

NS BLUESCOPE LYSAGHT MALAYSIA

LYSAGHT® BONDEK® II

Installation Guide



Structural Solutions



Roofing & Walling Solutions



House Framing Solutions



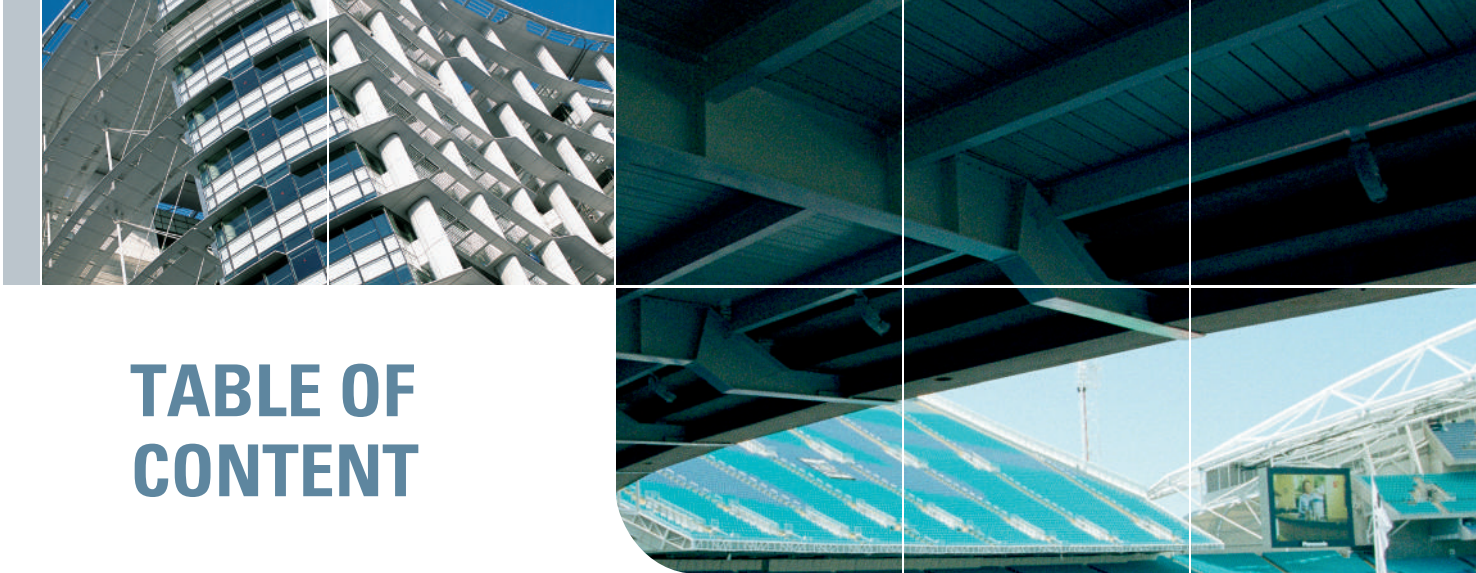


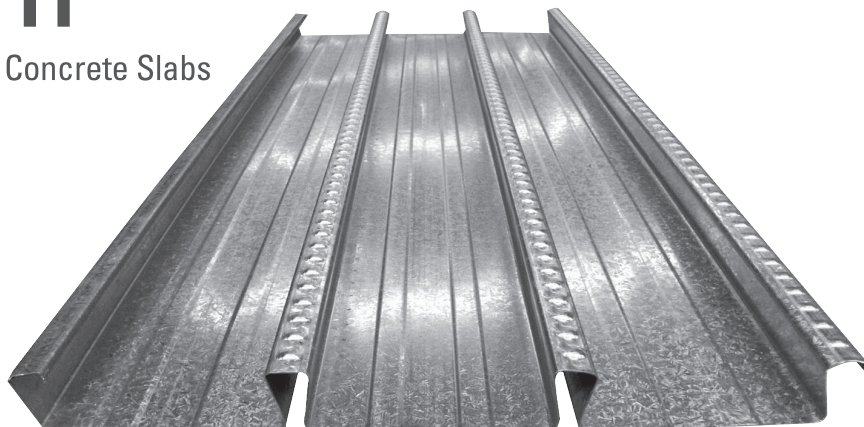
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LYSAGHT®

BONDEK® II

Structural Steel Decking for Composite Concrete Slabs



INSTALLATION METHOD

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.

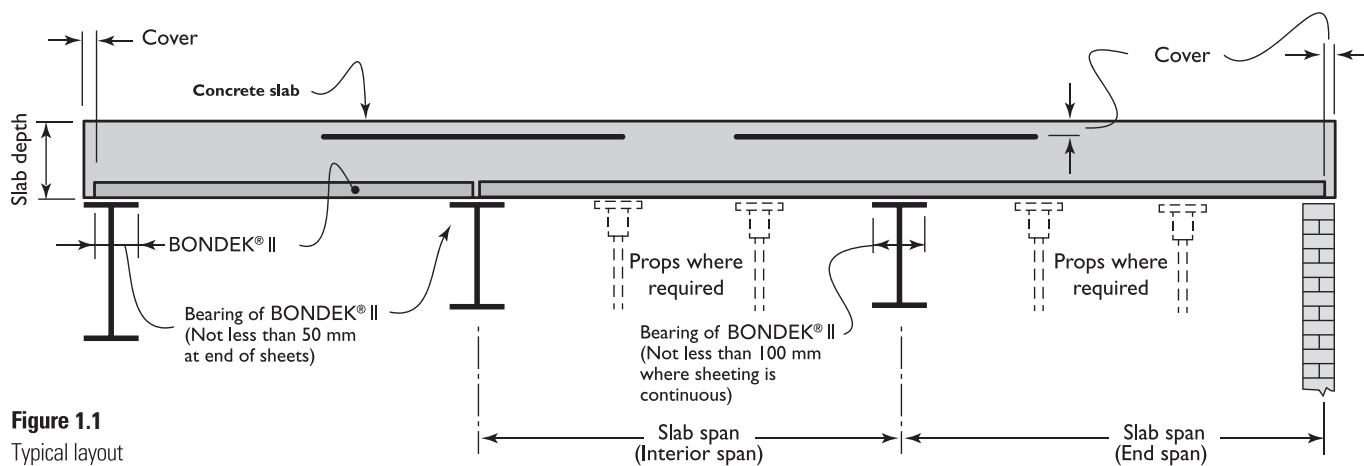


Figure 1.1
Typical layout

1.1 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.

1.2 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.

1.3 INTERLOCKING THE SHEETS

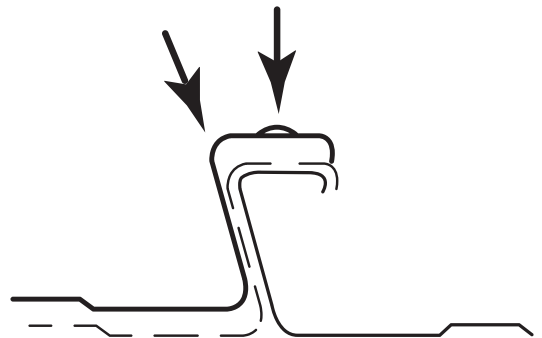
Overlapping ribs of BONDEK® II sheeting are interlocked. Either of two methods can be used in most situations, though variations may also work.

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 1.2).

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 1.2). 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 1.8, Fastening side-lap joints).

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 1.2

Two methods of interlocking adjacent BONDEK® II sheets

1.4 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.

1.5 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 1.3).
- At each intermediate slab support over which the sheeting is continuous: use a fixing at the ribs on both edges (Figure 1.3).
- 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.



Fixing at end of sheets □



Fixing at intermediate slab supports over which the sheeting is continuous

Figure 1.3

Positions for fixing BONDEK® II to steel framing

1.6 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 1.4).

- ***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.

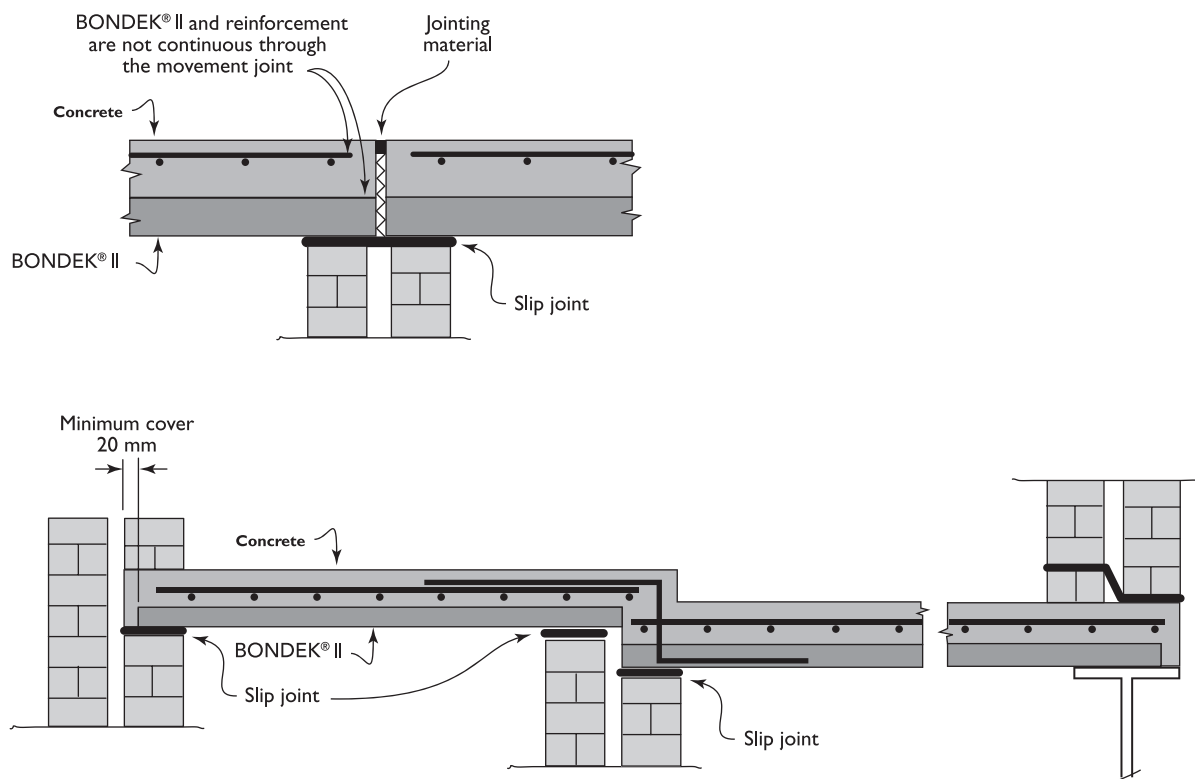


Figure 1.4

Typical movement and slip joints

1.7 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 1.4).

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.

1.8 FASTENING SIDE LAP JOINTS

If BONDEK® II sheeting has been distorted in transport, storage or erection, sidelap 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 1.5).

1.9 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 1.6 and 1.7.

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 1.6). Use 10–16 x 16 mm selfdrilling screws.

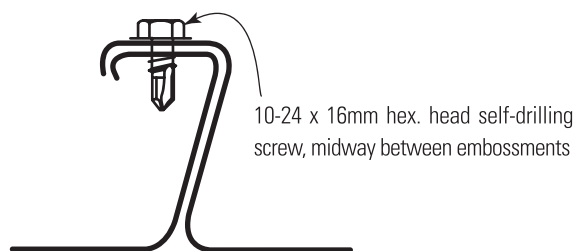
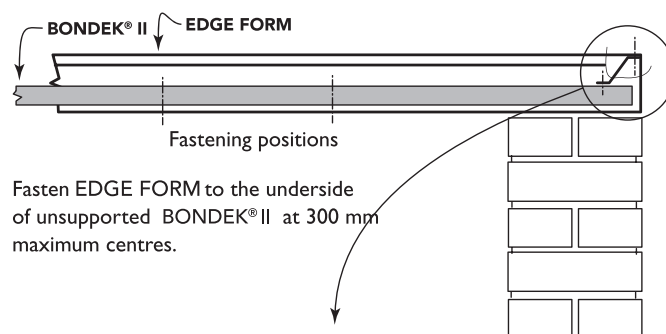


Figure 1.5
Fixing at a side-lap

Fastening bottom flange of EDGE FORM



Fasten EDGE FORM to the underside of unsupported BONDEK® II at 300 mm maximum centres.

Fastening top flange of EDGE FORM

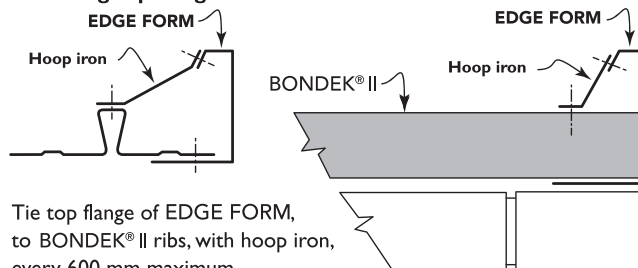
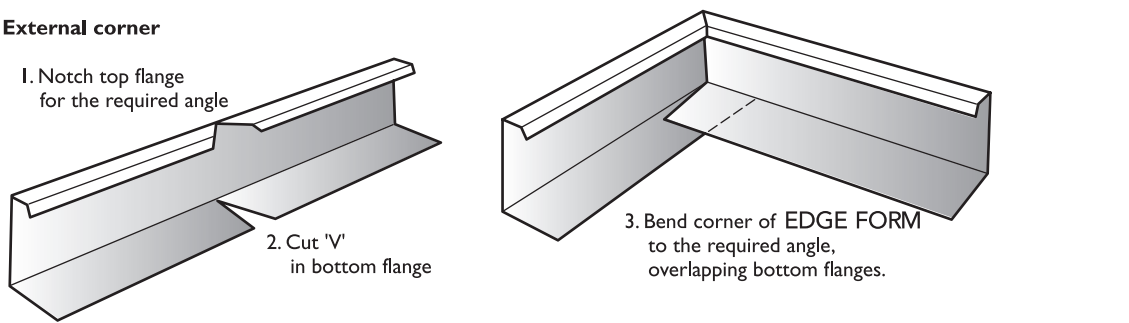
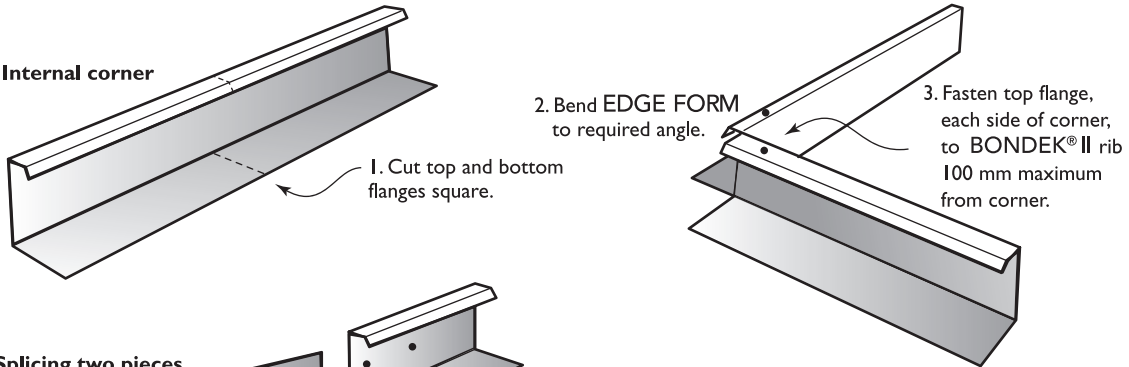
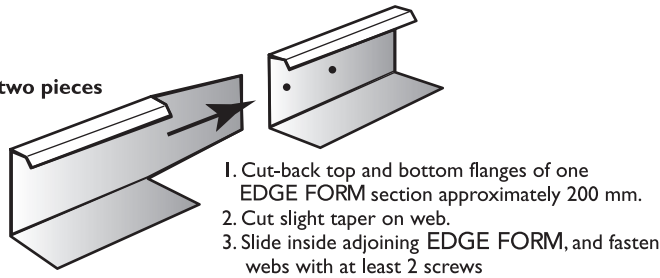


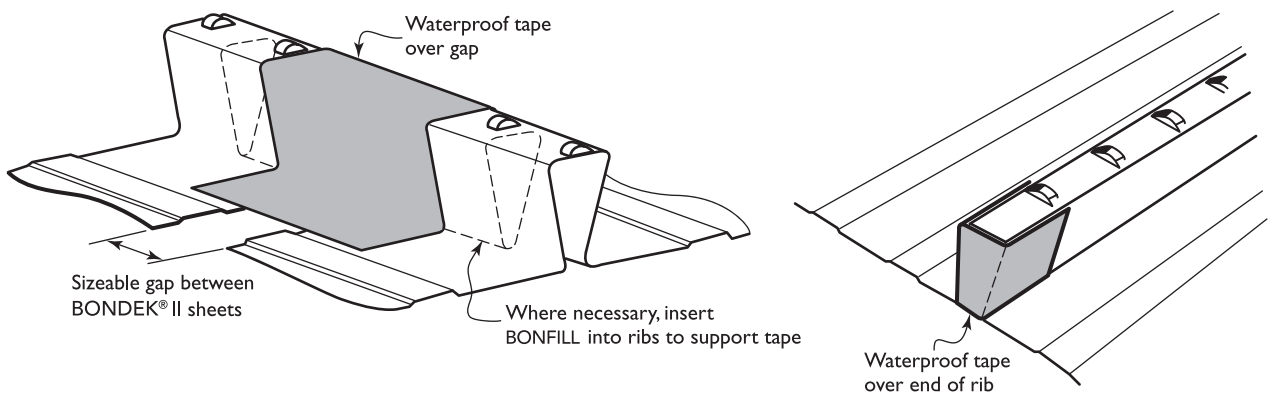
Figure 1.6
Typical fastening of EDGE FORM to BONDEK® II

External corner**Internal corner****Splicing two pieces****Figure 1.7**

Fabrication of formwork is easy with EDGE FORM

1.10 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 1.8).

**Figure 1.8**

Use waterproof tape to seal joints in BONDEK® II sheets

1.11 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 1.9**)

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.

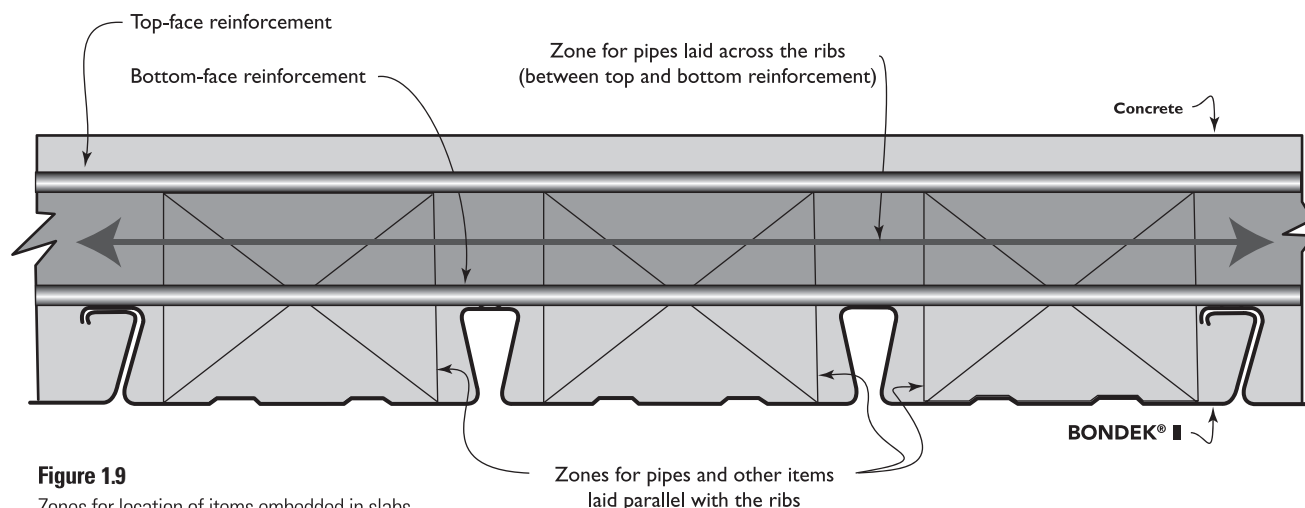


Figure 1.9

Zones for location of items embedded in slabs

1.12 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 1.10**):

- 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.

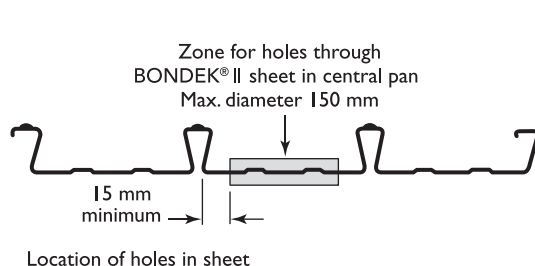
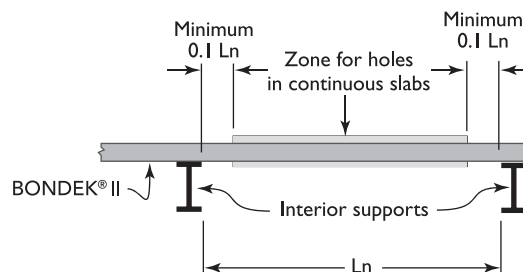


Figure 1.10

Zones for location of holes through BONDEK® II



Location of holes relative to supports in continuous slabs

1.13 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.

1.14 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.

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