Jacobsen Dincel® Structural Walling Formwork

INSTALLATION GUIDE

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GENERAL AND PRODUCT INFORMATION

PURPOSE

This installation guide relates to the installation of the Jacobsen Dincel® Structural Walling Formwork system (Dincel® System).

IMPORTANT DOCUMENTS

This guide must be read in conjunction with:

- the Jacobsen Dincel® Structural Walling System Formwork pass™
- the Jacobsen Dincel® Structural Walling Wall Formwork Specification guide or the Jacobsen Dincel® Structural Walling Basement Formwork Specification guide
- relevant Dincel® Structural Walling Formwork details
- the Dincel® Structural Walling System Formwork Installation record

SKILLS REQUIRED

This guide is suitable for use by a licensed building practitioner licensed to the relevant class or by a practitioner who will be supervised by a licensed building practitioner licensed to the relevant class or deemed LBP.

FOR MORE HELP

Technical assistance is available at www.jacobsen.co.nz.

While all reasonable efforts have been made to ensure the accuracy of information provided, this guide is a guide only. It may be subject to change.

FOR OUR WARRANTY

Refer to www.jacobsen.co.nz.

PRODUCT DESCRIPTION

The Dincel® system comprises lightweight, rigid, hollow re-engineered PVC panels, floor tracks and specialist components that snap-lock together. The structure is made watertight when the core is filled with concrete and steel reinforcement. It is a time and cost-efficient alternative to the traditional masonry block, precast and concrete formwork.

The PVC components are provided to create four wall thicknesses (110 mm, 155 mm, 200 mm and 275 mm).

The Dincel® system reduces concrete cracking by reducing evaporation time during curing (eliminating plastic shrinkage cracking). The combination of the continued cement hydration process and a reduced water/cement ratio concrete mix results in early tensile and compressive strength capacity and less porous concrete. These characteristics are maintained over time.

It can be finished by adhering an acrylic render, an overlay cladding, or an insulation sheet directly to the Dincel® panels. The panel surface can also be painted.

SCOPE AND LIMITATIONS

For scope of use, limitations, conditions and statement of building code compliance, refer to the Jacobsen Dincel® Structural Walling System Formwork pass™.

pass

MORE INFO

PRE-INSTALLATION

HEALTH AND SAFETY

Take all necessary steps to ensure your safety and the safety of others:

- ensure adequate ventilation or mechanical dust extraction when cutting or drilling
- wear appropriate safety equipment, clothing and footwear
- use all tools in accordance with relevant instruction manuals
- plan and monitor a safe approach for working at height and below excavated ground; select and use the right equipment
- do not carry out installation during high wind conditions
- clear the work area of any obstruction before work starts.

For further information refer to:

- WorkSafe. [July 2018] *Small Construction Sites, the Absolutely Essential Health and Safety Toolkit.*
- WorkSafe. [December 2016] *Health and Safety at Work, Quick Reference Guide.*

These documents are available at www.worksafe.govt.nz.

HANDLING AND STORAGE

Correct handling and storage of the Dincel® components is critical for best performance, ease of use and warranty adherence.

Handling

Handle Dincel® components with care. Lift packs off the truck by hand, hoist or hiab. Ensure a lifting bar is used with the sling to avoid damaging the webs of the panels, edges and surfaces. Do not tip packs from the truck.

Panels should be delivered undamaged. Inspect panels upon delivery.

Storage

Store packs in a clean area, on timber sleepers placed at 1 m maximum centres on flat ground.

The packs should be kept under cover and must be stored in a location with airflow, where temperatures are constantly over 30 °C.

TOOLS AND EQUIPMENT REQUIRED

Install the system using standard carpentry tools and equipment.

Use tools in accordance with good trade practice and supplier's instructions.

INSTALLATION

PREPARATION

Step 1 — **Building consent documentation**

Access and view the building consent documentation.

Step 2 — **Foundation**

Ensure the foundation is constructed in accordance with the building consent documentation.

Dewater site groundwater by pump or gravity fall away from the excavated work areas.

Ensure starter bar centres are as per Dincel recommendations.

Above ground:

Check the foundation surface. If Dincel® P-G and P-EG profiles are to be applied to the footing or slab, the surface must be flush and free of irregularities.

Below ground and/or below the water table:

Install water proofing to the foundation and wall junction as per the building consent documentation.

Install swellable and/or bandage waterstops in accordance with manufacturers instructions.

Install subsoil drainage to an approved outfall in accordance with Acceptable Solution B1/AS1 or to a specifically designed subsoil drainage.

NOTE: some waterproofing systems such as bandages require wall to be constructed prior to bandage being installed.

Step 3 — **Prepare panels**

Wash panels if there is dirt and/or dust accumulation.

INSTALLATION

Step 1 — **Details**

Access and view the selected Dincel® details in the building consent documentation or access the relevant details from Dincel®.

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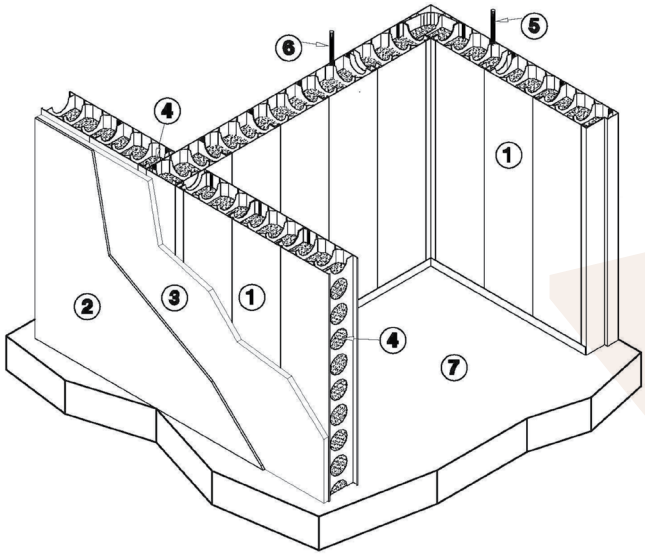
Step 2 — **Determine system wall construction**

Determine the correct sized system and wall construction described in the building consent documentation.

The Dincel® system wall construction can include the following:



① Dincel® wall
② Polymer render/plasterboard finish
③ Insulation
④ Concrete
⑤ Service space (electrical, communications)
⑥ Service space (water pipes)
⑦ Floor

Step 3 — Determine panel layout

Determine dimensional set out of the wall and panel layout.

Polymer forms may be subject to shrinkage and temperature shortenings or elongation, depending on the length, height and daily temperature. Allow a normal 10 mm movement for 15 m long walls and 20 mm movement for 30 m long walls for each 10 °C temperature variation above and below 20 °C.

Allow a construction tolerance of 1 mm for each main profile. This means a 332 mm dimension must be used for the dimensional set out of the wall.

Step 4 — Install Dincel®

Install panels

Dincel® panels are installed vertically, generally with safety scaffolding in place or mobile scaffolding, although the installation method means scaffolding can generally be minimal. Installation of Dincel® panels may be carried out without safety scaffolding in some cases.

Ensure panels are the right way up to ensure concrete flows through the panel correctly and web linkages are correct for steel installation.

To avoid cutting panels, use 200P-2 spacers to increase the width of the wall in 55 mm increments. Do not use 200P-2 spacers adjacent to each other.

Install panels in accordance with construction details shown in the building consent documentation or in accordance with Dincel® details.

- To install Dincel® panels from a permanent or mobile scaffold/elevated platform:Secure bottom guide track using either P-G, P-EG or timber 100 mm x 50 mm walers to the floor/footing below.
- (NOTE: P-G or P-EG not to be used for basement Dincel wall).

Connect panels

To connect panels, slide into place and/or click together using the snap-lock joints.

To improve slideability when connecting panels, use products such as Windex, Ajax liquid spray or similar.

Screw fix bottom of each panel to guide track to ensure it stays in place and straight during pour.

At top of wall, screw fix horizontally mild steel or aluminium angles/walers to ensure wall stays straight during pour. Similarly brace mild steel or aluminium angles/walers to floor/footing with adjustable length diagonal bracing (acrow props) to ensure wall stays plumb during pour.

Alternatively, top of wall can fixed to permanent scaffolding or structural frame if allowed for by project engineer.

Install joiners

Where joiners are needed, place joiners at a minimum of 333 mm (one panel) from the end of the wall or from a corner.

Use a P-J joiner or alternatively cut panel to the correct dimension and use a P-WS panel as a splicer. Screw and brace the joint. Avoid cutting panels in areas where waterproofing is required.

For below ground and/or below water table, if panels are connected not using the snap-lock joints (i.e. cut vertically and screwed together with P-WS), additional waterproofing is required at these joints.

Install bracing to areas of high pressure from pour

Propping is required at wall ends and T junctions in accordance with Dincel® details to avoid bulging as these areas will experience high pressure from concrete pour. Any areas where webbing has been broken require additional bracing.

Timber props must be braced by straps or external diagonal props so that the panels do not move during concrete pouring.

Step 5 Install reinforcing

Install reinforcing in accordance with reinforcing details shown in the building consent documentation or in accordance with Dincel® details.

Depending on the application, reinforcing steel may be omitted.

To avoid fracture or weakening, ensure that all hooks and bends are formed in accordance with the bend requirements of the building consent and Table 3.1, NZS 3101:2006.

Install reinforcing carefully, ensuring the polymer webs are not damaged.

Step 6 Install openings

Openings must be formed prior to the concrete pour.

Install the window spacers between the Dincel® panels to form the desired window or door trim size in accordance with the Dincel® details.

Install window and door openings in accordance with window frame and bracing details shown in the building consent documentation or in accordance with Dincel® details.

Step 7 — Install services

All conduit or ducting must be installed prior to concrete pour.

Electrical services

Electrical services can be accommodated by:

- Installing battens to create a cavity space for cable installation.
- Installing cables within the concrete walls.

Installing cables in the built service channels available in the 200 mm Dincel® panels. The service channels can accommodate electrical cablings and a switch box where the walls are finished with plasterboard.

Install services in accordance with electrical services details shown in the building consent documentation or in accordance with Dincel® details.

Plumbing services

Plumbing services can be accommodated by installing battens to create a cavity space for pipe installation.

Install services in accordance with plumbing services details shown in the building consent documentation or in accordance with Dincel® details.

Service duct penetrations

Install services in accordance with service duct penetration details shown in the building consent documentation or in accordance with Dincel® details, including air conditioning duct and ventilation grille penetrations.

Step 8 — Pour concrete

Prepare concrete

Prepare concrete in accordance with the building consent documentation and NZS 3101:2006.

Order the correct MPa strength concrete in accordance with the building consent documentation.

Pour concrete

Concrete must not be poured when the temperature is greater than 35 °C or less than 5 °C.

The placement of concrete can cause the formwork to move laterally if large variations in the concrete height are created. Care must be taken to minimise movement where aesthetics of the Dincel® system is important.

The maximum single pour height is 4.5 m for 275 mm panels and 5 m for other panels.

Keep pump nozzle at least 500 mm away from the wall and column ends. Do not aim the pump nozzle at corners or wall ends.

Inspect concrete during pouring to ensure vertical alignment and plumb of the formwork. The pour should be stopped or continued at reduced speed if any areas start to move and continued only after the concrete has an initial set.

Use timber or steel props to provide temporary bracing if needed.

Pour concrete in accordance with the following table to ensure a reasonable surface finish is achieved.

Use	Wall thickness	Wall height	First pour	Minimum wait time	Second pour	Minimum wait time	Third time
Above ground or not subject to earth or water pressure	110 mm	1.8 m	1.8 m				
	155 mm	3.0 m	1.2 m	0.5 hour	0.8 m		
	200 mm	4.0 m	1.8 m	0.5 hour	2.2 m		
	Concrete type A	5.0 m	1.2 m	0.5 hour	1.8 m	1.0 hour	2.0 m
Basement perimeter retaining walls not subject to permanent water table	155 mm	2.8 m	2.8 m Concrete Type A				
	200 mm	2.8 m	0.6 m Concrete Type B	0.5 hour	2.2 m Concrete Type A		
		3.8 m	0.9 m Concrete Type B	1.5 hour	2.9 m Concrete Type A		
	275 mm	4.5 m	Concrete Type B				
		6.5 m	4.5 m	1.0 hour	2.0 m		
Liquid storage tanks	200 mm Concrete Type B	2.1 m	2.1 m Concrete Type B				
		2.8 m	0.9 m Concrete Type B	1.0 hour	1.9 m Concrete Type B		

Concrete Type A: 10 mm aggregate, 140 mm minimum slump, 180 mm maximum slump

Concrete Type B: 10 mm aggregate, 180 mm minimum slump, 230 mm maximum slump

Testing

Carry out all quality tests and retain all representative samples as required by the engineer.

Where sampling is required, representative samples should be taken from the middle of the load and the first and/or last discharge from the load.

Compact concrete

Proper concrete compaction is important to prevent voids in the concrete. Pay special attention to the sides of all openings, bulkheads and any areas that have a higher-than-normal concentration of steel.

Use 25 mm pocket vibrators to ensure the concrete mix fills all voids at the snapping joints. Do not use vibrators bigger than 25 mm. Alternatively, tap walls with a rubber mallet or hand rodding. Take care not to damage the web links between each face of the formwork which may cause bulging.

Self-compacting concrete can be used with the Dincel® system. Refer to the Dincel® self-compacting concrete information

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Cure concrete

Where permanent floor formworking is being used (precast planks or permanent metal formworking) directly bearing on the wall without being propped, the concrete must be cured for either three days at a minimum temperature of 10 °C or for the time necessary to attain 35 % of the specified 28-day compressive strength.

Step 9 Install fire sealants and collars

Install sealant and collars in accordance with fire sealant and collar details shown in the building consent documentation or in accordance with Dincel® details and in accordance with relevant product manufacturer's details and instructions.

Step 10

Finishing

Cleaning and repair

Remove any spilt concrete slurry with high-pressure water within 30 minutes, before the concrete hardens.

If concrete slurry needs to be removed after it has hardened, apply hydrochloric acid diluted 1 in 10 or less to the concrete slurry with a brush, once the concrete is at least two weeks old. Soft brush the acid on the concrete to assist absorption. Apply high water pressure to remove the concrete slurry between 5 and 10 minutes after the application of the acid.

Repair concrete damage using conventional concrete patching.

Patch panel surface damage with a two-part polyester resin. Cover the surface of the concrete with at least 2 mm of resin to match the adjacent Dincel® panel surface. Sand and level the dried resin surface and apply etching primer to the panel and paint with a matching colour. Damaged service channels can also be patched using this process.

Internal finishing

The Dincel® system can be finished with plasterboard, render or paint, or left unfinished.

Select an appropriate finishing system and install in accordance with the manufacturer's requirements.

For plasterboard, the maximum surface deviation should not include 4 mm over a 1.8 m long straight edge, in order to control the thickness of glue required.

External finishing

The Dincel® system can be finished with an external cladding system (brick, stone, aluminium panels); render or paint; or left unfinished.

Select an appropriate finishing system and install in accordance with the manufacturer's requirements. Advice on joint location and spacing for a render finish should be sought from the manufacturer.

COMPLETION

Check to ensure all components are installed correctly and in accordance with all Jacobsen Dincel® system requirements.

Complete the Dincel® Structural Walling System Installation record.

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Document prepared by TBB November 2021

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