

## FOUNDATION WALL WINDOW OPENING REINFORCEMENT

Article 9.15.4.3 of the 2015 National Building Code requires openings wider than 1.2 m (4 ft) in concrete foundation walls to be reinforced when the backfill height exceeds the maximum backfill height for laterally unsupported foundation walls in Table 9.15.4.2-A

Any opening in a foundation wall exceeding 1.2 m (4 ft) in width must meet these minimum requirements or be sealed by a Design Professional (structural engineer or architect) licensed to consult in Saskatchewan. The design assumptions below specify conditions that must be met in order to use these tables.

Table 1

Required Reinforcing for $\leq 8'-4"$ High Foundation Wall		
Width of Window Opening (ft)	# of Vertical Bars Each Side of Window (Each Face)	# of Horiz Bars (Each Face)
4 – 4.5	1 – 15M	1 – 10 M
4.5 – 7	1 – 15M	1 – 15M
7 – 7.5	1 – 15M	1 – 20M

Table 3

Required Reinforcing for $> 9'$ and $\leq 10'$ High Foundation Wall		
Width of Window Opening (ft)	# of Vertical Bars Each Side of Window (Each Face)	# of Horiz Bars (Each Face)
4 – 4.5	2 – 15M	1 – 15 M
4.5 – 5.5	2 – 15M	1 – 20M
5.5 – 6.5	2 – 20M	2 – 15M
6.5 – 8	2 – 20M	2 – 20M

Table 2

Required Reinforcing for $> 8'-4"$ and $\leq 9'$ High Foundation Wall		
Width of Window Opening (ft)	# of Vertical Bars Each Side of Window (Each Face)	# of Horiz Bars (Each Face)
4 – 5	1 – 20M	1 – 15 M
5 – 6.5	1 – 20M	1 – 20M
6.5 – 7.5	1 – 20M	2 – 15M
7.5 – 8	2 – 15M	2 – 15M

### Designs Assumptions

- 20 MPa, HS (Type 50) cement.
- 200 mm (8 in) thick concrete.
- Minimum concrete cover of 25 mm (1 in) and a maximum concrete cover of 50 mm (2 in).
- "Each face" means one (or two) bar(s) adjacent to inside face and one (or two) bar(s) adjacent to the outside face.
- Horizontal reinforcement is to be at least 2-10M top and bottom. For walls over 2.5 m (8 ft 4 in) high add 2-10M mid-height.
- Each opening shall have a diagonal bar, at least 10M by 900 mm (36 in) long, installed at each lower corner and each face.
- Finished grade to be at least 0.61m (24 in) from the top of the foundation wall.
- Openings may not be more than 25% of the face of the concrete wall.

Figure 1 – Diagrams for Window Opening Reinforcement

