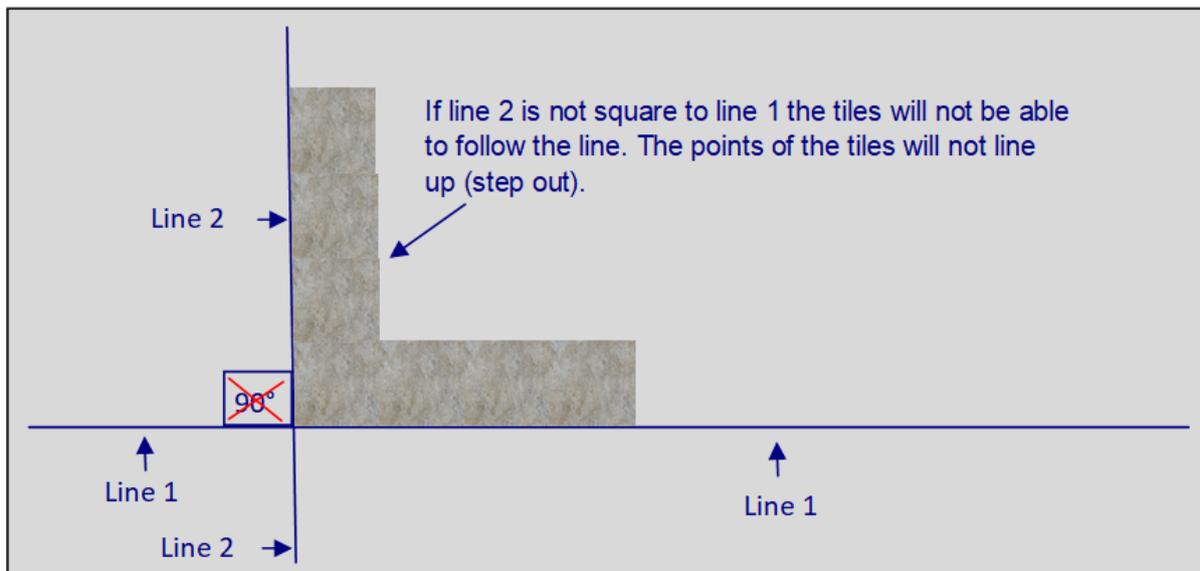
7.8 FORMING A SET OUT LINE

A square gridline must be formed on the floor surface to work from.

- Line 1 is formed parallel with the longest wall.



- Line 2 must cross Line 1 at exactly 90 degrees (perpendicular). It must be created from Line 1; not measured back parallel to the wall.

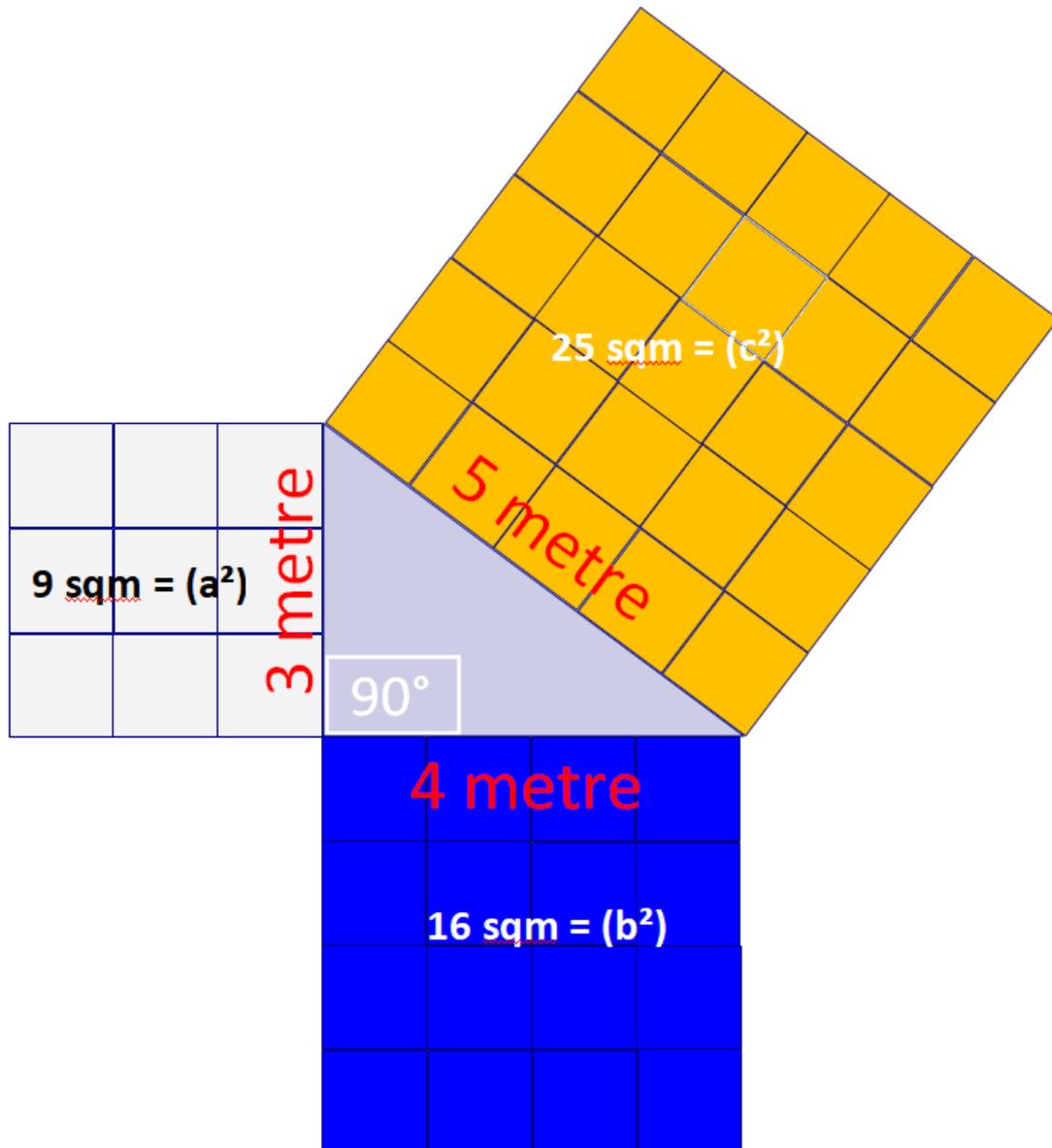


- Creating Line 2 by measuring off the wall does not guarantee an exact 90 degree right angle line to work from. Relying on the building to be exactly square is not recommended as it will cause tiles to step out.

7.9 FORMING A RIGHT ANGLE LINE

A square gridline must be formed on the floor surface to work from.

- While a builder's square is useful in small areas and laser technology for large areas, a method still used in construction today and has been around pre 500BC for creating a right angle line is the 3-4-5 rule. Mathematically known as Pythagoras's theorem $a^2 + b^2 = c^2$.

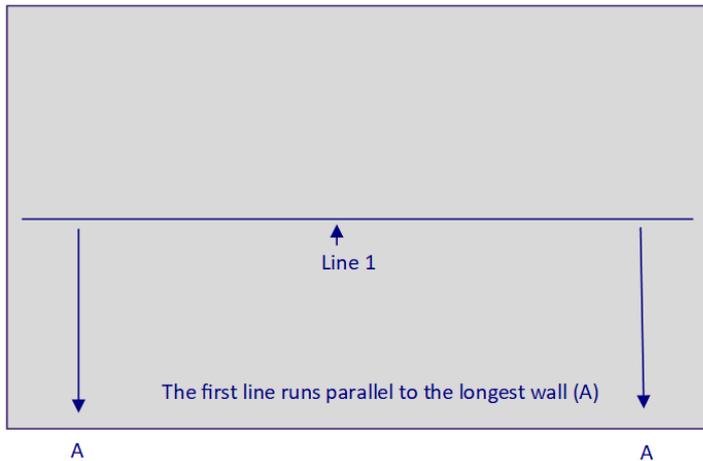


A simple way of applying this to flooring is to think of the 3-4-5 rule in metres. The 3 metre and 4 metre measurements are the right angle and the 5 metre measurement is always the longest side.

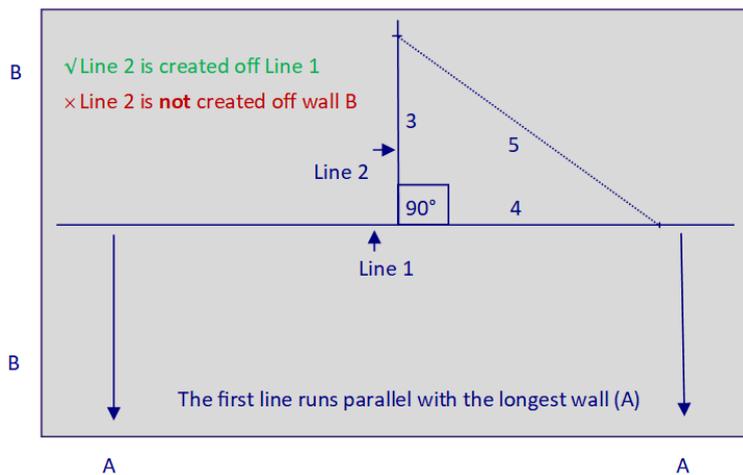
- If the area is bigger—double the measurements to 6 metre, 8 metre and 10 metre.
- If the area is smaller—half the measurements to 1.5 metre, 2 metre and 2.5 metres.

7.10 FORMING A SQUARE SET OUT LINE ON THE FLOOR

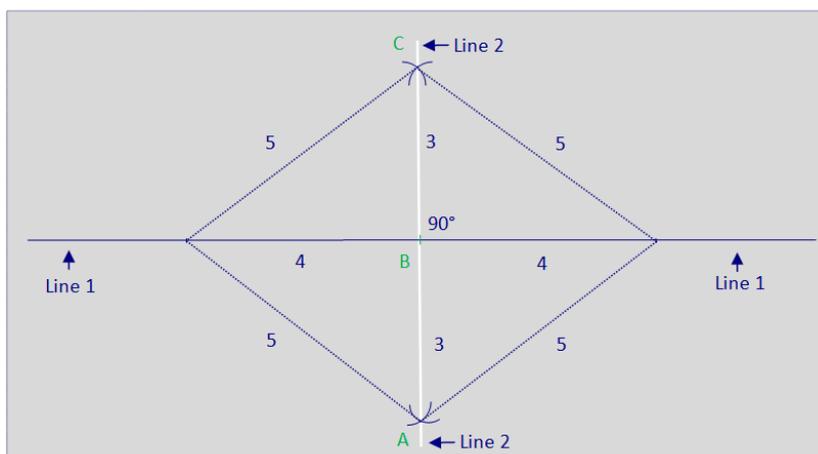
Step 1 - measure off the longest wall at each end to create Line 1. When the line is marked on the floor, check sections along the line that the line is parallel to wall A.



Step 2 - measure along Line 1 and mark the chosen start point. This may be the centre of the area or will be offset from the centre mark by half a tile width. Create Line 2 off line 1 using the 3-4-5 rule.



Step 3 - Repeating the 3-4-5 rule on the opposite of Line 1 side helps with accuracy when setting out larger areas. Points A, B, C should line exactly together when a string line is laid over them.



7.11 TILE STEP OUT

One of the challenges of a tile installation is keeping the corner points of tiles meeting up. Tile step out or tile creep is where the points of the tiles do not stay in line. This can happen gradually during and installation and is often a combination of a number of reasons.



Illustration 5: Tile points not lining up

Four key reasons that contribute for tiles to gradually step out are:

1. Surface
2. Set out
3. Installation
4. Tiles

1. Surface - humps and hollows in the surface will cause tiles to step out. Illustration 6 provides an example of the distance covered of a tile on a flat surface and a hollow (undulated) surface.

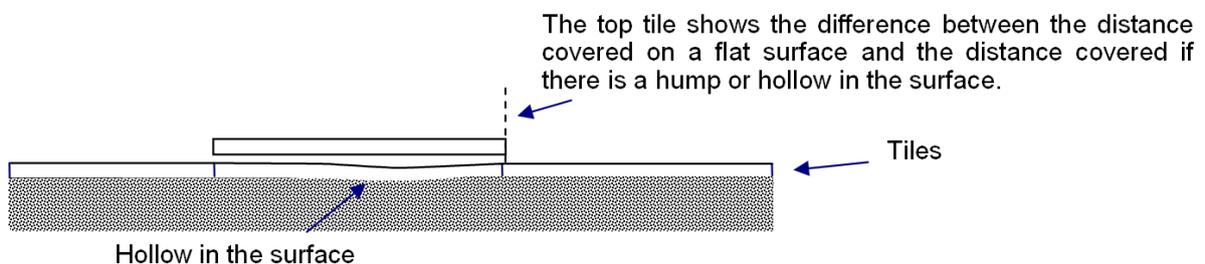


Illustration 6: Variations in surface causing tiles to step out.

- Manufacturers will have a recommended tolerance for the flatness of a surface for their tiles. They may also have a set measurement that a number of tiles should fit into.
- The method used to identify an acceptable tolerance for how flat a surface is will involve placing a metal straightedge on the floor and checking for any gaps between the straightedge and the surface.

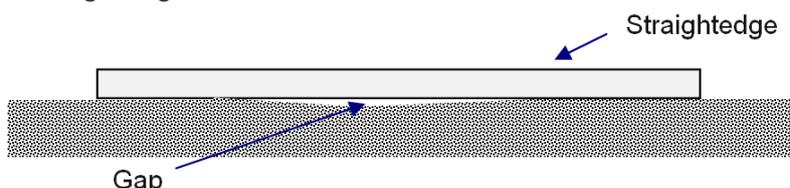


Illustration 7: Checking for gaps beneath a straight edge.

New concrete surfaces—there are 11 classes of concrete finishes for a new concrete surface. Formed finishes are moulded or cast finishes. An unformed finish needs a method to finish a concrete surface before it hardens. Where floor coverings are to be installed, the finish used by the concrete industry is U3 (unformed) which is set out in NZS 3114:1987.

The U3 finish class is a metal trowel finish with gradual changes specified as within 5mm over a 3m straightedge or where thin sheet or tiles are to be installed 3mm over a 3m straightedge

- A finished concrete surface might meet the concrete standard but may not meet the level of flatness specified for the tile. Both the person pricing the work and the installer have a duty of care to make themselves familiar with instructions for the tiles that are to be installed regarding the tolerance for flatness using a straightedge.

2. Tile set out - must involve a grid that is square (90°) to the main line. The tiles must be installed to the lines and not allowed to wander off. Installing to a line that is not square will eventually cause tiles to step out.

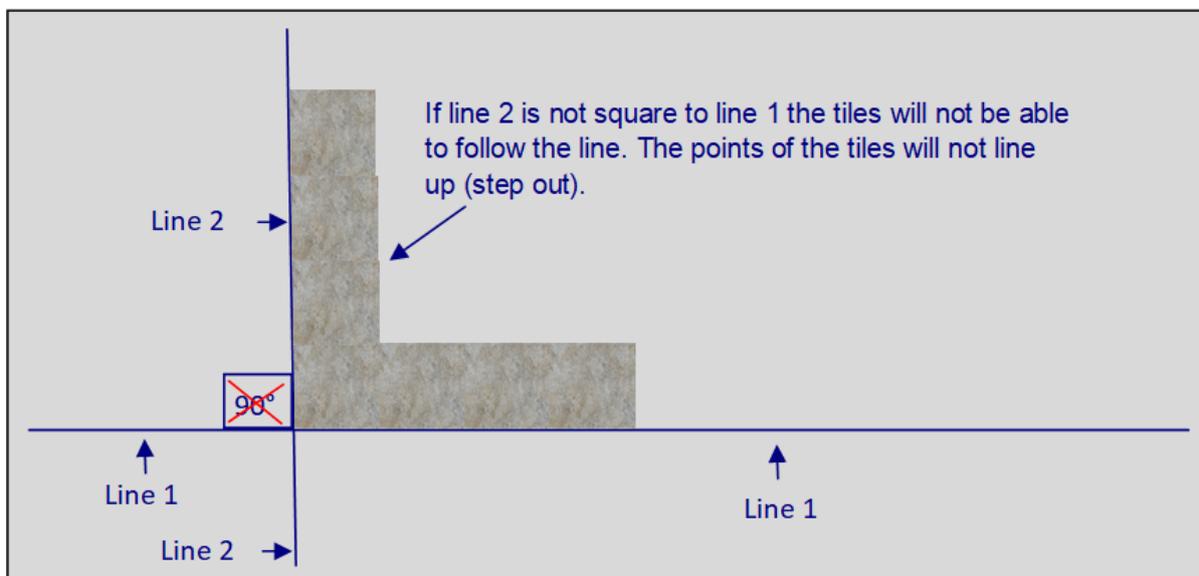


Illustration 8: Out of square line that will cause stepping.

3. Installation technique - work out the best start point for the area; this may be from the edge of a room or the centre. If possible in larger areas, starting from the centre if the area allows it halves the problems that can contribute to tiles stepping out.

- Different people involved in the same installation may have different hand pressure or have left-handed versus right-handed strengths. This can also contribute to stepping out over a large area.
- The standard laying tile technique is to install the field of tiles in a stepped formation. This method helps to keep the tiles on the right angle gridlines. At regular stages during the installation placing a tile that allows two edges to line together and running fingers across the joints will indicate at the early stages if tiles are starting to step out. See **Illustration 9** below.

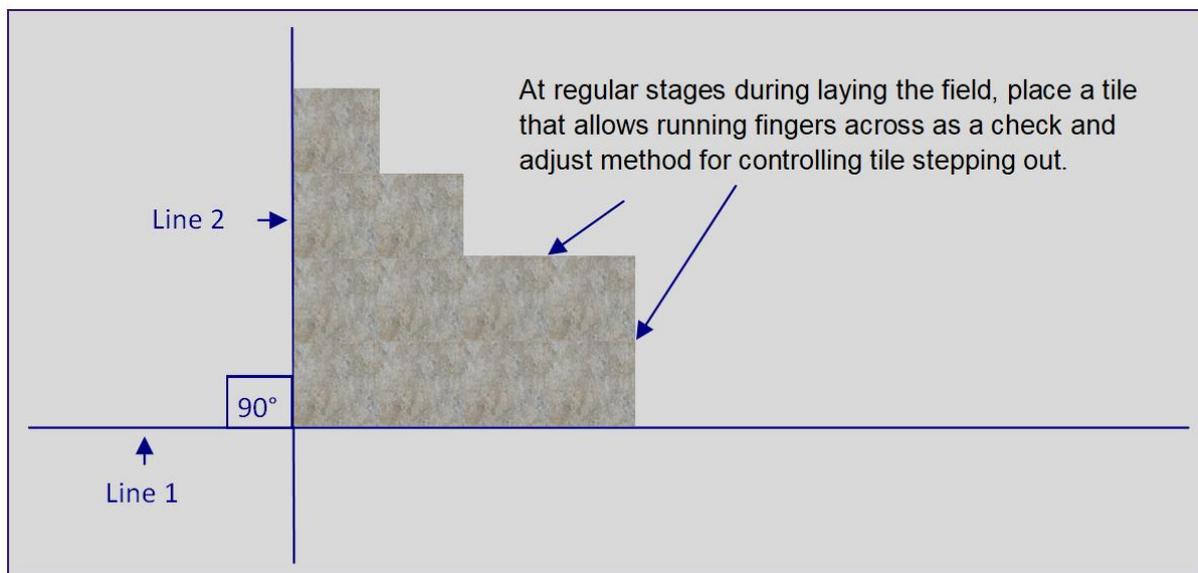


Illustration 9: Installing tiles in a step form.

Vinyl Composite Tile (VCT) or Linoleum Tile—resilient tiles that have no stabilising carrier are able to compress on themselves. In large areas where step out is starting, installing around the stepping tile and compressing a tile inside the stepped-out tile can help bring the stepping back under control.



- 4. Tiles** - manufacturers have a tolerance for slight size variation for the tiles. With advances in cutting technology and tile/plank construction, the accuracy of vinyl tiles is extremely precise.
- Over a large area a very small variance in size can also contribute to stepping.
 - When inspecting tiles at the unpacking stage if there is any concern or visual signs that tiles are not square or vary in size, then the supplier should be notified before the installation starts.
 - Similarly, if there are any issues during the installation with tile size then the installation should stop and the supplier notified.

8

ADHESIVE FOR RESILIENT FLOOR COVERINGS

IN THIS SECTION

- 8.1 Adhesive types
- 8.2 Tips when changing from solvent-base to water-base adhesive technology
- 8.3 Loose lay luxury tiles
- 8.4 Applying adhesive

8.1 ADHESIVE TYPES

Flooring businesses planning or installing resilient floor coverings have a duty of care to familiarise themselves with the ability and limitation of the adhesive that is going to be used. Also, where any building code clauses may apply.

For a resilient tile, the choice of adhesive is influenced by the make-up of the tile, plus the environment that the tile is going into. The environment includes what the area is used for and the ongoing conditions the tile will be expected to perform in. Considerations of the adhesive type to be used could be:

- moisture exposure in sanitary areas;
- heat exposure from the sun through windows/doors;
- commercial and residential areas; and
- situations /environments where usage is anticipated to be heavier than usual e.g. rental properties.

Installers have a duty of care to follow the adhesive guidance provided by both the resilient floor covering and adhesive manufacturer/supplier.

Dry back planks/tiles (LVT)—need an adhesive system that is suitable for the New Zealand environment. While some LVT have the capabilities of being installed with a pressure sensitive adhesive, a hard-set resilient tile adhesive is often more stable and suited for New Zealand conditions.

Water-based (acrylic) adhesive—is the most common type of adhesive recommended for both resilient sheet and tile.

- Water-based (dispersion) adhesives need the water to disperse (move) out of the adhesive as part of the setting process.
 - The flooring surface must be able to absorb the water out of the adhesive. If there is nowhere for the water to go, it will remain wet which will affect its ability to set.

The temperature and humidity of the area also need to be within the recommended ranges to assist the water to move out of the adhesive.

- All adhesives have benefits and limitations as they set differently. It is not always a one size that fits all scenario. In general.
 - Hard-set adhesives - initially move through a tacky stage before setting to a firm non tacky state giving the adhesive strong shear resistance (sideways movement).
 - Pressure sensitive adhesives - set to a soft tacky state.
 - A combination of both properties where an adhesive remains at a pressure sensitive state (tacky) for a long period of time before setting to a firm non tacky state.
- Adhesives that are fibre reinforced have increased shear strength (sideways movement). While these adhesives perform well in higher temperature environments, they should not be used outside of the manufacturer recommendations.

Reactive adhesive (high performance) - for installing resilient tiles into high sun/heat situations or high water splash/humid areas. While they are part of the installation system for these areas, the recommended RH levels for the concrete substrate must still be observed.

Reactive adhesives are produced in single or two component (2 part) form. The chemistry behind these adhesives work differently to water-based dispersion adhesives.

Single component adhesives react with a small amount of moisture in the substrate /atmosphere to start the curing process. When using single component moisture cured adhesives, the adhesive pail must remain covered during the installation. Once open, the

adhesive in the pail will start reacting with the moisture in the air and start the curing process.

Two component adhesives chemically react when the two parts are mixed together. The correct mixing tools and ratio of the two parts are critical to the process of adhesive curing.

There is a range of chemistry formulations behind the various reactive adhesives available e.g. modified silane polymer / hybrid polymer, urethane, epoxy technology.

Understanding how adhesives behave

Reactive adhesives behave differently to water-based adhesives when they are used. Water-based adhesives will develop a tack during the setting process before drying to a firm state. The tack helps to hold the tiles into the adhesive while it sets. This allows the installer a time frame during the installation to make sure the tiles stay bonded to the floor.

Reactive adhesives will gain strength as they cure over a period of time. Tiles must be able to remain stable, flat and relaxed during the adhesive curing time frame.

Both reactive adhesives and water-based dispersion adhesives are sensitive to temperature during the setting process. Adhesives may not set correctly if a concrete slab is too cold; generally, a slab temperature under 10 degrees. This consideration is part of the project planning for winter conditions. It is too late when the installer arrives to the job.

Not recommended - while general organic solvent contact adhesives have high instant strength and work in lower temperatures, there is a risk that over time the bond may fail.

Organic solvent contact adhesives are not always compatible with plasticisers that are part of a flexible vinyl make-up. A reaction between the property make-up of both the adhesive and backing can cause both the adhesive and vinyl backing to soften and

breakdown; this is often accelerated with an increase of temperature.

Using solvent-based adhesives where they are not recommended can void manufacturer warranties. Organic solvents can also be harmful to human health if not used correctly.

8.2

TIPS WHEN CHANGING FROM SOLVENT-BASE TO WATER-BASE ADHESIVE TECHNOLOGY

Water-based technology has made huge advances over recent years and more and more NZ flooring companies are making the change.

‘Overcoming the barrier of change’

- Change often puts people outside of their comfort zone so initial resistance to change is a normal human trait.
- When making change, focus your energy on how to make it work rather than comparing to what you are changing from.
- When we get used to things, we get back into our comfort zone and the change becomes easier and normal.
- When pricing work, allow any extra costs for the adhesive and any extra time needed for the installation. After completion of a number of jobs, carry out a back-cost analysis. Include compliance costs as in health monitoring, record keeping, training, safety gear, mask filters, planning/managing labour resources.
- Talk to other companies who have made the change.
- Flooring companies who have made the change find that when the process is normalised, the increased costs are not as much as was first thought.

Installing resilient floor coverings to vertical surfaces

- One of the key reasons flooring installers develop a liking to their favourite adhesive is they get used to the time it takes to develop a tack (open time) and how long they have to work with the material before the adhesive sets firm; losing its tack properties (working time).
- Knowing the tack up time helps an installer set the pace of the installation. When the adhesive is at a tacky stage the bond should be strong enough to wrap vinyl around corners and coving up the wall/toe space.
- Also, applying adhesive with a roller to the back of the vinyl where it will wrap around corners/coving can also help at these pressure points.



Photo 1: Initially the adhesive when first spread will have no initial tack.



Photo 2: Depending on temperature and humidity, the adhesive will soon start to develop a tack. Sometimes referred to as 'growing legs'

- If applying the adhesive to both surfaces like a contact adhesive, always make sure there is a **wet contact**. Letting both surfaces dry will not allow the adhesive to form a secure bond.
- Warmer temperatures help the water move out of the adhesive faster and colder temperatures slow down the movement rate.
- Humidity (the amount of water vapour in air) will affect the tack up rate. Increased humid conditions will slow down or prevent the water to move out of the adhesive.
- Air flow - fans or heat pumps will move air across the adhesive allowing the water to

move out of the adhesive (similar to drying the washing, a windy day will dry the washing faster).

Plan tasks to do in situations where a little more tack up time is needed rather than waiting for the adhesive to start tacking up.

8.3

LOOSELAY LUXURY TILE

Loose lay luxury planks/tiles installed without any adhesive, generally require near perfect conditions where the temperature remains consistent and stays within the product's maximum temperature range. With the New Zealand landscape and building designs these types of environments are rarely achievable.

- For the products to be fit for purpose in New Zealand conditions, the supplier may recommend that at a minimum application of pressure sensitive adhesive is used; along with any appropriate allowances for expansion.
- In high heat or kitchen (water splash) areas/zones, a specific adhesive system that is suited for these conditions will be recommended.

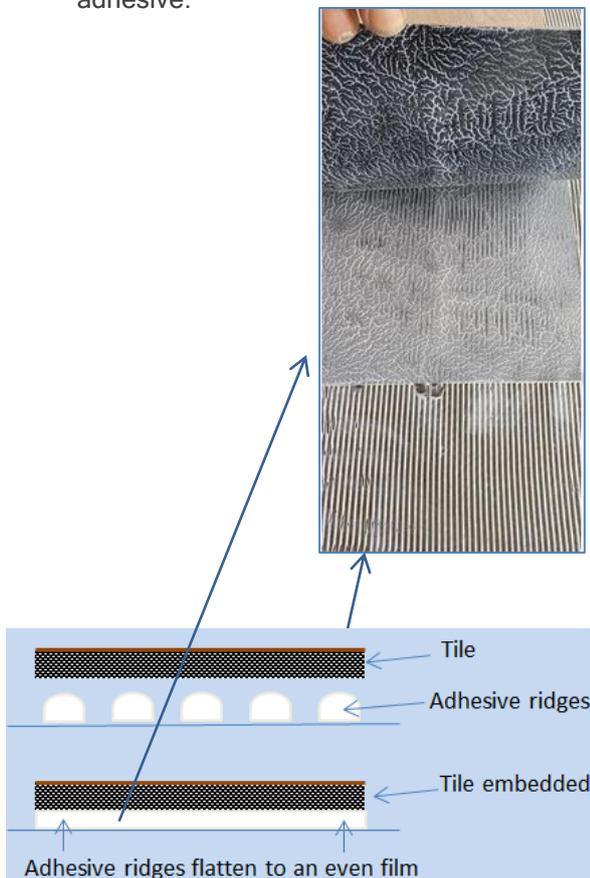
Before selling, planning or installing luxury tile that have loose lay capabilities, flooring businesses have a duty of care to source and make themselves familiar with the adhesive and expansion information that is product specific.

8.4 APPLYING ADHESIVE

Adequate adhesive transfer is absolutely critical to ensure a strong bond between the floor covering and the floor. In particular, luxury vinyl tile will need more adhesive applied than residential sheet vinyl, likewise the coverage rate for linoleum tile will be increased further.



- The trowel notch size and configuration are a crucial part of the system. The common trowel notch sizes are:
 - 1/16 x1/16 x1/16 - Imperial measurement.
 - V1 - 1.6 mm x 1.6mm x 1.6mm - Metric measurement.
 - Manufacturers may also specify the spread rate by grams per sqm.
- The gap between the notches is important. When the tiles are rolled, the adhesive should flatten out to an even film of adhesive.



- If the notches are too big, the adhesive can show through the floor covering as puddling lumps.
- If the notches are too small, the bond will be weak. This may cause an issue with the floor at a later time.

- The open time of the adhesive is the time allowed for the adhesive to start becoming tacky. This will vary between adhesives.
- If the open time is too long, the adhesive ridges may not flatten to an even film. The bond will be weak and could cause an issue with a resilient tiled floor.
- Setting a line for spreading the adhesive to is a helpful method to control the open time. This helps to ensure a consistent adhesive spread rate is applied over the whole area and importantly, a luxury vinyl tile can bed into the adhesive ridges creating a secure bond with an even film of adhesive.



- After the section of tile or resilient sheet is installed, any adhesive residue must be removed before it sets. A clean joint will make sure that the next joining section remains flush at the surface.

'Temperature is important for an adhesive to work correctly'.

- The flooring installer should be familiar with the technical information provided on the adhesive pail, particularly the temperature range, site conditions, open time and recommended spread rate.
- Temperatures exceeding both the low and high end of the range during an installation can be problematic. If the subfloor has been exposed to the sun it should be allowed to cool before the installation begins.

All windows should be covered to keep the sun off the floor before, during and after installation of a resilient vinyl tile to. A consistent ambient temperature will allow the adhesive to set correctly and securely bond the tiles to the floor.

- Keeping the trowel clean during the day is also crucial to prevent the notches from clogging up and reducing the adhesive spread rate.
- This can be achieved by soaking the trowel in water when not in use. Using a plastic bag and bucket, the water can be easily disposed of at the end of the day by tying a knot in the plastic bag and removing it from the jobsite.
- If using a wire brush to remove dried adhesive, check thoroughly that the entire adhesive residue is removed from the notches.

Effective rolling is a critical part of the process.

- Rolling the floor, plus the timing of the rolling is another essential part of the process. Regular rolling during the installation (in both directions) will help to secure a strong bond between the tile backing and the substrate.
- The application of a pressure sensitive adhesive may require a different technique depending on the manufacturer's

specifications. These may need a specific roller nap application or back rolled with a roller after applying adhesive with a notched trowel.

- The installer should make themselves familiar with the application technique specific to the tiles/planks that are to be installed.



Photo 1: Soaking the adhesive trowel in water.



Photo 2: Rolling the floor.

9

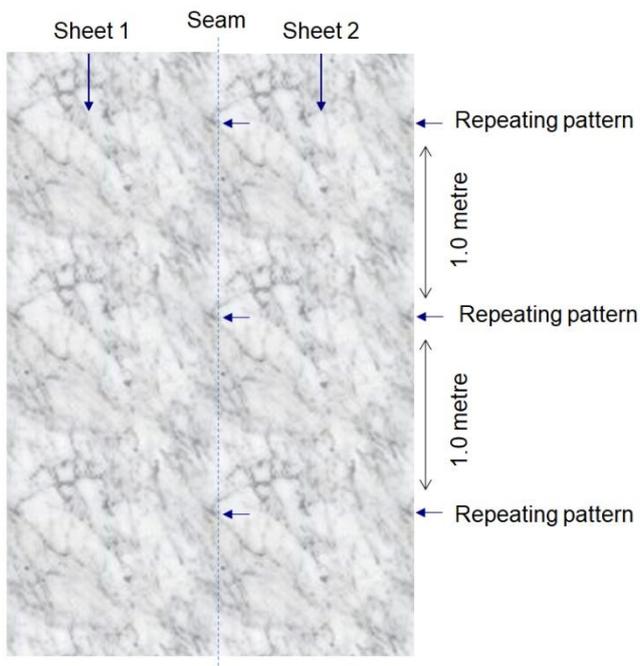
INSTALLING RESILIENT SHEET FLOORING

IN THIS SECTION

- 9.1 Pattern matching
- 9.2 Coving
- 9.3 Seam welding
- 9.4 Resilient flooring types
- 9.5 Seam placement
- 9.6 Coved mitre types
- 9.7 Seaming homogeneous vinyl
- 9.8 Thermo-weld grooving
- 9.9 Welding nozzles
- 9.10 Setting the welding gun temperature
- 9.11 Weld rod trimming
- 9.12 Installing Linoleum
- 9.13 Installing resilient floor coverings to sanitary areas
- 9.14 Sealing edges in sanitary areas
- 9.15 Cleaning up

9.1 PATTERN MATCHING

- Where possible, minimise or avoid joins by using a wider vinyl e.g. 3.0 metre wide in place of 2.0 metre wide vinyl.
- Be mindful that seams on light coloured/plain or diamond patterned vinyl tend to be more visible than dark or tile patterns where joins are made on an imitation tile grout line.
- Residential vinyls with printed patterns need an allowance made to match the pattern where it repeats; that also includes light textured, speckled/marbled designs which will also repeat.
- If there are any aspects of pattern matching / sheet direction that is unclear, the salesperson should ask for clarification from the product supplier before proceeding. This information will need to be passed on to the installer.
- A perfect match may not always be possible if the vinyl does not have a sufficient manufactured selvedge. If the installer needs to cut into the width of the vinyl to achieve a match, more material will need to be allowed for.



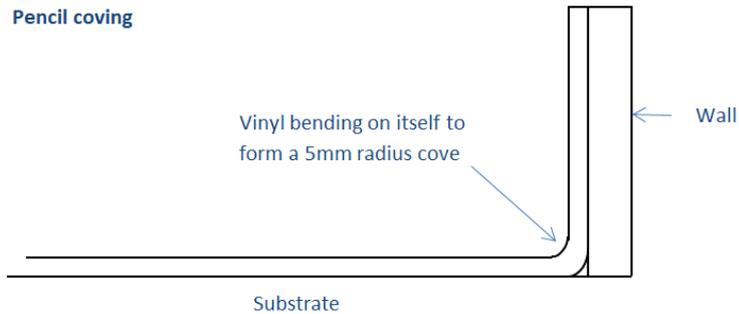
Plain or slightly textured, speckled patterns can be deceiving. If they are not matched correctly a shade variation may occur at the join.

- Where the design has a printed pattern that repeats the sheet direction is the same way. ↑↑
- If the sheet is to be reversed, there should be two arrows opposing each other on the back of the sheet indicating to reverse the sheet direction. ↑↓

9.2 COVING

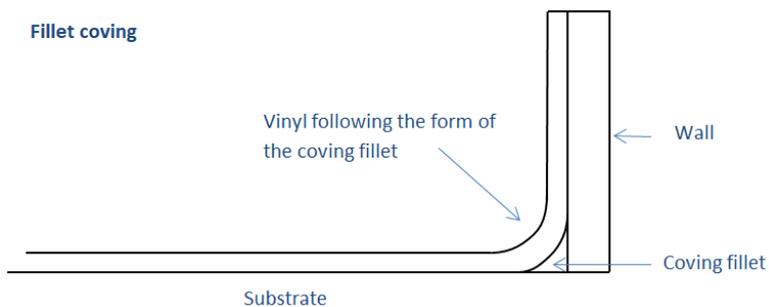
- **Pencil cove** - the choice of coving method used is based on the recommendation from the vinyl manufacturer and whether the vinyl type is able to bend on itself without creasing.

Pencil coving



- **Cove fillet** - for vinyl/linoleum that is not able to bend on itself without creasing, a plastic coving fillet can be fitted at the base to support the vinyl/linoleum and gradually increase the radius.

Fillet coving



9.3 SEAM WELDING

The manufacturers of residential sheet vinyl may recommend that seams are chemically welded together to help strengthen a vinyl seam.

A chemical welded seam helps to prevent dirt and grit working into seam and gradually breaking down the vinyl edges.



Photo 1: Applying a clear liquid chemical into the seam that side bonds the seam together (Photo: Polyflor).

Residential sheet vinyls often have an easy to clean coating applied over the clear PVC wear layer. This is often a polyurethane type coating.

Applying the liquid weld slowly allows the liquid to run into the seam and bond the sides together.

Applying the liquid weld too fast will not allow time for the liquid to run into the seam and securely bond the sides together. If the weld is mainly on the top surface and not in the seam, over time the chemical weld may peel off the vinyl surface.



Photo 2: Chemical weld peeling off the surface of an incorrectly welded seam.

Before applying the chemical weld, the seams should be first masked with tape to help with slowing down the application process. This will

allow time for the chemical to run into the seam and bond the sides together. The tape should then be removed before the chemical dries.

'When working with a new vinyl that you are not familiar with, cut and seam weld a piece together as a trial'

Before welding, the seam must be cut so joins are just touching; not cut too tight. The seam should be flush and clean of any adhesive residue.

✓ Cut the seam flush and clean ready for welding.



If the seam is cut too tight it may bubble, or the join will not have a finish that is flush at the surface.

✗ If a seam is cut slightly too tight, one wear layer can become trapped under the other wear layer. This seam could appear caved in if welded together.



It is more likely than unlikely that vinyl seams will be visible when finished; this is normal. How visible depends on the pattern, colour and the amount of natural light that is cast across the floor.

9.4 RESILIENT FLOORING TYPES

Best practice for planning an installation or carrying out the installation is to become familiar with:

- ✓ The manufacturer's installation guidelines of the product; and
- ✓ [NZS AS 1884:2013](#) Floor coverings - Resilient sheet and tiles - Installation practices

Commercial vinyl is produced in both homogeneous form (one solid layer) and heterogeneous (more than one layer).

Homogeneous vinyl - one solid layer from top to bottom. It is generally produced in two types.



2mm Homogeneous vinyl make up

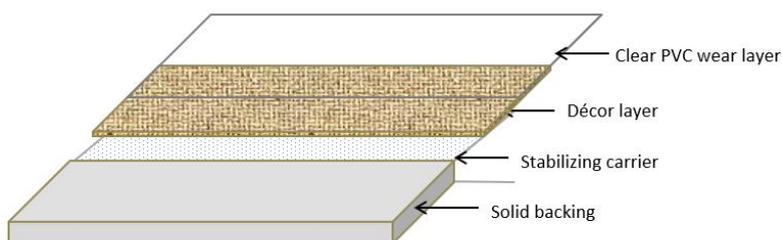


Marble



Chip

Heterogeneous vinyl - more than one layer



Heterogeneous vinyl layer

- **Vinyl safety flooring** - a slip resistance surface produced on both homogeneous and heterogeneous vinyl. These are more specific to building entries (access routes), commercial areas where the likes of slopes, stairs, water, oil or fat increases the chance of slipping.
- The Building code provides direction and acceptable solutions with slip resistance in **Access Routes D1 2.1 Slip resistance**.

While D1 references *AS/NZS 3661.1:1993 Slip resistance of pedestrian surfaces* this standard has been superseded with *AS 4586-2013 Slip resistance classification of new pedestrian surface materials* (Ref: *BRANZ Bulletin 626*)

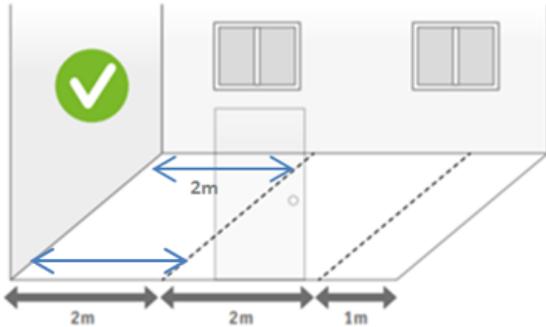
Interpretations of D1 from council authorities may vary regarding slip resistance rating options.

More information on slip resistance vinyl options for specific situations is available via the representatives or websites of the **NZ vinyl distributors**.

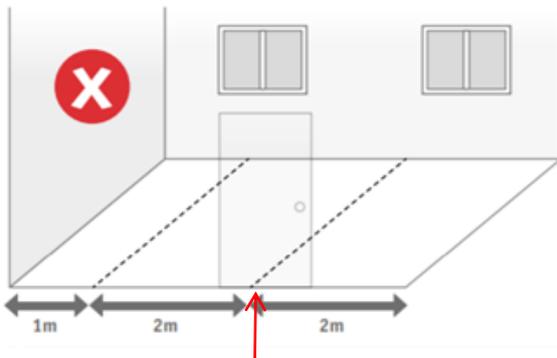
9.5 SEAM PLACEMENT

A little thought with seam planning before the installation can save time and enhance the overall appearance of the installation.

- ✓ Joins are parallel with the walls



- ✓ Plan joins so they do not run into doorways.
- ✓ Lengths run with the light.
- ✓ With the length of the room, If possible.

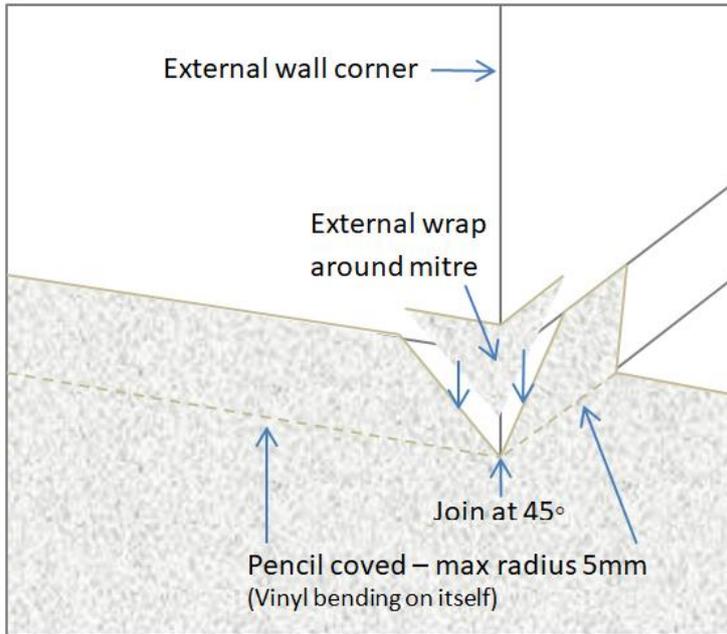


- ✗ Avoid joins running into the doorway

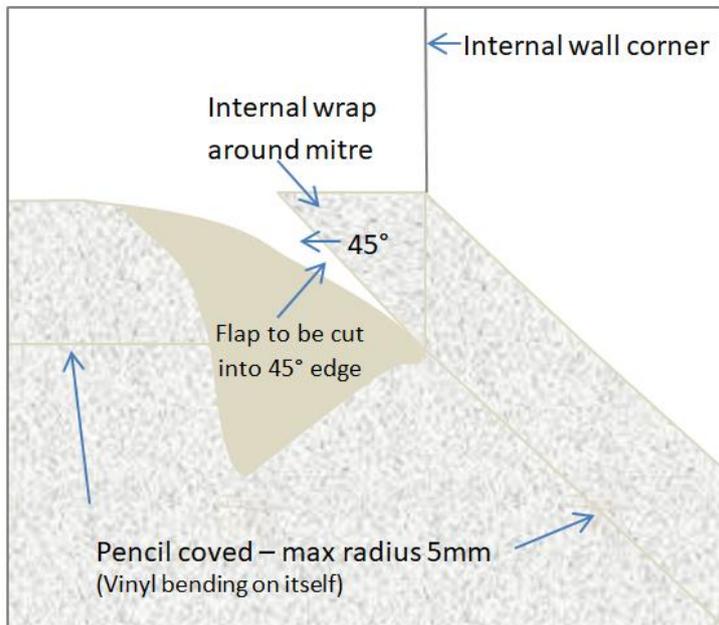
9.6 COVERED MITRE TYPES

Pencil cove - Tarkett Specification (Jacobsen)

- **External** pencil covered wrap around mitre



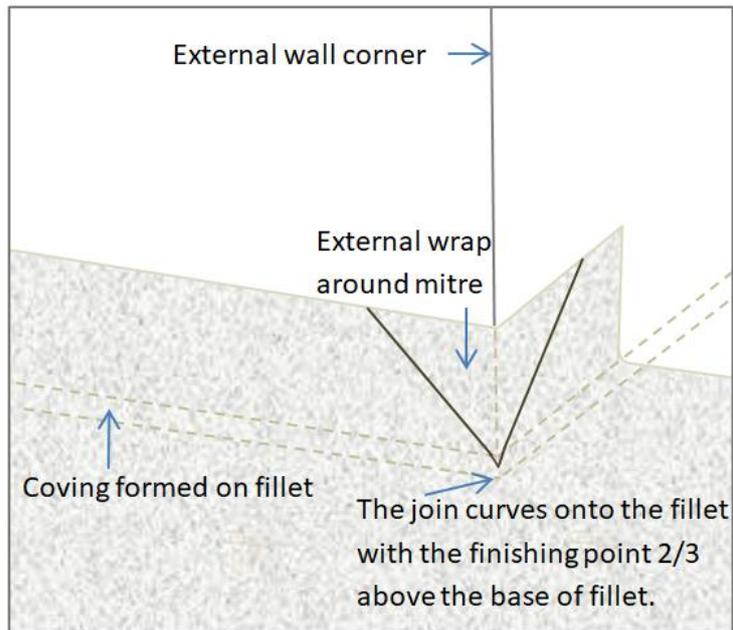
- **Internal** pencil covered wrap around mitre



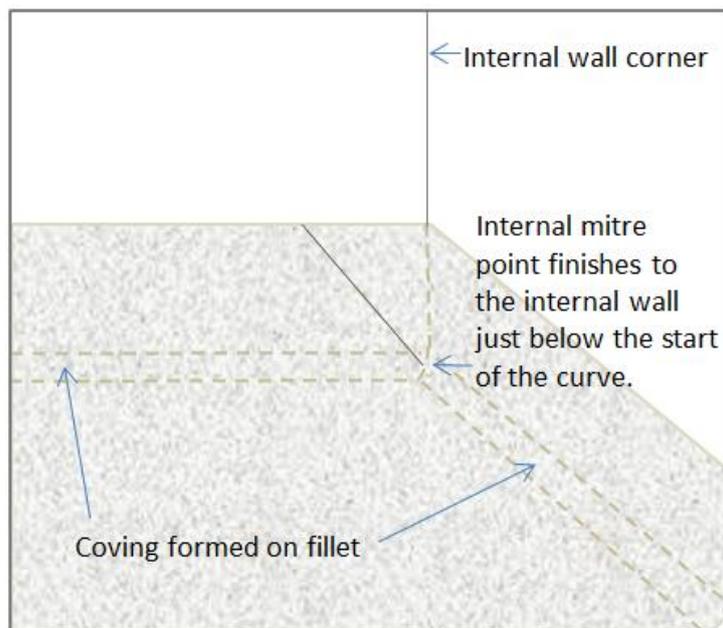
Pencil coving is based on a recommendation from the vinyl manufacturer and also whether the vinyl type is able to bend on itself without creasing.

Wrap around on fillet - Allnex and Armstrong specification

➤ External fillet covered wrap around mitre



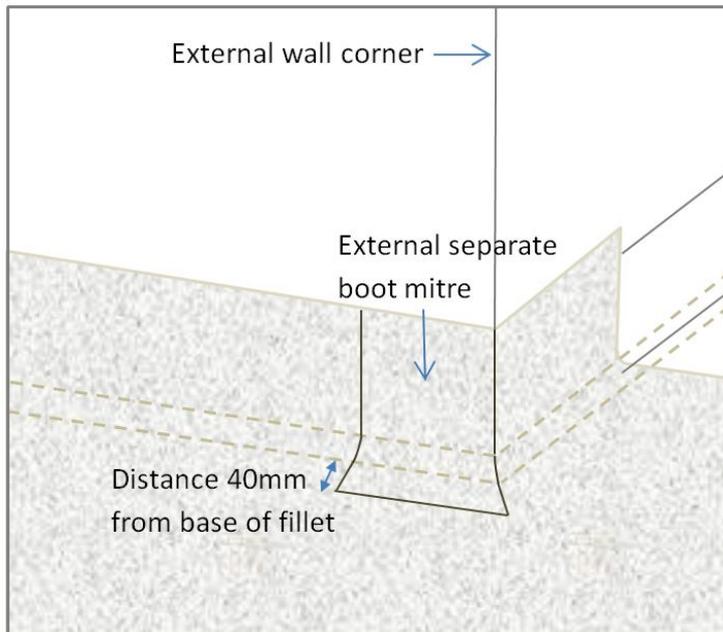
➤ Internal fillet covered wrap around mitre



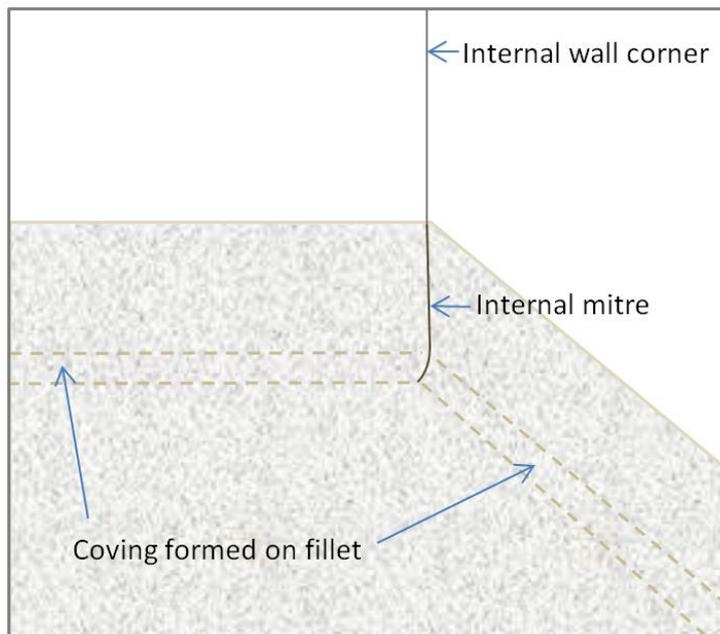
The finishing points should be no lower than 10mm above the floor

Conventional mitre on fillet - Polyflor specification

➤ External fillet covered boot mitre



➤ Internal fillet covered mitre



9.7 SEAMING HOMOGENEOUS VINYL

Whether seams are to be cut tight or are to be thermo-welded, the preparation process will play a key role in the finished appearance and strength of the seam.

Selvage trimming - trimming off the factory edge using an edge trimming tool or a knife with a straightedge is a recommended practice to ensure the seams finish flush along the join.



Trim off the edge of the vinyl sheet



- While edges may appear acceptable for seaming, there may be a very slight thickness variation at the edge caused during machining, or the sheer weight of the vinyl standing on its end during storage/transportation that may cause some inconsistency with thickness at the edge of the roll.

Joining - the gap or no gap allowed is specific to each manufacturer. Generally for hand or machine grooving the gap is typically less than .8mm (approximately credit card thickness). A fine gap will allow a guide for a 'V' hand groove or machine groove.



Up to .8mm gap (credit card)

- Set the recess scribe to a tight or slight gap.



- To avoid damage to the recess scribe pin, safety flooring can be pre-cut or trace cut with a hook knife or concave blade.



Pre-cut one edge



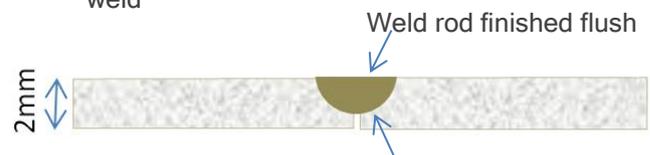
Trace cut

- Allowing too wider gap will result in the weld bonding to the sides reducing the bond and base support.



✗ Bond to sides only

- A finer gap will provide support for the weld



✓ Good bond to sides and base

9.8 THERMO-WELD GROOVING

Before starting the welding process the adhesive will need time to set firm. If not, it will bleed into the weld causing the bond to fail.

- Grooving that is consistent in depth, width and cleanly cut is key preparation for a successful weld.



- **Homogeneous vinyl** - groove to at least 2/3's depth.
- **Heterogeneous vinyl** - will be dependent on the wear layer. Refer to the vinyl manufacturer for the recommended setting.

Hand grooving is best performed with a 'U' or 'V' hand grooving tool that cuts with the bladed edge. The cutting blade cuts through the vinyl producing a clean cut edge to weld to. Used alongside a metal rule will help keep the groove straight.



- Triangular tools that are branded as **corner scrapers** are an aggressive gouging tool rather than a cutting tool. If used for grooving they can be difficult to control particularly on a homogenous chip vinyl.

The risk of the blade slipping out of the groove and damaging the surface of the vinyl is increased with these tools. If used with a metal rule, the blade will damage the edge of the rule.

The finished edge of a groove created with a gouging blade will not be as clean and straight as a groove created with a cutting blade.



- The electric groover provides speed and consistency when grooving large areas.



9.9 WELDING NOZZLES

Welding is a fusing process where both the vinyl and weld rod need heat applied. The weld nozzle should be appropriate to the type of vinyl being welded along with a suitable temperature.

- Before welding the type of vinyl should be identified. Manufacturers may specify a specific nozzle to be used on commercial heterogeneous vinyl or high quality homogeneous vinyl.
- Nozzles are available with a fine or wide hot air stream.



Wide hot air stream



Fine hot air stream

- Fine airflow nozzles concentrate the heated airflow directly to the groove, not the surface of the vinyl. This is to prevent any damage occurring to:
 - The clear PVC clear wear-layer of heterogeneous vinyl;
 - Polyurethane or lacquers applied to surface of homogeneous vinyl;
 - Safety vinyl that has metal filings added for slip resistance.



Hot air stream directed into the groove

9.10

SETTING THE WELDING GUN TEMPERATURE

Weld rods produced by different manufacturers will melt at different temperatures. Also, welding guns over time can vary with the temperature settings.

- Finding the appropriate temperature can be achieved by placing the weld rod under the tip of the gun and adjusting the temperature until the weld rod melts without burning.



Melting rod under tip



Melting rod without tip

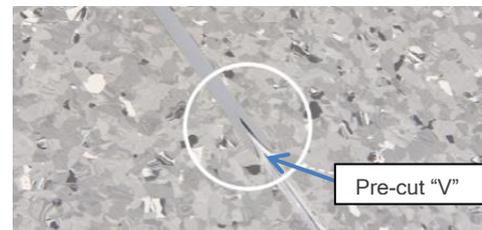
- The speed of the welding process should be gauged by the slight wash of melted weld rod that rises at the edge of the weld.



A slight **wash** of melted weld rod rising at the edge of the weld

Any visible burning would indicate the heat needs to be reduced. Setting the temperature too high can result in burning, discolouring the vinyl or visible wide claw marks appearing at the edge of the weld after trimming.

- When welding coves and mitres, a lower temperature will allow more time and help with accuracy.
- When joining welds, pre-cut a 'V' to help bond the two welds together.



Pre-cut "V"

9.11

WELD ROD TRIMMING

Before trimming allow to cool to room temperature. Applying a cool damp rag can speed up this process and lubricate to prevent scratching.

- Always trim in two passes to prevent the weld sinking. The first pass trims off the excess weld.



1st pass with a moon knife with a spatula



1st pass with a Mozart knife with a spacer



2nd pass with a moon knife without a spatula

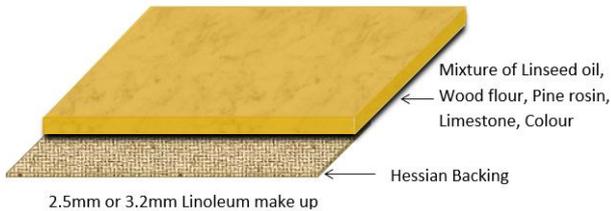


2nd pass with a Mozart knife without the spacer



9.12 INSTALLING LINOLEUM

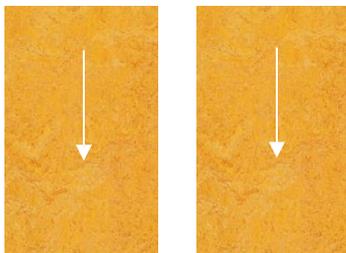
A term that is still often used today to describe resilient floor coverings is 'Lino'. Linoleum is the original resilient hard floor covering and has been around for over a century. It is made up of the natural products Linseed oil, Wood flour, (Cork flour in some linoleum products) Pine rosin, Limestone and Coloured pigments. The backing is Hessian.



Linoleum—one solid layer on a hessian backing.

As linoleum was the first resilient floor covering, many of the installation techniques provided in section **9.7** for installing homogenous floor coverings will apply.

- Linoleum sheets should be installed in the same direction unless specified otherwise.



- Each cut length should be back-rolled to release any roll tension from the winding of the sheet linoleum at time of manufacture.
- Once the sheet is back-rolled, stand the cut sheet upright in this state for approximately 15 minutes before unrolling for fitting.
- Linoleum while extremely resilient, is limited in flexibility and should not be bent tightly beyond its limitations. By nature, linoleum lends itself to be professionally fitted by pre-scribing sheets to shape. Two methods used for

scribing to shape are paper templating/patterning or bar scribing.

1. Scribing to shape by creating a paper pattern of the area.



- a. Create a paper pattern/template just short of the shape of the area, then mark the edges using a rule and pencil.
- b. Cut the material to shape.

2. Scribing the sheet to shape using tools with scribing pins



Scribing the end of a sheet with a sharp pin on a bar scribing tool. Dividers can be used to scribe around the door jambs.

Tip! - just before scribing a sheet, flatten the ends of the sheet to temporarily remove any end roll tension that may occur during the cutting process. Fold the end of the sheet back diagonally and feed the backing down with a gentle 'bouncing' action.

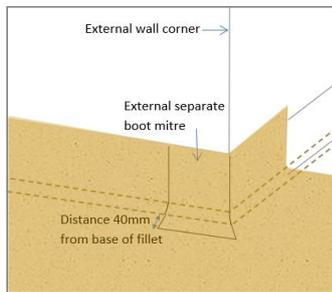


Flattening ends (Forbo)

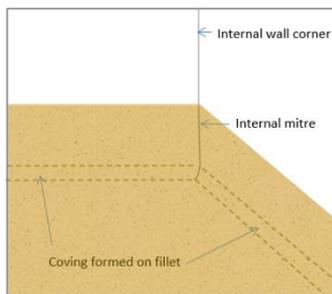
A general rule when scribing a sheet of linoleum is to allow an extra 1mm per metre in the length when scribing. This allows for any shrinkage that can occur when pulling the ends back, or back rolling the sheet during the adhesive application stage.

- Where linoleum is required to be coved, use a 28/30mm radius cove former.

External fillet coved boot mitre



Internal fillet coved mitre



Seaming

- While edges may appear acceptable for seaming, there may be a very slight thickness variation at the edge caused during machining, or the sheer weight of the roll standing on its end during storage/transportation that may cause some inconsistency with thickness at the edge of the roll.

- **Selvage trimming** - factory edges must be removed. An edge trimmer can be used, alternatively 20 mm can be trimmed off using a straightedge and utility knives with straight and hooked blades. This practice will ensure the seams finish continuously flush along the join.



Trim off the factory edge of the linoleum sheet

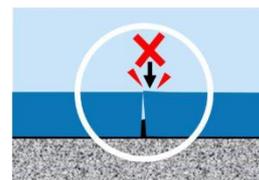


Factory edge trimming (Forbo)

- If the sheet is trimmed in place or after the sheet is put in place, run a pencil line down the edge to create a guide line to spread the adhesive to.

Because linoleum does not shrink across the width, welding seams may not always be necessary. Welding will be specific to the environment or the specification given for the job, for example in sanitary or hygiene areas.

- **Joining** - set the recess scribing tool to a just touching fit. Cutting too tight may cause one sheet edge to ride up over the joining edge resulting in a peaking appearance.



Incorrect



Correct (Forbo)

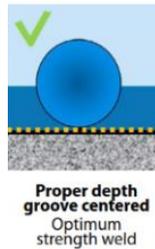
- Setting for a slight <math><0.5\text{mm}</math> gap is only needed for a guide on a manual or power groover to slot in to.



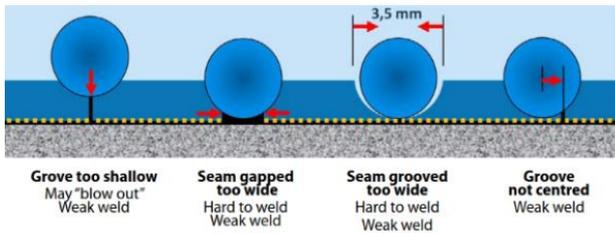
- After the seam is cut, roll the seam with a seam roller to ensure full contact with the adhesive. Remove any excess adhesive with a damp cloth.



Grooving - correctly for both linoleum and vinyl is crucial. While the weld rod is different in make-up to PVC, the reasons for using correct seaming and grooving processes are the same. See the illustration below.



X



(Forbo)

Hand grooving is best performed with a 'P' type hand grooving tool ('U' shaped blade). The sharp blade will provide a clean-cut edge to weld to. Used alongside a metal rule will help keep the groove straight.



Seams should be grooved out to just above the hessian backing for 2.5mm linoleum and 2.5mm for 3.2mm linoleum

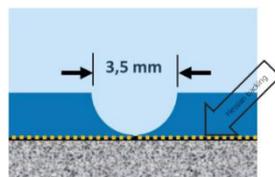


Illustration: Forbo

Thermo-welding - is a fusing process where both the linoleum and weld rod need heat applied. Rod weld for linoleum is not the same as rod weld for vinyl. Linoleum has adhesive properties whereas vinyl rod weld is PVC and will not melt into the linoleum. When welding linoleum to sheet vinyl, the linoleum rod weld must be used.

The tip used for welding linoleum is a 5mm speed-tip weld nozzle. Correct temperature setting and trimming methods are similar to rod welding vinyl sheet and are critical to

successful thermo-welding. A temperature that is set too hot will cause the rod weld to become a molten liquid that will be difficult to control and trim.



Temperature correct



Temperature too hot (Forbo)

See sections **9.9** and **9.11** for setting the weld gun temperature and trimming.

Bight marks in linoleum

During the manufacturing of linoleum, it is hung in large stoves in continuous festoons up to 16 metres to mature. At the top, the linoleum it passes over a pole, face inwards, and at the bottom forms a loop, or bight, face outwards.

During the 2-3 week curing process the weight of the material causes the linoleum to mould a little to the pole causing a mark cross the width (a pole mark) which is always cut out at the factory.

The fold or bight at the bottom is however more gentle, though sometimes detectable as a slight ridge across the sheet about 15cm wide (known as the bight mark).

- When site conditions are good, bight marks should present no problems using the appropriate adhesive with a 2mm x 6mm serrated edge trowel - a little extra attention is all that is required.



Bight mark (Forbo)



- As the sheet is fed into the wet adhesive and the bight mark is reached, lean gently on the bight mark to reduce the radius and rock in and out of the adhesive looking to

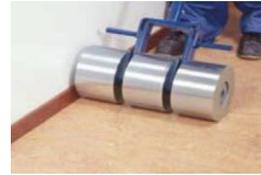
make sure that complete wet transfer of adhesive is achieved on the hessian backing over the whole width of the bight mark.

- By folding the end of the sheet back diagonally and feeding the backing down into the adhesive with a gentle 'bouncing' action as in the illustration below will ease the tension across the end of the length and the linoleum will have good contact with the adhesive.



- Do not make this so severe as to risk cracking the linoleum. Roll or rub down the edges to ensure the end of the linoleum sheet beds well into the adhesive,

- Once the remainder of linoleum still to be fed into adhesive clears the area of the bight mark, roll immediately with a 68kg roller to deal with any bubbles or trapped air before moving on.



- Repeat the rolling of the bight mark at 15 minute intervals until fully bonded to the subfloor.

For further information on installing linoleum, visit <https://www.inzide.co.nz/installation-guides> Marmoleum sheet.

INSTALLING RESILIENT FLOOR COVERINGS TO SANITARY AREAS

Building code clause E3 Internal moisture sets out objectives, functional requirements and expected performance criteria for sanitary spaces of a building.

The sanitary spaces of a building are more commonly known as the bathrooms, kitchens, kitchenettes, laundries and toilet areas of a building. They are used for hygiene purposes and will have a tap, basin, waste disposal system and/or an appliance.

Floor surfaces in these areas are expected to be impervious and also easily cleaned to help remove any bacteria that may form on the surface.

While these areas are dry under normal everyday conditions, they can become partially wet from water splash during the use of taps/appliances. For example, doing dishes, washing, getting out of a shower/bath or spilling a glass of water.

Areas that are wet under normal use such as an unenclosed shower space will require a purposed designed drain with a fall to allow water to drain.

Bathroom/shower areas are typically higher in water splash and in humidity when compared to other areas of a building. Any floor coverings/products or the associated installation products/systems used in these areas must be suitable for these conditions.

The B2 Durability Building code clause requires a 5-year durability requirement for linings that are easily accessed or replaced. The B2 Acceptable solution identifies protective floor coverings under this category.

The manufacturer /supplier of the floor covering/product will specify which areas their

flooring products are suitable for. The recent Building Products Information Requirements regulations, require a manufacturer /supplier is to publish and make easily accessible on-line product information, including which of the relevant clauses of the building code they deem to satisfy. The information should be accessible to a residential customer before a quotation is accepted.

While manufacturers and suppliers are to provide product information deemed to satisfy building code clauses and implied warranties, it is equally important that:

- ✓ floor coverings and systems are specified to the areas, circumstances and environment they are designed for in the first instance;
- ✓ Installations are planned and organised so the installer is able to carry out the work as specified when they arrive to the site; and
- ✓ the maintenance for the floor covering is carried out by the end user.

Refer section **3.3**

Building Code clause E3 - Internal Moisture

The **Objective** of this provision is to safeguard people from illness, injury or loss of amenity from the accumulation of internal moisture; and protect household units and other property from damage caused by free water from another household unit in the same building.

- **Functional requirement E3.2** requires that buildings must be constructed to avoid the likelihood of–

(a) fungal growth or the accumulation of contaminants on linings and other building elements; and

(b) free water overflow penetrating to an adjoining household unit; and

(c) damage to building elements caused by the presence of moisture.

- **Performance criteria E3.3.3** requires floor surfaces of any space containing sanitary fixtures or sanitary appliances to be impervious and easily cleaned.
- E3.3.6 Surfaces of building elements likely to be splashed must be constructed in a way that prevents water splash from penetrating behind linings or into concealed spaces.

E3 AS/1 is not a building code clause. It is a solution produced by MBIE that is deemed to satisfy the building code clause E3.

- E3 AS/1 provides sheet vinyl as a resilient floor covering example of an acceptable solution for sanitary areas. The edges of an area must be sealed or covered 1.5 m from a sanitary fixtures/appliance where water splash may occur.
- **Unenclosed shower spaces** that are wet areas as normal use, then sheet vinyl with thermo welded joints, edges covered and sealed is an acceptable solution. These areas will have a fall and drain to contain the water.

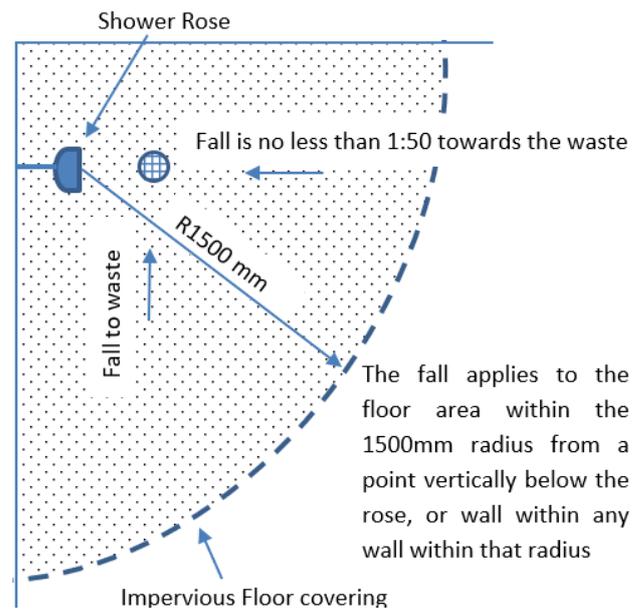
Wastes where vinyl is used for wet areas must allow the vinyl to be clamped into the waste.



↑ Allproof vinyl wet area wastes
↓

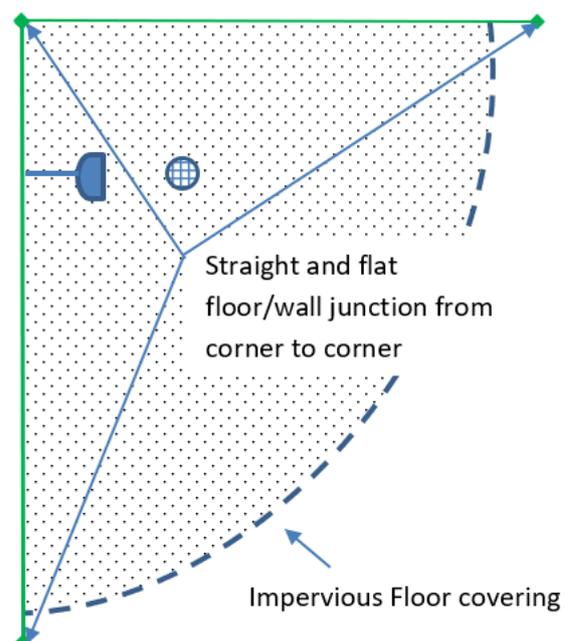
The fall given in E3/AS1 requires no less than a 1:50 gradient towards the floor waste. The fall applies to the fall area within a radius of 1500mm taken from the point vertically below

the shower rose, or from any wall within that radius.



How far a waste is situated from the wall or corner, the gradient, plus the sheet vinyl to be used should be identified at the design stage. This is to ensure the fall gradient is within the tolerance of the vinyl to be used when it is both covered and shaped into the fall.

At the floor/wall junction where the vinyl is to be covered, there must be a straight wall line and a flat floor surface between each corner point; no in-and-out of the wall line and no up-and-down of the flooring surface where it meets wall line.



This is critical as it enables the vinyl cove to be consistently formed along the junction from corner to corner. By ensuring a true floor/wall junction, a consistent tight pencil cove can be formed and where a cove fillet/former is used, the vinyl will sit firm consistently along the fillet.

A straight consistent cove will also assist the face of the vinyl to hold its shape and remain flat along the wall surface while the cove is being formed.

Where wall vinyl (cladding) is installed into sanitary areas, the same rules apply, the internal and external corners must be plumb from the floor corner point to the ceiling corner point.

- Waters splash areas where a waste is used to contain accidental overflow from damaging an adjoining household unit or other property, there is no fall required.

While E3/AS1 provides sheet vinyl as an acceptable solution, other floor coverings such as resilient LVT tile, Hybrid tile or timber-based floor coverings will need to apply for consent as an alternative solution. Building authorities will require appropriate information as to how these products will deem to satisfy the E3 code clause along with other building code clauses.

As part of the December 2023 Building Product Information Requirements regulations, the criteria for products and services used for **refurbishment work (non-consented)** need to be considered fit-for-purpose, therefore the same principles as consented work will apply.

Adhesive systems for resilient tile in sanitary areas

For a resilient tile, the choice of adhesive is influenced by the makeup of the tile, plus the environment that the tile is going into. The environment includes what the area is used for and the ongoing conditions the tile will be expected to perform in. Considerations of the adhesive type to be used could be:

- Moisture exposure in sanitary areas,

- Heat exposure from the sun through windows/doors.
- Commercial and residential areas
- Situations /environments where usage is anticipated to be heavier than usual e.g. rental properties.

Installers have a duty of care to follow the adhesive guidance provided by both the resilient floor covering and adhesive manufacturer/supplier.

- The adhesive should be an approved fit for purpose system that is compatible with the floor covering and suitable for the area.
- The B2, 5-year life durability clause will apply to both the resilient luxury vinyl tile and the adhesive.

The floor covering manufacturer / supplier may recommend a reactive type adhesive (high performance) for bathroom areas or where there is a higher degree of water splash and humidity.

Reactive adhesives are one or two part adhesives that are generally of modified silane polymer / hybrid polymer, urethane or epoxy technology.

- Recommended adhesive type used in residential kitchen and laundry areas should be able to sustain everyday normal use. Where it is anticipated that the area or dwelling will be subjected to heavier use, or where a slow leak could be concealed under sanitary appliances adhesive or floor covering suppliers may recommend reactive adhesives.
- The specified adhesive trowel notch must be used to ensure correct coverage rate is applied in order to achieve a full cover and secure bond. Refer to section **8.4**

Accidental overflow, leaks or floods are not an everyday occurrence, they are an event. As an example, water leaking within an internal wall cavity or cabinetry space can penetrate the bottom plate or toe space. It can also further penetrate the substrate and travel horizontally, damaging the floor covering or other rooms in the building. This situation is beyond the limitations of the floor covering or moisture control system where used.



Leak in an internal wall lining caused by a faulty connection in a new toilet cistern.



Damage caused 2 metres away from the source of the leak in another room.

- Any water spillage must be removed immediately or when practically possible to avoid:
 - any further damage occurring to the building,
 - any harm caused through slipping: or
 - mould/bacteria forming.
- For future reference and warranties, the identity of the manufacturer/supplier for any adhesive system used, should be recorded in the customer file or included in the quotation to the customer.

9.14 SEALING EDGES IN SANITARY AREAS

- E3 AS/1 provides a requirement for edges to be sealed or covered extending to the doors and all walls of the room or 1.5 m from all sanitary fixtures/appliance in an open room.
- This requirement is to prevent water damage occurring in concealed spaces beyond the floor surface area. This includes under sanitary appliances where an undetectable leak may cause damage.
- For a new build, a council inspector may look for sealed edges as part of the code of compliance.
- With the recently introduced Building Product Information Requirements, code compliance practices should still apply even if the refurbishment work does not require consent.
- An appropriate type and colour/clear sealant when applied should be gauged with a profiled tool to achieve a thin consistent bead of sealant.

The intention is to seal the joint; not to cover up inaccurate cutting.



Photo 1 - Sealant caulking and finishing tool.

- Creating a consistent fine bead can also be achieved by setting the width with masking tape. This process helps control the size of the bead width and the tape leaves a very fine square edge that can be helpful on embossed floor covering surfaces.



Photo 1 - Setting the bead width.



Photo 2 - Finished transparent bead.

- If applying sealant without masking tape, use the appropriate finishing tool to help provide a fine consistent bead.



Photo 3 - Monarch caulking tool.

- Care is needed to provide a fine consistent bead of sealant. Avoid or remove any fine sealant residue from the skirting/toe space and floor surface that may attract dust at a later time.
- Another option where a floor covering is pre-cut or patterned to shape is to apply a fine bead of sealant before installing the floorcovering (Photo 3). This method allows sealing from the bottom up and

leaves a finish without having a bead of sealant on the surface. (Photo 4).



Photo 3 Sealant to the shower/floor junction.



Photo 4 - After vinyl is fitted any excess sealant that squeezes up is removed.

From both a professional image and safety perspective the best practise for keeping a worksite tidy is removing rubbish and adhesive residue during the installation process rather than the end of the installation.

- Water based adhesives are soluble with water before they set. Any residue that is on the vinyl or a painted surface is easiest removed during the installation while it is still soluble.
- The more time the adhesive has been allowed to set the more difficult it is to remove. The consequence being:
 - The need for stronger chemicals or solvents; which increases exposure for the installer.
 - Damage to the vinyl or painted surface.
 - More time spent on the job.
 - Unprofessional appearance to the customer.
- Flooring businesses are required to provide a safe workplace for their workers and contractors.

- As part of workplace health and safety is the obligation for flooring businesses and their workers/contractors to be familiar with the Safety Data Sheet (SDS) of any chemicals or solvents used as part of a flooring installation.

Exposure controls/personal protection and toxicological information are specific sections in all Safety Data Sheets.

- Examples for products to be aware of are organic solvents, floor polish strippers, paint stripper, mineral turpentine, alcohol/ethanol-based cleaners/wipes.

Glove up is a website set up to provide basic information on the dangers of using organic solvents. As well as inhalation, chemicals also enter the body through skin contact.

While chemical/organic solvent products used for breaking down adhesives may be seen to be non-toxic in the short term (acute toxicity). It is the long-term exposure that may cause serious harm.

<https://www.gloveup.co.nz>