BlueScope Lysaght offers a family of structural steel decks for a broad range of applications - LYSAGHT W-DEK®, LYSAGHT BONDEK® and LYSAGHT POWERDEK™.

This publication compares the LYSAGHT decks with each other to highlight the key performance attributes. Comparisons of spans, concrete displacement, fire performance and other important criteria are included here. This data is the result of full scale testing, analysis and design comparisons at our NATA registered laboratory and associated academic research centres.

By understanding the relative strengths of each product, the specifier can choose the one most suitable for the job.
Application
Suitable for all general applications - LYSAGHT BONDEK steel deck is widely accepted in the building/construction industry. BONDEK is the original structural deck that revolutionised concrete slab construction. It replaces traditional timber plywood formwork with considerably longer unpropped spans. BONDEK can be used purely as permanent formwork, or also as a tensile reinforcement in the composite slab. It is ideal where slabs designed for fire resistance are required. The performance of BONDEK has been improved from recent analysis and confirmatory testing for formwork spanning and fire design.

FEATURES & BENEFITS
• Unpropped spans up to 3.4m
• Most suitable for thin slabs up to 120mm.
• Slab can be designed for fire rating of up to 90 minutes without additional fire reinforcement.
• Reduced volume of concrete due to concrete displacement resulting from ribs of the profile and reduced concrete cover to the bottom face reinforcement (minimum of 4m/1000m² approximately).
• Efficient design when used in composite floor construction.
• Simple installation of accessories for suspended services (ceilings, piping, ducting). Accessories lock into the dovetail rib profile.
• Clean and uniformly ribbed underside for exposed situations.

Cover width
The sheet width has a cover of 590mm and a nominal rib spacing of 200mm. This provides the advantages of:
• Safe walking platform provided by the wide pans
• Reduced deflections in transverse direction
• Quick deck installation on construction site.

Embossments and lap joint
BONDEK features embossments placed at the top of the ribs. The efficiency of the composite system depends upon the composite action between the steel sheeting and the concrete slab. Embossments are necessary to achieve this composite action. The best location for embossments for the deck's bending moment capacity is on top of the rib. This location is important to achieve maximum fire performance.

The lap joint in conjunction with the embossment provides the best composite action during fire condition and normal temperatures. The side lapping joint is a tight re-entrant closed lap and this is fully encased in concrete. Furthermore the top of the ribs can be considered able to resist tensile force during fire conditions.

Dovetail ribs
The intermediate ribs are a re-entrant or “dovetail” shape. This allows simple installation of accessories for the suspension of services (ceilings, piping, ducting). The accessories lock into this rib.

BONDEK Joint & ribs
The embossments, the intermediate dovetail ribs and the lap joint of BONDEK act in tension to ensure that its composite performance is the best for this type of deck.

Fire Performance
The dovetail ribs provide an air gap to allow the ribs to be effective during fire. This results in the ribs being almost as good as the lap joint.

BONDEK has excellent performance in fire. Slabs can be designed for up to 90 minutes fire resistance and are now possible without additional fire reinforcement.

Profile Depth
With a shallow depth of 54mm BONDEK provides the following construction benefits:
1. Ideal for shallow slab depths such as domestic construction where the brick course depth needs to be considered.
2. Suitable for use as permanent formwork as direct substitution of traditional ply formwork without requiring a redesign of the concrete slab.
3. Increases effective floor to ceiling height.
4. Suitable for use in two way slab design and in pre-stressed slab design.
**LYSAGHT W-DEK**

**Application**
LYSAGHT W-DEK steel deck can be used purely as permanent formwork, or utilised as tensile reinforcement in the composite slab. It is ideally suited for longer span slabs of thickness 130mm or greater.

**FEATURES & BENEFITS**

**Widest cover width**
LYSAGHT W-DEK has widest cover width of 700mm. LYSAGHT W-DEK is economical formwork with very efficient use of the steel per area coverage. It has the quickest deck installation on a construction site.

**LYSAGHT W-DEK profile**
The depth of 78mm is the most important parameter affecting formwork performance:
- Deeper profiles are stronger (higher imposed loads such as weight of wet concrete) and stiffer (less deflections) which results in long unpropped formwork spans up to 4.1m.
- LYSAGHT W-DEK profile lends itself to simple stacking of sheets and minimises the bundle sizes. This lowers transportation costs and reduces on-site handling time and costs.
- Substantially reduced concrete requirements due to concrete displacement resulting from voids created by the wide deep rib profile.
- It all results in the lowest cost floor construction. Up to 40m³/1000m² savings over normal concrete floor. This results in further saving of supporting structure and building footings.
- Safe working platform due to wide flat ribs.
- Clean profiled underside for exposed situations. LYSAGHT W-DEK is suitable for all spans and frame construction, however it is ideally suited for steel framed construction where long unpropped spans are required.
- Excellent composite performance for a “trapezoidal” profile. No additional bottom reinforcement is required as compared with other “W” type decks. Suitable for very high, imposed loads.

**Concrete Saving**
(compared with normal concrete slab)

<table>
<thead>
<tr>
<th>Depth of Trapezoidal Profile (mm)</th>
<th>Equivalent Depth of Concrete Savings (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>125</td>
<td>94</td>
</tr>
<tr>
<td>135</td>
<td>115</td>
</tr>
<tr>
<td>150</td>
<td>125</td>
</tr>
</tbody>
</table>

Notes: 1. Based on a symmetric trapezoidal (W) profile 2. Based on a 50mm concrete cover above the profile’s rib for adequate structural design 3. Concrete mass is taken as 2400kg/cu.m.

**Lapping**
- Easy installation due to lapping method, and quick installation due to wide cover.

**Flanges**
- The top and bottom flanges of LYSAGHT W-DEK are configured to maximise bending moment capacity – significant area of steel is located at maximum distance from neutral axis.
- The wide flat surface of top flange is safe to walk upon during the construction stage.
- The wide flat pans result in wide concrete ribs. The concrete ribs are much wider than in typical trapezoidal profiles. This results in greater mass of concrete to protect the added fire reinforcement, thus cooler concrete and more effective fire reinforcement.

**Embossments**
LYSAGHT W-DEK has three types of embossments located on:
- Webs
- Tops of flanges and
- Tops of lap joints

Embossments are necessary to increase the efficiency of composite action between the steel sheeting and the concrete slab.

**Optimised Performance**
Ductile composite slabs may be designed using advanced partial shear connection method. This method gives numerous advantages including rational, flexible design of composite slabs and reduced amount of conventional reinforcement.
This type of deck is commonly used overseas, however LYSAGHT W-DEK has been specifically designed in Australia for Australian construction practices using Australian high tensile steel.
LYSAGHT POWERDEK®

Application

POWERDEK steel deck has been specifically developed to span long unpropped spans. It is available in two depths – 100 and 120 mm. POWERDEK 100 may span up to 5.2m or more, POWERDEK 120 spans up to 6.0m.

POWERDEK has been designed to be used as tensile reinforcement in the composite slab. It is ideally suited for very long span slabs of thickness 140mm or greater. Excellent where high fire resistance, sound insulation or composite beam design are of importance.

FEATURES & BENEFITS

• Long un-propped spans up to 5.6m.
• No obstruction for following trades.
• Best performance when used in composite slab construction.
• Efficient design when used in composite floor construction.
• The most efficient performer in fire compared to the other LYSAGHT decks, due to deep ribs encased in concrete. Slabs can be designed for fire ratings up to 3 hours (180 minutes) without additional fire reinforcement.
• The resulting slab is the most efficient performer for sound transmission due to the closed lapping system.
• Clean and uniform underside for exposed situations. The closed lapping system results in a flat uniform underside.

‘One element’ profile

POWERDEK is a “single element” roll-formed profile with no additional elements joined together - unlike some alternative systems. This simplifies and significantly reduces the cost of the composite slab.

POWERDEK sheets are easily stacked together for transportation. It is ideally suited for very long span slabs of thickness 140mm or greater. It is also ideal for long span slabs with very high imposed loads.

The side lapping joint is a tight closed lap and is fully encased in concrete. This is best for composite action and in design for fire. POWERDEK is excellent where high fire resistance, sound insulation or composite floor design are of importance.

Single span formwork

POWERDEK is typically used as a single span formwork but can be designed as continuous to deliver longer unpropped spans. It has several advantages:
• Shear studs can be welded directly to supporting steel beam — no “through deck” welding of studs.
• It results in better controlled quality of weld since insufficient research data is available for “through deck” welding of decks with 1.2mm and 1.5 mm steel thickness.
• Reduced weight of POWERDEK sheets (single span sheets and narrow width of 300mm) makes it easy to handle on construction site.
• Advantages of precambering are fully utilized.

Lap Flanges:

POWERDEK lap rib flanges are in an opposing direction, unlike the typical lap arrangement where one flange is laid on the top of another one. This arrangement has advantages:
• Greatly increased lateral stability of the profile. It translates into increased load bearing capacity of the POWERDEK as formwork.
• Provides a wide and safe walking platform formed by the opposing flanges.

Precamber & Deflection

Maximum formwork spans are governed by strength or deflections. Shorter span formwork is more likely to be governed by strength. However, maximum long spans are normally limited by deflections. Longer formwork cannot be specified if formwork deflections exceed maximum allowed ratio, which is normally Span/240 or Span/130. Deeper profiles, increased steel thickness or alternative formwork systems are normally specified to comply with deflections criteria.

POWERDEK passes the most strict deflection requirements, due to its unique precambered shape without increasing steel thickness. It allows POWERDEK to span much longer than would be the case if the profile was not precambered. In fact, POWERDEK deflections at maximum spans are less than those required by the most strict L/240 deflection criteria – soffits made with POWERDEK look almost flat.

Lead time

POWERDEK requires longer supply lead times of 2-3 months as the product is roll-formed by BlueScope Lysaght in Asia.

Please contact your local LYSAGHT sales team for procuring your project requirements.
LYSAGHT deck comparison

<table>
<thead>
<tr>
<th>Profile</th>
<th>Cover (mm)</th>
<th>Depth (mm)</th>
<th>BMT (mm)</th>
<th>Minimum slab thickness (mm)</th>
<th>Unpropped Span (mm)</th>
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</thead>
<tbody>
<tr>
<td>BONDEK</td>
<td>590</td>
<td>54</td>
<td>0.6</td>
<td>90</td>
<td>up to 3400</td>
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<td>0.75</td>
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<td></td>
<td>1.0</td>
<td></td>
<td></td>
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<tr>
<td>LYSAGHT W-DEK</td>
<td>700</td>
<td>78</td>
<td>0.75</td>
<td>130</td>
<td>up to 4100</td>
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<tr>
<td></td>
<td></td>
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<td>1.0</td>
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<tr>
<td>POWERDEK</td>
<td>300</td>
<td>100</td>
<td>1.0</td>
<td>140</td>
<td>up to 5200</td>
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<td>1.2</td>
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<td></td>
<td>300</td>
<td>120</td>
<td>1.2</td>
<td>160</td>
<td>up to 6000</td>
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<td></td>
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<td>1.5</td>
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</table>

ALL LYSAGHT DECKS
Made from zinc coated high tensile steel.
Safe working platform for formworkers and following trades.
Software & technical manuals available.
BlueScope Lysaght structural performance.

LYSAGHT W-DEK
Ideal for steel frame construction.
Widest cover currently available (700mm).
Excellent concrete displacement.
Most economical floor design.
Unpropped formwork spans up to 4.1m.

Lapping configurations

**LYSAGHT BONDEK**
**Method 1**
Position BONDEK sheet parallel with previously-laid sheet.
Interlock sheets by applying pressure to either position.

**Method 2**
Position BONDEK sheet at an angle.
Interlock sheets by lowering sheet through an arc.

**LYSAGHT W-DEK**
Joining Method
Position LYSAGHT W-DEK sheet at an angle.
Interlock sheets by lowering female lap of sheet over male lap through an arc.

**BONDEK**
Ideal for domestic construction
Widely accepted as the industry standard
Most suitable for shallow slab depths
Unpropped formwork spans up to 3.4m
Fire design for 90 minutes is possible without additional reinforcement

**POWERDEK**
Ideal for longest unpropped forwork spans (up to 6.0m).
Excellent fire resistance (Up to 180 minutes without additional fire reinforcement)
Ideal for long slab spans and high imposed loads (30kPa or more).
Pre-cambered for clean, uniform underside
Best performance when used in composite slab construction.
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