



CONSTRUCTION MANUAL

WATERPROOF ADDENDUM

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NOTE: The DWS is NOT for sale and only used for the Dincel Waterproof System Warranty. The Dincel Waterproof System Warranty can not be provided on all projects. Designs need to be pre-approved as site specific conditions need to be accounted for.

*The information contained in this document is intended for suitably qualified and experienced architects, engineers and other building professionals. It is not intended to replace design calculations or analysis normally associated with the design and specification of buildings and their components. The information contained in this document is not project specific and shall be treated as general guidance. Building professionals are required to assess construction site conditions and provide project specific design/details and appropriate safe work method statements accordingly. Dincel Construction System Pty Ltd accepts no liability for any circumstances arising from the failure of a specifier or user of any part of Dincel Construction System to obtain appropriate project specific professional advice about its use and installation or from failure to adhere to the requirements of appropriate Standards, Codes of Practice, Worker Health & Safety Act and relevant Building Codes.

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G.1. OVERVIEW

This document is to be used where the Dincel Waterproofing Warranty is required. This document makes reference to the latest Dincel Structural Walling – Construction Manual (DCM). This can be sourced from www.dincel.com.au at the time of design and construction. This document takes precedence over the DCM when Dincel Waterproofing Warranty is applicable.

Following the DCM, the Design Engineer/Architect must:

1. Include the DWS profile, injection system and must include a dish drain to DCM specifications and appropriately designed drainage pit and pump out capability.
2. Ensure that all footings other than those directly bearing on rock or hard shale are required to have pile/piers founding on rock/hard shale to avoid or minimize long term foundation settlement or differential settlement due to ground movement. In cases where footings do not bear directly on rock or hard shale or do not have piles/piers founding on hard rock or shale; a site and photographic survey at the slab/footing to wall junction at 5m (maximum) intervals should be undertaken by a registered surveyor within 5 days after Occupation Certificate. This will be used as a base line against which future settlement (if any) could be compared.
3. Ensure construction details are consistent with the details shown in the DCM if they are not present in this Construction Manual Addendum.
4. Provide certification that the design of the Dincel Wall (155mm thick, 200mm thick, or 275mm thick) is adequately reinforced for the applied loading (i.e., earth, surcharge, traffic load, water pressures).
5. Certify that the design of the wall complies with Tables G.1.1, G.1.2 and their associated notes.
6. Inspect and provide certification that the reinforcement placed using Dincel reo-spacers complies with his/her design intent.

Additional notes:

Dincel shall not take any responsibility for any applied finishes e.g. paint/render etc. Where wall finishes such as paint/render etc are desired on internal face of Dincel wall. It is recommended to install an additional inner dry skin e.g. fibre cement sheeting on furring channels/battens.

Where screwing or fixings are used:

- Furring channels/battens to be fixed at least 100mm from Dincel vertical joints.
- Any drilled holes into the Dincel wall face must be epoxy set and sealed prior mechanically fixing.
- Inner dry skin wall must be terminated min. 50mm clear of dish drain and min. 50mm clear of slab soffit over.
- Moisture resistant cornices/skirting can be installed to the manufacturer's details.



**DWS & INJECTABLE ACCESSORIES NOT AVAILABLE FOR GENERAL SALES,
ONLY AVAILABLE AS PART OF DINCEL'S WATERPROOF WARRANTY PACKAGES.**

The Dincel Waterproof Warranty only covers the cases defined in the following tables G.1.1 and G.1.2 and is based on the:

- Nominated ground water table position.
- Earth loading.
- Max. 10KPa traffic/backfilling compaction surcharge loading (excludes surcharge loadings from neighbouring buildings if any).
- Limitation of the maximum out-of-plane deflection in the walls to 1mm.
- The walls must not be exposed to traffic/backfilling compaction and/or other surcharge loading greater than a combined 10kPa pressure unless the total wall deflection along the wall is limited to 1mm by the structural design engineer by utilising buttresses, single or double Dincel walls (200mm or 275mm combinations) depending on the height of the wall.

G.1.1. ONE WAY SPANNING WALLS BETWEEN BASEMENT SLABS

WALL THICKNESS	MAXIMUM STRUCTURAL HEIGHT BETWEEN SUPPORTS (M)*	MAXIMUM ALLOWABLE GROUND WATER HEIGHT (M) # ABOVE THE WALL-FOOTING JUNCTION
155 DINCEL	3.0 and lower	0.4
200 DINCEL	4.0	NIL
	3.6	0.4
	3.3	0.8
	3.0 and lower	1.0
275 DINCEL	4.5	1.5
	4.0	2.5
	3.5 and lower	3.5

G.1.2. TWO WAY SPANNING WALLS BETWEEN BASEMENT SLABS AND BUTTRESSES

WALL THICKNESS	MAXIMUM STRUCTURAL HEIGHT BETWEEN SUPPORTS (M)*	MAXIMUM ALLOWABLE GROUND WATER HEIGHT (M) # ABOVE THE WALL-FOOTING JUNCTION
275 DINCEL	5.0	2.0**
	4.5	3.5**
	4.0	4.0**

* **NOTE:** Represents the structural height for the basement wall between the lateral supports provided by the footing-slab and suspended slabs over.

** **NOTE:** Maximum space between buttresses supporting two way spanning basement wall is 3.0m. This is to suit any carparking spaced between 2.4m and up to 3m. The length, height, thickness of the buttress walls is to be determined by the Structural Design Engineer. Buttresses can only be placed at the inside face of the basement wall which is opposite to the earth and/or water. The connection between the perimeter basement wall and buttress walls shall only be a single galvanized dowel bar to the center of the buttress wall and away from any Dincel panel joint.

NOTE: Ground Water Table Position (water table ▼) means the highest potential ground water position which includes permanent (purged water table), tidal water position due to sea/river level movement and storm water movement above each relevant wall-footing slab junction for the period of warranty.

G.2. BASEMENT SLABS WITH FALLS

Basement slabs on sloping sites can be designed with various falls provided the permanent ground water table is below the concrete footing level. The Dincel system can allow for the DWS to be stepped down at 300mm heights along with the footings to suit sloping basement surface levels. The DWS and footing steps must be continuous behind the Dincel walls.

The Dincel Waterproofing Warranty must be coordinated with the provided shop drawings and shall show the below information.

G.2.1. TYPICAL SECTION VIEW OF STEPPED WALL

A - Basement slab profile provided by Project's Architect

B - 300mm footing steps where required

C - Dincel corner profile

D - Top of Dincel profiles

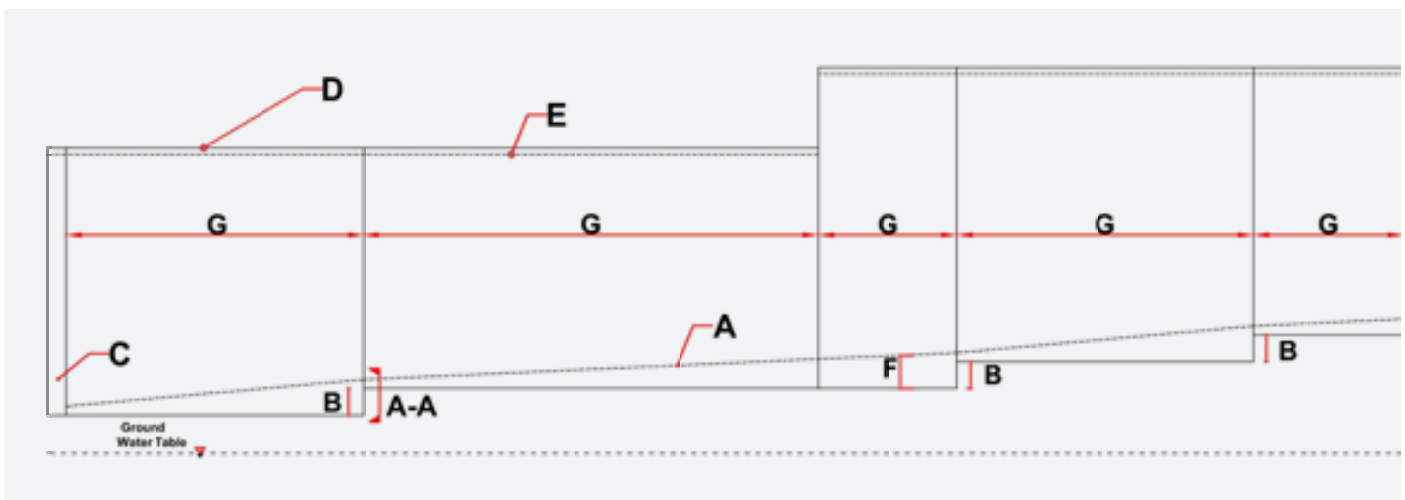
E - Soffit level for slabs/beams over

F - Max. 700mm from footing to slab level

G - Pack sizes to suit wall section heights/lengths.

A-A - Refer to section G.2.3.

NOTE: Ideal pack size spans include multiples of 10 x 200P-1 or 12 x 275P-1 main profiles.



G.2.2. PLAN VIEW OF STEPPED WALL

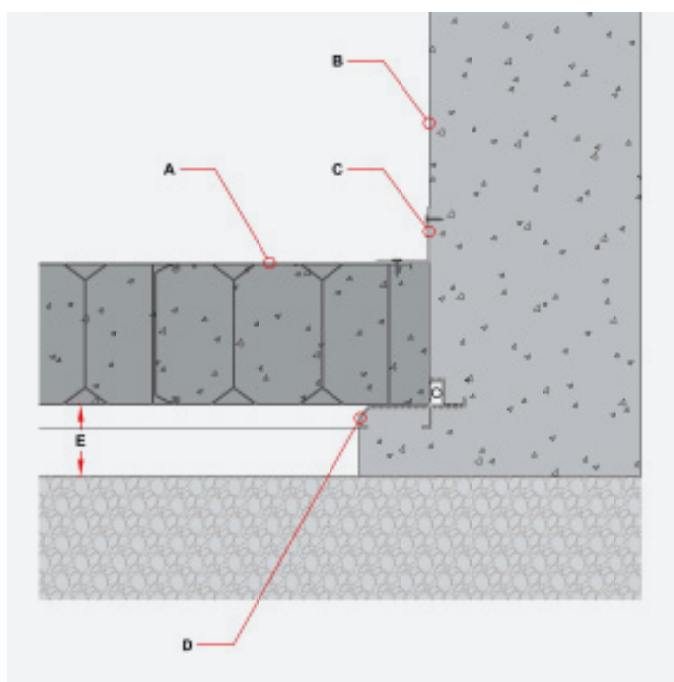
A - Set-out point by surveyor starting at corner profile.

G - Pack sizes to suit wall section heights/lengths.



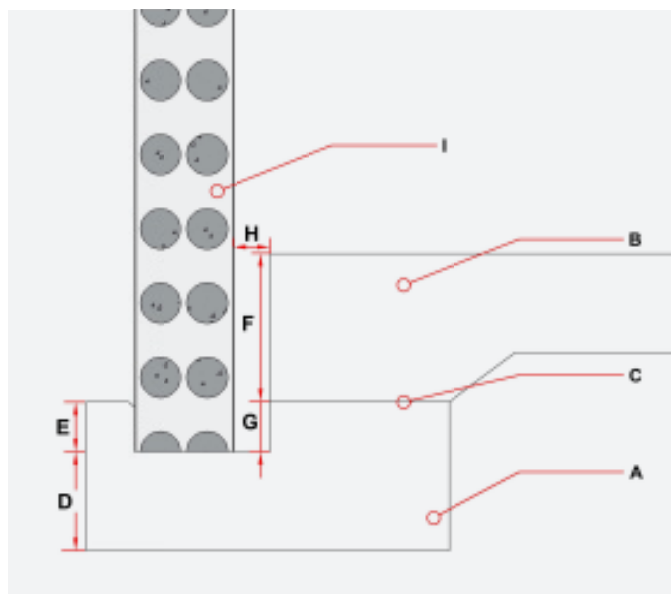
G.2.3. STEPPED FOOTING – PLAN VIEW SECTION A-A (G.2.1)

- A** - Dintel profile. Female end facing footing step.
- B** - Face of footing step to be formed with profile lengths (0-25mm construction tolerance).
- C** - Screw temporary D-ANG50 Angles at max:
 - 150mm centres.
- D** - Dintel Water Stop (DWS) used as cast-in shutter to form hob.
- E** - Min. 100mm (width of DWS hob).



G.2.4. SECTION AT BOTTOM OF DINCEL WALL - GROUND WATER TABLE BELOW FOOTING LEVEL

- A** - Concrete footing to engineer's details.
 - B** - Concrete floor slab to engineer's details.
 - C** - Concrete pour break where required. Min. 200mm wide. Concrete footing to slab connection to engineer's details. Optional waterstop can be incorporated (to engineers details).
 - D** - Min. 300mm.
 - E** - 100mm.
 - F** - Max. 600mm.
 - G** - Min. 100mm.
 - H** - Rebate to allow for drainage system. Refer to project's engineers specifications.
 - I** - Dintel Profile.
- NOTE:** DWS not shown.



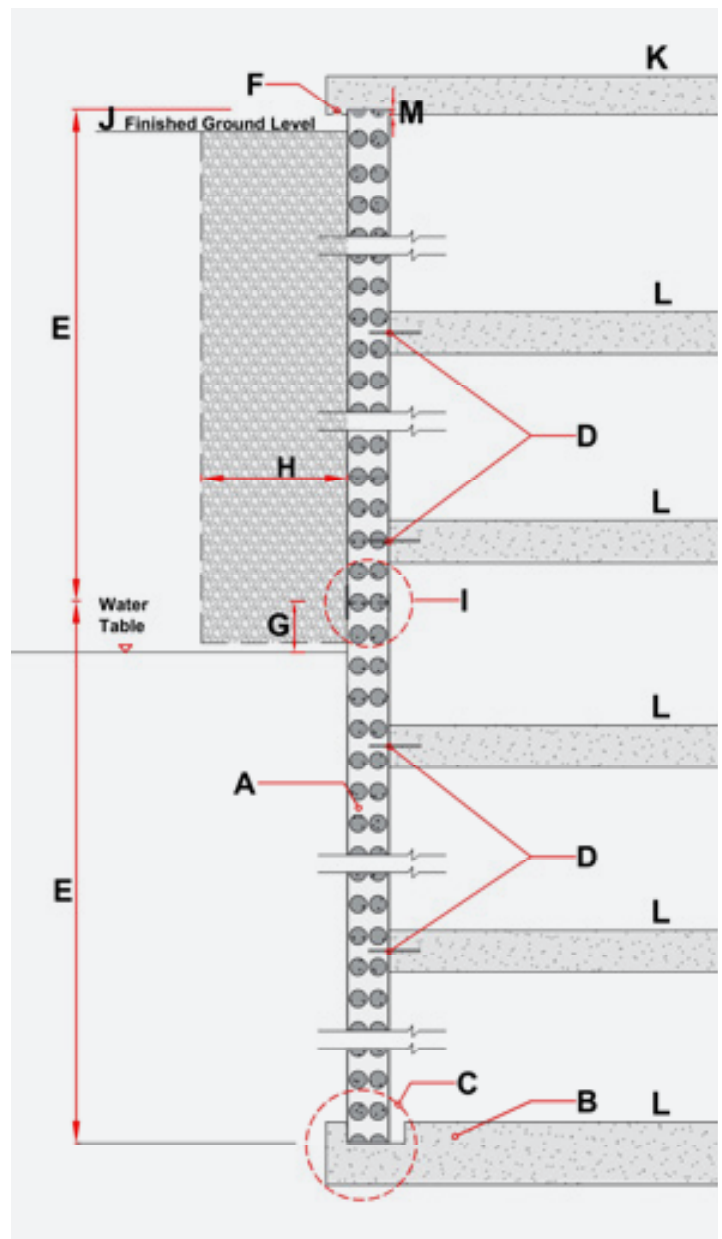
G.3. BASEMENT WALLS WITH MULTIPLE BASEMENT FLOORS - BELOW FINISHED GROUND LEVEL

Dintel Profile Lengths

- Dintel 275 profiles are generally extruded up to 6525mm long (special orders of up to 7950mm can be achieved)
- Dintel 155 & 200 profiles can be extruded up to 7950mm

G.3.1. TYPICAL DINCEL BASEMENT WALL ACCOMMODATING MULTIPLE LEVEL BASEMENT FLOORS

- A** - Dintel profile.
- B** - Concrete Footing or Slab to engineer's details.
- C** - Footing/Slab to engineer's details. Refer to Section G.6 for variations.
- D** - When required to connect to an external basement wall. Only dowel connections to the inside face of external basement walls and away from panel joints (drill and epoxy or in-situ bars).
- E** - Continuous length of Dintel profile. Max 7950mm for Dintel profiles.
- F** - Drip groove.
- G** - Ground water table (if any) min. 500mm below any horizontal panel joints.
- H** - Space to satisfy building authority requirements to install waterproof bandage. Backfill space to engineer's details (only required when a horizontal joint is applied). Refer to section G.4.
- I** - Horizontal splice joint. Refer to section G.4.
- J** - Finished Ground Level.
- K** - Top of ground floor slab.
- L** - Basement floor slabs 1, 2, 3, 4, 5 etc.
- M** - 25mm soffit level to allow for slab or beam.



G.4. EXTENDING BASEMENT WALLS BELOW GROUND

Horizontal splicing of Dincel panels only allowed if continuous 7950mm long panels is not adequate to cover the total erupted basement wall height below the finished ground level.

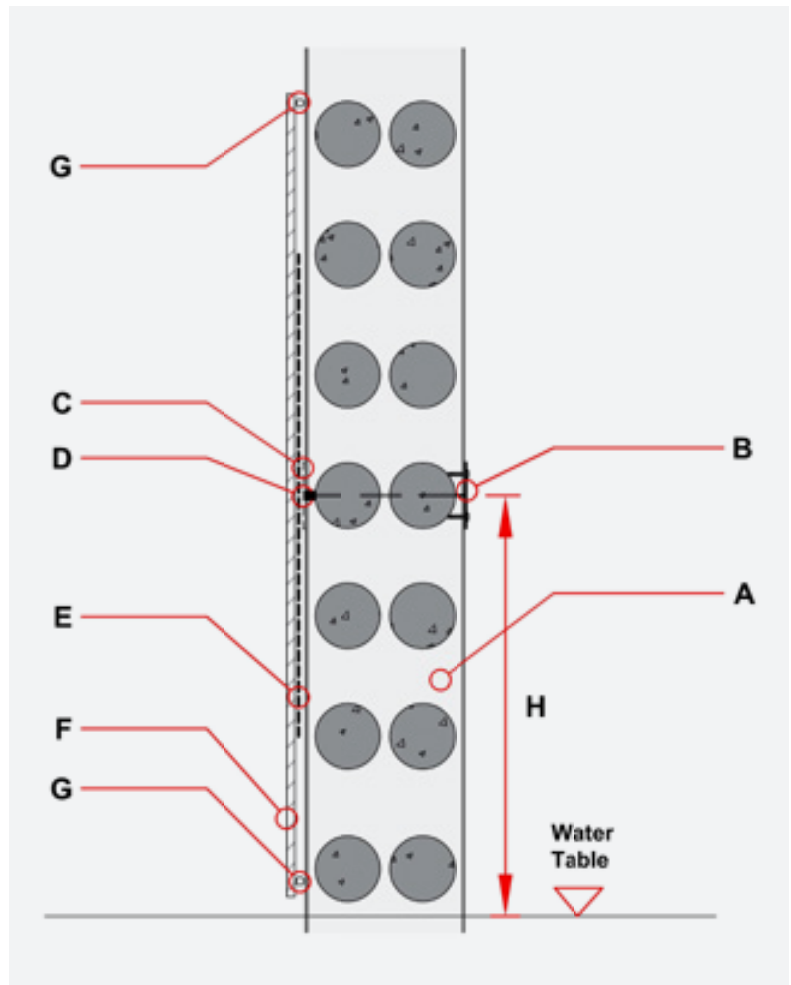
If horizontal splicing of Dincel panels is to be adopted; the splicing must adopt the following:

- No horizontal splicing is to take place at wall to suspended basement slab joints.
- Splicing joint must be a minimum 500mm above the permanent/tidal water table (to be confirmed by a geotechnical report).

G.4.1. DINCEL WALL SPLICE DETAIL – JOINT BELOW GROUND

This detail is used when a horizontal joint is required below ground. The joint must be minimum 500mm above permanent/tidal water table.

- A** - Dincel profile.
- B** - Dincel Wall Splice (P-WS) accessory. Refer to F.8.2.1 of DCM
- C** - Cut and remove exterior part of Dincel Wall Splice (P-WS) accessory once wall is filled with concrete and structure is complete. 10mm groove cut into horizontal joint. Cleaned and prepped ready for sealant
- D** - MS Polymer sealant or equivalent. Ensure continuous and without gaps.
- E** - Dincel nominated waterproofing bandage. Over sealant and 300mm above and below spliced joint.
- F** - Corflute positioned to protect waterproofing bandage and joint when backfilling. Min. 500mm above and below spliced horizontal joint.
- G** - PVC compatible adhesive to secure corflute in place before backfilling.
- H** - Horizontal joint minimum 500mm above permanent/tidal water table.

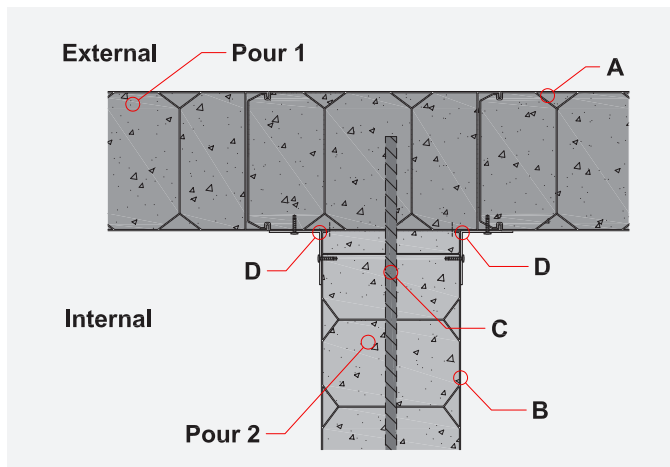


G.4.2. WALL JUNCTIONS

Where there are joints or junctions to exterior Dincel walls. No penetrations should occur at the earth face of the Dincel wall. Drilling into the interior side of the Dincel wall is permissible above wall-footing slab level and to engineer's details (drill & epoxy or in-situ bars) however should be minimised as much as possible.

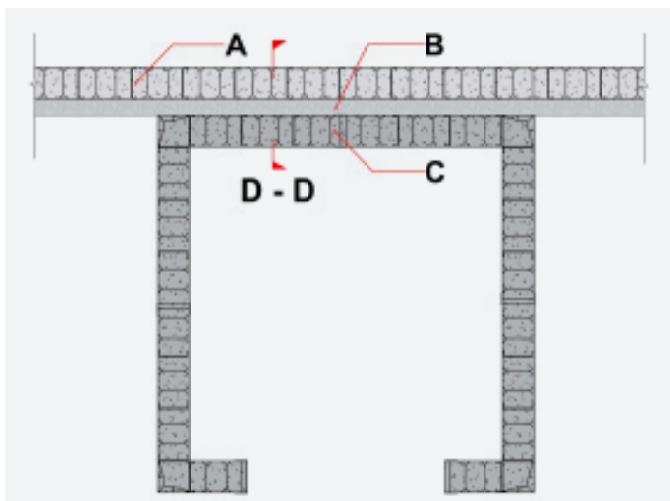
G.4.2.1. Typical Plan "T" Junction

- A - Earth face of Dincel wall.
- B - Internal Dincel wall.
- C - Dowel connection only (no cut-out of Dincel skin permissible. Drill only).
- D - Screw temporary D-ANG50 Angles at max:
 - 150mm centres for bottom 1/3 of wall.
 - 300mm centres for top 2/3 of wall.



G.4.2.2. Typical Lift Shaft/Pool/Tank Wall for Waterproofing Purposes - Plan View

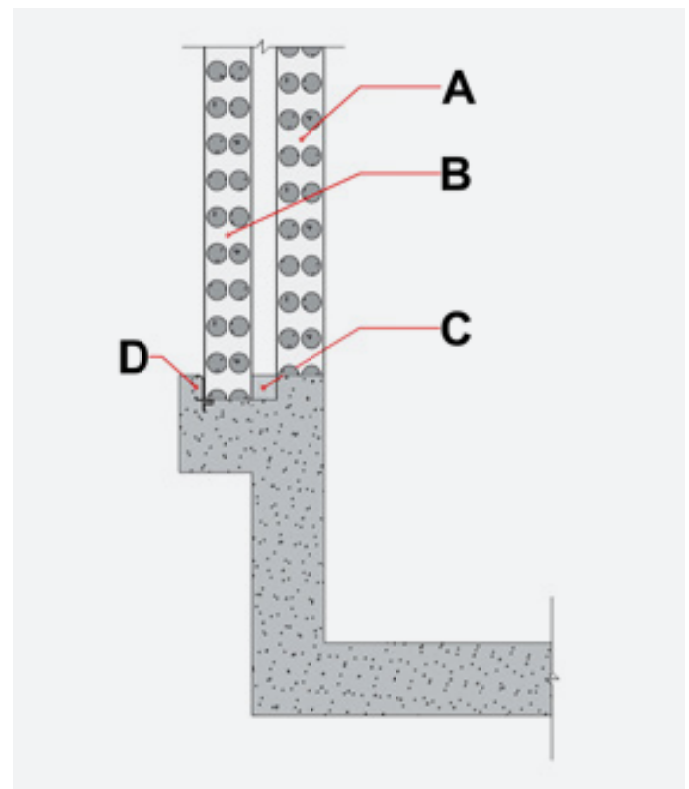
- A - Continuous Dincel profile
- B - Dish drain to engineer's details
- C - Internal Dincel wall
- D-D - Refer to section view G.4.2.3



G.4.2.3. Typical Lift Shaft Wall for Waterproofing Purposes - Section View

Industry standard is to pour in-situ monolithic concrete lift pits. Dincel wall construction above.

- A - Dincel lift shaft wall.
- B - Dincel external wall.
- C - Dish drain to project engineer's details.
- D - Monolithic concrete lift pit to project engineer's details (Dincel Water Stop (DWS) cast in hob).



G.5. DINCEL WATERSTOP (DWS)

The DWS accessory is part of a waterproofing system. The system incorporates a re-injectable hose and is installed as part of the hob prior to Dincel wall construction. In the event of any water seepage during the period warranted at the base wall junction, injection material is pumped through the re-injectable hose to fill and seal any voids where water ingress has occurred.

DWS AND INJECTABLES NOT AVAILABLE FOR GENERAL SALE.

G.5.1. INSTALLATION

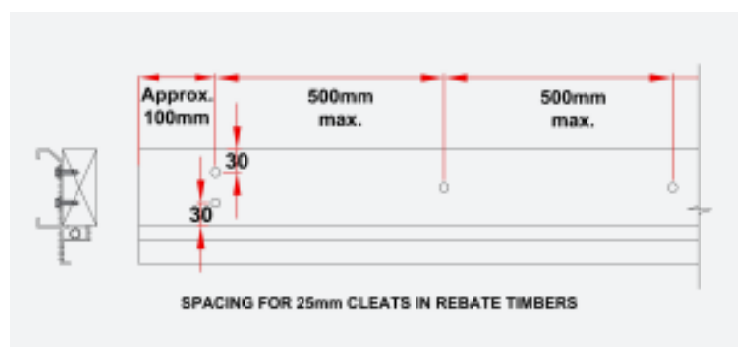
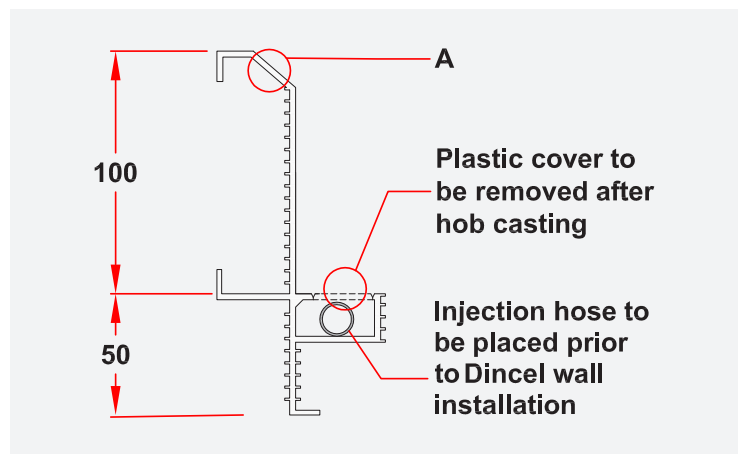
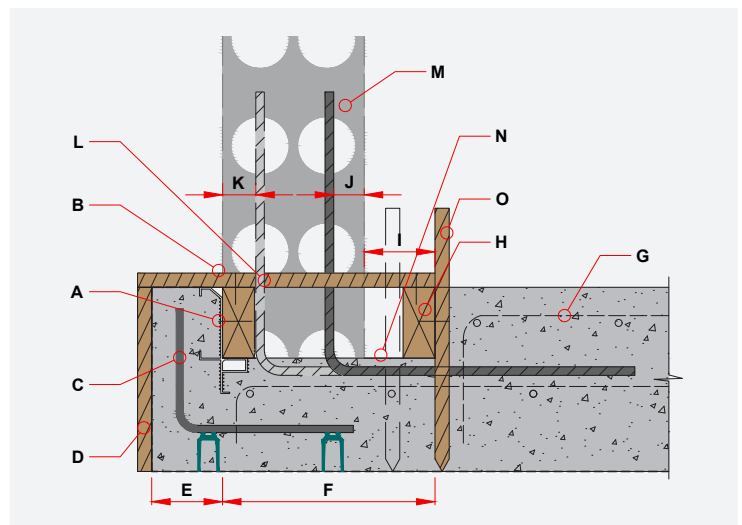
The DWS is secured to formwork to act as a shutter to form a hob. The re-injectable hose is installed into the DWS cavity prior to Dincel wall installation. The following is an example on how the DWS accessory can be fixed in place to form up the footing slab.

The following details incorporate the Dincel Waterstop accessory (DWS) and re-injectable hose system providing directions to ensure waterproofing around the Dincel wall and footing slab junction.

G.5.2. CONSTRUCTION OF SLAB REBATE WITH DINCEL WATER STOP (DWS)

- A** - Dincel Water Stop (DWS) used as cast-in shutter to form hob.
- B** - Timber batten held in place to stabilise the timbers used to form rebate using nails or screws. Preferably screws for ease of removal.
- C** - Steel reinforcement provided to hob design subject to engineer's details.
- D** - Plywood shutter (fixed/pinned appropriately to ground) or face of shoring/sheet piling.
- E** - Min. 100mm.
- F** - Total rebate width = Panel thickness + drainage cavity size.
- G** - Slab and slab reinforcement to engineer's details.
- H** - Timber positioned to suit required rebate.
- I** - Rebate distance to allow for dish drain (to project engineer's details).
- J** - Min. 55mm concrete cover from face of Dincel to starter bar
- K** - Min. 55mm concrete cover from face of Dincel to starter bar and to provide clearance to DWS
- L** - Option of one or two starter bars secured to timber batten using tie-wire as required by design engineer.
- M** - Dincel wall to be installed (shown for visual aid purposes)
- N** - Rebate base is troweled as flat as possible to maintain alignment with the base of rebate timbers.
- O** - Formwork stake located external face of rebate timbers.

NOTE: Maximum one layer of starter bars for Dincel 155 profiles to allow for sufficient concrete cover and clearance to DWS.



G.6. BASEMENT DETAILS

The following design details have been extracted from the DCM and should be included in basement designs to prevent water ingress through the cold joint located between the Dintel wall and footing slab.

The following designs incorporate three main waterproofing mechanisms;

- 1 - The waterproofing properties of the PVC membrane and patented 'snap' joints,
- 2 - The DWS/injection system to fill and seal any minor cracks at the wall-footing slab junctions in the event they have occurred and to prevent further additional water ingress (when required), and
- 3 - A free draining dish drain/pit/pump to remove any undesirable water that happens to travel into the basement. The dish drain may receive ground water prior to finalisation of injection procedure.

NOTE: Free draining dish drain means that the dish drain along the Dintel wall is free to drain and not subject to any blockage/ponding. Whilst the geotechnical report may confirm the site to be of non-submerged condition, if the drainage system fails, scenarios of submerged conditions can occur. Failure of the drainage system can cause hydrostatic pressure to lift the basement slab and joints, allowing water to penetrate through the floor slab and joints. Situations such as this are not covered by the Dintel Waterproof Warranty.

NOTE: Dish drains are required because of the following:

- To be able to drain out any water during the course of the structure's construction prior to application of the injection system.
- To be able to drain out any liquids overflowing from activities such as general and car cleaning and in the event of a sprinkler system being activated or failing.

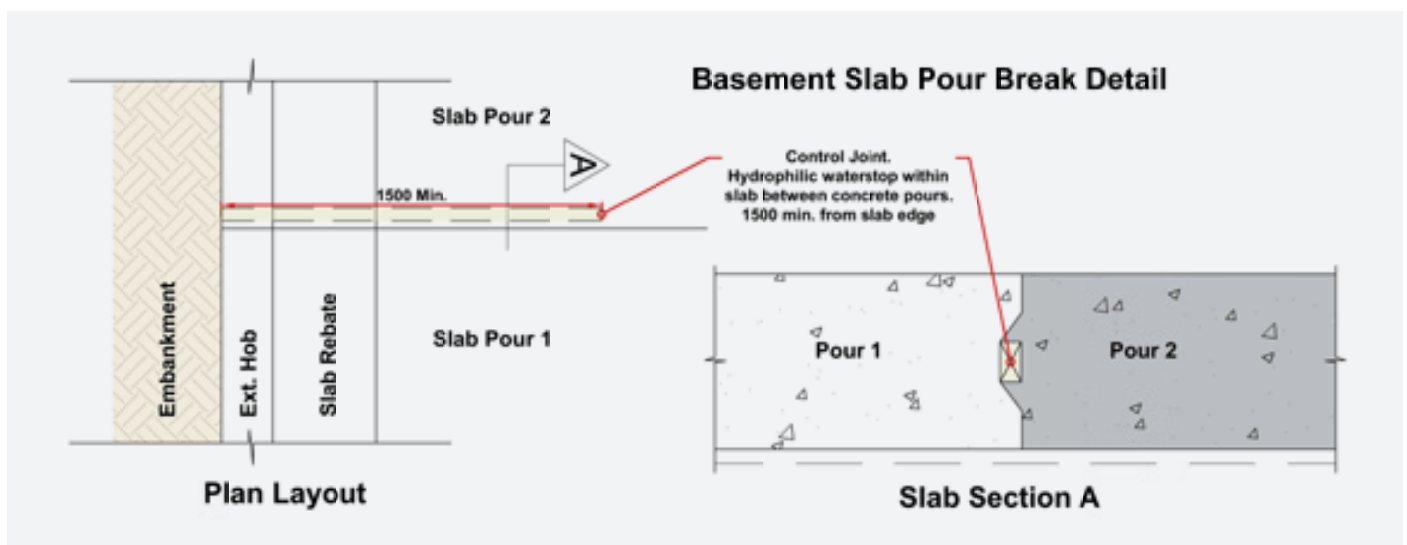
NOTE: The Waterproof Warranty is only applicable once the injection of the resin inside the DWS has taken place. The injection of the waterproofing resin is to take place no earlier than:

- 30 days after the Basement Walls have been filled with Compliant SCC, and
- After completion of all Basement Wall backfilling, and
- After the ending of any dewatering activities, and
- After completion of total structural works, only if the footings do not bear directly on rock or hard shale or if piles or piers do not bear on rock or hard shale.

NOTE: In non-submerged conditions, ag-lines and drainage cells are required if the basement wall is not designed for hydrostatic pressure. Hydrostatic pressure must be designed for submerged conditions.

NOTE: The engineers working on the project must take into account the thickness of the slabs and their joints for the entire duration of the structure's service life, particularly in the event of malfunctioning ag-lines.

NOTE: The following details do not show site specific reinforcement requirements. Please consult and refer to the project's engineering drawings for details.



G.6.1. WALL-SLAB JOINT ABOVE GROUND WATER TABLE POSITION

G.6.1.1 Monolithic Footing with Rebate: This detail is applicable to basement slabs with negligible falls. The footing and basement slab is poured at the same time.

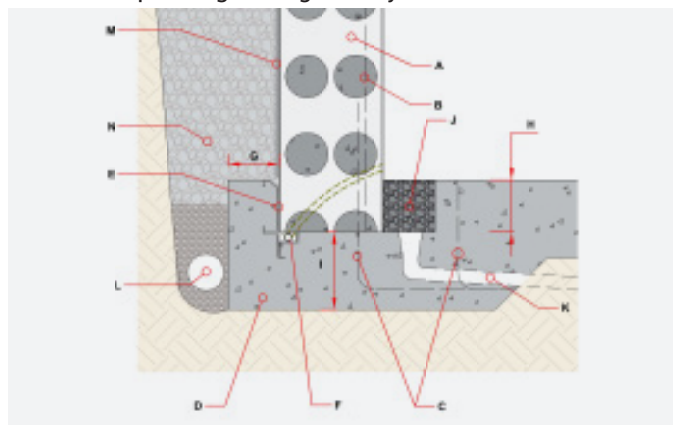
- A** - Dintel Wall (wall must be designed for hydrostatic water pressure if ag-line is not used or assumed to be non-functional in time).
- B** - Steel reinforcement to engineer's details.
- C** - Starter bars, tied to footing by either casting in or postfixing (drill & epoxy) as per engineer's detail.
- D** - Concrete floor slab to engineer's details.
- E** - Dintel Water Stop (DWS) used as cast-in shutter to form hob.
- F** - Re-injectable hose system to provide waterproofing injection material.
- G** - Min 100mm.
- H** - Min 100mm set down. Timber can be used to form rebate and also as temporary restraint.
- I** - Min 300mm and to engineers details.
- J** - Dish drain to project engineer's details.
- K** - Drainage connected to working sump pit by others.
- L** - Ag-line to project engineer's details. May be omitted if full height of wall is designed for hydrostatic pressure.
- M** - Adhere drainage cell to Dintel face as required by Project Engineer when Dintel wall is not designed for hydrostatic pressure. Ensure no damage or ruptures of Dintel panels occur during backfilling.
- N** - Free draining granular backfill to engineer's details.

NOTE: Use this detail over B3.2.1. of DCM when Dintel Waterproofing Warranty is required.

NOTE: Self Compacting Concrete (SCC) and injection material **MUST** be used with the following detail.

NOTE: No accessories (such as guide P-G) to be used underneath Dintel wall.

NOTE: Waterproofing footing/slab by others.



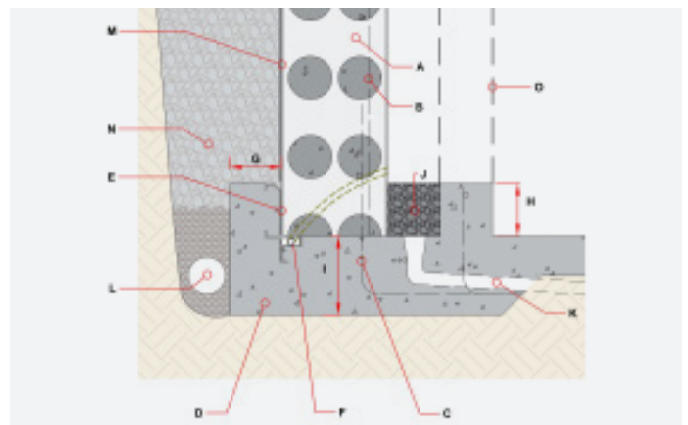
G.6.1.2 Monolithic Footing Slab with Monolithic Hob: This detail is applicable to basement slabs with negligible falls. The footing slab and hob are poured at the same time.

- A** - Dintel Wall (wall must be designed for hydrostatic water pressure if ag-line is not used or assumed to be non-functional in time).
- B** - Steel reinforcement to engineer's details.
- C** - Starter bars, tied to footing by either casting in or postfixing (drill & epoxy) as per engineer's detail.
- D** - Concrete footing slab and hob to engineer's details.
- E** - Dintel Water Stop (DWS) used as cast-in shutter to form hob.
- F** - Re-injectable hose system to provide waterproofing injection material.
- G** - Min 100mm.
- H** - Min 100mm hob. Timber can be used to form the hob and provide temporary wall restraint.
- I** - Min 300mm and to project engineers specifications.
- J** - Dish drain to project engineer's details.
- K** - Drainage connected to working sump pit by others.
- L** - Ag-line to project engineer's details. May be omitted if full height of wall is designed for hydrostatic pressure.
- M** - Adhere drainage cell to Dintel face as required by Project Engineer when Dintel wall is not designed for hydrostatic pressure. Ensure no damage or ruptures of Dintel panels occur during backfilling.
- O** - Internal wall location.
- N** - Free draining granular backfill to engineer's details.

NOTE: Self Compacting Concrete (SCC) and injection material **MUST** be used with the following detail.

NOTE: No accessories (such as guide P-G) to be used underneath Dintel wall.

NOTE: Waterproofing footing/slab by others.



This detail is applicable to basement slabs with significant falls. The footing is poured first. Basement slabs after.

B - Steel reinforcement to engineer's details.

D - Concrete floor slab to engineer's details.

F - Re-injectable hose system to provide waterproofing injection material.

H - Min 100mm set down to suit basement slab fall.

J - Dish drain to project engineer's details.

L - Ag-line to project engineer's details. May be omitted if full height of wall is designed for hydrostatic pressure.

M - Basement/ground floor slabs to engineer's details.

N - Footing steel reinforcement to engineer's details.

0 - Waterproofing of this pour break joint and floor slab by others.

P - Steel reinforcement to engineer's details. Min 50mm from slab edge face.

Q - Min. 200mm.

R - Steel reinforcement to engineer's details.

S - Ensure no damage or ruptures of Dincel panels during backfilling.

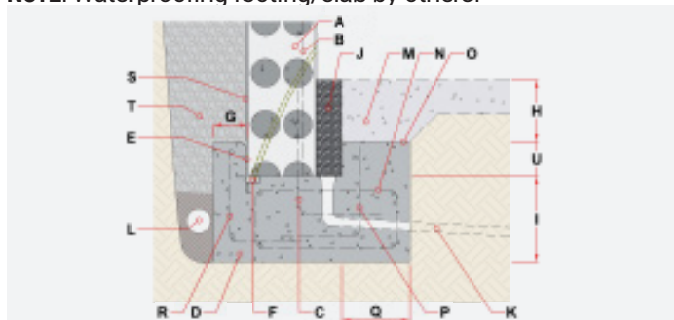
T - Free draining granular backfill to engineer's details.

U - Min. 100mm.

NOTE: Self Compacting Concrete (SCC) and injection material MUST be used with the following detail.

NOTE: No accessories (such as guide P-G) to be used underneath Dincel wall.

NOTE: Waterproofing footing/slab by others.



G.6.3.1 Monolithic Footing Slab with Rebate.

A - Dintel Wall designed for hydrostatic pressure.

B - Steel reinforcement to engineers' details.

C - Starter bars, tied to footing by either casting in or postfixing (drill & epoxy) as per engineer's detail.

D - Concrete footing slab to engineer's details.

E - Dintel Water Stop (DWS) used as cast-in shutter to form hob.

F - Re-injectable hose system to provide waterproofing injection material.

G - Min 100mm.

H - Min 100mm set down. Timber can be used to form rebate and also as temporary restraint.

I - Min 300mm and to project engineers specifications.

J - Dish drain to project engineer's details.

K - Drainage connected to working sump pit by others.

L - Concrete fines/sand/backfill to engineer's details.

M - Shoring by others.

N - If required, nominated membrane or equivalent by others.

0 - Dintel nominated waterproofing bandage over lapping nominated membrane on DWS by others if nominated membrane under slab is used.

NOTE: Self Compacting Concrete (SCC) and injection material MUST be used with the following detail.

NOTE: No accessories (such as guide P-G) to be used underneath wall.

NOTE: Waterproofing footing/slab by others.

