

## SURFACE MOVEMENT CAPACITIES OF AS 2870 RAFT SLABS

This document presents results of ultimate strength analysis\* of deemed to comply stiffened raft and waffle raft slab designs prescribed in Australian Standard AS 2870 - Residential slabs and footings (2011). Results are for a typical 165m<sup>2</sup> modern single storey house for five common types of construction. Dead load for each type of construction has been taken from SAA HB28 – 1997, with a dead load factor of 1.25. Live load of 1.5 kPa has been used with a live load factor of 1.5, and a soil stiffness of 1000 kPa/m has been assumed for each of the seven site classes. Slab proportions and reinforcement details have been taken from Figures 3.1 and 3.4 in AS 2870. Ultimate bending moments have been calculated in accordance with AS 3600, using a capacity reduction factor of 0.8 and effective flange widths 0.2L+B<sub>w</sub> for internal stiffening ribs and 0.1L+B<sub>w</sub> for edge stiffening ribs. L has been taken as 12.0 m for ribs in the short direction and 13.75 m for ribs in the long direction. The compressive strength of concrete has been taken as 20 Mpa, and the yield strength of steel reinforcement as 500 Mpa.

Table of results		Surface movement capacities (mm)				
Site class	Type of slab	Clad Frame	Articulated Masonry Veneer	Masonry Veneer	Articulated Full Masonry	Full Masonry
<b>Class S</b> 0 < y <sub>s</sub> ≤ 20mm	Stiffened raft	0 <sub>(1),(2)</sub>	0 <sub>(1),(2)</sub>	0 <sub>(1),(2)</sub>	0 <sub>(1),(2)</sub>	0 <sub>(3)</sub>
	Waffle raft	15 <sub>(1)</sub>	0 <sub>(1)</sub>	0 <sub>(1)</sub>	0 <sub>(1)</sub>	N/A
<b>Class M</b> 20 < y <sub>s</sub> ≤ 40mm	Stiffened raft	2 <sub>(2)</sub>	0 <sub>(1),(2)</sub>	0 <sub>(1),(2)</sub>	15 <sub>(3)</sub>	0 <sub>(3)</sub>
	Waffle raft	25 <sub>(1)</sub>	0 <sub>(1)</sub>	0 <sub>(1)</sub>	17 <sub>(3)</sub>	N/A
<b>Class M - D</b>	Stiffened raft	16 <sub>(2)</sub>	9 <sub>(1)</sub>	41 <sub>(3)</sub>	15 <sub>(3)</sub>	0 <sub>(3)</sub>
	Waffle raft	25 <sub>(1)</sub>	0 <sub>(1)</sub>	9 <sub>(1)</sub>	17 <sub>(3)</sub>	N/A
<b>Class H1</b> 40 < y <sub>s</sub> ≤ 60mm	Stiffened raft	16 <sub>(2)</sub>	9 <sub>(1)</sub>	41 <sub>(3)</sub>	13 <sub>(3)</sub>	0 <sub>(3)</sub>
	Waffle raft	36 <sub>(1)</sub>	25 <sub>(1)</sub>	43 <sub>(3)</sub>	40 <sub>(3)</sub>	N/A
<b>Class H1 - D</b>	Stiffened raft	39 <sub>(1)</sub>	42 <sub>(1)</sub>	39 <sub>(3)</sub>	13 <sub>(3)</sub>	0 <sub>(3)</sub>
	Waffle raft	36 <sub>(1)</sub>	25 <sub>(1)</sub>	43 <sub>(3)</sub>	N/A	N/A
<b>Class H2</b> 60 < y <sub>s</sub> ≤ 75mm	Stiffened raft	84 <sub>(1)</sub>	64 <sub>(1)</sub>	37 <sub>(3)</sub>	9 <sub>(3)</sub>	N/A
	Waffle raft	36 <sub>(2)</sub>	25 <sub>(1)</sub>	N/A	N/A	N/A
<b>Class H2 - D</b>	Stiffened raft	117 <sub>(3)</sub>	73 <sub>(3)</sub>	37 <sub>(3)</sub>	9 <sub>(3)</sub>	N/A
	Waffle raft	55 <sub>(1)</sub>	44 <sub>(1)</sub>	N/A	N/A	N/A

### Notes:

1. The suffix 'D' in site classifications means the soil moisture changes on the building site are deep-seated.
2. N/A means AS 2870 does not provide slab designs for the tabulated type of construction/site class.
3. Green fonts mean the tabulated surface movement capacities are within the range of characteristic values prescribed in AS 2870, as indicated under the tabulated site class in column 1 of the table.
4. Red fonts mean the tabulated surface movement capacities are below the range of characteristic values prescribed in AS 2870, as indicated under the tabulated site class in column 1 of the table.
5. Subscripts indicate the governing criteria for the tabulated surface movement capacities, as follows:
  - (1) = Overall hogging strength
  - (2) = Local slab panel strength
  - (3) = Overall hogging deflection

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