B-5.1. Minimum Vertical and Horizontal Reinforcement for *Basement Walls* of low-rise residential buildings in low and moderate Seismic Zones

Table B-5.1.1

150mm CONCRETE THICKNESS WALL
MINIMUM VERTICAL REINFORCEMENT FOR BASEMENT WALLS (RESTRAINED TOP & BOTTOM)
IN LOW AND MODERATE SEISMIC ZONES

Wall Height (Unbalanced Backfill Depth), mm	Equivalent Fluid Density, kN /m3				
	4,8	6,4	8	9,6	12,8
1800	10M @ 400 o.c.	10M @ 400 o.c.	10M @ 400 o.c.	10M @ 400 o.c.	10M @ 400 o.c.
2100	15M @ 400 o.c.	15M @ 400 o.c.	15M @ 400 o.c.	15M @ 400 o.c.	15M @ 400 o.c.
2400	15M @ 400 o.c.	15M @ 400 o.c.	15M @ 400 o.c.	15M @ 400 o.c.	20M @ 400 o.c.
2700	15M @ 400 o.c.	15M @ 400 o.c.	15M @ 400 o.c.	20M @ 400 o.c.	15M @ 200 o.c.
3000	15M @ 400 o.c.	20M @ 400 o.c.	20M @ 400 o.c.	15M @ 200 o.c.	20M @ 200 o.c.

Horizontal Rebar Requirements: 15M @ 400 o.c.

NOTE:
1. Calculations are based on maximum two floors above the basement
2. Concrete strength f 'c = 25MPa
3. Reinforcing steel f y = 400MPa
4. Vertical reinforcement should be placed within the middle third of the concrete wall
5. Wall shall be laterally supported at the top before backfilling

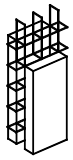


Table B-5.1.2

6-inch- CONCRETE THICKNESS WALL

MINIMUM VERTICAL REINFORCEMENT FOR BASEMENT WALLS (RESTRAINED TOP & BOTTOM)
IN LOW AND MODERATE SEISMIC ZONES

Wall Height (Unbalanced Backfill Depth), ft	Equivalent Fluid Density, pcf				
	30	40	50	60	80
6	# 4 @ 16" o.c.	# 4 @ 16" o.c.	# 4 @ 16" o.c.	# 4 @ 16" o.c.	# 4 @ 16" o.c.
7	# 4 @ 16" o.c.	# 4 @ 16" o.c.	# 4 @ 16" o.c.	# 5 @ 16" o.c.	# 5 @ 16" o.c.
8	# 4 @ 16" o.c.	# 5 @ 16" o.c.	# 5 @ 16" o.c.	# 5 @ 16" o.c.	# 6 @ 16" o.c.
9	# 4 @ 16" o.c.	# 5 @ 16" o.c.	# 5 @ 16" o.c.	# 5 @ 16" o.c.	# 6 @ 16" o.c.
10	# 5 @ 16" o.c.	# 6 @ 16" o.c.	# 5 @ 8" o.c.	# 5 @ 8" o.c.	# 6 @ 8" o.c.

Horizontal Rebar Requirements: # 4 @ 16" o.c.

NOTE:

1. Calculations are based on maximum two floors above the basement
2. Concrete strength f 'c = 3,500 psi
3. Reinforcing steel f y = 40,000 psi (# 4 bars); 60,000 psi (# 5 & bigger bars)
4. Vertical reinforcement should be placed within middle third of the concrete wall
5. Wall shall be laterally supported at the top before backfilling

Table B-5.1.3

200mm CONCRETE THICKNESS WALL
MINIMUM VERTICAL REINFORCEMENT FOR BASEMENT WALLS (RESTRAINED TOP & BOTTOM)
IN LOW AND MODERATE SEISMIC ZONES

Wall Height (Unbalanced Backfill Depth), mm	Equivalent Fluid Density, kN /m3				
	4,8	6,4	8	9,6	12,8
1800	10M @ 400 o.c.	10M @ 400 o.c.	10M @ 400 o.c.	10M @ 400 o.c.	10M @ 400 o.c.
2100	10M @ 400 o.c.	10M @ 400 o.c.	15M @ 400 o.c.	15M @ 400 o.c.	15M @ 400 o.c.
2400	10M @ 400 o.c.	10M @ 400 o.c.	15M @ 400 o.c.	15M @ 400 o.c.	15M @ 400 o.c.
2700	10M @ 400 o.c.	15M @ 400 o.c.	15M @ 400 o.c.	15M @ 400 o.c.	20M @ 400 o.c.
3000	15M @ 400 o.c.	15M @ 400 o.c.	15M @ 400 o.c.	20M @ 400 o.c.	20M @ 400 o.c.
3400	15M @ 400 o.c.	15M @ 400 o.c.	20M @ 400 o.c.	20M @ 400 o.c.	20M @ 200 o.c.
3700	15M @ 400 o.c.	20M @ 400 o.c.	15M @ 200 o.c.	20M @ 200 o.c.	—

Horizontal Rebar Requirements: 15M @ 400 o.c.

NOTE:
1. Calculations are based on maximum two floors above the basement
2. Concrete strength f 'c = 25MPa
3. Reinforcing steel f y = 400MPa
4. Vertical reinforcement should be placed on the tension side of the wall and shall be covered by 40mm thick concrete.
5. If wall is bearing pure axial load the reinforcement must be placed in the middle third of the
6. Wall shall be laterally supported at the top before backfilling

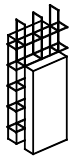


Table B-5.1.4.

8-inch- CONCRETE THICKNESS WALL
MINIMUM VERTICAL REINFORCEMENT FOR BASEMENT WALLS (RESTRAINED TOP & BOTTOM)
IN LOW AND MODERATE SEISMIC ZONES

Wall Height (Unbalanced Backfill Depth), ft	Equivalent Fluid Density, pcf				
	30	40	50	60	80
6	# 4 @ 16" o.c.	# 4 @ 16" o.c.	# 4 @ 16" o.c.	# 4 @ 16" o.c.	# 4 @ 16" o.c.
7	# 4 @ 16" o.c.	# 4 @ 16" o.c.	# 4 @ 16" o.c.	# 5 @ 16" o.c.	# 5 @ 16" o.c.
8	# 4 @ 16" o.c.	# 4 @ 16" o.c.	# 4 @ 16" o.c.	# 5 @ 16" o.c.	# 5 @ 16" o.c.
9	# 4 @ 16" o.c.	# 4 @ 16" o.c.	# 5 @ 16" o.c.	# 5 @ 16" o.c.	# 6 @ 16" o.c.
10	# 5 @ 16" o.c.	# 5 @ 16" o.c.	# 5 @ 16" o.c.	# 5 @ 16" o.c.	# 5 @ 8" o.c.
11	# 5 @ 16" o.c.	# 5 @ 16" o.c.	# 6 @ 16" o.c.	# 6 @ 16" o.c.	# 7 @ 16" o.c.
12	# 5 @ 16" o.c.	# 6 @ 16" o.c.	# 7 @16" o.c.	# 6 @ 8" o.c.	# 7 @ 8" o.c.

Horizontal Rebar Requirements: # 5 @ 16" o.c.

NOTE:

1. Calculations are based on maximum two floors above the basement
2. Concrete strength f 'c =3500 psi
3. Reinforcing steel f y = 60,00 psi
4. Vertical reinforcement should be placed on the tension side of the wall and shall be cov by1 1/2" thick concrete.
5. If wall is bearing pure axial load the reinforcement must be placed in the middle third of
6. Wall shall be laterally supported at the top before backfilling

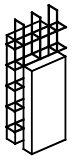


Table B-5.1.5

250mm CONCRETE THICKNESS WALL
MINIMUM VERTICAL REINFORCEMENT FOR BASEMENT WALLS (RESTRAINED TOP & BOTTOM)
IN LOW AND MODERATE SEISMIC ZONES

Wall Height (Unbalanced Backfill Depth), mm	Equivalent Fluid Density, kN /m3				
	4,8	6,4	8	9,6	12,8
1800	15M @ 400 o.c.	15M @ 400 o.c.	15M @ 400 o.c.	15M @ 400 o.c.	15M @ 400 o.c.
2100	15M @ 400 o.c.	15M @ 400 o.c.	15M @ 400 o.c.	15M @ 400 o.c.	15M @ 400 o.c.
2400	15M @ 400 o.c.	15M @ 400 o.c.	15M @ 400 o.c.	15M @ 400 o.c.	15M @ 400 o.c.
2700	15M @ 400 o.c.	15M @ 400 o.c.	15M @ 400 o.c.	15M @ 400 o.c.	15M @ 400 o.c.
3000	15M @ 400 o.c.	15M @ 400 o.c.	15M @ 400 o.c.	15M @ 400 o.c.	20M @ 400 o.c.
3400	15M @ 400 o.c.	15M @ 400 o.c.	15M @ 400 o.c.	20M @ 400 o.c.	20M @ 400 o.c.
3700	15M @ 400 o.c.	15M @ 400 o.c.	20M @ 400 o.c.	20M @ 400 o.c.	20M @ 200 o.c.

Horizontal Rebar Requirements: 15M @ 400 o.c.

NOTE:
1. Calculations are based on maximum two floors above the basement
2. Concrete strength f 'c = 25MPa
3. Reinforcing steel f y = 400MPa
4. Vertical reinforcement should be placed on the tension side of the wall and shall be covered by 40mm thick concrete.
5. If wall is bearing pure axial load the reinforcement must be placed in the middle third of the
6. Wall shall be laterally supported at the top before backfilling

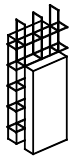
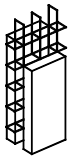


Table B-5.1.6.

10-inch- CONCRETE THICKNESS WALL
MINIMUM VERTICAL REINFORCEMENT FOR BASEMENT WALLS (RESTRAINED TOP & BOTTOM)
IN LOW AND MODERATE SEISMIC ZONES

Wall Height (Unbalanced Backfill Depth), ft	Equivalent Fluid Density, pcf				
	30	40	50	60	80
6	# 5 @ 16" o.c.	# 5 @ 16" o.c.	# 5 @ 16" o.c.	# 5 @ 16" o.c.	# 5 @ 16" o.c.
7	# 5 @ 16" o.c.	# 5 @ 16" o.c.	# 5 @ 16" o.c.	# 5 @ 16" o.c.	# 5 @ 16" o.c.
8	# 5 @ 16" o.c.	# 5 @ 16" o.c.	# 5 @ 16" o.c.	# 5 @ 16" o.c.	# 5 @ 16" o.c.
9	# 5 @ 16" o.c.	# 5 @ 16" o.c.	# 5 @ 16" o.c.	# 5 @ 16" o.c.	# 6 @ 16" o.c.
10	# 5 @ 16" o.c.	# 5 @ 16" o.c.	# 5 @ 16" o.c.	# 5 @ 16" o.c.	# 6 @ 16" o.c.
11	# 5 @ 16" o.c.	# 5 @ 16" o.c.	# 6 @ 16" o.c.	# 6 @ 16" o.c.	# 7 @ 16" o.c.
12	# 5 @ 16" o.c.	# 5 @ 16" o.c.	# 6 @16" o.c.	# 6 @ 16" o.c.	# 7 @ 16" o.c.

Horizontal Rebar Requirements: # 6 @ 16" o.c.

NOTE:

1. Calculations are based on maximum two floors above the basement
2. Concrete strength f 'c =3500 psi
3. Reinforcing steel f y = 60,00 psi
4. Vertical reinforcement should be placed on the tension side of the wall and shall be covered by1 1/2" thick concrete.
5. If wall is bearing pure axial load the reinforcement must be placed in the middle third of the
6. Wall shall be laterally supported at the top before backfilling