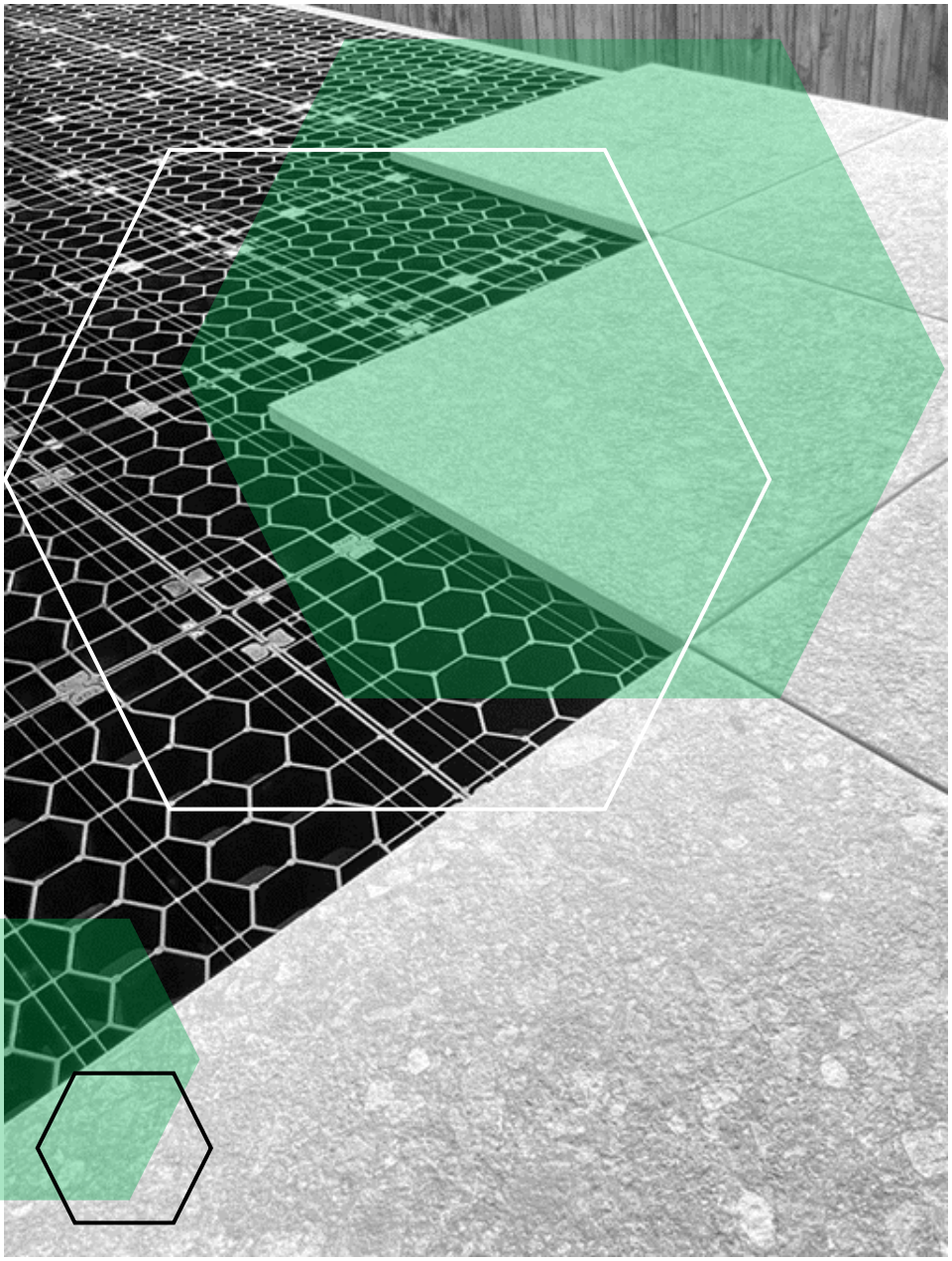
SILCA SYSTEM

INSTALL GUIDE

TIMBER JOIST



CONTENTS

INSTALL GUIDE - TIMBER JOIST

MANUFACTURERS RECOMMENDATIONS

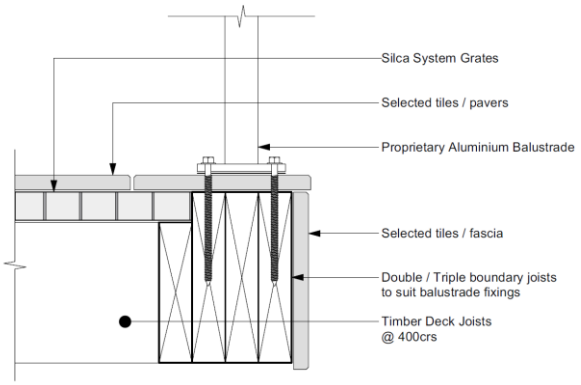
Silca System interlocking, structural deck grates are specifically designed for the support of heavy finished surface materials over elevated deck structure.

Manufactured in New Zealand from 100% recycled materials, our grates offer a robust, durable solution for installing tiles or pavers at any elevation.

Silca Grates connect together and are securely fastened directly to timber or aluminium deck joists. This provides a solid, flat, permeable surface to install various paving materials such as tiles, natural stone, heavy pavers, artificial turf or porcelain.

Silca System enables a free draining finished surface and air circulation beneath, preventing moisture buildup in the substructure and ensuring the longevity of the decking element. Suitable for standard elevated decks or those floating over membrane.

Compliance to B1/VM1 and B2 of AS/NZS1170.1. and E2/AS1 Permeable surface – level entry through threshold. Silca System is an environment-friendly patio solution for both residential and commercial applications.



PRELIMINARY INSTALLATION NOTES

1. **Safety Compliance:** Use appropriate personal protective equipment (PPE) at all times during installation.
2. **Pre-Installation Review:** Read and understand the complete Silca System Install Guides, Technical Data Sheet (TDS) and any other relevant documentation before commencing work.
3. **Structural Verification:** Ensure all footings, piles, bearers, and joists have been inspected or designed by a qualified professional to meet relevant building codes, load and site requirements.
4. **Technical Support:** If installation complexities arise, consult Silca System NZ for technical assistance.
5. **Site Management:** Maintain a clean, well-organised work area to promote safety and installation efficiency.
6. **Manufacturer Compliance:** Follow all manufacturer-recommended procedures and specifications to ensure a compliant and durable installation process.
7. **Regulatory and Site Compliance:** Ensure all works are performed in accordance with relevant local building codes, standards, and best practices by competent personnel familiar with structural decking systems.

BEFORE BEGINNING THE INSTALLATION PROCESS, GATHER ALL NECESSARY MATERIALS AND TOOLS.

MATERIALS:

- Silca System Grates
- Silca System Connectors
- Screws (Ecko Trex17 10g x 75mm Stainless Steel countersunk head wood thread)
- Tile Adhesive (SabreBond SMP45)
- Pavers or tiles. Recommended 14-70mm. (Most popular is 20mm)
- Tile spacers (2-5mm)
- Geotextile blanket (*optional* - for when sanding or grouting only)
- Border/Facia Type – Timber facia – Tile/paver to match – Aluminium system – Fiber Cement board or similar.

TOOLS:

- Drill or impact driver.
- Straightedge and Electric Plane (if needed to flatten joists)
- Hammer - for nocking in Connectors.
- String line - for tile layout
- Circular saw and/or reciprocating saw for cutting Grates if needed.
- Adhesive sausage gun

PREPARATION

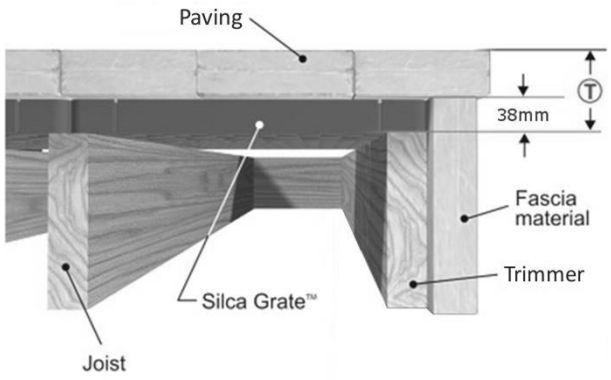
HEIGHTS, MATERIALS, METHODOLOGY

1. **Determine Finished Floor Level (FFL):**
   Establish the required FFL (top surface of tile or paver), considering paver/tile thickness, door thresholds, adjoining structures, and aesthetic alignment.

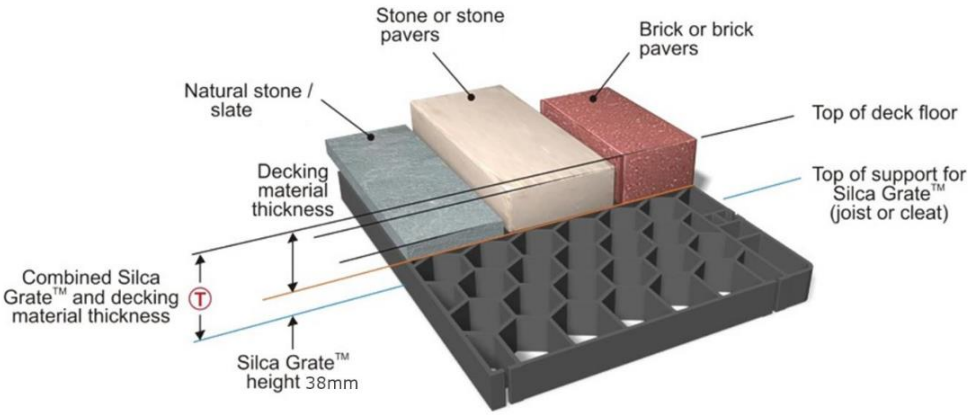
2. **Select Suitable Surface Material:**
   Confirm the selected tile or paver is appropriate for exterior use, of uniform thickness within the batch, and has a flat, consistent underside to prevent rocking. The most common materials are 20 mm porcelain or natural stone. A minimum tile thickness of 14 mm is recommended.

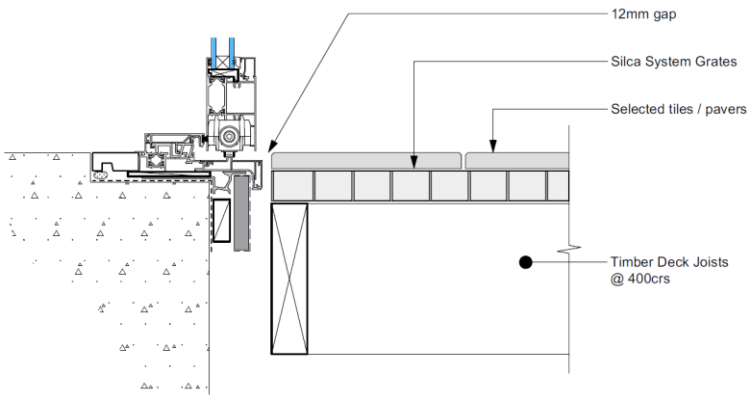
3. **Silca Grate Thickness:**
   Silca System Grates have a nominal thickness of **38 mm**.

4. **Joist Height Calculation:**
   Determine the required joist height using the following formula:



FFL – tile thickness – 38 mm (Silca Grate thickness) = Top of Joist (T)





5. **Drainage and Surface Type:**

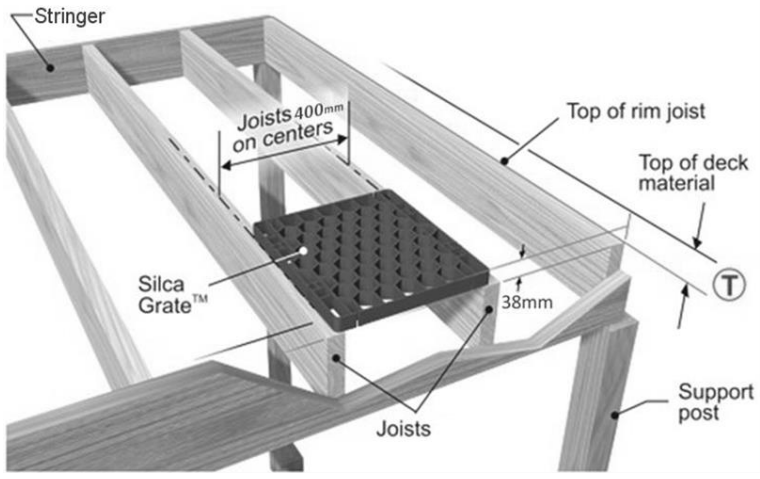
- Where a free draining **permeable surface** and level entry through threshold is desired (no grout) a level structure can be built. For *"permeable surface"* and *"level entry through threshold"* a 5mm gap around each tile is required as detailed in E2/AS1 for permeability and level entry.

- For **non-permeable, sealed surfaces** where a polymeric sand or grouting is to be used, then adequate fall or gradient will need to be designed and built for rainwater runoff. It is easiest to achieve fall with the joist. (This surface is classified as non-permeable and does not allow level entry through threshold.)

DECK CONSTRUCTION

TIMBER SUBSTRUCTURE

1. **Material Selection:**
   - Use KD (Kiln Dried) exterior-grade treated H3.2 SG8 timber for all joists and bearers.
   - Ensure all timber is straight, free from significant knots, warping, or cupping.
   - Refer to joist span and paver thickness tables to select appropriate timber sizes for the intended load and surface material.
2. **Structural Compliance:**
   - The substructure must comply with all relevant local building codes, including load, wind, and seismic requirements where applicable.
   - For decks of significant height or on challenging ground conditions, engage a qualified structural engineer to design a site-specific solution.
   - Obtain building consent where required by local authorities.
3. **Joist Layout and Preparation:**
   - Install joists at 400 mm centres, ensuring uniform spacing.
   - Joists must be level, straight, and flat along their entire length. Use a straightedge and electric plane to correct minor irregularities. Malthoid or DPC for packing if required.
   - Ensure joists are securely fixed to bearers, using approved fasteners and connection methods compliant with local building standards.
4. **Surface Gradient Considerations:**
   - For sealed surfaces (polymeric sand or grout), provide an appropriate fall or gradient within the joist structure to facilitate effective rainwater drainage.
   - For permeable, free-draining surfaces, construct the substructure level to allow consistent threshold access, maintain drainage through gaps, and comply with E2/AS1 permeability requirements.
5. **Additional Installation Notes:**
   - Ensure all timber connections, fixings, and intersections are neat, precise, and aligned. Accurate workmanship maintains structural integrity, ensures level installation of Silca Grates, and prevents movement or rocking of tiles. Verify all fasteners are fully seated and correctly positioned according to design specifications.
   - Maintain a clean work area during substructure assembly to facilitate safe, efficient, and precise installation.

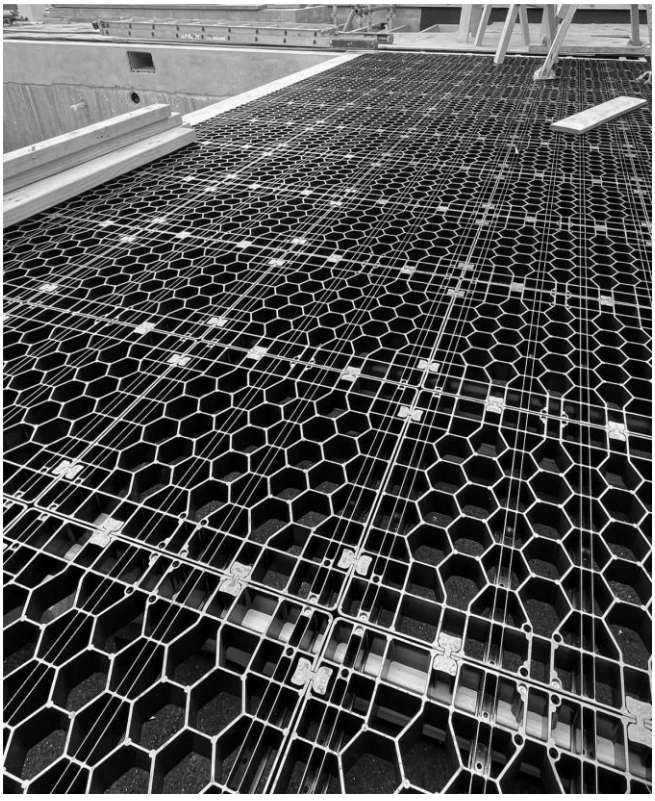


The diagrams provided in this guide are for **illustrative purposes only**. Timber positioning and structural layouts shown may **not represent compliant or engineered construction**. All substructures must be designed and installed in accordance with **relevant building codes and engineering requirements**.

SILCA GRATE INSTALLATION

INSTALLING THE SILCA GRATES AND CONNECTORS TO THE TIMBER SUBSTRUCTURE

1. **Positioning Grates:**
   - Place Silca Grates on top of the joists so that each grate **butts tightly against adjacent grates**.
   - Ensure the **edges of each grate are centered over the joists**.
   - The **spanning ribs** must extend fully from joist to joist to provide uniform load distribution.
2. **Connector Installation:**
   - Insert **Silca Lock Connectors** into the designated slots on each side of the grates, aligning with the adjoining grates.
   - Use **two connectors per side** on all sides.
3. **Flush Seating:**
   - Tap connectors in so they sit **approximately 2 mm below flush** with the grate surface.
   - **Do not leave Connectors proud,** as this may interfere with tile or paver installation and surface finish.



COMPLETE SILCA GRATE INSTALLATION

Install Silca Grate over the entire desired deck area. Steps and stairs can also be installed.

4. **Screw Fixing:**
   - Secure each Silca Grate to the joists using **six countersunk wood-thread screws (10g × 75 mm) per grate**.
   - Ensure **screw heads are flush** or slightly below the grate surface; **Do not leave screw heads proud**, as this may interfere with tile or paver installation.
   - Be aware that screw head sizes may vary between brands; some 10G screws may be **too large for the countersunk holes**.
   - **Recommended screws** compatible with both timber and aluminium joists are available to order through Silca System NZ.
   - Tighten screws **firmly but do not over-torque**, as over-tightening may damage the countersink and compromise the structural integrity of the grate.
5. **Complete Silca Grate Installation:**
   - Continue installing Grates across the **entire deck area**, including steps and stair landings where required.
   - Trim grates as necessary using a **suitable power saw**, ensuring Connector slots remain aligned where possible.
   - Additional fixation may be applied along the **strength bands** for areas requiring extra reinforcement.

TILE/PAVER INSTALLATION

TEST AND PLAN

Planning for the desired layout is vital as this will lead to a smooth efficient install with fewer cuts or redoes.

- Conduct a **trial layout** with your chosen tile or paver to verify pattern, fit, and necessary cuts.
- Plan the layout carefully to **minimise cuts and rework**, ensuring alignment with existing building elements such as railings, steps, stairs, and door thresholds.
- Use **strings, straightedges and measurement** to verify tolerances and maintain straight courses where desired.

INSTALL OPTIONS

Depending on your paver choice and design application, several installation methods are available.
Options vary based on permeability specification, material type or thickness, and desired style.

Option 1

Direct Adhesive Fix - (Permeable surface)

- Glue-fix tiles/pavers directly to the Silca Grates using **SabreBond SMP45 adhesive** (available on request).
- Apply **spot adhesive** on top of connectors, screw head areas, and bead along grate edges where they meet adjacent grates. Use **dobbs approximately the size of a Powerade cap**, These areas provide a good key for the adhesive as it squeezes in and around.
- Place tiles/pavers using **spacers and string lines** to maintain alignment.
- Position spacers in the top of the **tile-to-tile gap**, so they can be removed later. ***Not*** at the cross intersection of where four tiles meet.
- A 3mm spacer is a nice fine gap yet still allows water to drain. To achieve a “permeable surface” regarded by councils a 5mm Gap around each tile/paver is required. See E2/AS1 for permeability and level entry.
- Allow adhesive to **fully cure** before removing spacers or walking on the finished surface.

Option 2

Sand or Grout with Geotextile Layer:

- Lay a **geotextile cloth** over the Silca Grates to prevent sand or grout from falling through. Non-woven fabrics are preferred; weed mats may be used if necessary.
- Lay pavers on top and **bind with polymeric sand or grout** as desired. Modern grouts allow flexibility, including **permeable options** for drainage.
- Ensure **deck substructure fall/gradient** for rainwater runoff is pre-established.
- Grouted finishes can combine **Options 1 and 2** by cutting sections in the geotextile for adhesion where required.

Option 3

Dry Lay for Heavy Pavers:

- For sufficiently heavy pavers (e.g., 1.2 × 1.2 m × 60 mm concrete slabs), a **dry lay** may suffice under their own weight.
- Gaps or grout lines may still be required to **accommodate deviations in size, squareness, or gauge**.
- Deck substructure must be **engineer-designed** for large-format or heavy pavers.

ADDITIONAL NOTES – PLEASE READ

- Engage a **qualified and licensed industry professional** for all deck structure design and construction.
- **Do not expose Silca System components to undiluted acids or solvents**.
- **Screws must be tightened firmly but not over-torqued**, to avoid damaging the countersink and compromising the grate's structural integrity.
- Use only the **recommended screws and adhesive** specified in this Install Guide and by Silca System NZ.
- **Do not leave any screw heads, connectors, debris, or packers proud of the grate surface** during tile or paver installation. A flat, consistent surface is essential for proper adhesion and load distribution, particularly with softer natural stone types.
- Install Silca System strictly in accordance with the **Manufacturer's Recommendations** and Install Guide. For technical support, contact **Silca System NZ** info@silcasystem.co.nz or consult our **FAQs** at https://silcasystem.co.nz/faqs/.

NOTES, PLANS, SKETCHES: