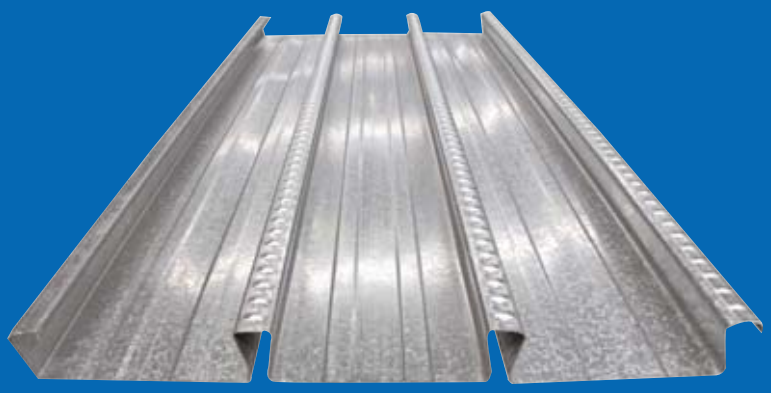
LYSAGHT

BONDEK®II

LYSAGHT® BONDEK® II

Design and Construction Guide

Structural Steel Decking for Composite Concrete Slabs



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INTRODUCTION

Welcome to the LYSAGHT® BONDEK® II structural steel decking design and construction manual. We have simplified the work of engineers with this single book which replaces two previous publications. Further, it was developed to latest versions of relevant British Standards and includes advanced design of formwork and design for fire.

BONDEK® II is a profiled steel sheeting widely accepted by the building construction industry to be highly economical, versatile and robust. It has been used to great effect on many major building projects, as well as countless small ones. It can be used as a formwork as well as a reinforcement system for composite concrete slab construction.

This new publication is based on our extensive research conducted on BONDEK® II profiled steel sheeting, so the information is not applicable to other sheeting profiles.

This manual implements several major new technical developments:

- Linear elastic analysis of continuous composite slabs
- Increased unsupported spans of BONDEK® II sheeting at the formwork stage due to inclusion of negative moment region capacities
- Design for reliable control of flexural cracking in support regions; and
- Economical design for fire due to BONDEK® II sheeting being partially effective for fire rating of up to 120 min.

This publication contains complete technical information on the following grades of BONDEK® II:

- BONDEK® II 0.75 mm thickness
- BONDEK® II 1.00 mm thickness
- BONDEK® II 1.20 mm thickness (Includes data for recently introduced 1.2mm).

These developments allow you to make significant improvements compared with the design methods we previously published for slabs using BONDEK® II.

Additionally, BONDEK® II 2003BS software has been developed which would allow you to get quicker and more economical solutions with more options. Call our Customer Support Centres (listed on the back cover) to obtain a copy of the software.

1 FEATURES AND APPLICATIONS

1.1 SPANNING CAPACITIES

New design rules have been developed for the design of BONDEK® II acting as a BONDEK® II structural formwork for the construction of composite and non-composite slabs (where BONDEK® II is used as lost formwork). The rules for calculating moment capacities are based on testing performed at BlueScope Lysaght Technology facility at Chester Hill, Sydney Australia.

The data obtained allowed us to include moment capacities in negative regions of the design model in accordance to BS 5950: Part 4: 1994 and reference document in this Standard: Technical Note 116: Design of profiled sheeting as permanent formwork. As a consequence, the span limits that previously applied to BONDEK® II in continuous spans have been increased by up to 12%.

1.2 COMPOSITE ACTION

BONDEK® II has a very high shear-bond capacity. Due to this, BONDEK® II slabs do not normally have limitations on imposed loads on typical spans unlike trapezoidal profiles.

1.3 DESIGN EFFICIENCY

The range of BONDEK® II gauges available (0.75 mm, 1.0 mm and 1.2 mm) allows much closer matching of design requirements and deck performance. BONDEK® II 1.2 mm is not available in the design tables and software. However, the solutions with this BONDEK® II 1.2 thickness may be designed by our Customer Support Centre.

1.4 ECONOMICAL DESIGN FOR FIRE

BONDEK® II sheeting was conservatively treated as ineffective in our previous publications.

Fire tests conducted recently at Victoria University of Technology showed that BONDEK® II has some capacity in fire up to 120 min. Effective area of BONDEK® II is mainly concentrated in top flanges of the profile. Lap joints fully cast in concrete contribute more than dovetail ribs. Fire tests have been conducted to investigate temperatures within concrete body and within BONDEK® II sheeting itself as well as effect of elevated temperatures on shear bond capacity.

BONDEK® II sheeting capacity was included in fire calculations as a result of this research. No additional fire reinforcement may be necessary in many design cases.

1.5 QUICKER TROUBLE-FREE INSTALLATION

The installation of BONDEK® II follows simple, familiar and widely accepted practice. BONDEK® II is available in long lengths so large areas can be quickly and easily covered to form a safe working platform during construction. The bold embossements along the top of the ribs of BONDEK® II enhance safety by reducing the likelihood of workers slipping.

1.6 TECHNICAL SUPPORT

Refer to the back cover for contact details of your local technical support.

2 SPECIFICATION AND DESIGN

2.1 BONDEK® II COMPOSITE SLABS

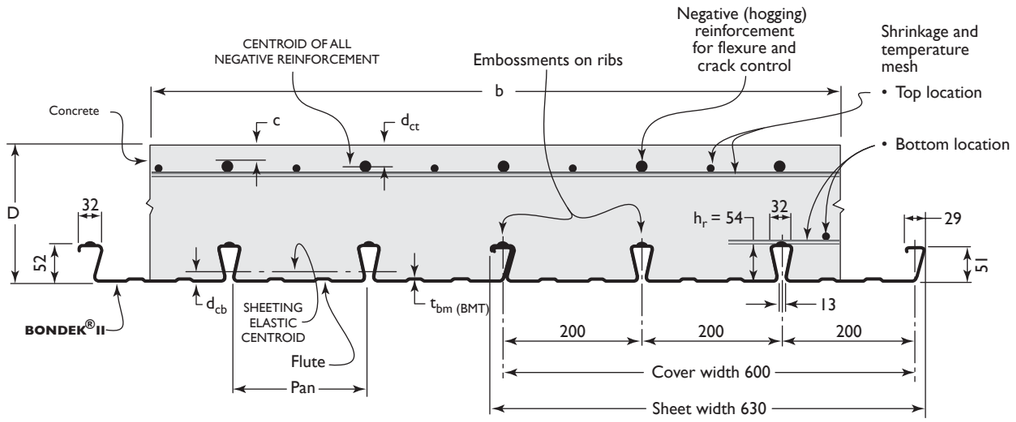


Figure 2.1
BONDEK® II profile dimensions and reinforcement

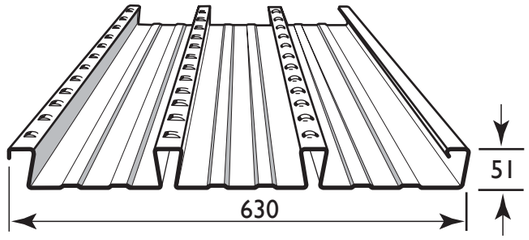


Figure 2.2
BONDEK® II profile and dimensions

2.2 BONDEK® II SECTION PROPERTIES

	Thickness	Section modulus	Cross-sectional area of BONDEK® II	Second moment of area
	BMT mm	Z_x 10^3 mm³/m	A_{sh} mm²/m	I_x 10^4 mm⁴/m
1.20 BMT BONDEK® II	1.20	20.03	2014	76.90
1.00 BMT BONDEK® II	1.00	16.69	1678	64.08
0.75 BMT BONDEK® II	0.75	12.50	1259	47.98

Table 1.2
Section properties in Table 1.2 are given for reference only.

2.3 SHEETING

BONDEK® II is rolled-formed from hot dipped, zinc-coated, high tensile steel, in base metal thickness (BMT) of 1.2, 1.0 and 0.75mm.
The steel conforms to both AS 1397 and BS EN 10147, and:
- for 1.2 BMT the grade is G500;
- for 1.0 and 0.75 BMT the grade is G550.

The coating is Z350 (350g/m² minimum coating mass) or Z450 (450g/m² minimum coating mass) on both sides.
Embossments on the top of flanges provide the mechanical connection between the steel and concrete.

2.4 CONCRETE

All tables have been developed for the C30 concrete with normal density of 2400 kg/m³ (wet density). Other concrete grades are available in the BONDEK® II 2003BS software.

2.5 REINFORCEMENT

Steel reinforcement is necessary to control shrinkage and temperature effects, as flexural negative reinforcement over supports and in some instances for fire engineering purposes. It shall comply with requirements of BS 4449:1997 for bars and with BS 4483:1998 for fabric.
Reinforcement Grade 460B shall be specified.

2.6 SHEAR CONNECTORS

Shear studs for composite beams may be specified with BONDEK® II concrete slabs as required by BS 5959:Part 3: section 3.1 where relevant. Strength reduction factors are not applicable since BONDEK® II forms a solid slab. Shear studs shall not be considered when composite beams are not a design option such as concrete frame buildings or composite slabs supported by masonry walls.

2.7 DESIGN METHODS

There are three ways you can design concrete slabs using BONDEK® II:
- Using the design tables given in this manual.
- Calculate from first principles using relevant British Standards and data from this manual and available through BlueScope Lysaght and Lysaght Technology at Chester Hill, Sydney Australia.
- Run our software. This is also likely to produce more economical design . The software allows input of parameters which are not available in tables such as grades of concrete other than C30.

2.8 FORMWORK DESIGN

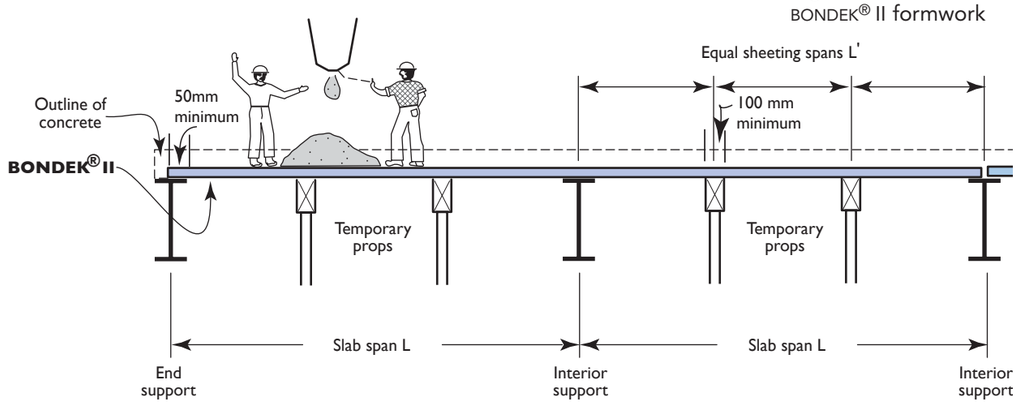
The BONDEK® II formwork shall be designed in accordance to BS 5950: Part 4: 1994 and BS 5950: Part 6: 1995 and Technical Note 116: Design of profile sheeting as permanent formwork

BONDEK® II bending capacities have been confirmed by tests conducted at the Lysaght Technology facility at Chester Hill, Sydney, Australia.

Our design tables can be used to detail BONDEK® II acting as a structural formwork, provided the following conditions are satisfied:

- The support lines extend across the full width of the sheeting and have a minimum bearing of 50 mm at the ends of the sheets when rest on steel or concrete and 70 mm when rest on other materials such as masonry wall.
- The sheets continue within each slab span length without any overlaps or intermediate splicing or jointing longitudinally.
- The sheets are designed as single or continuous span formwork.
- The slab has a uniform cross section.
- The formwork is not used as a restraint to supporting steel beams during construction. When necessary, restraint capacities can be analysed using first principles.
- Separate consideration is given to sides of the sheeting where edges shall be restrained.
- BONDEK® II sheeting ends shall be securely fixed to the supporting structure
- The ratio of the longer slab span to the shorter slab span (L_l/L_s) of any two adjacent spans does not exceed 1.2 (i.e. $L_l/L_s \leq 1.2$).
- The supports are effectively rigid such that their vertical deflections during the construction phase can be ignored in design.

Figure 2.3
BONDEK® II formwork



- Maximum construction imposed load is 1.5 kPa, or 4.5/Span kPa for slab spans less than 3m. Construction imposed load can be applied on the BONDEK® II formwork or recently formed slabs.
- Maximum imposed storage load on the formwork is 4 kPa. This load shall not be applied on recently formed slabs.
- Imposed construction loads shall not be applied to areas supporting storage loads and vice versa.

Deflection limits/loading parameters
BS 5950:Part 4: 1994 recommends that the sheeting deflection should not exceed L/130 (but <30mm) under its own weight plus the weight of wet concrete (including reinforcement) provided ponding is taken into account. In this publication, deflection limits of L/130 is adopted.

Table 1 - Factored load combinations for strength and deflection calculations

Construction Stage (See note 1)	Design Case (See note 2)	Sheeting Dead Load Gdp (See Note 3)	Concrete Dead Load Gdp	Imposed Construction Loads Qc	Imposed Storage Loads Qs
Ia	Strength	1.4	-	1.6	-
Ib	Strength	1.4	-	-	1.6
IIa	Strength	1.4	1.4	1.6	-
IIb	Deflection	1.0	1.0	-	-

NOTES:
1) Construction Stage 1 is defined as being prior to the placement of concrete, and Stage 2 as during the placement of concrete up until the concrete hardens.
2) G_{dc} includes an allowance for concrete ponding and the weight of steel reinforcement.
3) Both distributed and line load cases must be considered separately.

2.9 COMPOSITE SLAB DESIGN

The BONDEK® II composite slabs shall be designed in accordance to BS 5950: Part 4: 1994, BS 8110: Part 1: 1997, BS 8110: Part2: 1985, BS 4449: 1997. AS 3600-2001 may be used where relevant.

The design concept is based on "k" and "m" method. Data about shear-bond capacity have been obtained from full-scale tests and supplementary small-scale slip-block tests. The tables provide with solutions for steel frame or masonry wall types of construction.

Our design tables and software can be used to design composite slabs with BONDEK® II, provided the following conditions are satisfied:

- It is a common practice to design continuous slabs as a series of single spans. Minimum nominal reinforcement at intermediate supports shall be specified in this case in accordance to BS5950: Part4: 1994, Clause 6.8. It shall be noted that nominal reinforcement will not prevent formation of wide cracks over supports - requirements of BS8110: Part 1: 1994, Clause 3.5.8 for crack control will not be satisfied. Increased slab thickness may be required in many instances when continuous slabs are designed as a series of simply supported spans.

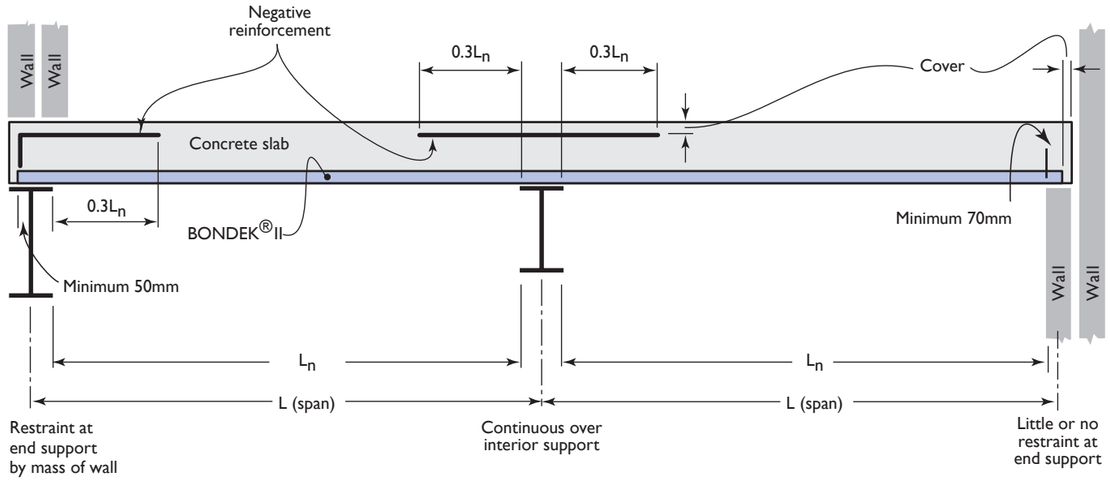


Figure 2.4
BONDEK® II Pattern 1 for conventional (standard) reinforcement

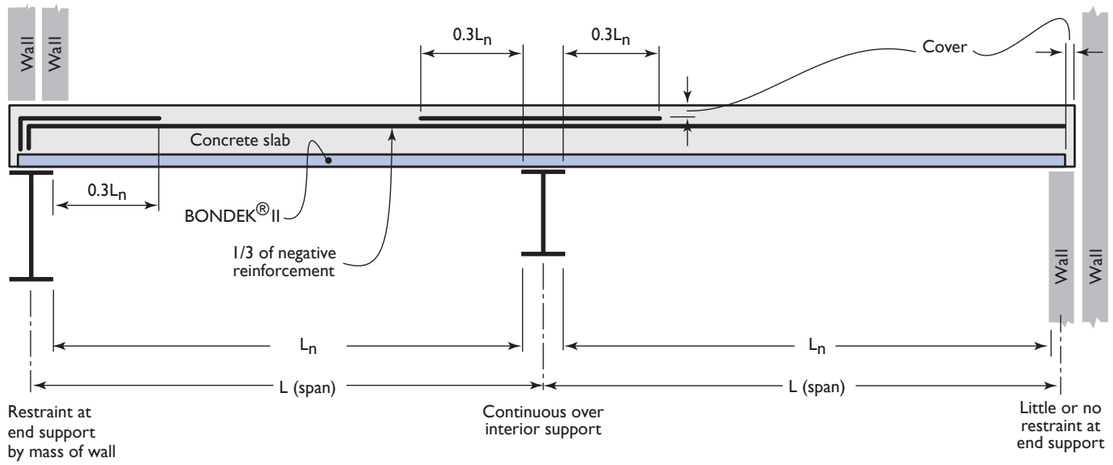


Figure 2.5
BONDEK® **II** Pattern 2 for conventional reinforcement when imposed load exceeds twice the dead load

- The ratio of longer slab span (L_l) to the shorter slab span (Ls) of any two adjacent spans does not exceed 1.2, that is $L_l/L_s <= 1.2$.
- The bending moments at the supports are only caused by the action of vertical loads applied to the slab.
- The first interior span shall have the same thickness as the end span.
- The geometry of the steel sheeting profile shall conform to the dimensions and tolerances shown on our production drawings.
  Sheeting with embossments of a depth less than that specified on these drawings shall not be used as composites unless the values of "k' and "m" are revised.
- The specified concrete strength grade is in the range C30 to C40 (only C30 is available in tables). The wet concrete density must be 2400 kg/m³ for normal weight concrete. The concrete shall follow the recommendations given in BS 8110.
- Composite action must be assumed to exist between the steel sheeting and the concrete once the concrete in the slab has attained a compressive strength of 20 MPa. Prior to the development of composite action during construction, potential damage to the shear connection must be avoided, and maximum construction imposed loads shall be limited to 1.5 kPa.
- Reinforcement Pattern 2 shall be used when imposed load exceeds twice the dead load.

2.10 DESIGN FOR FIRE

The BONDEK® II composite slabs shall be designed for fire conditions in accordance to BS 5950-8: 1990, BS 476-20: 1987 and BS 476-21: 1987.
Reduction factors are applied to allow for the adverse effect of elevated temperatures on the mechanical properties of concrete and steel. Values of these reduction factors have been derived from fire tests conducted at Victoria University of Technology and extensive finite element analysis of BONDEK® II composite slabs.
Reduced shear bond capacity is also considered for elevated temperatures.
Our tables may be used to detail BONDEK® II composite slabs when the soffit is exposed to fire provided the following conditions are satisfied:

- The composite slab acts as a one-way element spanning in the direction of the sheeting ribs for both room temperature and fire conditions.
- The composite slab has been initially designed and detailed for room temperature conditions in accordance to this manual.
- The fire design load is essentially uniformly distributed and static in nature.
- Adequate detailing of slab jointing, edges, slab holes and cavities (for penetrating, embedded or encased services) to provide the appropriate fire resistance period. Alternatively the local provision of suitable protection (such as fire spray material) will be necessary.
- The fire periods are 30, 60, 90, 120, 180 or 240 min.
- $x_b \geq 30$ mm

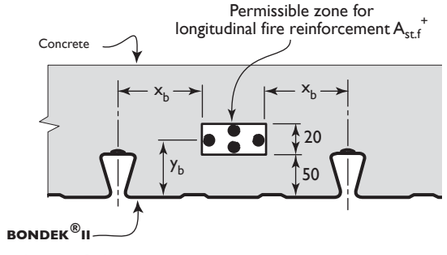
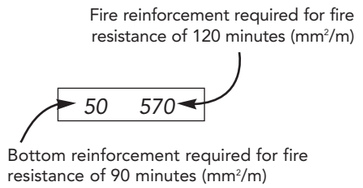


Figure 2.6
Permissible zone for location of longitudinal fire reinforcement.

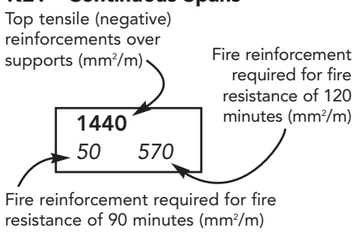
3 DESIGN TABLES

3.1 USE OF DESIGN TABLES

KEY - Single Spans



KEY - Continuous Spans



Notes:
1. Areas without cells mean that a design solution is not possible.
2. Single spans do not require top tensile reinforcement, relevant cells are not shown.
3. All spans are centre to centre.
4. A dash (-) means no fire reinforcement is necessary.
5. N/A means a design solution with this particular fire rating is not possible.
6. Top tensile/negative reinforcement includes longitudinal wires of shrinkage mesh, if any, and additional bars.

The design parameters specific for each table are given on the top of tables:

- Spans: single, continuous end or interior.
- Thickness of the slab.

The rest of parameters are common for all tables and listed below:

- More than four spans for continuous spans
- Concrete grade: C30.
- Type of construction: steel-frame or masonry wall construction.
- Density of wet concrete: 2400 kg/m³.
- BONDEK® II used as a structural deck with thickness 0.75 & 1.0mm BMT
- Formwork deflections limit: L/130.
- Maximum storage imposed loads on formwork: 4 kPa.
- Minimum 100 mm width of permanent supports.
- Mild conditions of exposure.
- Composite slab deflection limits: L/250 for total loads and L/350 for imposed loads.
- Indoor conditions for creep and shrinkage.
- Ratio of longer adjacent span to shorter does not exceed 1.2.
- Degree of redistribution of negative reinforcement is 10%.
- For crack control of slabs in flexure over supports limits the crack width to 0.3mm.
- Maximum 10 mm diameter reinforcing bars.
- Office type of imposed loads: 25% of imposed loads are permanent.
- 1 kPa of superimposed dead load.
- Reinforcement: 460B grade in accordance to BS 4449:1997 for bars and BS 4483:1998 for fabric.
- 0.8 factor for imposed loads for fire conditions.
- 90 and 120 min. fire resistance levels for single and continuous spans
- Location of negative reinforcement as shown on Fig. 2.1
- Location of fire reinforcement as shown on Fig. 2.6

3.2 SINGLE SPAN DESIGN TABLES 0.75 mm

Single Spans 110 mm slab

0.75 mm BMT

Span (mm)	Characteristic Imposed Load Qk (kPa)													
	2		3		4		5		6		7.5		10	
1800	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	10	N/A
2000	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	20	N/A	70	N/A
2200	0	N/A	0	N/A	0	N/A	10	N/A	30	N/A	70	N/A	150	N/A
2400	0	N/A	0	N/A	30	N/A	60	N/A	90	N/A	140	N/A	230	N/A
2600	0	N/A	40	N/A	70	N/A	110	N/A	150	N/A	220	N/A	330	N/A
2800	40	N/A	80	N/A	130	N/A	180	N/A	230	N/A	300	N/A		
3000	80	N/A	140	N/A	190	N/A	250	N/A						
3200	130	N/A	200	N/A										
3400	190	N/A												

Single Spans 120 mm slab

0.75 mm BMT

Span (mm)	Characteristic Imposed Load Qk (kPa)													
	2		3		4		5		6		7.5		10	
1800	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A
2000	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	30	N/A
2200	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	30	N/A	90	N/A
2400	0	N/A	0	N/A	0	N/A	20	N/A	50	N/A	90	N/A	150	N/A
2600	0	N/A	10	N/A	40	N/A	70	N/A	100	N/A	140	N/A	230	N/A
2800	10	N/A	40	N/A	80	N/A	120	N/A	150	N/A	210	N/A	310	N/A
3000	50	N/A	90	N/A	130	N/A	170	N/A	220	N/A	290	N/A		
3200	90	N/A	130	N/A	180	N/A	240	N/A	290	N/A				
3400	130	N/A	190	N/A										
3600	180	N/A												

Single Spans 130 mm slab

0.75 mm BMT

Span (mm)	Characteristic Imposed Load Qk (kPa)													
	2		3		4		5		6		7.5		10	
2000	0	0	0	20	0	40	0	60	0	70	0	100	0	150
2200	0	30	0	50	0	70	0	100	0	120	10	160	50	210
2400	0	60	0	90	0	120	0	140	20	170	50	210	100	280
2600	0	100	0	130	10	160	40	190	60	230	100	280	170	370
2800	0	130	20	170	50	210	80	250	110	290	150	350	230	460
3000	20	180	60	220	90	260	120	310	160	360	220	430	310	560
3200	60	220	90	270	130	320	180	380	220	430	280	520		
3400	90	270	140	330	190	390	230	450	280	520				
3600	130	320	190	390	240	460								
3800	180	380												

Single Spans 140 mm slab

0.75 mm BMT

Span (mm)	Characteristic Imposed Load Qk (kPa)													
	2		3		4		5		6		7.5		10	
2200	0	10	0	30	0	60	0	80	0	100	0	130	30	180
2400	0	40	0	70	0	90	0	120	0	140	30	180	70	240
2600	0	80	0	100	0	130	10	160	40	190	70	230	120	300
2800	0	110	0	140	30	180	50	210	80	240	120	290	180	380
3000	0	150	30	190	60	220	90	260	120	300	170	360	250	470
3200	40	190	70	230	100	280	140	320	170	370	220	440	320	560
3400	70	230	110	280	140	330	180	380	230	440	290	520		
3600	100	280	150	340	190	390	240	450	280	520				
3800	140	330	190	390	240	460								
4000	180	380												
4200														

Single Spans 150 mm slab

0.75 mm BMT

Span (mm)	Characteristic Imposed Load Qk (kPa)													
	2		3		4		5		6		7.5		10	
2400	0	30	0	50	0	70	0	100	0	120	10	150	50	200
2600	0	60	0	90	0	110	0	140	20	160	50	200	90	260
2800	0	90	0	120	10	150	30	180	50	210	90	260	140	330
3000	0	130	20	160	40	200	70	230	90	260	130	310	200	400
3200	20	170	50	200	80	240	110	280	140	320	180	380	260	480
3400	50	210	80	250	120	290	150	340	180	380	240	450	330	570
3600	80	250	120	300	160	340	200	400	240	450	300	530		
3800	120	290	160	350	200	400	250	460	290	520				
4000	150	340	200	400	250	470								
4200	190	390												
4400														
4600														

Single Spansl 75 mm slab

0.75 mm BMT

Span (mm)	Characteristic Imposed Load Qk (kPa)													
	2		3		4		5		6		7.5		10	
2800	0	60	0	90	0	110	0	130	10	160	40	190	80	250
3000	0	90	0	120	10	150	30	170	50	200	80	240	130	300
3200	0	120	10	150	40	180	60	210	80	240	120	290	170	360
3400	20	160	40	190	70	230	90	260	120	290	160	340	220	430
3600	40	190	70	230	100	270	130	310	160	350	200	400	280	500
3800	70	230	110	270	140	320	170	360	200	400	250	460	340	580
4000	100	270	140	320	180	370	210	410	250	460	310	530		
4200	140	320	180	370	220	420	260	470	300	530				
4400	170	350	210	410	250	470	300	530						
4600	200	400	250	460										
4800	240	450												
5000														

Single Spans 200 mm slab

0.75 mm BMT

Span	Characteristic Imposed Load Qk (kPa)													
(mm)	2		3		4		5		6		7.5		10	
3000	0	70	0	90	0	110	0	130	20	160	40	190	80	240
3200	0	100	0	120	10	150	30	170	50	200	80	230	120	290
3400	0	130	20	160	40	180	60	210	80	240	110	280	170	350
3600	20	160	40	190	70	220	90	250	120	280	150	330	210	410
3800	50	190	70	230	100	260	130	300	150	330	190	380	260	470
4000	70	230	100	270	130	310	160	350	190	380	240	440	310	540
4200	100	260	130	310	160	350	200	390	230	430	280	500	360	600
4400	130	300	160	350	200	390	240	440	270	490	330	560		
4600	160	340	200	390	240	440	280	500	320	550	380	620		
4800	190	390	240	440	280	500	320	550						
5000	230	430	270	490										
5200	260	480												
5400														

Single Spans 225 mm slab

0.75 mm BMT

Span	Characteristic Imposed Load Qk (kPa)													
(mm)	2		3		4		5		6		7.5		10	
3400	0	110	0	130	20	150	30	180	50	200	80	240	130	300
3600	0	140	20	160	40	190	60	220	80	240	110	280	170	350
3800	30	170	50	200	70	230	90	260	120	280	150	330	210	400
4000	50	200	70	230	100	260	120	290	150	330	190	380	250	460
4200	70	230	100	270	130	300	160	340	190	370	230	430	300	520
4400	100	270	130	310	160	340	190	380	220	420	270	480	350	580
4600	130	300	160	350	200	390	230	430	260	480	310	540	400	650
4800	160	340	200	390	230	440	270	480	310	530	360	600		
5000	190	380	230	430	270	480	310	540	350	590	410	660		
5200	220	430	270	480	310	540	350	590						
5400	260	470	300	530	350	590								
5600	290	520												
5800														

Single Spans 250 mm slab

0.75 mm BMT

Span	Characteristic Imposed Load Qk (kPa)													
(mm)	2		3		4		5		6		7.5		10	
3800	10	150	30	170	50	200	70	220	90	250	120	290	170	350
4000	30	170	50	200	80	230	100	260	120	290	150	330	210	400
4200	60	210	80	240	110	270	130	300	150	330	190	380	250	460
4400	80	240	110	270	140	310	160	340	190	380	230	430	290	510
4600	110	270	140	310	170	350	200	390	220	420	270	480	340	570
4800	140	310	170	350	200	390	230	430	260	470	310	530	390	640
5000	170	350	200	390	230	440	270	480	300	520	350	590	440	700
5200	200	390	230	440	270	480	310	530	340	580	400	650		
5400	230	430	270	480	310	530	350	580	390	630	450	710		
5600	260	470	300	530	350	580	390	640						
5800	290	510	340	570	380	630								
6000	330	560												
5800														

1.0 mm BMT

Single Spans 110 mm slab

Span	Characteristic Imposed Load Qk (kPa)													
(mm)	2		3		4		5		6		7.5		10	
1800	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A
2000	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	40	N/A
2200	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	40	N/A	110	N/A
2400	0	N/A	0	N/A	0	N/A	20	N/A	50	N/A	100	N/A	190	N/A
2600	0	N/A	0	N/A	40	N/A	80	N/A	120	N/A	180	N/A	290	N/A
2800	0	N/A	50	N/A	90	N/A	140	N/A	190	N/A	270	N/A	400	N/A
3000	50	N/A	100	N/A	160	N/A	210	N/A	270	N/A				
3200	100	N/A	160	N/A	230	N/A								
3400	150	N/A												
3600														

1.0 mm BMT

Single Spans 120 mm slab

Span	Characteristic Imposed Load Qk (kPa)													
(mm)	2		3		4		5		6		7.5		10	
1800	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A
2000	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A
2200	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	50	N/A
2400	0	N/A	0	N/A	0	N/A	0	N/A	10	N/A	50	N/A	120	N/A
2600	0	N/A	0	N/A	0	N/A	30	N/A	60	N/A	110	N/A	190	N/A
2800	0	N/A	10	N/A	40	N/A	80	N/A	120	N/A	180	N/A	280	N/A
3000	10	N/A	50	N/A	90	N/A	140	N/A	180	N/A	250	N/A	370	N/A
3200	50	N/A	100	N/A	150	N/A	200	N/A	250	N/A				
3400	100	N/A	150	N/A	210	N/A								
3600	140	N/A												
3800														

1.0 mm BMT

Single Spans 130 mm slab

Span	Characteristic Imposed Load Qk (kPa)													
(mm)	2		3		4		5		6		7.5		10	
2000	0	0	0	0	0	20	0	40	0	60	0	90	0	140
2200	0	10	0	40	0	60	0	80	0	110	0	140	20	200
2400	0	50	0	70	0	100	0	130	0	160	20	200	70	270
2600	0	80	0	110	0	150	0	180	30	210	60	260	130	350
2800	0	120	0	160	10	200	40	230	70	270	120	340	200	440
3000	0	160	20	210	50	250	90	300	120	340	180	420	280	540
3200	20	210	60	260	100	310	140	370	180	420	250	510	360	660
3400	60	260	100	320	150	380	200	440	250	510	320	610		
3600	100	310	150	380	210	450	260	520						
3800	140	370	200	450										
4000														

Single Spans140mm slab

1.0 mm BMT

Span (mm)	Characteristic Imposed Load Qk (kPa)													
	2		3		4		5		6		7.5		10	
2200	0	0	0	20	0	40	0	60	0	80	0	110	0	160
2400	0	30	0	50	0	80	0	100	0	130	0	160	40	220
2600	0	60	0	90	0	120	0	150	0	180	30	220	90	290
2800	0	100	0	130	0	160	20	200	40	230	80	280	150	370
3000	0	140	0	170	30	210	60	250	90	290	130	350	210	450
3200	0	180	30	220	70	260	100	310	140	350	190	420	280	550
3400	30	220	70	270	110	320	150	370	190	430	250	510	360	650
3600	70	270	110	320	160	380	200	440	250	500	320	600		
3800	110	320	160	380	210	450	260	520						
4000	150	370	210	450										
4200														

Single Spans150mm slab

1.0 mm BMT

Span (mm)	Characteristic Imposed Load Qk (kPa)													
	2		3		4		5		6		7.5		10	
2400	0	20	0	40	0	60	0	80	0	100	0	140	10	190
2600	0	50	0	70	0	100	0	120	0	150	10	190	60	250
2800	0	80	0	110	0	140	0	170	20	200	50	240	110	320
3000	0	120	0	150	10	180	30	220	60	250	100	300	160	390
3200	0	150	10	190	40	230	70	270	100	310	150	370	230	470
3400	10	190	50	240	80	280	110	320	150	370	200	440	290	560
3600	50	230	80	280	120	330	160	380	200	440	260	520	370	660
3800	80	280	120	330	170	390	210	450	260	510	330	600		
4000	120	330	170	390	220	460	270	520						
4200	160	380	210	450										
4400	200	440												
4600														

Single Spans 175mm slab

1.0 mm BMT

Span (mm)	Characteristic Imposed Load Qk (kPa)													
	2		3		4		5		6		7.5		10	
2800	0	50	0	70	0	100	0	120	0	140	10	180	50	230
3000	0	80	0	110	0	130	0	160	10	180	40	220	90	290
3200	0	110	0	140	0	170	30	200	50	230	80	280	140	350
3400	0	150	10	180	30	210	60	250	90	280	130	330	190	420
3600	10	180	40	220	70	260	100	300	130	330	170	390	240	490
3800	40	220	70	260	100	300	140	350	170	390	220	450	300	570
4000	70	260	110	310	140	350	180	400	210	450	270	520	370	650
4200	100	300	140	350	180	410	220	460	260	510	330	600		
4400	140	350	180	400	230	460	270	520	320	580				
4600	170	390	220	460	270	520								
4800	210	440	270	520										
5000														

Single Spans200mm slab

1.0 mm BMT

Span (mm)	Characteristic Imposed Load Qk (kPa)													
	2		3		4		5		6		7.5		10	
3000	0	60	0	80	0	100	0	120	0	140	10	180	50	230
3200	0	80	0	110	0	130	0	160	10	180	40	220	90	280
3400	0	110	0	140	0	170	30	200	50	230	80	270	130	340
3600	0	150	10	180	30	210	60	240	80	270	120	320	180	400
3800	10	180	40	220	70	250	90	280	120	320	160	370	230	460
4000	40	220	70	260	100	290	130	330	160	370	200	430	280	520
4200	70	250	100	300	130	340	170	380	200	420	250	490	330	600
4400	100	290	140	340	170	390	210	430	240	480	300	550	390	670
4600	130	340	170	390	210	440	250	490	290	540	350	620		
4800	160	380	210	440	250	490	290	550	340	600				
5000	200	430	250	490	290	550	340	610						
5200	240	470	290	540										
5400	270	510												
5600														

Single Spans225mm slab

1.0 mm BMT

Span (mm)	Characteristic Imposed Load Qk (kPa)													
	2		3		4		5		6		7.5		10	
3400	0	90	0	120	0	140	0	160	20	190	50	220	90	280
3600	0	120	0	150	10	180	30	200	50	230	80	270	130	330
3800	0	150	20	180	40	210	60	240	80	270	120	320	170	390
4000	20	190	40	220	70	250	90	280	120	320	160	370	220	450
4200	40	220	70	260	100	290	130	330	160	360	200	420	270	510
4400	70	260	100	300	130	340	160	380	190	420	240	470	320	570
4600	100	300	130	340	170	380	200	420	230	470	280	530	370	640
4800	130	340	170	380	200	430	240	480	280	520	330	590	420	710
5000	160	380	200	430	240	480	280	530	320	580	380	660		
5200	190	410	230	470	280	520	320	580	360	630	430	720		
5400	230	460	270	520	320	580	360	640						
5600	260	500	310	570	360	630								
5800	300	550												
6000														

Single Span250mm slab

1.0 mm BMT

Span (mm)	Characteristic Imposed Load Qk (kPa)													
	2		3		4		5		6		7.5		10	
3800	0	130	0	160	20	190	40	210	60	240	90	270	140	340
4000	0	160	20	190	50	220	70	250	90	280	120	320	180	390
4200	30	200	50	230	70	260	100	290	120	320	160	370	220	450
4400	50	230	80	260	110	300	130	330	160	370	200	420	260	500
4600	80	270	110	300	140	340	170	380	200	420	240	470	310	560
4800	110	300	140	340	170	380	200	420	230	470	280	530	360	630
5000	130	340	170	380	200	420	240	470	270	510	320	580	410	690
5200	160	370	200	420	240	470	270	520	310	570	370	640	460	760
5400	200	420	240	470	270	520	310	570	350	620	410	700		
5600	230	460	270	510	310	570	360	620	400	680	460	760		
5800	260	500	310	560	350	620	400	680						
6000	300	550	350	610	400	680								
5800														

END SPAN DESIGN TABLES 0.75 mm

End Spans 110 mm slab

0.75 mm BMT

Span (mm)	Characteristic Imposed Load Qk (kPa)													
	2		3		4		5		6		7.5		10	
1800	330	-	330	-	330	-	330	-	330	-	330	-	330	-
		N/A		N/A		N/A		N/A		N/A		N/A		N/A
2000	330	-	330	-	330	-	330	-	330	-	330	-	330	-
		N/A		N/A		N/A		N/A		N/A		N/A		N/A
2200	330	-	330	-	330	-	330	-	330	-	330	-	400	-
		N/A		N/A		N/A		N/A		N/A		N/A		N/A
2400	330	-	330	-	330	-	330	-	330	-	380	-	480	-
		N/A		N/A		N/A		N/A		N/A		N/A		N/A
2600	330	-	330	-	330	-	340	-	390	-	460	-	580	40
		N/A		N/A		N/A		N/A		N/A		N/A		N/A
2800	330	-	330	-	350	-	400	-	450	-	540	30	690	100
		N/A		N/A		N/A		N/A		N/A		N/A		N/A
3000	330	-	340	-	400	-	460	10	530	30	630	90	810	190
		N/A		N/A		N/A		N/A		N/A		N/A		N/A
3200	330	-	390	-	460	20	540	50	610	90	740	150		
		N/A		N/A		N/A		N/A		N/A		N/A		
3400	370	-	450	20	530	60	620	100	710	150				
		N/A		N/A		N/A		N/A		N/A				
3600	420	20	510	60	610	110	710	170						
		N/A		N/A		N/A		N/A						
3800	470	60	580	110										
		N/A		N/A										
4000	530	100												
		N/A												

End Spans 120 mm slab

0.75 mm BMT

Span (mm)	Characteristic Imposed Load Qk (kPa)													
	2		3		4		5		6		7.5		10	
1800	300	-	300	-	300	-	300	-	300	-	300	-	300	-
		N/A		N/A		N/A		N/A		N/A		N/A		N/A
2000	300	-	300	-	300	-	300	-	300	-	300	-	300	-
		N/A		N/A		N/A		N/A		N/A		N/A		N/A
2200	300	-	300	-	300	-	300	-	300	-	300	-	350	-
		N/A		N/A		N/A		N/A		N/A		N/A		N/A
2400	300	-	300	-	300	-	300	-	300	-	340	-	430	-
		N/A		N/A		N/A		N/A		N/A		N/A		N/A
2600	300	-	300	-	300	-	310	-	340	-	400	-	510	-
		N/A		N/A		N/A		N/A		N/A		N/A		N/A
2800	300	-	300	-	310	-	360	-	400	-	470	-	600	10
		N/A		N/A		N/A		N/A		N/A		N/A		N/A
3000	300	-	310	-	360	-	410	-	470	-	550	10	700	60
		N/A		N/A		N/A		N/A		N/A		N/A		N/A
3200	300	-	350	-	410	-	480	-	540	10	640	50	820	120
		N/A		N/A		N/A		N/A		N/A		N/A		N/A
3400	330	-	400	-	470	-	550	20	620	50	740	90	950	190
		N/A		N/A		N/A		N/A		N/A		N/A		N/A
3600	380	-	460	-	540	20	620	60	710	90	850	160		
		N/A		N/A		N/A		N/A		N/A		N/A		
3800	430	-	510	30	610	60	700	100						
		N/A		N/A		N/A		N/A						
4000	480	20	580	60	680	110								
		N/A		N/A		N/A								
4200	530	60												
		N/A												
4400														

End Spans 130mm slab

0.75 mm BMT

Span (mm)	Characteristic Imposed Load Qk (kPa)													
	2		3		4		5		6		7.5		10	
2000	270	-	270	-	270	-	270	-	270	-	270	-	270	-
		-		-		-		-		-		-		-
2200	270	-	270	-	270	-	270	-	270	-	270	-	320	-
		-		-		-		-		-		-		10
2400	270	-	270	-	270	-	270	-	270	10	310	-	380	-
		-		-		-		-		-		30		50
2600	270	-	270	-	270	-	280	-	310	-	370	-	450	-
		-		-		10		20		40		60		90
2800	270	-	270	-	290	-	320	-	370	-	430	-	530	-
		-		10		30		50		70		100		140
3000	270	-	280	-	330	-	380	-	420	-	500	-	620	10
		10		30		60		80		100		130		190
3200	270	-	320	-	380	-	430	-	490	-	570	20	720	50
		40		60		80		110		130		180		250
3400	310	-	370	-	430	-	490	-	560	20	660	50	830	100
		60		90		120		150		180		230		330
3600	350	-	420	-	490	-	560	20	630	50	750	80	950	160
		90		120		150		190		230		290		420
3800	390	-	470	-	550	20	630	50	720	80	850	130		
		120		160		200		240		290		370		
4000	440	-	520	20	610	50	710	90	810	120				
		160		200		250		300		360				
4200	490	20	580	50	690	90								
		200		250		300								
4400	540	50	650	90										
		240		300										
4600	600	80												
		290												

End Spans 140 mm slab

0.75 mm BMT

Span (mm)	Characteristic Imposed Load Qk (kPa)													
	2		3		4		5		6		7.5		10	
2200	240	-	240	-	240	-	240	-	240	-	240	-	290	-
		-		-		-		-		-		-		-
2400	240	-	240	-	240	-	240	-	250	-	290	-	350	-
		-		-		-		-		-		20		20
2600	240	-	240	-	240	-	260	-	290	-	340	-	410	-
		-		-		-		10		20		40		50
2800	240	-	240	-	270	-	300	-	340	-	390	-	490	-
		-		-		20		30		50		70		90
3000	240	-	270	-	310	-	350	-	390	-	450	-	560	-
		-		20		40		60		80		100		140
3200	260	-	300	-	350	-	400	-	450	-	520	-	650	10
		20		40		60		90		110		140		190
3400	290	-	340	-	400	-	450	-	510	-	590	20	740	50
		50		70		90		110		140		170		240
3600	330	-	390	-	450	-	510	-	580	20	670	50	850	90
		70		90		120		150		170		220		310
3800	360	-	430	-	500	-	570	30	650	50	760	80	970	140
		90		120		150		190		220		280		380
4000	410	-	480	-	560	30	640	50	730	80	860	120		
		120		160		190		230		270		340		
4200	450	-	540	30	630	50	720	80	810	110				
		160		190		230		280		330				
4400	500	20	600	50	700	80	800	120						
		190		230		280		340						
4600	550	50	660	80										
		230		280										
4800	600	70												
		260												

End Spans 150 mm slab

0.75 mm BMT

Span (mm)	Characteristic Imposed Load Qk (kPa)													
	2		3		4		5		6		7.5		10	
2400	**220**	-	**220**	-	**220**	-	**220**	-	**230**	-	**270**	-	**330**	-
2600	**220**	-	**220**	-	**220**	-	**240**	-	**270**	*10*	**310**	*30*	**380**	*30*
2800	**220**	-	**220**	-	**250**	-	**280**	*20*	**310**	*30*	**360**	*50*	**450**	*60*
3000	**220**	-	**250**	*10*	**290**	*30*	**320**	*40*	**360**	*60*	**420**	*80*	**520**	*100*
3200	**240**	*10*	**290**	*30*	**330**	*50*	**370**	*70*	**410**	*90*	**480**	*110*	**590**	*140*
3400	**280**	*30*	**320**	*50*	**370**	*70*	**420**	*90*	**470**	*120*	**550**	*150*	**680**	*190*
3600	**310**	*50*	**360**	*80*	**420**	*100*	**470**	*120*	**530**	*150*	**620**	*180*	**770**	*240*
3800	**340**	*80*	**400**	*100*	**470**	*130*	**530**	*150*	**600**	*180*	**700**	*220*	**870**	*300*
4000	**380**	*100*	**450**	*130*	**520**	*160*	**590**	*180*	**670**	*210*	**780**	*270*	**980**	*360*
4200	**420**	*130*	**500**	*160*	**580**	*190*	**660**	*220*	**750**	*260*	**880**	*320*		
4400	**470**	*150*	**550**	*190*	**640**	*230*	**730**	*270*	**830**	*310*				
4600	**510**	*180*	**600**	*220*	**700**	*270*	**800**	*310*						
4800	**560**	*220*	**660**	*260*	**770**	*310*								
5000	**610**	*250*												

End Spans 175 mm slab

0.75 mm BMT

Span (mm)	Characteristic Imposed Load Qk (kPa)													
	2		3		4		5		6		7.5		10	
2800	**230**	-	**230**	-	**230**	-	**250**	-	**270**	*10*	**310**	*20*	**380**	*50*
3000	**230**	-	**230**	-	**250**	-	**280**	*20*	**310**	*30*	**360**	*50*	**430**	*80*
3200	**230**	-	**250**	*10*	**290**	*20*	**320**	*40*	**360**	*50*	**410**	*70*	**500**	*110*
3400	**250**	*10*	**290**	*30*	**320**	*40*	**360**	*60*	**400**	*80*	**460**	*100*	**560**	*140*
3600	**280**	*30*	**320**	*50*	**360**	*60*	**410**	*80*	**450**	*100*	**520**	*130*	**640**	*180*
3800	**310**	*50*	**360**	*70*	**400**	*90*	**450**	*110*	**500**	*130*	**580**	*160*	**720**	*210*
4000	**340**	*70*	**390**	*90*	**450**	*110*	**510**	*130*	**560**	*160*	**650**	*190*	**800**	*250*
4200	**380**	*90*	**440**	*110*	**500**	*140*	**560**	*160*	**630**	*190*	**720**	*230*	**900**	*290*
4400	**410**	*100*	**470**	*130*	**540**	*160*	**610**	*190*	**690**	*220*	**800**	*260*	**990**	*330*
4600	**450**	*130*	**520**	*160*	**600**	*190*	**680**	*220*	**760**	*250*	**880**	*290*	**1100**	*370*
4800	**490**	*150*	**570**	*180*	**660**	*220*	**740**	*250*	**830**	*280*	**970**	*330*		
5000	**530**	*180*	**620**	*210*	**720**	*250*	**810**	*280*	**910**	*320*				
5200	**580**	*210*	**680**	*240*	**780**	*280*	**890**	*320*						
5400	**630**	*240*	**740**	*280*										
5600	**680**	*270*												

End Spans 200 mm slab

0.75 mm BMT

Span (mm)	Characteristic Imposed Load Qk (kPa)													
	2		3		4		5		6		7.5		10	
3000	**260**	-	**260**	-	**260**	-	**260**	-	**280**	*10*	**320**	*30*	**380**	*50*
3200	**260**	-	**260**	-	**260**	-	**290**	*20*	**320**	*30*	**360**	*50*	**430**	*80*
3400	**260**	-	**260**	*10*	**290**	*20*	**330**	*40*	**360**	*50*	**410**	*70*	**490**	*100*
3600	**260**	*10*	**290**	*30*	**330**	*40*	**360**	*60*	**400**	*70*	**460**	*100*	**550**	*130*
3800	**280**	*30*	**320**	*40*	**360**	*60*	**410**	*80*	**450**	*100*	**510**	*120*	**620**	*160*
4000	**310**	*50*	**360**	*60*	**400**	*80*	**450**	*100*	**500**	*120*	**570**	*150*	**690**	*200*
4200	**340**	*60*	**390**	*80*	**440**	*100*	**490**	*120*	**540**	*140*	**620**	*180*	**760**	*230*
4400	**370**	*80*	**430**	*100*	**490**	*130*	**540**	*150*	**600**	*170*	**690**	*210*	**840**	*260*
4600	**410**	*100*	**470**	*130*	**530**	*150*	**590**	*180*	**660**	*200*	**760**	*240*	**930**	*300*
4800	**450**	*120*	**510**	*150*	**580**	*180*	**650**	*200*	**720**	*230*	**830**	*270*	**1020**	*340*
5000	**480**	*140*	**560**	*170*	**630**	*200*	**710**	*230*	**790**	*260*	**910**	*310*	**1120**	*380*
5200	**520**	*170*	**600**	*200*	**690**	*230*	**770**	*260*	**860**	*290*	**990**	*340*		
5400	**570**	*190*	**660**	*220*	**750**	*260*	**840**	*290*	**940**	*330*	**1080**	*380*		
5600	**610**	*210*	**710**	*250*	**810**	*290*	**910**	*330*	**1010**	*360*				
5800	**660**	*240*	**770**	*280*	**870**	*320*								
6000	**710**	*270*	**820**	*310*										

End Spans 225 mm slab

0.75 mm BMT

Span (mm)	Characteristic Imposed Load Qk (kPa)													
	2		3		4		5		6		7.5		10	
3400	**300**	-	**300**	-	**300**	*10*	**300**	*20*	**330**	*30*	**370**	*50*	**440**	*80*
3600	**300**	-	**300**	*10*	**300**	*30*	**330**	*40*	**370**	*50*	**410**	*70*	**490**	*100*
3800	**300**	*20*	**300**	*30*	**340**	*40*	**370**	*60*	**410**	*70*	**460**	*90*	**550**	*130*
4000	**300**	*30*	**330**	*50*	**370**	*60*	**410**	*80*	**450**	*90*	**510**	*120*	**610**	*160*
4200	**320**	*50*	**360**	*60*	**410**	*80*	**450**	*100*	**490**	*120*	**560**	*140*	**670**	*190*
4400	**350**	*60*	**400**	*80*	**450**	*100*	**490**	*120*	**540**	*140*	**610**	*170*	**740**	*220*
4600	**380**	*80*	**430**	*100*	**490**	*120*	**540**	*150*	**590**	*170*	**680**	*200*	**820**	*250*
4800	**420**	*100*	**470**	*120*	**530**	*150*	**590**	*170*	**650**	*190*	**740**	*230*	**900**	*290*
5000	**450**	*120*	**510**	*150*	**580**	*170*	**640**	*200*	**710**	*220*	**810**	*260*	**980**	*320*
5200	**490**	*140*	**560**	*170*	**620**	*200*	**690**	*220*	**770**	*250*	**880**	*290*	**1070**	*360*
5400	**530**	*160*	**600**	*190*	**680**	*220*	**750**	*250*	**830**	*280*	**950**	*320*	**1160**	*400*
5600	**570**	*190*	**650**	*220*	**730**	*250*	**810**	*280*	**900**	*310*	**1030**	*360*		
5800	**610**	*210*	**700**	*240*	**790**	*280*	**880**	*310*	**970**	*340*	**1120**	*390*		
6000	**650**	*230*	**740**	*270*	**840**	*300*	**940**	*340*	**1040**	*370*				

End Spans 250 mm slab

0.75 mm BMT

Span (mm)	Characteristic Imposed Load Qk (kPa)													
	2		3		4		5		6		7.5		10	
3800	330	-	330	-	330	-	340	-	380	-	420	-	500	-
	-	10	-	20	-	30	-	40	-	60	-	80	-	110
4000	330	-	330	-	340	-	380	-	410	-	470	-	560	-
	-	20	-	30	-	50	-	60	-	80	-	100	-	130
4200	330	-	340	-	380	-	420	-	460	-	510	-	610	20
	-	40	-	50	-	70	-	80	-	100	-	120	20	160
4400	330	-	370	-	420	-	460	-	500	-	560	10	670	40
	-	50	-	70	-	80	-	100	-	120	10	140	40	190
4600	360	-	410	-	450	-	500	-	550	10	620	30	740	60
	-	70	-	90	-	110	-	120	10	140	30	170	60	220
4800	390	-	440	-	490	-	540	10	600	30	670	50	810	90
	-	90	-	110	-	130	10	150	30	170	50	200	90	250
5000	430	-	480	-	540	10	590	30	650	50	730	70	880	110
	-	100	-	130	10	150	30	170	50	190	70	220	110	280
5200	460	-	520	10	580	30	640	50	700	70	800	90	960	140
	-	120	10	150	30	170	50	190	70	220	90	250	140	310
5400	500	10	560	30	630	50	690	70	760	90	860	120	1040	170
	10	140	30	170	50	190	70	220	90	250	120	280	170	350
5600	530	30	600	50	670	70	750	90	820	110	930	140	310	
	30	160	50	190	70	220	90	250	110	270	140	310		
5800	570	40	640	60	720	90	800	110	880	130	1000	160	340	
	40	180	60	210	90	240	110	270	130	300	160	340		
6000	610	60	690	80	770	110	860	130	950	150	1080	190	380	
	60	210	80	240	110	270	130	300	150	330	190	380		

END SPANS DESIGN TABLES 1.0 mm

End Spans 110 mm slab

1.0 mm BMT

Span (mm)	Characteristic Imposed Load Qk (kPa)													
	2		3		4		5		6		7.5		10	
1800	330	-	330	-	330	-	330	-	330	-	330	-	330	-
	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A
2000	330	-	330	-	330	-	330	-	330	-	330	-	330	-
	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A
2200	330	-	330	-	330	-	330	-	330	-	330	-	400	-
	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A
2400	330	-	330	-	330	-	330	-	330	-	380	-	480	-
	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A
2600	330	-	330	-	330	-	340	-	390	-	460	-	580	-
	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A
2800	330	-	330	-	350	-	400	-	450	-	540	-	690	70
	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	70	N/A
3000	330	-	340	-	400	-	470	-	530	-	630	50	810	150
	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	50	N/A	150	N/A
3200	330	-	390	-	460	-	540	10	620	50	740	120	960	260
	-	N/A	-	N/A	-	N/A	10	N/A	50	N/A	120	N/A	260	N/A
3400	370	-	450	-	530	20	620	70	710	120	860	200		
	-	N/A	-	N/A	20	N/A	70	N/A	120	N/A	200	N/A		
3600	420	-	510	20	610	70	710	130	820	190				
	-	N/A	20	N/A	70	N/A	130	N/A	190	N/A				
3800	470	20	580	70	690	130								
	20	N/A	70	N/A	130	N/A								
4000	530	60												
	60	N/A												
4200														

End Spans 120 mm slab

1.0 mm BMT

Span (mm)	Characteristic Imposed Load Qk (kPa)													
	2		3		4		5		6		7.5		10	
1800	300	-	300	-	300	-	300	-	300	-	300	-	300	-
	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A
2000	300	-	300	-	300	-	300	-	300	-	300	-	300	-
	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A
2200	300	-	300	-	300	-	300	-	300	-	300	-	350	-
	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A
2400	300	-	300	-	300	-	300	-	300	-	340	-	430	-
	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A
2600	300	-	300	-	300	-	310	-	340	-	400	-	510	-
	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A
2800	300	-	300	-	310	-	360	-	400	-	480	-	600	-
	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A
3000	300	-	310	-	360	-	410	-	470	-	550	-	700	20
	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	20	N/A
3200	300	-	350	-	420	-	480	-	540	-	640	10	820	80
	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	10	N/A	80	N/A
3400	340	-	400	-	470	-	550	-	620	10	740	60	950	160
	-	N/A	-	N/A	-	N/A	-	N/A	10	N/A	60	N/A	160	N/A
3600	380	-	460	-	540	-	620	20	710	60	850	120		
	-	N/A	-	N/A	-	N/A	20	N/A	60	N/A	120	N/A		
3800	430	-	520	-	610	30	710	70	810	110				
	-	N/A	-	N/A	30	N/A	70	N/A	110	N/A				
4000	480	-	580	30	690	70	800	120						
	-	N/A	30	N/A	70	N/A	120	N/A						
4200	530	20	650	70										
	20	N/A	70	N/A										
4400	590	60												
	60	N/A												

End Spans 130 mm slab

1.0 mm BMT

Span (mm)	Characteristic Imposed Load Qk (kPa)													
	2		3		4		5		6		7.5		10	
2000	270	-	270	-	270	-	270	-	270	-	270	-	270	-
2200	270	-	270	-	270	-	270	-	270	-	270	-	320	-
2400	270	-	270	-	270	-	270	-	270	-	310	-	380	-
2600	270	-	270	-	270	-	280	-	310	-	370	-	460	-
2800	270	-	270	-	290	-	330	-	370	-	430	-	540	-
3000	270	-	290	-	330	-	380	-	420	-	500	-	620	-
3200	270	-	330	-	380	-	430	-	490	-	570	-	720	20
3400	310	-	370	-	430	-	490	-	560	-	660	10	830	70
3600	350	-	420	-	490	-	560	-	630	10	750	50	950	130
3800	390	-	470	-	550	-	630	10	720	40	850	90		
4000	440	-	530	-	620	20	710	50	810	90	960	150		
4200	490	-	590	20	690	50	800	90						
4400	540	10	650	50	770	100								
4600	600	50												

End Spans 140 mm slab

1.0 mm BMT

Span (mm)	Characteristic Imposed Load Qk (kPa)													
	2		3		4		5		6		7.5		10	
2200	240	-	240	-	240	-	240	-	240	-	240	-	290	-
2400	240	-	240	-	240	-	240	-	250	-	290	-	350	-
2600	240	-	240	-	240	-	260	-	290	-	340	-	410	-
2800	240	-	240	-	270	-	300	-	340	-	390	-	490	-
3000	240	-	270	-	310	-	350	-	390	-	450	-	560	-
3200	260	-	300	-	350	-	400	-	450	-	520	-	650	-
3400	290	-	340	-	400	-	450	-	510	-	600	-	750	10
3600	330	-	390	-	450	-	510	-	580	-	680	20	850	60
3800	370	-	430	-	500	-	580	-	650	10	760	50	970	110
4000	410	-	490	-	560	-	650	20	730	40	860	80	1100	160
4200	450	-	540	-	630	20	720	50	820	80	970	130		
4400	500	-	600	20	700	50	800	80	910	120				
4600	550	10	660	50	770	80								
4800	610	40	730	80										
5000	670	70												

End Spans 150 mm slab

1.0 mm BMT

Span (mm)	Characteristic Imposed Load Qk (kPa)													
	2		3		4		5		6		7.5		10	
2400	220	-	220	-	220	-	220	-	230	-	270	-	330	-
2600	220	-	220	-	220	-	240	-	270	-	310	-	380	-
2800	220	-	220	-	250	-	280	-	320	-	360	-	450	-
3000	220	-	250	-	290	-	320	-	360	-	420	-	520	-
3200	250	-	290	-	330	-	370	-	410	-	480	-	590	-
3400	280	-	320	-	370	-	420	-	470	-	550	-	680	-
3600	310	-	360	-	420	-	470	-	530	-	620	-	770	20
3800	350	-	410	-	470	-	530	-	600	-	700	20	870	60
4000	380	-	450	-	520	-	600	-	670	20	780	60	990	100
4200	430	-	500	-	580	-	660	20	750	50	880	90	1110	150
4400	470	-	560	-	640	20	740	50	830	80	980	120		
4600	520	-	610	20	710	50	810	80	920	110				
4800	570	10	670	40	780	80	900	110						
5000	620	40	740	70										
5200	680	70												

End Spans 175 mm slab

1.0 mm BMT

Span (mm)	Characteristic Imposed Load Qk (kPa)													
	2		3		4		5		6		7.5		10	
2800	230	-	230	-	230	-	250	-	270	-	310	-	380	-
3000	230	-	230	-	250	-	280	-	310	-	360	-	430	-
3200	230	-	250	-	290	-	320	-	360	-	410	-	500	-
3400	250	-	290	-	320	-	360	-	400	-	460	-	560	-
3600	280	-	320	-	360	-	410	-	450	-	520	-	640	-
3800	310	-	360	-	410	-	450	-	510	-	580	-	720	20
4000	340	-	400	-	450	-	510	-	560	-	650	10	800	50
4200	380	-	440	-	500	-	560	-	630	-	730	30	900	80
4400	410	-	480	-	550	-	620	10	690	30	800	60	1000	110
4600	450	-	530	-	610	10	680	30	760	50	890	90	1100	150
4800	500	-	580	10	660	30	750	60	840	80	980	120	1220	180
5000	540	-	630	30	730	50	820	80	920	110	1070	150		
5200	590	20	690	50	790	80	900	110	1010	140				
5400	640	40	750	70	860	100	980	140						
5600	690	60	810	100										
5800	740	80												

End Spans 200 mm slab — 1.0 mm BMT

Span (mm)	Characteristic Imposed Load Qk (kPa)											
	2		3		4		5		6		7.5		10	
3000	260	-	260	-	260	-	260	-	280	-	320	10	380	40
3200	260	-	260	-	260	-	290	-	320	20	360	30	440	60
3400	260	-	260	-	290	10	330	20	360	40	410	60	490	90
3600	260	-	290	10	330	30	370	40	400	60	460	80	550	120
3800	280	10	320	30	370	50	410	70	450	80	510	110	620	150
4000	310	30	360	50	410	70	450	90	500	110	570	140	690	180
4200	350	50	400	70	450	90	500	110	550	130	630	160	770	220
4400	380	70	430	90	490	120	550	140	610	160	700	200	850	250
4600	410	90	480	120	540	140	600	170	670	190	770	230	940	290
4800	450	110	520	140	590	170	660	190	730	220	840	260	1030	330
5000	490	130	560	160	640	190	720	220	800	250	920	300	1130	370
5200	530	160	610	190	700	220	780	250	870	280	1000	330	1240	410
5400	570	180	660	210	750	250	840	280	940	310	1080	370		
5600	610	200	710	240	810	280	910	310	1020	350	1180	400		
5800	660	230	770	270	880	310	990	350	1100	390				
6000	710	260	830	300	940	340								

End Spans 250 mm slab — 1.0 mm BMT

Span (mm)	Characteristic Imposed Load Qk (kPa)											
	2		3		4		5		6		7.5		10	
3800	330	-	330	10	330	20	340	30	380	40	420	60	500	90
4000	330	10	330	20	350	40	380	50	420	60	470	80	560	120
4200	330	20	340	40	380	50	420	70	460	80	520	110	620	150
4400	330	40	380	60	420	70	460	90	500	110	570	130	680	170
4600	360	60	410	80	460	90	500	110	550	130	620	160	740	200
4800	400	80	450	100	500	120	550	140	600	160	680	190	810	240
5000	430	90	480	110	540	130	590	160	650	180	730	210	880	260
5200	460	110	520	130	580	160	640	180	700	200	800	240	960	300
5400	500	130	560	160	630	180	690	210	760	230	860	270	1040	330
5600	540	150	600	180	670	210	750	230	820	260	930	300	1130	370
5800	570	170	650	200	730	230	800	260	880	290	1010	330	1220	410
6000	610	200	690	230	780	260	870	290	950	320	1090	370		

INTERIOR SPAN DESIGN TABLES 0.75 mm

Interior Spans 110 mm slab — 0.75 mm BMT

Span (mm)	Characteristic Imposed Load Qk (kPa)													
	2		3		4		5		6		7.5		10	
1800	330	N/A	330	N/A	330	N/A	330	N/A	330	N/A	330	N/A	330	N/A
2000	330	N/A	330	N/A	330	N/A	330	N/A	330	N/A	330	N/A	330	N/A
2200	330	N/A	330	N/A	330	N/A	330	N/A	330	N/A	330	N/A	370	N/A
2400	330	N/A	330	N/A	330	N/A	330	N/A	330	N/A	350	N/A	450	N/A
2600	330	N/A	330	N/A	330	N/A	330	N/A	350	N/A	420	N/A	530	N/A
2800	330	N/A	330	N/A	330	N/A	360	N/A	410	N/A	490	N/A	630	N/A
3000	330	N/A	330	N/A	360	N/A	420	N/A	480	N/A	580	N/A	750	N/A
3200	330	N/A	350	N/A	420	N/A	490	N/A	560	N/A	670	N/A	880	N/A
3400	330	N/A	400	N/A	480	N/A	560	N/A	640	N/A	780	N/A		
3600	370	N/A	450	N/A	540	N/A	640	N/A	730	N/A	890	N/A		
3800	410	N/A	510	N/A	610	N/A	720	N/A	840	N/A				
4000	460	N/A	570	N/A	690	N/A	820	N/A						
4200	520	N/A	640	N/A										
4400	570	N/A												

Interior Spans 120 mm slab — 0.75 mm BMT

Span (mm)	Characteristic Imposed Load Qk (kPa)													
	2		3		4		5		6		7.5		10	
1800	300	N/A	300	N/A	300	N/A	300	N/A	300	N/A	300	N/A	300	N/A
2000	300	N/A	300	N/A	300	N/A	300	N/A	300	N/A	300	N/A	300	N/A
2200	300	N/A	300	N/A	300	N/A	300	N/A	300	N/A	300	N/A	330	N/A
2400	300	N/A	300	N/A	300	N/A	300	N/A	300	N/A	310	N/A	390	N/A
2600	300	N/A	300	N/A	300	N/A	300	N/A	310	N/A	370	N/A	470	N/A
2800	300	N/A	300	N/A	300	N/A	320	N/A	370	N/A	440	N/A	550	N/A
3000	300	N/A	300	N/A	320	N/A	380	N/A	430	N/A	510	N/A	650	N/A
3200	300	N/A	310	N/A	370	N/A	430	N/A	490	N/A	590	N/A	750	N/A
3400	300	N/A	360	N/A	420	N/A	490	N/A	560	N/A	670	N/A	870	N/A
3600	330	N/A	400	N/A	480	N/A	560	N/A	640	N/A	770	N/A	1000	N/A
3800	370	N/A	460	N/A	540	N/A	630	N/A	730	N/A	880	N/A		
4000	420	N/A	510	N/A	610	N/A	710	N/A	820	N/A				
4200	460	N/A	570	N/A	680	N/A	800	N/A						
4400	510	N/A	630	N/A	760	N/A								
4600	570	N/A	700	N/A										
4800	630	N/A												

Interior Spans| 30mm slab

0.75 mm BMT

Span (mm)	Characteristic Imposed Load Qk (kPa)						
	2	3	4	5	6	7.5	10
1800	300 - N/A	300 - N/A	300 - N/A	300 - N/A	300 - N/A	300 - N/A	300 - N/A
2000	300 - N/A	300 - N/A	300 - N/A	300 - N/A	300 - N/A	300 - N/A	300 - N/A
2200	300 - N/A	300 - N/A	300 - N/A	300 - N/A	300 - N/A	300 - N/A	330 - N/A
2400	300 - N/A	300 - N/A	300 - N/A	300 - N/A	300 - N/A	310 - N/A	390 - N/A
2600	300 - N/A	300 - N/A	300 - N/A	300 - N/A	310 - N/A	370 - N/A	470 - N/A
2800	300 - N/A	300 - N/A	300 - N/A	320 - N/A	370 - N/A	440 - N/A	550 - N/A
3000	300 - N/A	300 - N/A	320 - N/A	380 - N/A	430 - N/A	510 - N/A	650 - N/A
3200	300 - N/A	310 - N/A	370 - N/A	430 - N/A	490 - N/A	590 - N/A	750 - N/A
3400	300 - N/A	360 - N/A	420 - N/A	490 - N/A	560 - N/A	670 - N/A	870 - N/A
3600	330 - N/A	400 - N/A	480 - N/A	560 - N/A	640 - N/A	770 - N/A	1000 - N/A
3800	370 - N/A	460 - N/A	540 - N/A	630 - N/A	730 - N/A	880 - N/A	
4000	420 - N/A	510 - N/A	610 - N/A	710 - N/A	820 - N/A		
4200	460 - N/A	570 - N/A	680 - N/A	800 - N/A			
4400	510 - N/A	630 - N/A	760 - N/A				
4600	570 - N/A	700 - N/A					
4800	630 - N/A						

Interior Spans| 40 mm slab

0.75 mm BMT

Span (mm)	Characteristic Imposed Load Qk (kPa)						
	2	3	4	5	6	7.5	10
2200	240 - -	240 - -	240 - -	240 - -	240 - -	240 - -	270 - -
2400	240 - -	240 - -	240 - -	240 - -	240 - -	260 - -	320 - -
2600	240 - -	240 - -	240 - -	240 - -	270 - -	310 - -	380 - -
2800	240 - -	240 - -	240 - -	270 - -	310 - -	360 - -	450 - -
3000	240 - -	240 - -	280 - -	310 - -	350 - -	410 - -	520 - -
3200	240 - -	270 - -	310 - -	360 - -	400 - -	480 - -	600 - -
3400	260 - -	310 - -	360 - -	410 - -	460 - -	540 - -	680 - -
3600	290 - -	340 - -	400 - -	460 - -	520 - -	620 - -	780 - -
3800	320 - -	380 - -	450 - -	520 - -	590 - -	690 - -	880 - -
4000	360 - -	430 - -	500 - -	580 - -	660 - -	780 - -	1000 - -
4200	390 - -	480 - -	560 - -	650 - -	730 - -	870 - 20	
4400	440 - -	530 - -	620 - -	720 - -	820 - 10	980 - 30	
4600	480 - -	580 - -	690 - -	790 - 10	910 - 30		
4800	520 - -	630 - -	750 - 10	870 - 30			
5000	570 - -	690 - 10	820 - 20				
5200	620 - -	760 - 20					
5400	670 - 10						

Interior Spans| 50 mm slab

0.75 mm BMT

Span (mm)	Characteristic Imposed Load Qk (kPa)						
	2	3	4	5	6	7.5	10
2400	220 - -	220 - -	220 - -	220 - -	220 - -	250 - -	300 - -
2600	220 - -	220 - -	220 - -	220 - -	250 - -	290 - -	350 - -
2800	220 - -	220 - -	230 - -	260 - -	290 - -	330 - -	410 - -
3000	220 - -	220 - -	260 - -	290 - -	330 - -	380 - -	480 - -
3200	220 - -	250 - -	290 - -	330 - -	370 - -	440 - -	550 - -
3400	240 - -	290 - -	330 - -	380 - -	430 - -	500 - -	620 - -
3600	270 - -	320 - -	370 - -	430 - -	480 - -	560 - -	710 - -
3800	300 - -	360 - -	420 - -	480 - -	540 - -	640 - -	800 - -
4000	340 - -	400 - -	470 - -	530 - -	600 - -	710 - -	900 - -
4200	370 - -	440 - -	520 - -	590 - -	670 - -	790 - 10	1010 - -
4400	410 - -	490 - -	570 - -	660 - -	750 - -	880 - 20	1130 - -
4600	440 - -	530 - -	630 - -	720 - -	820 - 10	970 - 30	
4800	490 - -	580 - -	690 - -	790 - 10	900 - 30		
5000	530 - -	640 - -	750 - 10	870 - 30			
5200	580 - -	700 - 10	820 - 20				
5400	630 - -	760 - 20					
5600	680 - 10						
5800	740 - 20						

Interior Spans| 75 mm slab

0.75 mm BMT

Span (mm)	Characteristic Imposed Load Qk (kPa)						
	2	3	4	5	6	7.5	10
2800	230 - -	230 - -	230 - -	230 - -	250 - -	290 - -	350 - -
3000	230 - -	230 - -	230 - -	260 - -	290 - -	330 - -	400 - -
3200	230 - -	230 - -	260 - -	290 - -	320 - -	370 - -	460 - -
3400	230 - -	250 - -	290 - -	330 - -	370 - -	420 - -	520 - -
3600	240 - -	280 - -	330 - -	370 - -	410 - -	470 - -	590 - -
3800	270 - -	320 - -	360 - -	410 - -	460 - -	530 - -	660 - -
4000	300 - -	350 - -	400 - -	450 - -	510 - -	590 - -	740 - -
4200	330 - -	390 - -	440 - -	500 - -	560 - -	660 - -	820 - -
4400	360 - -	420 - -	480 - -	550 - -	620 - -	720 - -	900 - 20
4600	390 - -	460 - -	530 - -	610 - -	680 - -	800 - 10	1000 - 30
4800	430 - -	500 - -	580 - -	660 - -	750 - -	880 - 20	1100 - 50
5000	460 - -	550 - -	640 - -	730 - -	820 - 10	960 - 30	1210 - 60
5200	500 - -	600 - -	690 - -	790 - 10	890 - 30	1050 - 50	
5400	540 - -	650 - -	750 - 10	860 - 30	970 - 40		
5600	590 - -	700 - 10	820 - 20	940 - 40	1060 - 50		
5800	640 - -	760 - 20	880 - 30	1010 - 50			
6000	680 - 10	820 - 30	950 - 50				

Interior Spans 200 mm slab

0.75 mm BMT

Span (mm)	Characteristic Imposed Load Qk (kPa)						
	2	3	4	5	6	7.5	10
3000	260 - -	260 - -	260 - -	260 - -	260 - -	290 - -	350 - -
3200	260 - -	260 - -	260 - -	260 - -	290 - -	330 - -	400 - -
3400	260 - -	260 - -	260 - -	290 - -	330 - -	370 - -	450 - -
3600	260 - -	260 - -	290 - -	330 - -	360 - -	420 - -	510 - -
3800	260 - -	290 - -	330 - -	370 - -	410 - -	460 - -	570 - -
4000	270 - -	320 - -	360 - -	410 - -	450 - -	520 - -	630 - -
4200	300 - -	350 - -	400 - -	440 - -	490 - -	570 - -	700 - -
4400	330 - -	380 - -	430 - -	490 - -	540 - -	630 - -	770 - -
4600	360 - -	420 - -	470 - -	530 - -	590 - -	690 - -	850 - 10
4800	390 - -	450 - -	520 - -	580 - -	650 - -	750 - -	930 - 20
5000	420 - -	490 - -	560 - -	630 - -	710 - -	820 - 10	1020 - 40
5200	460 - -	530 - -	610 - -	690 - -	770 - 10	900 - 20	1120 - 50
5400	490 - -	580 - -	660 - -	750 - 10	840 - 20	980 - 30	1220 - 60
5600	530 - -	620 - -	720 - 10	810 - 20	910 - 30	1060 - 50	1320 - 80
5800	570 - -	670 - -	770 - 20	880 - 30	980 - 40	1150 - 60	
6000	610 - -	720 - 10	830 - 30	940 - 40	1060 - 50		

Interior Spans 225 mm slab

0.75 mm BMT

Span (mm)	Characteristic Imposed Load Qk (kPa)						
	2	3	4	5	6	7.5	10
3400	300 - -	300 - -	300 - -	300 - -	300 - -	340 - -	410 - -
3600	300 - -	300 - -	300 - -	300 - -	330 - -	380 - -	450 - -
3800	300 - -	300 - -	300 - -	330 - -	370 - -	420 - -	510 - -
4000	300 - -	300 - -	330 - -	370 - -	410 - -	460 - -	560 - -
4200	300 - -	320 - -	360 - -	400 - -	450 - -	510 - -	620 - -
4400	300 - -	350 - -	400 - -	440 - -	490 - -	560 - -	680 - -
4600	330 - -	380 - -	430 - -	480 - -	540 - -	610 - -	750 - -
4800	360 - -	420 - -	470 - -	530 - -	580 - -	670 - -	820 - 10
5000	390 - -	450 - -	510 - -	570 - -	630 - -	730 - -	890 - 20
5200	420 - -	490 - -	550 - -	620 - -	690 - -	790 - 10	970 - 30
5400	460 - -	530 - -	600 - -	670 - -	750 - -	860 - 20	1060 - 40
5600	490 - -	570 - -	640 - -	730 - -	810 - 10	930 - 30	1150 - 50
5800	530 - -	610 - -	690 - -	780 - 10	870 - 20	1010 - 40	1240 - 70
6000	560 - -	650 - -	740 - 10	840 - 20	930 - 30	1080 - 50	

Interior Spans 250 mm slab

0.75 mm BMT

Span (mm)	Characteristic Imposed Load Qk (kPa)						
	2	3	4	5	6	7.5	10
3800	330 - -	330 - -	330 - -	330 - -	340 - -	380 - -	460 - -
4000	330 - -	330 - -	330 - -	340 - -	370 - -	420 - -	510 - -
4200	330 - -	330 - -	340 - -	370 - -	410 - -	470 - -	560 - -
4400	330 - -	330 - -	370 - -	410 - -	450 - -	510 - -	620 - -
4600	330 - -	360 - -	400 - -	450 - -	490 - -	560 - -	670 - -
4800	340 - -	390 - -	440 - -	490 - -	540 - -	610 - -	730 - -
5000	370 - -	420 - -	480 - -	530 - -	580 - -	660 - -	800 - -
5200	400 - -	460 - -	510 - -	570 - -	630 - -	720 - -	870 - 10
5400	430 - -	490 - -	550 - -	620 - -	680 - -	780 - 10	950 - 30
5600	460 - -	530 - -	600 - -	660 - -	730 - -	840 - 20	1020 - 40
5800	490 - -	570 - -	640 - -	710 - -	790 - 10	900 - 30	
6000	530 - -	610 - -	680 - -	760 - 10	850 - 20	970 - 40	

INTERIOR SPAN DESIGN TABLES 1.0 mm

Interior Spans| 10 mm slab — **1.0 mm BMT**

Span (mm)	Characteristic Imposed Load Qk (kPa) 2	3	4	5	6	7.5	10
1800	330 - N/A	330 - N/A	330 - N/A	330 - N/A	330 - N/A	330 - N/A	330 - N/A
2000	330 - N/A	330 - N/A	330 - N/A	330 - N/A	330 - N/A	330 - N/A	330 - N/A
2200	330 - N/A	330 - N/A	330 - N/A	330 - N/A	330 - N/A	330 - N/A	370 - N/A
2400	330 - N/A	330 - N/A	330 - N/A	330 - N/A	330 - N/A	350 - N/A	450 - N/A
2600	330 - N/A	330 - N/A	330 - N/A	330 - N/A	350 - N/A	420 - N/A	540 - N/A
2800	330 - N/A	330 - N/A	330 - N/A	360 - N/A	410 - N/A	490 - N/A	630 - N/A
3000	330 - N/A	330 - N/A	360 - N/A	420 - N/A	480 - N/A	580 - N/A	750 - N/A
3200	330 - N/A	350 - N/A	420 - N/A	490 - N/A	560 - N/A	670 - N/A	880 - N/A
3400	330 - N/A	400 - N/A	480 - N/A	560 - N/A	640 - N/A	780 - N/A	1030 - N/A
3600	370 - N/A	450 - N/A	540 - N/A	640 - N/A	740 - N/A	900 - N/A	
3800	410 - N/A	510 - N/A	610 - N/A	720 - N/A	840 - N/A		
4000	460 - N/A	580 - N/A	690 - N/A	820 - N/A			
4200	520 - N/A	640 - N/A	780 - N/A				
4400	580 - N/A	720 - N/A					
4600	640 - N/A						
4800							

Interior Spans| 20 mm slab — **1.0 mm BMT**

Span (mm)	Characteristic Imposed Load Qk (kPa) 2	3	4	5	6	7.5	10
1800	300 - N/A	300 - N/A	300 - N/A	300 - N/A	300 - N/A	300 - N/A	300 - N/A
2000	300 - N/A	300 - N/A	300 - N/A	300 - N/A	300 - N/A	300 - N/A	300 - N/A
2200	300 - N/A	300 - N/A	300 - N/A	300 - N/A	300 - N/A	300 - N/A	330 - N/A
2400	300 - N/A	300 - N/A	300 - N/A	300 - N/A	300 - N/A	310 - N/A	400 - N/A
2600	300 - N/A	300 - N/A	300 - N/A	300 - N/A	320 - N/A	370 - N/A	470 - N/A
2800	300 - N/A	300 - N/A	300 - N/A	320 - N/A	370 - N/A	440 - N/A	550 - N/A
3000	300 - N/A	300 - N/A	330 - N/A	380 - N/A	430 - N/A	510 - N/A	650 - N/A
3200	300 - N/A	320 - N/A	370 - N/A	430 - N/A	490 - N/A	590 - N/A	750 - N/A
3400	300 - N/A	360 - N/A	430 - N/A	490 - N/A	560 - N/A	670 - N/A	870 - N/A
3600	330 - N/A	410 - N/A	480 - N/A	560 - N/A	640 - N/A	770 - N/A	1000 - N/A
3800	370 - N/A	460 - N/A	540 - N/A	630 - N/A	730 - N/A	880 - N/A	
4000	420 - N/A	510 - N/A	610 - N/A	710 - N/A	820 - N/A	1000 - N/A	
4200	460 - N/A	570 - N/A	680 - N/A	800 - N/A	930 - N/A		
4400	520 - N/A	640 - N/A	760 - N/A	900 - N/A			
4600	570 - N/A	710 - N/A	850 - N/A				
4800	630 - N/A						
5000	690 - N/A						

Interior Spans| 30 mm slab — **1.0 mm BMT**

Span (mm)	Characteristic Imposed Load Qk (kPa) 2	3	4	5	6	7.5	10
2000	270 - -	270 - -	270 - -	270 - -	270 - -	270 - -	270 - -
2200	270 - -	270 - -	270 - -	270 - -	270 - -	270 - -	300 - -
2400	270 - -	270 - -	270 - -	270 - -	270 - -	290 - -	360 - -
2600	270 - -	270 - -	270 - -	270 - -	290 - -	340 - -	420 - -
2800	270 - -	270 - -	270 - -	300 - -	330 - -	390 - -	490 - -
3000	270 - -	270 - -	300 - -	340 - -	390 - -	460 - -	580 - -
3200	270 - -	290 - -	340 - -	390 - -	440 - -	520 - -	660 - -
3400	270 - -	330 - -	390 - -	450 - -	510 - -	600 - -	760 - -
3600	310 - -	370 - -	440 - -	500 - -	570 - -	680 - -	870 - -
3800	340 - -	420 - -	490 - -	570 - -	650 - -	770 - -	1000 - -
4000	380 - -	470 - -	550 - -	640 - -	730 - -	870 - -	1130 - 80
4200	430 - -	520 - -	610 - -	710 - -	820 - -	980 - 20	
4400	470 - -	570 - -	680 - -	790 - -	910 - 10		
4600	520 - -	640 - -	760 - -	880 - 10			
4800	570 - -	700 - -	840 - 10				
5000	630 - -	770 - 10					
5200	690 - -						

Interior Spans| 40 mm slab — **1.0 mm BMT**

Span (mm)	Characteristic Imposed Load Qk (kPa) 2	3	4	5	6	7.5	10
2200	240 - -	240 - -	240 - -	240 - -	240 - -	240 - -	270 - -
2400	240 - -	240 - -	240 - -	240 - -	240 - -	260 - -	330 - -
2600	240 - -	240 - -	240 - -	240 - -	270 - -	310 - -	380 - -
2800	240 - -	240 - -	240 - -	270 - -	310 - -	360 - -	450 - -
3000	240 - -	240 - -	280 - -	320 - -	350 - -	420 - -	520 - -
3200	240 - -	270 - -	310 - -	360 - -	410 - -	480 - -	600 - -
3400	260 - -	310 - -	360 - -	410 - -	460 - -	540 - -	690 - -
3600	290 - -	340 - -	400 - -	460 - -	520 - -	620 - -	780 - -
3800	320 - -	380 - -	450 - -	520 - -	590 - -	700 - -	890 - -
4000	360 - -	430 - -	500 - -	580 - -	660 - -	780 - -	1000 - -
4200	400 - -	480 - -	560 - -	650 - -	740 - -	880 - -	1130 - -
4400	440 - -	530 - -	620 - -	720 - -	820 - -	980 - 20	
4600	480 - -	580 - -	690 - -	800 - -	910 - 10	1090 - 40	
4800	530 - -	640 - -	760 - -	880 - 10	1010 - 30		
5000	580 - -	700 - -	830 - 10	970 - 30			
5200	630 - -	770 - 10	910 - 30				
5400	690 - -	840 - 20					
5600	750 - 10						

Interior Spans 150 mm slab — 1.0 mm BMT

Span (mm)	Characteristic Imposed Load Qk (kPa)						
	2	3	4	5	6	7.5	10
2400	220 - -	220 - -	220 - -	220 - -	220 - -	250 - -	300 - -
2600	220 - -	220 - -	220 - -	220 - -	250 - -	290 - -	350 - -
2800	220 - -	220 - -	230 - -	260 - -	290 - -	330 - -	410 - -
3000	220 - -	220 - -	260 - -	290 - -	330 - -	380 - -	480 - -
3200	220 - -	260 - -	300 - -	340 - -	380 - -	440 - -	550 - -
3400	240 - -	290 - -	330 - -	380 - -	430 - -	500 - -	630 - -
3600	270 - -	320 - -	370 - -	430 - -	480 - -	570 - -	710 - -
3800	300 - -	360 - -	420 - -	480 - -	540 - -	640 - -	800 - -
4000	340 - -	400 - -	470 - -	540 - -	610 - -	710 - -	900 - -
4200	370 - -	440 - -	520 - -	600 - -	670 - -	800 - -	1010 - -
4400	410 - -	490 - -	570 - -	660 - -	750 - -	890 - 10	1130 - -
4600	450 - -	540 - -	630 - -	730 - -	830 - -	980 - 20	1260 - -
4800	490 - -	590 - -	700 - -	800 - -	910 - 10	1090 - 40	
5000	540 - -	650 - -	760 - -	880 - 10	1010 - 30		
5200	590 - -	710 - -	830 - 10	970 - 30			
5400	640 - -	770 - 10	910 - 20				
5600	690 - -	840 - 20					
5800	750 - 10						
6000	800 - 20						

Interior Spans 175 mm slab — 1.0 mm BMT

Span (mm)	Characteristic Imposed Load Qk (kPa)						
	2	3	4	5	6	7.5	10
2800	230 - -	230 - -	230 - -	230 - -	250 - -	290 - -	350 - -
3000	230 - -	230 - -	230 - -	260 - -	290 - -	330 - -	400 - -
3200	230 - -	230 - -	260 - -	290 - -	320 - -	370 - -	460 - -
3400	230 - -	250 - -	290 - -	330 - -	370 - -	420 - -	520 - -
3600	240 - -	280 - -	330 - -	370 - -	410 - -	470 - -	590 - -
3800	270 - -	320 - -	360 - -	410 - -	460 - -	530 - -	660 - -
4000	300 - -	350 - -	400 - -	450 - -	510 - -	590 - -	740 - -
4200	330 - -	390 - -	440 - -	500 - -	570 - -	660 - -	820 - -
4400	360 - -	430 - -	490 - -	560 - -	620 - -	730 - -	910 - -
4600	400 - -	470 - -	540 - -	610 - -	690 - -	800 - -	1010 - 20
4800	430 - -	510 - -	590 - -	670 - -	760 - -	880 - 10	1110 - 30
5000	470 - -	560 - -	640 - -	730 - -	830 - -	970 - 20	1220 - 50
5200	510 - -	610 - -	700 - -	800 - -	900 - 10	1060 - 30	1350 - 60
5400	550 - -	660 - -	760 - -	870 - 10	980 - 30	1160 - 50	
5600	600 - -	710 - -	830 - 10	950 - 30	1070 - 40		
5800	640 - -	760 - -	890 - 20	1020 - 40	1150 - 50		
6000	690 - -	820 - 20	960 - 30	1100 - 50			

Interior Spans 200 mm slab — 1.0 mm BMT

Span (mm)	Characteristic Imposed Load Qk (kPa)						
	2	3	4	5	6	7.5	10
3000	260 - -	260 - -	260 - -	260 - -	260 - -	290 - -	350 - -
3200	260 - -	260 - -	260 - -	260 - -	290 - -	330 - -	400 - -
3400	260 - -	260 - -	260 - -	290 - -	330 - -	370 - -	450 - -
3600	260 - -	260 - -	290 - -	330 - -	360 - -	420 - -	510 - -
3800	260 - -	290 - -	330 - -	370 - -	410 - -	470 - -	570 - -
4000	270 - -	320 - -	360 - -	410 - -	450 - -	520 - -	630 - -
4200	300 - -	350 - -	400 - -	450 - -	500 - -	570 - -	700 - -
4400	330 - -	380 - -	440 - -	490 - -	540 - -	630 - -	780 - -
4600	360 - -	420 - -	480 - -	540 - -	600 - -	690 - -	850 - -
4800	390 - -	460 - -	520 - -	590 - -	660 - -	760 - -	940 - 10
5000	430 - -	500 - -	570 - -	640 - -	720 - -	830 - -	1030 - 20
5200	460 - -	540 - -	620 - -	700 - -	780 - -	910 - 10	1120 - 40
5400	490 - -	580 - -	660 - -	750 - -	840 - -	980 - 20	1220 - 50
5600	530 - -	620 - -	720 - -	810 - -	910 - 20	1060 - 30	1330 - 60
5800	570 - -	670 - -	770 - -	880 - 10	980 - 30	1150 - 50	1440 - 80
6000	620 - -	720 - -	830 - 10	950 - 30	1060 - 40	1240 - 60	

Interior Spans 225 mm slab — 1.0 mm BMT

Span (mm)	Characteristic Imposed Load Qk (kPa)						
	2	3	4	5	6	7.5	10
3400	300 - -	300 - -	300 - -	300 - -	300 - -	340 - -	410 - -
3600	300 - -	300 - -	300 - -	300 - -	330 - -	380 - -	460 - -
3800	300 - -	300 - -	300 - -	330 - -	370 - -	420 - -	510 - -
4000	300 - -	300 - -	330 - -	370 - -	410 - -	470 - -	560 - -
4200	300 - -	320 - -	370 - -	410 - -	450 - -	510 - -	620 - -
4400	310 - -	350 - -	400 - -	450 - -	490 - -	560 - -	680 - -
4600	340 - -	390 - -	440 - -	490 - -	540 - -	620 - -	750 - -
4800	370 - -	420 - -	480 - -	530 - -	590 - -	670 - -	820 - -
5000	400 - -	460 - -	520 - -	580 - -	640 - -	740 - -	900 - -
5200	430 - -	490 - -	560 - -	620 - -	690 - -	790 - -	970 - 20
5400	460 - -	530 - -	600 - -	670 - -	750 - -	860 - -	1060 - 30
5600	490 - -	570 - -	650 - -	730 - -	810 - -	930 - 20	1150 - 40
5800	530 - -	610 - -	700 - -	780 - -	870 - 10	1010 - 30	1240 - 50
6000	570 - -	660 - -	750 - -	840 - 10	940 - 20	1090 - 40	1340 - 70

Interior Spans250 mm slab **1.0 mm BMT**

Span (mm)	Characteristic Imposed Load Qk (kPa)						
	2	3	4	5	6	7.5	10
3800	330 - -	330 - -	330 - -	330 - -	340 - -	390 - -	460 - -
4000	330 - -	330 - -	330 - -	340 - -	380 - -	430 - -	510 - -
4200	330 - -	330 - -	340 - -	380 - -	410 - -	470 - -	560 - -
4400	330 - -	330 - -	370 - -	410 - -	450 - -	520 - -	620 - -
4600	330 - -	360 - -	410 - -	450 - -	500 - -	560 - -	680 - -
4800	340 - -	390 - -	440 - -	490 - -	540 - -	610 - -	740 - -
5000	370 - -	420 - -	480 - -	530 - -	580 - -	660 - -	800 - -
5200	400 - -	460 - -	520 - -	570 - -	630 - -	720 - -	870 - -
5400	430 - -	490 - -	560 - -	620 - -	680 - -	780 - -	950 - 10
5600	460 - -	530 - -	600 - -	660 - -	730 - -	840 - -	1020 - 20
5800	500 - -	570 - -	640 - -	710 - -	790 - -	910 - 10	1110 - 40
6000	530 - -	610 - -	690 - -	770 - -	850 - 10	980 - 20	1190 - 50

3.5 FORMWORK TABLES

Formwork Span 1.0 BMT

No props

Slab thickness (mm)	110	120	130	140	150	175	200	225	250
Single Span (mm)	2730	2670	2610	2550	2500	2390	2290	2210	2140
Continuous Span (mm	3240	3170	3100	3030	2960	2810	2670	2560	2460

1 prop

Slab thickness (mm)	110	120	130	140	150	175	200	225	250
Single Span (mm)	3400	3600	3800	4000	4400	4800	5350	5120	4920
Continuous Span (mm	4600	5000	5200	5600	5930	5620	5350	5120	4920

2 props

Slab thickness (mm)	110	120	130	140	150	175	200	225	250
Single Span (mm)	3400	3600	3800	4000	4400	4800	5400	5800	6000
Continuous Span (mm	4600	5000	5200	5600	6000	6000	6000	6000	6000

Formwork Span 0.75BMT

No props

Slab thickness (mm)	110	120	130	140	150	175	200	225	250
Single Span (mm)	2300	2240	2180	2130	2080	1980	1890	1810	1740
Continuous Span (mm)	2530	2460	2400	2340	2290	2170	2070	1980	1910

1 prop

Slab thickness (mm)	110	120	130	140	150	175	200	225	250
Single Span (mm)	3400	3600	3800	4000	4200	4350	4150	3970	3820
Continuous Span (mm)	4400	4800	4800	4690	4580	4350	4150	3970	3820

2 props

Slab thickness (mm)	110	120	130	140	150	175	200	225	250
Single Span (mm)	3400	3600	3800	4000	4200	4800	5200	5600	5740
Continuous Span (mm)	4400	4800	5200	5400	5800	6000	6000	5960	5740

Continuous maximum spans are limited as given in concrete slabs tables for interior spans and total 6000mm limit.
Single span formwork is limited to maximum spans as given in tables.

4 CONSTRUCTION

4.1 SAFETY

BONDEK® II is available in long lengths, so large areas can be quickly and easily covered to form a safe working platform during construction. One level of formwork gives immediate protection from the weather, and safety to people working on the floor below. The minimal propping requirements provide a relatively open area to the floor below.

The bold embossments along the top of the ribs of BONDEK® II enhance safety by reducing the likelihood of workers slipping. Some Lysaght centres, may supply BONDEK® II with knurling on the upper face of the flutes, which provides even more safety against slippage.

It is commonsense to work safely, protecting yourself and workmates from accidents on the site. Safety includes the practices you use; as well as personal protection of eyes and skin from sunburn, and hearing from noise. For personal safety, and to protect the surface finish of BONDEK® II, wear clean dry gloves. Don't slide sheets over rough surfaces or over each other. Always carry tools, don't drag them.

Occupational health and safety laws enforce safe working conditions in most locations. Local laws may require you to have fall protection which includes safety mesh, personal harnesses and perimeter guardrails where they are appropriate. We recommend that you adhere strictly to all laws that apply to your State.

BONDEK® II is capable of withstanding temporary construction loads including the mass of workmen, equipment and materials as specified in Section 2.8 of this manual. However, it is good construction practice to ensure protection from concentrated loads, such as barrows, by use of some means such as planks and/or boards.

4.2 INSTALLATION

BONDEK® II is delivered in strapped bundles. If not required for immediate use stack sheets or bundles neatly and clear of the ground, on a slight slope to allow drainage of water. If left in the open, protect with waterproof covers.

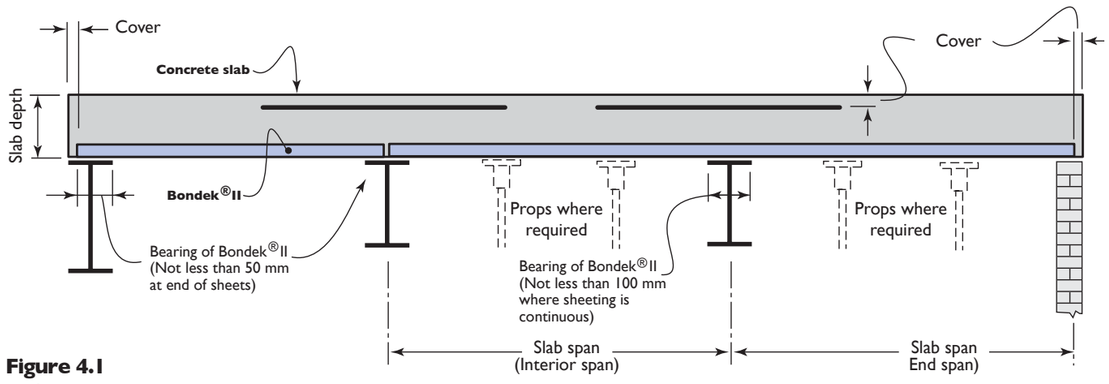


Figure 4.1
Typical layout

4.2.1 PROPPING

It is a common practice to specify unpropped BONDEK® II formwork, however, depending on the span of a BONDEK® II slab, temporary propping may be needed between the slab supports to prevent excessive deflections or collapse of the formwork.

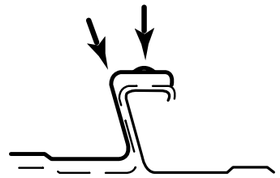
BONDEK® II formwork is normally placed directly on prepared propping. Props must stay in place during the laying of BONDEK® II formwork, the placement of the concrete, and until the concrete has reached the strength of 20 MPa.

Propping generally consists of substantial timber or steel bearers supported by vertical props. The bearers must be continuous across the full width of BONDEK® II formwork.

Where the underside of BONDEK® II formwork is featured as a finished ceiling, wide form-ply strips attached to the bearers will minimise marking. The width of the form-ply strips depends upon the slab depth, BONDEK® II metal thickness and spans. Form-ply strips of 300 mm width have been used successfully.

Propping must be adequate to support construction loads and the mass of wet concrete. The number of props you need for given spans is shown in our tables.

Method 1
Position BONDEK® II □ sheet parallel with previously-laid sheet. Interlock sheets by applying pressure to either position.



Method 2
Position BONDEK® II □ sheet at an angle. Interlock sheets by lowering sheet through an arc.

Figure 4.2
Two methods of interlocking adjacent BONDEK® II sheets

4.2.2 LAYING

BONDEK® II must be laid with the sheeting ribs aligned in the direction of the designed spans. Other details include the following:

- The slab supports must be prepared for bearing and slip joints as required.
- Lay BONDEK® II sheets continuously over each slab span without any intermediate splicing or jointing.
- Lay BONDEK® II sheets end to end. Centralise the joint at the slab supports. Where jointing material is required the sheets may be butted against the jointing material.
- Support BONDEK® II sheets across their full width at the slab support lines and at the propping support lines.
- For the supports to carry the wet concrete and construction loads, the minimum bearing is 50 mm for ends of BONDEK® II sheets, and 100 mm for intermediate supports over which the sheeting is continuous.
- In exposed applications, treat the end and edges of the BONDEK® II sheets with a suitable edge treatment to prevent entry of moisture.

4.2.3 INTERLOCKING THE SHEETS

Overlapping ribs of BONDEK® II sheeting are interlocked. Either of two methods can be used in most situations, though variations may also work.

In the first method, lay adjacent sheets loosely in place. Place the female lap rib overlapping the male lap rib of the previous sheet and apply foot pressure, or a light kick, to the female lap rib (Figure 4.2).

In the second method, offer a new sheet at an angle to one previously laid, and then simply lower it down, through an arc (see Figure 4.2).

If sheets don't interlock neatly (perhaps due to some damage or distortion from site handling or construction practices) use screws to pull the laps together tightly (see Section 4.2.8, Fastening side-lap joints).

4.2.4 SECURING THE PLATFORM

Once laid, BONDEK® II provides a stable working platform. BONDEK® II shall be fixed to supporting structure at end supports with screws or nails or equivalent. Where additional security is needed you can use:

- weights;
- screws or nails into the propping bearers
- BONWEDGE and BON-NUT Suspension system pulling down from underneath.

Take care if you use penetrating fasteners (such as screws and nails) because they can make removal of the props difficult, and perhaps result in damage to the BONDEK® II.

4.2.5 INSTALLING BONDEK® II ON STEEL FRAMES

BONDEK® II may be installed directly on erected structural steelwork.

General fastening of BONDEK® II

The sheeting shall be fixed to the structural steel using spot welds, or fasteners such as drive nails or self-drilling screws.

Place the fixings (fasteners and spot welds) in the flat areas of the pans adjacent to the ribs or between the flutes. The frequency of fixings depends on wind or seismic conditions and good building practice. However at least one fastener per pan shall be provided at end supports.

One fixing system is as follows.

- At the end of sheets: use a fixing at every rib (Figure 4.3).
- At each intermediate slab support over which the sheeting is continuous: use a fixing at the ribs on both edges (Figure 4.3).
- Fix BONDEK® II with drive nails, self-drilling screws or spot welds.
- Drive nails should be powder-activated, steel nails 4 mm nominal diameter, suitable for structural steel of 4 mm thickness or greater.
- For structural steel up to 12 mm thick, use 12-24 x 38 mm self-drilling hexagon head screws or equivalent.
- For structural steel over 12 mm thick, pre-drill and use 12-24 x 16 mm hexagon head screws or equivalent.
- Spot welds should be 12 mm minimum diameter. Surfaces to be welded must be free of loose material and foreign matter. Where the BONDEK® II soffit or the structural steelwork has a pre-painted surface, securing methods other than welding may be more appropriate. Take suitable safety precautions against fumes during welding zinc coated products.

Fastening composite beams

Stud welding through the sheet has been considered a suitable securing method for the sheeting in a composite beam; however some preliminary fixing by one of the methods mentioned above is necessary to secure the sheeting prior to the stud welding. Some relevant welding requirements are:

- Mating surfaces of steel beam and sheeting to be cleaned of scale, rust, moisture, paint, overspray, primer, sand, mud or other contamination that would prevent direct contact between the parent material and the BONDEK® II;
- Welding must be done in dry conditions by a certified welder;
- For pre-painted BONDEK® II sheets, special welding procedures may be necessary; and
- For sheets transverse to beams, Stud welding must be between pan flutes to ensure there is no gap between mating surfaces.

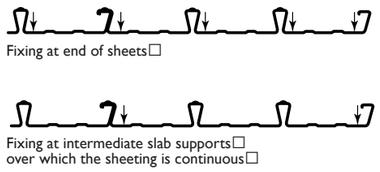


Figure 4.3
Positions for fixing BONDEK® II to steel framing

4.2.6 INSTALLING BONDEK® II ON BRICK SUPPORTS

Brick walls are usually considered to be brittle and liable to crack from imposed horizontal loads. Thermal expansion and contraction, long-term shrinkage, creep effects and flexural deflection of concrete slabs may be sufficient to cause such cracking. To prevent the cracking, BONDEK® II slabs are not usually installed directly on brick supports, although this is not always the case in earthquake construction.

Slip joints

Generally, a slip joint is provided between BONDEK® II and masonry supports (Figure 4.4).

- ***At least one fastener per pan (screws, nails, or equivalent) shall be provided at end support.***
- Slip joint material may be placed directly in contact with the cleaned surface of steelwork.
- The top course of masonry should be level, or finished with a levelled bed of mortar to provide an even bearing surface. Lay the top courses of bricks with the frogs facing down.
- The width of a slip joint should not extend beyond the face of the slab support.
- The slip joint material must have adequate compressive strength to avoid it being compressed into irregularities of the mating surfaces and thus becoming a rigid joint.

Slip joint material must allow movement to occur, usually by allowing flow under pressure or temperature, however it must not run or solidify. Generically, the materials are a non-rotting, synthetic carrier impregnated with a neutral synthetic or petroleum-based material.

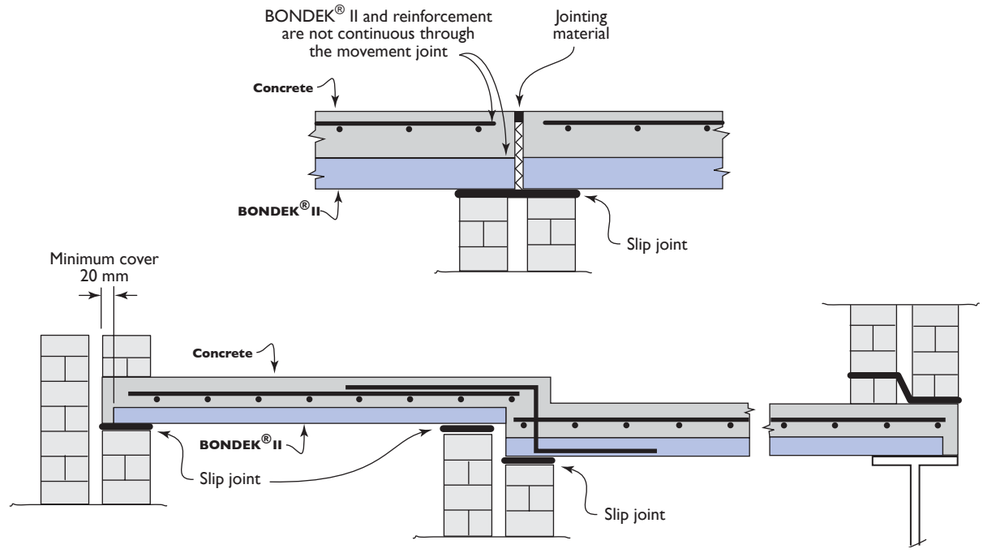


Figure 4.4
Typical movement and slip joints

4.2.4 SECURING THE PLATFORM

Once laid, BONDEK® II provides a stable working platform. BONDEK® II shall be fixed to supporting structure at end supports with screws or nails or equivalent. Where additional security is needed you can use:

- weights;
- screws or nails into the propping bearers
- BONWEDGE and BON-NUT Suspension system pulling down from underneath.

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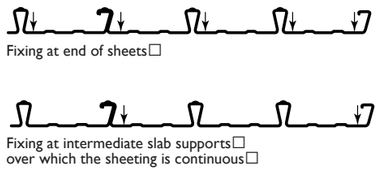

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- Slip joint material may be placed directly in contact with the cleaned surface of steelwork.
- The top course of masonry should be level, or finished with a levelled bed of mortar to provide an even bearing surface. Lay the top courses of bricks with the frogs facing down.
- The width of a slip joint should not extend beyond the face of the slab support.
- The slip joint material must have adequate compressive strength to avoid it being compressed into irregularities of the mating surfaces and thus becoming a rigid joint.

Slip joint material must allow movement to occur, usually by allowing flow under pressure or temperature, however it must not run or solidify. Generically, the materials are a non-rotting, synthetic carrier impregnated with a neutral synthetic or petroleum-based material.

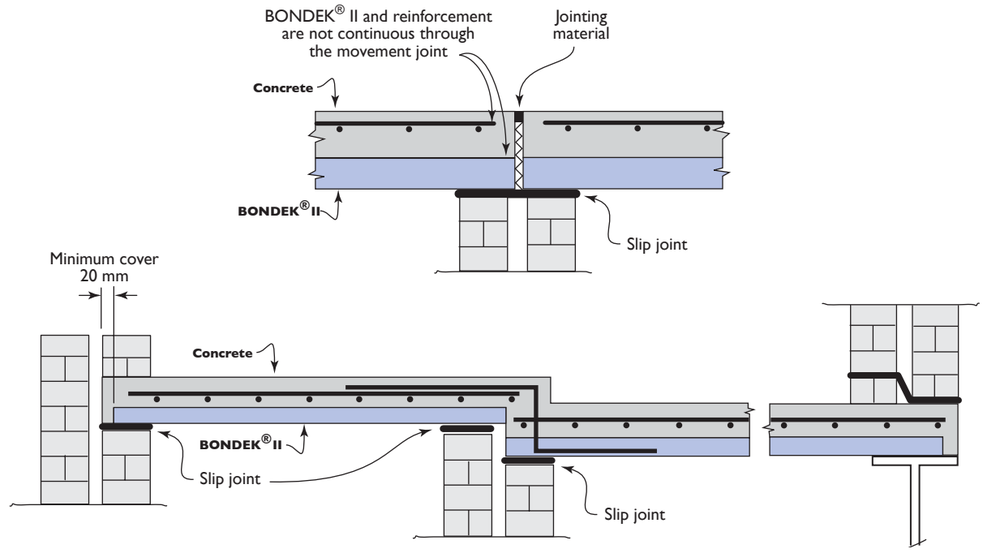


Figure 4.4
Typical movement and slip joints

4.2.7 CONSTRUCTION AND MOVEMENT JOINTS

Joints used between BONDEK® II slabs generally follow accepted construction practices. Construction joints are included between slabs for the convenience of construction. Movement joints allow relative movement between adjoining slabs. The joints may be transverse to, or parallel with, the span of the BONDEK® II slab. Movement joints need a slip joint under the BONDEK® II sheeting. (Figure 4.4).

The BONDEK® II sheeting and any slab reinforcement are not continuous through a joint.

Design engineers generally detail the location and spacing of joints because joints effect the design of a slab.

4.2.8 FASTENING SIDE LAP JOINTS

If BONDEK® II sheeting has been distorted in transport, storage or erection, side-lap joints may need fastening to maintain a stable platform during construction, to minimise concrete seepage during pouring, and to gain a good visual quality for exposed soffits (Figure 4.5).

4.2.9 CUTTING AND FITTING EDGE FORM

EDGE FORM is a simple C-shaped section that simplifies the installation of most BONDEK® II slabs. It is easily fastened to the BONDEK® II sheeting, neatly retaining the concrete and providing a smooth top edge for quick and accurate screeding. We make it to suit any slab thickness.

EDGE FORM is easily spliced and bent to form internal and external corners of any angle and must be fitted and fully fastened as the sheets are installed. There are various methods of forming corners and splices. Some of these methods are shown in Figures 4.6 and 4.7.

Fasten EDGE FORM to the underside of unsupported BONDEK® II panels every 300 mm. The top flange of EDGE FORM must be tied to the ribs every 600 mm with hoop iron 25 mm x 1.0 mm (Figures 4.7 and 4.15). Use 10–16 x 16 mm self-drilling screws.

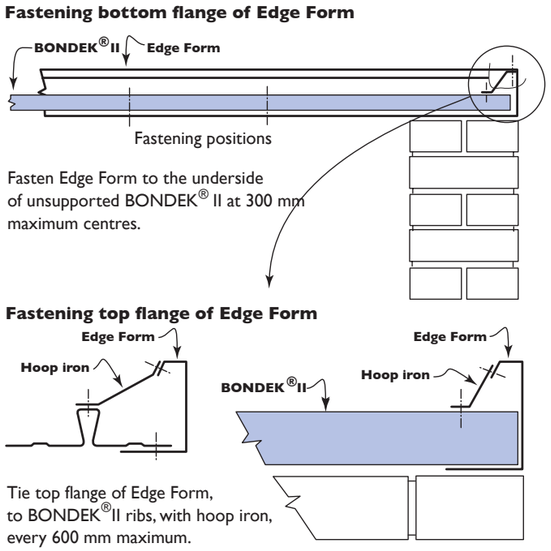


Figure 4.6
Typical fastening of EDGE FORM to BONDEK® II

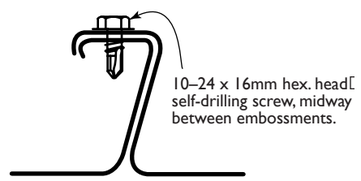


Figure 4.5
Fixing at a side-lap

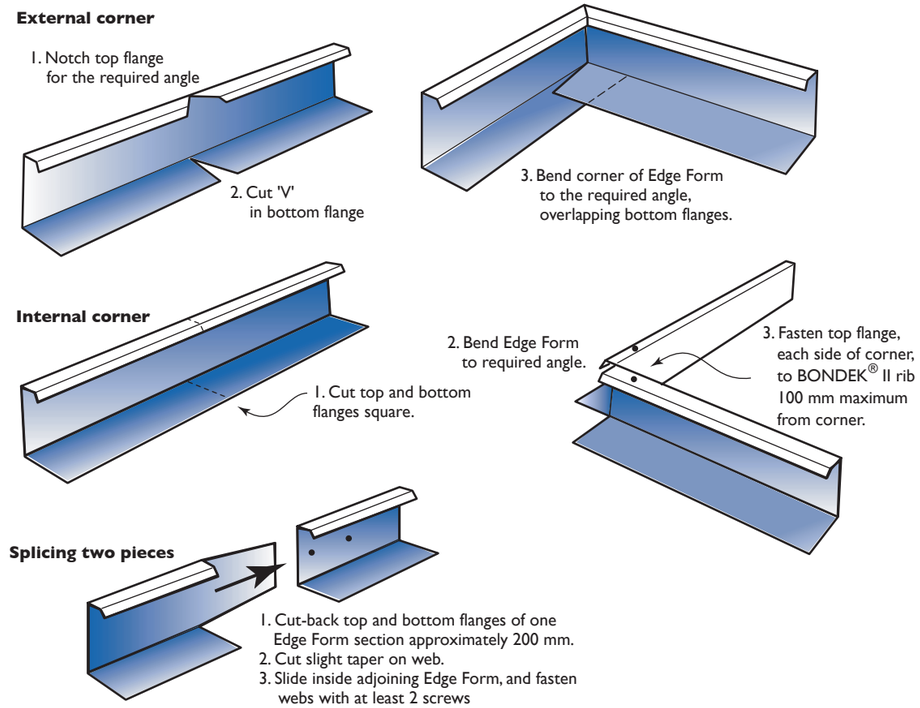


Figure 4.7
Fabrication of formwork is easy with EDGE FORM

4.2.10 SEALING

Seepage of water or fine concrete slurry can be minimised by following common construction practices. Generally gaps are sealed with waterproof tape or by sandwiching contraction joint material between the abutting ends of BONDEK® II sheet. If there is a sizeable gap you may have to support the waterproof tape, and BONFILL may be found useful (Figure 4.8).

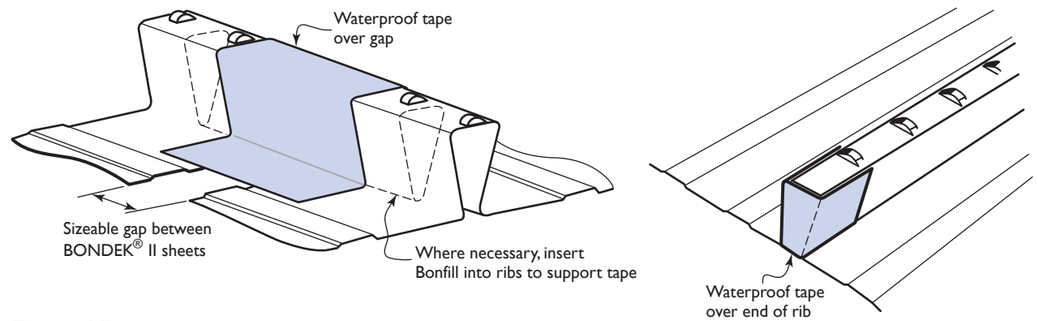


Figure 4.8
Use waterproof tape to seal joints in BONDEK® II sheets

4.2.11 ITEMS EMBEDDED IN SLABS

Included are pipes and conduits, sleeves, inserts, holding-down bolts, chairs and other supports, plastic strips for plasterboard attachment, contraction joint material and many more.

Location of items within the slab **(Figure 4.9)**

Minimise the quantity and size of holes through BONDEK® II sheeting, by hanging services from the underside of BONDEK® II using accessories such as BON-NUT, BONWEDGE and CEILING suspension nut.

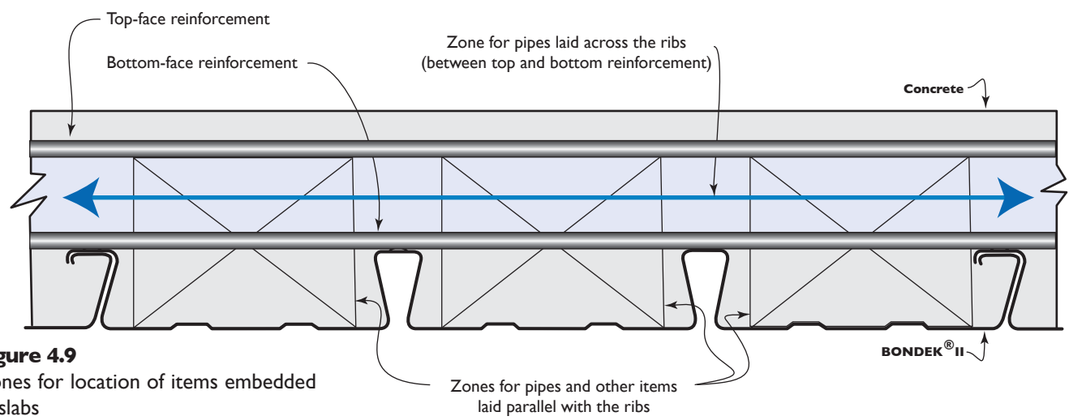


Figure 4.9
Zones for location of items embedded in slabs

4.2.12 HOLES

BONDEK® II acts as longitudinal tensile reinforcement similarly to conventional bar or fabric reinforcement does in concrete slabs. Consequently, holes in BONDEK® II sheets, to accommodate pipes and ducts, reduce the effective area of the steel sheeting and can adversely effect the performance of a slab.

Some guidelines for holes are (Figure 4.10):

- Place holes in the central pan of any sheet, with a minimum edge distance of 15 mm from the rib gap.
- Holes should be round, with a maximum diameter of 150 mm.
- For slabs designed as a continuous slab: space holes from an interior support of the slab no more than one tenth of a clear span.

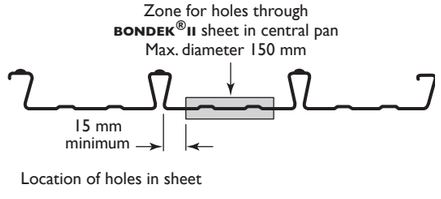
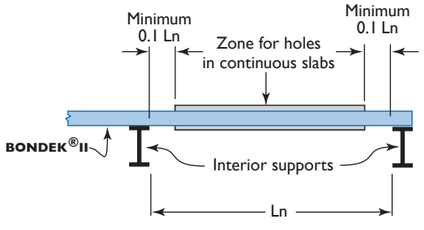


Figure 4.10
Zones for location of holes through BONDEK® II



Location of holes relative to supports in continuous slabs

4.2.13 INSPECTION

We recommend regular qualified inspection during the installation, to be sure that the sheeting is installed in accordance with this publication and good building practice.

4.2.14 CUTTING

It is easy to cut BONDEK® II sheets to fit. Use a power saw fitted with an abrasive disc or metal cutting blade. Initially lay the sheet with its ribs down, cut through the pans and part-through the ribs, then turn the over and finish by cutting the tops of the ribs.

4.3 REINFORCEMENT

BONDEK® II sheeting acts as longitudinal tensile reinforcement. The condition of sheeting should be inspected before concrete is poured.

Reinforcement in slabs carries and distributes the design loads and to control cracking. Reinforcement is generally described as transverse and longitudinal in relation to span, but other reinforcement required for trimming may be positioned in other orientations. Figure 4.11 shows a typical cross-section of a BONDEK® II composite slab and associated terms.

Reinforcement must be properly positioned, lapped where necessary to ensure continuity, and tied to prevent displacement during construction. Fixing of reinforcement shall be in accordance with BS-8110: Part 1.

To ensure the specified minimum concrete cover, the uppermost layer of reinforcement must be positioned and tied to prevent displacement during construction.

Where fabric is used in thin slabs, or where fabric is used to act as both longitudinal and transverse reinforcement, pay particular attention the required minimum concrete cover and the required design reinforcement depth at the splices—splice bars are a prudent addition.

Always place chairs and spacers on pan areas. Depending upon the type of chair and its loading, it may be necessary to use plates under chairs to protect the BONDEK® II, particularly where the soffit will be exposed. Transverse reinforcement may be used for spacing or supporting longitudinal reinforcement.

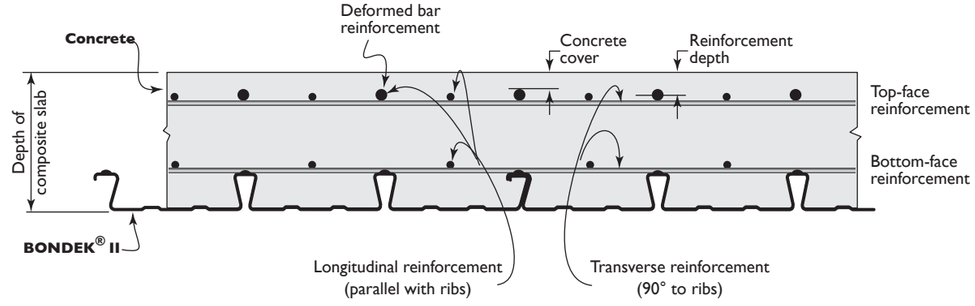


Figure 4.11
Typical cross-section of a slab showing common terms

4.3.1 TRANSVERSE REINFORCEMENT

Transverse reinforcement is placed at right-angles to the ribs of BONDEK® II. Deformed bar or fabric reinforcement may be used. In most applications the transverse reinforcement is for the control of cracks caused by shrinkage and temperature effects, and for locating longitudinal reinforcement

To control flexural cracking in the top face of the slab, transverse reinforcement in the top-face may be required over walls or beams which run in the same direction as the BONDEK® II sheets.

For ease of construction, reinforcement for control of cracking due to shrinkage and temperature is usually fabric reinforcement.

4.3.2 LONGITUDINAL REINFORCEMENT

Longitudinal reinforcement is positioned to carry design loads in the same direction as the ribs of BONDEK® II. Deformed bar or fabric reinforcement may be used.

Top-face longitudinal reinforcement is usually located over interior supports of the slab and extends into approximately a third of the adjoining spans.

Bottom-face longitudinal reinforcement is located between supports of the slab but, depending upon the detailing over the interior supports, it may be continuous, lapped, or discontinuous. Bottom-face longitudinal reinforcement may be placed on top of or below transverse reinforcement.

Location of bottom-face longitudinal reinforcement in elevated temperatures requires special design. (Figure 2.6)

4.3.3 TRIMMERS

Trimmers are used to distribute the design loads to the structural portion of the slab and/or to control cracking of the concrete at penetrations, fittings and re-entrant corners. Deformed bar or fabric reinforcement may be used.

Trimmers are sometimes laid at angles other than along or across the span, and generally located between the top and bottom layers of transverse and longitudinal reinforcement. Trimmers are generally fixed with ties from the top and bottom layers of reinforcement.

4.4 CONCRETE

4.4.1 SPECIFICATION

The concrete is to have the compressive strength as specified in the project documentation and the materials for the concrete and the concrete manufacture should conform to BS8110: Part 1: 1997, Section 6.

4.4.2 CONCRETE ADDITIVES

Admixtures or concrete materials containing calcium chloride or other chloride salts must not be used. Chemical admixtures including plasticisers may be used if they comply with BS8110.

4.4.3 PREPARATION

Before concrete is placed, remove any accumulated debris, grease or any other substance to ensure a clean bond with the BONDEK® II sheeting. Remove ponded rainwater.

4.4.4 CONSTRUCTION JOINTS

It is accepted building practice to provide construction joints where a concrete pour is to be stopped. Such discontinuity may occur as a result of a planned or unplanned termination of a pour. A pour may be terminated at the end of a day's work, because of bad weather or equipment failure. Where unplanned construction joints are made, the design engineer must approve the position.

In certain applications, the addition of water stops may be required, such as in roof and balcony slabs where protection from corrosion of reinforcement and sheeting is necessary.

Construction joints transverse to the span of the BONDEK® II sheeting are normally located where shear forces are a minimum (such as the mid-third of a slab span) and ideally over a line of propping. Locate longitudinal construction joints in the pan (Figure 4.12).

Form construction joints with a vertical face—the easiest technique is to sandwich a continuous reinforcement between two boards.

Prior to recommencement of concreting, the construction joint must be prepared to receive the new concrete, and the preparation method will depend upon the age and condition of the old concrete. Generally, thorough cleaning is required to remove loose material, to roughen the surface and to expose the course aggregate.

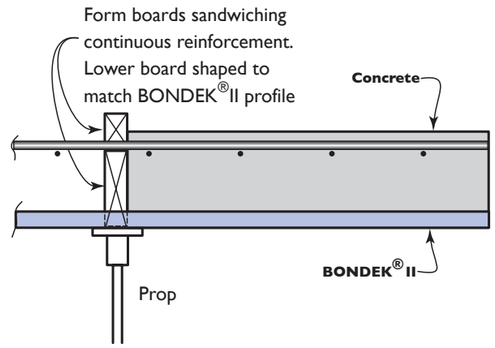


Figure 4.12
Typical construction joint

4.4.5 PLACING

The requirements for the handling and placing of the concrete are covered in BS8110: Part 1: 1997, Section 6.2.

The concrete is placed between construction joints in a continuous operation so that new concrete is placed against plastic concrete to produce a monolithic mass. If the pouring has to be discontinued for any more than approximately one hour, depending on the temperature, a construction joint may be required.

Start pouring close to one end and spread concrete uniformly, preferably over two or more spans. It is good practice to avoid excessive heaping of concrete and heavy load concentrations. When concrete is transported by wheel barrows, the use of planks or boards is recommended.

During pouring, the concrete should be thoroughly compacted, worked around ribs and reinforcement, and into corners of the EDGE FORMS by using a vibrating compactor. Ensure that the reinforcement remains correctly positioned so that the specified minimum concrete cover is achieved.

Unformed concrete surfaces are screeded and finished to achieve the specified surface texture, cover to reinforcement, depths, falls or other surface detailing.

Surfaces which will be exposed, such as EDGE FORMS and exposed soffits, should be cleaned of concrete spills while still wet, to reduce subsequent work.

4.4.6 CURING

After placement, the concrete is cured by conventional methods, for example, by keeping the slab moist for at least seven days, by covering the surface with sand, building paper or polythene sheeting immediately after it has been moistened with a fine spray of water. Follow good building practice. Be particularly careful when curing in very hot or very cold weather.

Until the concrete has cured, it is good practice to avoid concentrated loads such as barrows and passageways with heavy traffic.

4.4.7 WHEN TO REMOVE PROPS

Various factors affect the earliest time when the props may be removed and a slab initially loaded. Methods of calculating times and other guides are given in AS 3610—1995, Clause 5.4.3

4.5 FINISHING

4.5.1 SOFFIT AND EDGE FORM FINISHES

For many applications, BONDEK® II gives an attractive appearance to the underside (or soffit) of a composite slab, and will provide a satisfactory ceiling—for example, in car parks, under-house storage and garages, industrial floors and the like. Similarly, EDGE FORM will give a suitable edging. Additional finishes take minimal extra effort.

Where the BONDEK® II soffit is to be the ceiling, take care during construction to minimise propping marks (refer to Installation—Propping), and to provide a uniform surface at the side-laps (refer to Installation—Fastening *Side-lap* joints).

Exposed surfaces of BONDEK® II soffit and EDGE FORM may need cleaning and/or preparation for any following finishes.

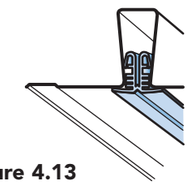


Figure 4.13
BONSTRIP makes an attractive cover for the gaps formed by BONDEK® II ribs.

4.5.2 PLASTERING

Finishes such as vermiculite plaster can be applied directly to the underside of BONDEK® II with the open rib providing a positive key. With some products it may be necessary to treat the galvanised steel surface with an appropriate bonding agent prior to application.

Plaster-based finishes can be trowelled smooth, or sprayed on to give a textured surface. They can also be coloured to suit interior design requirements.

4.5.3 CHANGE OF FLOOR LOADINGS

Where a building is being refurbished, or there is a change of occupancy and floor use, you may need to increase the fire resistance of the BONDEK® II composite slabs. This may be achieved by the addition of a suitable fire-protection material to the underside of the slabs. The open ribs of BONDEK® II provide a positive key to keep the fire spray in position. Such work is beyond the scope of this manual.

4.6 SUSPENDED CEILINGS & SERVICES

4.6.1 PLASTERBOARD

A BONDEK® II soffit may be covered with plasterboard by fixing to battens.

Fixing to battens

Steel ceiling battens can be fixed directly to the underside of the slab using powder-actuated fasteners. The plasterboard is then fixed to ceiling battens in the usual way (Figure 4.14).

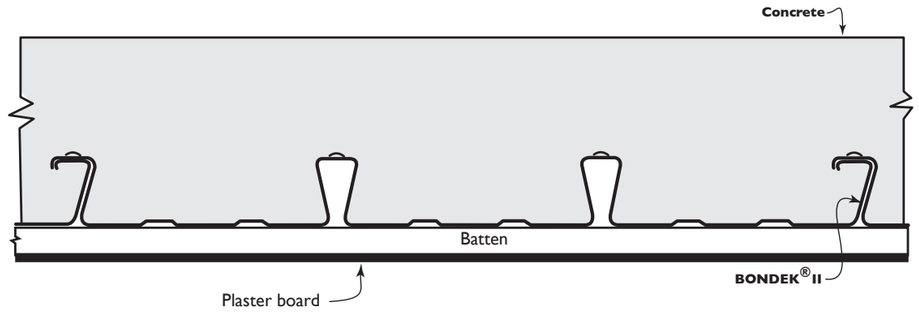


Figure 4.14
Fixing plasterboard to BONDEK® II

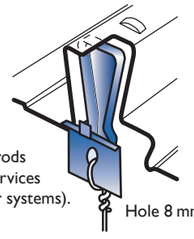
4.6.2 SUSPENDED CEILING

Ceilings are easily suspended from BONDEK® II slabs using Ceiling Suspension Nuts, BON-NUT suspension nuts, or BONWEDGE suspension brackets. Threaded rods or wire hangers are then used to support the ceiling. Alternatively, hangers may be attached to eyelet pins powder-driven into the underside of the slab, or to pigtail hangers inserted through pilot holes in the BONDEK® II sheeting before concreting (Figure 4.15).

4.7.3 SUSPENDED SERVICES

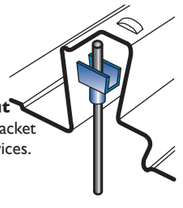
Services such as fire sprinkler systems, piping and ducting are easily suspended from BONDEK® II slabs using BON-NUT suspension nuts. Ceiling Suspension Nuts or BONWEDGE suspension brackets are suitable for services other than fire sprinkler systems—threaded rods being used to support the services.

4.8 ACCESSORIES

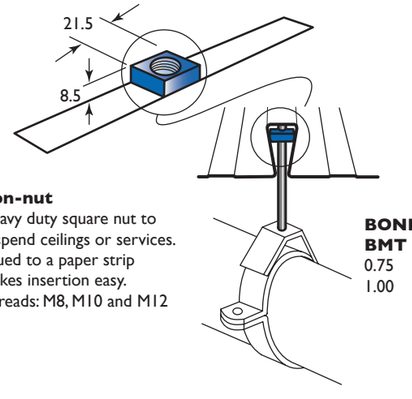


Bonwedge
Lightweight bracket for rods to suspend ceilings or services (other than fire sprinkler systems).

Configuration	Loading	Safe load (kN)
Single Bonwedge	Eccentric	1.0
Double Bonwedge	Eccentric	1.3
Double Bonwedge	Central	1.7



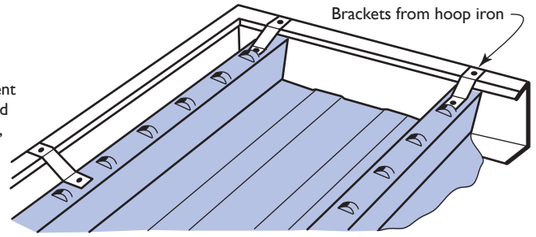
Ceiling suspension nut
Pressed metal threaded bracket to suspend ceilings or services.
Thread: M6
Max. load: 270 kg

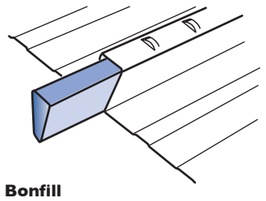


Bon-nut
Heavy duty square nut to suspend ceilings or services. Glued to a paper strip makes insertion easy.
Threads: M8, M10 and M12

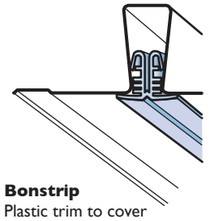
BONDEK® II Safe lo BMT	(kN)
0.75	4.4
1.00	6.7

Edgeform
A galvanised section that creates a permanent formwork at the slab edges—cut, mitred and screwed on site. Stock slab depths: 100, 125, 150 mm (others to special order).
Stock length: 6100 mm





Bonfill
Polystyrene foam stops concrete and air entering ends of ribs.
Stock length: 1200 mm
Required: 300 mm per sheet of BONDEK® II



Bonstrip
Plastic trim to cover gaps formed by ribs.
Used when underside of BONDEK® II forms an exposed ceiling.
Stock length: 3000 mm

Figure 4.15

5 REFERENCES

BS 5950: Part 4: 1994 Structural use steel work in buildings Part 4. Code of practice for design of composite slabs with profiled steel sheeting.

BS 8110: Part 1: 1997 Structural use of concrete Part 1. Code of practice for design and construction.

BS 8110: Part 2: 1985 Structural use of concrete Part 2. Code of practice for special circumstances.

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BS 6399: Part 1: 1996 Loading for buildings Part 1. Code of practice for dead and imposed loads.

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AS/NZS 4600:1996 Cold-formed steel structures.

AS 3600-2001 Concrete structures.

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