

DESCRIPTION SELLEYS® LIQUID NAILS DIRECT STICK® (LNDS) is a high performance moisture curing polyurethane flooring adhesive with rapid cure, easy trowelling and high strength. LNDS has a controlled foaming formulation that increases bond area and reduces the incidence of hollow spots. It is designed to expand to maximise the bond footprint. It cures very fast and is designed to adhere most types of overlay flooring to concrete, timber & composite substrates. The very high modulus bond of LIQUID NAILS DIRECT STICK offers significant advantages over more conventional highly flexible type flooring adhesives because it holds the overlay firmly to the substrate and minimises movement. The formulation wets onto surfaces (especially concrete) immediately. SUPPLIED READY TO USE IN A PAIL OR SAUSAGE FOR GOOD KEEPING, EASY APPLICATION AND LOW WASTE.

USES Bonding most types of wood flooring, parquet, strip (solid, engineered and prefinished) & sheet timber to common flooring substrates such as concrete, pre-existing strip flooring, particle board, plywood, and MDF, HMR (HDF), FC (Fibre Cement) sheets.
NB. Pre-testing for suitable adhesion is required (see Section A5).

FEATURES

- Excellent bond strength
- Low odour and low VOC formula.
- High strength and modulus for strong bonding
- Minimises hollow spots
- Rapid cure – Good strength is achieved in 2-3 hours
- Good wet grab and initial hold
- Designed to expand (high density foam) to maximise bond footprint
- Suitable for use with High Performance Polyurethane Protective Coatings (See Section C. Diagrams. 3/4)
- No rejection of finishes where spills on the timber have been sanded off.
- Resists cupping and rafting in timber overlay flooring

MIXING RATIO Single pack **COLOUR** Yellow Brown

PACKAGING Supplied in 14Kg(10L) pails (sufficient for 20m² using recommended trowels), and 700g(500ml) sausage (for 1m²)

COVERAGE 1½ - 2m² per litre, with the recommended trowels, dependent on substrate smoothness, porosity and trowelling technique.

CURE TIME Normally timber overlay floors can be walked on after 12 hours and sanded the next day. Full cure can be expected after 7 days.

RECOMMENDED TROWELS Parquetry Trowel or Spreader (Typically a ROBERTS 10-STV2 trowel.) 2.4mm wide by 2.4mm high v-notches at 4.8mm centres unless otherwise advised by Selleys.
Strip Flooring Trowel (available from Selleys) 5mm wide by 6mm high v-notches at 25mm centres unless otherwise advised by Selleys.

WORKING TIME Approximately 30 minutes once applied, depending on ambient conditions.

SHELF LIFE At least 12 months in unopened containers. Opened pails may skin/harden around the top but this can be cut or scraped off and the remaining soft product beneath will be satisfactory for use.

CLEAN UP TOOLS Clean tools and equipment with Liquid Nails Direct Stick Remover; polyurethane clean up solvent, lacquer thinners or acetone before product cures.

CLEAN SPILLS IMMEDIATELY Spills on pre-finished (factory applied UV-cured urethane) surfaces must be removed immediately and as completely as possible. It is advisable to clean up spills immediately with LIQUID NAILS DIRECT STICK REMOVER™. Cured product will need to be soaked with LIQUID NAILS DIRECT STICK REMOVER and removed with a plastic scraper. It is recommended that the scraper provided should be used to avoid scratching or gouging of the floor. Methylated Spirit may also be used to clean minor spills before they cure. [It is recommended to test any cleaner on a small inconspicuous area prior to use.] The best advice is to avoid contaminating finished surfaces by ensuring any spill is cleaned up immediately so that smears cannot be accidentally transferred to surfaces via shoes or other means. LIQUID NAILS DIRECT STICK REMOVER. May damage common one and two-part urethane finishes if not wiped off immediately.]

SAFETY INFORMATION Wear protective clothing. Good ventilation and gloves are essential. Avoid contact with skin. For further information refer to the Safety Data Sheet.

GENERAL NOTE These instructions are intended for flooring installers with a good understanding of timber flooring and installation. For further information, please consult your adhesive supplier or SELLEYS.

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Section A	SURFACE PREPARATION (Prior to Starting Job) when using LNDS
A1. LEVELNESS	<p>Surface must be structurally sound and level to 3mm in 3m. Out of level floors will increase the risk of hollow spots under strip timber overlay and give a washboard effect in parquetry overlay. Concrete slabs must be built in accordance with AS2870-1996 Residential Footings and Slabs Code (In New Zealand in accordance with the NZBC). Concrete surfaces must have a finish equivalent to that obtained when using a steel trowel.</p> <p>If a levelling compound must be used refer to Section A7 in this section (A). Consult SELLEYS to ensure compatibility with LIQUID NAILS DIRECT STICK [and LIQUID NAILS® VBS VAPOUR BARRIER, (VBS) if required]. Selleys recommendation for self-levelling compound is Roberts Flexiscreed 38 or an equivalent exterior grade product (which does not require a moisture barrier beneath it). If a levelling compound is used, then you must ensure that it is allowed to dry sufficiently before laying the overlay floor directly to it if not coated with a moisture barrier. [Note:-Drying time for levelling compounds can be days longer than the “walk on’ time.]</p> <p>NOTE: Selleys recommend that LIQUID NAILS VBS VAPOUR BARRIER be used over a levelling compound as moisture rising from below can affect most overlay flooring.</p> <p>1.1. Concrete Substrate A STRONG, smooth, flat and level surface is required. It is strongly recommended to grind the concrete to remove high spots, surface contaminants and weak surface layers. Use a straight edge to check for flatness. It is advisable to repair holes and surface defects in the concrete before hand. (Note: Minor holes and pitting can be safely filled with LNDSLFL). Sealing the floor with LIQUID NAILS VBS VAPOUR BARRIER allows an easier / smoother, more even adhesive spread, especially with the small notched parquetry trowel. If levelling compound is required see notes at Section A7 - “Self Levelling Compounds and Screeds</p> <p>1.2. Timber Substrate Sand the substrate to remove contaminants such as old glue or surface finishes and flatten any raised joints. Use a straight edge to check for flatness. Re-fasten the old flooring as necessary to ensure it is firmly fixed. (It is recommended to screw fix particleboard that has previously been conventionally glued and nailed).</p> <p>(Eg Particleboard or existing strip flooring) NOTE: New strip flooring is normally laid at right angles to the line of previous strip flooring. SELLEYS recommends use of a sheet timber underlay when laying parquetry over strip flooring.</p>
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1.3. Sheet Timber Underlay

This is a common technique for retro fitting an existing floor, or for simply laying new floors. Substrates include concrete, particleboard, ply or existing timber floors. Where height permits, an underlay of ply or particleboard can be bonded to the substrate, helping to give a true level and improved insulation. This also allows strip flooring to be secret nailed as well as glued. Whatever the timber underlay is laid over, it needs to be level (refer "1. Levelness"), dry (refer "2. Substrate Moisture Control") and sound (refer "3. Soundness of Substrate"). Install LIQUID NAILS VBS VAPOUR BARRIER if required. (Refer "2. Substrate Moisture Content Control"). On concrete it is recommended to use LIQUID NAILS DIRECT STICK (LNDS) adhesive to bond the sheets to the concrete as it will expand and reduce the chances of hollow spots. Lay the sheet timber underlay onto a ribbed bed of adhesive. Spread adhesive with the notched trowel recommended for strip flooring at the normal rate of 1.5 – 2m² per Litre. The glue lines should be across the line of lay. TAKE CARE TO PLACE BOARDS IN POSITION. DO NOT SLIDE THE BOARDS ACROSS THE APPLIED ADHESIVE BEADS, as this will smear the adhesive beads and cause poor bonding of both LNDSLIF and LNDS. In the case of LNDS will reduce the ability of the adhesive to foam and reduce the occurrence of hollow spots beneath the sheets. Weight or secure the laid boards as you proceed. Nailing is best if laying on a nail-able substrate. This is required to ensure good contact while the adhesive is curing and prevent boards lifting if using LNDS adhesive. (Lifting can occur as the adhesive expands if there is excessive adhesive present due to an uneven substrate or uneven application of LNDS adhesive).

Do not walk on laid panels during the first four hours after installation.

A2. SUBSTRATE MOISTURE CONTENT CONTROL

Moisture arising from the substrate that the timber is adhered to can be the determining factor for a successful timber flooring installation. It is a most important detail to consider. To obtain a full performance warranty for timber flooring, Selleys require that VBS be used and installed correctly. Issues that need to be considered for some different substrates are detailed below.

2.1. Concrete Substrate

[Refer to the Quick Reference Guide at the bottom of this page].

Surplus moisture rising from concrete slabs is the main cause of timber swelling which results in peaking and cupping in timber over concrete installations. A moisture sealer such as SELLEYS LIQUID NAILS VBS VAPOUR BARRIER moisture sealer for concrete slabs must be used unless moisture migration from the slab is less than 15g/m²/24hours. SELLEYS recommend that, unless proven otherwise, you should assume that all slabs have surplus moisture and treat them with LIQUID NAILS VBS VAPOUR BARRIER before installing the timber overlay. A slab that is currently dry can (even a suspended slab) become damp later for various reasons [The rate at which moisture migrates from the slab can be tested by using a test kit and procedures laid down in ASTM F 1869]. If serious dampness is suspected in any concrete slab, a quick check can be done by securely taping (sealing all around) a 1m x 1m square of heavy duty plastic onto the slab, and leaving it for 24 hours. Any visible dampness or discolouration of the slab under the patch on removal of the plastic is a warning sign.

New concrete should be cured until the moisture content of the slab is less than 5.5% and the rate of water vapour transmission from the slab is less than 15 g/m²/24 hrs. The time to achieve this may vary. Normally at least 28 days is required to ensure that the slab has shrunk to a stable dimension but drying can take a lot longer, as much as one month per 25mm thickness. If the slab is still green and high in water-of-placement, then encourage the excess water to migrate out by providing good ventilation or by using a dehumidifier. Note that this can result in a false appearance of dryness in the surface only. A quick check can be done using the 24 hour taped plastic sheet test referred to above, but even if this test shows no dampness, follow-up testing using the ASTM F1869 method would still be required. It is safer to consider using LIQUID NAILS VBS VAPOUR BARRIER once this "dry" state has been achieved**.

If the slab is below grade, and there is a possibility of the water table becoming high enough to pressurise the concrete, perimeter drains would need to be installed. The application of LIQUID NAILS VBS VAPOUR BARRIER would still be recommended in addition to the drainage.

For ground floor slabs and areas prone to high water vapour transmission or on very porous surfaces it is strongly recommended that 2 coats of LIQUID NAILS VBS VAPOUR BARRIER be used over concrete before applying LIQUID NAILS DIRECT STICK adhesive, the VBS will prevent excessive moisture migration and subsequent swelling of timber.

NOTE: For maximum bonding between the LIQUID NAILS DIRECT STICK VBS vapour barrier and the adhesives, it is recommended to lay the adhesive within 24 hours of applying VBS epoxy vapour barrier. If the adhesives are to be applied to the vapour barrier after 24 hours have elapsed then the surface of the epoxy vapour barrier will need to be roughened with 60 – 80 grit sandpaper. It is advisable to take this into account when planning the job (eg apply VBS on the next day's area or work as the last job each day).

Quick reference guide for controlling moisture from concrete slabs:

1. If the slab passes the 24 hour taped plastic sheet test, and the slab is older than 4 months, then test to show that moisture transmission is <15 g/m²/24hrs, or apply one coat of LIQUID NAILS VBS VAPOUR BARRIER to specifications.
2. If the slab does not pass the 24 hour taped plastic test but is >60 days old, apply one coat of LIQUID NAILS VBS VAPOUR BARRIER and test that moisture transmission rate is <15 g/m², or apply a 2nd coat of LIQUID NAILS VBS VAPOUR BARRIER.
3. If no testing is possible, or the slab is <60 days, seek specific recommendation from SELLEYS.

(Normally, if a slab is surface dry then VBS can be applied to it. Surface dry concrete is light in colour and colours dark grey if water is splashed onto it.)**

2.2. Timber Substrate Use a moisture meter to check the moisture content of the timber substrate over which the new floor will be installed. Moisture content of the timber substrate should be within 2% of the expected equilibrium moisture content of the building. [Refer below to “A6 Moisture content of New Timber Flooring to be Installed” for guidance on moisture testing].

SPECIAL NOTE: In the case of laying a new timber floor over existing suspended wood floors, check the moisture content of the subfloor timbers also. This is most important as once the new floor is laid on top and the surface is sealed, the new floor timber will equilibrate to the subfloor moisture content. If subfloor moisture is high then problems will result for the new floor. If subfloor moisture is high then measures must be taken to reduce it or isolate it from the new flooring. Typical remedies include improving subfloor ventilation, installing sizzilation and covering bare soil with plastic sheet. It may even be prudent to temporarily seal the surface of the new floor and allow it to equilibrate to the subfloor conditions for a number of weeks before sanding and finishing.

A3. SOUNDNESS OF SUBSTRATE

Adhesive bonded timber flooring can fail because the substrate surface to which it is adhered is not suitably strong or stable. The substrate may break away, allowing the floor to lift and move. Concrete floors may have been skim coated, patched or made up of layers that do not adhere well. Any new patches, repairs and self-levelling compounds must be applied correctly and achieve appropriate adhesion. However, a concrete slab may have been treated inappropriately by others prior, so checks must be made to ensure that it is suitably sound.

Some guidance is as follows:

The slab may have been exposed to rain during installation, causing cement to be washed out, leaving the surface soft, weak or powdery. If the surface does not resist gouging with a sharp screwdriver it could have this problem. (Grinding or blasting back to strong concrete could be required.)

Hollow spots, poorly adhering patches or skims can be detected as “drumminess” or hollow sounds when the surface is ‘percussion tested’ by tapping over it lightly with a hard object, (e.g. piece of wood etc). If found, such places need to be dug out and repaired properly.

The concrete surface should be strong enough to resist indentation when hit firmly with a steel hammer. If not then establish if the whole slab is weak or it is only a surface problem that can be ground or blasted off.

Is there laitance on the concrete surface? If so, determine if it is poorly adhering and needs to be removed by grinding and blasting. (If it is adhering strongly it will not be pulled off in an adhesion test, (see below “A5. Adhesion Checks”).

See also Section 7 “Self-levelling compounds and screeds”

A4. SURFACE CLEANLINESS

All surfaces must be clean, dry and sound, free of voids, loose materials and contaminants (curing compounds, oil, grease, waxes, sealers, coatings, previous adhesives etc.). [Presence of waxes and sealers that are not easily seen on or in the surface are indicated if water splashed onto the concrete does not quickly and freely soak into the surface].

Complete removal of any contamination must be carried out where it is suspected. Suitable surface preparation may be achieved by diamond grinding, shot blasting, sand blasting or by captive abrasive blast cleaning.

A5. ADHESION CHECKS

Destructive Pull Tests should be conducted to ensure that the adhesive will adhere to the timber to be used, to the floor surface, and that the floor surface (substrate) is strong enough. Once all the preparation work has been done, glue down a minimum of 5 x 300 mm long off cuts of the strip flooring timber (or 5 parquetry blocks), gluing only half the length of each block. Place these randomly around the whole area, ensuring placement in any suspected problem areas. After 24 hours (minimum 12 hours), lift the bonded pieces by the free end to lever them off the floor. Examine the bond failure in each test sample. Optimum properties are demonstrated where there is a combination of substrate, glue and wood failure in each test sample. If the concrete pulls off as a crust or as a plug, there are some structural concerns with the slab. If removal is easy or if bonding to the wood or to the surface is poor (adhesive comes away cleanly from these surfaces), contact SELLEYS for specific advice.

- NOTE:**
- (1) If LIQUID NAILS VBS VAPOUR BARRIER is to be used, it may be appropriate to test the floor before the LIQUID NAILS VBS VAPOUR BARRIER is applied, or to apply patches of LIQUID NAILS VBS VAPOUR BARRIER on the test areas only in case some rectification is found to be necessary.
 - (2) Application of VBS vapour barrier will not repair a soft / weak concrete substrate. The adhesive will bond to the VBS that will itself be easily lifted off the weak concrete.

A6. MOISTURE CONTENT OF NEW TIMBER TO BE INSTALLED

Timber strip and parquet flooring should be installed at a measured moisture content within 2% of the expected equilibrium moisture content of the building to minimise excessive movement after installation, which can overstress the adhesive bond. Use a moisture meter to check the moisture content* of the new flooring timber prior to installation and make sure it is within +/- 2% of the predicted Equilibrium Moisture Content (EMC) of the building#. The moisture content of at least 10 random samples representative of the entire quantity of new timber overlay should be recorded to establish that the whole quantity has a similar moisture level. Do this even if you have a Moisture Content Report from the timber supplier to confirm that there has been no change. [Timber supplier reports are usually "ex mill" reports and the timber is not checked again. Always, BOTH keep MC reports from the timber supplier and record the results of your own tests in the job records.] Acclimatisation may be required prior to installation to minimise the movement (natural and cyclical timber shrinkage and/or expansion) in the timber after installation. If the timber is too wet or too dry, a successful installation is very unlikely. *AS 1080.1: 1997 contains information on moisture testing of timbers and correction data for different species.

#AS 1684.2 – 1999 Appendix F gives the following indicative EMC's likely to be encountered			
Climate zone	Average indoor EMC (%)	Seasonal EMC range (%)	Recommended average moisture content at installation (%)
Coastal (Zone 3)	12	10 to 15	12
Inland (Zones 1 and 2)	9	7 to 12	9
Air conditioned	9	7 to 12	9

Not included in AS1684: - Heated floors. (Selleys recommend average moisture content at installation be 8 to 9% with appropriate loose laying.)

A7. SELF-LEVELLING COMPOUNDS AND SCREEDS

This is a most important issue for the installer of overlay timber flooring. **The condition and quality of self-levelling compound or cement screed can be the most important factor in achieving a long lasting timber over-lay floor.**

7.1. Self-levelling Compounds [SLC]

7.1.1. General important notes

Note that the technical data usually provided for these materials concerns itself with the compressive strength, speed of walkability and serviceability. This is because these materials are manufactured to give good top loading resistance only. They are often the primary load bearing surface for soft surface finishings such as vinyl or carpet. For this service they do not require significant wear resistance or tensile strength. Interior grade self-levelling compounds generally soften or lose strength rapidly when wet because they are designed for interior use only. Moisture rising from concrete below has a deleterious effect on them. Consequently, **Selleys only recommend the use of an exterior grade levelling compound that does not require a moisture barrier under it (Refer section 1 – Levelness).**

NOTE: Although not necessary with an exterior grade product, if VBS is used under a levelling compound then precautions are needed to ensure that the levelling compound actually bonds effectively to it. An appropriate primer for bonding the levelling compound to the epoxy based VBS should be used. [Consult Selleys for specialist advice in these cases].

When adhesive bonding timber overlay flooring to a surface, the tensile strength of the "system" is important. A lot of situations that other flooring systems can "get away with" are totally unsuitable for direct adhesive bonding of a functional strip or block timber overlay system; e.g. tiling, vinyl, carpet, do not place tensile stress on the compound. As timber is constantly moving, tensile stress is transferred through the adhesive to the levelling compound. If the stress is greater than the compound can resist it can: - break, pull off the surface below it or the surface of a weak compound will simply shear off at the surface. If there is any doubt about the strength of a levelling compound or screed (See A3. – SOUNDNESS of SUBSTRATE.) then it should be removed or the floor isolated from it with suitable thickness sheet timber overlay (which should be pinned rather than adhesive bonded to the floor).

7.1.2. Factors influencing final strength

Factors influencing self-levelling compounds that result in low strength or soft surface.

- Out of shelf life and/or poorly stored bags.** These products have a short shelf life of around 6 months only from the date of manufacture (DOM). Poor storage in the supply chain can expose them to moisture, which shortens their shelf life significantly. If out of shelf life or moisture affected, they will not set with good strength. [IF YOU CAN NOT READ THE "BEST BEFORE" DATE or the 'expiry date' and batch number on the bags THEN DO NOT USE THEM. If you can then ensure that the bags are in their shelf life period.]
- Too much water in the mix and/or poor mixing:** Correct and accurate water addition and correct mixing is critical to achieving levelling compound with good strength. It is common to "guess" the water addition and mix till it 'looks OK'. This can often result in soft surfaces on self-levelling due to one or both: "over watering" and poor dispersion of the suspending agents in the compounds.

7.2. Moisture content of installed self-levelling

Just as it takes time for excess moisture to dry out of a new concrete slab long after the slab has become “serviceable”, (see A3.1 Concrete substrate), this is also the case for SLC. While installed SLC will dry out faster than for a new concrete slab to dry down to 5.5% moisture, it can take longer than a day or two if the drying conditions are not good, or if it is a deep application. An installer must consider/test the moisture content of a newly laid SLC. If overlay flooring is laid too soon, the excess moisture in the SLC can rapidly affect lower density flooring timber, leading to temporary swelling and cupping which can rip the surface off the SLC and the floor will fail very soon. For these reasons Selleys recommend a strong cement screed or exterior grade SLC to level the surfaces and apply VBS over it.

7.3. Screeds (or toppings)

It is common to use sand-cement ‘screeds’ for setting levels prior to laying ceramic tiles. They have the advantages of not being affected by moisture from above or below (unlike common interior grade SLC’s) and have good compressive strength. However, it is also common to use minimal cement content and no additives so that the resulting ‘screed’ can have the tensile strength of “Weet-Bix ®” or “Vitabrits®” and be not at all suitable for holding down timber flooring. (Refer A3 – Soundness of substrate). Portland cement/sand levelling screeds must be prepared (compounded) properly for a strong out-come, use bonding aid and curing additive (such as Selleys Sealwall Bondcryn 737), use a maximum of 3 parts sand to 1 Portland cement by volume, if adding up to 4 parts fine (pea) gravel to the mix reduce the sand: cement ratio to 2 to 1.

NOTE: If diamond grinding or sheet timber overlay is not feasible for levelling a concrete floor then a strong (properly compounded) Portland cement/sand topping is the best solution. Although slower to harden than an SLC, it will not be affected by moisture from the slab below and can be coated with LIQUID NAILS VBS VAPOUR BARRIER as soon as it is surface dry. Note also: A very fast curing, hard screed to fill depressions can be made up by mixing dry clean washed sharp sand with previously mixed LIQUID NAILS VBS VAPOUR BARRIER. Not only is this very fast curing but is also a barrier to moisture.

A8. UNDER-FLOOR HEATING

SELLEYS LIQUID NAILS DIRECT STICK provide a service temperature resistance of up to 80°C. **However**, it is undesirable to expose timber flooring to such high temperatures for any period, as it will cause excessive shrinkage of the timber. Under-floor heating must have suitable thermostatic controls that limit the slab temperature to 30°C maximum. The moisture content of timber flooring installed over a heated floor needs to be 8% to 9% and layed loosely. (See Table at A6)

Section B**APPLYING LIQUID NAILS DIRECT STICK**

Important NOTE: Take care in the use of LIQUID NAILS DIRECT STICK polyurethane flooring adhesive. It is a very efficient adhesive and bonds well to unprotected skin. Wear clean disposable gloves and avoid leaving glued off-cuts around the job. Continually check for glue on other surfaces and remove it while it is still wet. The incredible strength and bonding ability make it very difficult to remove the glue once it has cured.

B1. OPENING, DISPENSING AND INTERMEDIATE STORAGE OF LNDSLF**Pail**

Upon removing the lid, (especially if the pail has been used before), the adhesive in the pail may have skin of cured adhesive on the surface. This skin should be carefully removed to reveal fresh, soft adhesive below. Avoid breaking up the skin in the pail as this can cause inconvenience in application, such as blockage of the trowel notches. Scoop or pour adhesive from the pail to the application surface, (avoid spills and drips outside the immediate application area.). Replace the lid loosely on the adhesive container during use to avoid curing in the pail. For overnight storage, clean the lip of half used pails, firmly replace the lid and stand upside down to avoid a skin forming.

Sausages

Lay the sausage pack on the surface to which adhesive is to be applied. Using a sharp knife, pierce or cut the sausage at one end only. The adhesive can then be easily squeezed from the pack and directed as required. (NOTE: If the sausage is pierced or cut while it is held in the hands, adhesive may spill out uncontrollably onto other surfaces, hands or clothing.)

Sausages with only one end cut off are easily stored for long periods by closing the opening flat, folding it tightly back on itself a couple of times, and pinning it closed with wire or long nails or clipping it with pegs/paper clips. LNDS will only cure in the vicinity of the folded seal. When ready for re-use, cut off the folded seal (only) or cut a new corner to allow the good product beneath to be dispensed and used normally.

Section B**Continued next page**

B2. IMPORTANT NOTES ON APPLYING ADHESIVE

Only spread as much adhesive as you can cover in 20 minutes. Do not leave spread adhesive over meal breaks, as curing will have begun. Keep the working area clean as small stones or chips of wood will stop the boards making full contact with the adhesive. Clean the trowel regularly as partially cured adhesive in the notches will reduce the amount of adhesive applied and reduce the quality of the bond.

AVOID WALKING ON NEWLY LAID STRIP AND ENGINEERED FLOORING FOR AT LEAST 4 HOURS.

WARNING: **LIQUID NAILS DIRECT STICK™ polyurethane flooring adhesive foams (expands) as it is curing. Use only the recommended trowels to spread the adhesive as the notches leave spaces where the adhesive may expand. If the adhesive is laid with a flat spreader or trowel the application (job) will be unsuccessful as expanding adhesive will lift and move boards significantly.**

B3. APPLYING STRIP FLOORING WITH LNDS

The most important consideration when using LNDS adhesive for installing strip flooring is the method used to clamp the boards together and hold them down in contact with the glue while the glue cures. There are many systems used including; heavy weights, temporary concrete nails, secret concrete nails, face fixings with plugs to cover them and wedging and “tomming” off walls and ceilings. (Refer to Illustrative Diagrams – Diagram C1). Edge boards should be well fastened to minimise damage to the floor in the event of accidental flooding. For best results use the trowel recommended for strip flooring. This provides the optimal spacing and height for adhesive ridges for expansion and bridging needed if surfaces are slightly uneven. It is the glue in the ridges that is going to achieve the bond. The height of the ridges ensures that the adhesive bridges across the gap* wetting onto the underside of the boards, and helps the foaming compensate for slightly uneven surfaces. **ALWAYS** ensure that boards are positioned before laying them down onto the adhesive. **Do not place and then slide boards across the adhesive**, as this action flattens and spreads the adhesive out thinly and may result in no bond forming between the board and the floor.

* There is a limit to the size of gap the ridges and expansion (foaming) of the adhesive can bridge, so make sure the flooring is held firmly down onto the substrate until the glue has cured.

Make cuts and set up the next “run” of boards before you spread the adhesive. [Do not (NEVER) spread the adhesive and then start searching for pieces and planning the cuts to fit the area. This risks laying into adhesive that has skinned, resulting in poor or no bond to the timber]. Work the adhesive with the trowel to make it easier to spread and minimise the amount of glue that is left between the ridges. Always trowel the adhesive so that the ridges are roughly perpendicular to the direction of the boards. (Refer to Illustrative Diagrams – Diagram C2). Spread the adhesive up to a maximum of 800mm ahead of the last board.

ALWAYS WORK FROM THE BACK OF THE ROOM TO THE DOOR SO THAT THERE IS NO NEED TO WALK ON FRESHLY LAID BOARDS.

3.1. Laying solid Strip Flooring Over Timber Sheet Substrates Or Old Strip Flooring (Secret or face nailed)

Ensure the under floor is firmly fixed. (Refer Section A1.2). Lay new strip flooring perpendicular to the run of the existing floor. Set out your starting board. Glue the individual board and fix it firmly. Top nail, or secret nail, wedge or block it so that it does not move off the line when clamping and fixing the adjacent boards. Glue four to six board widths at a time. Be careful to cut the boards accurately before spreading the glue and placing them to avoid the glue curing due to some delay and also avoid getting glue on your tools. Nail each 5th board to hold the “block” (or “run”) down in contact with the adhesive or weight each block of boards down as you go. Leave weights in place overnight. Use wedges or face nails to hold the last few boards. Be careful to remove any excess glue from walls etc before the glue cures. (Refer Section D3).

ALWAYS WORK FROM THE BACK OF THE ROOM TO THE DOOR SO THAT THERE IS NO NEED TO WALK ON FRESHLY LAID BOARDS.

3.2. Laying solid Strip Flooring Over Concrete

SELLEYS LIQUID NAILS DIRECT STICK is ideal for adhering strip flooring to concrete surfaces. Proceed as for laying over sheet timber substrates using appropriate fixing and weighting to hold the boards in contact with the adhesive while curing. (Refer to Illustrative Diagrams – Diagram C1).

ALWAYS WORK FROM THE BACK OF THE ROOM TO THE DOOR SO THAT THERE IS NO NEED TO WALK ON FRESHLY LAID BOARDS.

NOTE: If LIQUID NAILS VBS VAPOUR BARRIER has been applied over the concrete, it is recommended that temporary nails or face fixings not be used. Penetration through the vapour barrier will compromise its effectiveness and can cause localised swelling of timber overlay. (When removed, these will leave holes in the barrier and allow moisture to rise through from the concrete into the timber). If nailing through VBS can't be avoided then no more than 10 (straight driven) nails* per square meter can be tolerated. If possible it is recommended that the nails be left in place to keep the hole sealed. . (See notes to Illustrative Diagrams – Diagram C1). * Refers to nails or holes 3mm to 4mm diameter

3.3. Laying solid Strip Flooring over joists

SELLEYS recommend that a ply or particleboard working surface be laid over or between the joists before installing strip-flooring overlay. SELLEYS LIQUID NAILS DIRECT STICK is not suitable as the sole bonding method when fixing strip flooring directly to joists. Boards must be nailed as per normal (i.e. as per requirement of AS 1684.2 or NZBC). LNDS may be used for improving the bonding of boards to joists and to take up any unevenness across the joists. This gives a firmer and more stable floor.

NOTE: When fixing strip flooring direct to joists there is insufficient adhesive contact area to resist rafting of boards caused by edge bonding between board joints that can occur when some polyurethane finish coatings are used. It is NOT recommended to use LNDS polyurethane flooring adhesives in the groove of T&G strip flooring.

3.4. Laying Engineered strip flooring

Engineered strip flooring can be laid in a trowelled bed of LNDS in a similar fashion to solid strip flooring, BUT particularly, if the engineered flooring has been pre-finished the adhesive is more usually applied to the back of the board prior to positioning the board on the floor. If this is the preferred method then SELLEYS® LIQUID NAILS DIRECT STICK® LF (LNDSLFL) is the more appropriate adhesive for the job (Refer to LNDSLFL Application Notes). Unlike LNDS, LIQUID NAILS DIRECT STICK LF can be daubed with a spatula from the pail or extruded with a gun from sausages onto the back of the board prior to the lay. Ensure that depth/thickness of adhesive applied is sufficient to bridge any gap between the board and the substrate. One preferred method is to apply 5mm to 6mm diameter beads to the back of the board at 70mm centres using sausages in a sausage gun. This gives a good thickness for bridging and a good bonded area when the board is pressed into place and the adhesive is spread out under the board. It is common practice to also apply a cross-linking PVA adhesive to the upper part of the tongue & groove joint of engineered boards prior to installation. This is done immediately prior to applying the LNDSLFL adhesive to the back of the board.

A suitable cross-linking PVA glue for this is SELLEYS® AQUADHERE® EXTERIOR™. The use of this adhesive in this joint ensures that water spilt on the floor does not penetrate the joint and affect the timber below. (Note that some “engineered” or laminated flooring can be very susceptible to the effects of water.)

AVOID WALKING ON NEWLY LAID STRIP AND ENGINEERED FLOORING FOR AT LEAST 4 HOURS. ALWAYS WORK FROM THE BACK OF THE ROOM TO THE DOOR SO THAT THERE IS NO NEED TO WALK ON FRESHLY LAID BOARDS

NOTE on Bamboo and Prefinished Hardwood:

Compressed Bamboo Overlay needs special attention as its characteristics differ to solid timber and laminated engineered overlay.

Due to the nature of these prefinished products the effects of water absorption are accentuated and it is critical that the MC of the overlay is within 2% of the environment in which it is installed. Ensuring that boards are not laid too tight will further accommodate any expansion due to moisture absorption after installation.

These particular prefinished overlays are generally supplied with a coating on the base of the board and although this does not interfere with final bond strength of Direct Stick, the bond strength of the coating to the board cannot be guaranteed. To minimise the risk of delamination of this coating it is advised that the coated overlay be laid in a bed of trowelled adhesive to ensure full coverage.

3.5. Wideboards

Selleys have no different requirements for the use of Liquid Nails Direct Stick on wide boards **up to 20mm in thickness**, therefore the methods described under section 3.1 and 3.2 should be followed closely.

When direct sticking wide timber overlay (greater than 80mm cover) with LNDS there is no requirement for top or face nailing, **BUT** it is of paramount importance to note and understand the special needs and issues related to installing “wide” overlay timber flooring.

- Cupping and splitting are a much higher risk with solid timber wide boards than with “narrow” boards. The same degree of cupping may be negligible in a narrow board application but exaggerated for wide boards.
- It is most important to note that Selleys do not offer a warranty on over-lay strip flooring installed with an MC outside the range that it will be in service. This is of paramount importance, particularly in air-conditioned and centrally or under-floor heated residences where the EMC is more like 8 – 10%.

Whilst engineered flooring boards are more dimensionally stable than solid timber, it is of equal importance to ensure that the appropriate preparation is completed and that moisture content is within the EMC expected in service.

B4. APPLYING PARQUETRY FLOORING WITH LNDS

For best results when applying small parquetry block flooring use a trowel or spreader with 2.4mm wide by 2.4mm high v-notches at 4.8mm centres. (Typically a ROBERTS 10-STV2 trowel).

Parquetry, especially 8mm mosaic, should be laid taking care not to use excess adhesive as the excess expanding adhesive can lift the blocks unevenly. For a low foaming product, it is recommended that LIQUID NAILS DIRECT STICK LF be used (refer to the application notes for LNDSLFL).

Spread the glue evenly ensuring there is no glue surplus to the trowelled ridges. Trowel the ridges at right angles to the direction of lay. For herringbone and mosaic type patterns, trowel the glue on a diagonal so that the ridges do not run parallel with any blocks. Support the first row of blocks with a straight edge or wedges.

Place the blocks carefully and press them firmly into the glue until they will go no further. **It is recommended NOT place the block away from the previous row and slide it up**, as this will bunch the glue up between the blocks and reduce the amount of adhesive on the floor for the next block. Do not add extra adhesive to “rocking” blocks. If a block does not feel as if it is going down fully, remove it and check for small stones etc. in the glue. If replacing a block with a new one, **ALWAYS** apply fresh adhesive to the bottom of the new block before placing it in order to replace the adhesive that was removed from the floor with the discarded block.

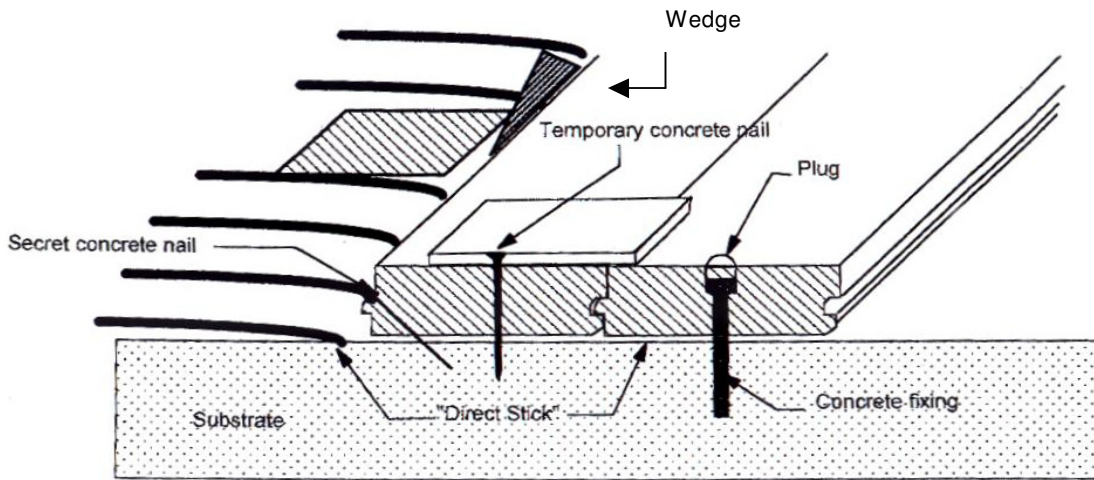
Avoid walking over the laid area within 4 hours if possible. Wedge all small end blocks and the last row to prevent any sideways movement as the glue cures. If you need to stop half way across a room overnight, pin* a temporary straight edge along to hold the last row of blocks tight.

*** Try to avoid temporary nails and face fixings when gluing over LIQUID NAILS DIRECT STICK VBS vapour barrier as they will damage the barrier when removed. Wedges or “tomming” may be used instead of nails. (See notes under 3.2 and on diagram on next page.)**

Section C ILLUSRATIVE DIAGRAMS

Diagram C1. - Various methods for securing timber until the adhesive sets.
 AVOID WALKING ON NEWLY LAID TIMBER OVERLAY FLOORING FOR AT LEAST 4 HOURS.

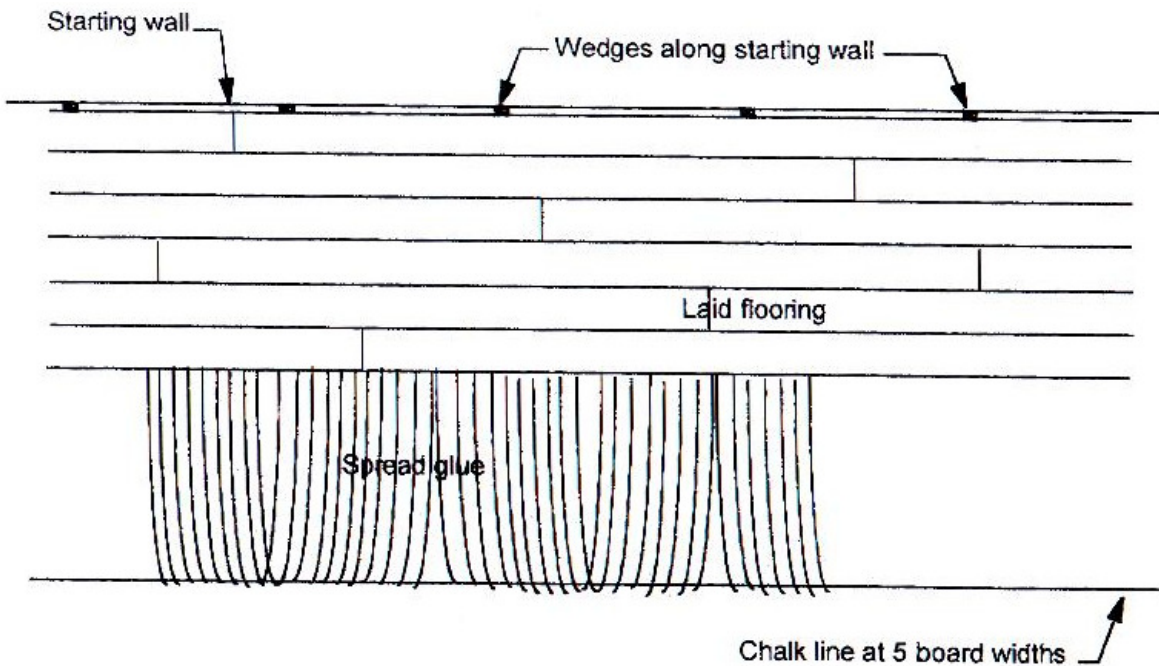
Some systems of holding timber to concrete while the glue sets



NOTE: It is not recommended to use temporary nails and face fixings when gluing over LIQUID NAILS VBS VAPOUR BARRIER, as they will damage the barrier when removed. If nailing through VBS then it is recommended that the nails be left in place to keep the hole sealed. If temporary nails are unavoidable do not exceed a maximum of 10 nails or holes per m² whether leaving nails in or removing them, (see Sect B 4.2) (Wedges and weights may be used instead of nails). The reference above to “secret concrete nail” is to a special purpose nail/pin. Do not use conventional nails to secret nail into concrete unless the hole in the concrete is pre-drilled as driving nails at an angle can greatly damage the coating.

Diagram C2. - Applying LIQUID NAILS DIRECT STICK

ALWAYS WORK FROM THE BACK OF THE ROOM TO THE DOOR SO THAT THERE IS NO NEED TO WALK ON FRESHLY LAID BOARDS.



Section C Continued next page

Section C Continued

Diagram C3. Rafting (panelisation) in strip flooring installed with a flexible adhesive system

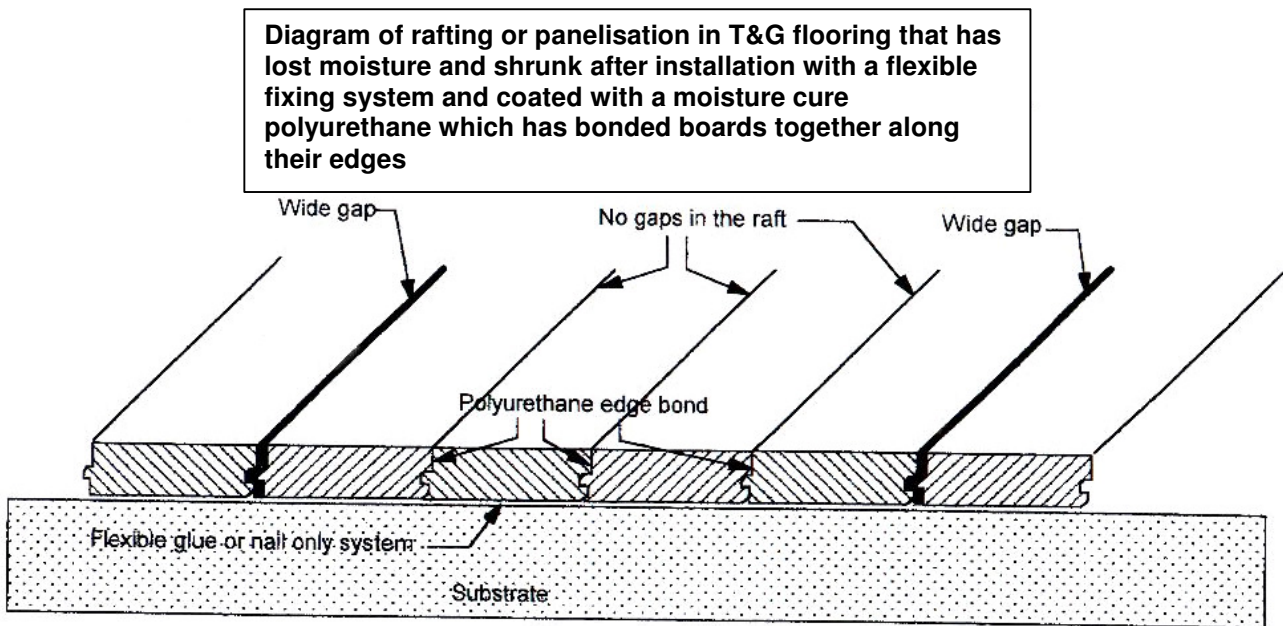
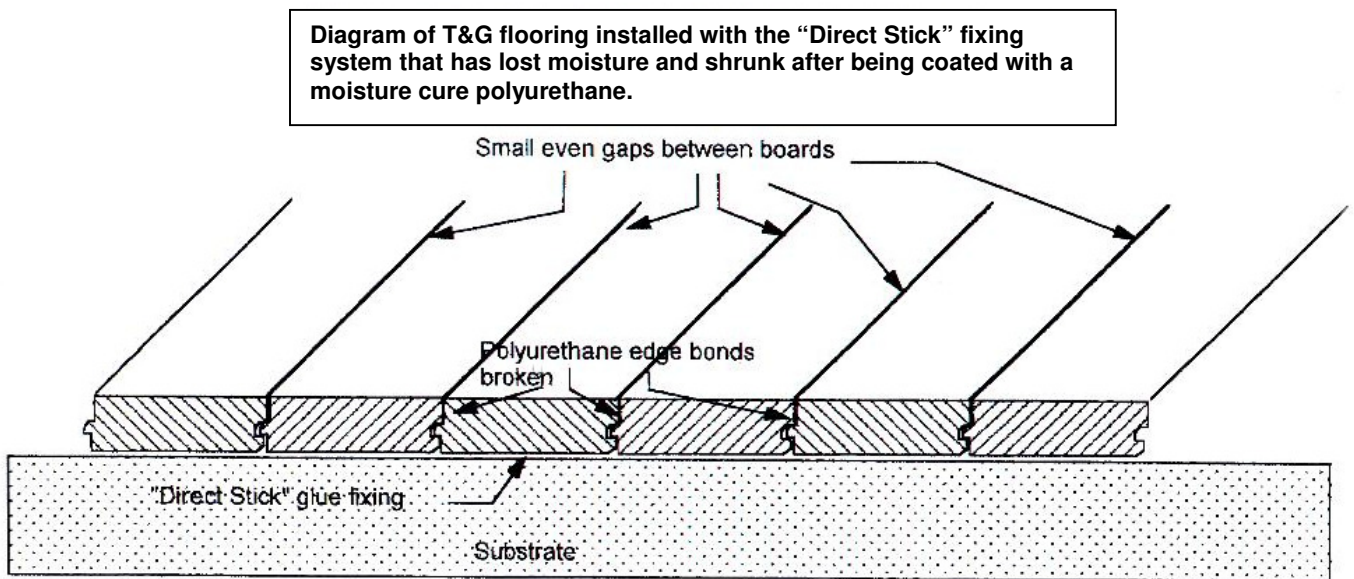


Diagram 4. LIQUID NAILS DIRECT STICK laid onto a continuous substrate resists the forces that cause rafting (panelisation).



NOTE: When laying strip flooring direct to joists, there is not enough directly contacted area to prevent rafting or panelisation in the flooring. We recommend a ply or particleboard working surface over or between the joists before installing the timber overlay.

Section D Commences over the page

D1. HOLLOW SPOTS AND SOME CAUSES OF THEM

This refers to the phenomenon of changes in the tone or pitch of footfall sound in some places as you walk a timber floored room.

The change in footfall sound is due to a drumming effect from areas of timber that are not attached to the substrate. This can equally arise from directly bonded strip flooring or from sheet flooring underlay bridging over depressions in the substrate surface (usually concrete substrate) that are not sufficiently filled or bonded by the adhesive.

Some causes:

- Concrete not flat and level.
- Areas of substrate coated with waxes or oils that have stopped the adhesive from bonding.
- Areas of self-levelling compound that have pulled off a moisture barrier below it.
- **Walking on newly laid sheet or strip flooring which has been laid on unlevel concrete and causing the sheet or strip to press down into the “hollow” area, flattening the adhesive down before springing back to leave a gap between substrate and flooring.**
- Not weighting or fastening the flooring to the substrate while the adhesive was curing
- Not using a controlled foaming adhesive such as LNDS when adhesive bonding sheet or strip flooring to inadequately level surfaces.

D2. REPAIRING HOLLOW SPOTS

If hollow spots are not extensive, an effective method of repair is to drill 3mm to 5mm diameter holes through the timber in the approximate centre of the area. Clear the hole of drilling debris and force inject SELLEYS® AQUADHERE® DURABOND™ expanding liquid polyurethane wood glue down the hole into the space / gap below the timber. (Press the applicator nozzle firmly into the hole and pressurise the bottle for as long as possible. Immediately plug the hole firmly by hammering in a spike of timber or trimmed dowel. This will force the Selleys Durabond to expand out into the gap beneath the flooring rather than just back out the hole. Allow a minimum of 24 hours before testing the area for hollowness to determine if more injections are required. Trim sand and finish the wood plugs to match the surrounding flooring.

D3. REMOVING SPILT LIQUID NAILS DIRECT STICK ADHESIVES

3.1 General

Once cured, both LNDS adhesives are impossible to remove from most surfaces without removing some of the under-surface with them. It is important to wipe these adhesives off all surfaces while they are still wet. Both adhesives chemically bond to skin and fingernails and while wet on the skin they pick up dust from handled object and blacken the skin. The only way to get cured adhesive off is to wait for exfoliation of the skin or scrape/file them off fingernails. Exfoliation can be encouraged by repeated cycles of extended massaging with Vaseline or vegetable oil followed by washing and soaking in hot soapy water. It is therefore best to wear disposable rubber or allergy free gloves (over the top of cotton gloves to reduce any annoying build up of sweat in the gloves). On unfinished timber flooring dried adhesive is readily removed during the normal sanding process without any risk of the adhesive “burning” into the timber and causing subsequent local rejection of the final finishes applied.

3.2 Pre-finished timber flooring

READ CAREFULLY

Pre-finished timber flooring is normally supplied with a very hard wearing, UV cured polyurethane finish. LNDS will bond very well to these finishes. Never the less, it is possible to remove thin films of the cured adhesives from these finishes with LNDS Remover without damaging the finish. The Remover relies on the fact that the UV cured polyurethane finish usually used on these products is more densely x-linked and tougher. It softens the cured adhesive more and allows the two to be parted. Note that this may not be the case with all pre-finishes, nor with single or 2-pack finishes which may be present if making a repair to an existing floor.

1. To aid later complete removal always wipe off spills immediately. (Do not spread the spill. Wipe to its centre). If possible conduct a final wipe or the smear with LNDS Remover (without spreading the smear further). [This wipe will not damage 2-pack moisture cure coatings but should be used with care. Single pack moisture cure and water based finishes will be damaged easily].

2. If on returning to the job you find marks/smears that were not completely removed and are visible as slight ‘matting’ of the gloss finish then – soak the marks with an application of LNDS Remover for 2 to 4 hours. After this time (or longer) use the special plastic scraper supplied as directed by the instructions on the Remover pack. [**Under no circumstances use a metal scraper or the under surface will be damaged**]

3. If the under finish is a single or 2-pack type then it quite possible it will also be removed with the scraper after the long soaking period

Special advice for Pre-finished timber:

Don't spill. Don't work with adhesive contaminated gloves or hands/fingers – even the slight smears and finger prints from contaminated gloves and fingers will be visible in the right light on a gloss pre-finish the next day.