

SURFACE MOVEMENT CAPACITIES OF STIFFENED RAFT AND WAFFLE RAFT SLABS

The table below presents results of ultimate strength analysis* of deemed to comply stiffened raft and waffle raft slabs prescribed in AS 2870-2011. These results are for a typical single storey house, for five common types of construction. The overall length of the floor plan is 13.75 m and the overall width is 12.00 m.

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

Slab proportions, stiffening beam layouts, and reinforcement details have been taken from Figures 3.1 and 3.4. in AS 2870-2011. Effective flange widths of stiffening beams have been calculated in accordance with Clause 4.4(e) of AS 2870-2011.

Ultimate bending moments have been calculated in accordance with AS 3600, using a capacity reduction factor of 0.8 The compressive strength of concrete has been taken as 20 Mpa, and the yield strength of steel reinforcement as 500 MPa.

Soil stiffness has been taken as 1000 kPa/m.

Table of results		Surface movement capacities (mm)				
Site class	Type of slab	Clad Frame	Articulated Masonry Veneer	Masonry Veneer	Articulated Full Masonry	Full Masonry
Class S $0 < y_s \leq 20\text{mm}$	Stiffened raft	0 ^{(1),(2)}	0 ^{(1),(2)}	0 ^{(1),(2)}	0 ^{(1),(2)}	0 ⁽³⁾
	Waffle raft	15 ⁽¹⁾	0 ⁽¹⁾	0 ⁽¹⁾	0 ⁽¹⁾	N/A
Class M $20 < y_s \leq 40\text{mm}$	Stiffened raft	2 ⁽²⁾	0 ^{(1),(2)}	0 ^{(1),(2)}	15 ⁽³⁾	0 ⁽³⁾
	Waffle raft	25 ⁽¹⁾	0 ⁽¹⁾	0 ⁽¹⁾	17 ⁽³⁾	N/A
Class M - D	Stiffened raft	16 ⁽²⁾	9 ⁽¹⁾	41 ⁽³⁾	15 ⁽³⁾	0 ⁽³⁾
	Waffle raft	25 ⁽¹⁾	0 ⁽¹⁾	9 ⁽¹⁾	17 ⁽³⁾	N/A
Class H1 $40 < y_s \leq 60\text{mm}$	Stiffened raft	16 ⁽²⁾	9 ⁽¹⁾	41 ⁽³⁾	13 ⁽³⁾	0 ⁽³⁾
	Waffle raft	36 ⁽¹⁾	25 ⁽¹⁾	43 ⁽³⁾	40 ⁽³⁾	N/A
Class H1 - D	Stiffened raft	39 ⁽¹⁾	42 ⁽¹⁾	39 ⁽³⁾	13 ⁽³⁾	0 ⁽³⁾
	Waffle raft	36 ⁽¹⁾	25 ⁽¹⁾	43 ⁽³⁾	N/A	N/A
Class H2 $60 < y_s \leq 75\text{mm}$	Stiffened raft	84 ⁽¹⁾	64 ⁽¹⁾	37 ⁽³⁾	9 ⁽³⁾	N/A
	Waffle raft	36 ⁽²⁾	25 ⁽¹⁾	N/A	N/A	N/A
Class H2 - D	Stiffened raft	117 ⁽³⁾	73 ⁽³⁾	37 ⁽³⁾	9 ⁽³⁾	N/A
	Waffle raft	55 ⁽¹⁾	44 ⁽¹⁾	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. Superscripts 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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