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EPS Waffle Pod System

The perfect foundation for innovation

The VoidForm® System is an advanced system for waffle pod slab foundations, developed by RMAX to reduce concrete quantities, provide greater slab strength, increase energy efficiency and save costs and time for the builder. It provides speed and ease of use, reliability and improved slab quality together with lower costs.

Benefits include;

- **Lightweight**
- **Easy to handle**
- **Durable**
- **Strong and flexible**
- **Fully load bearing**
- **Excellent sound insulation**
- **Long Term R-Value (thermal values)**
- **Meets all Australian Building Codes and Standards**
- **Low water absorption**
- **Recyclable (sustainable material)**
- **Dimensionally stable**
- **Produces no ozone depleting gases**
- **Does not contain CFC's or VOC's**
- **Perfect when building on reactive soils**

Waffle pods are available in two sizes

1090 x 1090 x 225mm or 1090 x 1090 x 300mm

Center and edge spacers are also available.

Description

Waffle raft slab (also known as a **waffle pod slab**) - These slabs are constructed entirely above the ground by pouring concrete over a grid of polystyrene blocks known as 'void forms'.

Waffle raft slabs are generally suitable for sites with less reactive soil, use about 30% less concrete and 20% less steel than a stiffened raft slab, and are generally cheaper and easier to install than other types (even in bad weather).

These types of slab are only suitable for very flat ground. On sloping ground or with more complex designs, a stiffened raft slab is normally the better option. Waffle raft slabs are suited to lightly and moderately reactive clay sites in particular, because they're not embedded in the ground like stiffened raft slabs. Waffle raft slabs are best suited for **Class A**, **Class S**, **Class M**, **Class H** and **Class E** soils (although you should consult an engineer about the suitability of the slab for very reactive soils, and generally to confirm this type of slab is suitable for your site).

Different classes of soil

Class A - This denotes very 'stable' ground - mostly sand and rock, not affected by moisture

Class S - Slightly reactive soil, slight movement due to moisture

Class M - Moderately reactive soil, moderate movement due to moisture

Class H - Highly reactive soil, a high amount of movement due to moisture

Class E - Extremely reactive soil, extreme movement due to moisture

Class P - 'Problem' soil, which experiences land slip, mine subsidence and so forth. If you are building on Class P site you will typically need to consult an engineer.

Waffle pod slab construction has a number of benefits including speed of production and

huge cost savings. Other benefits of a waffle pod slab include;

Waffle pod slabs are less affected by rain delay than conventional slabs

Waffle pod slabs provide better insulation from the ground, allowing minimal heat and cold transfer through the floor, which increases star rating

Pump prices are less for a waffle pod slab, due to less concrete required

Waffle pod slabs usually require little site excavation, resulting in minimal soil removal costs compared to conventional slabs

Waffle pod slabs can be constructed in areas of rocky foundation material

Calculations for Waffle Pod Slabs

Requirements for plan take off and estimating for engineering and slab detail.

To Calculate Waffle Pods Accessories.

- Divide the total square meters by 1.51 to get number of waffle pods required for the slab.
- Multiply the number of waffle pods by 1.4 to calculate the number of corner spacers required.
- Divide the number of corner spacers by 3 to calculate the number of edge spacers required. We use the same spacers for both the corners and the perimeter. Short edge for corners and long edge for the perimeter beam.
- Divide the length of the perimeter beam by 1.2 to calculate the number of trench mesh chairs required.
- Multiply the number of waffle pods by 3 to calculate the number of Bar Chairs required.

For Reinforcing Quantities

- Multiply the number of waffle pods by 2.3 then divide by 5.5 to calculate the number of 6 Meter Y Bar required.
- Measure and calculate any extra Y bar requirements (i.e. Principal ribs re-entrant corners etc)
- Divide lineal meters of edge beam 5.5 to calculate the trench mesh or bar as required by engineer (Y bar may be replaced with trench mesh)
- Divide total square meters of slab by 12.5 to calculate mesh requirements.

For Concrete Quantities (Quick Calculation Only)

85mm Thick Slab

- Multiply square meters of slab by 0.155 for 310 high slab.
- Multiply square meters of slab by 0.175 for 385 high slab.
- Multiply square meters of slab by 0.195 for 460 high slab.

100mm Thick Slab

- Multiply square meters of slab by 0.170 for 310 high slab.
- Multiply square meters of slab by 0.190 for 385 high slab.
- Multiply square meters of slab by 0.210 for 460 high slab.

For Concrete quantities (More accurate)

1. Multiply total lineal meter of edge beam by (normally 150x150)
2. Multiply total lineal meter of edge beam by the total height of slab by 50mm.
3. Divide total square meters of slab by 8.35 on 260 mm high slab.
   Divide total square meters of slab by 7.80 on 310 mm high slab.
   Divide total square meters of slab by 6.93 on 385 mm high slab.
   Divide total square meters of slab by 6.30 on 460 mm high slab.
   Divide total square meters of slab by 5.00 on 610 mm high slab
4. Add totals of steps 1 to 3 together and add 3% for waste.

Installation

Every step in the installation of the waffle pod system saves costs, reduces concrete quantities and provides greater slab strength and energy efficiency. The system ensures maximum control and reliability and also requires less preparation work.

As they arrive on site, ready to use, labour costs are reduced to a minimum. It enables maximum control of every concrete pour. The waffle pod system is made from Expanded Polystyrene which makes it resistant to moisture. No time is lost using them in wet weather and quality is maintained. They do not sag or buckle even in the most adverse of weather conditions.

The void form system improves the energy efficiency of houses. Its insulation features reduce energy costs, keeping your home cooler in summer and warmer in winter. The system can be used on sites of sand, rock, reactive soils and water tables. Beam excavation is eliminated and the voids are capable of spanning sewers and water mains without piers.

Step 1 The building site must be levelled, all plumbing pipes fixed in place and the formwork positioned.

Step 2 Plastic sheeting of 200 microns is spread over the site, with all laps taped.

Step 3 Starting from the corner of the site, lay VoidForms® in grid pattern, using Void-Lock® grid spacers. The VoidForms® can be easily cut to size and to fit plumbing fixtures.

Step 4 Place the reinforcement bars between the VoidForms® and the top mesh over the total area. Ensure tie laps are used as required.

Step 5 Place chairs under the mesh at a rate of 4 per VoidForm®.

Step 6 In a single concrete pour, partially cover the VoidForm® before filling the ribs. (This will help prevent the VoidForm® from floating).

DETAILS

This drawing is to be read in conjunction with Table 1 & Table 2. For VoidForm® height – H, Reinforcing fabric – F and Size of Y bar bottom reinforcement for each VoidForm® waffle raft slab type, refer to Table 1.

Table 1

Additional Reinforcement for External RIBS where stem width exceeds 150mm

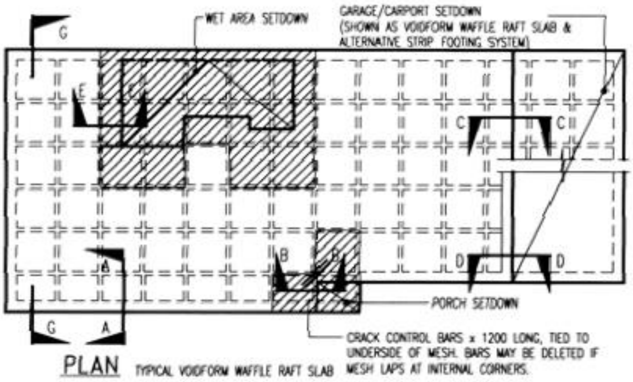
Stem Width Max	Additional Top Steel	Additional Bot. Steel
200mm	1-Y12	2-Y12
330mm	2-Y12	3-Y12
440mm	3-Y12	4-Y12

Table 2

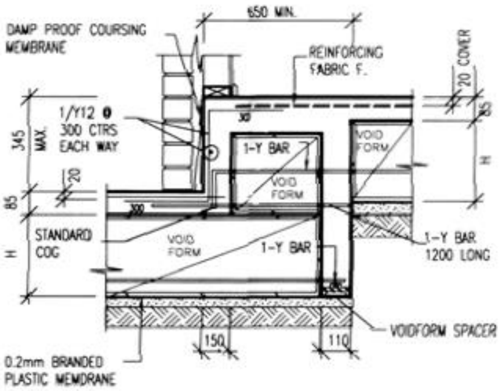
VoidForm® Waffle Raft Slab Proportions

Type	VoidForm® Height	RIB Construction reinforcing fabric – F. Main R'ment – Y
1	225mm	RIB depth – 310mm O/A 1-Y12 Bot. F72 in top
2	300mm	RIB depth – 385mm O/A 1-Y12 Bot. F82/72 in top
3	300mm	RIB depth – 385mm O/A 1-Y16 Bot. F82 in top

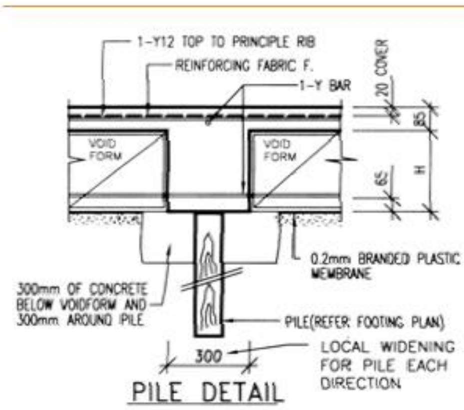
NOTE 1
The next VoidForm® must be set down "L" is 600mm for Y16 bars and 450mm for Y12 bars.
O/A denotes overall height.



PLAN TYPICAL VOIDFORM WAFFLE RAFT SLAB



STEP-DOWN DETAIL



PILE DETAIL

Notes

Surface fill, roots and vegetation are to be removed off the building platform. Site is to be cut and/or filled to form a level bench to within approx. 50mm. Up to 300mm of approved compacted fill may be used (refer AS 2870-1996). If additional fill is required or where a site has existing fill contact an engineer prior to further construction or design. Pressure required is 40kPa.

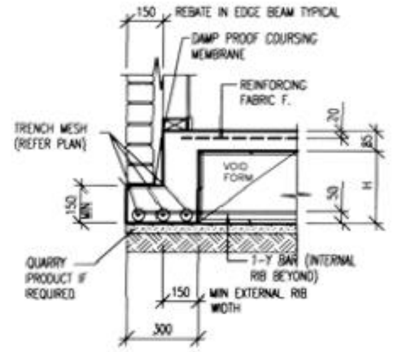
Place suitable quarry products (well graded quarry sands or rubble having a particle size of 4mm maximum) up to 50mm in depth to obtain a level platform within +/- 5mm. If the building platform is level after the above mentioned site works, quarry material may not be required and only used in the low areas. It is recommended that this material extends 1.0M past the building line.

A minimum RIB width of 110mm must be maintained where plumbing risers clash with RIBs. This may be achieved by cutting the waffle pod to suit and lapping reinforcement.

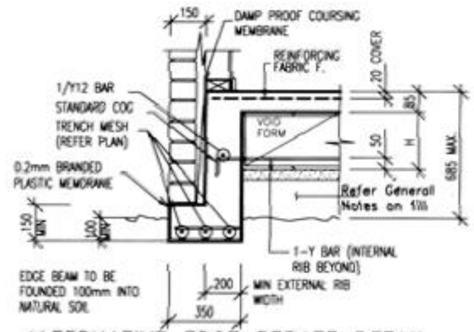
Concrete strength to be F'c=200MPa and is to be mechanically vibrated. Pour RIBs as part of slab.

The detail sheet shall be read in conjunction with the footing plan, architectural drawings, soil report and AS 2870-1996.

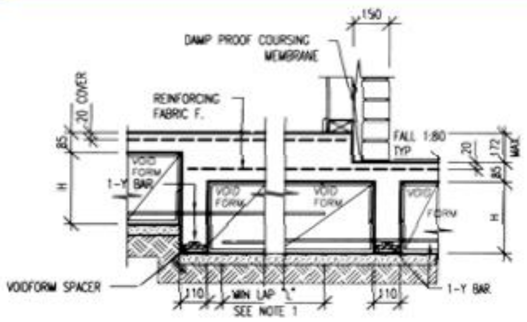
Details are to be used as a guide only. Footing designs are to be designed by a suitably qualified engineer.



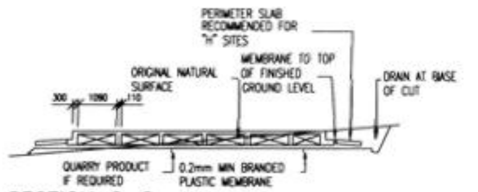
SECTION A–A EDGE REBATE DETAIL



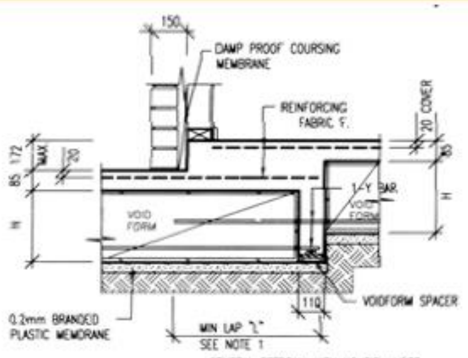
ALTERNATIVE EDGE REBATE DETAIL



SECTION B–B GENERAL SETDOWN WITH RIB UNDER EXTERNAL WALL

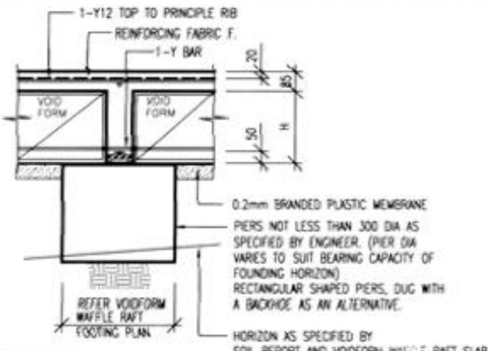


SECTION G–G TYPICAL SECTION THROUGH VOIDFORM WAFFLE RAFT SLAB

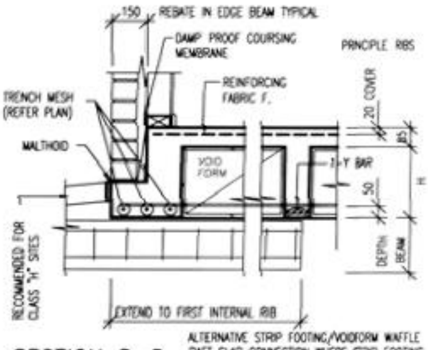


SECTION C–C GENERAL SETDOWN WITH NO RIB UNDER EXTERNAL WALL

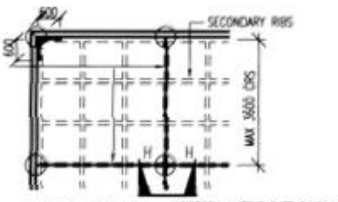
SECTION E–E SIMILAR



SECTION H–H



SECTION D–D ALTERNATIVE STRIP FOOTING/VOIDFORM WAFFLE RAFT SLAB CONNECTION WHERE STRIP FOOTING USED FOR CARPORT/PORCH /GARAGE



PART PLAN VOIDFORM WAFFLE RAFT SLAB & PIERS

A. REINFORCEMENT TO PRINCIPLE RIBS–
TOP 1–Y12 CONTINUOUS WITH LAPS AT MID SPAN BETWEEN PIERS
BOTTOM 1–Y12 BAR AS PER TABLE 1
B. REINFORCEMENT TO SECONDARY RIBS–
TOP REINFORCING FABRIC F. THROUGHOUT ENTIRE SLAB AS PER TABLE 1
BOTTOM 1–Y12 BAR REFER TABLE 1
C. REINFORCEMENT TO CORNER RIBS–
600mm CORNER LAP BAR (Y12)

Note

Details are to be used as a guide only. Footing designs are to be designed by a suitably qualified engineer.

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Case Studies

Case Study 1 – Townsville Wharf Queensland

The Challenge - To build a 3 story house on a canal estate. A formidable task given the presence of the water table and Council restrictions on the height of the roofline.

The Solution - By reducing the thickness of each suspended concrete floor, the system permitted the house to comply with the restrictions of both the water table and the Council's by-laws. The system eliminated the need for large concrete beams at the perimeter of the building.

Case Study 2 – Forestdale Queensland

The Challenge - Spanning a council's sewer main.

The Solution - Faced with the option of building a smaller house or spanning the sewer, the choice was the latter. This was achieved by the strength of the waffle pod slab which allowed it to be suspended over the sewer without piers. A great saving in time and money.

Case Study 3 – Oakden South Australia

The Challenge - To reduce costs on excavation footings.

The Solution - By applying the waffle pod slab there was significant reduction in excavation requirements, and combined with the elimination of the need for footings, the desired cost saving was achieved.

Case Study 4 – Ottoway South Australia

The Challenge - The presence of floating rock on the building site

The Solution - The unknown quantity of floating rock signalled an escalation of costs using the conventional footing slab. The engineer's preference for a waffle pod system not only saved costs, but importantly, achieved a secured foundation on this problem site.

Case Study 5 – Malvern Victoria

The Challenge -To erect 2 town houses, economically on soft, silty soil, with a depth of 800mm to natural clay.

The Solution – The initial design was based on a conventional stiffened raft slab. By converting to a waffle pod system, the cost was reduced by approximately $6000.

Case Study 6 – Doncaster Victoria

The Challenge – To provide a competitive alternative to a construction of units using screw-in piles.

The Solution – A redesign of the development to use a combination of bulk concrete piers and waffle pod slab. A system that saved the builder thousands of dollars.