

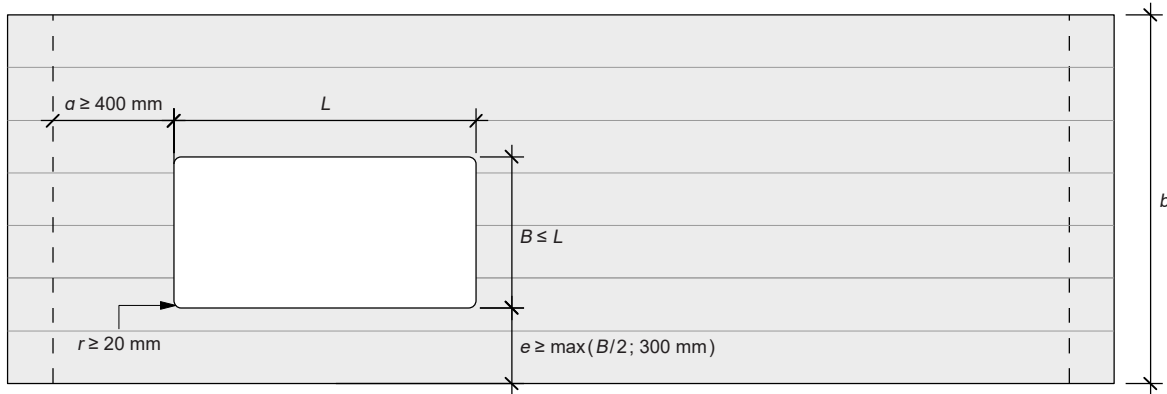
## Openings in Nordic X-Lam Floor Slabs

This technical note provides guidelines for the design of openings in Nordic X-Lam floor slabs.

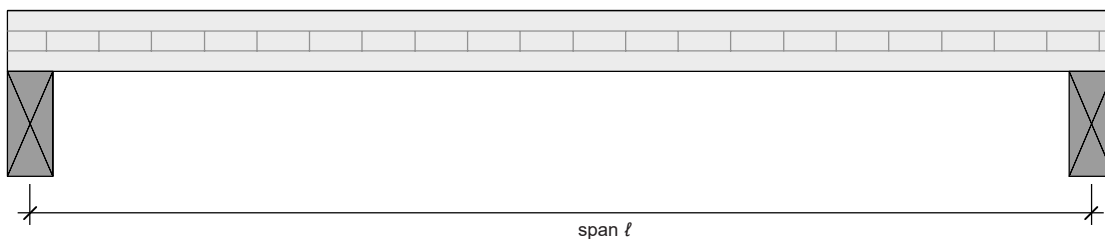
This technical note is only applicable if the following conditions are met:

- Simple or multiple span slab
- Bending in major strength direction
- Uniformly distributed loads only
- Deflection limit of  $L/360$  under live load and  $L/180$  under total load
- Maximum one opening per span

The openings shall conform to the following geometries. If these requirements cannot be met, an engineering analysis must be carried out and a reinforcement may be required. If applicable, the transmission of diaphragm lateral forces and fire-resistance requirements must be verified by a qualified engineer.



**Plan view**



**Elevation view**

Notes:

1. Opening size: The opening should conform to the following dimensions, with corners rounded to  $r \geq 20$  mm.
  - Length ( $L$ ): The maximum opening length, in the longitudinal direction of the panel, is given in the following table.
  - Width ( $B$ ): The opening width, in the transverse direction of the panel, should be less than or equal to the opening length.
2. Distance from support ( $a$ ): The minimal distance between the edge of the opening and the nearest inside face of support is 400 mm.
3. Edge distance ( $e$ ): The minimal distance between the edge of the opening and the nearest edge of the panel is  $1/2$  the opening width,  $B$ , or 300 mm., whichever is larger.
4. Circular opening : The opening can be circular if it fits inside a square meeting the above requirements.
5. Group of openings: A group of small openings located nearby may be considered as a single large opening whose dimensions are the overall length and width of the group.

**Live load = 1.9 kPa**

Maximum opening length,  $L$  (m) <sup>(c)</sup>

| Dead load <sup>(a)</sup><br>(kPa) | Layup<br>combination | Span, $\ell$ (m) <sup>(b)</sup> |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|-----------------------------------|----------------------|---------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|                                   |                      | 2.50                            | 2.75 | 3.00 | 3.25 | 3.50 | 3.75 | 4.00 | 4.25 | 4.50 | 4.75 | 5.00 | 5.25 | 5.50 | 5.75 | 6.00 | 6.25 | 6.50 | 6.75 | 7.00 |
| 1.0                               | 89-3s                | 0.76                            | 0.68 | 0.63 | 0.35 | 0.34 | 0.15 | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
|                                   | 105-3s               | 1.35                            | 1.35 | 1.35 | 1.30 | 0.54 | 0.37 | 0.39 | 0.22 | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
|                                   | 143-5s               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 0.47 | 0.49 | 0.52 | 0.34 | -    | -    | -    | -    | -    | -    |
|                                   | 175-5s               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 0.56 | 0.54 | 0.57 | 0.59 | 0.51 | 0.18 | -    | -    |
|                                   | 197-7s               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 0.59 | 0.62 | 0.64 | 0.67 | 0.67 |
|                                   | 213-7l               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.33 | 0.67 | 0.69 |
|                                   | 244-7s               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 0.67 | 0.69 |
|                                   | 244-7l               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 |
|                                   | 267-9l               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 |
| 2.0                               | 89-3s                | 0.62                            | 0.47 | 0.29 | 0.20 | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
|                                   | 105-3s               | 1.35                            | 1.35 | 1.16 | 0.39 | 0.34 | 0.22 | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
|                                   | 143-5s               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 0.43 | 0.44 | 0.47 | 0.21 | -    | -    | -    | -    | -    | -    | -    | -    |
|                                   | 175-5s               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 0.53 | 0.49 | 0.52 | 0.54 | 0.30 | -    | -    | -    | -    | -    | -    |
|                                   | 197-7s               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 0.54 | 0.57 | 0.59 | 0.62 | 0.39 | 0.15 | -    |
|                                   | 213-7l               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.34 | 1.21 | 1.11 | 0.59 | 0.62 | 0.64 | 0.67 | 0.57 |
|                                   | 244-7s               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 0.62 | 0.64 | 0.67 | 0.69 |
|                                   | 244-7l               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.33 | 0.67 | 0.69 |
|                                   | 267-9l               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 |
| 3.0                               | 89-3s                | 0.48                            | 0.27 | 0.15 | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
|                                   | 105-3s               | 1.35                            | 1.08 | 0.36 | 0.32 | 0.15 | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
|                                   | 143-5s               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 0.54 | 0.39 | 0.42 | 0.31 | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
|                                   | 175-5s               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 0.44 | 0.47 | 0.49 | 0.33 | -    | -    | -    | -    | -    | -    | -    |
|                                   | 197-7s               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 0.53 | 0.52 | 0.50 | 0.45 | 0.37 | 0.15 | -    | -    | -    |
|                                   | 213-7l               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.34 | 1.16 | 1.03 | 0.94 | 0.57 | 0.52 | 0.47 | 0.43 | 0.39 | 0.35 | 0.15 |
|                                   | 244-7s               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 0.57 | 0.58 | 0.53 | 0.49 | 0.45 | 0.36 |
|                                   | 244-7l               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.33 | 1.21 | 0.58 | 0.53 | 0.49 | 0.45 | 0.41 |
|                                   | 267-9l               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.33 | 0.56 | 0.52 | 0.48 |
| 4.0                               | 89-3s                | 0.28                            | 0.17 | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
|                                   | 105-3s               | 0.53                            | 0.39 | 0.29 | 0.15 | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
|                                   | 143-5s               | 1.35                            | 1.35 | 1.35 | 0.56 | 0.48 | 0.37 | 0.34 | 0.23 | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
|                                   | 175-5s               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 0.58 | 0.50 | 0.42 | 0.38 | 0.33 | 0.19 | -    | -    | -    | -    | -    | -    | -    | -    |
|                                   | 197-7s               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 0.55 | 0.49 | 0.43 | 0.38 | 0.33 | 0.29 | 0.18 | -    | -    | -    | -    | -    |
|                                   | 213-7l               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.32 | 1.09 | 0.56 | 0.50 | 0.45 | 0.40 | 0.35 | 0.31 | 0.27 | 0.24 | 0.20 | -    | -    |
|                                   | 244-7s               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 0.56 | 0.50 | 0.45 | 0.41 | 0.36 | 0.33 | 0.29 | 0.15 | -    |
|                                   | 244-7l               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 0.56 | 0.50 | 0.45 | 0.41 | 0.36 | 0.33 | 0.29 | 0.26 | 0.23 |
|                                   | 267-9l               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 0.58 | 0.53 | 0.48 | 0.44 | 0.39 | 0.36 | 0.32 | 0.29 |
| 5.0                               | 89-3s                | 0.22                            | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
|                                   | 105-3s               | 0.33                            | 0.25 | 0.17 | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
|                                   | 143-5s               | 1.35                            | 0.54 | 0.44 | 0.36 | 0.29 | 0.23 | 0.18 | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
|                                   | 175-5s               | 1.35                            | 1.35 | 1.35 | 0.53 | 0.45 | 0.38 | 0.32 | 0.26 | 0.22 | 0.15 | -    | -    | -    | -    | -    | -    | -    | -    | -    |
|                                   | 197-7s               | 1.35                            | 1.35 | 1.35 | 1.35 | 0.57 | 0.49 | 0.42 | 0.36 | 0.31 | 0.26 | 0.22 | 0.18 | 0.14 | -    | -    | -    | -    | -    | -    |
|                                   | 213-7l               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 0.57 | 0.50 | 0.43 | 0.37 | 0.32 | 0.28 | 0.23 | 0.20 | 0.16 | 0.13 | 0.10 | -    | -    | -    |
|                                   | 244-7s               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 0.54 | 0.48 | 0.42 | 0.37 | 0.32 | 0.28 | 0.24 | 0.21 | 0.18 | -    | -    | -    |
|                                   | 244-7l               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 0.54 | 0.48 | 0.42 | 0.37 | 0.32 | 0.28 | 0.24 | 0.21 | 0.18 | 0.15 | 0.12 | 0.09 |
|                                   | 267-9l               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 0.56 | 0.50 | 0.45 | 0.40 | 0.35 | 0.31 | 0.27 | 0.24 | 0.20 | 0.17 | 0.15 |

a) Specified dead load. The panel self weight is considered in the calculation and shall not be included in the dead load.

b) Span is measured centre to centre of supports.

c) The values take into account the factored bending moment and shear resistances as well as the deflection limits specified on page 1.

**Live load = 2.4 kPa**

Maximum opening length,  $L$  (m) <sup>(c)</sup>

| Dead load <sup>(a)</sup><br>(kPa) | Layup<br>combination | Span, $\ell$ (m) <sup>(b)</sup> |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|-----------------------------------|----------------------|---------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|                                   |                      | 2.50                            | 2.75 | 3.00 | 3.25 | 3.50 | 3.75 | 4.00 | 4.25 | 4.50 | 4.75 | 5.00 | 5.25 | 5.50 | 5.75 | 6.00 | 6.25 | 6.50 | 6.75 | 7.00 |
| 1.0                               | 89-3s                | 0.69                            | 0.62 | 0.48 | 0.32 | 0.27 | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
|                                   | 105-3s               | 1.35                            | 1.35 | 1.34 | 1.15 | 0.43 | 0.37 | 0.35 | 0.15 | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
|                                   | 143-5s               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 0.50 | 0.47 | 0.49 | 0.43 | 0.15 | -    | -    | -    | -    | -    | -    |
|                                   | 175-5s               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 0.52 | 0.54 | 0.57 | 0.57 | 0.26 | -    | -    | -    |
|                                   | 197-7s               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 0.58 | 0.59 | 0.62 | 0.64 | 0.67 | 0.42 |
|                                   | 213-7l               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.33 | 1.23 | 0.64 | 0.67 | 0.69 |
|                                   | 244-7s               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 0.67 | 0.69 |
|                                   | 244-7l               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 |
|                                   | 267-9l               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 |
| 2.0                               | 89-3s                | 0.60                            | 0.40 | 0.29 | 0.15 | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
|                                   | 105-3s               | 1.35                            | 1.35 | 0.55 | 0.33 | 0.34 | 0.15 | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
|                                   | 143-5s               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 0.54 | 0.42 | 0.44 | 0.38 | 0.15 | -    | -    | -    | -    | -    | -    | -    | -    |
|                                   | 175-5s               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 0.47 | 0.49 | 0.52 | 0.45 | 0.15 | -    | -    | -    | -    | -    |
|                                   | 197-7s               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 0.56 | 0.54 | 0.57 | 0.59 | 0.52 | 0.20 | -    | -    |
|                                   | 213-7l               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.24 | 1.12 | 1.03 | 0.59 | 0.62 | 0.64 | 0.55 | 0.51 |
|                                   | 244-7s               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 0.59 | 0.62 | 0.64 | 0.67 | 0.69 |
|                                   | 244-7l               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.34 | 0.64 | 0.67 | 0.69 |
|                                   | 267-9l               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 |
| 3.0                               | 89-3s                | 0.42                            | 0.27 | 0.15 | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
|                                   | 105-3s               | 1.35                            | 0.54 | 0.31 | 0.32 | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
|                                   | 143-5s               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 0.49 | 0.39 | 0.42 | 0.20 | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
|                                   | 175-5s               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 0.55 | 0.44 | 0.47 | 0.45 | 0.20 | -    | -    | -    | -    | -    | -    | -    |
|                                   | 197-7s               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 0.49 | 0.51 | 0.46 | 0.42 | 0.23 | -    | -    | -    | -    |
|                                   | 213-7l               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.26 | 1.10 | 0.99 | 0.59 | 0.53 | 0.48 | 0.44 | 0.40 | 0.36 | 0.30 | -    |
|                                   | 244-7s               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 0.57 | 0.55 | 0.50 | 0.46 | 0.42 | 0.20 |
|                                   | 244-7l               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.27 | 1.16 | 0.55 | 0.50 | 0.46 | 0.42 | 0.38 |
|                                   | 267-9l               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 0.58 | 0.53 | 0.49 | 0.45 | -    |
| 4.0                               | 89-3s                | 0.24                            | 0.15 | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
|                                   | 105-3s               | 0.50                            | 0.34 | 0.29 | 0.15 | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
|                                   | 143-5s               | 1.35                            | 1.35 | 1.35 | 0.54 | 0.45 | 0.37 | 0.32 | 0.15 | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
|                                   | 175-5s               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 0.56 | 0.48 | 0.42 | 0.36 | 0.31 | 0.15 | -    | -    | -    | -    | -    | -    | -    | -    |
|                                   | 197-7s               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 0.53 | 0.47 | 0.41 | 0.36 | 0.32 | 0.28 | 0.15 | -    | -    | -    | -    | -    |
|                                   | 213-7l               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.27 | 1.06 | 0.55 | 0.49 | 0.43 | 0.38 | 0.34 | 0.30 | 0.26 | 0.22 | 0.15 | -    | -    |
|                                   | 244-7s               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 0.54 | 0.49 | 0.44 | 0.39 | 0.35 | 0.31 | 0.28 | -    | -    |
|                                   | 244-7l               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 0.54 | 0.49 | 0.44 | 0.39 | 0.35 | 0.31 | 0.28 | 0.24 | 0.21 |
|                                   | 267-9l               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 0.57 | 0.52 | 0.47 | 0.42 | 0.38 | 0.34 | 0.31 | 0.28 | -    |
| 5.0                               | 89-3s                | 0.21                            | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
|                                   | 105-3s               | 0.32                            | 0.24 | 0.15 | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
|                                   | 143-5s               | 1.35                            | 0.53 | 0.43 | 0.35 | 0.29 | 0.23 | 0.16 | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
|                                   | 175-5s               | 1.35                            | 1.35 | 1.35 | 0.52 | 0.44 | 0.37 | 0.31 | 0.26 | 0.21 | 0.15 | -    | -    | -    | -    | -    | -    | -    | -    | -    |
|                                   | 197-7s               | 1.35                            | 1.35 | 1.35 | 1.35 | 0.56 | 0.49 | 0.42 | 0.36 | 0.30 | 0.26 | 0.21 | 0.17 | -    | -    | -    | -    | -    | -    | -    |
|                                   | 213-7l               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 0.56 | 0.49 | 0.43 | 0.37 | 0.32 | 0.27 | 0.23 | 0.19 | 0.16 | 0.13 | -    | -    | -    | -    |
|                                   | 244-7s               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 0.54 | 0.48 | 0.42 | 0.37 | 0.32 | 0.28 | 0.24 | 0.21 | 0.17 | -    | -    | -    |
|                                   | 244-7l               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 0.54 | 0.48 | 0.42 | 0.37 | 0.32 | 0.28 | 0.24 | 0.21 | 0.17 | 0.14 | 0.12 | -    |
|                                   | 267-9l               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 0.56 | 0.50 | 0.45 | 0.40 | 0.35 | 0.31 | 0.27 | 0.24 | 0.20 | 0.17 | 0.15 | -    |

a) Specified dead load. The panel self weight is considered in the calculation and shall not be included in the dead load.

b) Span is measured centre to centre of supports.

c) The values take into account the factored bending moment and shear resistances as well as the deflection limits specified on page 1.

**Live load = 4.8 kPa**

Maximum opening length,  $L$  (m) <sup>(c)</sup>

| Dead load <sup>(a)</sup><br>(kPa) | Layup<br>combination | Span, $\ell$ (m) <sup>(b)</sup> |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|-----------------------------------|----------------------|---------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|                                   |                      | 2.50                            | 2.75 | 3.00 | 3.25 | 3.50 | 3.75 | 4.00 | 4.25 | 4.50 | 4.75 | 5.00 | 5.25 | 5.50 | 5.75 | 6.00 | 6.25 | 6.50 | 6.75 | 7.00 |
| 1.0                               | 89-3s                | 0.39                            | 0.27 | 0.15 | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
|                                   | 105-3s               | 1.35                            | 0.53 | 0.29 | 0.31 | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
|                                   | 143-5s               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 0.51 | 0.39 | 0.42 | 0.26 | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
|                                   | 175-5s               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 0.44 | 0.47 | 0.44 | 0.35 | 0.15 | -    | -    | -    | -    | -    | -    |
|                                   | 197-7s               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 0.56 | 0.51 | 0.46 | 0.41 | 0.37 | 0.15 | -    | -    | -    |
|                                   | 213-7l               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.27 | 1.11 | 0.99 | 0.59 | 0.54 | 0.49 | 0.44 | 0.40 | 0.36 | 0.32 | 0.28 |
|                                   | 244-7s               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 0.56 | 0.52 | 0.47 | 0.43 | 0.40 |
|                                   | 244-7l               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.30 | 1.19 | 0.56 | 0.52 | 0.47 | 0.43 | 0.40 |
|                                   | 267-9l               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.32 | 0.56 | 0.52 | 0.48 |
| 2.0                               | 89-3s                | 0.38                            | 0.27 | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
|                                   | 105-3s               | 0.54                            | 0.44 | 0.29 | 0.27 | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
|                                   | 143-5s               | 1.35                            | 1.35 | 1.35 | 0.59 | 0.51 | 0.43 | 0.37 | 0.31 | 0.15 | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
|                                   | 175-5s               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 0.55 | 0.48 | 0.42 | 0.37 | 0.32 | 0.15 | -    | -    | -    | -    | -    | -    | -    |
|                                   | 197-7s               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 0.55 | 0.49 | 0.43 | 0.38 | 0.34 | 0.30 | 0.15 | -    | -    | -    | -    |
|                                   | 213-7l               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.20 | 1.04 | 0.57 | 0.51 | 0.46 | 0.41 | 0.36 | 0.32 | 0.29 | 0.25 | 0.18 | -    |
|                                   | 244-7s               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 0.58 | 0.53 | 0.48 | 0.43 | 0.39 | 0.35 | 0.32 | 0.15 |
|                                   | 244-7l               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 0.58 | 0.53 | 0.48 | 0.43 | 0.39 | 0.35 | 0.32 | 0.28 |
|                                   | 267-9l               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 0.57 | 0.52 | 0.47 | 0.43 | 0.39 | 0.36 | 0.36 |
| 3.0                               | 89-3s                | 0.24                            | 0.15 | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
|                                   | 105-3s               | 0.42                            | 0.31 | 0.25 | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
|                                   | 143-5s               | 1.35                            | 1.35 | 0.56 | 0.47 | 0.39 | 0.32 | 0.27 | 0.15 | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
|                                   | 175-5s               | 1.35                            | 1.35 | 1.35 | 1.35 | 0.58 | 0.50 | 0.43 | 0.37 | 0.32 | 0.27 | -    | -    | -    | -    | -    | -    | -    | -    | -    |
|                                   | 197-7s               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 0.56 | 0.49 | 0.43 | 0.37 | 0.32 | 0.28 | 0.24 | -    | -    | -    | -    | -    | -    |
|                                   | 213-7l               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.18 | 0.57 | 0.51 | 0.45 | 0.40 | 0.35 | 0.30 | 0.26 | 0.23 | 0.20 | -    | -    | -    |
|                                   | 244-7s               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 0.58 | 0.52 | 0.46 | 0.41 | 0.37 | 0.33 | 0.29 | 0.21 | -    | -    |
|                                   | 244-7l               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 0.58 | 0.52 | 0.46 | 0.41 | 0.37 | 0.33 | 0.29 | 0.26 | 0.23 | 0.20 |
|                                   | 267-9l               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 0.55 | 0.50 | 0.45 | 0.41 | 0.37 | 0.33 | 0.30 | 0.26 |
| 4.0                               | 89-3s                | 0.19                            | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
|                                   | 105-3s               | 0.32                            | 0.24 | 0.15 | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
|                                   | 143-5s               | 1.35                            | 0.54 | 0.45 | 0.36 | 0.30 | 0.24 | 0.15 | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
|                                   | 175-5s               | 1.35                            | 1.35 | 1.35 | 0.55 | 0.46 | 0.39 | 0.33 | 0.27 | 0.23 | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
|                                   | 197-7s               | 1.35                            | 1.35 | 1.35 | 1.35 | 0.59 | 0.51 | 0.44 | 0.38 | 0.32 | 0.27 | 0.23 | 0.19 | -    | -    | -    | -    | -    | -    | -    |
|                                   | 213-7l               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 0.59 | 0.52 | 0.45 | 0.39 | 0.34 | 0.29 | 0.25 | 0.21 | 0.17 | 0.14 | -    | -    | -    | -    |
|                                   | 244-7s               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 0.57 | 0.51 | 0.45 | 0.39 | 0.35 | 0.30 | 0.26 | 0.23 | 0.15 | -    | -    | -    |
|                                   | 244-7l               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 0.57 | 0.51 | 0.45 | 0.39 | 0.35 | 0.30 | 0.26 | 0.23 | 0.19 | 0.16 | 0.14 | -    |
|                                   | 267-9l               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 0.59 | 0.53 | 0.47 | 0.42 | 0.38 | 0.33 | 0.29 | 0.26 | 0.23 | 0.19 | 0.17 | 0.17 |
| 5.0                               | 89-3s                | 0.11                            | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
|                                   | 105-3s               | 0.21                            | 0.14 | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
|                                   | 143-5s               | 0.50                            | 0.40 | 0.32 | 0.25 | 0.19 | 0.13 | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
|                                   | 175-5s               | 1.35                            | 0.59 | 0.49 | 0.40 | 0.33 | 0.27 | 0.21 | 0.17 | 0.12 | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
|                                   | 197-7s               | 1.35                            | 1.35 | 1.35 | 0.52 | 0.44 | 0.37 | 0.31 | 0.26 | 0.21 | 0.17 | 0.13 | -    | -    | -    | -    | -    | -    | -    | -    |
|                                   | 213-7l               | 1.35                            | 1.35 | 1.35 | 1.35 | 0.52 | 0.45 | 0.38 | 0.32 | 0.27 | 0.23 | 0.18 | 0.15 | 0.11 | 0.08 | -    | -    | -    | -    | -    |
|                                   | 244-7s               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 0.57 | 0.50 | 0.43 | 0.37 | 0.32 | 0.28 | 0.23 | 0.20 | 0.16 | 0.13 | -    | -    | -    | -    |
|                                   | 244-7l               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 0.57 | 0.50 | 0.43 | 0.37 | 0.32 | 0.28 | 0.23 | 0.20 | 0.16 | 0.13 | 0.10 | 0.07 | -    | -    |
|                                   | 267-9l               | 1.35                            | 1.35 | 1.35 | 1.35 | 1.35 | 0.59 | 0.52 | 0.45 | 0.40 | 0.35 | 0.30 | 0.26 | 0.22 | 0.19 | 0.16 | 0.13 | 0.10 | 0.08 | 0.08 |

a) Specified dead load. The panel self weight is considered in the calculation and shall not be included in the dead load.

b) Span is measured centre to centre of supports.

c) The values take into account the factored bending moment and shear resistances as well as the deflection limits specified on page 1.